

May 17, 2000

Dear Water Users and Other Interested Parties:

The state engineer implemented an Interim Ground-Water Management Plan (Interim Plan) in Salt Lake Valley in April of 1991. The purpose of the Interim Plan was to address the over-appropriation of ground-water rights in Salt Lake Valley and to protect the quality of the resource. At the same time, the United States Geological Survey (USGS) in cooperation with the public water suppliers and Divisions of Water Quality and Water Rights conducted studies to determine the effects of large amounts of ground-water withdrawals on the water quality of Salt Lake Valley. These studies have been completed and are listed below:

- *Chemical composition of ground water, hydrologic properties of basin-fill material, and ground-water movement in Salt Lake Valley, Utah* (Department of Natural Resources Technical Publication No. 110-A)
- *Numerical simulation of ground-water flow in basin-fill material in Salt Lake Valley, Utah* (Department of Natural Resources Technical Publication No. 110-B)
- *Particle-tracking analysis of time-related capture zones for selected public-supply wells in Salt Lake Valley, Utah* (Department of Natural Resources Technical Publication No. 110-C)
- *Numerical simulation of the movement of sulfate in groundwater in southwestern Salt Lake Valley, Utah* (Department of Natural Resources Technical Publication No. 110-D)

A digital ground-water flow model for the Salt Lake Valley was developed in conjunction with the above technical publications. This model was created to simulate the various ground-water, flow-related components (recharge, rivers, canals, well withdrawals, etc.) of the aquifer system using physical properties of the aquifer such as hydraulic conductivity and storage coefficients. The impact of various withdrawal patterns on the long-term integrity of the aquifer can be reasonably determined by using the model. The model also provides a way to track the paths of water particles as they travel through the aquifer from areas of recharge to their points of discharge.

The Interim Plan was intended to guide water management while the USGS studies were being conducted. In developing this long-term management plan for the valley, several provisions were added to the Interim Plan and some provisions were modified or deleted to reflect the information obtained from the studies and comments from water users. This ground-water

management plan is intended to guide the long-term ground-water management activities in Salt Lake Valley. This plan is presented as a proposal to the water users in the valley and to other interested parties and will be modified following their review and may also be modified as additional information becomes available.

Before presenting the various provisions in this plan, an explanation of some of the current ground-water related issues confronting the water users and the state engineer is in order. In addition, a brief summary of the hydrogeology of the valley will also aid in understanding the approach taken in developing this plan.

An examination of water rights has been done to estimate potential ground-water withdrawal in the Salt Lake Valley. Currently, under approved applications and perfected water rights, there is approximately 400,000 afy of potential ground-water withdrawal from the principal aquifer. The safe yield of the principal aquifer based on the state engineer's interpretation of the USGS studies, measured data, and ground-water simulations is estimated to be 165,000 afy. It is in the opinion of the state engineer that withdrawals in excess of 165,000 afy will cause impairment of ground-water quality and may result in undesirable reductions in water level elevations. It is clear that well withdrawals need to be managed in order to ensure that pumping does not exceed safe yield.

Much of the ground-water recharge in the eastern part of the valley is supplied from infiltration of snow melt from the Wasatch Mountains. In general, the quality of the ground-water in this area is outstanding and the aquifer properties are excellent for withdrawing relatively large amounts of water. However, there is concern that heavy pumping in the valley east of the Jordan River is causing water quality degradation by drawing poorer quality water from the west side underneath the river into the capture zones of wells on the east. One of the specific objectives of this plan is to prevent water quality degradation of the pristine water in the valley. Modeling efforts have shown that this can be accomplished by limiting the total withdrawal, as well as the density of withdrawals, particularly on the east side of the Jordan River.

The western part of the valley receives much of its ground-water recharge from the Oquirrh Mountains. There is significantly less recharge from the Oquirrhs than there is from the Wasatch Mountains and, in general, the aquifer properties and water quality west of the Jordan River are poorer than they are east of the river. The challenge facing the western part of the valley is, for the most part, one of quantity rather than quality. Ground-water levels have decreased significantly over the last fifteen years in much of the western part of the valley. Withdrawals need to be managed to prevent mining of the ground-water resource, permanent damage to the aquifer, interference with other water users, and land subsidence.

