# TECHNICAL MEMORANDUM

**TO:** Bruce Buel, General Manager
Nipomo Community Services District

**FROM:** Alex Pappas, Joel Degner, Drew Beckwith, Brad Newton, Ph.D., P.G. (SAIC)

**RE:** Emergency Water Shortage Regulations and Future Groundwater in Storage

**DATE:** January 06, 2008

## INTRODUCTION

This technical memorandum presents an evaluation of Nipomo Community Services District's (NCSD) Draft Ordinance Chapter 3.24 – Emergency Water Shortage Regulations and an estimation of future groundwater in storage above mean sea level (GWS). This work was conducted under the General Consultation Task Order 100-06. This evaluation has evolved with the knowledge gleaned from interim work product prepared over the past months, summarized in five (5) technical memoranda titled: (1) Evaluation of Chapter 3.24 Emergency Water Shortages Regulations, dated June 6, 2007; (2) Alternative Methodology to Determine the Water Conservation Shortages Stages, dated August 28, 2007; (3) Evaluation of Groundwater in Storage for Triggering Conservation Stages, dated October 3, 2007; (4) Predicted Groundwater in Storage from Year 2007 through year 2039, dated November 21, 2007; and (5) Predicted Groundwater in Storage from Year 2007 through Year 2039, dated December 7, 2007.

Annual GWS within the Phase III boundary was computed from groundwater surface elevation measurements from 1975 to 2007, and was estimated for Year 2008 through Year 2039 based on consumptive use of groundwater and a repetition of 1975 to 2007 hydrologic conditions. Year 2007 consumptive use was estimated from a land use classification of the one-foot resolution aerial photograph taken in June 2007. Estimates of future annual GWS were based on four (4) escalation scenarios applied to the Year 2007 annual consumptive use and four (4) alternative hydrologic conditions. The efficacy of the proposed Ordinance was tested against combinations of the four (4) scenarios of water demands and water shortage conditions.

## SUMMARY OF FINDINGS

GWS amounts that designate Water Shortage Conservation Stages I – IV were developed on the basis of historical GWS estimates, the change in GWS annually, and the magnitude of uncertainty in the estimates of GWS. The following GWS ranges are recommended to designate Stages I – IV of the Water Shortage Conservation Stages (all GWS values are reported in acre-feet [AF]):



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**Stage I Conservation – Water Watch**

Water Shortage Condition: 100,000 > GWS ≥ 90,000

**Stage II Conservation – Water Warning**

Water Shortage Condition: 90,000 > GWS ≥ 80,000

**Stage III Conservation – Water Emergency**

Water Shortage Condition: 80,000 > GWS ≥ 70,000

**Stage IV Conservation – Extreme Water Emergency**

Water Shortage Condition: GWS < 70,000

## RESULTS

The efficacy of the proposed Ordinance criteria presented in the Summary of Findings were tested by applying them to historical GWS and to the estimated future GWS. Insights on the effects of the ordinance relative to the timing and magnitude of potential water shortages as well as the amounts of supplemental water requirement needed to provide a long-term water supply to the communities of the Nipomo Mesa were gleaned from the future GWS estimates.

### Historical GWS (1975 - 2007)

The Water Shortage Conservation Stages criteria were applied to the historical estimates of GWS for the period 1975-2007 to demonstrate the effectiveness of using the proposed GWS ranges in designating conservation stages. Increasing levels of conservation would have been imposed in both of the declining GWS periods in the late 70s and late 80s (Figure 1). The effect of conservation on the amount of GWS was not estimated in this analysis. However, making a correction based on conservation goals proposed in the Ordinance would be expected to decrease the rate of depletion of GWS thereby increasing GWS as compared to the observed record. The following table summarizes the number of years each proposed Conservation Stage would have been in effect during the historical period:

| Stage | Criteria - GWS (AF) | Conservation Goal | Number of Years |
|---|---|---|---|
| None | | 0% | 7 |
| 1 | 100,000 > GWS ≥ 90,000 | 0% | 8 |
| 2 | 90,000 > GWS ≥ 80,000 | 10% | 6 |
| 3 | 80,000 > GWS ≥ 70,000 | 35% | 4 |
| 4 | 70,000 > GWS | 50% | 6 |
| Total | | | 31 |

Note: Insufficient data exist in 1984 and 1997 to estimate the groundwater in storage.

The number of years that the historical GWS estimate occur in 10,000 AF increments was plotted to evaluate the Conservation Stages criteria within the total range of GWS observed (Figure 2). GWS estimates are above 90,000 AF in fifteen years and there are 16 years when estimates are below 90,000 AF. The proposed conservation measures and goals would have been expected to affectively change the historical amount of GWS for one-half of the observed record; the 16 years when estimates below 90,000 AF.

## Future GWS (2008 - 2039)

The Water Shortage Conservation Stages criteria were applied to the future estimates of GWS to demonstrate the effectiveness of the proposed GWS ranges in designating conservation stages. Sixteen (16) possible future GWS estimates from Year 2008 through Year 2039 were prepared by the consideration of four (4) scenarios of future consumptive use (CU) and four (4) potential hydrologic conditions.

Year 2007 total CU is approximately 10,650 acre feet per year (AFY), based on the land use classification and using a one-foot resolution aerial photograph. Four (4) scenarios of CU were prepared by assuming fixed annual escalation rates as follows:

| Scenario | Annual Escalation Rate |
|---|---|
| S1 | 0% |
| S2 | 1% |
| S3 | 2.3% |
| S4 | 4% |

The four scenarios (S1 - S4) were evaluated under four hydrologic conditions as follows: 1) a repetition of historical hydrologic condition (Year 1975 to Year 2007); 2) a repetition of historical hydrologic conditions with a 50% reduction of urban water consumptive use; 3) a dry hydrologic condition; and 4) a wet hydrologic condition. In general, each of the hydrologic conditions is described as follows. A repetition of historical hydrologic conditions begins the sequence with declining GWS periods in the late 70s and late 80s. Reduction of the CU by 50% is equivalent to reducing the groundwater extractions over the entire historical hydrologic condition. Dry and wet hydrologic conditions are defined by segmenting the historical record into wet periods and dry periods, holding the annual sequence within each period constant, and varying the order of wet and dry periods. Specifically, the historical record describes a dry period from Year 1975 to Year 1977 (D1), a wet period from Year 1977 to Year 1982 (W1), a dry period from Year 1985 to Year 1992 (D2), and a wet period from Year 1994 to Year 2001 (W2). Two hypothetical hydrologic conditions are presented as follows: DRY) a dry climate defined as D2 followed by D1 followed by W1 followed by W2, and WET) a wet climate defined as W2 followed by W1 followed by D1 followed by D2.

| | Calendar Year Order |
|---|---|
| **DRY** | YR1985 - YR1992, YR1975 - YR1977, YR1977 - YR1982, YR1994 - YR2001 |
| **WET** | YR1994 - YR2001, YR1977 - YR1982, YR1975 - YR1977, YR1985 - YR1992 |

These two hypothetical hydrologic conditions are 21 years long; and are shorter than the previous analyses of 32 years, however, 21 years of prediction are sufficient to understand the impact of dry conditions and wet conditions on GWS.

The Water Shortage Conservation Stages criteria were applied to all sixteen (16) possible future GWS estimates (Figure 3 through Figure 18). In general, Water Shortage Conservation Stage IV would be in effect by Year 2009, except for the Wet hydrologic condition where Stage IV is designated in Year 2021. In all future GWS estimates, with the exception of the wet hydrologic condition, all GWS is depleted by Year 2021 (14 years from the present), and may be as soon as Year 2015 (Dry hydrologic condition). The following table summarizes results from the four scenarios and four conditions:

| Scenario | Consumptive Use (AFY) | Annual Escalation Rate | Year of Conservation Stage IV | Number of Years Until GWS is Depleted | Total Groundwater Depletion (AF) | Supplemental Water Requirement (AFY) |
|---|---|---|---|---|---|---|
| **32 year analysis** | | | | | | |
| S1 | 10,650 | 0% | 2008 | 12 | 152,230 | 4,760 |
| S2 | | 1% | 2008 | 12 | 214,710 | 6,710 |
| S3 | | 2.3% | 2008 | 12 | 318,390 | 9,950 |
| S4 | | 4% | 2008 | 11 | 505,930 | 15,810 |
| S1 w/conservation | 8,360 | 0% | 2009 | 14 | 78,950 | 2,470 |
| S2 w/conservation | | 1% | 2009 | 14 | 128,000 | 4,000 |
| S3 w/conservation | | 2.3% | 2009 | 14 | 209,410 | 6,540 |
| S4 w/conservation | | 4% | 2009 | 12 | 356,570 | 11,140 |
| **21 year analysis** | | | | | | |
| S1 Dry | 10,650 | 0% | 2009 | 8 | 71,680 | 3,410 |
| S2 Dry | | 1% | 2009 | 8 | 97,990 | 4,670 |
| S3 Dry | | 2.3% | 2009 | 8 | 137,970 | 6,570 |
| S4 Dry | | 4% | 2009 | 8 | 202,140 | 9,630 |
| S1 Wet | 10,650 | 0% | 2023 | > 22 | 71,680 | 3,410 |
| S2 Wet | | 1% | 2023 | 21 | 97,990 | 4,670 |
| S3 Wet | | 2.3% | 2022 | 18 | 137,970 | 6,570 |
| S4 Wet | | 4% | 2021 | 16 | 202,140 | 9,630 |

## Implications of Water Shortages

The long-term (Year 1975 – Year 2000) average recharge from rainfall to the GWS is 5,430 AFY (SAIC Phase III Hydrologic Inventory, Oct 2002). Year 2007 CU (10,650 AFY) exceeds long-term average recharge from rainfall by 5,220 AFY. An average annual groundwater supply shortfall of 5,220 AFY accumulated each year will deplete the current GWS of 93,000 AF in 18 years. From these long-term averages, and without considering the inter-annual variability of hydrology, 5,220 AF of supplemental water is required annually to maintain the current 93,000 AF of GWS.

### *Repeat Historical Hydrologic Conditions*

Predicted GWS from Year 2007 to Year 2039 is based on CU scenarios (S1, S2, S3, and S4) and a repetition of historical hydrologic conditions (Year 1975 to Year 2007). In Year 2039, the total S1 GWS is depleted by 152,230 AF (sum of Column I, Table 1), and the GWS is zero in 12 years (Year 2019, blue line crosses zero abscissa, Figure 19). Augmenting CU by escalation rates of 1.0%, 2.3%, and 4.0% increases the total depletion of GWS and decreases the amount of time before GWS is zero. The total S2 (1.0% escalation) GWS depletion is 214,710 AF (sum of Column M, Table 1), the total S3 (2.3% escalation) GWS depletion is 318,390 AF (sum of Column Q, Table 1), and the total S4 (4.0% escalation) GWS depletion is 505,930 AF (sum of Column U, Table 1) over the 32 year prediction period, respectively. GWS is fully depleted by Year 2019 under all scenarios (all predictions cross zero abscissa, Figure 19). On average, a minimum of 4,800 AFY of supplemental water is required to meet current consumptive use demand, and depending on growth, the amount may be as high as 16,000 AFY, as determined from this simplified analysis.

### *50% Reduction in Urban Water Consumptive Use Condition*

A 50% reduction in urban water consumptive use may be garnered by imposing a Stage IV Conservation Measure. This would reduce Year 2007 total CU to 8,360 AFY (Column G, Table 2), 2,290 AFY less than the estimated Year 2007 CU. Estimated CU with conservation exceeds long-term average recharge to the GWS from rainfall by 2,930 AFY, and GWS is fully depleted by Year 2021 under all scenarios (all predictions cross zero abscissa, Figure 20). It is important to note that in S1 w/ conservation, GWS dips only slightly below sea level in Year 2021, and rebounds above sea level within six years (by Year 2027). This analysis suggests that urban conservation alone will not be sufficient to maintain the GWS.

With conservation, the amount of supplemental water required to meet CU ranges from approximately 2,500 AFY to 11,000 AFY. The reduction in urban water CU by imposing Stage IV Conservation Measures will extend the time until GWS is below sea level, but only by one to two years. Notably, the historical hydrologic condition ends in a drying trend; if this drying trend was followed by a series of wet years, it is possible that GWS would remain above sea level for the 0% escalation rate scenario.

### *Dry and Wet Conditions*

A 21-year dry hydrologic condition is analyzed by altering the order of the historical record. Using a 2007 CU estimate of 10,650 AF (Column G, Table 3), GWS is fully depleted by 2015 under all scenarios of the dry hydrologic condition (all predictions cross zero abscissa, Figure 21).

Similarly, a 21-year wet hydrologic condition is analyzed by altering the order of the historical record. Using a 2007 CU estimate of 10,650 AF (Column G, Table 4), GWS is not depleted under a 0% annual escalation of CU during the 21 year cycle; however, it trends significantly downward. GWS is fully depleted by 2029 for S2 Wet, is depleted by 2026 for S3 Wet, and is depleted by 2024 for S4 Wet (predictions cross zero abscissa, Figure 22). This analysis suggests that even when presented with unusually wet hydrologic conditions, the water resources available to Nipomo Mesa are at risk within 15 years given the current balance between water supply and demand.

The amount of supplemental water required to meet CU during dry and wet conditions is not directly comparable to the previous conditions because the length of the analyses differ. However, an adjustment to the previous conditions can be achieved by computing the average supplemental water required for the first 21 years. The recalculated supplemental water requirement for the historical hydrologic conditions ranges from 6,700 AFY to 13,000 AFY; and for the 50% reduction in urban water CU condition it ranges from 4,500 AFY to 9,300 AFY. The amount of supplemental water required for both the dry and wet conditions ranges from 3,400 AFY to 9,600 AFY. On average, no difference exists between dry and wet conditions because one is simply a re-ordering of the other, and the total amounts are the same.

### Year 2007 Consumptive Use Estimate

Year 2007 CU is based on the land use classification, and is approximately 10,650 acre feet per year (AFY). Land use within the Phase III boundary of the Nipomo Mesa area was classified from a one-foot resolution aerial photograph dated June 2007 (Figure 23).

## METHODOLOGY

Analyses presented herein began with the estimation of Year 2007 CU within the Phase III boundary of the Nipomo Mesa Management Area. Estimates of future CU, based on various possible scenarios of escalation, were combined with four possible hydrologic conditions to estimate annual GWS to Year 2039. The data produced through this analysis and the data available from the historical record were used to derive the criteria for determining Water Shortage Conservation Stages I - IV. Presented below is a detailed description of the methodologies used in these evaluations.

## BASES FOR ANALYSES

The bases for the analyses are listed following:

1. Urban land coverage was digitized following the 1996 DWR methodology. All land which contains residential units, multi-family housing, rural homesites, industry, and commercial space was classified as urban land and given the same urban water demand factor.
2. The urban applied demand factor (0.63 AF/acre) is the same in Year 2007 as it was in Year 2000.
3. The agricultural land use classification in Year 2007 has the same ratio of crop types detailed in the Year 1996 DWR survey.
4. The golf course consumptive use factor is the same in Year 2007 as in Year 2000.
5. The impact of the change in land use from native to agriculture or urban in the amount of future rainfall that recharges GWS is not accounted for in this analysis. Conversion from native to other uses had an effect as was shown in testimony for the adjudication but is not considered in this evaluation for simplicity.
6. Subsurface inflow to the GWS is equal to the subsurface outflow. Variations in subsurface flow as a function of the change in groundwater surface elevation are not considered in the GWS calculations.
7. Agricultural and Golf Course CU depend on precipitation. In wet years, agricultural lands and golf courses require less irrigation, and in dry years agricultural lands require more irrigation. In 2007, the precipitation was 6.92 inches, the driest year on record. The estimate of agricultural and golf course CU in 2007 is therefore higher than it would be in a year with average precipitation.

## Estimation of 2007 Consumptive Use

Year 2007 CU was estimated from the land use classification and using a June 2007 one-foot resolution aerial photograph. The following sections provide a detailed description of 1) the classification of the aerial photography used to estimate land use, and 2) the conversion of land use estimates to CU factors for urban, agriculture, and golf course.

### *2007 Aerial Photo Land Use Classification*

Land use was classified into 4 main categories based on the methodology used by DWR in 1996 (DWR, 2000); agriculture, urban, golf course and native vegetation (undeveloped lands). The classification activity was conducted with the ArcGIS software package and stored as shapefiles.

*Agricultural Land*

Agricultural land was classified into five categories, easily identifiable from the aerial photography; orchard, fallow, row crop, semi-ag, and pasture. Past methodology incorporated by the DWR included field visits to verify the agricultural classifications, but this level of effort was outside the scope of this investigation. To estimate land use to the same level of resolution employed by the 1996 DWR classification, the ratio of each agricultural land use type relative to the total agricultural land use was identified for the 1996 DWR survey. These ratios were then imposed on SAIC's 2007 agricultural land use classification and agricultural acreages were linearly interpolated between years when data were collected (1996 to 2007).

*Urban Land*

Urban land was classified following the 1996 DWR methodology. All land which contains residential units, multi-family housing, rural homesites, industry, and commercial space was classified as urban land. Annual urban acreages were linearly interpolated between years when data were collected.

*Golf Course*

Golf courses were classified separately from Agricultural or Urban Lands. The acreage of Black Lake and Cypress Ridge Golf Courses previously estimated for the Phase III Trial Hydrologic Inventory was used to represent these entities. The Woodlands Golf Course, not estimated in the Phase III trial, was determined by interpreting the 2007 aerial photograph.

*Native*

Native vegetation was classified following the 1996 DWR methodology. In the DWR methodology all undeveloped land was classified as native vegetation and includes groves of non-native eucalyptus and fields of non-native grasses.

Total land use coverage for the four main categories is summarized below:

| **LAND USE** | **2007 Area (Acres)** |
|---|---|
| AGRICULTURE | 2,590 |
| URBAN | 9,670 |
| GOLF COURSE | 630 |
| NATIVE | 6,520 |
| **TOTAL** | **19,410** |

## *Consumptive Use Calculations for each Land Use Class*

Following the classification of land use within the Phase III boundary, consumptive use was calculated based on the acreage of each specific land use as described below.

### *Agricultural Consumptive Use*

Agricultural consumptive use was based on the crop specific evapotranspiration rate of applied water ($ET_{AW}$). The $ET_{AW}$ for an agricultural crop is equal to the seasonal crop evapotranspiration ($ET_c$) less the effective precipitation.

$$ET_{AW} = ET_c - \text{Effective Precipitation}$$

Simply stated, the volume of groundwater delivered and consumed by a crop is the amount of demand not met by rainfall.

For each year in the hydrologic inventory, a lookup table was used to select the $ET_{AW}$ for a crop based on the annual precipitation. Effective precipitation was estimated as the difference between assumed constant $ET_c$ and assigned $ET_{AW}$ for each year.

$ET_c$ and $ET_{AW}$ values for vegetative crops in a coastal climate like that of the Nipomo Mesa were found in Tables 14 and 15 of the DWR report "Vegetative Water Use in California," Bulletin 113-3, dated April 1975. The representative $ET_{AW}$ value for each crop type was adjusted based on the average annual precipitation and the $ET_c$ value was held constant for all years. $ET_c$ and $ET_{AW}$ values were obtained using Tables 14 and 15 for the general agricultural crop classes of grain, pasture, truck and deciduous. Since these tables do not contain representative values of $ET_c$ and $ET_{AW}$ for the general agricultural crop class of citrus and subtropical, values from Table 21 of the 1975 DWR Bulletin 113-3 were used.

