SHOULD LARGE INTER-BASIN WATER TRANSFER BE ALLOWED?

The theory of underground aquifers and the water in them all lack a total knowledge. It is not realistic to think they are a sealed tube full of water. It is clear that some water moves underground, like a stream or even a river. A gravel sandy area lets the water move slowly. There are rock types that let water travel thru. In this mountain county there are fractures that will allow a lot of water to flow. An earthquake's faults can make a large drain.

These are part of what hydrologists look at and try to say how much water there is and where it goes. One thing is clear, if there is a way, water will go down. Las Vegas is the low bottom drain of a lot of Nevada. The name of Las Vegas was created by the springs there. There is a lot of underground water in Las Vegas.

It is very hard to know where underground water is, shallow or deep, still or moving. The springs and creeks aboveground can be measured. The plants that put their roots into underground moisture are estimated and the amount of water used is calculated. There are major factors to say how much water is in a valley. An ancient lake bottom like Lake Bonneville will hold much water near the surface giving water to the plants. Water 100 feet down below the old lake bottom is not easy to project. Some valleys like Spring Valley look like an old lake valley.

Some aquifers, like the Ogallala in the central United States from Nebraska to Texas are large ponds of old water. The Ogallala is being used up. Its use will hurt the future food production of that whole world. The large eastern part of Washington State is experiencing the same draw down. It is said that in 10-20 years this Washington area of large agriculture production will cease because the old water in the basin will be gone.

New data reveals farmers are mining groundwater at an alarming rate. In less than 7 years, groundwater in the Central Valley of California leaked away by an amount equal to 63% of the capacity of Lake Mead, our country's biggest reservoir.

California farms represent 8% of the U.S.'s agriculture value, and the Central Valley is where most of that growing takes place. However, as the state struggles with ongoing droughts, the groundwater supplies are dwindling at a frightening rate.

Additionally, northwest India, where the majority of that country's grain is grown, lost 109 cubic kilometers or 88.3 million acre feet of groundwater between 2002-2008—an amount triple the capacity of Lake Mead.

There are many other impacts of underground water pumping, southern Idaho near the Snake River for one. Crop water pumping is stopping water getting to the lower springs that for years have fed the fish rearing facilities. This water then flows into the Snake River. Will water pumping in Dry Lake and Delamar Valley take the water from Pahranagat Valley which is next to and below Dry Lake and Delamar Valley? The water in Pahranagat Valley is traveling thru earth from somewhere above it. How soon will an impact happen?

It is clear and well known that pumping underground dries up springs. When the water table goes down as it does with pumping, the plants die that had their roots in the moist ground soil. It is hard for salt and acidic ground created by close underground water to start non ground water plants.

When the spring quits or even flows less, it may never recover because the lack of water and pressure can let the flow channel fall in and seal up.

When these changes are created by pumping the water from underground it creates environmental impacts on the surface ground. Both plants and animals can die. When the Needle Point Spring ceased to flow in 2001 when the pivots and crops were put in across the hill, 17 wild horses died. When springs quit it affects both wildlife and livestock. The grass and other plants die as well as the animals that are losing drinking water.

The environmental impacts are clearly shown when the LAWP started pumping in Owens Valley in 1970 and taking the water out in a pipeline for an inter-basin transfer. The largest dust storm area in the US was created in Owens Valley with its water pumping drawdown. Draw down of water in east central Nevada and western Utah will create dust, but also could have more nuclear content than the nuclear problems in Japan, because of the military nuclear testing history in southern Nevada. All of these impacts are not felt in the same way when a city like Las Vegas is built and it dries up springs. Pumping for agriculture creates a new positive environment over the aquifer. In Snake Valley each pivot of corn creates a super home for at least 50 deer, and some will stay until the last row is harvested. If farming ceases and

the water table is drawn down, then the deer, geese, ducks and wildlife will change. Dust storms will take their place. Water is the limiting factor in agriculture. Agriculture has made large improvements on production with less water. When the underground water used goes down, production costs increase or production will end. The Ogallala and Washington state problems are large. The reality is that the underground water use in the western United States, whether it be a city or other use is a limiting factor. Many farming areas across Utah, Nevada and other states are being impacted by draw downs. The movement of underground water is impossible to fully understand. Some movement is down and to somewhere else, but where and when? Is this pumping part of what is believed to be drought impacts? Building a city or agriculture production above an aquifer is one kind of use where it takes time and the impacts are different. A town or field above ground makes a new environment. A large inter-basin transfer is different and should be totally viewed differently.

