

Figure 2-1. Existing Nye County Land Uses.

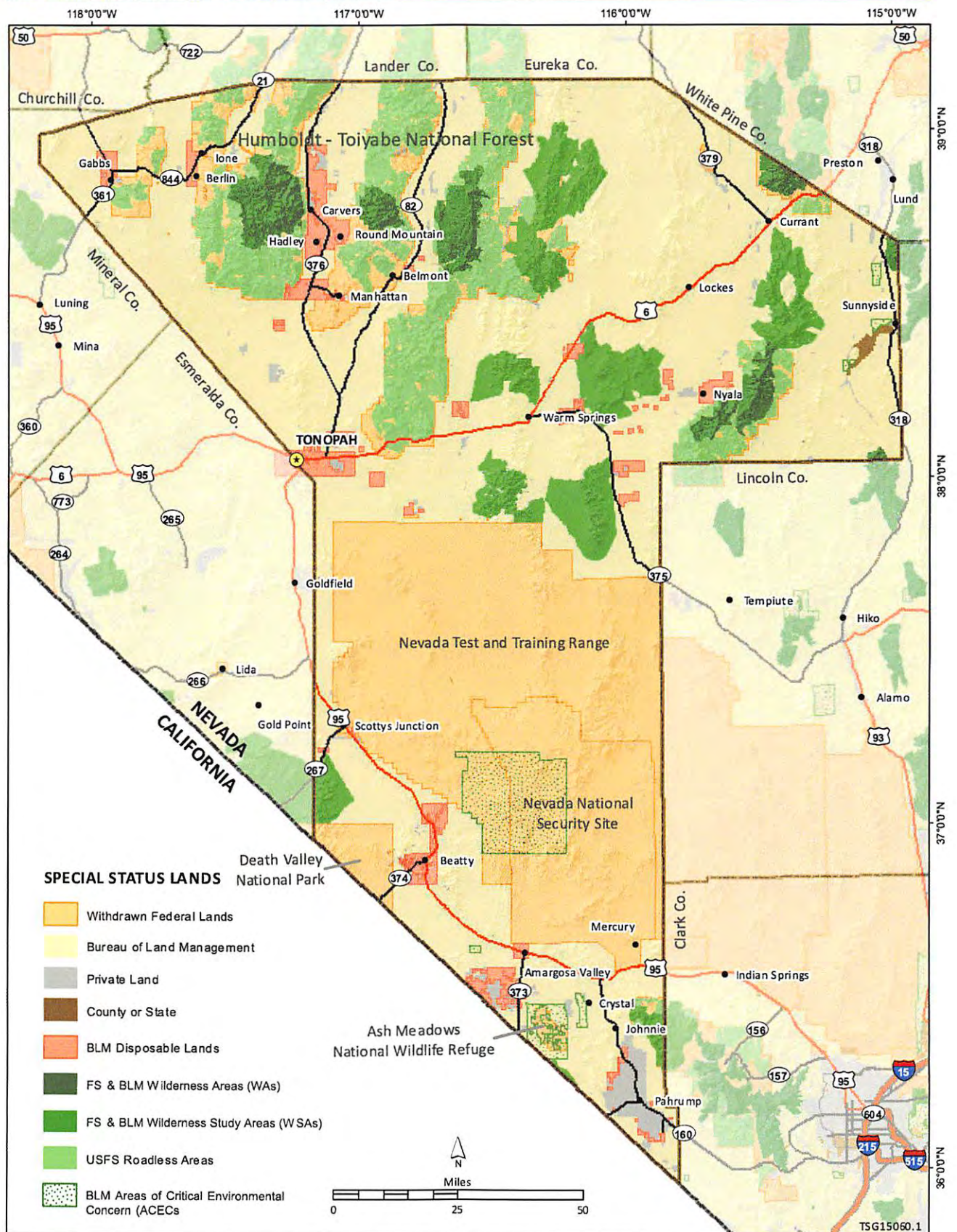


Figure 2-2. Federal facilities and special status lands in Nye County from BLM land status, WAs, WSAs, and ACECs (2014), USFS WAs and WSAs (2011), and USFS roadless areas (2008).

Beginning in 2009, interest in renewable energy development in many parts of Nevada increased dramatically. BLM received over 100 applications for renewable energy facilities on public lands in Nye County. The first wave of applications included facilities aimed at exploiting solar power using trough technology and wet cooling systems. Federal agency concerns about the water-intensive technology and proposed mitigation measures caused most applicants to opt out. Nye County also established leases for renewable energy developments at the Tonopah Airport. As with the majority of applications on public land, these projects have not materialized. Although there has been much interest and discussion of renewable energy development, after 10 years, only one facility has been constructed in Nye County.

The continued diversification of the County's economy, along with growth in existing sectors, will contribute to future water demand. Pending ready for action (RFAs) and/or ready for protest (RFPs) applications, as of August 2015 for groundwater, and April 2015 for surface water, totaled about 106,955 acre-feet per year (AFY) of mostly groundwater. These numbers suggest the following near-term trends.

Demand in the industrial sector is expected to rise gradually as new renewable energy power plants are approved, constructed and brought online. Although water demand for renewable energy facilities is highly variable depending upon the selected technology, new projects are not expected to have a large impact on groundwater resources. The Crescent Dunes facility, a 110 megawatt solar tower with molten salt storage located outside of Tonopah is completed and in the testing phase, and allocated approximately 900 acre-feet per year. Water demand for power generation (i.e., hydro-electric) is expected to remain at about 6,700 acre-feet per year since no additional surface water for power is available.

Agricultural water needs are not expected to change significantly in the future. Pending applications for irrigation totaled less than 10,000 acre-feet per year in April 2015. Agricultural water use is expected to remain near current levels in the short term, but will likely increase slightly as operations move from areas with a higher cost of doing business. Because federal land use policies are becoming more restrictive, agricultural growth will be limited to "wetter" northern basins. The Desert Land Entry applications, if perfected at the historic rate of about three percent, will add slightly to future water demand.

Commercial water demand is expected to rise slightly in the southern part of the County based on business licensing trends. Water demand to meet mining and milling needs is expected to remain at the current levels. Future water demand for quasi-municipal purposes is expected to increase as a result of pending applications by the Southern Nevada Water Authority. Federal water demand for wildlife, firefighting, and recreation are expected to increase in response to changes in federal resource management policy and continued drought conditions.

Nye County is projecting additional renewable energy industry projects, including solar energy, in Amargosa, Beatty, Pahrump, Round Mountain, and Tonopah. Expansion of the petroleum industry through additional oil and gas leases from the BLM in Railroad Valley are indicative of increase traditional energy supply production. New mining interests, continued operation, and expansion of established mines in the Round Mountain, Gabbs, Tonopah, Beatty, and Amargosa areas have supported direct and indirect development in those towns.

2.2. DEMOGRAPHICS

Nevada was the fastest growing state in the U.S. from 2000 to 2010. It is the only state that has maintained a growth rate of 25 percent or greater for the last three decades, and has been the fastest-growing state for five straight decades (Dept. of Census, 2011). Growth was explosive in southern Nye County until 2008, with most of the new residents settling in the community of Pahrump. The phenomenal growth of Pahrump established Nye County as one of the fastest growing counties in Nevada on a percentage basis. Nye County's northern and rural communities experienced relatively stable population numbers during this same period.

Population

In the late 2000s, both national and state population growth slowed as a result of the economic collapse and recession. By 2013, annual population growth rates were at their lowest nationally since the 1930s, at 0.072 percent. Nevada's population growth rate over the period of 2003 to 2008 held one of the highest rates in the country, reaching 3.0 percent annually. However, from 2008 to 2013, Nevada's annual population growth rate dropped to 1.0 percent. Domestic in-migration to Nevada also decreased significantly during this period. From 2003 to 2008, Nevada's domestic in-migration was recorded at 222,978 persons. The period from 2008 to 2013 was a stark contrast, at 3,257 persons migrating into the state. These numbers are once again rising; however, the return to the prior economic and demographic conditions is occurring more slowly than anticipated (Frey, 2014).

Table 2-1 presents the historical Nye County population figures and 2015 baseline values compiled from a number of sources, including the US Census Bureau, the Nevada State Demographer, the NDWP 1999 State Water Plan, and Nye County population counts. As can be seen from historic data (1900 to 2015), the County population has fluctuated greatly in response to economic conditions. Early demographics were affected by boom-bust mining cycles and later by federal defense and energy related projects and activities related to nuclear testing development of the stealth fighter, and the Yucca Mountain Repository Project. Recent growth from westward migrations caused a slow but steady increase through the 1990s that spiked with the national economic boom of the early 2000s.

Preliminary 2016 population projections by the Nevada State Demographer show Nevada and Nye County's population declining through 2020 and remaining flat until 2022 when it begins to increase slightly. These state projections are calculated with and without the effects of approved major projects (e.g., Tesla, Switch, and Faraday Future), none of which are located in Nye County. Nye County Planning Department population data, which are based on utility hook-ups and other local indicators, show a slow, steady increase in population, which is consistent with other recent demographic studies, but does not agree with the preliminary 2016 State Demographer projections, which are not presented.

The result of an increasing population in Nevada is an expected increase in the future water demand, and additional competition for water resources. This increased demand is not only expected to affect counties where the populations are increasing, but to affect all areas where water resources are presently or potentially available. Much like the 1980's when growth in southern Nevada prompted Las Vegas to seek water resources from distant basins in rural areas,

water-poor areas will continue to look to the wetter parts of Nevada to help to meet increasing demand.

Table 2-1. Historical Nye County Population Baseline as reported by various agencies.

YEAR	US Census Data	State Demographer	NDWP 1998	Nye County Planning
1900	1,140			
1910	7,513			
1920	6,504			
1930	3,989			
1940	3,606			
1950	3,101		3,101	
1955		2,600	2,600	
1960	4,624	4,642	4,624	
1965		5,453	5,453	
1970	5,599	5,459	5,459	
1975		5,500	5,500	
1980	9,048	9,048	9,048	
1985		14,570	14,570	
1990	17,781	18,190	18,190	18,190
1995		23,050	23,050	
2000	32,485	32,978	30,417	39,495
2005		37,289	34,988	46,800
2010	43,946	43,936	39,182	46,202
2015		45,619	45,471	47,319

U.S. Census Data 1900 – 1990, Forstall, Washington, DC

Nevada State Demographer 2000 – 2015 ASRHO 2000-2033 projected

Table 2-2 shows population forecasts from 2010 through the year 2060 from modified projections from the NDWP 1999 State Water Plan, and Nye County Planning Department population estimates. State Water Plan Forecasts were modified by projecting growth rates forward in time from 2020 to 2060. Nye County population projections were calculated based on County population counts, which yield an average annual growth rate of 0.48 percent for the last five-year period. This growth rate results in substantially lower projections than earlier state forecasts, but they are likely to be exceeded as the economy improves.

Figure 2-3, modified from the 2013 Nye County Water Supply Appraisal Investigation (WSAI) Report, illustrates historical population trends through 2010, and forecasts population at the 1.5 percent growth rate. Although, the 2004 Nye County WRP applied a 3 percent annual growth rate that was not sustained during the economic downturn of 2008, the Census Bureau, continues to forecast regional growth rates in the Mountain states (including Nevada) at 3.7 percent, and nearly 3 percent for the Pacific states (including neighboring California). Of the various population projections, the NDWP Modified Forecasts with a 1.5 percent annual growth consistently tracks more closely to the observed population than those of other sources. Population projections for the water demands developed later in Chapter 4 use the NDWP-Modified Forecast at 1.5 percent annual growth.

Table 2-2. Population Forecasts for Nye County as published by various agencies.

Year	NDWP-Modified Forecasts			Nye County Population/ Forecasts
	1% Annual Growth	1.5% Annual Growth	2% Annual Growth	1.5% Annual Growth
2010	41,185	41,185	41,185	46,202
2015	45,471	45,471	45,471	47,319
2020	48,684	48,684	48,684	50,976
2025	51,167	52,446	53,751	54,916
2030	53,777	56,500	59,346	59,160
2035	56,521	60,866	65,522	63,732
2040	59,404	65,570	72,342	68,657
2045	62,434	70,638	79,871	73,963
2050	65,619	76,097	88,184	79,680
2055	68,966	81,978	97,363	85,838
2060	72,484	88,314	107,496	92,471
2010 to 2020 from NDWP (1999); 2025 to 2060 from WSAI Modified Forecasts (GGI, 2013)				2020 and beyond based on constant 1.5% growth rate.

Forecasting future growth and population in a rapidly changing region such as Southern Nevada is difficult and inexact. Any of a number of factors can have a significant effect on Nye County's population. Because water planning is based upon the best available estimates of future demographics and the magnitude and distribution of water demands, the projections and forecasts presented in this updated WRP should be periodically reviewed and modified to reflect evolving information and developments.

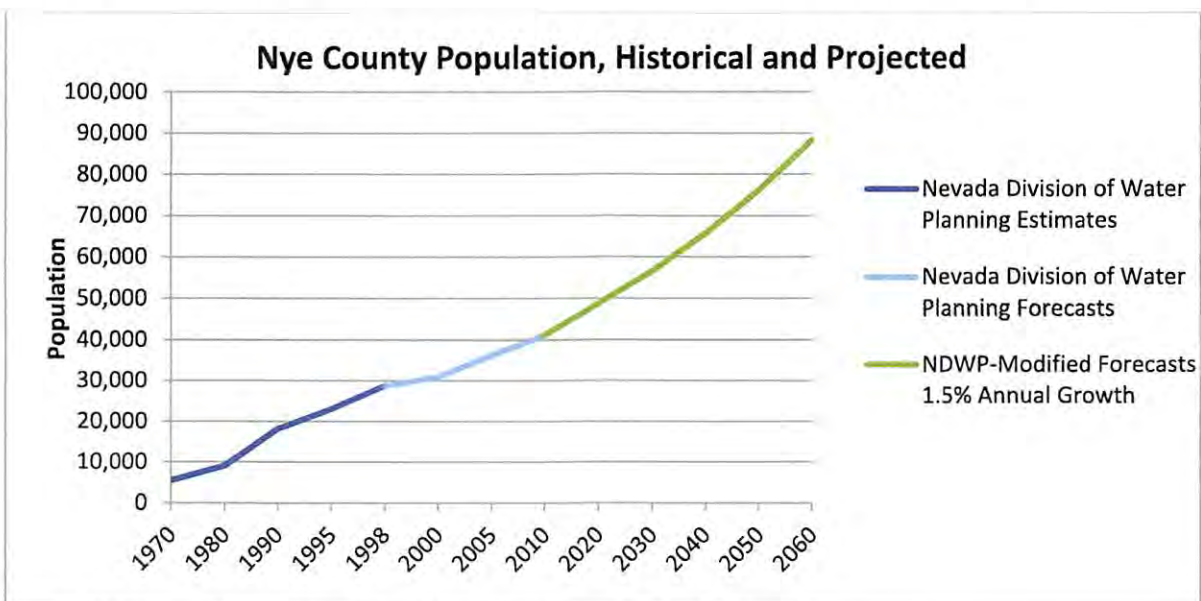


Figure 2-3. Graph showing Historical and Projected Population for Nye County.

Land Use

A “land-based” approach or build-out analysis for Pahrump and Amargosa Valley was presented in the 2004 Nye County WRP, and in the Pahrump Master Plan update to establish bounds on future water demand. Federal agencies, such as BLM, have also used it as a basis to evaluate future land disposal. The build-out approach to forecasting water demand identifies the maximum possible build-out of the existing and projected private land base and resultant water demand necessary to achieve and sustain it. It does not consider the time frame required to achieve full build-out, but does address whether full build can be achieved, when considering other constraints, including the availability of water resources. The purpose of a build-out analysis is to allow the community to test existing land use plans, zoning, and subdivision ordinances to estimate sustainable population once all developable land has been converted to the uses permitted under the approved regulatory framework.

The build-out analyses in Pahrump and Amargosa Valley were useful in establishing the maximum demands associated with the undeveloped residential land parcels, and commercial and industrial development. Results of these analyses spurred the adoption of planning ordinances that remove and mitigate the incidental creation of domestic well entitlements. Similar growth potential exists in the Town of Manhattan due to the large number of patented mining claims. Table 2-3 shows the inventory of vacant private parcels that could potentially be developed. Parcels greater than one acre are assumed to allow for a domestic well in the build-out analysis. This would represent the potential upper bound on domestic wells for the current number of parcels.

Table 2-3. Developable Parcels in Nye County.

Private Land Uses in Nye County		
Community	Vacant Parcels	
	Less than 1 acre	Greater than 1 acre
Amargosa Valley/Crystal	224	1,211
Beatty/Beatty Water and Sanitation District	122	145
Gabbs	29	16
Pahrump	21,955	8,508
Manhattan	82	0
Round Mountain	152	2
Tonopah includes Tonopah Library District	468	183
Smoky Valley (Includes Belmont)	78	204
Other Rural	2	152

Excludes patented mining claims. Data from Nye County Assessor's Office (August 2015)

As briefly discussed in Chapter 1, in order to better manage development related to the population growth in southern Nye County, the towns of Pahrump, Amargosa Valley, and Beatty prepared, approved, and implemented Master and Area Plans that establish the allowable land uses. Table 2-4 shows the approved land uses and their associated acreages as presented in these plans. Planning data collected since the 1990's show that the population of northern Nye County has remained relatively stable. As a result, these areas and communities have retained open land use and zoning.

Table 2-4. Designated Land Uses and associated acreage in approved County plans.

Designated Land Use (Acres)	Community		
	Amargosa Valley	Beatty	Pahrump
Agriculture	6,587	1,220	*
Commercial	1,623	1,463	5,087
Industrial	5,167	3,821	2,269
Municipal	47	621	6,873**
Recreation	40	820	534
Residential Domestic	11,675	1,641	79,451
Residential Quasi-Municipal	354	329	
Total	25,493	9,915	94,214

* Not designated

** Special Point of Diversion assumed to use Municipal Supply

From 2014 Pahrump Valley Master Plan, Amargosa Valley Area Plan, and Beatty Area Plan



Photo 2. Looking southwest across the Pahrump Valley, 2003. Photo credit: TerraSpectra Geomatics, 2003.

Development

Since the issuance of the 2004 WRP, Nye County has seen a variety of new development projects. Several of the projects identified in the 2004 plan were not completed due to the economic downturn that began shortly thereafter. Table 2-5 summarizes the projects by status: 1) previously identified in the 2004 WRP; 2) completed; 3) currently approved and/or under construction; and, 4) potential projects currently under discussion, but not yet in the formal planning process.

Table 2-5. 2004 WRP Development Project Summary by Status.

2004 WRP Development Summary

	Type	Location	Basin	Description/No. of units	Status
Mountain Falls	residential/ commercial	South Pahrump	Pahrump Valley	3,200 residential lots, golf course, and mixed commercial including gaming	Golf course completed. 1,276 lots sold to developers. 670 homes completed. 1,924 lots available.
Mayfield Ranch Estates	residential	North Pahrump	Pahrump Valley	181 lots for manufactured homes	sporadic activity
Artesia at Hafen Ranch	residential	South Pahrump	Pahrump Valley	898 lots	sporadic activity
Front Sight	commercial	Clark/Nye County line	Pahrump/ Sandy Valleys	shooting range	completed
Amargosa Valley Science and Technology Park	commercial, industrial	Amargosa Valley	Amargosa Desert	acres, individual	Awaiting BLM ROWs since 2009. No action.
Wal-Mart	commercial	North Pahrump	Pahrump Valley	15 acres	cancelled
Torino Ranch	recreational	Lovell Canyon (Clark County)	Pahrump Valley	30 cabins	completed
Desert Rock Sky Park	industrial	Nevada Test Site	Mercury Valley	512 acres	stalled
Gate 510 Business Park	industrial	north of Lathrop	Jackass Flats	6 mi ²	stalled
Smotrich Development	residential	Amargosa Valley	Amargosa Desert	64 lots	approved/no activity
Desert Trails	residential	North Pahrump	Pahrump Valley	1,246 lots	Intermittent activity, some land returned to agriculture
Timbisha Tribal Lands	residential/ commercial	Scotty's Junction	Sarcobatus Flat	2,800 acres, 1 commercial/ residential, 375 AFY reserved authorized rights	started, 1 structure completed
Yucca Mountain Repository	industrial	north of Amargosa Valley	Jackass Flats and Crater Flat	waste disposal and support facilities	stalled

Table 2-5 (continued) - Completed Projects

	Type	Location	Basin	Description/No. of units	Status
Snowden Commercial Bldg (Phase I)	commercial	Pahrump	Pahrump Valley	10,000 sf on 1.3 acres (Utilities Inc of Central Nevada (UICN) water, onsite septic)	completed
Holiday Inn Express	commercial	Pahrump	Pahrump Valley	103 room hotel on 1.6 acres (UICN)	completed
China Wok Buffet & Grill	commercial	Pahrump	Pahrump Valley	restaurant	completed
Tire Works Total Car Care	commercial	Pahrump	Pahrump Valley	retail	completed
O'Reilly Auto Parts	commercial	Pahrump	Pahrump Valley	retail	completed
Carl's Jr Restaurant	commercial	Pahrump	Pahrump Valley	restaurant	completed
Java Junkies	commercial	Pahrump	Pahrump Valley	coffee shop	completed
U.S. ICE Detention Facility	industrial, commercial	North Pahrump	Pahrump Valley	detention facility	completed
Dollar General	commercial	North Pahrump	Pahrump Valley	retail	completed
Home Depot	commercial	Pahrump	Pahrump Valley	retail	completed
Walmart (May 2003)	commercial	Pahrump	Pahrump Valley	retail shopping center	completed
Maverik Gas Station	commercial	South Pahrump	Pahrump Valley	gas station	completed
Saitta's Tomasino Restaurant	commercial	Pahrump	Pahrump Valley	restaurant [closed]	completed
Desert View Regional Hospital	commercial	Pahrump	Pahrump Valley	hospital/medical facilities	completed
Crescent Dunes Solar Facility	industrial	North of Tonopah	Big Smoky Valley Northern Part	renewable energy power generation	completed/testing/operational
Spring Mountain Motor Resort & Country Club	commercial, residential	Pahrump	Pahrump Valley	Use - over 40,000 sq ft of facilities including clubhouse, welcome center, classroom, training, and car facilities, engine shops, fitness facility, trackside garages and condos, freshwater lake, racquetball court, shooting range, up to 50 RV hookups, up to 100 residential lots, and over 6 miles of track.	completed, expansion areas under construction

Table 2-5 (continued) - Approved/Under Construction Projects

	Type	Location	Basin	Description/No. of units	Status
Nye County Fairgrounds	recreation	Pahrump	Pahrump Valley	427 acres/ball fields	started
Wine Ridge Casitas	commercial	Pahrump	Pahrump Valley	transient lodging on a portion on 15.76 acres (UICN)	started
Snowden Commercial Bldg (Phase II)	commercial	Pahrump	Pahrump Valley	10,000 sf building	started
Armstrong Phase II	commercial	Pahrump	Pahrump Valley	Two 4,900 sf buildings	started
Armstrong Phase III	commercial	Pahrump	Pahrump Valley	Two 4,900 sf buildings, commercial well, septic	started
Spring Mountain Aquatic Center	commercial	Pahrump	Pahrump Valley	1,100 sf support building on a portion of 310 acres	started
VEA Expansion	commercial, industrial	Pahrump	Pahrump Valley	33,374 sf building on a portion of 11.6 acres (UICN)	started
Morales Office Expansion	commercial	Pahrump	Pahrump Valley	1,103 sf office addition on a portion of 1.25 acres (well/septic)	started
Bell Vista RV Park	recreation	Pahrump	Pahrump Valley	52 space RV park (well/septic)	started
U.S. Ecology Expansion	industrial	Amargosa Valley	Amargosa Desert	400 acre administrative facilities, waste disposal	started
VEA Solar	industrial	Pahrump	Pahrump Valley	solar photovoltaic on 80 acres no water usage	started
Advanced Rail Energy Storage Project	industrial	Pahrump	Pahrump Valley	Peak power generation/Storage	started

Potential Projects

	Type	Location	Basin	Description/No. of units	Status
VA Clinic	medical clinic	Pahrump	Pahrump Valley	14,650 sf on 2 acres (UICN)	proposed
Great Basin College	commercial	Pahrump	Pahrump Valley	Pahrump Valley Center campus on 285 acres	proposed
Jewish Temple	community	Pahrump	Pahrump Valley	use existing bldg on 0.5 acres (UICN)	proposed
Animal Shelter (2)	community	Pahrump	Pahrump Valley	2 discrete projects	proposed
Creekside RV Park	recreation	Pahrump	Pahrump Valley	61 space RV park on 4.26 acres	proposed
Kellogg Park	recreation	Pahrump	Pahrump Valley	development of a park	proposed
Belarus Solar Projects	industrial	Pahrump	Pahrump Valley	power generation, 3 units	proposed
Desert View Regional Medical Center	commercial	Pahrump	Pahrump Valley	expansion of existing medical center	proposed
Grandpa's BBQ	commercial	Pahrump	Pahrump Valley	restaurant	proposed
Memory Care Facility	residential	Pahrump	Pahrump Valley	assisted living facility	proposed
Manhattan Project	commercial	Pahrump	Pahrump Valley	52,835 sf medical clinic/offices on 6.8 acres (UICN)	proposed
Tractor Supply Company	commercial, retail	Pahrump	Pahrump Valley	20,000 sf retail on 4 acres (UICN)	proposed
Jack in the Box Restaurant	commercial	Pahrump	Pahrump Valley	restaurant, 2,862 sf on 1.08 acres (UICN)	proposed

As of November 2015

Finally, there are a number of other unforeseen developments that may be expected to result from the continued expansion and diversification of the Nye County economy over the next 50 years. While not proposed or planned at this time, such developments could result in increases above the baseline population forecasts. The following reasonably foreseeable expected future development activities have been identified that may result in additional growth beyond that currently included in the County baseline population forecast:

- Development of a four-year educational institution in Nye County
- Development or expansion of one or more large mining projects
- Increased air service and industrial/commercial development of Tonopah, Beatty and Gabbs airports
- Additional renewable energy facilities
- Expansion of hotel-casino operations at the Nevada/California border and commercial development along future I-11 corridor
- Increased tourist visitation to Nye County
- Increased NNSA activities at the Nevada National Security Site
- Increased U.S. Air Force activities at the Nevada Test and Training Range Tonopah Test Range
- Development of up to 20 Marijuana Cultivation Facilities
- Development of one or more additional oil fields
- Increased semi-retired and retired persons locating in Nye County
- Expanded air service at Tonopah, Beatty, Gabbs
- UAV testing
- I-11 Construction
- Other industrial development

2.3. SUMMARY

The socioeconomic background presented in Chapter 2 provided an overview of Nye County's economic history and present economic conditions. This socioeconomic information, along with the demographic data including: (1) population baselines, forecasts, and trends; (2) master and area plan's designated land uses; and (3) an overview of historic, completed, in-process, proposed, and expected future development, form the basis for current and future water demands developed later in Chapter 4.



Photo 3. Longstreet Spring cabin. Photo credit: US Fish and Wildlife Service, 2008.

Chapter 3 – WATER RESOURCE ASSESSMENTS AND ISSUES

This chapter contains a summary of the surface water and groundwater resources of Nye County and projected water demands and trends. The summary provides information on the sources, quantity, and quality of those resources, the committed and pending water rights and the sociopolitical and geographic issues, and constraints associated with the management and use of the water resources of the County.

3.1. TOPOGRAPHY

The general topographic expression of Nye County is shown in Figure 3-1. The topography is typical of the Great Basin physiographic province and is characterized by a number of generally north-south trending mountain ranges separated by broad valleys. Total relief in the basin is more than 9,000 feet, ranging from 11,949 feet above mean sea level at Mt. Jefferson in the Toquima Range to less than 2,300 feet in the lowland portions of Amargosa Valley.

3.2. LAND STATUS

Nye County's land mass comprises nearly 98 percent federal land, and is approximately two percent private land. Thus, land status is a very important consideration when assessing the availability of water resources, and the potential issues associated with acquiring water rights, and accessing, developing, and delivering those water resources to Nye County's populations.

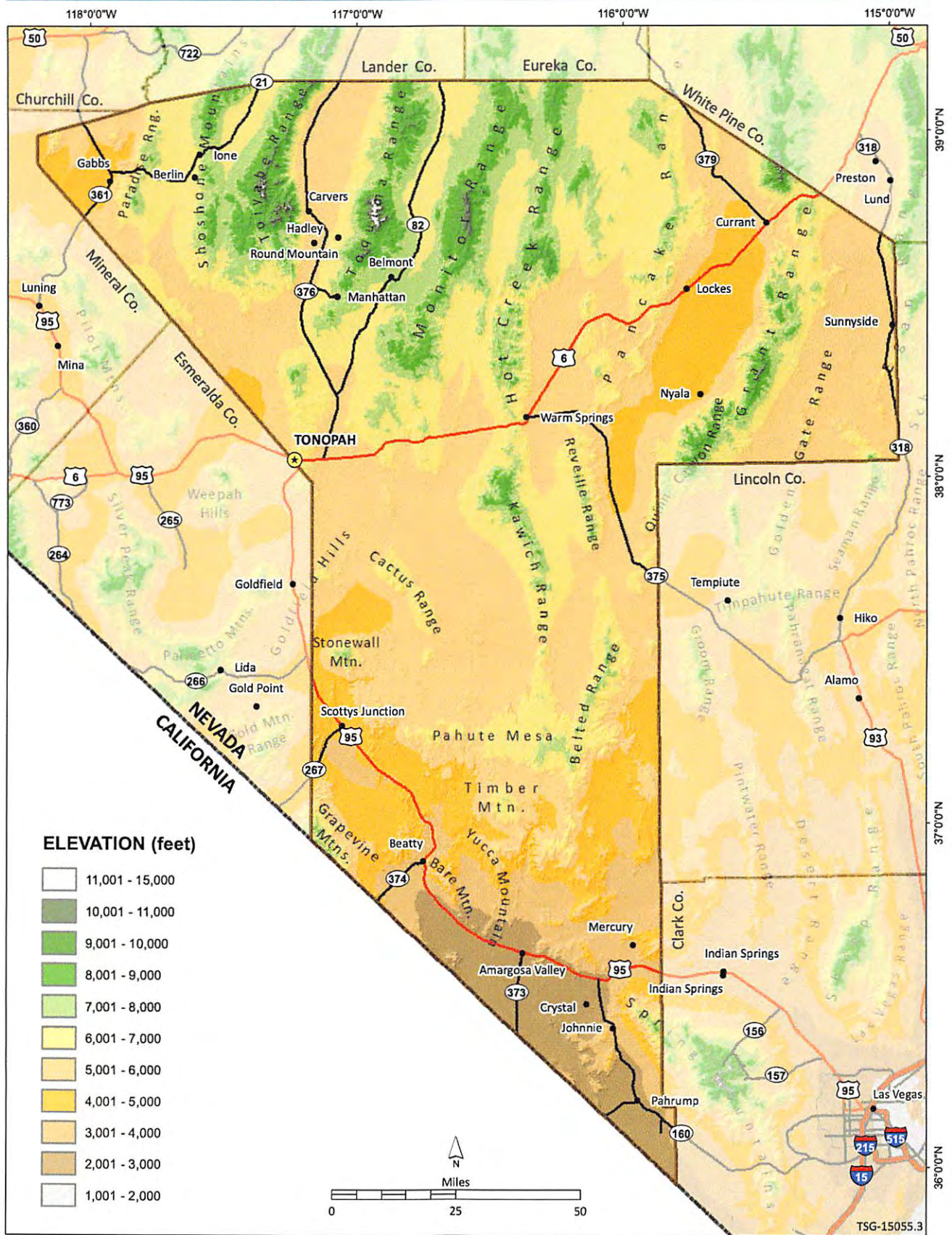


Figure 3-1. Topography (Jarvis and Others, 2008) and named physiographic features of Nye County.

3.3. CLIMATE

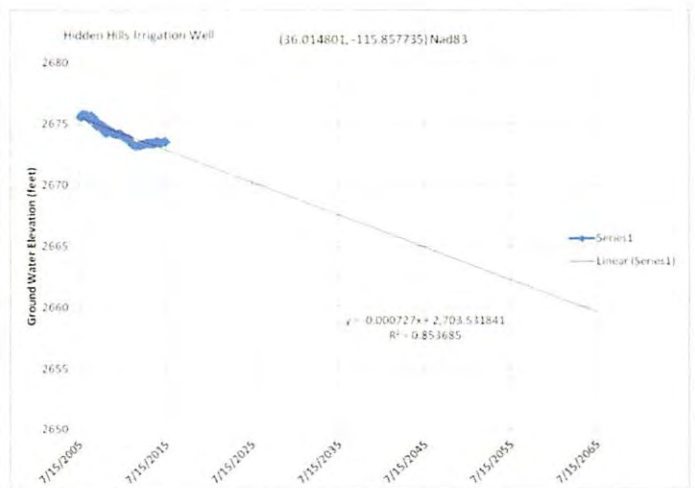
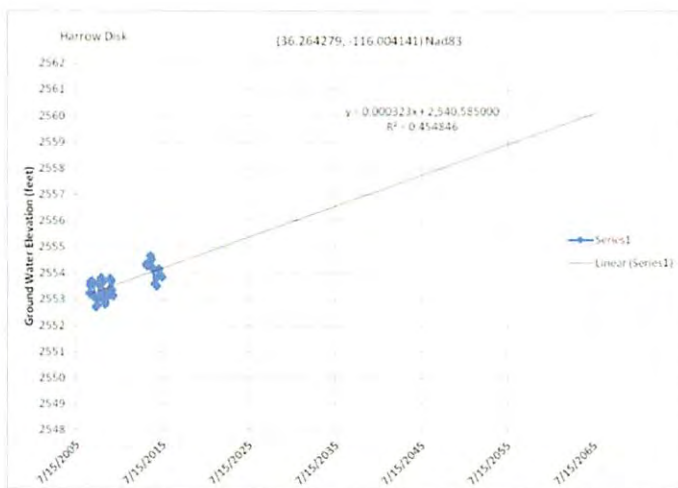
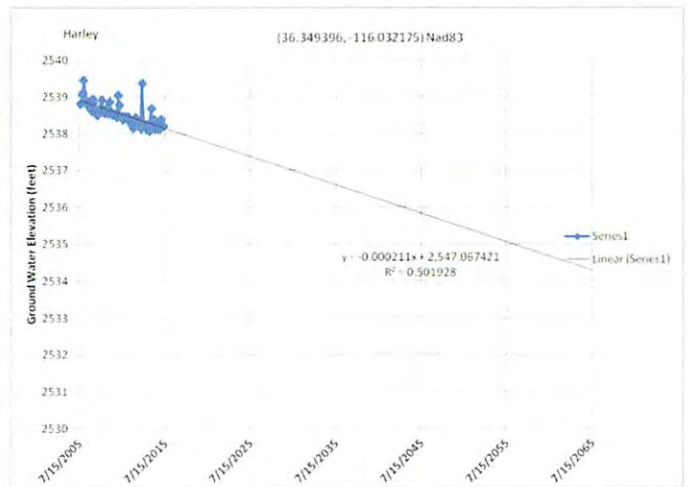
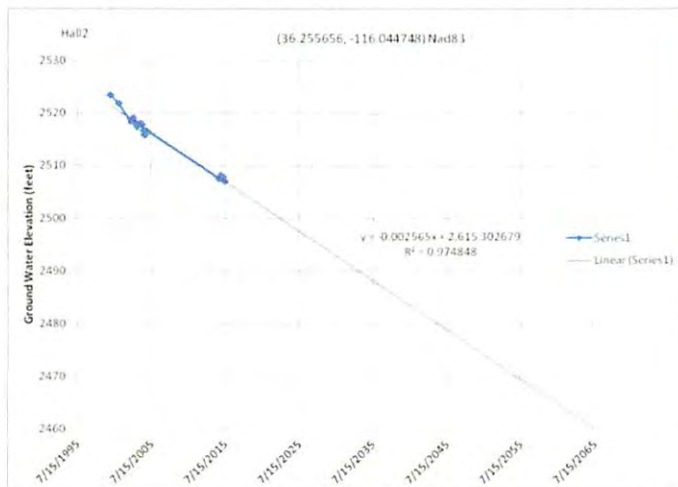
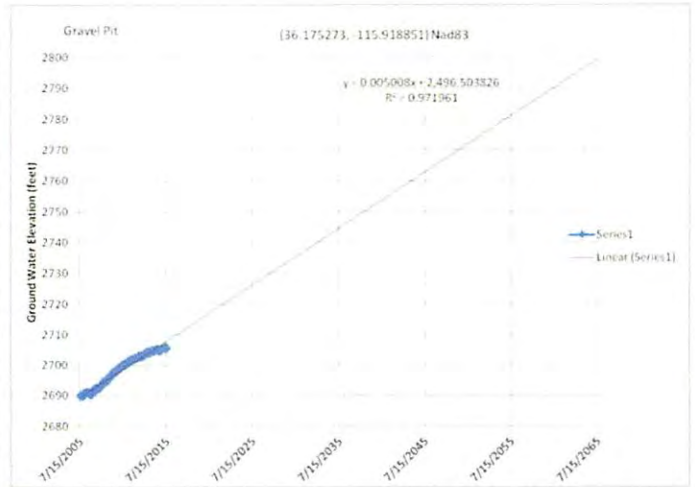
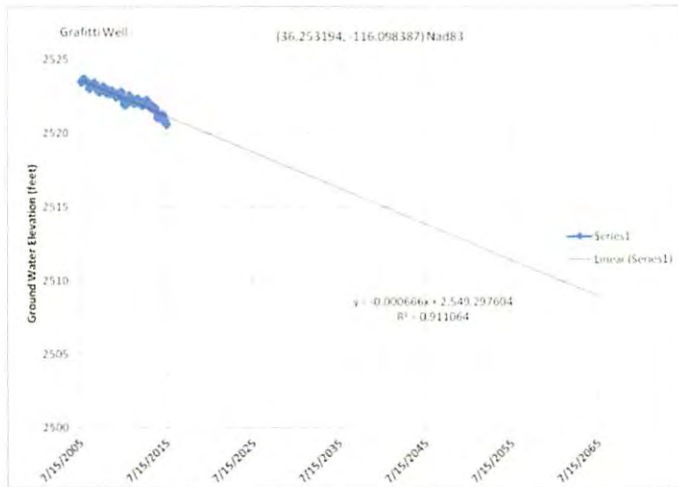
The general climate of Nye County depends upon the location. In the northern mountain ranges, sub-humid continental conditions occur, characterized by cold winters and moderate precipitation. The intervening valleys and the region as far south as about Highway 95 exhibit mid-latitude steppe and mid-latitude desert conditions characterized by cold winters, hot summers, and semi-arid to arid conditions. To the south, Pahrump Valley and most of Amargosa Desert have a typical low-latitude desert climate with very hot summers and arid conditions. Up-to-date climate data for each weather station located in Nye County can be accessed on Desert Research Institute website at: <http://www.wrcc.dri.edu/summary/climsmnv.html>.

Figure 3-2 shows the distribution of precipitation over Nye County. Most of the County is situated in the South Central climatological division with an average annual precipitation rate of only about 6.25 inches. The southernmost part of the County is in the Extreme Southern climatological division with an average annual precipitation rate of only about 4.5 inches. At higher elevations, precipitation is much greater and snow accumulates to considerable depths, with more than 80 inches per year of snowfall at the higher elevations of the Toiyabe, Toquima, and Monitor ranges.

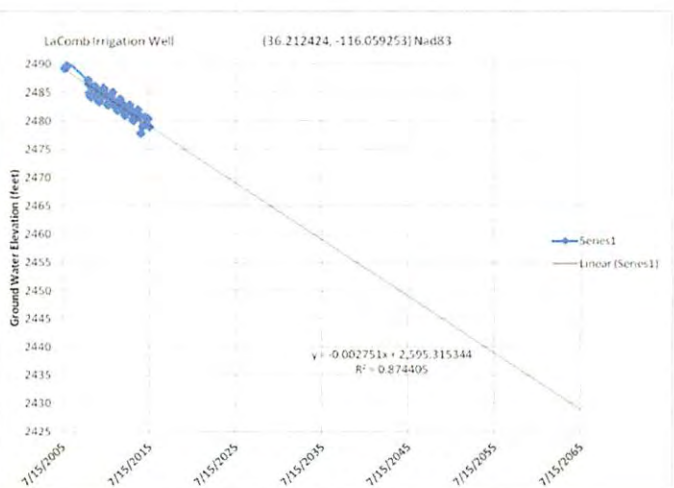
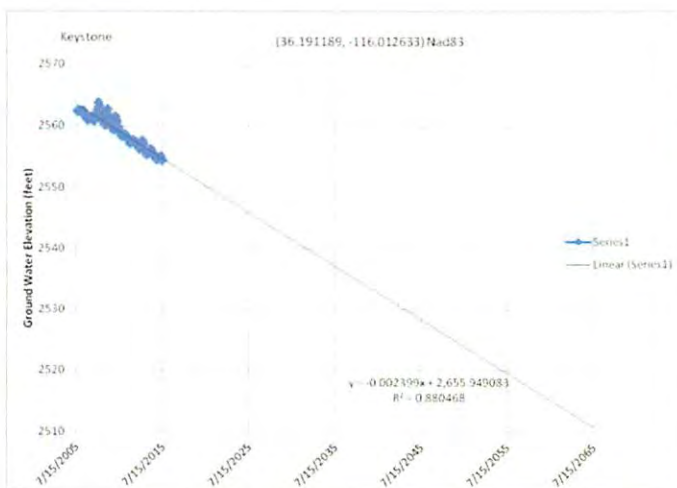
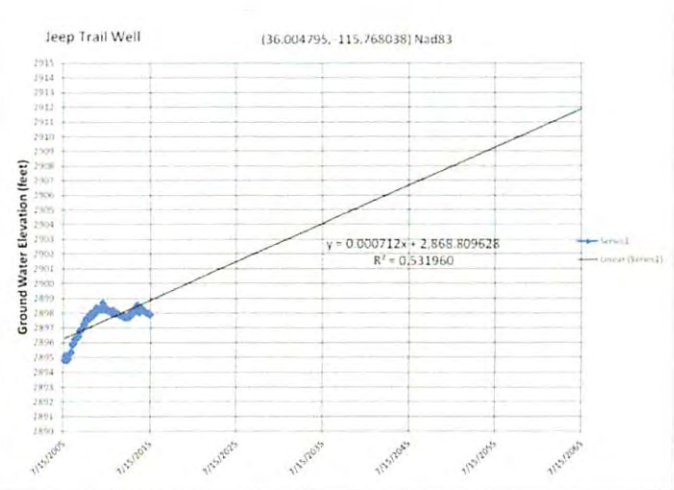
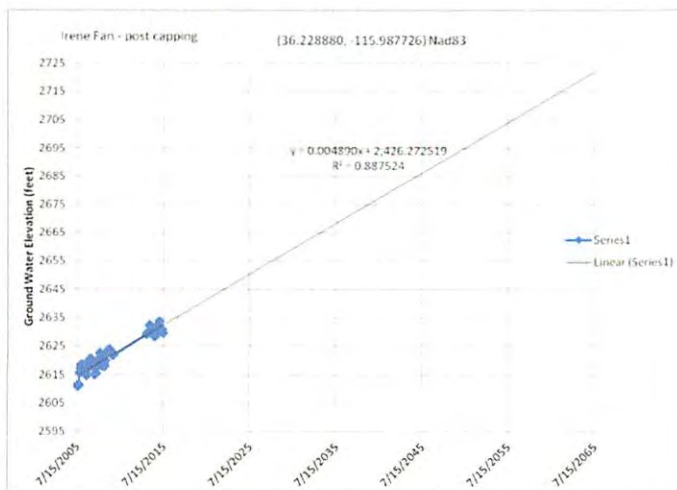
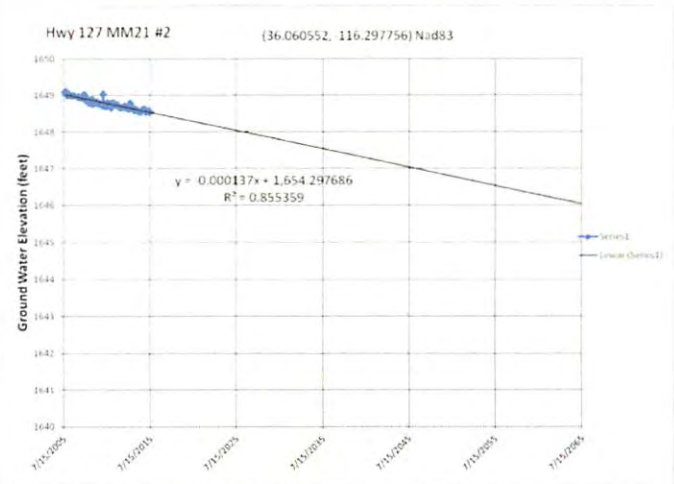
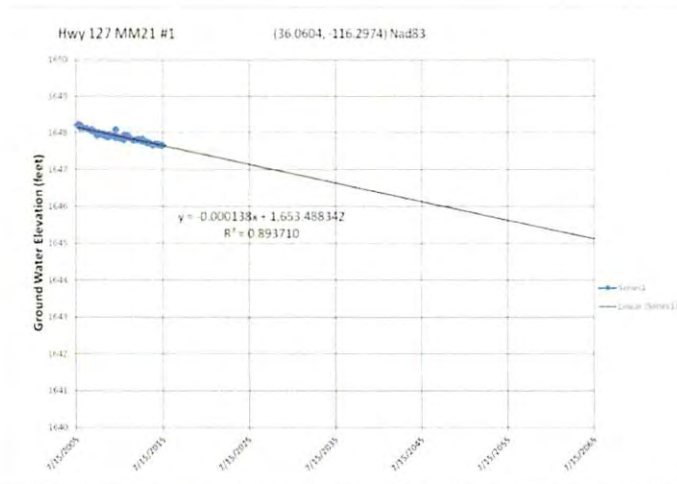
Precipitation during the course of a year typically has a bi-modal distribution with most precipitation occurring during either a winter rainy season or during the late summer months. During the winter months, high pressure conditions predominate resulting in west-to-east trending winds and precipitation patterns. During the summer months, low pressure conditions predominate, resulting in southwest-to-northeast trending precipitation patterns. Winter storm events tend to last longer and produce more precipitation than the summer events which tend to produce widely scattered showers of short duration.

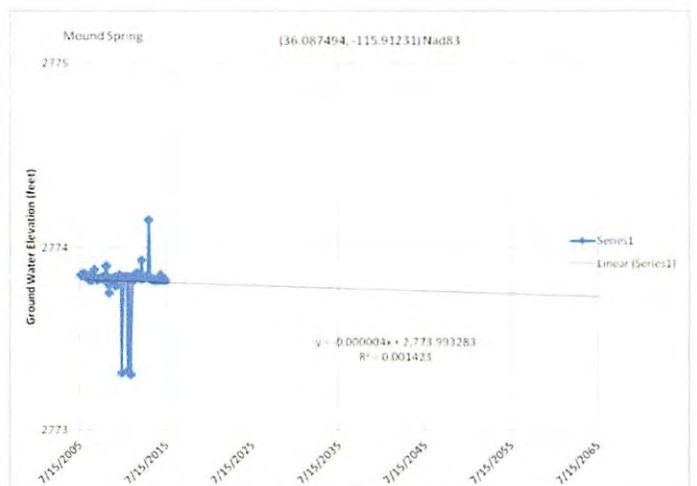
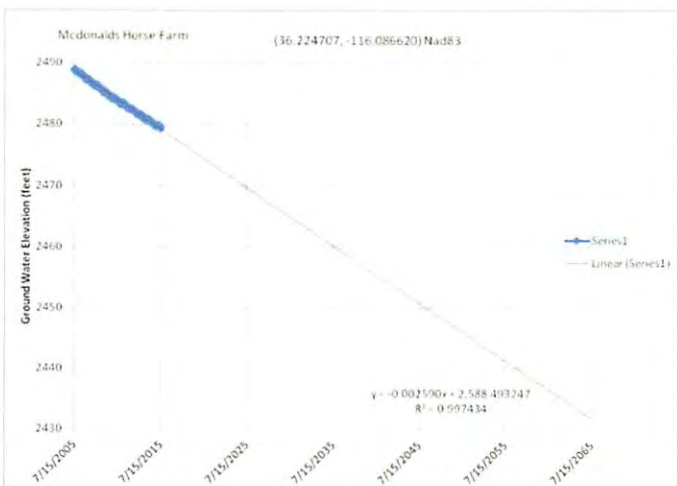
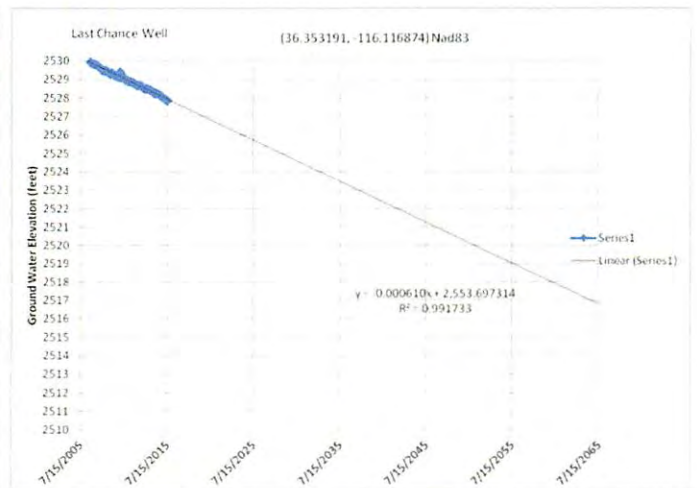
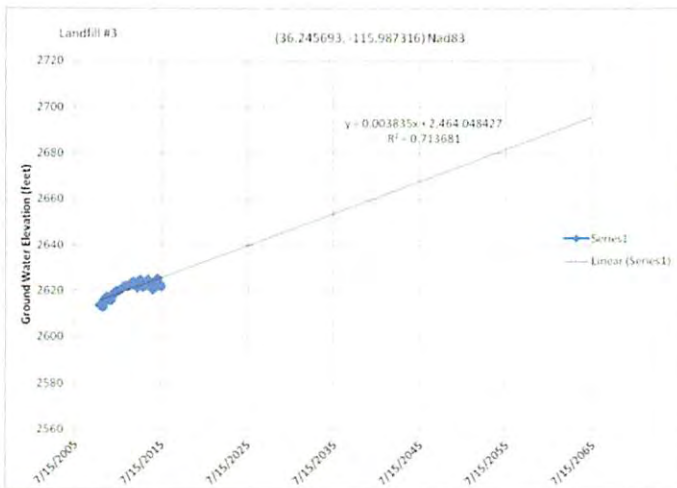
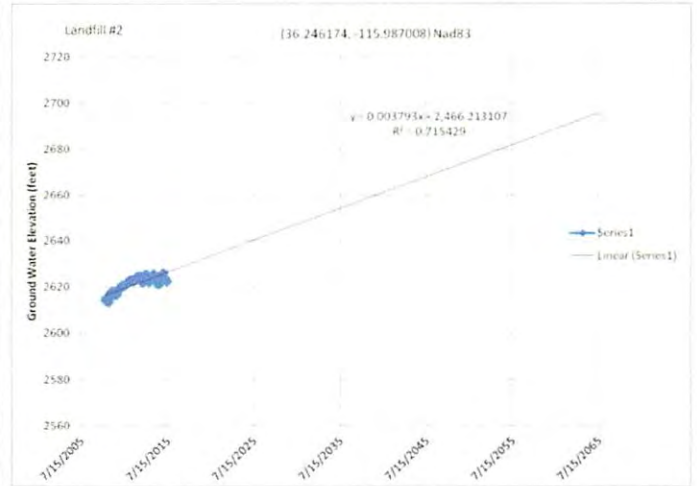
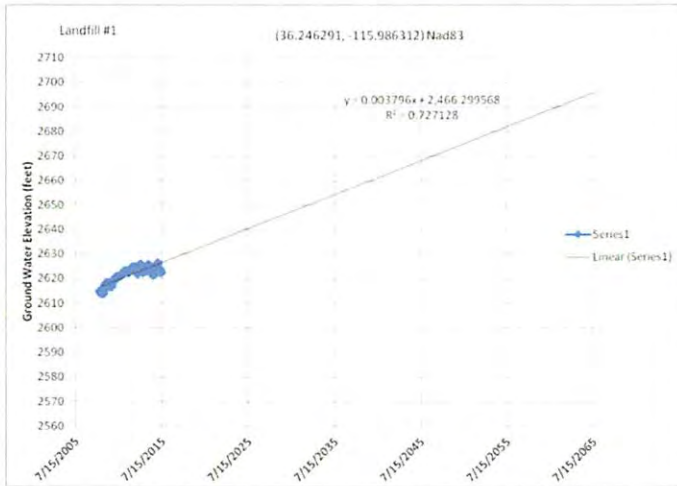
Drought is common and expected, especially in the southern part of the County where droughts of more than 100 days frequently occur. Beginning in February 2015, the USDA designated Nye County along with 11 other Nevada counties as a Primary Natural Disaster Area due to continued drought conditions that continue to affect much of the western United States. In 2016, 54 percent of Nye County was rated drought intensity D-0 – Abnormally Dry, 35 percent was rated D-1 Moderate-Drought, and nearly 6 percent was rated D-2 Severe Drought. In May 2015, all of Nevada's 17 counties had been designated by the USDA, but by 2016 only nine counties remained in the D-4 condition. The University of Nevada Cooperative Extension maintains a website that identifies drought resources currently available through state and federal agencies. As a result of recent weather in 2017, this designation is expected to be lifted soon.

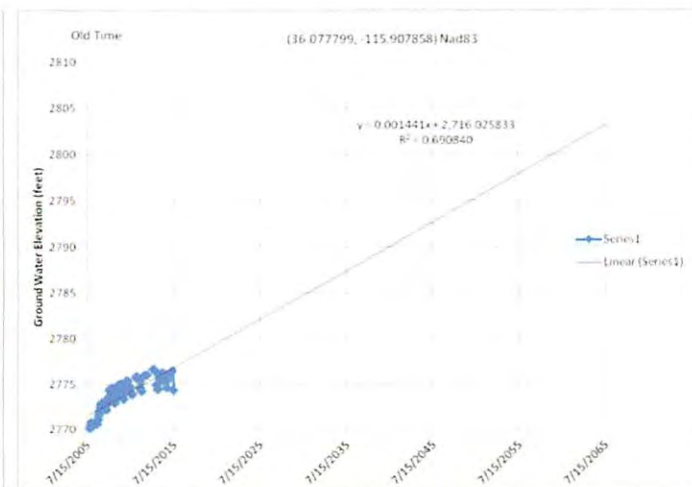
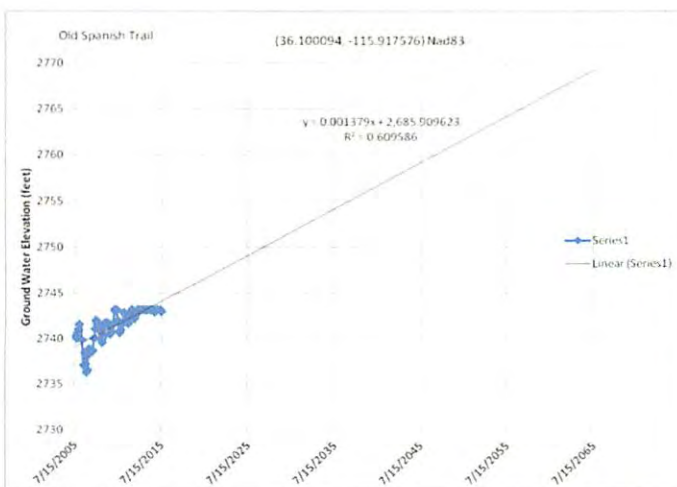
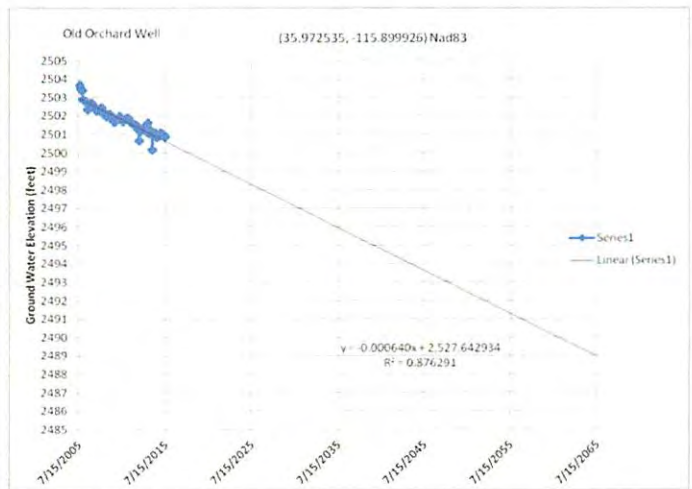
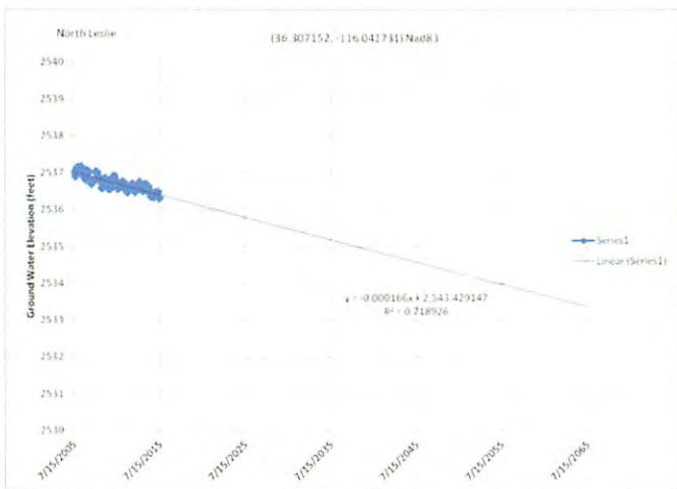
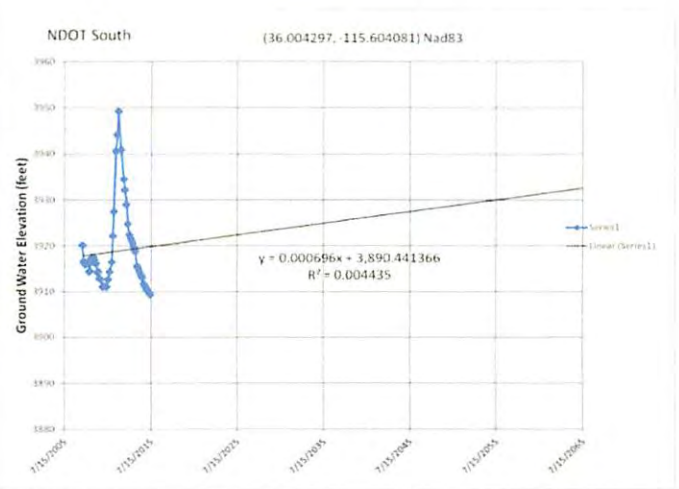
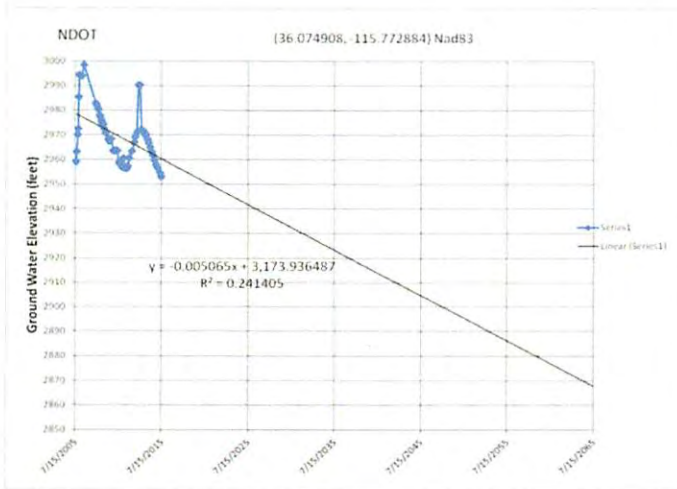
In 2012, the State Climate Office in conjunction with the Division of Water Resources, Division of Emergency Management prepared the State of Nevada Drought Response Plan. The plan establishes administrative procedures to collect drought-related data, monitor conditions on a county basis, and provides a framework of actions for response to drought based on three states: Drought Watch, Drought Alert, and Drought Emergency. The Plan established a Drought Response Committee (DWR and Department of Emergency Management), which is responsible for monitoring drought conditions, collecting data, overseeing intergovernmental coordination, disseminating information, reporting to the Governor about drought conditions, and working with the State

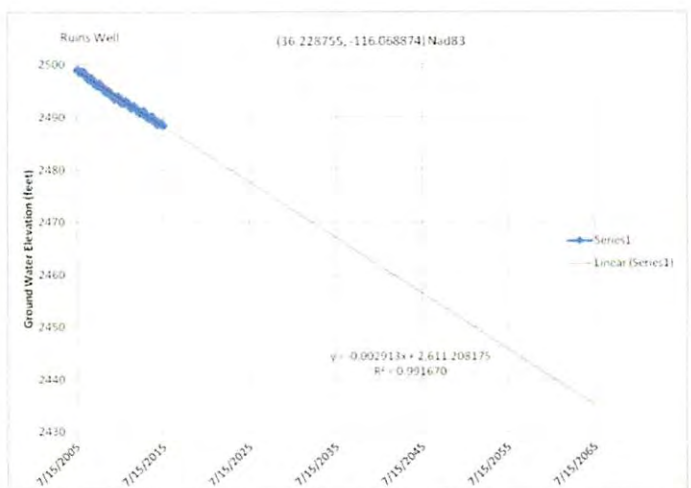
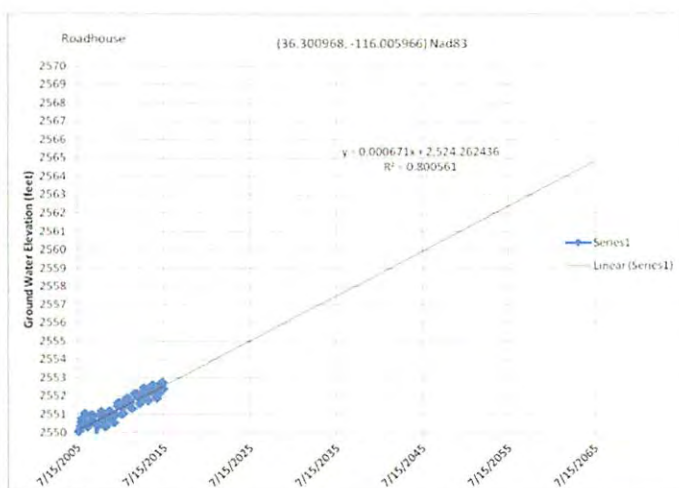
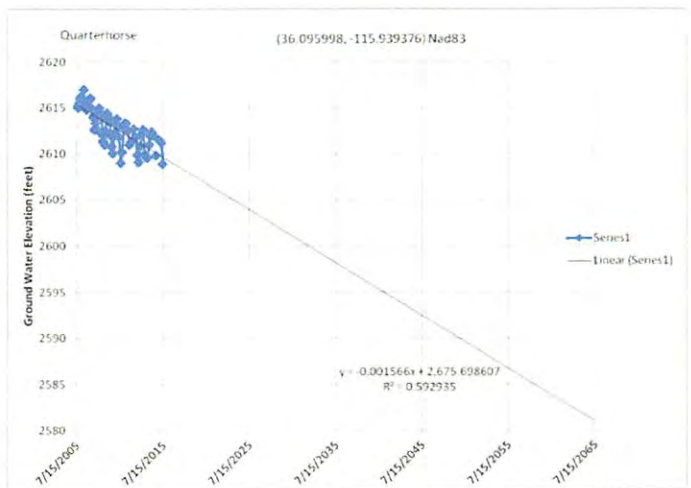
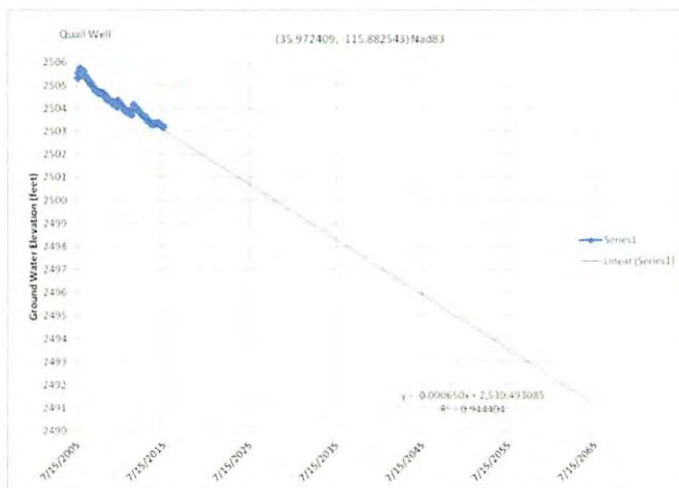
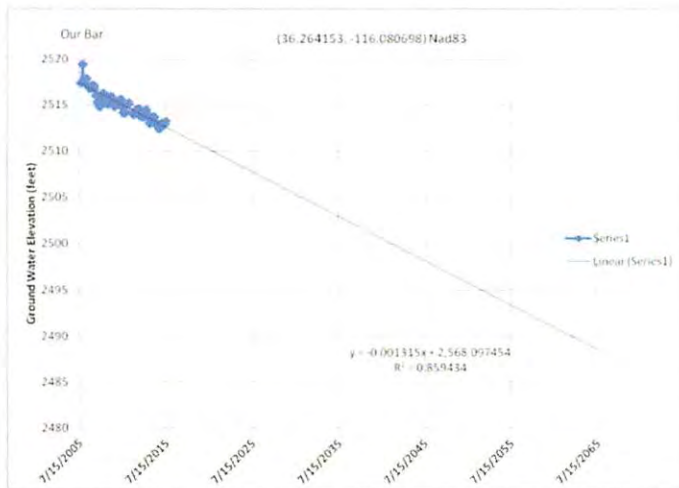


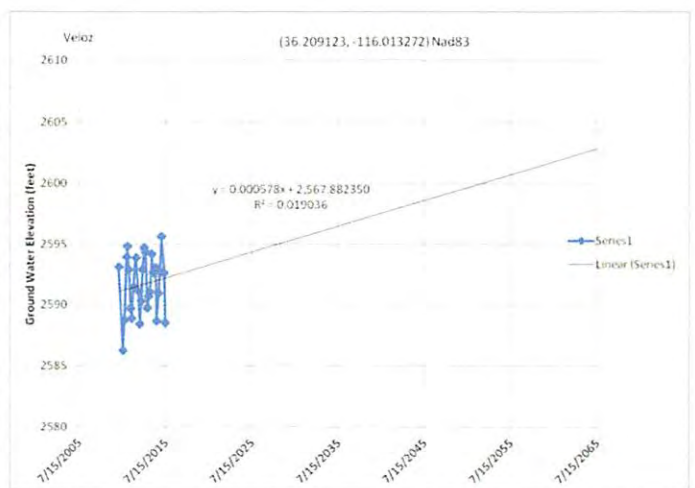
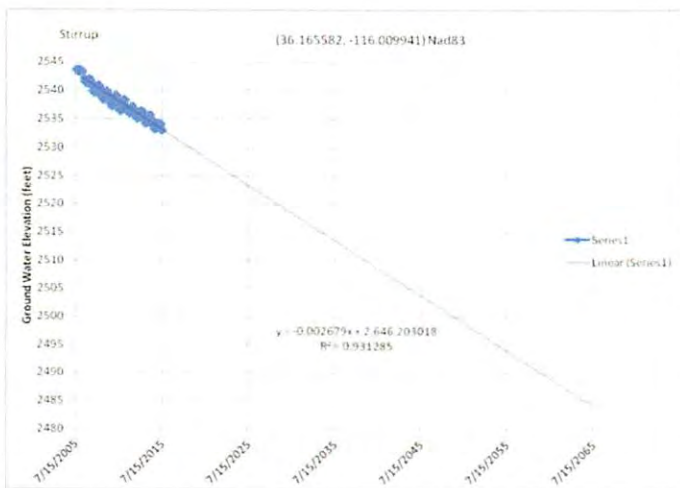
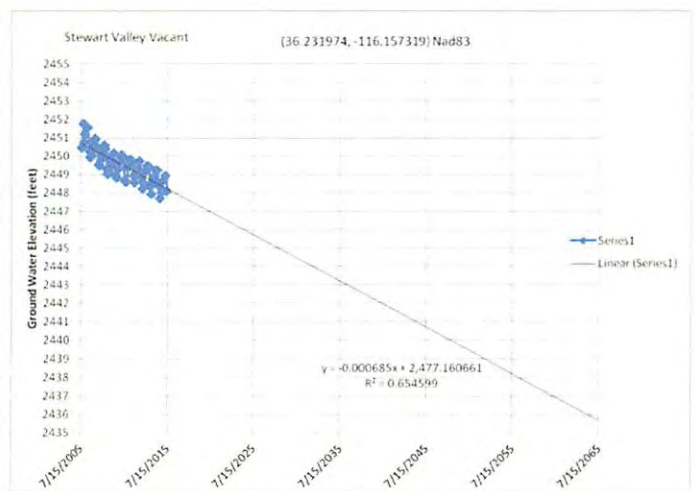
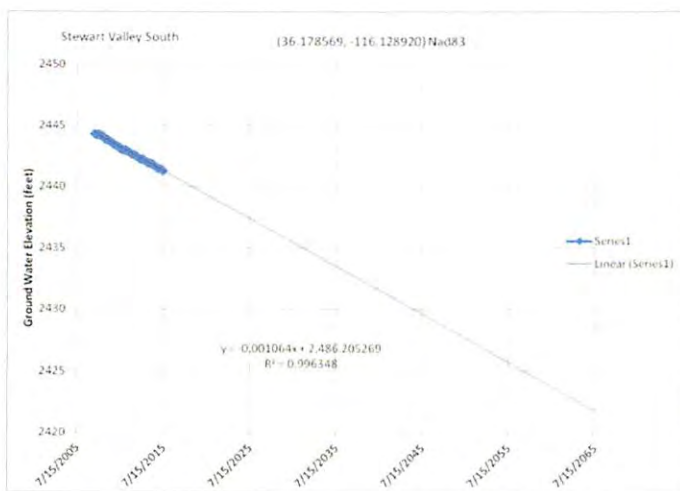
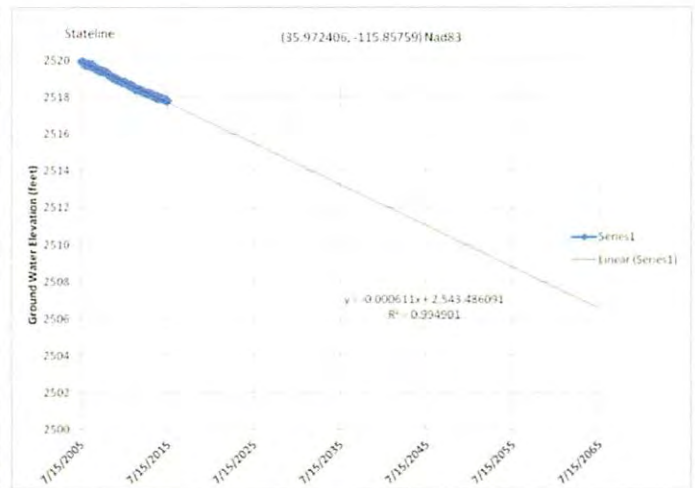
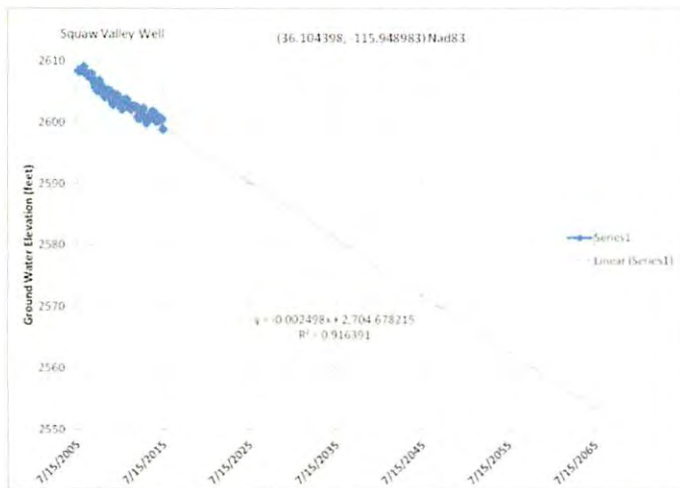
AA-8