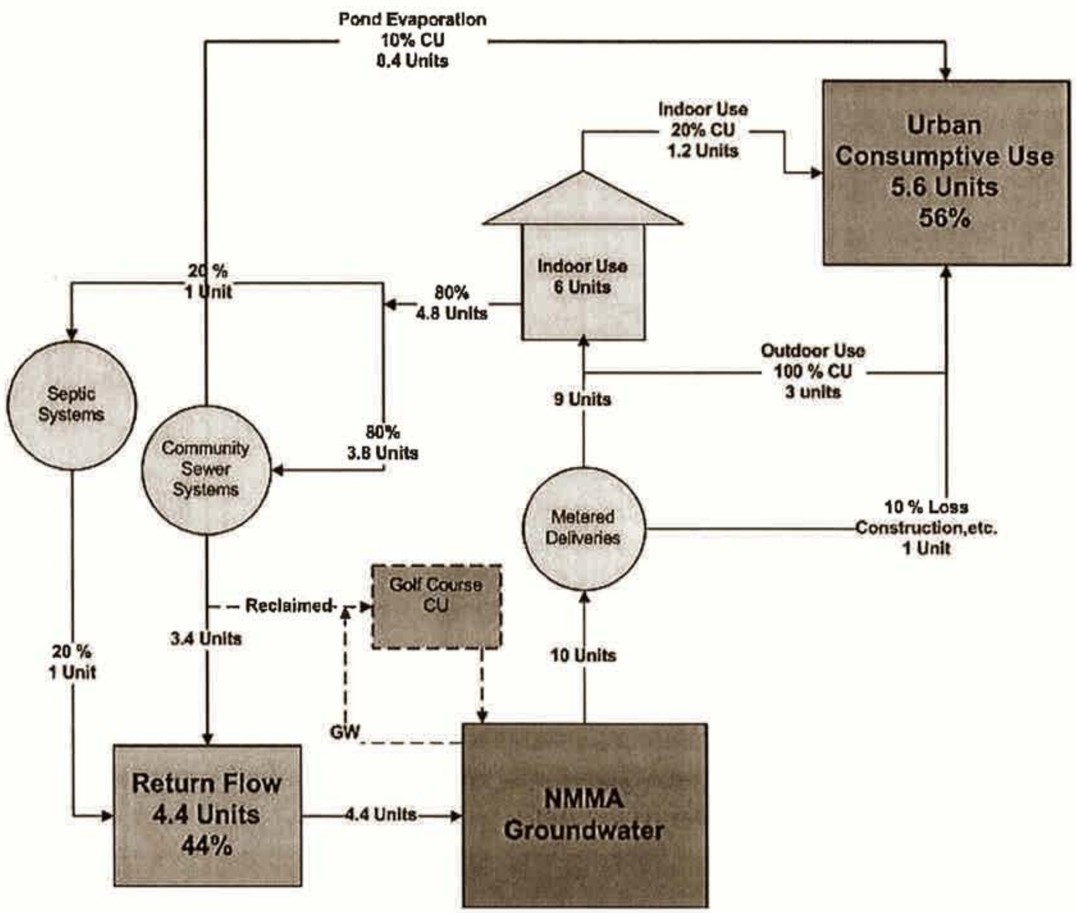
$ET_c$ Values Assigned to Land Use Codes:

| Land Use Class Code | $ET_c$ (AF/acre) |
|---|---|
| Citrus and Subtropical | 2.5 |
| Deciduous | 2.4 |
| Grain | 1.3 |
| Field Crops, Truck, Nursery and Berry | 1.2 |
| Pasture | 2.8 |
| Grain Multi Crop | 2.2 |
| Field Crops Multi Crop | 2.4 |
| Semi Agricultural | 1.0 |
| Idle, Un-Irrigated and Fallow Agriculture | 0.5 |

*Urban Water Consumptive Use*

The schematic below details how urban CU, calculated as 56 percent of the urban applied water demands based on a return flow of 44 percent, was determined.

**Estimated Returns and Depletions for Urban Applied Water Demands:**




The urban applied water demands were calculated by multiplying the estimated urban acreage in the Phase III boundary by the unit production of 0.63 acre-feet per acre. The unit production is a weighted average based on Nipomo Mesa water purveyors' 2000 groundwater production within the Phase III boundary (See table below).

| Urban Use | Approximate Area in Year 2000 (Acres) | Production in Year 2000 (AF) | Unit Production (AF/Acre) |
|---|---|---|---|
| NCSD | 3,506 | 1,830 | 0.52 |
| Cal Cities Water | 1,332 | 1,300 | 0.98 |
| Rural Water Co. | 855 | 500 | 0.58 |
| Other Urban | 407 | 189 | 0.46 |
| **Total Area =** | **6,100** | **Weighted Avg Unit Production (AF/A) =** | **0.63** |

This unit production factor does not include the Conoco-Phillips refinery water demands or the rural home sites within the Phase III boundary. The Conoco-Phillips refinery land use was placed in its own urban industrial category and its production was estimated to be 1,370 AF/year. There are no return flows from Conoco-Phillips' groundwater production.

Reclaimed water consumed by golf courses was accounted for by assigning a separate land use category for golf course grasses. Since all supply water to the golf course land use originates from local groundwater, the net change did not affect the urban water use schematic and the urban returns estimated for the hydrologic inventory.

*Golf Course Consumptive Use*

The golf course annual CU was estimated using a weighted annual crop evapotranspiration ($ET_c$) of 2.3 acre-feet per acre (AF/acre) that represents fairway, green, rough and fringe areas, and was based on the 1994 report "Water Resources Management Study for Cypress Ridge" by Cleath and Associates.

The golf course $ET_c$ is met by precipitation and irrigation. Effective precipitation, the estimated amount of rainfall that meets part of the $ET_c$, is 40%, based on Cleath and Associates 1994 report. Therefore, the evapotranspiration of applied water by the golf course ($ET_{AW}$) is equal to the annual CU of the golf course grasses less the effective precipitation.

Evapotranspiration of Applied Water ($ET_{AW}$) = $ET_c$ – (40%* Annual Precipitation)

To estimate the total golf course CU of groundwater, the $ET_{AW}$ was multiplied by the total irrigated golf course acreage within the Phase III boundary. There are three golf courses on the Nipomo Mesa: Cypress Ridge, Black Lake, and Woodlands golf courses. All these golf courses meet some of their irrigation demands with recycled water.

**Future Consumptive Use and Groundwater in Storage Above Sea Level**

Year 2007 CU was used as the basis for estimating future GWS. Four scenarios of future CU were defined by annual escalation rates of 0%, 1.0%, 2.3%, and 4.0% beginning in 2008.

Future CU scenarios were evaluated in combination with four hydrologic conditions to develop estimates of and a broad understanding of future GWS.

### *General Concept*

The annual change in GWS is a function of the volume of precipitation which percolates to groundwater during a year minus the volume of groundwater which is consumed in that year. For this analysis, future GWS was estimated as the previous year's GWS plus the predicted change in storage. The change in storage is equivalent to the balance between percolation and consumption. The following sections present a detailed description of the methods used to quantify this approach.

### *Predicted Groundwater in Storage Above Sea Level with Historical Hydrologic Conditions*

Table 1 presents the results of the future GWS based on a repeat of historical hydrology from Year 1975 to 2007. In this analysis, future consumptive use is defined as the product of Year 2007 consumptive use and the annual escalation rate, as follows:

$$Future\ Consumptive\ Use = 2007\ consumptive\ use * (1 + escalation\ rate)^{index}.$$

Where the index is equal to the future year of interest (i.e. for 2008 the index = 1)

The change in GWS from Year 1975 to Year 1976 ($\Delta GWS_{1976,1975}$) and the change in the consumptive use from Year 1976 to Year 2008 ($\Delta CU_{1976,2008}$) was computed and summed. This sum was added to the Year 2007 GWS to predict the Year 2008 GWS (Table 1), as follows:

$$2008\ GWS\ = 2007\ GWS\ + (\Delta GWS_{1976,1975} + \Delta CU_{1976,2008}).$$

This calculation was repeated for each year to Year 2039. The section below describes the content of each column in Table 1 used to compute estimates of future GWS.

*Detailed description of Table 1*

*Column A – Index Year*

*Column B - Historical Year of Interest*

*Column C - Estimated total GWS (SAIC 2007, technical memorandum on GWS)*

*Column D - Change in storage*

This value is the current year's total GWS minus the previous year's total GWS.

*Column E – Consumptive Use*

This value is based on estimates from previously discussed methodology.

*Column F - Year*

This column represents the future year of interest for estimated future values.

*Column G - Predicted CU based on a 0% annual escalation rate.*

This value is the equivalent of the estimated CU for the Year 2007 repeated until the Year 2039 (index 32). The following equation was used to generate the values in this column:

$$\textit{Future consumptive use (column G)} = 2007\ CU * (1 + \textit{escalation rate})\textasciicircum(\textit{column A})$$

*Column H – Change in CU*

This value is the estimated future CU for a given year (Column G) minus the historical CU (Column E).

*Column I – Change in Storage (predicted)*

The change in storage (predicted) has been calculated as the historical change in storage (Column D) minus the predicted change in CU (Column H).

This creates an estimate of predicted change in storage accounting for historical precipitation.

*Column J – Cumulative Storage*

This column calculates the total GWS for a given future year. It takes the volume of GWS of the previous year and adds to it the current year's change in storage (Column I).

The methodology used to arrive at Column J is repeated when changing the CU annual escalation rate. Calculations using the 1.0% escalation rate are presented in Columns K through N, using the 2.3% escalation rate in Columns O through R, and using the 4.0% escalation rate in Columns S through V.

### *Future Groundwater in Storage Above Sea Level with 50% Urban Conservation (Table 2)*

The purpose of this evaluation is to understand the impact of urban conservation on estimates of GWS. Urban conservation is represented as a 50% reduction in all urban water consumption by applying a Stage IV Conservation Measure. Annual GWS was estimated by the same procedure described for Table 1 with the value of CU based on 50% urban conservation (Table 2). The water demand for agriculture and for native vegetation was not reduced.

### *Predicted Groundwater in Storage Above Sea Level During Dry and Wet Hydrologic Conditions (Table 3 and 4)*

The purpose of this evaluation is to understand the impact of climate variability on GWS. Synthetic hydrologic conditions were created by separating the historical climatic conditions into wet periods and dry periods. Specifically, the historical GWS (Column C, Table 1) describes a dry period from Year 1975 to Year 1977 (D1), a wet period from Year 1977 to Year 1982 (W1), a dry period from Year 1985 to Year 1992 (D2), and a wet period from Year 1994 to Year 2001 (W2). The two alternative synthetic climate conditions were created: 1) a dry hydrology defined as D2 followed by D1 followed by W1 followed by W2, and 2) a wet hydrology defined as W2 followed by W1 followed by D1 followed by D2.

| | Calendar Year Order |
|---|---|
| DRY | YR1986 - YR1992, YR1976 - YR1977, YR1978 - YR1982, YR1995 - YR2001 |
| WET | YR1995 - YR2001, YR1978 - YR1982, YR1976 - YR1977, YR1986 - YR1992 |

These two synthetic hydrologic conditions are 21 years long, shorter than the previous analyses for 32 years. However, 21 years of prediction are sufficient to understand the impact of dry hydrologic and wet hydrologic conditions on GWS and future CU.

Annual GWS was estimated for the dry and wet hydrologic conditions by the same procedure described above for Table 1. Note the change in storage (Tables 3 and 4, Column C) follows with the reordering of calendar years to simulate a given hydrologic condition.

## REFERENCES

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1 Cleath and Associates. Water Resources Management Study for Cypress Ridge, September 1994.

2 San Luis Obispo County. Master Water Plan. 2001.

3 SAIC, Evaluation of Groundwater in Storage for Triggering Conservation Stages, October 2007.

4 SAIC, Phase III Hydrologic Inventory, October 2002.

**Predicted Groundwater in Storage Above Sea Level in Acre Feet**
**HISTORICAL HYDROLOGIC CONDITIONS**

| | Historic Data | | | | Scenario 1 | | | | | Scenario 2 | | | | Scenario 3 | | | | Scenario 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| Index | Year | Storage | Change in Storage | Consumptive Use | Year | Consumptive Use 0% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 1% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 2.3% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 4% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage |
| | | Oct. 3, 2007 Memo | [C] - [C(prev)] | Hydro Inv updated 2007 | | 2007 Consumptive Use | [G] - [E] | [D] - [H] | [J(prev)] + [I] | 10,650*(1+.01)^[A] | [K] - [E] | [D] - [L] | [N(prev)] + [M] | 10,650*(1+.023)^[A] | [O] - [E] | [D] - [P] | [R(prev)] +[Q] | 10,650*(1+.023)^[A] | [S] - [E] | [D] - [T] | [V(prev)] +[U] |
| 0 | 1975 | 99,000 | | 3,340 | 2007 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 |
| 1 | 1976 | 82,000 | -17,000 | 3,480 | 2008 | 10,650 | 7,170 | -24,170 | 68,830 | 10,760 | 7,280 | -24,280 | 68,720 | 10,890 | 7,410 | -24,410 | 68,590 | 11,080 | 7,600 | -24,600 | 68,400 |
| 2 | 1977 | 64,000 | -18,000 | 3,760 | 2009 | 10,650 | 6,890 | -24,890 | 43,940 | 10,860 | 7,100 | -25,100 | 43,620 | 11,150 | 7,390 | -25,390 | 43,200 | 11,520 | 7,760 | -25,760 | 42,640 |
| 3 | 1978 | 84,000 | 20,000 | 3,470 | 2010 | 10,650 | 7,180 | 12,820 | 56,760 | 10,970 | 7,500 | 12,500 | 56,120 | 11,400 | 7,930 | 12,070 | 55,270 | 11,980 | 8,510 | 11,490 | 54,130 |
| 4 | 1979 | 72,000 | -12,000 | 3,800 | 2011 | 10,650 | 6,850 | -18,850 | 37,910 | 11,080 | 7,280 | -19,280 | 36,840 | 11,660 | 7,860 | -19,860 | 35,410 | 12,460 | 8,660 | -20,660 | 33,470 |
| 5 | 1980 | 88,000 | 16,000 | 3,920 | 2012 | 10,650 | 6,730 | 9,270 | 47,180 | 11,190 | 7,270 | 8,730 | 45,570 | 11,930 | 8,010 | 7,990 | 43,400 | 12,960 | 9,040 | 6,960 | 40,430 |
| 6 | 1981 | 97,000 | 9,000 | 4,050 | 2013 | 10,650 | 6,600 | 2,400 | 49,580 | 11,310 | 7,260 | 1,740 | 47,310 | 12,210 | 8,160 | 840 | 44,240 | 13,480 | 9,430 | -430 | 40,000 |
| 7 | 1982 | 123,000 | 26,000 | 4,170 | 2014 | 10,650 | 6,480 | 19,520 | 69,100 | 11,420 | 7,250 | 18,750 | 66,060 | 12,490 | 8,320 | 17,680 | 61,920 | 14,010 | 9,840 | 16,160 | 56,160 |
| 8 | 1983 | 95,000 | -28,000 | 4,110 | 2015 | 10,650 | 6,540 | -34,540 | 34,560 | 11,530 | 7,420 | -35,420 | 30,640 | 12,770 | 8,660 | -36,660 | 25,260 | 14,580 | 10,470 | -38,470 | 17,690 |
| 9 | 1984 | N/A | 5,500 | 4,570 | 2016 | 10,650 | 6,080 | -580 | 33,980 | 11,650 | 7,080 | -1,580 | 29,060 | 13,070 | 8,500 | -3,000 | 22,260 | 15,160 | 10,590 | -5,090 | 12,600 |
| 10 | 1985 | 106,000 | 5,500 | 4,640 | 2017 | 10,650 | 6,010 | -510 | 33,470 | 11,760 | 7,120 | -1,620 | 27,440 | 13,370 | 8,730 | -3,230 | 19,030 | 15,760 | 11,120 | -5,620 | 6,980 |
| 11 | 1986 | 98,000 | -8,000 | 5,240 | 2018 | 10,650 | 5,410 | -13,410 | 20,060 | 11,880 | 6,640 | -14,640 | 12,800 | 13,680 | 8,440 | -16,440 | 2,590 | 16,400 | 11,160 | -19,160 | **-12,180** |
| 12 | 1987 | 83,000 | -15,000 | 5,520 | 2019 | 10,650 | 5,130 | -20,130 | **-70** | 12,000 | 6,480 | -21,480 | **-8,680** | 13,990 | 8,470 | -23,470 | **-20,880** | 17,050 | 11,530 | -26,530 | -38,710 |
| 13 | 1988 | 80,000 | -3,000 | 5,640 | 2020 | 10,650 | 5,010 | -8,010 | -8,080 | 12,120 | 6,480 | -9,480 | -18,160 | 14,310 | 8,670 | -11,670 | -32,550 | 17,730 | 12,090 | -15,090 | -53,800 |
| 14 | 1989 | 59,000 | -21,000 | 5,840 | 2021 | 10,650 | 4,810 | -25,810 | -33,890 | 12,240 | 6,400 | -27,400 | -45,560 | 14,640 | 8,800 | -29,800 | -62,350 | 18,440 | 12,600 | -33,600 | -87,400 |
| 15 | 1990 | 62,000 | 3,000 | 6,500 | 2022 | 10,650 | 4,150 | -1,150 | -35,040 | 12,360 | 5,860 | -2,860 | -48,420 | 14,980 | 8,480 | -5,480 | -67,830 | 19,180 | 12,680 | -9,680 | -97,080 |
| 16 | 1991 | 62,000 | 0 | 6,070 | 2023 | 10,650 | 4,580 | -4,580 | -39,620 | 12,490 | 6,420 | -6,420 | -54,840 | 15,320 | 9,250 | -9,250 | -77,080 | 19,950 | 13,880 | -13,880 | -110,960 |
| 17 | 1992 | 61,000 | -1,000 | 6,070 | 2024 | 10,650 | 4,580 | -5,580 | -45,200 | 12,610 | 6,540 | -7,540 | -62,380 | 15,680 | 9,610 | -10,610 | -87,690 | 20,750 | 14,680 | -15,680 | -126,640 |
| 18 | 1993 | 72,000 | 11,000 | 5,980 | 2025 | 10,650 | 4,670 | 6,330 | -38,870 | 12,740 | 6,760 | 4,240 | -58,140 | 16,040 | 10,060 | 940 | -86,750 | 21,570 | 15,590 | -4,590 | -131,230 |
| 19 | 1994 | 60,000 | -12,000 | 6,110 | 2026 | 10,650 | 4,540 | -16,540 | -55,410 | 12,870 | 6,760 | -18,760 | -76,900 | 16,410 | 10,300 | -22,300 | -109,050 | 22,440 | 16,330 | -28,330 | -159,560 |
| 20 | 1995 | 87,000 | 27,000 | 5,860 | 2027 | 10,650 | 4,790 | 22,210 | -33,200 | 13,000 | 7,140 | 19,860 | -57,040 | 16,780 | 10,920 | 16,080 | -92,970 | 23,340 | 17,480 | 9,520 | -150,040 |
| 21 | 1996 | 76,000 | -11,000 | 6,260 | 2028 | 10,650 | 4,390 | -15,390 | -48,590 | 13,120 | 6,860 | -17,860 | -74,900 | 17,170 | 10,910 | -21,910 | -114,880 | 24,270 | 18,010 | -29,010 | -179,050 |
| 22 | 1997 | N/A | 14,500 | 6,360 | 2029 | 10,650 | 4,290 | 10,210 | -38,380 | 13,260 | 6,900 | 7,600 | -67,300 | 17,560 | 11,200 | 3,300 | -111,580 | 25,240 | 18,880 | -4,380 | -183,430 |
| 23 | 1998 | 105,000 | 14,500 | 6,640 | 2030 | 10,650 | 4,010 | 10,490 | -27,890 | 13,390 | 6,750 | 7,750 | -59,550 | 17,970 | 11,330 | 3,170 | -108,410 | 26,250 | 19,610 | -5,110 | -188,540 |
| 24 | 1999 | 106,000 | 1,000 | 7,250 | 2031 | 10,650 | 3,400 | -2,400 | -30,290 | 13,520 | 6,270 | -5,270 | -64,820 | 18,380 | 11,130 | -10,130 | -118,540 | 27,300 | 20,050 | -19,050 | -207,590 |
| 25 | 2000 | 108,000 | 2,000 | 7,420 | 2032 | 10,650 | 3,230 | -1,230 | -31,520 | 13,660 | 6,240 | -4,240 | -69,060 | 18,800 | 11,380 | -9,380 | -127,920 | 28,390 | 20,970 | -18,970 | -226,560 |
| 26 | 2001 | 118,000 | 10,000 | 7,650 | 2033 | 10,650 | 3,000 | 7,000 | -24,520 | 13,790 | 6,140 | 3,860 | -65,200 | 19,240 | 11,590 | -1,590 | -129,510 | 29,530 | 21,880 | -11,880 | -238,440 |
| 27 | 2002 | 96,000 | -22,000 | 8,380 | 2034 | 10,650 | 2,270 | -24,270 | -48,790 | 13,930 | 5,550 | -27,550 | -92,750 | 19,680 | 11,300 | -33,300 | -162,810 | 30,710 | 22,330 | -44,330 | -282,770 |
| 28 | 2003 | 94,000 | -2,000 | 8,390 | 2035 | 10,650 | 2,260 | -4,260 | -53,050 | 14,070 | 5,680 | -7,680 | -100,430 | 20,130 | 11,740 | -13,740 | -176,550 | 31,940 | 23,550 | -25,550 | -308,320 |
| 29 | 2004 | 89,000 | -5,000 | 8,660 | 2036 | 10,650 | 1,990 | -6,990 | -60,040 | 14,210 | 5,550 | -10,550 | -110,980 | 20,590 | 11,930 | -16,930 | -193,480 | 33,210 | 24,550 | -29,550 | -337,870 |
| 30 | 2005 | 98,000 | 9,000 | 8,730 | 2037 | 10,650 | 1,920 | 7,080 | -52,960 | 14,350 | 5,620 | 3,380 | -107,600 | 21,070 | 12,340 | -3,340 | -196,820 | 34,540 | 25,810 | -16,810 | -354,680 |
| 31 | 2006 | 107,000 | 9,000 | 9,380 | 2038 | 10,650 | 1,270 | 7,730 | -45,230 | 14,500 | 5,120 | 3,880 | -103,720 | 21,550 | 12,170 | -3,170 | -199,990 | 35,920 | 26,540 | -17,540 | -372,220 |
| 32 | 2007 | 93,000 | -14,000 | 10,650 | 2039 | 10,650 | 0 | -14,000 | -59,230 | 14,640 | 3,990 | -17,990 | -121,710 | 22,050 | 11,400 | -25,400 | -225,390 | 37,360 | 26,710 | -40,710 | -412,930 |
| Total | | | -6,000 | 197,910 | | 351,450 | 153,540 | -152,230 | | 413,930 | 216,020 | -214,710 | | 517,610 | 319,700 | -318,390 | | 705,150 | 507,240 | -505,930 | |
| Average | | | -190 | 6,000 | | 10,650 | 4,650 | -4,760 | | 12,540 | 6,550 | -6,710 | | 15,690 | 9,690 | -9,950 | | 21,370 | 15,370 | -15,810 | |