A large pipeline costing much, taking large amounts of water to provide drinking water for many people has huge potential problems and impacts.

Can there be enough pumped water for the people to drink and not just run out of water when the drawdown happens?

Will the environmental impacts be large?

Will wildlife and wild horses be lost?

Will it cost billions of dollars more than expected?

Will it lessen food production, beef, lamb, milk, and many other products?

Will it reduce the sheep and cattle production from the desert ranges?

Will it hurt the quality of Great Basin National Park and the view of the valleys below the Park?

Will the winds create more dust?

Will the use of water on golf courses have impact on millions of acres of rural areas?

Will the meadows and grass areas that were large before and white man arrive in the west be hurt and disappear?

How many springs will dry up?

I think all these questions have significant potential impacts if what amounts to as river of water is put into a large, long pipeline for an inter-basin transfer from a higher and also one of the driest parts of the United States is allowed.

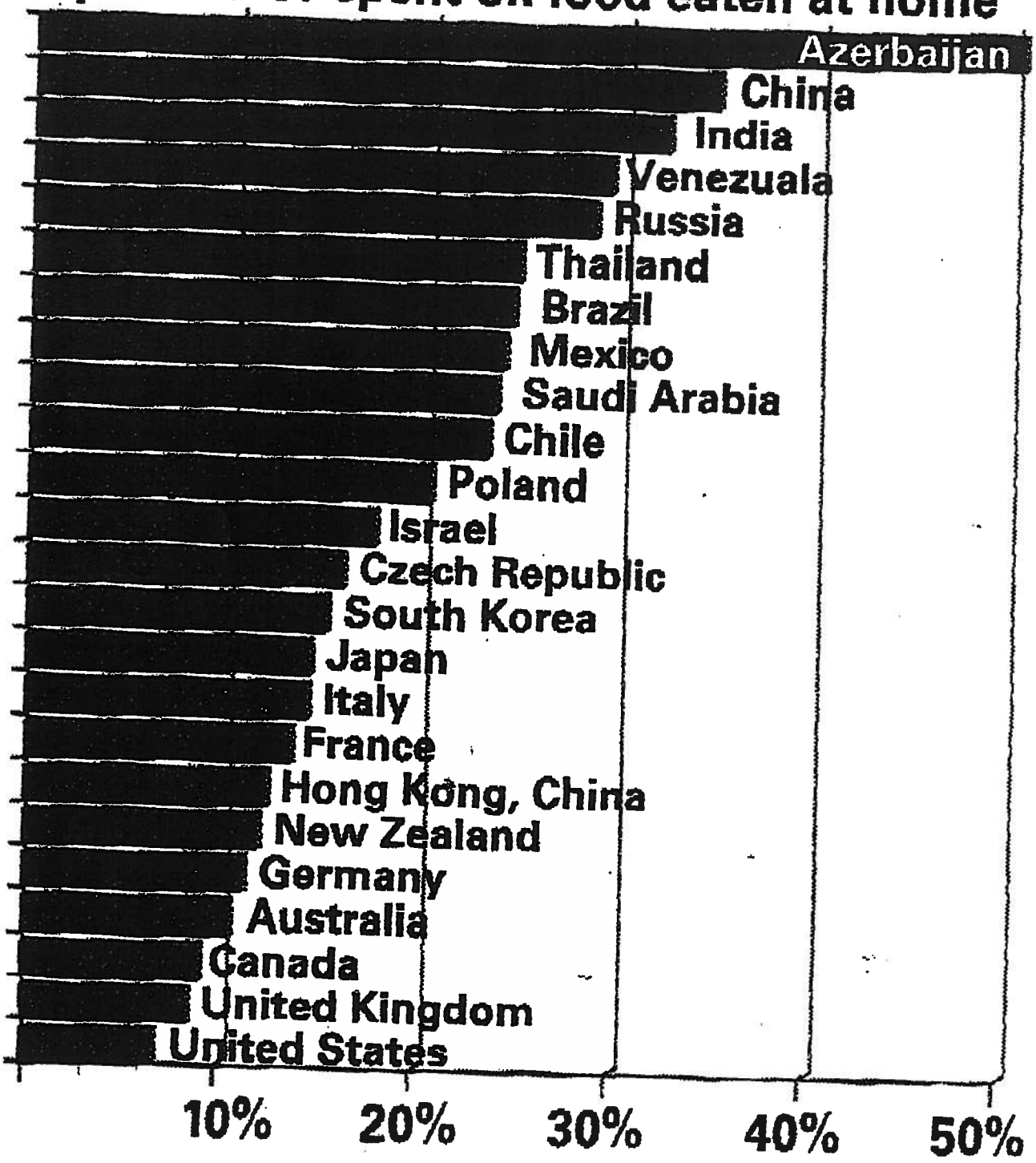
I appreciate Pat Mulroy saying that this will be SNWA's last option if no other water becomes available. But, let's not forget her quote in February 1994 in the High Country News where she acknowledges that the ground water importation plan has been proclaimed "the singular most stupid idea anyone's ever had", but was thankful that southern Nevada's needs would get attention due to the outpouring of concern over these applications.