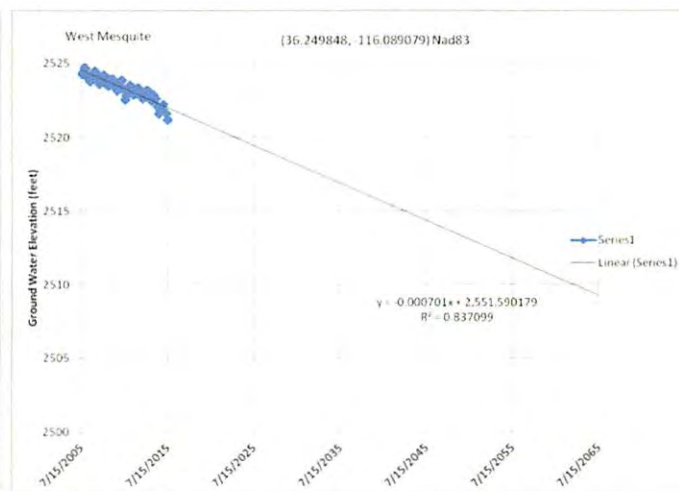
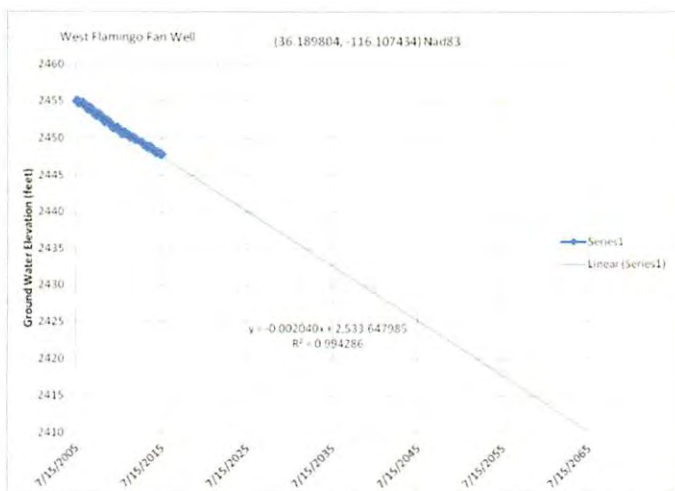
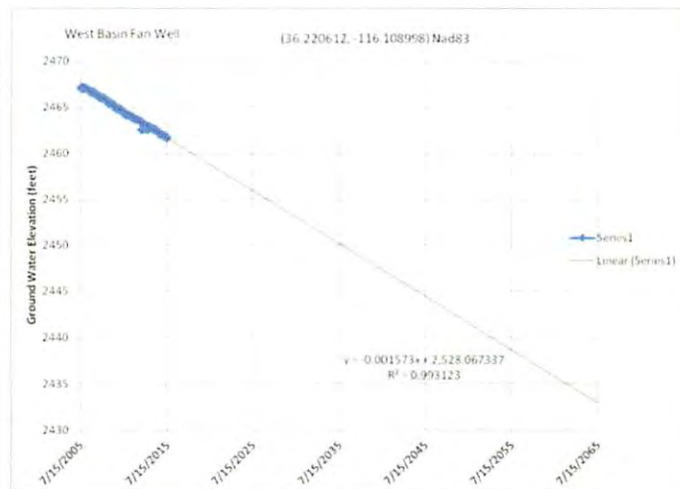
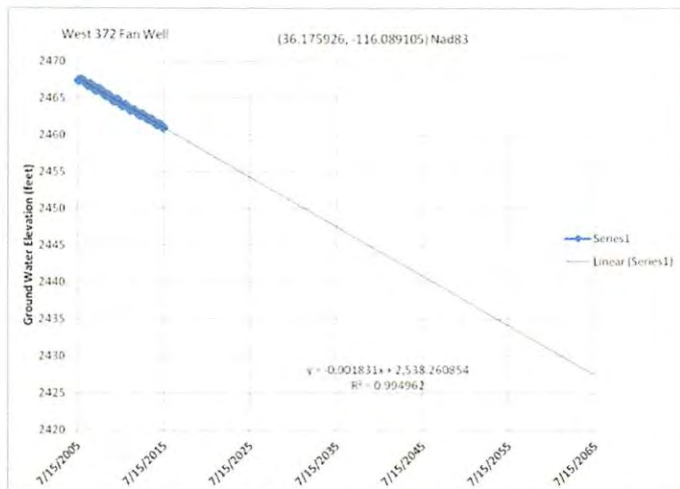




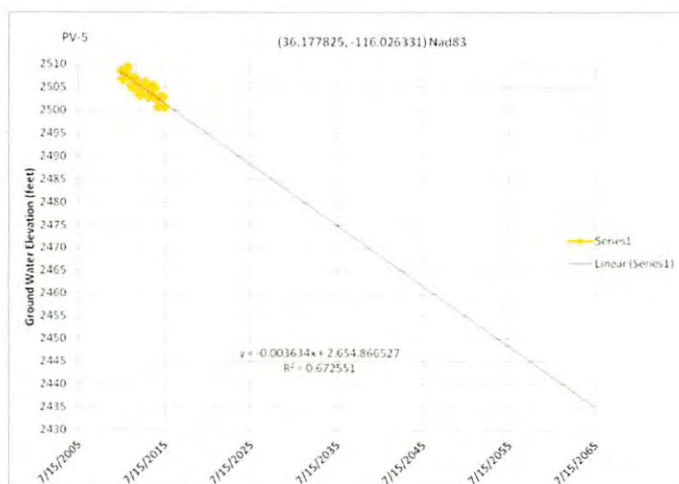
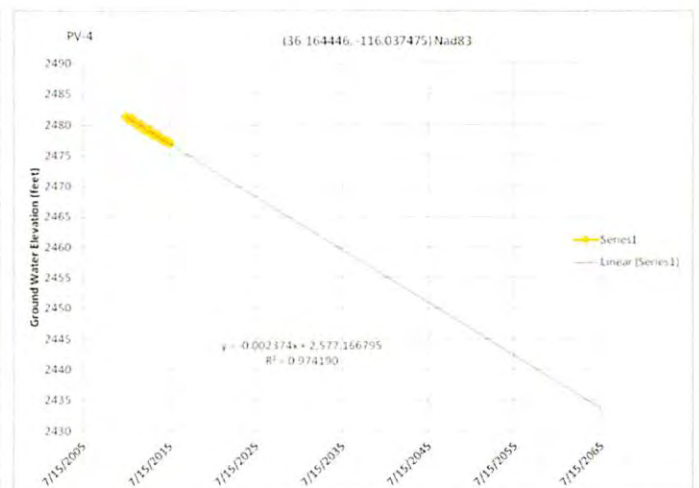
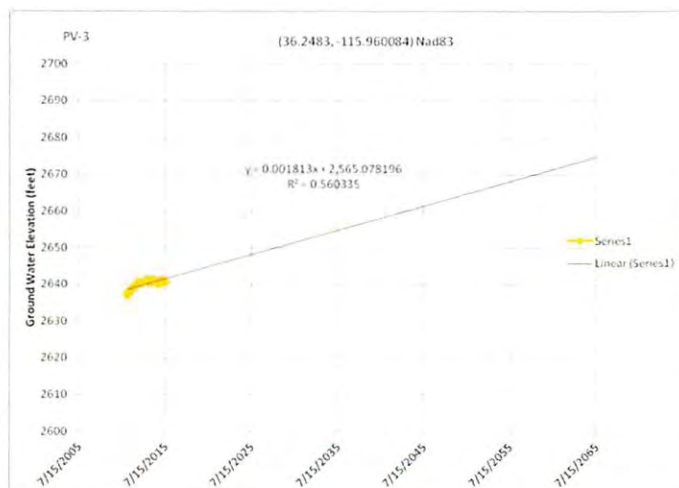
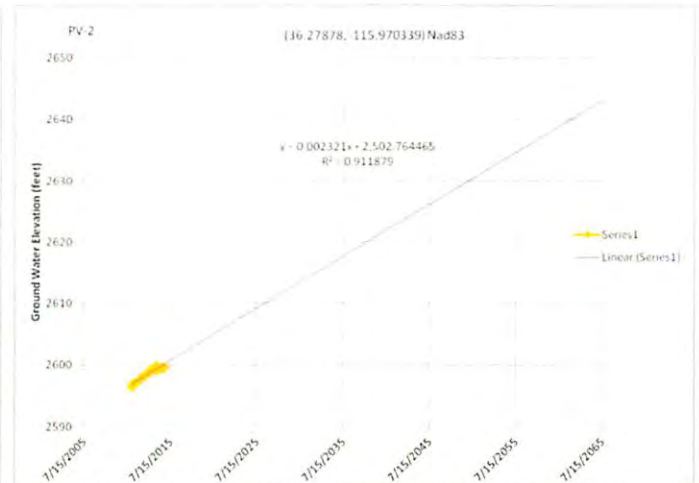
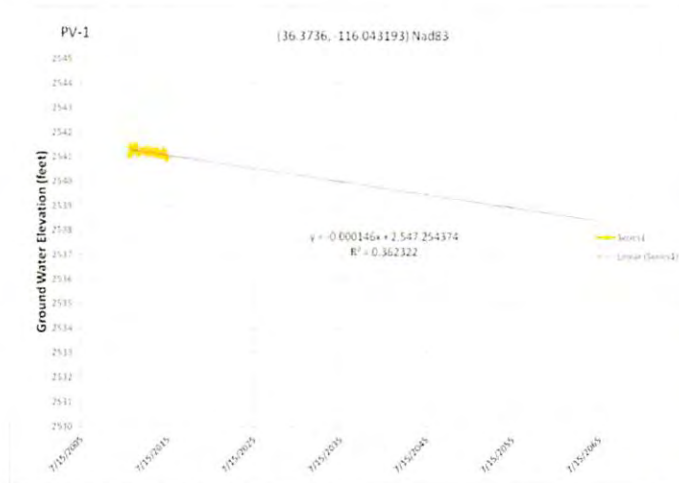




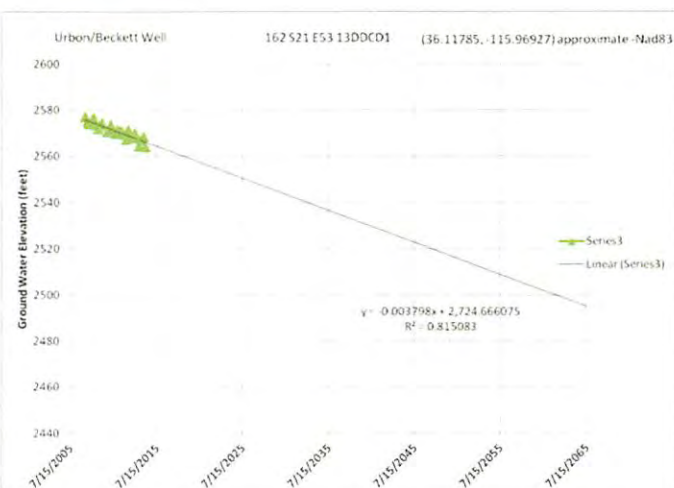
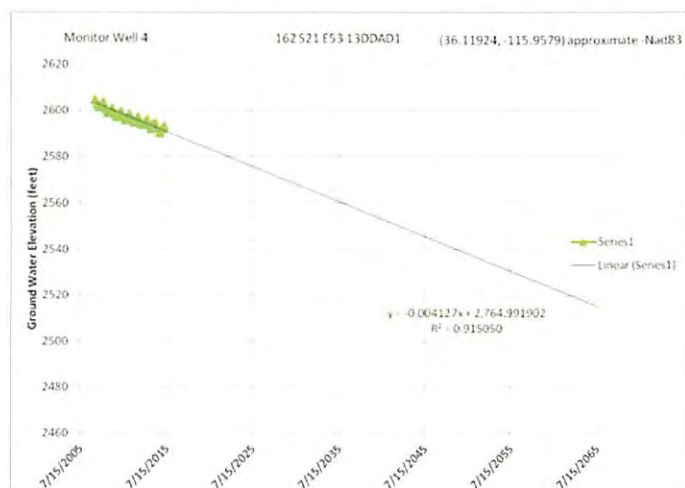
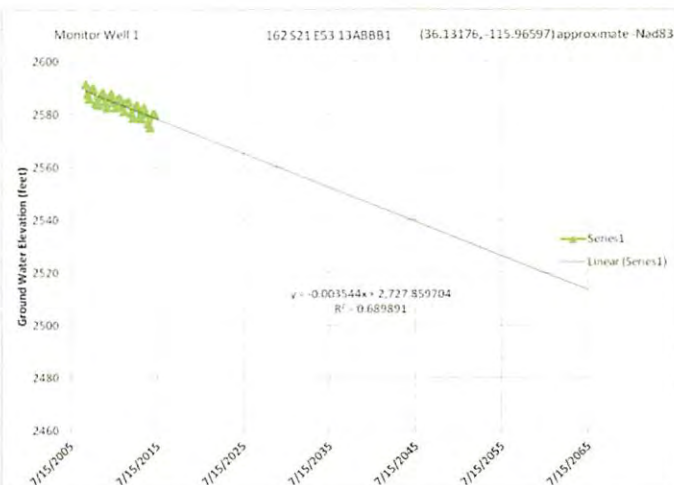
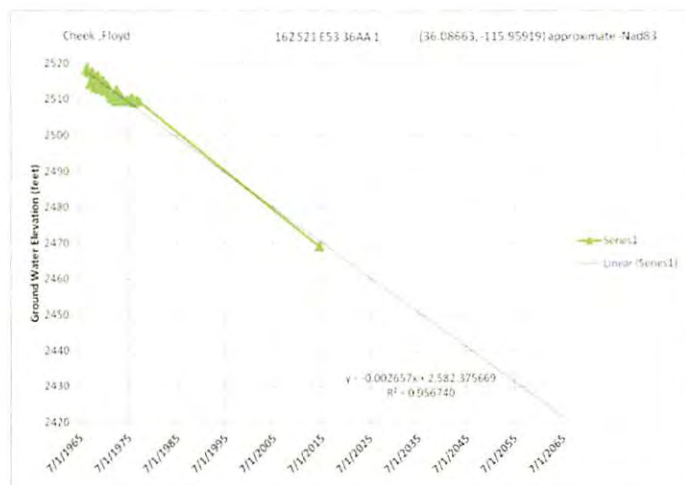




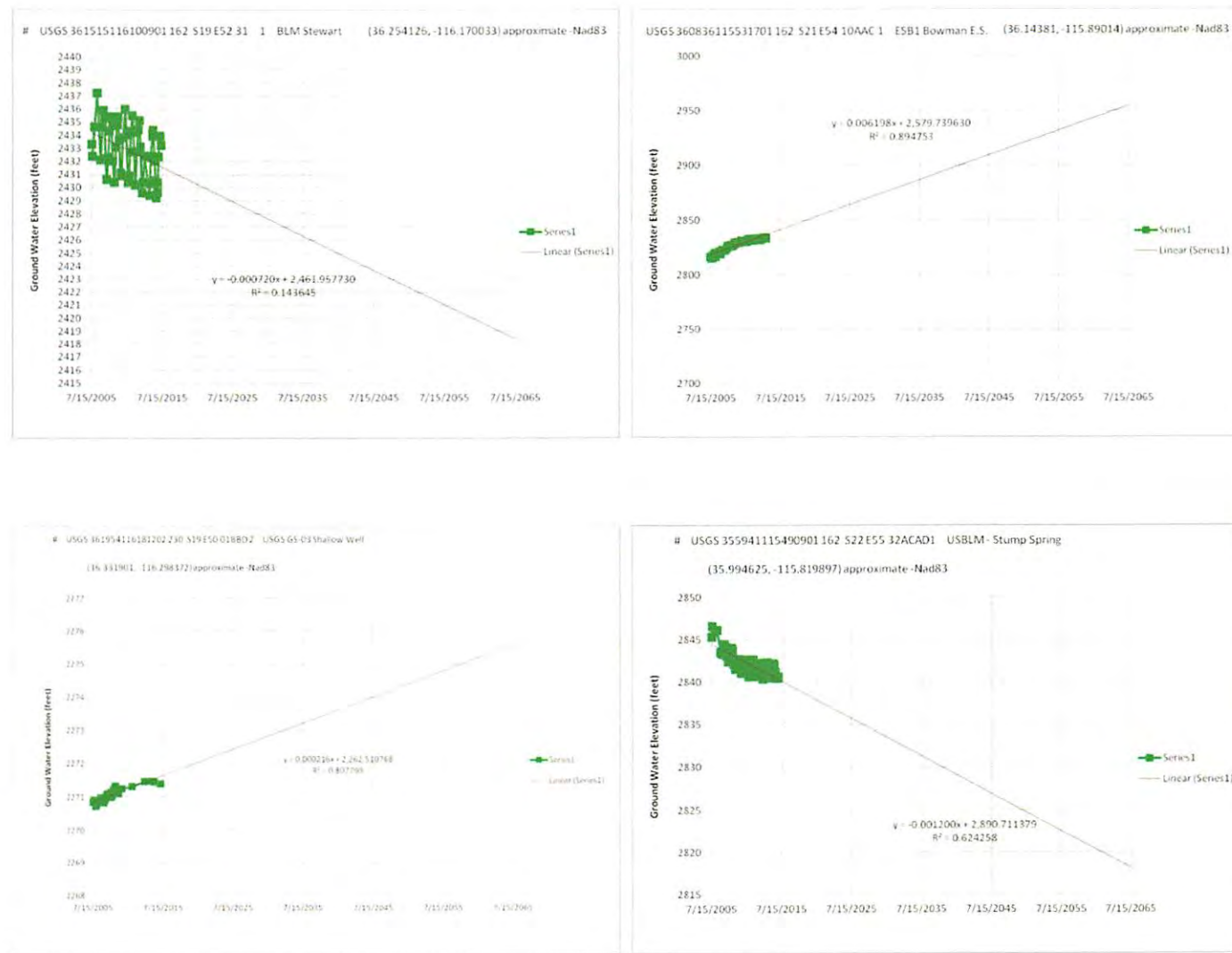
GWE wells



NDWR wells



USGS wells



Control Point Elevations:

Table used to generate potentiometric surfaces for the starting "current" potentiometric surface map (7-15-2015), 20-year surface (7-15-2035), and 50-year (7-15-2065). Data for "Estimated Water Table Elevations" was generated using the regression line equation where X is the number of days since 1/1/1990 and slope is in feet per day.

Well Name	Easting/X: State Plane NV cent 2702	Northing/y: State Plane NV cent 2702	Latitude (NAD 83)	Longitude (NAD 83)	Water Table Elevation 7-2015 (feet)	Estimated Water Table Elevation 7-15-35 (feet)	Estimated Water Table Elevation 7-15-65 (feet)	Slope used in calculations	Intercept used in calculations
Aquarium City	1845154	20212684	36.197789	115.972747	2649.09	2696.78	2759.48	0.005721	2413.57
AW01	1839221	20197238	36.155474	115.993217	2544.34	2519.40	2481.72	-0.003439	2689.65
AW07	1821494	20244294	36.285061	116.052254	2514.34	2503.68	2487.87	-0.001443	2575.11
AW10	1829928	20241851	36.278200	116.023693	2530.25	2524.37	2515.76	-0.000786	2563.28
AW11	1834534	20239287	36.271070	116.008127	2554.29	2556.25	2558.54	0.000209	2545.90
AW24	1826945	20215216	36.205088	116.034403	2515.09	2507.48	2494.93	-0.001146	2564.22
AW34	1847441	20236548	36.263296	115.964411	2619.75	2642.70	2675.01	0.002949	2496.71
AW37	1838396	20226217	36.235095	115.995331	2617.72	2640.65	2672.38	0.002895	2497.33
AW46	1840610	20188566	36.131628	115.988717	2526.13	2495.28	2448.09	-0.004307	2708.50
AW63	1845249	20193906	36.146205	115.972881	2570.55	2553.68	2528.42	-0.002305	2667.79
AW64	1840456	20194262	36.147277	115.989102	2539.46	2519.51	2488.55	-0.002825	2659.36
AW66	1845896	20191251	36.138900	115.970751	2572.37	2550.57	2518.12	-0.002961	2697.15
AW70	1830040	20256174	36.317542	116.022991	2540.19	2540.10	2539.70	-0.000037	2541.93
Basin Station	1822426	20220592	36.219936	116.049603	2484.67	2468.11	2441.90	-0.0023913	2586.49
Bathtub well	1826762	20260302	36.328940	116.034024	2538.13	2536.87	2535.03	-0.000168	2545.19
Beyond Sherrys	1850010	20165409	36.067829	115.957459	2482.85	2460.01	2423.72	-0.003311	2623.92
Big South	1844978	20164516	36.065476	115.974506	2483.09	2476.96	2468.08	-0.000811	2517.11
Blagg Spring	1832840	20215109	36.204686	116.014424	2594.90	2597.20	2600.04	0.000259	2584.38
Burnout	1836091	20234753	36.258586	116.002950	2591.19	2608.07	2630.34	0.002032	2507.48
Caas Well	1867587	20195767	36.150856	115.897174	2752.05	2759.70	2758.54	-0.000105	2764.89
Chicago	1785028	20142378	36.005660	116.177722	2074.40	2069.23	2060.65	-0.000783	2107.992
Donna	1841076	20190884	36.137986	115.987085	2535.64	2519.99	2494.42	-0.002334	2635.54
Dry Lakebed Well	1846335*	20141296*	36.001665	115.970475	2405.66	2404.71	2403.07	-0.000150	2412.14
Executive Golf Course	1841063	20205728	36.178763	115.986775	2590.14	2578.97	2561.91	-0.001557	2656.05
Floyd Farm Basin	1830075	20220434	36.219365	116.023676	2533.33	2521.27	2501.18	-0.001834	2612.07
Forum Group	1820056	20210847	36.193206	116.057845	2472.99	2452.66	2422.34	-0.002767	2589.64
Graffiti Well	1807966	20232611	36.253194	116.098387	2520.59	2516.33	2509.03	-0.000666	2549.30
Gravel Pit	1861119	20204605	36.175273	115.918851	2705.58	2744.42	2799.30	0.005008	2496.50
Harley	1827258	20267752	36.349396	116.032175	2538.21	2536.62	2534.31	-0.000211	2547.07
Hidden Hills Irrigation Well	1879642	20146335	36.014801	115.857735	2673.52	2667.54	2659.58	-0.000727	2703.53
Hwy 127 MM21 #1	1749556*	20162148*	36.060400	116.297400	1647.66	1646.66	1645.14	-0.000138	1653.49
Hwy 127 MM21 #2	1749451*	20162202*	36.060552	116.297756	1648.55	1647.52	1646.01	-0.000137	1654.30
Irene Fan	1840655	20223970	36.228880	115.987726	2629.59	2668.35	2721.94	0.004890	2426.27
Jeep Trail Well	1906202	20142925	36.004795	115.768038	2897.91	2904.06	2911.86	0.000712	2868.81
Keystone	1833402	20210199	36.191189	116.012633	2554.42	2537.19	2510.90	-0.002399	2655.95
LaComb Irrigation	1819597	20217840	36.212424	116.059253	2479.03	2459.13	2428.98	-0.002751	2595.32

Well Name	Eastng/X: State Plane NV cent 2702	Northng/y: State Plane NV cent 2702	Latitude (NAD 83)	Longitude (NAD 83)	Water Table Elevation 7-2015 (feet)	Estimated Water Table Elevation 7-15-35 (feet)	Estimated Water Table Elevation 7-15-65 (feet)	Slope used in calculations	Intercept used in calculations
Last Chance Well	1802308	20268981	36.353191	116.116874	2527.88	2523.50	2516.81	-0.000610	2553.70
McDonalds Horse Farm	1811497	20222262	36.224707	116.086620	2479.39	2460.28	2431.89	-0.002590	2588.49
Mound Spring	1863297	20172667	36.087494	115.912310	2773.82	2773.80	2773.75	-0.000004	2773.99
NDOT	1904535	20168435	36.074908	115.772884	2953.03	2923.19	2867.69	-0.005065	3173.94
North Leslie	1824543	20252356	36.307152	116.041731	2536.31	2535.21	2533.39	-0.000166	2543.43
Old Orchard Well	1867286*	20130849*	35.972535	115.899926	2500.85	2495.96	2488.95	-0.000640	2527.64
Old Spanish Trail	1861706	20177242	36.100094	115.917576	2743.02	2754.18	2769.29	0.001379	2685.91
Old Time	1864640	20169148	36.077799	115.907858	2774.40	2787.36	2803.15	0.001441	2716.03
Our Bar	1813157	20236632	36.264153	116.080698	2513.23	2503.00	2488.59	-0.001315	2568.10
Quall Well	1872430*	20130844*	35.972409	115.882543	2503.23	2498.31	2491.19	-0.000650	2530.49
Quarterhorse	1855277	20175702	36.095998	115.939376	2608.85	2598.17	2581.01	-0.001566	2675.70
Roadhouse	1835096	20250175	36.300968	116.005966	2552.43	2557.48	2564.83	0.000671	2524.26
Ruins Well	1816722	20223767	36.228755	116.068874	2488.47	2467.00	2435.08	-0.002913	2611.21
Squaw Valley Well	1852416	20178738	36.104398	115.948983	2598.92	2581.01	2553.64	-0.002498	2704.68
Stateline	1879813*	20130903*	35.972406	115.857590	2517.82	2513.24	2506.54	-0.000611	2543.49
Stewart Valley Vacant	1790631	20224790	36.231974	116.157319	2448.11	2443.25	2435.74	-0.000685	2477.16
Stirrup	1834259	20200883	36.165582	116.009941	2533.09	2513.58	2484.22	-0.002679	2646.20
West 372 Fan Well	1810870	20204500	36.175926	116.089105	2460.97	2447.62	2427.55	-0.001831	2538.26
West Basin Fan Well	1804906	20220732	36.220612	116.108998	2461.75	2450.20	2432.96	-0.001573	2528.07
West Flamingo Fan Well	1805431	20209520	36.189804	116.107434	2447.79	2432.66	2410.30	-0.002040	2533.65
West Mesquite	1810717	20231409	36.249848	116.089079	2521.21	2516.89	2509.21	-0.000701	2551.59
Aw28	1817422	20225980	36.234823	116.066456	2492.18	2469.75	2436.17	-0.003064	2621.43
Craig	1842935	20202769	36.170598	115.980504	2579.86	2565.45	2543.83	-0.001973	2663.13
Eagle Mtn North	1724703	20219619	36.218511	116.380916	1977.53	1976.95	1975.59	-0.000124	1983.09
Eagle Mtn South	1724776	20219506	36.218202	116.380669	1977.09	1976.33	1974.73	-0.000146	1983.56
Hall2	1823775	20233604	36.255656	116.044748	2507.10	2488.34	2460.27	-0.002561	2615.12
Harrow Disk	1835726	20236823	36.264279	116.004141	2553.85	2556.58	2560.11	0.000323	2540.59
Landfill #1	1841027	20230311	36.246291	115.986312	2622.62	2654.22	2695.82	0.003796	2466.30
Landfill #2	1840823	20230267	36.246174	115.987008	2622.42	2653.99	2695.55	0.003793	2466.21
Landfill #3	1840733	20230092	36.245693	115.987316	2621.98	2653.90	2695.92	0.003835	2464.05
NDOT South	1954699	20143232	36.004297	115.604081	3909.34	3924.90	3932.52	0.000696	3890.44
Pit Wall (USGS GA-08E)	1740386	20254183	36.313322	116.327338	2119.19	2120.94	2123.35	0.000220	2110.05
Stewart Valley South	1799114	20205395	36.178569	116.128920	2441.31	2433.49	2421.82	-0.001065	2486.21
Veloz	1833169	20216726	36.209123	116.013272	2588.50	2596.49	2602.83	0.000578	2567.88
PV-1	1823956	20276542	36.373600	116.043193	2541.04	2540.02	2538.42	-0.000146	2547.25
PV-2	1845652	20242171	36.278780	115.970339	2599.95	2617.67	2643.10	0.002321	2502.77
PV-3	1848756	20231098	36.248300	115.960084	2640.63	2654.83	2674.70	0.001813	2565.08
PV-4	1826134	20200416	36.164446	116.037475	2477.00	2459.64	2433.62	-0.002374	2577.17
PV-5	1829392	20205307	36.177825	116.026331	2500.70	2474.97	2435.14	-0.003634	2654.87
BLM Stewart Valley Well	1786840	20232834	36.254126	116.170033	2433.03	2426.31	2418.42	-0.000720	2461.96

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Well Name	Easting/X: State Plane NV cent 2702	Northing/Y: State Plane NV cent 2702	Latitude (NAD 83)	Longitude (NAD 83)	Water Table Elevation 7-2015 (feet)	Estimated Water Table Elevation 7-15-35 (feet)	Estimated Water Table Elevation 7-15-65 (feet)	Slope used in calculations	Intercept used in calculations
USBLM - Stump Spring Well	1890896	20139086	35.994625	115.819897	2841.00	2831.31	2818.16	-0.001200	2890.71
USGS GS-03 Shallow Well	1748894	20260977	36.331901	116.298372	2279.09	2273.20	2275.57	0.000216	2262.51
BOWMAN, E.S.	1869684	20193219	36.143810	115.890140	2837.40	2886.57	2954.49	0.006198	2579.74
Monitor Well 1	1847327	20188662	36.131760	115.965970	2575.00	2552.41	2513.58	-0.003544	2727.86
Monitor Well 4	1849743	20184122	36.119240	115.957900	2590.70	2560.68	2515.46	-0.004127	2764.99
Urbon/Beckett Well	1846389	20183592	36.117850	115.969270	2564.00	2536.65	2495.03	-0.003798	2724.67
Cheek, Floyd	1849448	20172249	36.086630	115.959190	2468.50	2450.84	2421.73	-0.002657	2582.38
Appaloosa Spring a	1915463	20180694	36.108302	115.735511	3809	3809	3809	0	3809
Appaloosa Spring b	1915349	20180698	36.108316	115.735897	3805	3805	3805	0	3805
Big Spring	1755908	20276542	36.374582	116.274344	2247	2247	2247	0	2247
Bole Spring	1756652	20272452	36.363338	116.271873	2265	2265	2265	0	2265
Bramer Spring	1759298	20272454	36.363315	116.262885	2278	2278	2278	0	2278
Buck Spring	1902890	20266204	36.343503	115.775409	7316	7316	7316	0	7316
Chappo Spring	1781653*	20121243*	35.947645	116.189482	1971	1971	1971	0	1971
Clark Spring	1918793	20258168	36.321016	115.721684	8527	8527	8527	0	8527
Grapevine Springs	1745711	20260315	36.330116	116.309187	2281	2281	2281	0	2281
Horse Springs a	1871693	20251549	36.303991	115.881738	5303	5303	5303	0	5303
Horse Springs b	1871390	20251397	36.303581	115.882768	5231	5231	5231	0	5231
Horse Springs c	1871014	20250641	36.301512	115.884066	5167	5167	5167	0	5167
Kulp Spring	1918329	20201491	36.165351	115.725125	5341	5341	5341	0	5341
Last Chance Spring	1756034	20270313	36.357471	116.274003	2251	2251	2251	0	2251
Lee Spring	1921190	20223297	36.225170	115.714711	8212	8212	8212	0	8212
Mound Spring	1861712	20175617	36.095632	115.917597	2754	2754	2754	0	2754
Santa Cruz Spring	1860963	20264499	36.339797	115.917810	4763	4763	4763	0	4763
Shoshone Spring	1756863*	20132854*	35.979848	116.273078	1609	1609	1609	0	1609
Stump Spring	1889341	20135054	35.983586	115.825273	2824	2824	2824	0	2824
Twelvemile Spring	1791597*	20148328*	36.021914	116.155407	2209	2209	2209	0	2209
unnamed spring #10	1871025	20249592	36.298631	115.884057	4983	4983	4983	0	4983
unnamed spring #11	1868847	20248784	36.296461	115.891470	4690	4690	4690	0	4690
unnamed spring #12	1871534	20248753	36.296316	115.882353	4978	4978	4978	0	4978
unnamed spring #13	1874656	20249047	36.297052	115.871753	5315	5315	5315	0	5315
unnamed spring #15	1875248	20248933	36.296727	115.869746	5332	5332	5332	0	5332
unnamed spring #17	1915551	20200698	36.163246	115.734564	4668	4668	4668	0	4668
unnamed spring #29	1913892	20178894	36.103398	115.740885	3712	3712	3712	0	3712
unnamed spring #31	1759096*	20122828*	35.952280	116.265672	1509	1509	1509	0	1509
unnamed spring #32	1792885*	20146872*	36.017894	116.151078	2226	2226	2226	0	2226
unnamed spring #6	1871007	20255266	36.314217	115.883964	5640	5640	5640	0	5640
unnamed spring #7	1871102	20255096	36.313749	115.883645	5614	5614	5614	0	5614
unnamed spring #8	1866215	20251860	36.304968	115.900319	4647	4647	4647	0	4647
unnamed spring #9	1866712	20251756	36.304670	115.898636	4655	4655	4655	0	4655

* indicates Nevada State Plane coordinates for California locations.

Appendix B – Table showing Sections Affected

TableB1. Showing well density for each section and number of wells predicted to fail, using the 20 foot submergence case, for the 20 and 50-year projection.

Sections affected (Nevada only)					-10 feet/20 years contour			-10 feet/50 years contour		
Township and Range	Section	Estimated Area of Section (mi ²)	Total Number of Wells in Section	Number of Wells in Section within -10 ft/50 yr contour	Estimated Area affected (mi ²) -10ft/20yrs	% Section affected -10ft/20yrs	Number of well failures by 2035 -10ft/20yrs	Estimated Area affected (mi ²) -10/50yrs	% Section affected -10ft/50yrs	Number of well failures by 2065 -10ft/50yrs
19S 51E	36	0.82	0**	0**	0.13	15.9	0**	0.18	22.0	0**
19S 52E	12	1.00	0**	0**	N/A	N/A	N/A	0.06	6.0	0**
19S 52E	13	1.00	0**	0**	N/A	N/A	N/A	0.18	18.0	0**
19S 52E	22	1.00	0**	0**	N/A	N/A	N/A	0.18	18.0	0**
19S 52E	23	1.00	0**	0**	N/A	N/A	N/A	0.30	30.0	0**
19S 52E	24	1.00	106	104	0.65	65.0	0	0.81	81.0	4
19S 52E	25	1.00	109	109	0.59	59.0	0	1.00	100.0	1
19S 52E	26	1.00	20	20	N/A	N/A	N/A	1.00	100.0	2
19S 52E	27	0.99	0**	0**	N/A	N/A	N/A	0.14	14.1	0**
19S 52E	31	0.96	3	3	0.77	80.20	0	0.79	82.3	1
19S 52E	32	1.00	0**	0**	N/A	N/A	1	0.01	1.0	0**
19S 52E	35	1.00	78	78	N/A	N/A	3	0.88	88.0	4
19S 52E	36	1.00	92	92	0.66	66.0	0	1.00	100.0	2
19S 53E	7	0.99	0**	0**	N/A	N/A	N/A	0.14	14.1	0**
19S 53E	16	1.00	215	0**	N/A	N/A	N/A	0.001	0.1	0**
19S 53E	17	1.00	52	42	N/A	N/A	2	0.39	39.0	3
19S 53E	18	1.00	11	10	N/A	N/A	1	0.62	62.0	1
19S 53E	19	1.00	151	151	0.51	51.0	57	1.00	100.0	76
19S 53E	20	1.00	70	70	0.22	22.0	0	1.00	100.0	5
19S 53E	21	1.00	19	9	N/A	N/A	7	0.44	44.0	7
19S 53E	28	1.00	218	170	0.03	3.0	0	0.74	74.0	0
19S 53E	29	1.00	79	79	0.93	93.0	0	1.00	100.0	2
19S 53E	30	1.00	205	205	1.00	100.0	8	1.00	100.0	51
19S 53E	31	1.00	172	172	1.00	100.0	3	1.00	100.0	21
19S 53E	32	1.00	281	281	1.00	100.0	0	1.00	100.0	20
19S 53E	33	1.00	114	54	0.10	10.0	0	0.60	60.0	2
20S 51E	1	0.11	0**	0**	0.006	5.5	0**	0.08	72.7	0**
20S 52E	1	1.00	160	160	0.96	96.0	0	1.00	100.0	8
20S 52E	2	1.00	5	5	0.22	22.0	0	0.63	63.0	0
20S 52E	3	1.00	0**	0**	N/A	N/A	N/A	0.15	15.0	0**
20S 52E	5	1.10	0**	0**	N/A	N/A	N/A	0.22	20.0	0**
20S 52E	6	0.87	8	8	0.40	46.0	0	0.87	100.0	0

Sections affected (Nevada only)					-10 feet/20 years contour			-10 feet/50 years contour		
Township and Range	Section	Estimated Area of Section (mi ²)	Total Number of Wells in Section	Number of Wells in Section within -10 ft/50 yr contour	Estimated Area affected (mi ²) -10ft/20yrs	% Section affected -10ft/20yrs	Number of well failures by 2035 -10ft/20yrs	Estimated Area affected (mi ²) -10/50yrs	% Section affected -10ft/50yrs	Number of well failures by 2065 -10ft/50yrs
20S 52E	7	0.08	2	2	N/A	N/A	N/A	0.08	97.0	0
20S 52E	8	0.83	1	1	N/A	N/A	N/A	0.06	7.2	0
20S 52E	10	1.00	16	10	0.14	14.0	1	0.62	62.0	4
20S 52E	11	1.00	35	35	0.98	98.0	1	1.00	100.0	3
20S 52E	12	1.00	94	94	1.00	100.0	1	1.00	100.0	35
20S 52E	13	1.00	320	320	1.00	100.0	0	1.00	100.0	200
20S 52E	14	1.00	225	225	1.00	100.0	0	1.00	100.0	44
20S 52E	15	1.00	3	3	0.25	25.0	2	0.70	70.0	2
20S 52E	22	0.79	16	16	0.28	35.4	0	0.59	74.7	0
20S 52E	23	1.00	228	228	1.00	100.0	7	1.00	100.0	59
20S 52E	24	1.00	275	275	1.00	100.0	2	1.00	100.0	128
20S 52E	25	1.00	30	30	1.00	100.0	0	1.00	100.0	3
20S 52E	26	0.77	99	99	0.73	94.8	4	0.77	100.0	16
20S 52E	27	0.06	2	2	0.06	100.0	0	0.06	100.0	0
20S 52E	35	0.05	1	1	0.05	100.0	1	0.05	100.0	1
20S 52E	36	0.81	22	22	0.81	100.0	1	0.81	100.0	8
20S 53E	4	1.00	125	35	0.1	10.0	0	0.59	59.0	0
20S 53E	5	1.00	106	106	1.00	100.0	2	1.00	100.0	14
20S 53E	6	1.00	247	247	1.00	100.0	2	1.00	100.0	40
20S 53E	7	0.96	99	99	0.96	100.0	21	0.96	100.0	39
20S 53E	8	1.00	351	351	1.00	100.0	5	1.00	100.0	65
20S 53E	9	1.00	260	239	0.34	34.0	5	0.77	77.0	7
20S 53E	16	1.00	118	78	0.18	18.0	0	0.69	69.0	8
20S 53E	17	1.00	471	471	0.91	91.0	2	1.00	100.0	31
20S 53E	18	0.98	289	289	0.98	100.0	4	0.98	100.0	168
20S 53E	19	0.99	17	17	0.99	100.0	0	0.99	100.0	5
20S 53E	20	1.00	111	111	0.96	96.0	4	1.00	100.0	31
20S 53E	21	1.00	125	122	0.57	57.0	1	0.94	94.0	2
20S 53E	22	1.00	13	8	0.10	10.0	3	0.30	30.0	3
20S 53E	25	1.00	81	0	N/A	N/A	N/A	0.002	0.2	0
20S 53E	26	1.00	9	3	0.21	21.0	0	0.46	46.0	0
20S 53E	27	1.00	5	5	0.86	86.0	0	0.99	99.0	1
20S 53E	28	1.00	196	196	1.00	100.0	5	1.00	100.0	96
20S 53E	29	1.00	328	328	1.00	100.0	23	1.00	100.0	181
20S 53E	30	1.00	66	66	1.00	100.0	3	1.00	100.0	22
20S 53E	31	1.00	91	91	1.00	100.0	0	1.00	100.0	24
20S 53E	32	1.00	207	207	1.00	100.0	1	1.00	100.0	60
20S 53E	33	1.00	137	137	1.00	100.0	3	1.00	100.0	83

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Sections affected (Nevada only)					-10 feet/20 years contour			-10 feet/50 years contour		
Township and Range	Section	Estimated Area of Section (mi ²)	Total Number of Wells in Section	Number of Wells in Section within -10 ft/50 yr contour	Estimated Area affected (mi ²) -10ft/20yrs	% Section affected -10ft/20yrs	Number of well failures by 2035 -10ft/20yrs	Estimated Area affected (mi ²) -10/50yrs	% Section affected -10ft/50yrs	Number of well failures by 2065 -10ft/50yrs
20S 53E	34	1.00	239	239	1.00	100.0	0	1.00	100.0	99
20S 53E	35	1.00	241	241	0.97	97.0	1	1.00	100.0	71
20S 53E	36	1.00	213	119	0.13	13.0	0	0.47	47.0	7
21S 52E	1	0.25	0**	0**	0.25	100.0	0**	0.25	100.0	0**
21S 53E	1	0.94	150	146	0.57	60.6	0	0.92	97.9	25
21S 53E	2	1.00	344	344	1.00	100.0	23	1.00	100.0	232
21S 53E	3	1.00	24	24	1.00	100.0	0	1.00	100.0	16
21S 53E	4	1.00	1	1	1.00	100.0	0	1.00	100.0	1
21S 53E	5	1.00	3	3	1.00	100.0	2	1.00	100.0	3
21S 53E	6	0.82	2	2	0.82	100.0	2	0.82	100.0	2
21S 53E	7	0.80	0**	0**	0.80	100.0	0**	0.80	100.0	0**
21S 53E	8	1.00	0**	0**	1.00	100.0	0**	1.00	100.0	0**
21S 53E	9	1.00	0**	0**	1.00	100.0	0**	1.00	100.0	0**
21S 53E	10	1.00	100	100	1.00	100.0	26	1.00	100.0	91
21S 53E	11	1.00	388	388	1.00	100.0	60	1.00	100.0	272
21S 53E	12	0.97	124	124	0.97	100.0	3	0.97	100.0	42
21S 53E	13	0.97	213	213	0.97	100.0	13	0.97	100.0	160
21S 53E	14	1.00	283	283	1.00	100.0	68	1.00	100.0	188
21S 53E	15	1.00	31	31	1.00	100.0	6	1.00	100.0	16
21S 53E	16	1.00	1	1	1.00	100.0	0	1.00	100.0	0
21S 53E	17	0.99	1	1	0.99	100.0	1	0.99	100.0	1
21S 53E	18	0.38	4	4	0.38	100.0	2	0.38	100.0	4
21S 53E	20	0.35	1	1	0.35	100.0	1	0.35	100.0	1
21S 53E	21	0.98	0**	0**	0.98	100.0	0**	0.98	100.0	0**
21S 53E	22	0.99	0**	0**	0.99	100.0	0**	0.99	100.0	0**
21S 53E	23	1.00	0**	0**	1.00	100.0	0**	1.00	100.0	0**
21S 53E	24	0.97	4	4	0.97	100.0	0	0.97	100.0	1
21S 53E	25	0.98	11	11	0.98	100.0	4	0.98	100.0	4
21S 53E	26	1.00	0**	0**	1.00	100.0	0**	1.00	100.0	0**
21S 53E	27	0.98	0**	0**	0.98	100.0	0**	0.98	100.0	0**
21S 53E	28	0.31	0**	0**	0.31	100.0	0**	0.31	100.0	0**
21S 53E	34	0.27	0**	0**	0.27	100.0	0**	0.27	100.0	0**
21S 53E	35	0.96	27	27	0.96	100.0	1	0.96	100.0	10
21S 53E	36	1.00	73	73	1.00	100.0	10	1.00	100.0	37
21S 54E	6	0.98	6	2	N/A	N/A	N/A	0.27	27.6	0
21S 54E	7	0.99	95	95	0.46	46.5	3	0.96	97.0	9
21S 54E	8	0.98	56	24	N/A	N/A	N/A	0.19	19.4	1
21S 54E	17	1.00	62	48	0.05	5	0	0.51	51.0	0

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JT APP 1434

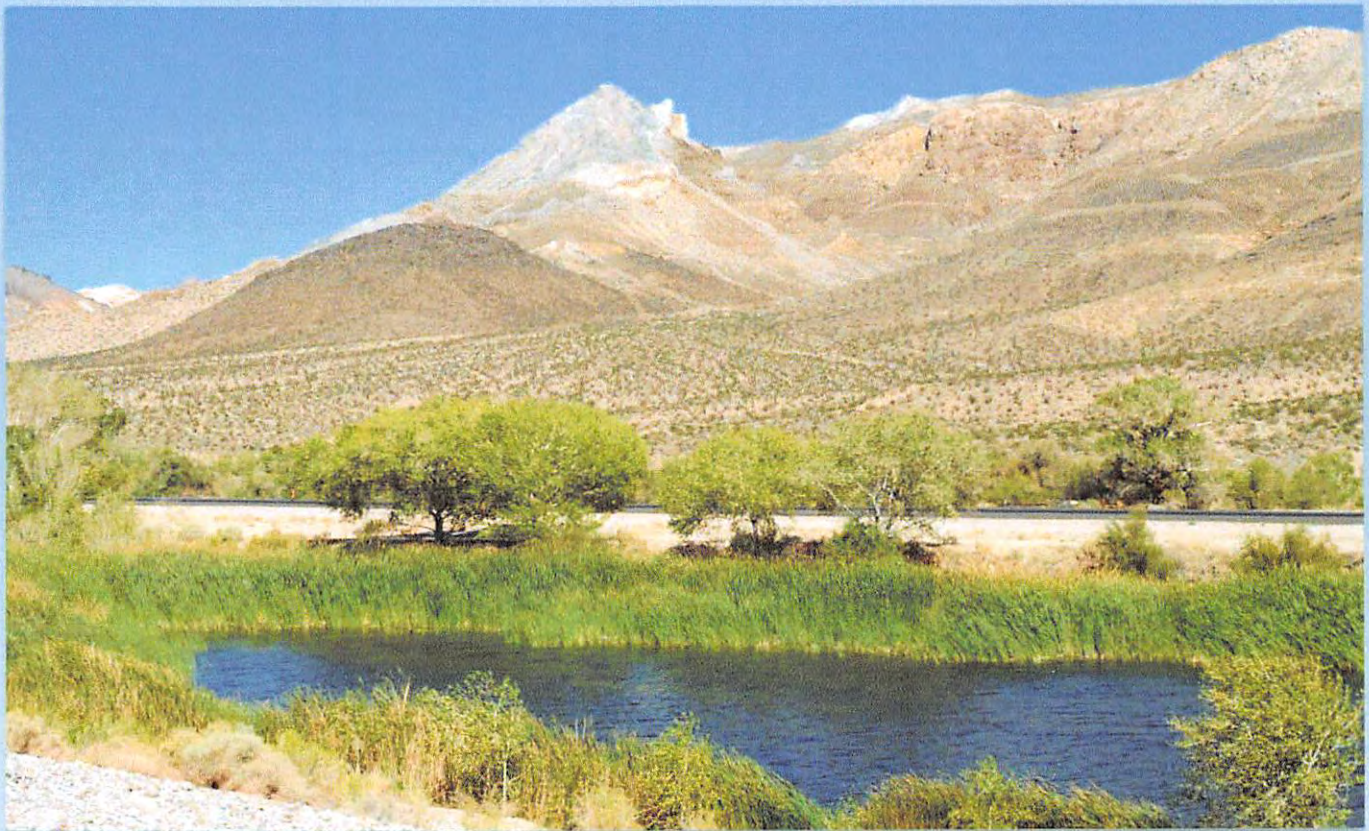
SE ROA 1387

Sections affected (Nevada only)					-10 feet/20 years contour			-10 feet/50 years contour		
Township and Range	Section	Estimated Area of Section (mi ²)	Total Number of Wells in Section	Number of Wells in Section within -10 ft/50 yr contour	Estimated Area affected (mi ²) -10ft/20yrs	% Section affected -10ft/20yrs	Number of well failures by 2035 -10ft/20yrs	Estimated Area affected (mi ²) -10/50yrs	% Section affected -10ft/50yrs	Number of well failures by 2065 -10ft/50yrs
21S 54E	18	0.99	156	156	0.95	96.0	4	0.99	100.0	72
21S 54E	19	0.99	296	296	0.99	100.0	12	0.99	100.0	108
21S 54E	20	0.96	322	161	0.10	10.4	0	0.50	52.1	0
21S 54E	29	1.00	138	69	0.11	11.0	0	0.70	70.0	0
21S 54E	30	0.97	3	3	0.97	100.0	1	0.97	100.0	2
21S 54E	31	0.99	56	56	0.99	100.0	6	0.99	100.0	9
21S 54E	32	1.00	0**	0**	0.20	20.0	0**	0.88	88.0	0**
22S 53E	1	1.00	77	77	0.92	92.0	1	1.00	100.0	5
22S 53E	2	0.24	0**	0**	0.13	54.2	0**	0.24	100.0	0**
22S 53E	12	0.13	0**	0**	0.13	100.0	0**	0.13	100.0	0**
22S 54E	5	1.11	0**	0**	0.18	16.2	0**	0.96	86.5	0**
22S 54E	6	1.11	14	14	1.11	100.0	1	1.11	100.0	2
22S 54E	7	0.85	0**	0**	0.46	54.1	0**	0.85	100.0	0**
22S 54E	8	0.99	0**	0**	0.001	0.1	0**	0.95	96.0	0**
22S 54E	16	1.00	0**	0**	N/A	N/A	N/A	0.01	1.0	0**
22S 54E	17	0.84	0**	0**	N/A	N/A	N/A	0.84	100.0	0**
22S 54E	18	0.10	0**	0**	N/A	N/A	N/A	0.10	100.0	0**
22S 54E	20	0.08	0**	0**	N/A	N/A	N/A	0.08	100.0	0**
24N 8E	10	0.05	0**	0**	0.01	20.0	0**	0.05	100.0	0**
24N 8E	14	0.04	0**	0**	0.00	0.0	0**	0.04	100.0	0**
24N 8E	15	0.76	0**	0**	0.029	3.8	0**	0.32	42.1	0**
24N 8E NV only	16*	0.72	0**	0**	0.019	2.6	0**	0.13	18.1	0**
24N 8E NV only	22*	0.68	0**	0**	N/A	N/A	N/A	0.006	0.9	0**
24N 8E	23	0.75	1	1	0.11	14.7	0	0.62	82.7	0
24N 8E	24	0.05	0**	0**	0.05	100.0	0**	0.05	100.0	0**
24N 8E	25	0.75	0**	0**	0.7	93.3	0**	0.75	100.0	0**
24N 8E NV only	26*	0.64	1	1	0.01	1.6	1	0.55	85.9	1
24N 8E NV only	35*	0.008	0**	0**	N/A	N/A	N/A	0.008	100.0	0**
24N 8E NV only	36*	0.57	0**	0**	0.55	96.5	0**	0.57	100.0	0**
25N 7E	25	0.71	0**	0**	N/A	N/A	N/A	0.18	25.4	0**
25N 7E	36*	0.78	0**	0**	N/A	N/A	N/A	0.03	3.8	0**
25N 8E	30	0.03	0**	0**	N/A	N/A	N/A	0.03	100.0	0**
25N 8E	31	0.47	0**	0**	N/A	N/A	N/A	0.14	29.8	0**
Total	95	120.38	10750	9774	72.51	60.23	438	94.88	78.8	3085

* Indicates section both in Nevada and California, and estimate of total area of the section only for Nevada part.

** Indicates no wells are present in section.

NYE COUNTY WATER DISTRICT WATER RESOURCES PLAN UPDATE



Prepared for:

The Nye County Water
District Governing Board



April 2017

Prepared by:

MaryEllen C. Giampaoli,
Environmental Compliance
Specialist

TerraSpectra Geomatics

Jamieson Geological, Inc.

NYE COUNTY WATER DISTRICT Water Resources Plan Update

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The Nye County Water District Governing Board

April 2017

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Cover photo Bombo's Pond in Beatty, Nevada courtesy of TerraSpectra Geomatics

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I would like to thank the Nye County Water District Governing Board Members and Staff, both past and present, whose knowledgeable perspectives and insights helped to frame many of the discussions in this Water Resources Plan Update. I would especially like to thank Mr. Oscar Wichman whose boundless patience during the many hours-long talks helped me to focus on the issues, and to ground some of the more contentious discussions in basic numbers and facts.

I would like to extend a special thanks to “Sam” Merlino for her help in researching historic water-related matters before the Board of Commissioners. I would also like to thank the Nye County Assessor’s Office for providing private land and parcel maps for use in the water demand calculations. Many thanks to Nye County Planning and Public Works staff who provided background information and periodic updates on water-related planning initiatives and projects. Very special thanks to John Klenke for coordinating with me and my contract team in sharing his scientific work products; these provide the basis for several sections of the Water Resources Plan Update. I also would like to thank the Division of Water Resources for providing consolidated versions of online surface and ground water rights databases for our convenience of use.

I would also like to gratefully acknowledge the members of my Contract Team – Elaine Ezra and David Brickey of TerraSpectra Geomatics, Inc. and Jamie Walker of Jamieson Geological, Inc., - for their ongoing efforts in data compilation, analysis, and display, and the production of maps and figures. Many, many thanks to Aundrea Kojis and Megan Labadie of my staff for their talented and tireless support in document production. This Water Resources Plan Update would not have been possible without their help.

Finally, many thanks to my late husband, Tom Buqo, for his work in advancing and promoting a proactive water resources management approach in Nye County.

MaryEllen C. Giampaoli
Environmental Compliance Specialist

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ACRONYMS

ACEC	Areas of Critical Environmental Concern
AFY	Acre-Feet per Year
BLM	Bureau of Land Management
BoCC	Board of County Commissioners
BWPC	Bureau of Water Pollution Control
CEDS	Comprehensive Economic Development Strategy
CFS	Cubic Feet per Second
CMA	Critical Management Area
CNRWA	Central Nevada Regional Water Authority
CSWP	Community Source Water Protection
DLE	Desert Land Entry
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DWR	Division of Water Resources
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FLPMA	Federal Land Policy Management Act
GGI	Glorieta Geosciences, Inc.
GID	General Improvement District
GPM	Gallons per Minute
GWMP	Groundwater Management Plan
LID	Local Improvement District
LUP	Land Use Plan
NAC	Nevada Administrative Code
NCWD	Nye County Water District
NDEP	Nevada Division of Environmental Protection
NDWP	Nevada Division of Water Planning
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOI	Notice of Intent
NPS	National Park Service
NRS	Nevada Revised Statutes
NTTR	Nevada Test and Training Range
NWRPO	Nuclear Waste Repository Project Office
PPB	Parts per Billion
PRPC	Pahrump Regional Planning Commission
PWS	Public Water Supply Systems
RIB	Rapid Infiltration Basins
RFA	Ready for Action
RFP	Ready for Protest
RMP	Resource Management Plan
ROD	Record of Decision

SNWA	Southern Nevada Water Authority
UICN	Utilities Inc. of Central Nevada
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
WCD	Water Conservancy District
WHPP	Wellhead Protection Plan
WLMP	Water Level Measurement Program
WRP	Nye County Water Resources Plan
WSAI	Water Supply Appraisal Investigation

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CHAPTER 1 – OVERVIEW, GOALS, AND GUIDELINES

The Nye County Water Resources Plan (WRP) is a tool to help guide the development, management, and use of the County's water resources. The 2017 WRP Update reaffirms Nye County's goals and guidelines for planning, updates the water resources and issues related to those resources, and provides specific alternatives and recommendations for the long-term (50-year) management of those resources. The plan was prepared under the direction of the Nye County Water District, and in coordination with Nye County and Water District staff. This plan was developed to be consistent with the Nye County Comprehensive Master Plan, the Basin 162 Groundwater Management Plan, and other County planning documents.

1.1. INTRODUCTION

In 2004, Nye County took its first steps toward proactive water resources management with the issuance and adoption of the WRP. The 2004 WRP set forth the County's philosophy, goals and objectives, and made several bold, forward-looking recommendations for managing the County's water resources into the future. Since the issuance of the first WRP in 2004, Nye County has taken many steps to proactively manage its water resources by implementing several of its recommendations. Nye County's many initiatives and accomplishments in water resources management since 2004 include:

- Working with the Nevada Legislature to establish the Nye County Water District;
- Joining with neighboring Counties with which it shares basins and water resources to work cooperatively to manage those resources through the creation of the Central Nevada Regional Water Authority (CNRWA);
- Developing and implementing NDEP-approved County-wide source water protection plans;
- Incorporating extensive conservation measures and public education initiatives into Regional Master Plans and Area Plans;
- Adopting ordinances that require relinquishment of water rights and their over-dedication to new parcels created by land division in order to restore the water balance in over-allocated basins; which resulted in relinquishing nearly 8,000 acre-feet of water rights in the Pahrump Basin to offset over-allocation;
- Adopting Ordinances setting zoning standards for water conservation and landscaping;
- Adopting Comprehensive Master Plan Goals, Objectives, and Policies that support resource identification, protection, and management;
- Establishing and supporting the Basin 162 Groundwater Management Plan Committee, including members from the community, State Engineer and Division of Water Resources staff, County and Water District staff, and the public, to work cooperatively to resolve the water resources over-allocation problem in the Pahrump basin;
- Continuing to conduct water level monitoring in Pahrump and Amargosa valleys, and expanding data collection when opportunities arise;
- Sponsoring several water planning and appraisal reports, including a review of basin health based on available water resources for beneficial use;
- Sponsoring the exhaustive Nye County Water Supply Appraisal Investigation Report on water supplies throughout Nye County;
- Sponsoring various studies related to water supply in Pahrump, including examinations of nitrates, and cost and feasibility of water importation; and

- Adopting an ordinance to require Geotechnical Testing Analysis by a licensed Geotechnical Engineer to address geotechnical soil hazards associated with water sensitive clays (e.g. expansive and collapsible).

This 2017 update to the WRP presents the current water resources baseline and describes the current hydrologic conditions and issues that have evolved since 2004. It provides recommendations for the continued successful management of Nye County's water resources to the extent provided by the Nevada Revised Statutes (NRS).

In this chapter, the updated WRP goals and objectives are presented along with the principles that guided its revision. The legal and regulatory framework under which water resource development and use are governed, and the relationship between this plan and other planning documents are also summarized. Subsequent chapters detail the socioeconomics and demographic trends; water resources of Nye County and the issues associated with the development and use of those resources; and specific plans and management practices aimed at addressing those issues.

1.2. STATEMENT OF PURPOSE AND GOALS

On April 21, 2015, the Nye County Board of County Commissioners (BoCC) publicly discussed Underlying Philosophy, Goals and Objectives as presented in the 2004 Nye County WRP. Changes recommended by the Board Members have been incorporated into the sections that follow.

Underlying Philosophy

Nye County's water resources are its most precious natural resource and are basic to all efforts to preserve resident lifestyles, to meet the needs of area citizens by providing for their economic well-being and improving their quality of life, and to preserve the environment.

Goals and Objectives

The Nye County WRP update was prepared to ensure that adequate supplies of water remain available in Nye County to improve the quality of life for residents and visitors to the County; to expand and diversify the economy of the County; and to maintain and enhance the quality of the environment. The implementation of this plan is in the best interest of the County and the State of Nevada and provides the framework for cooperative management of those resources.

By meeting the following objectives, these goals will be achieved:

1. Define the existing surface and ground water resources of the County
2. Identify existing water uses in the County
3. Identify forecasted growth and future water demands for the period 2010 to 2060
4. Identify water supply issues and management practices
5. Establish short and long-term strategies for the use of water resources in the County to benefit its environment and its citizens

This update adhered to the original guiding principles of the 2004 WRP. The guiding principles are listed in Table 1-1.

Table 1-1. Principles Guiding the Update of the Nye County Water Resources Plan

1. All of the water resources of Nye County, whether above or below ground, belong to the public.
2. The water resources needs of future generations of Nye County residents must be protected with a balanced approach that provides for the County's economic goals without detriment to the social, aesthetic, cultural, and ecological values of the County.
3. The appropriation and beneficial use of Nye County's water resources are administered by the Nevada State Engineer in accordance with the requirements of Nevada Water Law, and by state and federal court decrees and regulations.
4. Public education and public input are vital aspects of water resources planning and all units of local government, water users, and interested parties should be allowed to participate in the planning process.
5. The Nye County WRP update is aimed at accommodating planned, sustainable, growth within the various economic sectors of the County.
6. Water rights in Nye County are private property that may be bought, sold, or traded under free market conditions, in compliance with applicable Nevada Revised Statutes (NRS) and Nevada Administrative Code (NAC).
7. The Nye County WRP update considers water supply, water quality, water use, and environmental issues, and should be used to guide decisions that affect the water resources of the County.
8. All water resources development and use in Nye County should be conducted in a manner that is technically and economically sound, environmentally sustainable, and in compliance with local, state, and federal laws.
9. The Nye County WRP update is consistent with Nevada Water Law and was prepared in consultation with the Nye County Water District, the Nevada Division of Water Resources, and stakeholders in the County.
10. Water conservation is an important component of the planning and management of Nye County's water resources.
11. The Nye County WRP update must be based on sound science, water resources evaluation, and management principles.
12. The 2004 Nye County WRP was adopted as an element of the Nye County Comprehensive Plan; the 2017 WRP should be considered for adoption, as well.

1.3. INSTITUTIONAL FRAMEWORK

Water resources planning in Nye County must be consistent with County policies and plans, as well as with existing state and federal laws and regulations and court decrees. In general, the State of Nevada governs the allocation, planning, and management of the water resources. In this section, an overview of this institutional framework is provided. The federal government through various laws and regulations, implements land use and resource management plans that govern land use decisions and environmental issues that must be considered during water planning and development. These planning documents are described at the end of this Chapter.

Nye County has long recognized the need for water resource planning and management. Based on recommendations in the 2004 Nye County WRP, the Nye County BoCC undertook a legislative approach to establish the Nye County Water District (NCWD). The bill creating the NCWD Governing Board was enacted on June 18, 2007 by the Nevada Legislature pursuant to Nevada

Revised Statutes 2007, Chapter 542, under Selected Special and Local Acts. The bill, also known as the Nye County Water District Act, became effective July 1, 2007.

The NCWD was formed to develop sustainable sources of water vital to long-term economic development, protection of the environment, and the well-being of the residents of Nye County. In addition to other powers and duties of the Governing Board outlined within Chapter 542 of the Nevada Revised Statutes, the Board is authorized to levy and collect certain taxes; to incur indebtedness and issue bonds; to acquire land, water rights and property of every kind; and to construct any work for the development, importation, or distribution of the water of the District. The NCWD service area includes all real property within the boundaries of Nye County, Nevada.

The Water District consists of four Areas that are broken out along the hydrographic basin boundaries (Figure 1-1). The NCWD Governing Board comprises seven members, appointed by the Nye County BoCC, with one member representing each of the following Areas: Area 1 Currant Creek/Smoky Valley; Area 2 Tonopah; and Area 3 Beatty/Amargosa Valley; Area 4 Pahrump has three members; the seventh member is an at-large Nye County resident not from Pahrump.

The NCWD adopted the mission statement; "Provide, protect, and preserve water resources in Nye County." To this end, the NCWD is working to:

- Develop a long-term sustainability plan of development for Nye County water resources,
- Evaluate and mitigate the environmental impacts associated with resource use,
- Better define the groundwater and surface water resources conditions, and
- Define alternative approaches for the management of the water resources of the region.

The NCWD sponsors and oversees scientific, technical, and planning projects to address water resource and supply problems throughout Nye County. While the early projects of the NCWD have focused on water-related issues in Pahrump and Amargosa Valley, projects in the northern communities are also underway. Information regarding the NCWD can be found online at <http://www.nyecountywaterdistrict.net>.

The Central Nevada Regional Water Authority is an eight-county unit of local government in the State of Nevada that collaboratively and proactively addresses water resource issues common to the eight of the nine counties that share the water resources of Nevada's Central Hydrographic Region. The CNRWA exists under Nevada's Interlocal Cooperation Act and has delegated authority separate and apart from its member counties. The Authority has a 21-member board of directors appointed by the county commissions of the 8 counties. The CNRWA members are Churchill, Elko, Esmeralda, Eureka, Lander, Nye, Pershing and White Pine Counties. These counties cover approximately 65 percent of Nevada's land area.

HYDROGRAPHIC BASINS WITHIN THE NYE COUNTY WATER DISTRICT AREAS

Nye County Water District Areas, Number of Members
From Each Area*, and Hydrographic Basins

Area 1: Currant Creek / Smoky Valley Area - 1 Member

- 56 Upper Reese River Valley
- 122 Gabbs Valley
- 134 Smith Creek
- 135 Lone Valley
- 137B Big Smoky Valley Northern Part
- 140A Monitor Valley Northern Part
- 140B Monitor Valley Southern Part
- 150 Little Fish Lake Valley
- 151 Antelope Valley (Eureka & Nye)
- 155A Little Smoky Valley Northern Part
- 155B Little Smoky Valley Central Part
- 155C Little Smoky Valley Southern part
- 156 Hot Creek Valley
- 171 Coal Valley
- 172 Garden Valley
- 173A Railroad Valley Southern Part
- 173B Railroad Valley Northern Part
- 207 White River Valley
- 208 Pahroc Valley

Area 2: Tonopah Area - 1 Member

- 137A Big Smoky Valley Tonopah Flat
- 141 Raiston Valley
- 142 Alkali Spring Valley
- 145 Stonewall Flat
- 147 Gold Flat
- 148 Cactus Flat
- 149 Stone Cabin Valley
- 157 Kawich Valley
- 158A Emigrant Valley Groom Lake Valley
- 158B Emigrant Valley Pappoose Lake Valley
- 170 Penoyer Valley (Sand Spring Valley)

Area 3: Beatty / Amargosa Valley Area - 1 Member

- 144 Lida Valley
- 146 Sarcobatus Flat
- 159 Yucca Flat
- 160 Frenchman Flat
- 161 Indian Springs Valley
- 225 Mercury Valley
- 226 Rock Valley
- 227A Fortymile Canyon Jackass Flats
- 227B Fortymile Canyon Buckboard Mesa
- 228 Oasis Valley
- 229 Crater Flat
- 230 Amargosa Desert
- 231 Grapevine Canyon

Area 4: Pahrump Valley Area - 3 Members

- 162 Pahrump Valley

*In addition to the members appointed from the areas described above, there shall also be a member appointed who is a resident of an area in Nye County other than the Pahrump Valley.

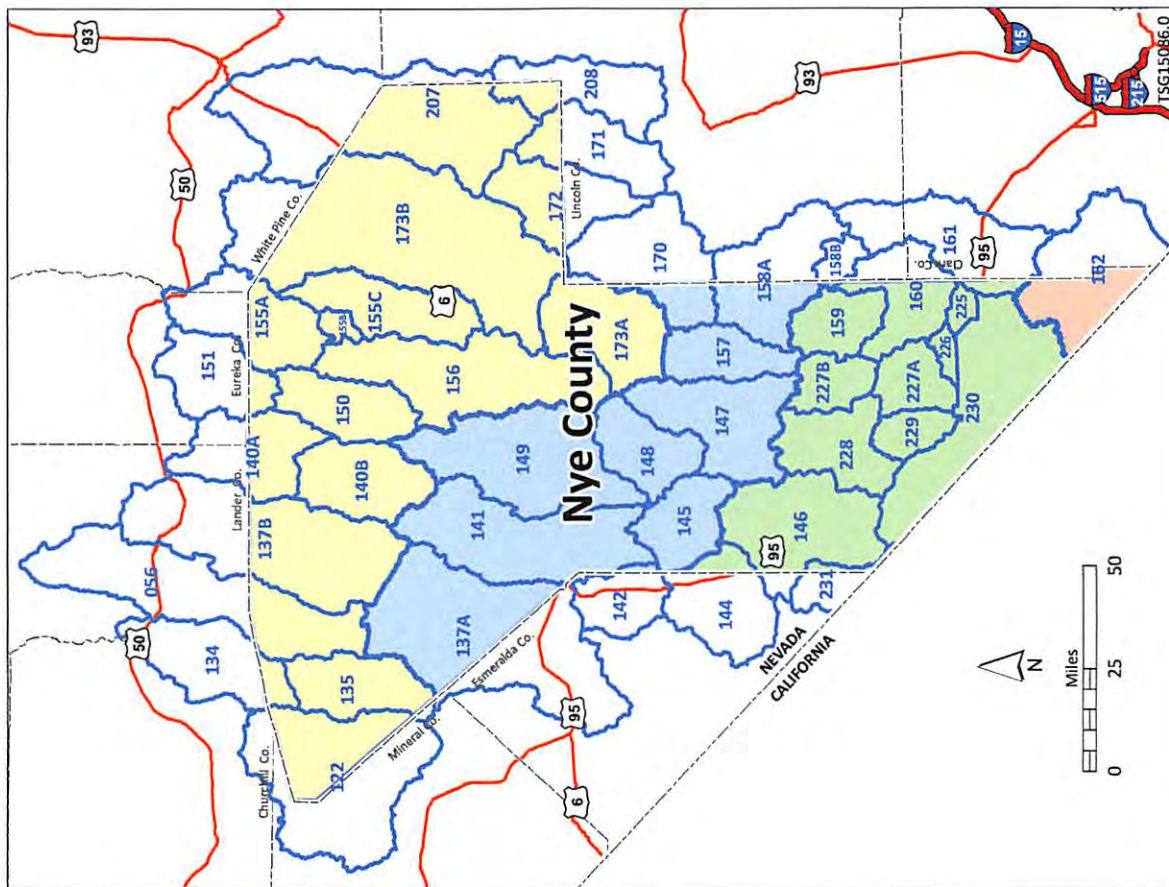


Figure 1-1. Hydrographic Basins within the Nye County Water District Areas.

The CNRWA's mission is to protect the water resources in member counties so these counties will not only have an economic future, but their valued quality of life and natural environment is maintained. The functions of the Authority are:

- To combine fiscal and staff resources to obtain technical support, legal counsel and policy advice necessary for sound water resource decisions by the member counties;
- To formulate and present a united position on water and water-related issues to the appropriate government entity (e.g., Nevada legislature, U.S. Congress, State of Nevada agencies, federal agencies and local government entities);
- To monitor, assess and respond to water projects that may adversely impact a member county;
- To develop and implement a groundwater monitoring program in areas of interest in the member counties;
- To host the annual Great Basin Water Forum established by counties in three states (California, Nevada and Utah) to address water and water-related issues in the Great Basin, and;
- To encourage citizen participation in water and water-related issues of importance to member counties.

Nye County's membership in the CNRWA consists of three representatives appointed by the NCWD Governing Board, and by charter, must include one County Commissioner. The CNRWA consults with water planners, scientists, and experts in water law and policy to assist with development of policies strategies and action plans to address the water related problems and concerns in Nevada's Central Hydrographic Region. Additional information regarding CNRWA meetings, news, and initiatives can be found on their website at <http://www.cnrwa.com>.

County Policy

The 2011 Nye County Comprehensive/Master Plan lists the County's goals, objectives, and specific policies regarding water resources. The goals, policies, and objectives described therein expand upon the goals and objectives originally set forth in the 2004 Nye County WRP. The Comprehensive Plan Water Goals are:

- To identify and maintain adequate water supplies for Nye County residents and businesses to meet current and future needs;
- To protect and develop the water resources that are essential to maintaining the County's economic and cultural viability;
- To implement an aggressive public education program to educate the public on how to reduce water use through conservation practices; and
- To implement controls and procedures that minimize water losses.

The objectives describe specific elements of water resources planning to be completed (i.e., participate with the State of Nevada Division of Water Resources (DWR) to develop accurate assessments of water supply and demand in each County basin; basis for developing water future demand, etc.). The Comprehensive/Master Plan also presents the County's policies that guide the day-to-day actions and decisions to ensure that the objectives and goals will be met. This update to the WRP considers and builds upon the Comprehensive/Master Plan Goals. The detailed

description and discussion can be found in the 2011 Nye County Comprehensive/Master Plan at nyecounty.net on the Planning Department tab.

Statutory Guidelines

All waters in Nye County belong to the public and are managed by the State of Nevada in accordance with the provisions of Nevada Water Law (NRS 533 and 534). The Nevada State Engineer determines the limit and extent of water rights including the quantity of appropriative right and any conditions that must be met for the water to be placed to a beneficial use. In ruling on a water right application, the State Engineer must consider four criteria:

1. Is there unappropriated water available for the proposed use?
2. Will the proposed use impair senior water rights?
3. Is the proposed water use in the public interest?
4. Is the proposed project feasible and not filed for speculative purposes?

Since the 2004 Nye County WRP, Nevada Water Law has undergone several changes, although, the basis for water appropriation that the State Engineer must consider remains unchanged. Many of the changes that have occurred are outside the scope of the Nye County WRP as they do not have an effect on County water planning. Only those changes that substantially affect Nye County water planning are discussed herein. A complete annotated compilation of the current Nevada Water Law can be found at www.leg.state.nv.us. The DWR website provides an excellent overview of Nevada Water Law and a link to the applicable sections of NRS at www.water.nv.gov/waterrights/waterlaw.

In 2011 the Nevada State Legislature passed into law Assembly Bill (AB) 419. The Bill established "critical management areas" (CMA) as any basin in which the "withdrawals [emphasis added] of groundwater consistently exceed the perennial yield of the basin." Under existing water law, the State Engineer has various powers and duties with respect to regulating the groundwater. Section 3 of AB 419 allows the State Engineer to designate CMAs. The bill requires the State Engineer to designate the basin as a CMA upon the petition of a majority of the holders of certificates or permits to appropriate water in the basin that are on file in the Office of the State Engineer.

