

**SALT LAKE VALLEY
INTERIM GROUND-WATER MANAGEMENT PLAN**

UPDATE REPORT

**Water Use and Water Quality Data
reported for
1994-1996**

Utah Department of Natural Resources
Division of Water Rights

June, 1997

1.0 Introduction

The State Engineer implemented the Interim Ground-Water Management Plan (Plan) in Salt Lake Valley in April of 1991. The purpose of implementing the Plan was to address the over-appropriation of ground-water rights in Salt Lake Valley and to protect the quality of the resource. The Management Plan is considered to be interim until studies completed by the U.S. Geological Survey (USGS) are evaluated by the Division of Water Rights and water users; and the new data and information can be incorporated into the management plan. During this interim period, it has been the intent of the Division of Water Rights to keep water users apprised of relevant issues and data collected to date. To address this need, an Update Report has been prepared and submitted to all major water users and interested parties. The last Update Report prepared was dated May 1994 and included water use and water quality data for 1993. Since the last report, the USGS has completed its studies and published various reports for the Salt Lake Valley area.

The water users have operated under the interim plan for six years and the Division of Water Rights encourages them to provide input as to what has worked well, items that need to be modified, or additional issues that should be considered. Following public review and comment, the State Engineer intends to adopt a long-term ground-water management plan for Salt Lake Valley. This plan will protect the future ground-water resources of Salt Lake Valley, while allowing for maximum utilization of the water.

The current Plan segregates Salt Lake Valley into nine (9) separate ground-water management areas (Figure 1). These areas were determined by using water quality data contained in the Division of Water Rights Technical Publication *Chemical Quality of Ground-Water in Salt Lake Valley, Utah, 1969-85* (No. 89). Each respective area has a maximum allowable ground-water withdrawal associated with it, as illustrated in Table 1. The allowable withdrawal was determined based upon estimated recharge quantities for each given area. In addition to the management areas, there are areas of restricted pumpage. Within the restricted areas no new water right applications will be approved. Change applications, which propose to move a water right into these restricted areas, will be denied.

TABLE 1 - Summary of Annual Allowable Withdrawals by Management Area

Management Area	1	2	3	4	5	6	7	8	9
Maximum Annual Allowable Withdrawal (acre-feet)	124800	7500	14000	3000	700	33000	19000	13000	20000

2.0 Reporting Ground-Water Users

As a requirement of the Plan, water users with wells which pump over fifty (50) acre-feet per year must report water usage data and those which pump over two-hundred and fifty (250) acre-feet per year are required to submit water quality data.

Salt Lake Valley Management Plans

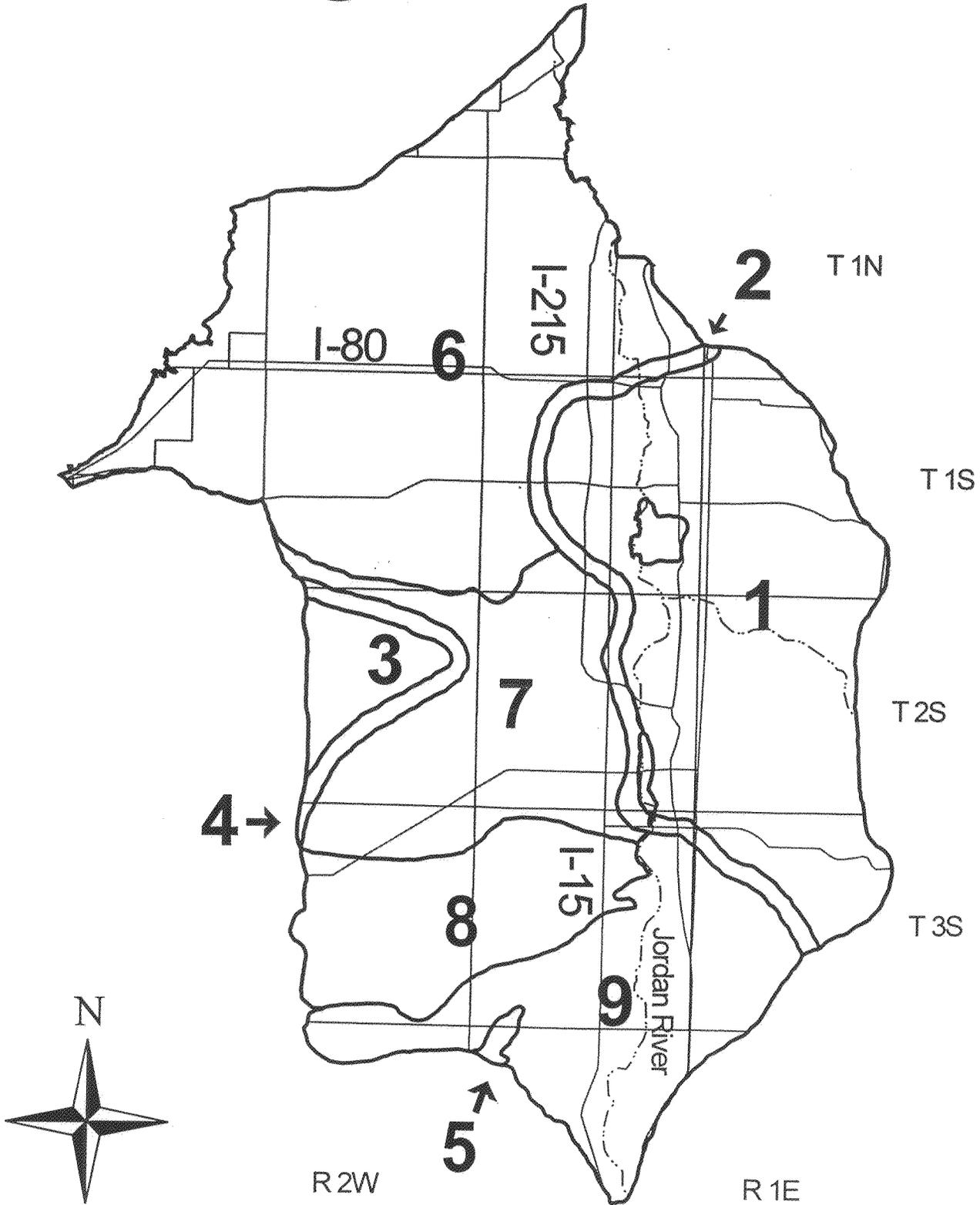


Figure 1

Reporting ground-water users, located within the management areas defined by the Plan, are summarized in Tables 2a - 2c.

