FUGRO CONSULTANTS, INC.

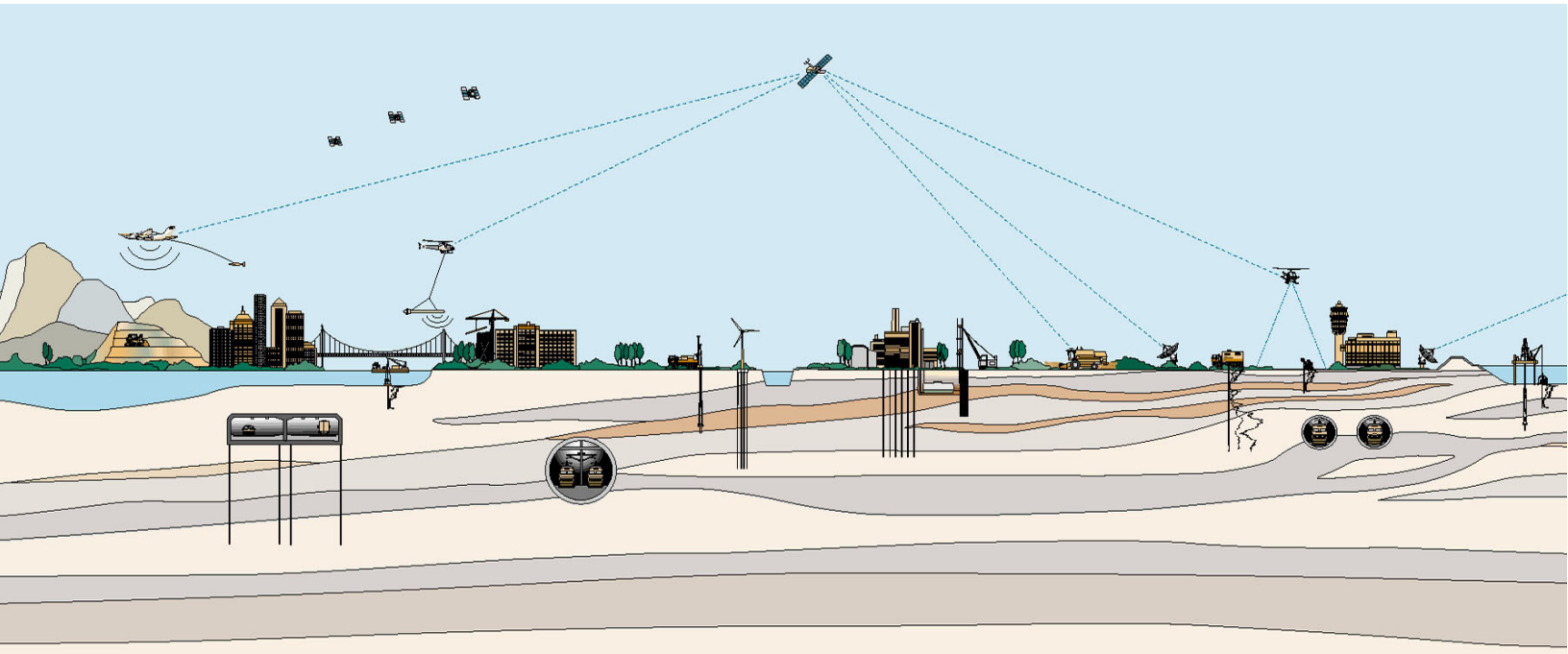
NORTHERN CITIES MANAGEMENT AREA
2015 ANNUAL MONITORING REPORT

Prepared for:
The Northern Cities Management Area Technical Group

City of Arroyo Grande
City of Grover Beach
Oceano Community Services District
City of Pismo Beach

Prepared by:
Fugro Consultants, Inc.

April 27, 2016



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Northern Cities Management Area

Northern Cities Management Area
2015 Annual Monitoring Report

Fugro Consultants, in collaboration with Rob Almy, PG, and GEI Consultants, Inc., is pleased to submit the 2015 Annual Monitoring Report for the Northern Cities Management Area. The report is prepared pursuant to the requirements of the Stipulation and Judgment After Trial for the Santa Maria Groundwater Adjudication. The report is prepared on behalf of the Northern Cities Management Area, which is comprised of the City of Arroyo Grande, City of Grover Beach, Oceano Community Services District, and City of Pismo Beach.

Sincerely,

FUGRO CONSULTANTS, INC.

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NORTHERN CITIES MANAGEMENT AREA
2015 ANNUAL MONITORING REPORT

1.0 EXECUTIVE SUMMARY

The 2015 Annual Monitoring Report for the Northern Cities Management Area (NCMA) is prepared pursuant to the requirements of the Stipulation and Judgment After Trial (Judgment) for the Santa Maria Groundwater Basin Adjudication. The Annual Report provides an assessment of hydrologic conditions for the NCMA based on data collected during the calendar year of record. As specified in the Judgment, the Northern Cities agencies, consisting of the City of Arroyo Grande, City of Grover Beach, City of Pismo Beach, and Oceano Community Services District, are to conduct groundwater monitoring in the NCMA, and collect and analyze data pertinent to water supply and demand, including:

- Land and water uses in the basin;
- Groundwater conditions (including water levels and water quality);
- Sources of supply to meet those uses;
- Amount and disposition of developed water supplies; and
- Amount and disposition of other sources of water supply in the NCMA.

Results of the data compilation and analysis for calendar year 2015 are documented and discussed in this Annual Report.

1.1 GROUNDWATER CONDITIONS

1.1.1 Groundwater Levels

- Overall, groundwater contours in April 2015 show a westerly groundwater flow and gradient. Because of a limited number of wells and water level data in the southern portion of the area, the groundwater gradient and flow are generally inferred on the basis of historical records and trends, as well as water level data from the Northern Cities Management Area (NMMA) further to the east. Based on the data, it appears that two areas of pumping depression existed during this time, one in the north-central part of the area in the vicinity of centralized municipal pumping, and the second in the eastern part of the NCMA in the region of centralized agricultural pumping. Water levels along the coast ranged from 4.53 to 8.10 feet NAVD88.
- Groundwater contours in October 2015 show a similar overall trend as in April 2015, although with a general lowering of water levels across the region. Much of the area from the north-central portion of the NCMA to near the southern boundary of the NCMA appears to have had water levels below sea level at this time, with water level elevations along the coast ranging from -0.4 to 6.97 feet NAVD88.
- During 2015, hydrographs of several water wells throughout the NCMA (05N02, 31H08, 31H09, 28K02, 29R03, 30K03, 33K03, 32D03, and 32D11) exhibited an overall decline in water level since the beginning of the year. In the east-central to northeastern portion of the NCMA, wells 30K03 and 28K02 reached historic low water levels in October 2015.

The water level in well 33K03 (located near the NCMA/NMMA boundary) continues to be near historic low levels.

- Water level tends in wells instrumented with pressure transducers:
  - Deep Index Wells: Water levels in wells 30N02 and 30F03 generally declined between February and April 2015 and then remained depressed into October when water levels began to rise. The water levels in both wells have now been above the index trigger value since mid-December 2015.
  - Coastal Wells: The water level in well 36L01 remained above sea level during 2015, and remains stable within a relatively narrow historic range. The water level in well 36L02 illustrates a much greater seasonal fluctuation than is seen in 36L01. The water elevation in 36L02 declined below sea level in late September and remained below sea level into late October when it reached an historic low elevation. Since late October, the water elevation in 36L02 has risen to 9 feet NAVD 88.
  - NCMA/NMMA Boundary: Well 32C03, which shows regular seasonal fluctuations, declined below sea level in early September and remained at a low elevation until late October, when the water level began to rise.

1.1.2 Groundwater Quality

- Chloride: Chloride concentrations in the shallow wells (24B01, 30F01, and 30N01) in October 2015 are below or near the historically observed low concentration levels.
- Total Dissolved Solids (TDS): During the third quarter monitoring event in July 2015, several wells exhibited elevated TDS concentrations, including wells 36L01 and 36L02. By the fourth quarter monitoring event in October 2015, TDS concentrations, in general, decreased to within historical concentration ranges.
- Sodium: In third quarter 2015, sodium concentrations were elevated in the three deep sentry wells (24B03, 30F03, and 30N02). However, by October 2015, sodium concentrations declined in all of the deep sentry wells to within historic ranges.

1.2 WATER SUPPLY AND DEMAND

- Total water use in the NCMA in 2015, including urban use by the Northern Cities agencies as well as applied irrigation and private pumping by rural water users, was 8,988.45 acre feet (AF). Of this amount, Lopez Lake deliveries were 3,161.87 AF, State Water Project deliveries totaled 1,803.11 AF, and groundwater pumping from the Santa Maria Groundwater Basin (SMGB) accounted for approximately 3,979.47 AF. Groundwater pumping from the Pismo Formation, outside the SMGB, accounted for 44 AF. The breakdown is shown on the following table.

Urban Area	Lopez Lake	State Water Project	SMGB Groundwater	Other Supplies	Total
Arroyo Grande	2,152.08	0.00	42.51	44.0	2,238.59
Grover Beach	790.59	0.00	474.81	0.0	1,265.40
Pismo Beach	219.20	1,231.73	284.77	0.0	1,735.70
Oceano CSD	0.00	571.38	131.88	0.0	703.26
Urban Water Use Total	**3,161.87**	**1,803.11**	**933.97**	**44.0**	**5,942.95**
Applied Irrigation	0.0	0.0	3,008	0.0	3,008
Rural Water Users	0.0	0.0	37.5	0.0	37.5
Total	**3,161.87**	**1,803.11**	**3,979.47**	**44.0**	**8,988.45**

- In general, urban water demand has ranged from 5,942.95 AF (current year 2015) to 8,982 AF (2007). Demand since 2009 shows an overall decline each year with a slight increase in 2012 and 2013; this overall decline in demand may be attributed to the relatively slower economy from 2009 through 2012 and, particularly in recent years, conservation activities implemented by the Northern Cities.
- Agricultural acreage has remained fairly constant. Thus, annual water demand for applied irrigation has been relatively stable and varies mostly with weather conditions. Acknowledging the variability due to weather conditions, applied irrigation water demand is not expected to change significantly given the relative stability of applied irrigation acreage and cropping patterns in the NCMA south of Arroyo Grande Creek. Changes in rural demand have not been significant.

1.3 THREATS TO WATER SUPPLY

- Total groundwater pumping from the SMGB in the NCMA (urban, agriculture, and rural domestic) was 3,979.47 AF in 2015, which is 41.9% of the calculated 9,500 AFY yield of the NCMA portion of the Santa Maria Groundwater Basin. However, even with the reduced pumping, 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 yield of an aquifer, the remaining volume of groundwater results in increased groundwater in storage, which is then manifested by rising water levels. The current condition, with groundwater pumping at 41.9% of the safe yield and declining water elevations, illustrates the impacts of the ongoing severe drought that has significantly reduced recharge.
- During 2015, there were no indications of seawater intrusion. There were slightly elevated concentrations of TDS, sodium, and chloride in July 2015, but concentrations generally had declined by October 2015 to normal range.

2.0 INTRODUCTION

The 2015 Annual Monitoring Report summarizes hydrologic conditions for calendar year 2015 in the Northern Cities Management Area (NCMA) of the Santa Maria Groundwater Basin (SMGB) in San Luis Obispo County, California. This report was prepared on behalf of four public agencies collectively referred to as Northern Cities, which includes the City of Arroyo Grande (Arroyo Grande), City of Grover Beach (Grover Beach), City of Pismo Beach (Pismo Beach) and the Oceano Community Services District (Oceano CSD). These agencies, along with local land owners, the County of San Luis Obispo (County), and the San Luis Obispo County Flood Control & Water Conservation District (SLOCFC&WCD) have managed local surface water and groundwater resources in the area since the late 1970s to preserve the long-term integrity of water supplies.

The collaborative approach was recognized in the 2001 Groundwater Management Agreement (which was based on the 1983 "Gentlemen's Agreement), formalized in the 2002 Settlement Agreement between the Northern Cities, Northern Landowners, and Other Parties (2002 Settlement Agreement), and incorporated in the 2005 Stipulation for the Santa Maria Groundwater Basin Adjudication (Stipulation). On June 30, 2005 the Stipulation was agreed upon by numerous parties, including the Northern Cities. The Stipulation included the 2002 Settlement Agreement. The approach was then adopted by the Superior Court of California, County of Santa Clara, in its Judgment After Trial, entered January 25, 2008 (Judgment). Although appeals to that decision were filed, a subsequent decision by the Sixth Appellate District (filed November 21, 2012) has upheld the Court's Judgment After Trial. On February 13, 2013, the Supreme Court of California denied a petition to review the decision.

In a separate but related action, a motion was filed on September 29, 2015 by the cities of Arroyo Grande, Pismo Beach, and Grover Beach against the Nipomo Mesa Management Area (NMMA) and SLOCFC&WCD to enforce the terms of the Stipulation and Judgment. That action is ongoing in 2016.

The Judgment orders the stipulating parties to comply with all terms of the Stipulation. As specified in the Judgment and as outlined in the *Monitoring Program for the Northern Cities Management Area* (Monitoring Program; Todd Groundwater, Inc. [Todd] 2008), the Northern Cities agencies are to conduct groundwater monitoring of wells in the NCMA. In accordance with requirements of the Judgment, the agencies comprising the NCMA group collect and analyze data pertinent to water supply and demand, including:

- Land and water uses in the basin;
- Sources of supply to meet those uses;
- Groundwater conditions (including water levels and water quality);
- Amount and disposition of developed water supplies; and,
- Amount and disposition of other sources of water supply in the NCMA.

The Monitoring Program requires that the NCMA gather and compile pertinent information on a calendar year basis; this is accomplished through data collected by Northern Cities agencies (including necessary field work), requests to other public agencies, and from online sources. Periodic reports such as Urban Water Management Plans (UWMP) prepared by Arroyo Grande,

Grover Beach and Pismo Beach provide information on demand, supply, and water supply facilities. Annual data are added to the comprehensive Northern Cities Management Area Database and analyzed. Results of the data compilation and analysis for calendar year 2015 are documented and discussed in this Annual Report.

As shown on Figure 1, the NCMA represents the northernmost portion of the SMGB, as defined in the adjudication and by California Department of Water Resources (DWR 1958) as the Santa Maria River Valley groundwater basin (Basin 3-12). Adjoining the NCMA to the southeast is the NMMA; the Santa Maria Valley Management Area (SMVMA) encompasses the remainder of the groundwater basin. Figure 2 shows the locations of the four Northern Cities agencies within the NCMA.

2.1 DESCRIPTION OF THE NORTHERN CITIES MANAGEMENT AREA TECHNICAL GROUP

Pursuant to a requirement contained in the Stipulation, the NCMA Technical Group (TG) was formed. The TG is composed of representatives of Arroyo Grande, Grover Beach, Pismo Beach, and Oceano CSD (Table 1).

Table 1. NCMA TG Representatives

Agency	Representative
City of Arroyo Grande	Geoff English Public Works Director
	Shane Taylor Utilities Manager
City of Grover Beach	Gregory A. Ray, PE Director of Public Works/City Engineer
	R.J. (Jim) Garing, PE Consulting City Engineer for Water and Sewer
City of Pismo Beach	Benjamin A. Fine, PE Director of Public Works/City Engineer
Oceano Community Services District	Paavo Ogren General Manager
	Tony Marracino Utility Systems Supervisor

Arroyo Grande, Pismo Beach, and Grover Beach contract with Water Systems Consulting, Inc. (WSC) to serve as staff extension to assist the TG in the roles and responsibilities of the TG for purposes of managing the water supply resources. The full TG contracts with a consulting firm

(currently Fugro Consultants, Inc.) to conduct the quarterly groundwater monitoring and sampling tasks, evaluate water demand and available supply, identify threats to water supply, and assist the group in preparation of the Annual Report.

2.2 COORDINATION WITH MANAGEMENT AREAS

Since 1983, management of the NCMA was based on cooperative efforts of the four Northern Cities agencies with continuing collaboration with San Luis Obispo County, the SLOCFC&WCD, and other local and state agencies. Specifically, the NCMA agencies have limited their pumping and, in cooperation with SLOCFC&WCD, invested in surface water supplies so not to exceed the safe yield of the NCMA portion of the SMGB. In addition to the efforts discussed in this report, cooperative management occurs through many means including communication of the Northern Cities in their respective public meetings and participation in the Water Resources Advisory Council (a County-wide advisory panel on water issues). The NCMA agencies participated in preparation and adoption of the 2007 San Luis Obispo County Integrated Regional Water Management Plan (IRWMP) as well as the 2014 San Luis Obispo County IRWM Plan. The IRWMP promotes integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy.

Since the 2008 Judgment, the NCMA has taken the lead in cooperative management of its management area. The NCMA TG met monthly (at a minimum) throughout 2015 and has been an active participant in the Santa Maria Groundwater Basin Management Area (SMGBMA) technical subcommittee, which formed in 2009. The purpose of the SMGBMA technical subcommittee is to coordinate efforts among the management areas such as enhanced monitoring of groundwater levels and improved sharing of data.

An NCMA Strategic Plan was developed in 2014 for the purposes of providing the NCMA TG with a mission statement to guide future initiatives, giving a framework for identifying and communicating water resource planning goals and objectives, and formalizing a 10-year Work Plan for implementation of those efforts. Several key objectives were identified related to enhancing water supply reliability, improving water resource management, and increasing effective public outreach. Implementation of some of these efforts continued throughout 2015.

3.0 BASIN DESCRIPTION

3.1 SETTING

The SMGB as defined in the adjudication has three jurisdictional or management areas. As shown in Figure 1 (following text), the NCMA represents the northernmost portion of the basin. Adjoining the NCMA to the southeast is the NMMA, and the SMVMA encompasses the remainder of the groundwater basin. The southern boundary of the NCMA is coincident with the NMMA portion of the basin.

Groundwater pumped from the NCMA is derived principally from the Paso Robles Formation, consisting of heterogeneous alluvial materials that extend westward beneath the ocean. The northern and eastern portions of the basin are bounded by bedrock and faults that potentially reduce subsurface inflow recharge to the basin aquifer.

The groundwater resource of the NCMA has several sources of recharge: precipitation, agricultural return flow, seepage from stream flow, and subsurface inflow from adjacent areas. In addition, some return flows occur from imported surface supply sources including Lopez Reservoir and the State Water Project. Historically, groundwater elevations in wells throughout the NCMA and resulting hydraulic gradients show that discharge occurs westward from the groundwater basin to the ocean, which is an important control to limit the potential of seawater intrusion.

3.2 PRECIPITATION

Each year climatological and hydrologic (stream flow) data for the NCMA are added to the NCMA database. Annual precipitation from 1950 to 2015 is presented on Figure 3.

Historical rainfall data are compiled on a monthly basis for the following three stations:

- Desert Research Institute (DRI): Western Regional Climate Center Pismo Station (Coop ID: 046943) for 1950 to Present;
- DWR California Irrigation Management Information System (CIMIS) Nipomo Station (No. 202) for 2006 to Present, and
- San Luis Obispo County-operated rain gage (No. SLO 759) in Oceano for 2005 to 2009;

The locations of the three stations are shown in Figure 4. In recent years, it was noted that the CIMIS Nipomo station is possibly recording irrigation overspray as precipitation and the precipitation data may not be reliable. For this reason, only the DRI and San Luis Obispo County gages were used in this report for reporting on precipitation. Note that precipitation values are only averaged for station readings for months when data were available. Average values are not weighted based on station location versus the study area. Figure 3 is a composite graph combining data from the two stations and illustrating annual rainfall totals from 1950 through 2015 (on a calendar year basis). Annual average rainfall for the NCMA is approximately 15.6 inches.

Monthly rainfall and evapotranspiration (ET) for 2015 as well as average monthly historical rainfall and ET are presented on Figure 5. During 2015 below average rainfall occurred for eleven of the twelve months (92 percent of year). Above average rainfall occurred in the summer month of July. The total for the year was 5.4 inches, 35 percent of the average annual rainfall for the NCMA. Figure 3 illustrates annual rainfall and exhibits several multi-year drought cycles (e.g., 6 years,

1984-1990) followed by cycles of above average rainfall (e.g., 7 years, 1991-1998). With the exception of 2010, the period 2007 through 2015 (8 years) has experienced below average annual rainfall suggesting a “dry” hydrologic period. The average rainfall 2007 through 2015 (including 2010) is 9.8 inches, 63 percent of the historical average.

Most regional rainfall typically occurs from November through April. The year 2015 was marked by lower (74 percent lower) than average rainfall in every month except July. July experienced higher than normal average rainfall at 1.32 inches (the average is 0.04 inches).

Evapotranspiration is covered in the following Section 3.3. However, it is worth noting that rainfall did not exceed evapotranspiration in any of the months in 2015. As such, deep percolation from rainfall that contributes to groundwater recharge was assumed to be nil in 2015. The lack of groundwater recharge from rainfall percolation is a continuation of the drought effects seen in 2014 when rainfall exceeded evapotranspiration in only one month (December), in 2013 when rainfall did not exceed evapotranspiration in any of the months, in 2012 when rainfall exceeded evapotranspiration in only one month (April), and in 2011 when rainfall exceeded evapotranspiration, again, in only one month (March).

3.3 EVAPOTRANSPIRATION

The CIMIS maintains weather stations in locations throughout the state in order to provide real time wind speed, humidity and evapotranspiration data. The nearest CIMIS station to the NCMA area is the Nipomo station (see Figure 4). The Nipomo station has gathered data since 2006. While this station may have been subject to irrigation overspray in recent years (noted in the precipitation section above), it does not have a significant impact on the measurements used for calculating ET. The monthly ET data for the Nipomo station is shown in Figure 5 for 2015 and average (8-years) conditions. Evapotranspiration rate affects recharge potential of rainfall and the amount of outdoor water use (irrigation). In all months, ET exceeded rainfall, indicating the recharge to groundwater from direct precipitation in 2015 was likely nonexistent.

4.0 GROUNDWATER CONDITIONS

The NCMA groundwater monitoring program includes: 1) compilation of groundwater elevation data from San Luis Obispo County, 2) water quality and groundwater elevation monitoring data from the network of sentry wells in the NCMA, 3) water quality data from the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW), and 4) groundwater elevation data from municipal pumping wells. Analysis of these data is summarized below in accordance with the July 2008 Northern Cities Monitoring Program.

4.1 GROUNDWATER MONITORING NETWORK

Approximately 145 wells within the NCMA were monitored by the County at some time during the past few decades. The County currently monitors 38 wells on a semi-annual basis (April and October), including five "sentry well" clusters (piezometers) located along the coast and a relatively recently constructed monitoring well (County Well No. 3 [12N/35W-32C03]) on the eastern NCMA boundary between the NCMA and NMMA (Figure 6). The County monitors more than 60 additional wells in southern San Luis Obispo County. Following the findings of the 2008 Annual Report, the Northern Cities initiated a quarterly sentry well monitoring program to supplement the County's semi-annual schedule. The quarterly monitoring includes County Well No. 3.

To monitor overall changes in groundwater conditions, representative wells within the NCMA were selected for preparation of hydrographs and evaluation of water level changes. Wells were selected based on the following criteria:

- The wells must be part of the County's current monitoring program;
- Detailed location information must be available;
- Construction details of the wells must be available;
- The locations of the wells should have a wide geographic distribution; and
- The historic record of water level data must be long and relatively complete.

Many of the wells that have been used in the program are production wells that were not designed for monitoring purposes and may be screened in various producing zones. Moreover, many of the wells are active production wells or located near active wells and therefore potentially subject to localized pumping effects that result in measurements that are lower than the "static" or more broadly representative water level. These effects are not always apparent at the time of measurement. As a result, data cannot easily be identified as representing static groundwater levels in specific zones (e.g., unconfined or deep confined). Hence, data should be considered as a whole in developing a general representation of groundwater conditions.

The "sentry wells" are a critical element of the groundwater monitoring network and provide an early warning system to identify and quantify potential seawater intrusion episodes in the basin (Figure 6). Each sentry well consists of a cluster of multiple wells allowing for the measurement of groundwater elevation and quality from discrete depths. Also shown on Figure 6 is the Oceano CSD Observation well cluster, a dedicated monitoring well cluster located just seaward of Oceano CSD production wells 7 and 8. Figure 7 shows the depth and well names of the sentry well clusters and the Oceano CSD observation well cluster.

The wells are divided into three basic depth categories: shallow, intermediate, and deep. Since beginning the sentry well monitoring program, 29 quarterly events have been conducted with one each in May, August, and October 2009, and winter, spring, summer and fall 2010 through 2015, as well as January and April 2016 (the 2016 data will be included in the 2016 Annual Report). These monitoring events include collection of synoptic groundwater elevation data and water quality samples for laboratory analysis.

4.2 GROUNDWATER LEVELS

Groundwater elevation data are gathered from the network of wells throughout the NCMA. Water level measurements in these wells are used to monitor effects of groundwater use, groundwater recharge, and as an indicator of risk of seawater intrusion. Analysis of these groundwater elevation data has included development of groundwater surface contour maps, hydrographs, and an index of key sentry well water levels over time.

4.2.1 Groundwater Level Contour Maps.

Contoured groundwater elevations for the Spring (April 2015) and Fall (October 2015) monitoring events, including data from the County of San Luis Obispo monitoring program, are shown on Figures 8 and 9, respectively.

Groundwater level contours for April 2015 are presented on Figure 8. Overall, groundwater contours in April show a westerly to southwesterly groundwater flow north of the Santa Maria River Fault. Because of a limited number of wells and water level data in the southern portion of the area, the groundwater gradient and flow are generally inferred on the basis of historical records and trends, as well as water level data from the NMMA further east. Based on the data, it appears that two areas of pumping depression existed at this time, one in the north-central part of the area in the vicinity of some centralized municipal pumping, and the second in the eastern part of the NCMA in the region of centralized agricultural pumping. Water levels along the coast ranged from 4.53 to 8.10 feet NAVD88.

Groundwater level contours for October 2015 are presented on Figure 9. Groundwater contours in October show a similar overall trend as in April 2015, although with a general lowering of water levels across the region. Much of the area from the north-central portion of the NCMA to near the southern boundary of the NCMA appears to have had water levels below sea level at this time, with water level elevations along the coast ranging from -0.4 to 6.97 feet NAVD88.

4.2.2 Basin-Wide Historical Hydrographs.

Historical hydrographs since 1995 for select wells in the County well monitoring program are presented on Figure 10. Of the seven wells, two are east of the NCMA in the NMMA. It should be noted that well 05N02 was inaccessible during 2014 to 2015.

The hydrographs for wells 32D03 and 32D11, and wells 31H08 and 31H09 (Figure 10) are paired hydrographs for wells in the vicinity of the municipal well fields. Depending on duration of pumping of the municipal wells, water levels in these wells have historically been below levels in other areas of the basin for prolonged periods of time. The hydrographs show that, historically, groundwater elevations in these wells have generally been above mean sea level. However, an area of lower groundwater elevations (“trough”) beneath the active well field appeared during the period of reduced rainfall in 2007 and 2008. As illustrated in Figure 10, the water elevations of

these two paired well sets have again declined to near sea level. The groundwater elevations in these wells, representing the conditions in the vicinity of the NCMA municipal pumping area, are generally below the levels observed in 2007 and 2008, before water quality degradation was observed in the coastal wells.

Prior to 2013, groundwater elevations throughout the area recovered from the 2007-2008 lows and remained at levels similar to 2006 (a wet year). However, the last three years of very low rainfall (2013-2015) resulted in water levels throughout the area declining 10 to 20 feet.

During 2015, all the wells exhibited an overall decline in water level since the beginning of the year. In the east-central to northeastern portion of the NCMA, wells 30K03 and 28K02 reached historic low water levels in October 2015 (for at least the period of record). The water elevation in 30K03 (located in the east-central portion of the NCMA) in October 2015 of 2.77 feet was below the previous record low of 6.15 feet in October 2014. The water elevation in 28K02 (located in the north near the NCMA/NMMA boundary) in October 2015 of 4.77 feet was below the previous record low of 6.15 feet in October 2014. The water level in well 33K03 (located near the NCMA/NMMA boundary) continues to be at or near historic low elevations, reflecting the reduced recharge from the drought as well as potentially reduced subsurface flow from the east.

4.2.3 Sentry Wells.

Regular monitoring of water elevations in clustered sentry wells located along the coast are an essential tool for tracking critical groundwater elevation changes at the coast. Groundwater elevations in these wells are monitored quarterly as part of the sentry well monitoring program. As shown by the hydrographs for the five sentry well clusters (Figure 11), the sentry wells provide a long history of groundwater elevations. The deepest wells in the clusters (wells 24B03, 30F03, and 30N02) are screened at depths closely matching the screened depths of most local pumping wells. Hence, measured water elevations in these deepest wells reflect the net effect of changing groundwater recharge and discharge conditions in the primary production aquifer.

Averaging the groundwater elevations from the three deep sentry wells provides a single, representative index, called the deep well index, for tracking the status and apparent health of the basin. Previous studies have suggested a deep well index value of 7.5 feet NAVD88 as a minimum threshold, below which the basin is at risk for eastward migration of seawater and a subsequent threat of encroaching seawater intrusion. Historical variation of this index is represented by the average deep sentry well elevations on Figure 12.

The deep well index started 2015 above the trigger value, with an index value of 9.10 in January 2015. By April 2015, the index value dropped to 6.07 (1.43 feet below the trigger value). Between April 2015 and October 2015 the deep well index remained significantly below the index trigger value, reaching an index value of 5.08 feet in October. In October 2015, the deep well index began to rise and since mid-December has been above the trigger value (Figure 12).

Key wells (24B03, 30F03, 30N02, 36L01, 36L02, and 32C03) are instrumented with pressure transducers equipped with conductivity probes that periodically record water level, water temperature, and conductivity (Figures 13 through 18; Note that transducer malfunctions in early to mid-2015 resulted in variable conductivity data in some of the wells; all transducers have now been replaced and are working properly). Wells 24B03, 30F03, and 30N02 comprise the wells used to

calculate the deep well index. Well 36L01 and 36L02 are adjacent the coast. Well 32C03 is the eastern-most well and adjacent the boundary between NCMA and NMMA.

- Deep Well Index Wells: Water levels in wells 30N02 and 30F03 generally declined between February and April 2015 and then remained depressed into October when they began to rise. The water elevation in well 24B03 has remained relatively stable throughout 2015 and into January 2016.
- Coastal Wells: The water level in well 36L01 remained above sea level during 2015, and remains stable within a relatively narrow historic range. The water level in well 36L02 illustrates a much greater seasonal fluctuation than is seen in 36L01. The water elevation in 36L02 declined below sea level in late September and remained below sea level into late October when it reached an historic low recorded elevation. Since late October, the water elevation in 36L02 has risen to 9 feet NAVD 88.
- NCMA/NMMA Boundary: Well 32C03, which shows regular seasonal fluctuations, declined below sea level in early September and remained at a low elevation until late October, when the water level began to rise.

4.3 WATER QUALITY

Water is used in several ways in the NCMA, each use requiring a certain minimum water quality. Because contaminants from seawater intrusion or from anthropogenic sources can potentially lower the quality of water in the basin, water quality is monitored at each of the sentry well locations in the NCMA and County Well No. 3 (32C03).

4.3.1 Quarterly Groundwater Monitoring

Quarterly groundwater monitoring events occurred in January, April, July, and October 2015. During each event, depths to groundwater were measured, and wells were sampled utilizing sampling equipment, procedures, and in-field sample preservation protocol pursuant to ASTM International Standard D4448-01. The water quality data from these events and available historical data from these wells are provided in Appendix A. Graphs of historical chloride and TDS concentrations over time are presented on Figures 19 and 20, respectively, to monitor for trends that may aid in the detection of impending seawater intrusion.

The historical water quality data indicate variable (at times significantly variable) water quality from 2009 through 2015 (Appendix A). The *NCMA 2009 Annual Monitoring Report* suggested the observed historic variation in water quality data could be caused by several reasons, such as variable permeability of geologic materials; potential mixing with seawater; ion exchange in clay-rich units; and variability in surface recharge sources such as Arroyo Grande and Meadow creeks (Todd 2010). Improved management of municipal groundwater demand (overall reduction in pumping) since 2009 may have contributed to groundwater quality becoming relatively stable in the past few years.

4.3.2 Analytical Results Summary

Analytical results of key water quality data (chloride, TDS, and sodium) were generally consistent with historical concentrations during 2015. The following sections for chloride, TDS, and sodium give overall trends in these select analytical results.

Chloride. Chloride concentrations in the shallow wells (24B01, 30F01, and 30N01) are below or near historically low concentrations in October 2015.

- Well 24B01 had a significant decrease in chloride concentrations from 1,300 milligrams per liter (mg/L) in April 2015 to 230 mg/L in October 2015. This concentration in October 2015 is approaching the historical low concentrations of 43 to 140 mg/L observed between May 2009 and July 2010.
- In well 30F01, the chloride concentration decline to a historical low of 58 mg/L in October 2015, which is equal to the historical low concentration of 58 mg/L in October 2014.
- In well 30N01, the chloride concentration is 120 mg/L, which is below the previous historical low concentration of 140 mg/L in October 2014.

Total Dissolved Solids. During the third quarter monitoring event in July 2015, several wells exhibited slightly elevated TDS concentrations as follows (Figure 20):

- TDS concentration in well 36L01 (930 mg/L) was the highest recorded since 1976, and
- Concentration well 36L02 (840 mg/L) was higher only during a single event in January 2012.

By the fourth quarter monitoring event in October 2015, TDS concentrations, in general, were observed within historical concentration ranges with notes regarding wells 30N01, MW-Green, 36L01, and 36L02.

- The TDS concentration in well 30N01 in October 2015 is 740 mg/L, which is below the historical low concentration of 790 mg/L in January 2014.
- The TDS concentration in well MW Green of 320 mg/L in October 2015 is approaching the historical low concentration of 290 mg/L in October 2010.
- TDS continues to be slightly elevated in well 36L01, but remains below the highest concentration of 936 mg/L in June 1976.
- The TDS concentration in well 36L02, which had been observed to slightly elevated in July 2015, decreased from 840 mg/L in July 2015 to 800 mg/L in October 2015.

Sodium. In July 2015, sodium concentrations were slightly elevated in the three deep sentry wells (24B03, 30F03, and 30N02). However, by October 2015, sodium concentrations declined in all of the deep sentry wells to within historic ranges.

5.0 WATER SUPPLY AND DEMAND

5.1 WATER SUPPLY

The NCMA water supply consists of three major sources: Lopez Lake, the State Water Project (SWP), and groundwater. Each source of supply has a defined delivery volume which varies from year to year.

5.1.1 Lopez Lake

Lopez Lake and Water Treatment Plant is operated by SLOCFC&WCD Zone 3, provides water to all four agencies in the NCMA, and releases water to Arroyo Grande Creek for habitat conservation and agricultural purposes. The operational safe yield of Lopez Lake is 8,730 acre feet per year (AFY), which reflects the amount of sustainable water supply during a drought of defined severity. Of this yield, 4,530 AFY has been apportioned by agreements to contractors including each of the Northern Cities agencies plus County Service Area (CSA) 12 (in the Avila Beach area). Of the 8,730 AFY safe yield, 4,200 AFY is reserved for downstream releases to maintain flows in Arroyo Grande Creek and provide groundwater recharge. The normal Zone 3 allocations are shown in Table 2.

In December 2014, the SLOCFC&WCD Zone 3 adopted a Low Reservoir Response Plan (LRRP). The purpose of the LRRP is to limit downstream releases and municipal diversions from Lopez Reservoir to preserve water within the reservoir, above the minimum pool, for a minimum of 3 to 4 years under drought conditions.

Table 2. Lopez Lake (SLOCFC&WCD Zone 3 Contractors) 2015 Water Allocation under LRRP 10% Diversion Reduction Strategy (AFY)

Contractor	Normal Water Allocation, (AFY)	LRRP Reduced Diversion, (AFY)
City of Arroyo Grande	2,290	2,061
City of Grover Beach	800	720
City of Pismo Beach	892	802.8
Oceano CSD	303	272.7
CSA 12 (not in NCMA)	245	220.5
Total	**4,530**	**4,077**
Downstream Releases	*4,200*	*3,800*
Safe Yield of Lopez Lake	*8,730*	*7,877*

The reduction strategies for the LRRP are tied to the amount of water in the reservoir. As the amount of water in the reservoir drops below the triggers (20,000; 15,000, 10,000; 5,000; and 4,000 AF), the hydrologic conditions are reviewed and adaptive management utilized to meet the LRRP objectives. The municipal diversions are to be reduced according to the strategies shown in Table 3.

Table 3. Lopez Lake Municipal Diversion Reduction Strategy Low Reservoir Response Plan

Amount of Water in Storage (AF)	Municipal Diversion Reduction	Municipal Diversion (AFY)
20,000	0%	4,530
15,000	10%	4,077
10,000	20%	3,624
5,000	35%	2,941
4,000	100%	0

The LRRP is automatically enacted if the total volume of water in the reservoir falls below 20,000 AF and the County Board of Supervisors declares an emergency related to Zone 3. The actions, once the LRRP is enacted, include: reductions in entitlement water deliveries; reductions in downstream releases; no new allocations of Surplus Water from unreleased downstream releases; and extension of time that agencies can take delivery of existing unused water, throughout the duration that the Drought Emergency is in effect, subject to evaporation losses if the water is not used in the year originally allocated. Included in the LRRP is an adaptive management provision that allows modification of the terms of the LRRP to match the initially prescribed reductions based on actual hydrologic conditions. The 2015 Zone 3 allocations are provided in Table 2, above.

The downstream releases are to be reduced according to the strategies described in Table 4. The release strategies represent the maximum amount of water that can be released. The SLOCFC&WCD controls the timing of the reduced releases to meet the needs of the agricultural stakeholders and to address environmental requirements.

Table 4. Lopez Lake Downstream Release Reduction Strategy Low Reservoir Response Plan

Amount of Water in Storage (AF)	Downstream Release Reduction	Downstream Releases (AFY)
20,000	9.5%	3,800
15,000	9.5%	3,800
10,000	75.6%	1,026
5,000	92.9%	300
4,000	100%	0

In the past, when management of releases resulted in a portion of the 4,200 AFY remaining in the reservoir, or the contractors did not use their full entitlement for the year, the water was

offered to the contractors as surplus water. Surplus water deliveries to the NCMA agencies in 2015 equaled 312.25 AF.

Total discharge from Lopez Lake in 2015 was 7,084.17 acre feet (AF), of which 3,161.87 AF was delivered to NCMA contractors, 112.69 AF delivered to CSA 12, and 3,809.61 AF was released downstream to maintain flow in Arroyo Grande Creek (Table 5).

Table 5. 2015 Lopez Lake Deliveries (AF)

Agency	2015 Allocation Usage (AF)	2015 Surplus Usage (AF)	2015 Total Lopez Lake Water Delivery, (AF)
City of Arroyo Grande	1,857.23	294.85	2,152.08
City of Grover Beach	773.19	17.4	790.59
City of Pismo Beach	219.20	0.00	219.20
Oceano CSD	0.00	0.00	0.00
Total NCMA 2015 Usage	**2,849.62**	**312.25**	**3,161.87**
CSA 12 (not in NCMA)	112.69	0.00	112.69
Downstream Releases	3,809.61	--	3,809.61
Total 2015 Lopez Lake Deliveries	**6,771.92**	**312.25**	**7,084.17**

Source: SLOCFC&WCD Zone 3 Monthly Operations Report

As of December 31, 2015, the total volume of water in storage in Lopez Lake was 13,880.6 AF. As of January 1, 2016, the reservoir was operated under the LRRP at a 10% reduction, thus the triggers of the LRRP are in effect going into 2016. As a result, downstream releases and municipal deliveries, at least in early 2016, are subject to the target levels outlined in the LRRP, including:

- Annual downstream releases at a maximum rate of 3,800 AF (actual releases may be less if releases can be reduced while still meeting the needs of the agricultural stakeholders and addressing the environmental requirements)
- No unreleased downstream water will be available as surplus in 2016 (a reduction of 400 AF)
- Municipal entitlements for Lopez Water Year 2015 are reduced by 10% (total 4,077 AF)
- Agencies may carry over any unused entitlement and/or surplus water from previous years.

