**STAFF REPORT**

**TO:** HONORABLE MAYOR AND CITY COUNCIL

**FROM:** GREG RAY, PUBLIC WORKS DIRECTOR/CITY ENGINEER

**SUBJECT:** STATUS REPORT – WATER SUPPLY AND RECOMMENDATIONS FOR ADDITIONAL ACTION

## BACKGROUND

A review of water records for the last twelve months indicates that businesses, residents and municipal uses are consuming approximately 65% of the City's current annual water supply. Under ideal conditions the City's annual water supply would remain stable and could easily provide adequate water for projected increases in demand resulting from future development. However, current and persistent drought conditions along with excessive demand in areas north of the City's groundwater aquifer have had a negative impact on the City's water supply.

The City has two principal water sources: Lopez Lake and the Santa Maria Groundwater Basin. At present, the total amount of water available to the City is 2,207 AF per year. This amount is comprised of the following:

| Water Source | Acre Ft (AF) |
|---|---|
| Groundwater allocation | 1,407 |
| County Zone 3 (Lopez Lake) | 800 |
| Total | 2,207 |

The purpose of this presentation is to provide an update on the water sources and options for the future. Public Works Director Greg Ray will be assisted by Engineer Jim Garing in providing a presentation.

## DISCUSSION

Water supply planning relies heavily on historical data and climate predictions. Records of rainfall in our watershed date back to the early sixties and most of our local water supply planning has relied on these records to predict long-term availability of water supplies. To date most predictions have concluded that the City would have a sufficient long term supply occasionally threatened by short periods of drought. In the last few years lake levels and groundwater storage have both seen record lows. Other sources of long term weather trends in California point to a possibility that the State may experience a decade or more of drier weather. Even now we simply aren't seeing the recovery in groundwater levels expected based on our

**APPROVED FOR FORWARDING**

ROBERT PERRAULT
CITY MANAGER

**Please Review for the Possibility of a Potential Conflict of Interest:**

☑ None Identified by Staff ☐ Bright
☐ Shoals ☐ Nicolls
☐ Lee ☐ Shah

**Meeting Date:** November 30, 2015 **Agenda Item No.** 1

own data. Recent predictions of above average rainfall this winter are promising, but even one or more years of strong El Nino conditions are unlikely to result in significant recovery of our water supplies.

Lopez Lake. Recent measurements indicate the lake is at approximately 29% full with 14,422 acre-feet of water in storage. Since its construction in 1969 Lopez Lake has consistently been able to provide 100% of the water allocated to agencies participating in the project. During that time period very low lake levels have occurred due to one or more years of below average rainfall but the lake has always rebounded. Current drought conditions have resulted in historic low water levels in Lopez Lake. In December 2014 the County Board of Supervisors adopted the Low Reservoir Response Plan (LRRP). The LRRP was adopted in response to a study conducted by the Zone 3 Technical Advisory Committee that showed current Lopez Lake delivery rates could result in complete depletion of the reservoir within two years under certain drought conditions. The LRRP identifies an adaptive management plan that reduces water deliveries in response to various reservoir storage levels. The adaptive management plan could extend the time of depletion another two years. In April the Zone 3 Advisory Committee approved a recommendation to reduce municipal water deliveries from Lopez Lake by 10% by implementing the adaptive management component of the Low Reservoir Response Plan. These actions will reduce the City's allocation, but because of the surplus water entitlements stored in Lopez Lake the City can expect to receive full delivery of its allocation in the 2016 water year (ending March 31, 2016).

Groundwater Supply. Rainfall has been below average for nearly five years. On behalf of the City, and as required by the Santa Maria Groundwater Basin Adjudication, consultants have completed extensive monitoring of the groundwater basin and prepared the Northern Cities Management Area (NCMA) Annual Report that is filed with the Court. The monitoring is conducted to document how the groundwater system is responding to annual rainfall and the extraction of water by urban and agricultural entities. The monitoring specifically includes the study of four wells situated in such a location as to provide early warning of impending deterioration of water quality and, in particular, seawater intrusion.

In 2009, monitoring well tests identified a rise in sodium-chloride, and potassium in one well located in Oceano. According to water experts the rise in these water constituents indicated the onset of seawater intrusion. In order to provide an early warning of impending salt water intrusion the NCMA used the 2009 well levels to identify an average well level of 7.5 feet as the critical point for concern of seawater intrusion. Annual monitoring since the 2009 event has not indicated recurrence of seawater intrusion; however, well levels have been persistently below 7.5 feet for more than two years. More detail is provided in the NCMA Annual Report which is available for public review at the customer service counter at City Hall and on the City's website at http://www.grover.org/DocumentCenter/Home/View/1893.