Water User	Data Received					
	Water Use			Water Quality		
	94	95	96	94	95	96
Copperton Improvement District	X	X	X			
Draper Irrigation Water Company						
Granger-Hunter Improvement District	X	X	X			X
Herriman Pipeline Company	X	X	X			
Hi-Country Estates	X	X	X		X	X
Holiday Culinary Water	X	X		X	X	X
Jordan Narrows Estates		X				
Kearns Improvement District	X	X	X			
Magna Water Improvement District	X	X	X	X		X
Midvale City Water Department	X	X	X			
Murray City Water	X	X	X	X	X	X
Riverton Culinary Water	X	X	X	X	X	X
S.L. City Corp. Culinary Water	X	X	X	X	X	X
Salt Lake County W.C.D.	X	X	X	X	X	X
Sandy City Corporation Water	X	X	X	X	X	X
Shangri-La, Inc.	X	X	X			
South Salt Lake Culinary Water	X	X	X			
Taylorville-Bennion	X	X	X	X	X	X
USA Department of the Army	X	X	X	N/A	N/A	N/A
Webb Well Water		X	X	N/A	N/A	N/A
West Jordan Culinary Water	X	X	X			
White City Water Improvement District			X	X		X

Notes: 1.) * = no withdrawals 2.) N/A = not applicable

Water User	Data Received					
	Water Use			Water Quality		
	94	95	96	94	95	96
Daily Foods Inc.	X	X	X			
Geneva Rock Products			X			
Hexcel Corporation		X	X			
Interstate Brick	X	X	X	N/A	N/A	N/A
Jerry Sorenson	X	X	X			
Joe Doctorman Packing Company	*X	*X	*X			
Jordan Meat Company, Inc.	X	X	X			
Kennecott Utah Copper Corporation	X	X	X	X	X	X
LDS Church		X	X			X
LDS Hospital	X	X	X			
Monroc Inc.	X	X	X			
Rushton Family Partnership	X	X	*X		X	X
Savage Industries, Inc.	*X	*X	*X			
SLICCAMA	X	X				
Staker Paving	X	X	X			X
University of Utah	X	X	X	X	X	X
Varian X-Ray Tube Products	X	X	X	X		X
Winder Dairy	X	X	X			

Notes: 1.) * = no withdrawals 2.) N/A = not applicable

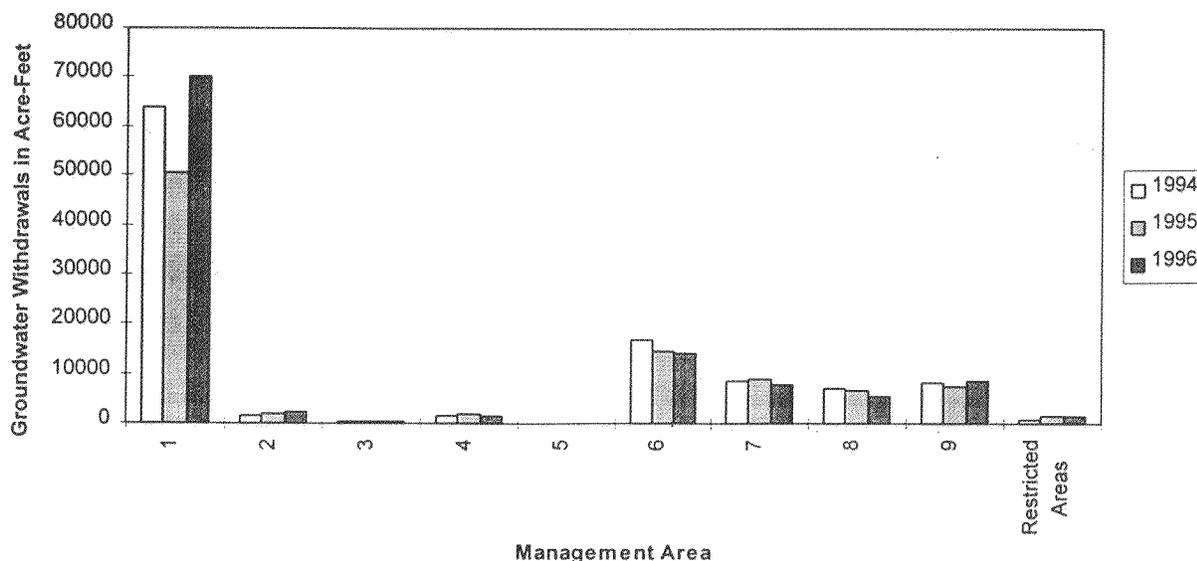
Water User	Data Received					
	Water Use			Water Quality		
	94	95	96	94	95	96
Ballard Real Estate Holdings Inc.	X	X	X			
Bruce Larsen	X	X	X			
Cletus Hamilton	X	X	X			
Elysian Burial Gardens	X	X	X			
Fore Lakes Golf Course	X	X	X			
Hidden Valley Country Club	X	X	X			
Robert I. Bowles	X	X	X			
Salt Lake County Parks and Recreation	X	X	X	X	X	
S-Devcorp	*X	*X	*X	N/A	N/A	N/A
State Of Utah Dept. Of Corrections	*X	*X	*X	X	X	X
The Country Club	X	X	X			
Unifed Industries			X			
Utah Roses	X	X	X			
Wasatch Lawn Memorial Park	X		X			

Notes: 1.) * = no withdrawals 2.) N/A = not applicable

Nineteen (19) public water supply systems, sixteen (16) self-supplied industrial users, and fourteen (14) irrigation users report water use data. In 1996, water quality data was reported by eight (8) public suppliers, three (3) self-supplied industrial users, and one (1) irrigator.

The Division of Water Rights is currently updating its records as to who should be reporting data as per the Plan. The updated list of water users will be used in the Plan. This list will include all users who have the right to pump fifty (50) acre-feet per year and all users who have the right to pump two-hundred and fifty (250) acre-feet per year. Newly added water users, required to report either water pumpage and/or water quality, will receive the update report along with the original Plan.

FIGURE 2 - Groundwater Withdrawals by Management Area for the Period 1994-1996



3.0 Water Quantity

Water use data is required to be submitted to the Division of Water Rights by any water user with a well that has a right to pump over 50 acre-feet per year. The water use data is used to ensure that the withdrawal limits set forth for each management area are not exceeded.