Notes:

(shaded) Due to lack of available data, the change in groundwater storage was averaged between known values and split equally to the unknown values.

N/A Data unavailable.

**bold** Indicates first year in which the groundwater in storage is below sea level.

All numbers have been rounded to the nearest 10.

## Predicted Groundwater in Storage Above Sea Level in Acre Feet
## 50% REDUCTION OF URBAN WATER CONSUMPTIVE USE

| | Historic Data | | | | Scenario 1 | | | | | Scenario 2 | | | | Scenario 3 | | | | Scenario 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| Index | Year | Storage | Change in Storage | Consumptive Use | Year | Consumptive Use 0% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 1% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 2.3% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 4% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage |
| | | Oct. 3, 2007 Memo | [C] - [C(prev)] | Hydro Inv updated 2007 | | 2007 Consumptive Use | [G] - [E] | [D] - [H] | [J(prev)] + [I] | 10,650*(1+.01)^[A] | [K] - [E] | [D] - [L] | [N(prev)] + [M] | 10,650*(1+.023)^[A] | [O] - [E] | [D] - [P] | [R(prev)] +[Q] | 10,650*(1+.023)^[A] | [S] - [E] | [D] - [T] | [V(prev)] +[U] |
| 0 | 1975 | 99,000 | | 3,340 | 2007 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 | 10,650 | 7,310 | | 93,000 |
| 1 | 1976 | 82,000 | -17,000 | 3,480 | 2008 | 8,360 | 4,880 | -21,880 | 71,120 | 8,440 | 4,960 | -21,960 | 71,040 | 8,550 | 5,070 | -22,070 | 70,930 | 8,690 | 5,210 | -22,210 | 70,790 |
| 2 | 1977 | 64,000 | -18,000 | 3,760 | 2009 | 8,360 | 4,600 | -22,600 | 48,520 | 8,530 | 4,770 | -22,770 | 48,270 | 8,750 | 4,990 | -22,990 | 47,940 | 9,040 | 5,280 | -23,280 | 47,510 |
| 3 | 1978 | 84,000 | 20,000 | 3,470 | 2010 | 8,360 | 4,890 | 15,110 | 63,630 | 8,610 | 5,140 | 14,860 | 63,130 | 8,950 | 5,480 | 14,520 | 62,460 | 9,400 | 5,930 | 14,070 | 61,580 |
| 4 | 1979 | 72,000 | -12,000 | 3,800 | 2011 | 8,360 | 4,560 | -16,560 | 47,070 | 8,700 | 4,900 | -16,900 | 46,230 | 9,160 | 5,360 | -17,360 | 45,100 | 9,780 | 5,980 | -17,980 | 43,600 |
| 5 | 1980 | 88,000 | 16,000 | 3,920 | 2012 | 8,360 | 4,440 | 11,560 | 58,630 | 8,790 | 4,870 | 11,130 | 57,360 | 9,370 | 5,450 | 10,550 | 55,650 | 10,170 | 6,250 | 9,750 | 53,350 |
| 6 | 1981 | 97,000 | 9,000 | 4,050 | 2013 | 8,360 | 4,310 | 4,690 | 63,320 | 8,870 | 4,820 | 4,180 | 61,540 | 9,580 | 5,530 | 3,470 | 59,120 | 10,580 | 6,530 | 2,470 | 55,820 |
| 7 | 1982 | 123,000 | 26,000 | 4,170 | 2014 | 8,360 | 4,190 | 21,810 | 85,130 | 8,960 | 4,790 | 21,210 | 82,750 | 9,800 | 5,630 | 20,370 | 79,490 | 11,000 | 6,830 | 19,170 | 74,990 |
| 8 | 1983 | 95,000 | -28,000 | 4,110 | 2015 | 8,360 | 4,250 | -32,250 | 52,880 | 9,050 | 4,940 | -32,940 | 49,810 | 10,030 | 5,920 | -33,920 | 45,570 | 11,440 | 7,330 | -35,330 | 39,660 |
| 9 | 1984 | N/A | 5,500 | 4,570 | 2016 | 8,360 | 3,790 | 1,710 | 54,590 | 9,140 | 4,570 | 930 | 50,740 | 10,260 | 5,690 | -190 | 45,380 | 11,900 | 7,330 | -1,830 | 37,830 |
| 10 | 1985 | 106,000 | 5,500 | 4,640 | 2017 | 8,360 | 3,720 | 1,780 | 56,370 | 9,230 | 4,590 | 910 | 51,650 | 10,490 | 5,850 | -350 | 45,030 | 12,370 | 7,730 | -2,230 | 35,600 |
| 11 | 1986 | 98,000 | -8,000 | 5,240 | 2018 | 8,360 | 3,120 | -11,120 | 45,250 | 9,330 | 4,090 | -12,090 | 39,560 | 10,740 | 5,500 | -13,500 | 31,530 | 12,870 | 7,630 | -15,630 | 19,970 |
| 12 | 1987 | 83,000 | -15,000 | 5,520 | 2019 | 8,360 | 2,840 | -17,840 | 27,410 | 9,420 | 3,900 | -18,900 | 20,660 | 10,980 | 5,460 | -20,460 | 11,070 | 13,380 | 7,860 | -22,860 | **-2,890** |
| 13 | 1988 | 80,000 | -3,000 | 5,640 | 2020 | 8,360 | 2,720 | -5,720 | 21,690 | 9,510 | 3,870 | -6,870 | 13,790 | 11,240 | 5,600 | -8,600 | 2,470 | 13,920 | 8,280 | -11,280 | -14,170 |
| 14 | 1989 | 59,000 | -21,000 | 5,840 | 2021 | 8,360 | 2,520 | -23,520 | **-1,830** | 9,610 | 3,770 | -24,770 | **-10,980** | 11,490 | 5,650 | -26,650 | **-24,180** | 14,480 | 8,640 | -29,640 | -43,810 |
| 15 | 1990 | 62,000 | 3,000 | 6,500 | 2022 | 8,360 | 1,860 | 1,140 | -690 | 9,710 | 3,210 | -210 | -11,190 | 11,760 | 5,260 | -2,260 | -26,440 | 15,060 | 8,560 | -5,560 | -49,370 |
| 16 | 1991 | 62,000 | 0 | 6,070 | 2023 | 8,360 | 2,290 | -2,290 | -2,980 | 9,800 | 3,730 | -3,730 | -14,920 | 12,030 | 5,960 | -5,960 | -32,400 | 15,660 | 9,590 | -9,590 | -58,960 |
| 17 | 1992 | 61,000 | -1,000 | 6,070 | 2024 | 8,360 | 2,290 | -3,290 | -6,270 | 9,900 | 3,830 | -4,830 | -19,750 | 12,310 | 6,240 | -7,240 | -39,640 | 16,280 | 10,210 | -11,210 | -70,170 |
| 18 | 1993 | 72,000 | 11,000 | 5,980 | 2025 | 8,360 | 2,380 | 8,620 | 2,350 | 10,000 | 4,020 | 6,980 | -12,770 | 12,590 | 6,610 | 4,390 | -35,250 | 16,940 | 10,960 | 40 | -70,130 |
| 19 | 1994 | 60,000 | -12,000 | 6,110 | 2026 | 8,360 | 2,250 | -14,250 | -11,900 | 10,100 | 3,990 | -15,990 | -28,760 | 12,880 | 6,770 | -18,770 | -54,020 | 17,610 | 11,500 | -23,500 | -93,630 |
| 20 | 1995 | 87,000 | 27,000 | 5,860 | 2027 | 8,360 | 2,500 | 24,500 | 12,600 | 10,200 | 4,340 | 22,660 | -6,100 | 13,170 | 7,310 | 19,690 | -34,330 | 18,320 | 12,460 | 14,540 | -79,090 |
| 21 | 1996 | 76,000 | -11,000 | 6,260 | 2028 | 8,360 | 2,100 | -13,100 | -500 | 10,300 | 4,040 | -15,040 | -21,140 | 13,480 | 7,220 | -18,220 | -52,550 | 19,050 | 12,790 | -23,790 | -102,880 |
| 22 | 1997 | N/A | 14,500 | 6,360 | 2029 | 8,360 | 2,000 | 12,500 | 12,000 | 10,410 | 4,050 | 10,450 | -10,690 | 13,790 | 7,430 | 7,070 | -45,480 | 19,810 | 13,450 | 1,050 | -101,830 |
| 23 | 1998 | 105,000 | 14,500 | 6,640 | 2030 | 8,360 | 1,720 | 12,780 | 24,780 | 10,510 | 3,870 | 10,630 | -60 | 14,100 | 7,460 | 7,040 | -38,440 | 20,610 | 13,970 | 530 | -101,300 |
| 24 | 1999 | 106,000 | 1,000 | 7,250 | 2031 | 8,360 | 1,110 | -110 | 24,670 | 10,610 | 3,360 | -2,360 | -2,420 | 14,430 | 7,180 | -6,180 | -44,620 | 21,430 | 14,180 | -13,180 | -114,480 |
| 25 | 2000 | 108,000 | 2,000 | 7,420 | 2032 | 8,360 | 940 | 1,060 | 25,730 | 10,720 | 3,300 | -1,300 | -3,720 | 14,760 | 7,340 | -5,340 | -49,960 | 22,290 | 14,870 | -12,870 | -127,350 |
| 26 | 2001 | 118,000 | 10,000 | 7,650 | 2033 | 8,360 | 710 | 9,290 | 35,020 | 10,830 | 3,180 | 6,820 | 3,100 | 15,100 | 7,450 | 2,550 | -47,410 | 23,180 | 15,530 | -5,530 | -132,880 |
| 27 | 2002 | 96,000 | -22,000 | 8,380 | 2034 | 8,360 | -20 | -21,980 | 13,040 | 10,940 | 2,560 | -24,560 | -21,460 | 15,450 | 7,070 | -29,070 | -76,480 | 24,100 | 15,720 | -37,720 | -170,600 |
| 28 | 2003 | 94,000 | -2,000 | 8,390 | 2035 | 8,360 | -30 | -1,970 | 11,070 | 11,050 | 2,660 | -4,660 | -26,120 | 15,800 | 7,410 | -9,410 | -85,890 | 25,070 | 16,680 | -18,680 | -189,280 |
| 29 | 2004 | 89,000 | -5,000 | 8,660 | 2036 | 8,360 | -300 | -4,700 | 6,370 | 11,160 | 2,500 | -7,500 | -33,620 | 16,170 | 7,510 | -12,510 | -98,400 | 26,070 | 17,410 | -22,410 | -211,690 |
| 30 | 2005 | 98,000 | 9,000 | 8,730 | 2037 | 8,360 | -370 | 9,370 | 15,740 | 11,270 | 2,540 | 6,460 | -27,160 | 16,540 | 7,810 | 1,190 | -97,210 | 27,110 | 18,380 | -9,380 | -221,070 |
| 31 | 2006 | 107,000 | 9,000 | 9,380 | 2038 | 8,360 | -1,020 | 10,020 | 25,760 | 11,380 | 2,000 | 7,000 | -20,160 | 16,920 | 7,540 | 1,460 | -95,750 | 28,200 | 18,820 | -9,820 | -230,890 |
| 32 | 2007 | 93,000 | -14,000 | 10,650 | 2039 | 8,360 | -2,290 | -11,710 | 14,050 | 11,490 | 840 | -14,840 | -35,000 | 17,310 | 6,660 | -20,660 | -116,410 | 29,330 | 18,680 | -32,680 | -263,570 |
| Total | | | -6,000 | 197,910 | | 278,170 | 80,260 | -78,950 | | 327,220 | 129,310 | -128,000 | | 408,630 | 210,720 | -209,410 | | 555,790 | 357,880 | -356,570 | |
| Average | | | -190 | 6,000 | | 8,430 | 2,430 | -2,470 | | 9,920 | 3,920 | -4,000 | | 12,380 | 6,390 | -6,540 | | 16,840 | 10,840 | -11,140 | |

Notes:

Due to lack of available data, the change in groundwater storage was averaged between known values and split equally to the unknown values

N/A Data unavailable.

**bold** Indicates first year in which the groundwater in storage is below sea level.

All numbers have been rounded to the nearest 10.

## Predicted Groundwater in Storage Above Sea Level in Acre Feet
### DRY HYDROLOGIC CONDITION

| | Historic Data | | | | Scenario 1 | | | | | Scenario 2 | | | | Scenario 3 | | | | Scenario 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| Index | Year | Storage | Change In Storage | Consumptive Use | Year | Consumptive Use 0% Annual Escalation Rate | Change in Consumptive Use | Change In Storage | Cumulative Storage | Consumptive Use 1% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 2.3% Annual Escalation Rate | Change In Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 4% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage |
| | | Oct. 3, 2007 Memo | [C] - [C(prev)] | Hydro Inv updated 2007 | | 2007 Consumptive Use | [G] - [E] | [D] - [H] | [J(prev)] + [I] | 10,650*(1+.01)^[A] | [K] - [E] | [D] - [L] | [N(prev)] + [M] | 10,650*(1+.023)^[A] | [O] - [E] | [D] - [P] | [R(prev)] +[Q] | 10,650*(1+.023)^[A] | [S] - [E] | [D] - [T] | [V(prev)] +[U] |
| 0 | | | | | 2007 | 10,650 | | | 93,000 | 10,650 | | | 93,000 | 10,650 | | | 93,000 | 10,650 | | | 93,000 |
| 1 | 1986 | 98,000 | -8,000 | 5,240 | 2008 | 10,650 | 5,410 | -13,410 | 79,590 | 10,760 | 5,520 | -13,520 | 79,480 | 10,890 | 5,650 | -13,650 | 79,350 | 11,080 | 5,840 | -13,840 | 79,160 |
| 2 | 1987 | 83,000 | -15,000 | 5,520 | 2009 | 10,650 | 5,130 | -20,130 | 59,460 | 10,860 | 5,340 | -20,340 | 59,140 | 11,150 | 5,630 | -20,630 | 58,720 | 11,520 | 6,000 | -21,000 | 58,160 |
| 3 | 1988 | 80,000 | -3,000 | 5,640 | 2010 | 10,650 | 5,010 | -8,010 | 51,450 | 10,970 | 5,330 | -8,330 | 50,810 | 11,400 | 5,760 | -8,760 | 49,960 | 11,980 | 6,340 | -9,340 | 48,820 |
| 4 | 1989 | 59,000 | -21,000 | 5,840 | 2011 | 10,650 | 4,810 | -25,810 | 25,640 | 11,080 | 5,240 | -26,240 | 24,570 | 11,660 | 5,820 | -26,820 | 23,140 | 12,460 | 6,620 | -27,620 | 21,200 |
| 5 | 1990 | 62,000 | 3,000 | 6,500 | 2012 | 10,650 | 4,150 | -1,150 | 24,490 | 11,190 | 4,690 | -1,690 | 22,880 | 11,930 | 5,430 | -2,430 | 20,710 | 12,960 | 6,460 | -3,460 | 17,740 |
| 6 | 1991 | 62,000 | 0 | 6,070 | 2013 | 10,650 | 4,580 | -4,580 | 19,910 | 11,310 | 5,240 | -5,240 | 17,640 | 12,210 | 6,140 | -6,140 | 14,570 | 13,480 | 7,410 | -7,410 | 10,330 |
| 7 | 1992 | 61,000 | -1,000 | 6,070 | 2014 | 10,650 | 4,580 | -5,580 | 14,330 | 11,420 | 5,350 | -6,350 | 11,290 | 12,490 | 6,420 | -7,420 | 7,150 | 14,010 | 7,940 | -8,940 | 1,390 |
| 8 | 1976 | 82,000 | -17,000 | 3,480 | 2015 | 10,650 | 7,170 | -24,170 | **-9,840** | 11,530 | 8,050 | -25,050 | **-13,760** | 12,770 | 9,290 | -26,290 | **-19,140** | 14,580 | 11,100 | -28,100 | **-26,710** |
| 9 | 1977 | 64,000 | -18,000 | 3,760 | 2016 | 10,650 | 6,890 | -24,890 | -34,730 | 11,650 | 7,890 | -25,890 | -39,650 | 13,070 | 9,310 | -27,310 | -46,450 | 15,160 | 11,400 | -29,400 | -56,110 |
| 10 | 1978 | 84,000 | 20,000 | 3,470 | 2017 | 10,650 | 7,180 | 12,820 | -21,910 | 11,760 | 8,290 | 11,710 | -27,940 | 13,370 | 9,900 | 10,100 | -36,350 | 15,760 | 12,290 | 7,710 | -48,400 |
| 11 | 1979 | 72,000 | -12,000 | 3,800 | 2018 | 10,650 | 6,850 | -18,850 | -40,760 | 11,880 | 8,080 | -20,080 | -48,020 | 13,680 | 9,880 | -21,880 | -58,230 | 16,400 | 12,600 | -24,600 | -73,000 |
| 12 | 1980 | 88,000 | 16,000 | 3,920 | 2019 | 10,650 | 6,730 | 9,270 | -31,490 | 12,000 | 8,080 | 7,920 | -40,100 | 13,990 | 10,070 | 5,930 | -52,300 | 17,050 | 13,130 | 2,870 | -70,130 |
| 13 | 1981 | 97,000 | 9,000 | 4,050 | 2020 | 10,650 | 6,600 | 2,400 | -29,090 | 12,120 | 8,070 | 930 | -39,170 | 14,310 | 10,260 | -1,260 | -53,560 | 17,730 | 13,680 | -4,680 | -74,810 |
| 14 | 1982 | 123,000 | 26,000 | 4,170 | 2021 | 10,650 | 6,480 | 19,520 | -9,570 | 12,240 | 8,070 | 17,930 | -21,240 | 14,640 | 10,470 | 15,530 | -38,030 | 18,440 | 14,270 | 11,730 | -63,080 |
| 15 | 1995 | 87,000 | 27,000 | 5,860 | 2022 | 10,650 | 4,790 | 22,210 | 12,640 | 12,360 | 6,500 | 20,500 | -740 | 14,980 | 9,120 | 17,880 | -20,150 | 19,180 | 13,320 | 13,680 | -49,400 |
| 16 | 1996 | 76,000 | -11,000 | 6,260 | 2023 | 10,650 | 4,390 | -15,390 | -2,750 | 12,490 | 6,230 | -17,230 | -17,970 | 15,320 | 9,060 | -20,060 | -40,210 | 19,950 | 13,690 | -24,690 | -74,090 |
| 17 | 1997 | NA | 14,500 | 6,360 | 2024 | 10,650 | 4,290 | 10,210 | 7,460 | 12,610 | 6,250 | 8,250 | -9,720 | 15,680 | 9,320 | 5,180 | -35,030 | 20,750 | 14,390 | 110 | -73,980 |
| 18 | 1998 | 105,000 | 14,500 | 6,640 | 2025 | 10,650 | 4,010 | 10,490 | 17,950 | 12,740 | 6,100 | 8,400 | -1,320 | 16,040 | 9,400 | 5,100 | -29,930 | 21,570 | 14,930 | -430 | -74,410 |
| 19 | 1999 | 106,000 | 1,000 | 7,250 | 2026 | 10,650 | 3,400 | -2,400 | 15,550 | 12,870 | 5,620 | -4,620 | -5,940 | 16,410 | 9,160 | -8,160 | -38,090 | 22,440 | 15,190 | -14,190 | -88,600 |
| 20 | 2000 | 108,000 | 2,000 | 7,420 | 2027 | 10,650 | 3,230 | -1,230 | 14,320 | 13,000 | 5,580 | -3,580 | -9,520 | 16,780 | 9,360 | -7,360 | -45,450 | 23,340 | 15,920 | -13,920 | -102,520 |
| 21 | 2001 | 118,000 | 10,000 | 7,650 | 2028 | 10,650 | 3,000 | 7,000 | 21,320 | 13,120 | 5,470 | 4,530 | -4,990 | 17,170 | 9,520 | 480 | -44,970 | 24,270 | 16,620 | -6,620 | -109,140 |
| Total | | | 37,000 | 114,970 | | 234,300 | 108,680 | -71,680 | | 260,610 | 134,990 | -97,990 | | 300,590 | 174,970 | -137,970 | | 364,760 | 239,140 | -202,140 | |
| Average | | | 1,760 | 5,470 | | 10,650 | 5,180 | -3,410 | | 11,850 | 6,430 | -4,670 | | 13,660 | 8,330 | -6,570 | | 16,580 | 11,390 | -9,630 | |

