TO: BOARD OF DIRECTORS

FROM: BRUCE BUEL BSB

DATE: JANUARY 4, 2008

AGENDA ITEM
E-4
JAN. 9, 2008

EMERGENCY WATER SHORTAGE REGULATIONS

ITEM

Propose emergency water shortage regulations for presentation to community at January 30, 2008 workshop to consider adoption [PROVIDE POLICY GUIDANCE].

BACKGROUND

Your Honorable Board reviewed a rough draft of the revised Emergency Water Shortage Regulations at your December 12, 2007 Board Meeting and set this hearing to consider finalizing the proposal to present to the community at the January 30, 2008 workshop (at 6:30pm at the Forum at Nipomo High School). At the December 12, 2007 Board Meeting, your Honorable Board made several edits to the draft and agreed, in concept, to a proposed set of trigger points based on SAIC's research. Your Honorable Board further agreed to discuss policy issues at this meeting. Attached is the most recent edition of the text of an ordinance showing the edits and inserting the proposed trigger points for determining the stage, if any, for responding to water shortage emergencies.

Also attached is a draft Technical Memorandum from SAIC predicting future water storage volumes above sea level in the Nipomo Mesa Groundwater Management Area assuming different climatic regimes. This Technical Memoranda also evaluates the retention of storage with enactment of Emergency Water Shortage regulations for municipal customers and documents their recommendations regarding set of triggers to shift between stages.

The Water Conservation Committee has scheduled a meeting on January 4, 2008 to continue its review of this matter and expects to forward additional recommendations to the full Board at your January 9, 2008 Board meeting.

RECOMMENDATION

Staff recommends that your Honorable Board discuss the ordinance text and the technical memoranda and then order edits so that staff can finalize the regulations for presentation to the Community at the Workshop.

ATTACHMENTS

- Draft Text of Emergency Water Supply Regulations
- Draft SAIC Technical Memoranda

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DRAFT
12-31-07 Board Comments
w/amended findings redlined
Mike Winn in Blue
Larry Verheilig in Pink

Nipomo Community Services District Draft Ordinance
Chapter 3.24
Emergency Water Shortage Regulations

3.24.010 Purpose

It is the purpose and intent of this Chapter to provide rules, regulations and procedures by which the Nipomo Community Services District ("District") Board of Directors can restrict water use upon a determination that there exists, or there is a threat of, a water shortage that affects the District's ability to supply its customers with potable water. The rules, regulations and procedures of this Chapter are in addition to water conservation measures that are adopted by the Board of Directors to avoid water shortage conditions and or conservation measures adopted by the County of San Luis Obispo in response to certification of Severity Level III for the Nipomo Mesa Water Conservation Area.

3.24.020 Findings

A. The District has been pumping from the underlying groundwater basin since 1965. In 2006 the District's wells extracted approximately 3,000 plus acre feet and supplied approximately 4,000 connections. The District's boundaries are largely within the Nipomo Mesa Water Conservation Area (NMWCA) as referenced in San Luis Obispo County Ordinance 3090.

B. The District's current water supply is groundwater extracted primarily from the NMWCA. A small proportion of District's water is pumped from groundwater in the Nipomo Valley.

C. The primary source of recharge of the NMWCA is deep percolation of rainwater, with contributions from agricultural and urban return flows, and sub-surface inflows within the Santa Maria Basin. The dependence on deep percolation as the major source of recharge makes the groundwater supply within the NMWCA vulnerable during prolonged periods of low rainfall.

D. Since July 1997 the Santa Maria Groundwater Basin has been the subject of ongoing litigation between nearly eight hundred parties (800), including the District, -with competitive claims to pump groundwater. (Superior Court of the State of California, County of Santa Clara, Case No. 770214).

E. As part of the Groundwater Adjudication referenced in Finding D, above, a majority of parties, including the District, ConocoPhillips, the Woodlands Mutual Water Company, Golden State Water Company and Rural Water Company have entered into a Stipulation, imposing a physical solution to establish a legal and practical means of assuring the Nipomo Mesa Management Area's (NMMA) longterm sustainability (herein "Stipulation"). The NMMA's boundaries are substantially similar to the boundaries referred to herein as the NMWCA. The Stipulation contemplates the formation of a NMMA Technical Group to develop a monitoring program for the NMMA. Additionally, the NMMA Technical Group will develop, for Court approval, criteria for declaring Potentially Severe Water Shortage Conditions and Severe Water Shortage Conditions.

F. In November 2004, the County Board of Supervisors received a Resource Capacity Study ("RCS") prepared by the San Luis Obispo County Planning Department for the NMWCA. The RCS reached the same conclusions as other groundwater reports that pumping from the NMWCA exceeds safe yield and recommended a Severity Level III be adopted pursuant to the County's Resource Management System.

G. On August 22, 2007, Science Applications International Corporation ("SAIC") issued Technical Memorandum regarding Groundwater in Storage Above Sea Level for the Nipomo Mesa Management Area as of Spring, 2007. That Memorandum summarizes the decline in groundwater storage in the NMWCA from Spring of 2000 through Spring of 2007. The Technical Memorandum concluded that between Spring of 2000 and Spring of 2007, the groundwater in storage declined by 15,000 AF, with 14,000 AF decline between Spring of 2006, and Spring of 2007.

H. On June 26, 2007, the County, at the recommendation of the Planning Commission, certified a Severity Level III for water resources of the NMWCA pursuant to the County's Resource Management System. Under the County system, Level III indicates an "Unavoidable Resource Deficiency," defined as follows: "This is the most critical level of concern. Level III occurs when the capacity (maximum safe yield) of a resource has been met or exceeded. At Level III there is a deficiency of sufficient magnitude that drastic actions may be needed to protect public health and safety".

I. The San Luis Obispo County Public Works Department measures groundwater surface elevations in monitoring wells located within the NMWCA in the Spring and Fall of each year ("DPW Reports").

J. Science Applications International Corporation (SAIC), using the DPW Reports and other data, has developed a method of calculating groundwater in storage above mean sea level within the NMWCA.

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K. SAIC Reports have been presented to the District Board of Directors, with the most recent report dated December 5, 2007. The December 5, 2007 SAIC Report provides a historical analysis of the water demand and groundwater in storage of the NMMA. The December 5, 2007 SAIC Report recommends the use of groundwater in storage to establish trigger points to implement water shortage regulations.

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L. Using groundwater in storage above mean sea level within the NMMA provides a logical method of establishing the threat or existence of water shortages and the adoption of regulations to conserve the water resource.

M. This Chapter is adopted to conserve a public water supply for the protection of the health, welfare and safety of the residents of the Nipomo Community Services District.

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3.24.025 Authority

The District's authority includes, but is not limited, to Government Code §61100 (A) and §§ 71640 et seq. of the Water Code.

3.24.030 Definitions

AF means acre feet of water.

Base Year means the calendar year immediately prior to the District Board of Directors declaring a Water Conservation Stage.

CCF means 100 cubic feet of water.

Customer means the owner of property that receives District water service.

GWS means groundwater in storage above mean sea level, as reported to the District.

Irrigation Use means and includes all uses other than residential use and commercial use and includes water supplied to parks, recreational facilities such as golf courses, landscaping, and water supplied to schools to irrigate turf.

Multi-family Residential means (A): a building(s) or portion thereof designed and used as residence for two or more families living independently of each other under a common roof. Such uses shall include but are not limited to: duplexes, triplexes, apartments, planned unit developments, condominiums and townhouses, and (B) mobile homes used as residential units within mobile home parks. Multi-family Residential does not include secondary units.

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Non-Residential Use means all uses other than residential uses, including commercial use and irrigation use, that receive District water.

Owner means one who has title to the property being served, or is legally authorized to represent the title owner.

Person includes a natural person, joint venture, joint stock company, partnership, association, club, company corporation, business, trust organizer, or the manager, lessee, agent, servant officer, or employee of any of them.

Single Family Residence or SF means a stand-alone building not connected to another dwelling, and designed for residential occupancy by one family regardless of zoning of the property. A single family residence may, or may not, have a secondary unit.

Deleted: **Reset Value** means when GWS equals or exceeds 95,000 AF as reported to the District Board of Directors.¶

3.24.030 Santa Maria Groundwater Adjudication

With reference to the adjudication of the Santa Maria Groundwater Basin and the formation of the NMMA Technical Group, the following are incorporated into the most appropriate stage referenced in Section 3.24.040 by reference:

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A. The Court- approved criteria for declaring a Potentially Severe Water Shortage Condition and Severe Water Shortage Condition.

B. The conservation measures recommended by the NMMA Technical Group to address Potentially Severe Water Shortage Conditions.

C. Water conservation programs approved by the Court for Severe Water Shortage Conditions.

3.24.040 Trigger Points

Water Shortage Conservation Stages I – IV shall be triggered by the following conditions when the GWS is at or below the relevant Trigger Condition:

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Stage I Conservation – Water Watch

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Trigger Condition: The GWS is less than 100,000 AF but greater than the Stage II Trigger Point.

Stage II Conservation – Water Warning

Trigger Condition: The GWS is less than 90,000 AF but greater than the Stage III Trigger Point.

Stage III Conservation – Water Emergency

Trigger Condition: The GWS is less than 80,000 AF but greater than the Stage IV Trigger Point.

Stage IV Conservation – Extreme Water Emergency

Trigger Condition: The GWS is less than 70,000 AF.

3.24.050 Stage Implementation

The General Manager shall monitor the groundwater in storage above mean sea level and the demand for water and shall report in writing to the Board, on or before June 1 of each year, the appropriate water conservation stage, if any, referenced in Sections 3.24.040, above. The Board shall, no later than four weeks after receipt of such report, consider the General Manager's report at a public hearing. Notice of the time and place of the public hearing shall be published one time at least seven days prior to the date of the hearing in a newspaper of general circulation within the District. If the Board concurs that any such events have occurred, it shall immediately adopt a resolution implementing a water conservation stage referenced in Section 3.24.060.

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3.24.060 Water Shortage Conservation Stages.

A. Stage I Conservation – Water Watch.

1. Upon a determination by the Board of Directors that a Stage I condition exists, the following prohibitions shall take effect.:

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(a) All outdoor irrigation of vegetation shall occur only after 8 p.m. and before 9 a.m.

(b) The use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground and other hard-surface areas by direct application is prohibited.

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(c) The use of non-drinking water fountains, except for those using recirculated water, is prohibited.

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(d) Use of water which results in run-off in gutters or streets is prohibited.

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2. In addition to those measures stated above, the Board of Directors by resolution and/or ordinance may adopt additional water conservation measures.

3. The General Manager shall provide notice to all District customers, regarding the Board of Directors, declaration of WWwater watch condition and activation of Stage I Water Conservation Program.

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Such notice shall be mailed within fourteen (14) days of the Board's action.

B. Stage II Conservation – Water Warning.

1. Upon a determination by the Board of Directors that the a Stage II condition exists, the following prohibitions shall take effect with the goal of achieving a **ten percent (10%)** reduction in water consumption:

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(a) The water conservation measures referenced in Stage I.

(b) Water deliveries for residential uses shall be limited as follows:

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1. 24 ccf of water bi-monthly or 295 gallons per day per multi-family residential unit.
2. 27 ccf of water bi-monthly or 329 gallons per day per single family residential unit on lots <4500 sf.
3. 36 ccf of water bi-monthly or 442 gallons per day per single family residential unit on lots 4.5 – 10 K sf.
4. 64 ccf of water bi-monthly or 787 gallons per day on single family residential lots >10 K sf.

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(c) Non-residential uses shall be limited to ninety percent (90%) of their water consumption for the same billing cycle during the Base Year.

(d) A surcharge of **two hundred percent (200%)** will be levied on all water use in excess of the maximum water use allotment referenced in subparagraphs (b) and (c) above and shall be assessed to the account of the customer.

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(e) Use of water from fire hydrants shall be limited to fire suppression and/or other activities immediately necessary to maintain health, safety and welfare of residents within the boundaries of the Nipomo Community Services District.

(f) The use of District potable water for dust control and compaction for construction projects shall be prohibited.

(g) The washing of automobiles, pickup trucks, horse trailers, boats and other types of mobile equipment not occurring upon the immediate premises of a commercial car wash and/or commercial service station that use recirculated water

shall be prohibited. Emergency service vehicles are exempted from the requirements of this subsection (g).

(h) Restaurants shall not serve water to their customers except upon specific request.

(i) Applications for Intent-to-Serve Letters shall be received and placed on a waiting list, but further processing shall be suspended.

(j) The use of potable water to irrigate grass, lawns, ground cover, shrubbery, crops, vegetation, ornamental trees, etc., shall be limited to Mondays and Thursdays for even numbered addresses and Tuesdays and Fridays for odd numbered addresses,

(j) Water main flushing shall only occur in emergency situations as declared by the District General Manager.

(k) All swimming pools shall be covered when not in use.

2. The General Manager is authorized and directed to pursue a vigorous public information program about water supply conditions and the need to reduce water consumption by such means deemed appropriate by the General Manager.

3. The District will meet with other water purveyors, public school districts, park agencies, and golf courses, that use water sources other than District supplied water, to seek voluntary reduction in irrigation of decorative landscape and reduce irrigation of turf and play areas.

4. In addition to those measures stated above, the Board of Directors, by resolution and/or ordinance, may adopt additional water conservation measures on an urgency basis.

C. Stage III Conservation – Water Emergency.

1. In addition to the water conservation measures established in Stage I and Stage II above, upon a determination of the Board of Directors, that Stage III conditions exist, the following prohibitions

shall take effect with a goal of achieving a **thirty-five percent (35%)** reduction in water consumption:

(a) Water deliveries for residential uses shall be limited as follows:

1. 17 ccf of water bi-monthly or 214 gallons per day per multi-family residential unit.
2. 19 ccf of water bi-monthly or 238 gallons per day per single family residential units <4500 sf.
3. 26 ccf of water bi-monthly or 319 gallons per day per single family residential units 4.5 – k10K sf.
4. 46 ccf of water bi-monthly or 569 gallons per day per single family residential units >10k sf.