3.1 Distribution of Reported Withdrawals

The total reported withdrawals for 1994, 1995, and 1996 are 109,436 acre-feet, 94,269 acre-feet, and 111,996 acre-feet, respectively. The total reported groundwater withdrawals for each management area is illustrated in Figure 2 and presented in Table 3.

Management Area	1994	1995	1996	Withdrawal Limit
1	63832	50433	70253	124800
2	1764	2035	2338	7500
3	267	222	239	14000
4	1611	1775	1416	3000
5	0	0	0	700
6	16964	14755	14182	33000
7	8559	9148	8054	19000
8	7205	6768	5522	13000
9	8255	7522	8603	20000
Restricted Areas	980	1610	1390	
Total Withdrawal	109436	94269	111996	235000

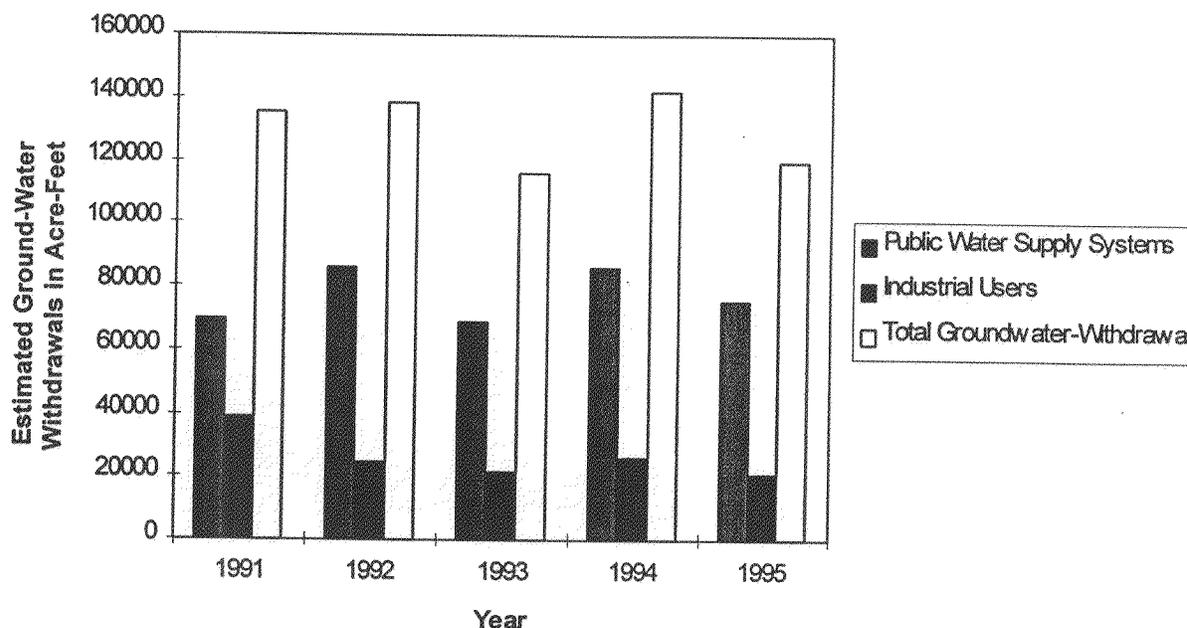
Increases in reported ground-water withdrawals occurred in the eastern portions of the Salt Lake Valley (management areas 1, 2, and 9, and the restricted areas). Decreases in reported ground-water withdrawals occurred in the western portions of the Salt Lake Valley (management areas 3, 4, 6, 7, and 8). There were no reported withdrawals in management area 5.

The reported data indicates that each management area is using less than sixty percent of its maximum allowable annual ground-water withdrawal. It is important to note that the reported ground-water withdrawals are only a portion of the total ground-water withdrawals in the Salt Lake Valley. Therefore, actual ground-water withdrawals in some areas may be closer to their maximum allowable limit than is indicated.

3.2 Estimated Ground-Water Withdrawals

The USGS estimates ground-water withdrawals in its annual publication *Ground-Water Conditions in Utah*. These estimates are an attempt to determine the total annual amounts of ground-water withdrawals within a certain drainage area, in this case the Salt Lake Valley. The estimated withdrawals can be compared to the reported withdrawals in order to determine the amount of ground-water withdrawn by users that do not report to the Division of Water Rights. Non-reporting users include both users who withdraw less than fifty (50) acre-feet per year and are not required to submit data; and also those users who are required

FIGURE 3 - USGS Estimated Ground-Water Withdrawals in the Salt Lake Valley for the Period 1991-95



to submit data under the Plan and yet fail to report. The ground-water withdrawals estimated by the USGS from 1991 to 1995 are summarized in Figure 3.

As per the Plan, the maximum allowable ground-water withdrawal for the Salt Lake Valley is 235,000 acre-feet per year. Over the last five years the average annual withdrawal was 130,200 acre-feet which means that approximately fifty-six percent of the maximum annual allowable withdrawals are being used. It is important to emphasize that these are estimated values. However, it is believed that they are representative of the magnitude of the total ground-water withdrawals.

4.0 Water Quality

Water quality data, in reference to the Salt Lake Valley principal aquifer, is available from three main sources. These data sources include: 1) the USGS monitoring network; 2) the Public Water Supply data required to be submitted every three (3) years to the Division of Drinking Water; and 3) the inorganic data received by the Division of Water Rights, as per requirements of the Plan. Long-term inorganic water quality data is a critical component of the Plan. Water quality data within the valley is being reviewed by the Division of Water Rights to better evaluate the long-term effects of withdrawals on the quality of the ground water, establish withdrawal limits, and define management areas.

The Plan requires that water users within Salt Lake Valley who pump over two-hundred and fifty (250) acre-feet per year of water must submit water quality data to the Division of Water Rights on an annual basis. This annual water quality report should include a total inorganic analysis for each

well which pumps over two-hundred and fifty (250) acre-feet per year. Over the past three years there has been a decline in the number of users reporting this data. In 1996, out of the fifty-six (56) users who were notified to report an inorganic water quality analysis, only twelve (12) users submitted data. The objective of such data collection is to investigate and understand correlations between ground-water withdrawals and water quality variations. Understanding the impacts of ground-water pumping upon water quality is not possible if such data is lacking.