The status of the reservoir and management actions related to the LRRP will be monitored throughout 2016.

5.1.2 State Water Project

Pismo Beach and Oceano CSD have contracts with SLOCFC&WCD to receive water from the SWP. The SLOCFC&WCD serves as the SWP contractor, providing imported water to local

retailers through the Coastal Branch pipeline. Pismo Beach and Oceano CSD have contractual water delivery allocations (commonly referred to as "Table A" water) of 1,100 AFY and 750 AFY, respectively (see Table 7, page 20). (Pismo Beach contracts for 1,240 AF of SWP, but 100 AF is owned by Pismo Ranch and 40 AF is owned by Brad Wilde). In addition to its Table A allocation, Pismo Beach holds 1,240 AFY of additional allocation with SLOCFC&WCD. The additional allocation held by Pismo Beach (usually referred to as a "drought buffer") is available to augment Pismo Beach's SWP water supply when the SWP Annual Allocation (i.e., percent of SWP water available) is less than 100%. In any given year, however, Pismo Beach's total SWP deliveries cannot exceed 1,240 AF.

The SWP Annual Allocation for contractors for 2015 was set at 20% of Table A contractual allocation amounts. However, because SWP contractors have the opportunity to store or bank a portion of their allocated water in any one year for delivery during the next year, the volume of delivered SWP water may exceed that year's Table A allocation. Normally, carryover water is water that has been exported during the year from the Delta, but has not been delivered, although storage for carryover water no longer becomes available if it interferes with storage of SWP water for project needs.

For 2016, the allocation of the SWP contractors was initially set at 10% of Table A contractual allocation amounts on December 1, 2015; a series of increases have been announced in the first three months of 2016, with the most recent allocation amount of 45% set on March 17, 2016.

The SWP supply has the potential to be affected by drought as well as environmental issues, particularly involving the Delta smelt in the Sacramento-San Joaquin Delta. However, Oceano CSD and Pismo Beach have not been negatively affected to date by reduced SWP supplies since SLOCFC&WCD allocations to its subcontractors are typically fulfilled, even in dry years. This is due to SLOCFC&WCD's maintenance of excess, unused SWP entitlement. Therefore, even when SWP supplies are decreased, the SLOCFC&WCD's excess SWP entitlement provides a buffer so that contracted volumes to water purveyors, like the Oceano CSD and Pismo Beach, may still be provided in full. As a result, during 2015, Oceano CSD took delivery of 571.38 AF of SWP water, and Pismo Beach took delivery of 1,231.73 AF.

5.1.3 Groundwater

Each of the NCMA agencies have the capability to extract groundwater from municipal water supply wells located in the central and northern portion of the NCMA. Groundwater also satisfies applied irrigation and rural domestic demands throughout the NCMA. Groundwater use in the NCMA is governed by the Judgment and the 2002 Settlement Agreement, which establishes that groundwater will continue to be allotted and independently managed by the "Northern Parties" (Northern Cities, NCMA overlying owners, and the SLOCFC&WCD).

A calculated "safe yield" value of 9,500 acre-feet per year (AFY) for the NCMA portion of the SMGB was cited in the 2002 Settlement Agreement (through affirmation of the 2001 Groundwater Management Agreement) among the Northern Cities with allotments for applied irrigation (5,300 AFY), subsurface outflow to the ocean (200 AFY), and urban use (4,000 AFY). The volume of the allotment for urban use was subdivided as follows:

- City of Arroyo Grande: 1,202 AFY
- City of Grover Beach: 1,198 AFY
- City of Pismo Beach: 700 AFY
- Oceano Community Services District: 900 AFY

The basis of the safe yield was established in 1982 by a Technical Advisory Committee, consisting of representatives from Arroyo Grande, Grover Beach, Pismo Beach, Oceano CSD, Avila Beach Community Water District, Port San Luis Harbor District, Farm Bureau, and the County of San Luis Obispo to deal with subdivision of and agreement not to exceed the safe yield of the "Arroyo Grande Groundwater Basin". The basis for the committee's analysis was DWR (1979). The Technical Advisory Committee concluded that DWR (1979) had not adequately accounted for inflow from Lopez Lake, and determined the safe yield to be 9,500 AFY. These findings and the allocation of the safe yield were then incorporated into a voluntary groundwater management plan (1983 "Gentlemen's Agreement") and were further formalized in the 2002 Settlement Agreement and the 2005 Stipulation for the SMGB Adjudication.

According to Todd (2007), the "safe yield" allotment for applied irrigation is significantly higher than the actual applied irrigation demand, and the calculated amount for subsurface outflow is unreasonably low (Todd 2007). Todd (2007) recognized that maintaining sufficient subsurface outflow to the coast and preservation of a westward groundwater gradient is essential to preventing seawater intrusion, and although the minimum subsurface outflow necessary to prevent seawater intrusion is unknown, a regional outflow of 3,000 AFY was estimated as a reasonable approximation. At the same time, since significant expansion of agricultural irrigation and a long-term increase of irrigation demand is unlikely, it appears that the current balance of water use between agriculture and municipal uses has been sustainable for the last 40 years.

The 2001 Groundwater Management Agreement provides that groundwater allotments of each of the urban agencies can be increased when land within the corporate boundaries is converted from agricultural use to urban use, referred to as an agricultural conversion credit. Agricultural conversion credits equal to 121 AFY and 209 AFY were developed in 2011 for the cities of Arroyo Grande and Grover Beach, respectively. These agricultural credits remain unchanged during 2015 (Table 6).

Total groundwater use in the NCMA, including applied irrigation and rural uses, is shown in Table 6 (a description of applied irrigation and rural use estimation is provided in Sections 5.2.1 and 5.2.2, respectively). Total estimated groundwater pumpage in the NCMA in 2015 from the SMGB was 3,979.47 AF.

Table 6. NCMA Groundwater Pumpage from Santa Maria Groundwater Basin, 2015 (AF)

Agency	Groundwater Allotment + Ag Conversion Credit (AF)	2015 Groundwater Use (AF)	Percent Pumped of Groundwater Allotment
City of Arroyo Grande	1,202 + 121 = 1,323	42.51	3.2%
City of Grover Beach	1,198 + 209 = 1,407	474.81	33.7%
City of Pismo Beach	700	284.77	40.7%
Oceano CSD	900	131.88	14.7%
Total Urban Groundwater Allotment / Use	**4,000 + 330 = 4,330**	**933.97**	**21.6%**
Applied Irrigation	**5,300 - 330 = 4,970**	**3,008**	**--**
Rural Water Users	**--**	**37.5**	**--**
Est. subsurface outflow to ocean (2001 Groundwater Management Agreement)	**200**		
Total NCMA Groundwater Allotment / Use	**9,500**	**3,979.47**	**41.9%**

5.1.4 Developed Water

As defined in the Stipulation, "developed water" is "groundwater derived from human intervention" and includes infiltration from the following sources: "Lopez Lake water, return flow, and recharge resulting from storm water percolation ponds." Return flow results from deep percolation of water used in irrigation that is in excess of the plant's requirements and from outdoor uses of Lopez Lake and SWP deliveries, and a minor component of return flows from other supplies pumped from outside the NCMA boundaries (see following Section 5.1.5). These return flows have not been recently estimated, but would be considered part of the groundwater basin yield.

In 2008, the cities of Arroyo Grande, Grover Beach, and Pismo Beach prepared storm water management plans. To control storm-water runoff, and to increase groundwater recharge, each City now requires new development to construct onsite retention or detention ponds. As these new ponds or basins are constructed, the resultant increase in groundwater recharge could result in recognition of substantial augmentation of basin yield and provision of recharge credits to one or more of the Northern Cities agencies (as described in Todd, 2007). Thus a re-evaluation of estimated storm water recharge is warranted as new recharge facilities are installed and as additional information on flow rates, pond size, infiltration rates, and tributary watershed area becomes available. Pursuant to the 2001 Groundwater Management Agreement, recharge credits would be based on a mutually-accepted methodology to evaluate the amount of recharge which would involve quantification of such factors as Lopez Lake and State Water recharge, storm water runoff amounts, determination of effective recharge under various conditions, and methods to document actual recharge to developed aquifers.

5.1.5 Total Water Supply Availability

The baseline (full allocation) water supply available to the Northern Cities agencies is summarized in Table 7. The baseline water supplies include Lopez Lake allocation, SMGB

groundwater allotments, agricultural credits, and 100% delivery of SWP allocations. This baseline water supply does not include Lopez Lake surplus or SWP carryover because these supplies are not always available. The category of "Other Supplies" includes groundwater pumped from outside the NCMA boundaries (outside the SMGB). The baseline supply for the NCMA agencies totals 10,625 AFY (Table 7).

Table 7. Baseline (Full Allotment) Available Urban Water Supplies (AFY)

Urban Area	Lopez Lake	SWP Allocation (at 100%)	Groundwater Allotment	Ag Credit	Other Supplies	Total
Arroyo Grande	2,290	0	1,202	121	160	**3,773**
Grover Beach	800	0	1,198	209	0	**2,207**
Pismo Beach	892	1,100	700	0	0	**2,692**
Oceano CSD	303	750	900	0	0	**1,953**
Total	**4,285**	**1,850**	**4,000**	**330**	**160**	**10,625**

The available water supply to the NCMA agencies in 2015, including Lopez Lake allocations operating under the LRRP, Lopez Lake surplus water, the 2015 SWP 20% delivery schedule, and the available SWP carryover water is summarized in Table 8.

Table 8. 2015 Available Urban Water Supply, under 2015 Lopez LRRP 10% Municipal Reduction Diversion (AF)

Urban Area	Lopez Lake Allocation	Lopez Lake Surplus	2015 SWP Allocation (at 20% Delivery)	2015 Drought Buffer	2015 SWP Carryover	Ground-water Allotment	Ag Credit	Other Supplies	Total (2015)
Arroyo Grande	2,061	881.2	0	0	0	1,202	121	160	**4,425.2**
Grover Beach	720	393.6	0	0	0	1,198	209	0	**2,520.6**
Pismo Beach	802.8	504.9	220	248	999	700	0	0	**3,474.7**
Oceano CSD	272.7	459.0	150	0	0	900	0	0	**1,781.7**
Total	**3,856.5**	**2,238.7**	**370**	**248**	**999**	**4,000**	**330**	**160**	**12,202.2**

5.2 WATER DEMAND

Water demand refers to the total amount of water used to satisfy various needs. In the NCMA, water demand predominantly serves urban demand and applied irrigation demand, as well as a relatively small component of rural domestic demand, which includes small community water systems, domestic, and recreational and agriculture-related businesses.

5.2.1 Applied Irrigation Demand

For 2015, the estimated irrigation demand in the NCMA area was 3,008 AF. The Applied Irrigation Demand is an in-direct measurement that is estimated based on land-use, soil, climate, and farm management conditions within the NCMA. In previous reports the applied irrigation demand was calculated using ET data published by the Irrigation and Training Research Center (ITRC) at California Polytechnic State University in San Luis Obispo, California. The ITRC ET data is based on general climate zones and hydrologic year type. The ITRC ET values were previously multiplied by the known crop acreages and adjusted based on irrigation efficiencies to estimate the applied water. While the previous method provided a good estimate for applied water, it did not account for specific climate conditions for the given year (precipitation and ET), soil properties in the area, and the resulting spatial variation in ET.

For this 2015 Annual Report, the applied irrigation demand estimations were refined over previous reports by using the Integrated Water Flow Model Demand Calculator (IDC). The IDC is a stand-alone program that simulates land surface and root zone flow processes, and, importantly for this report, the agricultural water demands. IDC applies user specified soil, weather, and land-use data to estimate and track the soil water balances, specifically available water for the crops within the root zone and simulates irrigation events based crop requirements and cultural practices. The data used in the IDC program for NCMA are described below along with their respective sources.

Data Used in Integrated Water Flow Model Demand Calculator:

1. **Land-use.** In recent years, the San Luis Obispo County Agricultural Commissioner's Office (ACO) has compiled an estimate of irrigated acres, compatible for use in GIS. A view displaying the irrigated agriculture lands within NCMA for 2015 is presented as Figure 21. The 2015 survey indicates a total of 1,472 acres in NCMA of irrigated agriculture consisting predominantly of rotational crops. Table 9 lists the crop types and acreages found in NCMA that were used in the IDC program.
2. **Climate Data**. 2015 data from the San Luis Obispo County rain gage in Oceano and the CIMIS Nipomo Station (202) were used for precipitation and reference ET values, respectively.
3. **ET Values by Crop Type**. The California Department of Water Resources Consumptive Use Program (CUP) was used in order to estimate ET values based on specific annual climate data and crop type. The CUP used monthly climate data from the nearby CIMIS station (202, Nipomo) and crop coefficients to calculate ET values for the irrigated crops. However, because the NCMA is on the coast and is influenced by the "marine layer" and, as shown on Figure 4 the Nipomo CIMIS station is located further inland than the easternmost boundary of NCMA, it is likely that the weather data collected does not fully account for the cooling effect of the marine layer (and reduced ET values). ET values in the

marine layer can be as much as 25% lower than those in the same regional area just outside of the marine layer influence. The distance the marine layer extends inland can vary from less than ½ mile to as much 4 to 5 miles. The NCMA boundary extends between 2 and 5 miles inland. Recognizing that not all the crops would be impacted by the marine layer, but also accounting for the cooling influence over some of the area, ET values calculated based on the Nipomo CIMIS data were adjusted lower by 12%. See Table 9 for final ET values.

4. **Soil Data**. The Natural Resources Conservation Service Soil Survey Geographic Database was used to collect soil parameters in the NCMA for use in the IDC. The soil properties used include: saturated hydraulic conductivity, porosity, and the runoff curve number. The field capacity and wilting points were developed based on the described soil textures (i.e. sand, loam, sandy clay, etc.). The soil properties are important for estimating water storage, deep percolation, and run-off, all of which lead to a refined estimation of applied water.

Table 9. 2015 NCMA Crop Acreages and Evapotranspiration

Crop Type	Acreage	2015 Potential ET[1] (AF per acre)
Rotational Crops	1,339	2.0[2]
Strawberry	110	1.2
Nursery Plants	11	1.7
Potatoes	12	0.8

1. See Bullet 3 in "Data Used in IDC" section above.
2. Rotational crops ET based on a 2 to 3 crop rotation.

Once the data were collected, the information was applied to a finite element grid within the IDC framework to simulate the root zone moisture for 2015 in the NCMA agricultural areas. The IDC monitors the moisture content within the root zone and applies an irrigation event when the moisture is below a user defined percentage of the total available water (defined as the difference between the field capacity and the wilting point). For this application, the minimum moisture content was set to trigger an irrigation event when the moisture was one-half the total available water.

The resulting Applied Water Demand for 2015 was estimated to be 3,008 AF. The effective precipitation (i.e., rainwater used by the crop) was 373 AF. Figure 22 illustrates the estimated applied agricultural water within the NCMA as calculated by the IDC. Figure 22 displays the four identified crop types and their estimated monthly applied water. The rotational crops clearly create the highest demand for water as they cover the greatest area (see Figure 21), and have the largest potential ET (Table 9).

5.2.2 Rural Demand

In the NCMA, rural water demand refers to uses not designated as urban demand or applied irrigation demand and includes small community water systems, individual domestic water systems, recreational uses, and agriculture-related business systems. Small community water systems using groundwater in the NCMA were identified initially through a review of a list of water purveyors

compiled in the 2007 San Luis Obispo County Integrated Regional Water Management Plan (IRWMP). These include the Halcyon Water System, Ken Mar Gardens, and Pacific Dunes RV Resort. The Halcyon Water System serves 35 homes in the community of Halcyon, while Ken Mar Gardens provides water supply to 48 mobile homes on South Halcyon Road. The Pacific Dunes RV Resort, with 215 RV sites, provides water supply to a largely transitory population as well as a nearby riding stable. In addition, about 25 homes and businesses have been identified as served by private wells through inspection of aerial photographs of rural areas within NCMA. Two mobile home communities, Grande Mobile and Halcyon Estates, are served by Oceano CSD through the distribution system of Arroyo Grande; thus the demand summary of Oceano CSD includes these two communities. Based on prior reports, it is assumed that the number of private wells is negligible within the service areas of the four Northern Cities. The estimated rural water demand is provided in Table 10.

Table 10. Estimated Rural Water Demand

Groundwater User	No. of Units	Estimated Water Demand, AFY per Unit	Estimated Water Demand, AFY	Notes
Halcyon Water System	35	0.40	14	*1*
Ken Mar Gardens	48	0.25	7.5	*2*
Pacific Dunes RV Resort	215	0.03	6	*3*
Rural Users	25	0.40	10	*1*
Current Estimated Rural Use			**37.5**	

1 - Water demand/unit based on 2000 and 2005 Grover Beach water use per connection, 2005 UWMP.
2 - Demand based on metered water usage.
3 - Water demand/unit assumes 50 percent annual occupancy and 0.06 AFY per occupied site.

5.2.3 Urban Demand

Urban water demands are presented in Table 11 for each of the Northern Cities from 2005 through 2015. These demand values reflect Lopez Lake deliveries, SWP deliveries, and groundwater production data, and represent all water used within the service areas of the four agencies comprising Northern Cities, including the portions of Arroyo Grande and Pismo Beach that extend outside the NCMA and system losses (see Figure 2). Urban demand declined steadily from a high in 2007 until 2011, increased slightly each year for the three years from 2011 through 2013 reaching 7,939 AF, but then declined dramatically in 2014 to 6,855.37 AF. The dramatic decline in urban demand in 2014 continued into 2015 to 5,942.95 AF.

Table 11. Urban Water Demand (Groundwater and Surface Water, AF)

Year	Arroyo Grande	Grover Beach	Pismo Beach	Oceano CSD	Total Urban
2005	3,460	2,082	2,142	931	**8,615**
2006	3,425	2,025	2,121	882	**8,453**
2007	3,690	2,087	2,261	944	**8,982**
2008	3,579	2,051	2,208	933	**8,771**
2009	3,315	1,941	2,039	885	**8,180**
2010	2,956	1,787	1,944	855	**7,542**
2011	2,922	1,787	1,912	852	**7,473**
2012	3,022	1,757	2,029	838	**7,646**
2013	3,111	1,792	2,148	888	**7,939**
2014	2,752.12	1,347.19	1,949.24	806.82	**6,855.37**
2015	2,238.59	1,265.40	1,735.70	703.26	**5,942.95**

5.2.4 2015 Groundwater Pumpage

Total SMGB groundwater use in the NCMA, including urban demand, applied irrigation, and rural demand, is shown in Table 12 (replication of Table 6). Total estimated SMGB groundwater pumpage in the NCMA in 2015 was 3,979.47 AF, which represents the lowest volume of groundwater production from the NCMA portion of the basin in at least the past 17 years.

Table 12. NCMA Groundwater Pumpage from Santa Maria Groundwater Basin, 2015 (AF)

Agency	Groundwater Allotment + Ag Conversion Credit (AF)	2015 Groundwater Use (AF)	Percent Pumped of Groundwater Allotment
City of Arroyo Grande	1,202 + 121 = 1,323	42.51	3.2%
City of Grover Beach	1,198 + 209 = 1,407	474.81	33.7%
City of Pismo Beach	700	284.77	40.7%
Oceano CSD	900	131.88	14.7%
Total Urban Groundwater Allotment / Use	**4,000 + 330 = 4,330**	**933.97**	**21.6%**
Applied Irrigation	**5,300 – 330 = 4,970**	**3,008**	**--**
Rural Water Users	**--**	**37.5**	**--**
Est. subsurface outflow to ocean (2001 Groundwater Management Agreement)	**200**	**--**	**--**
Total NCMA Groundwater Allotment / Use	**9,500**	**3,979.47**	**41.9%**

The estimated groundwater pumpage of 3,979.47 in 2015 represents about 41.9% of the calculated yield of 9,500 AFY for the NCMA portion of the Santa Maria Basin. However, even with the relatively low volume of pumping, water elevations throughout the area declined by several feet as of October 2015, with some areas exhibiting October 2015 water elevations below sea level. With an estimated safe yield of 9,500 AFY, the difference between the safe yield and groundwater pumping would normally represent increased groundwater in storage as well as outflow to the ocean, an unknown but major portion of which is needed to inhibit seawater intrusion.

A graphical depiction of water use by supply source for each NCMA agency since 1999 is presented as Figure 23. The graphs depict changes in water supply availability and use over time, including the increased use of SWP water during the early years of the period when SWP Table A deliveries were greater. During 2015, Pismo Beach and Oceano CSD greatly supplemented their municipal water demand by maximizing their available SWP water supply, while reducing their groundwater pumping and reducing Lopez Lake water (Oceano CSD utilized no Lopez Lake water in 2015). Grover Beach and Arroyo Grande utilized a similar water supply strategy in 2015 as in 2014, with Arroyo Grande pumping 3.2% of its calculated groundwater allotment.

As shown in Figure 24, groundwater pumpage reached a peak in 2007, and then declined in 2008, 2009, and 2010. From 2010 through 2013, pumpage increased slightly every year, but even so, overall groundwater use remained significantly lower than historic annual pumpage rates. In 2015, urban groundwater use declined to 933.97 AF, which is 21.6% of the 4,330 AF of combined urban groundwater allotment and agricultural conversion credit.

5.2.5 Changes in Water Demand

The historical water demands for urban uses, applied irrigation, and rural uses is shown in Table 13.

Table 13. Total Water Demand (Groundwater and Surface Water, AF)

Year	Arroyo Grande	Grover Beach	Pismo Beach	Oceano CSD	Total Urban	Applied Irrigation	Rural Water	Total Demand
2005	*3,460*	*2,082*	*2,142*	*931*	*8,615*	*2,056*	*36*	**10,707**
2006	*3,425*	*2,025*	*2,121*	*882*	*8,453*	*2,056*	*36*	**10,545**
2007	*3,690*	*2,087*	*2,261*	*944*	*8,982*	*2,742*	*36*	**11,760**
2008	*3,579*	*2,051*	*2,208*	*933*	*8,771*	*2,742*	*36*	**11,549**
2009	*3,315*	*1,941*	*2,039*	*885*	*8,180*	*2,742*	*36*	**10,958**
2010	*2,956*	*1,787*	*1,944*	*855*	*7,542*	*2,056*	*38*	**9,636**
2011	*2,922*	*1,787*	*1,912*	*852*	*7,473*	*2,742*	*38*	**10,253**
2012	*3,022*	*1,757*	*2,029*	*838*	*7,646*	*2,742*	*41*	**10,429**
2013	*3,111*	*1,792*	*2,148*	*888*	*7,939*	*2,742*	*42*	**10,722**
2014	*2,752.12*	*1,347.19*	*1,949.24*	*806.82*	*6,855.37*	*2,955.4*	*38.4*	**9,849.17**
2015	*2,238.59*	*1,265.40*	*1,735.70*	*703.26*	*5,942.95*	*3,008*	*37.5*	**8,988.45**

In general, urban water demand has ranged from 5,942.95 AF (current year 2015) to 8,982 AF (2007; Table 13). Demand since 2007 shows an overall decline each year with a slight increase

in 2012 and 2013; this overall decline in demand may be attributed to the relatively slower economy and, particularly in recent years, conservation activities implemented by the Northern Cities.

In the applied irrigation category, agricultural acreage has remained fairly constant. Thus, annual water demand for applied irrigation varies mostly with weather conditions. Acknowledging the variability due to weather conditions (see Table 13), applied irrigation water demand is not expected to change significantly given the relative stability of applied irrigation acreage and cropping patterns in the NCMA south of Arroyo Grande Creek. Changes in rural demand have not been significant.

6.0 COMPARISON OF WATER SUPPLY V. WATER DEMAND

The Baseline Available Urban Water Supplies for each of the Northern Cities is 10,625 AFY (assuming 100% delivery of SWP allocation and also assuming no Lopez Lake surplus water or SWP carryover; refer to Table 7). In 2015, because of the availability of Lopez Lake surplus water and SWP carryover water and despite a limited SWP delivery, the total available urban water supply was 12,202.2 AF (Table 8).

As described in the 2001 Groundwater Management Agreement and affirmed in the 2002 Settlement Agreement, the calculated historical "safe yield" from the NCMA portion of the groundwater basin is 9,500 AFY. Because all of the applied irrigation water demand is supplied by groundwater, the total available applied irrigation supply is a portion of the estimated safe yield; this portion was allocated as 5,300 AFY for agricultural and rural use. The agricultural conversion of 330 AFY reduces this allocation to 4,970 AFY. Of the estimated safe yield of 9,500 AFY, other than what is allocated for applied irrigation and rural use, the remaining 4,330 AFY is allocated for urban water use (4,330 AFY, including 4,000 AFY groundwater allocation plus 330 AFY in agricultural conversion credit) and an estimated 200 AFY for subsurface outflow to the ocean.

In 2015, the total estimated NCMA water demand was 8,988.45 AF (Table 13). The 2015 water demand, by source, of each city and agency is shown in Table 14.

Table 14. 2015 Water Demand by Source (AF)

Urban Area	Lopez Lake	State Water Project	SMGB Groundwater	Other Supplies	Total
Arroyo Grande	2,152.08	0.00	42.51	44.0	2,238.59
Grover Beach	790.59	0.00	474.81	0.0	1,265.40
Pismo Beach	219.20	1,231.73	284.77	0.0	1,735.70
Oceano CSD	0.00	571.38	131.88	0.0	703.26
Urban Water Use Total	**3,161.87**	**1,803.11**	**933.97**	**44.0**	**5,942.95**
Applied Irrigation	0.0	0.0	3,008	0.0	2,685
Rural Water Users	0.0	0.0	37.5	0.0	37.5
Total	**3,161.87**	**1,803.11**	**3,979.47**	**44.0**	**8,988.45**

Urban water demand in 2015 to the NCMA was supplied from 3,161.87 AF of Lopez Lake water, 1,803.11 AF of State Water Project water, and 933.97 AF of groundwater. The 44.0 AF of "Other Supplies" delivered to Arroyo Grande consists of groundwater pumped from the Pismo Formation, which is located outside of the shared groundwater basin.

Based on the calculated yield of the NCMA portion of the basin, the baseline (full allocation) total available supply for all uses is 15,595 AFY, which is the sum of 10,625 AFY for urban plus the allocation for applied irrigation and rural area of 4,970 AFY. In 2015, factoring in the SWP delivery

schedule and availability of SWP carryover water and Lopez surplus, the total available supply for all uses (in 2015) was 12,202.2 AF, compared to actual 2015 NCMA water demand of 8,988.45 AF. It must be noted, however, that this comparative review of available 2015 supply versus demand must be viewed with caution because of the potential threats to the groundwater supply (see Section 7.1, below). As described earlier, the NCMA agencies pumped only 41.9% of their "available" groundwater allotment, yet the basin experienced declining water levels and the development of groundwater depressions with water elevations below sea level. It is clear that the NCMA agencies could not have used their entire groundwater allotment this past year without significantly lowering water elevations below current conditions and potentially seriously exacerbating the threat of sea water intrusion.

7.0 THREATS TO WATER SUPPLY

Because the NCMA agencies depend on both local and imported water supplies, changes in either state-wide or local conditions can threaten the NCMA water supply. Water supply imported from other areas of the state may be threatened by State-wide drought, effects of climate change in the SWP source area, management and environmental protection issues in the Sacramento-San Joaquin Delta that affect the amount and reliability of SWP deliveries and risk of seismic damage to the SWP delivery system. Local threats to NCMA water supply similarly include extended drought and climate change that may affect the yield from Lopez Lake as well as reduced recharge to the NCMA. In addition, the NCMA is not hydrologically isolated from the NMMA and the rest of the Santa Maria Groundwater Basin, and water supply threats in the NMMA are a potential threat to the water supply sustainability of the NCMA.

There is a potential impact from seawater intrusion if the groundwater system as a whole, including the entire Santa Maria Basin, is not adequately monitored and managed. In particular, the management of the basin may need to account for sea level rise and the relative change in groundwater gradient along the shore line.

7.1 THREATS TO LOCAL GROUNDWATER SUPPLY

7.1.1 Declining Water Levels

Water levels continue to exhibit an overall declining trend in the NCMA. Two important factors to maintaining water levels are managing inflow and outflow.

- Inflow: An important inflow component to the NCMA area is subsurface inflow into the aquifers that supply water wells serving the NCMA. Historically, subsurface inflow to the NCMA from the NMMA along the southeast boundary of the NCMA is an important component of groundwater recharge in the form of subsurface inflow from the NMMA. This inflow may be reduced from historical levels, as recognized in 2008-2009, to "something approaching no subsurface flow" due to lower groundwater levels in the NMMA (*NMMA 2nd Annual Report CY 2009*, page 43). It appears that this condition continues to worsen, as described in NMMA Annual Reports for Calendar Years 2010, 2011, 2012, 2013, and 2014.

- Outflow: A major outflow component is groundwater pumpage. Total groundwater pumping in the NCMA (urban, agriculture, and rural domestic) was 3,979.47 AF in 2015, which is 41.9% of the calculated 9,500 AFY safe yield of the NCMA portion of the basin. However, even with the reduced pumping, 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 pumping at 41.9% of the safe yield and declining water elevations, illustrates the impacts of the ongoing severe drought that has significantly reduced recharge. But it likely also illustrates the impacts of reduced subsurface inflow recharge from the east (Nipomo Mesa). This condition of declining water levels in the NCMA, even though total pumping is currently 41.9% of the basin safe yield, will likely be exacerbated if the NCMA agencies

are required to increase groundwater withdrawals due to reduction in local surface water supplies or State Water project deliveries.

7.1.2 Seawater Intrusion

The NCMA is underlain by an accumulation of alluvial materials that slope gently offshore and extend for many miles under the ocean (DWR 1970, 1975). Coarser materials within the alluvial materials comprise aquifer zones that receive freshwater recharge in areas above sea level. If sufficient outflow from the aquifer occurs, the dynamic interface between seawater and fresh water will be prevented from moving onshore. Sufficient differential pressure to maintain a net outflow is indicated by onshore groundwater elevations that are above mean sea level and establish a seaward gradient to maintain that outflow.

The 2008 Annual Report documented that a portion of the NCMA groundwater basin exhibited water surface elevations below sea level (*NCMA 2008 Annual Monitoring Report*). Hydrographs for NCMA sentry wells (Figures 11 and 12) show coastal groundwater elevations that were at relatively low levels for as long as two years. Such sustained low levels had not occurred previously in the historical record and reflected the impact of drought on groundwater levels. The low coastal groundwater levels indicated a potential for seawater intrusion.

Elevated concentrations of TDS, chloride, and sodium were observed in wells 30N03 and 30N02 beginning in May 2009, indicating potential seawater intrusion (Figure 25). Concentrations declined to historical levels in well 30N03 by July 2010, and declined in well 30N02 (one of the sentry wells comprising the Deep Well Index) to historical levels by October 2009. Comparing well 30N02 to the other deep index wells, the other deep index wells showed no elevated concentrations during the same time period. However, comparing well 30N02 to wells with similar screen elevations (Figure 7), wells 36L01 (approximately 11,950 feet south of well 30N02) and MW-Blue (approximately 3,300 feet east-southeast of well 30N02) suggested that seawater intrusion progressed eastward as far as MW-Blue, but not as far south as well 36L01 (Figure 26). While the TDS and chloride concentrations were elevated from August 2009 to July 2011 in well MW-Blue, the sodium concentrations remained within historical levels. During the same time period, TDS, chloride, and sodium concentrations remained within historical levels in well 36L01. The well cluster at 32S/13E 30N may be relatively prone to seawater intrusion because of their location near Arroyo Grande Creek and the more permeable sediments deposited by the ancestral creek (NCMA 2009 Annual Monitoring Report) as well as the lower groundwater elevations typical to the east (Figures 10 and 11).

During 2015, there were no indications of seawater intrusion. There were slightly elevated concentrations of TDS, sodium, and chloride in July 2015, but concentrations generally had declined by October 2015 to normal range.

7.1.3 Measures to Avoid Seawater Intrusion

In recognition of the risk of seawater intrusion, the Northern Cities have developed and implemented a water quality monitoring program for the sentry wells and Oceano CSD observation wells. The Northern Cities, SLOCFC&WCD, and the State of California have also worked cooperatively toward the protection of the sentry wells as long-term monitoring sites. Several measures are employed by the Northern Cities to reduce the potential for seawater intrusion. Specifically, the Northern Cities have voluntarily reduced coastal groundwater pumping, decreased

overall water use via conservation, and initiated plans, studies, and institutional arrangements to secure additional surface water supplies. As a result, each of the four major municipal water users reduced groundwater use between 25 and 90% from 2007 to 2010. In 2015, municipal groundwater use was 933.97 AF, which constitutes 21.6% of the urban user's groundwater allotment (including agricultural conversion credits) of the basin safe yield (Table 6).

Reduced groundwater recharge, whether it is from drought or reduction of subsurface inflow from the north and east, reduces subsurface outflow to the ocean and increases potential threat of seawater intrusion.

7.2 THREATS TO STATE WATER PROJECT SUPPLY

Both extended drought and long-term reduction in snowpack due to climate change can affect deliveries from the SWP. Despite the predictions of a strong El Nino hydrologic year in 2016, the current rainfall patterns in the Central Coast of California do not appear to be the "drought-buster" that would pull California from the impacts of the recent four-year severe drought. However, rainfall in March in the SWP source area have increased water in the state's two largest reservoirs, Lake Shasta and Lake Oroville, to 88% and 86% capacity, respectively, as of March 30, 2016. As a result, DWR announced on March 17, 2016, that deliveries for 2016 will be 45% of requests for deliveries, which is the largest allocation of water since 2012. The last 100% allocation – difficult to achieve even in wet years largely because of Delta pumping restrictions to protect threatened and endangered fish species – was in 2006.

7.3 THREATS TO LOPEZ LAKE WATER SUPPLY

Extended drought conditions in recent years have contributed to record low water levels in Lopez Lake and impacts of climate change may affect future precipitation amounts in the Lopez Creek watershed. As discussed in Section 5.1.1, the Zone 3 agencies developed and implemented the LRRP in response to reduced water in storage in the lake. The LRRP is intended to reduce municipal diversions and downstream releases as water levels drop in order to preserve water within the reservoir for an extended drought. However, if drought conditions continue, even with reduced diversions and releases, water from Lopez Lake may be unavailable, or at least significantly reduced, to the Zone 3 agencies. Without access to water from Lopez Lake, the NCMA agencies and local agriculture stakeholders may be forced to rely more heavily on their groundwater supplies and increase pumping during extended drought conditions, which could result in lowering water levels in the aquifer and an increased threat from seawater intrusion. Moreover, a reduction in downstream releases from the reservoir, as mandated by the LRRP, will likely lead to reduced recharge to the NCMA portion of the SMGB and further contribute to declining groundwater levels.

8.0 MANAGEMENT ACTIVITIES

The NCMA and overlying private well users have actively managed surface water and groundwater resources in the Northern Cities area for more than 30 years. Management objectives and responsibilities were first established in the 1983 Gentlemen's Agreement, recognized in the 2001 Groundwater Management Agreement, and affirmed in the 2002 Settlement Agreement. The responsibility and authority of the Northern Parties for NCMA groundwater management was formally established through the 2002 Settlement Agreement, 2005 Stipulation, and 2008 Judgment After Trial. Throughout the long history of collaborative management, which was formalized through the Agreement, Stipulation, and Judgment, the overall management goal for the Northern Cities is to preserve the long-term integrity of water supplies in the NCMA portion of the Santa Maria Groundwater Basin (SMGB).

8.1 MANAGEMENT OBJECTIVES

Eight basic Water Management Objectives have been established for ongoing NCMA groundwater management:

1. Share Groundwater Resources and Manage Pumping
2. Enhance Management of NCMA Groundwater
3. Monitor Supply and Demand and Share Information
4. Manage Groundwater Levels and Prevent Seawater Intrusion
5. Protect Groundwater Quality
6. Manage Cooperatively
7. Encourage Water Conservation
8. Evaluate Alternative Sources of Supply.

Each of these objectives is discussed in the following sections. Under each objective, the NCMA Technical Group has identified a number of strategies to meet the objectives. These strategies are listed and then discussed under each of the eight objectives listed below. Other potential objectives are outlined in the final section.

A major management undertaking of the NCMA TG in 2014 was the development of a Strategic Plan (WSC, 2014) to provide the NCMA with:

1. A Mission Statement to guide future initiatives
2. A framework for communicating water resource goals, and
3. A formalized Work Plan for the next 10 years.

Through the strategic planning process, the TG identified several key Strategic Objectives to guide their efforts. These efforts include:

A. <u>Enhance Water Supply Reliability</u>

- Prepare the Northern Cities for prolonged drought conditions

- Develop coordinated response plan for seawater intrusion and other supply emergencies
- Analyze impacts of pumping on the groundwater basin
- Better protect against threats to groundwater sustainability

B. Improve Water Resource Management

- Update the 2001 Groundwater Management Agreement
- Develop more formalized structure/governance for the NCMA TG

C. Increase Effective Outreach

- Engage agriculture stakeholders
- Improve coordination with San Luis Obispo County Flood Control and Water Conservation District (SLOCFC&WCD) and other regional efforts
- Increase communication with various City Councils and Boards of Directors

The Strategic Plan formalized many of the water resource management projects, programs, and planning efforts that the Northern Cities, both individually and jointly, have been engaged in that address water supply and demand issues, particularly with respect to efforts to assure a long-term sustainable supply. The following section discusses the major management activities that the NCMA agencies have pursued during 2015 that incorporate the planning objectives outlined in the 2014 Strategic Plan.

In January the NCMA members adopted a Water Supply, Production and Delivery Plan (WSPDP) that applies the strategic objectives to the various supplies available to the area. The NCMA area receives supplies from Lopez Lake, the State Water Project and the underlying groundwater basin.

> *The purpose of the FY 2014/15 Water Supply, Production and Delivery Plan is to provide the NCMA agencies with a delivery plan that optimizes use of existing infrastructure and minimizes groundwater pumping from the SMGB. The plan includes the development of a water supply and delivery modeling tool for the NCMA agencies, evaluation of three delivery scenarios, and development of recommendations for water delivery for FY 2014/15.*

The WSPDP made a number of recommendations that were implemented or subject to further study. These recommendations are summarized in subsequent sections, and include:

- *Continue ongoing water conservation efforts to limit demand and make additional supply available for potentially future dry years.*
- *Immediately implement the strategies identified in Scenario 1 Baseline Delivery to minimize SMGB groundwater pumping in the near term.*
- *Develop an implementation plan to install the necessary appurtenances to allow the Arroyo Grande/Grover Beach Intertie to be utilized to deliver additional Lopez water to Grover Beach. Based on the results of the Arroyo Grande/Grover Beach Intertie Evaluation, construction of the 8" intertie appears to be the most cost effective.*
- *Perform additional analysis of a potential Grover Beach Pump Station to evaluate temporary and permanent pump station alternative.*

These recommendations reinforce the ongoing management efforts by the NCMA and provide potential projects to improve water supply reliability and protect water quality in the face of the ongoing drought. Ongoing work to implement the recommendations includes evaluation of additional delivery facilities to add operational flexibility to assure optimum use of all supplies.

Implementing the WSPDP has allowed the NCMA to minimize the use of groundwater thereby protecting against seawater intrusion while meeting the needs of their customers and other water users in the basin.

Additionally, in late 2015 and early 2016 the NCMA agencies, in conjunction with the other Zone 3 agencies and the SLOCFC&WCD, began an initiative to evaluate potential extended drought emergency options. This initiative included identification, evaluation and ranking of potential options, shown below, available to Zone 3 to improve the reliability of their water supplies, should the drought continue. This evaluation of options was completed by the Zone 3 Technical Advisory Committee and presented to the Zone 3 Advisory Committee and the San Luis Obispo County Board of Supervisors (BOS). As a result of these efforts, the Zone 3 agencies and the County have pledged to work collaboratively together to continue to evaluate and implement emergency water supply reliability options as required in a continued drought.