The 2014 NCMA Annual Report indicates that total water use in the basin was at just 42% of the 9,500 AFY safe yield. However, even with the reduced demand, water elevations throughout the area declined by several feet, with some areas finishing the year with water elevations below sea level. Typically, when pumping is less than the safe yield, the remaining volume of groundwater results in increased groundwater in storage, which is then manifested by rising water levels. The current condition, with groundwater extractions at 42% of the safe yield and declining water elevations, illustrates the impacts of the ongoing severe drought that has significantly reduced recharge. This current condition is also in part a result of the impacts of reduced subsurface inflow recharge from the east (Nipomo Mesa) that has occurred because of overdraft pumping in the Nipomo Mesa Management Area (NMMA), the development of a

pumping depression beneath the Mesa, and the elimination of the groundwater divide between the NCMA and NMMA. This condition of declining water levels in the NCMA, even though total pumping is currently 42% of the basin safe yield, will be exacerbated if the NCMA agencies are required to increase their dependency on groundwater withdrawals due to reductions or interruptions in local surface water supplies or State Water Project deliveries.

Potential Severe Water Shortage. For the reasons identified above the City's water supplies are in critical condition. Lake levels have reached record lows and even with the predicted strong El Nino this winter it is unlikely the lake will recover to more than 50% full. Even so, the City should be able to rely on its 800 acre-feet per year entitlement for the next few years. Probably more critical is the current groundwater level. If groundwater supplies are threatened by saltwater intrusion, the City could be forced to rely entirely on Lopez Lake deliveries until emergency water provisions could be enacted. Under the provisions of the LRRP, Lopez Lake deliveries could be reduced by 20% during the same time period. Under this scenario the total annual supply available without groundwater could be as little as 640 acre-feet. This amounts to 43.5 gallons per person per day. For comparison, even with the City's conservation mandate in place the current demand amounts to approximately 72 gallons per person per day. A loss of groundwater supply would require an additional 42% reduction in all water uses to reduce demand consistent with available supply.

Recommendations. The possibility of long term drought conditions and the threat of seawater intrusion into our groundwater supply may result in the need to develop a new long term water supply in addition to an emergency water supply.

In response to a possible short term or unexpected loss in water supplies, the Zone 3 Technical Advisory Committee developed a subcommittee to study emergency supply options. The City's Public Works Director is attending and coordinating efforts with this subcommittee. Recommendations from the subcommittee have been reviewed by the Zone 3 Advisory Board and forwarded to the County Board of Supervisors with a recommendation requesting that the County take a lead role in developing emergency supply options. Currently the County is studying expansion of the Diablo Canyon desalination facility that could supply between 500 and 1000 acre-feet to agencies in the south county area. Several years ago the City and other Zone 3 agencies explored the purchase of emergency State water. This effort could be reinstated or the City could consider purchase of State water as a permanent supply. Under emergency conditions the City may need to rely on an intertie with neighboring agencies to provide a supplemental emergency water supply.

Many options have been considered in developing a new long term supply. They include desalination, raising the Lopez Lake Dam spillway and recycled water projects. There are currently two studies focusing on the use of recycled water. One is evaluating the cost and feasibility of using recycled water from the City of Pismo Beach. The other is evaluating construction of a recycled water facility in Arroyo Grande using reclaimed water from the South San Luis Obispo County Sanitation District. In addition, the Zone 3 Technical Advisory Committee is recommending the Diablo Canyon desalination project be developed into a long term supply.

Water Conservation Efforts. Water conservation is the most cost effective and feasible water supply option currently available. It addresses both long and short term water supplies. Recent conservation efforts have yielded on average a 30% reduction in the City's water production compared to 2013. This amounts to a water use savings of approximately 726 acre-feet per year. The current conservation efforts were initiated as a short term water supply action in

accordance with the City's Water Shortage Contingency Plan. The Water Shortage Contingency Plan is a component of the 2010 Urban Water Management Plan. The City's Water Shortage Contingency Plan includes stages of action related primarily to drought, but also considers other short- and long-term supply shortages. The Council adopted four stages of action that include Stage 1 which is primarily educational; Stage 2 which identifies voluntary water conservations measures and use prohibitions; Stage 3 mandates a 10% reduction in water use, mandatory water conservation measures and use prohibitions; and Stage 4 which mandates a 25% reduction in water use, mandatory water conservation measures and use prohibitions. Stage 3 was enacted by City Council in 2014. The Council subsequently received an update regarding conservation efforts at a special workshop held on June 8, 2015.

Depending on the condition of the City's water supplies, it may be necessary to enact a Stage 4 Water Shortage Condition or to consider making current conservations measures permanent. In addition the State is currently considering prolonging or modifying the State's mandated water conservation requirements initiated in 2015 in response to the drought. Depending on the outcome of the State's action, this may require additional actions by Council.