4.1 Distribution of Total Dissolved Solids (TDS) Quantities

Various water users within all management areas, except management area three (3) and management area five (5), reported Total Dissolved Solids (TDS) data for their wells which pumped over 250 acre-feet per year. TDS concentrations are reported in Table 4. Because many water users have not consistently reported data for the past three years, it is difficult to evaluate possible trends. It can be observed from this data that the lowest TDS concentrations occurred in management area one (1) through four (4). These regions of the valley are known to have the best quality water. Based upon reported data for the past three (3) years, management area six (6) has consistently proved to have the poorest quality water for Salt Lake Valley. In 1996, a reported TDS concentration of 6890 mg/L was measured in a well in management area six (6), and was found to be the highest TDS value for the past three (3) years. The lowest reported TDS concentration of 396 mg/L was measured in management area one (1) in 1995.

Figure 4a, 4b, and 4c depict the sites of all reporting wells within the Salt Lake Valley. The TDS concentration of each well is represented by a range. As discussed previously, the lowest TDS concentrations are located in management area one (1) and the highest TDS concentrations are located in management area six (6).

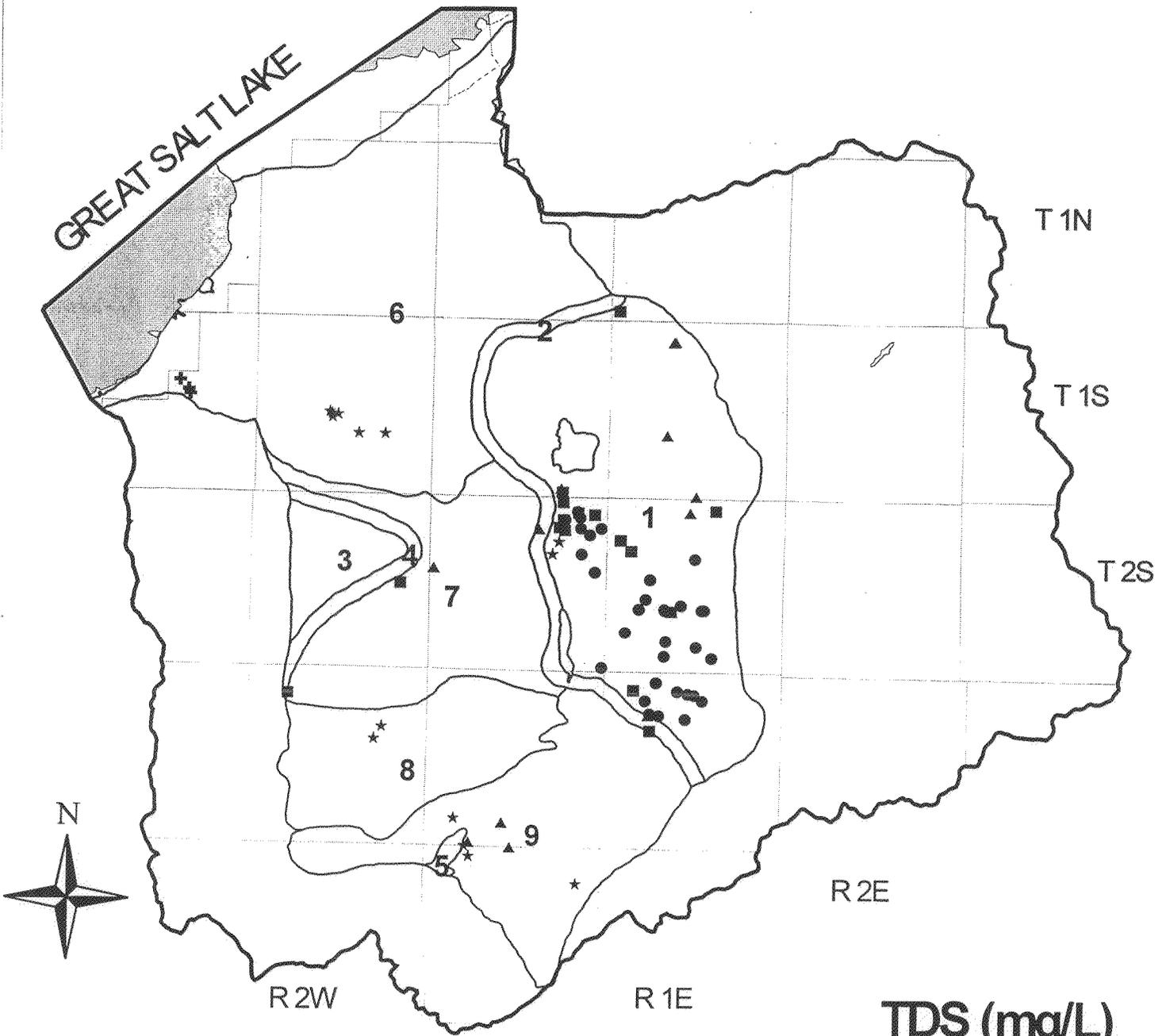
4.2 USGS Monitoring Network

To better monitor the impact of ground-water withdrawals on the overall water quality in the principal aquifer of the Salt Lake Valley, the U.S. Geological Survey (USGS) has been monitoring twenty-one (21) wells within Salt Lake Valley for various water quality parameters. Field parameters, such as specific conductance, temperature, and pH are measured annually. If significant changes are noted in the conductivity measurement, then a water sample is collected for analyses. If no significant changes occur then a water quality sample is collected for laboratory analyses on a three (3) year rotational basis. When sampled, each well is analyzed for various inorganic constituents. By 1996, ten (10) additional sites were added to the original monitoring network, which consisted of eleven (11) wells. Table 5 presents the reported conductivity data and an estimated TDS data for 1994 and 1995 for twenty (20) wells in the monitoring network.