Zone 3 Extended Drought Emergency Options:

- **Cloud Seeding** – Investigate opportunities to utilize cloud seeding to enhance rainfall within the Lopez Watershed. This could involve a cooperative agreement with Santa Barbara County.
- **State Water Project** - Maximize importation of SLOCFC&WCD SWP supplies, including subcontractor and "Excess Entitlement" supplies.
    - Evaluate delivery of SWP water to non-SWP subcontractors under emergency provisions (e.g. Arroyo Grande, Grover Beach, etc.).
- **Unsubscribed Nacimiento Water Project (NWP) Water** - Investigate transfer/exchange opportunities to obtain unsubscribed NWP water for the Zone 3 agencies (i.e. exchange agreements with the City of San Luis Obispo and the Chorro Valley pipeline SWP subcontractors).
- **Water Market Purchases** - Investigate opportunities to obtain additional imported water and deliver it to the Zone 3 agencies through the SWP infrastructure (e.g. exchange agreements with San Joaquin/Sacramento Valley farmers, water broker consultation, groundwater banking exchange agreements, etc.).
- **Morro Bay Desalination Plant Exchanges –** Investigate opportunities to obtain SWP water from Morro Bay by providing incentives for Morro Bay to fully utilize its desalination plant capacity.
- **Land Fallowing** – Evaluate potential agreements with local agriculture representatives to offer financial incentives to fallow land within the Arroyo Grande and Cienega Valleys and make that water available for municipal use.
- **Lopez Reservoir Minimum Pool -** Investigate feasibility of extracting water from Lopez Reservoir below the 4,000 AF minimum pool level.
- **Enhanced Conservation** – Evaluate opportunities for enhanced water conservation by the Zone 3 agencies beyond the Governor's Mandatory Water Conservation Order

(e.g. water rationing, no outdoor watering, agriculture water restrictions, etc.) to preserve additional water.

- **Diablo Power Plant Desalination** – Utilize excess capacity from the Diablo Power Plant's Desalination Facility to supply water to the Zone 3 agencies through a connection to the Lopez Pipeline. Estimates of the amount of unused capacity are approximately 900 AFY.
- **Nacimiento/California Men's Colony Intertie –** Complete design of pipeline that would connect the NWP Pipeline to the California Men's Colony (CMC) Water Treatment Plant. Investigate opportunities for Zone 3 agencies to purchase NWP water and utilize exchange agreements and existing infrastructure to deliver additional water to Zone 3 through the Coastal Branch pipeline.
- **Emergency Indirect Potable Reuse Groundwater Recharge –** Investigate opportunities to develop an Indirect Potable Reuse (IPR) Groundwater Recharge System, under emergency permits, to provide a supplemental supply for the Zone 3 Agencies.
- **Emergency Seawater/Brackish Water Desalination Facility –** Investigate opportunities to develop a desalination facility, under emergency permits, to provide a supplemental supply for the Zone 3 Agencies.
- **Price Canyon Produced Water Recovery** – Investigate opportunities to recover and utilize produced water from ongoing oil operations in Price Canyon.
- **Upper Lopez Wells** – Investigate potential water storage in aquifers upstream of Lopez Reservoir and evaluate opportunities to obtain this water supply.

8.1.1 Share Groundwater Resources and Manage Pumping

Strategies:

- Continued reduction of groundwater pumping, maintain below safe yield.
- Coordinated delivery of Lopez Lake water to the maximum amount available, pursuant to the Lopez Lake Low Reservoir Response Plan.
- Continue to import State Water Project supplies to Oceano CSD and Pismo Beach.
- Maintain surface water delivery infrastructure to maximize capacity.

Discussion:

A longstanding objective of water users in the NCMA has been to cooperatively share and manage groundwater resources. In 1983 the Northern Parties (including water users in the NCMA area) mutually agreed on an initial safe yield estimate and an allotment of pumping between the urban users and applied irrigation users of 57 percent and 43 percent, respectively. In this agreement the Northern Cities also established pumping allotments among themselves. Subsequently, the 2001 Groundwater Management Agreement included provisions to account for changes such as agricultural land conversions. The agreements provide that any change in the accepted safe yield based on ongoing assessments would be shared on a pro rata basis. Pursuant to the stipulation, the Northern Cities conducted a water balance study to update the safe yield estimate (Todd 2007). As a result, the parties agreed to maintain the existing pumping allotment

among the urban users and established a consistent methodology to address agricultural land use conversion.

In addition to cooperatively sharing and managing groundwater resources, the Northern Cities have coordinated delivery of water from Lopez Lake. At the same time, the City of Pismo Beach and Oceano CSD have continued to import SWP water. Both actions maximize use of available surface water supplies. The WSPDP now provides a framework for the Northern Cities, as a whole, to actively and effectively manage the groundwater resource, particularly in years of below normal rainfall and below "normal" SWP delivery schedules. The WSPDP outlined a strategy to provide sufficient supplies to NCMA water users despite the threat of reduced SWP delivery. Specifically, in 2015, municipal groundwater pumpage at 933.97 AF was less than any year during the 16-year period from 1999 through 2014.

Many aspects of the NCMA's water management strategy that shifted direction in 2014 as a result of the severity of the ongoing drought continued through 2015. Adoption of the LRRP by SLOCFC&WCD resulted in the implementation of at least the first stage of LRRP reduction triggers, which protect the reservoir from running dry in any single year while providing flows for habitat protection in Arroyo Grande Creek. In addition, the NCMA agencies have increased conservation efforts even more than in previous years, in order to adequately and safely manage the water resource (additional discussion in Section 8.1.7).

The water balance study (Todd 2007) highlighted the threat of seawater intrusion as the most important potential adverse impact to consider in managing the basin. Seawater intrusion, a concern since the 1960s, would degrade the quality of water in the aquifer and potentially render portions of the basin unsuitable for groundwater production (DWR 1970). A deep sentry well index of 7.5 feet (NAVD 88) has been recognized as the index, above which it is thought that there is sufficient fresh water (groundwater) outflow to prevent seawater intrusion. From late 2009 to April 2013, the Northern Cities management of groundwater levels and groundwater pumpage maintained the sentry well index above the 7.5-foot level. However, for several weeks in April and May, and then again from early July through mid-December 2013, and then again from mid-April 2014 through mid-December 2014, the index value dropped below the target. In 2015 the index value was above the deep well index trigger from January through February, however the index remained below the target level from March through December 2015, generally between 4 and 7 feet below the 7.5-foot target.

Another potential adverse impact of localized pumping includes reduction of flow in local streams, notably Arroyo Grande (Todd 2007). The Northern Cities (as Zone 3 contractors) have participated with SLOCFC&WCD in preparation of the Arroyo Grande Creek Habitat Conservation Plan (HCP) that addresses reservoir releases to maintain both groundwater levels and habitat diversity in the creek. The SLOCFC&WCD contracted with ECORP in 2015 to conduct the additional hydraulic studies to finalize the HCP; these results are expected in 2016.

8.1.2 Enhance Management of NCMA Groundwater

Strategies:

- Develop a groundwater model for the NCMA/NMMA or the entire SMGB
- Coordinate with the County and NMMA to develop new monitoring well(s) in key locations within the SMGB

- Develop a Salt and Nutrient Management Plan for the NCMA/NMMA
- Develop and implement a framework for groundwater storage/conjunctive use, including return flows
- Update the 2001 Agreement Regarding Management of the Arroyo Groundwater Basin

Discussion:

NCMA participated in the oversight of the performance of the Santa Maria Basin Characterization Study, which was completed in late 2015. In addition to the collection and analysis of extensive data sets to be utilized in the development of a numerical groundwater flow model and Salt/Nutrient Management Plan, continuous monitoring transducers were installed in 2015 in coastal sentry Wells 36L01 and 36L02 (which are part of the NCMA monitoring program) and in Wells 11N36W-12C01 and 12C02. In cooperation with the SLOCFC&WCD and NMMA, potential locations for new monitoring well(s) have also been identified to enhance the coastal monitoring well network.

The monthly NCMA TG meetings provide for collaborative development of joint budget proposals for studies and plans as well as shared water resources. In addition, the monthly meetings provide a forum for discussing the data collected as part of the quarterly monitoring reports.

8.1.3 Monitor Supply and Demand and Share Information

Strategies:

- Develop coordinated UWMPs for the Northern Cities
- Develop a coordinated Water Shortage Contingency Plan to respond to a severe water shortage condition within the NCMA
- Share groundwater pumping data at monthly NCMA Technical Group meetings
- Evaluate future water demands through comparison to UWMP projections
    - Arroyo Grande 2010 UWMP
    - Pismo Beach 2010 UWMP
    - Grover Beach 2010 UWMP
    - Oceano CSD is not required to prepare an UWMP because the community population does not meet the minimum requirement threshold

Discussion:

UWMPs are scheduled for update by Arroyo Grande, Pismo Beach, and Grover Beach. Oceano CSD is not required to prepare an UWMP because the community population does not meet the minimum requirement threshold; however, many of the aspects of an UWMP are addressed through participation in the NCMA planning process.

Regular monitoring of activities that affect the groundwater basin, and sharing that information, has occurred for many years. The monitoring efforts include gathering data on hydrologic conditions, water supply and demand, and groundwater pumping, levels, and quality.

The current monitoring program is managed by the Northern Cities in accordance with the 2005 Stipulation and 2008 Judgment, guided by the July 2008 Monitoring Program for the NCMA. The monitoring data and a summary of groundwater management activities are summarized in the Annual Reports. Arroyo Grande, Grover Beach, and Pismo Beach have each evaluated their future water demands as part of their respective 2010 UWMP updates. The NCMA shares information with the two other management areas (NMMA and SMVMA) through data exchange and regular meetings throughout the annual report preparation cycle.

Management activities have become more closely coordinated among the NCMA members as a result of prolonged drought conditions. In particular, the NCMA members are implementing the LRRP to limit municipal diversions and downstream releases from Lopez Reservoir to ensure that water is available for future potentially dry years. In addition, the Zone 3 agencies (which include the NCMA TG) initiated a long-term drought planning effort. The planning effort is intended to plan water supplies if the present drought continues.

8.1.4 Manage Groundwater Levels and Prevent Seawater Intrusion

Strategies:

- Utilize storm-water ponds to capture storm-water run-off and recharge the groundwater basin.
- Install transducers in key monitoring wells to provide continuous groundwater elevation data; the following wells have transducers:
    - 24B03,
    - 30F03,
    - 30N02,
    - 36L01,
    - 36L02, and
    - 32C03 (County Monitoring Well No. 3).
- Collect and evaluate daily municipal pumping data to determine impact on local groundwater elevation levels.

Discussion:

Prevention of seawater intrusion through the management of groundwater levels is essential to protect the shared resource. The NCMA agencies both increase groundwater recharge with storm water infiltration as well as closely monitoring groundwater levels and water quality in sentry wells along the coast.

Arroyo Grande and Grover Beach each maintain storm water retention ponds within their jurisdiction; the SLOCFC&WCD maintains the storm water system, including retention ponds, in Oceano. These ponds collect storm water runoff, allowing it to recharge the underlying aquifers. There are approximately 140 acres of detention ponds in Arroyo Grande and 48 acres of detention ponds in Grover Beach. The storm water detention pond in Oceano is approximately one-half acre. Grover Beach modified its storm water system in 2012 to direct additional flow into one of its recharge basins.

Although closely related to the objectives to manage pumping, monitor supply and demand, and share information, this objective also specifically recognizes the proximity of production wells to the coast and the threat of seawater intrusion. The Northern Cities and SLOCFC&WCD have long cooperated in the monitoring of groundwater levels, including quarterly measurement by the NCMA of groundwater levels in sentry wells at the coast. Upon assuming responsibility for the coastal monitoring wells, the NCMA became aware of the need to upgrade their condition. In July 2010 the well-heads (surface completions) at four sentry monitoring well clusters within the Northern Cities Management Area were renovated:

- 24B01, -B02, and-B03;
- 30F01, -F02, and -F03;
- 30N01, -N02, and -N03; and
- 36L01 and -L02.

The renovations included raising the elevations of the top of each individual well casing by two to three feet and resurveying relative to the NAVD 88 standard in late September 2010 (Wallace Group 2010). The individual well casings are now above ground surface and protective locking steel risers now enclose each cluster. As a result of this work, the sentry wells within the NCMA are now protected from surface contamination and tampering.

Quarterly measurement of groundwater levels aids in assessing the risk of seawater intrusion along the coast. To enhance the data collection and assessment efforts, the NCMA installed transducers in five of the key sentry monitoring wells to provide continuous groundwater levels at key locations. By combining this with the collection and evaluation of daily municipal pumping data, the NCMA is better able to determine the response of local groundwater levels to extractions and therefore better manage the basin.

In order to gain insight into water level fluctuation and water quality variation in the area between the NCMA and NMMA, a continuous monitor was installed in Well 32C03 (County Well No. 3). Well 32C03 was constructed and is owned by the County of San Luis Obispo and is part of their county-wide groundwater monitoring network. To provide more detail regarding seasonal and other groundwater level changes in the area between the NCMA and NMMA, detailed water level monitoring was initiated in April 2012. Sensors were installed to document long- and short-term changes in water level, temperature and specific conductance.

In 2015 continuous monitoring sensors were installed in coastal monitoring wells 36L01 and 36L02 located in the Oceano Dunes. Data from the transducers in these wells are now collected on a quarterly basis along with the other sentry wells.

Additional studies to enhance basin management efforts that have been discussed by the NCMA TG include:

- Consider implementation of a monthly water level elevation data analysis of the sentry wells during periods when the deep well index value is below the index target of 7.5 feet NAVD for an extended period of time. Since the index has generally remained steady due to reduced groundwater pumping, the NCMA has deferred the issue of monthly analysis.

- Consider implementation of a monthly analysis of electrical conductivity data from the wells with downhole transducers during periods when the deep well index value is below the index target of 7.5 feet to track potential water quality degradation (an enhanced monitoring schedule of County Well No. 3 is not necessary because background water quality does not change or fluctuate significantly). If electrical conductivity data suggest water quality degradation, implement a monthly sampling and monitoring program. Since the index has generally remained steady because of reductions in groundwater pumping, the NCMA has deferred the issue of monthly analysis.
- Assess the potential impacts on sentry well water level elevations from extended periods of increased groundwater pumping by conducting analytical modeling analyses to predict water level responses given certain pumping scenarios. These analyses may prove fruitful as scenarios unfold regarding decreased SWP deliveries or short-term emergency cuts to Lopez Lake deliveries. The NCMA has adopted the Water Supply, Production and Delivery Plan as previously discussed.
- Lastly, the 2005 Settlement requires NCSD and the other Mesa parties to import 2,500 acre feet per year (AFY) to mitigate over pumping that has impacted groundwater inflow to the NCMA, and thus may facilitate seawater intrusion in both NCMA and NMMA. On July 2, 2015 the NCSD began taking deliveries of state water from the City of Santa Maria. The current project capacity is 650 AFY and plans are underway to eventually take it to its full capacity.

8.1.5 Protect Groundwater Quality

Strategies:

- Perform quarterly water quality monitoring at all sentry wells and County Well #3.
- Gather temperature and electrical conductivity data from six monitoring wells to continuously track water quality indicators for seawater intrusion.
- Prepare a Salt and Nutrient Management Plan pursuant to State policy utilizing the results of the Santa Maria Groundwater Basin Characterization study.
- Construct a Recycled Water system in the City of Pismo Beach, pursuant to the results of the recently completed Recycled Water Facilities Planning Study.
- Support performance of a Water Recycling Facilities Planning Study by the South San Luis Obispo County Sanitation District

Discussion:

The objective to protect groundwater quality is closely linked with the objective for monitoring and data sharing. To meet this objective all sources of water quality degradation, including the threat of seawater intrusion, need to be recognized. Water quality threats and possible degradation affect the integrity of the groundwater basin, potentially resulting in loss of use or expensive water treatment processes. Sentry wells are monitored quarterly and data from other NCMA production wells are assessed annually. The monitoring program includes evaluation of potential contaminants in addition to those that might indicate seawater intrusion. Temperature and electrical conductivity probes have been installed in five monitoring wells to provide continuous

water quality tracking for early indication of seawater intrusion. A sixth sentry well cluster (36L) in the Oceano Dunes was instrumented in April 2015 as part of the Santa Maria Groundwater Basin Characterization Study. The results of the SMGB Characterization Study provide the foundation for preparation of a Salt and Nutrient Management Plan.

Pismo Beach completed a Recycled Water Facilities Planning Study (RWFPS) in April 2015 to investigate alternatives for constructing a recycled water system that will enable Pismo Beach to produce and beneficially use recycled water to augment its water supply. Implementation of the recommended alternatives from the study will allow the City to utilize recycled water to recharge the groundwater basin and provide a new, drought proof, source of water supply for the area. The RWFPS was funded in part by a grant from the California State Water Resources Control Board Water Recycling Funding Program. Now referred to as the Pismo Beach Regional Groundwater Sustainability Project, the project includes additional advanced treatment processes that would allow for production of advanced purified water and direct injection into the groundwater basin, and is currently undergoing preliminary engineering and environmental review. Pismo Beach is investigating ways to make this project a more regional project by incorporating flows from the South San Luis Obispo Sanitation wastewater treatment plant. The member agencies of the NCMA have held the first governance meeting to investigate how a regional project can be funded and the water produced from this project can be shared between the agencies.

The South San Luis Obispo County Sanitation District (SSLOCSD) provides wastewater transmission and treatment for the cities of Arroyo Grande and Grover Beach and the Oceano CSD. The SSLOCSD is preparing a Water Recycling Facilities Planning Study to evaluate and select a preferred alternative for a recycled water program that could provide a supplemental water supply source and improve the water supply reliability for the area. As discussed in Section 8.1.8, Oceano CSD has been given a grant to study the most effective use of water produced either by the Pismo Beach or the SSLCSD recycling projects.

8.1.6 Manage Cooperatively

Strategies:

- Improve agriculture outreach by enhancing coordination with local growers.
- Coordinate groundwater monitoring data sharing and annual report preparation with the NCMA, NMMA and the SMVMA.
- Improve inter-agency coordination within the NCMA agencies and include the County.

Discussion:

Since 1983, NCMA management has been based on cooperative efforts of the affected parties, including the Northern Cities entities, private agricultural groundwater users, San Luis Obispo County, the SLOCFC&WCD, and other local and state agencies. Specifically, the NCMA agencies have limited their pumping and, in cooperation with SLOCFC&WCD, invested in surface water supplies so as to not exceed the safe yield of the NCMA portion of the SMGB. Other organizations participate, as appropriate. In addition to the efforts discussed in this report, cooperative management occurs through many other venues and forums, including communication by the Northern Cities in their respective public meetings and participation in the Water Resources Advisory Council (the County-wide advisory panel on water issues).

The NCMA agencies participated in preparation and adoption of the 2014 update of the San Luis Obispo County Integrated Regional Water Management Plan (IRWMP). The IRWMP promotes integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy. The IRWMP integrates all of the programs, plans, and projects within the region into water supply, water quality, ecosystem preservation and restoration, groundwater monitoring and management, and flood management programs.

Since the 2008 Judgment, the NCMA has taken the lead in cooperative management of its management area. The NCMA TG met monthly (at a minimum) throughout 2015 and has been a willing and active participant in the Santa Maria Groundwater Basin Management Area (SMGBMA) technical subcommittee, which first met in 2009. The purpose of the SMGBMA technical subcommittee is to coordinate efforts among the management areas such as enhanced monitoring of groundwater levels and improved sharing of data. With the current threats to water supply in all management areas, greater communication, analytical collaboration, and data sharing, especially between NCMA and NMMA, is encouraged.

8.1.7 Encourage Water Conservation

Strategies:

- Share updated water conservation information
- Implement UWMPs

Discussion:

Water conservation, or water use efficiency, is linked to the monitoring of supply and demand and the management of pumping. Water conservation reduces overall demand on all sources, including groundwater, and supports management objectives to manage groundwater levels and prevent seawater intrusion. In addition, water conservation is consistent with State policies seeking to achieve a 20% reduction in water use by the year 2020. Water conservation activities in the NCMA are summarized in various documents produced by the Northern Cities, including the 2010 Urban Water Management Plans of Arroyo Grande, Grover Beach, and Pismo Beach.

In addition to ongoing water conservation efforts, the drought conditions that extended throughout 2015 led the NCMA members to increase their effort to reduce water use. In addition, on April 1, 2015, the Governor signed Executive Order B-29-15, enacting statewide mandatory water conservation requirements due to ongoing drought conditions and the historical low Sierra snowpack measurements. The final regulations adopted by the State Water Resource Control Board on May 5, 2015 imposed mandatory water use reductions on the cities of Arroyo Grande, Grover Beach and Pismo Beach. Although not directly subject to these mandatory restrictions, the Oceano CSD increased their water conservation efforts as well. The water conservation measures instituted by each of the NCMA member are summarized below.

City of Arroyo Grande

Arroyo Grande implemented in 2015 a series of water conservation restrictions and offered a comprehensive program of water conservation incentives. On May 26, 2015, the City declared a

Water Shortage Emergency and implemented mandatory water conservation measures through adoption of Ordinance No. 670. The mandatory water conservation measures include:

- Use of water which results in excessive gutter runoff is prohibited.
- No water shall be used for cleaning driveways, patios, parking lots, sidewalks, streets, or other such use except where necessary to protect the public health and safety.
- Outdoor water use for washing vehicles shall be attended and have hand-controlled water devices.
- Outdoor irrigation is prohibited between the hours of 10:00 a.m. and 4:00 p.m.
- Irrigation of private and public landscaping, turf areas and gardens is permitted at even-numbered addresses only on Mondays and Thursdays and at odd-numbered addresses only on Tuesdays and Fridays.
- No irrigation of private and public landscaping, turf areas and gardens is permitted on Wednesdays. Irrigation is permitted at all addresses on Saturdays and Sundays.
- In all cases, customers are directed to use no more water than necessary to maintain landscaping.
- Emptying and refilling swimming pools and commercial spas are prohibited except to prevent structural damage and/or to provide for the public health and safety.
- New swimming pools may be constructed, however, they shall have a cover that conforms to the size and shape of the pool and act as an effective barrier to evaporation. The cover must be in place during periods when use of the pool is not reasonably expected to occur.
- Use of potable water for soil compaction or dust control purposes in construction activities is prohibited.
- Hotel, motel or other commercial lodging establishments shall offer their patrons the option to forego the daily laundering of towels, sheets and linens.
- Restaurants or other commercial food service establishments shall not serve water except upon the request of a patron.
- The City may impose fines for violation of mandatory conservation measures. Customers who received a financial penalty may have their penalty waived if they attend a 2-hour water conservation class.

In addition to the mandatory water conservation measures outlined above, the Water Shortage Emergency resolution included a tiered billing system, whereby residential customers were assigned a baseline amount of water, based on the amount of water used during the same billing period of the previous year. Residential customers in Tier 1 were then required to reduce consumption by 10%, customers in Tier 2 were required to reduce consumption by 20%, and customers in Tier 3 were required to reduce consumption by 30%. Dedicated irrigation meters were required to reduce consumption by 25%.

To help manage the use of water, the City offers several water conservation incentive programs designed to decrease overall water use, particularly outside (irrigation) use in the summer. The conservation and incentive programs include:

- *Plumbing Retrofit Program.* The City's plumbing retrofit program includes installation or adjustment of showerheads, toilets, faucet aerators, and pressure regulators for single-family and multi-family residential units constructed prior to 1992. This program has been in place since 2004 at an expense to the City of more than $1.3 million.
- *Cash for Grass*. The program rebates water customers for each square foot of grass (500 square feet minimum) and replaced with drought tolerant plants or mulch.
- *StormRewards Program* This rebate program (administered by Coastal San Luis Resource Conservation District) provides an incentive for landowners to install rain gardens, rain barrel, dry well, porous pavement and remove impervious pavement.
- *Sustainable Landscape Seminar Series* Monthly seminar on sustainable landscaping practices are offered. DVD's of the seminars are available at the County Library located at 800 West Branch Street in Arroyo Grande.
- *Smart Irrigation Controller and Sensor Program*. The City offers Smart Irrigation Controllers and Sensors at no charge to customers to encourage residents to upgrade their old irrigation controllers with new weather-based sensor technology.
- *Washing Machine Rebate*. This program pays water customers a one-time rebate for the installation of a certified energy efficient tier 3 washing machine.
- *Mandatory Plumbing Retrofit*. Upon change of ownership of any residential property, the seller must retrofit the property's plumbing fixtures to meet defined low-water use criteria.

The water conservation efforts of Arroyo Grande have been successful; the ongoing programs have decreased water use per residential connection from 186 gallons per capita per day (gpcd) in 2010 to 117 gpcd in 2015. With a defined target per capita usage for 2020 of 149 gpcd (based on the City's 2010 UWMP), the City has far exceeded its conservation goals originally set in 2010.

City of Pismo Beach

Pismo Beach approved several Water Conservation Incentive Programs in 2015 to help reduce water consumption and ensure reliable future water supply. The programs include:

- *Cash for Grass*. The program reimburses residents for each square foot of lawn removed and replaced with drought tolerant landscaping, which is required to have drip or micro spray irrigation and be on an automatic timer.
- *Washing Machine Rebate*. This program will pay a one-time amount for the purchase and installation of a certified energy efficient tier 3 washing machine.
- *Smart Irrigation Controller Program*. This program pays a one-time amount towards the cost of a new irrigation controller and associated sensors.
- *Irrigation Retrofit Program*. This program provides a one-time rebate for conversion of a manually operated irrigation system to automatic irrigation.

- *Commercial Urinal Rebate Program*. This program provides a one-time rebate for each conventional flushing urinal with a flushless urinal.
- *High Efficiency Toilet Rebate Program*. This program provides a one-time rebate for each 3.5 gallon per flush or higher toilet replaced with a 1.28 gallon per flush or lower toilet.

In July 2015, Pismo Beach declared a "Severely Restricted Water Supply" with modified restrictions, including:

- Use of water which results in excessive gutter runoff is prohibited.
- No outdoor water use – except irrigation.
    - No water shall be used for cleaning driveways, patios, parking lots, sidewalks, streets or other such uses except where necessary to protect the public health and safety;
    - Outdoor water use for washing vehicles or boats shall be attended and have hand-controlled watering devices.
    - Using potable water in decorative water features that do not recirculate the water is prohibited.
- Outdoor Irrigation.
    - Outdoor irrigation is prohibited between the hours of 10 a.m. and 4 p.m.;
    - Irrigation of private and public landscaping, turf areas and gardens is permitted at even- numbered addresses only on Mondays and Thursdays and at odd-numbered addresses only on Tuesdays and Fridays.
    - Using outdoor irrigation during and 48 hours following measurable precipitation is prohibited.
- Restaurants shall serve drinking water only in response to a specific request by a customer.
- Hotels and Motels must provide guests with the option of not having towels and linens laundered daily.
- Use of potable water for compaction or dust control purposes in construction activities is prohibited.

The City of Pismo Beach also introduced the first-in-the-State waterless urinal mandate and a 0.5 gallon per minute restroom aerator retrofit requirement. The components of this program includes:

- Waterless urinal retrofits. All existing urinals within the City shall be retrofitted to waterless urinals before February 14, 2016. Exemptions to this section may be granted at the discretion of the City Engineer under certain conditions.
- Aerators. Residential construction shall be fitted with aerators that emit no more than 0.5 (one-half) gallon per minute. Exemptions to this section may be granted at the discretion of the City Engineer in cases to protect public health and safety.

- Sub-meters in new construction. All new multi-unit buildings, regardless of proposed use, shall be required to have a separate sub-meter capable of measuring the water use of every usable unit, separate common space and landscaping that is expected to use at least 25 gallons of water per day on average over the course of a year, regardless of the overall size of the building. Buildings that have a separate water meter for each unit are exempt.
- Faucet aerators. Restroom faucets in all publicly accessible restrooms, including those in hotel rooms, lobbies and restrooms, restaurants, schools, commercial and retail buildings, public buildings and similar publicly accessible restrooms were retrofitted to install aerators that emit no more than 0.5 (one-half) gallon per minute.

The water conservation efforts of Pismo Beach helped reduce water consumption in the City by 11% in 2015 compared to 2014. The City is committed to continuing implementation of water conservation programs.

City of Grover Beach

In June 2014, Grover Beach declared a Stage III Water Shortage that requires all water customers to reduce their water usage by 10%. Many of the prohibitions that had previously been voluntary during the two years of the Stage II Water Shortage Declaration became mandatory with the Stage III declaration. The declaration also provides the City with the authority to impose penalties for failure to comply with the water reduction or use prohibitions. These prohibitions include:

- Washing of sidewalks, driveways, or roadways where air-blowers or sweeping provides a reasonable alternative.
- Refilling of private pools except to maintain water levels.
- Planting of turf and other new landscaping, unless it consists of drought tolerant plants.
- Washing vehicles, boats, etc. without a quick-acting shut-off nozzle on the hose.
- Washing any exterior surfaces unless using a quick-acting shut-off nozzle on the hose.
- Restaurant water service, unless requested.
- Use of potable water for construction purposes, unless no other source of water or method can be used.
- Operation of ornamental fountain or car wash unless water is re-circulated.

Grover Beach has implemented demand management rebate programs including:

- Cash for Grass Rebate Program
- Smart Irrigation Controller and Sensor Rebate Program
- Toilet Fixtures, Showerheads, and Aerators Retrofit Rebate Program
- Washing Machine Rebate Program

In addition, Grover Beach sponsors workshops on drought tolerant landscaping. The 10-year baseline average water use for Grover Beach is 140.7 gpcd. The water use for 2015 was 90

gpcd. With a target per capita usage for 2020 of 113 gpcd, the City has far exceeded its conservation goals originally set in 2010.

Oceano Community Services District

Due to the population of its service area, Oceano CSD is not required to prepare an UWMP or reduce water consumption as mandated by the Governor for Urban Water Suppliers. Outdoor water use restrictions have been adopted, as required. Additionally, in April 2015, the Oceano CSD adopted a rate increase that included tiered rates to promote water conservation despite a water supply portfolio that is proving resilient in the face of the current drought. Oceano CSD has essentially eliminated groundwater pumping, and is maintaining its annual allocation of Lopez water in storage as allowed pursuant to the Low Reservoir Response Plan. Water year 2016-17 will be the third year in a row that Oceano CSD is storing 100% of its Lopez Lake allocation. Meanwhile, Oceano CSD's conservation efforts have been between 25-30% in comparison to 2013, and exceeds the Governor's goal of 25%. Overall consumption has declined to approximately 85 gpcd after the implementation of drought conservation rates in April 2015, illustrating that as a disadvantaged community, it is responding effectively to conservation rates. Oceano CSD's demand is less than its annual allocation of SWP water, preserving local supplies if needed in subsequent years, depending on SWP deliveries. In the event that SWP deliveries are decreased to a level that is insufficient to meet Oceano CSD demand, then mandatory conservation efforts will be implemented to match the available supply. If the supply is less than 55 gpcd needed to meet health and safety needs, then the supply shortfall will be supplemented from Lopez Lake supplies. Current SWP reliability analyses prepared by the DWR illustrates a low probability that SWP water will not be able to meet Oceano CSD demands in two consecutive years. Further strategies exist in the event of temporary non-delivery of SWP and Lopez water and other unforeseen circumstances. Post-drought strategies include resumption of groundwater pumping, resumption of Lopez deliveries, and storage of SWP water as provided in SWP contracts.

8.1.8 Evaluate Alternative Sources of Supply

Strategies:

- Evaluate expanded use of recycled water;
- Analyze capacity of the Lopez Lake and Coastal Branch pipelines to maximize deliveries of surface water. The following analyses have been completed:
    - Lopez Pipeline Capacity Evaluation
    - Lopez Pipeline Capacity Re-Evaluation
    - Coastal Branch Capacity Assessment
- Optimize existing surface water supplies, including surface water storage through the development of a framework for interagency exchanges and transfers, including SWP and Lopez supplies
- Maximize Lopez pipeline capacity
- Improve Lopez WTP capacity and reliability

- Expansion of the Diablo Canyon Power Plant Desalination Facility to provide water to the Zone 3 agencies.

Discussion:

The Northern Cities continue to evaluate alternative sources of water supply which could provide a more reliable and sustainable water supply for the NCMA. An expanded portfolio of water supply sources will support sustainable management of the groundwater resource and help to reduce the risk of water shortages. These alternative sources include:

State Water Project

Oceano CSD and Pismo Beach are currently SWP customers and could utilize additional water deliveries. Pismo Beach has increased its SWP allocation by securing a "drought buffer" to increase the availability of supply during periods of SWP shortfalls. Grover Beach and Arroyo Grande are not SWP customers.

Water Recycling

As discussed in Section 8.1.5, the SSLOCSD is in the process of preparing a Recycled Water Facilities Planning Study to evaluate and select a preferred alternative for a recycled water program that could provide a supplemental water supply source and improve the water supply reliability for the member agencies, including Arroyo Grande, Grover Beach, and Oceano CSD.

Section 8.1.5 also includes a description of efforts in 2014 and 2015 by the City of Pismo Beach to prepare a Regional Groundwater Sustainability Project that will enable the City to produce recycled water to augment its water supply. Construction of the new facility will allow the City to utilize recycled water to recharge the groundwater basin and provide a new, drought proof, source of water supply for the area. As conceived, the project includes construction of a distribution system that will inject advanced purified water into the SMGB and will allow the City and its NCMA partners to increase the recharge to the basin, improve water supply reliability and help prevent future occurrences of seawater intrusion. Pismo Beach is currently evaluating two potential locations for the advanced treatment facility: at the existing wastewater treatment plant and at an offsite location, closer to the SSLOCSD WWTP.

The Oceano CSD has received a grant under Proposition 84 to evaluate potential injection of recycled water to augment ground water supplies in several locations. This study would provide a plan for the most beneficial use of water produced by the Pismo Beach and/or SSLOCSD projects. The groundwater injection study will be initiated in 2016.

Lopez Lake Expansion

In 2008, San Luis Obispo County sponsored a preliminary assessment of the concept of installing an inflatable rubber dam at the Lopez Dam spillway. Subsequently, the SLOCFC&WCD Service Area 12 and the Cities of Arroyo Grande, Grover Beach and Pismo Beach funded a study to further analyze the feasibility of increasing the yield of Lopez Lake by raising the spillway height with an inflatable dam or permanent extension. The study was finalized in 2013 and identified the potential to increase the annual yield from the lake by 500 AFY with a spillway height increase by 6 feet (Stetson 2013). The NCMA agencies are continuing to evaluate other aspects of the project, including pipeline capacity and impacts on the HCP process.

Desalination

In 2006, Arroyo Grande, Grover Beach, and Oceano CSD utilized Prop 50 funds to complete a feasibility study on desalination as an additional water supply option for the NCMA. This alternative supply is not considered to be a viable option at this time.

The SLOCFC&WCD is working with Pacific Gas & Electric to evaluate the potential to expand the existing desalination facility at the Diablo Canyon Power Plant and connect it to the Lopez pipeline to provide a supplemental water supply for the Zone 3 agencies. This evaluation included analysis of the technical and hydraulic feasibility, investigation of environmental and permitting requirements and development of preliminary cost estimates.

Nacimiento Pipeline Extension

In 2006, Arroyo Grande, Grover Beach, and Oceano CSD completed a Nacimiento pipeline extension evaluation to determine the feasibility of delivery water from the Nacimiento reservoir to the NCMA. This alternative supply is not considered to be a viable option at this time.