Notes:

N/A Data unavailable.

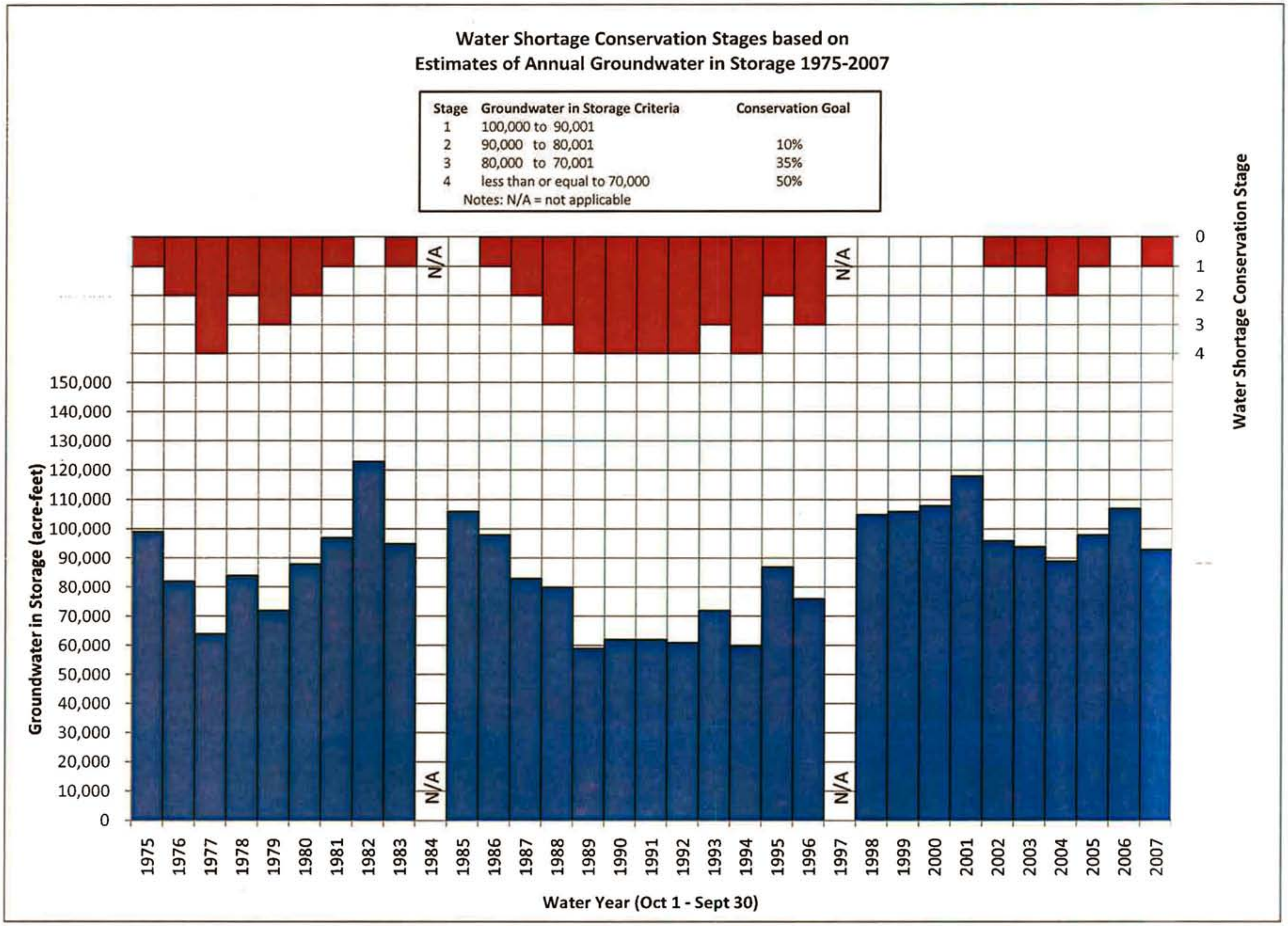
**bold** Indicates first year in which the groundwater in storage is below sea level.

All numbers have been rounded to the nearest 10.

## Predicted Groundwater in Storage Above Sea Level in Acre Feet
## WET HYDROLOGIC CONDITION

| | Historic Data | | | | Scenario 1 | | | | | Scenario 2 | | | | Scenario 3 | | | | Scenario 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| Index | Year | Storage | Change in Storage | Consumptive Use | Year | Consumptive Use 0% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 1% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 2.3% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage | Consumptive Use 4% Annual Escalation Rate | Change in Consumptive Use | Change in Storage | Cumulative Storage |
| | | Oct. 3, 2007 Memo | Historic Value | Hydro Inv updated 2007 | | 2007 Consumptive Use | [G] - [E] | [D] - [H] | [J(prev)] + [I] | 10,650*(1+.01)^[A] | [K] - [E] | [D] - [L] | [N(prev)] + [M] | 10,650*(1+.023)^[A] | [O] - [E] | [D] - [P] | [R(prev)] +[Q] | 10,650*(1+.023)^[A] | [S] - [E] | [D] - [T] | [V(prev)] +[U] |
| 0 | | | | | 2007 | 10,650 | | | 93,000 | 10,650 | | | 93,000 | 10,650 | | | 93,000 | 10,650 | | | 93,000 |
| 1 | 1995 | 87,000 | 27,000 | 5,860 | 2008 | 10,650 | 4,790 | 22,210 | 115,210 | 10,760 | 4,900 | 22,100 | 115,100 | 10,890 | 5,030 | 21,970 | 114,970 | 11,080 | 5,220 | 21,780 | 114,780 |
| 2 | 1996 | 76,000 | -11,000 | 6,260 | 2009 | 10,650 | 4,390 | -15,390 | 99,820 | 10,860 | 4,600 | -15,600 | 99,500 | 11,150 | 4,890 | -15,890 | 99,080 | 11,520 | 5,260 | -16,260 | 98,520 |
| 3 | 1997 | N/A | 14,500 | 6,360 | 2010 | 10,650 | 4,290 | 10,210 | 110,030 | 10,970 | 4,610 | 9,890 | 109,390 | 11,400 | 5,040 | 9,460 | 108,540 | 11,980 | 5,620 | 8,880 | 107,400 |
| 4 | 1998 | 105,000 | 14,500 | 6,640 | 2011 | 10,650 | 4,010 | 10,490 | 120,520 | 11,080 | 4,440 | 10,060 | 119,450 | 11,660 | 5,020 | 9,480 | 118,020 | 12,460 | 5,820 | 8,680 | 116,080 |
| 5 | 1999 | 106,000 | 1,000 | 7,250 | 2012 | 10,650 | 3,400 | -2,400 | 118,120 | 11,190 | 3,940 | -2,940 | 116,510 | 11,930 | 4,680 | -3,680 | 114,340 | 12,960 | 5,710 | -4,710 | 111,370 |
| 6 | 2000 | 108,000 | 2,000 | 7,420 | 2013 | 10,650 | 3,230 | -1,230 | 116,890 | 11,310 | 3,890 | -1,890 | 114,620 | 12,210 | 4,790 | -2,790 | 111,550 | 13,480 | 6,060 | -4,060 | 107,310 |
| 7 | 2001 | 118,000 | 10,000 | 7,650 | 2014 | 10,650 | 3,000 | 7,000 | 123,890 | 11,420 | 3,770 | 6,230 | 120,850 | 12,490 | 4,840 | 5,160 | 116,710 | 14,010 | 6,360 | 3,640 | 110,950 |
| 8 | 1978 | 84,000 | 20,000 | 3,470 | 2015 | 10,650 | 7,180 | 12,820 | 136,710 | 11,530 | 8,060 | 11,940 | 132,790 | 12,770 | 9,300 | 10,700 | 127,410 | 14,580 | 11,110 | 8,890 | 119,840 |
| 9 | 1979 | 72,000 | -12,000 | 3,800 | 2016 | 10,650 | 6,850 | -18,850 | 117,860 | 11,650 | 7,850 | -19,850 | 112,940 | 13,070 | 9,270 | -21,270 | 106,140 | 15,160 | 11,360 | -23,360 | 96,480 |
| 10 | 1980 | 88,000 | 16,000 | 3,920 | 2017 | 10,650 | 6,730 | 9,270 | 127,130 | 11,760 | 7,840 | 8,160 | 121,100 | 13,370 | 9,450 | 6,550 | 112,690 | 15,760 | 11,840 | 4,160 | 100,640 |
| 11 | 1981 | 97,000 | 9,000 | 4,050 | 2018 | 10,650 | 6,600 | 2,400 | 129,530 | 11,880 | 7,830 | 1,170 | 122,270 | 13,680 | 9,630 | -630 | 112,060 | 16,400 | 12,350 | -3,350 | 97,290 |
| 12 | 1982 | 123,000 | 26,000 | 4,170 | 2019 | 10,650 | 6,480 | 19,520 | 149,050 | 12,000 | 7,830 | 18,170 | 140,440 | 13,990 | 9,820 | 16,180 | 128,240 | 17,050 | 12,880 | 13,120 | 110,410 |
| 13 | 1976 | 82,000 | -17,000 | 3,480 | 2020 | 10,650 | 7,170 | -24,170 | 124,880 | 12,120 | 8,640 | -25,640 | 114,800 | 14,310 | 10,830 | -27,830 | 100,410 | 17,730 | 14,250 | -31,250 | 79,160 |
| 14 | 1977 | 64,000 | -18,000 | 3,760 | 2021 | 10,650 | 6,890 | -24,890 | 99,990 | 12,240 | 8,480 | -26,480 | 88,320 | 14,640 | 10,880 | -28,880 | 71,530 | 18,440 | 14,680 | -32,680 | 46,480 |
| 15 | 1986 | 98,000 | -8,000 | 5,240 | 2022 | 10,650 | 5,410 | -13,410 | 86,580 | 12,360 | 7,120 | -15,120 | 73,200 | 14,980 | 9,740 | -17,740 | 53,790 | 19,180 | 13,940 | -21,940 | 24,540 |
| 16 | 1987 | 83,000 | -15,000 | 5,520 | 2023 | 10,650 | 5,130 | -20,130 | 66,450 | 12,490 | 6,970 | -21,970 | 51,230 | 15,320 | 9,800 | -24,800 | 28,990 | 19,950 | 14,430 | -29,430 | **-4,890** |
| 17 | 1988 | 80,000 | -3,000 | 5,640 | 2024 | 10,650 | 5,010 | -8,010 | 58,440 | 12,610 | 6,970 | -9,970 | 41,260 | 15,680 | 10,040 | -13,040 | 15,950 | 20,750 | 15,110 | -18,110 | -23,000 |
| 18 | 1989 | 59,000 | -21,000 | 5,840 | 2025 | 10,650 | 4,810 | -25,810 | 32,630 | 12,740 | 6,900 | -27,900 | 13,360 | 16,040 | 10,200 | -31,200 | **-15,250** | 21,570 | 15,730 | -36,730 | -59,730 |
| 19 | 1990 | 62,000 | 3,000 | 6,500 | 2026 | 10,650 | 4,150 | -1,150 | 31,480 | 12,870 | 6,370 | -3,370 | 9,990 | 16,410 | 9,910 | -6,910 | -22,160 | 22,440 | 15,940 | -12,940 | -72,670 |
| 20 | 1991 | 62,000 | 0 | 6,070 | 2027 | 10,650 | 4,580 | -4,580 | 26,900 | 13,000 | 6,930 | -6,930 | 3,060 | 16,780 | 10,710 | -10,710 | -32,870 | 23,340 | 17,270 | -17,270 | -89,940 |
| 21 | 1992 | 61,000 | -1,000 | 6,070 | 2028 | 10,650 | 4,580 | -5,580 | 21,320 | 13,120 | 7,050 | -8,050 | **-4,990** | 17,170 | 11,100 | -12,100 | -44,970 | 24,270 | 18,200 | -19,200 | -109,140 |
| Total | | | 37,000 | 114,970 | | 234,300 | 108,680 | -71,680 | | 260,610 | 134,990 | -97,990 | | 300,590 | 174,970 | -137,970 | | 364,760 | 239,140 | -202,140 | |
| Average | | | 1,760 | 5,470 | | 10,650 | 5,180 | -3,410 | | 11,850 | 6,430 | -4,670 | | 13,660 | 8,330 | -6,570 | | 16,580 | 11,390 | -9,630 | |

Notes:
N/A Data unavailable.
**bold** Indicates first year in which the groundwater in storage is below sea level.
All numbers have been rounded to the nearest 10.