I believe the legislature should restrict inter-basin transfers but should do anything they can to help get southern Nevada other sources of water.

Dean Baker

coupled with real food inflation in the last
o take for granted the economic miracle U.S.
vn the cost of food and the percent of income
iselves.

Percent of country's personal consumption expenditures spent on food eaten at home



mic Research Service

Hydrogeologic Analysis of Needle Point Spring
Fillmore Field Office, Utah

(Revised final)

by
Paul Summers
Senior Hydrogeologist
BLM
National Science & Technology Center
Denver, Colorado
July 27, 2001

Introduction:

Needle Point Spring is a low flowing spring that occurs at the northern tip of the Needle Point Mountain, a north-south trending outcrop of dolomite hills about one mile east of the Nevada state line, in Millard County, Utah. It is located in the upper part of Snake Valley, with Hamlin Valley adjacent to the west in Nevada.

The spring has a long history of existence. It was documented as early as 1939 by the Civilian Conservation Corps (CCC) work crew, who did improvements at the spring. Flow was measured at 6 gallons per minute (gpm) by Robert Wilkins and Robert Elliot, CCC camp engineers, on Sept. 22, 1939. The spring was developed by digging into the alluvium about 10 ft. and installing a 6 ft. diameter circular steel tank which is perforated to allow water to flow into the tank. An outlet pipe feeds water to a nearby trough and a surface pond for easy access by stock and wild horses. Water at the spring has been used for watering stock and wild horses for several decades. BLM filed a diligence water right on the spring on May 30, 1986 for .0133 cfs of water. The spring is noted on the master title plat as a Public Water Reserve 107. The diligence claim asserts that the water was being used for public land management purposes prior to 1903.

The Army Map Service plotted the spring on their topographic map of 1956. The spring was mentioned in a U.S. Geological Survey report on the area (Snyder, 1963), and the spring was visited during a study by the Las Vegas Valley Water District (1993).

Flows measured at the spring have remained steady since the first known measurement in 1939. The following flow measurements have been recorded since 1939 :

Sept. 24, 1992 flow 6 gpm measured by Fillmore BLM staff.

Feb. 16, 1994 flow 7 gpm measured by Fillmore BLM staff.

July 11, 1997 flow 7 gpm measured by Fillmore BLM staff.

June 6, 2001 flow 2.4 gpm measured by Fillmore BLM staff, and state office BLM.

Late June, 2001: Water level drops below outlet pipe of spring box and flow to the watering trough and surface pond ceases.

A local rancher has told BLM that in the 40 yrs. he has been ranching out there, Needle Point Spring has never gone dry.

The spring didn't actually go dry in the sense that the water supply is now gone. The water level in the alluvium dropped to a level below the outflow pipe in the steel tank, and water ceased to flow out of the buried inflow tank. The alluvium likely remains saturated in the vicinity of the spring.

Ground Water Conditions

Needle Point Spring is located in the alluvium that overlies fractured dolomite that forms Needle Point Mountain south of the spring (Whitebread, 1969). The spring likely was originally evident as a seep where water flowed from the fractured dolomites into the alluvium, creating a wet area on the alluvial slope. The seep was likely noted to be perennial, and prompted the development of an inflow structure to increase flow of the water supply.

Alluvial basin fill is extensive in the area, and extends from the mountain front along the Snake Range in Nevada about 5 miles to the west, eastward into Utah to the Burbank Hills and the Mountain Home Range, a distance of about 6 miles east of the spring. The alluvial basin fill is recharged by precipitation in the Snake Range, and provides a large amount of recharge water to the alluvium in Hamlin Valley just west of the spring. The alluvium is also recharged by the flow of Big Spring, a high flowing spring (3,700 gpm) issuing from near the base of the Snake Range. Water flows from the spring northward, forming Big Spring Creek, a major drainage that flows along the center of Hamlin Valley, an alluvial basin about 2 miles west of Needle Point Spring.