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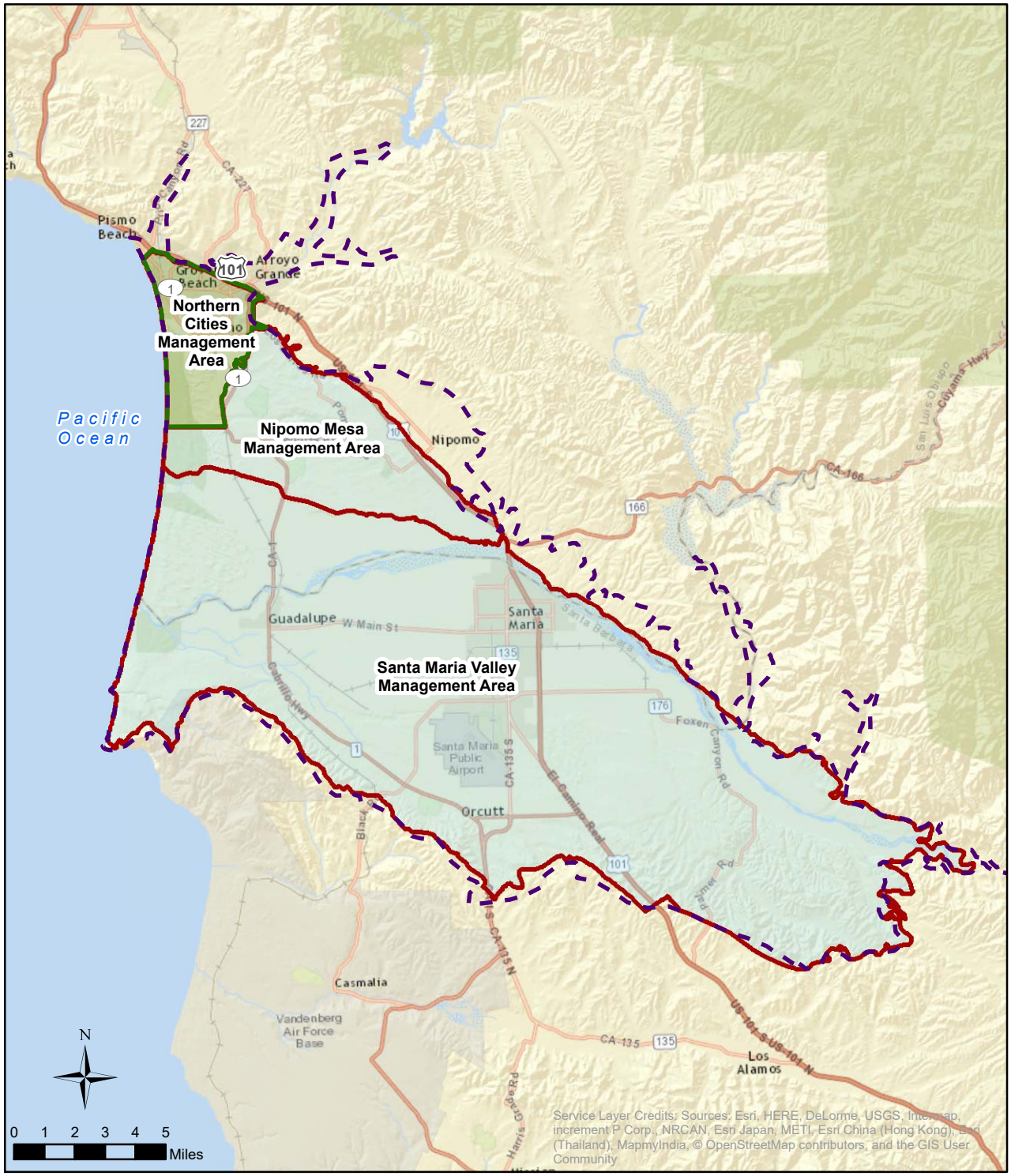
FIGURES



Legend

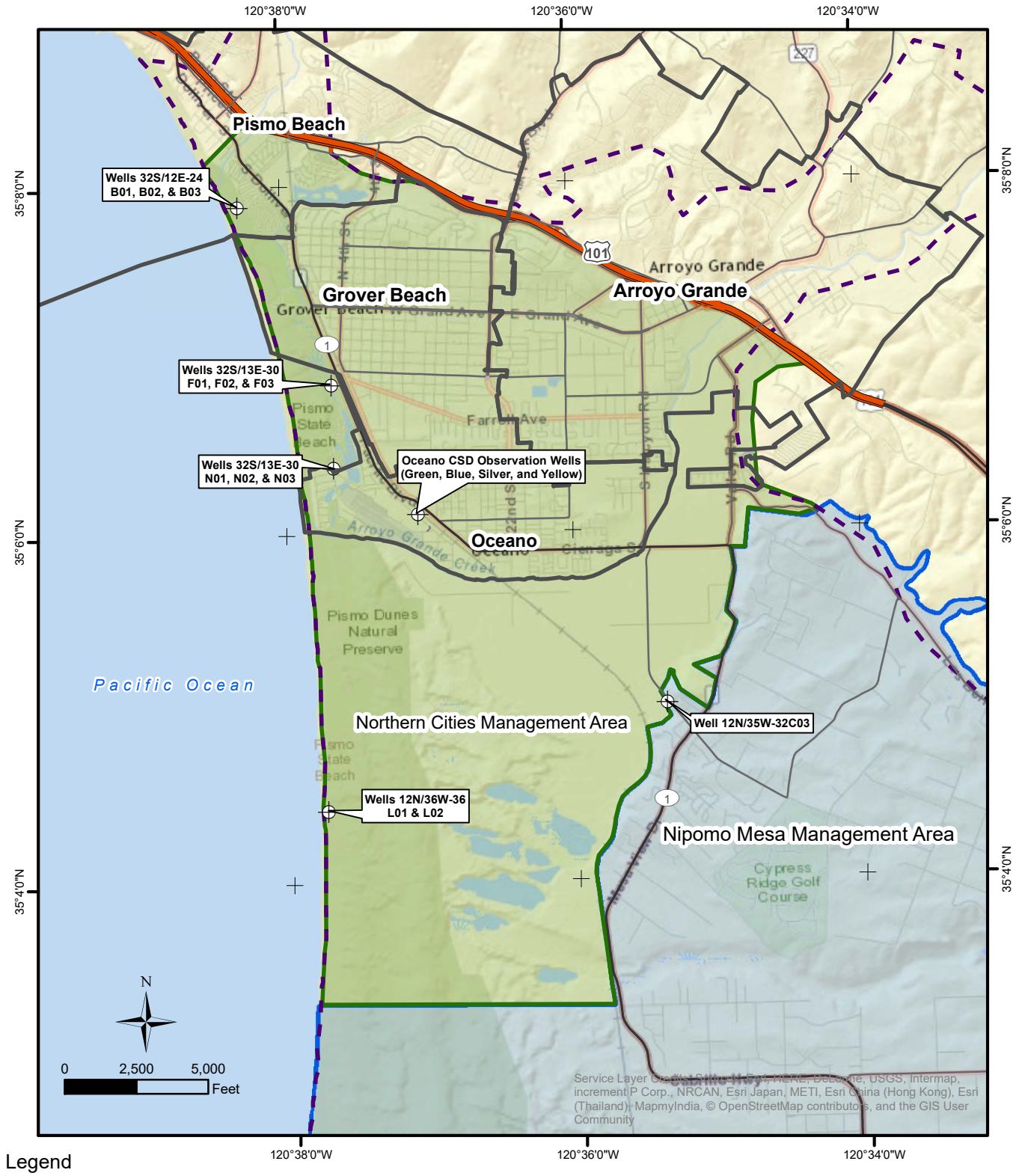
- Northern Cities Management Area
- Adjudication Area Boundary
- Santa Maria Groundwater Basin (DWR Bulletin 118)

SANTA MARIA GROUNDWATER BASIN

Northern Cities Management Area
San Luis Obispo County, California

FIGURE 1

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 1 SantaMariaGroundwaterBasin.mxd, 4/22/2016, CDean



Legend

- City Limits
- Santa Maria Groundwater Basin (DWR Bulletin 118)
- Northern Cities Management Area
- Nipomo Mesa Management Area

NORTHERN CITIES MANAGEMENT AREA
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 2

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 2 Northern Cities Management Area.mxd, 4/22/2016, CDean

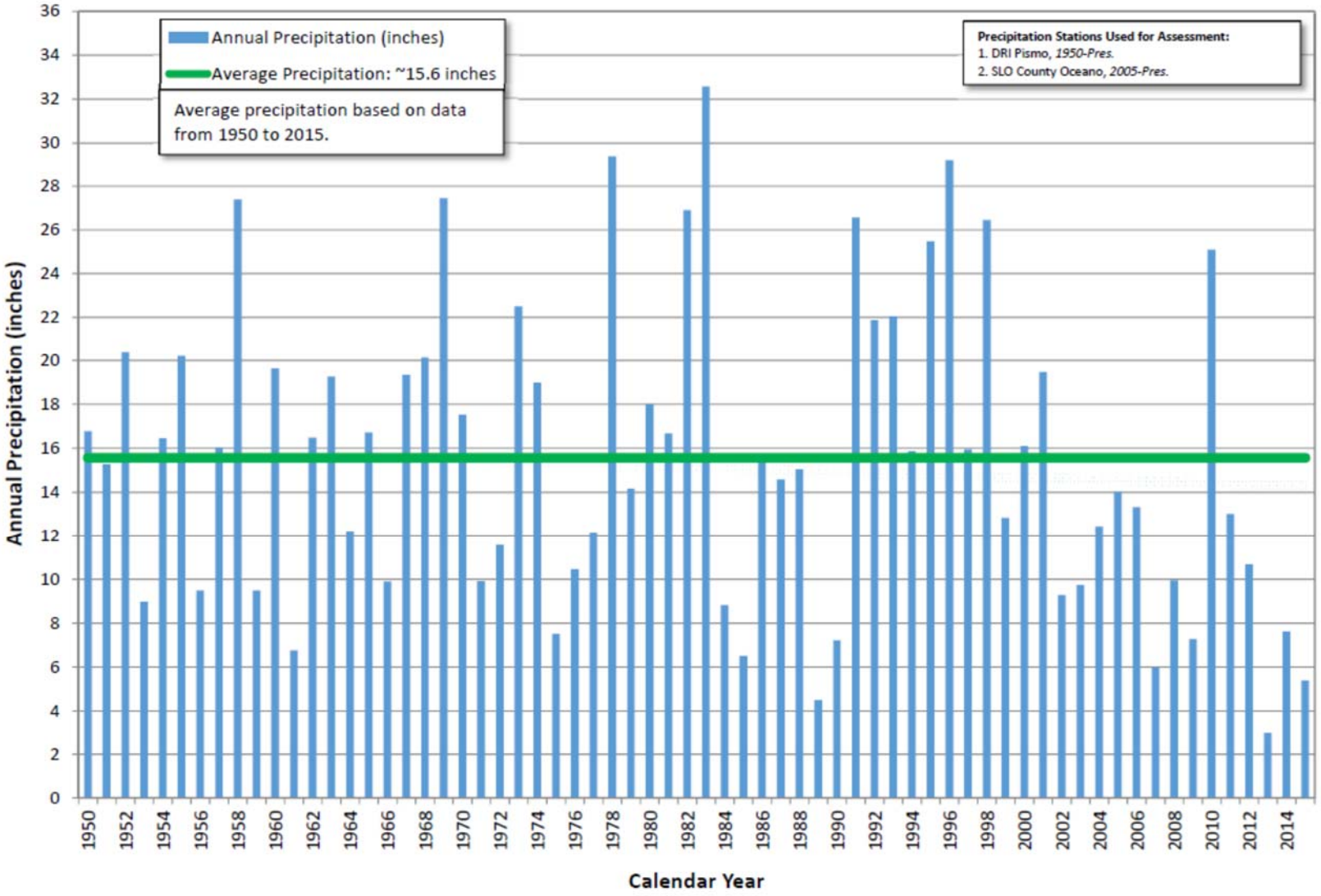
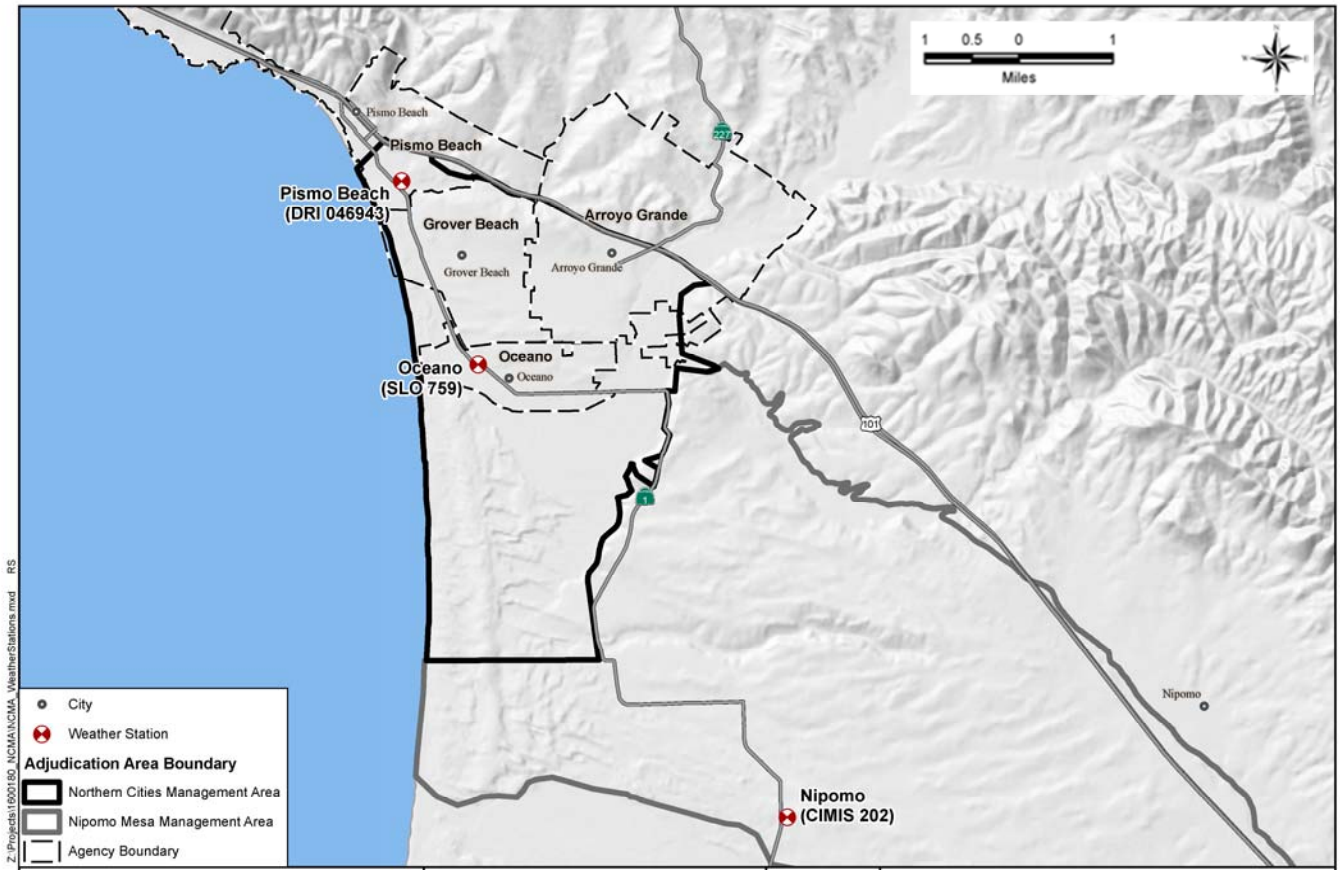


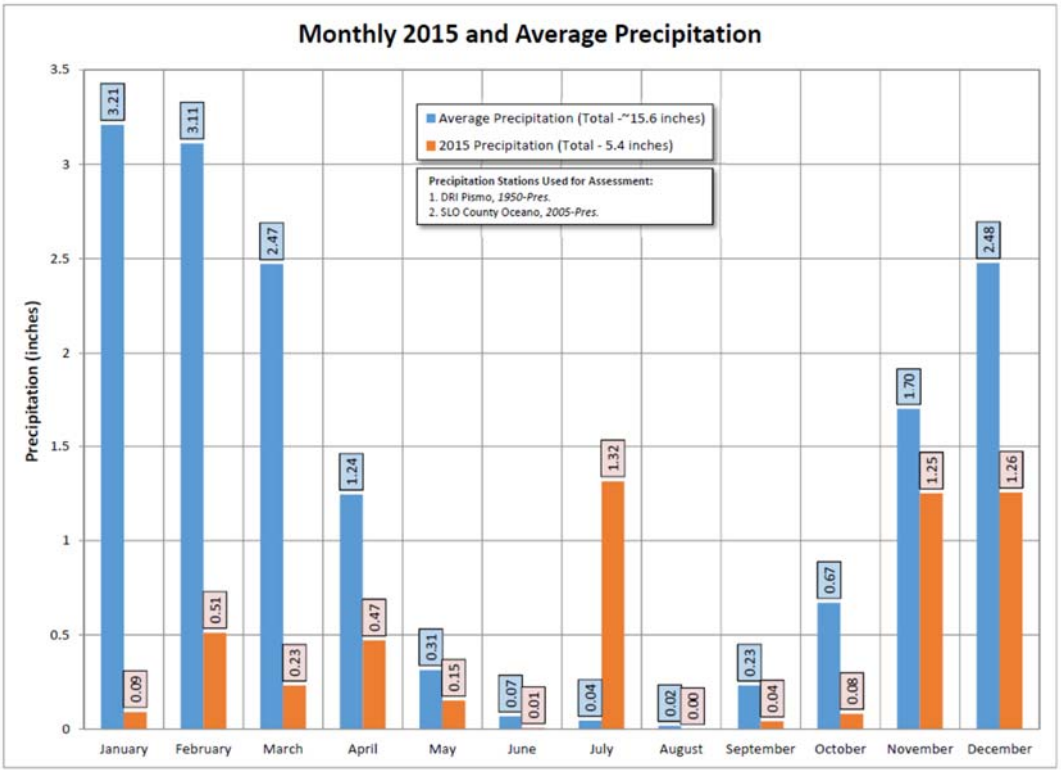
FIGURE 3

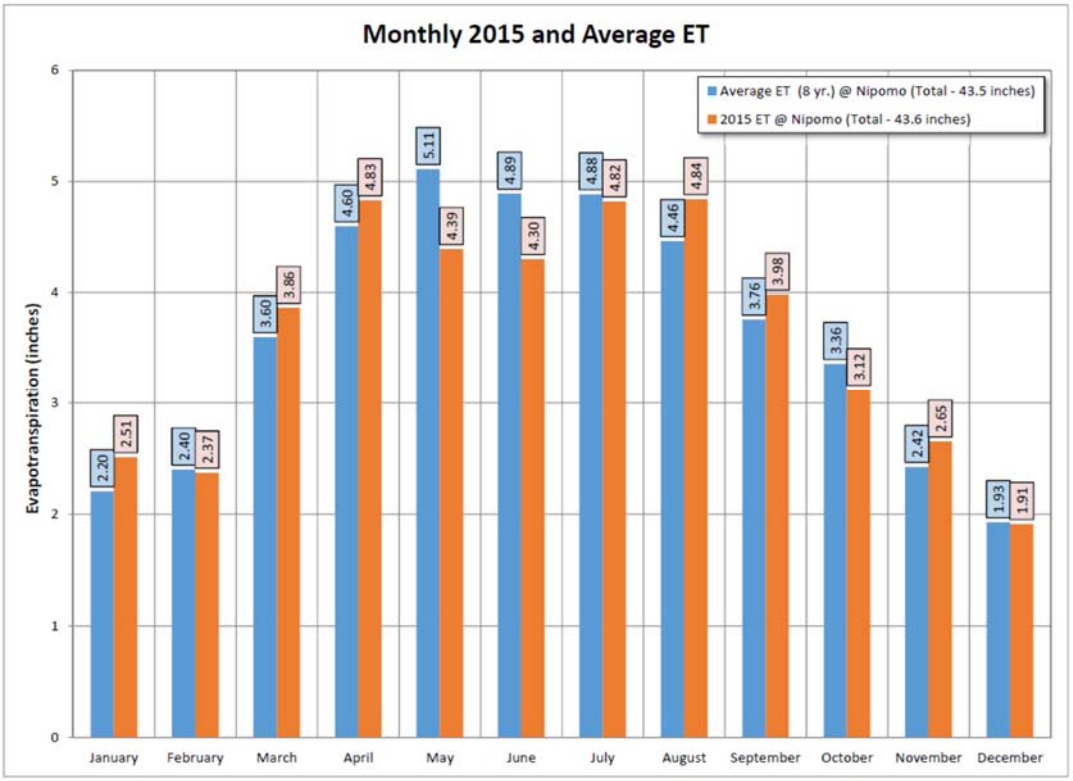
ANNUAL PRECIPITATION 1950 TO 2015
Northern Cities Management Area
San Luis Obispo County, California



Precipitation Station Locations
Northern Cities Management Area
San Luis Obispo County, California

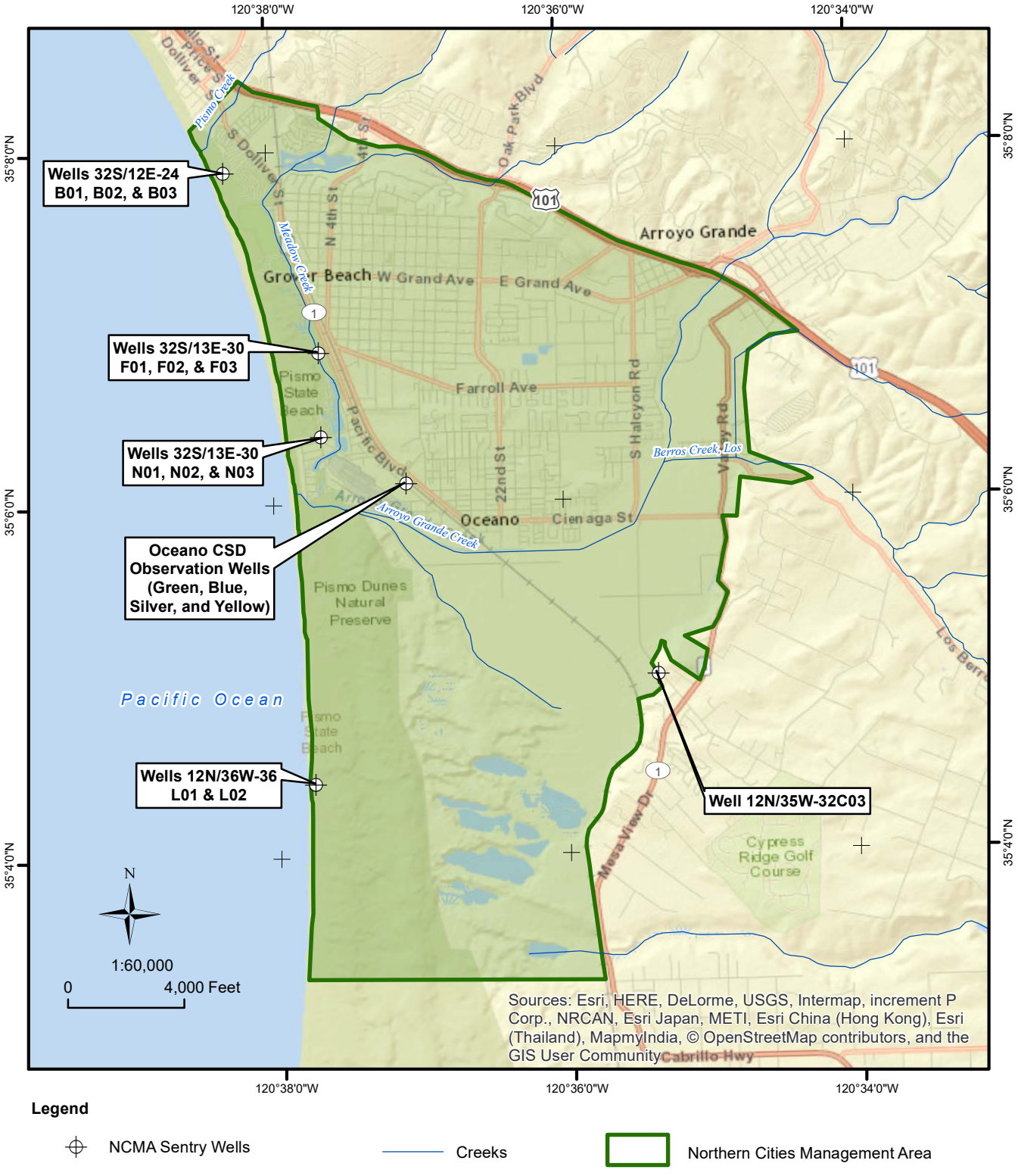
FIGURE 4





MONTHLY 2015 AND AVERAGE PRECIPITATION AND EVAPOTRANSPIRATION
Northern Cities Management Area
San Luis Obispo County, California

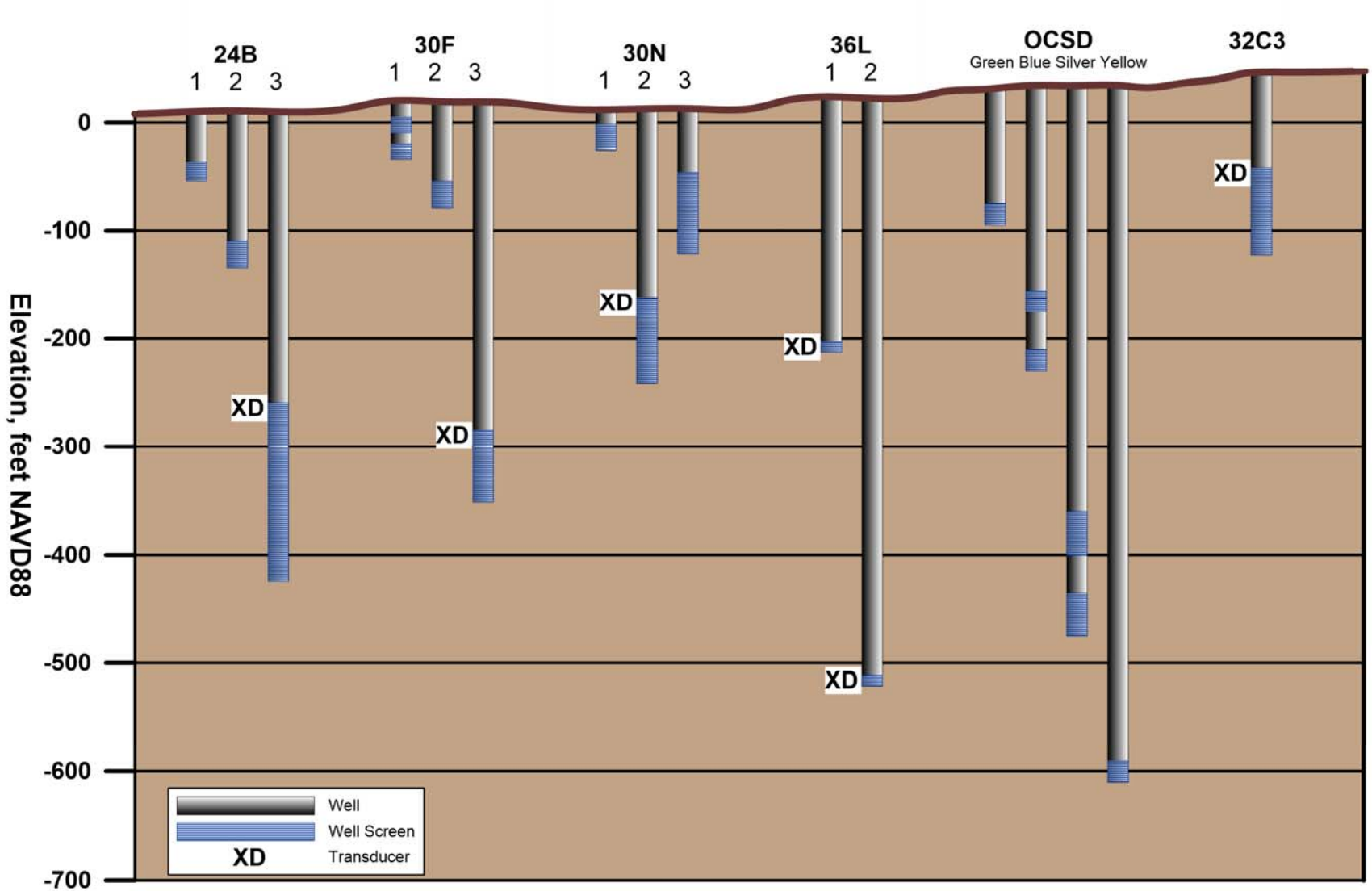
FIGURE 5



N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 6 Location of Sentry Wells.mxd, 4/22/2016, CDean

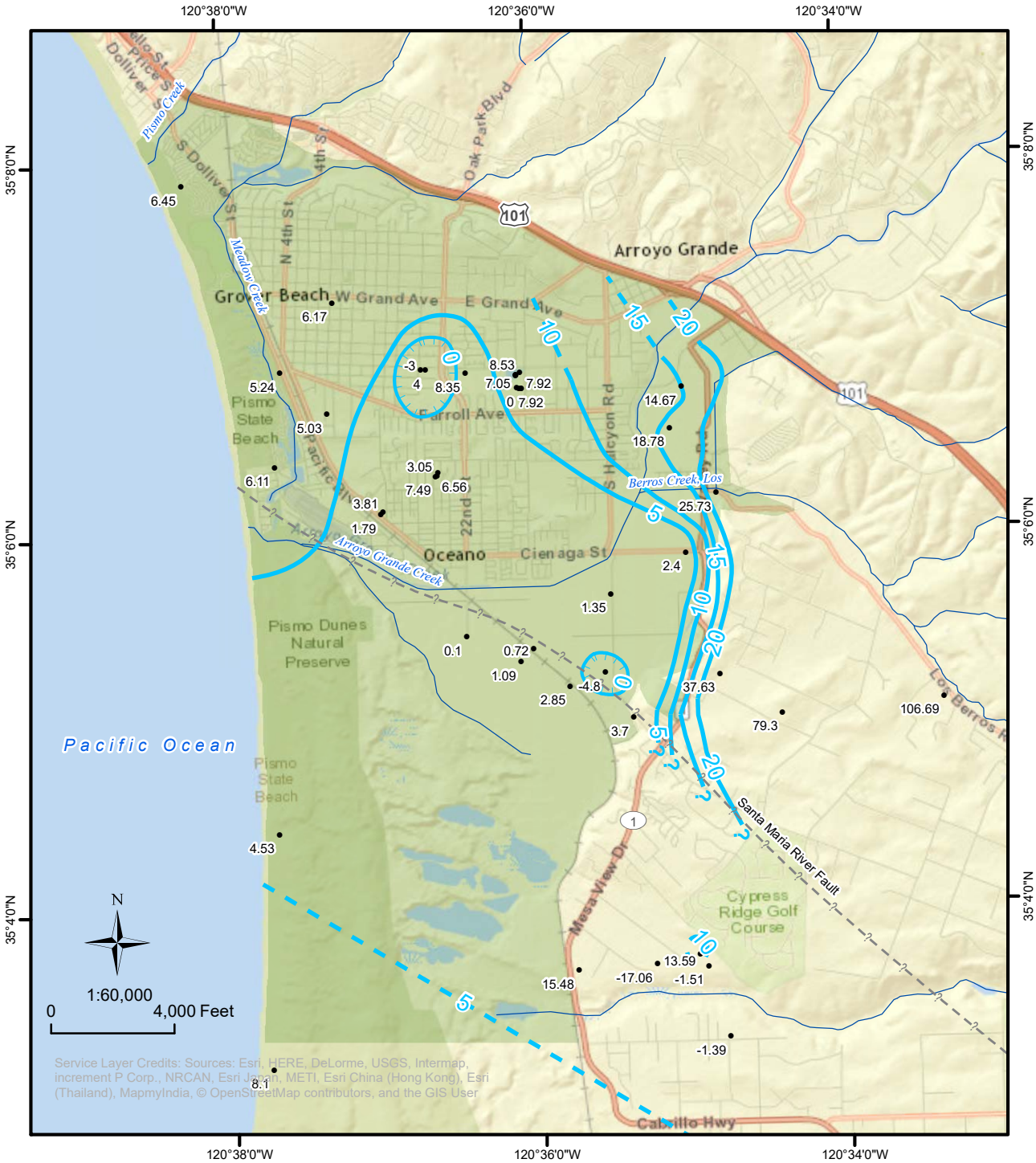
LOCATION OF SENTRY WELLS
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 6



DEPTHS OF SENTRY WELLS
Northern Cities Management Area
San Luis Obispo County, California

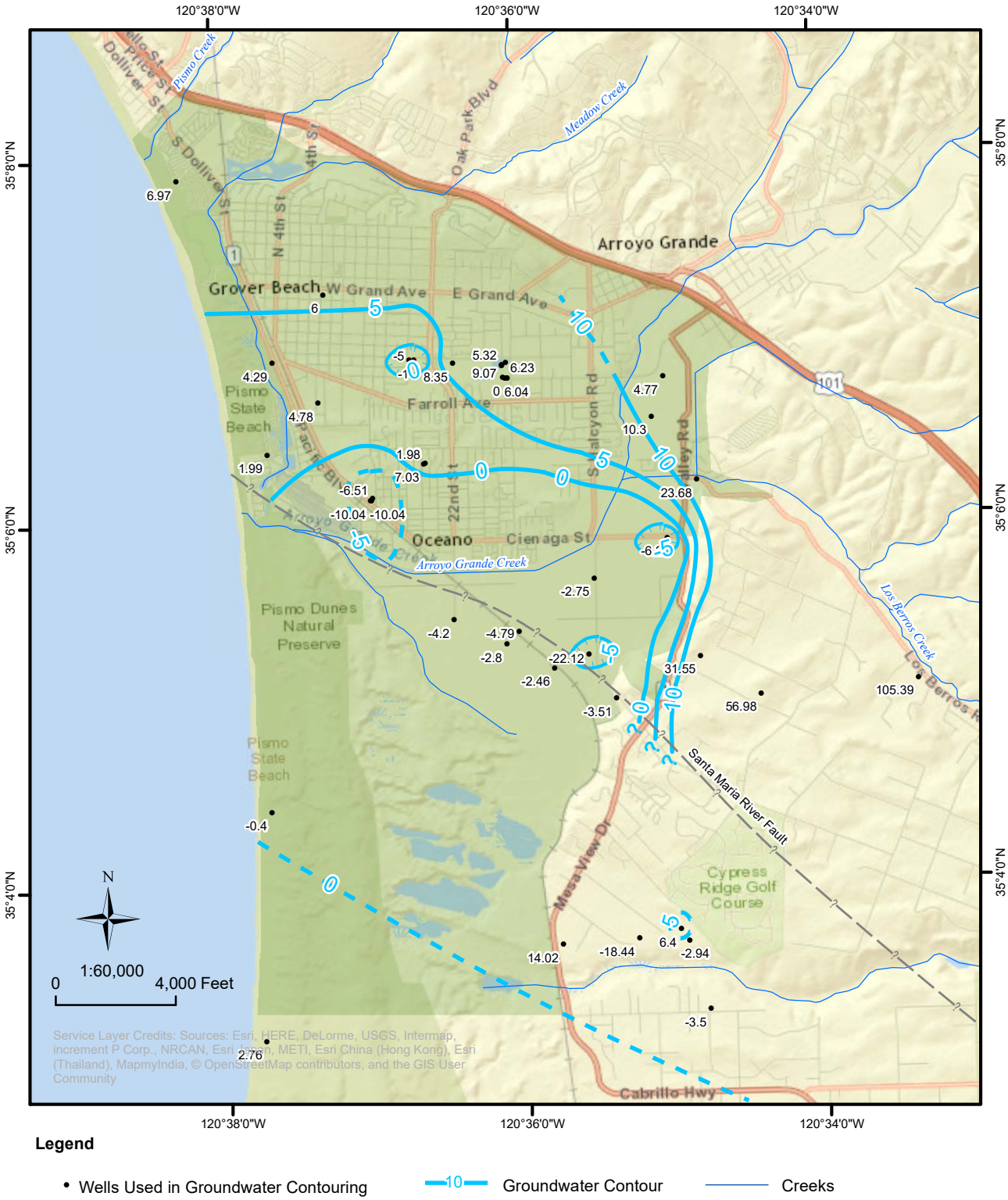
FIGURE 7



WATER LEVEL ELEVATION, APRIL 2015
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 8

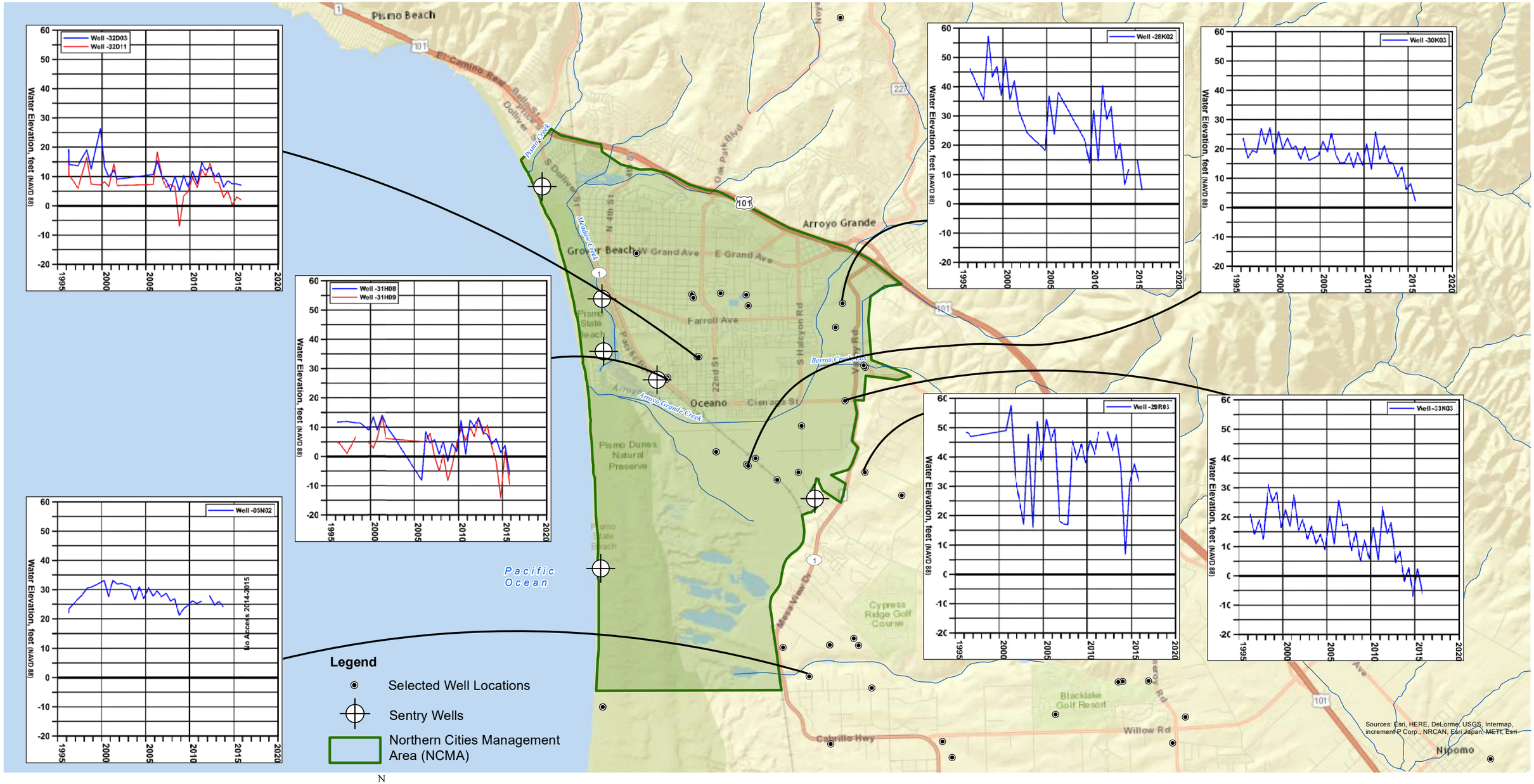
N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 8_2015 April NCMA Contours-WLE.mxd, 4/22/2016, CDean



WATER LEVEL ELEVATIONS, OCTOBER 2015
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 9

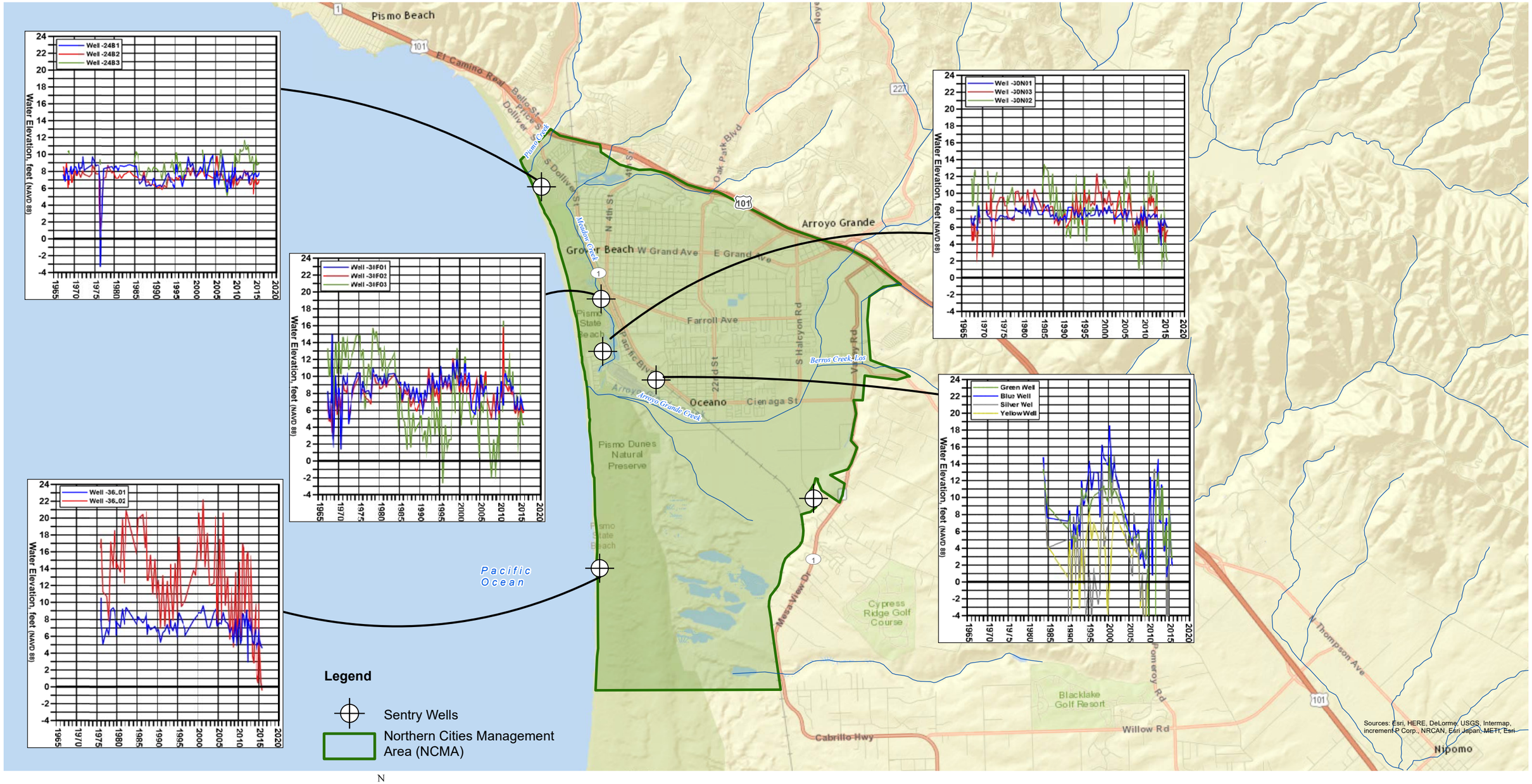
N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 9_2015 October NCMA Contours-WLE.mxd, 4/22/2016, CDean