If a basin is designated as a CMA for at least 10 consecutive years, the bill requires the State Engineer to order that withdrawals of groundwater be restricted in the basin to conform to priority rights, including without limitation withdrawals from domestic wells, unless a Groundwater Management Plan (GWMP) has been approved for the basin. The bill also prescribes the process for the proposal, approval, and revision of such a plan. Section 2 of the bill addresses the significance of a locally developed basin GWMP as a consideration for the State Engineer in determining whether to grant a request for an extension of the time necessary to work a curtailment of water use in such a basin. If State Engineer is faced with regulating by priority then all water users would be affected by curtailment proceeding including those served by domestic wells. The potential applicability of the regulation to Nye County basins is discussed in the following Chapters.

Federal Issues and Considerations

Federal law and policy establish standards for clean water, controlling growth in flood plains, and protecting the environment. While each of these goals is beneficial and consistent with the long-

term goals and values held by Nye County and its citizens, the immediate impact of the legislation is often limiting. The Safe Drinking Water Act of 1984 and its amendments require certain protection for sources of drinking water; the increasingly stringent drinking water standards for arsenic in groundwater have posed technological and financial challenges to County and private water systems in many parts of Nye County. Water quality issues facing the County's communities are discussed in later Chapters. The Clean Water Act of 1972 establishes standards for surface water protection; this statute has limited effects in Nye County because of the scarcity of surface water.

Several federal laws address the way in which federal agencies manage public lands. Because federal lands comprise nearly 98 percent of Nye County, with only slightly more than 2 percent private lands (Figure 1-2), these statutes can have extensive and direct consequences on access to water resources beneath those federal lands. The Federal Land Policy Management Act (FLPMA) establishes the framework for how federal lands can be used. The Endangered Species Act protects certain species of plants, insects, fish, and birds that are native to Nye County. These federal acts mandate the development and implementation of Land Use Plans and Resource Management Plans (LUPs and RMPs, respectively) that impose terms, conditions, and restrictions on public land uses that are costly to implement. Similar provisions may hinder development by imposing costly controls on any industry proposing to use federal lands for energy development, mineral exploration, resource development, and other business or industrial uses.

Nye County maintains good working relationships through Memoranda of Understanding and other agreements with the local offices of the Department of Energy (DOE), National Nuclear Security Administration (NNSA), Bureau of Land Management (BLM), U.S. Forest Service (USFS), and U.S. Fish and Wildlife Service (USFWS) to minimize the potential for negative impacts stemming from federal land policies and management decisions. Several recent and pending federal plans and policies attempt to limit the State's water law and authority. Most of the policy outlined in the State Water Policy and state water law reflect the policy of Nye County and philosophy of most of its residents. Most believe that the state should have primacy in issuing water rights, and agree that there must be a balance in the appropriation of water resources to protect the interests of rural communities whose populations do not afford them political strength in the state legislature.

1.4. UPDATE PROCESS

The first (2004) Nye County WRP was mandated and adopted by the Nye County BoCC. The BoCC recognized the need for long-term resource and development planning and worked diligently to accomplish planning goals for several years. This 2017 Nye County WRP continues water resources planning initiatives by updating relevant statistics, data, issues, and studies to reflect the current and projected future conditions.

State Consultation

The 2004 Nye County WRP was developed in close coordination with the Nevada State Engineer to define a scope that would be responsive to both the needs of Nye County and the State of Nevada.

The scope of the WRP update remains unchanged. Nye County, working through its BoCC, NCWD, and staff, have continued communication and coordination with the DWR staff and State Engineer to address evolving issues and challenges, such as basin over-appropriation and overdraft. County,

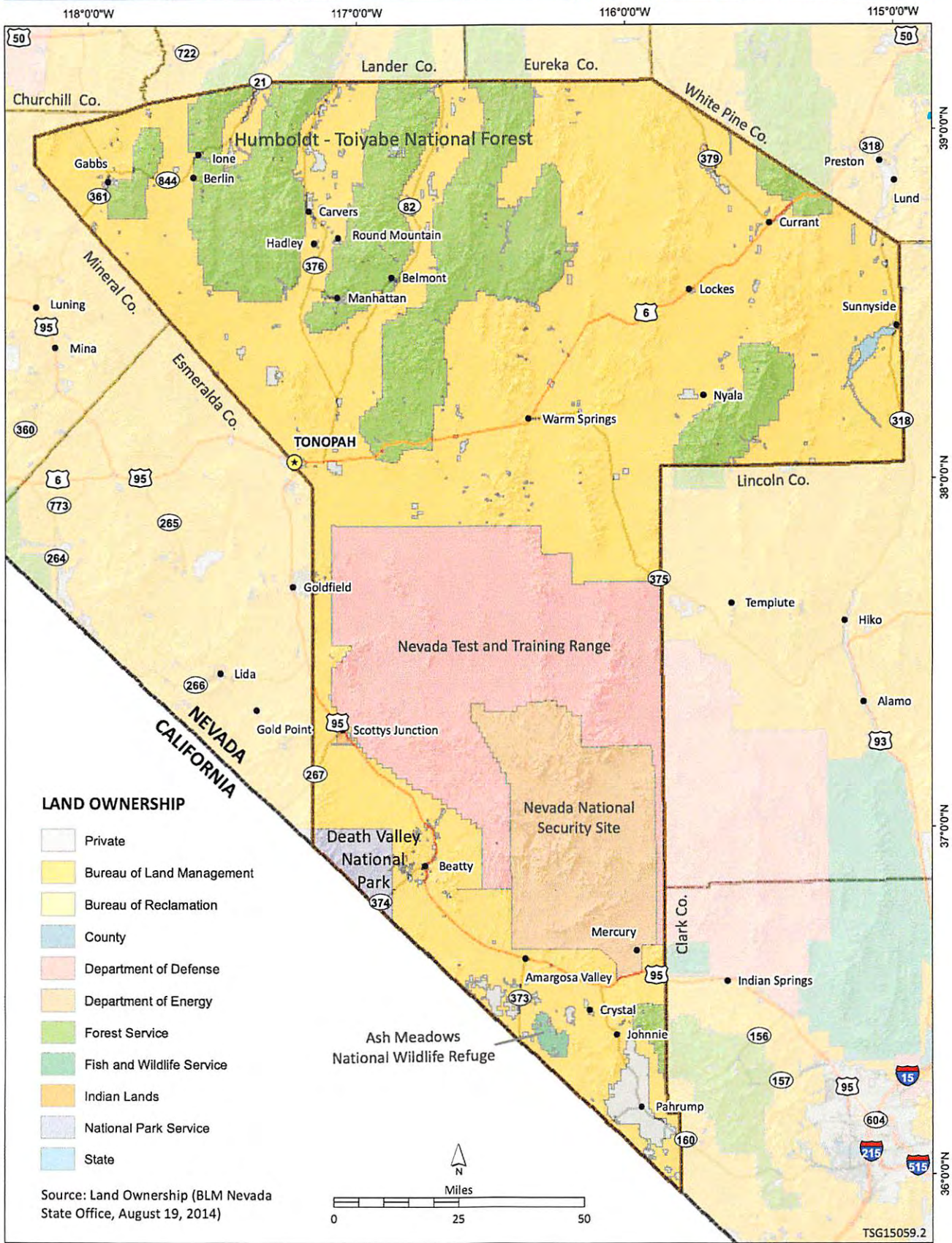


Figure 1-2. Nye County Land Status.

town, and local community water system operators continue to work with Nevada Division of Environmental Protection (NDEP) staff to address quality and treatment issues related to fluoride, nitrates, arsenic, and other naturally-occurring contaminants in many communities throughout Nye County.

Public Participation

As with the 2004 Nye County WRP, the preparation of the updated WRP included public review and input from throughout Nye County. Scoping included public review and discussion of the WRP underlying philosophy, goals and objectives by the Nye County BoCC to consider whether to re-affirm or revise those statements presented in the 2004 Nye County WRP. In April 2015, the BoCC re-affirmed these statements with minor changes. One-on-one consultation with members of the NCWD Governing Board members and staff provided information on water resources and related issues facing the County's towns, communities, General Improvement Districts, businesses, and local utilities. This input was used to develop this draft WRP, which was presented in public meetings in Amargosa Valley (April 13), Beatty (April 10), Gabbs (April 12), Pahrump (March 27), Tonopah (April 12), Railroad Valley-Currant (April 18), and Round Mountain-Hadley Subdivision (March 28). Comments received from the public are summarized in Appendix B.

1.5. RELATIONSHIP TO OTHER PLANS

The goals, objectives, conclusions, and recommendations of this updated WRP are consistent with those established in existing County plans and implemented through various ordinances and codes. The various County and community plans address different aspects of resource protection, land use and development, and are summarized in the following section. Each of these County plans has been considered and the pertinent portions included in this updated WRP, through direct incorporation or by reference.

County and Community Plans

The Community Source Water Protection (CSWP) Plan for Public Water Supply System (PWS) in Nye County, Nevada was prepared November 2012 by the Nye County CSWP Team and endorsed by the NDEP Bureau of Water Pollution Control (BWPC). The purpose of the Plan is to establish the framework for protecting community drinking water sources following the EPA's Integrated Source Water Protection Program, which promotes encouraging the support of local government and stakeholders. The CSWP Plan developed a congruence approach of culture, structure, people, work for developing strategies to prevent water supply contamination of 80 Public Water Supply systems in Nye County. The CSWP Plan also encourages public education for source water protection, and consolidates information presented in the County's six Wellhead Protection Plans (WHPP) for Nye County's communities.

Since establishing its county-wide Comprehensive Plan in 1994, Nye County has continued to advance its planning efforts. In response to federal planning efforts, Nye County updated its Comprehensive Plan in 2011 to strengthen and memorialize County policies regarding the increasing federal overreach of emerging policies and plans. The 2011 Nye County Comprehensive/Master Plan serves as Nye County's long-range plan relating to public lands and how best to work collaboratively with the federal and state land management agencies. This plan is intended to provide effective planning, communication, and coordination between Nye County and these agencies, taking advantage of the "consistency" language in Section 202(c)(9) of FLPMA.

Nye County updated its Comprehensive Economic Development Strategy (CEDS) in June 2012. The updated CEDS identified strengths, weaknesses, opportunities and threats to economic development in each Nye County community. Basin overdraft and other water resource and supply issues are considered in the community-by-community analysis. The CEDS update included meetings with varied interests from throughout Nye County, and with each of its six communities. The CEDS update process identified an extensive list of high-priority regional projects, programs, and activities and an implementation strategy to diversify each of the local community economies.

Nye County's communities have advanced their planning efforts significantly since 2004. In 1999, the Town of Pahrump's population exceeded 30,000. As required by NRS 278.220, the Pahrump Regional Planning Commission (PRPC) was established and promptly issued the first Pahrump Master Plan in 1999. In November 2003, in response to the rapid growth that was occurring in the Pahrump Valley, the PRPC issued a Master Plan update, which was adopted in 2004. The Pahrump Master Plan was again updated in May 2014 and reflected the conditions of relative stability, as well as slowed growth and development, following the economic downturn that began in 2008.

The Towns of Amargosa Valley and Beatty have also approved and implemented Area Plans. The BoCC, in concert with the Town of Amargosa Valley and lead by the Amargosa Valley Area Plan Committee, completed and adopted an Area Plan in November 2009. Similarly, the BoCC and the Town of Beatty working through its Beatty Area Plan Steering Committee completed and adopted the Town of Beatty Area Plan on May 12, 2014.

The Congressionally-mandated Geologic Repository for Spent Nuclear Fuel and High Level Radioactive Waste at Yucca Mountain spurred the planning effort for the Yucca Mountain Project Gateway Area Concept Plan. The Concept Plan was completed and accepted in 2007 by the Nye County BoCC to assist federal repository planners in developing safe site access, an industrial and business support hub to enhance operations, and a modern residential community to attract repository workers to Nye County. The Concept Plan was incorporated by reference into the Amargosa Valley Area Plan, which includes the Yucca Mountain Project Gateway Area. The Yucca Mountain Project was delayed by executive mandate in 2008 which eliminated federal funding. Congress is currently considering various paths forward, including restarting the Project's licensing process by the Nuclear Regulatory Commission.

State Water Plan

In 1999, the Nevada Division of Water Planning (NDWP) issued the Nevada State Water Plan (NDWP, 1999). The State Water Plan provided information on the water resources and their use in Nye County at the county-wide level but has not been updated since its release. Update of the State Water Plan to reflect the current issues would help local governments and communities to better address water supply related challenges. Nonetheless, it serves as a useful framework for much of the detailed information presented in this plan. The State Water Plan made a number of recommendations concerning water resource issues. Many of these issues remain relevant and are considered in the appropriate sections of this updated WRP. These State Water Plan recommendations are shown in Table 1-2.

Table 1-2. Nevada State Water Plan – Issues and Recommendations, 1999

Category	Issues	Recommendations
Water Supply and Allocation	Water Conservation	Establish state Office of Conservation; revise plan requirements; formalize credits for conservation; technical assistance to farmers; fund demonstration projects; meter public supplies; increase reuse of water; start water measurement pilot program
	Integrated Water Management	Refine perennial yield estimates; increase recharge/recovery projects; increase multiple source use
	Interbasin and Intercounty Transfers	Recognize net value of transfers; ensure transfers are justified, environmentally sound, consistent with regional plans, and do not unduly limit growth; encourage mitigation plans; provide assistance to local government; additional research on water banking and water marketing
	Water Use Measurement & Estimation	Develop and fund a comprehensive water use measurement and estimation program
	Domestic Wells	Notify counties of impacts of parceling; inventory domestic wells; educate well owners; fund regional water supply and/or wastewater treatment where water quality is impaired
Water Quality	Non-point Source Pollution	Continue non-point source program
	Comprehensive Ground Water Protection and Management	Support state groundwater protection program; develop monitoring network; support evaluation of gasoline additives; expand regional water supplies where septic tank pollution is an issue
Resource Conservation and Recreational Uses	Maintenance of Recreational Values	Continued resource evaluation and planning; continue acquisition of water rights for recreational purposes; increase watershed and water recreation research and management
	Water for Wildlife and Environmental Purposes	Develop integrated plan for management; adopt policy encouraging acquisition of water rights for wildlife; establish incentive based restoration programs; establish working group of experts to study alternative water supplies for wildlife
Flood Management	Flood Management in Nevada	Develop modeling capability; develop plan to update flood maps; basin planning; review watershed management plans
Water Planning and Management	Watershed Planning and Management	Develop planning strategy; support local planning; continue basin plans; fund planning
	Water Resources Data Management	Develop GIS; establish water use, water level, and water quality monitoring networks; support research projects to update perennial yield estimates
	Water Planning Assistance to Local Governments	Enhance assistance to local governments; improve water use measurements and estimates; improve data management and sharing; enhance management and planning
	Water Education	Expand water education funding and staffing; increase program evaluation and coordination with water education activities

Federal Resource Management Plans and Planning Documents

The federal agencies that have stewardship over the public lands in Nye County, prepare and implement a number of plans that must be considered in any water resources planning activities. As nearly 98 percent of Nye County's land base is under the stewardship of various federal agencies, the policies presented in these documents drive many of the issues, and are important in formulating the management recommendations and practices described later in this plan.

The National Environmental Policy Act (NEPA) encourages local government participation in the federal planning process. Nye County actively participates and coordinates with the federal agencies as a Cooperating Agency, whenever possible, in the preparation of federal plans including RMPs, LUPs and Environmental Impact Statements (EIS). While such efforts provide an excellent opportunity for coordination and a forum for discussing local perspectives and priorities, the input received from local government during the NEPA process rarely influences the agency's final decision.

In recent years, Federal land use policies have become more restrictive, moving away from the multiple use mandate of FLPMA to a preservation stance. This is evidenced by the number of new Wilderness Areas, Areas of Critical Environmental Concern, as well as the decline in non-federal land use authorizations to local governments and private interests. The policies and mandates contained in these documents that relate to and affect Nye County water resources are considered in this Nye County WRP update and are discussed in Chapters 5 and 6.

Several Federal planning efforts are in progress at the time of writing (2015-2017); however, until the plans are finalized and Decision Records are signed, the current approved plans remain in effect. Table 1-3 identifies federal planning initiatives that are in progress, and Table 1-4 summarizes the currently-approved federal plans that forms the basis for federal land use and management decisions.

Table 1-3. Federal Land Use Plans currently in progress

Agency	Document Title	Date Initiated
BLM	Battle Mountain District Notice of Intent (NOI) to prepare a RMP and associated EIS (suspended since 2014)	2010
BLM	Las Vegas and Pahrump Field Offices NOI, and Draft RMP and EIS	2010 2014
BLM	Carson City District NOI, and Draft RMP and EIS	2012 2014
USAF	Fallon Range Training Complex Requirements at Naval Air Station Fallon, Nevada NOI	2016
USFS	Humboldt National Forest Land and RMP Revision, suspended since May 2009	2009
USFS	Toiyabe National Forest Land and RMP Revision, suspended since May 2009	2009

Table 1-4. Approved Federal Plans, Strategies, and Records of Decision

Agency	Document Title	Approval Date
BLM and USFS	Nevada and Northeastern California Greater Sage-Grouse Approved LUP Amendment, Final EIS, and Record of Decision (ROD)	2015
USAF	Final EIS for Military Readiness Activities at Fallon Range Training Complex	2015
DOE/NNSA	Final Site-Wide EIS for the Continued Operation of the DOE/NNSA NNSS and Off-Site Locations in the State of Nevada, and ROD	2013 2014
USFWS	Near-Term Greater Sage-Grouse Conservation Action Plan	2012
USFWS	Revised Recovery Plan for the Mojave Population of the Desert Tortoise	2011
USAF	Final Integrated Natural RMP, Nellis Air Force Base/Creech Air Force Base/Nevada Test and Training Range	2010
USFWS	Desert National Wildlife Refuge Complex Final Comprehensive Conservation Plan and EIS	2009
BLM	Ely District Approved RMP and ROD	2008
DOE/NNSA	Final Supplemental EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada	2008
DOE/NNSA	Final Supplemental EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada – Nevada Rail Transportation Corridor and Final EIS for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada	2008
Western Association of USFWS Agencies	Greater Sage-Grouse Comprehensive Conservation Strategy	2006
BLM	National Sage-Grouse Habitat Conservation Strategy	2004
BLM	Nevada Test and Training Range Approved RMP and Final EIS and ROD	2004
BLM	Carson City Field Office Consolidated RMP	2001
NPS	Death Valley National Park Final EIS and ROD and General Management Plan	2001 2002
USAF	Final EIS for the Proposed Fallon Range Training Complex Requirements at Naval Air Station Fallon, Nevada and ROD	2000
BLM	Approved Las Vegas RMP and Final EIS and ROD	1998
USAF	Water Requirement Study of the Nellis Air Force Range	1998
DOE/NNSA	Nevada Test Site Resource Management Plan	1998
BLM	Tonopah Resource Management Plan and Record of Decision	1997
BLM	Shoshone-Eureka Approved RMP Amendment Final EIS and ROD	1987
USFS	Humboldt National Forest Land and RMP, and Amendments 1-10	1986
USFS	Toiyabe National Forest Land and RMP, and Amendments 1-8	1986

1.6. CONCLUSIONS

Nye County has made great progress in addressing water supply issues since the 2004 Water Resources Plan was adopted. Many of the Plan's recommendations have been implemented, including creation of the NCWD by the Nevada Legislature in 2007. The NCWD, in concert with the BoCC, has undertaken review and action on a number of pressing items including the legal over-allocation of water rights and localized over-pumpage in certain basins. Public lands in Nye County, the move towards more restrictive Federal agency policies and land use plans continues to impact and influence the local and regional water resources and supply landscape. Nye County continues to be proactive in developing, and implementing water resources and goals and objectives into its County Plans, Ordinances, and Resolutions.



Photo 1. 1907 Montgomery-Shoshone Mill. Photo credit: Library of Congress Prints and Photographs Division (ID: pan.6a13899r)

CHAPTER 2 – SOCIOECONOMIC AND DEMOGRAPHIC ASSESSMENT

This chapter presents information on the historic, present, and projected future economy of Nye County, along with information on the population, growth trends, and demographics. As the future population of the County will determine the future demand for water, an understanding of past trends, current water use, and expected future conditions are important considerations in water resources planning.

2.1. SOCIOECONOMIC BACKGROUND

This section summarizes the social and economic factors that shaped Nye County, and provides an overview of the current socioeconomic conditions.

Nye County's Economic History

Nye County's economic prosperity has historically been tied to the fortunes of the mining industry, ranching and farming, and the government sector (most notably the U.S. Air Force (USAF) and the DOE). In its early history, the County's settlements were gold and silver boom towns such as Tonopah, Belmont, Manhattan, Beatty, Rhyolite, and other numerous mining camps. While some ore bodies have been mined out, exploration and new discoveries have ensured that mineral extraction remains an important sector of the Nye County economy with significant production of gold, silver, and magnesite, along with industrial minerals including clays, zeolites, cinders, and dimension stone. Nye County remains a leading gold producer in Nevada, behind Eureka and Elko counties. Tax revenue from production at Round Mountain Gold provides significant general fund revenue to Nye County. The Sierra Magnesite Mine in Gabbs is the only domestic source of magnesia ore. The mine has operated for more than 50 years, and operations are projected to continue well into the 50 year planning period. There were 195 mining-related operations in Nye County in 2014 (NBMG, 2015). Nye County continues to rank first in oil production in Nevada, accounting for approximately 87 percent of Nevada's total 2014 production of slightly more than 316,000 barrels (NBMG, 2015).

Ranching and farming have been important sectors of Nye County's economy since the Homestead Act of 1862 opened up western lands for development. By 1964, Nye County had about 46,000 acres of farmland, and by 1965 irrigated pasture and harvested cropland peaked at 47,270 acres. Since that time, irrigated agriculture has ranged between 24,000 and 34,000 acres in the County. In 2015, agriculture remained the single largest user of water in Nye County with 60 percent of the total water used in the County going towards irrigation. The Division of Water Resources data show that irrigation continues to be the largest user of water in Nye County, except in the Pahrump Valley

where municipal/quasi-municipal and domestic are the largest users. Figure 2-1 shows existing land uses that reflect Nye County's socioeconomic history.

Since the 1940s, Nye County has been the host to a number of important federal facilities including the Nevada National Security Site (NNSS) (previously known as the Nevada Test Site), the Tonopah Test Range, and portions of the Nevada Test and Training Range (NTTR). In addition to the Department of Defense (DOD)/DOE, Nye County also hosts several Department of Interior (DOI) lands including portions of Death Valley National Park, Ash Meadows National Wildlife Refuge, Railroad Valley Wildlife Management Area, and portions of the U.S. Department of Agriculture (USDA) Humboldt-Toiyabe National Forest. Three recognized Native American Tribes, the Yomba, Duckwater, and Timbisha, have reservation lands in Nye County.

Several new wilderness areas, and other protected land tracts have been designated by various laws enacted by the U.S. Congress and by the President. The Basin and Range National Monument was established in 2015 by Presidential Proclamation in portions of Nye and Lincoln Counties. Additional areas have been proposed for protection or special status through agency administrative actions (e.g., BLM areas of critical environmental concern, and USFS natural areas). Some of the recent laws expanded existing areas, such as the Ash Meadows National Wildlife Refuge; and others converted portions of previously established Wilderness Study Areas to Wilderness Areas. Figure 2-2 shows the federal facilities and special status lands in Nye County.

Private, state, and county-owned lands account for less than two percent of Nye County's total land area. The vast majority (approximately 98 percent) of Nye County lands are administered by various agencies of the federal government. There is limited economic benefit to Nye County associated with these federally managed lands.

Present Economic Conditions

Employment in Nye County has historically been driven by natural resources (e.g., mining and agriculture), leisure and hospitality, government employment, and professional and business services. Mining employed 2,052 persons in 2015 while agriculture employed 444 persons. Utilities, which includes contractor employment at federal facilities, has become an important sector in Nye County, rising from 632 to 1,600 employees. The Nye County 2012 CEDS (Table 4, page 21) provides a complete breakout of Nye County employment by sector. By community, Amargosa Valley's top employer is agriculture. Gabbs and Round Mountain's top employers are mining companies. Closure of some mines have shifted Beatty's top employer to the Leisure and Hospitality industry. The majority of Pahrump's top employers are Leisure, Hospitality and Trade related. Local government and education services make up Tonopah's top employers.

Nye County has aggressive programs to expand and diversify local economies. These programs are based on expectations of continued growth in the western region of the United States. Forecasts of the future population for western states prepared by the Census Bureau predict that the populations of Nevada and five bordering states will increase by almost 16 million people by 2025. While California will attract most of this growth (9 million), rapid growth is also projected for Nevada, with an increase of 1 million people.

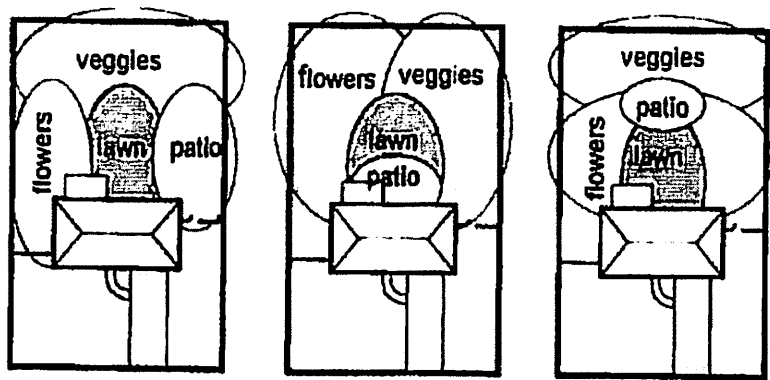


Figure 1: Examples of residential backyard layout with minimized turf grass area

H. Prohibited Plantings:

1. Salt cedar (tamarisk) bushes or trees is specifically prohibited
 - a. Salt cedars of all sizes must be removed from a property prior to any new development.
2. Planting cool season grasses such as Rye and Fescue from seed is prohibited from May through August.
- I. **Clear Sight Areas:** Clear sight areas must be maintained at all entrances and exits of parking areas and driveways in accordance with Table VIII: Sight Triangle Easement Requirements of the Standard Details and Specifications for Public Improvements within the Pahrump Regional Planning District.
 1. No walls, fences, trees, shrubs or any other object other than street hardware may be constructed or installed within the sight triangle easement, unless maintained at less than thirty-six inches (36") in height measured from the top of adjacent asphalt, curb, gravel or pavement street surface.

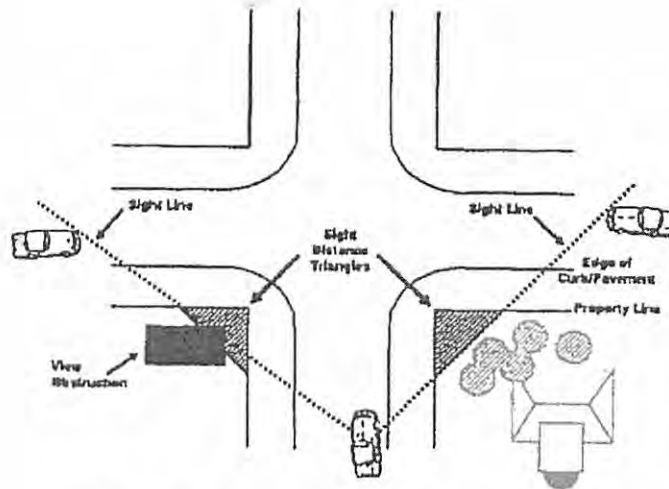


Figure 2: Clear Sight Triangle Diagram

- J. Landscape Buffering and Screening Requirements: Landscape buffer areas are required between residential uses and nonresidential uses. Landscape buffers may be crossed by driveways connecting to adjacent land. No parking is permitted within a required landscape buffer area. The buffer landscaping must consist primarily of drought tolerant trees of an approved variety, which trees must be at least eight feet (8') high at time of planting and capable of reaching a height at maturity of at least twenty feet (20'). Spacing of the trees must be equal to seventy five percent (75%) of the mature canopy diameter of the trees. In no case shall the width of the on-site landscape buffer be less than the requirements listed below.

1. Locations and minimum widths:

- a. Front: Ten feet (10') minimum.
- b. Side: Five feet (5'). The landscape buffer may be relocated if the lot line is within a common access easement or where overhead powerlines exist.
- c. Rear: Six feet (6'). The landscape buffer may be relocated if the lot line is within a common access easement or where overhead powerlines exist.
- d. The buffer landscaping between residential and nonresidential property lines must be maintained on the nonresidential side of the boundary.
- e. When adjacent properties have similar zoning (i.e., commercial adjacent to commercial or industrial adjacent to industrial) the side and rear landscape buffers may be replaced with a block wall.
- f. No trees shall be planted in any landscaping buffer that is located below overhead power lines.

(1) Trees may be relocated to a different landscape buffer within the property, provided the total number of trees required is provided.

2. Screened areas: When properties are developed and the public cannot access the rear of the building or lot, the rear landscaping buffer and the portion of the side landscaping buffer that will not be accessed or viewed by the public may be removed or replaced with a block wall.

a. Where parking or vehicle circulation areas are adjacent to the landscaping strip, a minimum six foot (6') high opaque wall or fence shall also be required, located along the property line, to visually screen the parking or circulation area from any adjacent residential zone; chain link fence with slats shall not constitute acceptable screening.

b. Where perimeter walls are used surrounding residential developments in village residential, multi-family, mobile home park or mixed use zoning districts a minimum fifteen feet (15') of perimeter landscaping (which may include the sidewalk) must be installed, but shall not be turf.

(1) Irrigated landscaping that could adversely impact a block wall may be relocated away from the block wall and all other structures on the property, provided a soils report is submitted with the site development plan.

(2) The soils report submitted must be prepared by a licensed geotechnical or civil engineer licensed in the state of Nevada, and should indicate minimum separation from irrigation and any block walls or other structures on the property.

K. Special Landscape Standards:

1. Commercial, Industrial and Multi-Family Housing greater than four units must include landscaping as part of their design as shown on a plan submitted pursuant to NCC 17.04.950 and must include live native, xeric and drought tolerant plants and be designed to minimize outdoor water use on landscapes. Outdoor sculptures, shade structures, decorative hardscapes and rock work are encouraged. Existing native trees and shrubs must be preserved to the fullest extent possible. Trees, shrubs and other vegetative landscaping must be trimmed and maintained so as not to interfere with the ability of vehicles to park in any provided parking spaces.

a. Off Street Parking Area Trees: Quantity and distribution of trees shall be as follows:

(1) One tree is required per twenty (20) parking spaces;

(2) The minimum size of tree planters within off street parking areas shall be thirty-six (36) square feet per tree;

(3) Trees must be drought tolerant shade trees, capable of achieving a mature canopy diameter of at least twenty-five feet (25').

(4) The total number of trees may be reduced by 20% if 10% or more of the required parking lot is finished with a permeable surface or pavers.

b. Ground Cover: To minimize water consumption, the use of vegetative ground cover other than turf grass is encouraged. Any portion of a landscape area not planted must be covered with decorative rock, bark, mulch or other material suitable for reducing dust and evaporation and improve the aesthetic appearance of the area.

(1) Any nonliving ground cover areas must be clearly delineated on the landscaping plan.

c. Water Features, Ponds and Artificial Lakes:

(1) Decorative water features and ponds are limited to less than 50 square feet surface area.

(2) Bodies of water used for recreation purposes that are not one hundred percent (100%) reclaimed water are to be authorized by conditional use permit.

(3) Swimming pools and spas are encouraged to be covered to mitigate evaporation when not in use.

d. Artificial Outdoor Landscaping:

(1) Artificial Turf Landscaping:

(i) Must be constructed of a low-density polyethylene material with a melting point equal to or in excess of one hundred fifty degrees Fahrenheit (150°F), a softening point equal to or in excess of one hundred twenty degrees Fahrenheit (120°F), and a brittle point equal to or in excess of zero degrees Fahrenheit (0°F).

(ii) Shall be a minimum of three colors combined of natural grass colors to mirror living vegetation. The primary color must be green. Product must have UV resistant pigmentation and UV stabilization to prevent fading and allow for longevity.

(iii). Products must be installed and anchored so as to withstand ninety (90) mile per hour wind loads, and anchored to reasonably withstand storm event flooding.

(iv). Products that are torn, broken, faded, damaged or missing must be replaced immediately.

(v). The use of plastic, vinyl, polyester, silk or glass in artificial outdoor landscaping products is prohibited.

L. Water Conservation Standards – New Construction:

1. Wasting water is unlawful per NRS 534.0165, 534.020(2), 534.070, and NAC 704.567:

a. Automatic irrigation systems are required for all common areas, residential and commercial landscaped areas,

- b. Overhead spray must be minimized and restricted to turf grass and flower beds, all other landscaped areas must use low volume drip lines,
- c. Large radius spray heads adjacent to roads or sidewalks are prohibited,
- d. Runoff or spraying water directly onto roads, paths, sidewalks or other non-turf areas is prohibited,
- e. Overhead spray watering during high wind events is prohibited,

M. Watering Restrictions and Watering Schedules – New Construction:

1. All common areas, residential dwellings and commercial areas must comply with watering schedules issued by Nye County Water District (NCWD) which sets forth the days, time of day and duration of time allowed for outdoor watering.

- a. From November 1 through February watering is limited to one day a week.
- b. From September 1 through October and March 1 through April, watering is limited to three days per week.
- c. From May 1 through August, watering is allowed seven days of the week.

(1) Summer watering restrictions allow landscape watering any day of the week through August

(2) Watering newly installed sod is allowed daily for up to 30 days once per calendar year.

2. Additional Watering Restrictions:

- a. From May 1 until October 1 sprinkler and drip system watering is prohibited from 11 am to 7 pm.

SEVERABILITY. If any provision of this ordinance or amendments thereto, or the application to any person, thing or circumstance is held to be invalid, such invalidity shall not affect the validity or provisions or applications of the ordinance or amendments thereto which can be given effect without the invalid provisions or applications, and to this end the provisions of this ordinance and amendments thereto are declared to be severable.

CONSTITUTIONALITY. If any section, clause or phrase of this ordinance shall be declared unconstitutional by a court of competent jurisdiction, the remaining provisions of this ordinance shall continue in full force and effect.

EFFECTIVE DATE. This Ordinance shall be in full force and effect from and after passage, approval, and publication as required by law, to wit, from and after the day of 5th day of June, 2017.

Proposed on the 16th day of May, 2017


Proposed by: Commissioner Koenig.

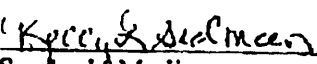
Adopted on the 16th day of May, 2017.

Vote: Ayes: Commissioners: Schinhofen, Koenig, Wichman

Nays: Commissioners: Borasky, Cox

Absent: Commissioners: Ø

BY: 
Daniel Schinhofen, Chairman
Nye County Board of
County Commissioners

ATTEST: 
Sandra L. Merlino
Clerk and Ex-Officio
Clerk of the Board

NCWD Table 10-4 - Water Rights Commitments Estimate for Future Conditions (2065)

Water Rights	AFA	Source
1 Committed Underground	51,372	NDWR, Aug 2017 Basin Summary Minus Domestic Well Relinquishments (7,809 AF)
2 Domestic Wells (non-permitted)	9,770	NDWR 2015 Domestic Well estimate plus 8,500 additional lots to be developed, based on current parcels; and an estimate of 0.5 AFA pumped per well
3 Decreed Right for Manse Spring (Potential Mitigation Right)	2,173	Needs to be included due to potential for claim for mitigation rights
4 Subtotal: Committed Underground Water Rights, Springs, Domestic Wells	63,315	Sum Rows 1 to 3
Projected Over Dedication - Subdivisions - Commercial Projects	26,380	NCWD/NDWR estimate of: Current subdivision over-dedication of 6,436 AF, plus additional relinquished of 5,101 AF (conversion of AG AF to M&I at 3:1; with 2000 AF remaining in AG), plus 14,843 AF relinquished for projects (2/3 of 22,264 AF water rights held by utilities not yet committed to projects by public record) Aug 2017 data
5		Row 4 minus 5
6 Adjusted Water Right Commitment	36,935	Section 8, of Shaw report
7 Unaccounted Septic System Return Flow	3,512	15% of AG water rights, assuming 2000 AF remains in AG
8 Unaccounted Agricultural Return Flow	300	Row 6 minus the sum of 7 and 8
9 Adjusted Water Right Commitment to Consumptive Use	33,123	Section 8, Shaw report – all WWTP effluent pump to use for urban landscaping
10 Potential Reuse Credit	1,600	Section 8, Shaw report, 15% of water used for irrigation
11 Potential Return Flow Credit from Reuse	240	Section 7, Shaw report
12 Potential AR Recharge Credit for Flood Control Basins	500	Section 9, Shaw report (Zero due to - Unlikely to be pursued)
13 Potential AR Credit for Manse Spring (50-year average)	0	To remove mitigation right appropriation or claim (Zero due to - Unlikely to be pursued)
14 Retirement of Manse Spring Rights	0	
Adjusted Water Right Commitment to Consumptive Use plus Water		
15 Resources Management Strategies	30,783	Row 9 minus the sum of 10 thru 14
16 Perennial Yield	20,000	NDWR, Order 1252 (2015)
Net Potential Over-Allocation (rounded)	10,783	Row 15 minus 16
Net Potential Over-Allocation is defined as: "Pumpage over the 20,000 AF PY that can be expected by 2065". The primary goal of the GWMP is to reduce this number to 0 (zero).		
Reduction of 10873 AFA [Potential over-pumpage by 2065]		
1 DWR Order - Future domestic wells require relinquishments	4250	Assumes 8500 future domestic wells at expected pumpage of 0.5 AFA each
Attrition estimate due to forfeiture and cancellation of water rights over		Assumes 85% of todays 53,545 af water rights will still be active in 2065. Attrition at 15% or appx 8000 AF of forfeiture divided by 3 to account consistently for 1 AF used and 2 AF over-
2 the next 50 years	2666	dedicated or relinquished
3 Impact of Water Conservation over the next 50 years	2700	Assumes a 15% gain in water use efficiency on all pumpage by 2065 except 2000 AF in Agriculture
NET REDUCTION SUBTOTAL OF LINES 1,2,3	9616	Sum of lines 1 to 3
Potential pumpage OVER the 20,000 AF PY (DEFICIT)	1,167	10783 minus the sum of lines 1 through 3. Multiply by 3 to express as water rights.

NYE COUNTY WATER DISTRICT



Estimated Effects of Water Level Declines in the Pahrump Valley on Water Well Longevity

Prepared by
John Klenke
January 2017

Disclaimer

Although every effort has been made to insure accuracy, the nature of this analysis includes several sources of error, and as such this analysis should be used only as a guideline. Results presented are preliminary and the methodology provides a rough approximation of the broad effects of water level declines on shallow aquifer wells. This report is NOT to be used on an individual well basis, but rather in a geographic manner to observe trends. The numbers of wells predicted to fail in any section are estimates only – based on the method presented.

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John Klenke

Abstract

A method to project water level declines in the Pahrump Valley was developed and used to predict future shallow well failures due to declining water levels. Water level data from the Nye County Water District (NCWD) Water Level Measurement Program (WLMP) were used to document existing conditions and the trends in declines (and rises) in water levels over a 17-year period (GWMPC, 2015). Using these data, the rates of decline across the entire Pahrump Valley were estimated and used to constrain the analysis to only those wells having a projected decline greater than 10 feet in 50 years, or an average rate of decline greater than 0.2 ft per year. Using current rates of water level declines and projecting into the future for 20 years (2035), and 50 years (2065) and intersecting those future levels with existing wells constructed in the shallow aquifer, an estimate of the number of wells that will fail due to these projected declining water levels was made. Well construction data from Nevada Division of Water Resources (NDWR) database (WLOG) and ground elevation information developed from Google Maps API utility and WLMP GPS survey were used to determine the elevation for the bottom of well. Wells with the bottom-of-screen elevation above a projected declining water table will certainly “fail”; wells in areas where water levels are not declining will not be impacted; wells with screens within the declining water table could be impacted. The method predicts a range of outcomes that are dependent upon the vertical distance between declining water table and bottom-of-screen elevations for the nearly 10,000 wells that were included. Four distances above the bottom of screen elevation, where the declining water table would impact well operation, were considered. The method reasonably estimates and bounds the percentages of wells that will be impacted for each of the various bottom-of-screen elevation (submergence) values used. Values of 10, 20, 30 and 40 feet above the bottom-of-screen elevation were analyzed providing results (predictions) that between 18% and 57% of the nearly 10,000 wells will fail in 50 years. In the shorter 20-year timeframe, predictions indicate that 2% to 19% of the wells are predicted to fail. This analysis assumes all conditions affecting the aquifer system will remain constant throughout the 50 year period.

Introduction

Since 2014, the Nye County Water District (NCWD) has overseen the Water Level Measurement Program (WLMP), originally established in 1999 by the Nye County Nuclear Waste Repository Project Office (NWRPO) to monitor water levels in basins downgradient of Yucca Mountain and Pahrump Valley. The WLMP has collected water levels across the Pahrump Valley on a regular basis for the past 17 years and maintains these measurements in a water level database (RGED.6.0.acddb). The areas of water level decline in the Pahrump Valley have been defined using the WLMP water level data (NCWD, 2015).

The WLMP program has reported on levels and trends in the water table wells in Pahrump Valley for several years. This analysis used data and maps generated from the WLMP to examine the longevity of existing shallow wells (mostly domestic wells) in areas of measured and sustained water table declines. Water level data were used to make a map of the potentiometric surface and a map of the rates of water level change (decline and rise). A total of 116 control points consisting of 83 monitored wells and 33 springs were gridded using Kriging methods to make the starting "current" potentiometric surface map (7-15-2015) (Figure 1), and a map showing the distribution of rate of water level changes (declines and rises, Figure 2). Nine of these wells and thirty one of the springs were located outside of the immediate area of interest, but were used to help constrain the contouring results. As declining water tables are of concern, additional maps, based on an assumption of linear declines, were constructed to depict the predicted potentiometric surfaces at 20 years (7-15-2035) and 50 years (7-15-2065) into the future (Figure 7 and Figure 8).

Only wells within the geographic areas where estimated rates of water level decline are greater than 10 feet over 50 years (average rate of decline ≥ 0.2 ft/yr, Area of Appreciable Decline (AAD)) were analyzed in this study (see Figure 2). Areas where the estimated rate of water level decline are greater than 10 feet over 20 years (average rate of decline 0.5 ft/yr) will be referred to as the Area of Rapid Decline (ARD). The AAD include some 10,497 wells but only 9,774 wells were used after eliminating wells with missing, spurious or conflicting data. Well location and elevation data for 103 of the wells were improved by positioning wells based on local parcel number and/or address, and eliminating several errors introduced by the WLOG dataset. The bottom-of-screen elevation (or bottom of well when bottom-of screen was not available), was determined for each of the 9,774 wells. By subtracting the elevation of the potentiometric surface, at well locations, from the ground elevation it was possible to make a map that estimates the depth-to water across the valley (see Figure 4).

Predictions of the intersection of the declining water table elevations with the fixed well-bottom elevation at a point through time was conducted using Surfer[®] 11 grids and Microsoft Excel[®]. Four sets of predictions were conducted by varying the height of the water table above the bottom-of-screen, for simplicity, called submergence. Submergence can be defined as the amount of saturated screen (in feet) in a well. For this analysis, 10-, 20-, 30- and 40- foot intervals were used to simulate the range of likely well submergences that would exist at well failure.

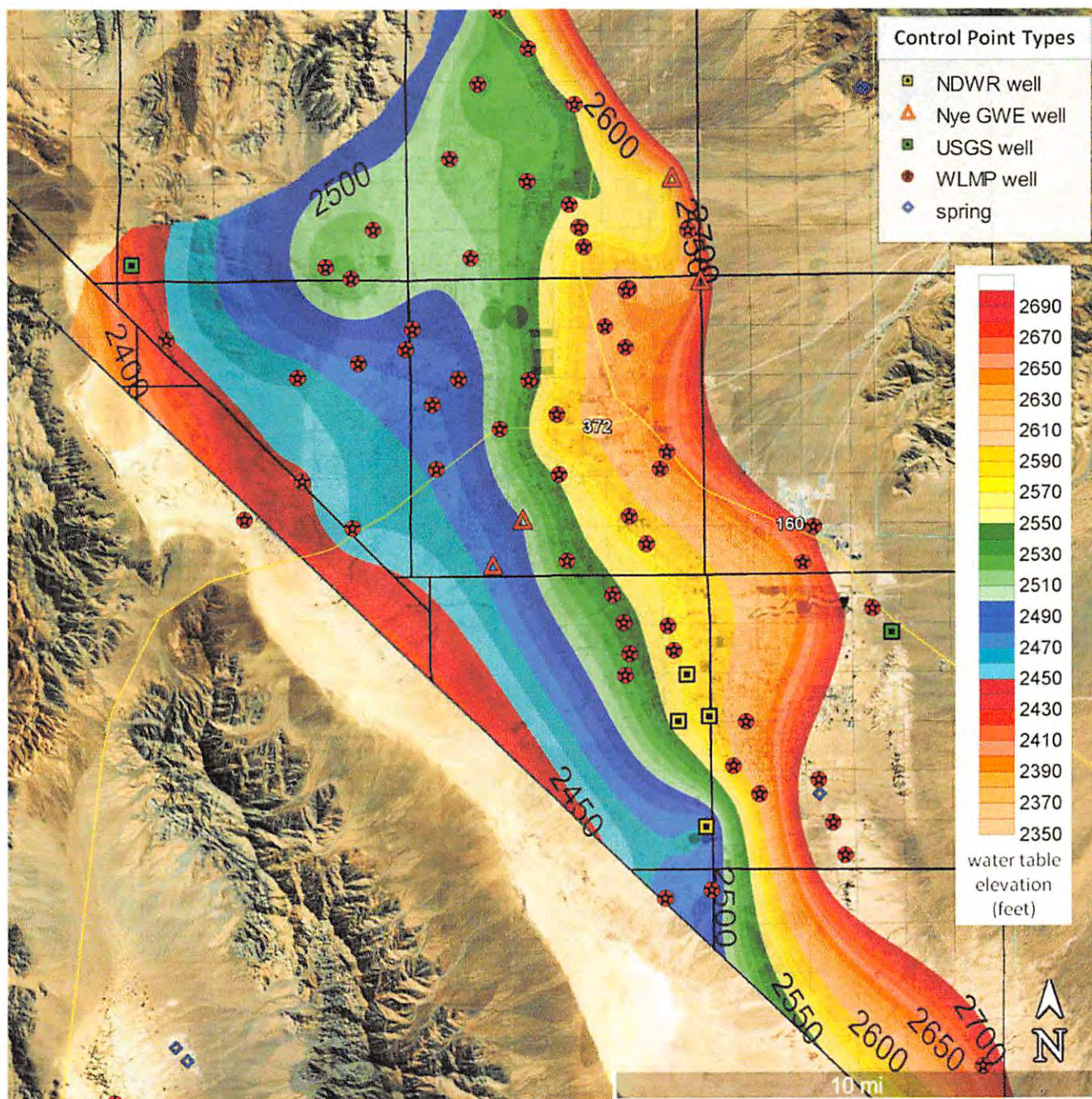


Figure 1. Potentiometric map showing water table elevations across the Pahrump Valley for the starting or "current" potentiometric surface (7-15-2015). Elevations are contoured at 10 foot interval. The control points used to create the potentiometric surface are shown.

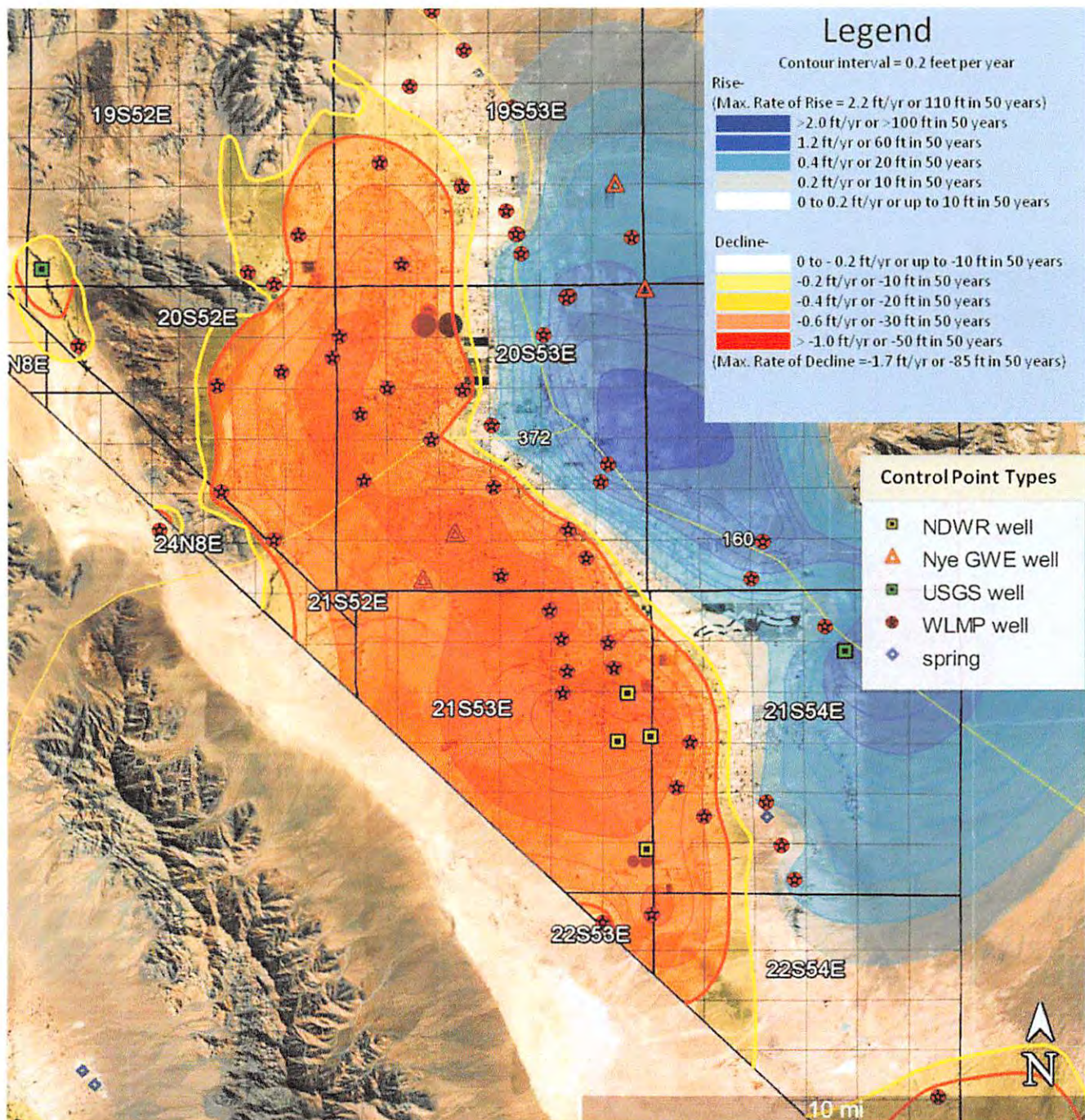


Figure 2. Contour map showing the areal distribution of rates of water table elevation change. Two contour intervals are highlighted. The area enclosed by the lower rate of decline (yellow polygon), of 10 feet in 50 years (average decline of ≥ 0.2 ft/yr), referred to as the Area of Appreciable Decline (AAD), bounds the aerial extent used for further analysis. The area enclosed by the higher rate of decline (red polygon) of 10 feet in 20 years (average decline of ≥ 0.5 ft/yr), referred to as the Area of Rapid Decline (ARD), and bounds the aerial extent of area of relatively rapid decline. These highlighted contours will be repeated for reference on subsequent maps. Map was clipped at the California border to remove areas not supported by the original data.

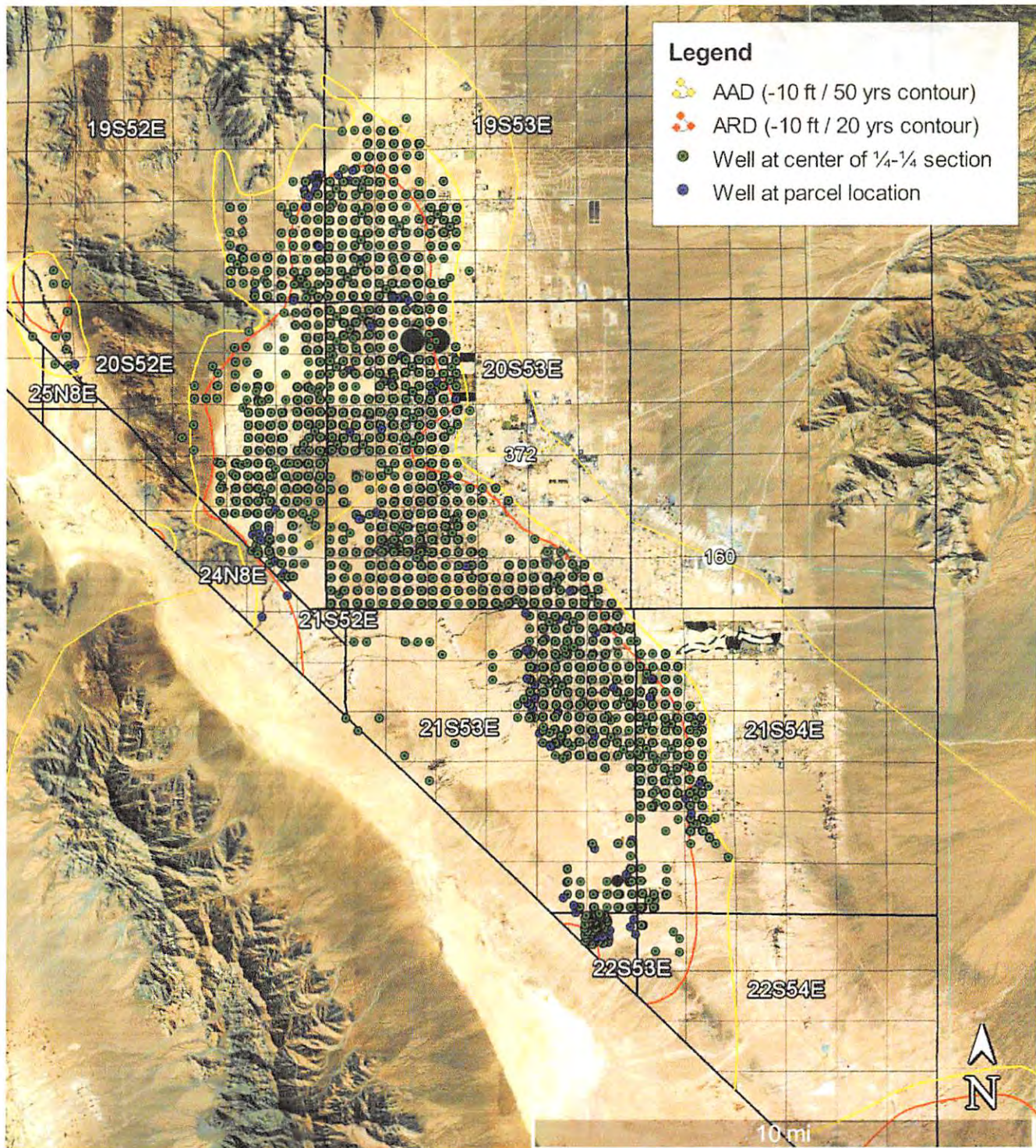


Figure 3. Map showing all 9,774 wells in the Pahrump Valley located within the AAD. Wells are plotted to the center of the 1/4-1/4 section and are “stacked”. Blue circles show the 103 wells that were located to parcel locations.

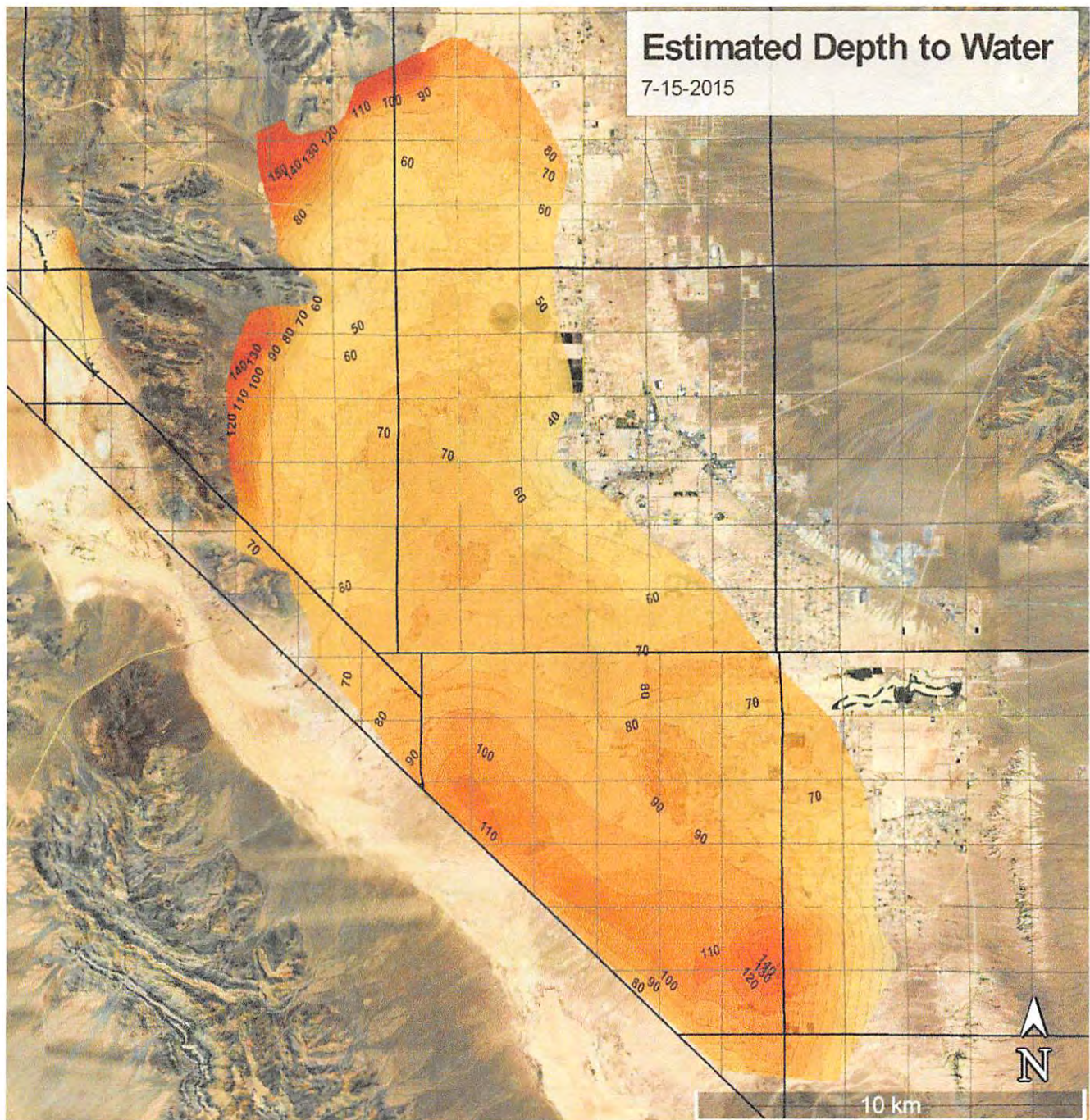


Figure 4. Map showing the estimated depth to water within the Area of Appreciable Decline (AAD) where estimated rates of water level decline are greater than 10 feet over 50 years (average decline of ≥ 0.2 ft/yr) across the Pahrump Valley. Contour interval is 10 feet. Data were contoured using the Natural Neighbor method, and clipped at the California border to remove areas not supported by the original data.

Methodology

Hydrographs of 83 control point wells were constructed and analyzed to determine (1) water table elevations, and (2) the rate of decline (or rise). These derived water table elevations are relatively accurate because they are based on WLMP well surveys using a high-accuracy Trimble GeoXH GPS unit with less than 1 foot error vertically and horizontally (Trimble, 2016). Water level measurement data from the previous 10 years (where possible) to present (7-15-05 to 7-15-15) were used to conduct linear regressions using a least square method (Excel 2007, built-in function) to determine a rate of decline or rise (see Appendix A for limitations on data periods used for hydrographs). The linear regression line was projected into the future years to predict water levels and water table elevations in each of the control wells (See Figure 5). The slope of the regression line provides a linear rate of decline/rise used further to predict impacts to existing wells within the AAD in Pahrump Valley. The results are presented at both 20 and 50 year increments into the future (7-15-2035, and 7-15-2065). This method and analysis assumes all conditions affecting the aquifer system will remain constant throughout the 50-year period.

Both the water table elevation (potentiometric map) and the rate of change in water table elevation (declines) were constructed using the Kriging method subroutine in Surfer[®] 11, with a 1000 x 690 node grid (230 ft x 229 ft). The Kriging was constrained by 116 control points (83 wells) based on the 70 WLMP wells, five (5) NWRPO-GWE wells, four (4) USGS-NWIS wells, and four (4) Nevada DWR wells. Thirty-three springs with constant heads (zero declines) were also used as “control points”, however only two of these were in the immediate study area. The water table elevations determined by the hydrograph interpretations were applied to the control points and gridded using Kriging methods and contoured to produce a potentiometric map as shown in Figure 1. The linear rate of change in water table elevation, as determined by regression, was applied to the control points. The rates were then gridded by Kriging, and contoured as shown in Figure 2. A sample hydrograph illustrating the linear regression method is shown in Figure 5. Using the regression method it was also possible to make predicted potentiometric surface for 20 years (7-15-2035) and 50 years (7-15-2065) into the future (see Figures 7 and 8). To predict the number of wells that are likely to be impacted by declining water levels, well construction data from existing wells in Pahrump Valley were captured from the Nevada DWR WLOG water well database (NDWR-WLOG database dated 8-3-2015). These records are derived from standardized State-required Well Driller’s Reports. Positional errors are well-recognized in well data from the WLOG database. These errors are discussed under the heading Estimate of Error. The NDWR WLOG database included 159 well records that did not contain a value for the bottom of perforation (screen depth) but were used in the analysis by substituting in either the depth cased, or if not available depth drilled (usually the same depth) from the NDWR-WLOG database. Eleven wells were removed from the analysis because the drillers log did not show a value for the bottom of perforation, depth cased, or depth drilled.

To limit the analysis to only areas of declining water levels, the well dataset was limited to include only those wells within the Areas of Applicable Decline (AAD, average decline of ≥ 0.2 ft/yr, Figure 2). Initially this area included 10,497 wells. 712 of these wells were located in PLSS sections where the water level is declining, but outside of the 10ft/50 year contour line and were removed from the dataset. An additional 11 wells were removed for quality reasons, for a total of 9,774 well included in the analysis.

The ground elevations for all 9,774 wells were estimated by assuming all wells in a common $\frac{1}{4}$ - $\frac{1}{4}$ section have identical ground elevations. Assigning ground elevation from Google Maps API to these wells, the submergence elevation at the bottom of each well (screen) was then calculated by subtracting the submergence depth [depth to bottom of perforation from WLOG + length of saturated screen (either 10-,20-,30-, or 40- foot alternative)] from

the API calculated ground elevation. A starting point water table elevation was assigned to each well location by using the 7-15-15 potentiometric map (grid in Surfer®, Figure 1), and a rate of decline was similarly assigned from the of rate water table change map (Figure 2). The rate was multiplied by number of years (20 and 50) then subtracted from the starting point water table elevation. This predicted water table elevation is compared against the submergence at the four alternatives and provides a test to whether the water table elevation has declined below the submergence and hence a simulated fail. This method is a summary of the direct solution algebraically. Elevation error is calculated in the Estimate of Error section. Methods to qualify records are described in Appendix A – Hydrographs and Control Point Elevations.

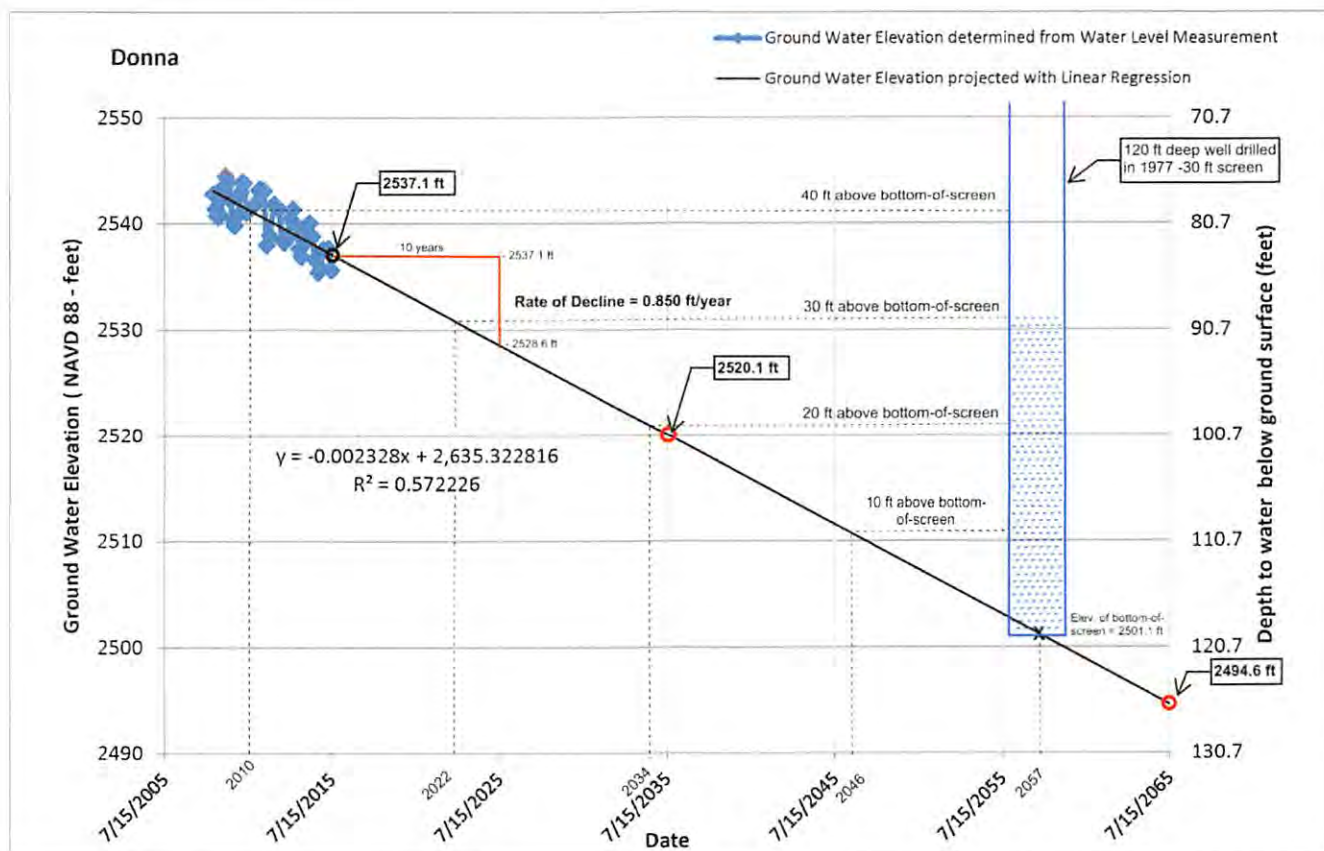


Figure 5. Actual (2007-2015) and projected (2016-2065) hydrographs for selected well “Donna” showing application of linear regression method to predict decline in ground water elevation. Blue diamonds are ground water elevation (water table elevation) periodically measured as part of the Water Level Measurement Program (WLMP). Black sloping line is the projected regression line based on the approximately 7 years of water level measurements. A diagrammatic well construction with 30 foot well screen is shown in blue. Also shown are the derived values used for: 1) elevation of water table on 7-15-2015 or starting point elevation (black circle); 2) linear rate of decline; and 3) predicted ground water elevations at 20 years (7-15-2035) and 50 years (7-15-2065) (red circles). Dashed lines show years in which water table elevation will pass 40, 30, 20 and 10 feet above bottom of screen. “X” symbol shows date when water table declines below well. Equation of regression line given in X=days since 1-1-1990 and slope in feet per day.

Results

The method produces four types of results 1); a cumulative frequency plot of “failing” wells vs. time, 2); predictive potentiometric surfaces, 3); maps showing location and number of wells “failing” at specific locations at discrete times, and 4) and predictive maps showing depths-to -water.

The cumulative frequency plot of the number of wells that will “fail” through time based on the distance of the water table above the well screen or submergence, for the 9,774 wells used in this analysis, is shown in Figure 6. The graph was produced by accumulating the predicted failing wells at 1-year intervals. The range of results predicts that at 20 years (2035) and a submergence of 10 feet that 1% of the wells will “fail”, and at 40 feet 19% will “fail”. Similarly, at 50 years (2065) the results predict that a submergence of 10 feet predicts 18% of the wells will “fail”, and at 40 feet 57% will “fail”. This analysis emphasizes the sensitivity of outcomes to the submergence. Empirically, twenty feet of submergence is considered as a minimum amount of submergence that would reasonably be needed to maintain well function. For simplicity, further analysis in this report only presents results from the 20-foot submergence alternative

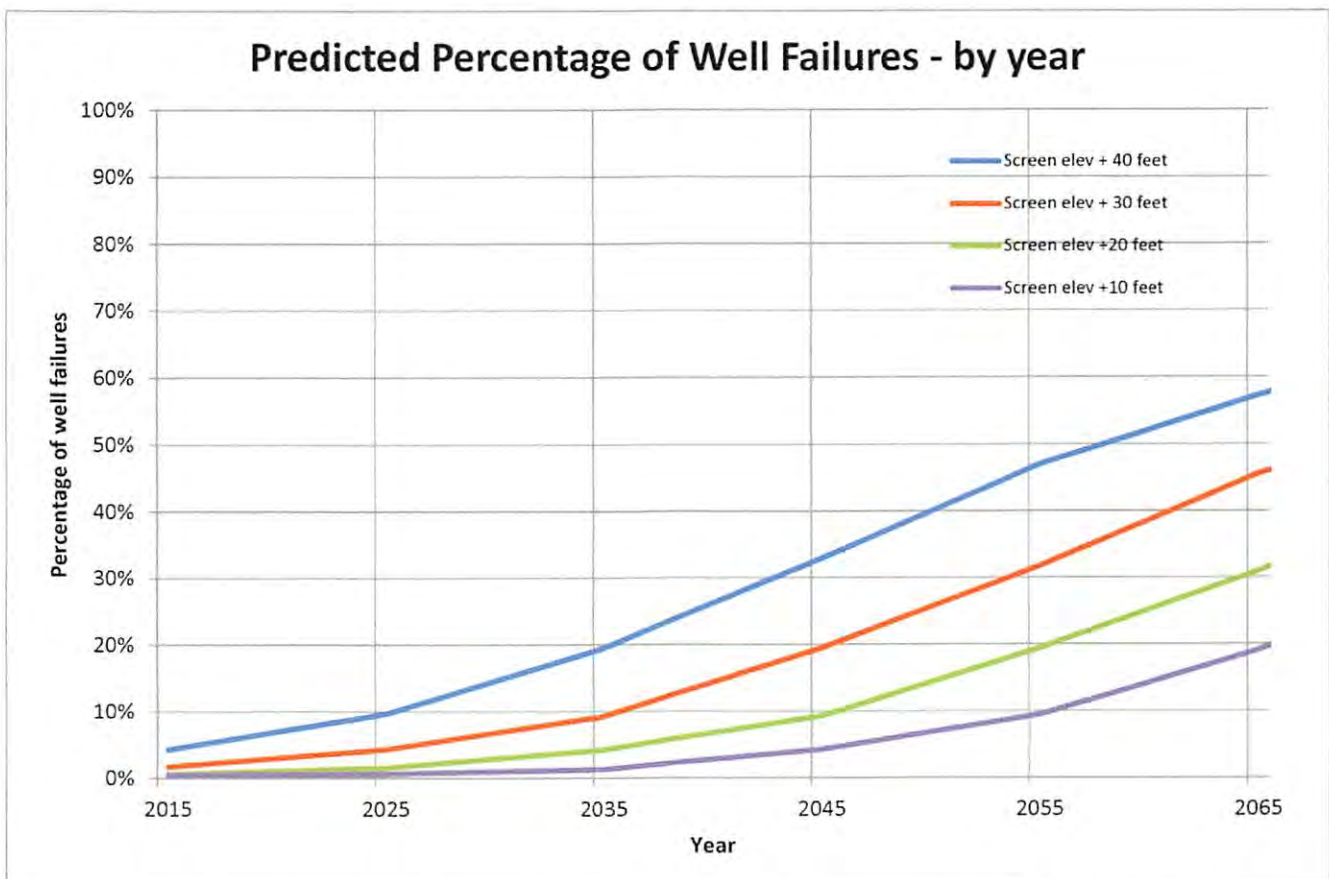


Figure 6. Cumulative frequency plot showing the percentage of the 9,774 wells within the AAD that are predicted to “fail” over the next 50 years varying the well submergence at 10-, 20-, 30- and 40-foot distances above the bottom-of-well screen elevation.

Predicted potentiometric maps for both the 20-year (2035) and 50-year (2065) projections were created by Kriging the projected water level elevations at the control points as obtained from the regression lines (see Appendix A). Elevation errors are expected to increase the farther locations are from control points and are larger in the southwest portion of the maps where control points are lacking (western portion of T21SR53E), however there are less than 30 wells that have been drilled in this area (See Figures 7 and 8).