1/6/2008

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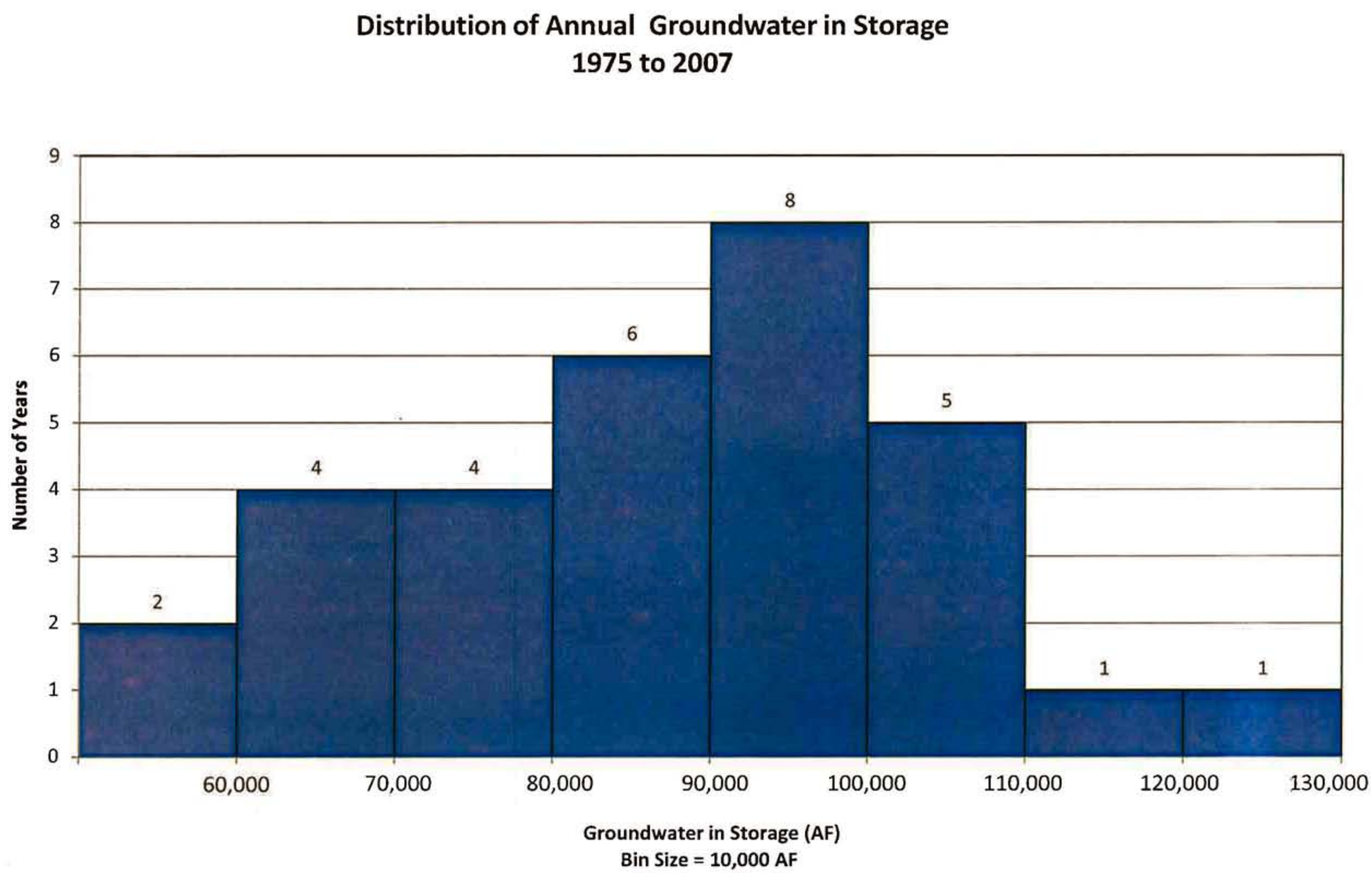
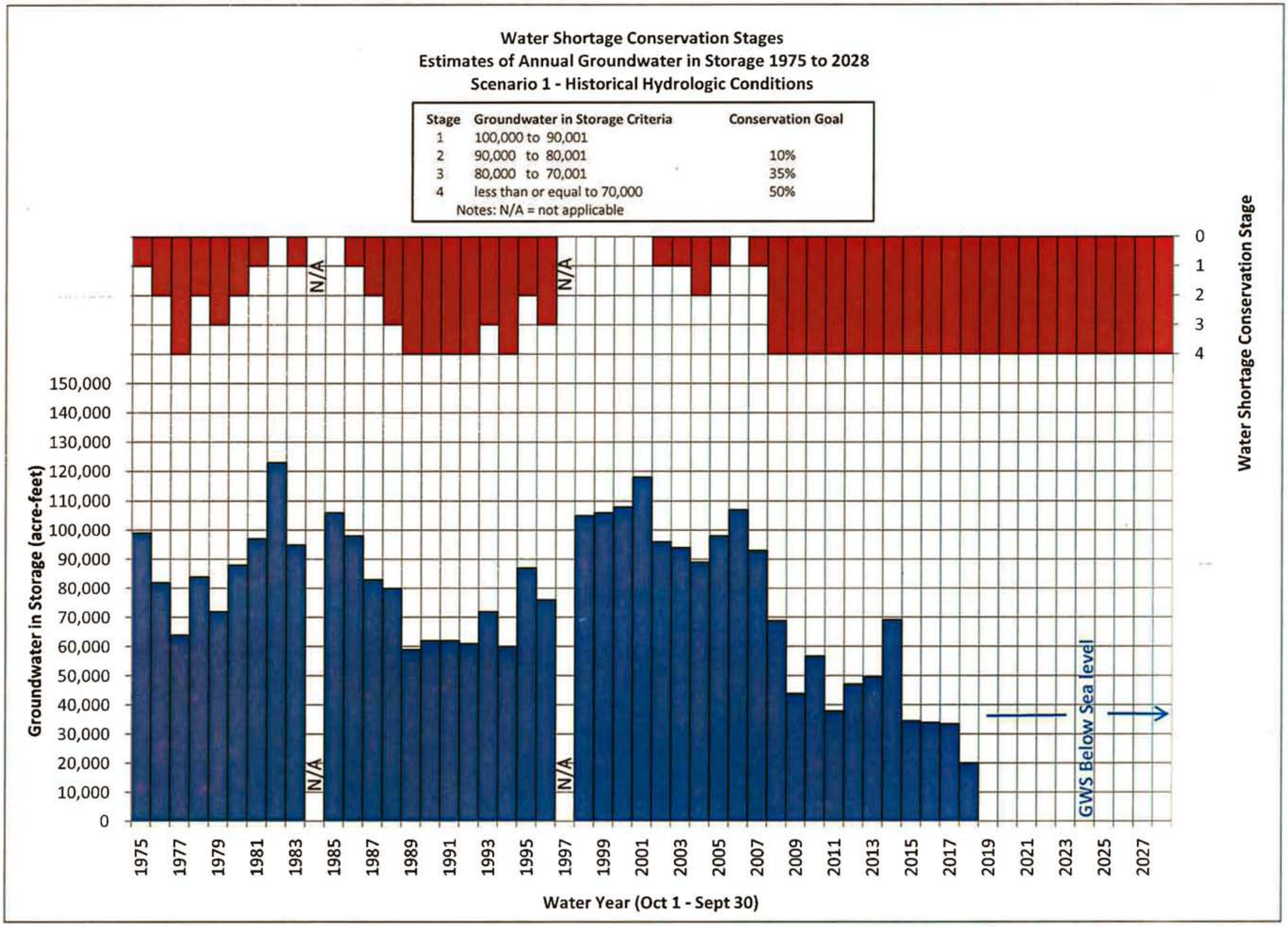
Figure 1




**NOTES:**
Total number of data points = 31




1/7/2008

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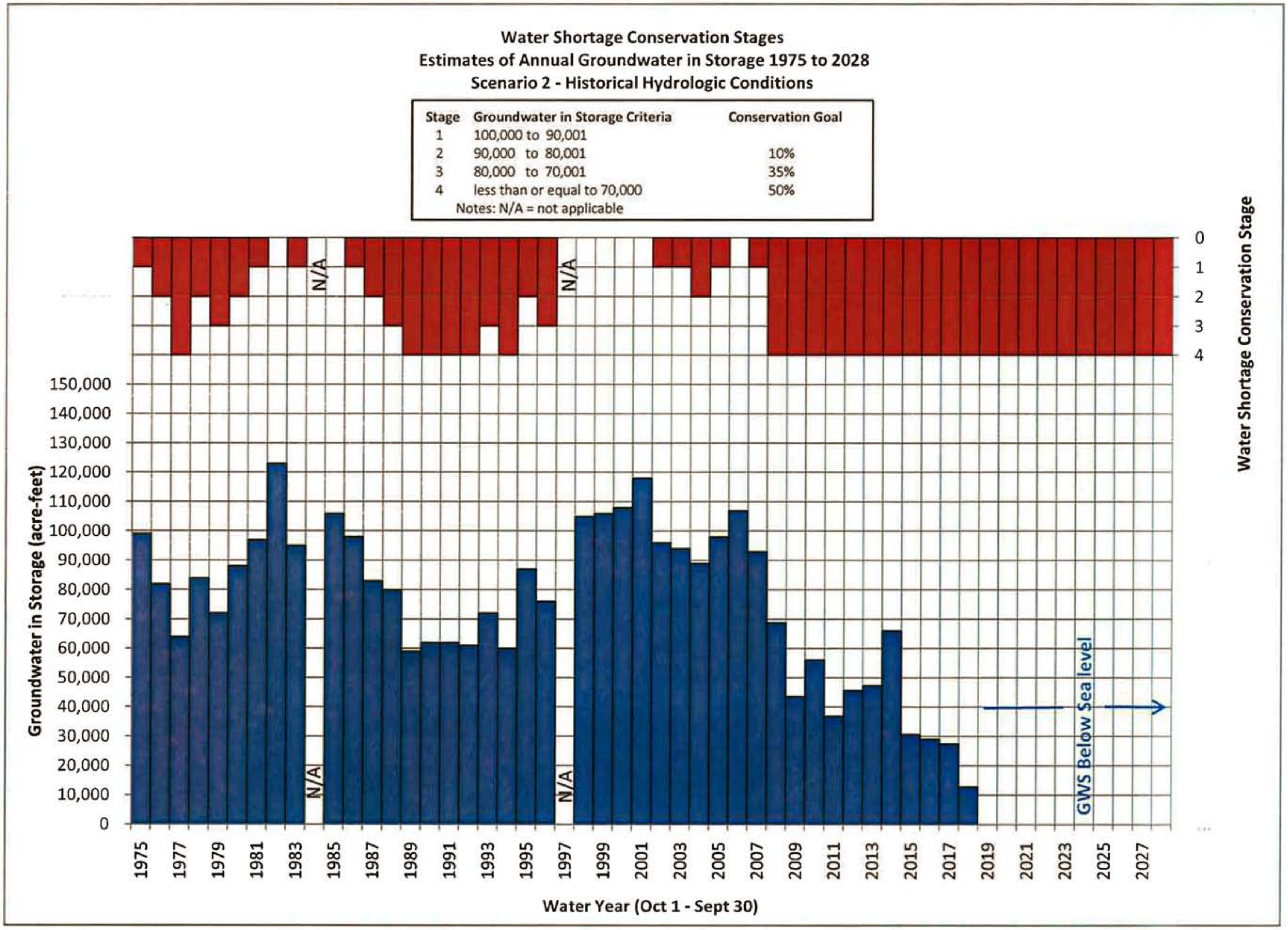
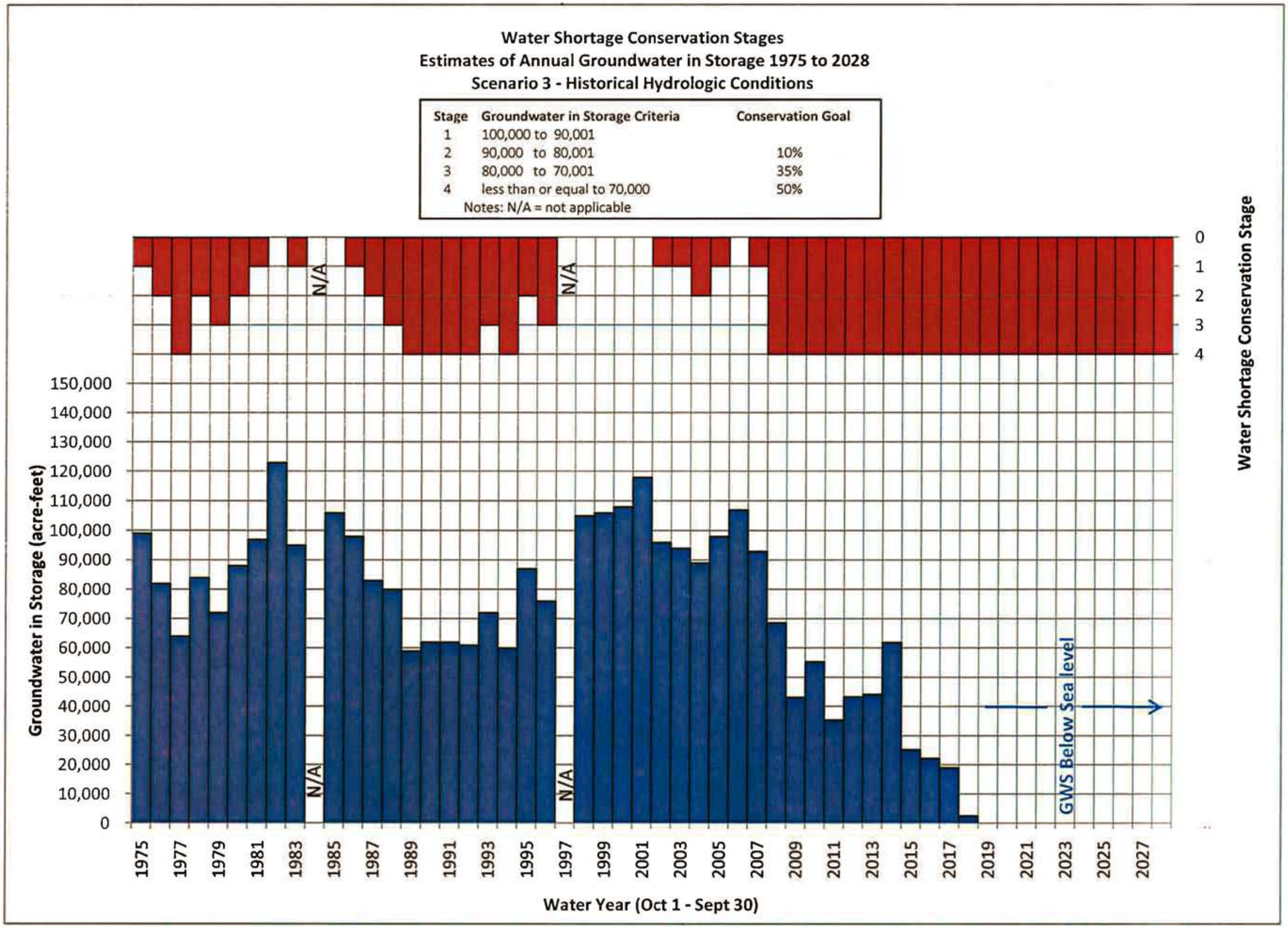
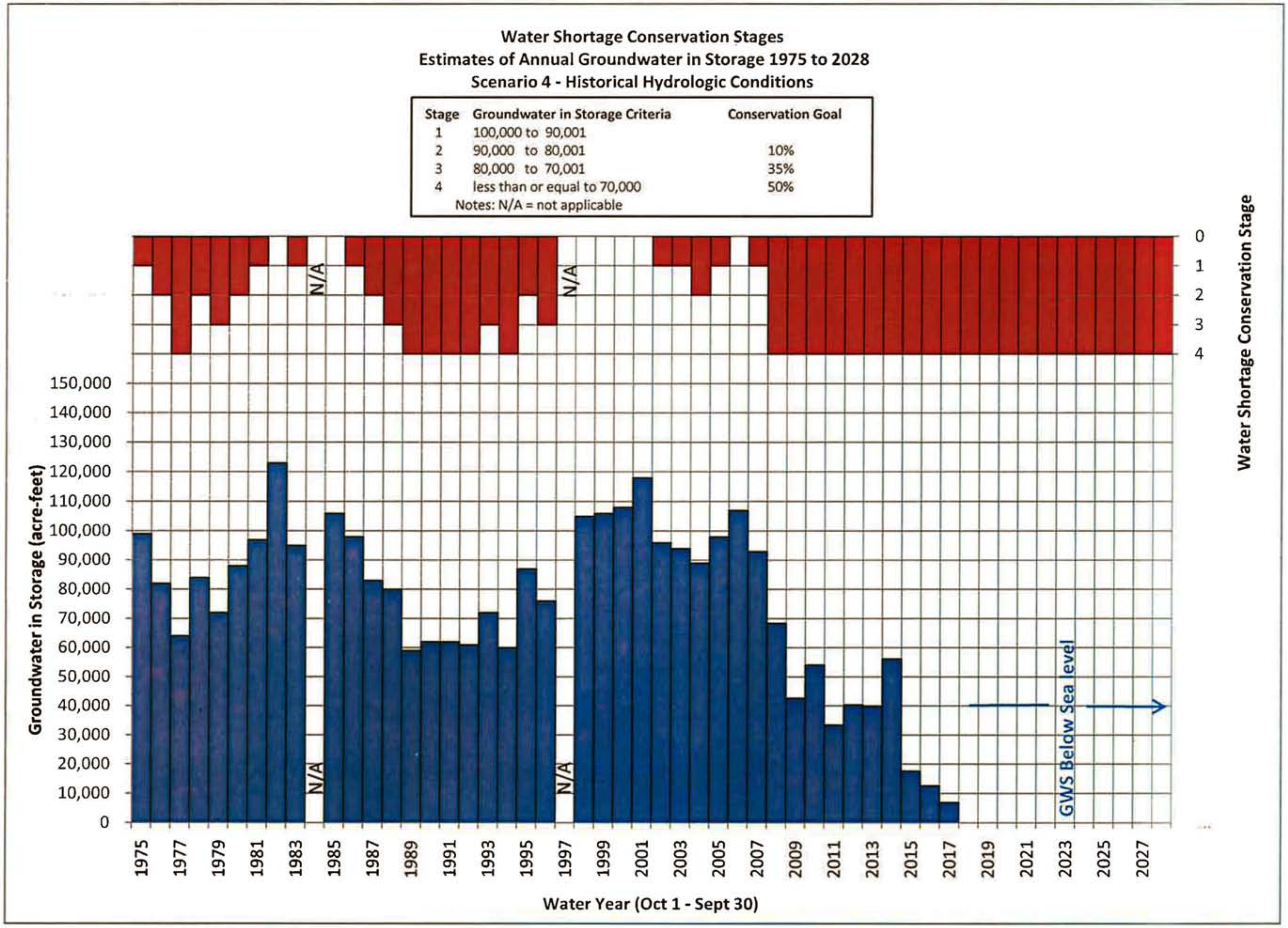
FIGURE 3