SELECTED HYDROGRAPHS
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 10

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 10 2015 Selected Hydrographs.mxd, 4/22/2016, CDean



Legend

Sentry Wells

Northern Cities Management Area (NCMA)

N

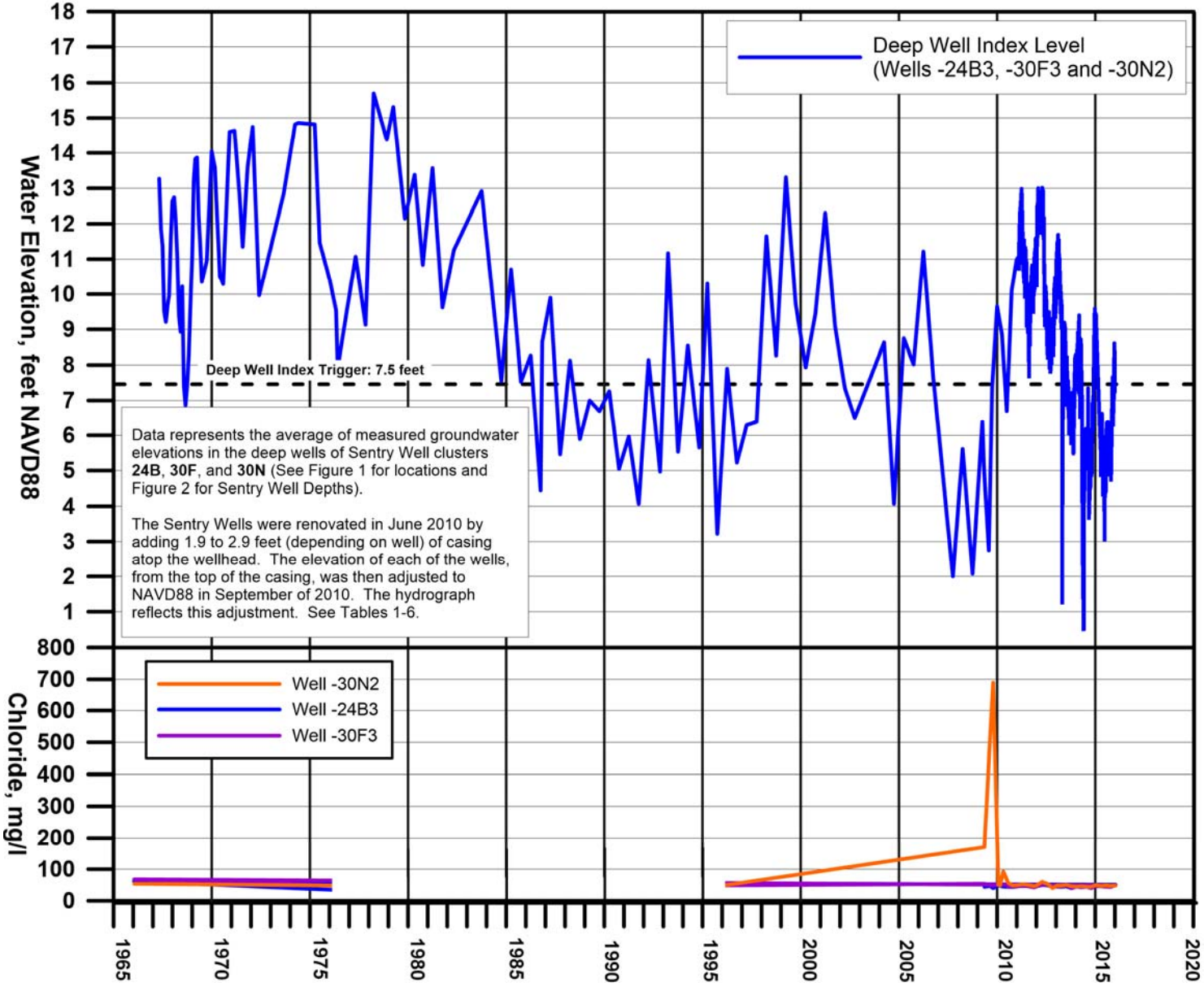
1 inch equals 1 mile

0 1 2 Miles

SENTRY WELL HYDROGRAPHS
Northern Cities Management Area
San Luis Obispo County, California

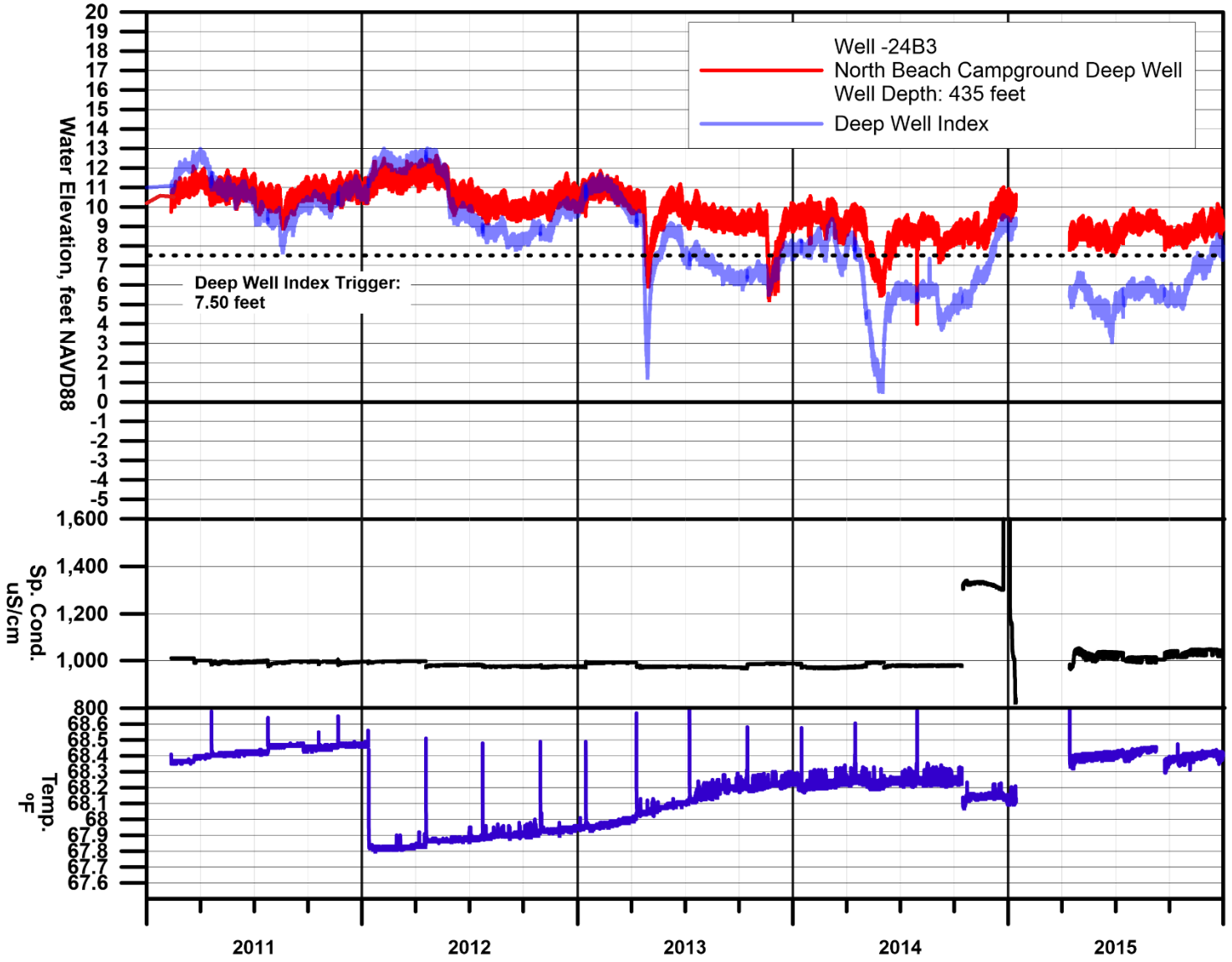
FIGURE 11

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 11 2015 NCMA Sentry Well Hydrographs.mxd, 4/22/2016, CDean



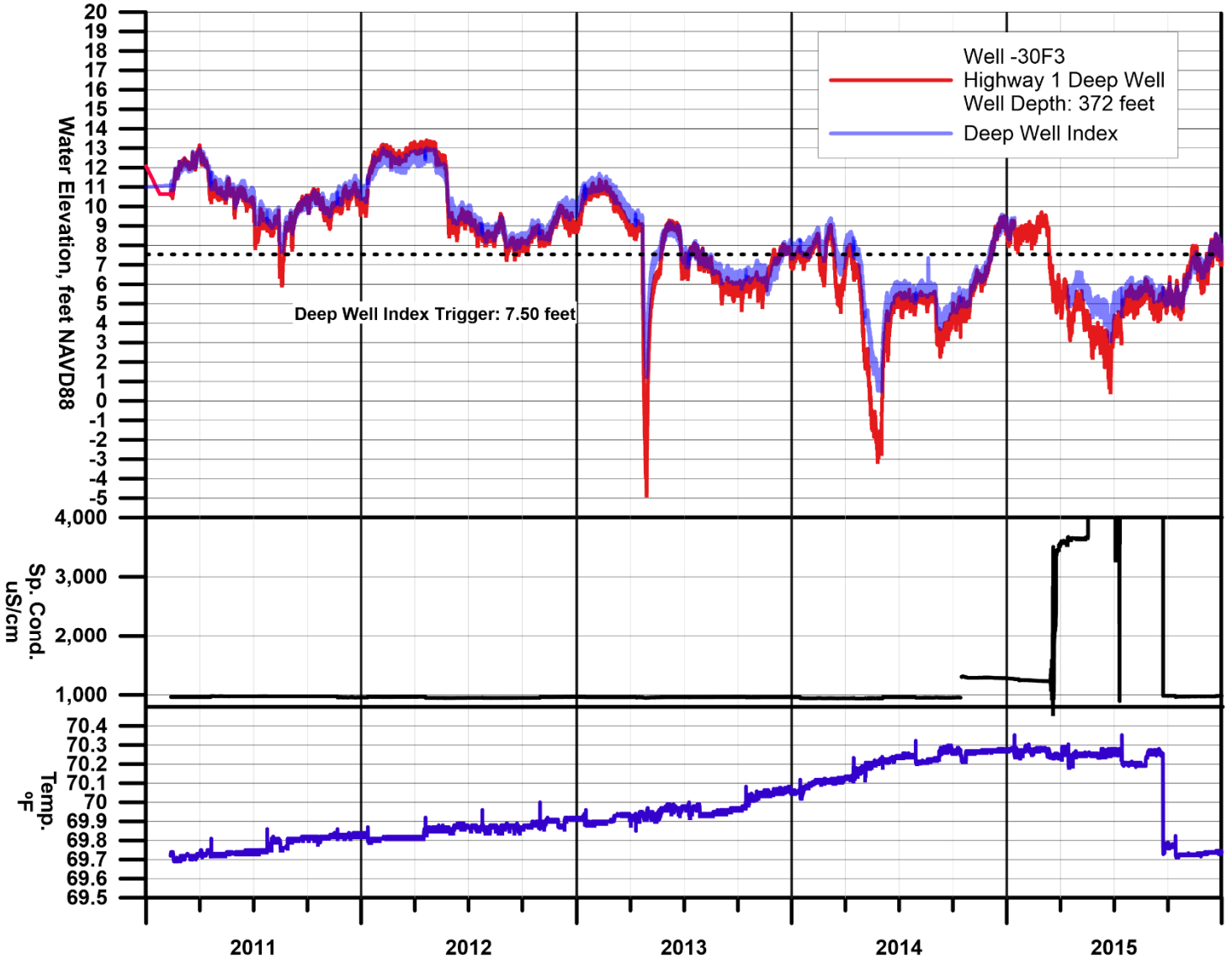
HYDOGRAPH OF AVERAGE DEEP SENTRY WELL ELEVATIONS
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 12



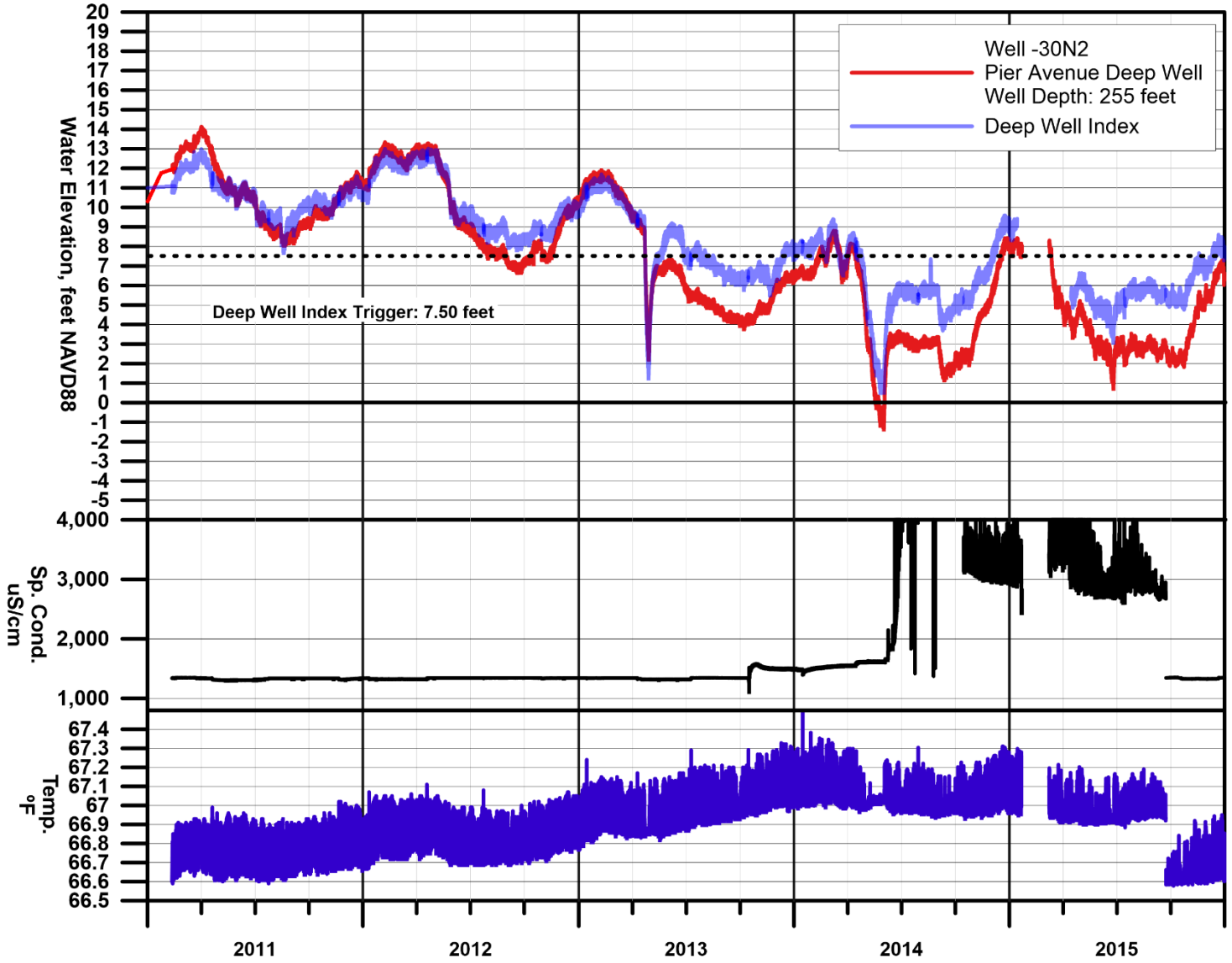
WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 24B03
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 13



WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 30F03
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 14

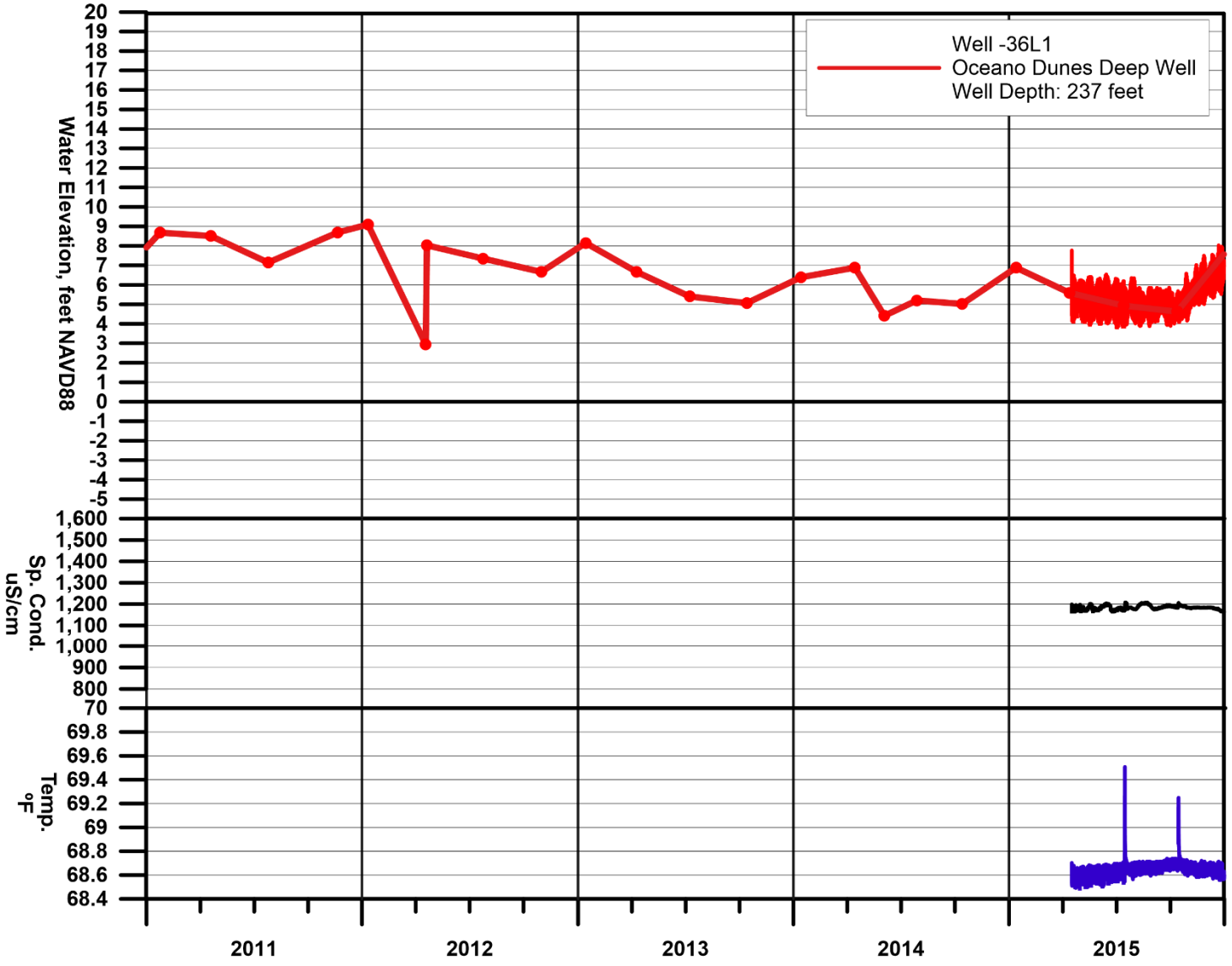


WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 30N02

Northern Cities Management Area

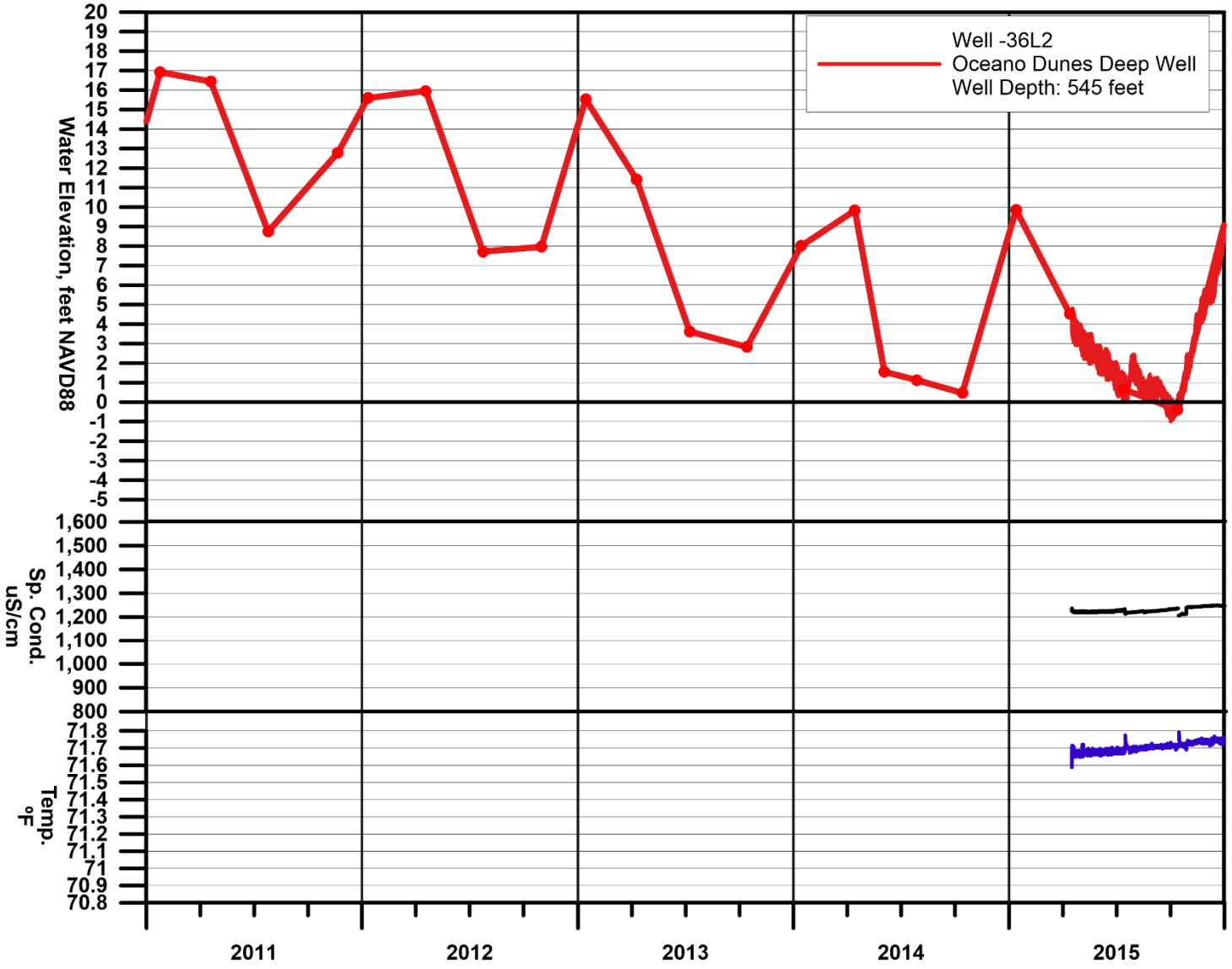
San Luis Obispo County, California

FIGURE 15



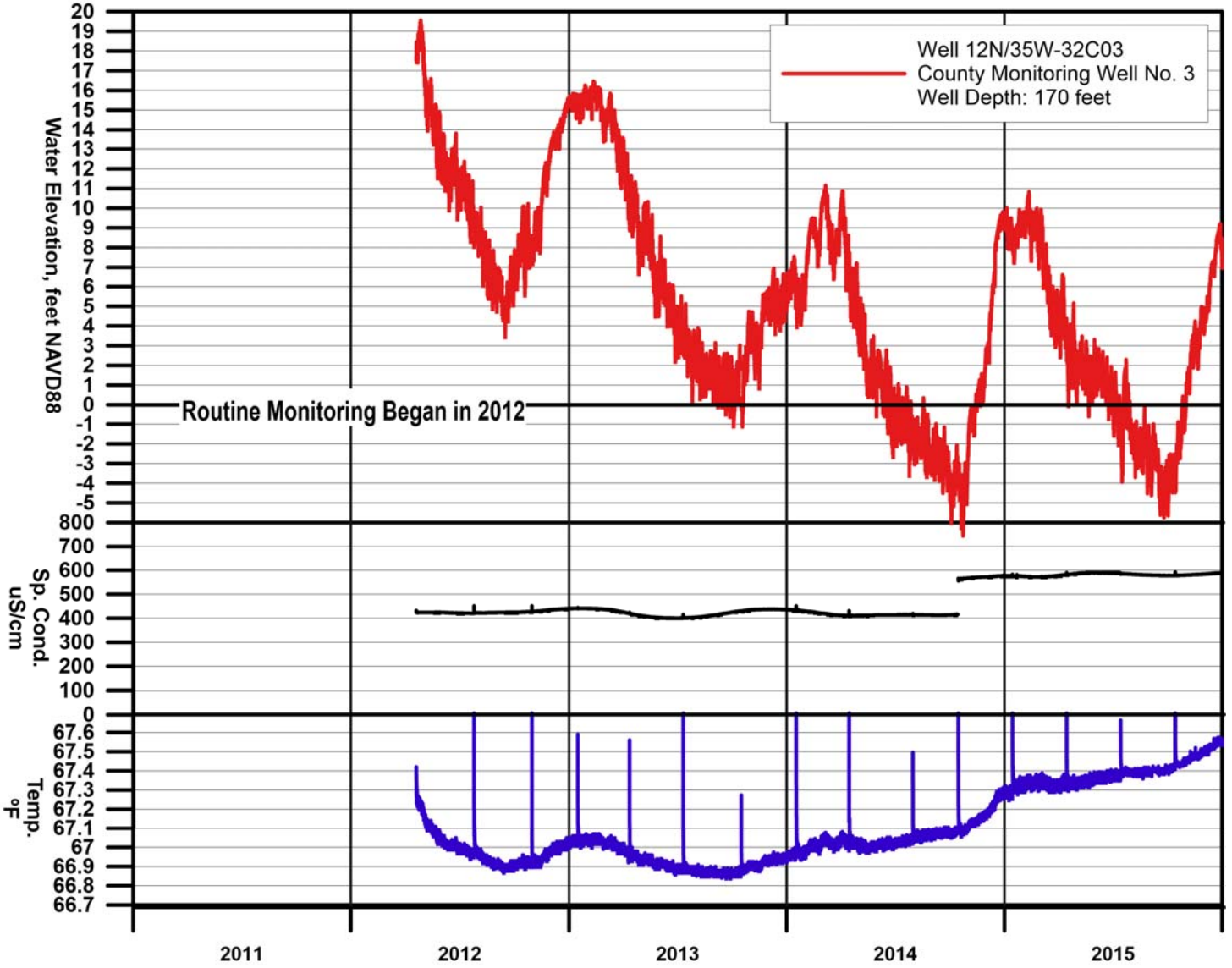
WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 36L01
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 16



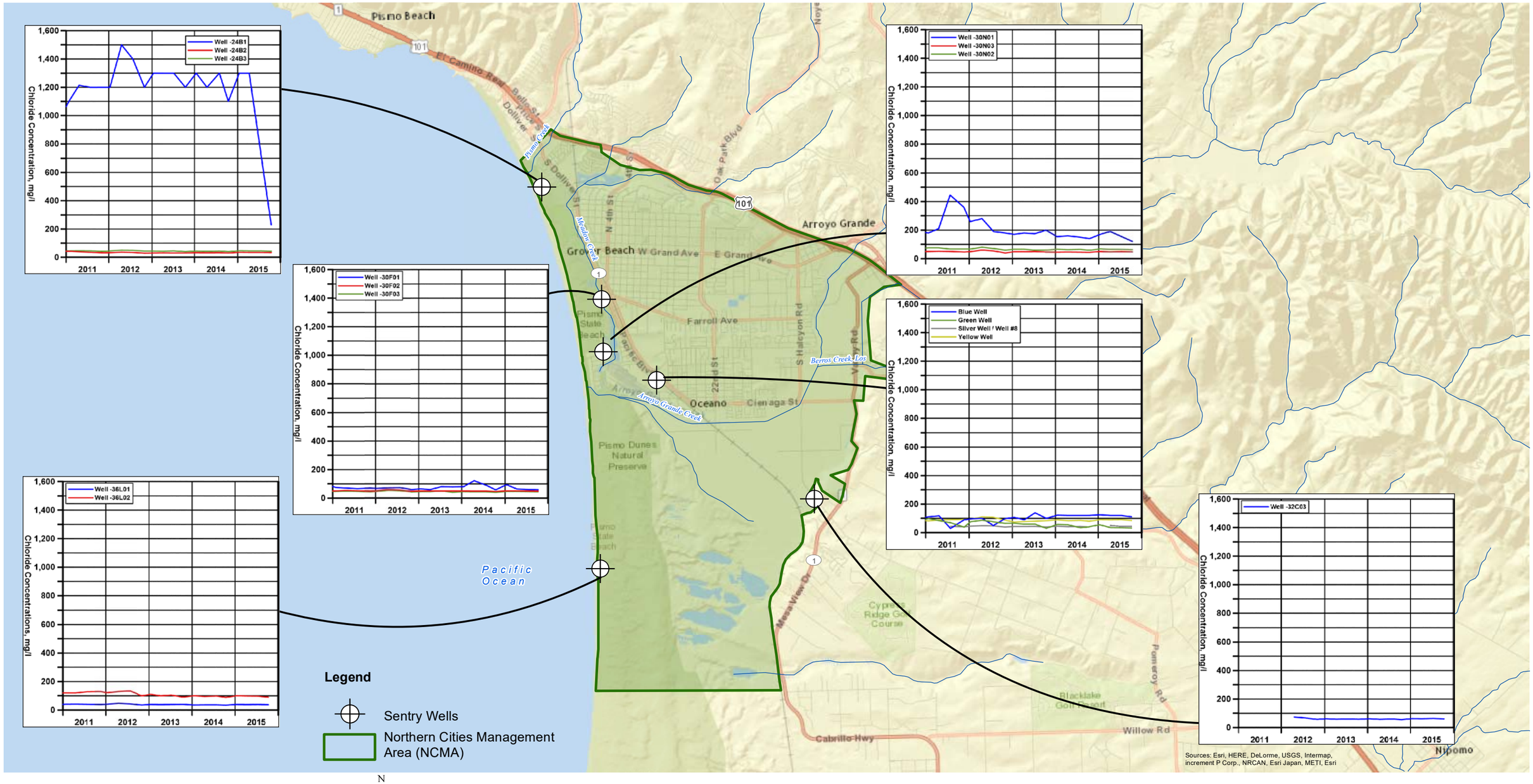
WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 36L02
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 17



WATER ELEVATION, CONDUCTIVITY, AND TEMPERATURE, WELL 32C03
Northern Cities Management Area
San Luis Obispo County, California

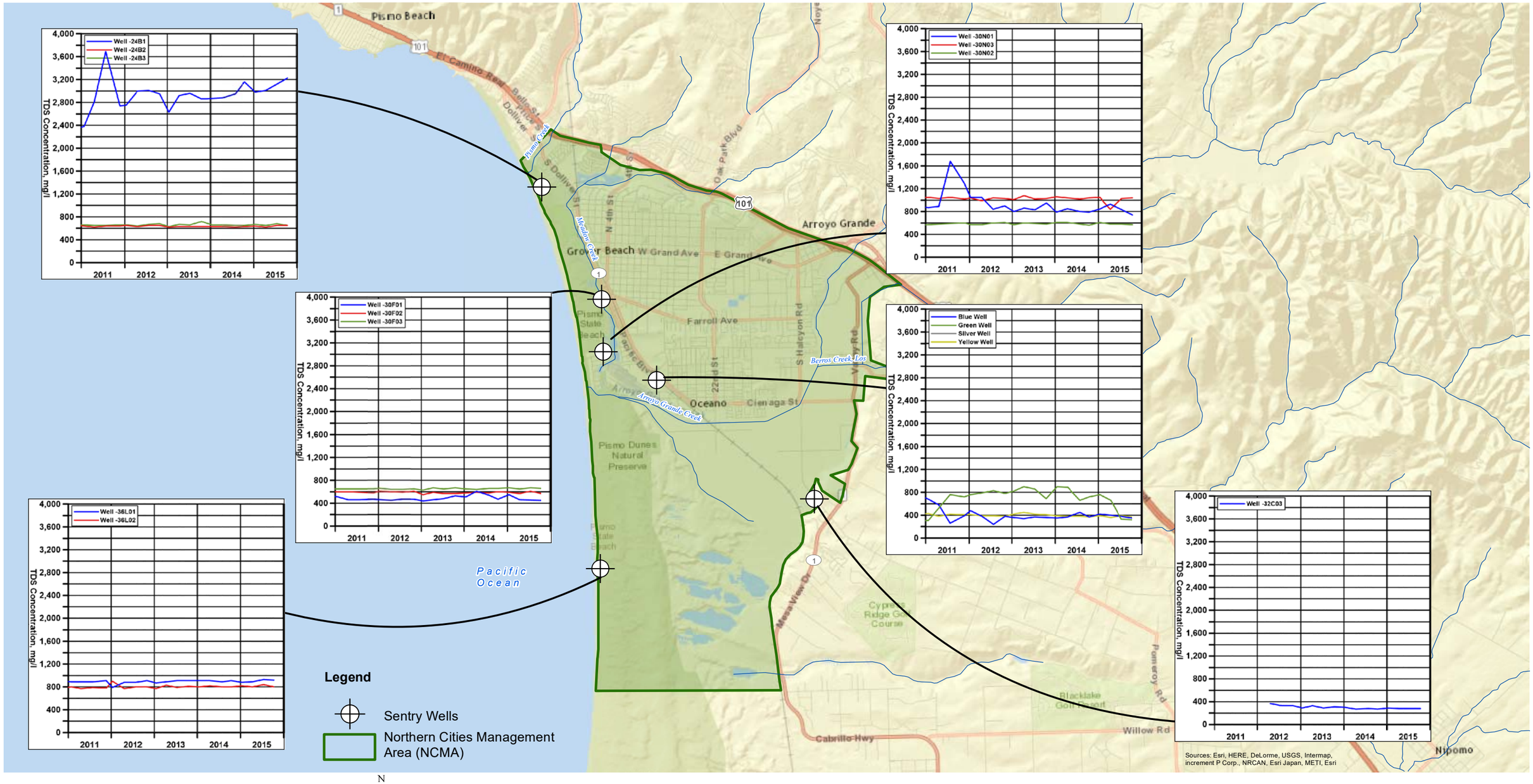
FIGURE 18



CHLORIDE CONCENTRATIONS IN SENTRY WELLS
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 19

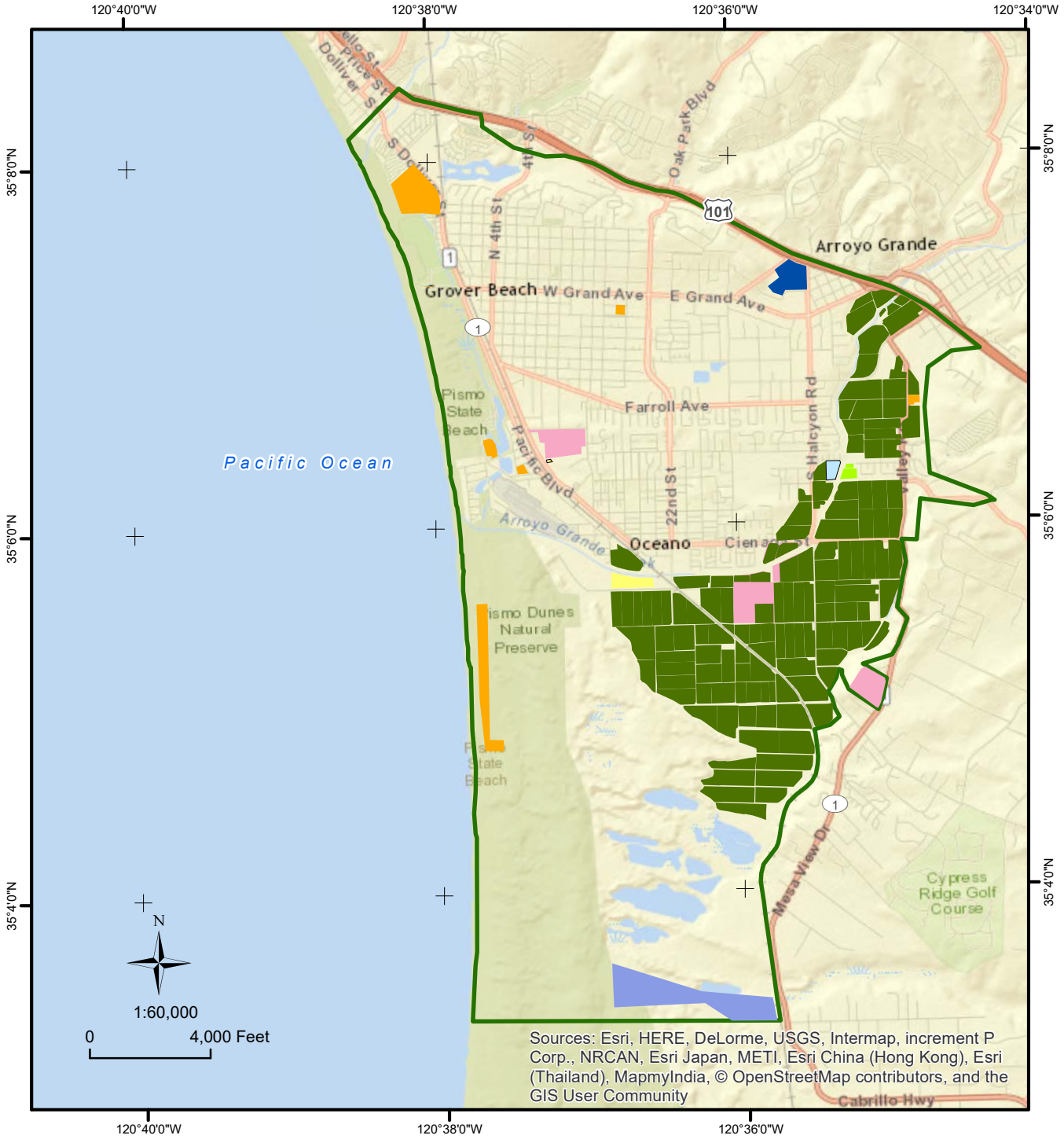
N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 19 2015 Chloride Concentrations Sentry Wells.mxd, 4/22/2016, CDean



TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN SENTRY WELLS
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 20

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 20 2015 TDS Concentrations Sentry Wells.mxd, 4/22/2016, CDean