Ground water flows from the recharge area in mountain front alluvial fans along the Snake Range eastward into Utah, then northward towards Great Salt Lake (Brothers, et al., 1993, and Hood and Rush, 1965). The water level at the spring is at about 5445 ft. elevation, which is about the same elevation as water in the deep irrigation well 4500 feet northwest of the spring, and about the same elevation as water in a well 3.5 miles to the east (sec. 3, T. 24 S., R. 19 E.) which was drilled into the alluvial basin fill. Needle Point Spring is located along the hydraulic gradient from west to east, and likely represents the potentiometric level of the deep aquifer in the alluvial basin fill.

Ground water saturates the alluvial basin fill in Hamlin Valley (1 mile west of the spring), and a few flowing springs occur in this area, indicating that there is considerable upward movement of ground water under confined conditions. The alluvium is a widespread aquifer, extending over the entire alluvial basin, from Hamlin Valley eastward to the Burbank hills in Utah. The alluvial aquifer is comprised of a shallow unconfined aquifer and a deep confined aquifer that forces water upward, with a water level higher than the shallow aquifer. The deep confined aquifer appears to be the source of water for the irrigation wells west of Needle Point Spring, based on well depths, and possibly the source of water for Needle Point Spring.

Some water likely issues from the dolomite rocks of Needle Point Mountain into the alluvium near Needle Point Spring, as the water quality analysis at the spring shows that sulfate is slightly elevated, likely from thin gypsum beds present in the the dolomite of Needle Point Mountain (Hintze, 1986). This is not considered a major source of water to the system. The temperature of

the water at the spring, 15° C in 1992 (BLM measurement), and 12.5 °C in 1991 (Brothers, et al, 1993) indicates that the water source for the spring is not a deep regional aquifer, as the water is too cool. The water is more from a local system, and is likely recharge from the Snake Range to the west in Nevada. Because of the extensive fracturing of dolomites in Needle Point Mountain, water is likely flowing through the fractured rocks into the alluvium, near the spring.

Information from drillers logs of the wells indicates that the wells in Nevada and Utah are 16-inch diameter wells. A well of this diameter is designed for high capacity irrigation pumping. Although pump test information is not available on all of the wells, one well test on the Nevada side was at 750 gpm. It is expected that all the wells would be capable of at least 500 gpm. Water right applications for two wells on the Utah side (in T. 24 S., R. 20 W., sec. 2) are for high capacity pumping. One application stated 3 cfs (about 1300 gpm) and another well has applied for 2 cfs (about 900 gpm).

Water Level Declines

The water level decline at Needle Point Spring is about 2.5 ft., (measured from the top of the steel tank intake) which is enough to drop the water level below the out flow pipe, resulting in cessation of flow to the watering trough and pond. The water level in the spring intake structure dropped from 11.6 inches on June 6 (measured by BLM hydrologists) to 29.5 inches on July 18, 2001. However, from the discovery date of the wild horse mortalities, the spring likely stopped flowing into the trough about the last week of June, so the water level decline was rather rapid, dropping 1.5 feet in about 2-3 weeks, but the water level may have dropped more than 1.5 ft, as there may have been some decline prior to the June 6th field visit by BLM.