Maps showing location and number of wells “failing”, using the 20- foot submergence alternative, in specific PLSS sections, at both the 20-year and 50-year time projection are shown in Figures 9 and 10. The study predicts that 438 wells will have “failed” by 7-15-2035 (20 years), and 3085 wells will have “failed” by 7-15-2065 (50 years).

Maps depicting the predicted depth to water across the AAD, for the 20-year (2035) and 50-year (2065) time frames were created by subtracting predicated water table elevations (potentiometric maps) from API derived ground elevations from ¼-¼ sections (See Figures 11 and 12).

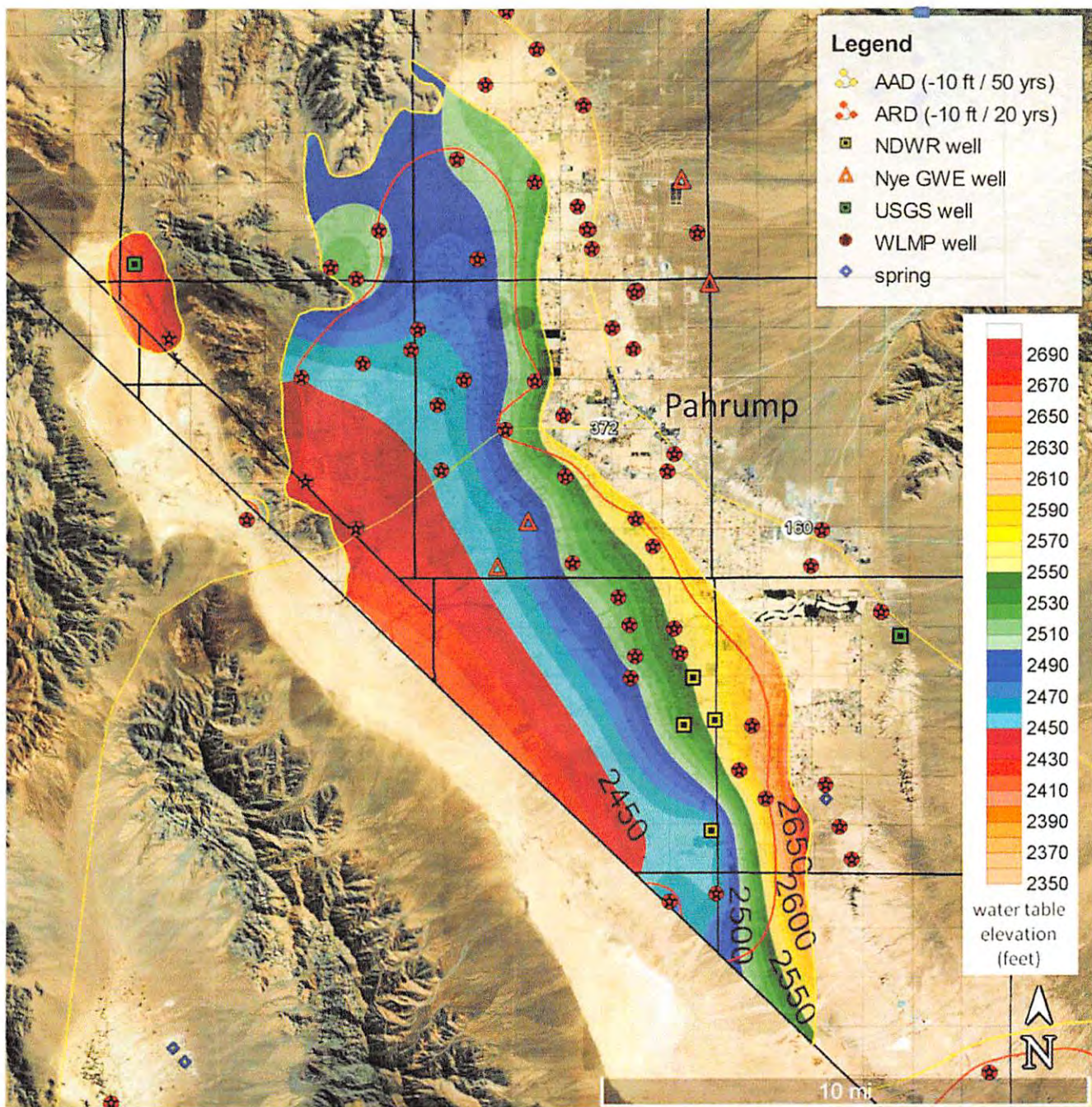


Figure 7. Potentiometric map showing predicted water table elevations within the AAD, for 7-15-2035. Elevations are contoured at 10 foot intervals.

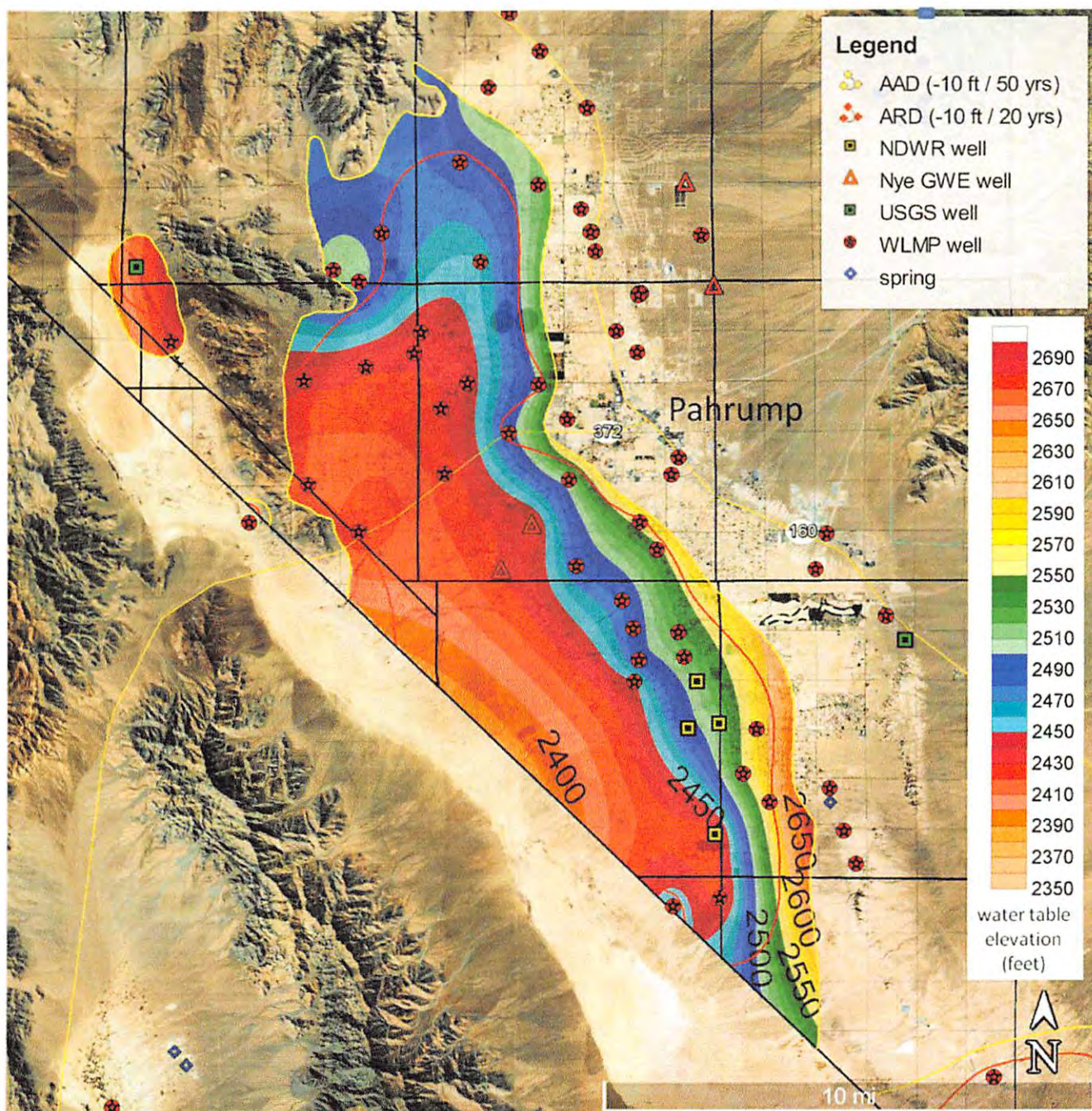


Figure 8. Potentiometric map showing predicted water table elevations within the AAD, for 7-15-2065. Elevations are contoured at 10 foot intervals.

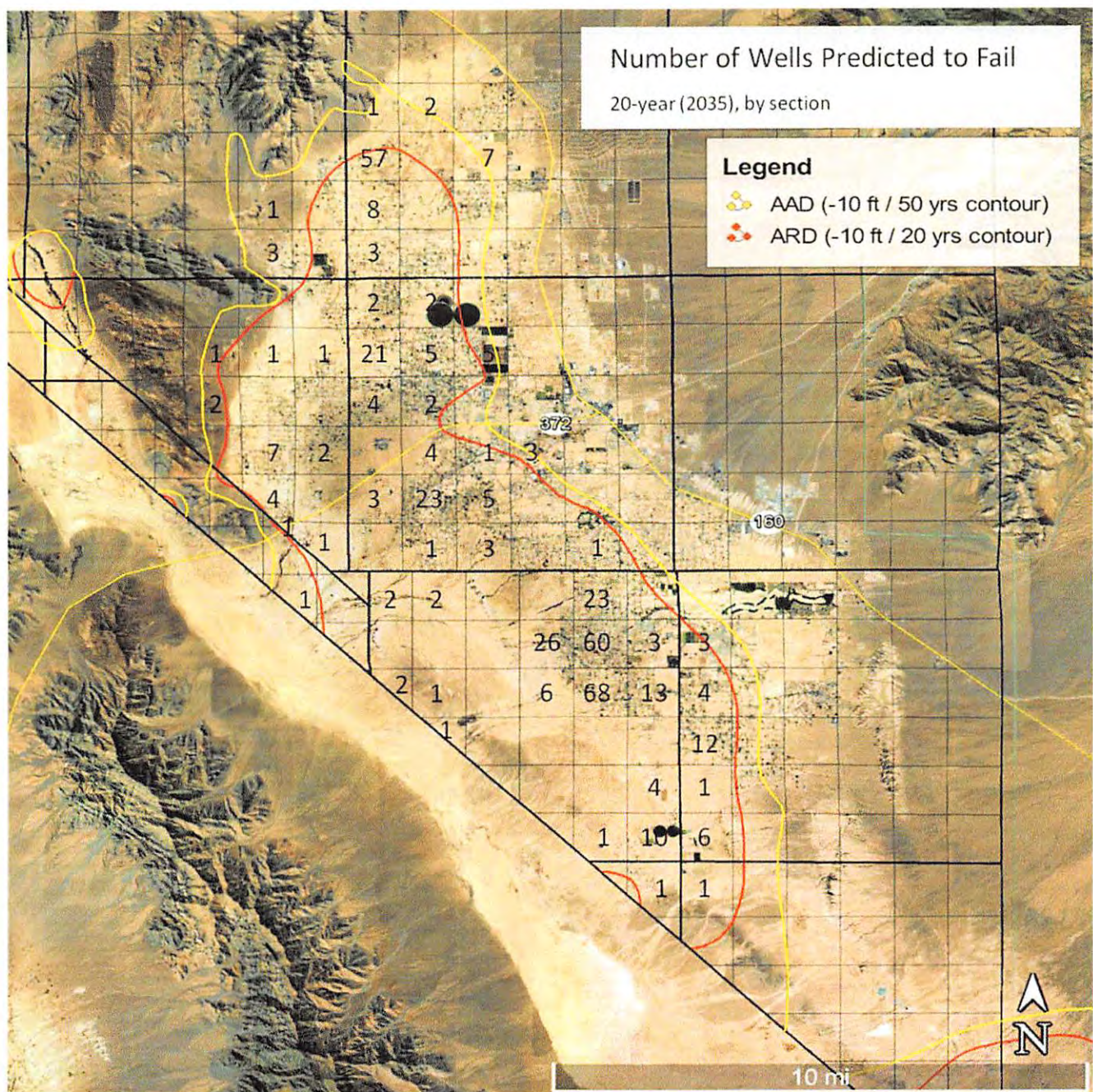


Figure 9. Map showing the locations of the 438 wells predicted to “fail” by 7-15-2035 using the 20 foot submergence alternative. Note the 10 foot decline contour for both 20 years (ARD) -red, and 50 years (AAD) - yellow.

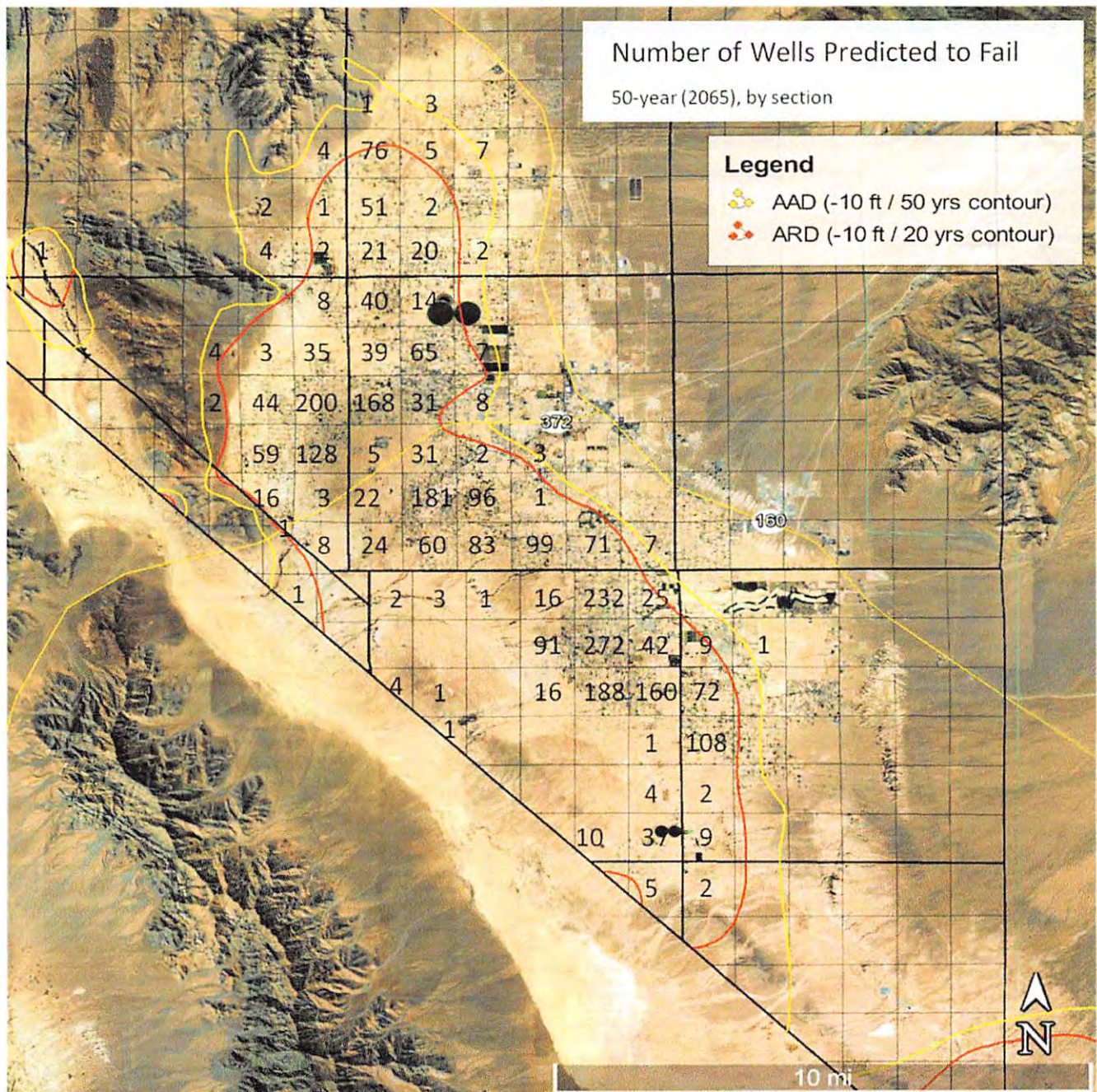


Figure 10. Map showing the locations of the 3,085 wells predicted to “fail” by 7-15-2065 using the 20 foot submergence alternative. Note the 10 foot decline contour for both 20 years (ARD) -red, and 50 years (AAD) - yellow.

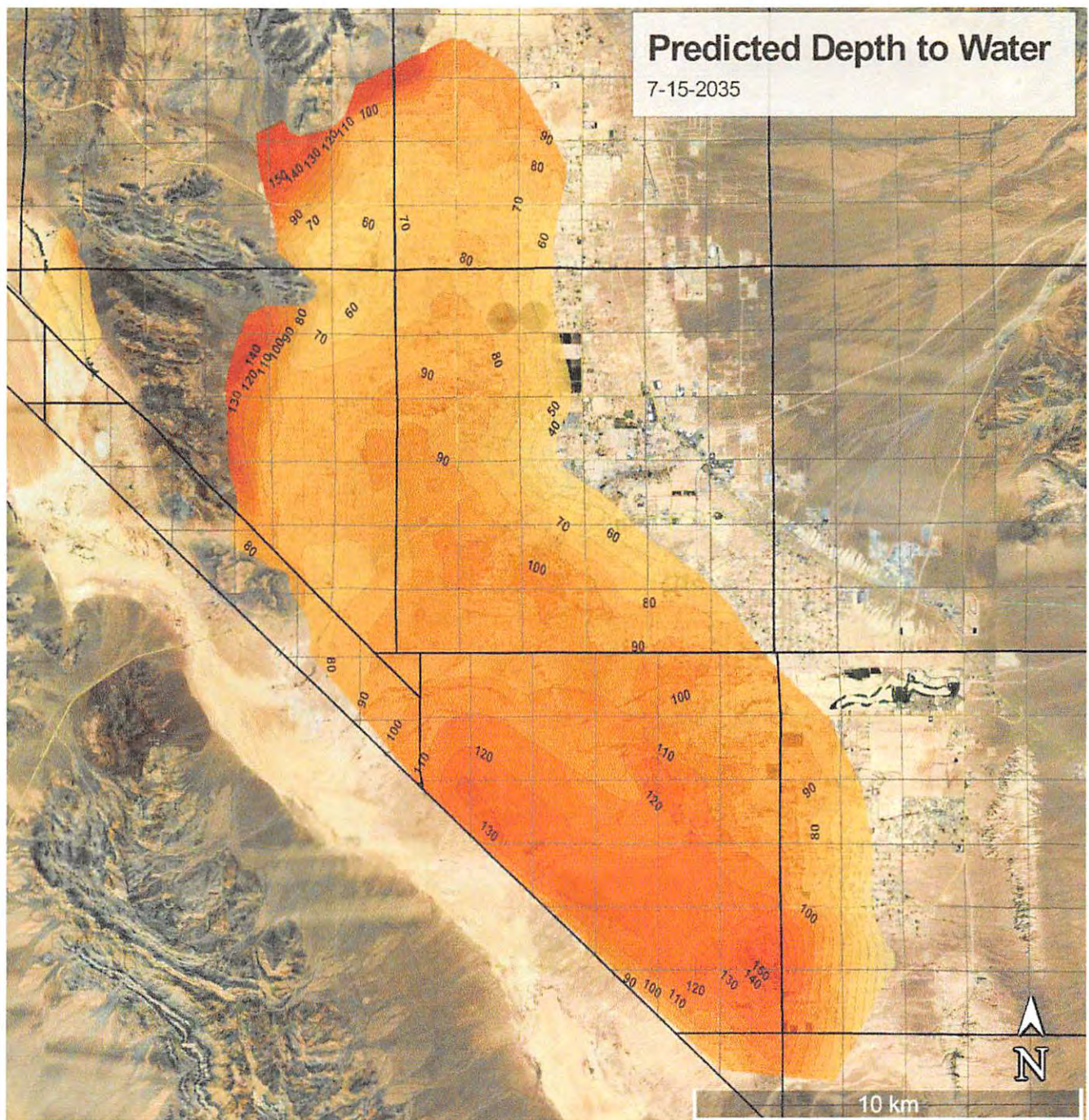


Figure 11. Map showing the predicted depth to water for the AAD within the Pahrump Valley for 7-15-2035 (20-year prediction). Contour interval is 10 feet. Data were contoured using the Natural Neighbor method, and clipped at the California border to remove areas not supported by the original data.

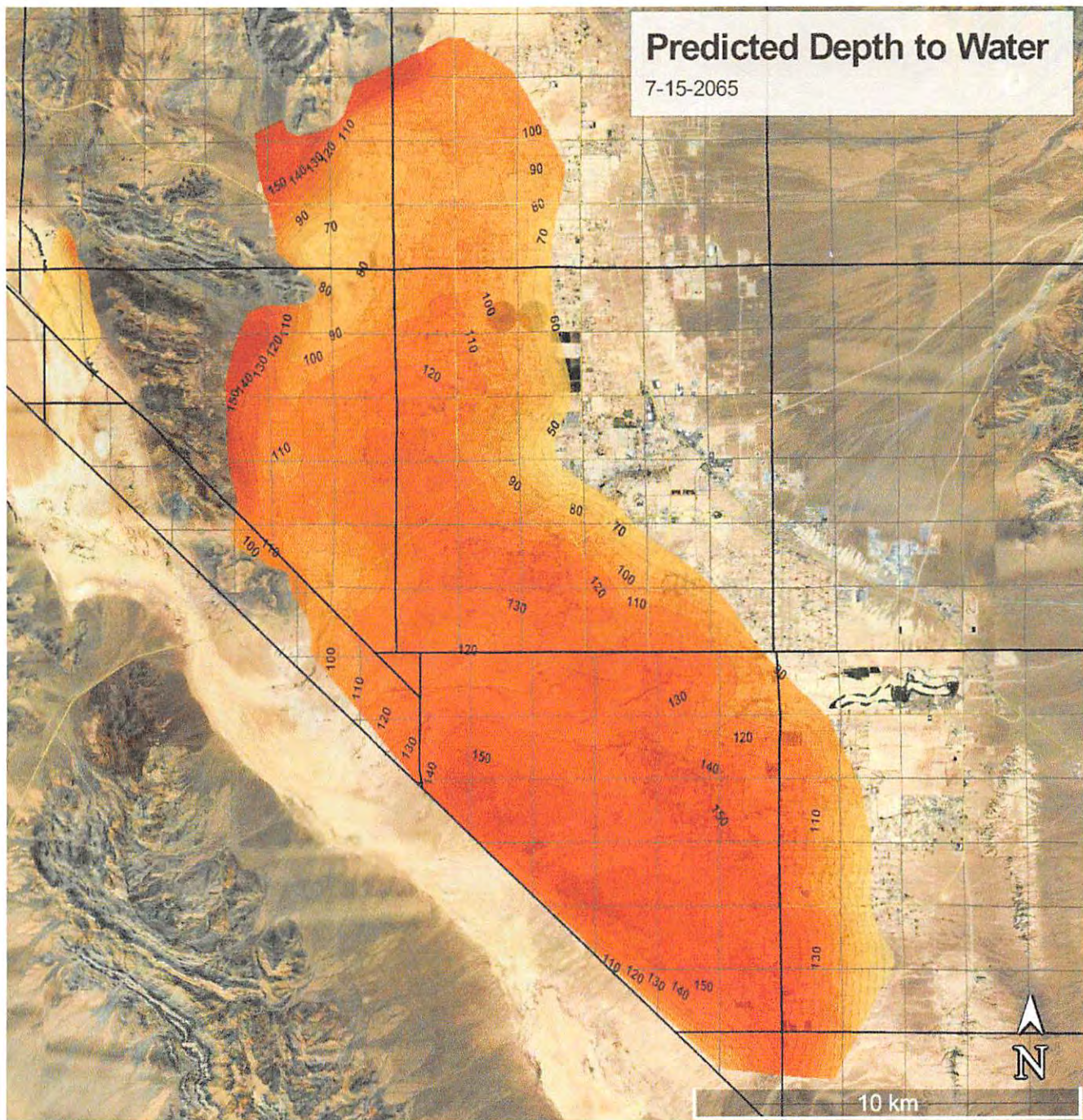


Figure 12. Map showing the predicted depth to water for the AAD within across the Pahrump Valley for 7-15-2065 (50-year prediction). Data were contoured using the Natural Neighbor method, and clipped at the California border to remove areas not supported by the original data.

Assumptions and Constraints on Methodology

This analysis should be used only as a general guideline to aid in identifying areas where wells are expected to fail under continued conditions. Foremost in this analysis is the assumption that wells in this analysis tap the shallow aquifer underlying the Pahrump Valley as a single unconfined homogeneous aquifer, and conditions affecting the aquifer system will effectively be constant throughout the 50-year period under consideration (groundwater withdrawals and water table declines, precipitation, evapotranspiration, etc). Additionally, this analysis assumes that spatial projection of geostatistical estimates from "control well data" do not contain significant errors, and information supplied by well drillers to the WLOG database are reasonably accurate. This method also assumes that predicted well failure is due only to inadequate submergence of the well screen and does not consider other real world factors, such as screen/perforation fouling, degradation of well gravel pack, pump location and condition.

Estimate of Errors

There is a systemic error associated with the difference between the actual ground elevation for a well and the estimated and assigned ground elevation based on the center of the $\frac{1}{4}$ - $\frac{1}{4}$ section. Well locations from the NDWR database (WLOG), and hence this study, also carry locational errors of up to 933 feet by plotting them to the center of $\frac{1}{4}$ - $\frac{1}{4}$ sections. The spatial error also has an associated vertical error due to variations of ground elevation changes within the $\frac{1}{4}$ - $\frac{1}{4}$ section. This in turn introduces an error in the calculated elevation at the bottom of each well. This vertical error is approximated by: one-half of the difference in elevation across the center each $\frac{1}{4}$ - $\frac{1}{4}$ section in an east-west direction divided by the rate of decline at the center of the $\frac{1}{4}$ - $\frac{1}{4}$ section. This assumes that the change in elevation across any individual $\frac{1}{4}$ - $\frac{1}{4}$ section of the valley floor can be approximated by taking the elevation difference across the center of the $\frac{1}{4}$ - $\frac{1}{4}$ section from east to west. Errors also occur in Well Driller's Reports supplied to the NDWR. Positional errors can also be due to incorrect PLSS locations, and incorrect parcel or lot number (if location is updated from WLOG location). Errors in well depth, as shown on Well Drillers Report, will substantially impact well failure predictions. Additionally, well casing stick-up "raises" the screen elevations relative to the ground elevation.

To estimate the impact of the vertical errors recognized as a result of the generalized well locations, the magnitude of the error was estimated for 872 $\frac{1}{4}$ - $\frac{1}{4}$ sections within the AAD. This showed that vertical error of 57% of the wells were ≤ 5 feet, and 92% were ≤ 10 feet. It should be noted that the east-west direction is sub-parallel to the direction of the ground water gradient (WSW), and was not factored into the error estimate, but would have reduced the estimated error to some extent if it had been incorporated. To estimate the error (in years) for when a well is predicted to "fail" in each $\frac{1}{4}$ - $\frac{1}{4}$ section, the total elevation error estimate was divided by the decline rate (in years). The result was then divided by 2 to translate the error into \pm years since we assumed a constant elevation change across the $\frac{1}{4}$ - $\frac{1}{4}$ sections and half of the elevations would be above that of the center (fail at an earlier time than predicted), and half would be below (fail at a later time than predicted). Figure 13 is a map showing the distribution of the estimated error, and shows that the magnitude of the error is generally $\leq \pm 5$ years for much of the Pahrump Valley floor (within the AAD) except for the fringe zones, most notably to the northwest.

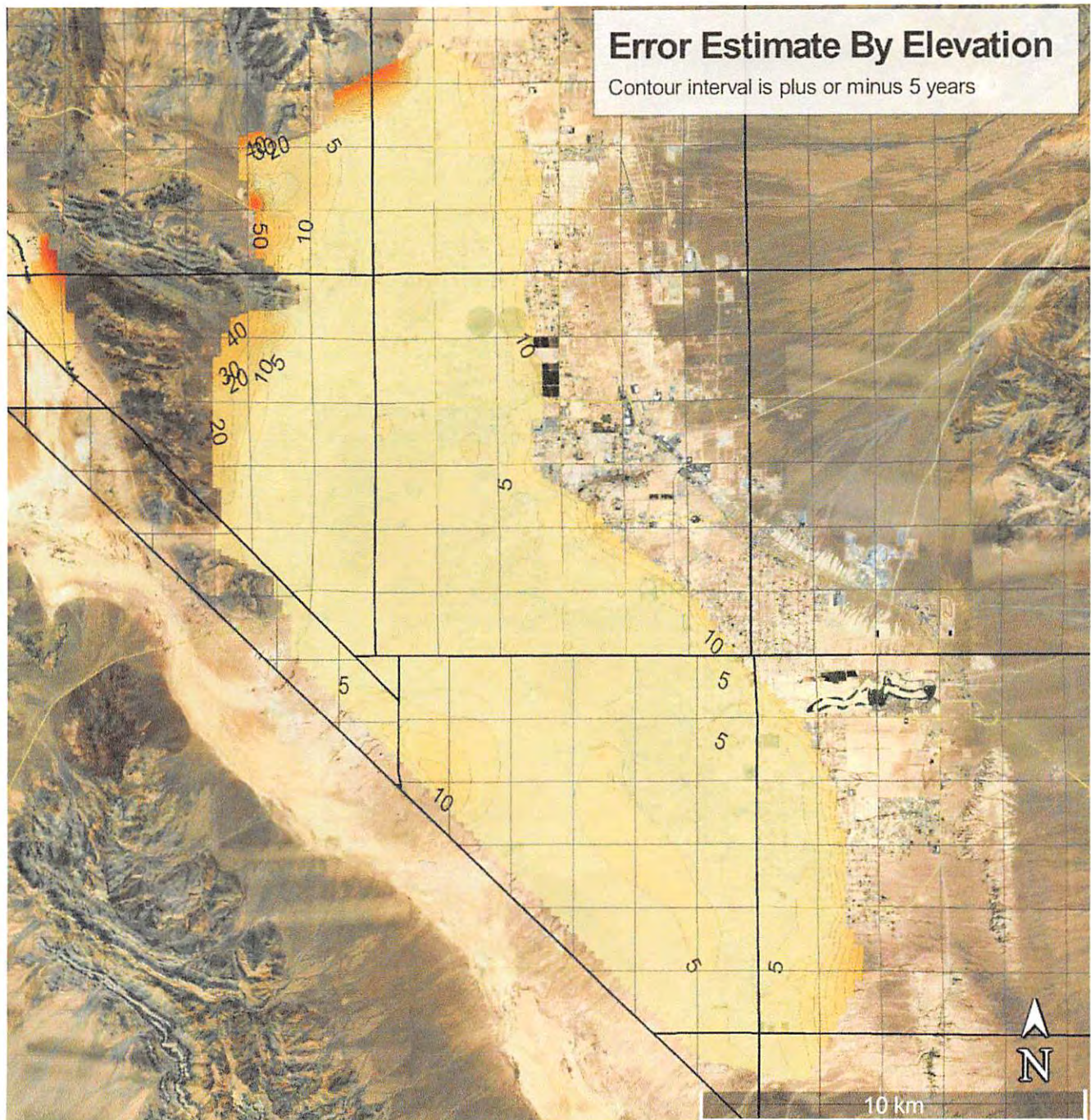


Figure 13. Contour map of the AAD showing error estimates (by $\frac{1}{4}$ - $\frac{1}{4}$ section) associated with "Number of Wells Predicted to Fail" measured in years. Contour interval is ± 5 years.

Vertical accuracy for all control wells is very high, and has been demonstrated to be less than 1 foot vertically and horizontally (NCWD TP-9.8, 2015). This was achieved by surveying the wells using a resource grade Trimble GeoXH GPS unit. The high accuracy wellhead locations along with a QA approved and standardized Nye County Water District water level meters also allowed for high accuracy water levels to be taken in the control wells (NCWD TP-9.9, 2015, and NCWD WP-10, 2015). A comparison of the ground elevation for the 34 control point wells, within the AAD, from the API utility to those obtained from the high accuracy Trimble GeoXH GPS unit is shown in Figure 14. The comparison showed the API utility elevations averaged 0.19 ft higher than the Trimble elevations with a standard error of 3.32 feet.

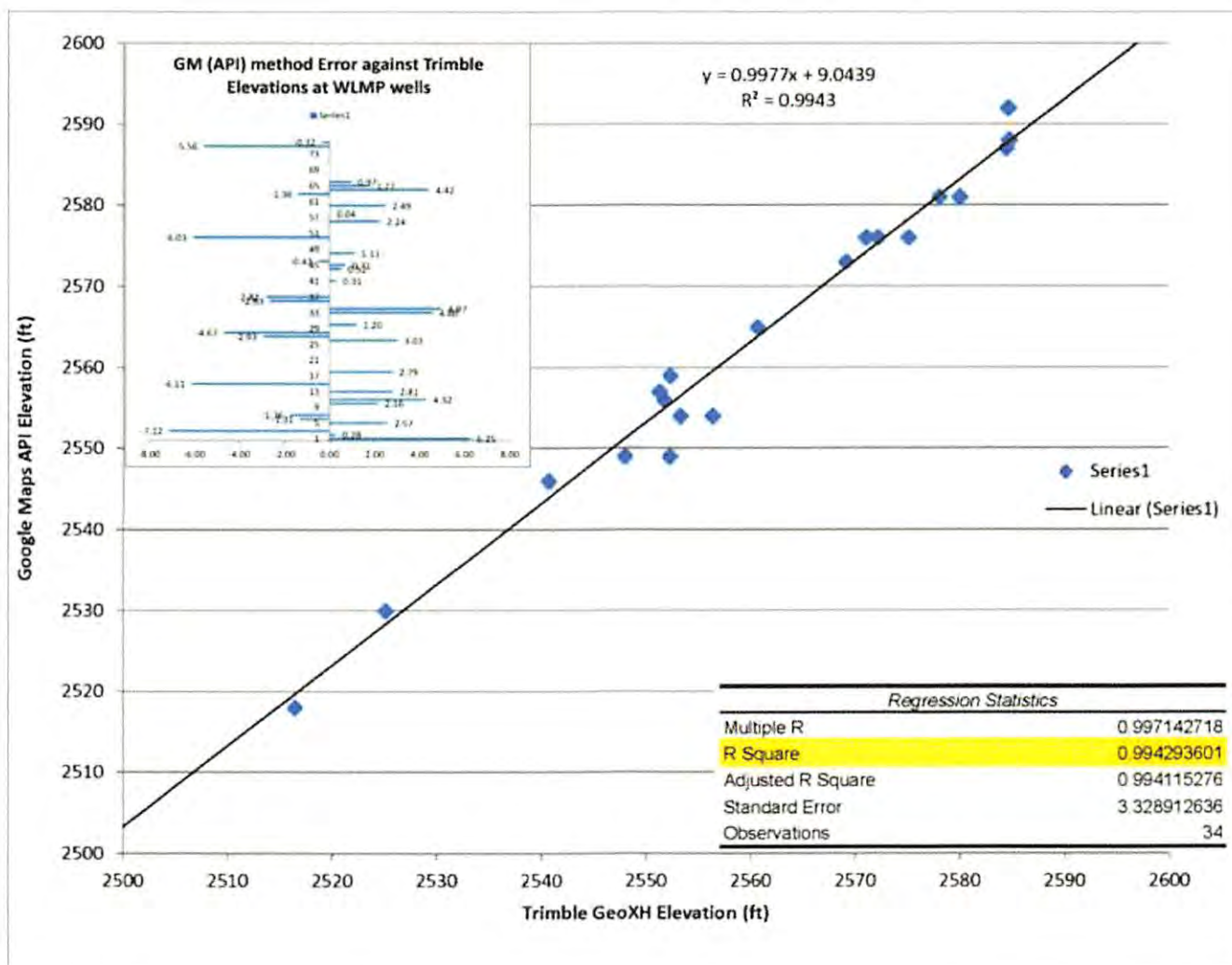


Figure 14. Graph showing the Google Map API utility derived elevations for the 34 control wells within the AAD (decline of ≥ 0.2 ft/yr) as compared to the Trimble GeoXH derived elevations. The API elevations averaged 0.19 ft higher than the Trimble elevations with a standard error of 3.32 feet.

Summary

The method presented has produced reasonable approximations as to the timing of well “failures” within the Area of Appreciable Decline. More importantly geographic areas have been identified along with the relative magnitude of impacts which can be expected if future water table declines in the valley remain unchanged. Limitations associated with this study have been recognized and discussed as well as advice on how to improve any future updates. Future data collection by the Water District’s Water Level Measurement Program and the locating of new index wells are major components to understanding the impacts of water level declines in the Pahrump Valley.

Recommendations

The method used in this preliminary study produced reasonable results, but can potentially be improved. Of the 9,774 wells used in this analysis, 6,798 have a parcel number associated with them (original Well Drillers Report). If these wells were repositioned to the actual parcel locations within the ¼-¼ PLSS section, elevation errors could be substantially reduced. Of the remaining 2,976 wells it is expected that a large portion of these have a physical address or a block and lot number associated with them, and could be repositioned and an improved ground elevation assigned, again reducing vertical error. Although the estimates of ground elevation using the Google Maps API utility worked well for this study, it is felt that more accurate ground elevations could be obtained by using either currently available or soon to be available higher resolution Digital Elevation Maps (DEM’s). To verify the results of this study, ground truthing is recommended. A study similar to this one, but using more sophisticated non linear techniques could also potentially produce more accurate predictions. This analysis should be updated within 5 to 10 years to incorporate: 1) new information derived from wells drilled within the AAD, 2) additional water level measurements, and 3) any new index wells which may become available from the WLMP. Further understanding the hydrology of the Pahrump Valley is crucial to proactively address future concerns. Continued data acquisition and analysis are critical to understanding the hydrology of the Pahrump Valley.

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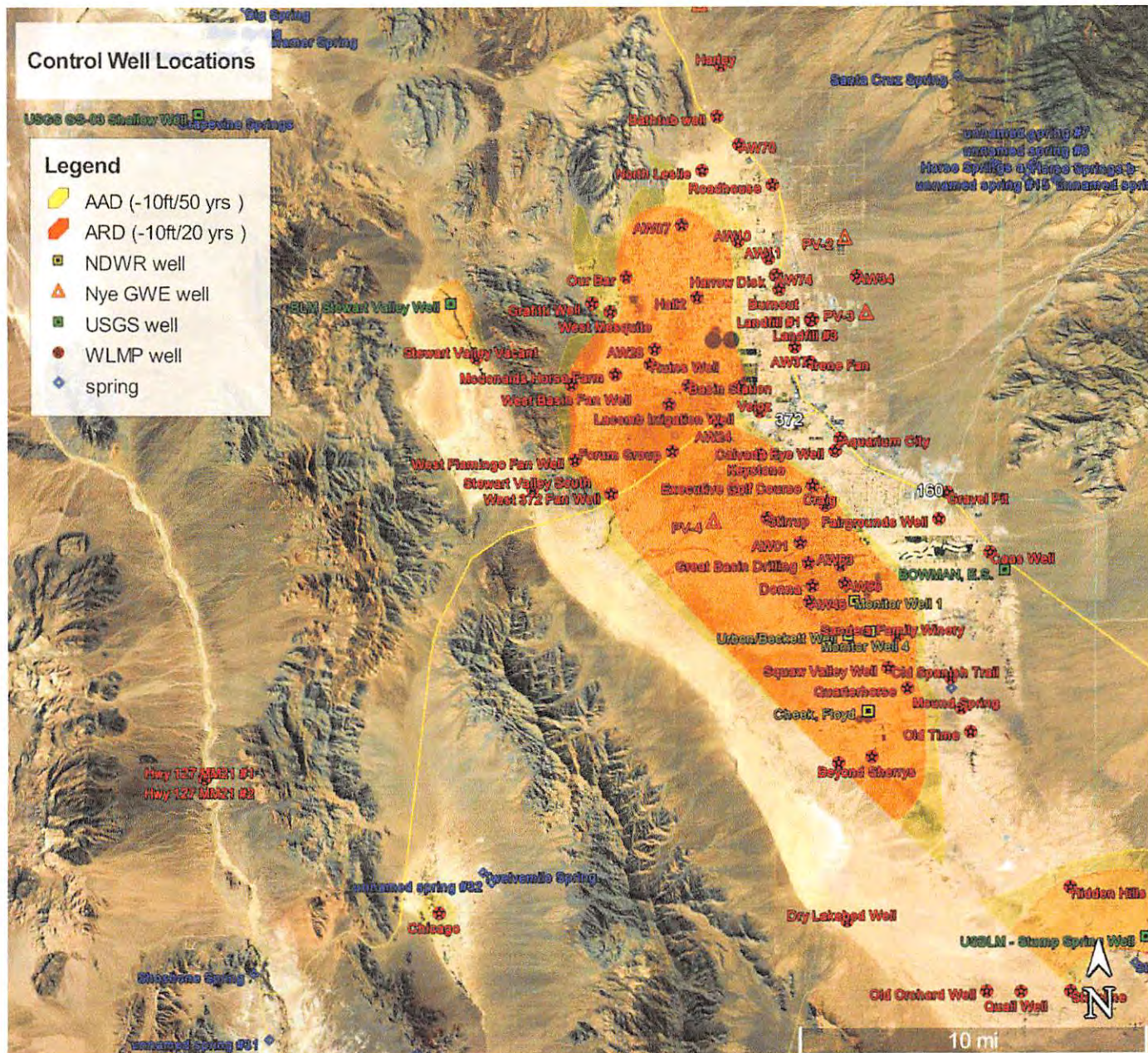
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<http://www.trimble.com/globalTRL.asp?nav=Collection-85287>
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Appendix A - Hydrographs and Control Point Elevations

Data used to determine potentiometric (water level) surfaces.

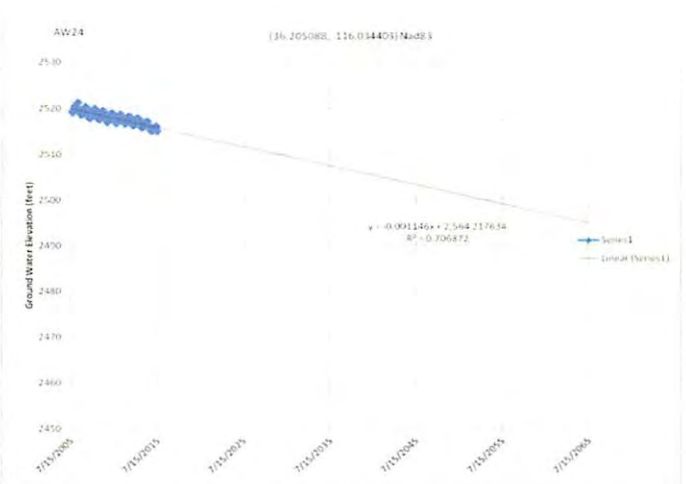
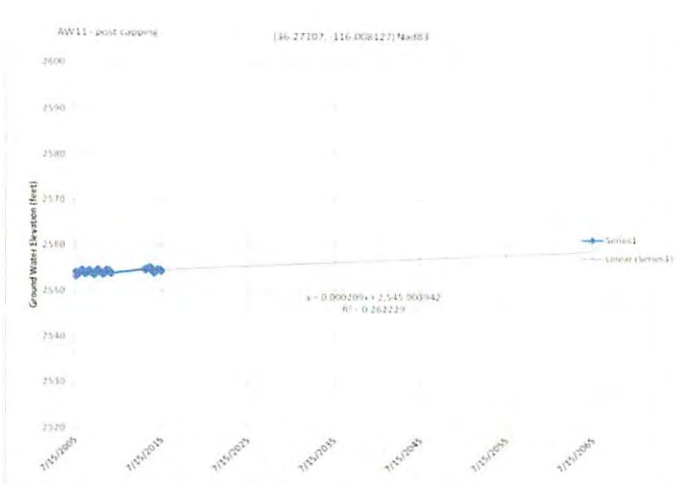
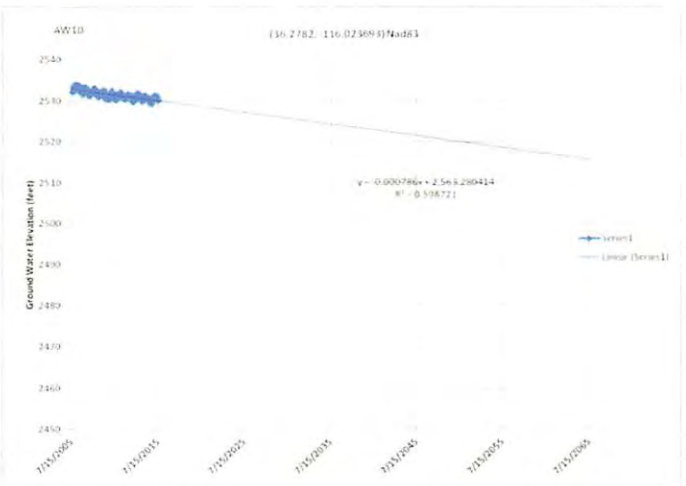
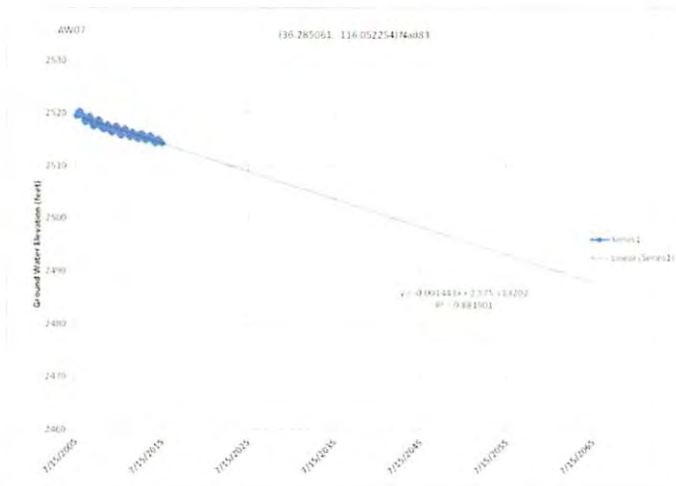
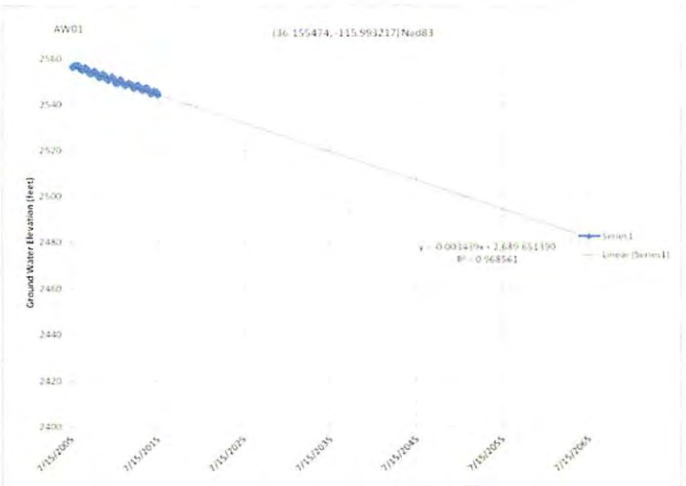
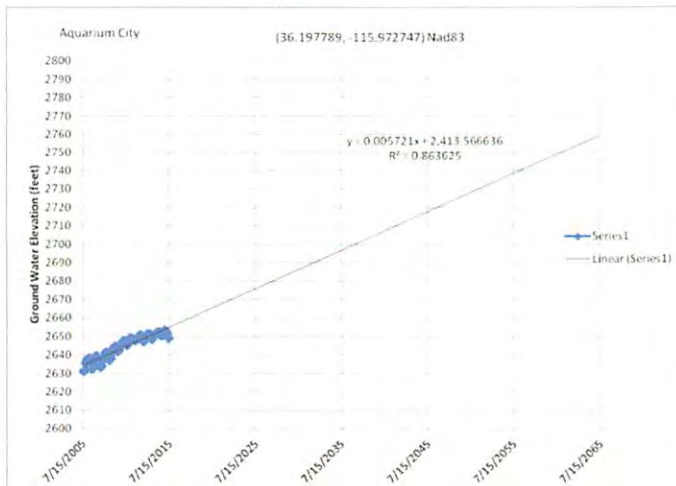
Hydrographs:

In developing the Water Level/ Potentiometric map Water level data for some wells do not go back as far as 7-15-05 (10 years for regression analysis) but were still used in the analysis (Craig, Donna, Hall2, Harrow Disk, Landfill#1, Landfill#2, Landfill#3, Stewart Valley South, Veloz, PV-1, PV-2, PV-3, PV-4, PV-5, Monitor Well 1, Monitor Well 4, and Urbon/Beckett Well). Water Level data for Donna and Hall2 is contained in the WLMP database previous to 7-15-05, but these wells were reactivated, a therefore only the water level data after 7-15-05 were used in the regressions. Note: Water level data from 12-27-99 to 7-15-15 were used in the regression for well AW28 to insure sufficient data points to better define the regression line. Individual water level measurements that were not stable (pumping and recovering wells) were removed, and not used in the regressions.

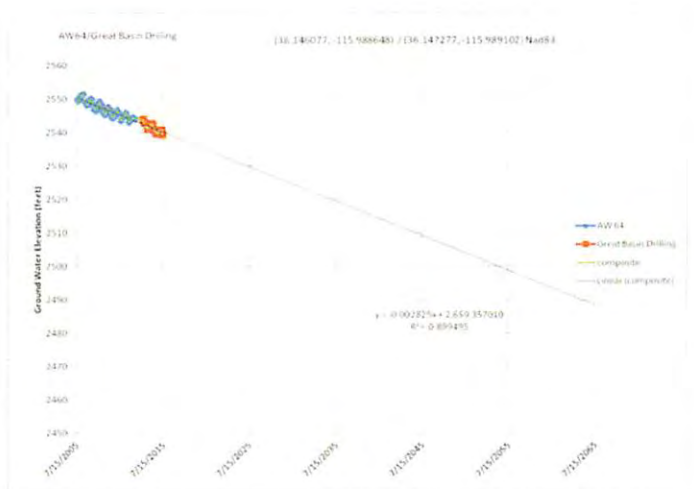
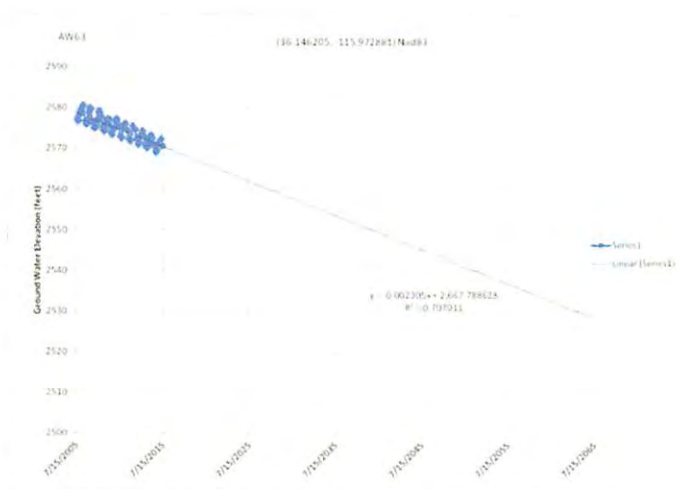
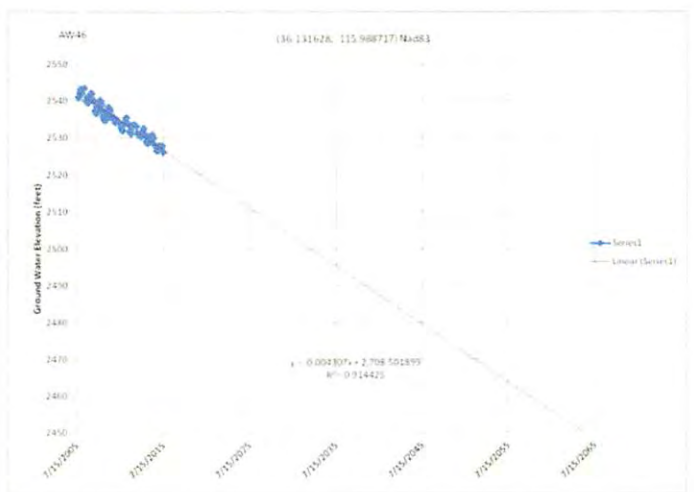
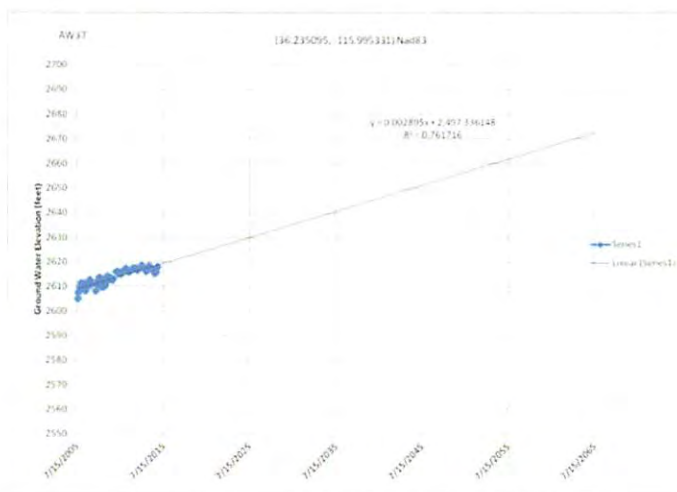
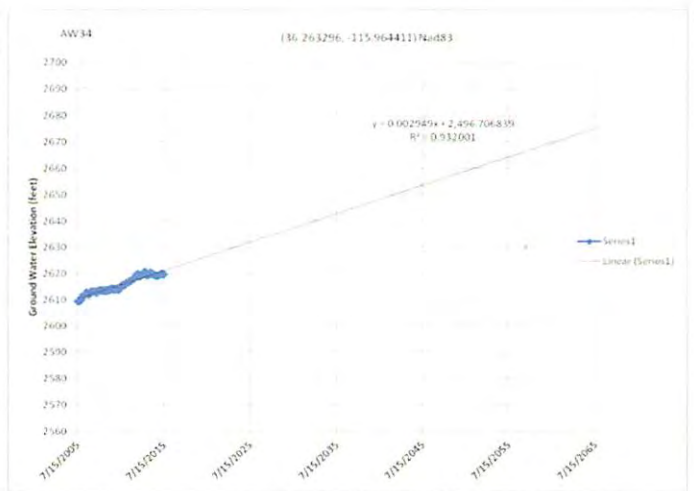
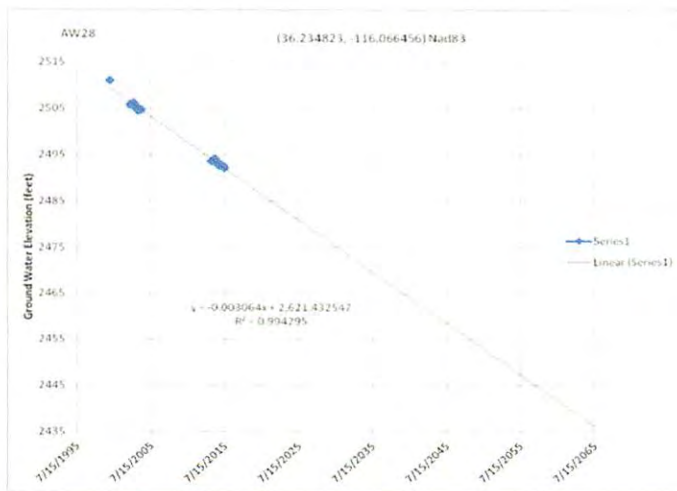


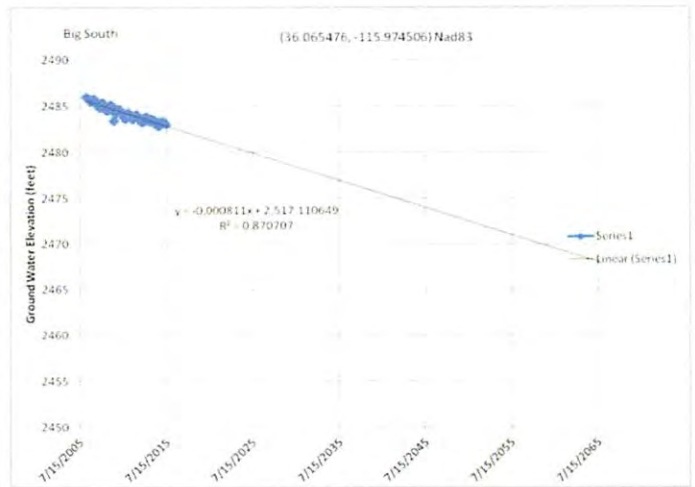
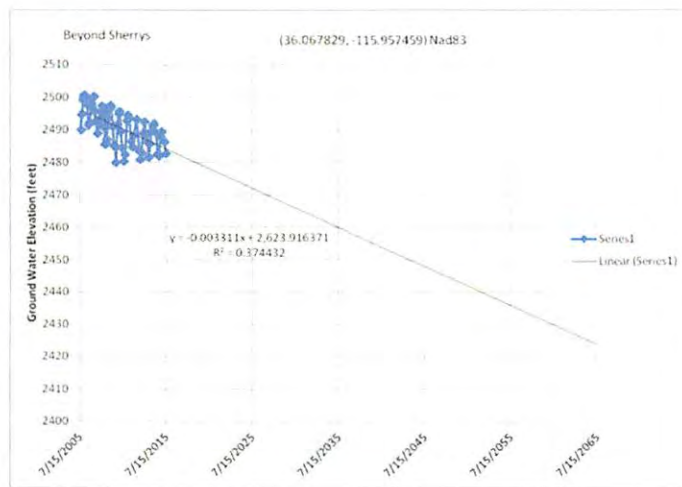
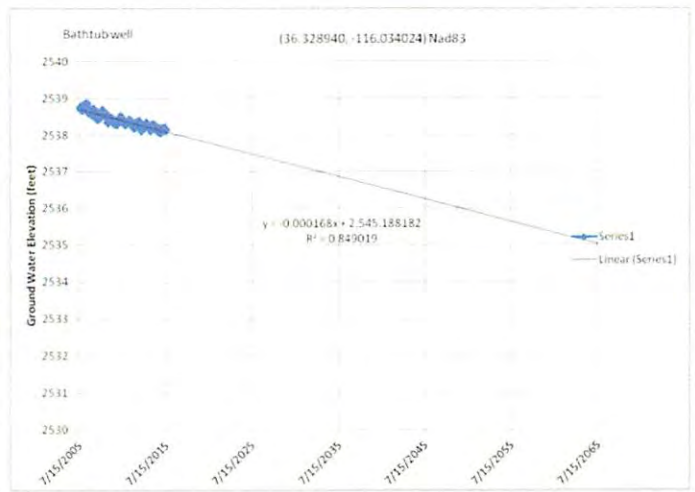
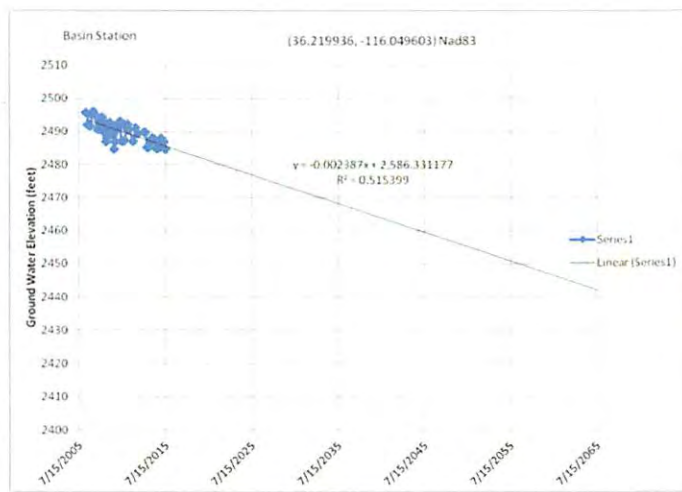
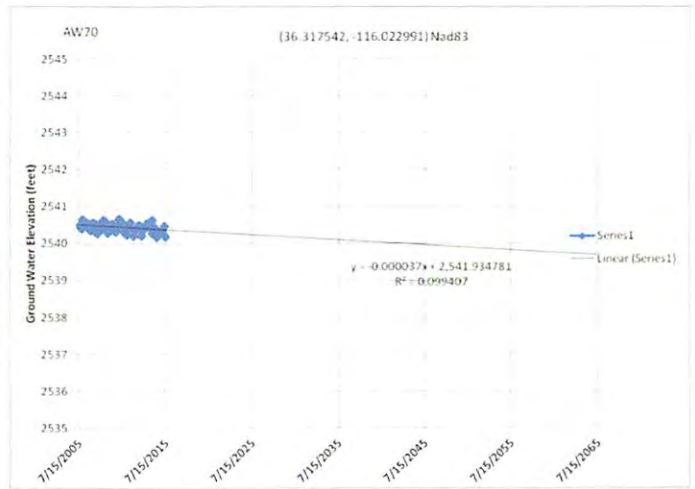
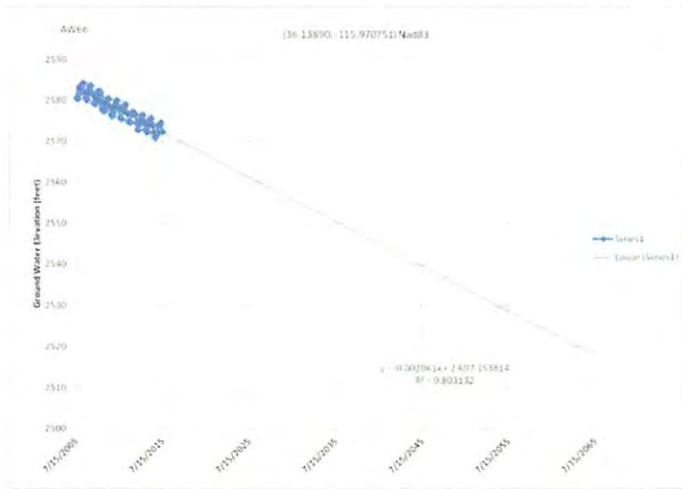
FigureA1. Showing the location of control points used to make hydrographs to define the potentiometric surfaces for the starting “current” potentiometric surface map (7-15-2015), 20-year surface (7-15-2035), and 50-year (7-15-2065). The area enclosed by the lower rate (AAD- yellow polygon) of -10 feet in 50 years (average decline of ≥ 0.2 ft/yr) bounds the aerial extent used for further analysis. The area enclosed by the ARD-orange polygon of -10 feet in 20 years (average decline of ≥ 0.5 ft/yr) bounds the aerial extent of area of relatively rapid decline. The following 7 wells were used to help constrain the contouring of the potentiometric surfaces, but are outside the limits of this view: Jeep Trail Well, NDOT, Eagle Mtn North, Eagle Mtn South, NDOT South, Pit Wall (USGS GA-08E), and USGS GS-03 Shallow Well.