1/7/2008 DRAFT **FIGURE 4**




1/7/2008 DRAFT **FIGURE 5**




1/7/2008

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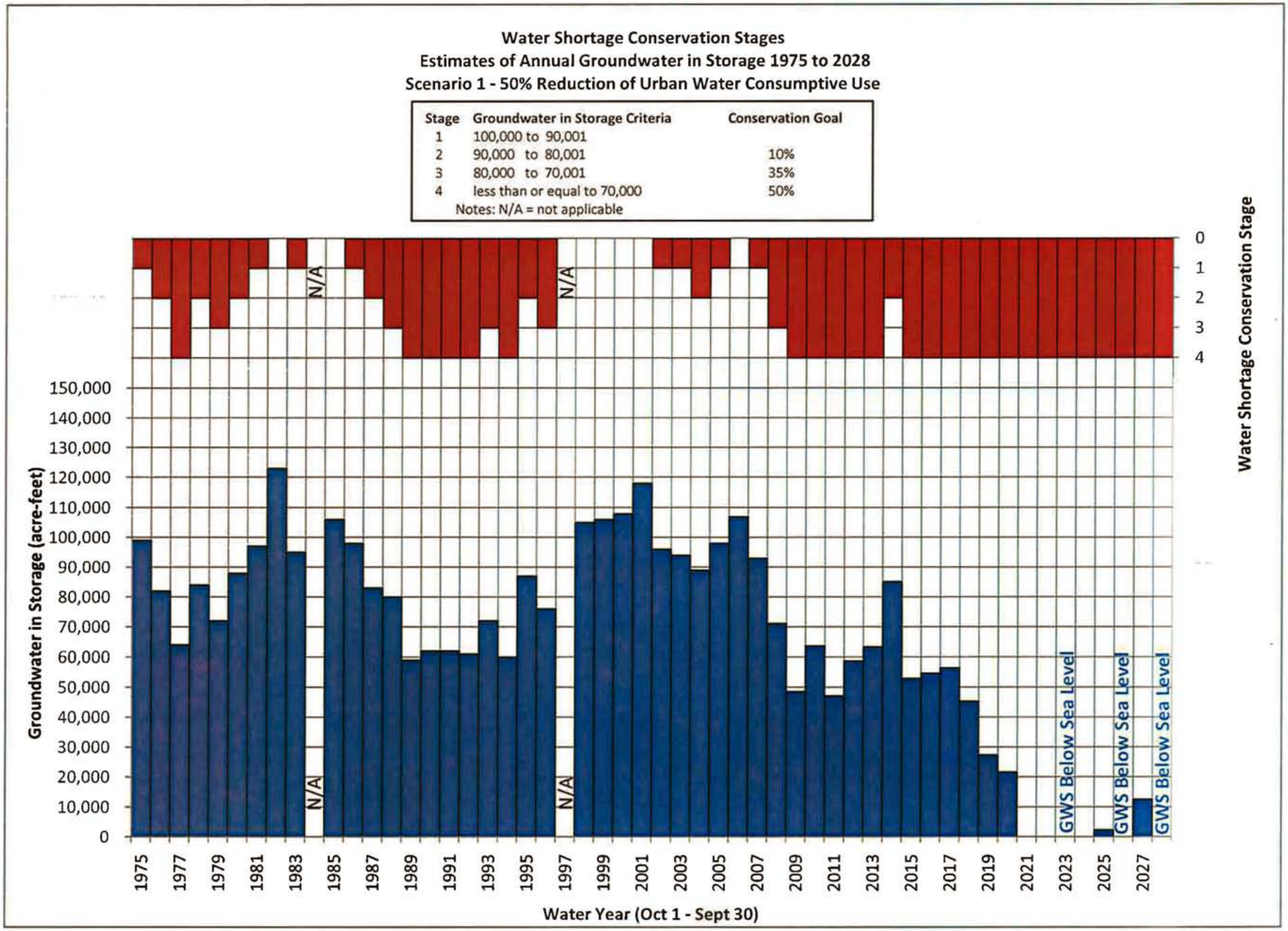
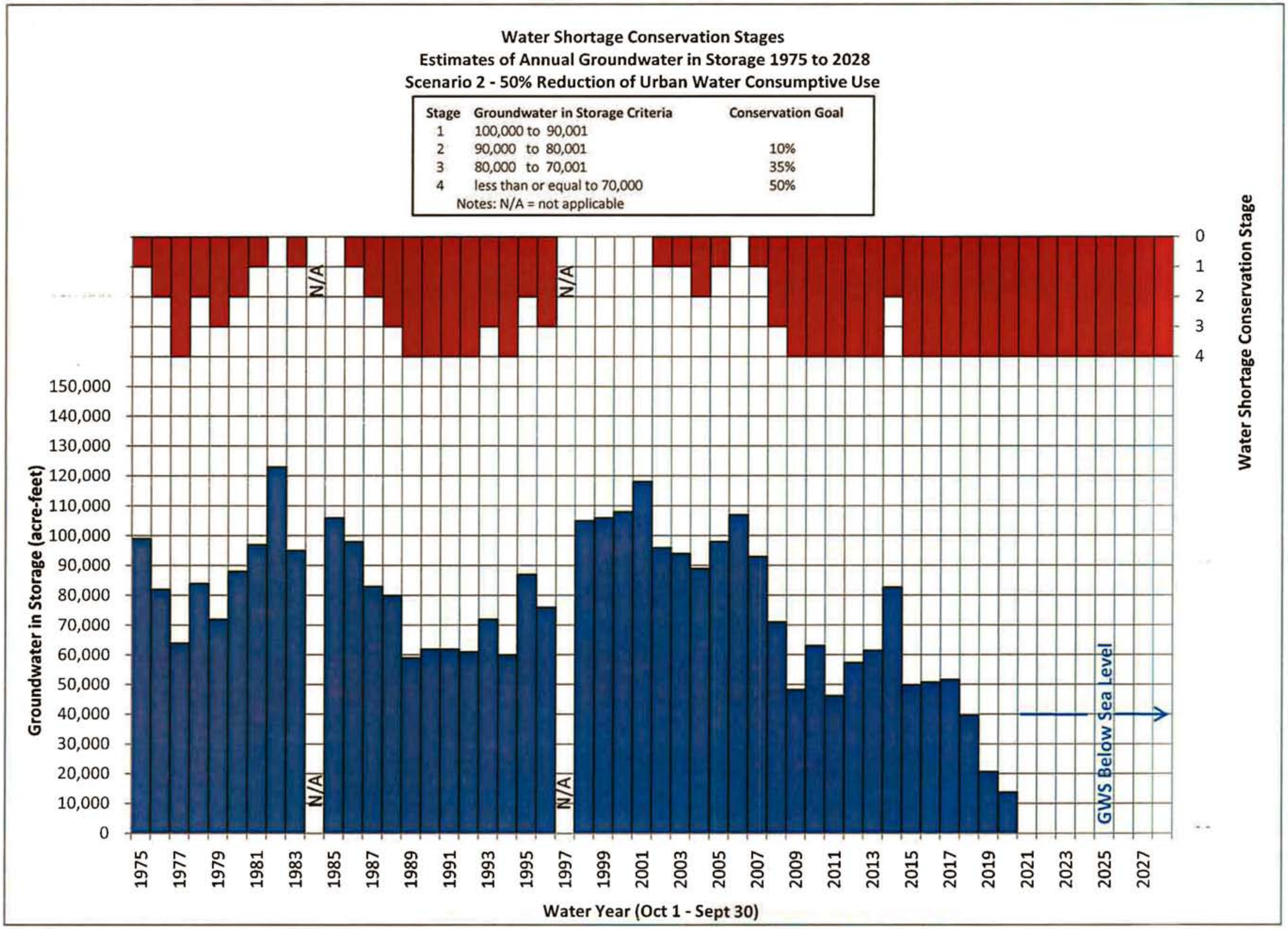
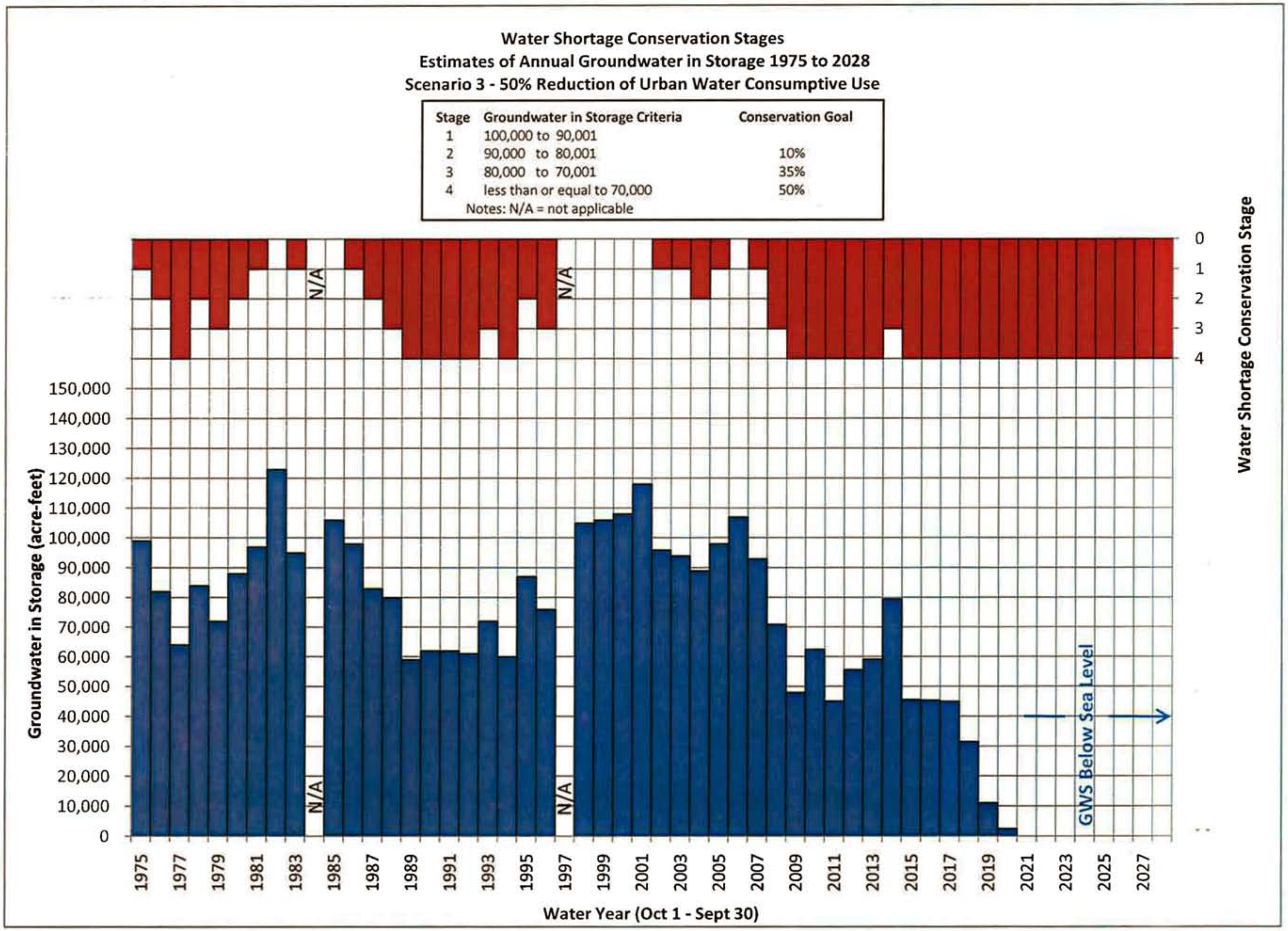
FIGURE 6