(b) Non-Residential Uses shall be limited to **sixty-five percent (65%)** of ~~the~~ their water consumption for the same billing cycle during the Base Year.

(c) A surcharge of **four hundred percent (400%)** will be levied on all water use in excess of the maximum water use allotment reflected in subparagraphs (a) and (b) above, and shall be assessed to the account of the customer.

(d) The setting of new water meters shall be prohibited and Will Serve Letters shall be suspended.

(e) The use of potable water to irrigate grass, lawns, ground cover, shrubbery, crops, vegetation, and ornamental trees, etc. shall be prohibited; and all irrigation meters within the District shall be locked.

2. In addition to those measures stated above, the Board of Directors, by resolution and/or ordinance, may adopt additional water conservation measures on an urgency basis.

D. Stage IV Conservation – Extreme Water Emergency

1. In addition to the water conservation measures established in Stages I, II, and III above, upon a determination of the Board of Directors that Stage IV conditions exist, the following prohibition measures shall be take effect, with the goal of achieving a **fifty percent (50%)** reduction in water consumption:

(a) Water deliveries for residential uses shall be limited as follows:

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1. 14 ccf per of water bi-monthly or 170 gallons per day per multi-family residential unit.
2. 15 ccf of water bi-monthly or 183 gallons per day per single family residential unit <4500 sf lot.
3. 20 ccf of water bi-monthly or 246 gallons per day per single family residential unit 4.5-10K sf lot.
4. 36 ccf of water bi-monthly or 437 gallons per day per single family residential unit >10K sf lot.

(b) Non-Residential Uses shall be limited to **fifty per cent (50%** of the water consumption for the same billing cycle during the Base Year.

(c) A surcharge of **five hundred percent (500%)** will be levied on all water use in excess of the maximum water use allotment reflected in subparagraph a and b above and shall be assessed to the account of the customer.

2. In addition to those measures stated above, the Board of Directors, by resolution and/or ordinance, may adopt additional water conservation measures on an urgency basis.

3.24.070 Termination of Stages

The Board of Directors may terminate water conservation stages based upon a finding that the groundwater storage above mean sea level within the NMWCA is at or above 100,000 AF or the Board of Directors may reduce a water conservation stage to a lower level by Resolution based on a finding that the GWS is capable of providing sufficient water at a reduced water conservation stage to meet the demands and requirements of the District's water customers.

3.24.080 Calculation of Multi-Family Water Use

When Multi-Family units are served by a single water meter, the total volume of metered water shall be divided by the number of units to determine compliance with conservation stages.

3.24.090 Enforcement

A. In addition to the water surcharges referenced in Section 3.24.060, the following applies to customers violating the water allotment provisions of this Chapter commencing with Stage II:

1. First Violation. A Notice of Violation shall be both mailed to the customer by first class mail, return receipt requested, and posted by door hanger on the affected property.

2. Second Violation. A Notice of Violation shall be sent to the customer by certified mail, return receipt requested, and by door hanger, with an explanation of the gravity of the situation and the penalties for future violations. A delinquent bill, including the appropriate surcharge, shall be increased by a penalty of ten percent (10%).

3. Third Violation. Water service will be discontinued and the water meter will be removed from the premises of the violator. The District will send notice via certified mail at least seventy-two (72) hours prior to discontinuance of service and will attempt to contact an adult person at the premises by telephone or personal contact at least twenty-four (24) hours prior to discontinuance of service.

   The meter will be reinstalled on conditions set by the District and after the payment of District reconnection charges and the payment of all other charges, surcharges and penalties owing.

B. Violation of Conservation Measures Other Than Water Allotment.

1. First Violation. A Notice of Violation shall be both mailed to the customer or person other than the customer, (i.e. tenant), by first class mail, return receipt requested, and posted by door hanger on the affected property.

2. Successive Violations. The second violation and each and every violation thereafter shall be subject to the provisions of Section 3.24.080 C, below.

C. Violations Unlawful.

1. It is unlawful for any person to violate any provision or fail to comply with any of the requirements of this Chapter. A violation of any of the provisions or failure to comply with any of the requirements shall constitute a misdemeanor punishable by a fine not exceeding six hundred dollars ($600) or by imprisonment in the County Jail for a period not exceeding thirty (30) days or by both such fine and imprisonment.

2. Notwithstanding subparagraph 1, above, any misdemeanor violation or failure to comply may, in the discretion of District Legal Counsel, be initially charged and subsequently prosecuted as an

infraction. Each and every infraction or violation is punishable by a fine not exceeding fifty dollars ($50) for the first violation; a fine not exceeding one hundred dollars ($100) for the second violation of this Chapter within one year; and a fine not exceeding two hundred fifty dollars ($250) for the third violation of this Chapter within one year.

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3. Each person shall be guilty of a separate offense for each and every day during any portion of which any violation of this Chapter is committed, continued, or permitted by such person and shall be punishable accordingly.

D. Injunctive Relief

The District may petition the Superior Court for the issuance of a permanent or temporary injunction, or both, as may be appropriate, in restraining any person or customer from the continued violation of this Chapter.

E. Enforcement Officer.

1. The General Manager, or designee, shall be the Code Enforcement Officer primarily charged with enforcement of this Chapter.

2. For new construction, the General Manager has the authority to establish monthly Base Year water consumption for Non-Residential Use.

F. Collections.

1. Charges, surcharges and penalties authorized by this Chapter shall constitute a lien on the property, and the District Manager is authorized to record a certificate declaring the amount of the charges, surcharges and penalties due pursuant to Government Code § 61115(c).

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2. The Board of Directors may order that the charges, surcharges and penalties be collected on the tax roll in the same manner as property taxes pursuant to the procedures of Government Code §61115(b).

G. Remedies Cumulative

The remedies available to the District to enforce this Chapter are cumulative and may be pursued consecutively by the District. The District's use of any one of the remedies and/or legal actions prescribed herein shall not bar the use of any other remedies provided in this Chapter, or other District ordinances or by law for the purpose of enforcing the provisions hereof.

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3.24.090 Appeals

A. The General Manager may, in his/her discretion, grant exceptions to the water allotments referenced in Section 3.24.060, if he/she finds based on a certification by a California-licensed physician or other California-licensed health care provider that the water allotment restrictions would cause undue hardship or emergency medical conditions. The application for an exception shall be on a District form provided by the General Manager.

B. The terms of any exception shall be set forth in writing, the original to be kept on file with the District and a copy to be furnished to the applicant. All exceptions granted shall be reported to the Board of Directors at a regularly scheduled meeting.

C. An applicant may appeal the General Manager's decision to the Board of Directors. A request for appeal must be submitted to the District in writing not more than ten (10) days after the General Manager's decision. The Board of Directors shall consider the appeal within thirty (30) days of receipt of the request for appeal.

3.24.100 Severability

If any section, subsection, sentence, clause or phrase of this Chapter is for any reason held to be unconstitutional, ineffective, or in any manner in conflict with the laws of the United States or the State of California, such decision shall not affect the validity of the remaining portions of this Chapter. The District Board of Directors hereby declares that it would have adopted this Chapter and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsection, sentence, clause or phrase be declared unconstitutional, ineffective, or in any manner in conflict with the laws of the United States or the State of California.

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NIPOMO COMMUNITY SERVICES DISTRICT

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POST OFFICE BOX 326
NIPOMO, CA 93444 - 0326
(805) 929-1133 FAX (805) 929-1932
Web site address www.nipomocsd.com

TO: BOARD

FROM: BRUCE BUEL BBB

DATE: JANUARY 7, 2008

RE: 1/9/08 BOARD PACKET AGENDA ITEM E-4 – SAIC ATTACHMENT

Attached is a copy of the SAIC Technical Memorandum referenced in the staff note for Agenda Item E-4 for "Distribution under separate cover".

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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]):

SAIC Engineering, Inc. A Subsidiary of Science Applications International Corporation
5464 Carpinteria Ave., Suite K • Carpinteria, CA 93013 • Telephone 805/566-6400 • Facsimile 805/566-6427

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.

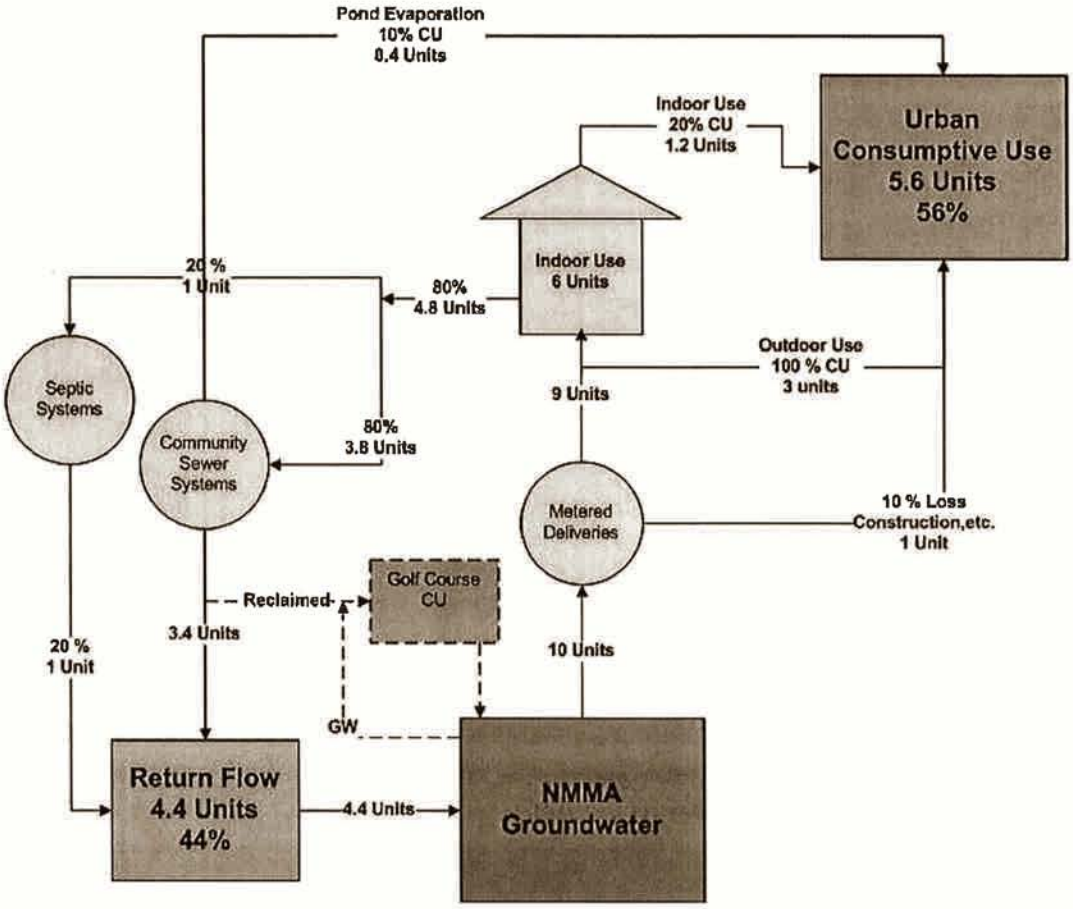
ET_cValues Assigned to Land Use Codes:

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:

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

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.

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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:

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.

Water Shortage Conservation Stages based on Estimates of Annual Groundwater in Storage 1975-2007