## ALTERNATIVES

It is anticipated that the information contained in this report may inform future Council decisions related to emergency and long term water supply options and the City's water conservation program. The Council has the following alternatives to consider:

1. Receive and file this report; or
2. Receive and file this report and provide staff with additional direction as necessary.

## RECOMMENDATION

It is recommended that the Council receive and file this report.

## FISCAL IMPACT

There are no immediate financial impacts associated with this report. Currently there are insufficient funds available in the City's Water Enterprise Fund to allow significant participation in any of the regional water supply projects being studied. It is imperative that the City develop a source of funding in order to participate in any of the projects identified above. The City or all of the agencies included in the Northern Cities Management Area together may be eligible for grant funding to offset some of the costs of developing these projects but it is also likely the City will need to develop a significant capital reserve fund in the City's Water Enterprise Fund.

At present, the Water Fund reserves are dwindling as a result of increased costs for water conservation, reduced water sales and implementation of water system upgrades. Council has authorized staff to undertake a rate study to determine if water rates are appropriate for anticipated costs in the Water Fund. Staff is recommending the study include development of short and long term water supplies as well as anticipated effects of additional water conservation actions.

## PUBLIC NOTIFICATION

The agenda was posted in accordance with the Brown Act.

## ATTACHMENTS

1. PowerPoint by Jim Garing regarding the City's Water Supply concerns

2. The NCMA 2014 Annual Report is available for public review at the customer service counter at City Hall and on the City's website at http://www.grover.org/DocumentCenter/Home/View/1893

# Concerns Regarding The Grover Beach Water Supply

Jim Garing

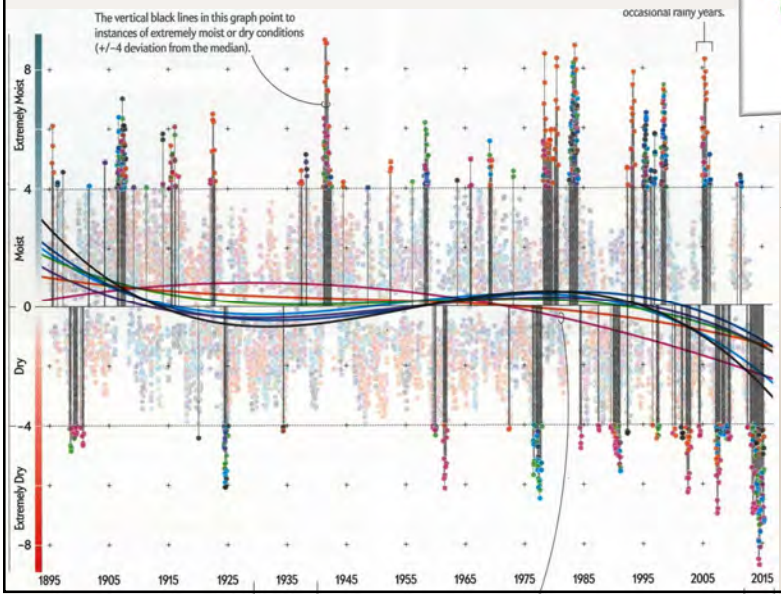
Consulting City Engineer

- Sewer/Water

- **Grover Beach City Council Meeting – November 30, 2015**

1

## Our Current Trajectory
(Palmer Hydrological Drought Index)




**Reference:** Scientific American, August 2015. Author Dan Baum.

2

## The Lopez Lake Dam Project

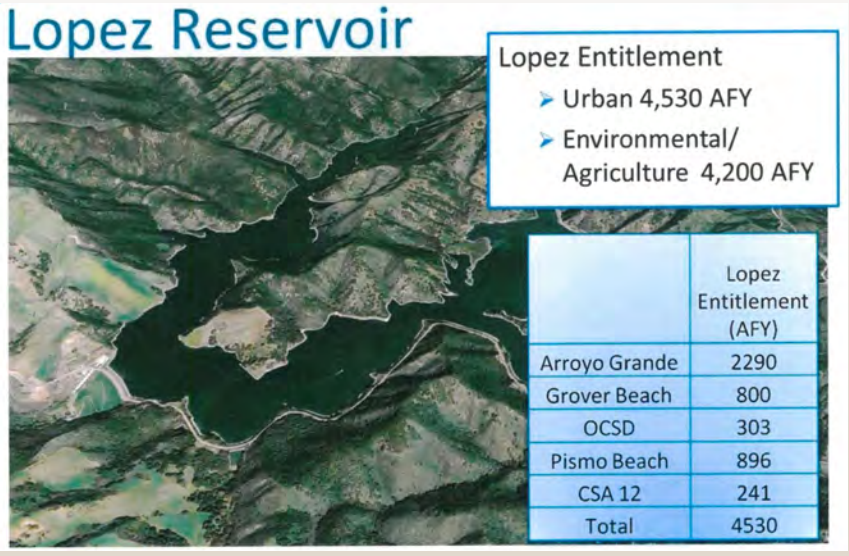
In 1965, Grover City, Pismo Beach, Arroyo Grande and Oceano signed a contract with the San Luis Obispo County Flood Control and Water Conservation District to implement the Lopez Lake Dam Project.