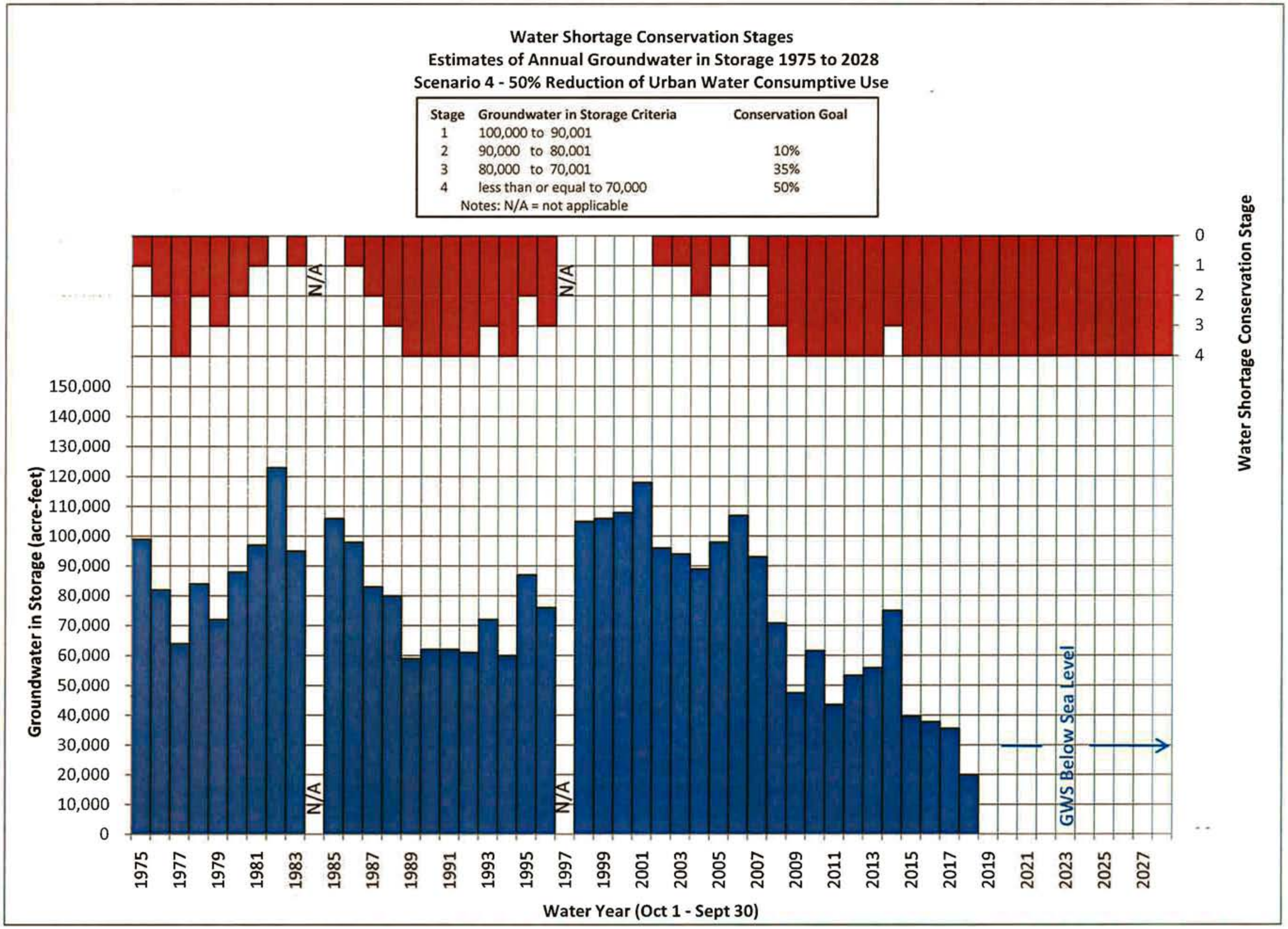

1/7/2008 DRAFT **FIGURE 7**




1/7/2008 DRAFT FIGURE 8



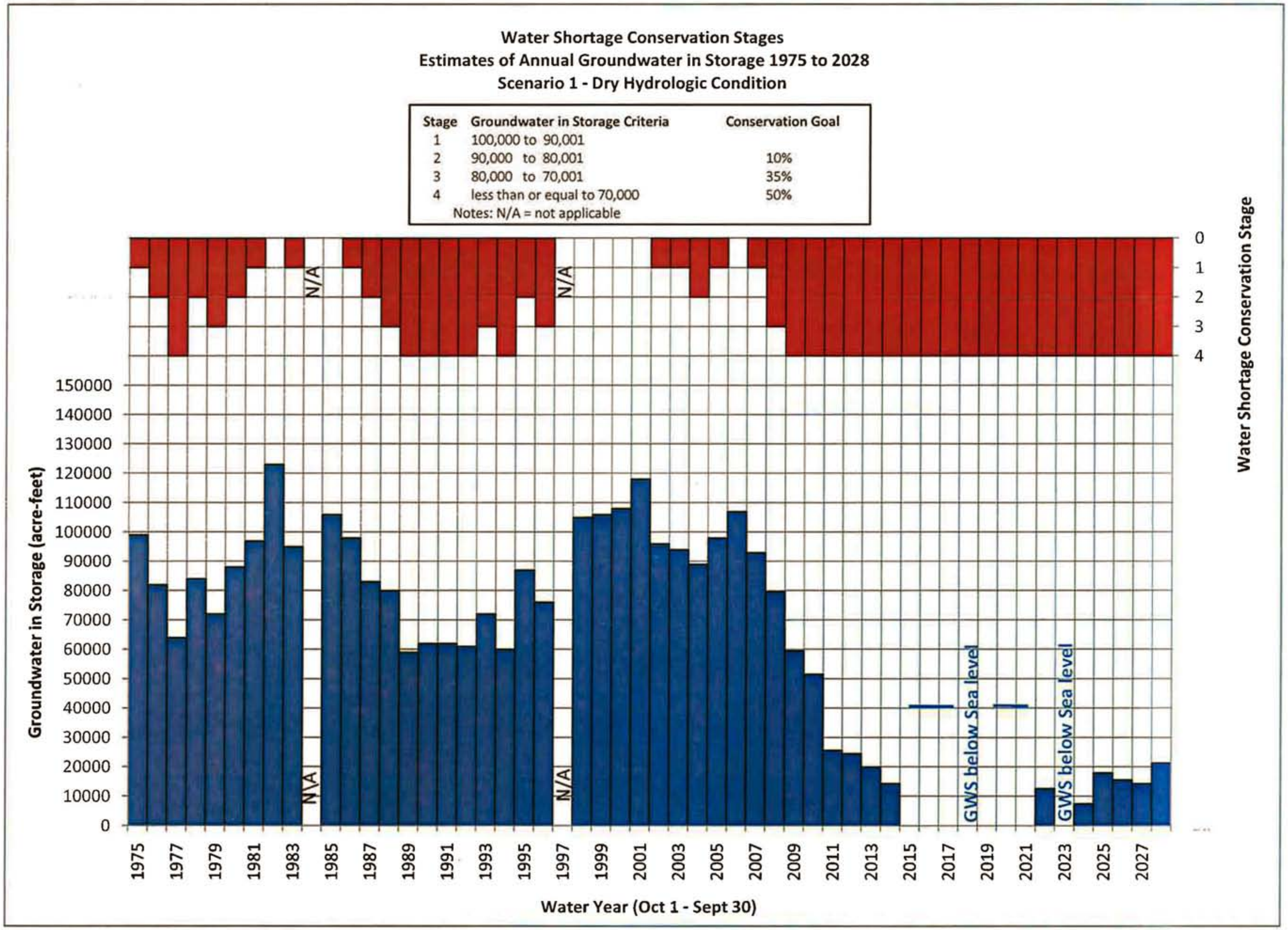

1/7/2008 DRAFT **FIGURE 9**



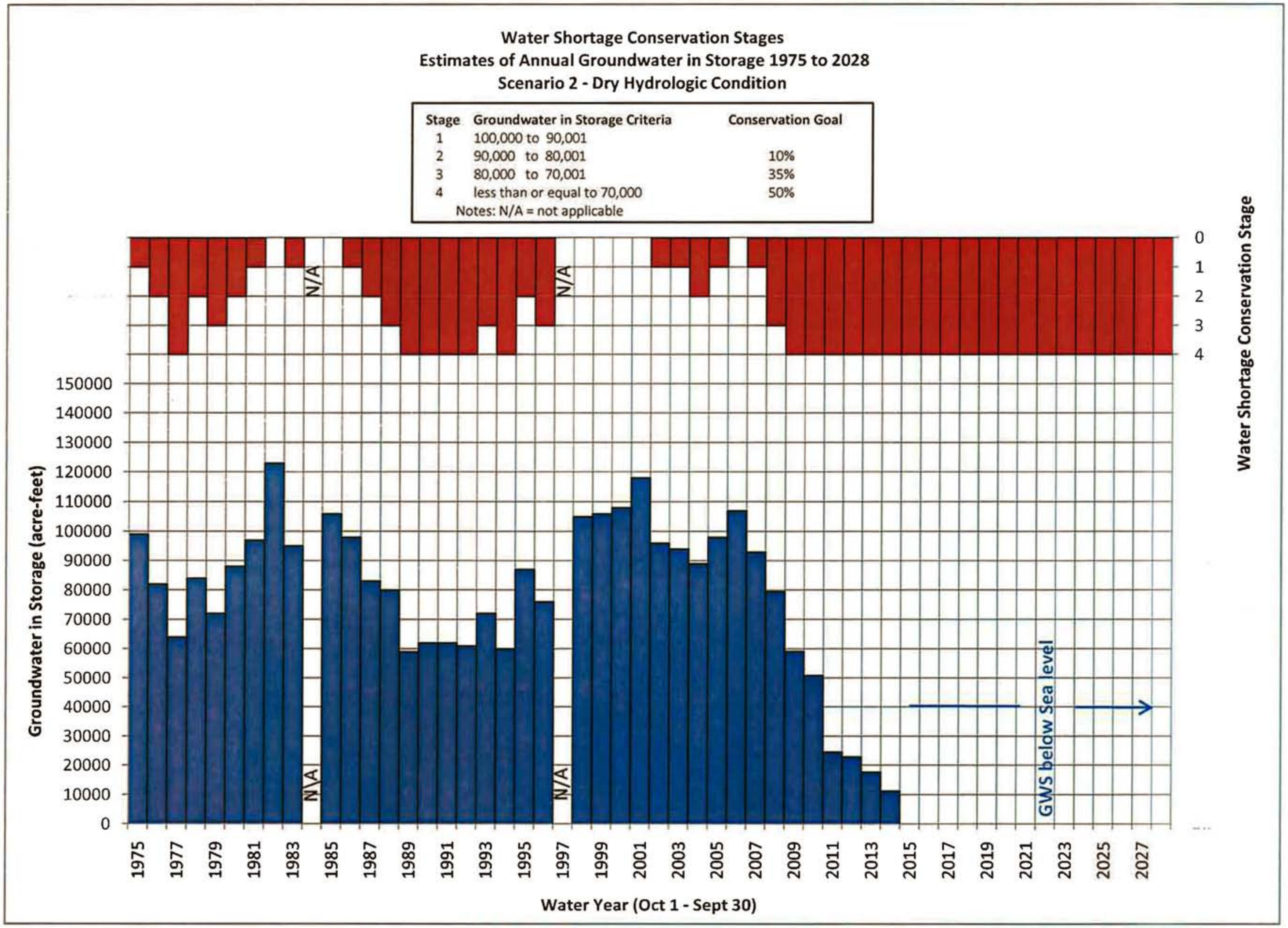

1/7/2008

DRAFT

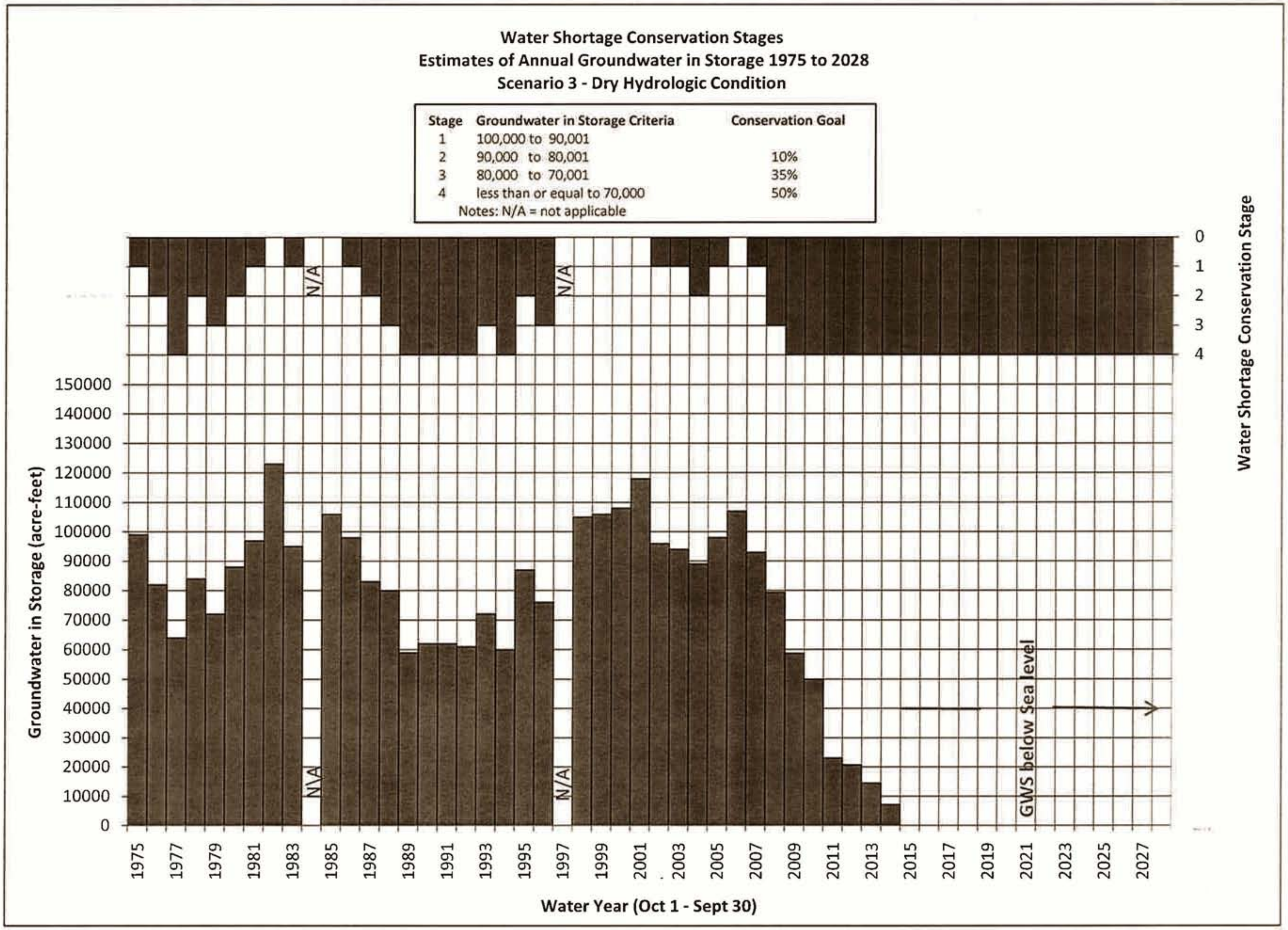
FIGURE 10



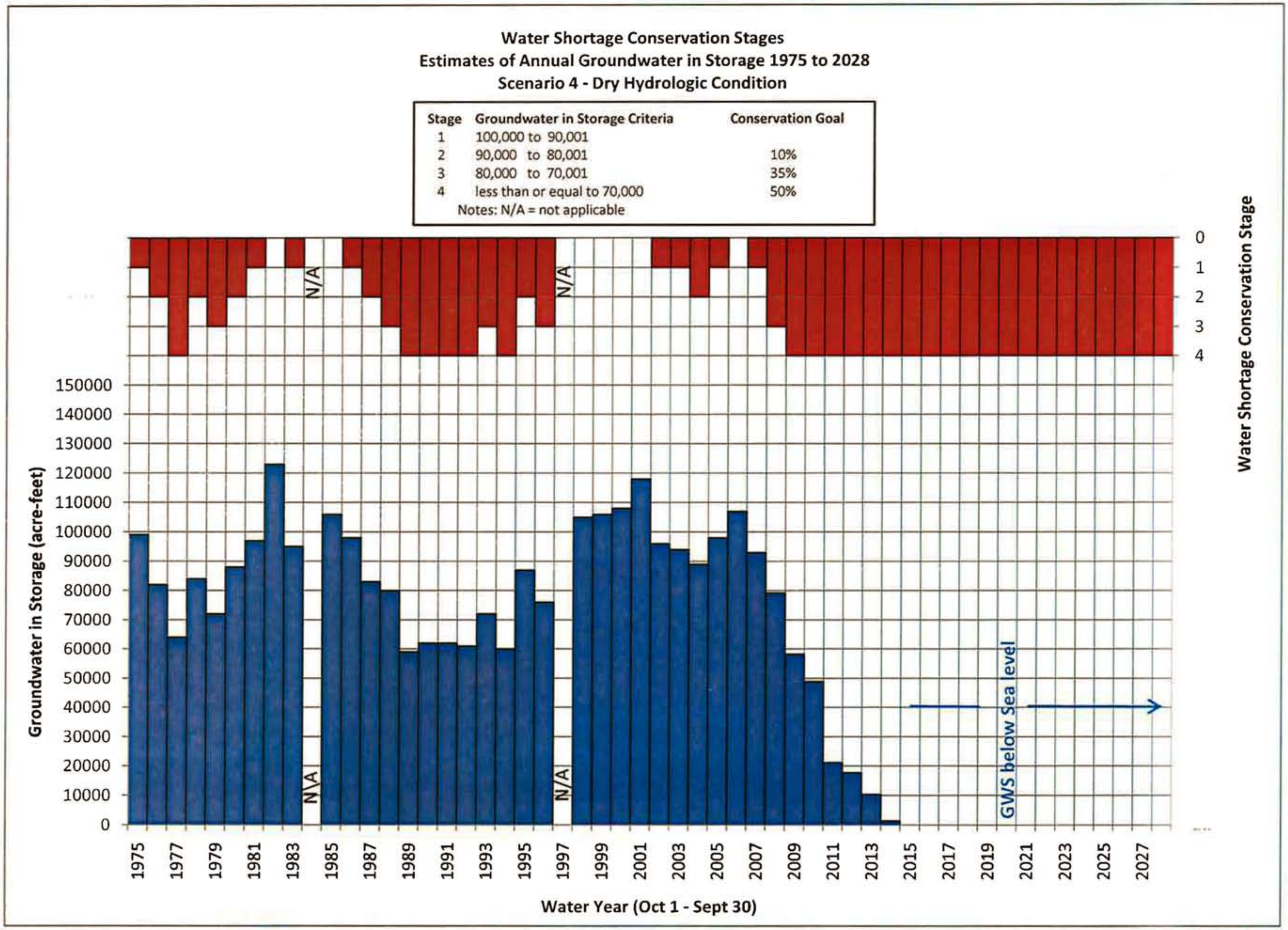

1/7/2008 DRAFT **FIGURE 11**




1/7/2008 DRAFT **FIGURE 12**




1/7/2008 DRAFT **FIGURE 13**




1/7/2008

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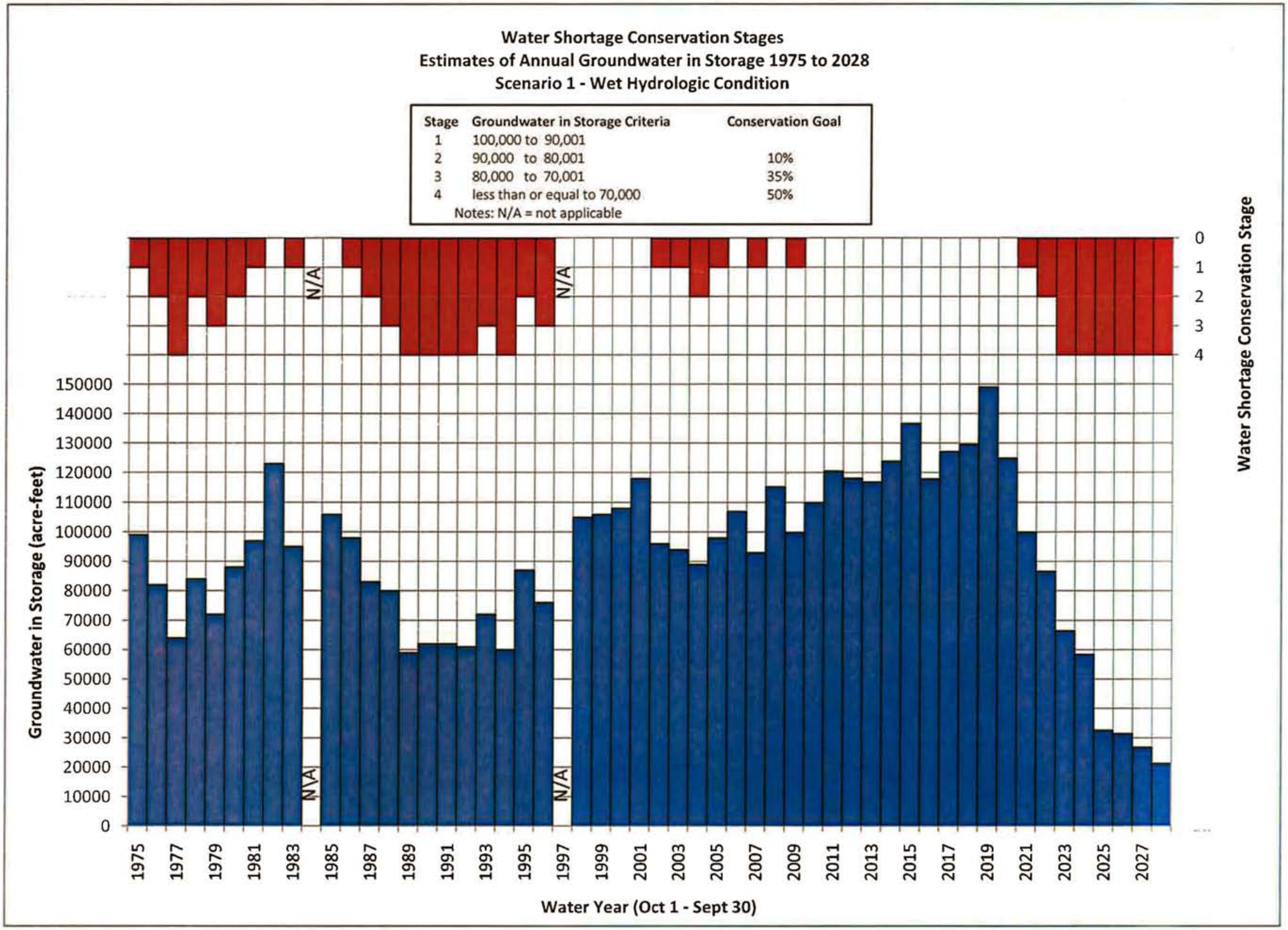
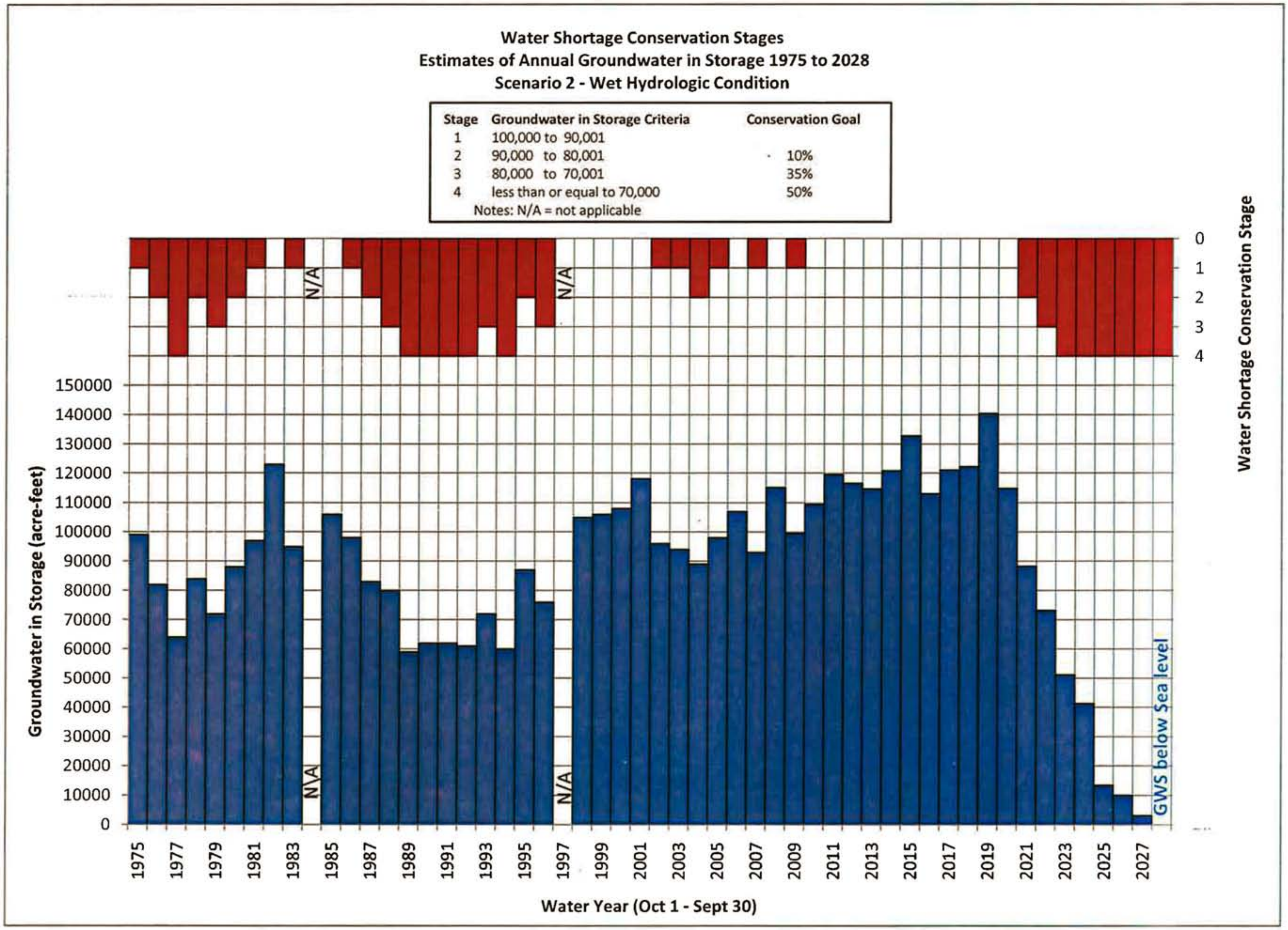
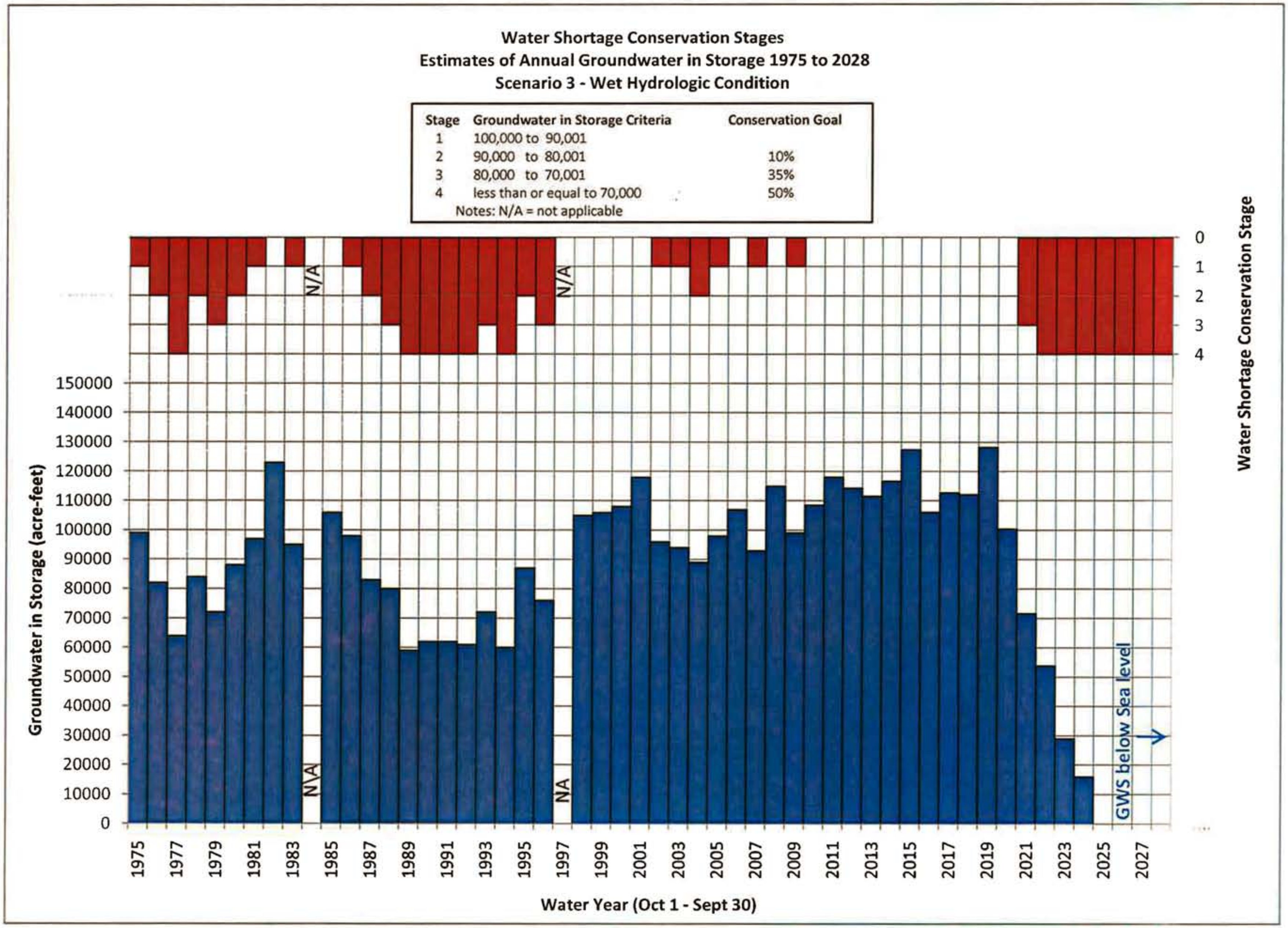
FIGURE 14




1/7/2008 DRAFT **FIGURE 15**


Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 2 - Wet Hydrologic Condition
Stage Groundwater in Storage Criteria Conservation Goal
1 100,000 to 90,001
2 90,000 to 80,001 10%
3 80,000 to 70,001 35%
4 less than or equal to 70,000 50%
Notes: N/A = not applicable
N/A
N/A
GWS below Sea level
Groundwater in Storage (acre-feet)
Water Shortage Conservation Stage
Water Year (Oct 1 - Sept 30)
0
1
2
3
4
150000
140000
130000
120000
110000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027