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

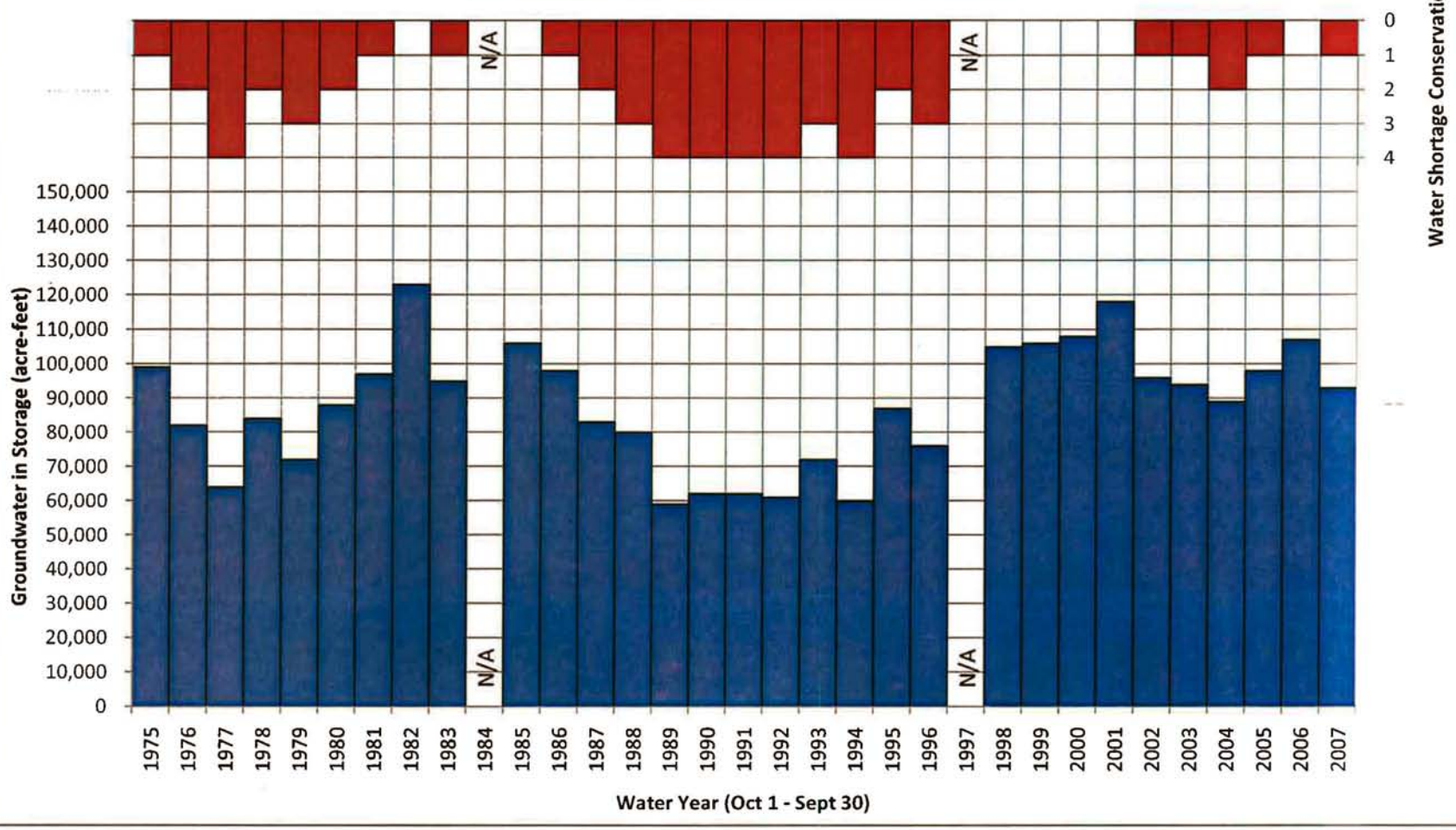

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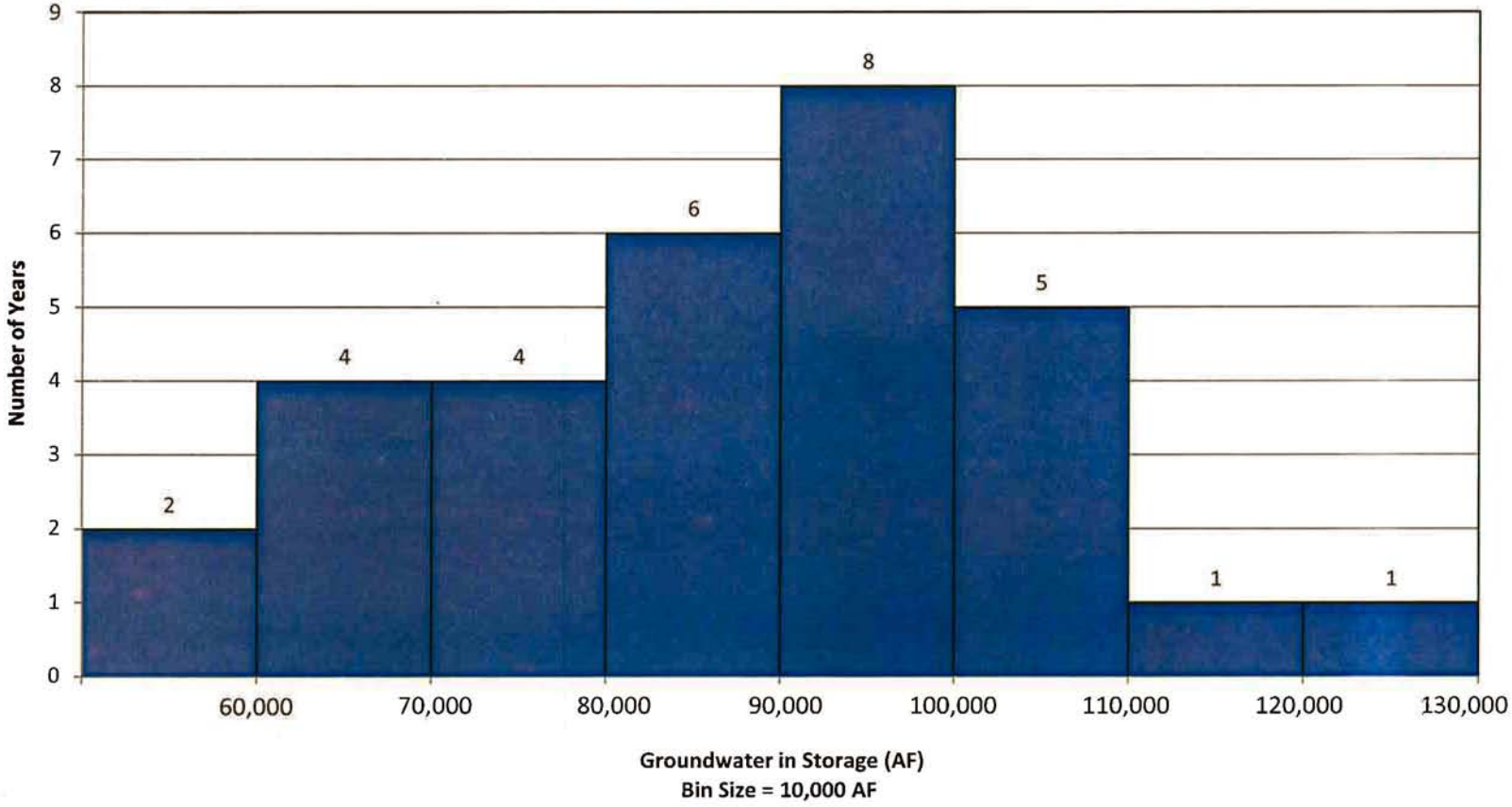
Figure 1

Distribution of Annual Groundwater in Storage
1975 to 2007



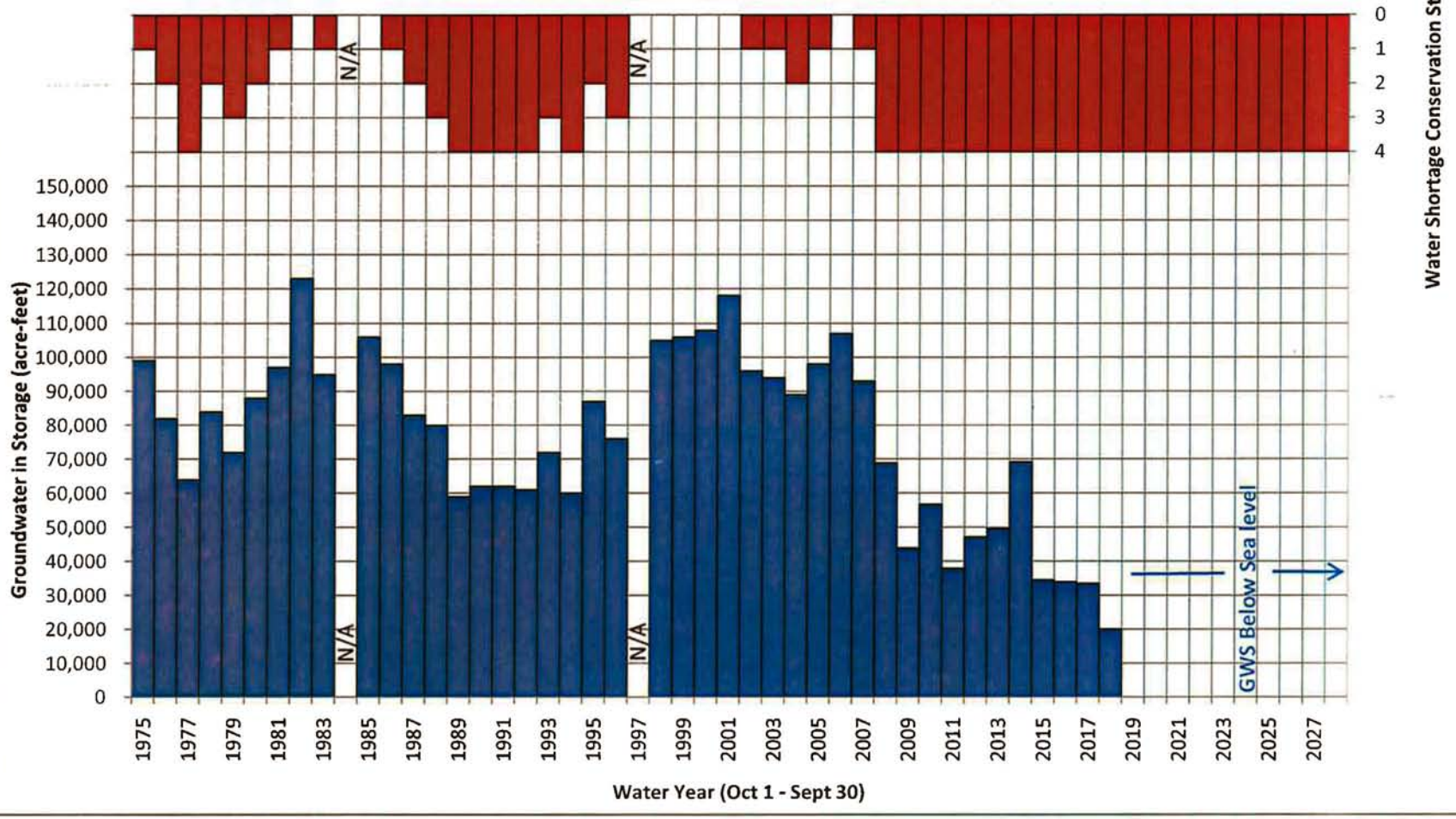
NOTES:
Total number of data points = 31

1/7/2008 DRAFT **Figure 2**

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 1 - Historical Hydrologic Conditions