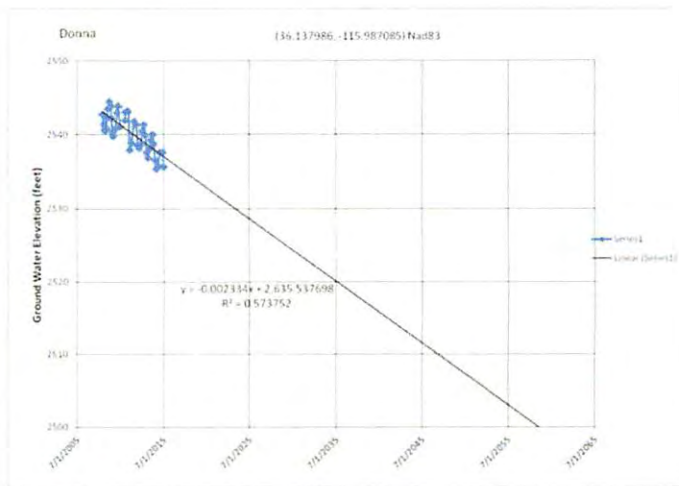
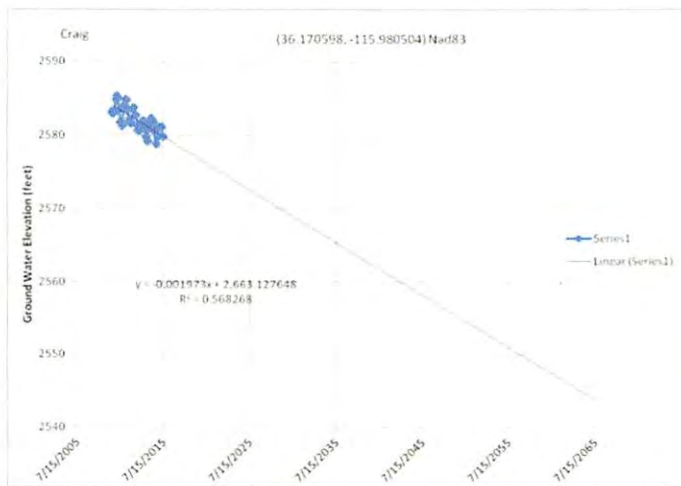
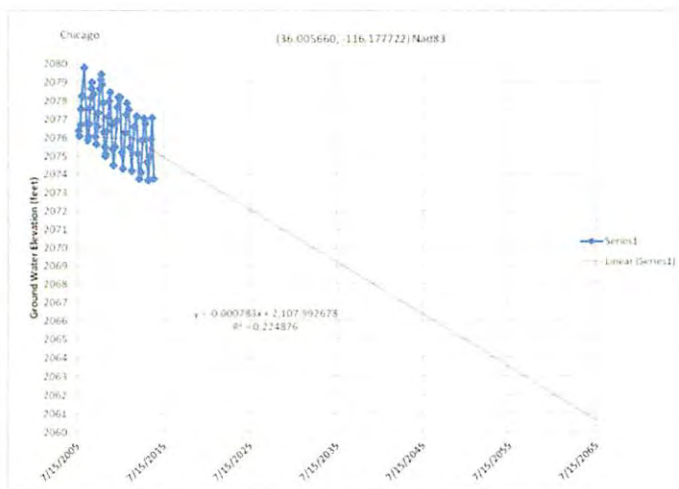
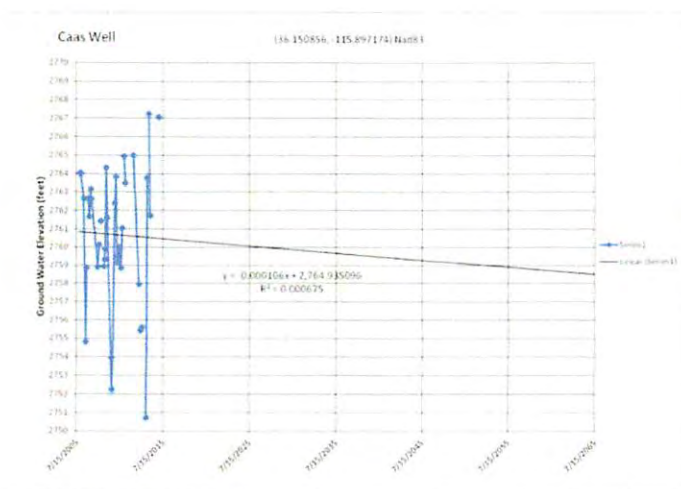
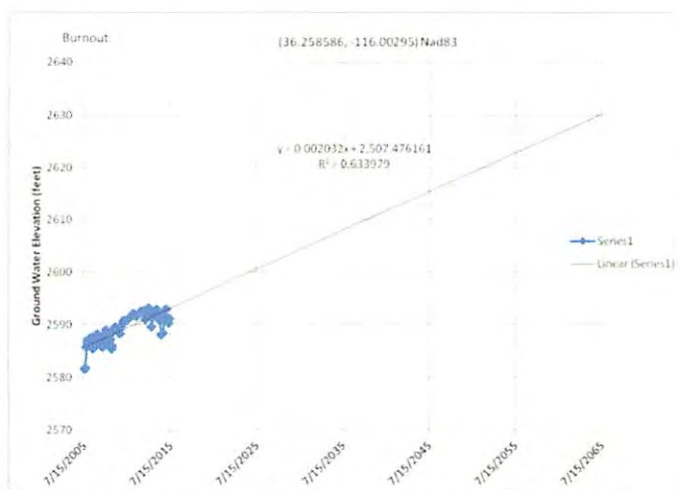
WLMP wells

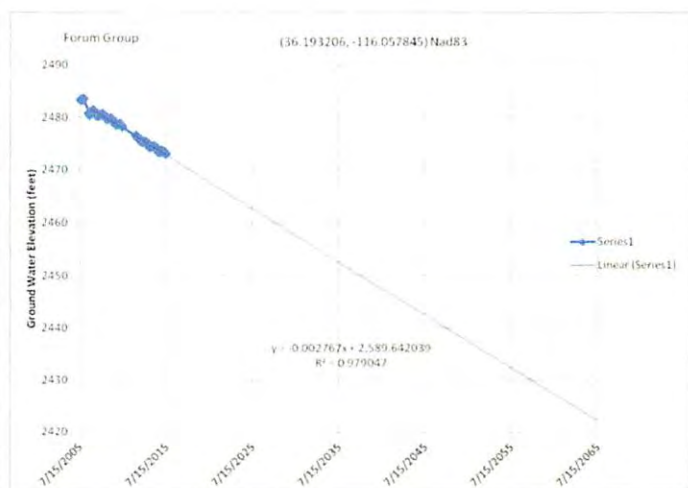
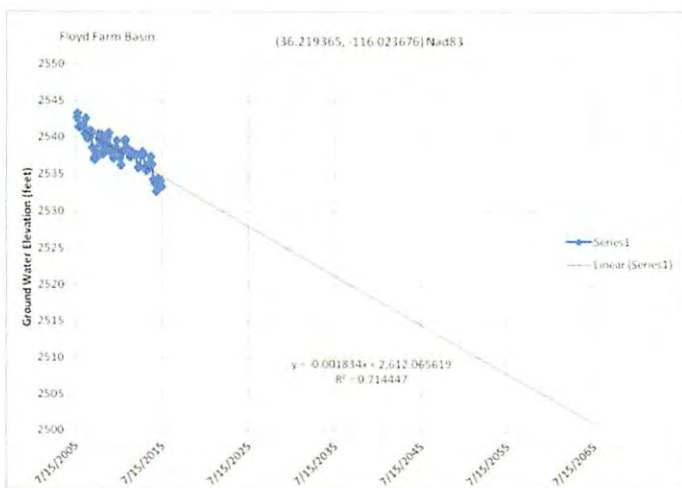
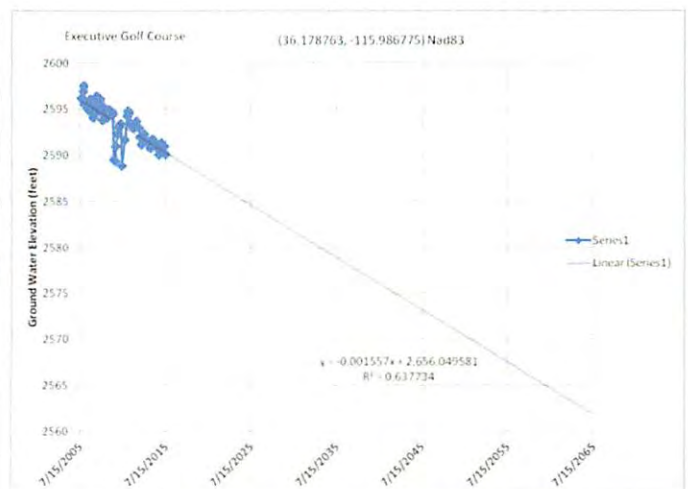
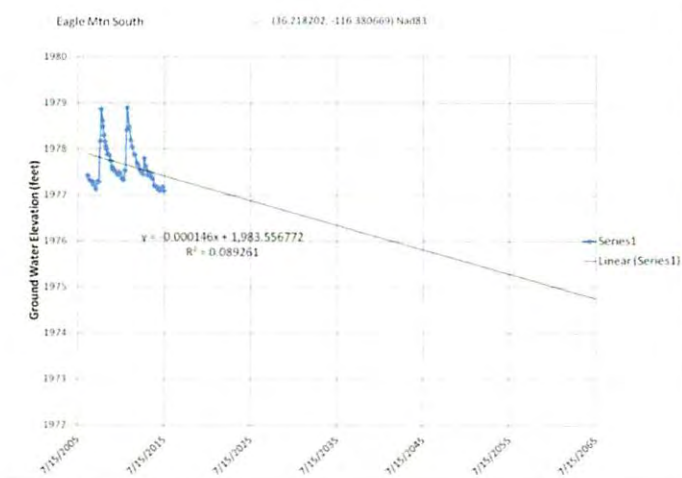
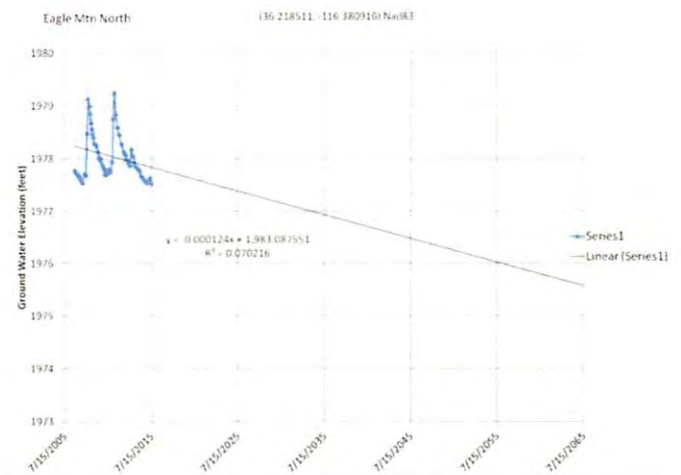
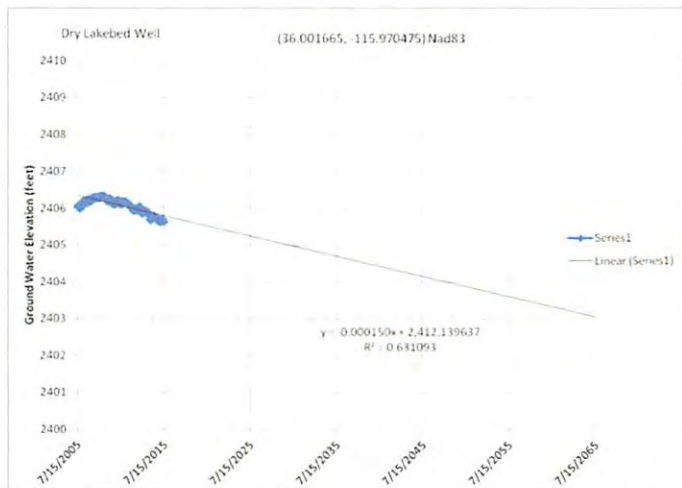


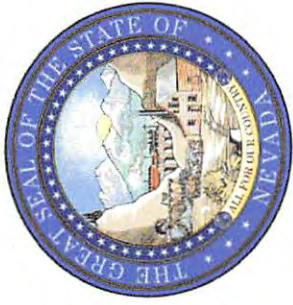
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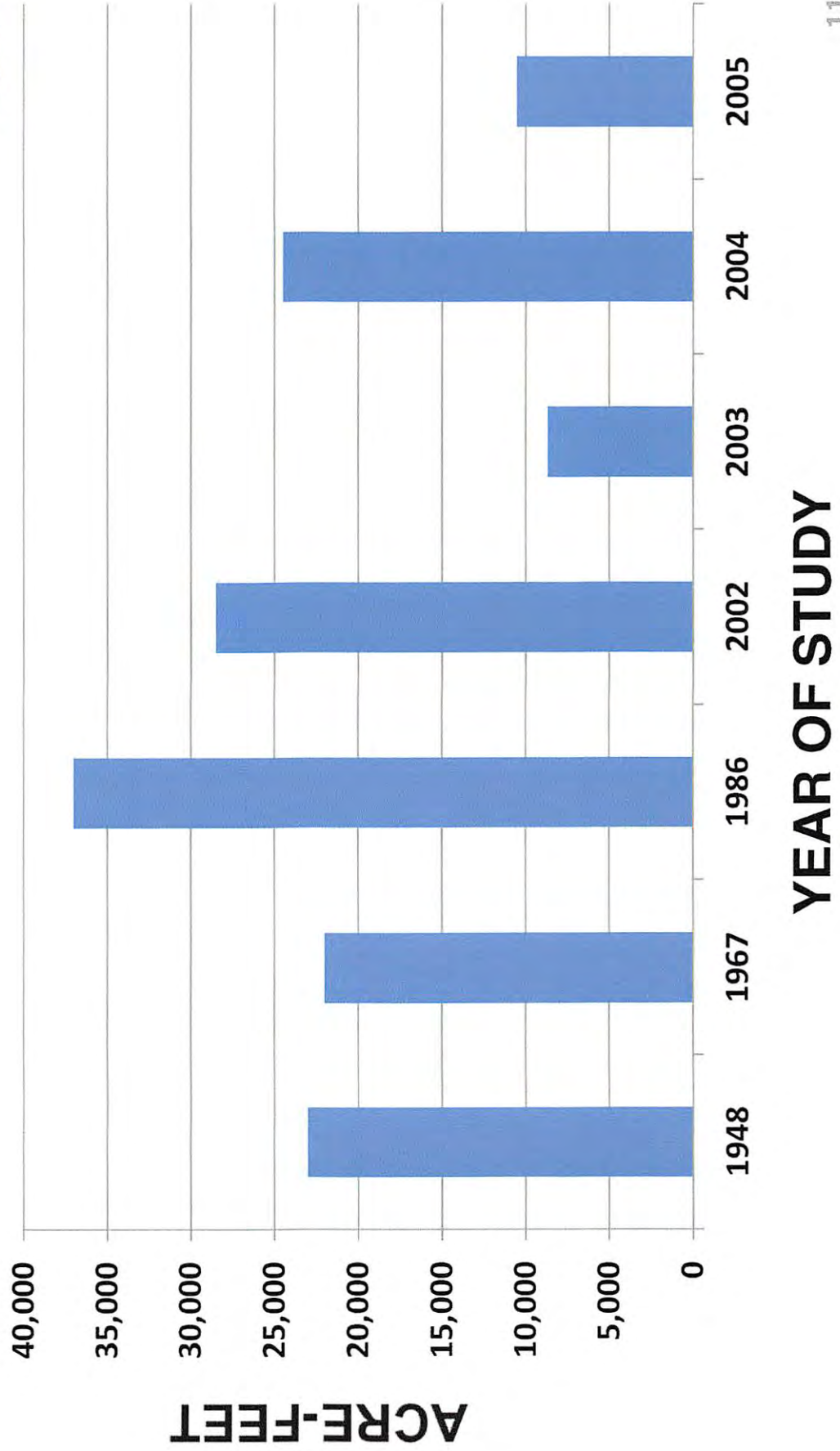






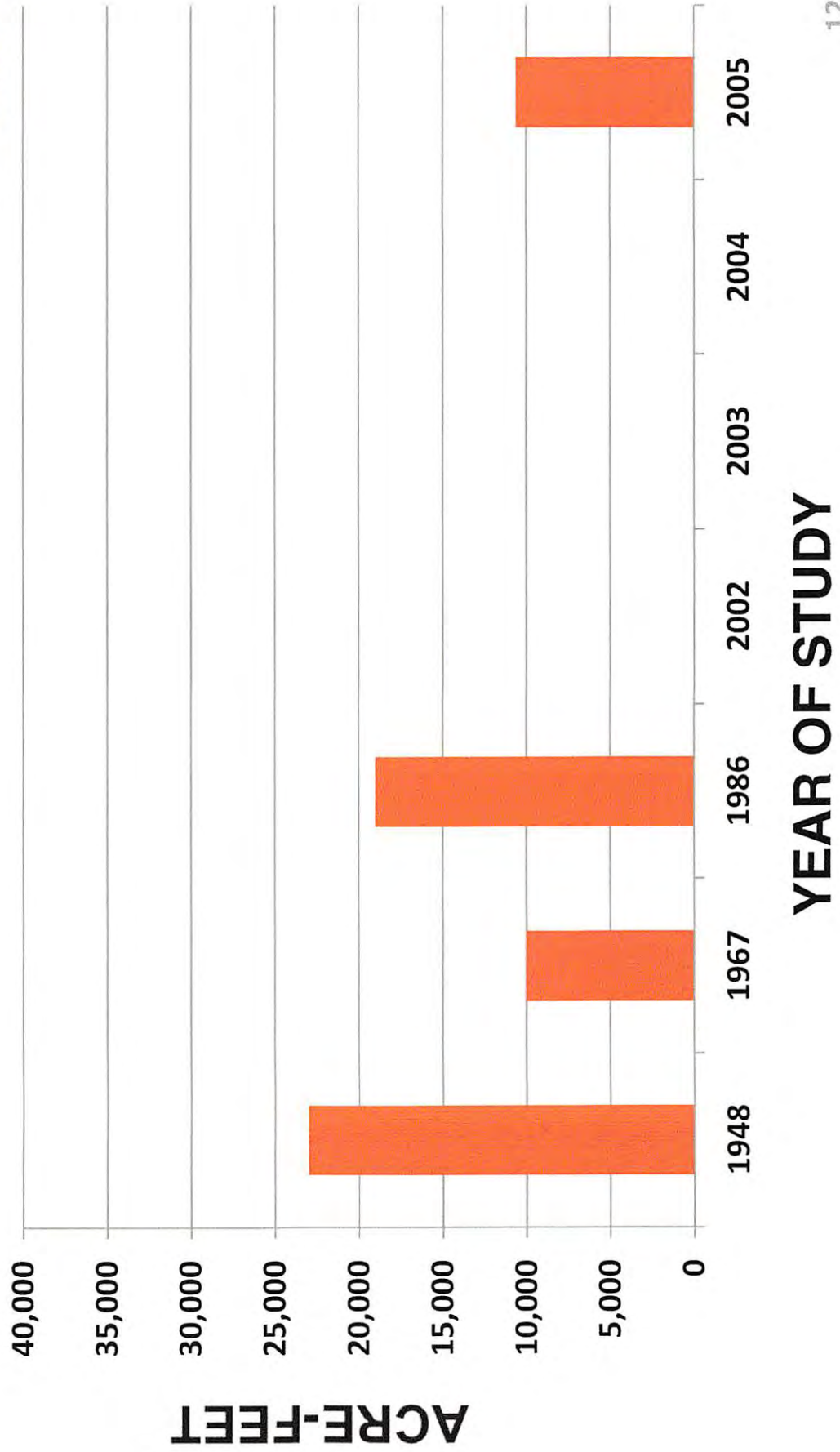


Pahrump Basin Recharge Estimates





Pahrump Basin ET Estimates



Existing Groundwater Rights



<u>Manner of Use</u>	<u>Acre-Feet</u>
Commercial	1,038
Domestic	7,105
Irrigation	15,442
Municipal and QM	38,156
Other	799
Total Water Rights	62,540
Existing domestic Wells = 11,106	5,553
Potential New Domestic Wells = 8,500	4,250
Total Potential Pumpage	72,343

Pahrump Well History



- First well drilled in 1910, (unsuccessful)
- In 1916 there were 28 wells existing, 15 of which were flowing
- Currently there are over 11,000 wells
- Current pumping at 60-year low

Historical Pumping



GROUNDWATER PUMPAGE INVENTORY PAHRUMP VALLEY, NO. 162 2011

IRRIGATION

2442 Ac-Ft

UTILITIES, INC. [Includes Lakeview Golf Course (formerly Executive), Willow Creek Golf Course (formerly Champion), commercial, irrigation, domestic and line losses]

3490 Ac-Ft

COMMERCIAL AND OTHER USES NOT ON UTILITIES, INC.

1179 Ac-Ft

QUASI-MUNICIPAL NOT ON UTILITIES, INC.

504 Ac-Ft

DOMESTIC NOT ON UTILITIES, INC.

5553 Ac-Ft

Domestic wells drilled in 2011 = 7

Domestic wells plugged in 2011 = 1

NO PERMITS OR CERTIFICATES

184 Ac-Ft

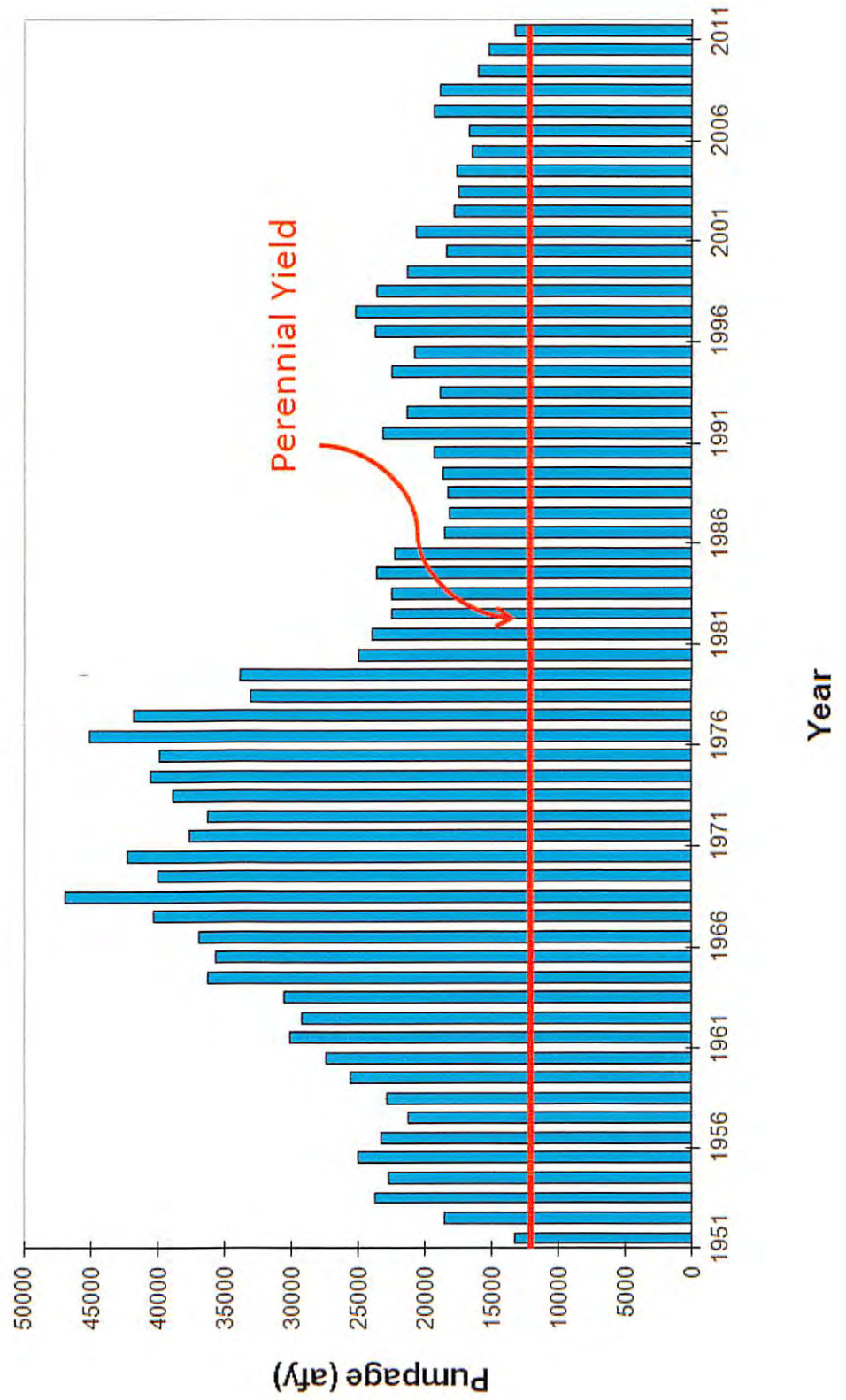
TOTAL 13,352 Ac-Ft

15



Pumping

Pahrump Annual Pumpage



Effects of Over-pumping

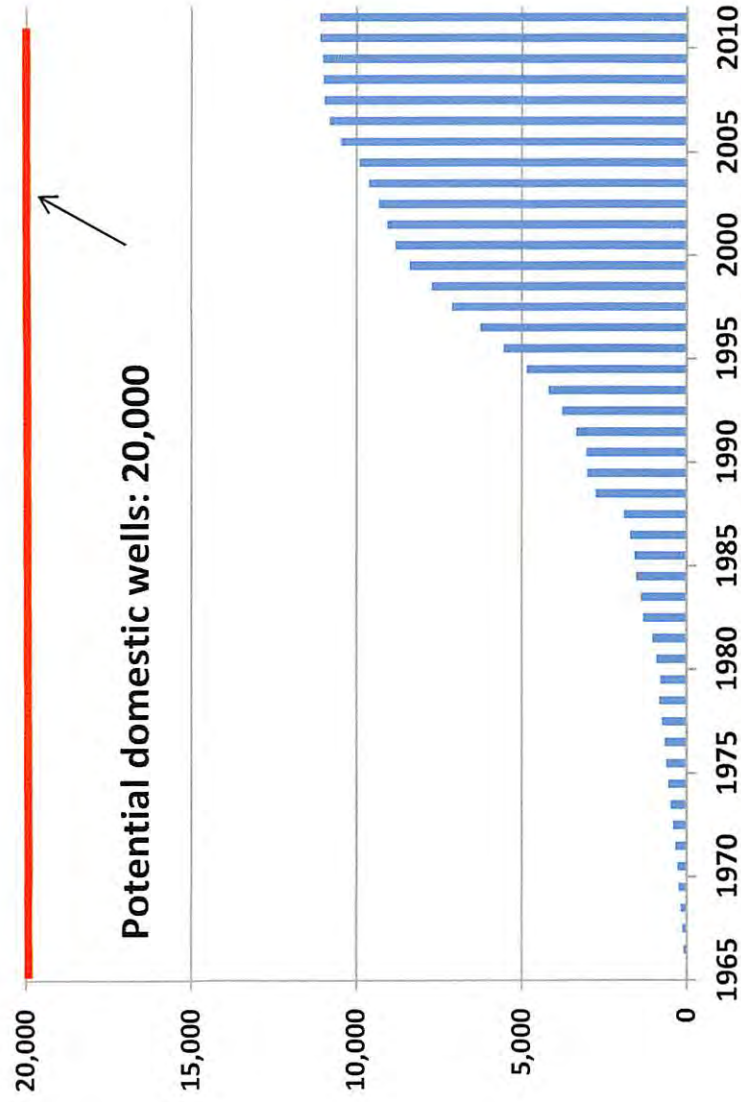


- Excessive water-level decline
 - Increased pumping lifts
 - Dry wells
 - Conflict with existing rights
- Subsidence
- Depletion of aquifer

Domestic Wells

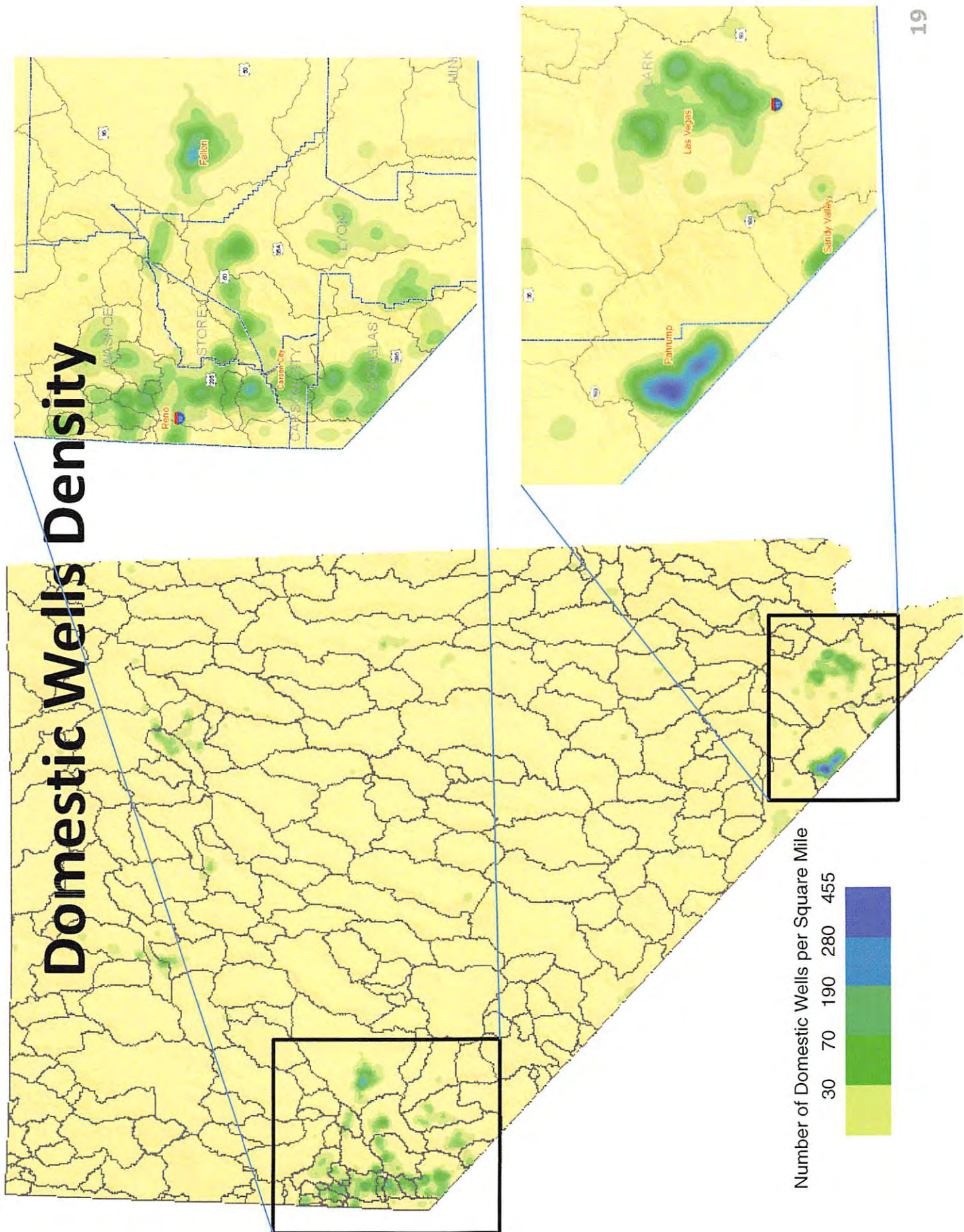


Domestic Wells in Pahrump



- Number of domestic wells increased dramatically from late 1980's to 2005
- More drawdown expected in areas of highest density

Domestic Wells Density



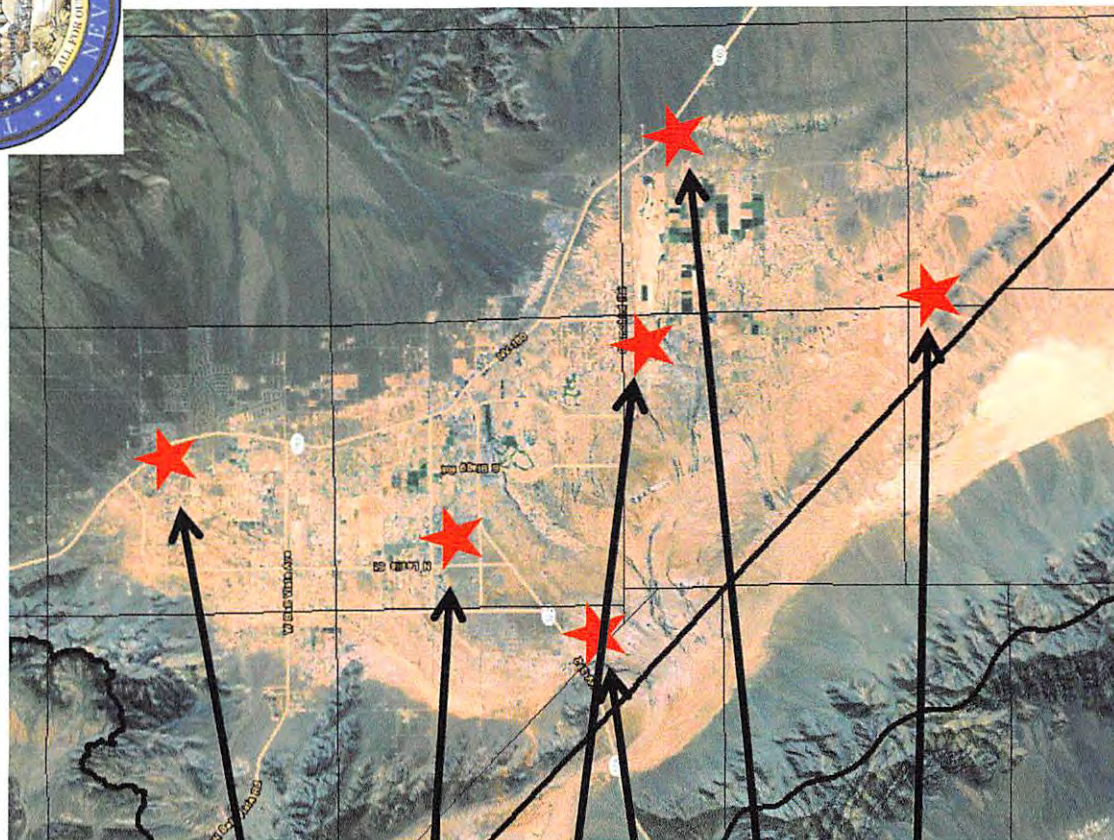
Water Level Trends



- 30 to 60 feet of water level decline across the valley
- Reduced pumpage having positive effects in some areas
- Recovery in wells closer to the fans
- Steady decline to the west and south on valley floor



Water Level Trends



162 S19 E53 15DB 1

T20S, R53E, S17 Comp

T21S, R53E, S12 Comp

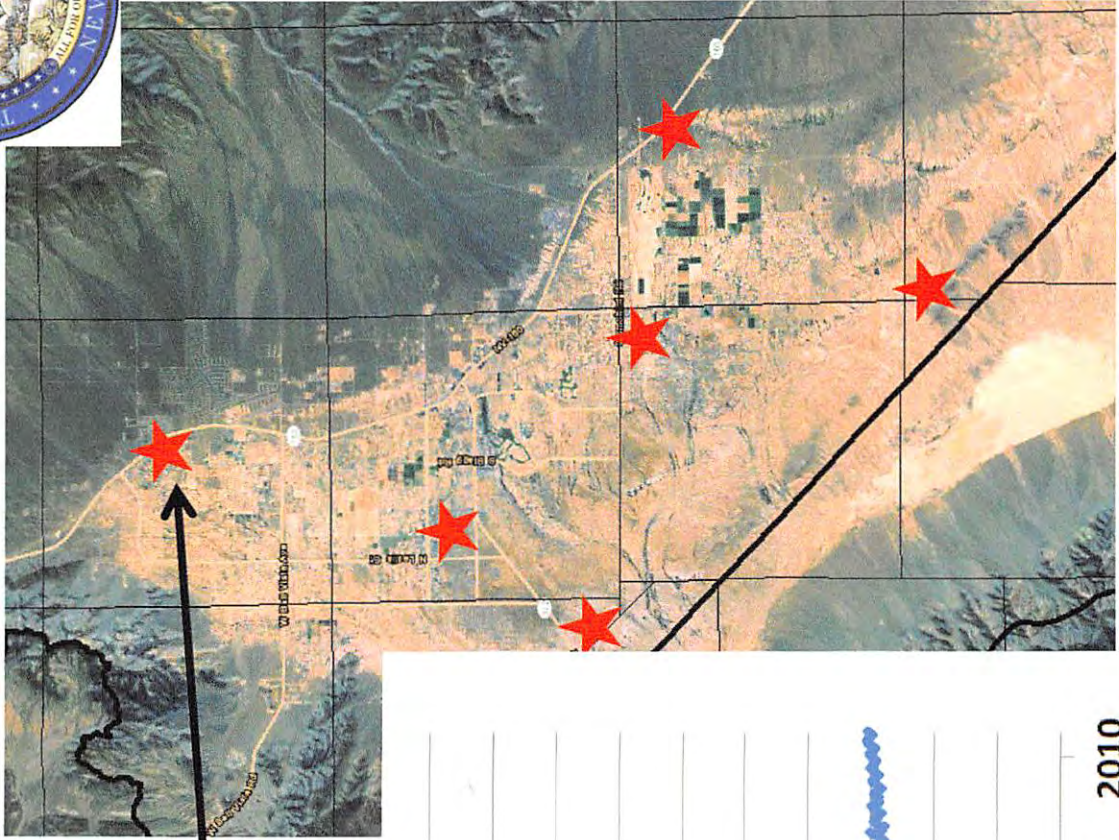
162 S20 E52 36BD 1

162 S21 E54 10AAC 1

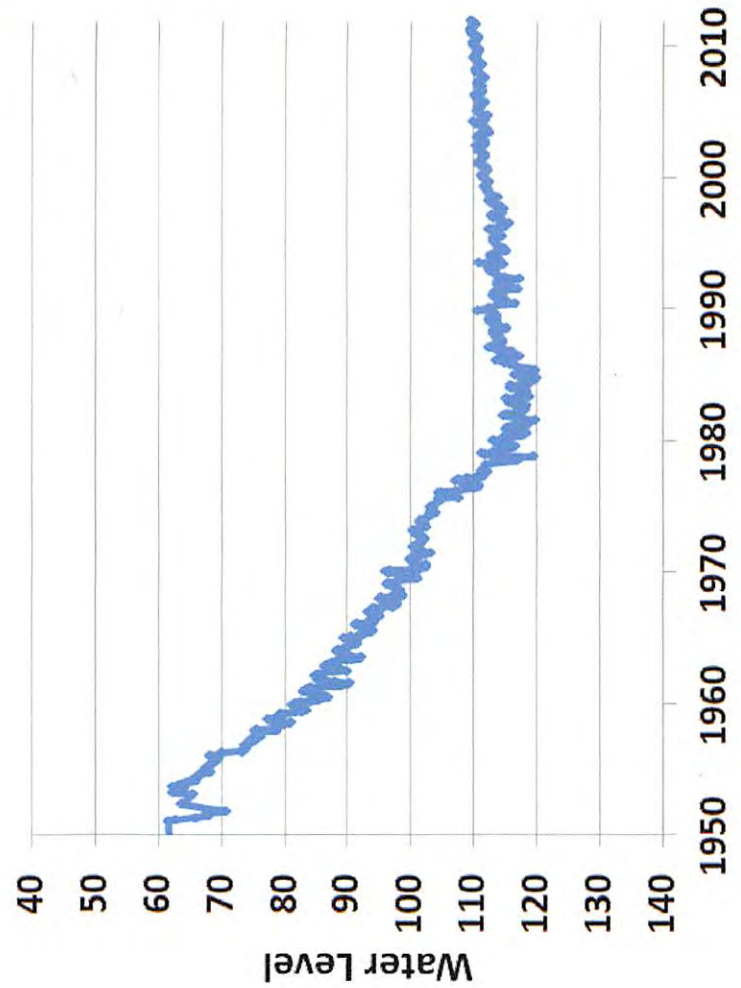
162 S22 E53 01DA 1



Water Level Trends



162 S19 E53 15DB 1



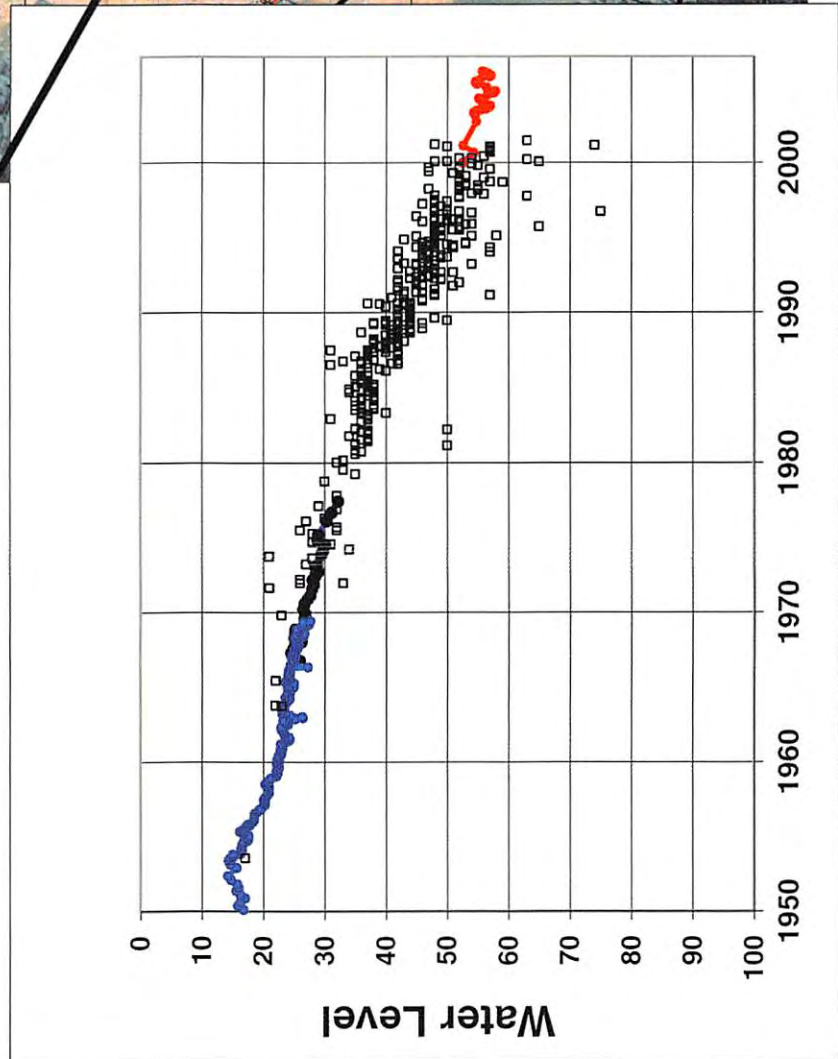
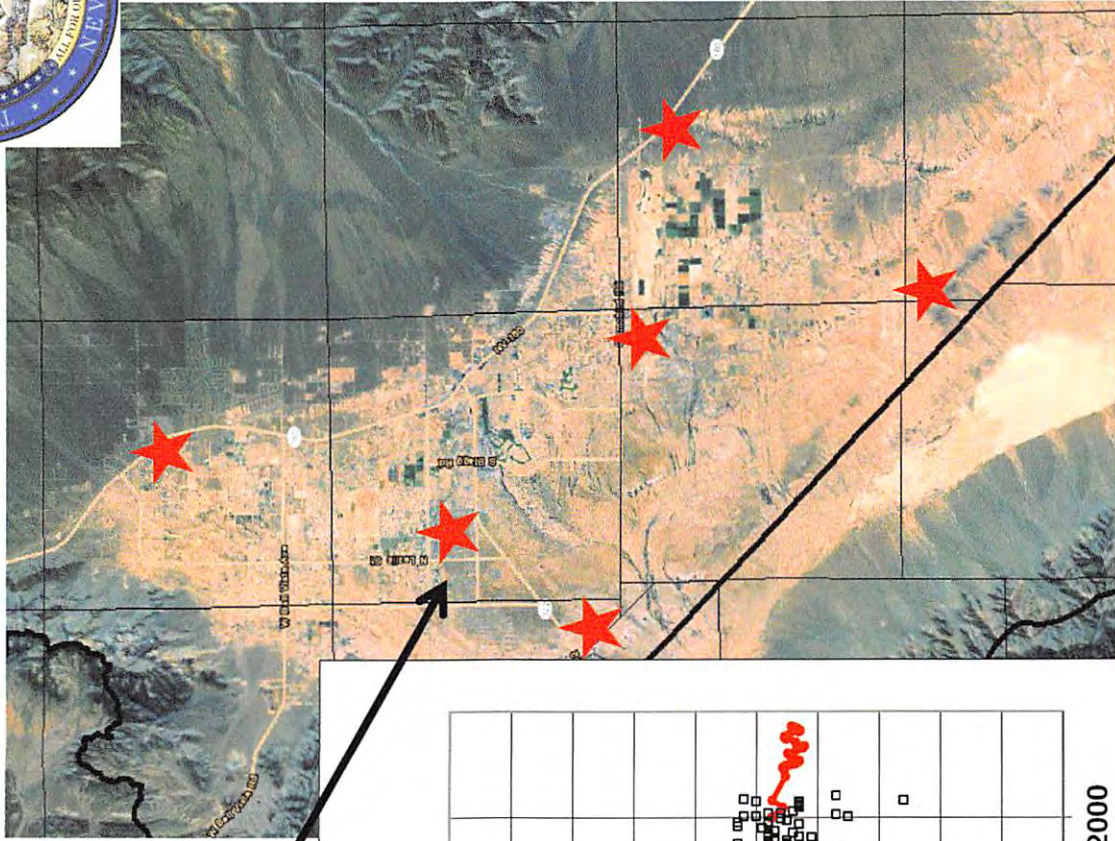
JT APP 1340

SE ROA 1293



Water Level Trends

T20S, R53E, S17 Comp



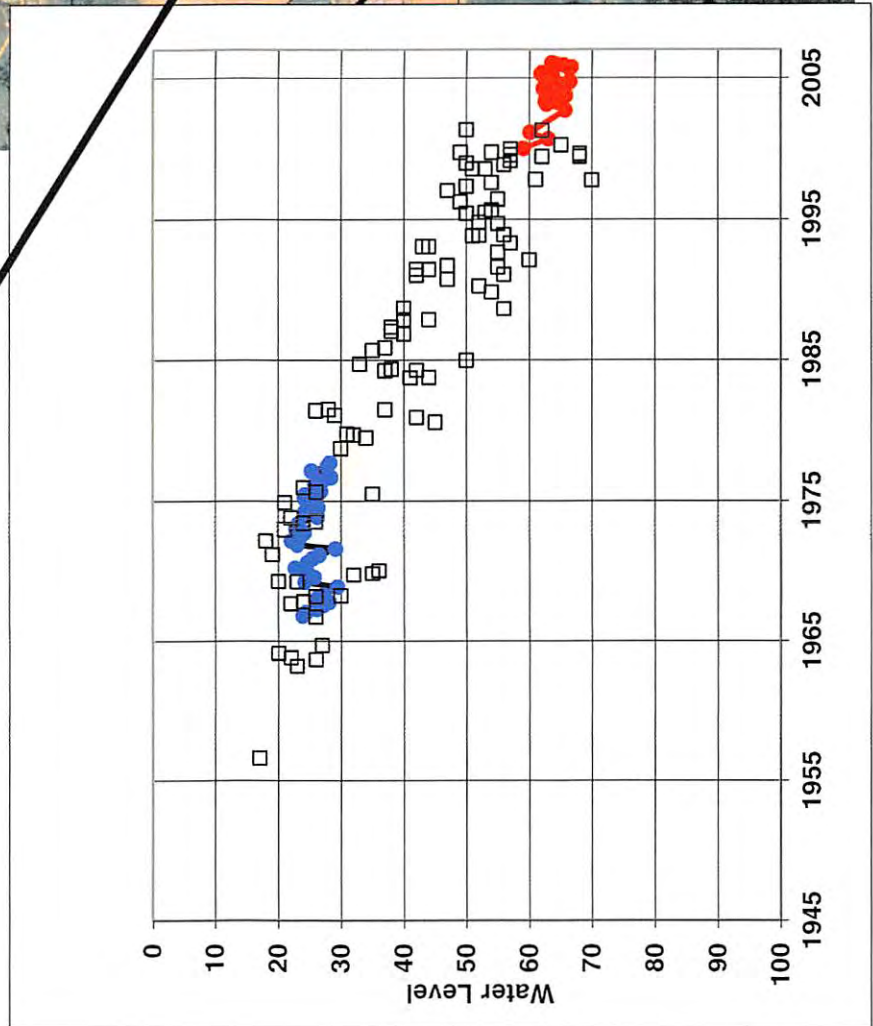
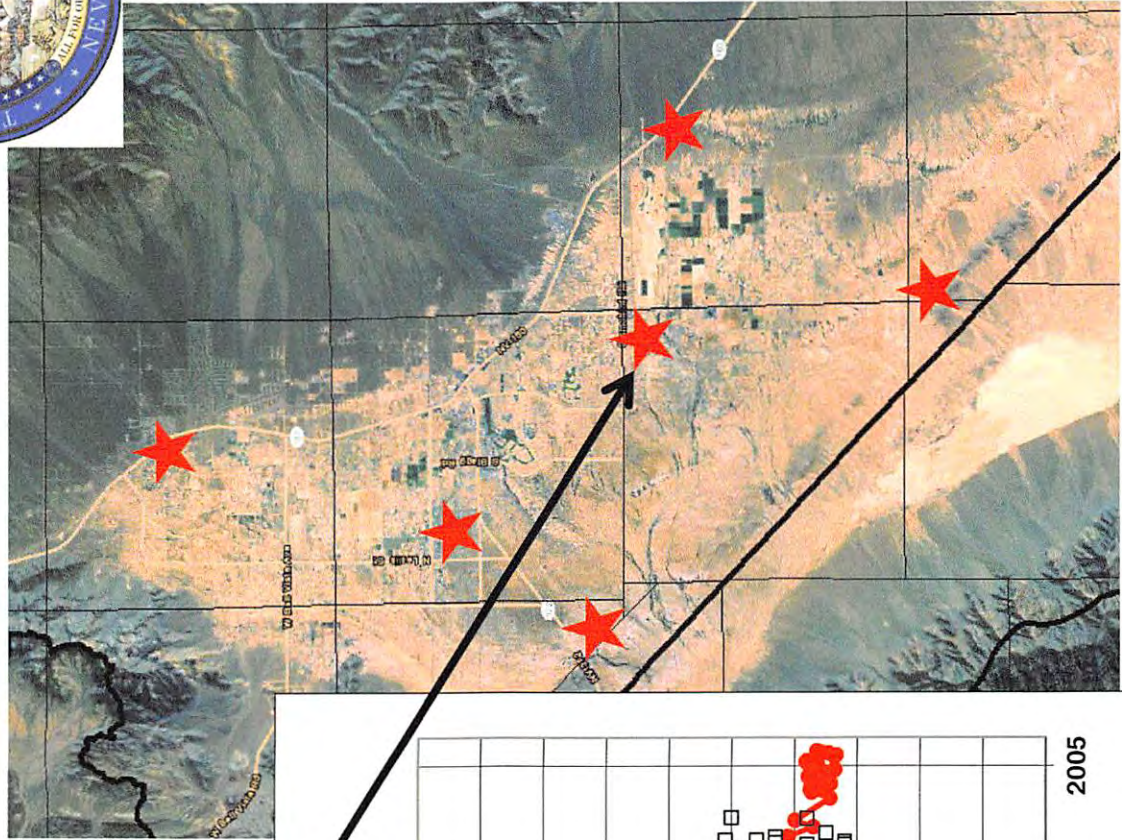
JT APP 1341

SE ROA 1294



Water Level Trends

T21S, R53E, S12 Comp



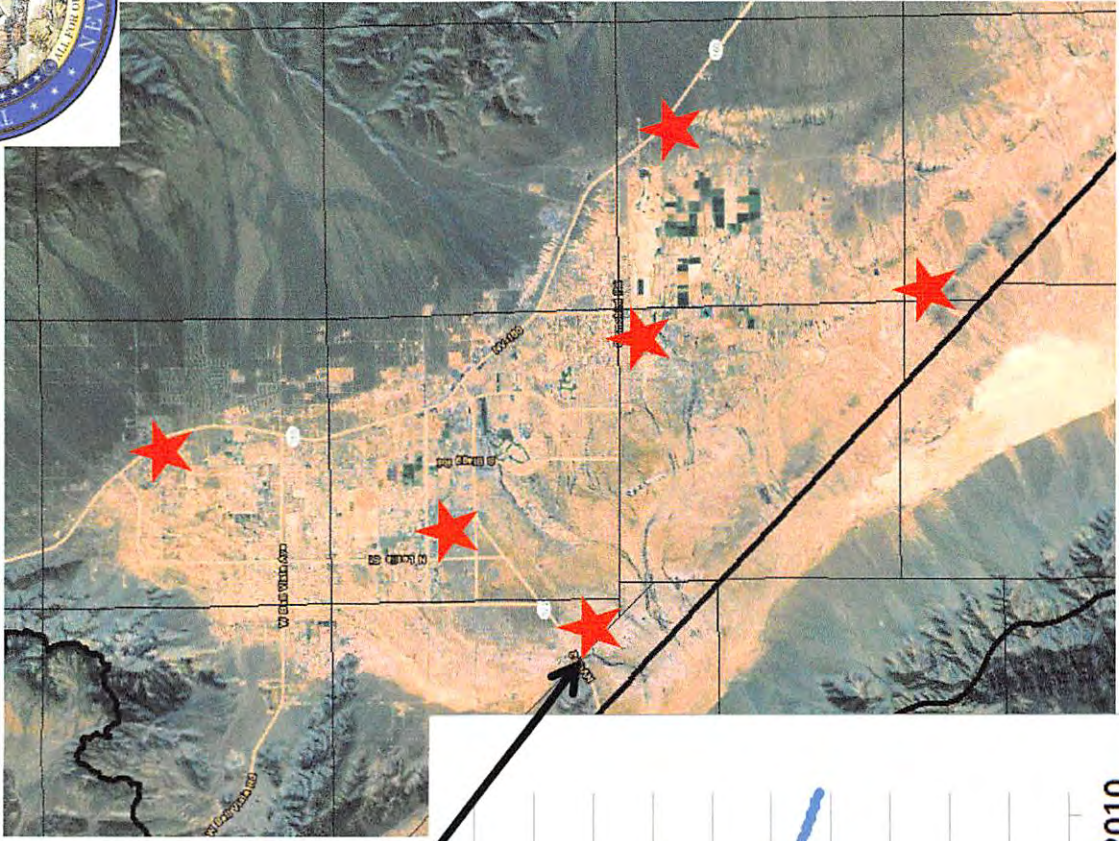
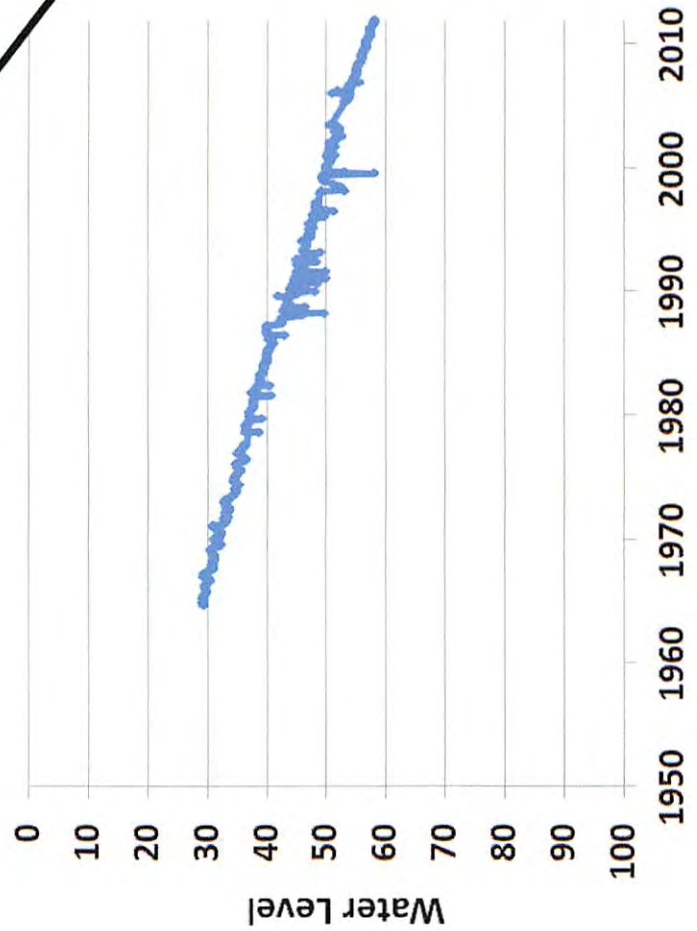
JT APP 1342

SE ROA 1295



Water Level Trends

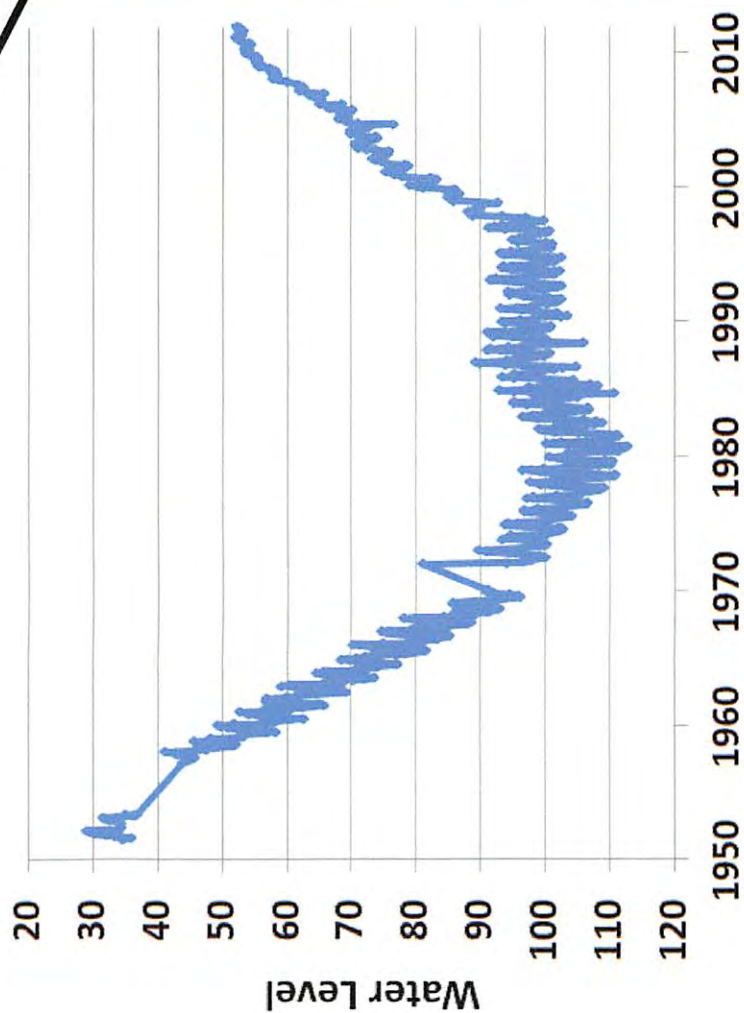
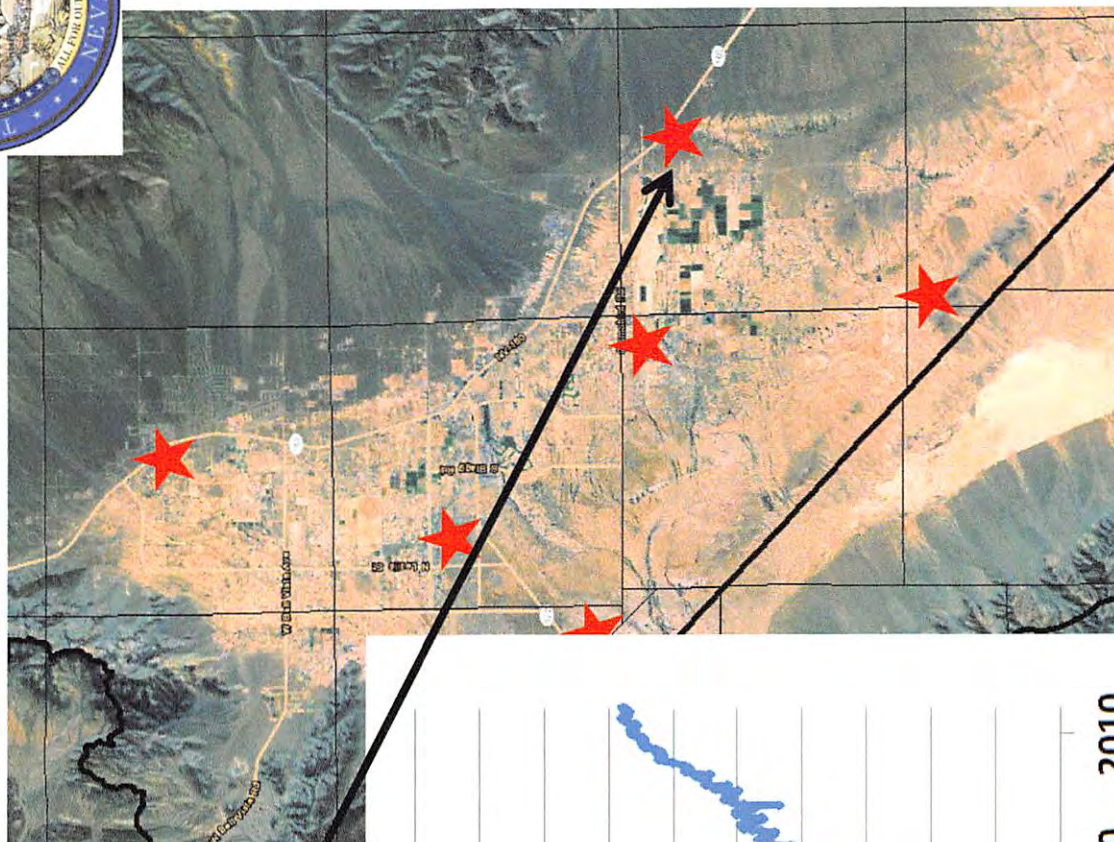
162 S20 E52 36BD 1





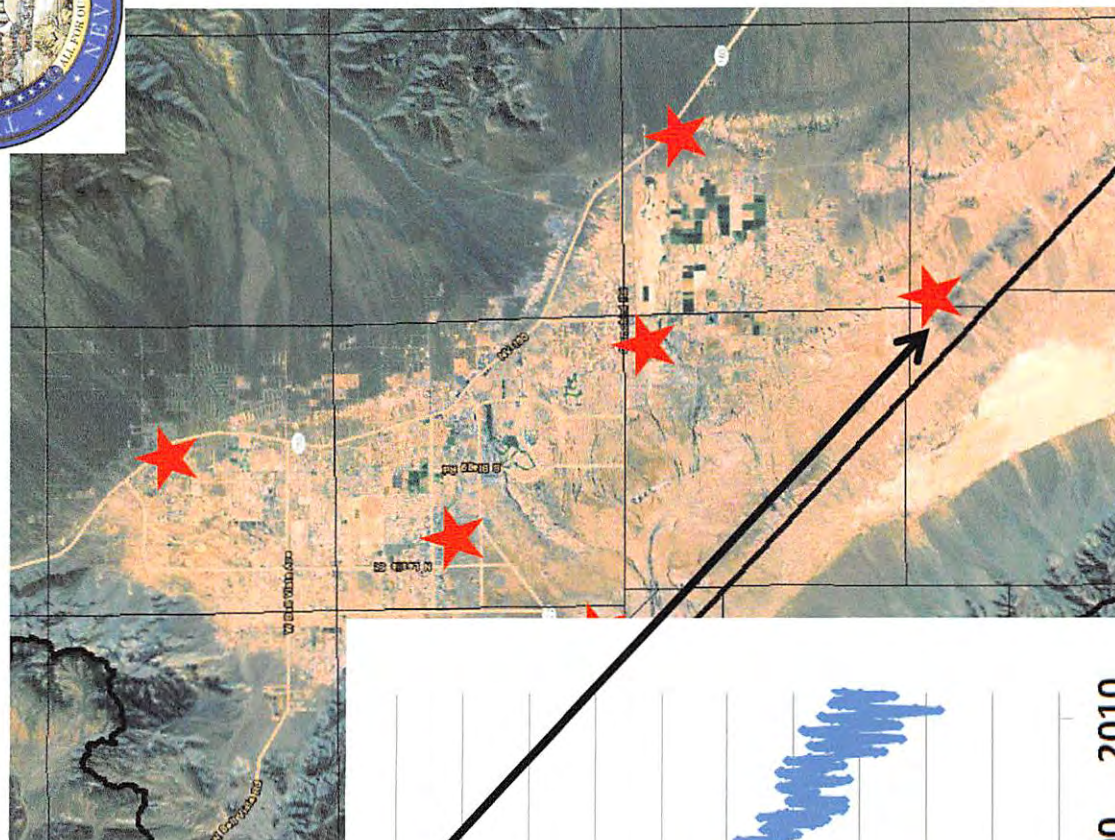
Water Level Trends

162 S21 E54 10AAC 1

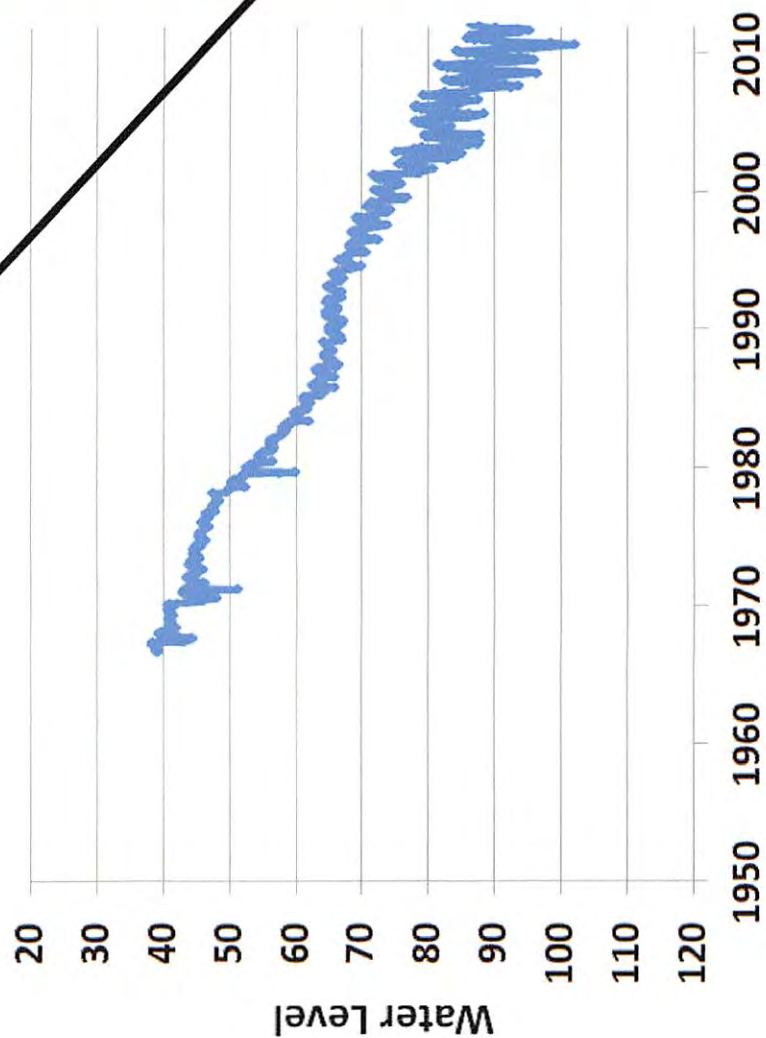




Water Level Trends



162 S22 E53 01DA 1



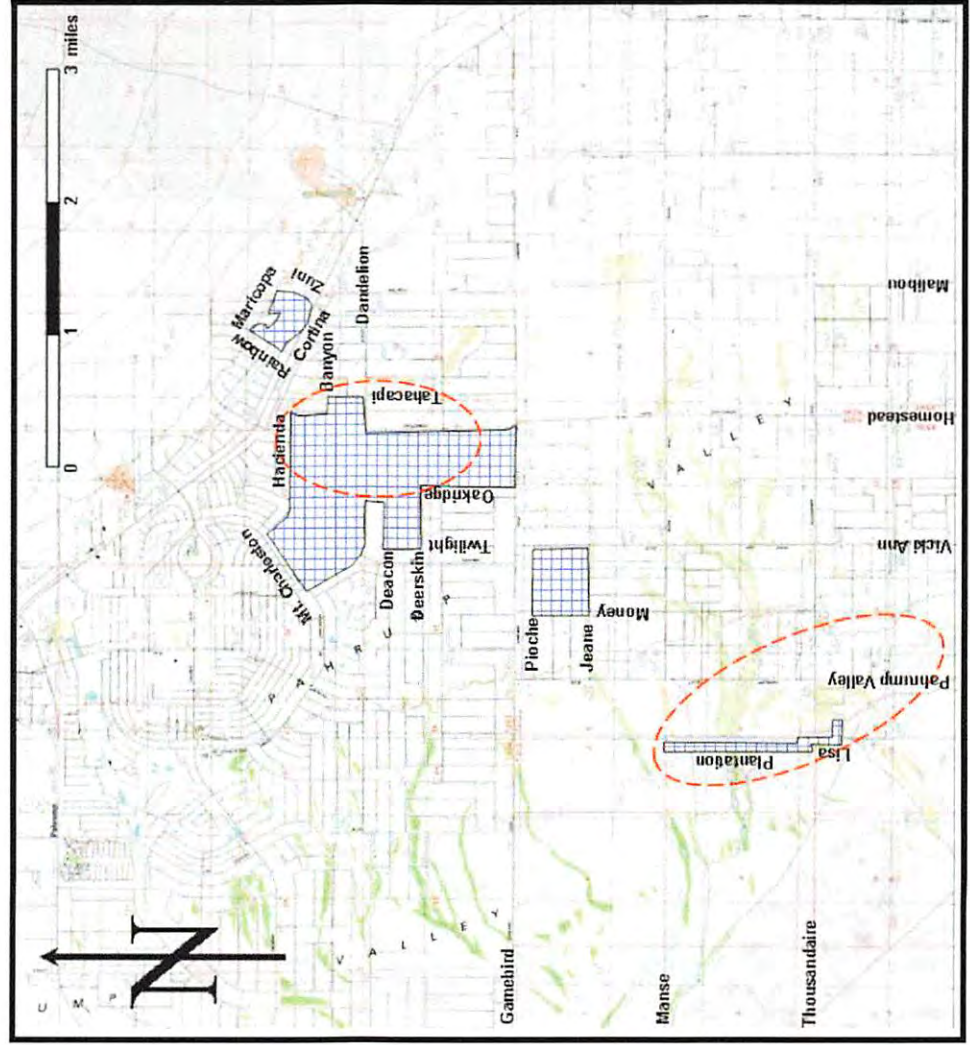
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SE ROA 1298

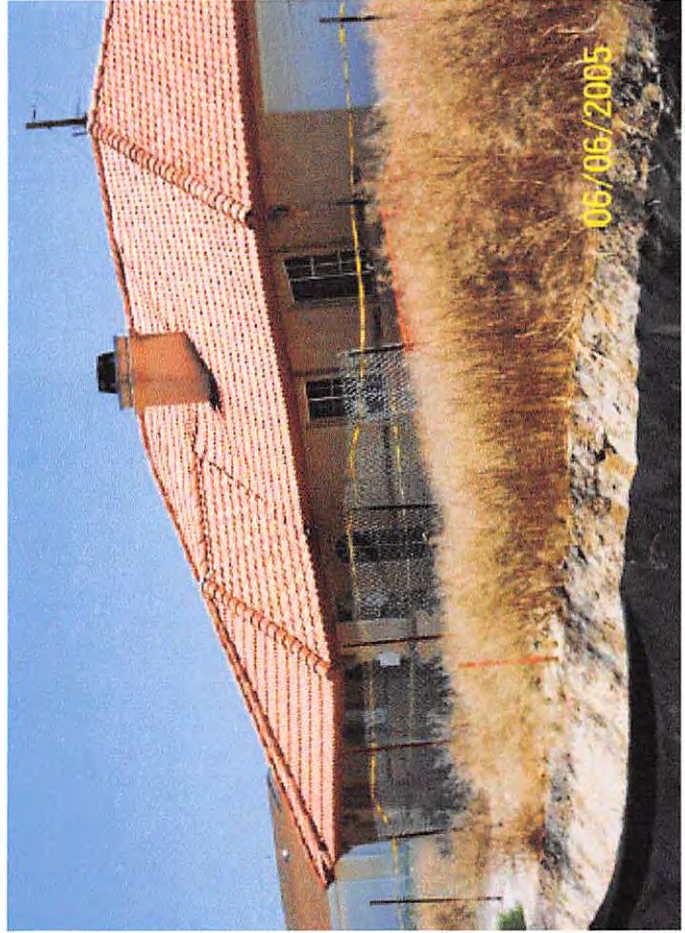
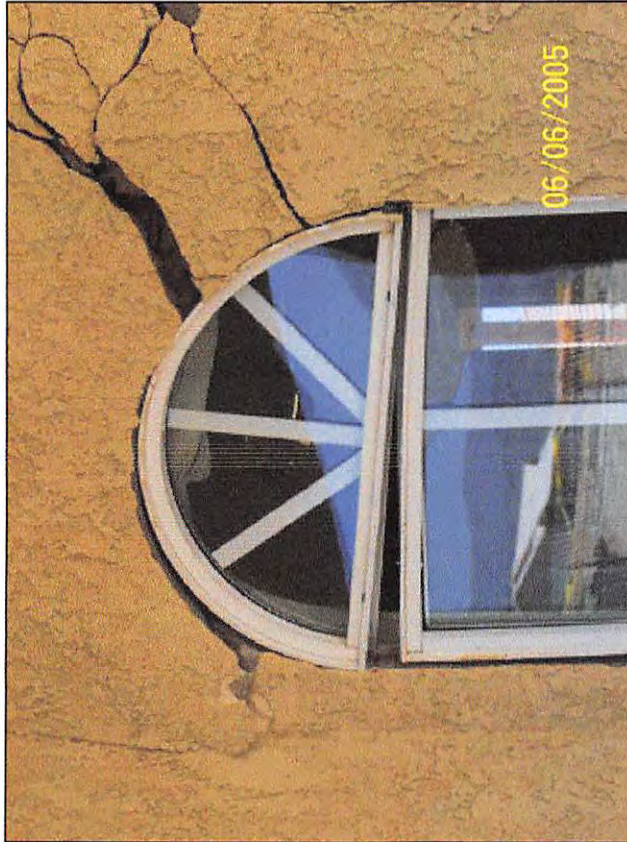
Subsidence



- Two Separate Concerns
 - Regional Subsidence
 - Heavy pumping
 - Water table decline
 - Fine sediments
 - Localized Subsidence and Collapse Features
 - Hydro-collapsible soils
 - Variable compaction
 - Drainage
 - Tectonics/faults

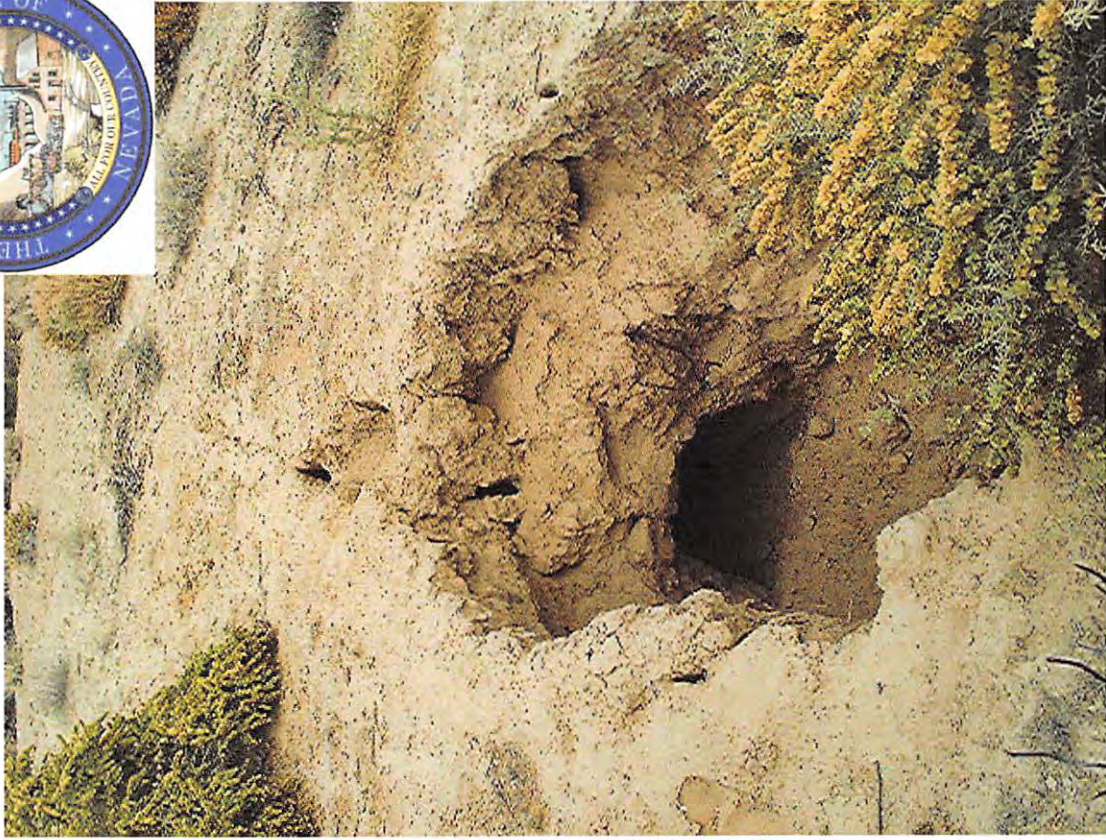
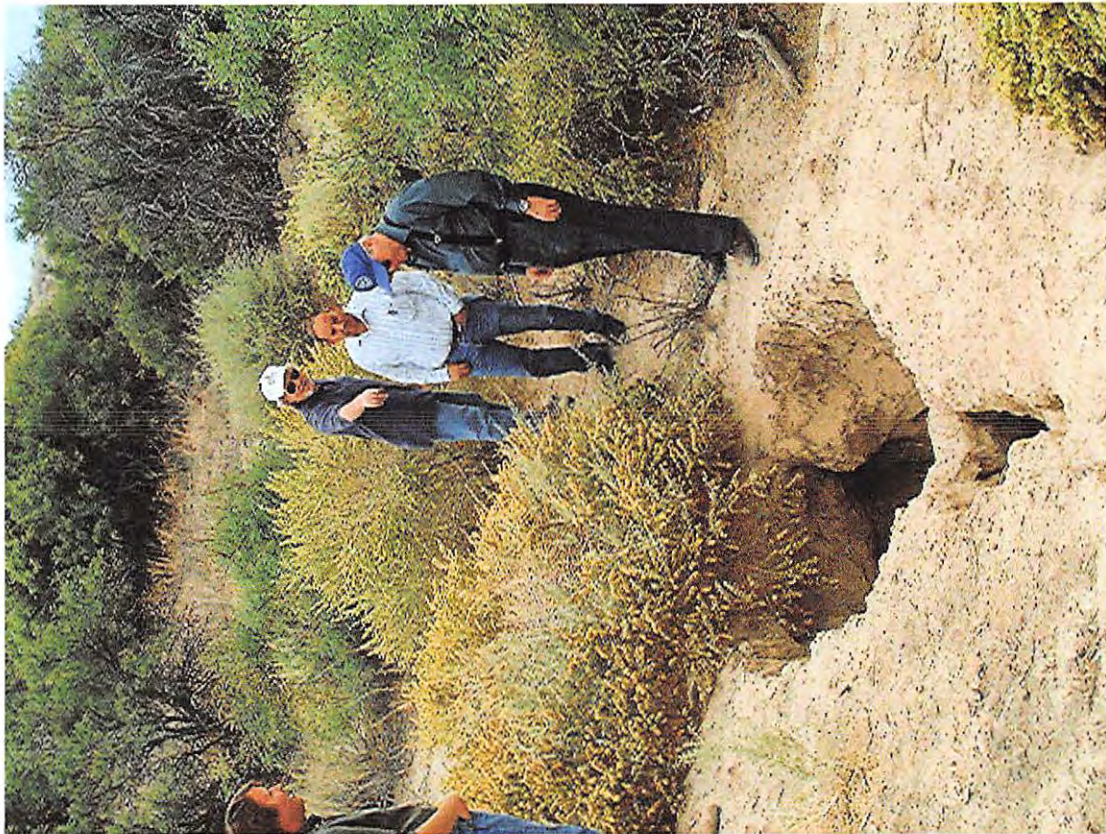


Subsidence Related Problems



Buqo, 2005

Subsidence Related Problems



Pahrump - October 2000

What has the State Engineer done in the Pahrump Basin?

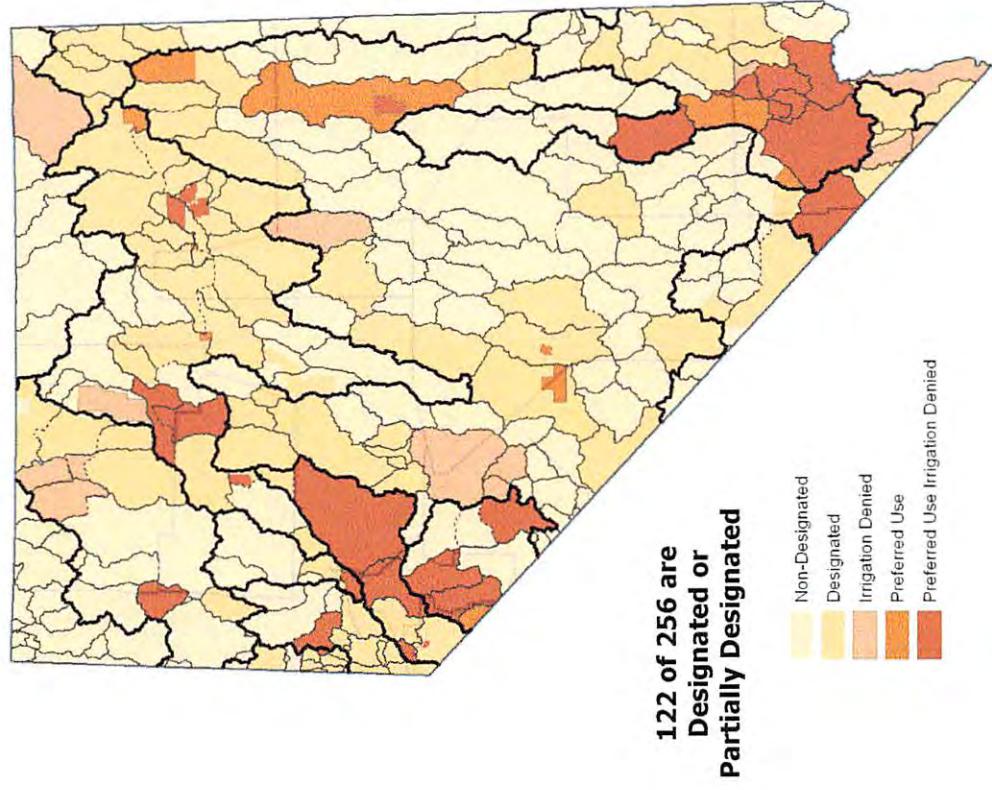


- State Engineer has taken numerous actions to minimize pumping and control drawdown
 - Designated the basin
 - Restricted new permits
 - Restricted transfers from off fan to on fan
 - Required relinquishment or transfer of existing water rights for subdivision approval
 - Recommended against further parceling w/o water right relinquishment
 - Required utilities to acquire water rights in excess of dedication rate
 - Forfeited water rights for non-use

Designated vs. Non-Designated

Ground-Water Basins

- Designating a basin enables the State Engineer to impose additional conditions and restrictions on water use.
- A designated basin is not necessarily closed to additional appropriations. Preferred uses of water may be allowed; e.g., commercial, industrial, typically for minimal amounts.