Table 4: Reporting Water Users with the Right to Pump over 250 Acre-Feet per Year						TDS (mg/L)	
USER	WIN	DEPTH	MA	1994	1995	1996	
DEPT OF CORRECTIONS	002126	1005	9	1210	2000	2000	
GRANGER HUNTER IMPROVEMENT DIST	000052	990	1			465	
GRANGER HUNTER IMPROVEMENT DIST	000059	775	1			440	
GRANGER HUNTER IMPROVEMENT DIST	000061		1			545	
GRANGER HUNTER IMPROVEMENT DIST	000101	980	1			320	
GRANGER HUNTER IMPROVEMENT DIST	000058	916	2			590	
GRANGER HUNTER IMPROVEMENT DIST	000057	420	7			600	
HI-COUNTRY ESTATES	000034	510	9		871		
HOLLIDAY WATER COMPANY	000136	515	1	682	692	728	
HOLLIDAY WATER COMPANY	000156	664	1	628	672	406	
HOLLIDAY WATER COMPANY	000194	750	1	404	398	416	
HOLLIDAY WATER COMPANY	002206	810	1		280	278	
KENNECOTT	001022		4	474	550	502	
KENNECOTT	000400	570	6	5190	5190		
KENNECOTT	000427	524	6	1460	1330	1340	
KENNECOTT	000428	420	6	1970	1910	1930	
KENNECOTT	000486	404	6	1370	1470	1470	
KENNECOTT	001087	437	6	4640	4480	4810	
KENNECOTT	001092		6	6006	3610	6890	
KENNECOTT	001120	593	6		1716	2070	
KENNECOTT	001123		6	1564	1568	1550	
KENNECOTT	000681	1000	8	1700	2180	2270	
KENNECOTT	000721	650	8	1330	1454	1650	
LDS CHURCH	005589		1			800	
LDS CHURCH	008636		1				
MAGNA IMPROVEMENT DISTRICT	001476	177	6	1220			
MAGNA IMPROVEMENT DISTRICT	002007		6	1190			
MURRAY CITY CORPORATION	001267	620	1	278	270	232	
MURRAY CITY CORPORATION	001276	468	1	214		228	
MURRAY CITY CORPORATION	001285	496	1	502	648		
MURRAY CITY CORPORATION	001306	445	1	161	168	154	
MURRAY CITY CORPORATION	001312	455	1	226	246	256	
MURRAY CITY CORPORATION	001332	391	1		630	630	
MURRAY CITY CORPORATION	001334		1	109	126		
MURRAY CITY CORPORATION	001359	695	1	359			
MURRAY CITY CORPORATION	001378	521	1	206	154	208	
MURRAY CITY CORPORATION	001417	544	1	197	200	198	
MURRAY CITY CORPORATION	001421		1	274		264	
MURRAY CITY CORPORATION	001434	616	1		202		
MURRAY CITY CORPORATION	001435		1	558			
MURRAY CITY CORPORATION	001439	448	1	366		354	
MURRAY CITY CORPORATION	014679		1			682	
RIVERTON CITY CORPORATION	000255	345	9	1240	1680	1470	
RIVERTON CITY CORPORATION	000437	447	9	830	979	1020	
RIVERTON CITY CORPORATION	000475	357	9	858	956	998	
RIVERTON CITY CORPORATION	000476	670	9	1100	1430	1310	
RIVERTON CITY CORPORATION	000477	700	9	1100	1190	1220	
RIVERTON CITY CORPORATION	001494	500	9	770	910	858	
RUSHTON FAMILY PARTNERSHIP	002155	950	7		673		
SALT LAKE CITY CORPORATION	001495		1		420		
SALT LAKE CITY CORPORATION	001556	464	1	560			
SALT LAKE CITY CORPORATION	001557	385	1		533		
SALT LAKE CITY CORPORATION	001631	502	1	680	733		
SALT LAKE CITY CORPORATION	001656	500	1		347		
SALT LAKE CITY CORPORATION	001659	604	1		167		
SALT LAKE CITY CORPORATION	001671	740	1	150	160		

Table 4: Reporting Water Users with the Right to Pump over 250 Acre-Feet per Year						TDS (mg/L)	
SALT LAKE CITY CORPORATION	001684			1		173	
SALT LAKE CITY CORPORATION	001747	600		1	270	280	
SALT LAKE COUNTY PARKS AND REC	002324			1	1730	1690	
SALT LAKE COUNTY PARKS AND REC	002351			1	1130	368	
SALT LAKE COUNTY PARKS AND REC	002352			1	466	528	
SALT LAKE COUNTY WATER CONSERVANCY DIST	001296	920		1	220	202	192
SALT LAKE COUNTY WATER CONSERVANCY DIST	001297	960		1		222	194
SALT LAKE COUNTY WATER CONSERVANCY DIST	001751	700		1	200	180	198
SALT LAKE COUNTY WATER CONSERVANCY DIST	001754			1	144		134
SALT LAKE COUNTY WATER CONSERVANCY DIST	001757			1			138
SALT LAKE COUNTY WATER CONSERVANCY DIST	001765	711		1	210	194	228
SALT LAKE COUNTY WATER CONSERVANCY DIST	001766	782		1	142	132	148
SALT LAKE COUNTY WATER CONSERVANCY DIST	001779	875		1		224	236
SANDY CITY	001827	555		1	198	135	
SANDY CITY	000124	605		1	298		
SANDY CITY	000124	605		1	298		
SANDY CITY	000137	1010		1	169	148.7	
SANDY CITY	000391	692		1	215	176.7	
SANDY CITY	000505	442		1		434	
SANDY CITY	001280	656		1	203		
SANDY CITY	001831	500		1		107.6	
SANDY CITY	001860	626		1	133		135
SANDY CITY	001862	1000		1	400	284	
SANDY CITY	001864	915		1		142.9	
SANDY CITY	001869	1000		1	195		
SANDY CITY	001877	938		1	159		
SANDY CITY	001895	1015		1	200	153.7	
SANDY CITY	001931	190		1	322	255	
SANDY CITY	007542			1		148.8	174
TA YLORSVILLE BENION IMPROVEMENT DIST	001878			1	213	324	363
TA YLORSVILLE BENION IMPROVEMENT DIST	001933			1	789	995	1044
TA YLORSVILLE BENION IMPROVEMENT DIST	001107			1	198	251	298
TA YLORSVILLE BENION IMPROVEMENT DIST	001272			1	514	499	528
TA YLORSVILLE BENION IMPROVEMENT DIST	001330	805		1	482	515	639
TA YLORSVILLE BENION IMPROVEMENT DIST	001828			1	377	405	385
TA YLORSVILLE BENION IMPROVEMENT DIST	001873	995		1	1231	996	1252
TA YLORSVILLE BENION IMPROVEMENT DIST	001923	678		1	383	449	464
TA YLORSVILLE BENION IMPROVEMENT DIST	001950			1	481	612	590
TA YLORSVILLE BENION IMPROVEMENT DIST	002021	499		1	259	253	276
TA YLORSVILLE BENION IMPROVEMENT DIST	002022	395		1	297	207	360
TA YLORSVILLE BENION IMPROVEMENT DIST	002023	657		1	1344	1298	1620
TA YLORSVILLE BENION IMPROVEMENT DIST	002026			2	853	872	965
TA YLORSVILLE BENION IMPROVEMENT DIST	002024	1107		7	433	534	537
TA YLORSVILLE BENION IMPROVEMENT DIST	002025	1107		7	390	531	
TA YLORSVILLE BENION IMPROVEMENT DIST	002029	950		7	850	1175	1347
TA YLORSVILLE BENION IMPROVEMENT DIST	002045			7		788	1035
UNIVERSITY OF UTAH	001964	445		1	614	614	774
UNIVERSITY OF UTAH	004716	445		1	730	742	836
WHITE CITY WATER IMPROVEMENT DIST	002095	915		1	174		176
WHITE CITY WATER IMPROVEMENT DIST	002105	723		1	268		372
WHITE CITY WATER IMPROVEMENT DIST	002136	1012		1	206		256
WHITE CITY WATER IMPROVEMENT DIST	002090	657		2	654		