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



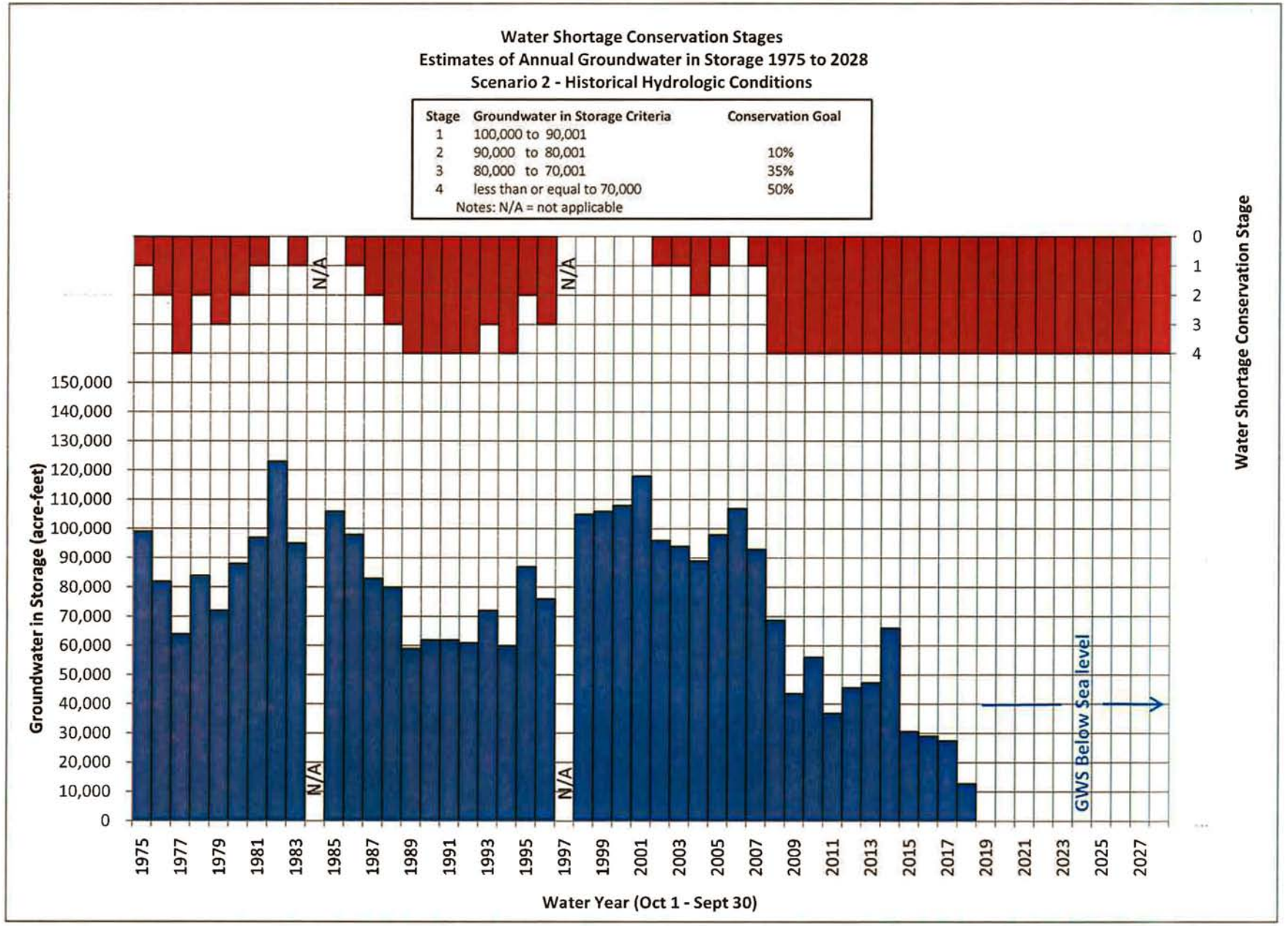


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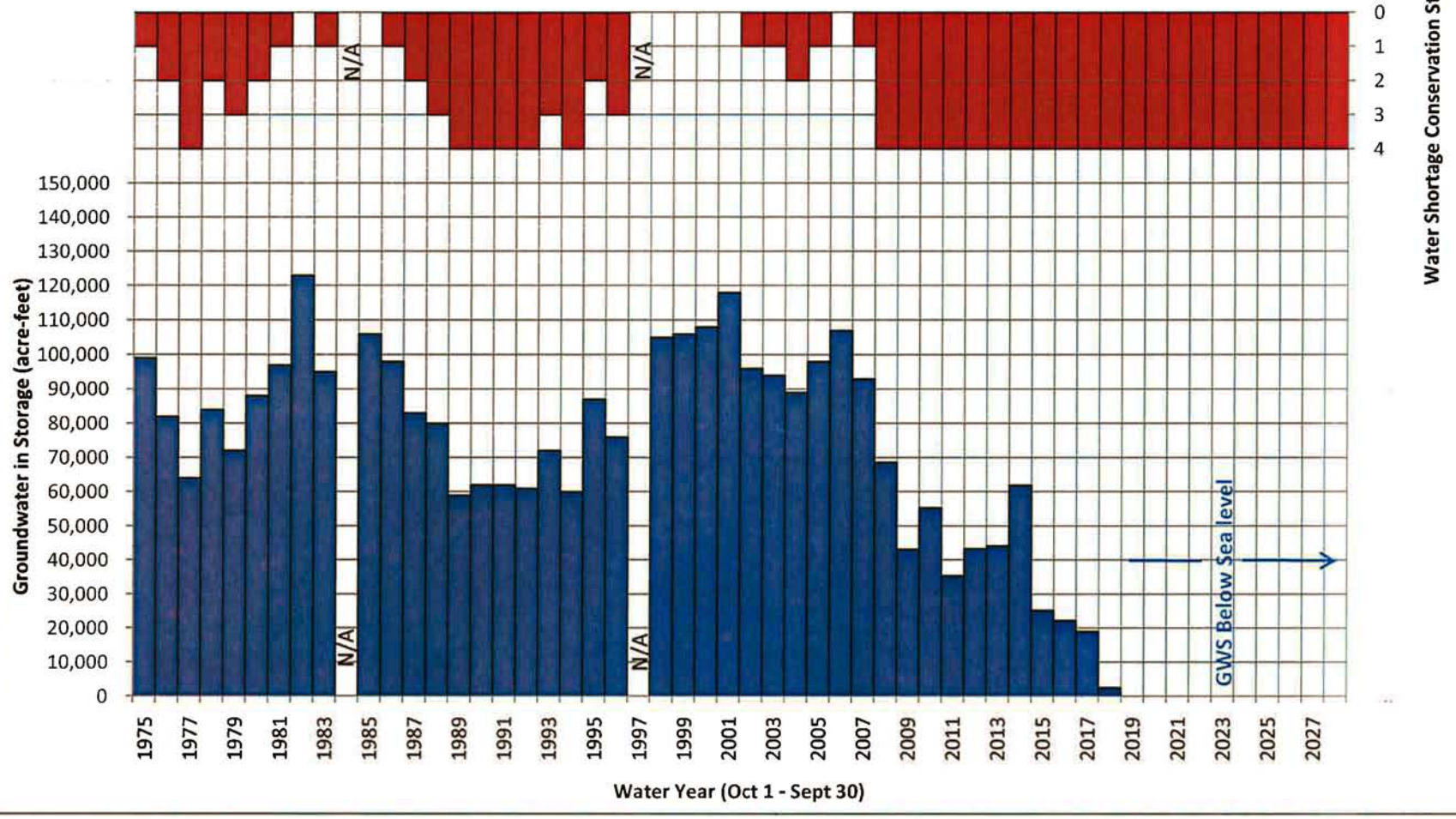
FIGURE 4

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 3 - Historical Hydrologic Conditions

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%

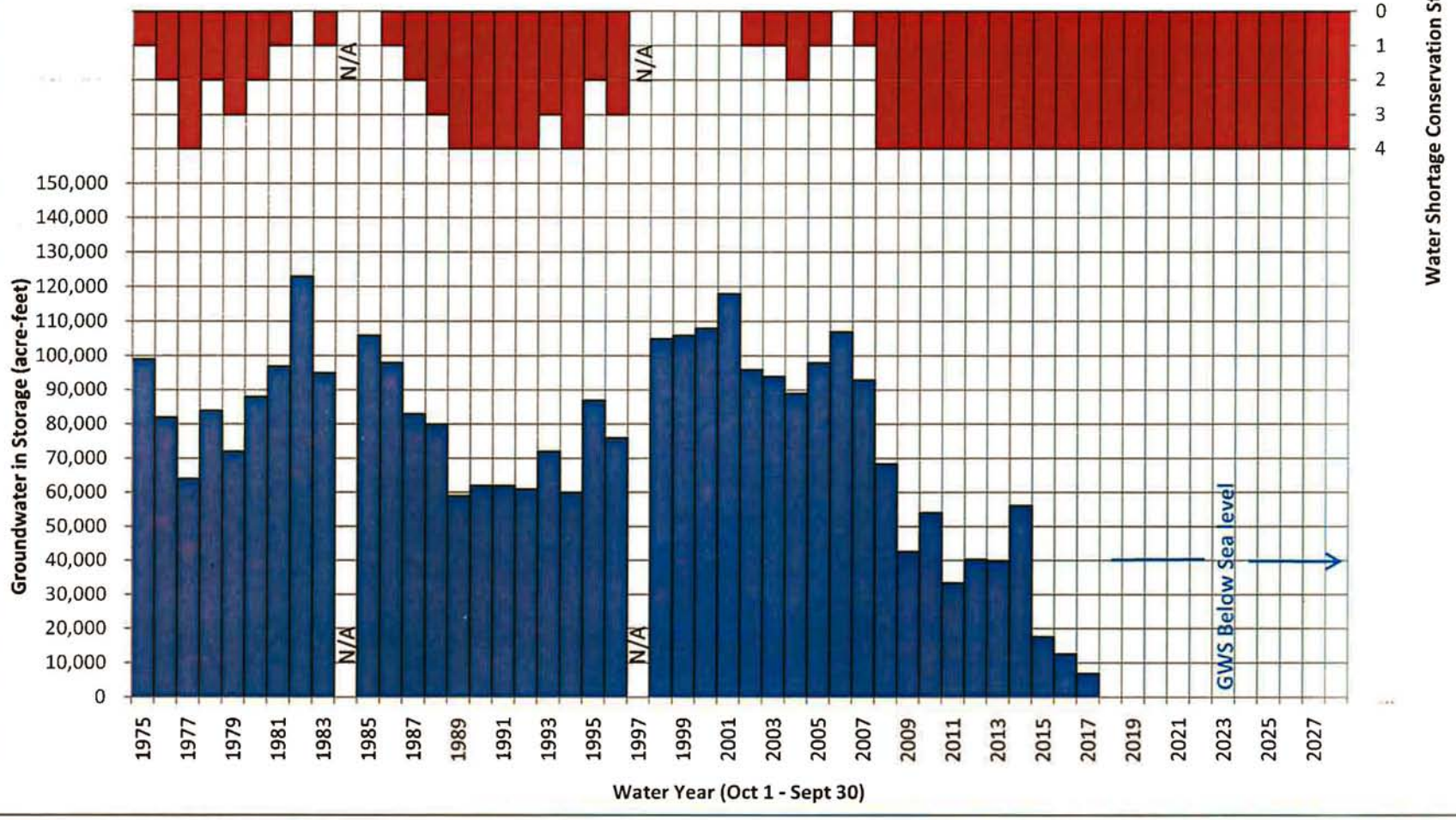
Notes: N/A = not applicable



Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 4 - Historical Hydrologic Conditions

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



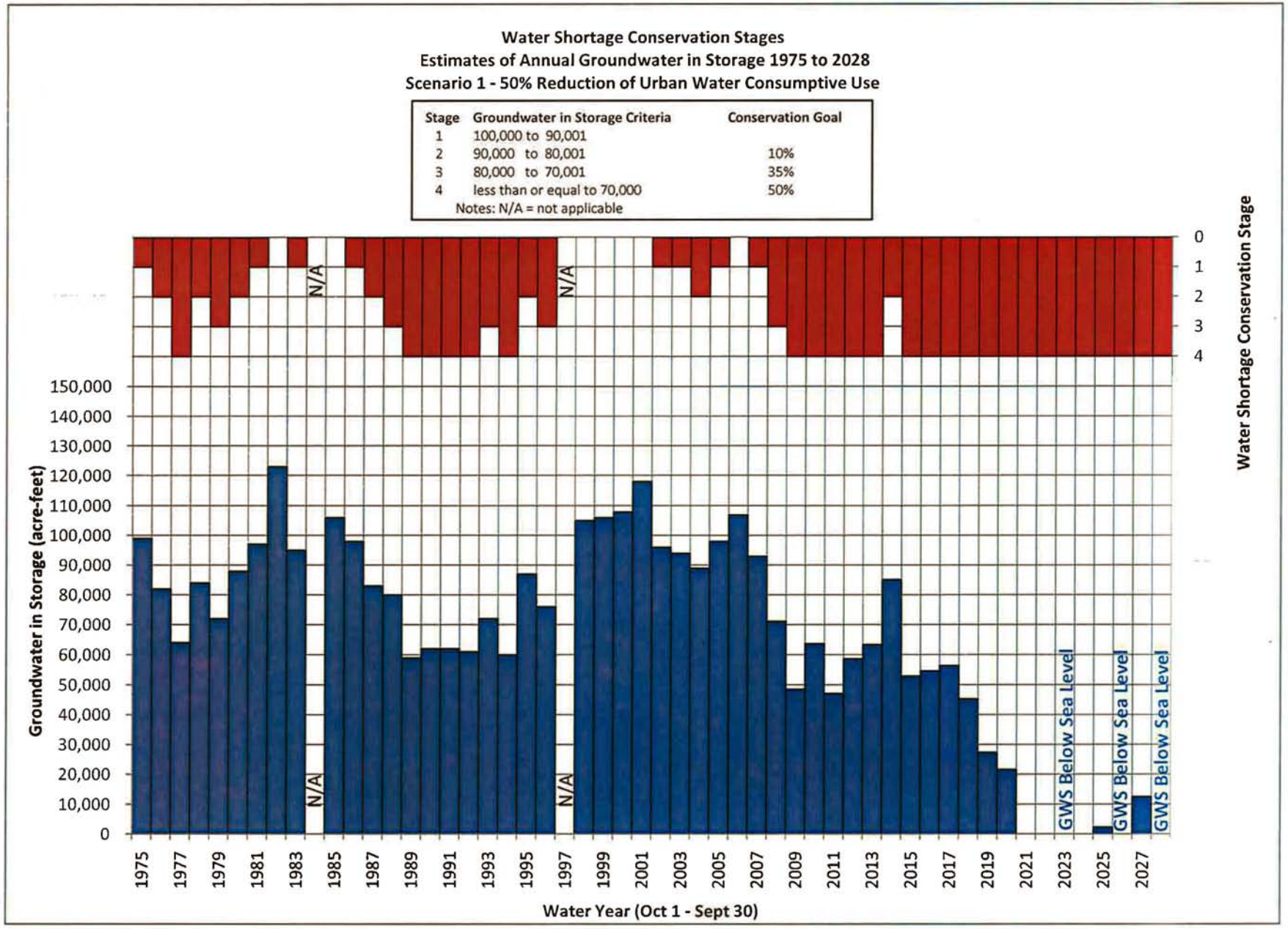


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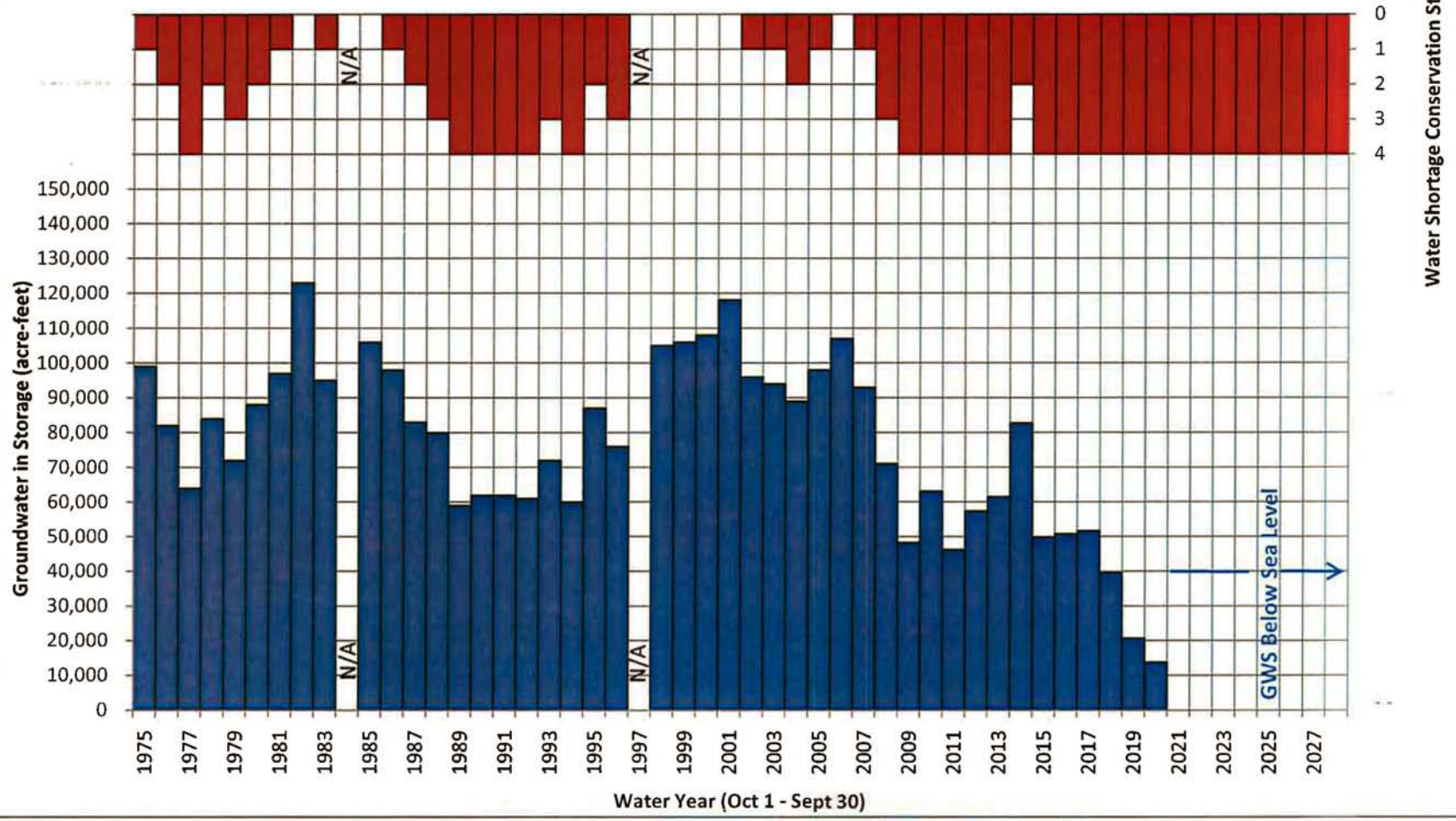
FIGURE 7