Designation of Pahrump Valley



- The authority for the State Engineer to designate groundwater basins in need of further administration is granted under NRS 534.030
- State Engineer designation orders in the basin and subsequent expansion of the area:
 - Order No. 176 1941
 - Order No. 193 1948
 - Order No. 205 1953

Designation of Pahrump Valley



- NRS 534.120 allows the State Engineer to make additional rules and regulation:
 - Order No. 206 (1953) required measuring devices on wells
 - Order No. 381 (1970) no new appropriations for irrigation
 - Order No. 955 (1987) restricted new appropriation to valley floor and 5,000 gpd
 - Order No. 1107 (1994) further limited appropriations to small commercial and industrial (non-living) to 1,800 gpd
 - Order No. 1183 (2007) domestic well credit



What are the Options?

- Do nothing
- Administer basins by priority date NRS 534.110 (6)
 - ...where it appears that the average annual replenishment to the ground water supply may not be adequate for the needs of all permittees and claimants, and if his findings so indicate, the State Engineer may order that withdrawals be restricted to conform with priority rights.
- Call for Proofs of Beneficial Use
- Designate the basin as a **critical management area** pursuant to NRS 534.110(7)



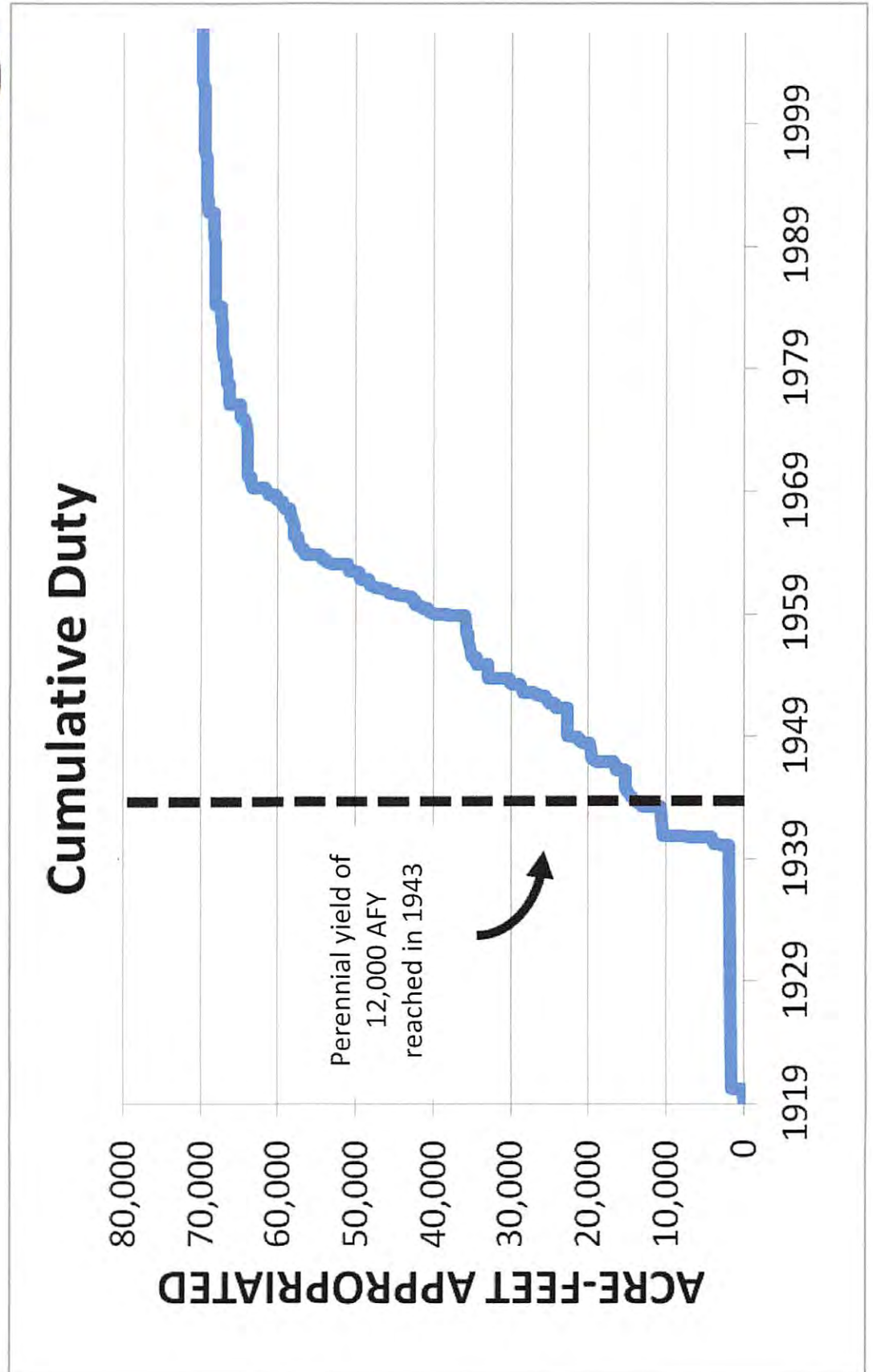
Regulation by Priority

What does administering the valley on a priority date basis mean?

- Groundwater pumping in the valley would be limited to the annual perennial yield of 12,000 acre-feet.
- Water rights with priority dates later than 1943 would be subject to regulation.
- Domestic Wells have a “priority” of the date they were drilled, and would have similar restrictions (NRS 534.080), and almost all were drilled after 1943.



Groundwater Rights by Priority





Call for Proofs of Beneficial Use

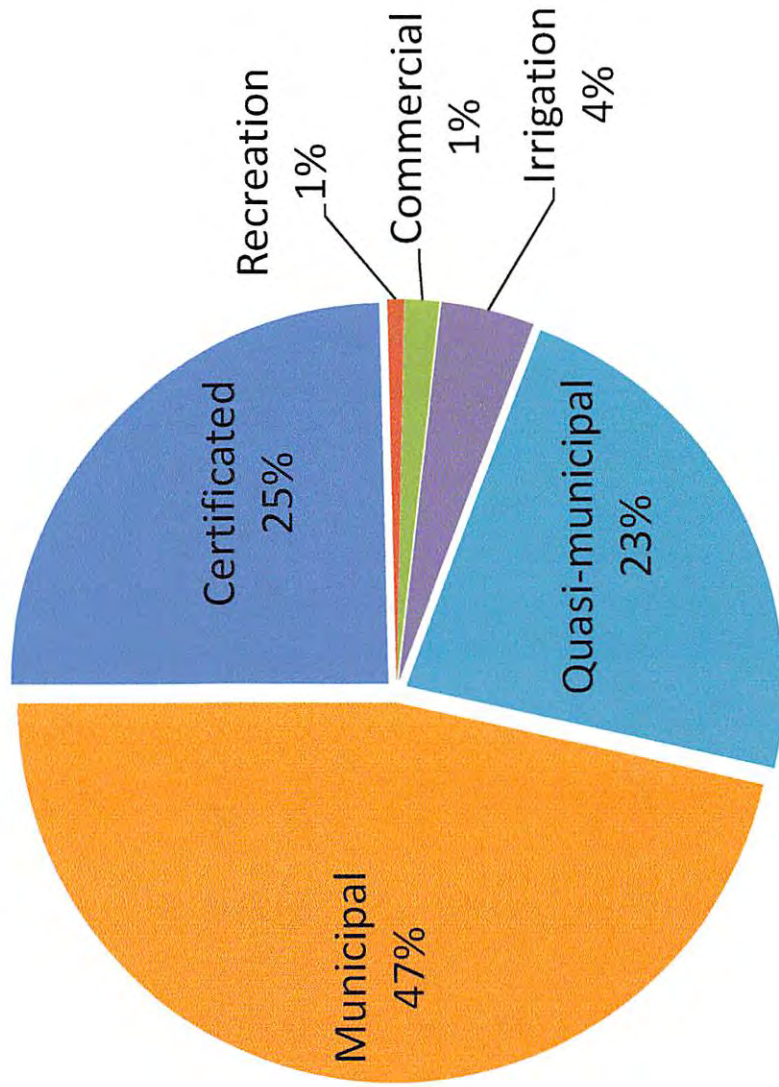
What does a call for beneficial use mean?

- A permit is not perfected until it is certificated.
- Permits are typically not certificated until full permit duty is pumped.
- A call for beneficial use means the Permittee must submit pumpage records for whatever has been pumped.
 - The permit will be certificated for the amount pumped even if it is not full permit duty.
 - The difference between the permit and certificated duty will be returned to groundwater source.

Call for Proofs of Beneficial Use



Water Right Duty by Manner of Use



Critical Management Area



NRS 534.110(7) The State Engineer:

- a) May designate as a critical management area any basin in which withdrawals of groundwater consistently exceed the perennial yield of the basin.
- b) Shall designate as a critical management area any basin in which withdrawals of groundwater consistently exceed the perennial yield of the basin upon receipt of a petition for such a designation which is signed by a majority of the holders of certificates or permits to appropriate water in the basin that are on file in the Office of the State Engineer.



Critical Management Area

NRS 534.110(7):

The designation of a basin as a critical management area pursuant to this subsection may be appealed pursuant to NRS 533.450. If a basin has been designated as a critical management area for at least 10 consecutive years, the State Engineer shall order that withdrawals, including, without limitation, withdrawals from domestic wells, be restricted in that basin to conform to priority rights, unless a groundwater management plan has been approved for the basin pursuant to NRS 534.037.



Groundwater Management Options

- Heavily dependent on future growth
- Address domestic well issue
- Retirement of existing rights
- Interconnection of systems
- Consolidation of utilities
- Distribution of production wells
- Increased dedications for parceling and subdivisions
- Ordinance requiring xeriscaping
- Import water from other basins
- Use a groundwater flow model as a planning tool
- Develop water in other parts of the valley



Summary

- The problem isn't going away.
- Stakeholders (Pahrump, Nye County and State Engineer's Office) need to ACT NOW.
- Best interest of stakeholders to be an integral part of the solution - not wait for State Engineer's office to begin regulating on priority.
- Domestic wells need to be addressed – city, county and state statutory changes?
- Critical Management Area designation needs to be seriously considered.



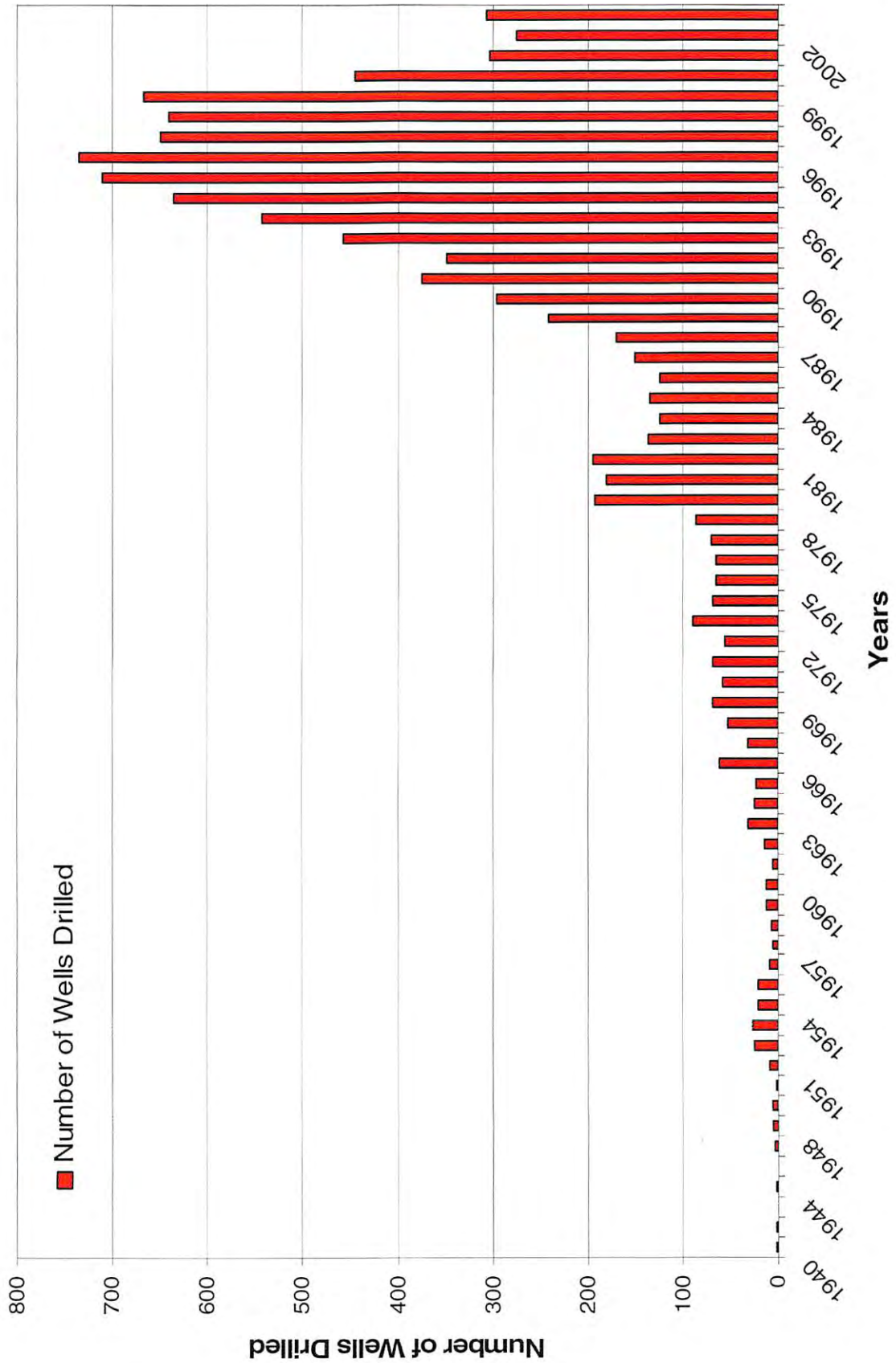
**State of Nevada
Division of Water Resources
Office of the State Engineer**

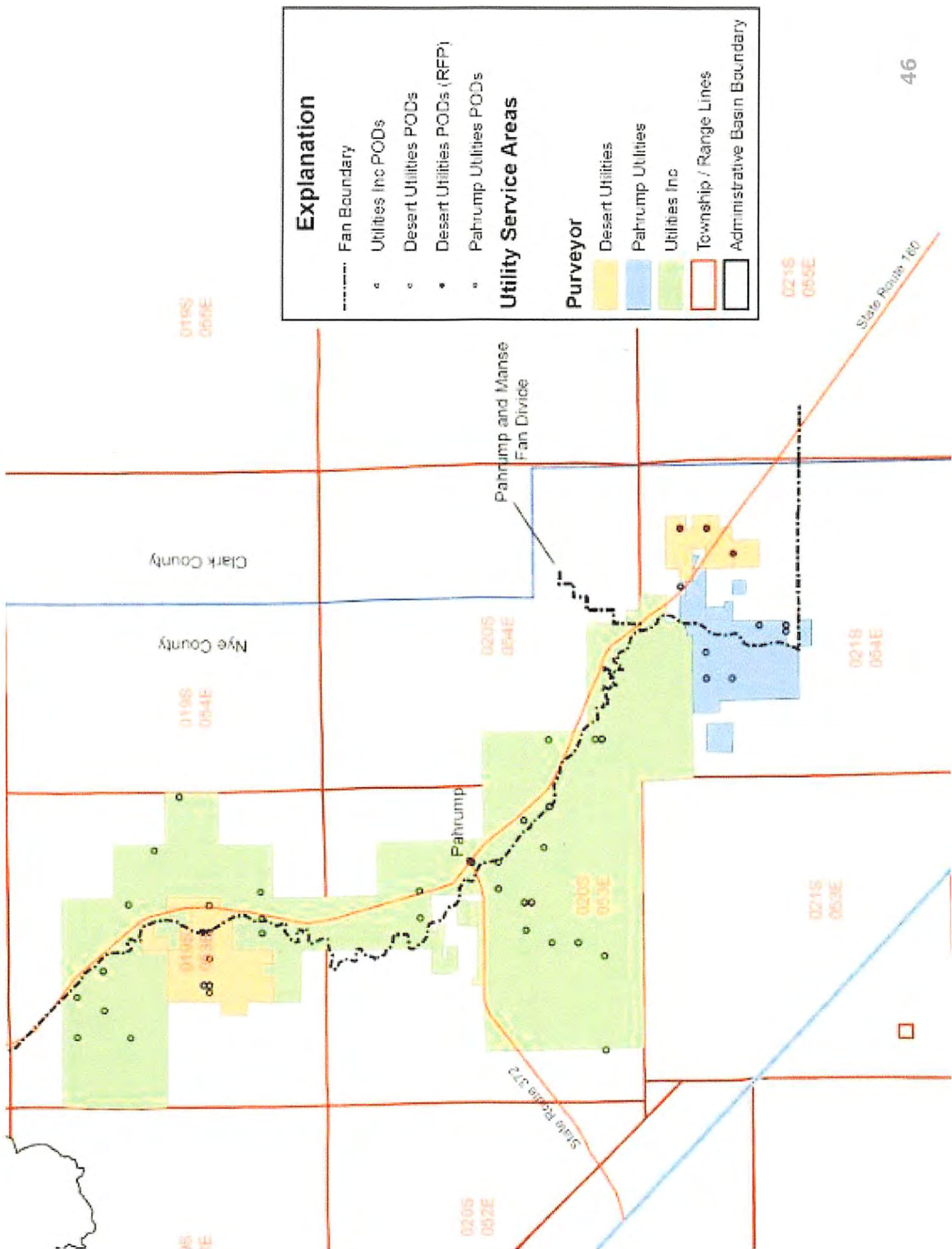


**Thank You
Questions?**

**Visit us on the Web
<http://water.nv.gov>**

Number of Wells Drilled Annually in Pahrump Valley







Nye County Water District

2101 E. Calvada Blvd. Ste., 100 • Pahrump, Nevada 89048
(775) 727-7727 • Fax (775) 727-7919

Dec 11, 2016

Jason King, State Engineer
Division of Water Resources
901 South Stewart Street, Su. 2002
Carson City, Nevada, 89701

RE: Items of critical concern for achieving a water balance in Basin 162.

Dear Jason,

A significant portion of our ability to balance the amount of water rights on the books versus available water resources centers on the discussion of the following items.

- 1.) Forfeitures and cancellations (attrition).
- 2.) Over dedication of water rights in support of development projects.
- 3.) Water conservation.
- 4.) Limiting the propagation of domestic wells in perpetuity in Basin 162 without pulling from water rights currently on the books.

Attrition: After review of the records for cancellations and forfeitures; we have determined that over 16,000 acre feet of water rights have been canceled or forfeited in the past 30 years. We request that your offices continue to provide critical review of water rights for non-use and extensions of time. We are aware that this trend will slow as water rights become more valuable, but the fact remains that this effort has made a significant impact to over appropriation in the basin.

Over Dedication: Over dedication of water rights in support of development projects [water rights dedication in excess of predicted usage] has reduced expected pumpage by over 6,400 acre feet to date. On April 25, 2016 the Nye County water district sent you a request to issue an Order for Basin 162 securing dedicated water to specified lands in perpetuity. An excerpt from the request reads: *"The Nye County Water District Governing Board is formally requesting that you do not allow dedicated water rights to be moved [change of the Place of Use by Change Application] in support of new [more] development and we request your continued assistance in applying this tool to future commercial projects and other development. Please issue an Order or take other documented administrative action to clarify this important issue. Further, we are requesting that this action should include past, present and future water rights dedicated in support of development."* After review of water rights in the basin that are not yet committed to development projects, and as supported by the staff report attached to this correspondence, we are reaffirming this request.

Water Conservation: A Water Conservation Plan for new construction has been adopted by the Nye County Board of Commissioners and is attached to this correspondence for your consideration. The staff report attached to this correspondence provides an estimate of a 15% water efficiency gain by the year 2065. This equates to an estimate of 2700 acre feet reduction in potential pumpage as a result of adoption of this plan. Nye County and Nye County Water District are currently working on practical methods for enforcement.

Domestic Wells: Domestic wells total more than 11,000 drilled to date in Basin 162. Using an estimated average use of 0.5 acre feet each accounts for approximately 28% of the pumpage in the basin at this time. Adding 8500 new domestic wells by the year 2065 increases potential pumpage to 49% of the total perennial yield [8500 additional domestic wells equates to 4,500 acre feet of pumpage]. Should the State Engineer allow new domestic wells to be drilled without relinquishment of water rights [in perpetuity] a water balance cannot be achieved for the basin. When considering that Nevada is a priority doctrine state and taken together with the implications of NRS 534.080 and under a potential curtailment order; propagation of domestic wells in perpetuity places your offices in the position to limit withdrawals of not only new domestic wells but the majority of those currently in use.

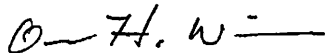
NRS 534.080.4: The date of priority for the use of underground water from a well for domestic purposes where the draught does not exceed 2 acre-feet per year is the date of completion of the well as:

(a) Recorded by the well driller on the log the well driller files with the State Engineer pursuant to NRS 534.170; or

(b) Demonstrated through any other documentation or evidence specified by the State Engineer.

As such, the Nye County Water District is requesting that you issue an Order requiring relinquishment or dedication of water rights for new domestic wells. In addition, we are requesting that existing domestic wells are expressly exempt from the Order. This exemption should include existing domestic wells that require any type of rehab, refurbishment, deepening or replacement.

Sincerely,



Oz Wichman
General Manager
Nye County Water District

List of attachments:
Staff report with tables.
Nye County Bill 2017-06.

Approved by the Nye County Water District Governing Board members on DEC. 11, 2017.

Dave Hall X Yea _____ Nay _____ Absent

Dennis Gaddy X Yea _____ Nay _____ Absent

Richard Carver _____ Yea X Nay _____ Absent

James Weeks X Yea _____ Nay _____ Absent

Joe Westerlund _____ Yea X Nay _____ Absent

William Knecht X Yea _____ Nay _____ Absent

Walt Kuver X Yea _____ Nay _____ Absent

DWR Table 10-4 - Water Rights Commitments Estimate for Future Conditions (2065) (Less optimistic scenario)

Water Rights		AFA	Source
1	Committed Underground	51,372	NDWR, Aug 2017 Basin Summary Minus Domestic Well Relinquishments (7,809 AF)
2	Domestic Wells (non-permitted)	9,770	NDWR 2015 Domestic Well estimate plus 8,500 additional lots to be developed, based on current parcels; and an estimate of 0.5 AFA pumped per well
3	Decreed Right for Manse Spring (Potential Mitigation Right)	2,173	Needs to be included due to potential for claim for mitigation rights
4	Subtotal: Committed Underground Water Rights, Springs, Domestic Wells	63,315	Sum Rows 1 to 3
5	Projected Over Dedication - Subdivisions - Commercial Projects	22,669	NCWD/NDWR estimate of: Current subdivision over-dedication of 6,436 AF, plus additional relinquished of 5,101 AF (conversion of AG AF to M&I at 3:1, with 2000 AF remaining in AG), plus 11,132 AF relinquished for projects (1/2 of 22,264 AF water rights held by utilities not yet committed to projects by public record) Aug 2017 data
6	Adjusted Water Right Commitment	40,646	Row 4 minus 5
7	Unaccounted Septic System Return Flow	3,512	Section 8, of Shaw report
8	Unaccounted Agricultural Return Flow	300	15% of AG water rights, assuming 2000 AF remains in AG
9	Adjusted Water Right Commitment to Consumptive Use	36,834	Row 6 minus the sum of 7 and 8
10	Potential Recharge Credit	1,600	Recharged treated effluent
11	Potential Return Flow Credit from Reuse	0	Reuse not included, return flows would not exist
12	Potential AR Recharge Credit for Flood Control Basins	500	Section 7, Shaw report
13	Potential AR Credit for Manse Spring (50-year average)	0	Manse spring may dry again
14	Retirement of Manse Spring Rights	0	To remove mitigation right appropriation or claim
15	Adjusted Water Right Commitment to Consumptive Use plus Water Resources Management Strategies	34,734	Row 9 minus the sum of 10 thru 14
16	Perennial Yield	20,000	NDWR, Order 1252 (2015)
Net Potential Over-Allocation (rounded)		14,734	Row 15 minus 16
Net Potential Over-Allocation is defined as: "Pumpage over the 20,000 AF PY that can be expected by 2065". The primary goal of the GWMP is to reduce this number to 0 (zero).			
Reduction of 14,734 AFA [Potential over-pumpage by 2065]			
1	DWR Order - Future domestic wells require relinquishments	4250	Assumes 8500 future domestic wells at expected pumpage of 0.5 AFA each
2	Attrition due to forfeiture and cancellation of water rights over the next 50 years	1000	Assumes 95% of the water rights on the books will still be active in 2065. Is appx 3000 AF of forfeiture divided by 3 to account consistently for 1 AF used and 2 AF over-dedicated or relinquished
3	Impact of Water Conservation over the next 50 years	2700	Assumes a 15% gain in water use efficiency on all pumpage by 2065 except 2000 AF in Agriculture - outdoor use only
NET REDUCTION SUBTOTAL OF LINES 1,2,3		7950	Sum of lines 1 to 3
Potential pumpage OVER the 20,000 AF PY (DEFICIT)		6,784	14,734 minus the sum of lines 1 through 3. Multiply by 2 to 3 to express as water rights.

STAFF REPORT – BASIN 162 GWMP – DEC. 2017 – Prepared by O. Wichman

The full Ground Water Management Plan with appendices can be accessed online at:

http://nyecountywaterdistrict.net/attachments/File/documents/GWMP_Draft_6_Stage_1_October_2015.pdf

The report prepared by Shaw Engineering titled: Pahrump Groundwater Plan Evaluation in Regards to Identifying Projects for Preliminary Engineering Reports can be accessed online at:

http://nyecountywaterdistrict.net/attachments/File/documents/reports/Pahrump_GWMP_PER_Final_Report_June_2_2017.pdf

Approach and Key Assumptions with regard to the Pahrump GWMP

The Perennial Yield is 20,000 AFA

Capture of the carbonate aquifer is necessary to salvage the bulk of the Perennial Yield

Water Modeling is a necessary component of the GWMP to define the potential yield of the carbonate aquifer

Recharge and Reuse are both key factors to balancing a water budget

Individual Septic Disposal Systems have a recharge component

Water Rights Dedication or Relinquishment at a ratio of 1 AF used -to- 2 AF Over-Dedicated or Relinquished is used

Attrition due to forfeiture of water rights will reduce over allocation

Assumes the State Engineer will issue an Order securing over-dedicated water rights to the specified dedicated lands

Ultimately the State Engineer will limit or prohibit new domestic wells unless with a water right relinquishment or dedication

Past growth trends will remain consistent over the planning period (primarily housing with limited growth in industry)

Importation from outside Basin 162 is not included

Executive Summary

Two versions of Table 10-4 are included in this staff report that provide an estimate of water rights plus domestic wells *expressed as potential pumpage* by the year 2065. The first version has been prepared by NCWD staff and expands on previous versions presented in the report prepared by Shaw Engineering. The second version was provided by DWR and takes a more conservative approach to the 50 year outlook for the basin. Staff has worked closely with DWR and other stakeholders in the Pahrump basin during the preparation of this material. Conclusions presented herein have been supported by investigation into dedication of water rights to date, parcels created to date of sufficient size to support a domestic well, trends in the community with regard to growth, water usage for homes connected to a utility and on a domestic well, recharge, reuse, water rights not yet committed to specific projects by public record, impact of attrition due to forfeiture and cancellation of water rights, water modeling, cost estimates for infrastructure, and other items like

water quality; all of which provide the framework for a broad range of discussions with regard to potential pumpage by year 2065.

There are a few items that will make significant impact on balancing the water resource (20,000 AF) weighed against what pumpage might look like by 2065. These items are:

Over Dedication

New Domestic Wells required to Relinquish Water Rights

Water Conservation for New Construction

Attrition due to forfeiture and cancellation of water rights over the next 50 years

Explanation:

Over Dedication is the amount of water rights dedicated in support of a development project - in excess of expected pumpage. Expected pumpage is qualified by current actual water use. Both versions of Table(s) 10-4 are premised on the ability of the State Engineer to secure dedicated water rights to the lands in perpetuity. If dedicated water rights are not secured to the lands in perpetuity, and are not required in amounts approaching 1 AF pumped -to- 2 AF over-dedicated; a GWMP cannot achieve a water balance for the basin.

Domestic wells at 11,000 drilled to date with an estimated average use of 0.5 AF each; account for approximately 28% of the pumpage in the basin at this time. Adding 8500 new domestic wells by 2065 increases potential pumpage [for domestic wells alone] to 49% of the total Perennial Yield. Should the State Engineer allow *new* domestic wells to be drilled without relinquishment of water rights - in perpetuity; a water balance cannot be achieved.

Water conservation for new construction will have a significant impact on pumpage. Table 10-4 uses an estimate of a 15% water efficiency gain by 2065. Studies indicate that Las Vegas is using 20% less in a much shorter time frame. The BoCC recently adopted a Water Conservation Plan for Pahrump. This will need to be enforced for new construction in the basin or a GWMP cannot achieve a water balance for the Basin.

Attrition due to forfeiture of water rights over the next 50 years is estimated to reduce the water rights on the books by 15%. [This equates to appx. 8000 AF of water rights which are equal to 2666 AFA of pumpage, using 1 AF pumped -to- 2 AF over dedicated].

Questions, Conclusions and Supporting Material:

- 1.) Question: Is 1 AF pumped -to- 2 AF over-dedicated an appropriate over dedication ratio needed to balance the basin going forward?
Conclusion: Yes it is. Two versions of Table 10-4 are included as part of this staff report that provide the framework for this discussion.

2.) Question: Is DWR currently using and appropriate guideline at or near 1 AF pumped -to- 2 AF over dedication for subdivision maps?

Conclusion: Yes they are. Depending upon individual lot size the ratio varies somewhat, but DWR currently requires at [or greater than] 1 AF pumped -to- 2 AF over-dedication for subdivision maps.

3.) Question: What actions are truly critical to balancing the water budget in Basin 162?

Conclusions:

A.) Over dedicated water rights must be secured to the lands as originally dedicated and 1 AF pumped -to- 2 AF over-dedicated must be maintained in the future.

B.) We cannot drill NEW Domestic Wells in perpetuity in Basin 162 without pulling from the pool of water rights on the books. Nothing is proposed in Table 10-4 that impacts existing domestic wells.

C.) Nye County and the Nye County Water District need to work together to enforce the Water Conservation Plan that was adopted by the BoCC in March 2017.

D.) Capture of carbonate water to salvage something approaching the 20,000 AF PY is necessary. Staff is proposing work on the DRI model and the NCWD has funding in place to draft grant applications to define carbonate waters in Basin 162.

4.) Question: Will forfeiture and cancellation of water rights (attrition) have a significant impact on over allocation?

Conclusion: Yes it will. DWR has provided material at quantifies forfeitures and cancellations to date in Basin 162. Staff has summarized this material for the past 30 year period; attrition averages near 500 AFA. This stated, it is generally agreed that attrition rates will slow down as water rights become more scarce (and valuable) in the basin. Table 10-4 uses a 15% attrition rate over 50 years -or- some 8000 AF of water rights that will no longer be on the books. The table below provides attrition rates over the past 30 years in Basin 162:

ATTRITION TRENDS

	DATE RANGE	FOR/CAN IN AF
	1988 TO 1997	7994
	1998 TO 2007	3054
	2008 TO 2017	5316
TOTAL	30 YEARS	16364
	AVERAGE - AF/YR	545
	DATE RANGE	FOR/CAN IN AF
	1998 TO 2007	3054
	2008 TO 2017	5316
TOTAL	20 YEARS	8370
	AVERAGE - AF/YR	418
	DATE RANGE	FOR/CAN IN AF
	2008 TO 2017	5316
TOTAL	10 YEARS	5316
	AVERAGE - AF/YR	532

Estimate of Water Rights Going Forward:

The 2015 version of the GWMP assumes that water rights currently used for agriculture will continue to give way to development with the exception of 2000 AF remaining for irrigation. At the time Shaw Engineering was working on Table 10-4; NCWD staff had not attempted an analysis of *all* water rights in the basin that are not committed to projects by public record [i.e. a public record is the filing of a subdivision map committing water rights which is signed off by DWR.] Staff has since completed a preliminary analysis of water rights held by the three utilities doing business in the Pahrump Basin, have included the information for discussion and have included the data in the Table 10-4. Capture of this data is necessary to estimate water rights versus expected pumpage for the basin. This material represents a snapshot in time as Basin Summaries (water rights) change day to day as water is moved, manner of uses change and water rights are forfeited or cancelled. The table below provides information for discussion:

CURRENT BASIN SUMMARY		WATER DEDICATED TO UTILITIES PER PUBLIC RECORDS TO DATE		NOTES
Commercial	1,235.80	Desert Utilities	431.2	
Construction	45	Pahrump Utilities	1208.51	
Domestic	7,808.95	Great Basin (UICN)	11726.62	
		Total dedicated to utilities	13366.33	Source: Over Dedication Project
Industrial	151.64			
Irrigation (DLE)	700			
		WATER RIGHTS NOT DEDICATED PER PUBLIC RECORD		
		Water Rights held by utilities (MUN)		
		[includes a deduct of 591 AF owned by others]		
Irrigation	9,653.02		30,571.26	Source: Hydrographic Abstract
Mining and Milling	10			
Municipal	31,162.26	Water Rights held by utilities (QM)	5059	Source: Hydrographic Abstract
		Dedication records to date on water rights held by utilities		
Quasi-Municipal	7,918.69		13366.33	Source: Over Dedication Project
				Sum of MUN & QM held by utilities - minus dedication to date
Recreation	490.53	Estimate - not committed to projects	22,263.93	held by utilities
Stockwater	4.7	2/3 of 22,263.93 (to be over dedicated)	14,842.62	Added to line 5 of table 10-4

Items in Table 10-4 which are NOT expected to be cost effective:

The purchase of Manse Springs water rights and subsequent construction of a RIB to get the water back in the basin has a potential cost of some \$10 million dollars. Therefore in this staff report - the Manse Springs lines (13 and 14) in Table 10-4 are entered with a zero AF value. There may be other items that prove to be cost prohibitive like converting storm detention basins to RIBs. This said, staff would propose that like the Pahrump Raceway Project, there will be other projects that will include RIBs in coming years. The construction of like projects will have a positive impact on recharge.

Items with a high degree of uncertainty:

Staff cannot conclusively determine if the Basin Summaries as published by DWR are supplementally adjusted and have requested assistance from the State Engineer in this item. The construction of Table 10-4 uses available information.

Analysis of water rights not yet committed to specific projects requires more work. Data presented should be considered preliminary. Staff will continue working with stake holders to refine this material.

A 1.5% growth rate places the population of Pahrump approaching 80,000 people by year 2065. 200 gallons per capita day (gpcd) for a population of 80,000 places pumpage at 18,000 AFA. The GWMP assumes 2000 AF will still be used for irrigation at that time.

Looking ahead 50 years has a high level of uncertainty. This comes with the territory.

Staff Recommendations

Areas of uncertainty need more work going forward. Staff will continue working with stake holders to refine the material presented in this staff report and moreover, Table 10-4.

The NCWD has budgeted for work on items recommended for action in the report prepared by Shaw Engineering. Staff is recommending the NCWD fund compilation of grant applications for water modeling efforts, to define the carbonate aquifer in Basin 162. Staff can present an agenda item at a future WDGB meeting proposing a scope of work and cost to compile grant applications.

Nye County and the Nye County Water District must work together to support the following:

- 1.) Over dedicated water rights must be secured to the lands as originally dedicated *and* 1 AF pumped -to- 2 AF over-dedicated must be maintained in the future.
- 2.) We cannot drill NEW domestic wells *in perpetuity* in Basin 162 without pulling from the pool of water rights on the books (relinquishment -or- dedication of water rights required going forward).
- 3.) Enforce the Water Conservation Plan for new construction that was adopted by the BoCC in March 2017.

BILL NO. 2017-06

NYE COUNTY ORDINANCE NO. 514

SUMMARY: An Ordinance amending Nye County Code 17.04, the Pahrump Regional Planning District (PRPD) Zoning Regulations, by amending Section 17.04.740, to fulfill the water conservation specifications outlined within the following policy documents; 2014 PRPD Master Plan Update, and the Pahrump Basin 162 Groundwater Management Plan, providing for the severability, constitutionality and effective date thereof; and other matters properly related thereto.

TITLE: AN ORDINANCE AMENDING NYE COUNTY CODE 17.04, THE PAHRUMP REGIONAL PLANNING DISTRICT (PRPD) ZONING REGULATIONS, BY AMENDING SECTION 17.04.740, TO FULFILL THE WATER CONSERVATION SPECIFICATIONS OUTLINED WITHIN THE FOLLOWING POLICY DOCUMENTS; 2014 PRPD MASTER PLAN UPDATE AND THE PAHRUMP BASIN 162 GROUNDWATER MANAGEMENT PLAN PROVIDING FOR THE SEVERABILITY, CONSTITUTIONALITY AND EFFECTIVE DATE THEREOF; AND OTHER MATTERS PROPERLY RELATED THERETO.

WHEREAS, pursuant to NRS 278.020, for the purpose of promoting the health, safety and the general welfare of the residents of Nye County, the Nye County Board of County Commissioners (Board) is authorized and empowered to regulate and restrict the improvement of land and to control the location and soundness of structures; and

WHEREAS, any such regulation, restriction and control must take into account the potential impairment of natural resources and the total population which the available natural resources will support without unreasonable impairment; and

WHEREAS, the Board is acutely aware that the dominant issue related to the continued growth within the Pahrump Regional Planning District is the availability of water; and

WHEREAS, wasteful uses of Pahrump Basin groundwater will only accelerate the future need to import water into the Pahrump Valley at great expense; and

WHEREAS, the Board would like to emphasize to all residents that the Pahrump Valley is a desert climate and should be respected as such; and

WHEREAS, adopting water conserving and outdoor landscape design standards for new development will significantly reduce the outdoor use of water, and

NOW, THEREFORE, the Board of County Commissioners of the County of Nye, State of Nevada, does hereby adopt, promulgate and order compliance therewith within the Pahrump Regional Planning District, the following regulations:

NYE COUNTY CODE CHAPTER 17.04 IS AMENDED AS FOLLOWS:

17.04.740: LANDSCAPING:

A. Purpose: The purpose of this section is to create visually attractive desert-themed, drought tolerant landscapes along streets and commercial corridors, i provide shade across large expanses of pavement, provide landscaped areas around multi-family buildings and reduce the impacts of nonresidential uses on residences. All required landscaping must consist of live native, xeric and drought tolerant plants to minimize outdoor water use on landscapes. Outdoor sculptures, shade structures, decorative hardscapes and rock work are encouraged

B. Scope: Wasting water is unlawful per NRS 534. 0165, 534.020(2), 534.070, and NAC 704.567. Since Pahrump is in a desert with scarce water supplies, the use of xeric and native plants is required. For the purposes of this section, "xeric landscaping" shall mean utilizing plants that are drought tolerant, Great Basin desert compatible and zero to moderate water use. Use of treated recycled water for irrigation is required wherever such water is available. The use of artificial turf is also permitted.

Development that is processed through the Site Development Plan Review Procedures pursuant to NCC 17.04.950, uses authorized by CUP or expansion of legally grandfathered use or building(s) meeting the criteria set forth in section 17.04.905 and Multi-family development greater than 5-units shall comply with these requirements. Livestock pastures, vegetable gardens are specifically exempt from these restrictions.

C. Recommended plants, trees and shrubs are included in Appendix G of the Ground Water Management Plan.

D. Landscaping Plan:

1. Landscape plans must incorporate water conserving designs which includes appropriate soil, soil amendments, mulching and drainage. All applicants for building permits for construction that have an approved and certified site development plan must submit and have approved by the zoning administrator, a landscaping plan prior to issuance of a related building permit. The landscaping plan must show:

a. Location of buildings and structures on the property;

b. The common names of the plants to be used; if there is no common name or if that name does not clearly indicate the species, the botanical name must be used;

- c. Planned location of all plants;
- d. The type and location of watering system/lines, soil amendments and how installation and maintenance will be performed;
- e. The parties responsible for maintenance of the landscaping;
- f. The square footage for all landscaping on the site; dimensions of each landscaping area must be provided, along with the quantities and locations of trees and shrubs, and their mature height and spread;
- g. The location of all underground utility easements, septic, leach field, and any existing or proposed overhead power lines;
- h. The estimated total landscape water use.
- i. Type of groundcover, any portion of a landscape area not planted must be covered with decorative rock, bark, mulch or other suitable material for reducing dust and evaporation and improving the aesthetic appearance of the area.
- j. Salt Cedar plants must be identified on the property if any exist. See G. Prohibited Plantings

E. Installation and Maintenance:

- 1. Plantings must not obstruct the clear sight triangle views of drivers, see Figure 1 below.
- 2. Landscaping must be installed according to the approved plan; installation must be completed at the time of the related building's occupancy.
- 3. Site Grading, must be designed to minimize irrigation water runoff onto streets and to maximize the use of storm water for on-site irrigation.
 - a. The slope of turf grass areas must exhibit minimal slope or none at all
- 4. Water conserving irrigation system must be installed along with an automatic rain sensors. All irrigation must be adequately maintained. Landscaping which dies must be replaced by the owner as expeditiously as possible, but in no case, longer than sixty (60) days after notification.
- 5. Appropriate soil, soil amendments and top mulch to absorb and retain water and encourage the formation of deep root systems;
- 6. Plants with similar water requirements should be grouped on the same irrigation line.

D. Landscaping Area Requirements:

- 1. 1. Commercial, Multi-Family and Industrial: The total landscaped area required must equal not less than ten percent (10%) of the net lot area. For the purposes of this section, "net lot area" means the total area of the lot minus:

- a. The area of the lot covered by buildings;
 - b. The portions of the lot that are fully screened from view from any adjacent lot or public right of way by an opaque wall or fence at least six feet (6') high, no landscaping will be required except buffer landscaping, as applicable;
- (1) Chain link fence with slats does not constitute acceptable full screening;

G. Turf Restrictions:

1. Single Family Residential:

- a. 1,500 square feet is the maximum turf area allowed for single family residential parcels,
 - b. Turf in the front yard is prohibited, except for artificial,
 - c. Turf must be placed at least 3-feet from all buildings, structures and walls, except for artificial,
 - d. Turf must be at least 15-feet from the pavement of all streets, except for artificial,
 - e. Planting cool season grasses such as Rye and Fescue from seeds is prohibited May through August, (the hottest times of the year). Laying sod is permitted,
2. All new golf courses must limit turf to 3-5 acres of turf per hole, watered with effluent reuse water to the extent possible,
3. Farming, ranching and livestock pastures using permitted water rights and in existence prior to the adoption of this ordinance are exempt from turf grass restrictions.

IN THE SUPREME COURT OF THE STATE OF NEVADA

TIM WILSON, P.E., Nevada State
Engineer, DIVISION OF WATER
RESOURCES, DEPARTMENT OF
CONSERVATION AND NATURAL
RESOURCES,

Appellant,

vs.

PAHRUMP FAIR WATER, LLC.,
a Nevada limited-liability company;
STEVEN PETERSON, an
individual; MICHAEL LACH,
an individual; PAUL PECK,
an individual; BRUCE JABEOUR,
an individual; and GERALD
SCHULTE, an individual,

Respondents.

Electronically Filed
Feb 19 2019 11:57 a.m.
Elizabeth A. Brown
Clerk of Supreme Court

Case No. 77722

**JOINT APPENDIX
Volume VI of XIV, pages 1249–1479**

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DATE	DOCUMENT DESCRIPTION	VOLUME	PAGE NOS.
10/12/18	Answering Brief filed by State Engineer	XIV	4910–4945
12/10/18	Ex Parte Motion for Order Shortening Time on Motion for Stay of Order Granting Petition for Judicial Review and Reversing State Engineer’s Amended Order No. 1293A Pending Appeal	XIV	5474–5476
09/05/18	Letter from Court & Memorandum of Temporary Assignment (Steven Kosach)	XI	3628–3629
12/18/18	Letter from Nye County Clerk to Nevada Supreme Court re: submittal of appeal packet	XIV	5496–5497
09/18/18	Memorandum of Temporary Assignment (Steven Elliott)	XIV	4906
08/22/18	Memorandum of Temporary Assignment (William Maddox)	I	34–35
12/10/18	Motion for Stay of Order Granting Petition for Judicial Review and Reversing State Engineer’s Amended Order No. 1293A Pending Appeal on Order Shortening Time	XIV	5461–5473
12/10/18	Notice of Appeal filed by State Engineer	XIV	5442–5460
08/17/18	Notice of Appeal of Nevada State Engineer Amended Order 1293A	I	1–14
01/02/19	Notice of Entry of Order (Denying Motion for Stay)	XIV	5530–5539
12/07/18	Notice of Entry of Order (Granting Petition for Judicial Review)	XIV	5427–5441

DATE	DOCUMENT DESCRIPTION	VOLUME	PAGE NOS.
09/11/18	Notice of Transmittal of Record on Appeal	XI	3630–3631
09/11/18	Opening Brief filed by Pahrump Fair Water, LLC, <i>et al.</i> (“PFW”)	XI	3634–3655
12/18/18	Opposition to Motion for Stay of Order Granting Petition for Judicial Review	XIV	5498–5508
12/27/18	Order Denying Motion for Stay	XIV	5525–5529
12/06/18	Order Granting Petition for Judicial Review	XIV	5417–5426
08/31/18	Order Granting Stipulation and Order Regarding Briefing Schedule	XI	3622–3624
08/22/18	Order of Recusal (Robert Lane)	I	31–33
10/29/18	Order Setting Hearing	XIV	4946–4947
09/11/18	Peremptory Challenge of Judge (Steven Kosach) filed by State Engineer	XI	3632–3633
09/04/18	Peremptory Challenge of Judge (William Maddox) filed by PWF	XI	3625–3627
08/17/18	Petition for Judicial Review	I	15–30
11/08/18	PowerPoint Presentation by PFW re: Petition for Judicial Review	XIV	5137–5185
11/08/18	PowerPoint Presentation by State Engineer re: Petition for Judicial Review	XIV	4988–5136
12/27/18	[Proposed] Order Denying Motion for Stay filed by PFW	XIV	5515–5524

DATE	DOCUMENT DESCRIPTION	VOLUME	PAGE NOS.
12/10/18	[Proposed] Order Granting Motion for Stay of Order Granting Petition for Judicial Review and Reversing State Engineer's Amended Order No. 1293A Pending Appeal filed by State Engineer	XIV	5483–5493
11/26/18	[Proposed] Order Granting Petition for Judicial Review filed by PFW	XIV	5402–5416
11/26/18	[Proposed] Order Granting Petition for Judicial Review filed by State Engineer	XIV	5378–5401
12/10/18	[Proposed] Order Shortening Time on Motion for Stay of Order Granting Petition for Judicial Review and Reversing State Engineer's Amended Order No. 1293A Pending Appeal filed by State Engineer	XIV	5477–5482
11/01/18	Reply Brief filed by PFW	XIV	4955–4987
12/20/18	Reply in Support of State Engineer's Motion for Stay of Order Granting Petition for Judicial Review and Reversing State Engineer's Amended Order No. 1293A Pending Appeal	XIV	5509–5514
12/12/18	Request for Submission of Ex Parte Motion for Order Shortening Time	XIV	5494–5495
09/21/18	Request to Set Hearing Date (re: Petition for Judicial Review)	XIV	4907–4909
10/31/18	Stipulation and Order for Extension of Time (re: Reply Brief)	XIV	4948–4954

DATE	DOCUMENT DESCRIPTION	VOLUME	PAGE NOS.
08/30/18	Summary of Record on Appeal and Bates-stamped pages SE ROA 1–3574	I–XI	36–3621
09/11/18	Supplemental Record on Appeal and Bates-stamped pages SROA 1–1245 filed by PFW	XI–XIV	3656–4905
11/08/18	Transcript (re: Oral Arguments on Petition for Judicial Review)	XIV	5186–5377

RESPECTFULLY SUBMITTED this 15th day of February, 2019.

AARON D. FORD
Attorney General

By: /s/ James N. Bolotin
JAMES N. BOLOTIN
Deputy Attorney General
Attorney for Appellant,
State Engineer

CERTIFICATE OF SERVICE

I certify that I am an employee of the Office of the Attorney General and that on this 15th day of February, 2019, I served a copy of the foregoing JOINT APPENDIX, by electronic service to:

Paul G. Taggart, Esq.
David H. Rigdon, Esq.
TAGGART & TAGGART, LTD.
108 North Minnesota Street
Carson City, Nevada 89703

/s/ Dorene A. Wright

brought into compliance with permit or statutory limits on groundwater pumping through a graduated assessment structure based upon the quantity of water over-pumped and the duration of noncompliance, with an allowance for meter error. Further, for certain residential properties with allocations of less than 1,000 gallons per day (gpd) per residence, the Advisory Committee recommended that penalties only be applied to water use over 1,000 gpd.

The State Engineer made a presentation on domestic wells and related issues at the Water Resources Committee's January 2006 meeting in Las Vegas. The Committee also received testimony from the Nevada Well Owners Association in opposition to the proposal to impose fines for over-pumping and the Association proposed several alternatives to address the problem. The State Engineer's recommendation on bill draft requests to the Committee included a request for a bill authorizing the imposition of administrative fines for violations of Nevada water law. See State Engineer's letter dated June 2, 2006, attached as Appendix C.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 1 — Amend statutes to authorize the State Engineer in the Division of Water Resources (DWR), State Department of Conservation and Natural Resources, to order any person in violation of the provisions of *Nevada Revised Statutes* Chapters 533, 534, 535, and 536 and *Nevada Administrative Code* Chapters 534 and 535 to: (a) pay an administrative fine not to exceed \$10,000 per day for each violation; and (b) be liable for any expense incurred by the DWR in investigating and stopping the violation. Any appeal of a violation would be done through the courts under NRS 533.450. Administrative details for addressing violations, assessing fines or penalties, and procedures would be done through the promulgation of rules and regulations. [BDR 48-206]

To clarify the record on its intent, the Committee voted to:

RECOMMENDATION NO. 2 — Include a statement in the final report noting, for the record, the State Engineer's testimony on the recommendation to authorize administrative fines for certain violations of Nevada water law. Specifically, the State Engineer testified that he does not enforce residential watering restrictions and administrative fines would not be imposed for violations of residential watering restrictions or other local ordinances. Further, the State Engineer testified that the regulations implementing the fines will create a sliding scale of fines based on the severity of the violation. Finally, the Committee directed the State Engineer to provide examples of the proposed regulations at the time the bill amending the statutes to authorize administrative fines is heard by the Legislature.

2. **Water Rights Speculation:** As water becomes an increasingly valuable commodity, the potential for speculation in water rights also increases. Nevada law states that the water belongs to the people of the State, and it is generally accepted that the State's continued well being depends, in part, upon maximizing the use of water to sustain and promote industry, agriculture, recreation, and the residential and tourist populations, among other things. Since

applying for water rights or otherwise tying up water for speculative purposes means that water is not being put to beneficial use, the State has an interest in avoiding speculation in water.

The 1993-1994 interim legislative study on water resources considered the problem of speculation at length. Pursuant to the interim study's recommendation, the 1995 Legislature enacted Senate Bill 98 (Chapter 192, *Statutes of Nevada*) amending NRS 533.370 to require a water rights applicant to prove "his financial ability and reasonable expectation actually to construct the work and apply the water to the intended beneficial use with reasonable diligence."

The Water Resources Committee heard testimony throughout the interim from persons concerned about speculation in water rights. The State Engineer testified that the current statutes were adequate to avoid speculation and did not object to including a statement of support. (See Appendix B, No. 5 on page 35.)

Therefore, the Committee voted to:

RECOMMENDATION NO. 3 — Include a statement in the final report noting the Committee's strenuous endorsement of the State's policy against speculation in water rights, including without limitation, the findings required by NRS 533.370 that were added in 1995 to prevent speculation in water rights.

3. **Ombudsman**: One of the recommendations from the Central Nevada Regional Water Authority and the Great Basin Water Network was to create an ombudsman position within the Division of Water Resources. The Director of the SDCNR opposed the concept on the grounds it would be "detrimental to the neutrality of the Department" and might put the SDCNR in the role of "legal counsel" to applicants or protestants. (See Appendix B, No. 8 at page 37.) The Water Resources Committee members discussed the proposal at length. Some members thought that assistance could be given in a non-adversarial way and the position could also be used to educate members of the public to avoid problems and unnecessary protests and litigation. Other members echoed the Director's concerns that creation of an ombudsman position to assist persons with applications or other procedures might result in conflicts within the Division and suggested, as an alternative, that later recommendations for additional resources for the Division may be a better way to address the problem. Overall, the Committee was sympathetic to the difficulties faced by the average person when navigating the water rights application process or other procedures related to water rights.

Therefore, the Committee voted to:

RECOMMENDATION NO. 4 — Include a statement in the final report noting that the public often needs assistance in understanding the water rights application process, including protests, and that education is critical to avoiding or resolving unnecessary conflicts. Further, the Committee considers this an important issue that may be appropriate for further study.

B. Wells and Groundwater Issues

1. Forfeiture: In its opening presentation on Nevada water law, the State Engineer discussed the statutes on forfeiture proceedings based on the nonuse of water. In response to a question from the Committee, the State Engineer advised that the statutes do not require advance notice of forfeiture proceedings in basins in which pumping inventories are not conducted (so-called “non-inventoried” basins). Water Resources Committee members expressed concern that, because of the onerous nature of forfeiture proceedings, notice of forfeiture proceedings should be given in all basins. The State Engineer did not oppose expansion of the notice requirements to all groundwater basins although he asked that the record be clear that amending NRS 534.090 would not “restart the clock” on the calculation of nonuse of water that is ongoing. (See Appendix B, No. 35 at pages 48-49.)

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 5 — Amend the statutes to require the State Engineer to give notice in all basins prior to forfeiture for nonuse of water. In the absence of pumping records in certain basins, the State Engineer may base a notice of forfeiture on other evidence of nonuse. As currently set forth in NRS 534.090, prior to forfeiture the State Engineer must give notice of four years of nonuse only in basins for which the State Engineer has pumping records, also referred to as inventoried basins. [BDR 48–208]

2. Priority Date: As the populations of western states continue to grow, the proliferation of domestic wells is causing concerns about the cumulative effect of such water use. At the January 2006 meeting in Las Vegas, the State Engineer gave a presentation on the issue of domestic wells and the problems being experienced or anticipated in several areas of the state. According to the Division of Water Resources, there are approximately 47,000 domestic wells in Nevada. As in some other western states, these domestic wells are exempt from permitting requirements although Assembly Bill 16 (Chapter 736, *Statutes of Nevada 1981*) instituted a requirement for registering wells, including domestic wells. In 1993, the Legislature created a “protectible interest” in domestic wells as set forth in NRS 533.024. However, the State Engineer has testified that, in the case of a conflict between permitted water rights and domestic wells, the statutes are silent on which interest has priority.

In its testimony at the March 2006 meeting, the Central Nevada Regional Water Authority suggested the need for clarifying “protectible interest” and establishing priority dates for domestic wells. At the May 2006 meeting, the State Engineer asked the Committee to consider legislation setting priority dates for domestic wells. (See Appendix C.)

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 6 — Amend the statutes to set the priority date for all domestic wells as the completion date of the well as stated on the well log submitted to the DWR by the well driller. For wells drilled prior to the requirement for submittal of well logs, other competent evidence shall be used to determine the completion date. [BDR 48-208]

3. Auxillary Uses: Another issue related to domestic wells that has been a continuing subject of legislative water studies, is the treatment of an ancillary or auxillary use to a single family residence with a domestic well. The statutes define “domestic purposes” in relation to a single family dwelling but do not address ancillary uses. Further, domestic well pumping is generally limited to 1,800 gallons per day (NRS 534.180). Construction of a caretaker’s quarters or a mother-in-law unit results in additional burdens on the domestic well from the second kitchen, additional bathrooms, and other water consuming appliances in the second residence. Since domestic wells can only supply a single family residence, it appears that a quasi-municipal permit is needed for a secondary residence to be served by an existing domestic well. However, as noted by the State Engineer, some basins are over-appropriated and subject to an order denying future permits. The State Engineer presented his concerns on auxillary uses to the Water Resources Committee at its January 2006 meeting and proposed a bill draft on the issue. (See Appendix C.)

Another issue raised by well users was the “gallons per day” standard. Enforcement of a daily standard is problematic and, as noted by the State Engineer, annual usage is the standard used for planning purposes. Further, water usage fluctuates seasonally and so substitution of a comparable annual standard was suggested by the State Engineer. The Nevada Well Owners Association also recommended a change to an annual rather than a daily standard.

Therefore the Committee recommended that the Legislature:

RECOMMENDATION NO. 7 — Amend the statutes to address water service to auxiliary dwellings, e.g., caretaker’s quarters or mother-in-law units, from a domestic well: (a) if local ordinances allow for such uses; and (b) with the condition that a meter be installed on the well to measure usage to ensure the total water pumped does not exceed two acre feet (see NRS 534.013 and 534.180). In addition, the proposed amendment would quantify the limit on domestic use as two acre-feet per year instead of 1,800 gallons per day (gpd). This change recognizes that typically domestic use increases in the summer months and decreases in the winter months and, further, that the total annual pumpage from a domestic well is used for planning purposes. [BDR 48-208]

4. Parcel Maps: The proliferation of domestic wells is due, in part, to local government approvals of parcel maps. Under Nevada law, parcel maps are defined as subdivisions of land of four or less parcels that are less than 40 acres in size. Unlike subdivision maps, State law does not require parcel maps to demonstrate the availability of water and the newly-created parcels are eligible to drill domestic wells. At the January 2006 presentation on domestic

wells, the State Engineer testified that he did not know the exact number of vacant parcels eligible to drill domestic wells without a water right but estimated it to be a significant number. The State Engineer has the authority under NRS 534.120, in designated basins, to prohibit the drilling of domestic wells if water can be furnished by a water district or municipality. The State Engineer may also limit deepening and repair of domestic wells in some situations and may require a well owner to hook up to a municipal water supply if certain conditions are met.

As demonstrated by testimony at the Elko meeting in April 2006, some local jurisdictions have enacted ordinances to address this issue. Some local ordinances require a dedication of water rights as a condition of approval of a parcel map. In this way, the local jurisdiction avoids the cumulative impact of domestic wells on its water supply. Further, if and when the parcel is connected to and served by the municipal water system, the dedication of water rights will avoid an undue impact on the municipal water supply. However, not all jurisdictions have enacted such ordinances despite possible future water shortages.

According to testimony, such regulation is best done at the local level but, if a jurisdiction is experiencing or is about to experience water supply problems, the State Engineer should be able to step in and address the matter. The State Engineer supported the recommendation but asked that his authority to require a dedication of water rights be discretionary rather than mandatory. (See Appendix B, No. 40 at page 50.)

Therefore the Committee recommended that the Legislature:

RECOMMENDATION NO. 8 — Amend the statutes to authorize the State Engineer to designate basins in jurisdictions that do not require a certain minimum dedication of water rights for parcel maps creating one or more parcels that are less than 40 acres and eligible to drill a domestic well. Further, in such designated basins, authorize the State Engineer to impose a requirement, if appropriate, for a minimum dedication of water rights for such parcel maps. [BDR 48-208]

5. Consolidation of Water Rights: In the context of requiring dedications of water rights for parcel maps, the Water Resources Committee was advised that the State Engineer's office and various cities and counties are working to address the problem of multiple filings for extensions of time to put water rights associated with parcel maps to beneficial use. When a local government requires dedicated water rights for a parcel map, a change application (for future municipal use of the water right and to transfer ownership to the municipality) must be submitted and approved by the State Engineer. Until such time as the local government can serve the newly-created parcels, it must file annual requests for extensions of time to put the water to beneficial use, along with a filing fee of \$100. Each dedicated water right requires a separate extension application and associated fee. The time, effort, and expense involved in monitoring and preparing the extension applications is significant, and there is always the potential for losing track of one or more water rights. Consolidation of such water rights into a single permit would streamline the process and result in fewer fees being paid by local governments. While the State Engineer supports this effort, certain details, such as tracking multiple priority dates in a single permit, must be worked out.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 9 — Adopt a resolution directing the State Engineer, and the counties and cities that acquire water rights dedications when new parcels are created, to work together on a process for consolidation of such water rights into a single permit, or other appropriate document, and on a process for adding future water rights dedications as they occur. The intent of this collaboration is to save time and money for the counties, cities, and State in the processing of applications for extensions of time to put such water rights to beneficial use, while addressing priority dates and other considerations. [BDR R-204]

6. Mitigation for Over-Appropriation: The Central Nevada Regional Water Authority testified at the March 2006 meeting in Ely on rural counties' concerns about over-appropriation of groundwater. Noting that some groundwater basins are fully or over-appropriated, the Authority observed that currently the primary "cure" is regulation and that regulation is an "expensive, long and litigious solution that does not always best serve the public interest." The Authority suggested development of a menu of mitigation options, such as water rights buyout, water banking, or water conservation provisions, to provide alternatives to regulation.

The State Engineer expressed concern that development of mitigation policies would divert staff from other activities and be a time-consuming effort. Furthermore, the State Engineer felt the statutes already contain sufficient options to deal with over-appropriation and many such situations were best addressed through negotiation on a case-by-case basis. For these and other reasons, he opposed the recommendation. (See Appendix B, No. 47 at page 52.)

Therefore the Committee voted to:

RECOMMENDATION NO. 10 — Send a letter to the State Engineer requesting the development of policies for mitigation for over-appropriations of groundwater and asking the State Engineer to report his findings to the 2009 Legislature.

7. Perennial/Basin Yield: The calculation of perennial or basin yields is a critical component of the decision-making process for water rights allocations. Determining the amount of water available for appropriation is a difficult task and, since groundwater supplies cannot be quantified with absolute certainty, the science of making such determinations continues to evolve. The State Engineer testified that his office uses a variety of sources when determining perennial yield, including USGS models and studies. At its April 2006 meeting in Elko, the Committee heard from a water development company, Aqua Trac, LLC. According to Aqua Trac, new methodologies and more current data may result in more accurate estimates of perennial yield. The State Engineer cautioned that new methodologies are not necessarily more reliable and assured the Committee that he uses the best available methodologies and data in making his decisions and would continue to do so. (See Appendix B, No. 7 at page 36.)

Therefore, the Committee recommended to:

RECOMMENDATION NO. 11 — Include a statement in the final report asking the State Engineer to consider, where appropriate, the use of new technology or updated information to determine perennial or basin yields.

C. Water Resources Studies and Data

1. Collaboration on Data: The Central Nevada Regional Water Authority testified on its efforts to collect data and create a centralized system to optimize the knowledge of Nevada's water resources. Noting that data is collected at a variety of levels from the State Engineer to irrigation districts, the Authority intends to pursue its goal of a statewide database for use by water regulators and users alike. The State Engineer noted that collaboration was occurring and that the DWR's Web site made much of the information collected by the State available to the public. He expressed concern about the fiscal impact of a statewide information management system. (See Appendix B, No. 18 at page 41 and No. 19 at page 42.)

Water Resources Committee members questioned the availability of data from water entities and the withholding of such data from public record requests.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 12 — Adopt a resolution directing collaboration between the State Engineer, local governments, water districts and authorities, water purveyors, large commercial/agricultural users, and other water users, and the sharing of water use data, with the goal of implementing a statewide information management system to assist in the development and management of groundwater resources. [BDR R-204]

Further, the Committee voted to:

RECOMMENDATION NO. 13 — Send a letter to Nevada's Congressional Delegation, Desert Research Institute, the University of Nevada, Reno, and University of Nevada, Las Vegas urging them to work together to obtain funding for development of a statewide research program on sustainable groundwater development, including agricultural and urban conservation; policy research; and governance structures.

2. Conjunctive Use and Management: Conjunctive use is the coordinated management of surface water and groundwater to maximize the yield of the overall water resource and to avoid negative impacts. The benefits of conjunctive use of surface and groundwater are being recognized throughout the West and several states have enacted legislation implementing conjunctive management of surface and groundwater.

At the Water Resources Committee's Elko meeting in April 2006, Churchill County made a presentation. Two of the County's more urgent concerns were that not enough attention is being given to the interrelationship of surface and groundwater and that surface and groundwater are administered separately by the State Engineer. According to Churchill County representatives, the State Engineer has largely ignored the Nevada Supreme Court ruling in *Griffin v. Westergard*, 96 Nev. 627 (1980), in which the Court noted the connectivity of groundwater and surface water in Smith Valley. Churchill County and others recommended that conjunctive use and management be studied further.

Therefore, the Committee voted to:

RECOMMENDATION NO. 14 — Include a statement in the final report noting the Committee's interest in the conjunctive use of surface and groundwater and recommending this issue for future study by the interim committee on water resources. Conjunctive use is the coordinated management of surface water and groundwater to maximize the yield of the overall water resource and to avoid negative impacts. Conjunctive use is especially relevant if the surface and groundwater sources are hydrologically interconnected.

D. Water Conservation, Planning, and Development

1. Additional Funding: During the 2005 Session, several proposals to fund various activities related to water were considered. Senate Bill 62 (Chapter 493, *Statutes of Nevada* 2005) created the Water Rights Technical Support (WRTS) Fund and appropriated \$1 million for grants to local governments to assist rural counties working to protect existing water rights. The Water Resources Committee heard testimony about additional needs for funding related to water planning, studies, and data collection. The Central Nevada Regional Water Authority, the Great Basin Water Network, Humboldt River Basin Water Authority and others, urged the Committee to continue the funding for the WRTS Fund and to create another fund for groundwater studies and additional assistance for rural counties.

The Central Nevada Regional Water Authority suggested an appropriation of \$1 million for a new fund similar to the WRTS Fund to make grants for studies and other assistance. The Authority noted that, although funding for implementation of water plans is available, funding for water planning and information management is not. The proposed new fund would focus on water planning and information management. Like the WRTS Fund, this new fund would be administered by the State Board of Financing Water Projects that is staffed by the Nevada's Division of Environmental Protection (NDEP) within the SDCNR.

The Administrator of NDEP testified that the duties of the State Board of Financing Water Projects have been increasing but the level of staff support level remains the same (one engineer and a secretary). He expressed concerns that continuing administration of the WRTS Fund and adding administration of a second fund would raise issues about the adequacy of resources. The NDEP has not included more positions in its budget proposals but if the Board's duties are expanded, then expansion of staff support should be considered also.

The Water Resources Committee complimented the Board and NDEP staff on the criteria for grants and administration of the WRTS Fund. Although not part of the original request from the Central Nevada Regional Water Authority, the Committee included a priority that funds be used in rural counties or in rural areas of Clark County and Washoe County. Due to fiscal concerns, the Committee suggested renewing the prior (S.B. 62) funding level of \$1 million and combining the existing WRTS Fund with the proposed new fund.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 15 — Request an appropriation of \$1 million to continue the Water Rights Technical Support Fund, as enacted by Senate Bill 62 (Chapter 493, *Statutes of Nevada 2005*) through the next biennium and to expand the Fund to include need-based grants for local water resource planning and information management. The legislation would create a framework for long-term funding and provide clear direction for program administration by the State Board of Financing Water Projects. In addition, priority would be given to rural counties and local governments outside the urban areas within Clark and Washoe Counties. The Legislature's intent to consistently fund water resource planning and information management should be explicit in the bill. [BDR 48-207]

2. **Infrastructure Funding**: Another recommendation from the Central Nevada Regional Water Authority pertained to funding for water infrastructure implementation to enable local governments or water entities to more actively guide future development compatible with water planning goals. The Authority testified that the A.B. 198 program (NRS 349.984) generally finances retrofit of existing water systems or treatment facilities, but is not currently available for construction of certain infrastructure to ensure compatibility with local land use plans and consistency with water planning goals. After some discussion, funding was not included since the bonding cap for the A.B. 198 program was increased last session to \$125 million through Assembly Bill 20 (Chapter 71, *Statutes of Nevada 2005*). The Administrator of NDEP noted that his comments on Recommendation No. 15, above, pertained equally to an expansion of the A.B. 198 program and the corresponding increase in duties for the Board and NDEP staff.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 16 — Amend the statutes to expand the eligible uses of the Fund for Grants for Water Conservation, Capital Improvements to Certain Water Systems and Improvements to Certain Sewage Disposal Systems to include requests for need-based funding for water resource plan implementation, e.g., infrastructure development. This fund is administered by the State Board for Financing Water Projects and is commonly referred to as the A.B. 198 program (NRS 349.984). Although new development must always be encouraged to pay for its own infrastructure, communities that lack the financial capacity, that is, an established body of rate-payers to supply primary infrastructure necessary to properly locate development, may need assistance. In addition, priority would be given to rural counties and local governments outside the urban

areas within Clark and Washoe Counties. Appropriate assistance for these communities can be provided by allowing the A.B. 198 program to make need-based grants or low-interest loans aimed at expanding supply and transmission capability to meet future growth needs as identified in water resource plans. [BDR 48-207]

3. Conservation Incentives: Throughout the interim, the Water Resources Committee received testimony on water conservation. Noting on many occasions that Nevada law did not include incentives for water conservation, the Committee looked to models from other states for ideas. Utah water law includes a specific provision that non-use of water due to implementation of conservation measures is not considered grounds for forfeiture. The State Engineer testified that, although there is not a specific provision in Nevada law, that no water rights have been forfeited in Nevada due to non-use resulting from water conservation. Further, the State Engineer stated his intent to continue that policy. (See Appendix B, No. 22 at page 43.)

Therefore, the Committee voted to:

RECOMMENDATION NO. 17 — Include a statement in the final report noting that the State Engineer has never commenced forfeiture proceedings based on the non-use of water due to the application of conservation measures and further that the Committee strongly supports the continuation of this policy.

4. Economic Development: The Humboldt River Basin Water Authority testified at the Committee's April 2006 meeting in Elko on a number of issues and concerns, including economic development in the rural counties. The Authority noted that when water resources were available in rural areas, siting new development near water was more efficient than transporting water to an urban area.

Therefore, the Committee recommends that the Legislature:

RECOMMENDATION NO. 18 — Adopt a resolution encouraging rural development that matches the availability of water resources with new businesses and industry. [BDR R-204]

E. Water Transfers

1. Water Transfers: Interbasin and intercounty transfers have generated legislative concern for many years. Transporting water from one basin to another raises issues and transferring water from one county to another (even within the same groundwater basin) raises another set of issues. In both situations, the State Engineer must balance competing interests. On one hand, it is generally thought to be in the best interests of the State to have its waters put to beneficial use. On the other hand, transporting water out of a basin or county may hamper future development in the sending area and result in undesirable environmental impacts.

The proposal by the SNWA to transport large quantities of water via a pipeline from eastern Nevada to the Las Vegas Valley has raised both interbasin and intercounty issues. The State Engineer held a hearing in September 2006 on the first group of applications for water rights in Spring Valley in White Pine County. The remaining SNWA transfer applications will be scheduled for hearings in 2007 or later. The BLM is preparing an environmental impact statement on the proposed pipeline and wells to be located on BLM property and the USGS is working on the BARCASS (water study) due to Congress in December 2007.

The Water Resources Committee heard testimony on other interbasin and intercounty transfers occurring in Nevada as well as how other states handle water transfers. The Committee was reminded that interbasin transfer issues have been considered during earlier interim studies and Senate Bill 108 (Chapter 236, *Statutes of Nevada 1999*) set forth review criteria for interbasin transfers in subsection 5 of NRS 533.370. A speaker at the May 2006 meeting testified on the Owens Valley experience that involved transporting water from eastern California to Los Angeles at the environmental expense of the Owens River and surrounding areas. To avoid the environmental impacts caused by the Owens Valley water transfers, the speaker had several suggestions for policies on interbasin transfers.

Therefore, the Committee voted to:

RECOMMENDATION NO. 19 — Include a statement in the final report urging consideration of the following issues in connection with an interbasin transfer: (1) development of a clear description of the project; (2) identification and investigation of the potential environmental and socio-economic impacts of the project; (3) that rural communities have adequate water for future development; (4) development and implementation of a rigorous monitoring program; and (5) consideration of the conveyance of water by lease rather than transfer of ownership.