1/7/2008

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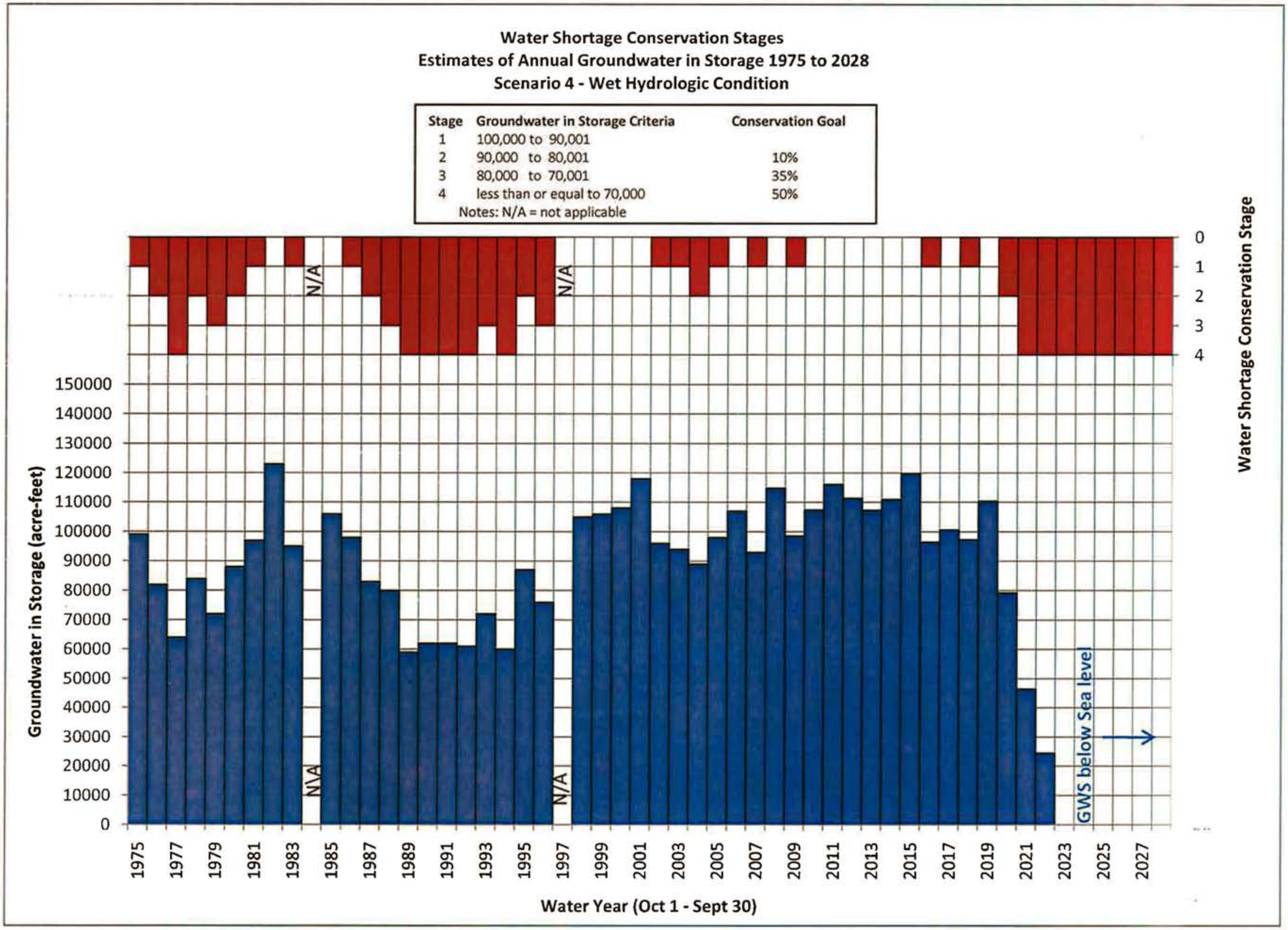
FIGURE 17




1/7/2008 DRAFT **FIGURE 18**

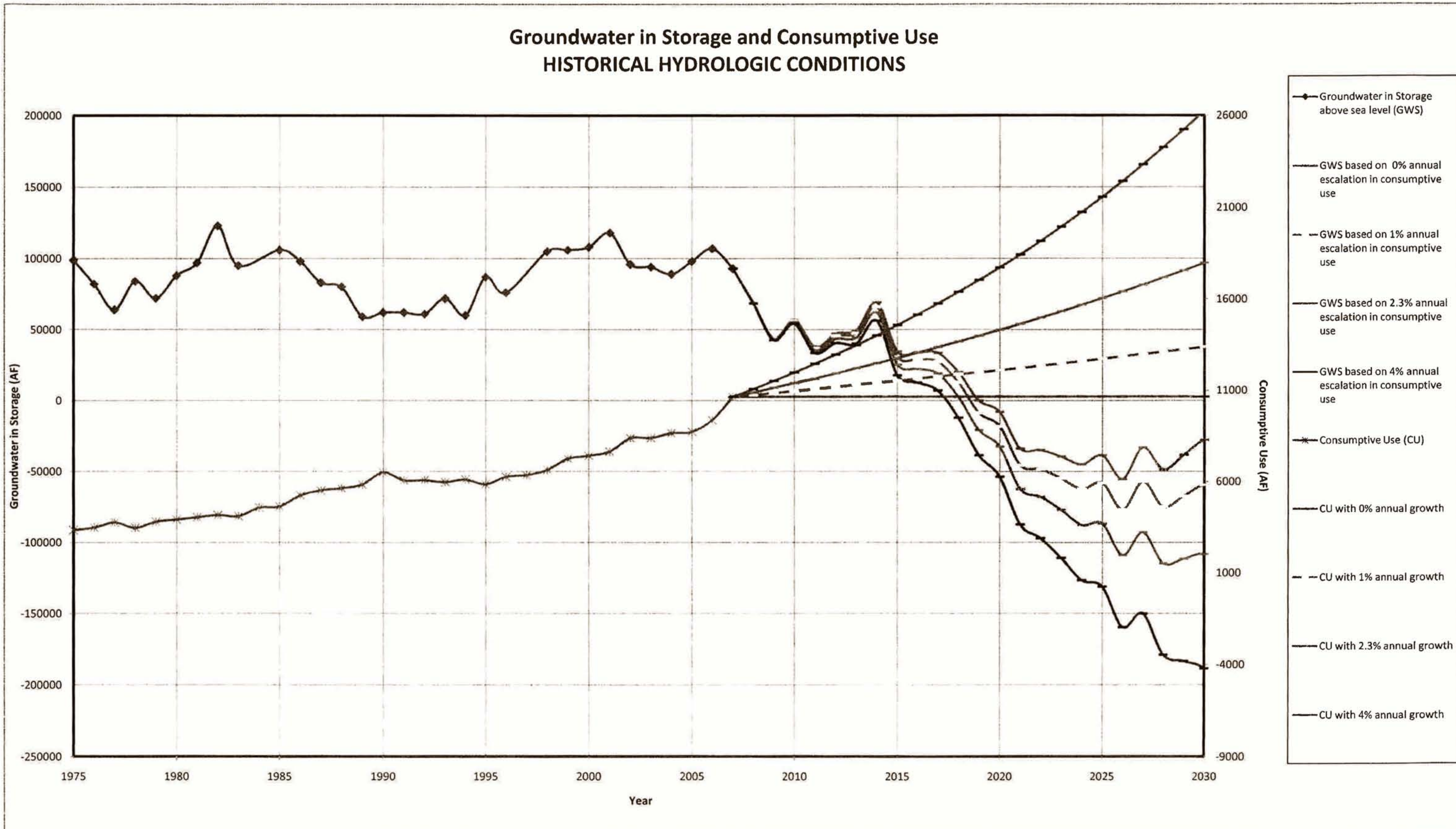

Groundwater in Storage and Consumptive Use
HISTORICAL HYDROLOGIC CONDITIONS
200000
150000
100000
50000
0
-50000
-100000
-150000
-200000
-250000
Groundwater in Storage (AF)
26000
21000
16000
11000
6000
1000
-4000
-9000
Consumptive Use (AF)
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
Year
Groundwater in Storage above sea level (GWS)
GWS based on 0% annual escalation in consumptive use
GWS based on 1% annual escalation in consumptive use
GWS based on 2.3% annual escalation in consumptive use
GWS based on 4% annual escalation in consumptive use
Consumptive Use (CU)
CU with 0% annual growth
CU with 1% annual growth
CU with 2.3% annual growth
CU with 4% annual growth

Figure 19

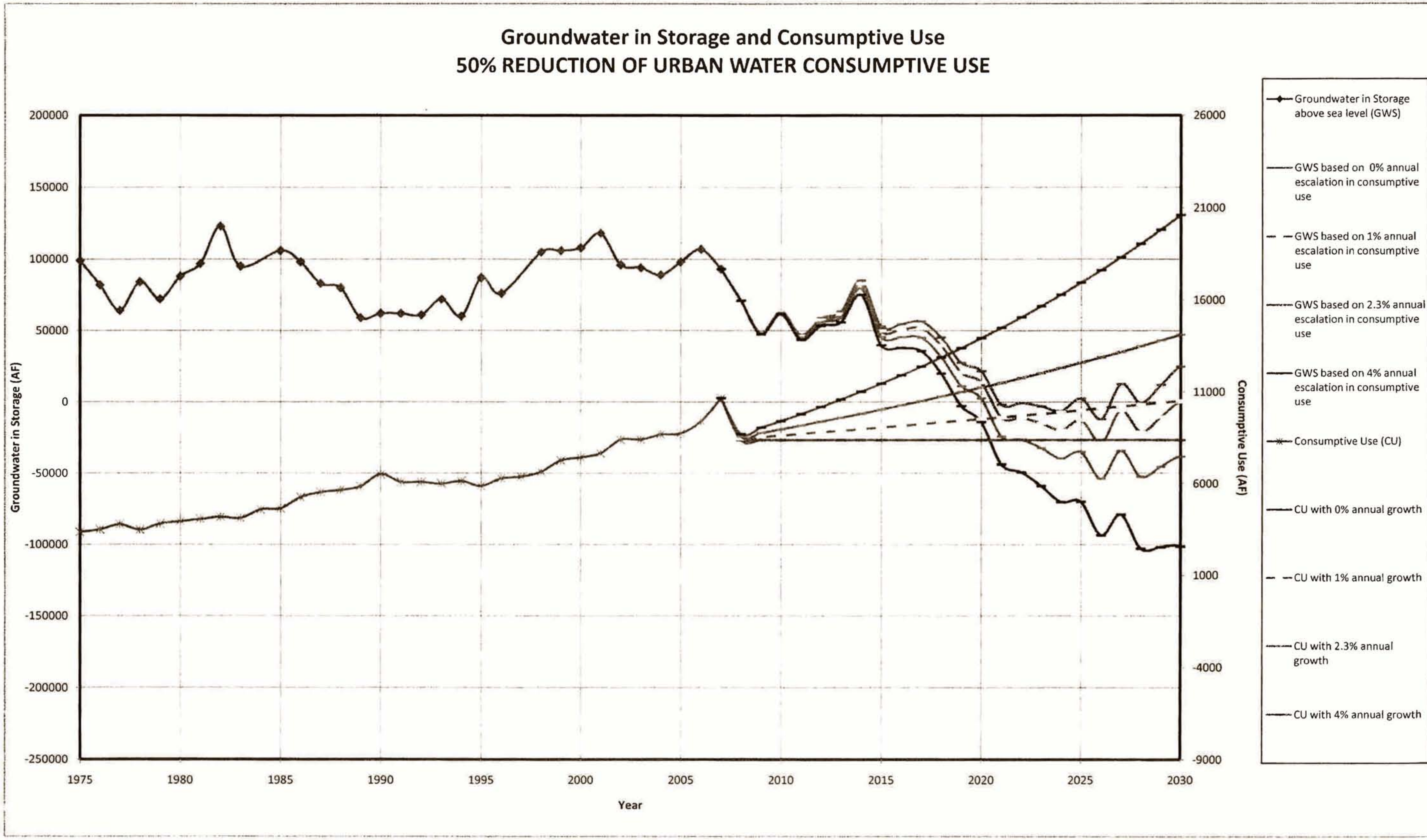



Figure 20



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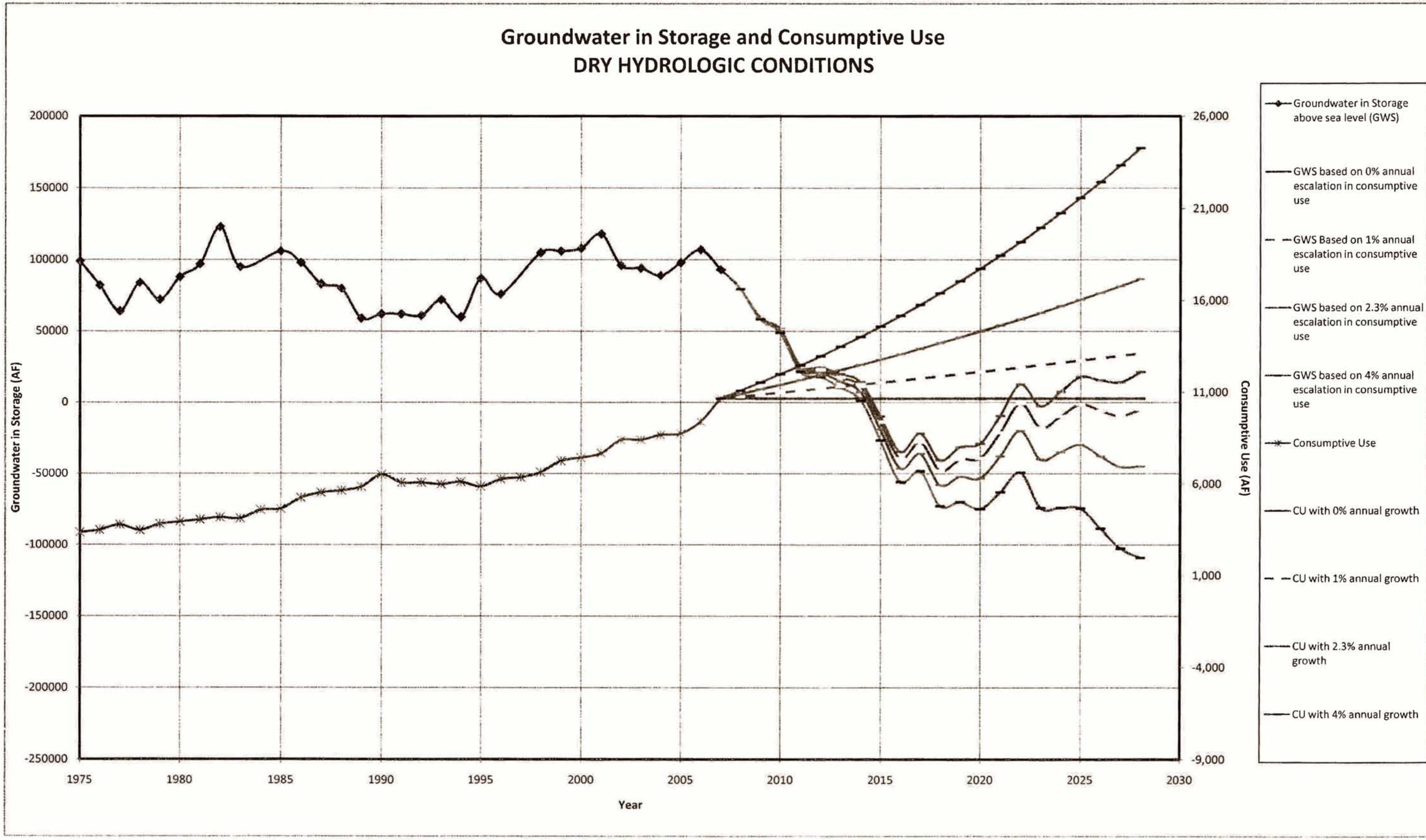


Figure 21



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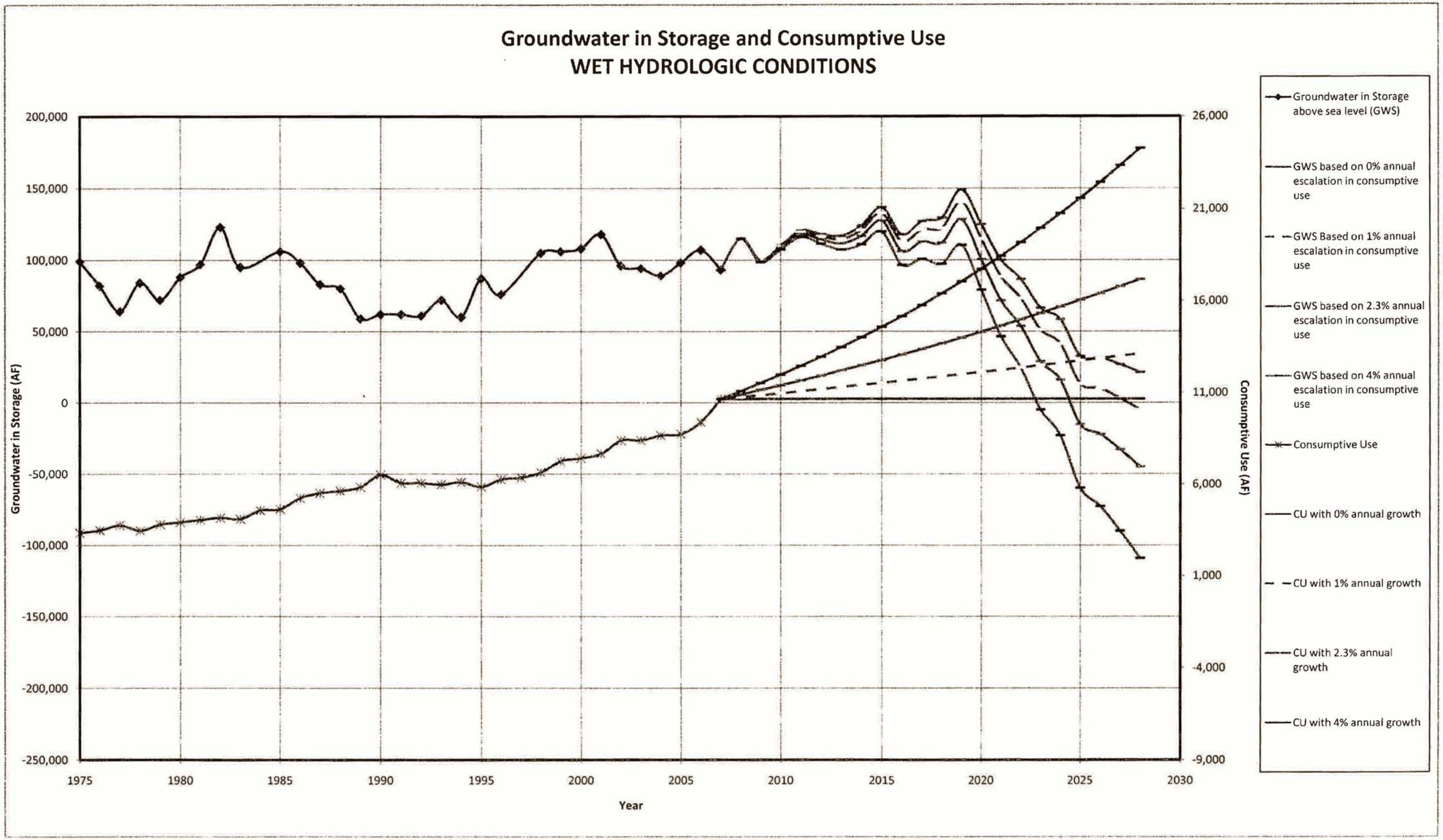

Groundwater in Storage and Consumptive Use
WET HYDROLOGIC CONDITIONS
200,000
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
-250,000
Groundwater in Storage (AF)
26,000
21,000
16,000
11,000
6,000
1,000
-4,000
-9,000
Consumptive Use (AF)
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
Year
Groundwater in Storage above sea level (GWS)
GWS based on 0% annual escalation in consumptive use
GWS Based on 1% annual escalation in consumptive use
GWS based on 2.3% annual escalation in consumptive use
GWS based on 4% annual escalation in consumptive use
Consumptive Use
CU with 0% annual growth
CU with 1% annual growth
CU with 2.3% annual growth
CU with 4% annual growth


## 2007 Nipomo Mesa Land Use Classification

- Phase III NMMA Boundary
- Agriculture
- Urban
- Native

0 0.25 0.5 1 1.5 2

Miles

N

***NOTES:***
Base Map: June 2007 IK Curtis 1ft-res air photo
Coordinate System: UTM Zone 10N
Horizontal Datum: NAD 83

SAIC® *From Science to Solutions*

FIGURE: 23

DATE: 11/20/07 BY: A Pappas