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 2 - 50% Reduction of Urban Water Consumptive Use

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



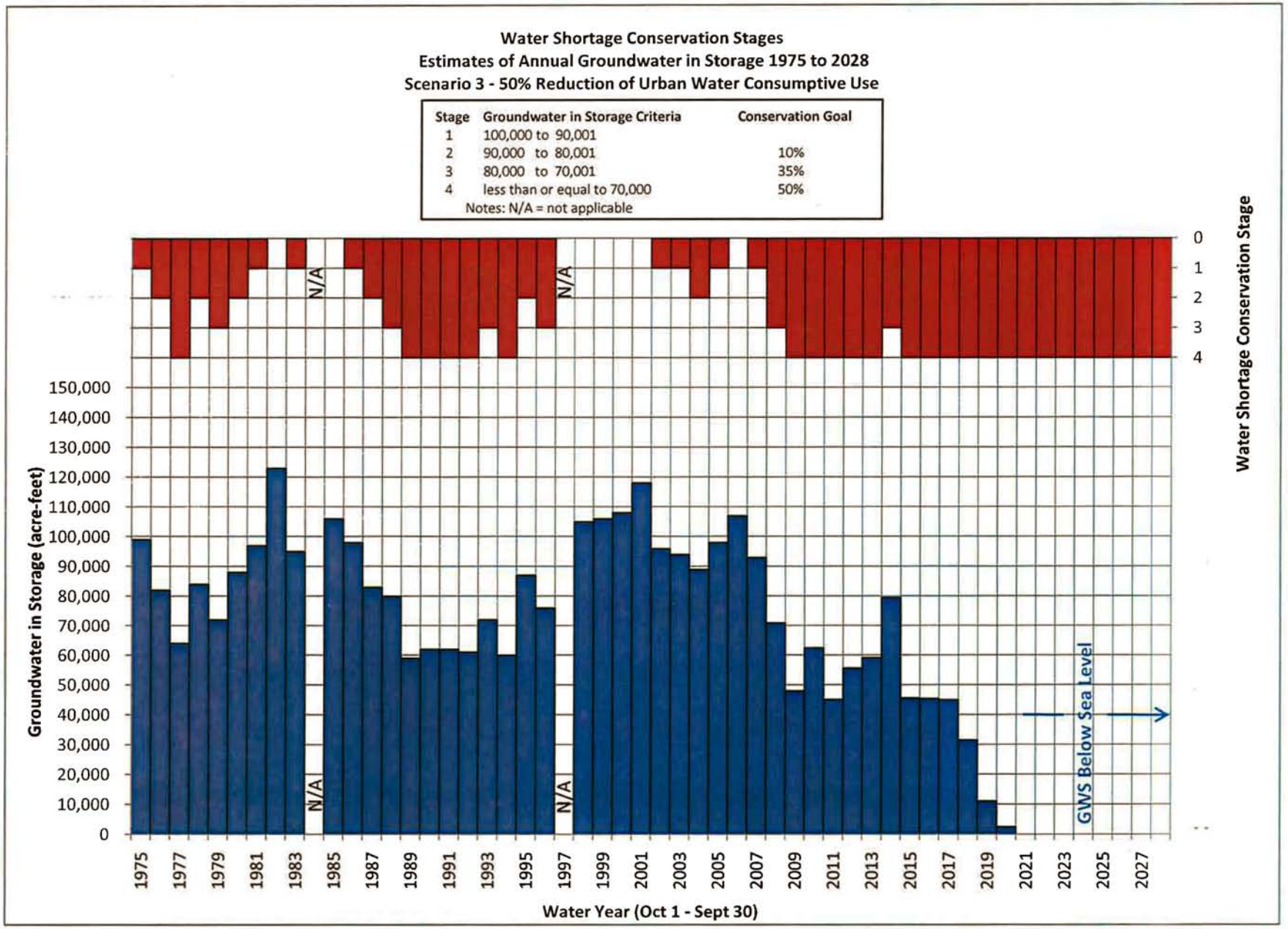


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FIGURE 9

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 4 - 50% Reduction of Urban Water Consumptive Use

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

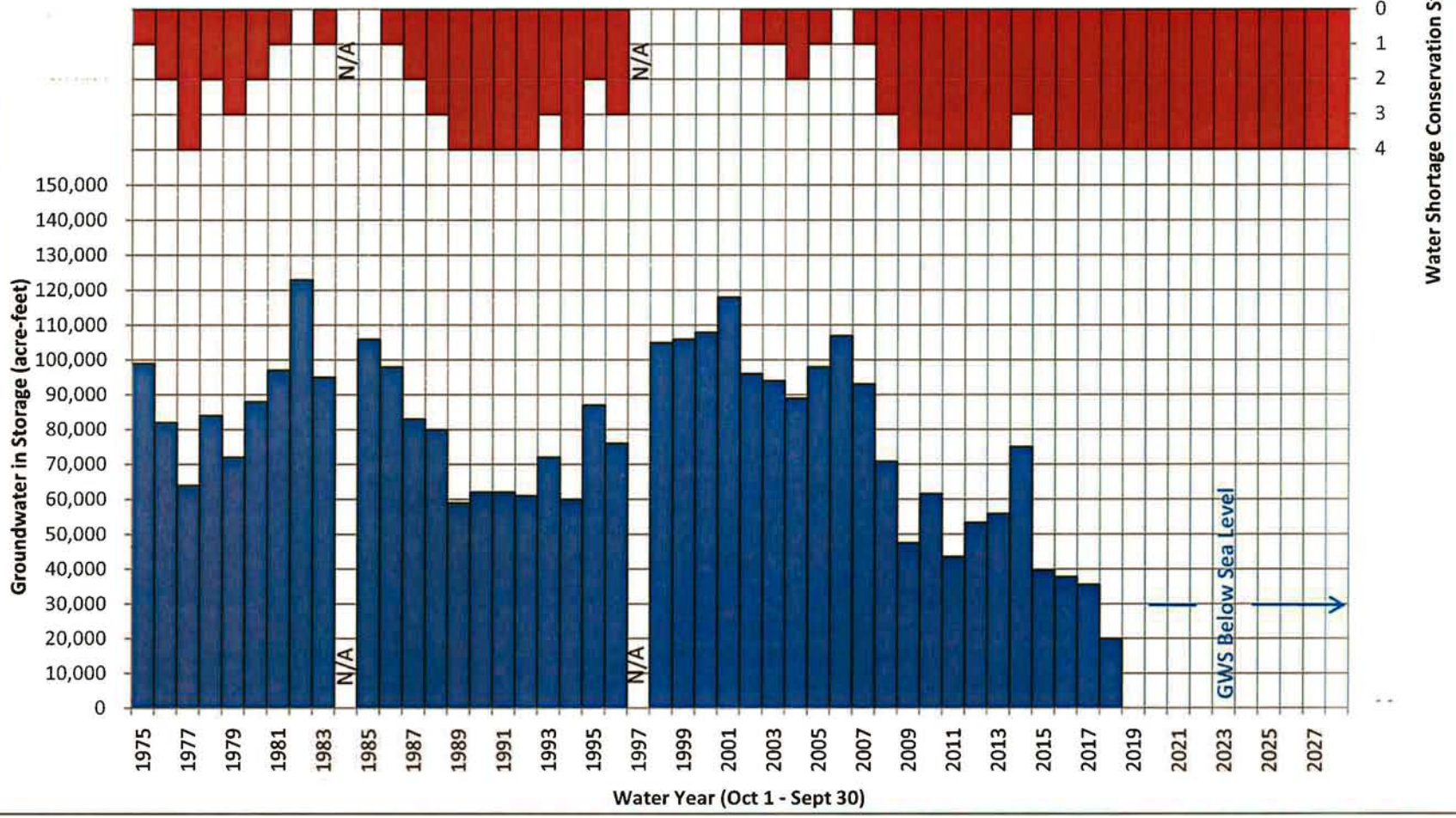

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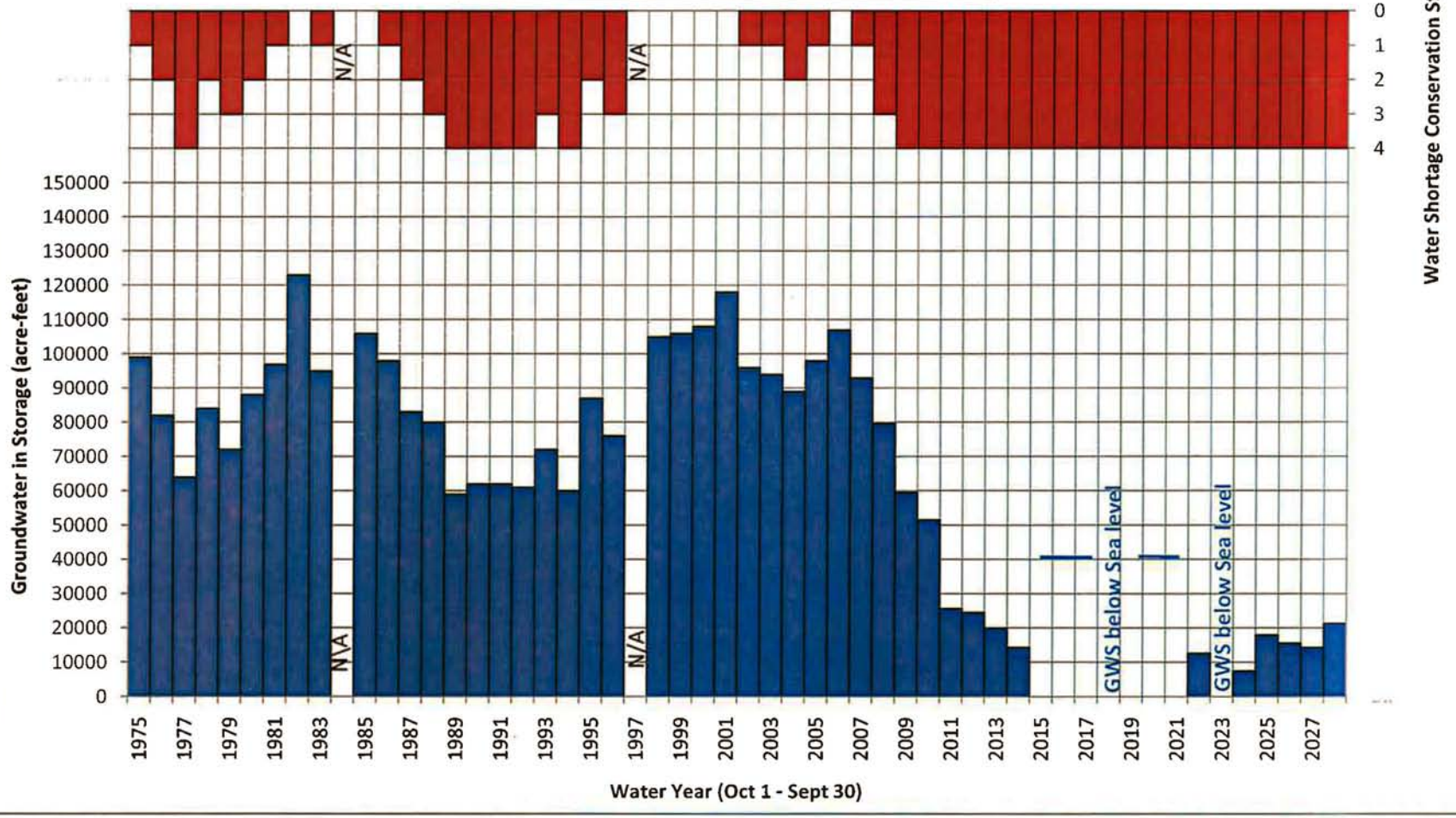
FIGURE 10

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 1 - Dry 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%