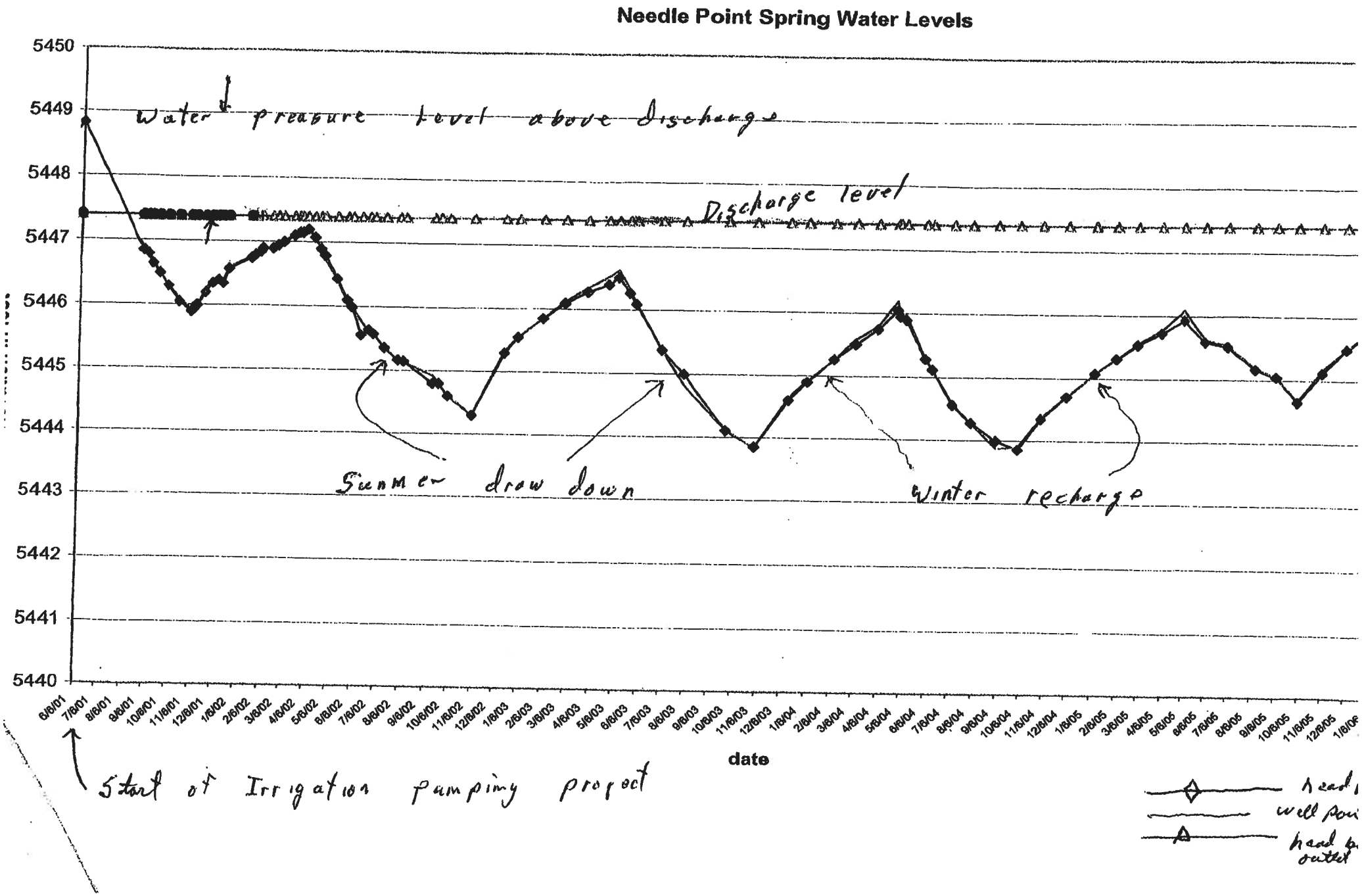
The recent decline in ground water level at Needle Point Spring is likely due to increased irrigation pumping with center pivot sprinkler systems about a mile to the west. A related factor could be that precipitation has been less than normal. The lower precipitation is not documented in this area by rain gages, but reports from local ranchers suggest that precipitation is generally less than in the past. This factor is not regarded as being the cause of the decline of the spring, because the decline was abrupt, and seemed to coincide with the onset of the 2001 irrigation season. The most likely explanation for the spring going dry is the irrigation pumping. There are about 13 center pivots in Hamlin Valley to the west (2 miles away); some of the center pivots are in Utah and some are across the line in Nevada, extending south for about 4 miles. Water is used for crops from April to October. The exact pumping cycle applied to the crops is not known.