2. **Intercounty Transfer Fees**: At the March 2006 meeting in Ely, county representatives addressed mitigation for interbasin transfers as provided for in NRS 533.438, which authorizes the imposition of a fee by the county of origin on groundwater transfers to another county. Effective January 1, 2007, the fee increases from \$6 per acre-foot per year to \$10 per acre-foot per year. Under current law, the fee proceeds are remitted to the county and may only be used for health, education or economic development. The testimony centered on concerns that there is no provision for mitigation of impacts to individual landowners or businesses. The conceptual recommendation made at the Ely meeting was to amend the statutes to permit a portion of the intercounty transfer fee to be used for “reparations” to individuals.

The State Engineer expressed concerns that the proposal might have unintended consequences and opposed the recommendation. (See Appendix B, No. 28 at page 45.) The Committee felt the concept merited further consideration.

Therefore, the Committee voted to:

RECOMMENDATION NO. 20 — Include a statement in the final report to recommend further consideration of a concept to authorize the counties to set aside up to \$2 of the fee on interbasin transfers to be used for compensating private parties impacted by water exports (see NRS 533.438). The counties would adopt ordinances setting forth the application process and criteria to be used for dispersal of the funds and for the administration of the set-aside, including any provisions for reversion to the county. According to testimony, protection of senior water rights would be a priority of such “reparations” set-asides. Further, the Committee recommends this issue for future study by the interim committee on water resources.

F. Division of Water Resources

At the Committee’s meeting in October 2005, the State Engineer provided an overview of his office’s activities. During the 2005 Session, the State Engineer received funding for 11 new positions and reported to the Committee on the progress in filling those positions and reducing the backlog of applications. The State Engineer announced his intent to fund a water planner position created in the 2005 Session that had not been funded at that time and to seek funding for an advisory board that exists in statute but is not currently functioning. (See Appendix C.)

Therefore, the Committee voted to:

RECOMMENDATION NO. 21 — Send a letter of support to the Governor and the Chairmen of the Senate Committee on Finance and Assembly Committee on Ways and Means for the State Engineer’s budget request for additional funding for water planning activities, including funding for the position of Chief of the Water Planning Section (NRS 540.036).

RECOMMENDATION NO. 22 — Send a letter of support to the Governor and the Chairmen of the Senate Committee on Finance and Assembly Committee on Ways and Means for the State Engineer’s budget request for additional funding to activate the Advisory Board on Water Resources Planning and Development (NRS 540.111).

Throughout the interim, various other persons and organizations testified as to the need for adding staff or hiring staff with certain expertise, due to the increasing complexity of water rights transactions. In particular, several persons and organizations expressed a desire for more studies and for more oversight or analysis by the DWR of such studies.

Therefore, the Committee also voted to:

RECOMMENDATION NO. 23 — Send a letter of support to the Governor and the Chairmen of the Senate Committee on Finance and Assembly Committee on Ways and Means recommending funding or other support for increased resources and staff within the DWR to address staffing and other needs as determined by the State Engineer.

G. *Other Actions*

1. Interim Committee: Senate Bill 216 (Chapter 408, *Statutes of Nevada 2003*), added the review of water authorities, water districts; and other public and private entities involved in water resources, to the duties of the Legislative Committee on Public Lands (NRS 218.5368). However, that provision expires on June 30, 2007, and the Legislative Committee on Public Lands is not recommending continuation of its review of water resource issues and entities. Further, in S.C.R. 26, the Water Resources Committee was directed to consider the advisability of creating an ongoing interim Legislative Committee on Water Resources to monitor water resource issues between sessions and to formulate recommendations to the Legislature.

Therefore, the Committee recommended that the Legislature:

RECOMMENDATION NO. 24 — Amend the statutes to create an ongoing interim Legislative Committee on Water Resources with a sunset date of June 30, 2015.
[BDR 17-205]

2. Retirement of State Engineer: At the May 2006 meeting of the Committee, Hugh Ricci announced his retirement from the Office of the State Engineer effective in June 2006 and advised the Committee that the Director of the SDCNR had appointed Tracy Taylor as the new State Engineer. Appendix D contains Mr. Ricci's proclamation.

Therefore, the Committee acted to:

RECOMMENDATION NO. 25 — Adopt a proclamation from the Committee commending Hugh Ricci for his years of State service and retirement as State Engineer.

V. APPENDICES

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APPENDIX A

Senate Concurrent Resolution No. 26 (File No. 100, *Statutes of Nevada 2005*)

APPENDIX A

Senate Concurrent Resolution No. 26 Committee on Natural Resources

FILE NUMBER 100

SENATE CONCURRENT RESOLUTION—Creating an interim study of the use, allocation and management of water resources in Nevada.

WHEREAS, The waters of the State of Nevada are among its most precious and vital resources; and

WHEREAS, The State of Nevada is the most arid state in the country and has relatively few supplies of surface water and ground water, a condition which is periodically exacerbated by drought conditions in Nevada and in the Rocky Mountains which supply the headwaters of the Colorado River; and

WHEREAS, Adequate, long-term supplies of water are essential to maintaining stable economic growth and the development of rural and urban areas of this State; and

WHEREAS, The conservative and prudent use of supplies of water is necessary to promote adequate, long-term supplies and to protect the environment of this State; and

WHEREAS, The rapid growth in the population and the economy of this State within the last 30 years has placed growing demands on the limited water supplies and has resulted in an increasing number of projects for the reallocation of water resources from areas of supply to areas of demand; and

WHEREAS, The residents of this State are vitally interested in the decisions made relating to the use, management and allocation of Nevada's scarce water resources; and

WHEREAS, The Nevada Legislature has conducted several interim studies on the general topic of laws and activities related to water resources and large amounts of information concerning Nevada's water resources have been compiled through the years and the degree to which these materials fill the current needs is not immediately evident; and

WHEREAS, The provision of services related to water, including the supply of safe water for municipal and industrial uses, the management of wastewater and storm drainage, the management of floodplains and the administration of water reclamation projects, in an efficient manner is critical to the current and future welfare of the citizens of Washoe County; and

WHEREAS, In Washoe County, these water-related services are presently provided through several governmental entities; now, therefore, be it

RESOLVED BY THE SENATE OF THE STATE OF NEVADA, THE ASSEMBLY CONCURRING, That the Legislative Commission is hereby directed to appoint a committee to conduct an interim study of the use, management and allocation of water resources in this State; and be it further

RESOLVED, That the committee must:

1. Be composed of eight Legislators as follows:

- (a) The Chairman of the Senate Standing Committee on Government Affairs;
- (b) The Chairman of the Senate Standing Committee on Natural Resources;

- (c) One member appointed by the Majority Leader of the Senate;
 - (d) One member appointed by the Minority Leader of the Senate;
 - (e) The Chairman of the Assembly Standing Committee on Government Affairs;
 - (f) The Chairman of the Assembly Standing Committee on Natural Resources, Agriculture, and Mining;
 - (g) One member appointed by the Speaker of the Assembly; and
 - (h) One member appointed by the Minority Leader of the Assembly.
2. Select a chairman and vice chairman from among its members; and be it further RESOLVED, That the study must include, without limitation:
- 1. An analysis of the laws, regulations and policies regulating the use, allocation and management of water in this State;
 - 2. A review of the status of existing information and studies relating to water use, surface water resources, and groundwater resources in this State;
 - 3. An evaluation of the need, if any, for additional information or studies of water use and water resources in this State, including, without limitation, an analysis of whether:
 - (a) A need exists for additional field investigations to quantify surface water resources, groundwater resources and water uses, and if so, the procedures and costs associated with such investigations; and
 - (b) Valuable information can be obtained through placing groundwater basins, or portions thereof, under hydrologic stress by drilling and pumping wells over a period of time within those basins, and if so, the procedures and costs associated with these actions;
 - 4. A review of the report of the State Engineer provided pursuant to Assembly Bill 213 of the 2003 Session of the Nevada Legislature;
 - 5. Development of recommendations concerning appropriate statutory provisions for administrative procedures and penalties to be imposed upon a person who violates the provisions of NRS 533.460;
 - 6. An analysis of the potential ramifications of initiating procedures for the adjudication of existing rights within hydrologic basins in the State;
 - 7. An evaluation of the feasibility and desirability of quantifying the groundwater resources of this State using existing information;
 - 8. A review of statewide water use and the efficiency of water use, including, without limitation:
 - (a) Per capita water consumption;
 - (b) Water use by the economic sector; and
 - (c) Potential methods of increasing the efficiency of water use in this State;
 - 9. An analysis of the effectiveness of existing water systems for administering, controlling, allocating, distributing and protecting the water resources of this State;
 - 10. An evaluation of the potential for the government of this State to provide:
 - (a) Technical assistance and information services regarding water resources to local governments within the State; and
 - (b) Increased access to informational and educational services regarding water resources to the residents of the State;

11. An evaluation of the feasibility and advisability of creating a statutory Legislative Committee on Water Resources and prescribing its membership and duties; and be it further

RESOLVED, That the Legislative Commission is hereby directed to appoint a subcommittee of the committee to study the feasibility and advisability of consolidating the water-related services in Washoe County; and be it further

RESOLVED, That the subcommittee must:

1. Be composed of six Legislators as follows:

- (a) One member of the Senate appointed by the Chairman of the Committee;
- (b) One member of the Assembly appointed by the Chairman of the Committee;
- (c) One member appointed by the Majority Leader of the Senate;
- (d) One member appointed by the Minority Leader of the Senate;
- (e) One member appointed by the Speaker of the Assembly; and
- (f) One member appointed by the Minority Leader of the Assembly;

2. Select a chairman and vice chairman from among its members; and be it further

RESOLVED, That the study conducted by the subcommittee must include, without limitation:

1. An analysis of relevant financial considerations, ownership and operation of facilities, and potential management and staffing structures;

2. A review of potential alternatives including, without limitation, consolidation of:

(a) All water supply, wastewater treatment, flood control, storm drainage and water reclamation programs;

(b) Only water supply and wastewater treatment programs;

(c) Only the water supply programs;

(d) Only the responsibilities for procuring water and water rights, treating the water and providing the water to the existing distributors; and

(e) Only the responsibilities for procuring water and water rights and providing the water to the water treatment facilities managed by the various distributors; and be it further

RESOLVED, That the entities providing water-related services in Washoe County are hereby directed to participate and cooperate in the study and furnish all necessary assistance to the subcommittee; and be it further

RESOLVED, That any recommended legislation proposed by the committee or subcommittee must be approved by a majority of the members of the Senate and a majority of the members of the Assembly appointed to that committee or subcommittee; and be it further

RESOLVED, That the Legislative Commission shall submit a report of the results of the studies and any recommendations for legislation to the 74th Session of the Nevada Legislature.

APPENDIX B

**State Engineer's Comments on the S.C.R. 26, June 21, 2006,
"Work Session Document"**

KENNY C. GUINN
Governor

APPENDIX B
STATE OF NEVADA



ALLEN BIAGGI
Director

HUGH RICCI, P.E.
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES

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MEMORANDUM

Date: June 21, 2006

To: Members of the Legislative Commission's Committee to Study the Use, Management and Allocation of Water Resources
(S.C.R. 26, File No. 100, *Statutes of Nevada 2005*)

Through: Susan Scholley, Chief Principal Research Analyst, Research Division

From: Tracy Taylor, P.E., State Engineer

Subject: Comments to Work Session Document Recommendations

The attached document is our comments to the fifty-one (51) recommendations posed in the Work Session Document.

We look forward to working through any and all language you will be considering for bill drafts. As always, thank you for all your help during this interim-study period.

**STATE ENGINEER'S COMMENTS ON THE SCR 26
JUNE 21, 2006, WORK SESSION DOCUMENT**

WATER LAW AND ADMINISTRATION

1. PROTESTS – REOPENING OF PROTEST PERIOD. **Amend the statutes** relating to the protest procedures for water rights applications to require that the protest period be reopened for 30 days if an application is not processed within 7 years. Further, if a protest is based on impacts to a specific property, amend the statutes to allow successorship of protestant status to successive owners of the property (by sale or inheritance). The burden of notifying the Division of Water Resources, State Department of Conservation and Natural Resources (SDCNR), of a claim of succession and any change of address shall be on the person seeking successor status. See NRS 533.365. (Central Nevada Regional Water Authority, Las Vegas, May 2006)

Note: The effective date of any change to the protest period should be considered. Options include making the changes effective as to: (1) all pending applications; (2) pending applications for which hearings have not been scheduled; or (3) only applications filed after effective date of bills.

COMMENTS: The State Engineer supports this type of action in concept; however, there are a number of details that would require further consideration.

This suggestion would require the State Engineer to re-publish an application in the appropriate newspaper in order to assure everyone was aware of the dates for filing new protests. However, re-publication indicates a fiscal impact and there is no indication as to who will be responsible for the costs incurred in the re-publication. Is it contemplated that the applicant will be responsible for said costs; otherwise, the State Engineer's budget will require additional funding to provide for the cost of re-publishing applications.

Nevada Revised Statute 533.365 requires that protests must set forth with reasonable certainty the grounds of such protest and are to be verified by the affidavit of the protestant, his agent or attorney. The State Engineer takes no issue with clarifying the succession of a protest to a specific property owner when the protest was addressed to the impacts to water rights to a specific property; however, perhaps general protest grounds also asserted by that property owned should also be considered.

The State Engineer would recommend the period of time be set at 10 years as re-publication and processing of new protests will take a substantial amount of effort and a decade is a reasonable amount of time for changes in landownership and new information to have been presented. The State Engineer believes the request is to address the larger proposed water projects; therefore, he suggests that the provision only apply to requests that singularly or in multiple applications request to appropriate an amount of water equal to or greater than 500 acre-feet annually and for which hearings have not been held or scheduled.

2. **FINES. Amend statutes** to authorize the State Engineer to order any person in violation of the provisions of NRS Chapters 533, 534, 535, 536 and *Nevada Administrative Code* (NAC) Chapters 534 and 535 to: (a) pay an administrative fine not to exceed \$10,000 per day for each violation; and (b) be liable for any expense incurred by the Division of Water Resources, SDCNR, in investigating and stopping the violation. Any appeal of a violation would be done through the courts under NRS 533.450. Administrative details for addressing violations, assessing fines or penalties, and procedures would be done through the promulgation of rules and regulations. (State Engineer, Las Vegas, May 2006)

COMMENTS: The State Engineer originated this recommendation and continues to support it. Please note that Recommendations No. 38 is encompassed in this item and is somewhat related to Item No. 42.

Please see the memorandum from the State Engineer attached to the Work Session Document under Tab A.

3. **LOCAL GOVERNMENTS HOLDING WATER RIGHTS. Amend the statutes** to allow local governments to “hold” water rights for a longer time recognizing their extended planning horizon and give private parties less time to prove beneficial use. (Bevan Lister, Caliente, February 2006)

COMMENTS: The State Engineer does not believe this recommendation is necessary because such considerations are already provided for in Nevada water law

Current law provides the State Engineer flexibility in the determining timeframes initially granted a permittee for perfecting a water right and provides the State Engineer with discretionary authority in considering requests for extensions of time. Nevada Revised Statute 533.380 provides that applicants have 5 years in which to complete the construction of their works of diversion and 10 years for placing the water to beneficial use. Nevada Revised Statute 533.380 provides the State Engineer with the discretion to shorten the time for the completion of work and, for good cause shown, to extend the time in which the construction of the works of diversion must be completed. In a request for extension of time, a permittee must provide evidence of reasonable diligence and good faith in pursuing perfection of the application. Nevada Revised Statute 533.390 provides a similar provision with respect to the filing of proof of beneficial use. Since every permittee may present a different factual scenario, the State Engineer recommends this discretion not be limited by statute.

Nevada Revised Statute 533.380(4) already provides the State Engineer with many factors to consider in granting the holders of municipal or quasi-municipal water rights extensions of time for perfecting such rights. These factors include whether the holder of the water right permit has shown good cause for not having placed the water to beneficial use, the number of parcels or commercial or residential units to be served by the county, city, town, public water district or public water company, any economic conditions which affect the water right holder’s ability to make complete application of the water to beneficial use, any delays in the development of the land or the area being served which were caused by unanticipated natural

conditions, and the period contemplated in the plan for the development of a project approved by the local government, or plan for development of a planned unit development.

4. **100 YEAR SUPPLY.** Amend the statutes to require evidence of a 100-year water supply as a condition of approving new subdivisions, using the Arizona model. (Val Taylor for Snake Valley Citizens Alliance, Ely, March 2006) See relevant Arizona statutes under Tab B.

COMMENTS: The State Engineer does not support this recommendation as Nevada water law is already more protective and restrictive.

Arizona's water law presents a completely different method as to the use of water and the State Engineer does not believe statutes from other states should be readily adopted without focusing on the difference in those laws. Water rights in Nevada are administered on the perennial yield analysis of the quantity of water that can be appropriated from a groundwater basin year to year. This analysis as to the quantity of water available provides greater assurance as to a long-term supply than the 100-year supply recommended.

5. **Include a statement in the final report** urging the State Engineer to be mindful of the state policy against speculation in water rights and to prevent speculation for profit. (Val Taylor for Snake Valley Citizens Alliance, Ely, March 2006)

COMMENTS: The State Engineer takes no issue with such a statement being included in the final report because Nevada water law already directs him to consider whether applications for speculative purposes.

Nevada Revised Statute 533.370(1)(c) was enacted in reaction to the Legislature's concern about speculation in water rights. This statutory provision requires an applicant provide proof satisfactory of his intention in good faith to construct any work necessary to apply water to its intended beneficial use and the financial ability and reasonable expectation to actually construct the work and apply the water to the intended beneficial use with reasonable diligence. These provisions are sufficient for the State Engineer to determine whether an application has been filed merely for the purpose of sale.

6. SUBORDINATION OF APPLICATIONS. **Include a statement in the final report** requesting the State Engineer to consider taking action on subsequent applications when earlier filed applications are held in abeyance, if appropriate, given the specific circumstances of the affected applications. (Bevan Lister, Ely, March 2006)

COMMENTS: The State Engineer supports this recommendation only if it applies to basins with pending interbasin transfers. Otherwise, the State Engineer believes the prior appropriation system should govern.

The State Engineer is aware that water right applications filed for large interbasin transfers of water have held up the consideration of smaller applications for uses of water within the basin of origin for a number of years due to the prior appropriation system established under Nevada water law. However, the interbasin transfer statute found in Nevada Revised Statute 533.370(6) requires the State Engineer to consider whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported. The State Engineer would not oppose clarification that he can act on applications junior to the exportation project for uses of water within the basin of origin prior to acting on the request for the interbasin transfer of water.

7. NEW TECHNOLOGY OR UPDATED INFORMATION. **7. Include a statement in the final report** asking the State Engineer to consider, where appropriate, the use of new technology or updated information to determine perennial or basin yields. (Aqua Trac LLC, Elko, April 2006)

COMMENTS: The State Engineer supports such a statement in the final report because the State Engineer always wants to consider the best available science.

DIVISION OF WATER RESOURCES

8. OFFICE OF WATER RESOURCE USERS ADVOCATE. **Amend statutes** to create the Office of Water Resource Users Advocate in the State Department of Conservation and Natural Resources. This position is intended to: (a) help filter tenuous charges of injury or mismanagement related to water resources; (b) provide guidance to individuals or interests who feel injured, but may not have the sophistication to act on their concerns; and most importantly, (c) build a sense of parity among parties engaged in emerging water resource disputes. (Central Nevada Regional Water Authority and Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer must oppose this recommendation as drafted as it presents the potential for internal conflict within the Department of Conservation and Natural Resources and would be detrimental to the neutrality of the Department. The State Engineer's office is always available to the public in order to educate those who do not have the level of sophistication to act on their concerns. The Department should not take on the role of legal counsel the individuals who wish to protest a particular application.

9. FUNDING FOR WATER PLANNING. **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees for the State Engineer's budget request for additional funding for water planning activities, including funding for the position of the Chief of the Water Planning Section within the Division of Water Resources, SDCNR. See NRS 540.036. (State Engineer, Las Vegas, May 2006)

COMMENTS: The State Engineer originated this recommendation and continues to support funding the position of a Chief of Water Planning.

10. FUNDING FOR ADVISORY BOARD ON WATER RESOURCES PLANNING AND DEVELOPMENT. **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees for the State Engineer's budget request for additional funding to activate the Advisory Board on Water Resources Planning and Development. See NRS 540.111. (State Engineer, Las Vegas, May 2006)

COMMENTS: The State Engineer originated this recommendation and continues to support it.

11. **FUNDING FOR INCREASED TECHNICAL CAPACITY OF THE DIVISION OF WATER RESOURCES.** **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees recommending funding or other support for an increase in the technical capacity of the Division of Water Resources, SDCNR, (e.g. hiring persons with degrees in hydrology or hydrogeology) to allow greater monitoring, evaluation and oversight. According to testimony, this recommendation is aimed at improving the public's confidence that impacts caused by rapid water resource development will be: (a) timely recognized by the State Engineer; and (b) addressed when impacts emerge, and before they become disruptive and costly. (Central Nevada Regional Water Authority and Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer supports the Governor's Budget as proposed, but recognizes the need for additional technical capacity in the Office of the State Engineer and would put any additional funding to use for the benefit of the public.

The State Engineer has knowledge of the concern that the appropriation of water be based on technical analyses that are supported by a conclusive data and would be in support of increasing the number of hydrologists or hydrogeologists on staff. However, while recognizing the concern, the State Engineer understands there are significant fiscal impacts associated with this recommendation. The use of such personnel is becoming increasingly important in the review of information being presented by applicants in order to support their water right applications, particularly where the filings are for substantial quantities of water far in excess of the amount of water historically believed to be available for appropriation as established in the United States Geological Reports. However, even if these positions are supported, it must be recognized the State Engineer finds it challenging to find such skilled personnel willing to work under present salary constraints.

12. **FUNDING TO INCREASE ABILITY TO CONDUCT INVENTORIES.** **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees recommending the addition of staff in the Division of Water Resources, SDCNR, to increase the capacity of the Office of the State Engineer to conduct and maintain water resource inventories, through monitoring and identification of water sources, including without limitation, wells, large local springs, and surface waters. (Assemblyman Pete J. Goicoechea, District No. 35, Ely, March 2006)

COMMENTS: The State Engineer supports the Governor's Budget as proposed, but is aware of the need for additional water resource inventories and would put any additional funding to use for the benefit of the public.

The State Engineer recognizes the concern for collection of additional data and the public's request that significant amounts of data be accumulated prior to the State Engineer acting on pending applications. However, the State Engineer recognizes that associated with this recommendation there are significant fiscal impacts.

13. FUNDING TO UPDATE AND CREATE WATER RESOURCE INVENTORIES AND TO EXPEDITE HEARINGS. **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees recommending funding for additional staff in the Division of Water Resources, SDCNR, to handle the backlog of pending requests for adjudications and other hearings. (Brent Eldridge, White Pine County Commissioner, Ely, March 2006)

COMMENTS: The State Engineer supports the Governor's Budget as proposed, but is aware that additional resources are needed to handle the backlog of pending adjudications and other hearings and would put any additional funding to use for the benefit of the public, but notes that this recommendation has significant fiscal impacts.

14. FUNDING TO UPDATE AND CREATE WATER RESOURCE INVENTORIES AND EXPEDITE HEARINGS. **Send a letter of support** to the Governor and the Chairmen of the Senate Finance and Assembly Ways & Means Committees recommending additional funding for the Division of Water Resources, SDCNR, to facilitate the update and creation of water resource inventories and to expedite hearings. (Bob Erickson, Fallon City Council Member, Elko, April 2006)

COMMENTS: The State Engineer supports the Governor's Budget as proposed, but is aware that additional resources are needed to facilitate the updating and creation and to expedite hearings and would put any additional funding to use for the benefit of the public, but notes that this recommendation has significant fiscal impacts.

STUDIES/DATA

15. \$1 MILLION TO CONTINUE WATER RIGHTS TECHNICAL SUPPORT FUND. **Request an appropriation** of \$1 million to continue the Water Rights Technical Support Fund, as enacted by Senate Bill 62 (Chapter 493, *Statutes of Nevada 2005*) through the next biennium and until 2009. (Central Nevada Regional Water Authority, Ely, March 2006; Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer is neutral as to this recommendation as it does not directly affect the Office of the State Engineer.

16. **FUNDING FOR BASIN INVENTORIES. Request an appropriation** to the Division of Water Resources for the purpose of contracting for groundwater basin studies to inventory surface, ground and domestic well water in basins where conflicts are identified and prioritized. The approximate cost is \$1.6 million per basin study or about \$3.2 to \$4.8 million annually (2-3 studies). Studies would take approximately three years to complete and include the following:

(a) Phase 1 comprised of geochemical studies; aerial photos of phreatophytes (vegetation which may provide evapotranspiration estimates); samplings of existing wells and springs for quantity and quality (water level measurements); precipitation information (collection of new data using USGS, PRIZM, or other calibrated models); installation of stream gages on perennial streams, estimation of non-perennial streams, and definition of existing uses: crops, livestock needs, wildlife needs, phreatophyte needs to prevent air quality/soil erosion problems; and

(b) Phase 2 (for priority basins) with aquifer testing (well drilling, pumping and monitoring); recharge estimates from precipitation and from irrigation; hydrogeologic mapping to determine the framework or geometry of the aquifer or saturation of alluvial fills and bedrock limits; complete inflows or chloride mass balance tests; develop a groundwater budget of input and output to reach a balance; and use all the collected data and assumptions to create a full numerical model that can be used as a management tool to test water management scenarios.

This should assist the Office of the State Engineer in meeting the requirements of NRS 532.165. (Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer supports the Governor's Budget as proposed, but recognizes the need for funding additional studies that may be required. However, the State Engineer would propose a less restrictive funding structure and more flexibility on the types and length of studies than outlined under Recommendation No. 16. The State Engineer suggests an approach similar to the revolving fund that found in NRS 532.320.

The State Engineer recommends the Committee consider a \$5 million dollar fund that is to be replenished every biennium, which provides the State Engineer the discretion to determine the priority of basin studies and the type of study needed. These studies should be approached individually and it cannot be categorically stated that a particular basin study will require a specific amount of money or can be completed within a specific timeframe. The State Engineer understands the need for additional study, but suggests that a constant source of funding be provided that would assure the State Engineer the flexibility needed to determine which basin should be considered for study.

17. **LEGISLATIVE COUNSEL BUREAU COMPARATIVE STUDY. Direct the Legislative Counsel Bureau (LCB)** to undertake a comparative study of water resource organizational structures for several western states (Utah, Idaho and Arizona) to identify: (a) responsibilities for groundwater studies and conservation programs; (b) required water commitments for development; and (c) methods of how each state constructs the definitions of public benefits and public interests. The LCB study would be submitted to the 2009 Legislature. **ALTERNATIVELY OR IN ADDITION TO SUBMITTAL TO THE LEGISLATURE,** the Committee could direct that the report be submitted by January 1, 2008, to the interim committee assigned to review water resource issues. (Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer is neutral as to what areas the Legislative Counsel Bureau should be studying, but also believes this recommendation is unnecessary.

The State Engineer is presently a member of the Western States Water Council that meets yearly to discuss the issues the various states are addressing and holds workshops twice a year where the State Engineer meets with other state engineers to discuss specific issues. The State Engineer is also a member of the Western State Engineers Association, which also annually holds a spring workshop and a fall meeting. Therefore, as part of the State Engineer's current job he has ongoing discussions with the western states as to their organizational structures and the other issues referenced.

18. **ADOPT OF RESOLUTION DIRECTING COLLABORATION IN SHARING OF DATA. Adopt a resolution** directing collaboration between the State Engineer, local governments, water districts and authorities, water purveyors, large commercial/agricultural users, other water users, and the sharing of water use data, with the goal of implementing a statewide information management system to assist in the development and management of groundwater resources. (Central Nevada Regional Water Authority, Ely, March 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary as there is already significant collaboration between entities within Nevada. We recommend the Committee not consider this recommendation under the time consuming process of adopting a resolution, but rather only as a statement in the report.

The State Engineer already makes every effort to make the data possessed by the Division of Water Resources readily available to the public. A considerable amount of time and effort has gone into the creation of databases of information that are now available to the general public over the internet. The State Engineer presently has the ability to enter into cooperative agreements with the United States Geological Survey and other entities for the sharing of data and sharing is taking place; therefore, the State Engineer believes there is already a mechanism in place for collaboration and it is being done. The State Engineer believes this recommendation has substantial fiscal impacts with regard to the maintenance of a statewide information management system and questions the anticipated funding source and staffing to maintain such a system.

19. **LETTER FOR SUSTAINABLE GROUNDWATER DEVELOPMENT.** **Send a letter** to Nevada's Congressional Delegation, Desert Research Institute, the University of Nevada Reno, and University of Nevada Las Vegas, urging them to work together to obtain funding for development of a statewide research program on sustainable groundwater development, including agricultural and urban conservation, policy research, and governance structures. (Central Nevada Regional Water Authority, Ely, March 2006)

COMMENTS: The State Engineer provides no comment regarding this recommendation because this office is unclear as to what objective this item hopes to achieve.

CONSERVATION/PLANNING

20. **FUND FOR LOCAL WATER RESOURCE PLANNING.** **Amend the statutes and request an appropriation** of \$1 million to create a permanent need-based fund for local water resource planning and information management. The fund would provide grants similar to the grants provided by the Water Rights Technical Support Fund (S.B. 62) but the legislation would create a framework for long-term funding and provide clear direction for program administration by the State Board of Financing Water Projects. In addition, priority would be given to rural counties and local governments outside the urban areas within Clark and Washoe Counties. The Legislature's intent to consistently fund water resource planning and information management should be explicit in the bill. (Central Nevada Regional Water Authority and Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer takes no position with regard to this recommendation.

21. **FUND FOR GRANTS FOR WATER CONSERVATION, CAPITAL IMPROVEMENTS TO CERTAIN WATER SYSTEMS AND IMPROVEMENTS TO CERTAIN SEWAGE DISPOSAL SYSTEMS.** **Amend the statutes** to expand the eligible uses of the Fund for Grants for Water Conservation, Capital Improvements to Certain Water Systems and Improvements to Certain Sewage Disposal Systems to include requests for need-based funding for water resource plan implementation, e.g., infrastructure development. This fund is administered by the State Board for Financing Water Projects and is commonly referred to as the A.B. 198 program (See NRS 349.984). Although new development must always be encouraged to pay for its own infrastructure, communities that lack the financial capacity, that is, an established body of rate-payers to supply primary infrastructure necessary to properly locate development may need assistance. In addition, priority would be given to rural counties and local governments outside the urban areas within Clark and Washoe Counties. Appropriate assistance for these communities can be provided by allowing the A.B. 198 program to make need-based grants or low interest loans aimed at expanding supply and transmission capability to meet future growth needs as identified in water resource plans. (Central Nevada Regional Water Authority and Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer takes no position with regard to this recommendation.

22. **NO FORFEITURE FOR CONSERVATION.** **Amend the statutes** to prohibit forfeiture of water rights due to implementation of conservation measures, using Utah Code §73-1-4 as a model. (Water Resources Committee)

See attached Utah statute with pertinent sections highlighted under Tab C.

COMMENTS: The State Engineer does not oppose the concept that conserved water is not subject to the forfeiture provisions of Nevada water law; however, the specific provisions found in the Utah law may not translate appropriately into Nevada law. Nevada water law already provides a mechanism whereby a water right holder can file a request for extension of time to prevent forfeiture. The State Engineer would be more than willing to work with the bill drafters on the details and definitions of any proposed bill, but this is a very intricate area of the law and should be approached thoughtfully.

23. **ROTATIONAL CROP MANAGEMENT.** **Amend the statutes** to allow the State Engineer to approve rotational crop management contracts that thereby permit other uses of the conserved water, including leasing of such conserved water rights. The program would be based on recent Colorado legislation. See attached Colorado House Bill 06-1124 under Tab D. (Water Resources Committee)

COMMENTS: The State Engineer supports the concept of rotational crop management and Nevada Revised Statute 533.075 already provides for the rotation of surface water. However, the specific provisions found in the Colorado law may not translate appropriately into Nevada law. The State Engineer would be more than willing to work with the bill drafters on the details and definitions of any proposed legislation, but this is a very intricate area of the law and should be approached thoughtfully.

24. **CONSERVATION PLANS.** **Amend the statutes** to require water conservation plans to include what steps will be, and have been, taken to use water more efficiently and how much water may have been saved in various water use sectors, including urban, residential, commercial, agriculture, golf courses, and public facilities, such as schools, colleges, public buildings' indoor and outdoor use, and athletic fields. (Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary because Nevada Revised Statute 540.141 already define the factors that should be considered in a conservation plan.

25. **ANNUAL REPORTING OF WATER USE.** Amend the statutes to require annual reports from water providers serving 600 or more customers in counties whose population is greater than 100,000. These reports would accompany the annual water quality report and be distributed to ratepayers and the appropriate local government. Reports would include: (a) locations and amounts of water supplied by source; (b) total and average use of water by user groups, e.g., single-family, multi-family, commercial, resort-hotel casino, public facilities, golf courses; (c) total water loss in the water supply system; and (d) totals for income, expenditures, and debts of the water provider, as well as anticipated costs for each project planned within the upcoming 10 years. (Great Basin Water Network, Las Vegas, May 2006)

COMMENTS: The State Engineer is neutral on this recommendation as written, the State Engineer does recognize the value of this type of information on a statewide basis for regional planning and studies. The State Engineer already has the ability to require and has required annual reporting from many permittees.

26. **RESOLUTION SUPPORTING WATER CONSERVATION.** Adopt a resolution emphasizing the importance of and encouraging water conservation and further urging water providers to demonstrate water savings and to implement conservation (tiered) pricing. (Great Basin Water Network and Snake Valley Citizens Alliance, Ely, March 2006)

COMMENTS: While the State Engineer supports water conservation as an important element of planning, the State Engineer believes it would be wise to change this recommendation from the time consuming process of adopting a resolution to a statement in the report.

27. **RESOLUTION ENCOURAGING RURAL DEVELOPMENT.** Adopt a resolution encouraging rural development that matches the availability of water resources with new businesses and industry. (Humboldt River Basin Water Authority, Elko, April 2006; Val Taylor for Snake Valley Citizens Alliance, Ely, March 2006)

COMMENTS: While the State Engineer supports the concept that the availability of water resources should be considered in water planning and already reviews water plans submitted, the State Engineer believes it would be wise to change this recommendation from the time consuming process of adopting a resolution to a statement in the report.

INTERBASIN TRANSFERS

28. COUNTY SET ASIDE OF FEE FOR COMPENSATION FOR IMPACTS. **Amend the statutes** to authorize the counties to set aside up to \$2 of the fee on interbasin transfers to be used for compensating private parties impacted by water exports (See NRS 533.438). The counties shall adopt ordinances setting forth the application process and criteria to be used for dispersal of the funds and for the administration of the set-aside, including any provisions for reversion to the County. According to testimony, protection of senior water rights would be a priority of any such “reparations” set-aside. (Brent Eldridge, White Pine County Commissioner, Ely, March 2006)

COMMENTS: Recommendation No. 28 appears only to affect local government and the distribution of funds under NRS 533.438; however, it appears to the State Engineer that the recommendation could have unintended consequences that will likely affect the Office of the State Engineer. The Legislature has already directed the State Engineer to review impacts to existing water rights as part of the application review process and an application cannot be granted if the State Engineer believes there will be impacts to existing rights. The State Engineer does not believe this recommendation is as simple as it appears and cannot support the recommendation at this time.

29. CONSUMPTIVE USE CAN ONLY BE TRANSFERRED. **Amend the statutes** to clarify that only consumptive use can be transferred between water basins. (Brent Eldridge, White Pine County Commissioner, Ely, March 2006)

COMMENTS: The State Engineer supports consumptive use limitations and under his current authority has been placing consumptive use limitations on the transfer of water to municipal purposes that has been previously used for irrigation. The State Engineer would like to work with the bill drafter on details and definitions as this a complex concept.

30. TEMPORARY INTERBASIN TRANSFERS. **Amend the statutes** to allow issuance of temporary permits for interbasin transfers and require data reports for three to five years as a condition of the permit. Data reports shall include water levels, recharge rates, impacts to habitat, and environmental impacts. At the end of the monitoring period the State Engineer shall hold a public hearing and determine whether to issue a final permit. (Warren Russell, Elko County Commissioner, Elko, April 2006)

COMMENTS: The State Engineer does not support this recommendation. Water developed under a temporary transfer should not be used for a permanent use, such as development in our cities and towns. The State Engineer signs off on subdivision maps and questions how those maps can be signed if the water rights are only considered to be temporary. The State Engineer has tools at his disposal to acquire data from the use of water permitted under an interbasin transfers and such a tool was utilized in State Engineer's Order No. 1169, wherein water right holders were required to pump existing rights and gather data before additional water going to be considered for appropriation.

31. RESOLUTION ON FACTORS STATE ENGINEER TO CONSIDER IN PERMITTING INTERBASIN TRANSFER. **Adopt a resolution** directing the State Engineer to consider the following during the permitting process for interbasin or intercounty transfer projects that result in the exportation of a significant portion of the groundwater resources: (1) a comprehensive baseline inventory of historical and current water uses and related environmental factors; (2) an in-place, continuing monitoring system to ascertain impacts; (3) incorporation of the baseline inventory and monitoring into the project, along with the hydrogeology studies; (4) implementation of testing; and (5) incremental development of the project. (Dean Baker for Snake Valley Citizens Alliance, Las Vegas, May 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary because he already has the statutory authority to perform these functions and can take these into account when reviewing interbasin transfer applications.

The State Engineer is not sure what a resolution hopes to accomplish, but this resolution is similar to legislation proposed last session that called for the adjudication of water rights in a basin before the allowance of an interbasin transfer. A comprehensive baseline inventory of historical and current water uses is the work that is performed in an adjudication. Requiring a comprehensive baseline inventory (an adjudication) and related environmental factors would have an enormous economic impact on Nevada in that it would essentially halt development all over the state in areas such as Reno, Sparks, Churchill County, Las Vegas and Mesquite, which are all looking outside the basins in which they are physically located for water to support their communities and would essentially stop all interbasin transfers from many years.

To complete a comprehensive baseline inventory of historical and current water uses and related environmental factors would first mean funding and finding dozens and dozens of qualified employees that would require significant training, would require millions of dollars on an annual basis for their salaries and equipment and would require support staff for data entry, and would require years of fieldwork. The State Engineer is already requiring monitoring plans for interbasin transfers of water and it is not clear what the recommendation means by implementation testing.

32. RESOLUTION DIRECTING BASELINE INVENTORY. **Adopt a resolution** directing the Division of Water Resources, SDCNR, to establish a baseline inventory over time, including: (a) information and data on certificated rights; (b) historical and actual uses; (c) proof of beneficial uses; and (d) itemization of acres affected by surface/subsurface flows or water tables that create meadows or pastures. Further, direct the Division to implement monitoring systems. (Connie Simkin, Caliente, February 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary because he already has the statutory authority to perform these functions and much of the information currently exists within the Division of Water Resources.

The Division of Water Resources already has information on certificated water rights in its database. In basins where annual pumpage inventories are performed, the Division of Water Resources has information on historical and actual water use. Where pre-statutory water right holders have filed claims of vested water rights, that information is also available in the Division of Water Resources. All permittees are required to file proof of beneficial use during the certification process. As to the itemization of acres affected by surface/subsurface flows or water tables that create meadows or pastures, in Nevada it is most likely that a claim of pre-statutory vested right exists and would be considered during the adjudication process. This request, like the one in Item No. 31 would require a substantial increase in the workforce and budget of the Division of Water Resources. To inventory every basin every year would require an extremely large financial expansion of the budget for the Division of Water Resources for fieldwork and furtherance of the adjudication of every basin.

33. NEW MODELS. **Send a letter** requesting the State Engineer to investigate new models estimating impacts from interbasin transfers of large quantities of water. (Brent Eldridge, White Pine County Commissioner, Ely, March 2006)

COMMENTS: The State Engineer has no objection to a letter being issued as he always considers the newest models.

34. STATEMENT TO SOUTHERN NEVADA WATER AUTHORITY. **Include a statement in the final report** urging the Southern Nevada Water Authority and the State Engineer, in connection with an interbasin transfer, to: (1) develop a clear description of the project; (2) identify and investigate the potential environmental and socio-economic impacts of the project; (3) ensure that rural communities have adequate water for future development; (4) develop and implement a rigorous monitoring program; (5) regulate purchases from urban areas; and (6) consider conveyance of water by lease rather than transfer of ownership. (Greg James, Attorney, Las Vegas, May 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary, as he is already required by statute to perform the functions suggested in this proposal.

The State Engineer believes the potential environmental impacts will be addressed during the water rights hearing process and the federal environmental review process conducted under the National Environmental Policy Act. Nevada water law found in NRS 533.370(6) requires the State Engineer to address whether an interbasin transfer is environmentally sound as it relates to the basin from which the water is exported and whether the proposed interbasin transfer is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported. The State Engineer is already requiring monitoring programs on interbasin transfers of water. The State Engineer is not clear as to what the proposal is attempting to address as to regulating purchases from urban areas, and therefore, makes no comment on this provision. It is unclear what the person proposing the conveyance of water by lease rather than transfer of ownership meant and therefore makes no comments on this provision.

WELLS/GROUNDWATER ISSUES

35. FORFEITURE NOTICE. **Amend the statutes** to require that the State Engineer to give notice in all basins prior to forfeiture for nonuse of water. In the absence of pumping records in certain basins, the State Engineer may base a notice of forfeiture on other evidence of nonuse. Currently, prior to forfeiture the State Engineer must give notice of four years of nonuse only in basins for which the State Engineer has pumping records, also referred to as inventoried basins. See NRS 534.090. (Assemblyman Pete J. Goicoechea, District No. 35, Las Vegas, October 2005)

COMMENTS: The State Engineer will support this recommendation with considerations similar to those discussed during the previous amendments of NRS 534.090. This provision should not be used to re-start the clock on water rights having more than 5 consecutive years of non-use at the time any legislation is enacted. The recommendation also raises a number of practical considerations described below.

In basins where the State Engineer does not conduct pumpage inventories, a person or entity outside the Office of the State Engineer may initiate a forfeiture proceeding. In order to determine if there was any validity to the allegation, the State Engineer would be required to hold a hearing to determine if there is clear and convincing evidence of non-use. Under this provision the person would then get notice after the hearing of the potential forfeiture? Another example is where a water right permit holder has filed extensions of time to prevent forfeiture. It is the water right holder themselves that has informed the State Engineer that the water is not being used. If use of the water is not timely resumed, is the water right forfeited or would this provision then require an additional notice of possible forfeiture? The State Engineer would be concerned about the retroactive application of such as statute, as he was when the statute applicable to inventoried basins was enacted.

36. **PRIORITY DATE ON DOMESTIC WELL.** **Amend the statutes** to set the priority date for a domestic well as the completion date of the well as stated on the well log submitted to the Division of Water Resources, SDCNR, by the well driller. (State Engineer, Las Vegas, May 2006; Central Nevada Regional Water Authority, Ely, March 2006)
See attached memorandum from State Engineer under Tab A.

COMMENTS: The State Engineer originated this recommendation and continues to support it. Please see the memorandum from the State Engineer attached to the Work Session Documents as Tab A.

37. **MOTHER-IN-LAW QUARTERS:** **Amend the statutes** to address water service to auxiliary dwellings, e.g., caretaker's quarters or mother-in-law unit, from a domestic well if: (a) local ordinances allow for such uses; and (b) with the condition that a meter be installed on the well to measure usage to ensure the total water pumped does not exceed 2 acre feet. In addition, the proposed amendment would quantify the limit on domestic use as 2 acre-feet per year instead of 1,800 gallons per day (gpd). This change recognizes that more water is usually needed in the summer months than in the winter months and that the total annual use from a domestic well is what is used for planning purposes. See NRS 534.013 and 534.180.
(State Engineer, Las Vegas, May 2006)

COMMENTS: The State Engineer originated this recommendation and continues to support it. Please see the memorandum from State Engineer attached to the Work Session Documents as Tab A.

38. **FINING AUTHORITY. Amend the statutes** to authorize the State Engineer to order any person in violation of the provisions of NRS Chapter 534 and NAC Chapter 534 to: (a) pay an administrative fine not to exceed \$10,000 per day for each violation; and (b) be liable for any expense incurred by the Division of Water Resources, SDCNR, in investigating and stopping the violation. Any appeal of a violation will be done through the courts pursuant to NRS 533.450. The details for addressing violations, assessing fines or penalties, and procedures will be done through the promulgation of rules and regulations. (State Engineer, Las Vegas, May 2006)

Note: This recommendation may be moot if the Committee approves Recommendation No. 2. See attached memorandum from State Engineer under Tab A.

COMMENTS: The State Engineer originated this recommendation and continues to support it. Please see the memorandum from State Engineer attached to the Work Session Documents as Tab A.

39. **CEASE PUMPING ORDER. Amend the statutes** to clarify that the State Engineer can order a groundwater permittee to cease pumping if monitoring shows significant impacts. (Senator Mark E. Amodei, Capital Senatorial District; Warren Russell, Elko County Commissioner, Elko, April 2006)

COMMENTS: The State Engineer supports this recommendation as it clarifies his present authority.

Under NRS 534.110 the State Engineer can regulate the use of water under a municipal, quasi-municipal or industrial permit to limit or prohibit the pumping of water to prohibit any unreasonable adverse effect on an existing domestic well located within 2,500 feet of the well, unless the holder of the permit and the owner of the domestic well have agreed to alternative measures to mitigate the adverse effects. The State Engineer may currently order a water right holder to cease pumping if adverse impacts are being caused to a senior water right holder.

40. **DEDICATION FOR DOMESTIC WELLS. Amend the statutes** to require a minimum dedication of water rights for parcel maps if local ordinances do not regulate domestic wells. **ALTERNATIVELY**, amend the statutes to require the State Engineer to initiate designation of basins in jurisdictions without local regulation of domestic wells and to require the dedication of water rights for parcel maps in designated basins. See NRS 278.462 and NRS 534.430. (Senator Mark E. Amodei, Capital Senatorial District, Elko, April 2006)

COMMENTS: The State Engineer supports this recommendation but the authority to require the dedication of water rights should be discretionary instead of being required.

41. DOMESTIC WELL IMPACTS. **Adopt a resolution** urging counties and cities concerned about the impact of domestic wells on water resources to enact local ordinances that require water rights for drilling of domestic wells on newly created parcels. Furthermore the water right dedicated for the domestic well, held by the county or city, could be transferred to a public utility when or if the parcel is served by a municipality or a water purveyor regulated by the Public Utilities Commission or the Nevada Division of Environmental Protection, SDCNR. (Steve Walker, Ely, March 2006)

COMMENTS: The State Engineer supports urging cities and counties to consider the impacts of domestic wells on water resource availability.

42. GROUNDWATER PUMPING. **Send a letter** to the State Engineer urging him to consider the recommendations of the Advisory Committee for Groundwater Management in the Las Vegas Valley to bring well owners into compliance with permit terms or statutory limits on groundwater pumping through a graduated assessment structure based upon the quantity of water overpumped and the duration of non-compliance with permit or statutory limits, with an allowance for meter error. Further, for certain residential properties with allocations of less than 1,000 gpd per residence, urge the State Engineer to support the Advisory Committee's recommendation that penalties only be applied to water use over 1,000 gpd.

Note: This letter would be sent upon the passage of a bill amending the statutes to authorize the State Engineer to levy fines for overpumping. (John Hiatt, Advisory Committee for Groundwater Management, Las Vegas, May 2006)

COMMENTS: Please see the State Engineer's comments as to Recommendation No. 2 – fining authority for overpumping.

The State Engineer does not agree there should be any provision for graduated assessment. Either a permit holder is pumping within the conditions of the water right permit or the limitations on domestic wells or he is not. The proposal confuses water right permits with the statutory limitations placed on domestic wells and the two should not be mixed. Community wells operating under water right permits are distinct from domestic wells presently exempt from the permitting process.

43. DOMESTIC WELL QUANTITY PUMPED. **Amend the statutes** to allow the daily pumping limit of 1,800 gpd for domestic wells to be averaged over a calendar year for the purpose of determining compliance with pumping limits. (Ray Preston for Nevada Well Owners Association, Las Vegas, May 2006)

COMMENTS: Under Item No. 37, the State Engineer has proposed amending the statutes to allow 2 acre-feet per year to be pumped from a domestic well; therefore, this recommendation may be unnecessary.

44. OVER PUMPING BY DOMESTIC WELL OWNERS. **Amend the statutes** to enable domestic or quasi-municipal well owners to "purchase" additional water (over the 1,800 gpd)

from the local water purveyor to address overuse through an offset mechanism whereby the water purveyor would reduce its pumping by an equivalent amount. (Ray Preston for Nevada Well Owners Association, Las Vegas, May 2006)

COMMENTS: The State Engineer opposes this recommendation.

If a domestic well owner is going to use more water than allotted for a domestic purpose, the well owner should obtain a water right. This proposal conflicts with the fundamental application of Nevada water law.

45. **TRADING ALLOCATION POOL.** **Amend the statutes** to enable domestic or quasi-municipal well owners to form a “Trading Allocation Pool (TAP)” consisting of credits from owners of wells using less than 1,800 gpd that are sold to the TAP for purchase by well owners desiring to exceed the 1,800 gpd limit. The TAP could be a non-profit organization or implemented by a willing water purveyor. (Ray Preston for Nevada Well Owners Association, Las Vegas, May 2006)

COMMENTS: The State Engineer opposes this recommendation.

There has been continual confusion by domestic well owners between the rights of use under a domestic well and the rights of use under community well permit holders. If the domestic well owner is going to use more water than allotted for a domestic purpose, the well owner should obtain a water right and file a change application under Nevada’s water law. This provision would require meters to be placed on all domestic wells resulting in a need for additional monitoring of those wells.

46. **DOMESTIC WELL USE.** **Adopt a resolution** urging the State Engineer and local governments, water districts and authorities, water purveyors, and others, to work together to predict and quantify domestic well use to facilitate planning and mitigation. (Central Nevada Regional Water Authority, Ely, March 2006)

COMMENTS: The State Engineer believes this recommendation may be unnecessary as the number of domestic wells are already qualified.

47. **MITIGATION POLICY.** **Send a letter** to the Division of Water Resources, SDCNR, requesting the development of policies for mitigation for over-appropriation of groundwater and asking the Division to report its findings to the 2009 Legislature. (Central Nevada Regional Water Authority, Ely, March 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary and that the activities it contemplates with such a broad directive would be extremely time consuming and a waste of valuable staff time that is being demanded in other places. Nevada water law provides a policy for over-appropriation and it is found in the concept of basin regulation by priority of right. See NRS § 534.110 and 534.120. Additionally, the State Engineer has the

authority to order cessation of pumping if impacts are demonstrated to existing rights. The State Engineer believes mitigation should be considered on a case-by-case basis and often is a matter of resolution between parties with conflicting rights. The State Engineer does not agree that specific written policies are useful or warranted, and as such would have to oppose this recommendation at this time.

48. SUBSURFACE IRRIGATED LANDS. Include a statement in the final report urging the State Engineer to look at impacts on subsurface irrigated lands when approving groundwater permits. (Connie Simkin, Caliente, February 2006)

COMMENTS: The State Engineer believes this recommendation is unnecessary. The State Engineer addresses impacts to existing rights during the application review process and would assess whether a water right had been alleged as to irrigated lands.

MISCELLANEOUS

49. INTERIM STANDING COMMITTEE. Amend the statutes to create an interim standing committee on water resources with a sunset date of June 30, 2015. (Water Resources Committee)

COMMENTS: Over the last 46 years numerous interim committees have been created and committee reports exist from 1959, 1981, 1985, 1991 and 1994 with another going to be presented by this Committee. These committees have performed comprehensive reviews of Nevada water law and policy and all have reached similar basic conclusions, that Nevada's water law works well and the policy should be to maintain and preserve the water resources of the state and to promote, participate in and fund basic studies. These committees have also spent considerable amounts of time discussing speculation, conservation, interbasin and intercounty transfers of water and development of resources from the carbonate-rock aquifer(s), staffing and water planning. These reports have provided valuable and productive information and have adequately addressed the policy matters that will face us in the future. While the work of these committees have resulted in important legislation, the State Engineer does not believe a standing committee is warranted, but rather the committees appointed every decade or so are sufficient to address the issues important to Nevada's citizens. In addition, while appreciating the work of the committees, the State Engineer notes that significant amounts of time are spent by the State Engineer and his staff in preparation for and attendance at the committee meetings, while at the same time the Legislature has directed the State Engineer to handle the backlog of pending applications. This conflict of tasks reduces the efficiency of the Office of the State Engineer and results in delays in decisions on specific water right matters at a time the public is requesting things be handled more expeditiously. Unless there is a truly valid purpose in continuing the committee, the State Engineer believes his time is better spent working on increasing the output of all matters pending in the Office of the State Engineer and questions whether the creation of another interim committee is warranted at this time.

50. LINCOLN COUNTY WATER DISTRICT. Amend the Lincoln County Water District Act (S.B. 336—2003 Session) to require election of the Water District Board so that the Lincoln

County Commission would no longer function as the Water District Board. (Warren and Ruby Lister, Elko, April 2006)

COMMENTS: The State Engineer has no comments as to this recommendation.

51. HUGH RICCI. **Adopt a proclamation** from the Committee commending Hugh Ricci for his years of state service and retirement as State Engineer. (Water Resources Committee)

COMMENTS: The State Engineer would support the recommendation.

APPENDIX C

Letter dated June 2, 2006, from State Engineer on Bill Draft Proposals

APPENDIX C

STATE OF NEVADA

KENNY C. GUINN
Governor



ALLEN BIAGGI
Director

HUGH RICCI, P.E.
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES

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Carson City, Nevada 89706

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MEMORANDUM

Date: June 2, 2006

To: Members of the Legislative Commission's Committee to Study the Use, Management and Allocation of Water Resources
(S.C.R. 26, File No. 100, *Statutes of Nevada 2005*)

Through: Susan Scholley, Chief Principal Research Analyst, Research Division

From: Hugh Ricci, P.E., State Engineer

Subject: Bill Draft Proposals

The following are three (3) bill draft suggestions for your consideration. They address the issue with mother-in-law quarters, priorities for domestic wells and request authority to fine for violations of the water law. The first two bill drafts provide specific statutory amendment language however the third bill draft simply requests authority for penalties. Our office is working on specific language for penalties based on recently adopted language in other states. We hope we will have the opportunity to provide this language to you in the very near future.

In addition to the bill draft language, two of the three drafts would have fiscal impacts to our office. These costs will not be included in our budget for '08-'09.

We look forward to working through any and all language you will be considering for bill drafts. As always, thank you for all your help during this interim-study period.

APPENDIX C

BDR – Mother-In-Law Quarters

Issue:

There are areas in the state where there is more than one residence connected to a domestic well illegally, OR there is a desire to hook-up an additional residence to a domestic well. In areas where the State Engineer has issued an order denying any new quasi-municipal (community well) permits, a person wanting to hook-up an auxiliary dwelling to his domestic well is forced to purchase an existing water right and move it to the domestic well which can be cost prohibitive.

Concept:

The following language are amendments to NRS 534.013 and 534.180 which provides auxiliary dwellings on a domestic well in those areas where local ordinances allow for it and with the condition that a meter be installed on the well to measure usage to ensure the total water pumped does not exceed 2 acre feet.

In addition, domestic use is quantified as 2 acre-feet per year instead of 1,800 gallons per day. This amendment will clear up the issue of allowing only 1,800 gallons of usage per day regardless of the time of year. Obviously, more water is needed in the summer months than in the winter months and ultimately, the total annual use from a domestic well is what is used for planning purposes.

Fiscal Impact:

Yes. One additional staff engineer will be needed to review and monitor these new uses at an annual cost of approximately \$70,000 and an initial expenditure of \$25,000 to cover a vehicle, computer and office furniture.

NRS 534.013 “Domestic use” defined. “Domestic use” or “domestic purposes” extends to culinary and household purposes directly related to a single-family dwelling, *unless local planning agency ordinances extends such use to buildings accessory to said single family dwelling*, including, without limitation, the watering of a family garden and lawn and the watering of livestock and any other domestic animals or household pets, if the amount of water drawn does not exceed the ~~threshold daily~~ maximum amount set in NRS 534.180.

NRS 534.180 Applicability of chapter to wells used for domestic purposes; registration and plugging of wells used for domestic purposes.

1. Except as otherwise provided in subsection 2 and as to the furnishing of any information required by the State Engineer, this chapter does not apply in the matter of obtaining permits for the development and use of underground water from a well for domestic purposes where the draught does not exceed *two (2) acre feet per year*. ~~daily maximum of 1,800 gallons.~~
2. The State Engineer may designate any groundwater basin or portion thereof as a basin in which the registration of a well is required if the well is drilled for the development and use of underground water for domestic purposes. A driller who drills such a well shall register the information required by the State Engineer

within 10 days after the completion of the well. The State Engineer shall make available forms for the registration of such wells and shall maintain a register of those wells.

3. The State Engineer may require the plugging of such a well which is drilled on or after July 1, 1981, at any time not sooner than 1 year after water can be furnished to the site by:

- (a) A political subdivision of this State; or
 - (b) A public utility whose rates and service are regulated by the Public Utilities Commission of Nevada,
- but only if the charge for making the connection to the service is less than \$200.

4. *For those domestic wells supplying water to an accessory dwelling as defined by the local planning agency and pursuant to NRS 534.013, the following conditions apply:*

- a) *Any such approval by a local planning agency shall require a meter that shall measure the total amount of water use from the well and that use shall not exceed two (2) acre feet per year. The local planning agency shall inform the state engineer of the use of a domestic well in this manner on a form supplied by the state engineer. The state engineer will be responsible for monitoring water use from the well and taking any enforcement action for violations of this chapter.*
- b) *No other manner of use will be allowed from a domestic well. The priority for any new use from a well under this section will be the date of the approval by the local planning agency. The priority date for the previous use will be the date in which the well was completed as evidenced by the well log required under NRS 534.170.*

BDR - Domestic Well Priority

Issue:

The statutes are silent regarding the priority of domestic wells. The priority of permitted wells is the date that the original application is filed in the office of the State Engineer. Because domestic use does not require the filing of a water rights application, there is no coinciding priority date. The foundation of Nevada's water law is first-in-time, first-in-right, therefore it is critical to have a priority for domestic wells.

Concept:

The following language is an amendment to NRS 534.080 and provides for assigning a priority to domestic wells.

Fiscal Impact:

No.

NRS 534.080 Appropriation of underground water for beneficial use from artesian or definable aquifer: Acquisition of rights under chapter 533 of NRS; orders to desist; dates of priority.

1. A legal right to appropriate underground water for beneficial use from an artesian or definable aquifer subsequent to March 22, 1913, or from percolating water, the course and boundaries of which are incapable of determination, subsequent to March 25, 1939, can only be acquired by complying with the provisions of chapter 533 of NRS pertaining to the appropriation of water.

2. The State Engineer may, upon written notice sent by registered or certified mail, return receipt requested, advise the owner of a well who is using water therefrom without a permit to appropriate such water to cease using such water until he has complied with the laws pertaining to the appropriation of water. If the owner fails to initiate proceedings to secure such permit within 30 days from the date of such notice he shall be guilty of a misdemeanor.

3. The date of priority:

- a. of all appropriations of water from an underground source, pursuant to this section, is the date when application is made in proper form and filed in the office of the State Engineer pursuant to the provisions of chapter 533 of NRS.
- b. for domestic wells as defined under NRS 534.013, is the completion date of the well as stated on the well log submitted to the division by the responsible driller.

BDR - Penalties

Issue:

The existing process for addressing violations of the water law is slow and cumbersome without any meaningful consequence or accountability for violations. Therefore, additional penalty authority is needed to ensure the proper and appropriate use of Nevada's water resources.

Concept:

Provide the state engineer authority to order any person in violation of the provisions under Nevada Revised Statutes (NRS) chapters 533, 534, 535, 536 and Nevada Administrative Code (NAC) chapters 534 and 535 to:

1. Pay an administrative fine not to exceed \$10,000 per day for each violation; and
2. Be liable for any expense incurred by the Division of Water Resources in investigating and stopping the violation.

Any appeal of a violation should be done through the courts pursuant to NRS 533.450.

It is envisioned that the details for addressing violations, assessing fines or penalties, etc., would be done through the promulgation of rules and regulations. We welcome the opportunity to provide you with language we have drafted based on recently adopted codes from other states.

Fiscal Impact:

Yes. Two additional staff engineers and one additional Deputy Attorney General will be needed to enforce the new regulations at an annual cost of approximately \$250,000 and an initial expenditure of \$30,000 to cover a vehicle, computer and office furniture.

What violations should be subject to a fines/penalties?

The following sections within the water law provide for misdemeanors against any violators. The State Engineer is seeking penalty authority within those statutes:

NRS Chapter 533

- Willful waste of water, illegal uses (533.460)
- Interference with headgates (533.465)
- Violations of any of the provisions of 533.010 to 533.475 (533.480)
- Illegal livestock watering (533.505)
- Unlawful diversion and waste of water (533.530)

NRS Chapter 534

- Any person using water after a permit has been withdrawn, denied, cancelled, revoked or forfeited (534.050)
- Waste of water from an artesian well (534.070)
- Owner of a well who is using water without a permit to appropriate such water (534.080)
- Violating any of the provisions of 534.010 to 534.180 shall be guilty of a misdemeanor.

NRS Chapter 535

- Any person beginning the construction of a dam before approval of plans and specs (535.010)
- Whenever any appropriator of water has the lawful right-of-way for the storage, diversion or carriage of water, it shall be unlawful to place or maintain any obstruction that shall interfere with the use of his works or prevent convenient access thereto (535.090)
- Unlawful removal, damage or destruction of piling, dike, dock or lock; unlawful structures. (535.110)

NRS Chapter 536

- Every person who shall willfully and maliciously remove, damage or destroy a ditch or flume lawfully erected for carrying water or draining land. (536.120)

NAC 535

- A person who violates any provision of this chapter.

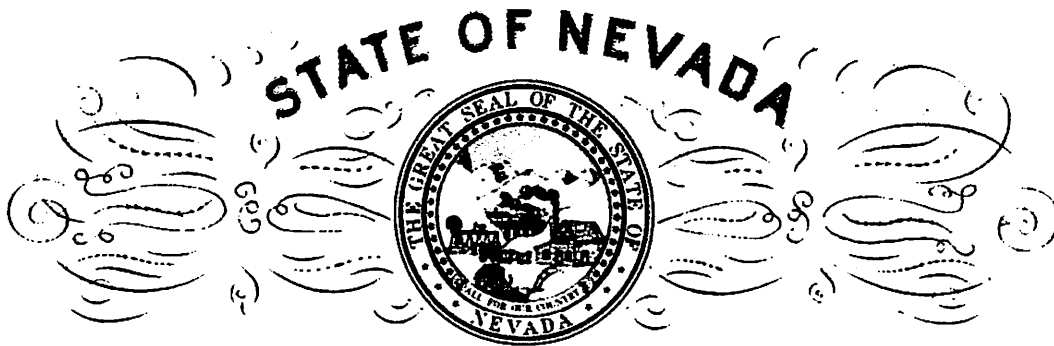
Additional areas where fines and penalties should apply:

NAC 534

- Well Drilling Infractions
 - Well Plugging
 - Well Construction
 - Licensing/Non-licensing issue
 - Failure to file required paperwork
 - Fraudulent paperwork

APPENDIX D

Proclamation for Hugh Ricci



PROCLAMATION

WHEREAS, Hugh Ricci was born in east Ely in 1944 to proud Italian-American parents; and

WHEREAS, Hugh enjoyed all that eastern Nevada had to offer while growing up and acquired a lifelong appreciation of all things Italian; and

WHEREAS, Hugh attended the University of Nevada Reno, graduated with a B.S. in Civil Engineering in 1967, and then served his country in the U.S. Army; and

WHEREAS, Hugh began his employment with the State of Nevada in 1970 as a Civil Engineer with the Nevada Department of Highways and, in 1974, transferred to the Nevada Division of Environmental Protection as an Environmental Engineer in the Air Quality Section; and

WHEREAS, In 1981, Hugh went to work for the Division of Water Resources and served in a variety of positions, ultimately becoming a Deputy State Engineer; and

WHEREAS, In 2000, Hugh was appointed State Engineer and served as State Engineer for six years—surviving three legislative sessions—until his retirement in June 2006; now, therefore, be it

PROCLAIMED, That the Legislative Commission's Committee on the Use, Management, and Allocation of Water Resources extends its gratitude to Hugh Ricci for his lifelong service to the people of Nevada and for his assistance to the Committee during the 2005-2006 interim; and be it further

PROCLAIMED, That the Committee on the Use, Management, and Allocation of Water Resources recognizes Hugh Ricci's service as State Engineer—a difficult job in the driest state in the U.S.—and extends its best wishes to him and his wife Pam, and to his enjoyment of a well-earned retirement of rock hunting and remodeling.

DATED this 1st day of December, 2006.

A handwritten signature in dark ink, appearing to read "Dean A. Rhoads".

Nevada State Senator Dean Rhoads,
Chairman, Committee on Water Resources

APPENDIX E

Suggested Legislation

The following Bill Draft Requests will be available during the 2007 Legislative Session, or can be accessed after “Introduction” at the following Web site: <http://www.leg.state.nv.us/74th/BDRList/>.

- | | |
|------------|---|
| BDR R-204 | Urges Various Actions Concerning Water Resources. |
| BDR 17-205 | Establishes a Statutory Legislative Committee on Water Resources. |
| BDR 48-206 | Authorizes the State Engineer to Impose Administrative Fines for Certain Violations. |
| BDR 48-207 | Makes Various Changes Relating to Funding for Water Resource Planning and Implementation. |
| BDR 48-208 | Makes Various Changes Relating to Water Resources. |



Nye County Nuclear Waste Repository Office

Long-Term Water Level Trends In Pahrump Valley

Presented by

Tom Buqo

**Devils Hole Workshop
May 2 – 3, 2007**

Long-Term Water Levels in Pahrump – Why Do We Care?

- Declines have been documented.
- Pahrump Valley has more domestic water wells (>10,000), than any other basin in the State of Nevada (and still drilling).
- Most (82%) of these domestic wells have been drilled to depths of only 140 ft to 160 ft below land surface.
- Land subsidence in portions of the basin has been attributed to water level declines and has led to catastrophic failure.
- Lack of long-term pilot points for numerical model calibration.
- People want to know.

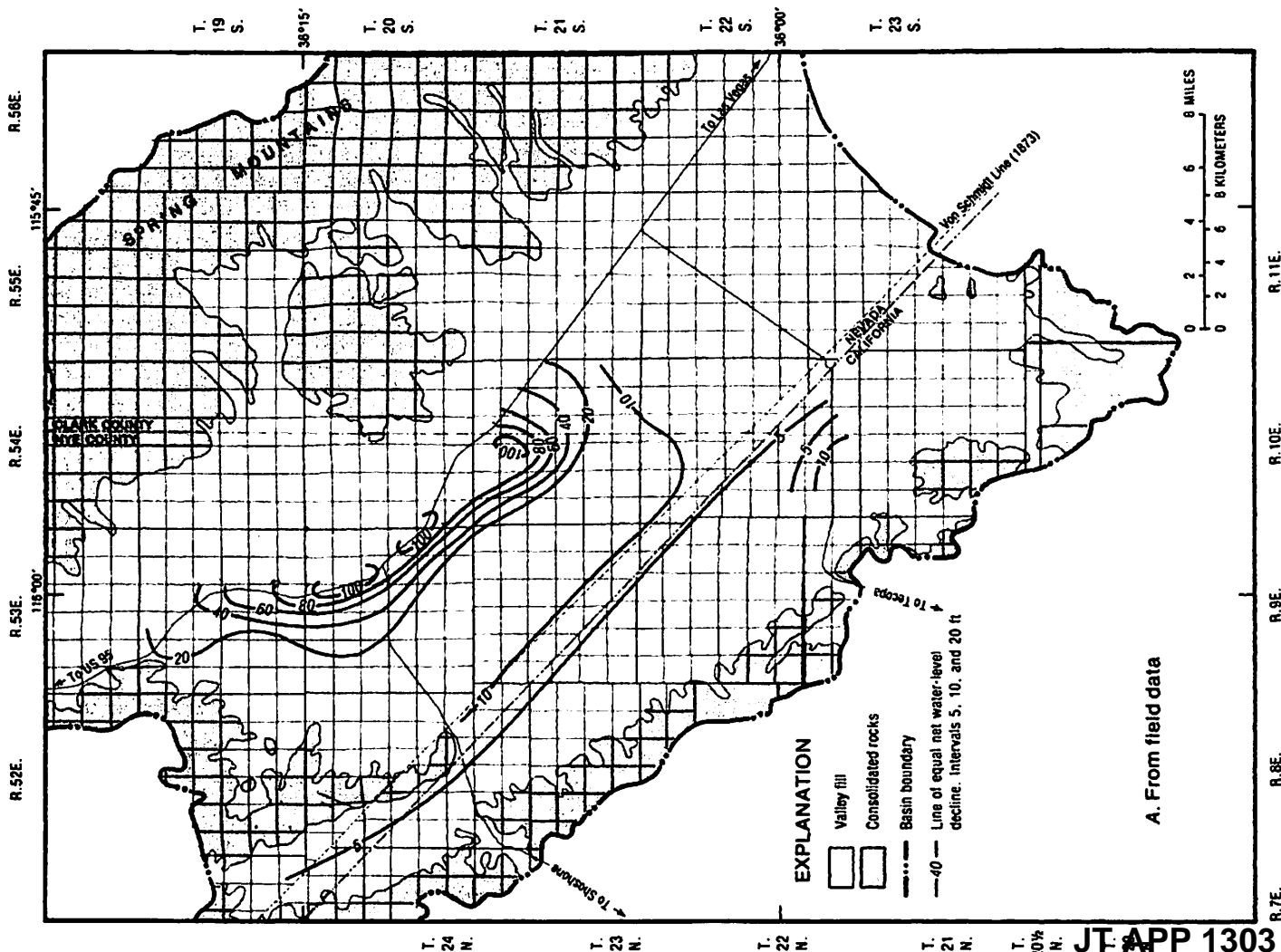
Long-Term Water Levels in Pahrump – Documentation

Developed three-layer model of basin to simulate pre-pumping natural water level and effects of groundwater withdrawals from 1913 to 1975.

From 1962 to 1975, 540,000 acre feet were withdrawn with about 40% (219,000 af) from storage depletion.

Conclusion 13. – “ ... pumping can remain at the 1975 level [40,800 af] for many years before the reservoir of stored groundwater is seriously depleted. If serious problems arise they will probably not be related to running out of water on a valley-wide basis but, instead, to situations such as deteriorating water quality, land subsidence, or too closely spaced pumping.

Harrill, J.R., 1986, Groundwater Storage Depletion in Pahrump Valley, Nevada-California, 1962-75, U.S. Geological Survey, Water-Supply Paper 2279.



Net water-level declines, 1913-76 from field data.

Long-Term Water Levels in Pahrump - Documentation

NYE COUNTY WATER RESOURCES PLAN (August, 2004)

Updated USGS hydrographs and developed hydrographs from DWR Well Log Database.

