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DIVISION OF WATER RIGHTS

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INTERIM CACHE VALLEY GROUND-WATER MANAGEMENT PLAN

INTRODUCTION

The purpose of this plan is to set forth the framework for future management of ground-water resources in Cache Valley and the State Engineer's guidelines regarding ground-water appropriations and change applications. The State Engineer believes there exists a close regional hydrologic connection between ground-water aquifers, springs and streams, and thus surface and ground water must be jointly managed. In adopting this plan, the State Engineer's primary objective is to protect prior water rights while putting to beneficial use the greatest amount of available water.

In evaluating the ground-water resources of Cache Valley, the State Engineer has used, among other information, the U.S. Geological Survey (USGS) report entitled *Hydrology of Cache Valley, Cache County, Utah, and Adjacent part of Idaho, with Emphasis on Simulation of Ground-Water Flow* (Kariya, et al., 1994).

BACKGROUND

The State Engineer believes that there is unappropriated water available in Cache Valley, Utah, during certain times of the year. According to the *Utah State Water Plan, Bear River Basin*, there is 196,000 acre-feet of depletable water available each year on the Bear River system for development in Utah. Much of this water is available during the winter and spring runoff period. During peak demand periods of most years, principal water sources are fully appropriated and there is not sufficient flow in surface sources to meet the demand of all existing surface water rights. In 1992 the basin experienced severe drought conditions and many early priority surface rights experienced shortages.

The USGS study shows, through measured data and model simulations, that surface and ground water within Cache Valley are hydrologically connected. Although the ground-water flow model (model) developed by the USGS is a simplified representation of the physical system, if used within the limitations of the model, it is a useful tool to evaluate the effects of ground-water withdrawals. Flows from the ground-water system to surface water sources are sensitive to both well withdrawals and changes in recharge to the ground-water system. The model (Kariya, et al., 1994) indicates that on an annual basis, the effect of additional ground-water withdrawal and consumption, is a reduction in surface water flows. Increased ground-water depletions cause 1) less water to be discharged from the aquifer to

surface water sources in discharge areas and, to a lesser degree, 2) more water to enter the aquifer system from surface water sources in recharge areas. In assessing the impact on the hydrologic system of existing and future ground-water withdrawals, it is important to consider that a portion of the withdrawn water may be returned to the system.

Physically, there are significant quantities of water within the basin fill aquifers. However, because ground water and surface water within Cache Valley are interrelated, it is anticipated that additional development and depletion of ground water will affect surface water flows. The ground-water system discharges water to the surface streams, springs, and reservoirs; and this water constitutes part of the flow in the tributaries and main stem of the Bear River. The limiting factor regarding ground-water development in Cache Valley is not the amount of water which is physically available within the aquifers, but rather the amount of ground water which can be withdrawn without impairing prior rights. Because of their interrelationship, ground-water and surface water systems need to be jointly managed as one system.

Ground-water withdrawals in Cache Valley represent about 12% of the annual recharge. The ground-water system is not currently experiencing any significant, regional, long-term problems. Locally, water levels fluctuate seasonally due to well withdrawals and climatic conditions; however, long-term, regional water levels appear to be stable. Estimated average annual recharge and discharge to the ground-water system in the Utah portion of Cache Valley for 1982 through 1990 are shown in table 1.

	Acre-Feet
Recharge	
Infiltration of precipitation and unconsumed irrigation water	90,000
Seepage from streams	1,000
Seepage from canals	86,000
Other forms of recharge (bedrock)	46,000
Total	223,000
Discharge	
Seepage to streams	70,000
Spring discharge	58,000
Evapotranspiration	36,000
Seepage to reservoirs	31,000
Withdrawals from wells	28,000
Total	223,000

Table 1 - Estimated water budget for the ground-water flow system in Cache Valley, Utah, 1982-90.

Table 1 shows a mass balance of the recharge and discharge components of the ground-water system and its relationship to surface water sources. Changes in one component will generally cause changes in other components. The table also shows that about 25 percent of the total discharge from the ground-water system is to springs.

Springs supplied from the valley fill aquifers generally occur in those areas where either the water level in a water table aquifer intersects the land surface or the water level in a confined aquifer is above the land surface and issues forth through an opening in the confining layer. Therefore, to maintain the discharge of springs at current levels, no significant change in the ground-water level should occur.

The issue is whether ground-water development should be curtailed in order to maintain current water levels. The State Engineer's water management objectives for the valley are to protect prior rights while putting to beneficial use the greatest amount of available water. The challenge is to institute criteria to guide development in a reasonable and equitable manner. The State Engineer recognizes the prior rights of spring users; however, he does not believe at this time it is reasonable or wise water management to close ground-water to further appropriations.

The affects of additional ground-water withdrawals are difficult to predict because they are dependent on several factors, such as, location, rate of withdrawal, geologic conditions, aquifer permeability and other related parameters. However, it is anticipated that as additional ground-water is withdrawn in Cache Valley, generally, water levels will change, with the greatest changes in the vicinity of large production wells. These general water level changes may result in a corresponding decrease in certain spring flows.