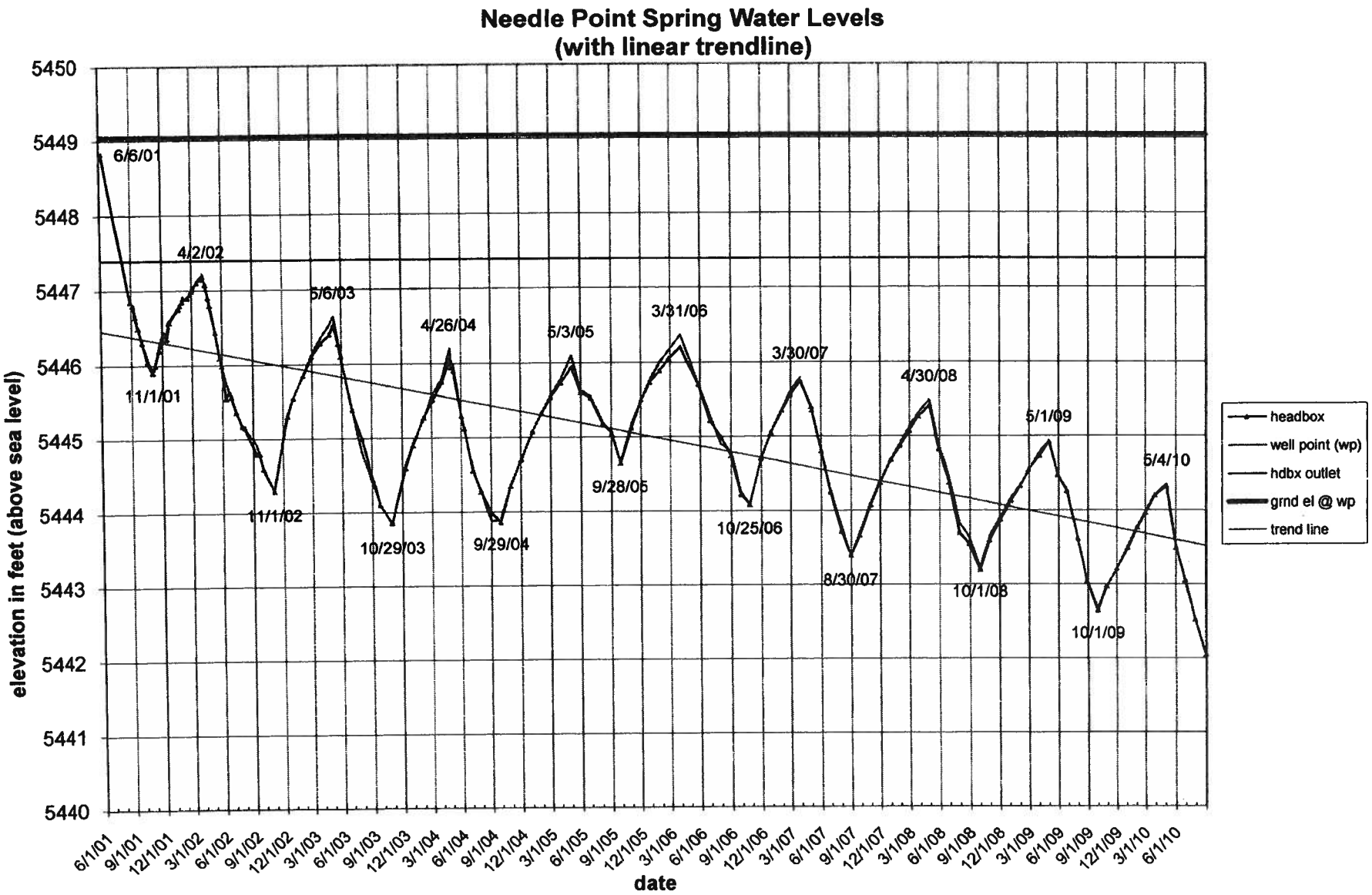
Because the basin fill alluvium extends from the area of the irrigation wells to Needle Point Spring, a hydraulic connection exists between the area being pumped for irrigation and the spring. A predictive analysis of drawdown due to pumping of planned wells in Snake Valley by the Las Vegas Valley water District in 1993 indicated that drawdown would extend throughout the extent of Snake Valley including the area of Needle Point Spring after pumping until steady state is reached, a period of several years.

A predictive analysis of the potential drawdown at Needle Point Spring as a result of the irrigation pumping is difficult because of the lack of actual pumping data, including the rate of pumping and the duration. An estimate of the possible magnitude of drawdown was made, using pumping rates as applied for in the water right applications, and assuming a period of use which is unconfirmed.