Distribution of Total Dissolved Solids 1994 ¹⁰



TDS (mg/L)

- 100 - 300
- 301 - 600
- ▲ 601 - 900
- ★ 901 - 2000
- ✦ 2001 - 7000

Figure 4a

Distribution of Total Dissolved Solids 1995 ¹¹

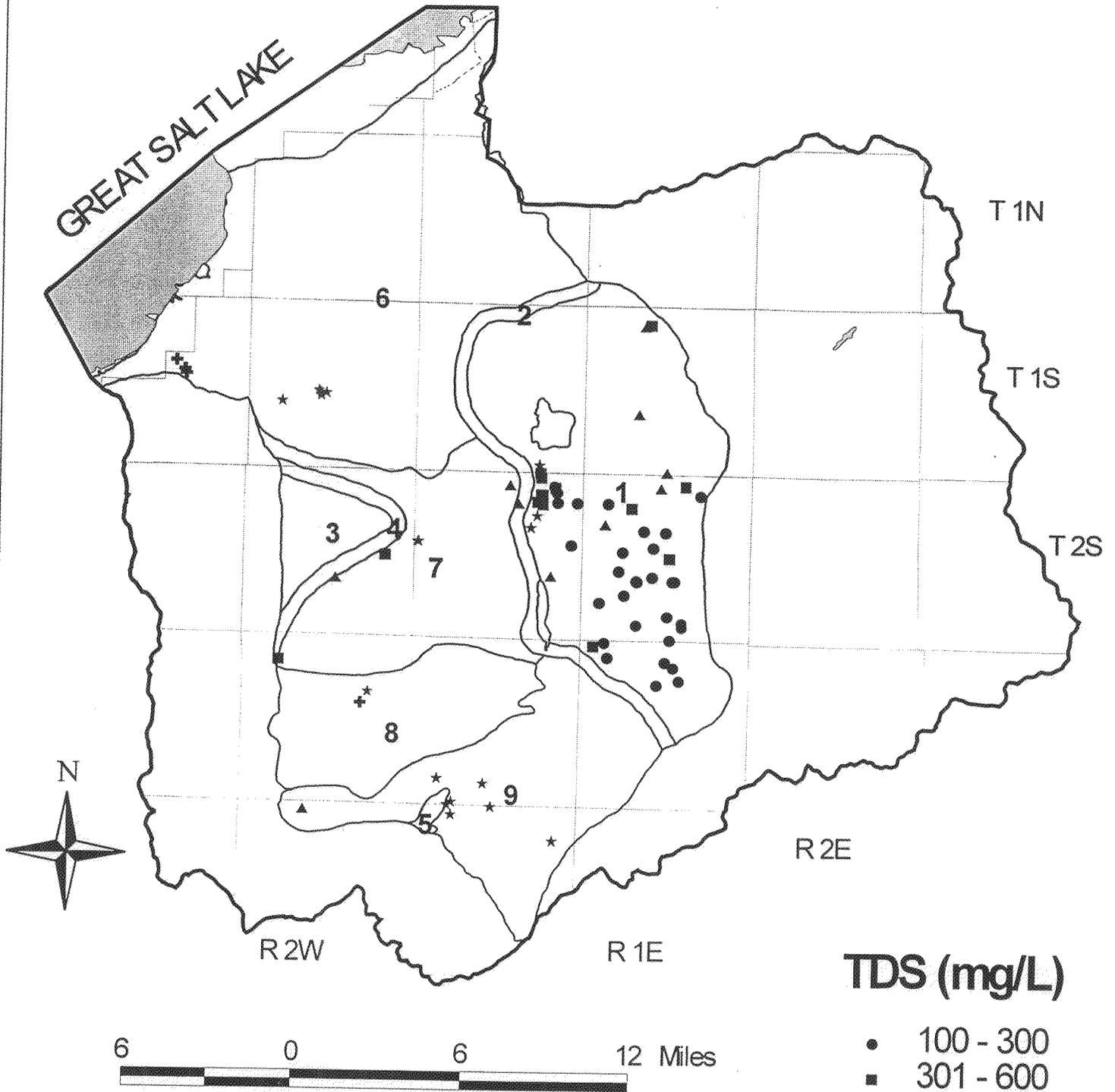
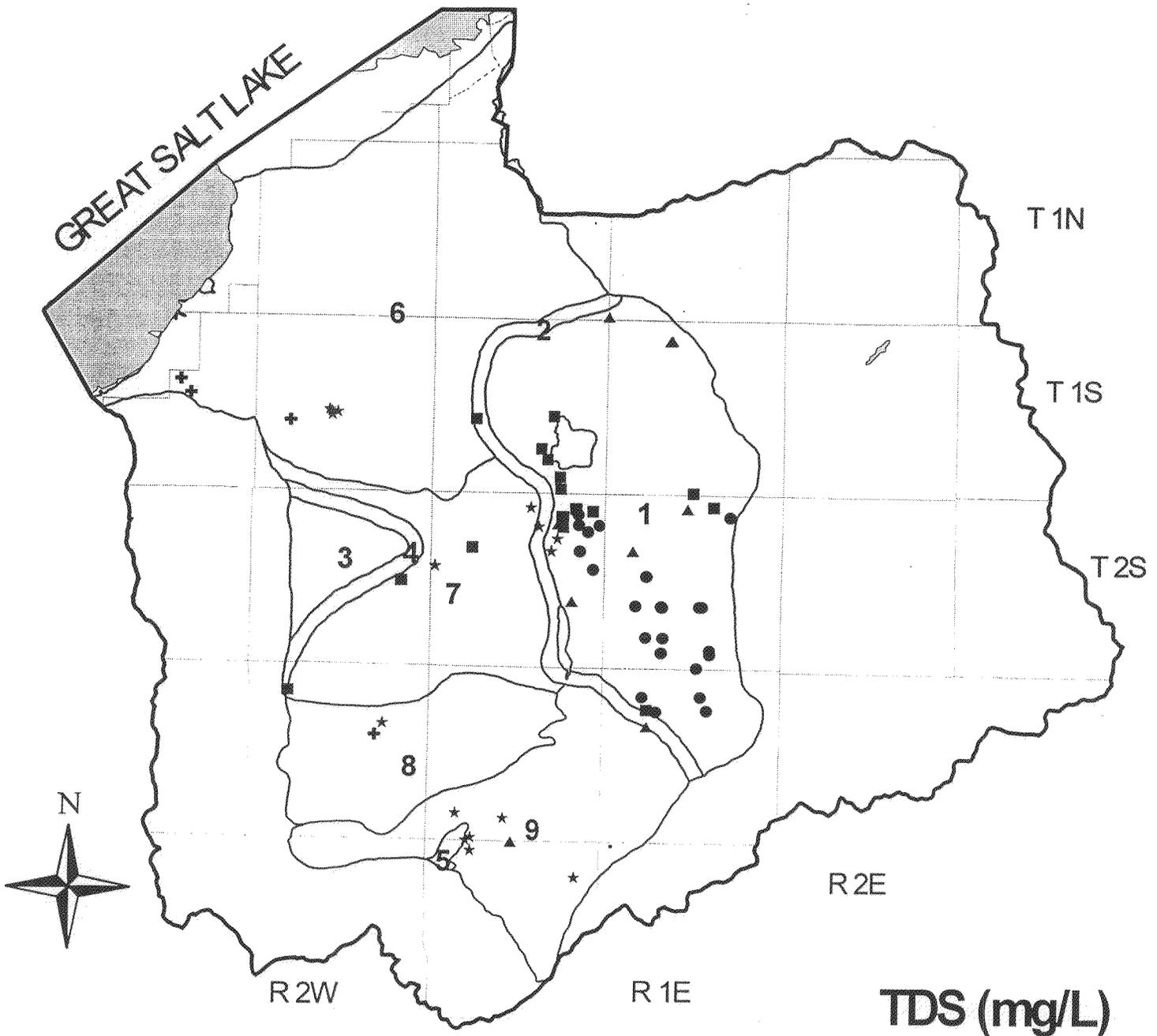