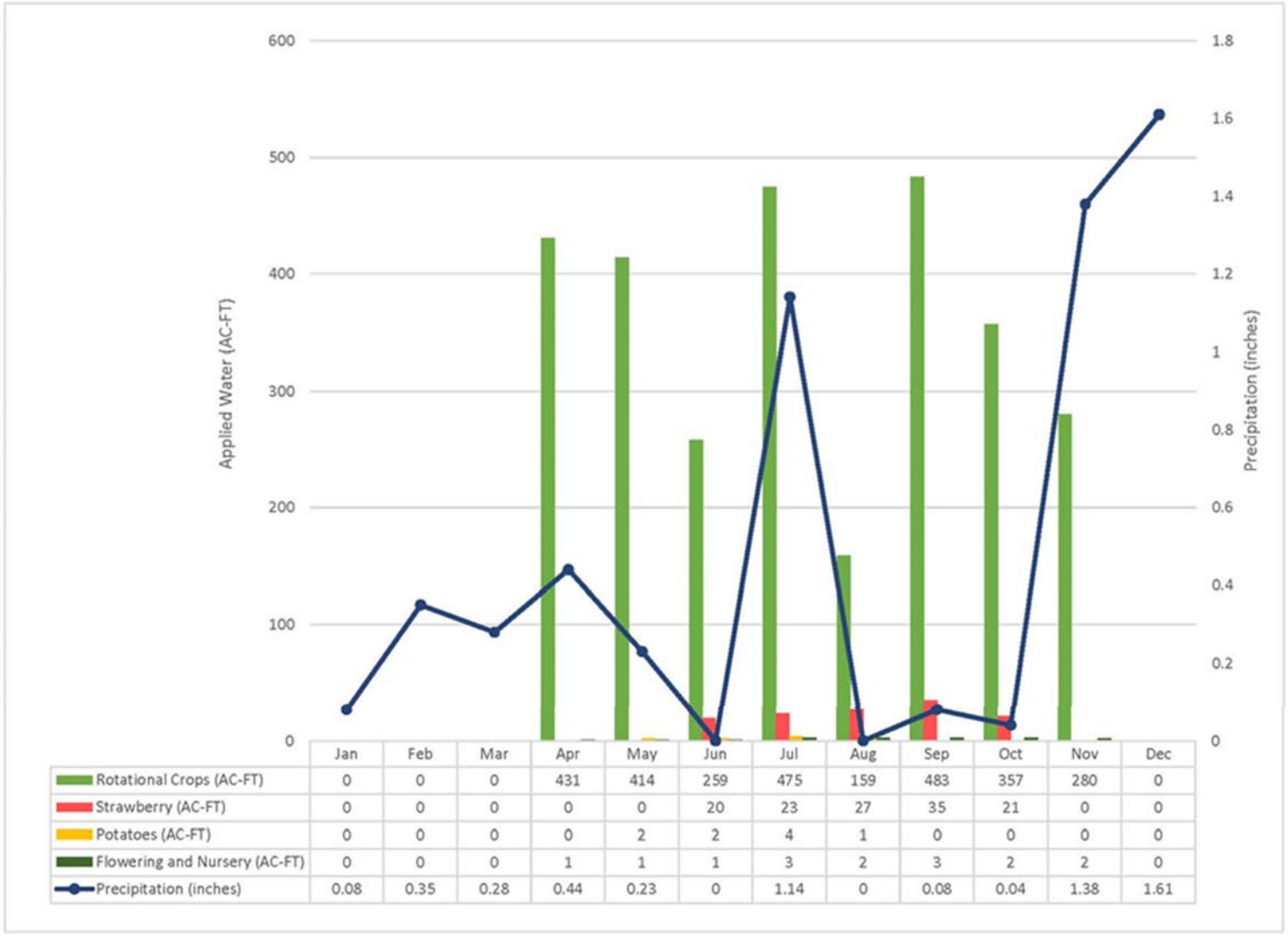
Legend

- Northern Cities Management Area
- Rotational Crops
- Strawberry
- Uncultivated Land
- Potato
- Landscape
- Recreation Area
- Garden Transplant Plants
- Outdoor Transplant Plants

NCMA Agricultural Land 2015
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 21

N:\Projects\04_2015\04_6215_0079_NCMA 2015 AGMR\Outputs\2016_04_22_NCMAnnualReport\mxd\Figure 21 2015 NCMA Agricultural Land.mxd, 4/22/2016, CDean

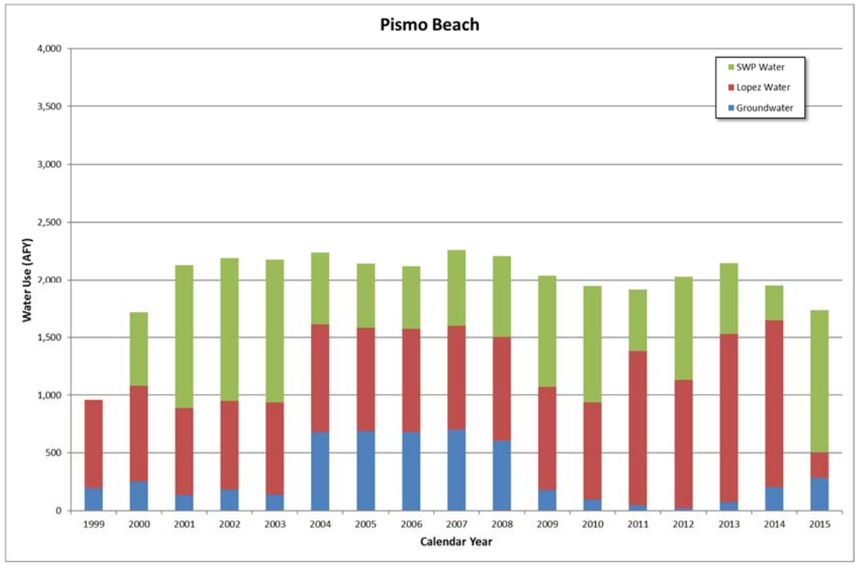


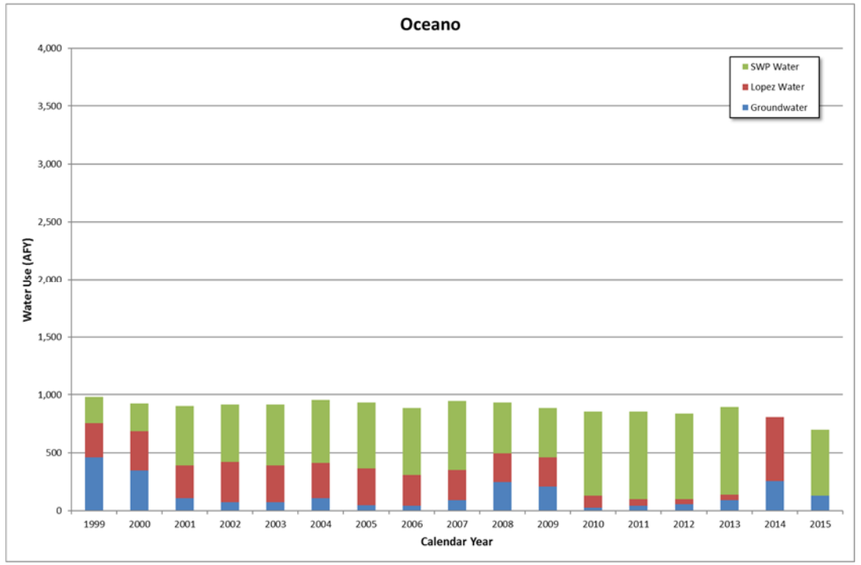
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rotational Crops (AC-FT)	0	0	0	431	414	259	475	159	483	357	280	0
Strawberry (AC-FT)	0	0	0	0	0	20	23	27	35	21	0	0
Potatoes (AC-FT)	0	0	0	0	2	2	4	1	0	0	0	0
Flowering and Nursery (AC-FT)	0	0	0	1	1	1	3	2	3	2	2	0
Precipitation (inches)	0.08	0.35	0.28	0.44	0.23	0	1.14	0	0.08	0.04	1.38	1.61

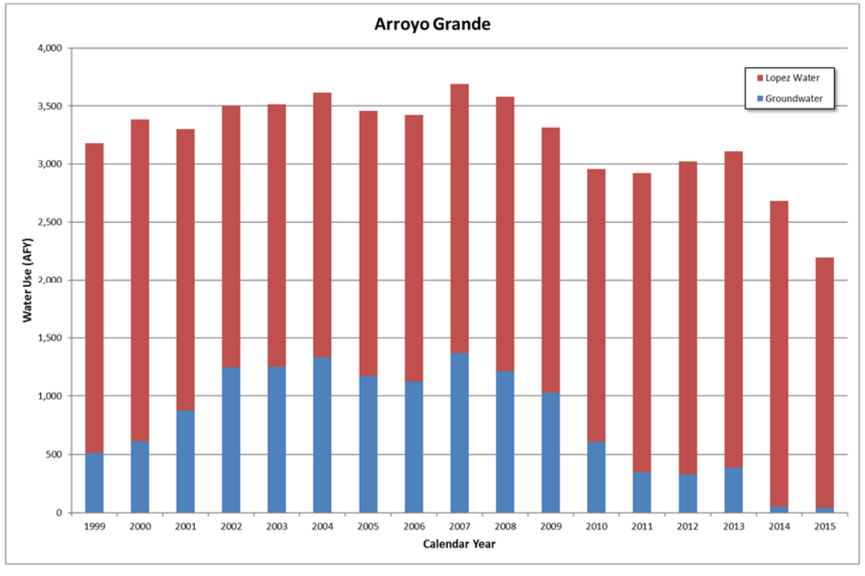
FIGURE 22

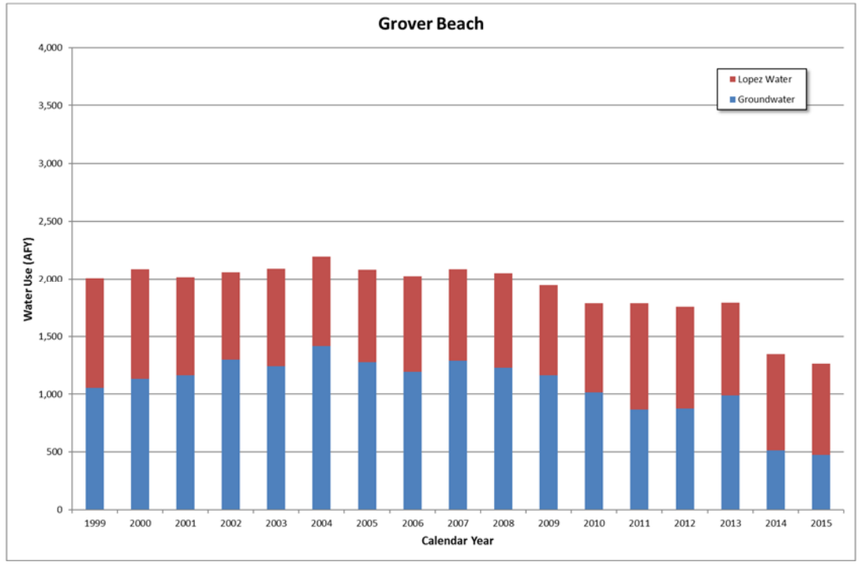
2015 NCMA ESTIMATED APPLIED WATER AND MONTHLY PRECIPITATION AT THE CIMIS NIPOMO STATION

Northern Cities Management Area
San Luis Obispo County, California









MUNICIPAL WATER USE BY SOURCE
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 23

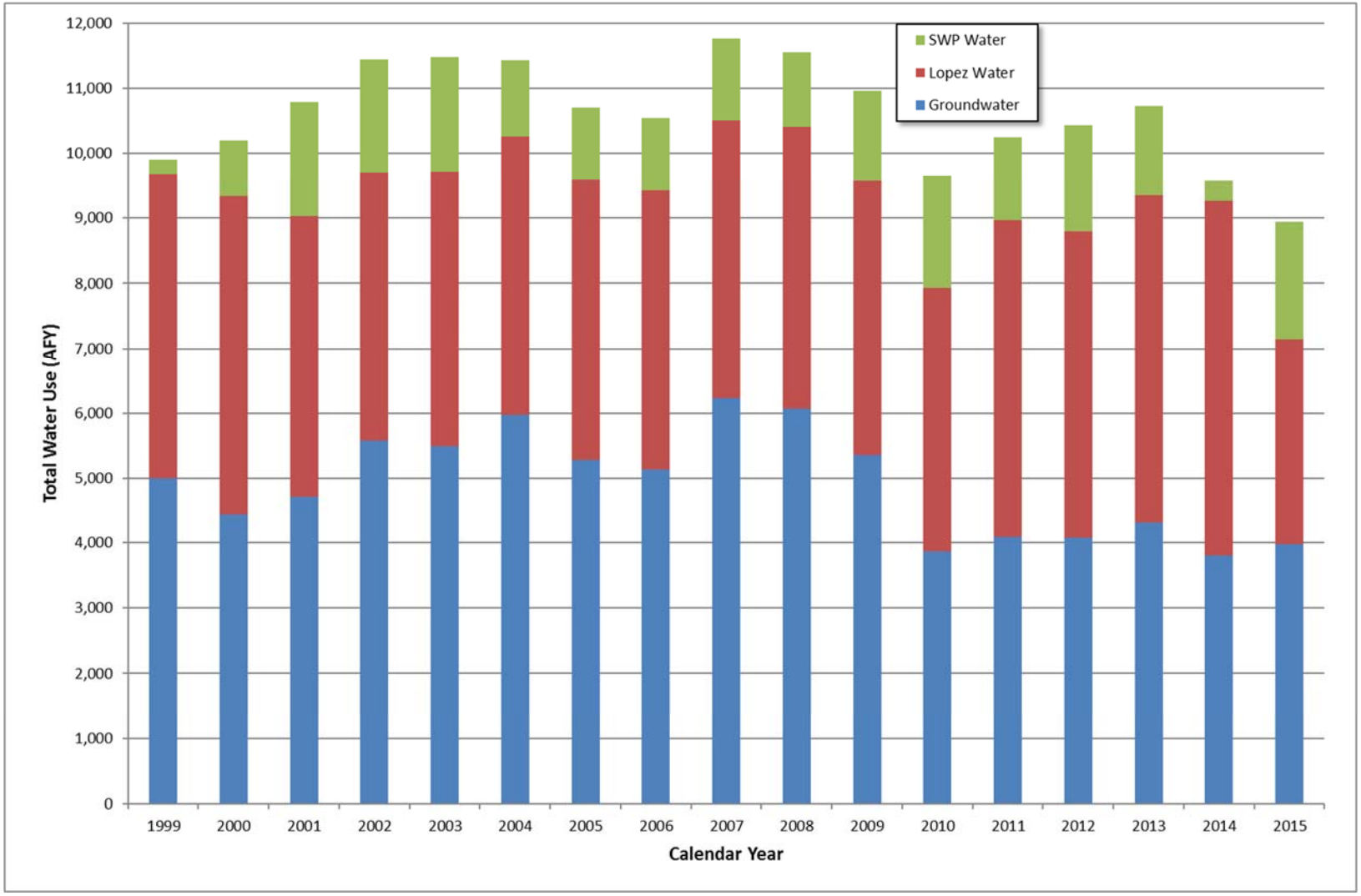
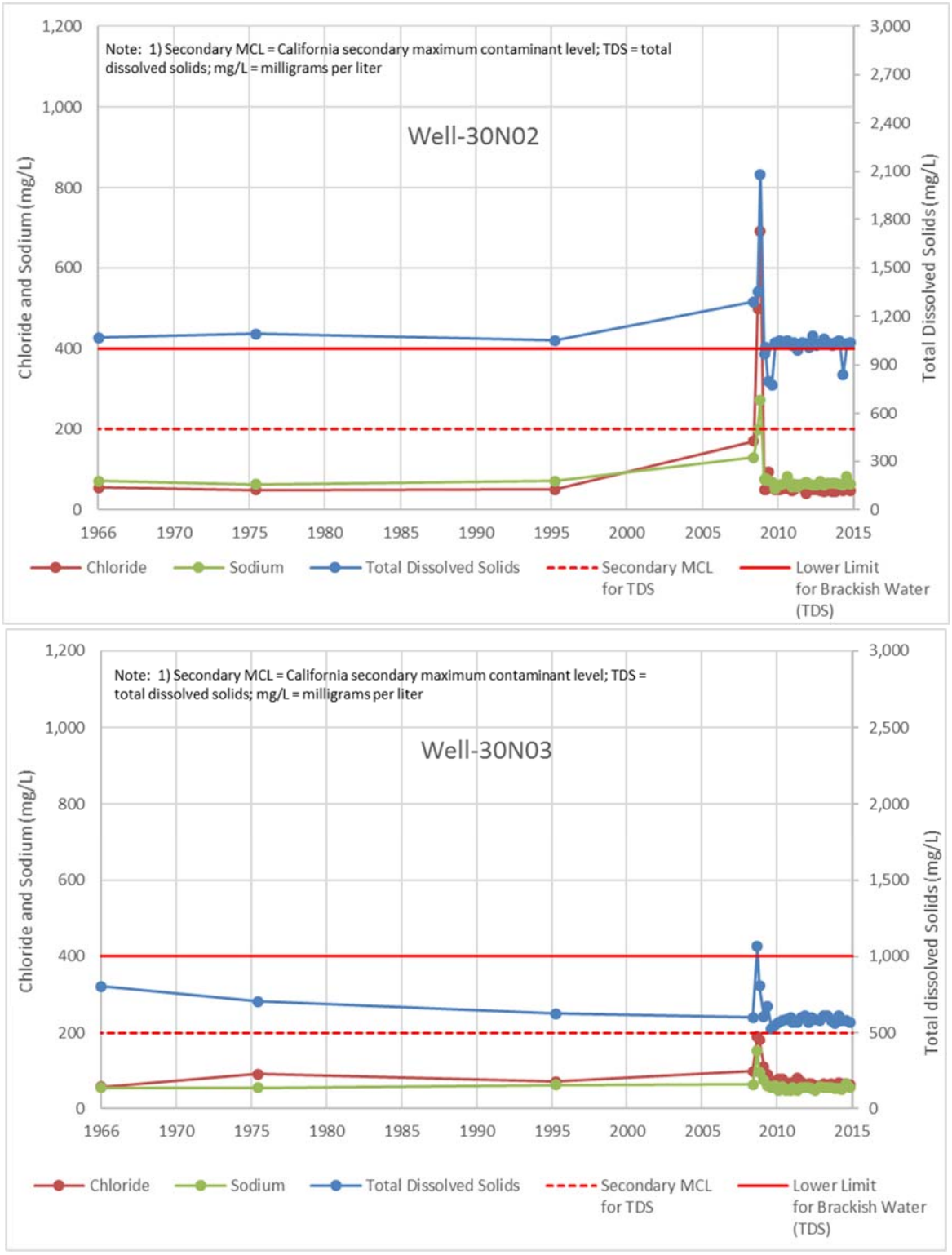


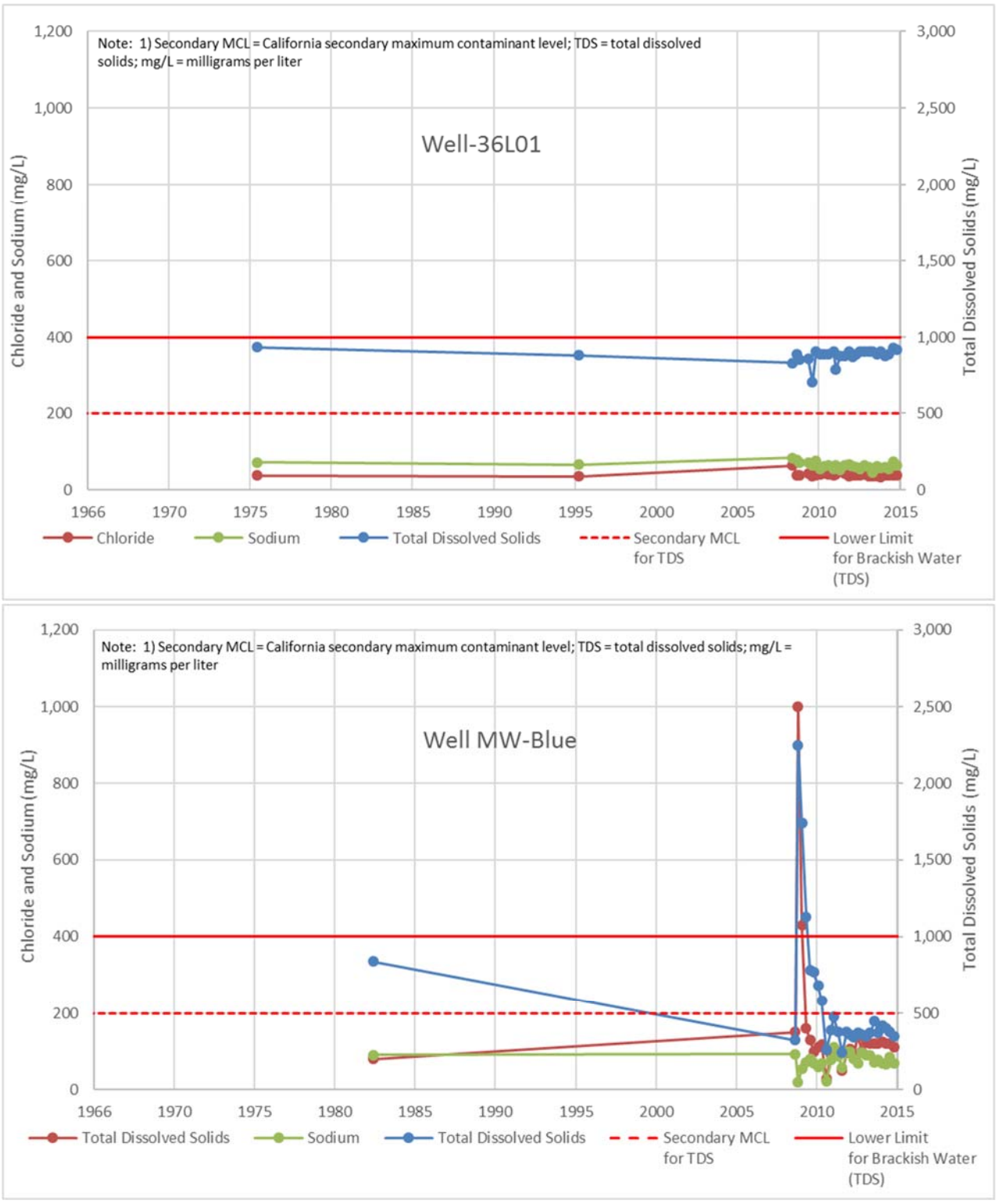
FIGURE 24

TOTAL WATER USE BY SOURCE
Northern Cities Management Area
San Luis Obispo County, California



Wells 30N03 and 30N02 Historical TDS, Chloride, Sodium
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 25



Wells MW-Blue and 36L01 Historical TDS, Chloride, Sodium
Northern Cities Management Area
San Luis Obispo County, California

FIGURE 26

APPENDIX A

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/12E-24B01	Screened from 48-65' - 2-inch diameter	**13.58**																									
Height of steel casing added to the concrete pad elevation		2.88	10/15/2015	NA	NA	3,230	230	560	34	160	170	413	42	<0.05	2.2	0.14	<0.10	0.091	1.1	0.68	413	<10	<10	4,880	0.54	0.0030	338
Pad elevation NAVD 88		10.70	10/13/2015	5.73	7.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		10.7	7/14/2015	6.06	7.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	3,010	1300	510	30	150	160	410	220	<0.05	2.9	0.15	<0.5	0.023	1.0	3.4	410	<10	<10	4,760	0.72	0.0026	382
			4/14/2015	6.22	7.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	2,980	1300	520	30	150	170	400	210	<0.25	2.2	0.14	<0.5	<0.021	1.0	2.9	400	<10	<10	4,640	0.52	0.0022	448
			1/13/2015	5.83	7.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	5.76	7.82	3,160	1100	530	32	150	170	390	180	0.32	2.2	0.16	<0.5	<0.01	1.1	<0.5	390	<10	<10	4,780	0.67	NA	NA
			7/30/2014	NA	NA	2,950	1300	520	29	140	170	440	190	<0.25	1.9	0.11	<0.5	0.03	1.1	2.6	440	<10	<10	4,830	0.62	0.0020	500
			7/29/2014	5.99	7.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	6.52	7.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	5.95	7.63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	2,880	1200	560	29	140	140	390	190	<0.05	2.2	0.130	<0.5	0.03	0.92	2.9	390	<10	<10	4,790	0.72	0.0024	414
			1/15/2014	NA	NA	2,870	1300	540	30	140	160	380	214	<0.25	2.4	0.17	<0.5	<0.01	1.0	3.0	380	<10	<10	4,800	0.71	0.0023	433
			1/14/2014	5.75	7.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	2,860	1200	560	31	150	160	380	200	<0.25	2.2	0.13	<0.5	<0.01	1.0	3.0	380	<10	<10	4,810	0.75	0.0025	400
			10/14/2013	6.07	7.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/9/2013	6.09	7.49	2,960	1300	560	32	150	160	395	215	<0.25	2.4	0.16	<0.5	<0.01	1.1	2.0	395	<10	<10	4,850	0.81	0.0015	650
			4/10/2013	7.00	6.58	2,920	1300	540	30	140	150	410	220	<0.25	1.9	0.16	<0.1	<0.01	1.00	3.5	410	<10	<10	4,830	0.67	0.0027	371
			1/14/2013	5.72	7.86	2,630	1300	540	30	140	140	410	220	<0.05	2.7	0.15	<0.1	<0.01	0.96	2.8	410	<10	<10	4,790	0.72	0.0022	464
			10/29/2012	5.92	7.66	2,950	1200	590	34	150	160	360	200	<0.25	2.4	0.18	<0.5	<0.01	1.1	11	360	<10	<10	4,750	0.78	0.0092	109
			7/23/2012	5.79	7.79	3,010	1400	530	30	120	130	397	210	<0.05	2.1	0.15	<0.1	0.041	0.86	3	397	<10	<10	4,720	1.4	0.0021	467
			4/18/2012	5.58	8.00	3,000	1500	450	27	120	120	400	230	<0.1	2	0.13	0.13	<0.01	0.89	3.12	400	<10	<10	4,660	0.6	0.0021	481
			1/11/2012	5.72	7.86	2,750	1200	520	30	140	140	400	170	<0.1	4	0.18	0.1	0.033	0.94	3.2	400	<10	<10	4,560	0.55	0.0027	375
			11/21/2011	5.80	7.78	2,740	1200	410	25	130	120	380	200	<0.3	2.3	0.13	<0.6	0.053	0.9	2.73	380	<10	<10	4,470	0.7	0.0023	440
			7/26/2011	6.38	7.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	3,690	1199.9	530	33	140	150	380	200.2	<0.05	1.8	0.14	<0.1	0.053	0.91	3.281	380	<5	<5	4,900	0.73	0.0027	366
			4/20/2011	6.40	7.18	2,810	1214	500	27	140	130	400	216	<0.05	1.7	0.24	0.18	0.067	0.95	3.3	400	<2.0	<2.0	4,430	NA	0.0027	368
			1/24/2011	5.78	7.42	2,380	1100	370	24	110	120	380	180	<0.15	1.8	0.16	<0.3	0.63	0.68	2.8	380	<2.0	<2.0	4,020	0.89	0.0025	393
			10/28/2010	NA	NA	2,330	960	390	25	140	140	350	160	<0.1	3.9	0.15	<0.1	NA	0.75	2.6	350	<10	<10	3,860	1.3	0.0027	369
			10/21/2010	6.37	7.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/27/2010	6.48	7.1	616	43	52.5	6.21	115	44.7	341	160	< 0.10	2.9	0.063	< 0.10	0.11	0.274	0.18	341	< 1.0	< 1.0	1,000	9.34	0.0042	239
			4/27/2010	3.84	9.74	676	47	54.7	4.60	107	43.6	327	140	< 0.10	0.98	0.0714	< 0.10	< 0.10	0.0458	0.18	327	< 1.0	< 1.0	990	4.06	0.0038	261
			1/27/2010	3.13	10.45	694	55	56.2	6.80	123	43.2	340	150	0.40	1.7	0.12	< 0.10	0.33	0.875	0.19	340	< 1.0	< 1.0	1,000	16.6	0.0035	289
			10/19/2009	2.28	11.30	766	140	121	16.7	111	52.4	303	150	0.25	2.8	0.0959	0.11	< 0.10	0.208	0.47	303	< 1.0	< 1.0	1,200	7.79	0.0034	298
			8/20/2009	3.25	10.33	705	94	86.8	11.7	116	35.6	286	150	0.21	2.7	NA	< 0.10	0.12	0.248	0.38	286	< 1.0	< 1.0	1,000	7.15	0.0040	247
			5/12/2009	3.58	10.00	695	100	82.1	13.2	108	45	288	150	NA	NA	NA	0.11	NA	0.66	0.29	288	< 1.0	< 1.0	1,100	23.9	0.0029	345
			3/26/1996	NA	NA	1,870	773	380	24.0	125	95	427	154	0.2	NA	0.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/9/1976	NA	NA	1,706	667	400	16.2	94	95	474	159	0.4	NA	0.12	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/17/1966	NA	NA	1,700	652	406	20.0	95	83	440	175	1	NA	0.07	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/12E-24B02	Screened from 120-145' - 2-inch diameter	**13.58**																									
Height of steel casing added to the concrete pad elevation		2.88	10/15/2015	NA	NA	650	34	41	3.8	100	33	306	160	<0.05	<1	0.054	<0.10	0.014	0.18	<0.10	306	<10	<10	950	0.72	NA	NA
Pad elevation NAVD 88		10.70	10/13/2015	6.61	6.97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		10.7	7/15/2015	NA	NA	650	35	50	3.0	120	36	295	160	<0.05	<1	0.069	<0.1	0.01	0.16	<0.1	295	<10	<10	950	0.69	NA	NA
			7/14/2015	6.97	6.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	620	35	40	3.4	100	31	300	170	<0.05	<1	0.066	<0.1	0.01	0.14	<0.1	300	<10	<10	900	0.45	NA	NA
			4/14/2015	7.13	6.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	640	36	41	3.3	110	32	290	170	<0.05	<1	0.062	<0.1	<0.01	0.14	<0.1	290	<10	<10	900	0.48	NA	NA
			1/13/2015	6.28	7.30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	6.61	6.97	630	30	41	3.9	100	32	290	140	<0.05	<1	0.065	<0.1	<0.01	0.15	<0.1	290	<10	<10	940	0.44	NA	NA
			7/29/2014	NA	NA	620	33	42	3.5	100	33	300	150	<0.05	<1	<0.1	<0.1	<0.01	0.14	<0.1	300	<10	<10	940	0.37	NA	NA
			7/29/2014	7.05	6.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	8.25	5.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	6.55	7.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	630	32	43	4.3	88	28	300	150	<0.05	<1	0.067	<0.1	<0.01	0.12	<0.1	300	<10	<10	940	0.32	NA	NA
			1/15/2014	NA	NA	630	33	46	3.9	100	34	290	165	<0.05	<1	<0.05	<0.1	<0.01	0.14	<0.1	290	<10	<10	940	0.37	NA	NA
			1/14/2014	6.34	7.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	630	30	44	3.8	98	32	290	170	<0.05	<1	<0.05	<0.1	<0.01	0.13	<0.1	290	<10	<10	920	0.39	NA	NA
			10/14/2013	7.08	6.50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/9/2013	7.17	6.41	630	30	43	3.9	110	33	295	170	<0.05	<1	0.076	<0.1	<0.01	0.14	<0.1	295	<10	<10	940	0.6	NA	NA
			4/10/2013	6.33	7.25	630	31	44	4	100	32	310	160	<0.05	<1	0.08	<0.1	<0.01	0.13	<0.1	310	<10	<10	940	0.41	NA	NA
			1/14/2013	5.61	7.97	620	30	43	4	97	31	305	170	<0.05	<1	0.079	<0.1	<0.01	0.12	<0.1	305	<10	<10	950	0.72	NA	NA
			10/29/2012	5.88	7.7	650	29	45	4.2	100	32	280	160	<0.05	<1	0.074	0.14	<0.01	0.13	<0.1	280	<10	<10	950	0.56	NA	NA
			7/23/2012	6.12	7.46	650	35	45	4.3	87	27	297	170	<0.05	<1	<0.1	<0.1	<0.01	0.12	<0.1	297	<10	<10	950	0.43	NA	NA
			4/18/2012	5.48	8.1	630	37	39	3.7	88	28	310	171	<0.1	<1	<0.1	0.16	<0.01	0.099	<0.2	310	<10	<10	950	0.26	NA	NA
			1/11/2012	5.47	8.11	650	33	46	4.6	110	32	300	150	<0.1	1.3	<0.1	0.21	<0.02	0.13	0.03	300	<10	<10	950	1.7	0.0010	971
			11/21/2011	5.69	7.89	640	32	39	3.9	93	29	290	150	<0.05	<1	0.064	<0.1	<0.01	0.096	<0.1	290	<10	<10	930	0.32	NA	NA
			7/26/2011	6.51	7.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	640	36	48	4.2	97	31	290	165.3	<0.05	<1	<0.1	<0.1	<0.01	0.096	<0.1	290	<5	<5	950	0.88	NA	NA
			4/20/2011	6.30	7.28	620	39	46	7.4	90	36	320	174	<0.05	<1	0.17	0.14	0.014	<0.005	<0.1	320	<2.0	<2.0	950	NA	NA	NA
			1/24/2011	5.69	7.53	640	43	44	5.9	87	28	270	170	<0.05	<1.0	0.11	<0.1	0.14	0.085	<0.1	270	<2.0	<2.0	940	1.3	NA	NA
			10/28/2010	NA	NA	650	43	50	4.5	110	35	270	160	<0.1	<1.0	0.12	<0.1	NA	0.085	<0.3	270	<10	<10	970	0.63	NA	NA
			10/21/2010	6.79	6.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/27/2010	7.05	6.53	598	42	48.9	4.29	111	40.5	318	160	< 0.10	1.3	0.0609	< 0.10	0.11	0.106	0.15	318	< 1.0	< 1.0	980	2.84	0.0036	280
			4/27/2010	4.34	9.24	668	46	52.7	4.73	111	43.2	349	150	< 0.10	1.3	0.0666	< 0.10	0.14	0.101	0.16	349	< 1.0	< 1.0	980	6.66	0.0035	288
			1/27/2010	3.38	10.20	622	45	58.0	5.39	115	32.2	270	160	0.18	0.84	0.117	< 0.10	0.14	0.209	0.16	270	< 1.0	< 1.0	920	3.49	0.0036	281
			10/19/2009	2.26	11.32	600	49	59.1	5.12	112	30.1	281	160	< 0.10	0.98	0.0776	0.14	< 0.10	0.163	0.19	281	< 1.0	< 1.0	870	1.14	0.0039	258
			8/20/2009	4.09	9.49	630	49	63.5	5.85	128	30.1	288	150	< 0.10	0.98	NA	< 0.10	< 0.10	0.203	0.20	288	< 1.0	< 1.0	920	3.22	0.0041	245
			5/12/2009	4.74	8.84	622	82	67.5	6.33	114	34.5	282	150	NA	NA	NA	0.11	NA	0.252	0.24	282	< 1.0	< 1.0	990	6.76	0.0029	342
			3/26/1996	NA	NA	652	54	46	5	107	24	344	169	0.2	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/9/1976	NA	NA	565	34	52	4	104	27	337	153	0.6	NA	0.02	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/17/1966	NA	NA	651	62	79	5	101	32	380	147	0	NA	0.05	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/12E-24B03	Screened from 270-435' - 2-inch diameter	**13.58**																									
Height of steel casing added to the concrete pad elevation		2.88	10/15/2015	NA	NA	650	44	48	4.4	100	42	325	160	<0.05	<1	<0.05	<0.10	0.016	0.010	<0.10	325	<10	<10	1,020	0.21	NA	NA
Pad elevation NAVD 88		10.70	10/13/2015	4.62	8.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		10.7	7/15/2015	NA	NA	680	46	60	40.0	120	47	333	160	<0.05	<1	0.064	<0.1	0.01	0.010	<0.1	333	<10	<10	1,020	0.20	NA	NA
			7/14/2015	4.76	8.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	650	46	44	3.5	96	38	330	170	<0.05	<1	0.061	<0.1	0.012	0.0080	<0.1	330	<10	<10	980	0.17	NA	NA
			4/14/2015	4.86	8.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	670	47	48	3.6	110	43	330	170	<0.05	<1	0.052	<0.10	0.01	0.090	<0.1	330	<10	<10	970	0.17	NA	NA
			1/13/2015	3.59	9.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	4.60	8.98	650	40	48	4.1	100	41	330	142	<0.05	<1	0.061	<0.1	<0.01	0.010	<0.1	330	<10	<10	1,010	0.19	NA	NA
			7/30/2014	NA	NA	650	45	45	3.1	94	40	390	150	<0.05	<1	<0.1	<0.1	<0.01	<0.005	<0.1	390	<10	<10	1,020	0.19	NA	NA
			7/29/2014	4.78	8.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	7.33	6.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			5/5/2014	5.36	8.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	3.94	9.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	660	43	46	4.3	90	35	330	150	0.23	<1	0.056	<0.1	<0.01	<0.005	0.11	330	<10	<10	1,010	0.16	0.0026	391
			1/15/2014	NA	NA	660	45	52	4.0	100	41	320	165	<0.05	<1	<0.05	<0.1	<0.01	0.0090	<0.1	320	<10	<10	1,010	0.17	NA	NA
			1/14/2014	3.81	9.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	720	40	51	4.0	100	40	310	170	<0.05	<1	<0.05	<0.1	<0.01	0.0090	<0.1	310	<10	<10	1,010	0.2	NA	NA
			10/14/2013	4.50	9.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/9/2013	4.48	9.1	660	46	47	3.9	110	41	310	170	<0.05	<1	0.066	<0.1	<0.01	0.0100	<0.1	310	<10	<10	1,010	0.27	NA	NA
			4/10/2013	3.41	10.17	670	44	46	3.8	96	38	320	160	<0.05	<1	0.071	<0.1	<0.01	0.0080	<0.1	320	<10	<10	1,010	0.19	NA	NA
			1/14/2013	2.48	11.1	630	45	47	3.9	96	37	320	170	<0.05	<1	0.065	<0.1	<0.01	0.0080	<0.1	320	<10	<10	1,010	0.26	NA	NA
			10/29/2012	3.01	10.57	680	45	49	4.1	100	39	305	158	<0.05	<1	0.069	0.1	<0.01	0.0090	<0.1	305	<10	<10	1,010	0.22	NA	NA
			7/23/2012	2.98	10.6	670	49	47	4.1	86	35	318	170	<0.05	<1	<0.1	<0.1	<0.01	0.0150	<0.1	318	<10	<10	1,010	0.24	NA	NA
			4/18/2012	1.93	11.65	640	50	40	3.4	84	33	320	160	<0.1	<1	<0.1	<0.2	<0.01	0.0070	<0.2	320	<10	<10	1,010	0.23	NA	NA
			1/12/2012	2.15	11.43	660	46	48	3.2	92	36	300	150	<0.1	<1	<0.1	0.35	<0.02	0.0080	<0.2	300	<10	<10	1,000	0.15	NA	NA
			11/21/2011	2.93	10.65	660	43	41	3.7	91	34	310	150	<0.05	1.6	0.046	<0.1	0.014	0.0090	<0.1	310	<10	<10	970	0.12	NA	NA
			7/26/2011	3.17	10.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	650	46.3	50	6.0	98	38	310	159.6	<0.05	<1	<0.1	<0.1	0.011	0.0100	<0.1	310	<5	<5	1,010	0.21	NA	NA
			4/20/2011	3.25	10.33	650	47	48	4.6	95	31	310	168	<0.05	<1	0.11	0.08	0.015	0.0080	<0.1	310	<2.0	<2.0	1,020	NA	NA	NA
			1/24/2011	2.65	10.58	660	46	44	5.6	87	33	320	160	<0.05	<1.0	NA	<0.1	0.15	0.0096	<0.1	320	<2.0	<2.0	1,020	0.22	NA	NA
			10/28/2010	NA	NA	660	44	48	3.8	110	39	315	50	<0.1	<1.0	0.089	<0.1	NA	0.0120	<0.3	315	<10	<10	1,020	0.55	NA	NA
			10/21/2010	4.60	8.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/27/2010	4.54	9.04	610	44	51.4	8.34	112	41.6	328	160	< 0.10	1.8	0.0533	< 0.10	0.17	0.0602	0.16	328	< 1.0	< 1.0	1,000	6.7	0.0036	275
			4/27/2010	1.43	12.15	666	45	53.2	4.84	118	44	357	150	< 0.10	1.5	0.0636	< 0.10	0.1	0.0519	0.17	357	< 1.0	< 1.0	980	9.71	0.0038	265
			1/27/2010	0.94	12.64	672	48	56.4	5.40	119	43.4	336	150	< 0.10	1.4	0.101	< 0.10	0.15	0.140	0.15	336	< 1.0	< 1.0	1,000	5.18	0.0031	320
			10/19/2009	0.81	12.77	622	40	55.1	3.93	110	42.6	342	160	< 0.10	< 0.50	0.0613	< 0.10	0.13	0.0181	0.14	342	< 1.0	< 1.0	880	0.343	0.0035	286
			8/19/2009	4.18	9.40	680	47	54.9	5.21	128	43.4	337	150	< 0.10	2.2	NA	< 0.10	0.66	0.182	0.15	337	< 1.0	< 1.0	1,000	14.3	0.0032	313
			5/12/2009	3.18	10.40	645	44	53.2	4.53	108	41.8	332	140	NA	NA	NA	< 0.10	NA	0.124	0.16	332	< 1.0	< 1.0	1,000	5.9	0.0036	275
			3/26/1996	NA	NA	646	41	52	4.3	104	42	412	164	0.2	NA	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/9/1976	NA	NA	569	36	53	3.7	85	39	330	165	0	NA	0.06	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/17/1966	NA	NA	670	79	74	5	103	36	345	158	1	NA	0	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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32S/13E-30F01	Screened from 15- 30 and 40-55' - 1-inch diameter	**23.16**																									
Height of steel casing added to the concrete pad elevation		2.80	10/14/2015	NA	NA	450	58	61	2.1	39	19	87	120	13	<1	0.084	<0.10	<0.01	<0.005	0.18	87	<10	<10	700	<0.05	0.0031	322
Pad elevation NAVD 88		20.36	10/13/2015	17.11	6.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		20.4	7/14/2015	16.93	6.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	460	64	60	2.0	40	19	90	130	12	<1	0.081	<0.1	<0.01	<0.005	0.202	90	<10	<10	700	<0.05	0.0032	317
			4/14/2015	16.01	7.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	550	95	69	2	50	24	98	140	12.5	<1	0.085	<0.1	<0.01	<0.005	0.169	98	<10	<10	820	<0.05	0.0018	562
			1/13/2015	15.41	7.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	17.05	6.11	470	58	64	2.2	42	19	84	120	10	<1	0.081	<0.1	<0.01	<0.005	0.172	84	<10	<10	730	<0.05	0.0030	337
			7/30/2014	NA	NA	540	89	71	2	46	24	94	130	13.6	<1	<0.1	<0.1	<0.01	<0.005	0.101	94	<10	<10	860	<0.05	0.0011	881
			7/29/2014	17.11	6.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	16.82	6.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	15.56	7.60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	610	122	78	3.3	47	22	100	140	12	<1	0.100	<0.1	<0.01	<0.005	0.17	100	<10	<10	970	<0.05	0.0014	718
			1/15/2014	NA	NA	510	80	69	2.3	45	22	94	136	12.6	13.00	<0.1	<0.1	<0.01	<0.005	0.19	94	<10	<10	810	<0.05	0.0024	421
			1/14/2014	16.58	6.58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	530	78	73	2.3	47	22	86	140	12	<1	0.072	<0.1	<0.01	<.005	0.17	86	<10	<10	830	<0.05	0.0022	459
			10/14/2013	17.07	6.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	480	80	64	2.2	49	22	85	140	12.2	<1	0.089	<0.1	<0.01	<0.005	<0.1	85	<10	<10	770	<0.05	NA	NA
			7/9/2013	16.17	6.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	460	60	60	2.20	38	18	78	120	12	<1	0.091	<0.1	<0.01	<0.005	0.2	78	<10	<10	710	<0.05	0.0033	300
			4/10/2013	14.58	8.58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	440	65	64	2.40	40	19	95	130	12	<1	0.090	<0.1	<0.01	<0.005	0.11	95	<10	<10	720	0.05	0.0017	591
			1/14/2013	14.36	8.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	14.95	8.21	470	60	66	2.50	43	20	75	123	12	<1	0.087	<0.1	<0.01	<0.005	0.13	75	<10	<10	720	<0.05	0.0022	462
			7/24/2012	14.00	9.16	470	73	66	2.70	36	18	86	120	13	<1	<0.1	<0.1	<0.01	0.019	0.11	86	<10	<10	720	<0.05	0.0015	664
			4/19/2012	NA	NA	450	72	52	1.90	32	15	81	130	13	<1	<0.1	<0.2	<0.01	<0.005	<0.2	81	<10	<10	700	<0.1	NA	NA
			4/18/2012	13.42	9.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/10/2012	13.80	9.36	460	67	61	2.00	35	17	81	120	11	<1	<0.1	0.12	<0.01	<0.005	<0.1	81	<10	<10	720	<0.1	NA	NA
			11/21/2011	13.78	9.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			11/17/2011	NA	NA	470	70	82	2.40	40	19	78	120	12	<1	<0.1	<0.1	<0.01	<0.005	0.16	78	<10	<10	720	<0.1	0.0023	438
			7/26/2011	13.50	9.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	460	65.8	68	4.40	37	19	78	117.4	12.17	<1	0.100	0.101	<0.01	0.014	0.178	78	<5	<5	720	0.11	0.0027	370
			4/20/2011	12.82	10.34	460	71	69	2.60	36	14	87	124	12	<1	0.180	0.11	<0.01	<0.005	0.17	87	<2.0	<2.0	730	NA	0.0024	418
			1/24/2011	13.33	9.97	510	75	64	4.00	34	18	83	140	11	<1.0	0.170	0.11	<0.10	<0.005	<0.1	83	<2.0	<2.0	780	<0.1	NA	NA
			10/21/2010	16.55	6.61	540	100	73	2.00	43	21	88	120	13	<1.0	0.067	<0.1	NA	<0.005	<0.3	88	<10	<10	894	<.1	NA	NA
			7/26/2010	15.68	7.48	464	74	82.2	2.16	47.9	25.1	88.0	120	12	< 0.50	0.098	< 0.10	< 0.10	0.0817	0.37	88.0	< 1.0	< 1.0	710	0.79	0.0050	200
			4/27/2010	11.02	12.14	534	72	77.1	2.59	45.8	23.6	100	140	9.8	0.56	0.129	< 0.10	< 0.10	0.112	0.29	100	< 1.0	< 1.0	780	1.02	0.0040	248
			1/28/2010	12.73	10.43	725	140	99.9	2.70	76.4	35.8	214	170	1.6	0.84	0.120	< 0.10	< 0.10	0.112	0.56	214	< 1.0	< 1.0	1,200	0.640	0.0040	250
			10/19/2009	14.33	8.83	522	74	85.6	2.35	52.8	26.3	102	150	13	0.70	0.136	0.13	< 0.10	0.123	0.32	102	< 1.0	< 1.0	770	1.30	0.0043	231
			8/19/2009	14.34	8.82	648	92	98.9	3.84	63.1	31.9	113	190	10	0.56	NA	< 0.10	0.12	1.03	0.32	113	< 1.0	< 1.0	970	4.52	0.0035	288
			5/12/2009	12.38	10.78	792	110	108	2.89	80.2	39.9	136	280	NA	NA	NA	< 0.10	NA	0.0353	0.39	136	< 1.0	< 1.0	1,200	0.281	0.0035	282