Water Level draw down - showing effects of Summer irrigation pumping

The Spring never has recovered to flow since the start of the Proj




Needle Point Spring Water Levels
(with linear trendline)
elevation in feet (above sea level)
5450
5449
5448
5447
5446
5445
5444
5443
5442
5441
5440
6/6/01
11/1/01
4/2/02
11/1/02
5/6/03
10/29/03
4/26/04
9/29/04
5/3/05
9/28/05
3/31/06
10/25/06
3/30/07
8/30/07
4/30/08
10/1/08
5/1/09
10/1/09
5/4/10
6/1/01
9/1/01
12/1/01
3/1/02
6/1/02
9/1/02
12/1/02
3/1/03
6/1/03
9/1/03
12/1/03
3/1/04
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9/1/07
12/1/07
3/1/08
6/1/08
9/1/08
12/1/08
3/1/09
6/1/09
9/1/09
12/1/09
3/1/10
6/1/10
date
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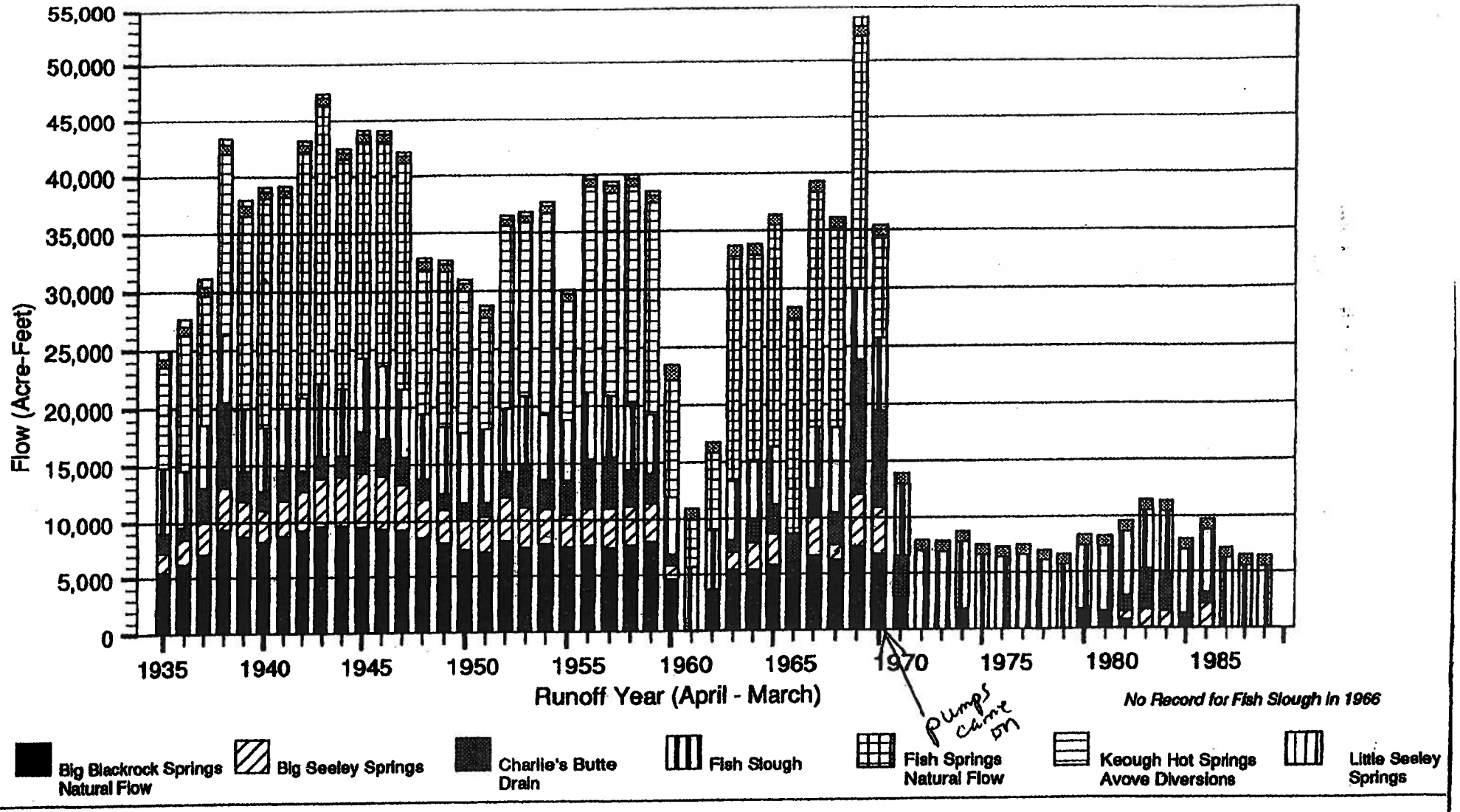
well point (wp)
hdbx outlet
grnd el @ wp
trend line



O W E N S V A L L E Y As shown on this graph when LAWP started pumping, there was a huge impact on Spring Flow in Owen Valley. For the last 5 years LAWP has been pumping only 75,000 acre ft. of water per year into the pipeline and still has not been able to maintain ground water levels. SNWA wants to pump over 2 times this much water from a smaller area with less recharge. It won't work