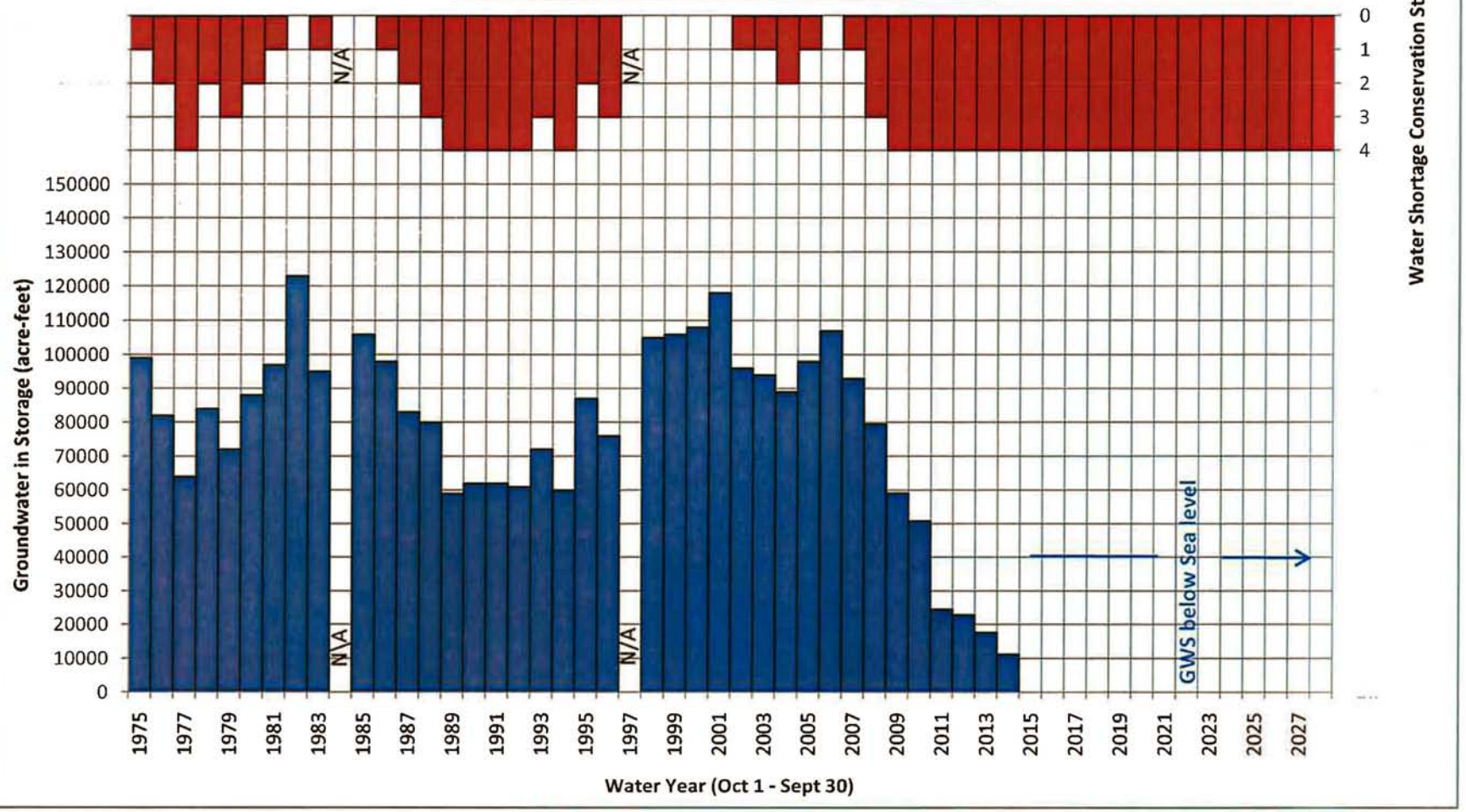
Notes: N/A = not applicable

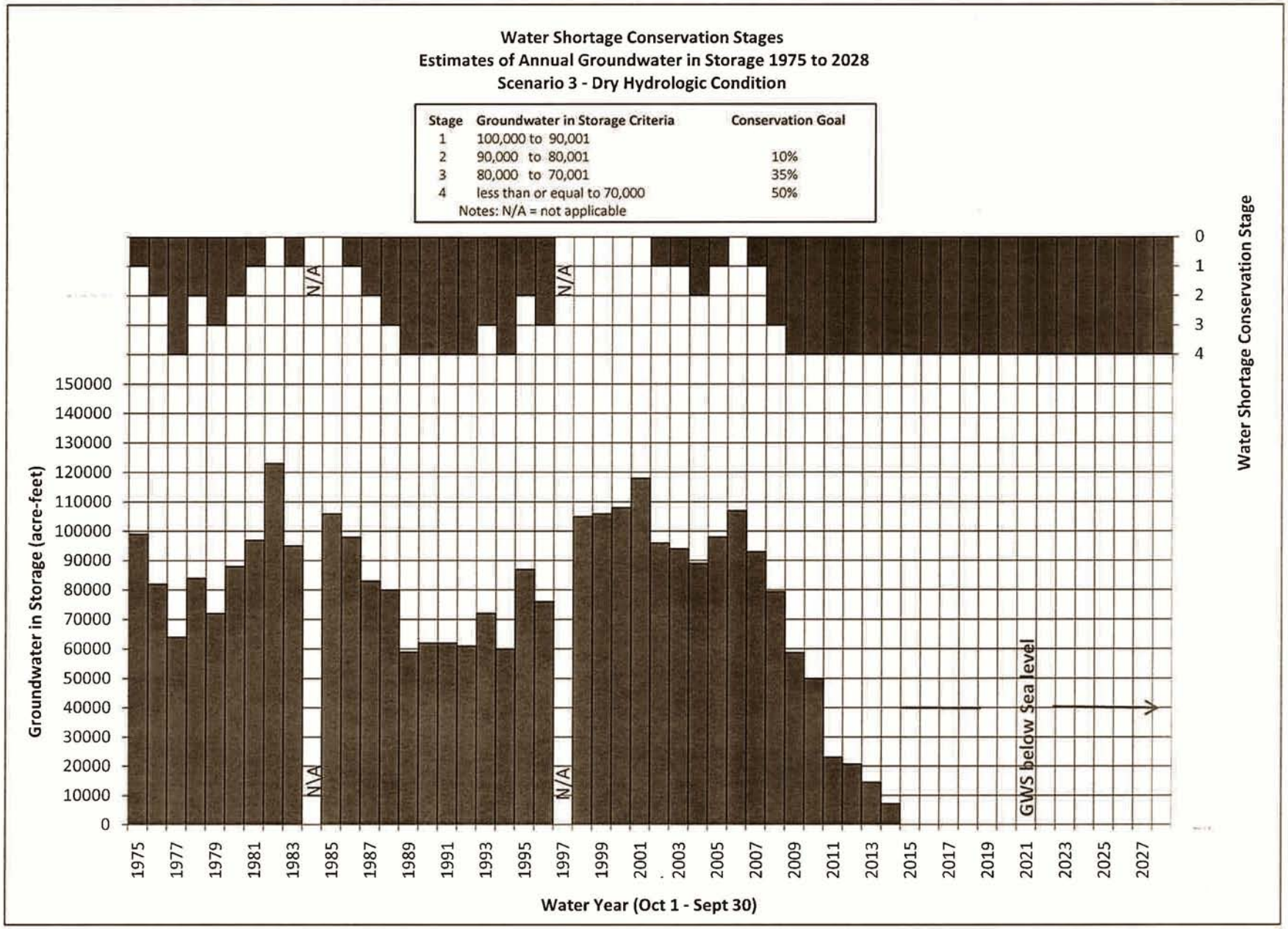


Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 2 - Dry Hydrologic Condition

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

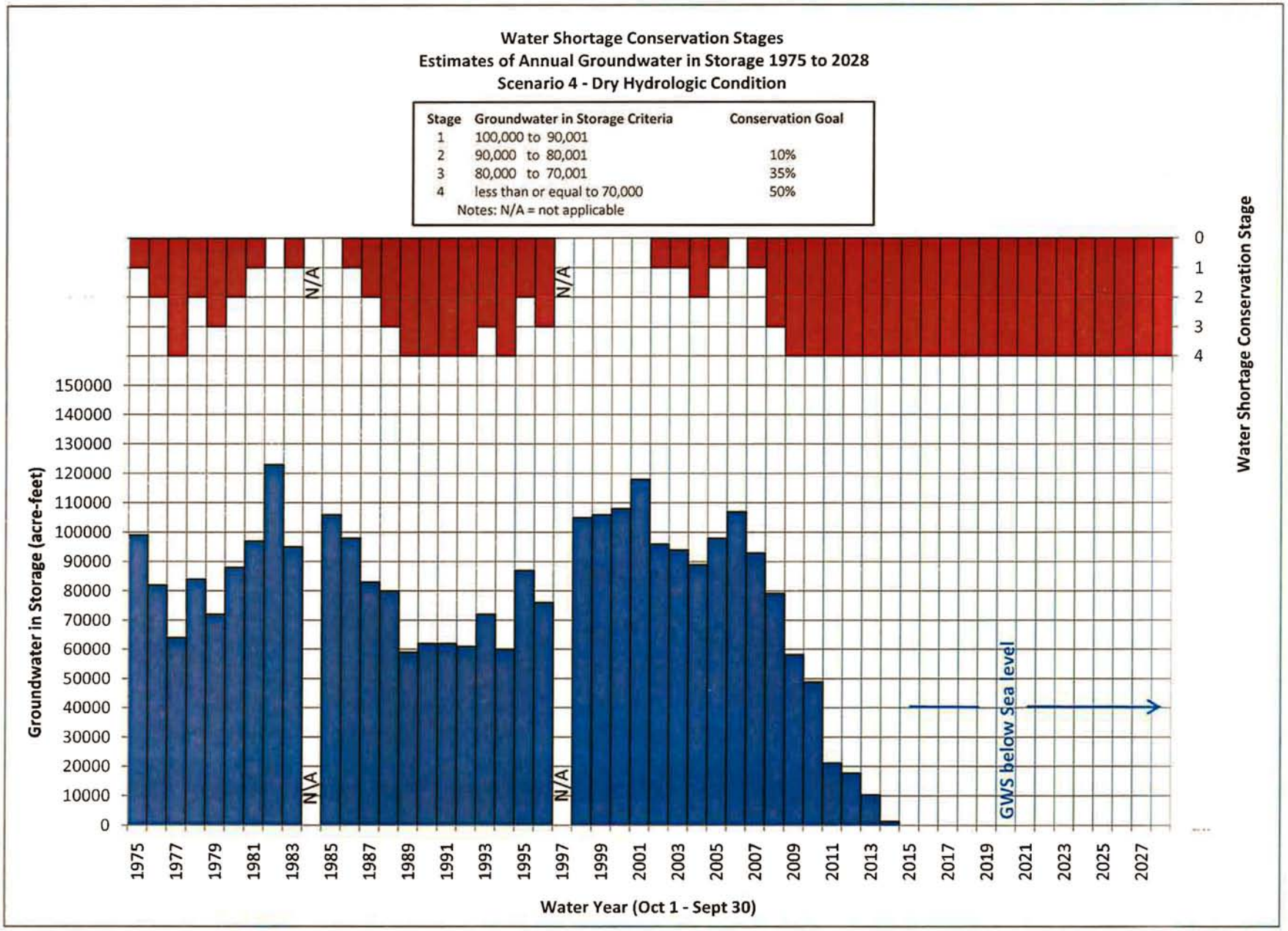




Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 4 - Dry Hydrologic Condition