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/13E-30F02	Screened from 75-100' - 2-inch diameter	**23.16**																									
Height of steel casing added to the concrete pad elevation		2.80	10/14/2015	NA	NA	570	49	45	2.8	80	35	212	130	13	<1	0.085	<0.10	<0.01	0.20	0.39	212	<10	<10	890	0.078	0.0080	126
Pad elevation NAVD 88		20.36	10/13/2015	17.29	5.87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		20.4	7/15/2015	NA	NA	610	50	51	2.0	88	38	204	140	13	<1	0.091	<0.1	<0.01	0.048	0.30	204	<10	<10	890	<0.05		
			7/14/2015	17.44	5.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	570	51	43	2.7	78	34	200	140	13.5	<1	0.085	<0.1	<0.01	0.087	0.42	200	<10	<10	850	<0.05	0.0082	121
			4/14/2015	16.94	6.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	590	51	42	2.4	80	34	210	140	13	<1	0.08	<0.1	<0.01	0.014	0.324	210	<10	<10	860	<0.05	0.0064	157
			1/13/2015	16.41	6.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	17.33	5.83	600	46	42	2.6	76	32	310	120	12	<1	0.08	<0.1	<0.01	0.22	0.37	310	<10	<10	890	<0.05	0.0080	124
			7/30/2014	NA	NA	580	49	46	2.6	80	35	210	130	13	<1	<0.1	<0.1	<0.01	0.02	0.27	210	<10	<10	890	<0.05	0.0055	181
			7/29/2014	17.31	5.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	18.00	5.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	16.27	6.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	590	49	45	3.3	68	30	200	130	12	<1	0.089	<0.1	<0.01	0.011	0.44	200	<10	<10	890	<0.05	0.0090	111
			1/15/2014	NA	NA	580	50	45	2.7	76	31	190	136	13.1	13.4	<0.1	<0.1	<0.01	0.054	0.4	190	<10	<10	890	<0.05	0.0080	125
			1/14/2014	17.01	6.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	570	50	45	2.7	75	33	190	140	12	<1	0.69	0.19	<0.01	0.099	0.38	190	<10	<10	890	<0.05	0.0076	132
			10/14/2013	17.52	5.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	570	50	38	2.6	78	32	190	180	<0.05	<1	0.08	0.13	<0.01	0.14	<0.1	190	<10	<10	880	<0.05	NA	NA
			7/9/2013	17.15	6.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	590	50	41	2.6	70	30	190	140	14	<1	0.09	0.1	<0.01	0.082	0.43	190	<10	<10	880	<0.05	0.0086	116
			4/10/2013	15.76	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	550	50	44	2.9	72	31	200	140	13	<1	0.09	0.1	<0.01	0.011	0.32	200	<10	<10	880	0.12	0.0064	156
			1/14/2013	15.01	8.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	15.27	7.89	610	48	45	3.0	79	34	188	135	13	<1	0.09	<0.1	<0.01	0.06	0.31	188	<10	<10	890	0.011	0.0065	155
			7/24/2012	14.82	8.34	590	56	46	3.2	69	30	194	140	14	<1	<0.1	0.11	<0.01	0.038	0.27	194	<10	<10	880	<0.05	0.0048	207
			4/19/2012	NA	NA	600	60	40	2.7	68	30	200	140	14	<1	<0.1	<0.2	<0.01	0.19	0.3	200	<10	<10	890	0.11	0.0050	200
			4/18/2012	14.38	8.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/12/2012	14.31	8.85	610	52	45	3.0	73	32	200	130	12	<1	<0.1	0.25	<0.02	0.29	0.33	200	<10	<10	890	<0.1	0.0063	158
			11/21/2011	14.94	8.22	580	49	38	2.7	73	30	190	120	13	<1	0.07	<0.1	<0.01	0.022	0.34	190	<10	<10	870	<0.1	0.0069	144
			7/26/2011	14.46	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	590	52.1	46	5.1	73	31	190	134.3	13.19	<1	<0.1	0.127	<0.1	0.025	0.387	190	<5	<5	900	<0.1	0.0074	135
			4/20/2011	14.23	8.93	600	54	57	4.2	74	29	200	141	13	<1	0.18	0.17	<0.01	0.025	0.38	200	<2.0	<2.0	920	NA	0.0070	142
			1/24/2011	14.36	8.93	600	51	43	4.9	71	31	210	140	12	<1.0	0.15	0.12	0.27	0.041	0.3	210	<2.0	<2.0	920	<0.1	0.0059	170
			10/28/2010	NA	NA	610	49	38	2.3	70	30	210	130	11	<1.0	0.10	<0.1	NA	0.0094	<0.3	210	<10	<10	920	<0.1	NA	NA
			10/21/2010	7.39	15.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/26/2010	16.21	6.95	560	49	45.8	2.95	85.4	36.8	223	130	11	2.5	0.0928	< 0.10	0.13	0.0646	0.59	223	< 1.0	< 1.0	890	< 0.100	0.0120	83
			4/27/2010	12.14	11.02	634	51	50.3	3.12	87.9	38.6	225	130	10	0.8	0.112	< 0.10	< 0.10	0.615	0.51	225	< 1.0	< 1.0	880	3.28	0.0100	100
			1/28/2010	13.09	10.07	604	44	52.2	4.47	92.1	38.5	230	150	11	1.4	0.127	< 0.10	< 0.10	0.913	0.48	230	< 1.0	< 1.0	920	4.55	0.0109	92
			10/19/2009	14.36	8.80	566	49	49.5	2.80	88.3	37.6	240	140	11	1.0	0.0942	0.17	< 0.10	0.924	0.51	240	< 1.0	< 1.0	850	2.15	0.0104	96
			8/19/2009	14.81	8.35	614	49	51.8	3.19	87.3	36.8	225	130	11	2.00	NA	0.10	< 0.10	2.24	0.54	225	< 1.0	< 1.0	920	19.4	0.0110	91
			5/12/2009	14.34	8.82	514	54	48.7	3.26	81.1	34.9	206	120	NA	NA	NA	0.11	NA	1.87	0.53	206	< 1.0	< 1.0	890	3.23	0.0098	102
			3/27/1996	NA	NA	678	49	52	3.8	98	42	305	166	49	NA	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/9/1976	NA	NA	637	48	55	2.8	98	43	343	172	17.6	NA	0.1	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/20/1966	NA	NA	580	68	47	2	94	38	280	152	27	NA	0.08	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/13E-30F03	Screened from 305-372' - 2-inch diameter	**23.16**																									
Height of steel casing added to the concrete pad elevation		2.80	10/14/2015	NA	NA	660	44	38	2.8	100	44	306	160	<0.05	<1	<0.05	0.13	0.028	0.021	0.10	306	<10	<10	990	<0.05	0.0023	440
Pad elevation NAVD 88		20.36	10/13/2015	18.87	4.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		20.4	7/15/2015	NA	NA	670	45	45	1.9	120	51	305	170	<0.05	<1	0.060	0.11	0.03	0.019	<0.1	305	<10	<10	990	<0.05	NA	NA
			7/14/2015	18.87	4.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2015	NA	NA	650	46	35	2.3	99	44	300	170	<0.05	<1	0.056	0.126	0.02	0.015	0.1	300	<10	<10	950	<0.05	NA	NA
			4/14/2015	17.92	5.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	670	46	36	2.2	100	45	310	180	<0.05	<1	0.05	0.121	0.02	0.016	<0.1	310	<10	<10	950	0.01	NA	NA
			1/13/2015	14.13	9.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	18.98	4.18	660	41	35	3.0	99	42	310	150	<0.05	<1	<0.05	<0.1	0.011	0.017	<0.1	310	<10	<10	990	<0.05	NA	NA
			7/30/2014	NA	NA	660	44	38	2.6	96	46	300	160	<0.05	<1	0.28	0.12	0.02	0.015	<0.1	300	<10	<10	990	<0.05	NA	NA
			7/29/2014	18.62	4.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	22.27	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			5/5/2014	21.34	1.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	16.14	7.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	640	44	36	3.3	55	38	310	169	<0.05	<1	0.062	0.12	0.02	0.011	0.11	310	<10	<10	990	<0.05	0.0025	400
			1/15/2014	NA	NA	650	45	35	2.5	90	41	300	173	<0.05	<1	<0.05	0.13	0.01	0.015	0.12	300	<10	<10	990	<0.05	0.0027	375
			1/14/2014	15.35	7.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	670	41	40	2.7	100	44	280	179	<0.05	<1	<0.05	0.14	0.02	0.016	<0.1	280	<10	<10	990	<0.05	NA	NA
			10/14/2013	17.30	5.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	650	50	33	2.4	100	43	290	140	13.5	<1	0.055	<0.1	0.02	0.017	0.23	290	<10	<10	990	<0.05	0.0046	217
			7/9/2013	16.61	6.55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	670	45	36	2.7	94	42	300	170	<0.05	<1	0.06	0.13	0.02	0.016	0.12	300	<10	<10	990	<0.05	0.0027	375
			4/10/2013	14.69	8.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	630	45	36	2.3	92	41	295	180	<0.05	<1	0.06	0.11	<0.01	0.015	<0.1	295	<10	<10	980	<0.05	NA	NA
			1/14/2013	12.62	10.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	14.61	8.55	650	43	40	3.1	100	46	280	170	<0.05	<1	0.06	<0.1	0.03	0.016	<0.1	280	<10	<10	990	0.02	NA	NA
			7/24/2012	14.50	8.66	640	51	36	2.7	81	37	296	180	<0.05	<1	<0.1	0.17	<0.01	0.016	0.2	296	<10	<10	990	<0.05	0.0039	255
			4/19/2012	NA	NA	640	54	32	2.3	84	36	290	180	<0.1	<1	<0.1	<0.2	0.01	0.014	<0.2	290	<10	<10	990	<0.1	NA	NA
			4/18/2012	10.43	12.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/12/2012	12.37	10.79	660	46	39	2.1	94	42	280	160	<0.1	<1	<0.1	0.2	0.025	0.016	<0.2	280	<10	<10	990	<0.1	NA	NA
			11/21/2011	13.24	9.92	650	43	33	2.6	93	39	290	160	<0.05	<1	0.04	0.15	0.028	0.016	<0.1	290	<10	<10	960	<0.1	NA	NA
			7/26/2011	14.22	8.94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	650	46.5	46	5.1	73	31	190	170.5	<0.05	<1	<0.1	0.155	0.02	0.025	<0.1	190	<5	<5	900	<0.1	NA	NA
			4/21/2011	NA	NA	650	48	40	3.8	91	34	280	179	<0.05	<1	0.1	0.2	0.029	0.015	0.11	280	<2.0	<2.0	1,000	NA	0.0023	436
			4/20/2011	12.51	10.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	12.67	10.64	650	46	36	4.7	87	38	300	170	<0.05	<1.0	0.11	0.17	0.24	0.016	<0.1	300	<2.0	<2.0	990	<0.1	NA	NA
			10/28/2010	NA	NA	650	46	37	2.7	100	43	280	160	<0.1	<1.0	0.10	<0.1	NA	0.032	<0.3	280	<10	<10	1,000	0.53	NA	NA
			10/21/2010	6.62	16.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/26/2010	17.32	5.84	608	45	43.8	2.94	107	46.8	294	160	1.3	0.84	0.0479	< 0.10	0.10	0.129	0.24	294	< 1.0	< 1.0	900	7.55	0.0053	188
			4/27/2010	11.38	11.78	668	48	40.8	2.91	101	44.7	304	160	0.21	0.84	0.0733	0.14	0.11	0.0694	0.23	304	< 1.0	< 1.0	940	2.62	0.0048	209
			1/28/2010	10.98	12.18	656	40	43.1	3.91	112	47.2	310	180	< 0.20	2.8	0.0833	0.13	< 0.10	0.287	0.21	310	< 1.0	< 1.0	980	4.80	0.0053	190
			10/19/2009	14.18	8.98	626	48	43.3	3.14	108	46.2	308	170	< 0.10	1.8	0.0646	0.22	< 0.10	0.255	0.17	308	< 1.0	< 1.0	910	2.09	0.0035	282
			8/19/2009	20.23	2.93	672	45	43.1	3.15	111	44.3	290	170	< 0.10	2.5	NA	0.14	< 0.10	0.468	0.19	290	< 1.0	< 1.0	980	18.5	0.0042	237
			5/12/2009	17.68	5.48	678	49	44.8	3.32	109	42.9	276	180	NA	NA	NA	0.17	NA	0.146	0.18	276	< 1.0	< 1.0	960	1.16	0.0037	272
			3/27/1996	NA	NA	686	41	40	3.4	109	48	379	197	0.2	NA	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/7/1976	NA	NA	616	43	41	2.6	96	49	333	190	0.4	NA	0.05	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/19/1966	NA	NA	642	69	49	4	109	40	321	182	1	NA	0.05	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/13E-30N01	Screened from 15-40' - 1-inch diameter	**16.13**																									
Height of steel casing added to the concrete pad elevation		2.60	10/15/2015	NA	NA	740	120	100	27	52	41	250	190	<0.05	<1	0.18	0.43	0.032	0.072	1.3	250	<10	<10	1,220	1.8	0.0108	92
Pad elevation NAVD 88		13.53	10/13/2015	10.11	6.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		13.5	7/14/2015	9.91	6.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/14/2015	9.51	6.62	930	190	130	28	69	54	360	170	<0.05	1.4	0.23	0.334	0.01	0.087	1.2	360	<10	<10	1,500	2.5	0.0063	158
			1/14/2015	NA	NA	845	170	110	29.0	71	54	320	180	<0.05	<1	0.21	0.332	0.01	0.087	1.2	320	<10	<10	1,360	2.3	0.0071	140
			1/13/2015	9.03	7.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2014	NA	NA	790	140	110	30.0	62	53	300	160	0.68	<1	0.21	0.29	<0.01	0.084	1.2	300	<10	<10	1,350	2.5	0.0086	117
			10/14/2014	9.95	6.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	800	150	110	27.0	61	52	310	160	<0.05	<1	0.81	0.33	0.01	0.081	1.1	310	<10	<10	1,360	2.4	0.0073	136
			7/29/2014	9.88	6.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	9.54	6.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	9.17	6.96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	850	160	112	26.0	55	43	310	170	<0.05	<1	0.20	0.33	0.01	0.077	1.3	310	<10	<10	1,410	2.4	0.0081	123
			1/15/2014	NA	NA	790	154	110	26.0	56	45	260	190	<0.05	<1	0.19	0.41	<0.01	0.077	1.4	260	<10	<10	1,340	2.5	0.0091	110
			1/14/2014	9.61	6.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	950	200	140	32.0	74	60	330	180	<0.05	<1	0.21	0.33	0.01	0.095	1.3	330	<10	<10	1,570	2.8	0.0065	154
			10/14/2013	9.86	6.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	830	175	120	29.0	71	54	310	185	<0.05	<1	0.22	0.32	0.01	0.087	0.84	310	<10	<10	1,430	2.3	0.0048	208
			7/9/2013	9.40	6.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/10/2013	8.98	7.15	860	180	120	29.0	67	54	320	180	<0.05	1.1	0.21	0.31	0.01	0.087	1.2	320	<10	<10	1,470	2.5	0.0067	150
			1/14/2013	8.60	7.53	800	170	120	32.0	66	53	280	200	<0.05	1.1	0.22	0.26	<0.01	0.09	1.2	280	<10	<10	1,380	2.5	0.0071	142
			10/29/2012	8.96	7.17	900	180	120	34.0	77	60	300	190	<0.05	<1	0.21	0.40	0.011	0.098	1.2	300	<10	<10	1,500	2.8	0.0067	150
			7/23/2012	8.54	7.59	840	190	120	31.0	56	45	266	200	<0.05	<1	0.22	0.43	<0.01	0.096	1.2	266	<10	<10	1,370	2.3	0.0063	158
			4/18/2012	8.53	7.60	1,050	280	140	31.0	59	47	330	210	<0.1	1.4	0.2	0.50	<0.01	0.078	1.3	330	<10	<10	1,680	2.4	0.0046	215
			1/9/2012	8.74	7.39	1,050	260	170	34.0	68	52	307	200	<0.05	2.7	0.21	0.41	<0.01	0.088	1.9	307	<10	<10	1,760	2.9	0.0073	137
			11/21/2011	8.78	7.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			11/17/2011	NA	NA	1,300	360	320	40	90	69	390	220	<0.1	<1	0.23	0.38	0.017	0.11	2.5	390	<10	<10	2,210	3.4	0.0069	144
			7/26/2011	9.01	7.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	1,680	445.3	230	42	99	81	380	255.5	<0.05	1.2	0.21	<0.1	<0.01	0.12	3.016	380	<5	<5	2,480	4.2	0.0068	148
			4/20/2011	8.59	7.54	890	210	130	26	68	46	180	215	<0.05	<1	0.24	0.39	0.013	0.086	4.57	180	<2.0	<2.0	1,550	NA	0.0218	46
			1/24/2011	8.18	7.35	870	180	100	28	84	46	240	210	<0.05	<1.0	<0.1	0.34	0.12	0.24	3.63	240	<2.0	<2.0	1,430	18	0.0202	50
			10/21/2010	9.99	6.14	890	190	120	26	58	45	246	200	<0.1	<1.0	<0.1	0.37	NA	0.078	2.3	246	<10	<10	1,498	<0.1	0.0121	83
			7/27/2010	8.97	7.16	917	200	130	30.0	75.0	56.2	241	220	< 0.10	< 0.50	0.165	0.29	0.23	0.101	2.8	241	< 1.0	< 1.0	1,400	2.61	0.0140	71
			4/27/2010	6.14	9.99	808	150	130	29	136	55.6	286	210	0.76	1.7	0.171	0.37	0.19	0.276	2.6	286	< 1.0	< 1.0	1,300	20.4	0.0173	58
			1/26/2010	4.90	11.23	902	210	155	33.5	156	66.4	307	230	< 0.10	1.7	0.317	0.30	0.12	0.333	3.2	307	< 1.0	< 1.0	1,500	27.3	0.0152	66
			10/20/2009	6.53	9.60	828	200	159	34.3	118	59.8	238	230	< 0.10	1.3	0.241	0.38	< 0.10	0.157	3.2	238	< 1.0	< 1.0	1,300	5.33	0.0160	63
			8/20/2009	6.71	9.42	835	160	150	27.8	121	49.4	235	220	< 0.10	1.3	NA	0.37	0.12	0.228	2.9	235	< 1.0	< 1.0	1,400	15.9	0.0181	55
			5/11/2009	6.03	10.10	960	180	175	33.5	86.7	46.2	274	220	NA	NA	NA	0.36	NA	0.113	3.2	274	< 1.0	< 1.0	1,500	2.26	0.0178	56

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Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/13E-30N03	Screened from 60-135' - 2-inch diameter	**16.13**																									
Height of steel casing added to the concrete pad elevation		2.60	10/15/2015	NA	NA	570	63	54	3.3	69	32	162	130	15	<1	0.0161	0.23	<0.01	0.015	0.56	162	<10	<10	860	<0.05	0.0089	113
Pad elevation NAVD 88		13.53	10/13/2015	10.48	5.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		13.5	7/16/2015	NA	NA	580	65	65	3.0	81	35	160	140	15	15.3	0.079	0.14	0.45	0.011	0.46	160	<10	<10	880	<0.05		
			7/14/2015	10.88	5.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/14/2015	11.88	4.25	580	65	49	2.9	65	31	160	140	15.2	<1	0.078	<0.1	<0.01	<0.005	0.47	160	<10	<10	860	<0.05	0.0072	138
			1/14/2015	NA	NA	610	68	53	3.0	73	34	170	150	15	<1	0.074	0.151	<0.01	0.0540	0.43	170	<10	<10	870	0.49	0.0063	158
			1/13/2015	9.40	6.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2014	NA	NA	560	59	52	3.5	67	32	160	130	14	0.54	0.066	0.14	<0.01	<0.005	0.452	160	<10	<10	890	<0.05	0.0077	131
			10/14/2014	10.52	5.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	580	65	55	3.2	69	32	170	130	15	<1	<0.1	0.16	<0.01	<0.005	0.34	170	<10	<10	910	<0.05	0.0052	191
			7/29/2014	10.22	5.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	11.33	4.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	9.31	6.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	610	63	55	4.3	65	29	170	140	13.00	<1	0.08	0.15	<0.01	0.058	0.38	170	<10	<10	910	<0.05	0.0060	166
			1/15/2014	NA	NA	610	66	54	3.2	67	31	170	149	14.8	15	<0.1	0.16	<0.01	0.065	0.46	170	<10	<10	910	0.27	0.0070	143
			1/14/2014	10.26	5.87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	580	60	57	3.3	71	32	170	150	14	<1	0.057	0.16	<0.01	0.370	0.41	170	<10	<10	910	0.1	0.0068	146
			10/14/2013	10.72	5.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	590	60	48	3.1	71	31	160	150	15.1	<1	0.074	0.18	<0.01	1.3	0.17	160	<10	<10	900	0.43	0.0028	353
			7/9/2013	10.36	5.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/10/2013	8.26	7.87	600	66	53	3.3	69	31	160	150	15	<1	0.11	0.2	<0.01	0.064	0.35	160	<10	<10	910	<0.05	0.0053	189
			1/14/2013	7.71	8.42	570	66	55	3.4	68	30	165	150	15	<1	0.093	0.2	<0.01	0.028	0.27	165	<10	<10	900	0.084	0.0041	244
			10/29/2012	8.01	8.12	610	60	56	3.7	74	33	155	148	14	<1	0.081	0.2	<0.01	0.027	0.3	155	<10	<10	900	0.04	0.0050	200
			7/23/2012	9.15	6.98	600	71	56	3.5	61	28	152	200	<0.05	<1	0.1	<0.1	<.002	0.120	0.3	152	<10	<10	890	0.44	0.0042	237
			4/18/2012	6.72	9.41	570	80	47	3.0	57	25	150	150	16	<1	0.1	0.3	<0.01	<0.005	0.28	150	<10	<10	880	<0.1	0.0035	286
			1/11/2012	7.17	8.96	570	67	55	3.9	68	30	140	130	14	<1	0.1	0.2	<0.02	0.0510	0.39	140	<10	<10	870	0.17	0.0058	172
			11/21/2011	6.45	9.68	600	67	47	3.2	64	28	140	130	15	1.2	0.088	0.2	<0.01	<0.005	0.62	140	<10	<10	850	<0.1	0.0093	108
			7/26/2011	7.59	8.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	590	67	47	5.0	54	24	290	139.8	15	<1	<0.1	0.2	<0.01	0.0520	0.79	290	<5	<5	890	0.14	0.0118	85
			4/20/2011	6.65	9.48	580	76	58	4.2	62	23	140	142	16	<1	0.12	0.2	<0.1	0.0510	0.92	140	<2.0	<2.0	890	NA	0.0121	83
			1/24/2011	6.68	8.75	570	76	48	4.8	55	25	130	130	16	<1.0	0.12	0.2	<0.10	0.0088	1.7	130	<2.0	<2.0	900	<0.1	0.0224	45
			10/21/2010	10.76	5.37	550	69	59	3.3	65	31	133	130	15	<1.0	<0.1	0.1	NA	<0.005	1.1	133	<10	<10	886	<0.1	0.0159	63
			7/27/2010	9.53	6.60	528	72	55.1	3.41	68.7	31.0	139	130	15.0	< 0.50	0.0672	0.14	0.11	< 0.00500	1.3	139	< 1.0	< 1.0	860	< 0.100	0.0181	55
			4/27/2010	6.14	9.99	672	89	60.6	3.65	70.6	32.5	134	130	14.0	< 0.50	0.0779	0.18	0.11	< 0.00500	1.2	134	< 1.0	< 1.0	870	< 0.100	0.0135	74
			1/26/2010	5.88	10.25	606	110	75.0	4.51	77.8	34.3	126	130	14	1.4	0.0654	0.15	< 0.10	0.0130	1.3	126	< 1.0	< 1.0	990	0.653	0.0118	85
			10/20/2009	6.56	9.57	806	180	93.3	25.5	92.3	41.5	162	150	9.7	2.2	0.107	0.26	< 0.10	0.245	1.4	162	< 1.0	< 1.0	1,200	0.344	0.0078	129
			8/20/2009	7.50	8.63	1,070	190	151	61.6	112	44.2	130	130	16	3.4	NA	0.20	< 0.10	0.151	1.6	130	< 1.0	< 1.0	1,700	1.93	0.0084	119
			5/12/2009	6.33	9.80	602	97	63.4	3.96	72.9	32.2	122	120	NA	NA	NA	0.22	NA	24	1.2	122	< 1.0	< 1.0	900	2.24	0.0124	81
			3/27/1996	NA	NA	624	70	62	4	78	35	150	161	106.8	NA	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/7/1976	NA	NA	705	90	54	2.9	99	43	189	168	112.5	NA	0.08	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/21/1966	NA	NA	804	57	54	3	132	59	410	250	1	NA	0.08	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
32S/13E-30N02	Screened from 175-255' - 2-inch diameter	**16.13**																									
Height of steel casing added to the concrete pad elevation		2.60	10/15/2015	NA	NA	1,040	47	64	4.6	140	60	192	480	0.72	<1	0.13	0.18	<0.01	<0.005	<0.10	192	<10	<10	1,350	<0.05	NA	NA
Pad elevation NAVD 88		13.53	10/13/2015	14.14	1.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		13.5	7/16/2015	NA	NA	1,030	49	82	4.4	170	70	190	480	1.4	1.52	0.15	<0.1	<0.01	<0.005	0.11	190	<10	<10	1,360	<0.05		
			7/14/2015	13.55	2.58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/14/2015	10.02	6.11	840	47	61	4.3	130	58	190	500	0.576	<1	0.14	<0.3	<0.01	<0.005	<0.3	190	<10	<10	1,330	<0.05	NA	NA
			1/14/2015	NA	NA	1,050	50	62	4.2	140	59	190	520	0.40	<1	0.13	0.115	<0.01	<0.005	<0.1	190	<10	<10	1,320	<0.05	NA	NA
			1/13/2015	7.85	8.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2014	NA	NA	1,040	44	65	5.0	140	58	200	440	0.77	<1	0.13	<0.1	<0.01	<0.005	<0.1	200	<10	<10	1,370	<0.05	NA	NA
			10/14/2014	13.69	2.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/29/2014	NA	NA	1,020	45	66	4.6	140	60	220	470	0.51	<1	0.10	0.13	<0.01	<0.005	<0.4	220	<10	<10	1,340	<0.05	NA	NA
			7/29/2014	13.27	2.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	15.20	0.93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			5/5/2014	13.19	2.94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	8.57	7.56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	1,040	46	66	5.0	120	50	190	520	0.47	<1	0.14	0.1	<0.01	<0.005	<0.1	190	<10	<10	1,350	<0.05	NA	NA
			1/15/2014	NA	NA	1,060	45	60	4.1	120	49	190	477	0.65	1.1	0.13	0.43	<0.01	<0.005	<0.2	190	<10	<10	1,370	<0.05	NA	NA
			1/14/2014	9.30	6.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/15/2013	NA	NA	1,030	46	70	4.9	140	58	190	541	0.46	<1	0.12	0.18	<0.01	<0.005	<0.2	190	<10	<10	1,360	<0.05	NA	NA
			10/14/2013	12.13	4.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	1,020	50	61	4.5	140	59	185	500	0.63	<1	0.14	0.12	<0.01	<0.005	<0.1	185	<10	<10	1,370	<0.05	NA	NA
			7/9/2013	11.05	5.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/10/2013	7.06	9.07	1,080	48	60	4.3	120	52	185	500	0.50	<1	0.15	<0.2	<0.01	<0.005	<0.2	185	<10	<10	1,360	<0.05	NA	NA
			1/14/2013	4.98	11.15	1,010	48	63	4.5	120	53	188	530	0.40	<1	0.14	<0.2	<0.01	<0.005	<0.2	188	<10	<10	1,350	0.07	NA	NA
			10/29/2012	8.52	7.61	1,030	40	68	5.0	140	58	180	500	<0.25	<1	0.14	<0.5	<0.01	<0.005	<0.5	180	<10	<10	1,360	<0.05	NA	NA
			7/23/2012	8.31	7.82	1,040	54	63	4.5	110	48	188	510	0.13	<1	0.15	0.15	<0.01	0.01	<0.1	188	<10	<10	1,360	<0.05	NA	NA
			4/18/2012	3.45	12.68	990	60	56	4.2	110	47	190	560	0.14	<1	0.12	0.21	<0.01	<0.005	0.28	190	<10	<10	1,360	<0.1	0.0047	214
			1/11/2012	4.88	11.25	1,040	49	64	4.9	130	54	180	460	1.30	<1	0.17	0.16	<0.02	<0.005	<0.2	180	<10	<10	1,360	<0.1	NA	NA
			11/21/2011	5.35	10.78	1,020	46	57	4.5	130	54	180	450	0.15	<1	0.15	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,360	<0.1	NA	NA
			7/26/2011	7.25	8.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	1,050	50.4	81	7.7	150	62	180	479.1	0.15	<1	0.16	0.144	<0.01	0.006	<0.1	180	<5	<5	1,370	0.49	NA	NA
			4/20/2011	3.53	12.60	1,030	52	63	5.4	130	44	180	508	0.17	<1	0.19	0.2	<0.01	<0.005	<0.1	180	<2.0	<2.0	1,380	NA	NA	NA
			1/24/2011	3.67	11.76	1,050	50	60	6.4	120	49	190	490	0.24	<1.0	0.17	0.17	<0.10	0.064	<0.1	190	<2.0	<2.0	1,380	0.12	NA	NA
			10/21/2010	10.42	5.71	1,040	48	52	3.5	100	45	181	460	0.15	<1.0	<0.1	<0.1	NA	<0.005	<0.3	181	<10	<10	1,377	<0.1	NA	NA
			7/27/2010	10.02	6.11	777	57	67.6	7.31	141	58.5	190	470	0.3	3.5	0.138	< 0.10	0.11	0.102	0.28	190	< 1.0	< 1.0	1,300	3.43	0.0049	204
			4/27/2010	5.26	10.87	800	93	71.9	12.50	108	46.3	159	300	7.0	3.2	0.123	0.13	0.11	0.0776	0.7	159	< 1.0	< 1.0	1,100	3.27	0.0075	133
			2/25/2010	1.72	14.41	1,000	48	71.4	4.70	141	58.1	195	490	0.16	< 0.50	0.15	0.15	< 0.10	0.0393	0.16	195	< 1.0	< 1.0	1,300	3.30	0.0033	300
Confirmation Sample Collected from Pump Discharge at End of Purge:			2/25/2010	1.72	14.41	1,010	74	76.9	10.2	138	55.8	195	440	0.13	2.4	0.142	0.16	< 0.10	0.0579	0.24	195	< 1.0	< 1.0	1,400	1.69	0.0032	308
Confirmation Sample Collected by Standard Method (Bailer):			1/26/2010	3.72	12.41	970	50	74.2	4.77	152	62.2	195	510	0.14	< 0.50	0.129	0.11	< 0.10	< 0.00500	0.16	195	< 1.0	< 1.0	1,300	< 0.100	0.0032	313
			10/20/2009	7.38	8.75	2,080	690	274	151	239	101.0	220	400	< 0.10	7.0	0.201	0.16	0.87	0.398	2.0	220	< 1.0	< 1.0	2,800	5.50	0.0029	345
			8/20/2009	11.94	4.19	1,350	500	199	82.2	123	49.0	199	220	6.4	6.3	NA	0.23	0.14	0.339	2.8	199	< 1.0	< 1.0	2,100	4.91	0.0056	179
			5/11/2009	6.98	9.15	1,290	170	129	52	137	66.9	176	470	NA	NA	NA	0.18	NA	0.128	0.56	176	< 1.0	< 1.0	1,800	5.24	0.0033	304
			3/27/1996	NA	NA	1,050	50	71	5.5	145	60	243	516	0.9	NA	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/7/1976	NA	NA	1,093	48	62	4.7	150	60	248	484	0	NA	0.13	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/21/1966	NA	NA	1,069	54	71	5	148	63	232	483	0	NA	0.12	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
Oceano MW-Green	Screened from 110-130' - 3-inch diameter	**30.49**																									
	Casing relative to concrete pad	-4.14	10/14/2015	NA	NA	320	32	33	2.7	17	48	216	68	<0.05	<1	0.089	0.12	0.016	0.098	<0.10	227	11	<10	600	1.4	NA	NA
	Pad elevation above MSL, approximate	34.63	10/13/2015	31.88	2.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	All elevations relative to MSL		7/15/2015	NA	NA	330	34	44	3.4	15	54	195	81	<0.05	<1	0.082	<0.1	<0.01	0.081	<0.1	213	18	<10	610	0.98		
			7/14/2015	31.61	3.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2015	NA	NA	660	35	33	2.7	99	48	360	170	<0.05	<1	0.083	0.163	<0.01	0.17	<0.1	360	<10	<10	1,000	4.6	NA	NA
			4/14/2015	28.81	5.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	760	55	56	3.0	110	50	300	250	<0.05	<1	0.11	0.159	0.021	0.17	<0.1	300	<10	<10	1,070	4.2	NA	NA
			1/13/2015	26.11	8.52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2014	NA	NA	720	41	46	3.7	110	53	330	200	<0.05	<1	0.10	<0.1	<0.01	0.17	<0.1	330	<10	<10	1,090	6.5	NA	NA
			10/14/2014	31.64	2.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	660	34	35	2.4	95	49	420	160	<0.05	<1	<0.1	0.16	<0.01	0.17	<0.1	420	<10	<10	1,040	6.5	NA	NA
			7/29/2014	32.30	2.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	32.82	1.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	27.98	6.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/17/2014	NA	NA	890	55	70	5.4	100	45	250	380	<0.05	<1	0.15	0.12	0.01	0.31	0.13	250	<10	<10	1,260	4.9	0.0024	423
			1/16/2014	NA	NA	900	57	66	4.60	110	50	240	360	<0.05	<1	0.180	0.2	0.02	0.32	<0.1	240	<10	<10	1,260	6.0	NA	NA
			1/14/2014	28.55	6.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	690	30	40	3.40	100	49	340	190	<0.05	<1	0.091	0.14	<0.01	0.23	<0.1	340	<10	<10	1,050	7.4	NA	NA
			10/14/2013	30.31	4.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/11/2013	NA	NA	860	60	50	4.40	110	47	240	340	<0.05	<1	0.18	0.15	0.02	0.28	<0.1	240	<10	<10	1,230	4.9	NA	NA
			7/9/2013	29.98	4.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	900	60	69	4.60	110	47	250	350	0.82	<1	0.2	0.12	0.03	0.28	<0.2	250	<10	<10	1,250	5.7	NA	NA
			4/10/2013	23.30	11.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/16/2013	NA	NA	820	66	76	5.00	100	47	260	320	<0.1	<1	0.21	0.13	<0.01	0.31	<0.2	260	<10	<10	1,230	4.2	NA	NA
			1/14/2013	23.59	11.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	27.31	7.32	780	65	75	4.70	100	46	255	280	<0.05	<1	0.19	0.14	0.04	0.23	<0.1	255	<10	<10	1,190	4	NA	NA
			7/25/2012	27.15	7.48	830	76	80	5.30	96	45	250	310	<0.05	<1	0.22	0.15	0.04	0.24	<0.1	250	<10	<10	1,220	6.7	NA	NA
			4/19/2012	NA	NA	790	87	69	4.50	52	37	250	270	<0.1	<1	0.19	0.21	0.05	0.17	<0.2	250	<10	<10	1,180	4	NA	NA
			4/18/2012	21.65	12.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/12/2012	23.29	11.34	760	76	85	4.00	79	40	270	190	<0.1	<1	0.23	0.21	0.069	0.23	<0.2	270	<10	<10	1,150	4.8	NA	NA
			11/21/2011	22.46	12.17	720	39	38	3.40	96	43	320	180	<0.05	3.5	0.079	0.19	0.013	0.17	<0.1	320	<10	<10	1,050	4.8	NA	NA
			7/26/2011	25.51	9.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	760	69.3	66	6.40	80	35	310	208.8	<0.05	<1	0.16	0.17	0.041	0.23	0.199	310	<5	<5	1,170	5.3	0.0029	348
			4/20/2011	114.79	-80.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	106.59	-71.96	310	98	22	8.1	34	9.2	19.0	53	<0.05	<1.0	<0.1	0.2	4.42	0.4	0.63	19.0	<2.0	<2.0	480	10	0.0064	156
			10/28/2010	NA	NA	290	81	26	9.3	64	11	160.0	68	<0.1	<1.0	<0.1	0.2	NA	0.85	0.36	160.0	<10	<10	520	38	0.0044	225
			10/21/2010	112.71	-82.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/26/2010	95.61	-65.12	438	85	34.3	1.93	61.7	30.4	30.0	210	< 0.10	< 0.50	0.0435	0.58	0.22	1.46	0.32	30.0	< 1.0	< 1.0	690	36	0.0038	266
			4/26/2010	63.90	-33.41	560	83	47.7	5.7	86.1	48.3	62	310	< 0.10	0.84	< 0.02	< 0.1	0.56	2.54	0.31	62.0	< 1.0	< 1.0	880	233	0.0037	268
			1/27/2010	43.71	-13.22	460	130	45.0	25.4	682	124	112	100	0.56	NA	< 0.0200	0.21	0.25	32.4	0.49	112.0	< 1.0	< 1.0	760	4,360	0.0038	265
			10/20/2009	29.20	1.29	362	92	39.6	2.92	19.2	45.1	76.8	110	< 0.10	< 0.50	0.0697	< 0.10	< 0.10	0.242	0.39	80.0	3.2	< 1.0	590	11.4	0.0042	236
			8/19/2009	24.55	5.94	420	160	48.4	3.37	49.9	20.4	17.6	54	< 0.10	1.1	NA	< 0.10	0.25	1.76	0.68	17.6	< 1.0	< 1.0	690	242	0.0043	235
			5/16/1983	15.80	14.69	665	35	40	NA	85	65	360	90	< 4	NA	NA	0.2	NA	0.01	NA	360	ND	ND	950	0.10	NA	NA