**Compelling Reasons to Participate Included:**

- Potential for Sea Water Intrusion
- Increasing Nitrate Concentration of Groundwater
- Future Needs

3

## Lopez Reservoir




| | Lopez Entitlement (AFY) |
|---|---|
| Arroyo Grande | 2290 |
| Grover Beach | 800 |
| OCSD | 303 |
| Pismo Beach | 896 |
| CSA 12 | 241 |
| Total | 4530 |

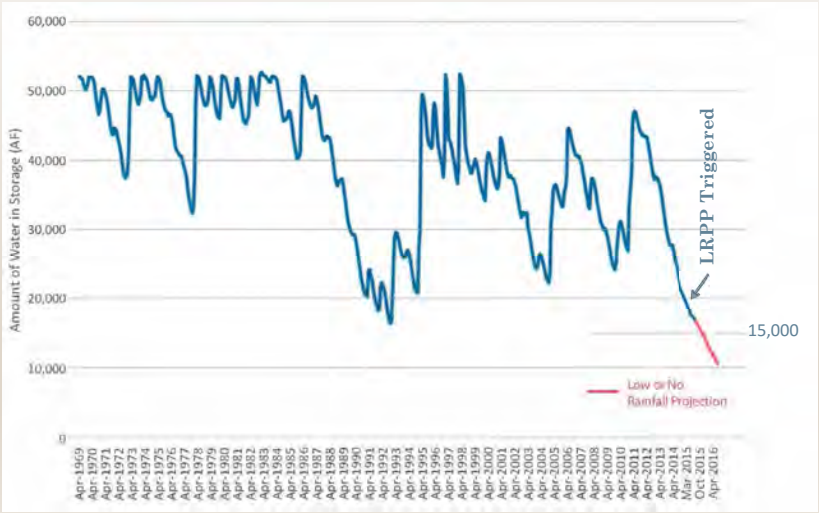
4

## Lake Lopez Vista Lago Swim Area

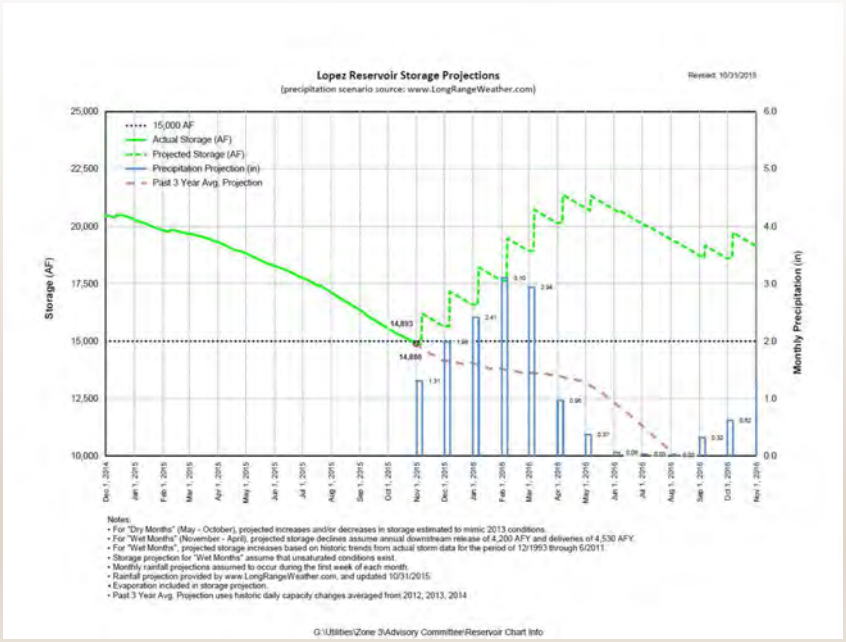
2013 2015

5

## Lake Lopez Storage (acre-feet)
(1969 – Present)




6




7

# Low-Reservoir Response Plan

**Table 1. Initial Prescribed Municipal Diversion Reduction Strategy**

| Amount of Water In Storage (ac-ft) | Municipal Diversion Reduction | Municipal Diversion (ac-ft per year) |
|---|---|---|
| 20,000 | 0% | 4,530 |
| 15,000 | 10% | 4,077 |
| 10,000 | 20% | 3,624 |
| 5,000 | 35% | 2,941 |
| 4,000 | 100% | 0 |