Figure 4b

Distribution of Total Dissolved Solids 1996



TDS (mg/L)

- 100 - 300
- 301 - 600
- ▲ 601 - 900
- * 901 - 2000
- + 2001 - 7000

Figure 4c

TABLE 5 USGS #	CONDUCTIVITY (micromhos/cm)		TDS (mg/L)	
	1994	1995	1994	1995
(C-2-1)6abc-4	2750	2560	1650	1536
(C-1-1)25cca-2	410	440	246	264
(C-2-2)25cdd-1	1000	1270	600	762
(C-3-1)16bcc-2	1950	2290	1170	1374
(C-2-1)25cbb-1	590	530	354	318
(D-1-1)19cdb-17	1080	1040	648	624
(D-3-1)19ada-1	1880	1770	1128	1062
(D-2-1)4acb-1				
(D-2-1)35bbb-1	360	315	216	189
(C-3-1)4aac-1		1300		780
(B-1-2)2dac-1	880	860	528	516
(B-1-2)36baa-1	6370	6280	3822	3768
(C-1-1)33ddd-1				
(C-1-2)22bdd-4		2080		1248
(C-3-1)12ccb-1	960	920	576	552
(C-4-1)23dbb-1	1210	1410	726	846
(C-4-2)1bbb-1	1290	1270	774	762
(D-1-1)7abd-6	1220	1210	732	726
(D-2-1)21dbc-1	295	280	177	168
(D-3-1)31abb-1	460	460	276	276

(TDS concentrations were estimated as the measured field conductivity multiplied by a factor of 0.6)

5.0 Water Rights

The Division of Water Rights has divided the state into various water right areas based generally upon the hydrologic boundaries. Salt Lake Valley, as defined in the Interim Plan, is comprised of water right areas 57 and 59. Area 57 is located east of the Jordan River whereas Area 59 is located west of the Jordan River.

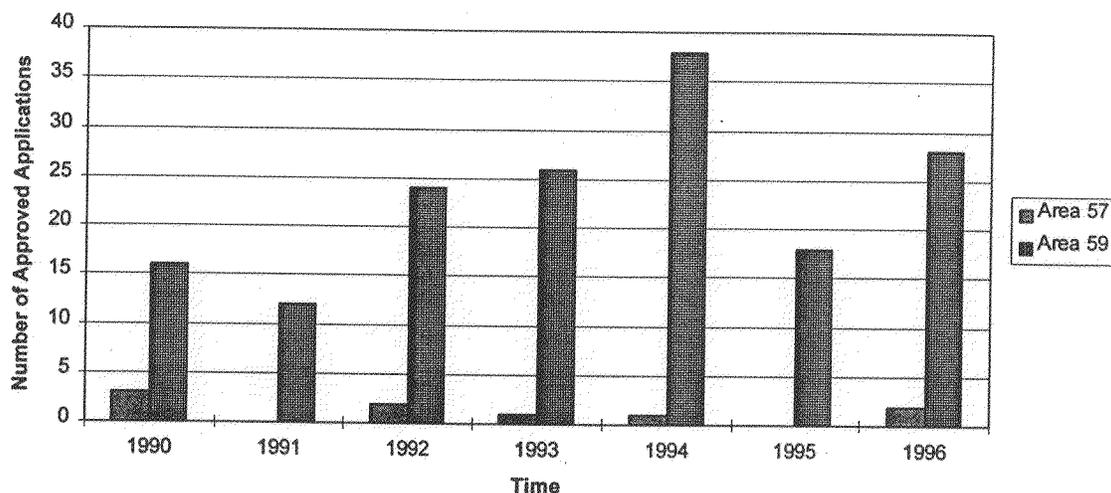
The number of applications to appropriate ground water approved during 1990 through 1996 in Area 57 and Area 59 is illustrated in Figure 5. The number of approved applications to change the point of diversion, place, or nature of use of a water right in Area 57 and Area 59 is illustrated in Figure 6. These values include applications in all of Area 57 and Area 59, not just the Salt Lake Valley.