Identifies two general valley-wide trends:

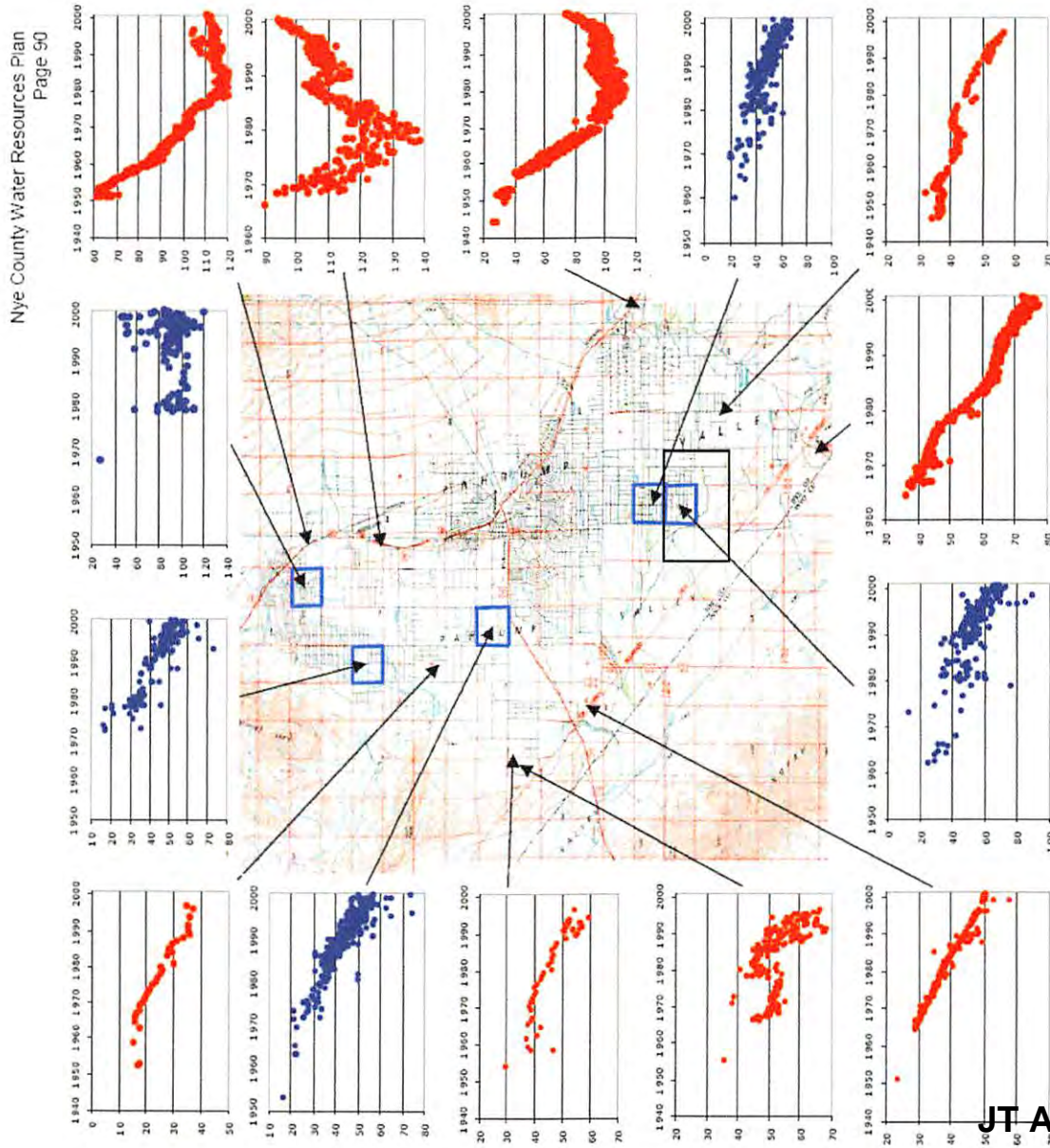
Trend 1 – Declining water levels until ~1980 followed by rise in water levels

Trend 2 – General decline in water levels over period of development

Looked at recent trends in six square mile area in southern Pahrump with 936 water wells.

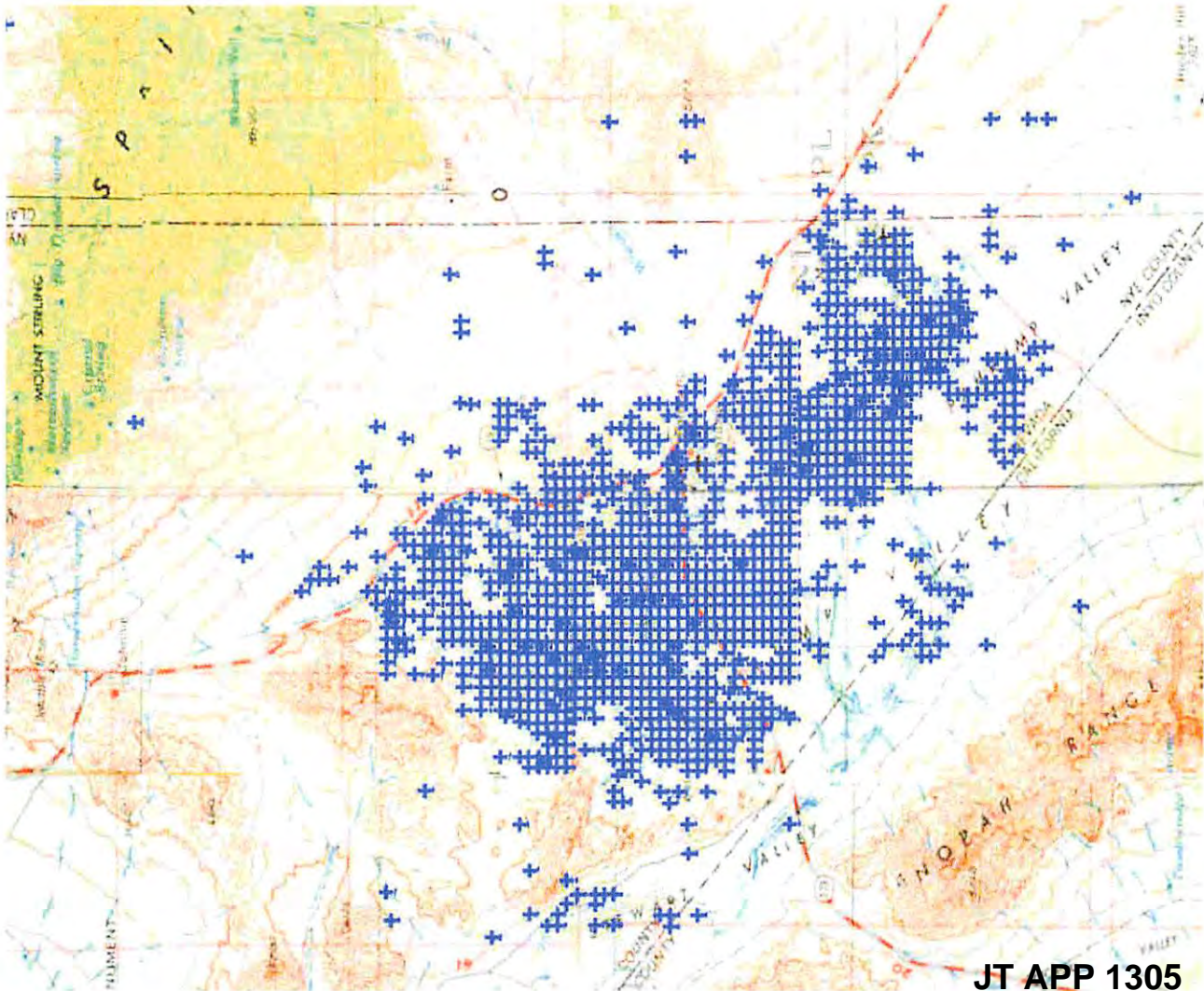
Did not include DWR water level data; just data from Well Log DB.

Identified impacts of overdraft as subsidence, higher well drilling and pumping costs, and water quality degradation.



Long-Term Water Level Trends in Pahrump Valley 1940-2000

Long-Term Water Levels in Pahrump – Domestic Water Wells



JT APP 1305

SE ROA 1258

DIVISION OF WATER RESOURCES WELL LOG DATABASE

(March, 2005)

10,857 total wells with 10,191
domestic wells (94%)

Depth Range (ft)	Number Drilled	Percent
<100	11	0.10
100 – 139	642	6.3
140	6,063	59
141-160	1,741	17
161 – 199	618	6.1
200 – 499	1,098	11
500 – 1000	13	0.13
>1,000	1	0.01

Note: Does not add up to 100 percent
because of four well logs with no
reported depth drilled.

Subsidence - Documentation



UNR Masters Thesis by Utley (2004)

Used satellite radar imagery to evaluate subsidence in Pahrump Valley.

Compared radar images taken months or years apart, to identify areas where subsidence or uplift is active.

Subsidence fringes were identified around a “bowl” in southern Pahrump.

Subsidence features occurs on the edges of the bowl.

Attributes subsidence to declining water tables.

NC Board of County Commissioners adopted geotechnical requirements in 2006.

Figure 3-16. Zoomed view of subsidence fringes in interferogram 14510_28538 (28 Jan 1998 to 4 Oct 2000). Roads indicated in white; fissures indicated in pink; faults indicated in black; GPS benchmarks indicated by small squares. See appendix for full view of interferogram.



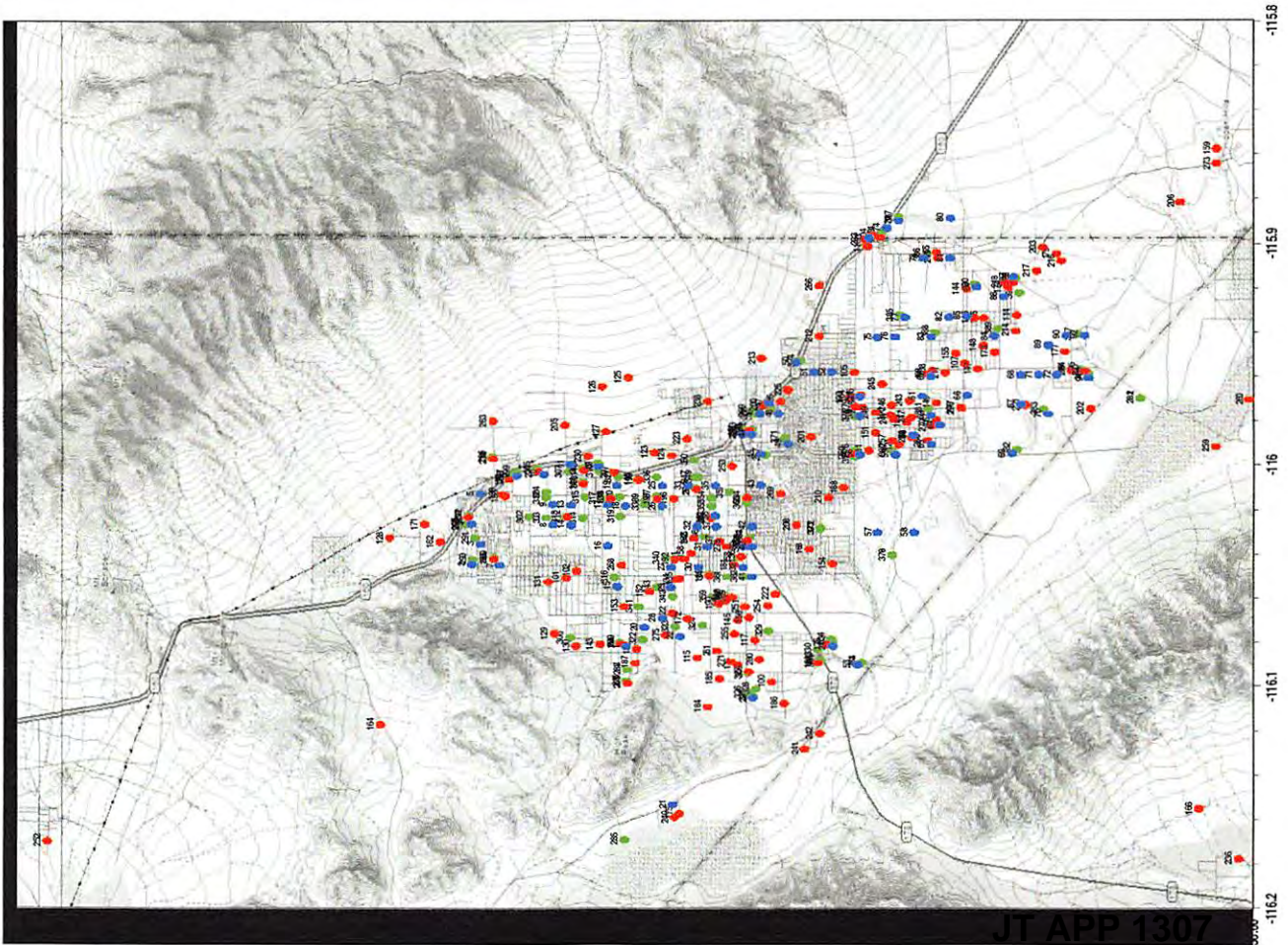
Long-Term Water Levels in Pahrump – Available Data

- USGS NWIS (196)
- DWR Water Level Database (99)
- Nye County RGED (182)
- DWR Well Log Database (~10,000)
(not shown on map)
- SNWA High-Elevation Wells in Spring Mountains (5)
(not shown on map)

In total, a great deal of water level data is available but with limitations on:

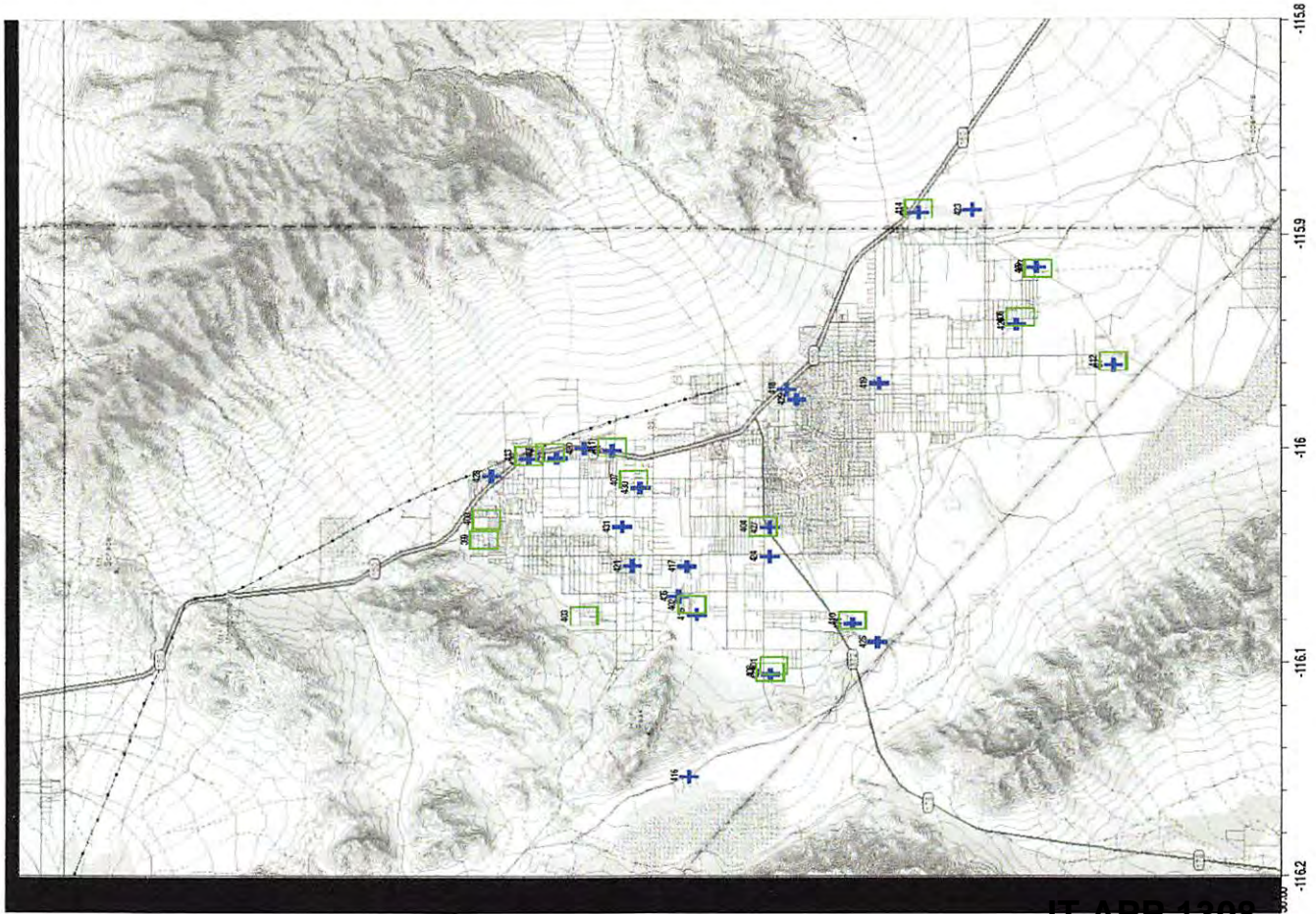
Accuracy of location coordinates

Temporal distribution...lots of data for 1967-77 and 1999-2006, but not well distributed for 1945-1967 and 1977-1999.

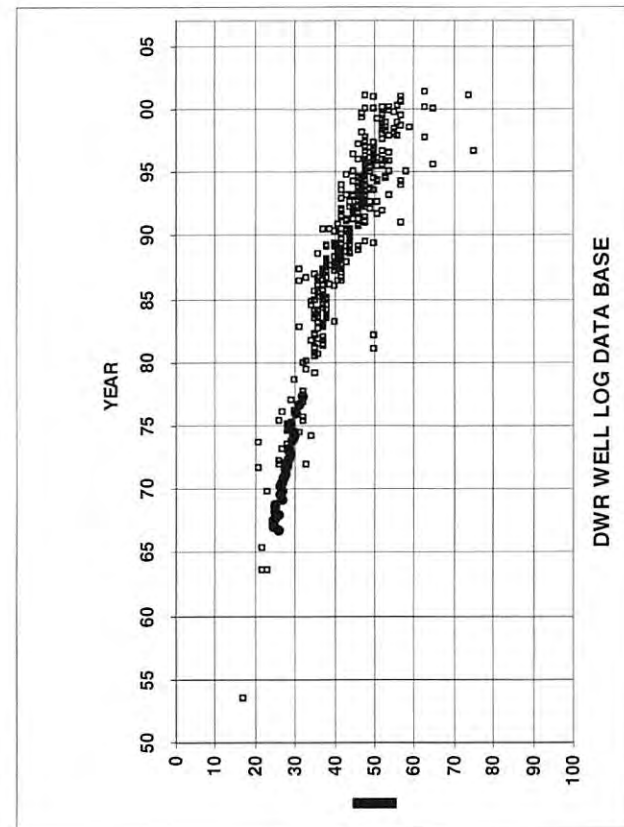
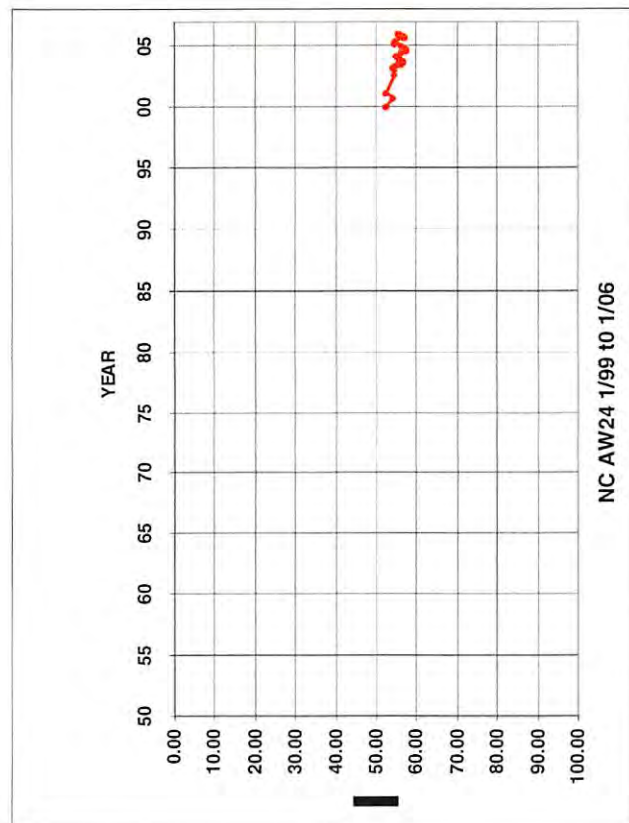
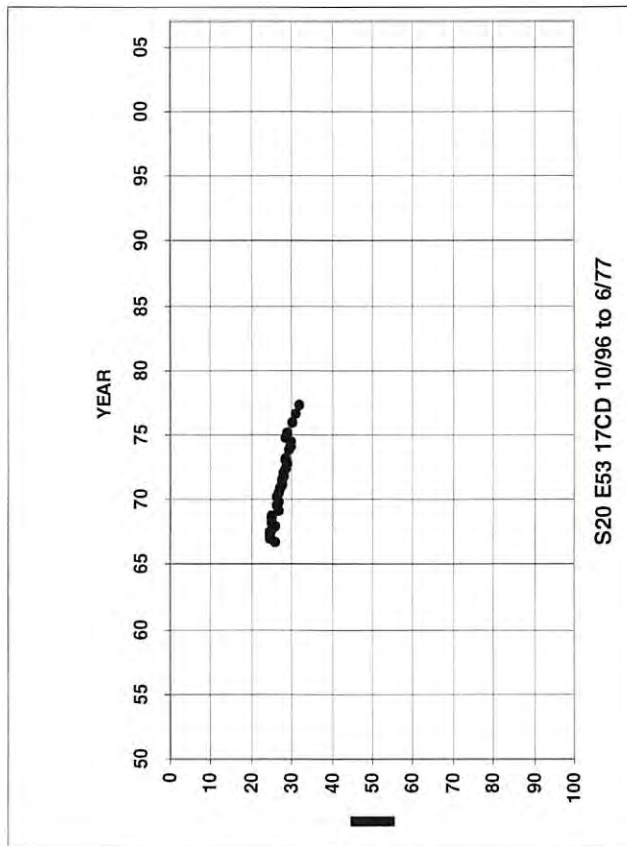
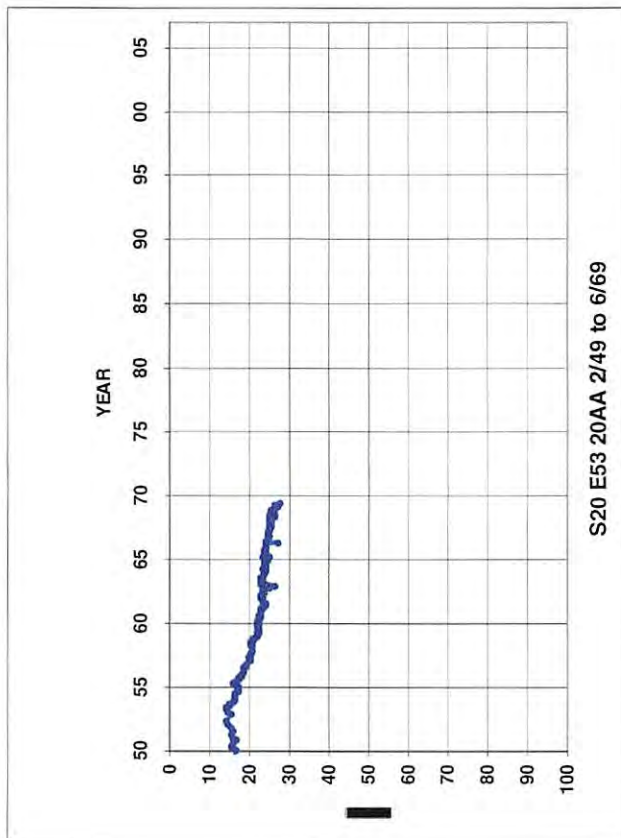


Existing Long-Term Water Level Records

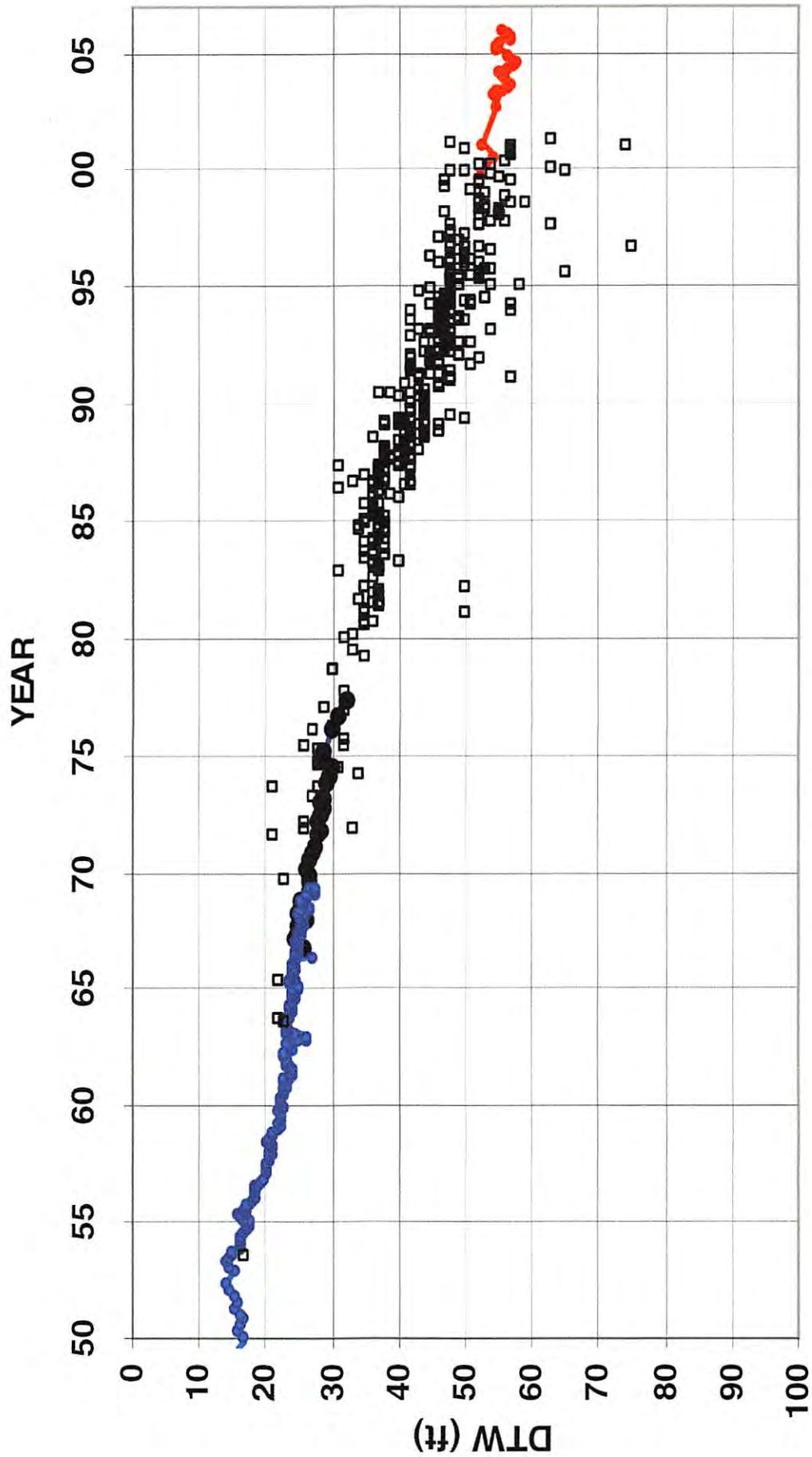
- USGS NWIS – 16 wells with 50+ measurements between 1939 and 2004; 3 not in DWR water level database
- DWR Water Level Database – 25 wells with 50+ measurements between 1939 and 2006; 8 not in USGS NWIS
- Nye County – 17 wells with 21 to 27 measurements between 1999 and 2006
- Bottom line....long-term records are only available for ~20 wells
- But the periods of record for these wells are not consistent.
- Composite hydrographs were developed out of necessity.



Composite Long-Term Water Level Records

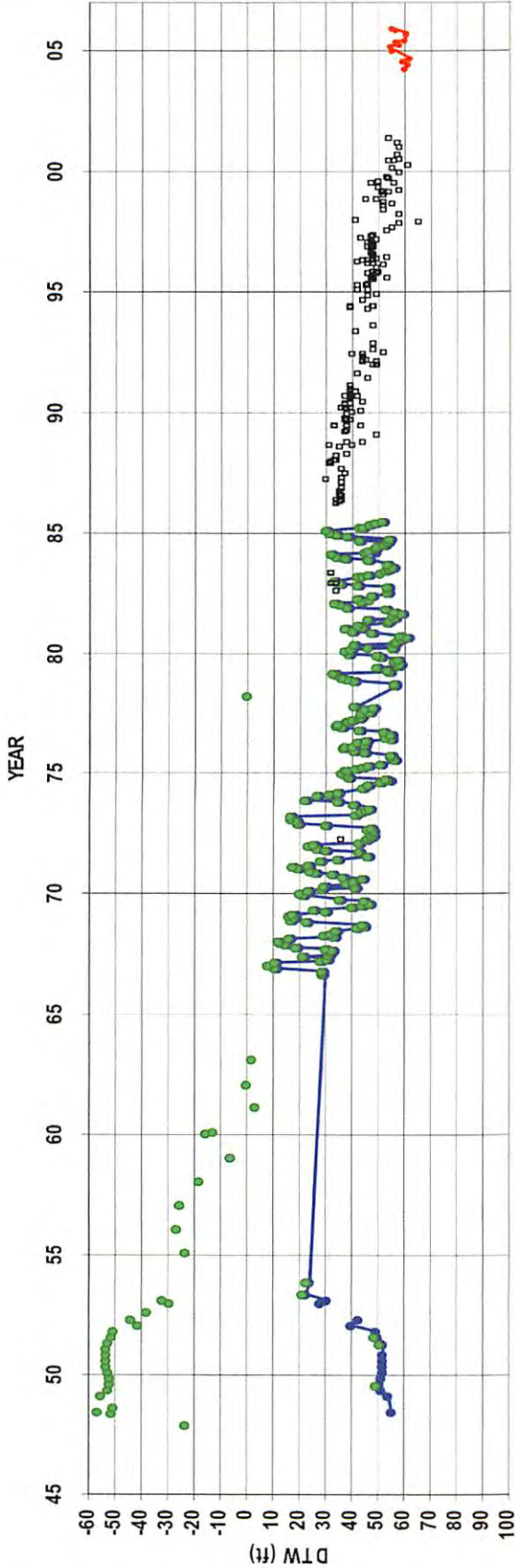


Composite Long-Term Water Level Records

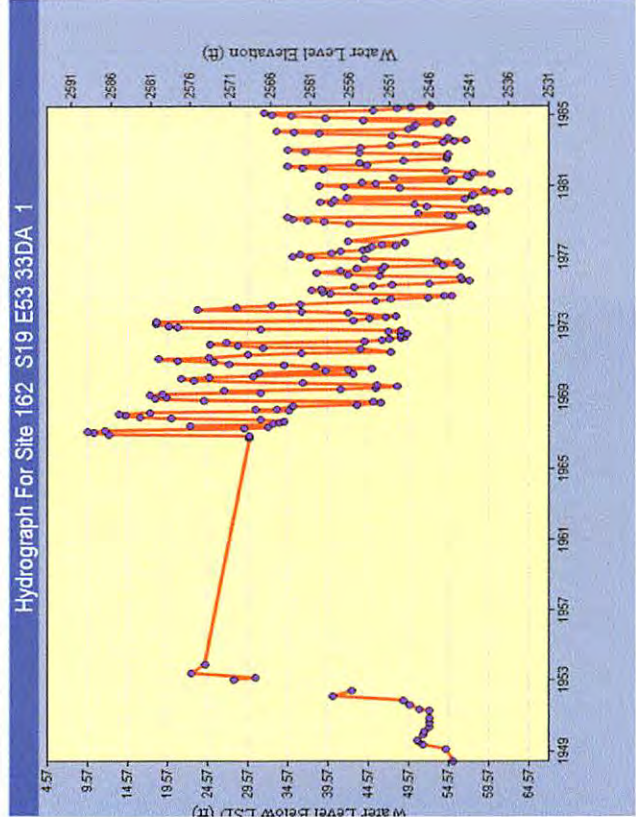
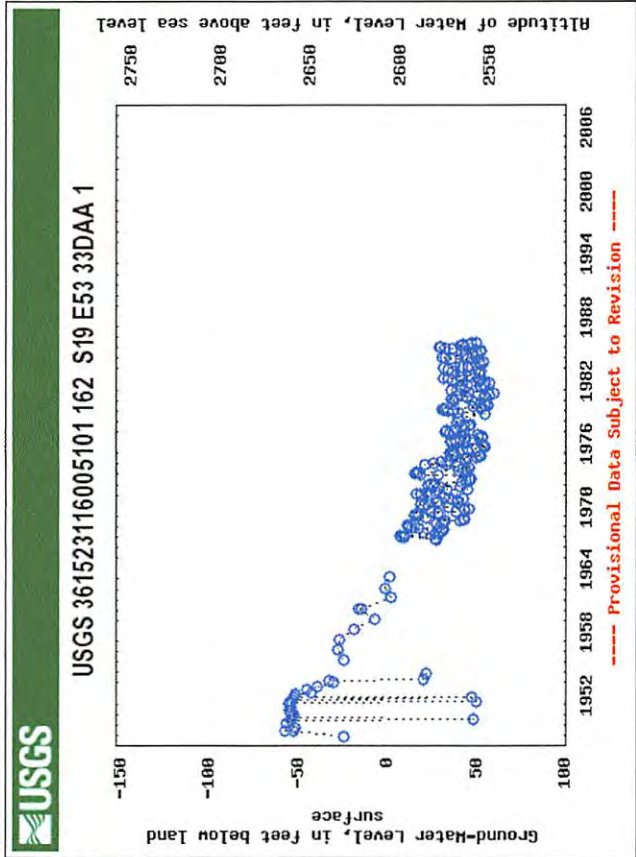


S20 E53 17CD AND 20AA, NC AW24

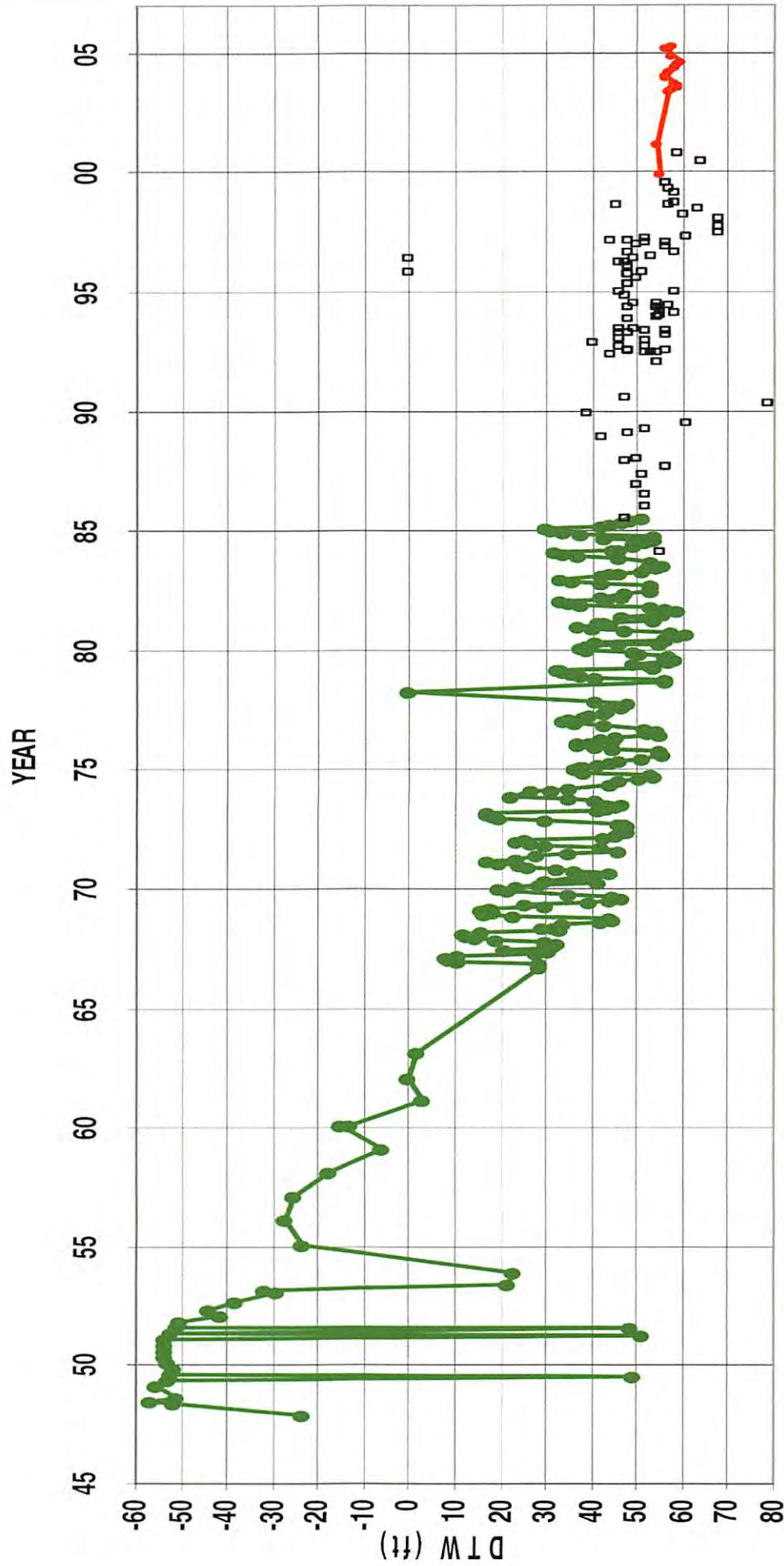
Composite Records - Resolving Conflicts



A S19 E53 33AA, 33DA, and 34BD, NC BURNOUT

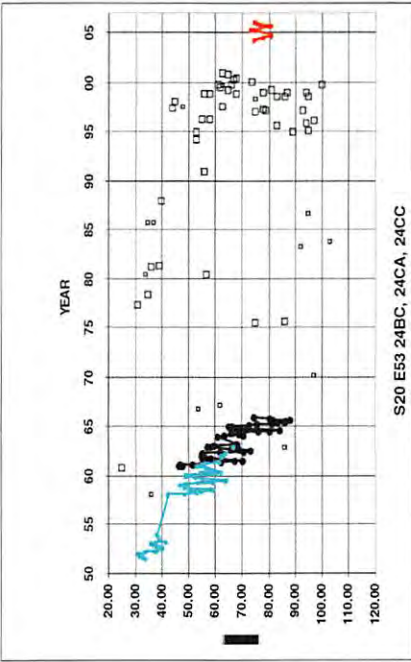
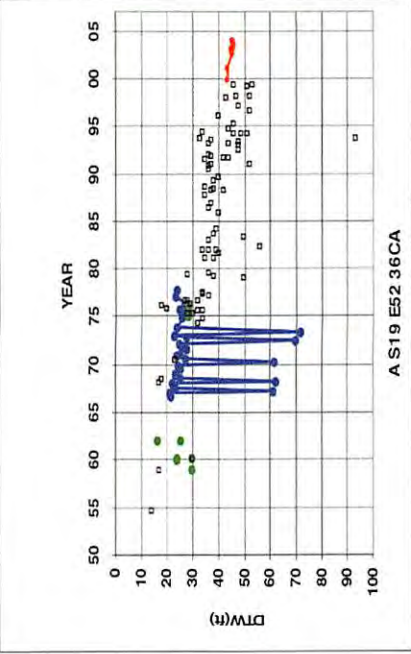
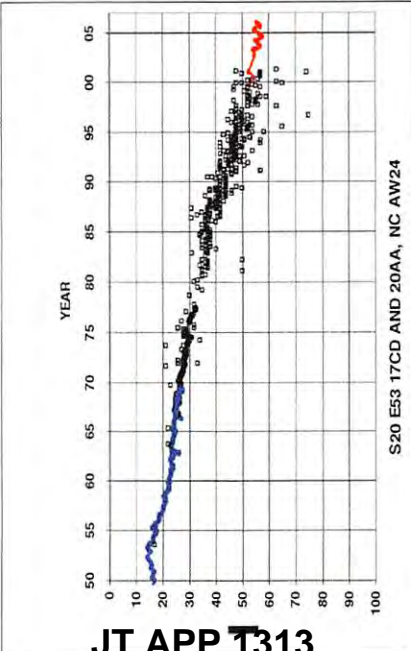
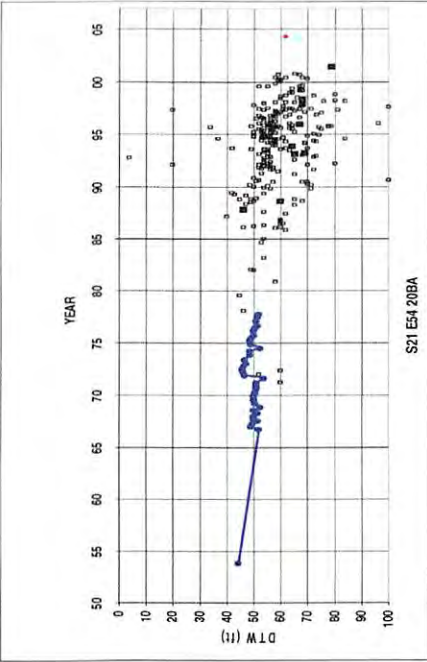
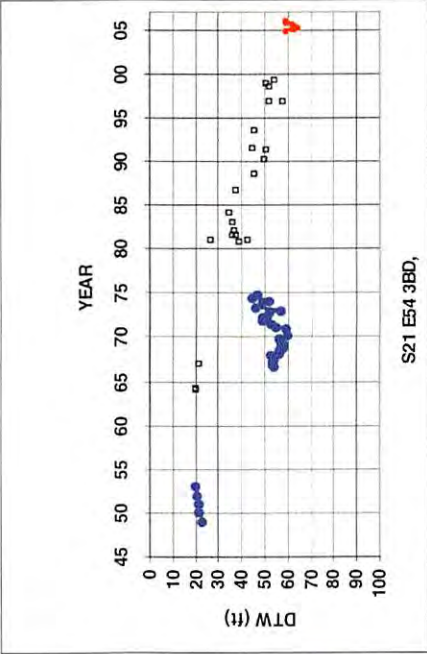
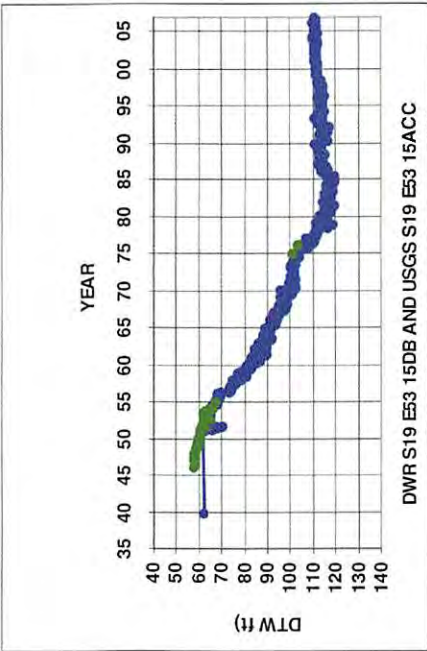
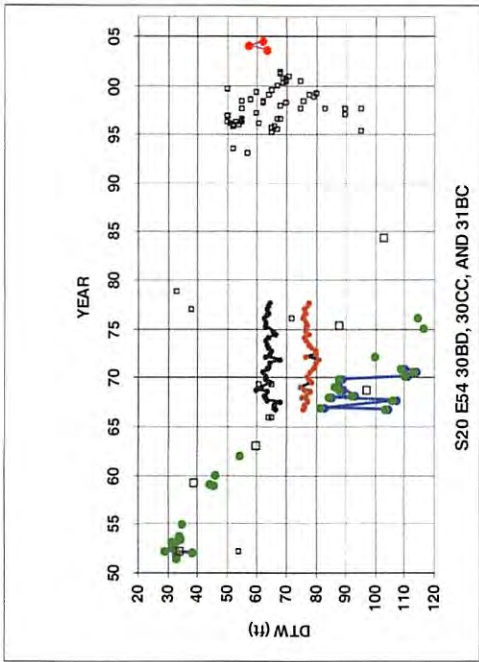
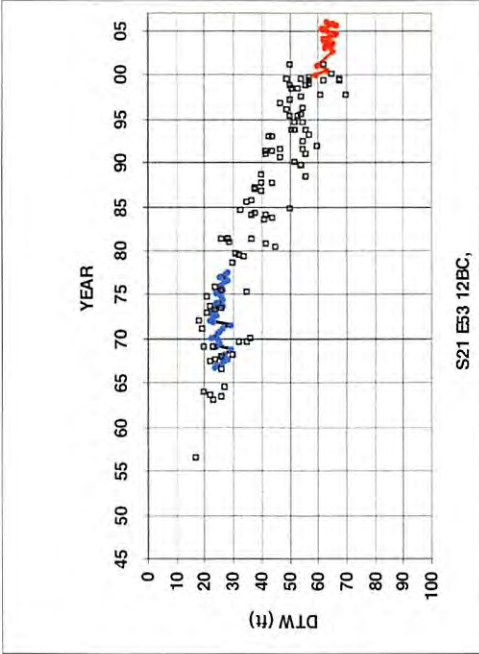
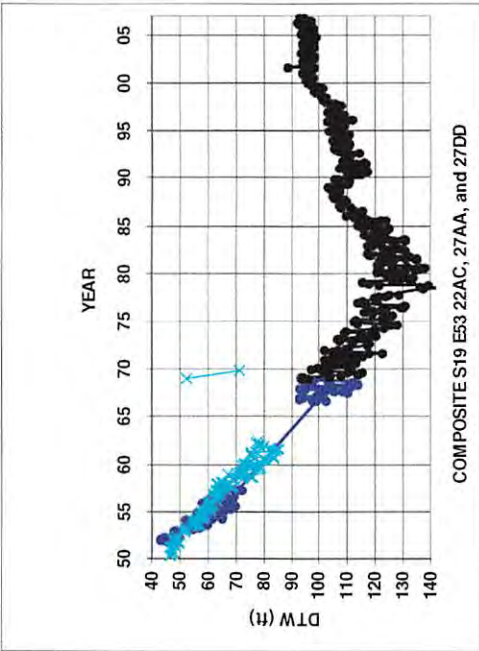


Composite Records - Conflict Resolved?



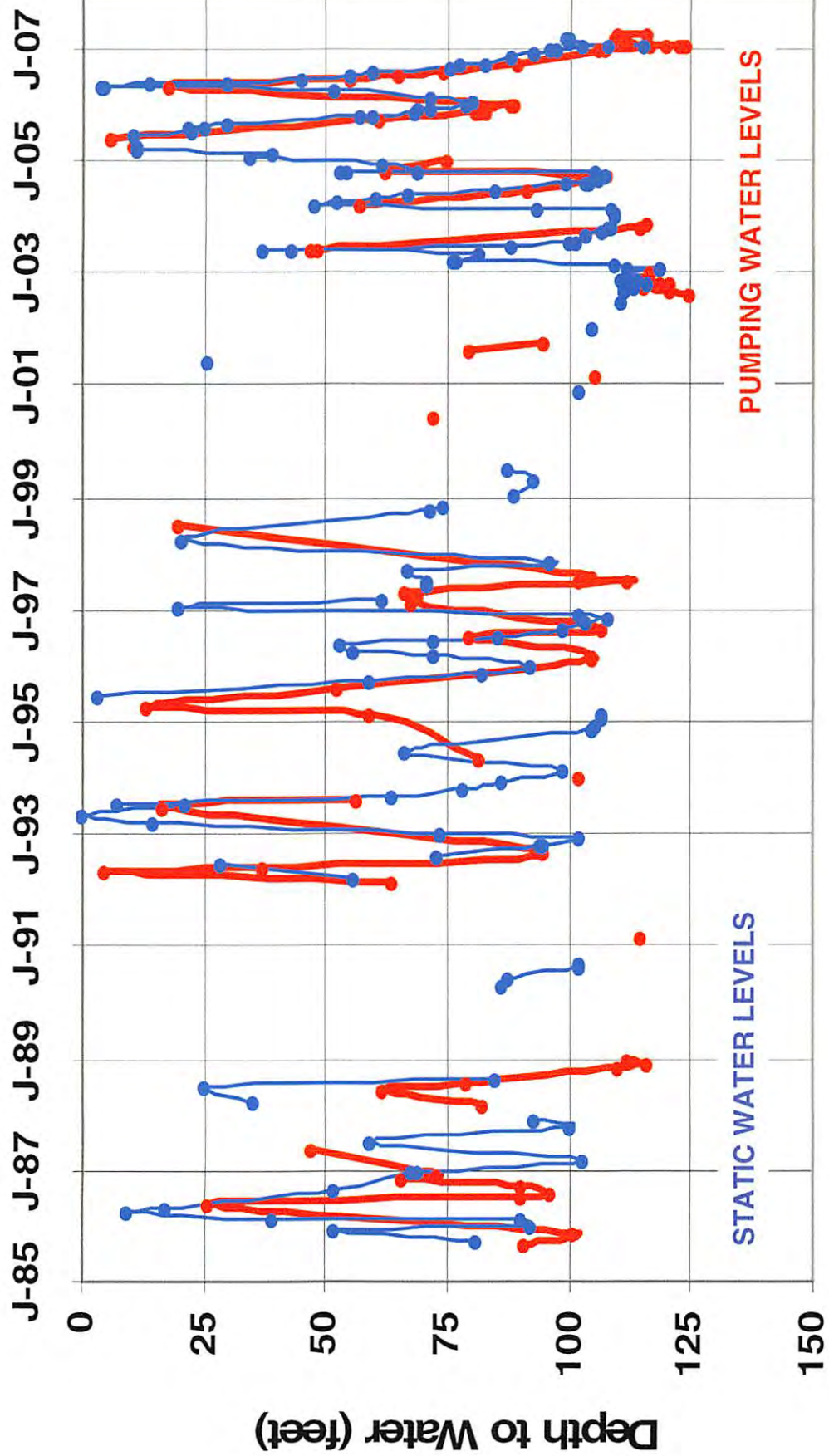
USGS S19 E53 33DA

Composite Records – Good – Moderate - Poor

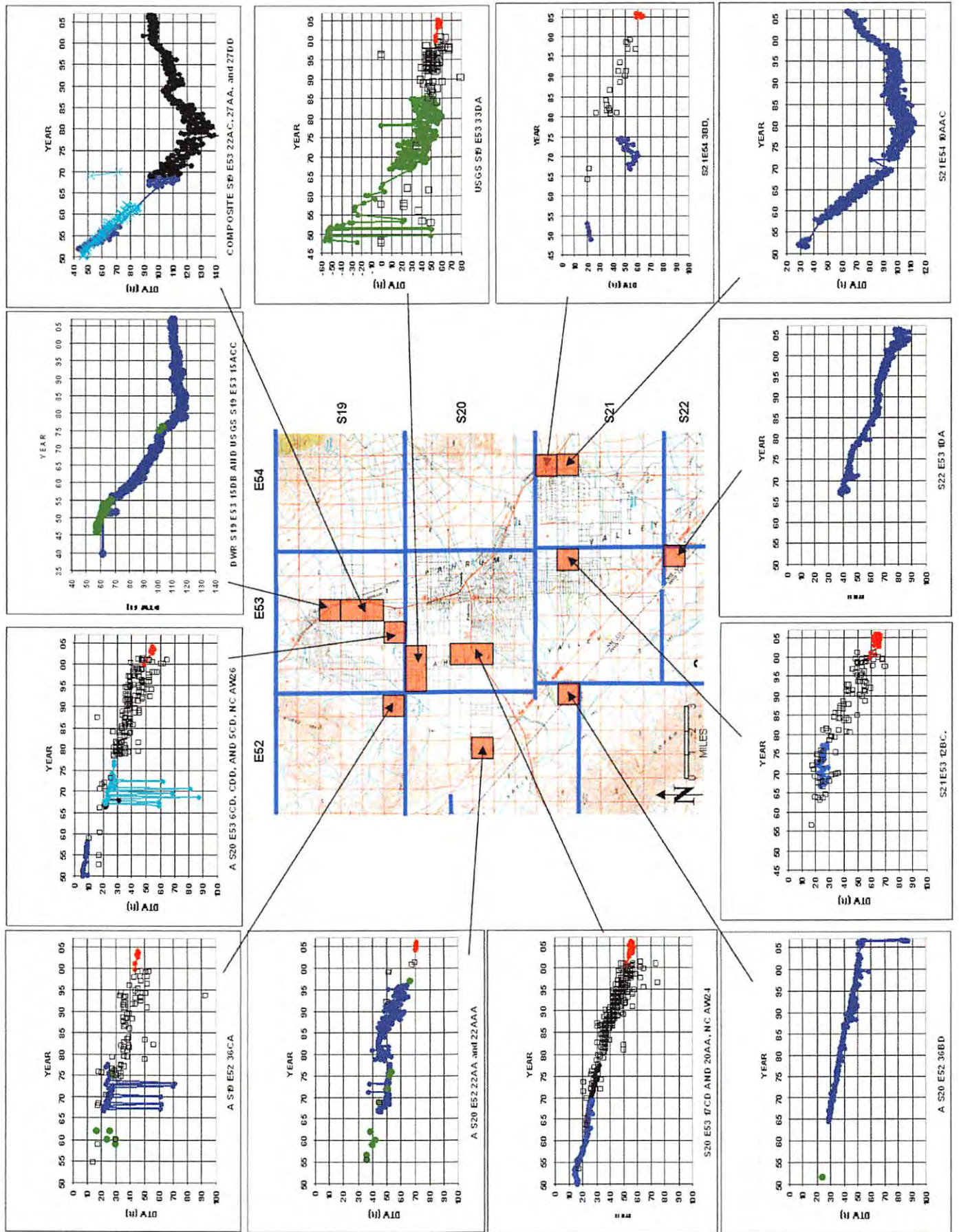


Long-Term Water Levels – High Elevation Wells

Depth to Water Echo Well



Long-Term Water Levels in Pahrump – Results

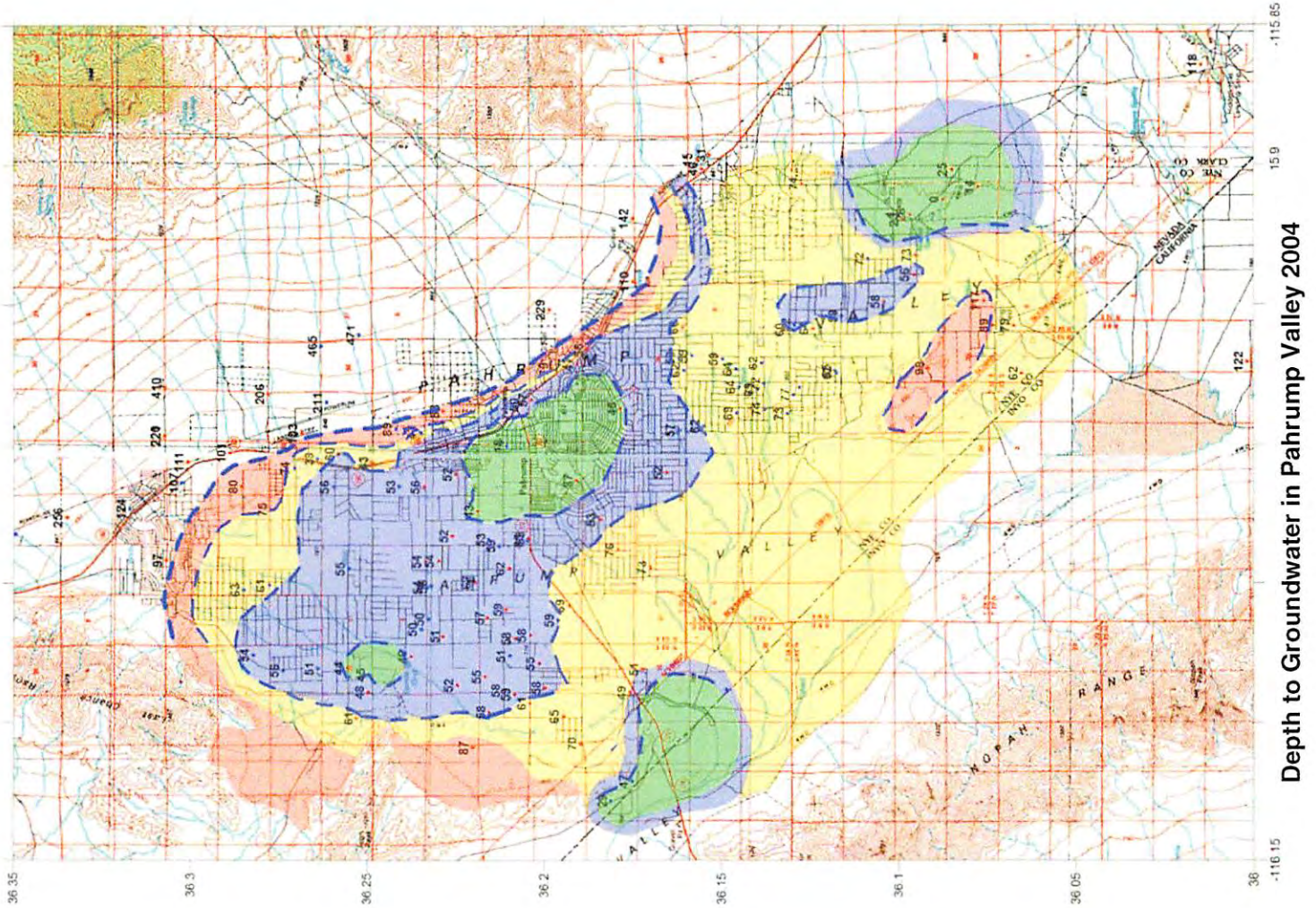
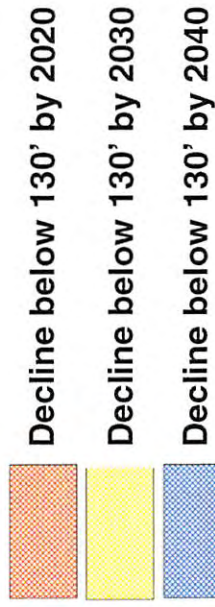
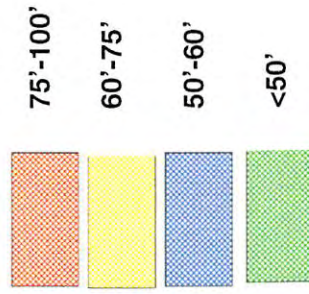


Future Water Levels in Pahrump – What to Expect

- **Water withdrawals will increase with time to an estimated 80,000 acre feet per year.**
- **Water levels will decline more rapidly under the valley-floor area than on the fan.**
- **Water level declines will accelerate as withdrawals increase (the more straws in the reservoir, the faster the rate of decline).**
- **Water level declines will likely be exacerbated by drought.**
- **Water levels near Highway will decline below 130' by 2020.**
- **Water levels under large areas of the valley-floor will decline below 130' by 2030.**
- **Water levels most of valley-floor will decline below 130' by 2040.**

2004 Depth to Water and Future Projections

Depth to Water (ft) in 2004

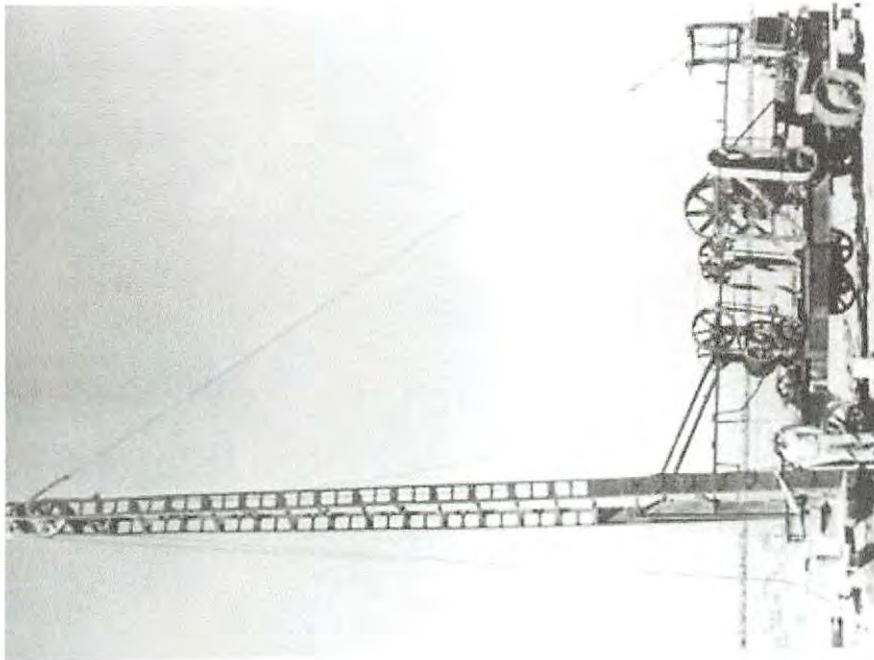


CONCLUSIONS

- Water level data now available from the DWR web page adds a significant new dataset on long-term water levels in Pahrump.
- The newly available DWR data, when used in conjunction with the USGS NWIS, Nye County measurements, and information from the Well Drillers Reports is useful in creating composite long-term hydrographs.
- Water level data for high elevation wells in the Spring Mountains show high seasonal variability, the effects of drought, and the effects of wet years.
- As more wells are drilled and more water extracted, water level declines in Pahrump are expected to accelerate over the coming decades.
- The time has come to update and build on the numerical simulations by Harrill (1986) to provide a management tool.
Yes, Buqo really said somebody *should* do a model.....



State of Nevada Division of Water Resources Office of the State Engineer



Pahrump Valley Water Resource Management
October 2, 2012

Introductions



- Jason King, State Engineer
- Kelvin Hickenbottom, Deputy State Engineer
- Rick Felling, Chief of Hydrology
- Hamilton Reed, Basin Engineer
- John Guillory, Senior Engineer – Las Vegas
- Bob Dennis, Basin Inventory



Why Are We Here?

- **Pahrump Basin is over-appropriated and over-pumped**
- **Water levels continue to decline**
- **Explore options to minimize any adverse effects of ground-water pumping in the basin**
- **Discuss available tools to bring the basin back into balance**
- **Listen to residents and water users concerns**



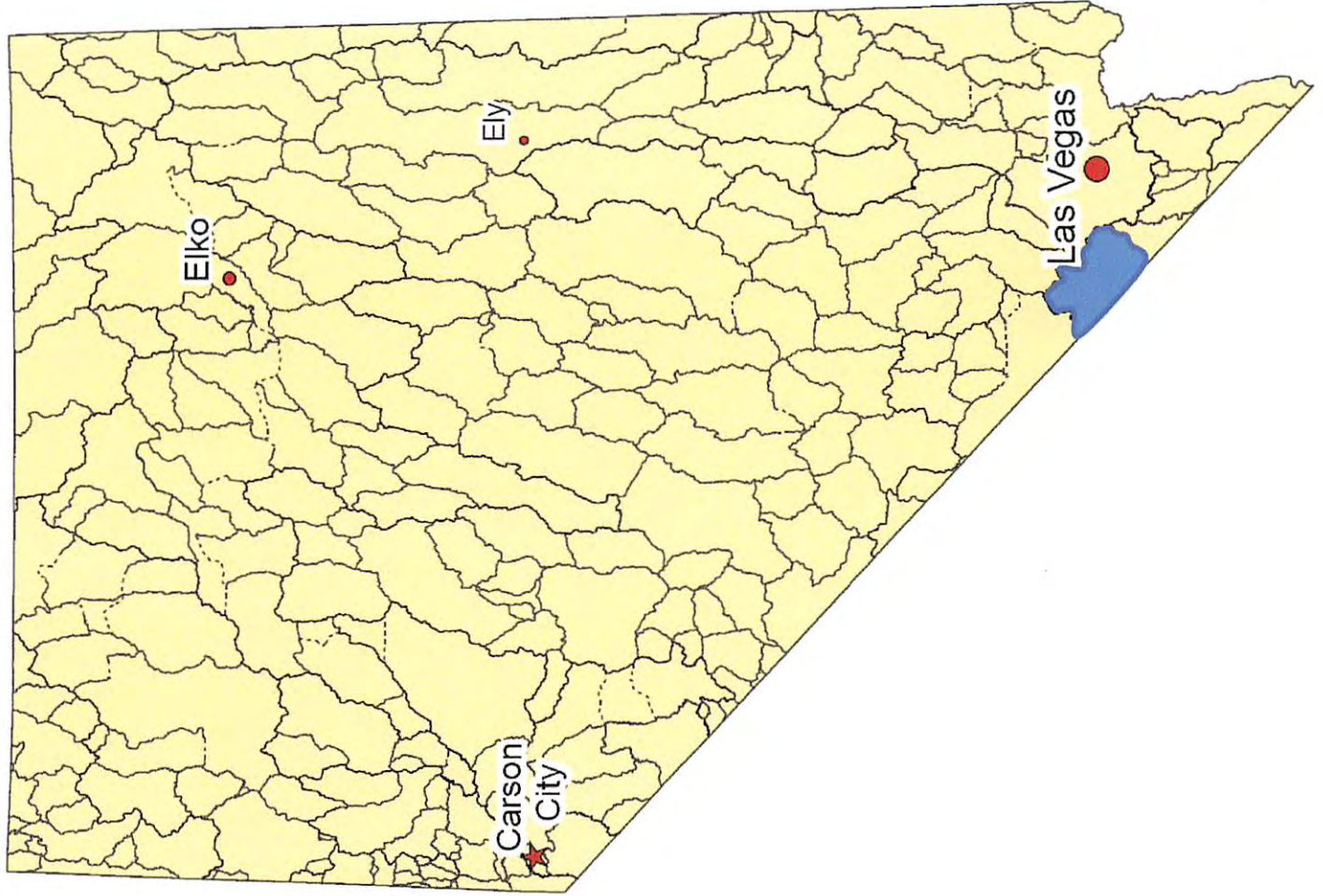
Agenda

1. Administering Groundwater in Nevada
2. Hydrology Overview
3. Perennial Yield of Pahrump Valley
4. Existing water rights
5. Pumpage Inventory
6. Water Table Drawdown
7. Decisions and Orders of the State Engineer in Pahrump
8. Management of the Basin – Options
9. Summary
10. Open Discussion on Future Management of Pahrump Valley

Groundwater

State divided into 256 hydrographic basins and sub-basins.

Each basin is administered separately.



Prior Appropriation Doctrine



- First in time, first in right
- Beneficial use is the limit and use of the water right
- Use it or lose it



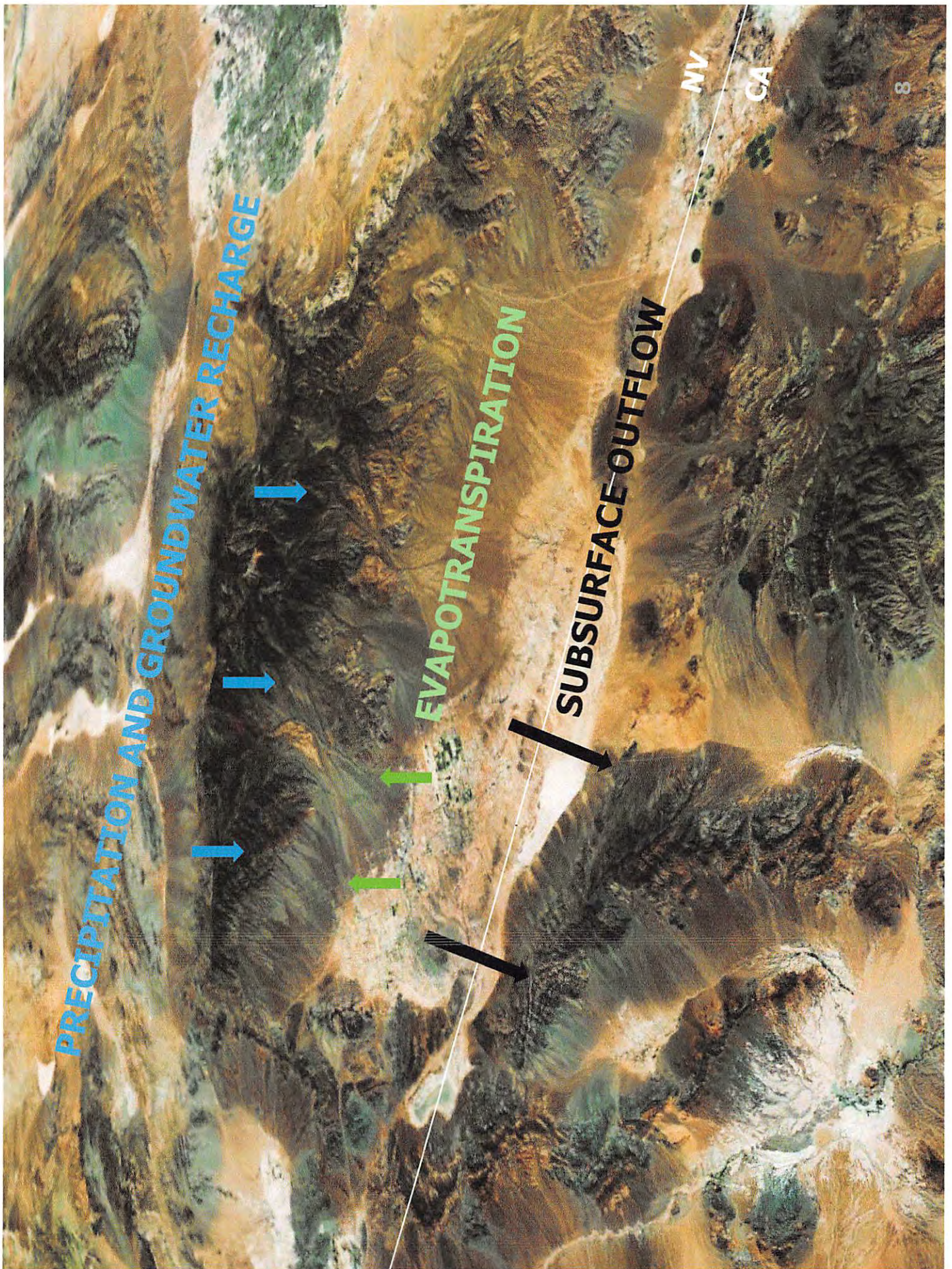
Groundwater

- **Groundwater Basins are Managed Based on the Perennial Yield Concept:**

The maximum amount of ground water that can be used each year over the long term without depleting the ground-water reservoir.

- **The goal is to appropriate water up to the perennial yield of a basin.**

The perennial yield has been exceeded in Pahrump Valley.





Conceptual View of Groundwater Flow

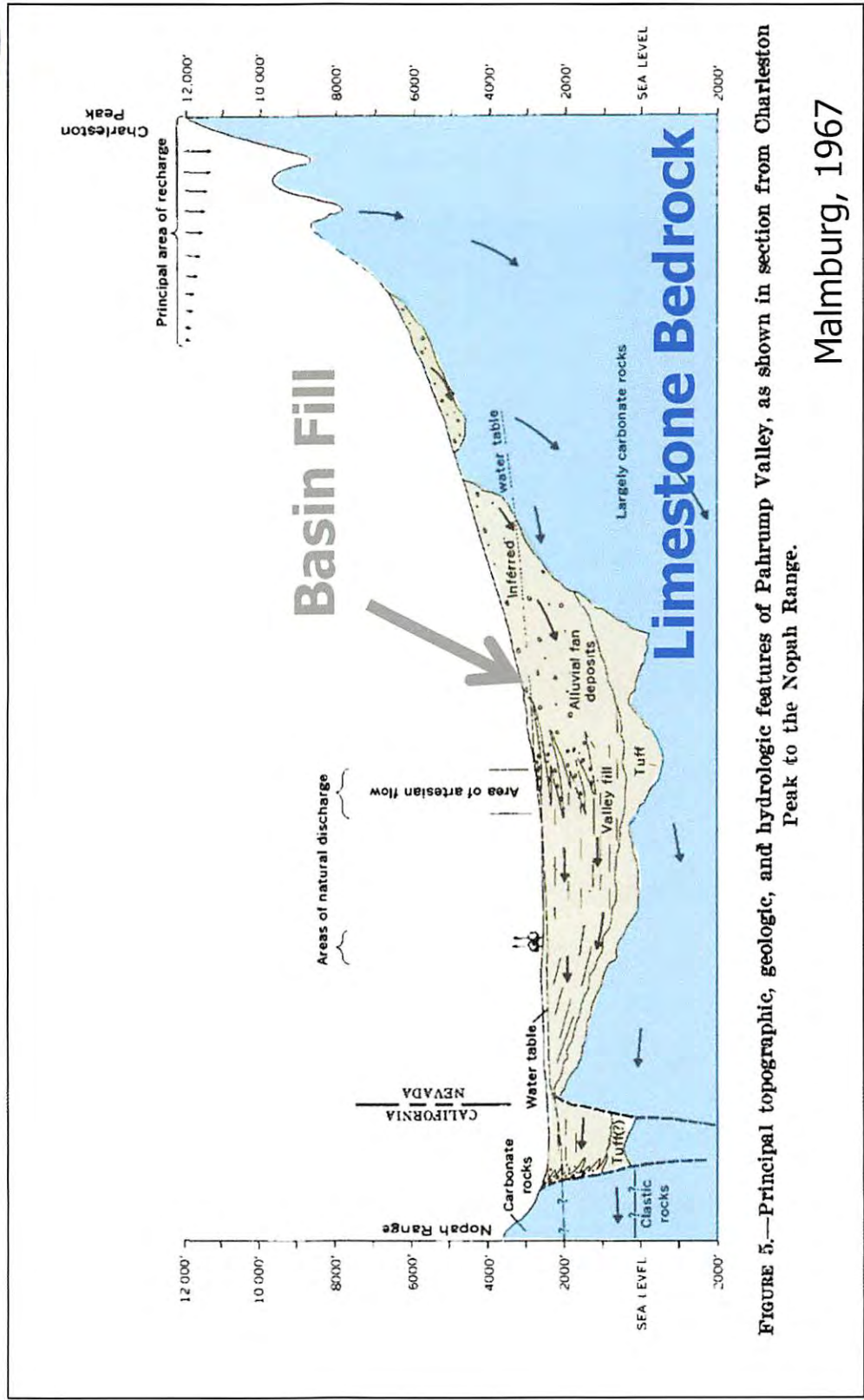


FIGURE 5.—Principal topographic, geologic, and hydrologic features of Pahrump Valley, as shown in section from Charleston Peak to the Nopah Range.

Malmburg, 1967



Perennial Yield

- Recharge in the basin is ~ 20,000 to 30,000 AFA
- (Predevelopment) ET about 12,000 AFA
- The remainder is lost by subsurface flow in limestone bedrock to CA
- Perennial yield of the basin is 12,000 AFA