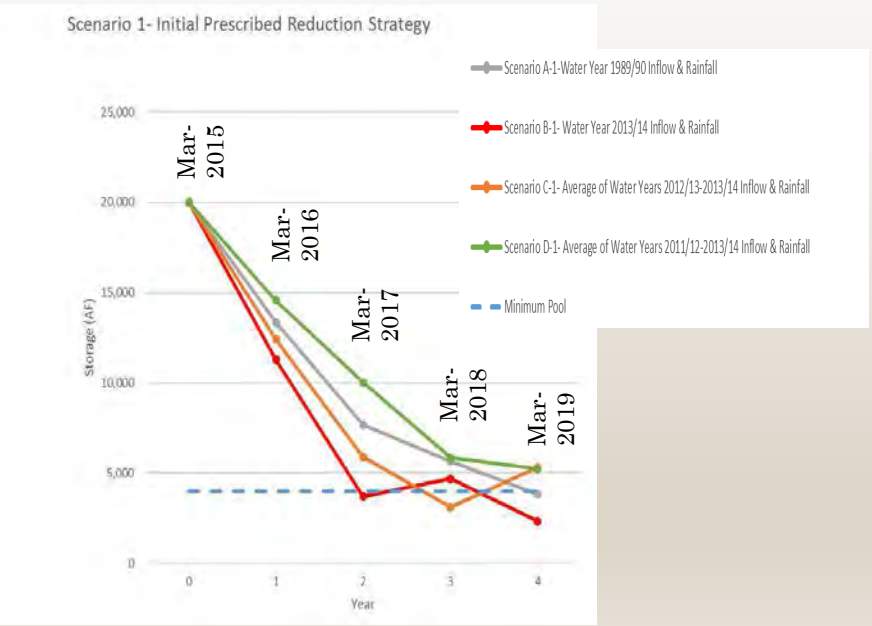
8

# Low-Reservoir Response Plan

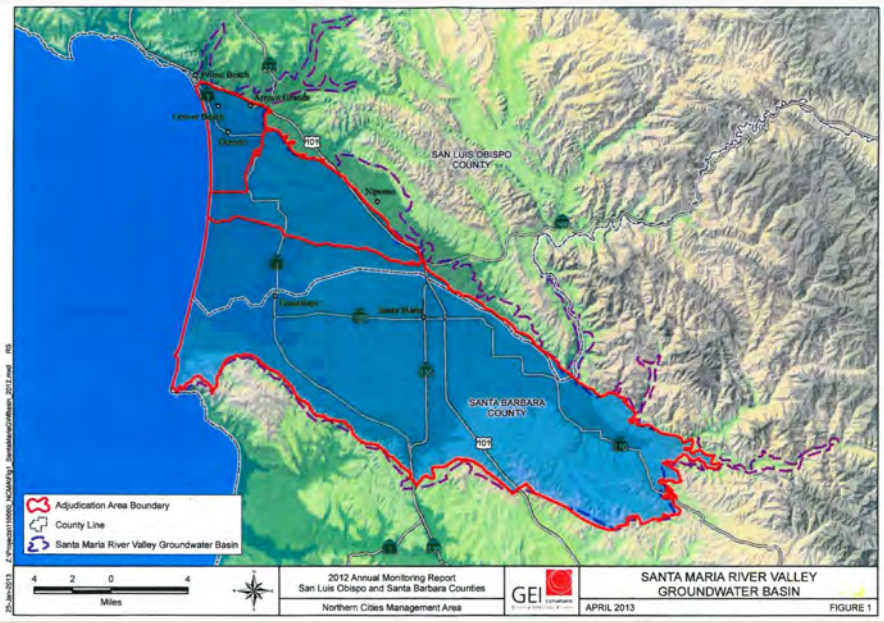
**Table 2. Initial Prescribed Downstream Release Reduction Strategy**

| Amount of Water In Storage (ac-ft) | Downstream Release | Downstream Release (ac-ft per year) |
|---|---|---|
| 20,000 | 10% | 3,800 |
| 15,000 | 10% | 3,800 |
| 10,000 | 76% | 1,026 |
| 5,000 | 93% | 300 |
| 4,000 | 100% | 0 |