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%

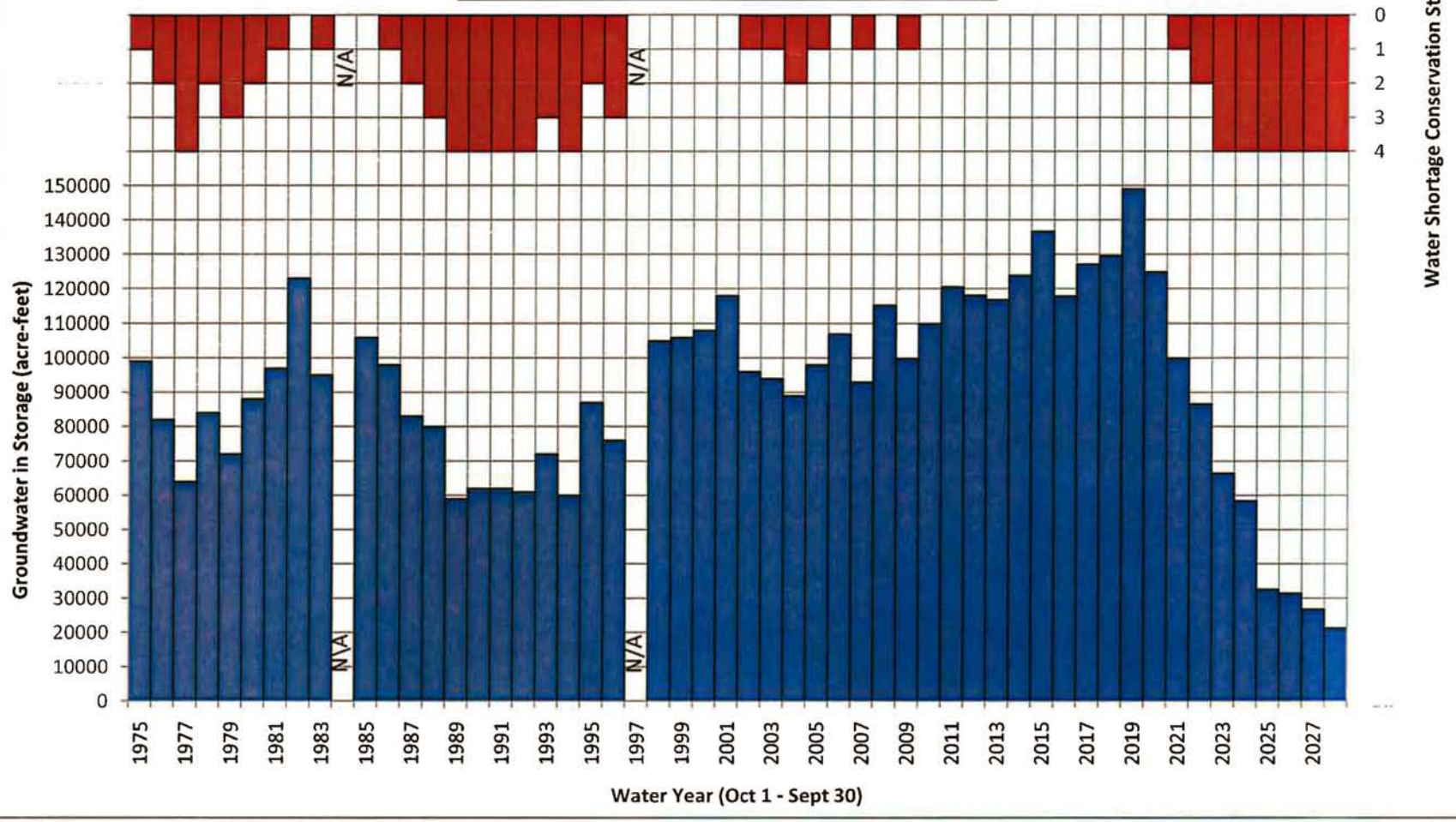
Notes: N/A = not applicable

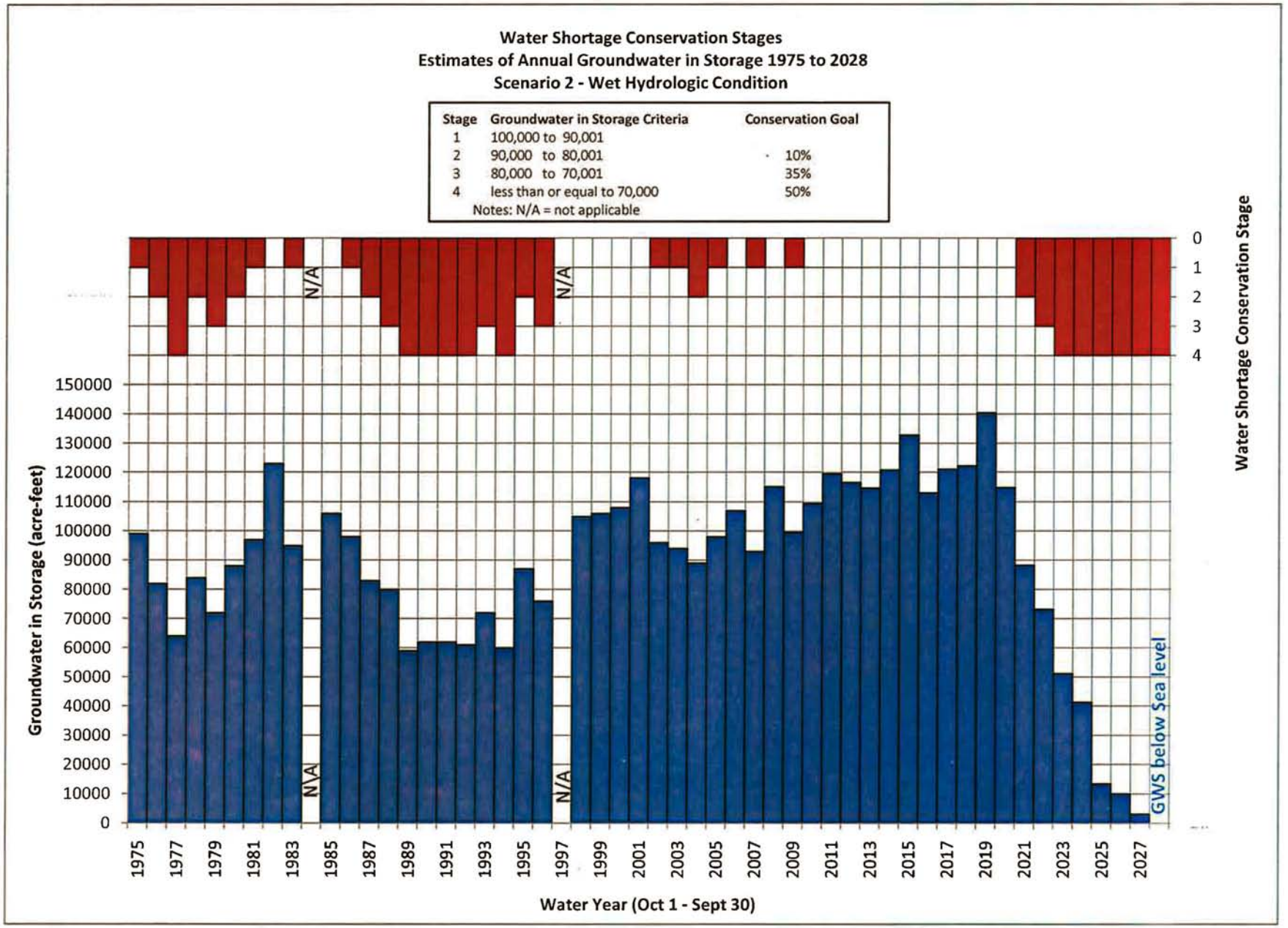


Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 1 - Wet Hydrologic Condition

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



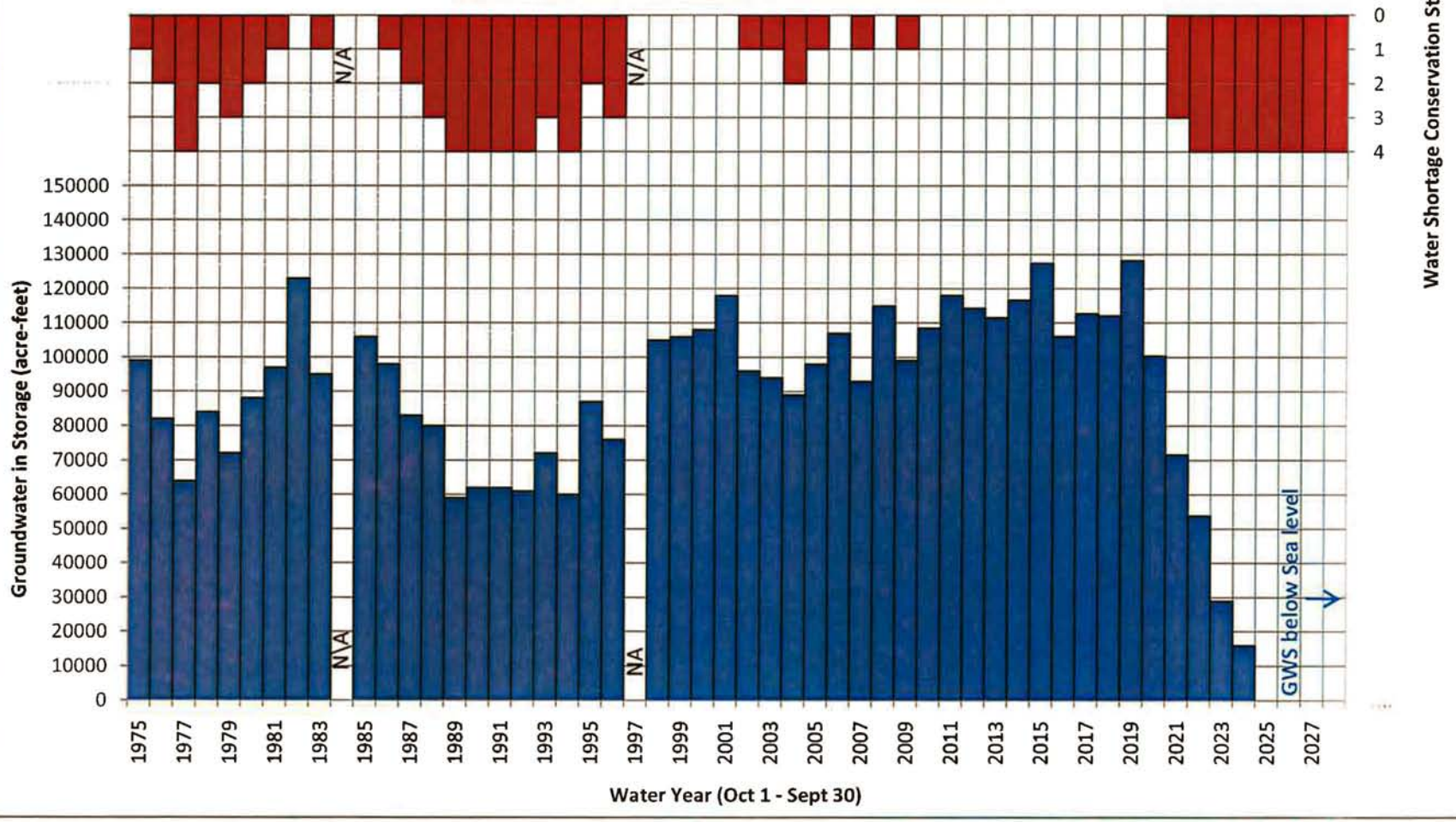


1/7/2008 DRAFT **FIGURE 16**

Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 3 - 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%

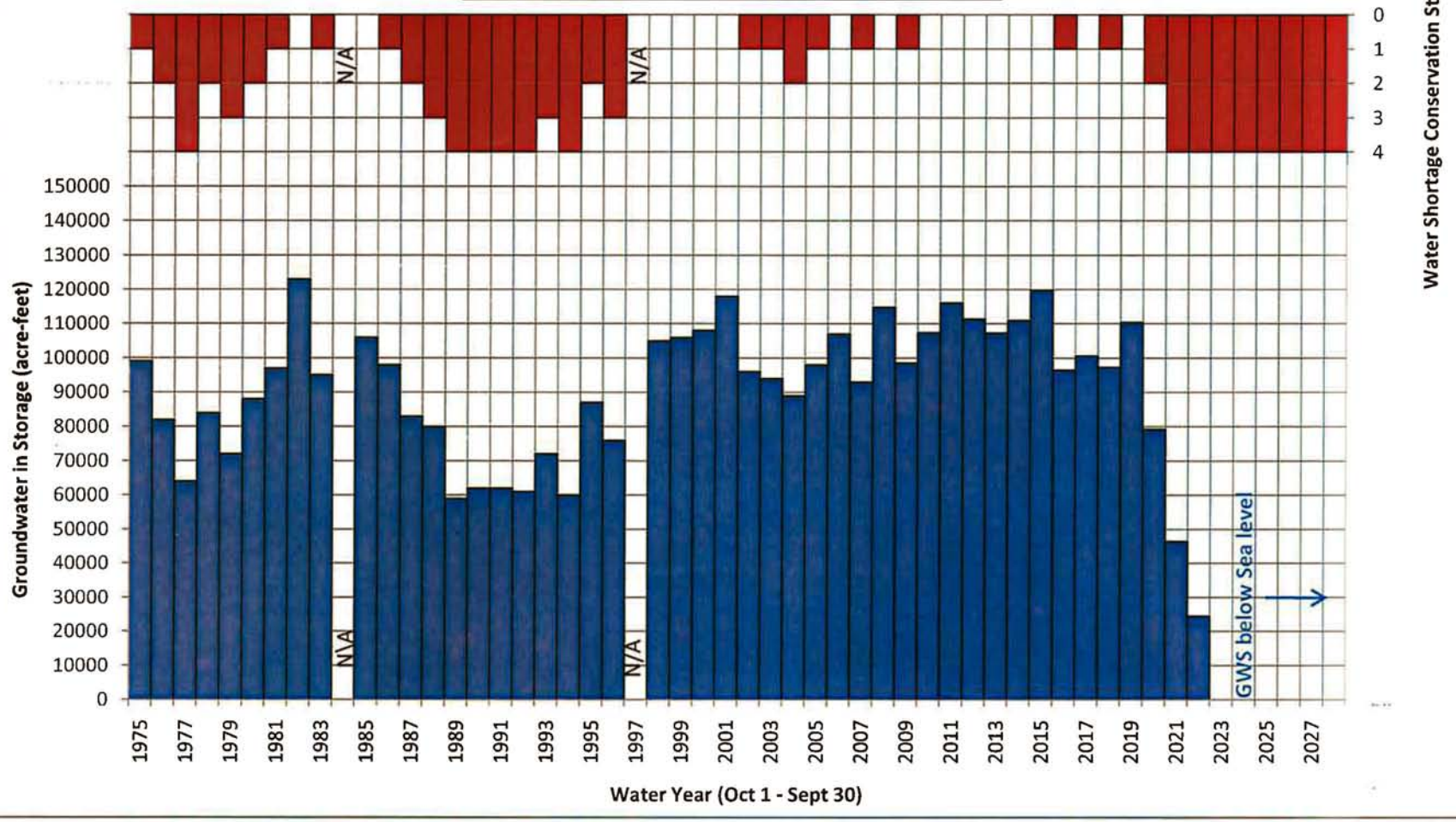
Notes: N/A = not applicable



Water Shortage Conservation Stages
Estimates of Annual Groundwater in Storage 1975 to 2028
Scenario 4 - 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



Groundwater in Storage and Consumptive Use
HISTORICAL HYDROLOGIC CONDITIONS

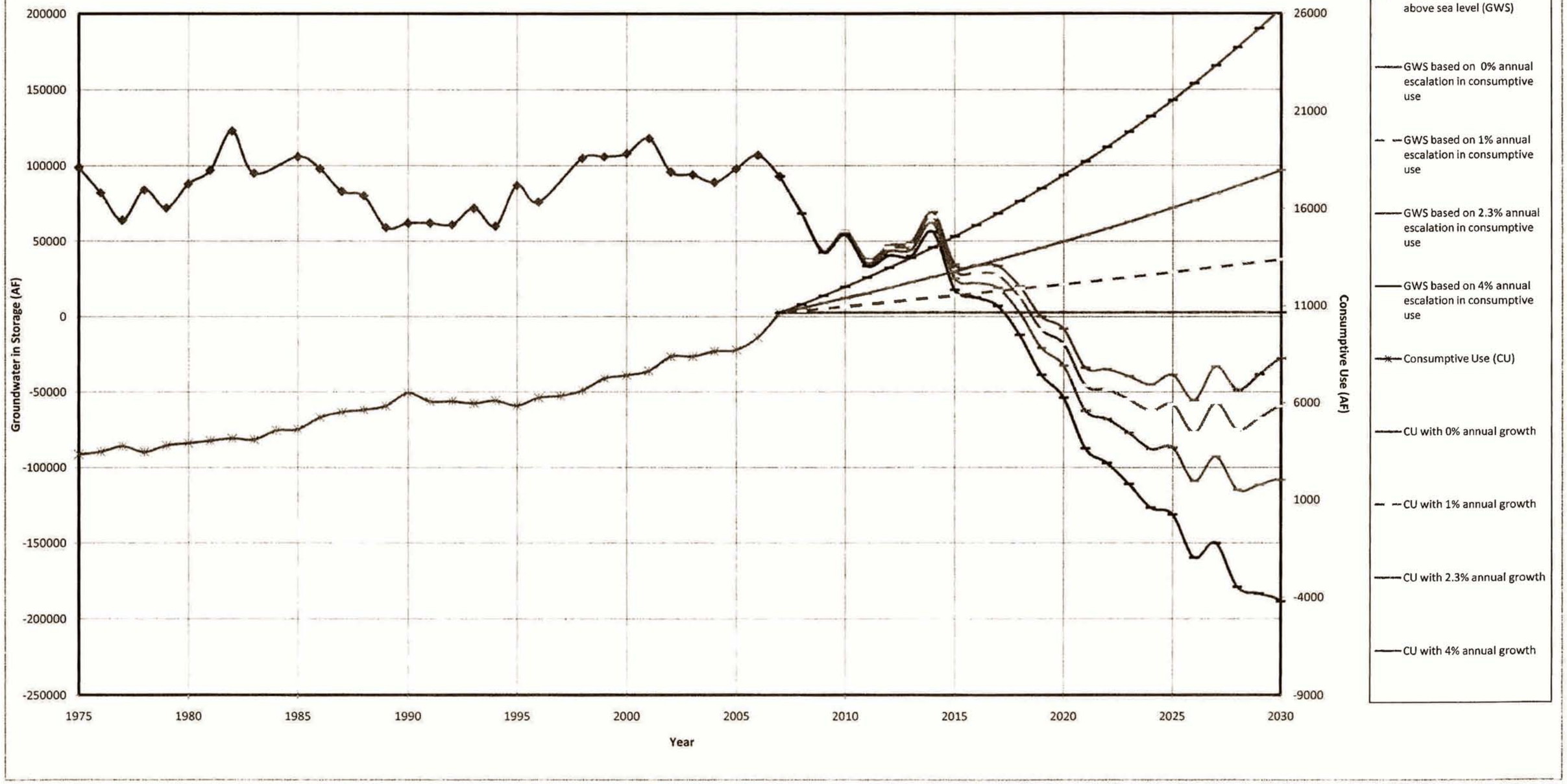


Figure 19

Groundwater in Storage and Consumptive Use
50% REDUCTION OF URBAN WATER CONSUMPTIVE USE