5.1 New Appropriations (Domestic Users)

The Salt Lake Valley Plan implemented in 1991 states that applications to appropriate water from the principal aquifer will be considered for single family uses where water is not available from a water supply system. These applications will be limited to a maximum annual diversion of 1.0 acre-foot. Over the past six (6) years such applications have been approved on a Fixed-Time basis.

Figure 5 illustrates that from 1990 to 1996 the majority of applications approved were filed in Area 59 as opposed to Area 57. This is most likely due to development and growth in the western portion of the valley, where domestic users do not have the option to hook up

FIGURE 5 - Approved Water Right Applications for the Period 1990-1996

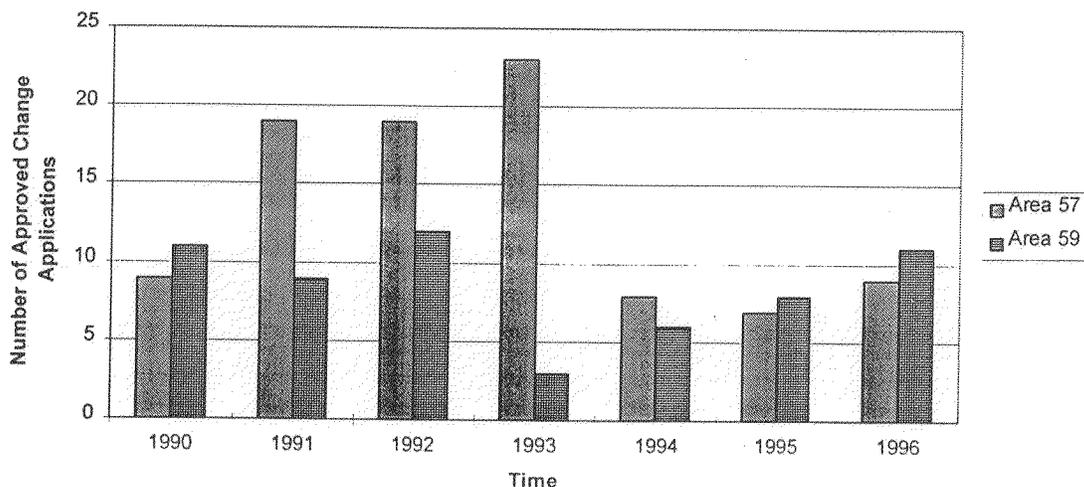


to a public water supply system. Area 57 has had less than five (5) approved applications for each year from 1990 to 1996.

5.2 Change Applications

The Plan, which was implemented in 1991, states that change applications will be considered and evaluated on their own individual merits. Change applications that propose to transfer shallow aquifer water rights to principal aquifer water rights have not and will not be approved. Change applications have been approved in both areas 57 and 59 over the past seven (7) years. A decrease in approved change applications has occurred for the 57 area after 1993. Changes have been approved at a more constant rate in the 59 area over the past seven (7) years.

FIGURE 6 - Approved Water Right Change Applications for the Period 1990-1996



6.0 Reports Prepared in the Salt Lake Valley Study

Four reports have been completed by the USGS in cooperation with several of the public water suppliers and the Division of Water Rights since the last Salt Lake Valley Plan Update Report was sent out in 1994. They are as follows:

- *Chemical composition of ground water, hydrologic properties of basin-fill material, and ground-water movement in Salt Lake Valley, Utah* was published in 1995. The principal aquifer contains lower concentrations of dissolved solids than water in the shallow unconfined aquifer, and the fine grained sediments that separate the two aquifers. Dissolved solids concentrations ranged from 130 milligrams per liter (mg/L) on the east side of the valley to 48,100 mg/L on the west side of the valley. The eastern part of the valley is predominately recharged by the Wasatch Range. The western part of the valley is recharged by the Oquirrh Mountains. The higher dissolved solids concentrations in the western part of the valley is due to both geology and mining activities.
- *Numerical simulation of ground-water flow in basin-fill material in Salt Lake Valley, Utah* was published in 1995. A three-dimensional, finite-difference, numerical model of the basin-fill ground-water flow system in Salt Lake Valley was created. This report describes both the steady-state and transient simulations. The model can be used to evaluate ground-water movement and can be used with other computer models to evaluate solute movement and effects of water use on ground- water quality.
- *Particle-tracking analysis of time-related capture zones for selected public-supply wells in Salt Lake Valley, Utah* was published in 1995. Twenty-five and fifty year capture zones were estimated using a regional, finite-difference, ground-water flow model in conjunction with a particle-tracking program. For selected wells capture zones were estimated for the wells for current average pumping and projected increased pumping during a fifty year period from 1992 to 2041. Each of the well sets selected for the test showed at least one instance of capturing poorer quality ground-water as pumpage increases in the future.
- *Numerical simulation of the movement of sulfate in ground-water in southwestern Salt Lake Valley, Utah* was published in 1996. A three-dimensional solute-transport model of southwestern Salt Lake Valley was used to investigate potential future changes in sulfate concentration in southwestern Salt Lake valley. The movement of the sulfate plume was simulated for the period 1994-2043 and based on projected increased withdrawals for public supply in Salt Lake valley. The plume is simulated as moving west to east under the Jordan River toward the public supply wells during the final twenty-five (25) years of the simulation. The largest increase in sulfate concentration was seen in the West Jordan City Fire Station Well, where the concentration is projected to be 200 mg/l in the year 2006 and 4,100 mg/l in the year 2022.

7.0 Future Plans and Summary

The State Engineer is currently reviewing the data, reports, and models developed by the USGS. There is concern that the sulfate plume located in the southwestern Salt Lake Valley is migrating east towards the West Jordan City wells. As a better understanding of the study evolves, the Plan will be reevaluated and focused on significant water quality issues such as the one in West Jordan. Once these studies have been thoroughly reviewed, public meetings will be held to discuss the findings with water users within the valley and receive their comments and suggestions. Modifications to the 1991 Interim Management Plan may be in order to better reflect the information determined by the Salt Lake Valley studies and input presented at the public meetings.

The State Engineer appreciates the efforts made by the reporting water users within the valley. A major objective of the "update report" is both to encourage water users to report their water use and water quality data and also to inform users of all reported data and any observable trends. As the management plan is revisited and a final plan is developed, there will be ample opportunity for Salt Lake Valley water users to offer comments, concerns, and suggestions.