9

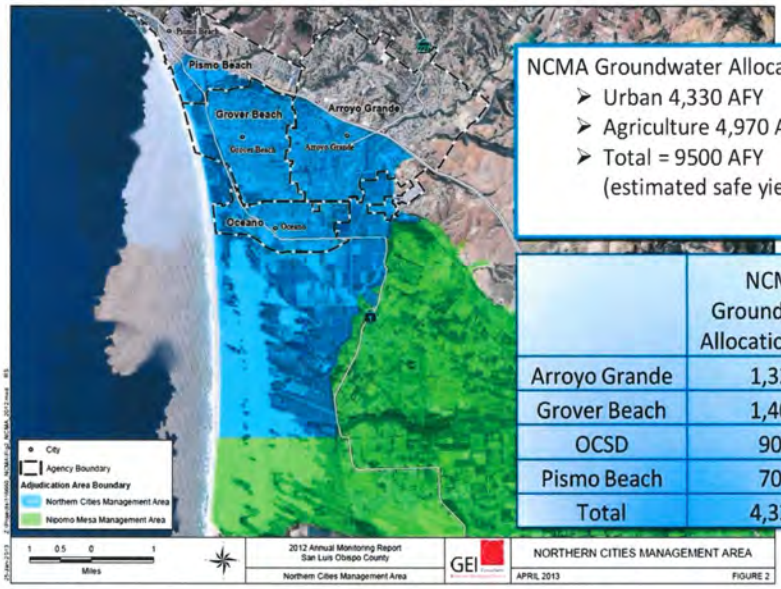



10




11

# Northern Cities Management Area




NCMA Groundwater Allocation
- Urban 4,330 AFY
- Agriculture 4,970 AFY
- Total = 9500 AFY (estimated safe yield)

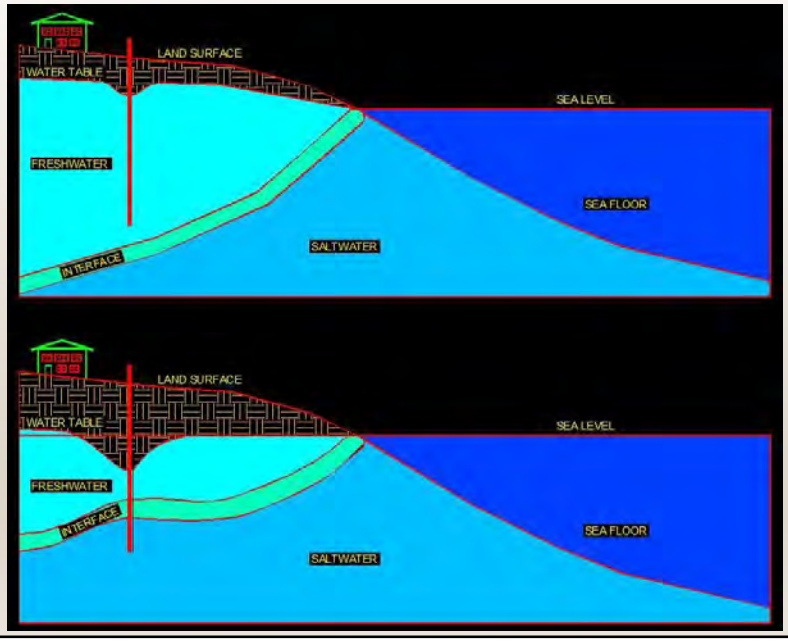
| | NCMA Groundwater Allocation (AFY) |
|---|---|
| Arroyo Grande | 1,323 |
| Grover Beach | 1,407 |
| OCSD | 900 |
| Pismo Beach | 700 |
| Total | 4,330 |

12

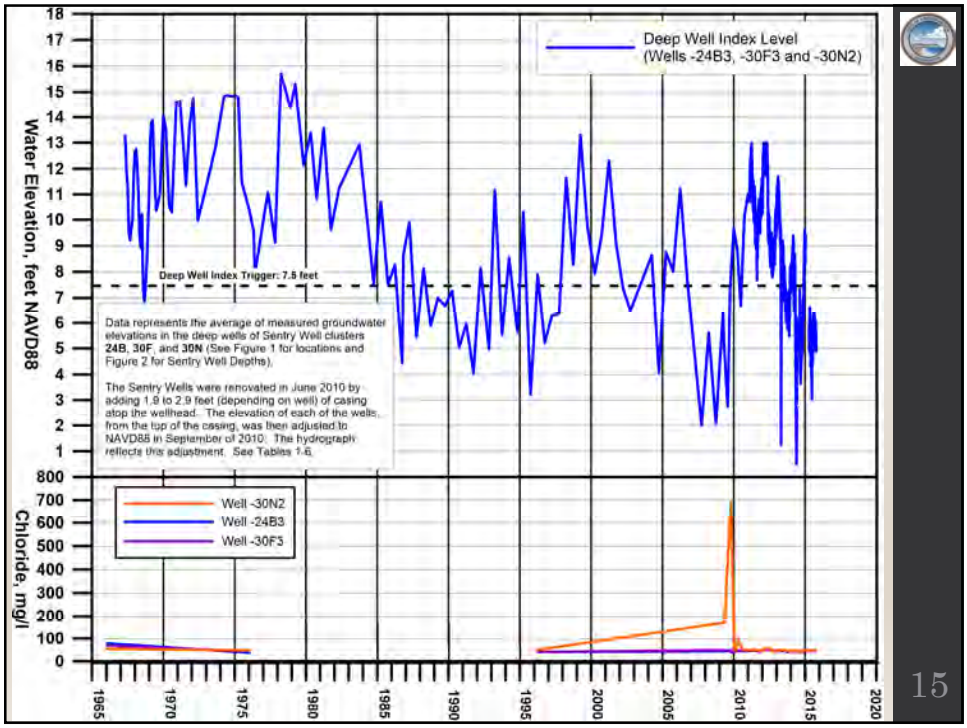
# Location of Sentry Wells
# Northern Cities Management Area