In the case where the discharge of a spring decreases to a point where the flow is insufficient to supply their beneficial uses, the spring user should be allowed to drill a well to replace that water no longer supplied from the spring. The well should be used only within the limitations of the water right and would carry the same priority date as the spring.

Surface water rights are supplied from many different sources, such as, runoff, ground-water inflow and irrigation return flow. Senior water rights are entitled to rely on upstream sources to make up their water supply. Since the ground-water system is hydrologically connected to some surface sources, the State Engineer believes that both surface and ground-water rights should be managed conjunctively. If surface flows are not sufficient to supply all rights, both surface and ground-water rights should be distributed according to priority.

Municipal and industrial water demand has been projected for Cache Valley through 2020 (Hughes, 1996). Based on population projections and historical water use practices, it is estimated that water diversion will increase by 15,000 AF from 1990 usage. Other uses and demands on the system may account for an additional 10,000 AF over the next 20 years. The State Engineer believes that potential withdrawals of 25,000 AF is a reasonable quantity of additional water to be developed to meet future demands for water over the next 20 years.

MANAGEMENT GUIDELINES

After considering at length the total situation of the Cache Valley hydrologic system as briefly summarized above, the State Engineer has formulated a plan which seeks to reasonably and wisely manage the water resources of Cache Valley. The plan strives to balance the protection of existing water rights in a reasonable manner, with the objective of encouraging that the greatest amount of available water be put to beneficial use. The State Engineer will use the following guidelines in reviewing applications and managing the ground-water resources of Cache Valley.

1) Cache Valley is open to new appropriations of ground water for individual family domestic purposes. Such applications are limited to a maximum diversion of 1.73 acre-feet per year for the domestic purposes of one family, up to 0.25 acres of irrigation of lawn and garden and incidental stock watering of 10 livestock. Applications considered under this paragraph may not be approved if water can be supplied by a public water system or the land is in a subdivision. The State Engineer may approve no more than one application to appropriate ground water under the provisions of this paragraph on any parcel of land which exists as of the effective date of this plan.

2) Applications to appropriate ground water, larger than the limitations set forth in paragraph 1, above, will be considered for approval, if the applicant can show that, (a) There is reason to believe that prior water rights will not be impaired, or (b)That impacts to prior water rights will be compensated or adequate replacement water provided. It is the responsibility of the applicant to make an evidentiary showing to the State Engineer at the time the application is filed, pursuant to (a) or (b)above. The evidentiary showing should address local, regional, and downstream effects on springs, streams, and the ground-water system. Appropriations considered under this paragraph will be subject to the annual withdrawal limitations set forth in paragraph 5, below. All applications are also subject to the statutory criteria of Section 73-3-8, Utah Code Annotated.

3) Change applications that propose to move surface water rights to ground water and/or move within the ground-water system will be considered on their own individual merits subject to the statutory criteria set forth in sections 73-3-3 and 73-3-8, Utah Code Annotated. Applications will be reviewed to ensure there is no enlargement of the underlying right and intervening rights are not impaired. Changes under this paragraph will be subject to the annual withdrawal limitations set forth in paragraph 5, below.

4) Extension of time requests on approved applications will be critically reviewed and if the applicant is not diligently pursuing the development of the water, the extension request may be denied, the quantity of water reduced, or the priority date reduced.

5) The State Engineer will allow an additional 25,000 acre-feet/year of potential ground-water withdrawals. As this water is fully developed and used, the effect of such development on the hydrologic system will be evaluated to determine if additional withdrawals can be allowed. The State Engineer will continue to monitor ground-water withdrawals, water levels in selected wells, and, as necessary, discharge at various springs in Cache Valley. As ground water is developed and provisions for replacement water implemented, or at the request of water users, the State Engineer will investigate the need to appoint a water commissioner to ensure the proper distribution of both surface and ground water.

6) Owners of existing water rights, whose source of supply is from springs, will be allowed to drill a well(s) if the flow of their spring is reduced by new ground-water development to a point where the flow is insufficient to supply their beneficial uses. A water user would need to file a change application, and set forth their claim of reduced spring flow.

7) Local water administration practices which exist within Cache Valley will supplement this plan and will remain in effect and are not overridden by this plan. These areas include Cove, Paradise and Petersboro, among others.

8) The effective date of this management plan is September 1, 1999.

REFERENCES

Hughes, Trevor C., Cache County Water Demand/Supply Model. Final Report to Utah Division of Water Resources, U.S. Bureau of Reclamation and Cache County, Utah State University, December 1996.

Kariya, K.A., Roark, M.D., Hanson, K.M., Hydrology of Cache Valley, Cache County, Utah and Adjacent Part of Idaho, with Emphasis on Simulation of Ground-Water Flow, United States Geological Survey in cooperation with Utah Department of Natural Resources and Utah Division of Water Rights, 1994.

Utah Code Annotated, 1953, as Amended, Title 73.

Utah State Water Plan, Bear River Basin, Utah Board of Water Resources, January 1992.