FIGURE 9-15

OWENS VALLEY SPRING FLOWS, RUNOFF YEARS 1935-1989

SOURCE: LADWP, AQUEDUCT DIVISON

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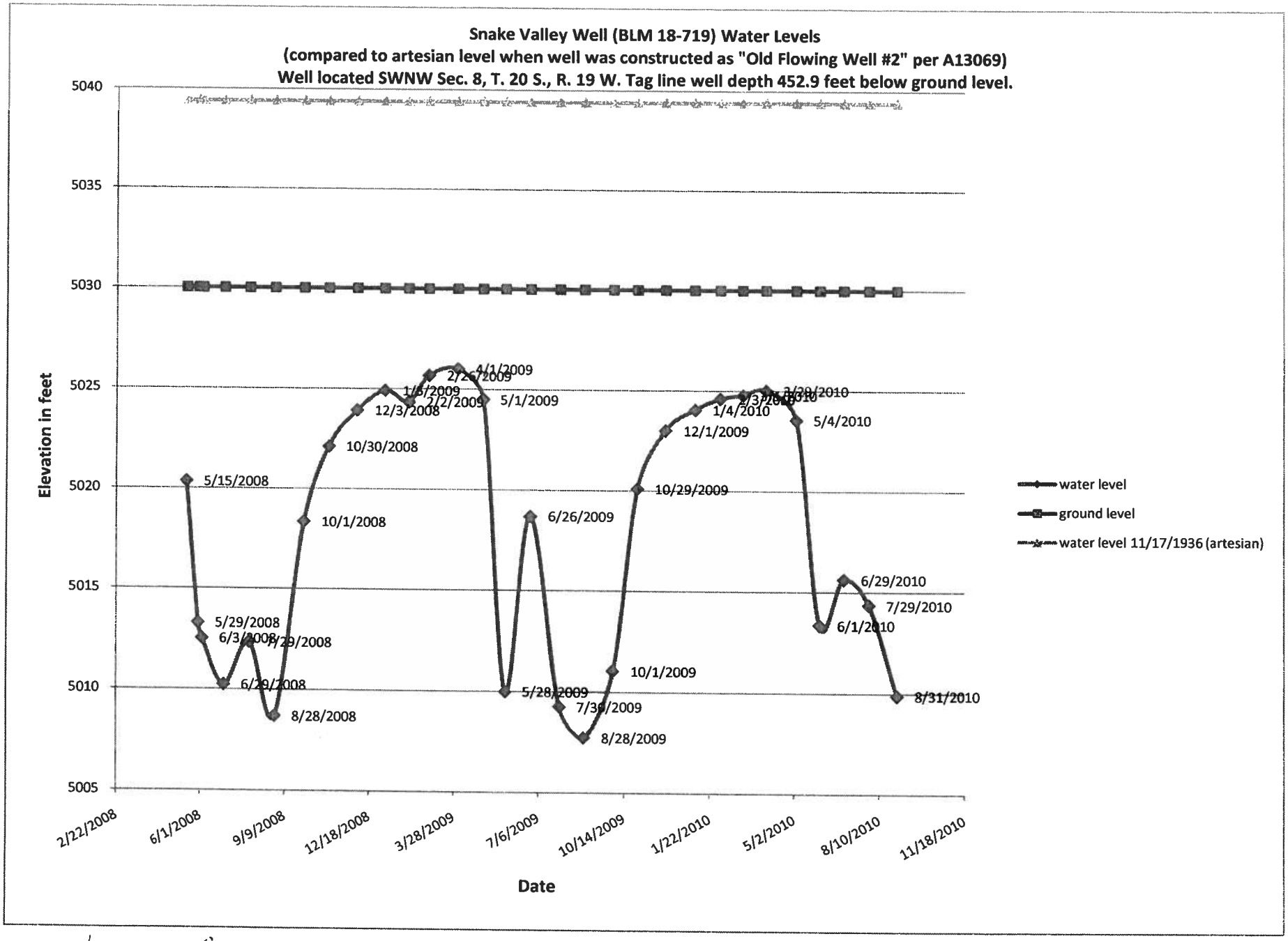
Snake Valley Well (BLM 18-719) Water Levels
(compared to artesian level when well was constructed as "Old Flowing Well #2" per A13069)
Well located SWNW Sec. 8, T. 20 S., R. 19 W. Tag line well depth 452.9 feet below ground level.
Elevation in feet
5040
5035
5030
5025
5020
5015
5010
5005
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
7/6/2009
10/14/2009
1/22/2010
5/2/2010
8/10/2010
11/18/2010
Date
5/15/2008
5/29/2008
6/3/2008
6/29/2008
8/28/2008
10/1/2008
10/30/2008
12/3/2008
1/6/2009
2/2/2009
2/26/2009
4/1/2009
5/1/2009
5/28/2009
6/26/2009
7/30/2009
8/28/2009
10/1/2009
10/29/2009
12/1/2009
1/4/2010
2/3/2010
3/29/2010
5/4/2010
6/1/2010
6/29/2010
7/29/2010
8/31/2010
water level
ground level
water level 11/17/1936 (artesian)