13

# Saltwater Intrusion

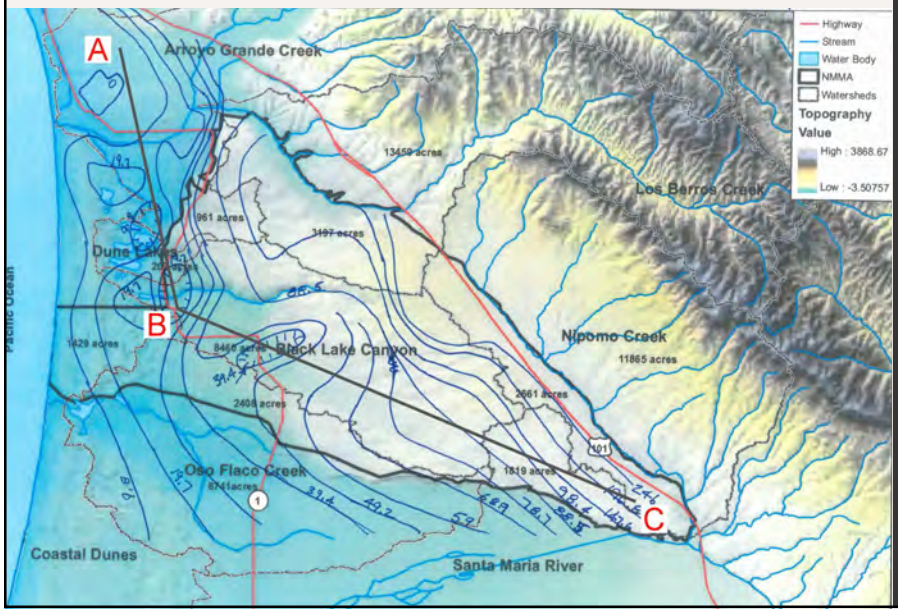



14



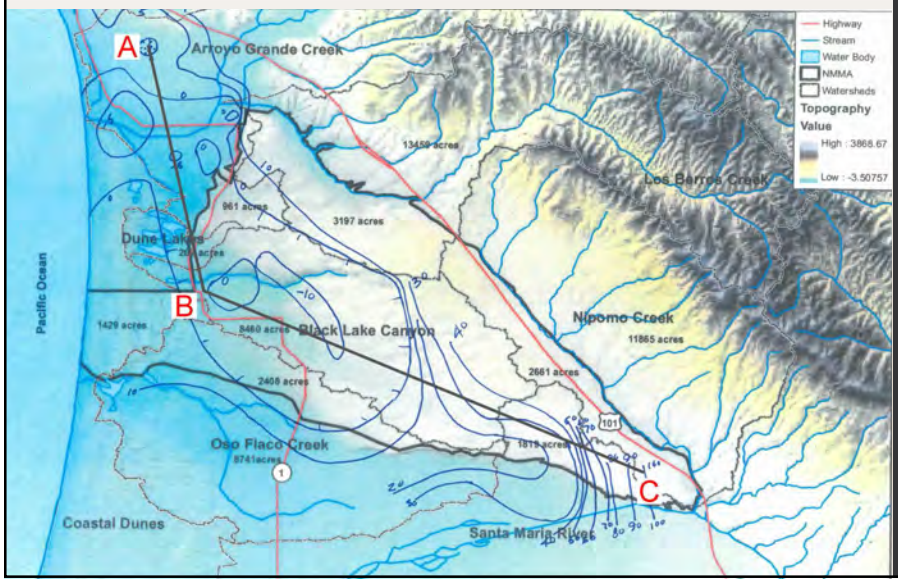

15

# Fall 1965 Ground Water Surface



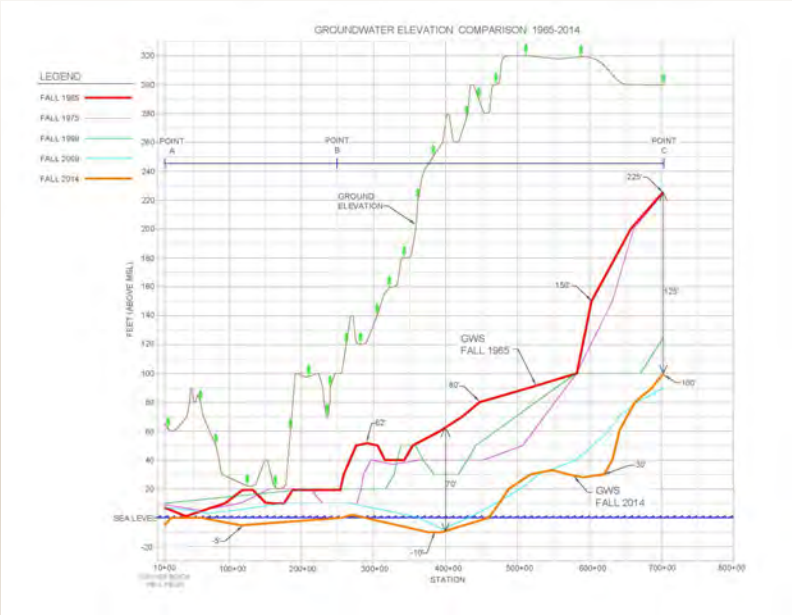

16

# Fall 2014 Ground Water Surface




17

# Ground Water Surface Comparison




18

## State Water

SLO County State Water Entitlement :

25,000 ac-ft (in Central Valley Aqueduct)

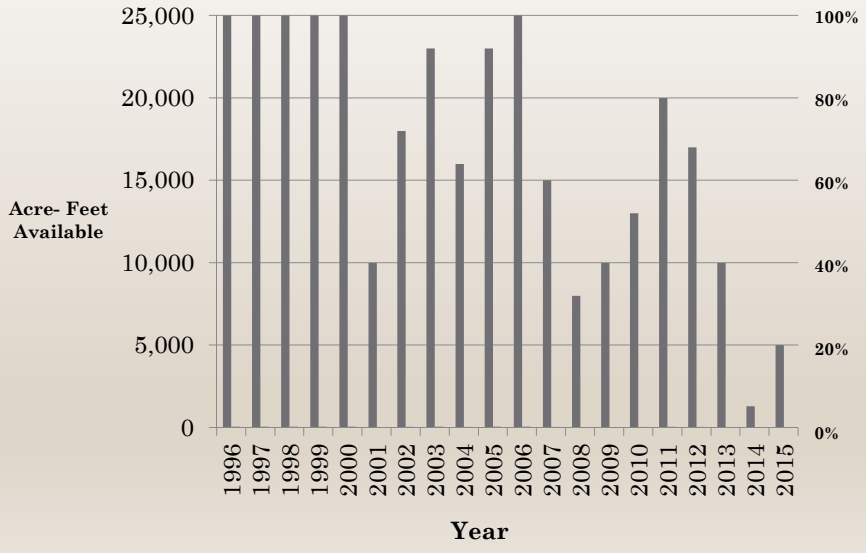
SLO County Capacity in Coastal Branch of State Water Project : 4,750 ac-ft

Northern Cities Entitlements to State Water:

Pismo Beach 1,240 ac-ft