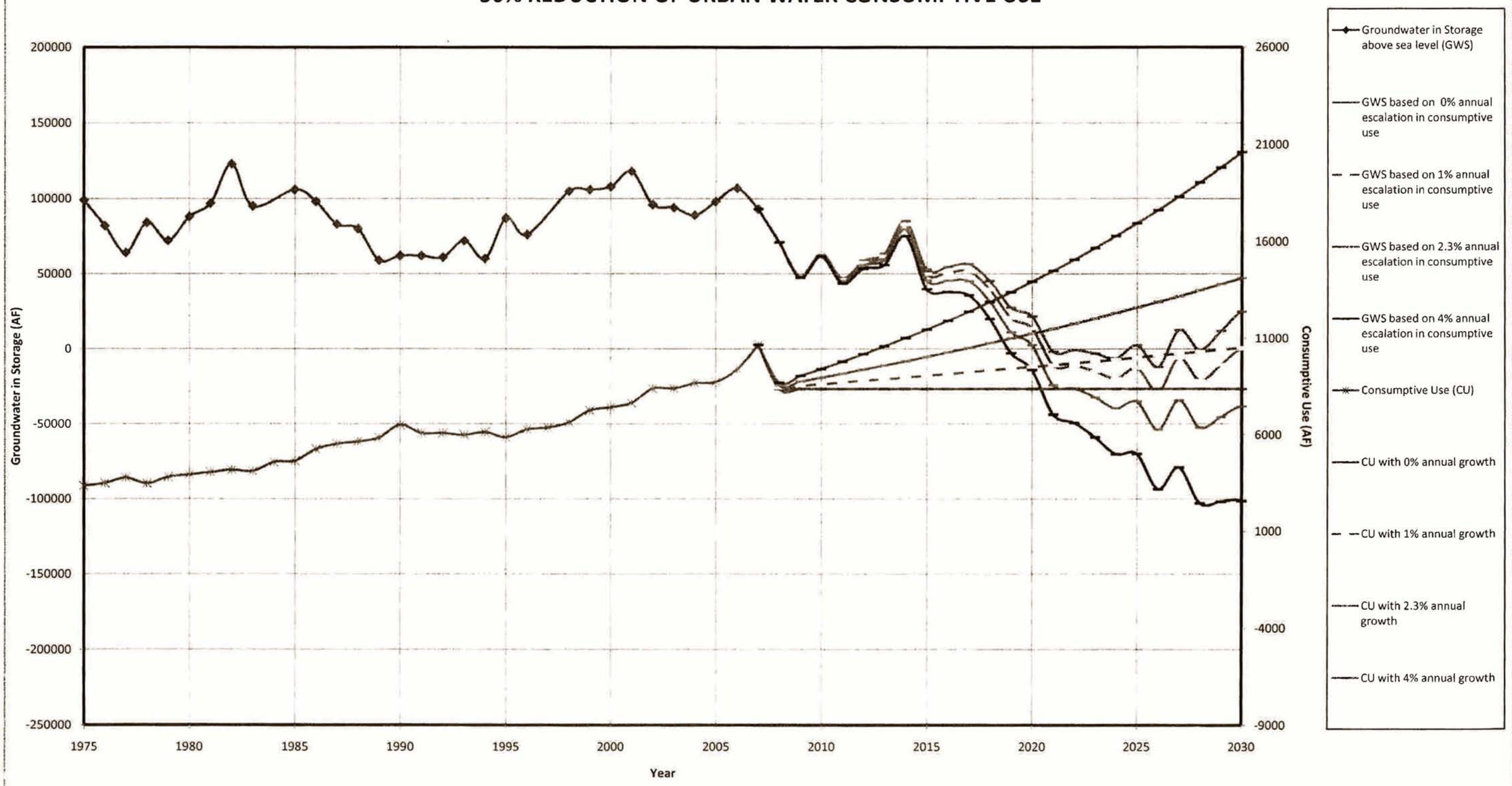


Figure 20

Groundwater in Storage and Consumptive Use
DRY HYDROLOGIC CONDITIONS

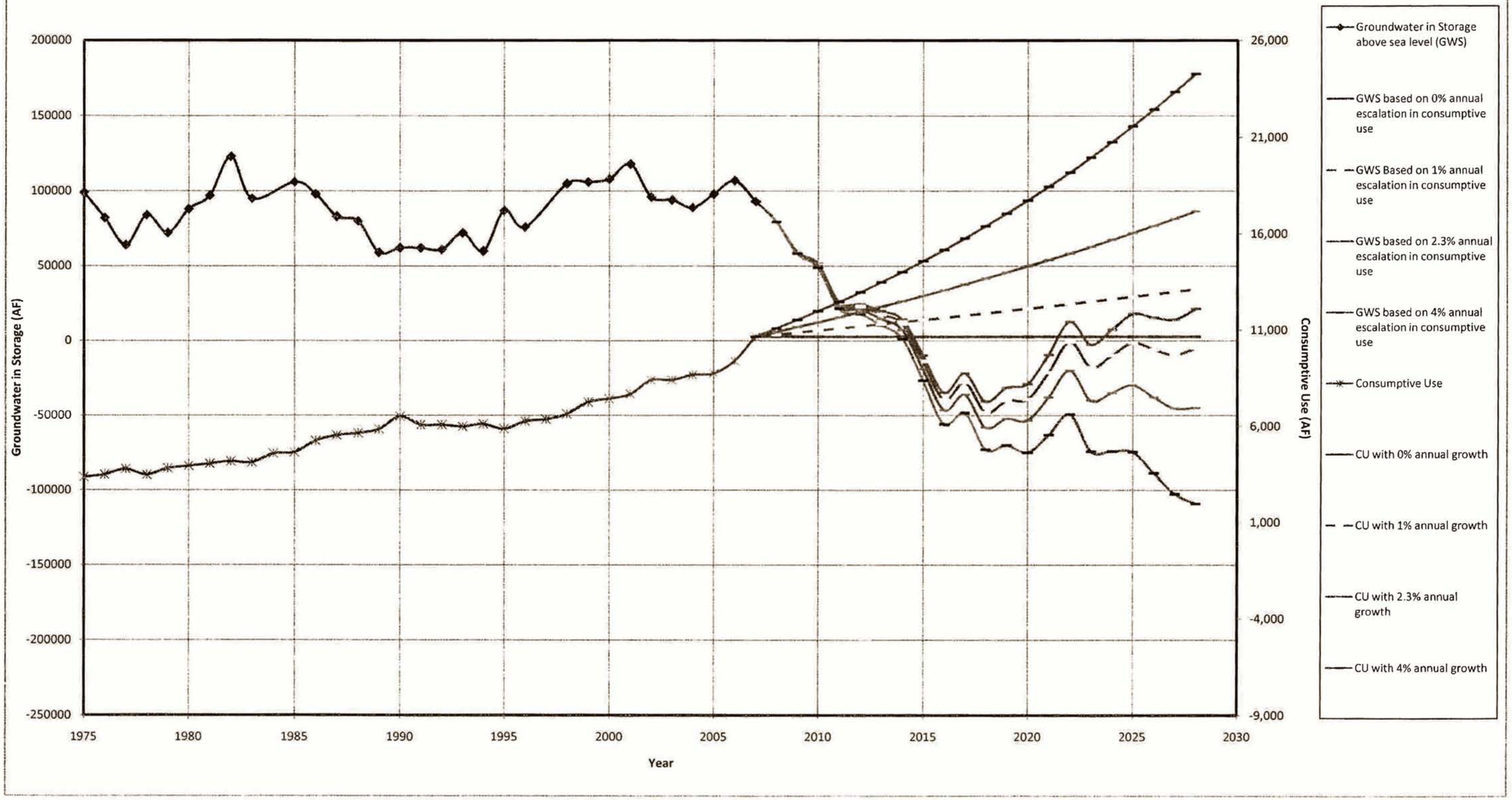


Figure 21

Groundwater in Storage and Consumptive Use
WET HYDROLOGIC CONDITIONS

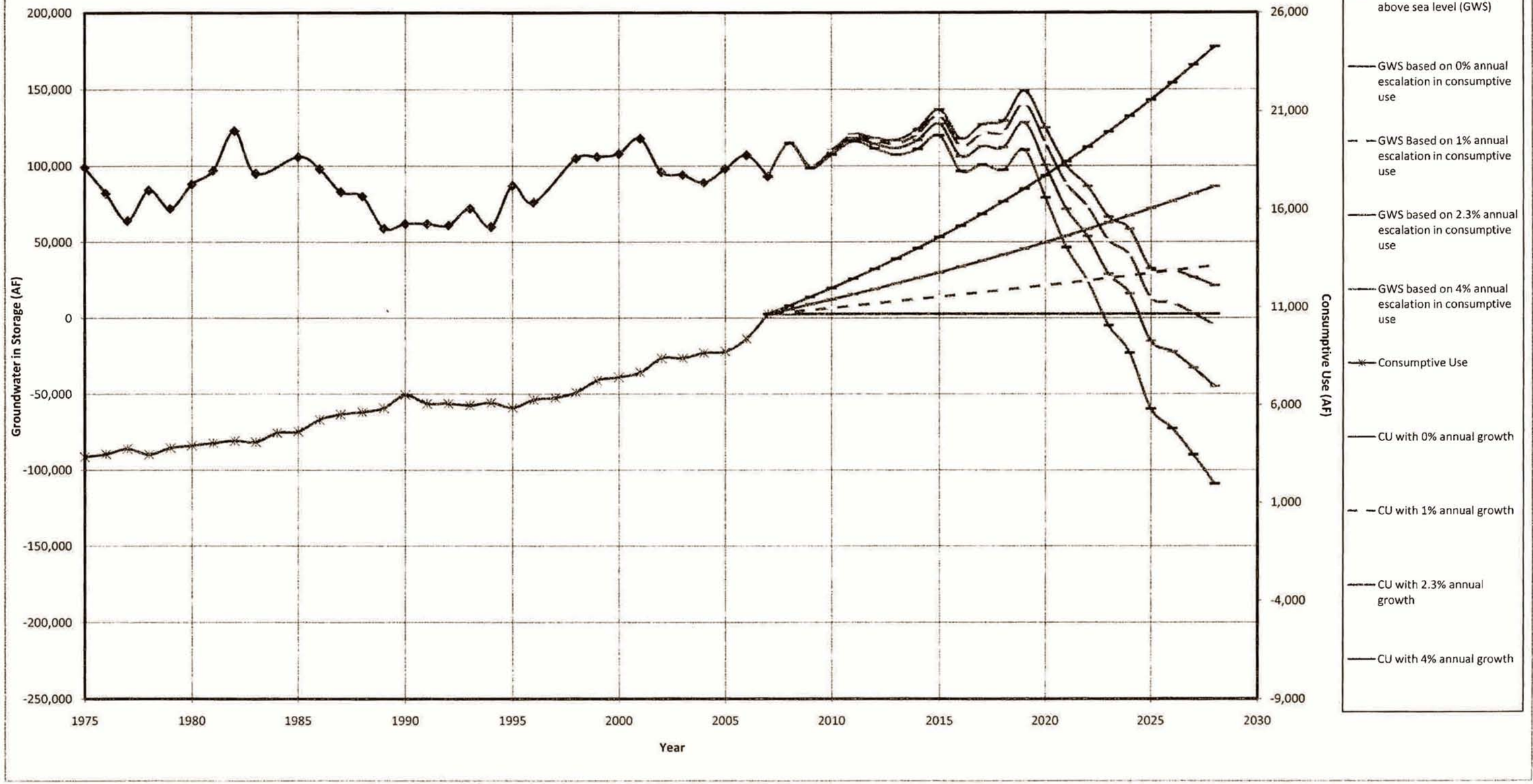


Figure 22

2007 Nipomo Mesa Land Use Classification

- Phase III NMMA Boundary
- Agriculture
- Urban
- Native

0 0.25 0.5 1 1.5 2

Miles

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

File: Nipomo/2007_LandUse.mxd

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