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
Oceano MW-Blue	Screened from 190-210' and 245-265' - 3-inch diameter	**30.54**																									
	Casing relative to concrete pad	-4.09	10/14/2015	NA	NA	350	110	69	9.2	3.7	31	42	74	<0.05	<1	0.16	<0.10	0.099	0.036	0.44	75	33	<10	670	5.7	0.0040	250
	Pad elevation above MSL, approximate	34.63	10/13/2015	32.70	1.93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	All elevations relative to MSL		7/15/2015	NA	NA	380	120	85	11.0	4.3	35	40	85	<0.05	<1	0.19	<0.1	0.1	0.05	0.409	65	25	<10	690	9.6		
			7/14/2015	32.21	2.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2015	NA	NA	400	120	66	7.6	4.9	36	54	100	<0.05	<1	0.17	<0.1	0.088	0.039	0.481	76	22	<10	700	6.6	0.0040	249
			4/14/2015	28.41	6.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	420	125	68	7.0	6.4	37	45	126	<0.05	<1	0.15	<0.1	0.097	0.038	0.39	65	20	<10	720	3.5	0.0031	325
			1/13/2015	25.98	8.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2014	NA	NA	370	120	78	13.0	4.2	29	53	77	<0.05	<1	0.17	<0.1	0.11	0.040	0.35	88	<10	<10	740	4.5	0.0029	343
			10/14/2014	32.70	1.93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	450	120	71	4.4	9.6	43	53	130	0.13	<1	0.15	0.12	0.1	0.078	0.29	73	20	<10	800	8	0.0024	414
			7/29/2014	32.69	1.94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	34.02	0.61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	27.07	7.56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/17/2014	NA	NA	370	120	89	14.0	2.4	17	76	39	<0.05	<1	0.16	<0.1	0.12	0.03	0.43	121	45	<10	720	3.7	0.0036	279
			1/16/2014	NA	NA	350	122	89	15	2	18	68	42	<0.05	<1	0.17	0.1	0.09	0.026	0.48	125	57.5	<10	710	2.3	0.0039	254
			1/14/2014	27.86	6.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	360	100	98	20	3.1	15	66	36	<0.05	<1	0.19	<0.1	0.11	0.057	0.38	139	73	<10	710	4.1	0.0038	263
			10/14/2013	30.98	3.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/11/2013	NA	NA	370	140	70	6.3	4	23	82	40	0.4	<1	0.2	0.11	0.11	0.043	0.44	117	35	<10	730	3.2	0.0031	318
			7/9/2013	29.36	5.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	340	90	81	14	2.9	18	78	30	<0.05	<1	0.19	0.12	0.07	0.046	0.3	155	77.5	<10	650	3.2	0.0033	300
			4/10/2013	24.45	10.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/16/2013	NA	NA	360	107	99	7.1	3.3	24	110	36	<0.05	<1	0.25	<0.1	<0.01	0.048	0.4	165	55	<10	720	3.7	0.0037	268
			1/14/2013	23.14	11.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	27.68	6.95	380	97	100	6.4	4.5	24	130	38	<0.05	<1	0.28	<0.1	0.1	0.09	0.2	168	38	<10	720	6.1	0.0021	485
			7/25/2012	27.18	7.45	240	49	56	11	5.4	22	99	43	<0.05	<1	0.16	0.19	0.023	0.11	<0.1	132	33	<10	470	6.6	NA	NA
			4/19/2012	NA	NA	380	100	87	5.5	3.5	26	150	79	<0.1	<1	0.27	0.26	0.09	0.033	0.68	180	30	<10	750	1.6	0.0068	147
			4/18/2012	20.10	14.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/12/2012	22.26	12.37	480	96	110	4.9	5.6	33	154	95	<0.1	<1	0.28	<0.2	0.11	0.01	0.306	180	26	<10	850	0.2	0.0032	314
			11/21/2011	22.73	11.90	390	90	78	4.6	5.2	24	111	86	<0.05	<1	0.19	0.13	0.092	0.014	0.28	128	17	<10	720	0.5	0.0031	321
			7/26/2011	25.29	9.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	260	29.3	23	5.3	8.7	20	84	80	<0.05	<1	<0.1	0.199	0.072	0.041	<0.1	89	<5	<5	440	2.7	NA	NA
			4/21/2011	NA	NA	580	118	70	19	49	17	8.8	274	<0.05	<1	<0.1	0.29	0.109	0.091	0.4	11.3	2.5	<2.0	950	NA	0.0034	295
			4/20/2011	22.59	12.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	24.87	9.76	680	110	60	17	64	22	5.0	330	<0.05	<1.0	<0.1	0.22	0.96	0.16	0.31	11.2	6.2	<2.0	1,040	10.0	0.0028	355
			10/21/2010	30.11	0.43	770	100	68	12	88	31	14.0	380	<0.1	<1.0	<0.1	0.28	NA	0.054	<0.3	14.0	<10	<10	1,163	2.2	NA	NA
			7/26/2010	24.74	5.80	783	130	80.1	8.58	142	42.0	2.8	450	< 0.10	< 0.50	< 0.0200	0.26	0.31	3.97	0.8	2.8	< 1.0	< 1.0	1,200	593	0.0059	169
			4/26/2010	18.52	12.02	1,130	160	70.2	6.48	208	50.7	8.4	530	< 0.10	0.56	< 0.02	0.23	0.54	3.10	1.0	8.4	< 1.0	< 1.0	1,600	383	0.0061	165
			1/27/2010	22.06	8.48	1,740	430	55.6	4.98	282	43.0	< 1.0	680	< 0.10	< 0.50	0.0819	0.14	0.41	9.41	2.0	< 1.0	< 1.0	< 1.0	2,300	170	0.0047	215
			10/20/2009	27.50	3.04	2,250	1,000	19.5	2.40	487	22.5	5.0	410	< 0.10	0.98	0.0532	0.13	< 0.10	13.1	4.5	5.0	< 1.0	< 1.0	3,100	236	0.0045	222
			8/19/2009	24.65	5.89	322	150	93.2	16.7	23.9	12.1	3.0	4.0	< 0.10	1.3	NA	0.19	0.5	0.7	0.74	23.0	20.0	< 1.0	640	153	0.0049	203
			5/16/1983	13.30	17.24	840	80	90	NA	100	50	250	160.0	< 4	NA	ND	0.2	NA	0.14	NA	250.0	ND	ND	1,200	0.10	NA	NA

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Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
Oceano MW-Silver	Screened from 395-435' and 470-510' - 3-inch diameter	**30.48**																									
	Casing relative to concrete pad	-4.15	10/13/2015	32.30	2.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pad elevation above MSL, approximate	34.63	7/14/2015	32.58	2.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	All elevations relative to MSL		4/14/2015	30.38	4.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/13/2015	26.19	8.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2014	43.01	-8.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/29/2014	33.65	0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	36.33	-1.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	42.20	-7.57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2014	37.78	6.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/14/2013	30.92	3.71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/9/2013	30.91	3.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/10/2013	26.08	8.55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2013	23.12	11.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	27.14	7.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2012	27.68	6.95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/18/2012	20.13	14.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/11/2012	23.00	11.63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			11/21/2011	22.85	11.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/26/2011	25.23	9.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/21/2011	NA	NA	410	97	100	7.2	3.5	21	80	134	<0.05	<1	0.23	0.18	0.097	0.065	0.42	100	20	<2.0	770	NA	0.0043	231
			4/20/2011	21.27	13.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	22.02	12.61	440	92	90	9.2	3.4	27	90	140	<0.05	<1.0	0.25	0.11	0.94	0.041	0.35	110	20	<2.0	810	2.2	0.0038	263
			10/21/2010	29.11	5.52	460	90	110	15	6.8	32	94	140	<0.1	<1.0	0.2	0.1	NA	0.1	0.38	124	30	<10	868	3.5	0.0042	237
			7/26/2010	24.24	6.24	478	83	109	5.94	52.9	30.4	122.0	94	< 0.10	<0.50	0.255	< 0.10	0.41	0.477	0.56	130.0	8.0	< 1.0	730	61.0	0.0067	148
			4/26/2010	19.04	11.44	452	83	83	7.42	29.3	34.5	72.0	190	< 0.1	0.56	0.134	< 0.10	0.65	0.702	0.4	86.0	14.0	< 1.0	810	71.0	0.0048	208
			1/27/2010	21.05	9.43	496	71	92.2	10.6	22.9	39.1	13.0	230	<0.10	< 0.50	0.323	< 0.10	0.20	0.604	0.29	51.0	38.0	< 1.0	780	54.4	0.0041	245
			10/20/2009	27.52	2.96	564	71	80.8	8.63	33.2	49.8	49.6	310	<0.10	< 0.50	0.148	< 0.10	< 0.10	0.337	0.32	64.0	14.4	< 1.0	850	20.0	0.0045	222
			8/19/2009	29.34	1.14	522	180	148	71.6	95.2	8.42	30.0	3.5	<0.10	1.7	NA	0.24	0.52	2.36	0.76	170	140	< 1.0	1,000	278	0.0042	237
			5/16/1983	13.50	16.98	630	40	40	NA	90	50	330	80	< 4	NA	NA	0.1	NA	0.02	NA	330	ND	ND	900	0.05	NA	NA
Oceano # 8																											
	Casing relative to concrete pad		10/14/2015	NA	NA	680	43	44	3.1	100	50	360	160	<0.05	<1	0.089	0.28	0.02	0.033	<0.10	360	<10	<10	1,060	0.18	NA	NA
	Pad elevation above MSL, approximate		7/15/2015	NA	NA	680	43	52	2.4	120	56	360	170	<0.05	<1	0.079	0.11	0.01	0.033	<0.1	360	<10	<10	1,070	0.13	NA	NA
	All elevations relative to MSL		4/16/2015	NA	NA	680	49	41	2.4	100	47	350	170	<0.05	<1	0.068	0.114	<0.01	0.039	<0.1	350	<10	<10	1,030	0.47	NA	NA
			1/13/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2014	NA	NA	670	40	43	2.8	110	50	3500	150	<0.05	<1	0.055	0.103	<0.01	0.03	<0.1	350	<10	<10	1,060	0.064	NA	NA
			7/30/2014	NA	NA	670	43	43	2.2	110	48	360	160	<0.05	<1	<0.1	0.15	<0.01	0.029	<0.1	360	<10	<10	1,070	0.057	NA	NA
			4/15/2014	NA	NA	680	42	43	3.3	87	43	340	170	<0.05	<1	0.09	0.11	<0.01	0.023	<0.1	340	<10	<10	1,070	0.05	NA	NA
			1/16/2014	NA	NA	680	45	42	2.6	100	46	360	171	<0.05	<1	<0.05	0.13	<0.01	0.032	<0.1	360	<10	<10	1,060	0.18	NA	NA
			10/16/2013	NA	NA	670	40	44	2.6	100	47	350	180	0.47	<1	<0.05	0.15	<0.01	0.03	<0.1	350	<10	<10	1,053	0.11	NA	NA
			7/10/2013	NA	NA	670	44	43	2.8	110	52	350	180	<0.05	<1	0.072	0.12	<0.01	0.032	<0.1	350	<10	<10	1,070	0.11	NA	NA
			4/11/2013	NA	NA	720	43	40	2.7	98	46	350	170	<0.05	<1	0.072	0.14	<0.01	0.029	<0.1	350	<10	<10	1,070	0.12	NA	NA
			1/16/2013	NA	NA	660	43	43	2.7	100	47	360	180	<0.05	<1	0.07	0.1	<0.01	0.031	<0.1	360	<10	<10	1,060	0.130	NA	NA
			10/30/2012	NA	NA	660	40	44	2.9	110	49	345	170	<0.05	<1	0.071	0.14	<0.01	0.03	<0.1	345	<10	<10	1,070	0.086	NA	NA
			7/24/2012	NA	NA	700	47	44	2.8	93	45	356	180	<0.05	<1	<0.1	0.17	<0.01	0.029	<0.1	356	<10	<10	1,070	0.660	NA	NA
			4/25/2012	NA	NA	680	48	44	2.7	95	43	350	200	<0.1	<1	<0.1	0.26	<0.01	0.032	<0.2	350	<10	<10	1,070	0.200	NA	NA
			1/10/2012	NA	NA	690	45	44	2.6	100	44	340	160	<0.05	<1	<0.1	0.2	<0.01	0.024	<0.1	340	<10	<10	1,070	0.100	NA	NA
			11/22/2011	NA	NA	690	41	39	2.7	100	46	350	160	<0.1	<1	0.046	<0.2	0.013	0.03	<0.2	350	<10	<10	1,010	0.0	NA	NA
			7/25/2011	NA	NA	690	44	39	4.5	86	40	340	166.9	<0.05	<1	<0.1	0.145	<0.01	0.026	<0.1	340	<5	<5	1,070	<0.1	NA	NA

Table A : Northern Cities Sentry Well Water Quality Data Summary

Well	Construction	Top of Casing Elevation (ft NAVD88)	Date	Depth to Water (feet)	Groundwater Elevation (feet NAVD88)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Bicarbonate (as CaCO3) (mg/L)	Sulfate (mg/L)	Nitrate (as N) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Boron (mg/L)	Fluoride (mg/L)	Iodide (mg/L)	Manganese (mg/L)	Bromide (mg/L)	Alkalinity, Total (as CaCO3) (mg/L)	Carbonate (as CaCO3) (mg/L)	Hydroxide (as CaCO3) (mg/L)	Specific Conductance (umhos/cm)	Iron (mg/L)	Bromide / Chloride Ratio	Chloride / Bromide Ratio
Oceano MW-Yellow	Screened from 625-645' - 3-inch diameter	**30.52**																									
	Casing relative to concrete pad	-4.11	10/14/2015	NA	NA	370	85	91	4.8	3.1	32	159	45	<0.05	<1	0.23	<0.10	0.060	0.043	0.26	189	30	<10	710	0.30	0.0031	327
	Pad elevation above MSL, approximate	34.63	10/13/2015	32.28	2.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	All elevations relative to MSL		7/15/2015	NA	NA	390	90	99	4.4	2.7	34	145	55	<0.05	<1	0.21	<0.1	0.06	0.034	0.24	185	40	<10	730	0.24		
			7/14/2015	32.60	2.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2015	NA	NA	360	89	86	4.8	2.6	31	137	58	<0.05	<1	0.20	<0.1	0.057	0.030	0.266	172	35	<10	680	0.42	0.0030	335
			4/14/2015	30.42	4.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	390	90	84	4.8	2	31	140	61	<0.05	<1	0.18	<0.1	0.059	0.035	0.24	170	30	<10	670	0.47	0.0026	383
			1/13/2015	26.32	8.31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2014	NA	NA	370	80	84	5.0	3.2	32	146	59	<0.05	<1	0.19	<0.1	0.055	0.044	0.18	170	24	<10	720	0.61	0.0023	444
			10/14/2014	41.12	-6.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	380	86	81	4.2	3.6	35	158	61	<0.05	<1	0.16	<0.1	0.05	0.047	0.17	175	17	<10	730	0.25	0.0020	506
			7/29/2014	33.72	0.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	36.55	-1.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	39.06	-4.43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/17/2014	NA	NA	380	84	86	5.2	3	26	120	87	<0.05	<1	0.18	<0.1	0.08	0.032	0.3	143	23	<10	730	0.45	0.0036	280
			1/16/2014	NA	NA	390	89	91	5.0	4.1	34	119	103	<0.05	<1	0.20	<0.1	0.06	0.043	0.34	136	17	<10	740	0.30	0.0038	262
			1/14/2014	27.80	6.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	410	84	87	4.7	5.3	33	114	130	<0.05	<1	0.17	<0.1	0.08	0.053	0.3	124	10	<10	760	0.28	0.0036	280
			10/14/2013	30.83	3.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/11/2013	NA	NA	420	80	70	4.8	4.5	35	116	120	<0.05	<1	0.19	<0.1	0.06	0.047	0.21	136	20	<10	760	0.19	0.0026	381
			7/9/2013	30.41	4.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	450	77	77	4.7	5.8	38	113	150	<0.05	<1	0.19	<0.1	0.06	0.069	0.2	128	15	<10	780	0.15	0.0026	385
			4/10/2013	26.09	8.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	420	74	78	4.7	7.0	40	110	180	<0.05	<1	0.18	<0.1	<0.01	0.087	<0.1	125	15	<10	810	0.55	NA	NA
			1/14/2013	23.25	11.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	27.23	7.40	380	88	99	5.7	3.3	30	160	63	<0.05	<1	0.25	<0.1	0.08	0.035	0.3	168	7.5	<10	740	0.33	0.0034	293
			7/25/2012	27.69	6.94	390	108	107	5.5	2.7	29	13	66	<0.05	<1	0.28	<0.1	0.079	0.0037	0.23	168	155	<10	750	0.84	0.0021	470
			4/19/2012	NA	NA	390	110	83	4.3	2.5	26	400	68	<0.1	<1	0.22	0.23	0.09	0.032	0.39	420	20	<10	790	0.24	0.0035	282
			4/18/2012	20.05	14.58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/12/2012	23.08	11.55	410	94	95	4.5	3.0	28	300	68	<0.1	<1	0.24	<0.2	0.1	0.032	0.31	320	20	<10	760	0.89	0.0033	303
			11/21/2011	22.98	11.65	410	94	83	4.6	3.4	30	152	72	<0.05	<1	0.21	<0.1	0.09	0.035	0.3	160	8	<10	730	0.65	0.0032	313
			7/26/2011	26.73	7.90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	420	89.7	84	7.1	4.4	31	148	91.8	<0.05	<1	0.20	<0.1	0.071	0.046	0.297	150	2.5	<5	760	1.90	0.0033	302
			4/21/2011	NA	NA	380	88	110	6.3	4.0	27	140	101	<0.05	<1	0.41	0.14	0.07	0.13	0.33	140	<2.0	<2.0	750	N/A	0.0038	267
			4/20/2011	21.30	13.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	22.01	12.62	430	83	73	6	6.3	31	160	100	<0.05	<1.0	0.22	0.11	0.66	0.078	0.28	160	<2.0	<2.0	780	0.49	0.0034	296
			10/21/2010	28.22	2.30	410	87	100	3.9	6.0	33	148	100	<0.1	<1.0	0.14	<0.1	NA	0.087	<0.3	148	<10	<10	796	0.66	NA	NA
			7/26/2010	25.50	5.02	446	94	93.0	8.81	10.2	32.0	38.4	120	< 0.10	< 0.50	0.142	< 0.10	0.32	0.196	0.48	56.0	17.6	< 1.0	700	22.4	0.0051	196
			4/26/2010	19.17	11.35	416	96	87.6	9.86	14.8	37.1	46.0	150	< 0.1	0.63	0.132	< 0.10	0.39	0.579	0.44	58.0	12.0	< 1.0	780	56.2	0.0046	218
			1/27/2010	20.58	9.94	498	89	79.6	10.2	15.6	38.0	31.0	180	< 0.10	0.56	0.132	< 0.10	0.19	0.283	0.38	51.0	20.0	< 1.0	810	23.6	0.0043	234
			10/20/2009	25.80	4.72	446	100	97.1	12.8	16.4	37.9	26.6	180	< 0.10	0.56	0.168	0.2	< 0.10	0.180	0.42	42.6	16.0	< 1.0	760	18.9	0.0042	238
			8/19/2009	31.04	-0.52	426	160	101	18.9	93.2	29.1	64.4	36	< 0.10	0.98	NA	0.2	0.31	5.490	0.60	84.4	20.0	< 1.0	790	682	0.0038	267
			5/16/1983	14.30	16.22	770	60	70	NA	90	70	330	120	9	NA	NA	0.1	NA	0.02	NA	330	ND	ND	1,100	0.24	NA	NA

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12N/36W-36L01	Screened from 227-237' - 2-inch diameter	**26.77**																									
Height of steel casing added to the concrete pad elevation		2.79	10/15/2015	NA	NA	920	37	63	4.2	120	47	180	400	0.68	<1	0.15	<0.20	<0.01	<0.005	<0.20	180	<10	<10	1,210	<0.05	NA	NA
Pad elevation NAVD 88		23.98	10/13/2015	22.14	4.63	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		24.0	7/16/2015	NA	NA	930	39	74	2.8	140	50	180	410	1.2	<1	0.15	<0.1	<0.01	<0.005	<0.1	180	<10	<10	1,210	<0.05		
			7/14/2015	21.84	4.93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/14/2015	21.18	5.59	890	38	55	3.1	110	44	180	440	0.759	1.0	0.16	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,160	<0.05	NA	NA
			1/13/2015	19.89	6.88	880	39	59	3.0	120	45	180	440	0.584	<1	0.14	<0.1	<0.01	<0.005	<0.1	180	<10	<10	1,160	<0.05	NA	NA
			10/15/2014	NA	NA	910	34	58	3.7	120	43	180	380	0.950	<1	0.14	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,210	<0.05	NA	NA
			10/14/2014	21.75	5.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/29/2014	NA	NA	890	36	61	3.2	120	47	180	390	0.603	<1	0.12	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,220	<0.05	NA	NA
			7/29/2014	21.57	5.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	22.36	4.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	19.89	6.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	910	36	46	2.6	76	27	180	440	0.77	<1	0.15	<0.1	<0.01	<0.005	<0.1	180	<10	<10	1,200	<0.05	NA	NA
			1/16/2014	NA	NA	910	35	60	3.1	110	42	180	416	1.00	1.1	0.14	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,190	<0.05	NA	NA
			1/14/2014	20.38	6.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	910	40	63	4.5	120	43	170	460	0.76	<1	0.13	<0.2	<0.01	<0.005	<0.2	170	<10	<10	1,210	<0.05	NA	NA
			10/14/2013	21.71	5.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	910	39	54	3.2	120	42	175	430	0.78	<1	0.14	<0.1	<0.01	<0.005	<0.1	175	<10	<10	1,210	0.18	NA	NA
			7/9/2013	21.37	5.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	890	38	59	3.6	110	43	180	420	0.82	<1	0.16	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,200	<0.05	NA	NA
			4/10/2013	20.10	6.67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	870	39	61	3.4	110	41	178	440	0.57	<1	0.15	<0.2	<0.01	<0.005	<0.2	178	<10	<10	1,190	0.13	NA	NA
			1/14/2013	18.62	8.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/31/2012	20.11	6.66	910	35	66	4.0	130	46	165	400	1.60	<1	0.16	0.2	<0.01	<0.005	<0.5	165	<10	<10	1,200	<0.05	NA	NA
			7/24/2012	19.42	7.35	880	43	65	3.9	110	41	168	420	<0.05	<1	0.16	<0.1	<0.01	0.02	<0.1	168	<10	<10	1,190	0.19	NA	NA
			4/20/2012	18.26	8.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/18/2012	23.83	2.94	880	47	52	3.2	95	36	180	450	0.42	<1	0.12	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,190	<0.1	NA	NA
			1/11/2012	17.68	9.09	790	41	64	4.1	120	44	170	380	1.30	<1	0.19	0.18	<0.02	<0.005	<0.2	170	<10	<10	1,190	<0.1	NA	NA
			11/21/2011	18.08	8.69	910	39	55	3.5	110	40	180	380	0.37	<1	0.16	<0.2	<0.01	<0.005	<0.2	180	<10	<10	1,200	<0.1	NA	NA
			7/26/2011	19.63	7.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	890	40.5	65	5.7	110	43	170	408.9	0.39	<1	0.15	<0.1	<0.01	<0.005	<0.1	170	<5	<5	1,200	0.024	NA	NA
			4/21/2011	NA	NA	890	42	61	4.2	100	30	170	415	0.60	<1	0.19	0.07	<0.01	<0.005	<0.1	170	<2.0	<2.0	1,200	NA	NA	NA
			4/20/2011	18.26	8.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	17.61	8.68	890	41	55	5.1	98	36	180	400	0.50	<1.0	0.20	0.15	<0.10	<0.005	<0.1	180	<2.0	<2.0	1,200	<0.1	NA	NA
			10/21/2010	20.75	5.54	910	38	76	3.6	130	47	169	400	0.39	<1.0	0.10	<0.1	NA	<0.005	<0.3	169	<10	<10	1,213	<0.1	NA	NA
			7/27/2010	21.18	5.11	707	36	64.2	3.70	127	47.4	182	420	0.40	< 0.50	0.158	< 0.10	< 0.10	< 0.00500	0.11	182	< 1.0	< 1.0	1,100	< 0.100	0.0031	327
			4/26/2010	15.94	8.06	860	42	70.3	4.13	129	48.9	191	400	0.45	0.77	0.223	< 0.1	0.15	0.057	0.14	191	< 1.0	< 1.0	1,100	4.53	0.0033	300
			10/21/2009	17.72	6.28	856	38	72.0	4.64	131	48.2	192	420	0.49	0.84	0.150	0.12	< 0.10	0.0994	0.13	192	< 1.0	< 1.0	1,100	1.68	0.0034	292
			8/20/2009	19.16	4.84	890	39	78.0	4.21	138	48.1	184	390	0.49	0.56	NA	< 0.10	< 0.10	0.185	0.14	184	< 1.0	< 1.0	1,200	2.03	0.0036	279
			5/11/2009	17.68	6.32	832	63	83.8	4.88	111	45.4	204	330	NA	NA	NA	0.12	NA	0.551	0.22	204	< 1.0	< 1.0	1,200	4.02	0.0035	286
			3/26/1996	NA	NA	882	35	66	4.8	124	47	233	408	2	NA	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/8/1976	NA	NA	936	38	72	3.5	130	48	223	423	0.6	NA	0.15	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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12N/36W-36L02	Screened from 535-545' - 2-inch diameter	**26.77**																									
Height of steel casing added to the concrete pad elevation		2.79	10/15/2015	NA	NA	800	89	96	6.0	91	0.15	266	230	<0.05	2.2	0.32	0.22	0.098	0.15	0.37	266	<10	<10	1,220	0.32	0.0042	241
Pad elevation NAVD 88		23.98	10/13/2015	27.17	-0.40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOC elevation prior to renovation (Approximate)		24.0	7/16/2015	NA	NA	840	97	120	5.9	110	46	260	240	<0.05	2.44	0.34	0.11	0.11	0.15	0.59	260	<10	<10	1,230	0.16		
			7/14/2015	26.11	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/14/2015	22.24	4.53	800	98	88	5.3	83	39	270	240	<0.05	2.9	0.33	0.104	0.089	0.13	0.380	270	<10	<10	1,180	0.40	0.0039	258
			1/13/2015	16.91	9.86	820	100	91	5.5	86	39	250	250	<0.05	2.2	0.31	0.105	0.09	0.13	0.322	250	<10	<10	1,190	0.077	0.0032	311
			10/15/2014	NA	NA	800	88	96	6.4	91	40	260	210	<0.05	2.1	0.32	<0.1	0.092	0.14	0.358	260	<10	<10	1,230	0.12	0.0041	246
			10/14/2014	26.30	0.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/29/2014	NA	NA	800	98	99	5.8	88	39	280	210	<0.05	2.4	0.28	0.11	0.09	0.14	0.19	280	<10	<10	1,240	0.27	0.0019	516
			7/29/2014	25.64	1.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	25.22	1.55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	16.94	9.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/16/2014	NA	NA	820	95	89	6.3	73	31	280	210	<0.05	2.3	0.31	<0.1	0.09	0.13	0.35	280	<10	<10	1,240	0.22	0.0037	271
			1/16/2014	NA	NA	800	100	87	5	76	33	270	230	<0.05	2.3	0.31	0.23	0.09	0.14	0.44	270	<10	<10	1,230	0.41	0.0044	227
			1/14/2014	18.76	8.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	810	90	110	6.4	91	40	260	240	<0.05	2.2	0.32	<0.1	0.1	0.15	0.32	260	<10	<10	1,220	0.54	0.0036	281
			10/14/2013	23.94	2.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/10/2013	NA	NA	790	105	94	5.8	88	38	260	240	<0.05	2.5	0.34	<0.1	0.08	0.13	0.11	260	<10	<10	1,240	0.31	0.0010	955
			7/9/2013	23.15	3.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/11/2013	NA	NA	830	100	99	6.2	83	37	260	220	<0.05	2.2	0.35	<0.1	0.098	0.14	0.45	260	<10	<10	1,240	0.60	0.0045	222
			4/10/2013	15.35	11.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	770	110	110	6.7	84	38	265	220	<0.05	2.8	0.36	<0.1	0.02	0.14	0.20	265	<10	<10	1,240	0.61	0.0018	550
			1/14/2013	11.24	15.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/31/2012	18.81	7.96	800	100	120	7.3	90	39	265	200	<0.1	2.4	0.4	0.34	0.12	0.14	0.34	265	<10	<10	1,250	0.30	0.0034	294
			7/24/2012	19.05	7.72	800	134	125	7.4	83	35	277	200	<0.05	2.3	0.42	0.13	0.12	0.14	0.31	277	<10	<10	1,250	0.52	0.0023	432
			4/18/2012	10.81	15.96	770	130	95	6.2	75	33	270	210	0.42	4	0.35	0.36	0.12	0.13	<0.2	270	<10	<10	1,250	0.77	NA	NA
			1/11/2012	11.18	15.59	900	122	110	7.2	95	37	290	170	<0.1	4.8	0.48	0.28	<0.02	0.17	0.45	290	<10	<10	1,250	1.80	0.0037	271
			11/21/2011	13.99	12.78	780	130	95	6.1	77	33	270	160	<0.1	<1	0.4	<0.2	<0.01	0.13	0.45	270	<10	<10	1,240	0.40	0.0035	289
			7/26/2011	18.03	8.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/25/2011	NA	NA	790	128.8	110	9.1	74	33	280	177	<0.05	2.3	0.36	0.12	0.14	0.13	0.51	280	<5	<5	1,280	2.30	0.0040	252
			4/21/2011	NA	NA	770	120	90	5.3	86	26	280	206	<0.05	2.3	0.24	0.26	0.14	0.004	0.57	280	<2.0	<2.0	1,270	NA	0.0048	211
			4/20/2011	10.33	16.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/24/2011	9.37	16.92	800	120	95	7.6	75	30	300	190	<0.05	2.3	0.39	0.16	1.31	0.13	0.53	300	<2.0	<2.0	1,270	1.40	0.0044	226
			10/21/2010	19.77	6.52	770	120	130	7.6	89	44	275	160	<0.1	3.4	0.48	<0.1	NA	0.15	0.54	275	<10	<10	1,293	0.12	0.0045	222
			7/27/2010	20.53	5.76	737	110	121	7.81	91.1	38.9	268	190	< 0.10	< 0.50	0.427	0.10	0.77	0.180	0.80	268	< 1.0	< 1.0	1,200	0.845	0.0073	138
			4/26/2010	9.24	14.76	720	100	116	6.88	85.4	32.4	215	210	1.5	0.77	0.382	0.2	0.28	0.167	0.7	215	< 1.0	< 1.0	1,100	3.870	0.0070	143
			10/21/2009	17.65	6.35	638	99	113	6.15	81.6	23.0	172	200	< 0.10	3.2	0.268	0.33	57	0.128	0.61	172	< 1.0	< 1.0	940	0.255	0.0062	162
			8/20/2009	19.15	4.85	785	100	131	6.66	89.8	36.6	290	190	< 0.10	3.8	NA	0.15	0.27	0.307	0.75	290	< 1.0	< 1.0	1,200	0.830	0.0075	133
			5/11/2009	14.38	9.62	775	120	132	7.24	84	39.7	294	180	NA	NA	NA	0.18	NA	0.426	0.78	294	< 1.0	< 1.0	1,300	0.958	0.0065	154
			3/26/1996	NA	NA	772	127	130	8.7	86	36	390	148	0.2	NA	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/8/1976	NA	NA	820	126	118	6.6	94	44	393	184	0	NA	NA	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
County MW-3 12N/35W-32C03	Screened from 90-170' - 5-inch diameter	47.70																									
Casing relative to concrete pad			10/14/2015	NA	NA	280	61	57	2.6	12	5.8	51	28	8.4	<1	0.090	<0.10	<0.01	<0.005	<0.10	51	<10	<10	430	0.33	NA	NA
Pad elevation above MSL, approximate		47.70	10/13/2015	51.21	-3.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
All elevations relative to MSL			7/14/2015	49.07	-1.37	280	64	67	2.7	14	6.2	50	30	8.0	<1	0.10	<0.1	<0.01	<0.005	<0.1	50	<10	<10	440	0.22		
			4/15/2015	NA	NA	280	62	52	2.4	12	5.4	51	30	7.8	<1	0.081	<0.1	<0.01	<0.005	0.11	51	<10	<10	420	0.11	0.0018	564
			4/14/2015	44.00	3.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/14/2015	NA	NA	290	63	56	2.3	13	5.8	51	30	8.2	<1	0.077	<0.1	<0.01	<0.005	0.1	51	<10	<10	420	0.38	0.0016	630
			1/13/2015	38.90	8.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2014	NA	NA	270	55	54	2.7	13	5.7	51	26	7.3	0.3	0.069	<0.1	<0.01	0.005	<0.1	51	<10	<10	430	0.35	NA	NA
			10/14/2014	50.50	-2.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/30/2014	NA	NA	280	60	58	1.9	14	6.5	60	29	7.3	<1	<0.1	<0.1	<0.01	<0.005	<0.1	60	17	<10	450	0.16	NA	NA
			7/29/2014	44.02	3.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			6/4/2014	45.46	2.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/15/2014	41.51	6.19	270	57	55	2.2	12	5	54	29	7.1	<1	0.096	<0.1	<0.01	<0.005	0.11	54	<10	<10	430	0.21	0.0019	518
			1/16/2014	NA	NA	300	62	57	2.8	14	6.3	54	35	8.1	8.2	<0.1	<0.1	<0.01	0.008	0.12	54	<10	<10	450	0.47	0.0019	517
			1/14/2014	41.00	6.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/16/2013	NA	NA	310	58	62	2.9	15	6.4	54	38	7.5	<1	0.06	<0.1	<0.01	0.009	0.1	54	<10	<10	450	0.21	0.0017	580
			10/14/2013	45.26	2.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			7/11/2013	NA	NA	290	60	45	2.4	14	5.9	61	30	7.4	<1	0.071	<0.1	<0.01	0.006	<0.1	61	<10	<10	440	0.17	NA	NA
			7/9/2013	43.83	3.87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			4/12/2013	NA	NA	330	58	55	2.9	16	6.6	60	35	7.5	<1	0.091	<0.1	<0.01	0.019	0.1	60	<10	<10	460	0.49	0.0017	580
			4/10/2013	37.89	9.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			1/15/2013	NA	NA	290	62	57	2.8	15	6.3	55	38	8.3	<1	0.089	<0.1	<0.01	0.01	<0.1	55	<10	<10	470	0.23	NA	NA
			1/14/2013	32.26	15.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			10/30/2012	40.05	7.65	330	57	60	3.3	19	7.5	60	36	7.8	<1	0.09	<0.1	<0.01	0.033	<0.1	60	<10	<10	470	1.9	NA	NA
			7/25/2012	38.62	9.08	330	67	61	3.3	17	6.4	59	35	8.2	<1	<0.1	<0.1	<0.01	0.068	<0.1	59	<10	<10	460	0.49	NA	NA
			4/19/2012	23.02	24.68	370	74	52	2.9	30	12	120	58	5	<1	0.17	0.2	<0.01	0.056	<0.2	120	<10	<10	580	1.3	NA	NA