Oceano CSD 750 ac-ft

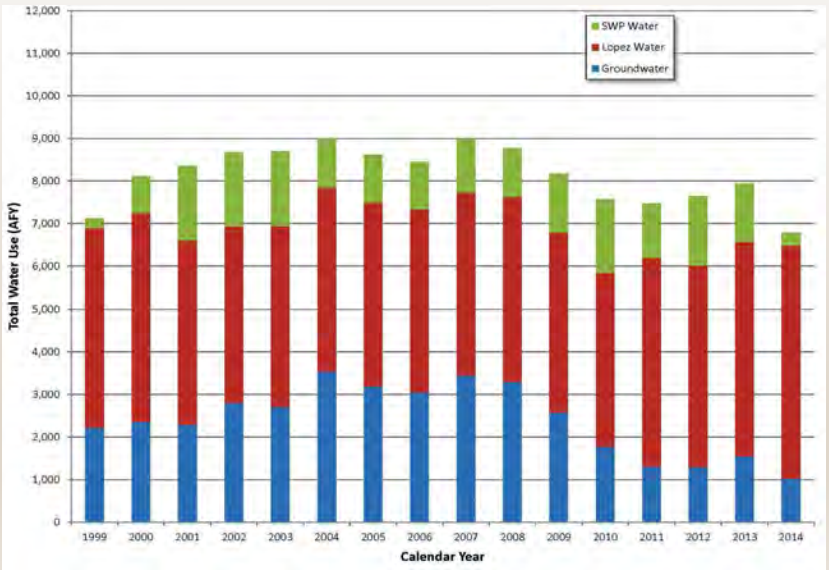
19

## State Water Availability




20

## Total Water Use by Source




21

## Summary

- Lopez Lake and Groundwater Elevations are at historically low levels while State Water deliveries are at historically low levels.
- Conservation will dramatically extend the availability of these critical water resources.
- Predicted El Nino Conditions may bring a wet winter, but there is no guarantee that this will occur.
- If dry conditions continue, even more restrictive conservation measures will be necessary.

22