In the northern and central parts of the valley, there are some unique hydrologic conditions compared to the western and eastern recharge areas of Salt Lake Valley. These parts of the valley are essentially ground-water discharge areas. Ground water from both sides of the valley naturally discharges to several sources including the Jordan River, shallow drains, springs, uncontrolled flowing wells, phreatophytes, and the Great Salt Lake. To a certain extent, wells constructed in these areas have the effect of reducing the amount of water discharging to the

various sources instead of decreasing the ground-water levels in the aquifer. From a ground-water management standpoint, it is desirable to capture water in the aquifer with wells before it is discharged to one of the sources listed above.

Thus, the primary concern in the east is water quality degradation, while the concern in the west is a lack of sufficient water quantity. In general, the northern and central portions of the valley do not appear to be immediately threatened by either quality degradation or a lack of water quantity. These conclusions have guided the development of the management plan and are reflected in the attached policy

If you have any questions or comments regarding this proposed policy, please feel free to contact us.

Sincerely,

Robert L. Morgan, P.E.
State Engineer

CONTENTS

1.0 Introduction	1
2.0 Proposed Salt Lake Valley Ground-Water Management Plan	1
2.1 New Appropriations	1
2.2 Ground-Water Withdrawal Limits	1
2.2.1 Regional Withdrawals from the Principal Aquifer	1
2.2.2 Localized Ground-Water Withdrawals	3
2.2.3 Ground-Water Withdrawals From the Shallow Aquifer	3
2.3 Applications to Change the Point of Diversion, Place of Use, or Purpose of Use ...	3
2.4 Proof of Appropriation/Change	4
2.5 Well Spacing and Flow Rate	4
2.6 Segregation Applications	6
2.7 Extensions of Time for Water Right Applications	6
2.8 Ground-Water Remediation Projects	6
2.9 Aquifer Storage Recovery (ASR)	6
2.10 Metering and Annual Reporting of Ground-Water Withdrawals	6
2.11 Monitoring Activities and Aquifer Status Update	6
Endnotes	7

FIGURES

Figure 1. Salt Lake Valley Ground-Water Management Plan regions	2
Figure 2. Management squares with potential withdrawals above limits shown in table 2	5
Figure A. Management squares for evaluating change applications	7

TABLES

Table 1. Regional ground-water withdrawal limits	3
Table 2. Management squares restricted to change applications	4

1.0 Introduction

The purpose of this document is to present the state engineer's proposed policy for the management of the ground-water resources of Salt Lake Valley. The objectives of this ground-water management plan are to promote wise use of the ground-water resource, to protect existing water rights, and to address over-appropriation of ground water in the valley. In proposing this ground-water management plan, the state engineer is using his statutory authority to administer the measurement, appropriation, and distribution of the ground water of Salt Lake Valley.

For the purposes of this plan, the Salt Lake Valley consists of the area of unconsolidated basin-fill material generally bounded by the Wasatch Range to the east, Oquirrh Range to the west, Great Salt Lake to the north, and Traverse Mountains to the south. This area is illustrated in Figure 1.

2.0 Proposed Salt Lake Valley Ground-Water Management Plan

The following policy guidelines are hereby proposed:

2.1 New Appropriations

The Salt Lake Valley is closed to new appropriations of ground water from the principal aquifer with the exception of single family uses in non-subdivision areas where water is not available from a public water supply system. Applications to appropriate water will be limited to a maximum annual diversion of 1.0 acre-foot. The uses under such application shall not exceed the domestic purposes of one family, the irrigation of 0.10 acres, and/or the stock watering of a maximum of 10 heads of livestock. Such rights shall be approved as fixed time applications for a ten-year period and upon the condition that when a public water system is available, the users will connect to the system, the well will be sealed, and the water right abandoned. Upon expiration of the ten-year period, if a public water supply system is still not available, such application will be extended upon proper filing of a request for extension.

2.2 Ground-Water Withdrawal Limits

In order to fulfill the objectives of this management plan, guidelines have been proposed to help distribute withdrawals on a regional basis. If withdrawals exceed the withdrawal limits set forth in this plan, the state engineer will distribute the water in accordance with the priority dates of the individual water rights using the following guidelines.

2.2.1 Regional Withdrawals from the Principal Aquifer

Salt Lake Valley has been divided into four regions: Western, Eastern, Central, and Northern as shown on Figure 1. The average annual withdrawals and the maximum withdrawals in any one year from each region shall be limited to the amounts shown in Table 1 below.

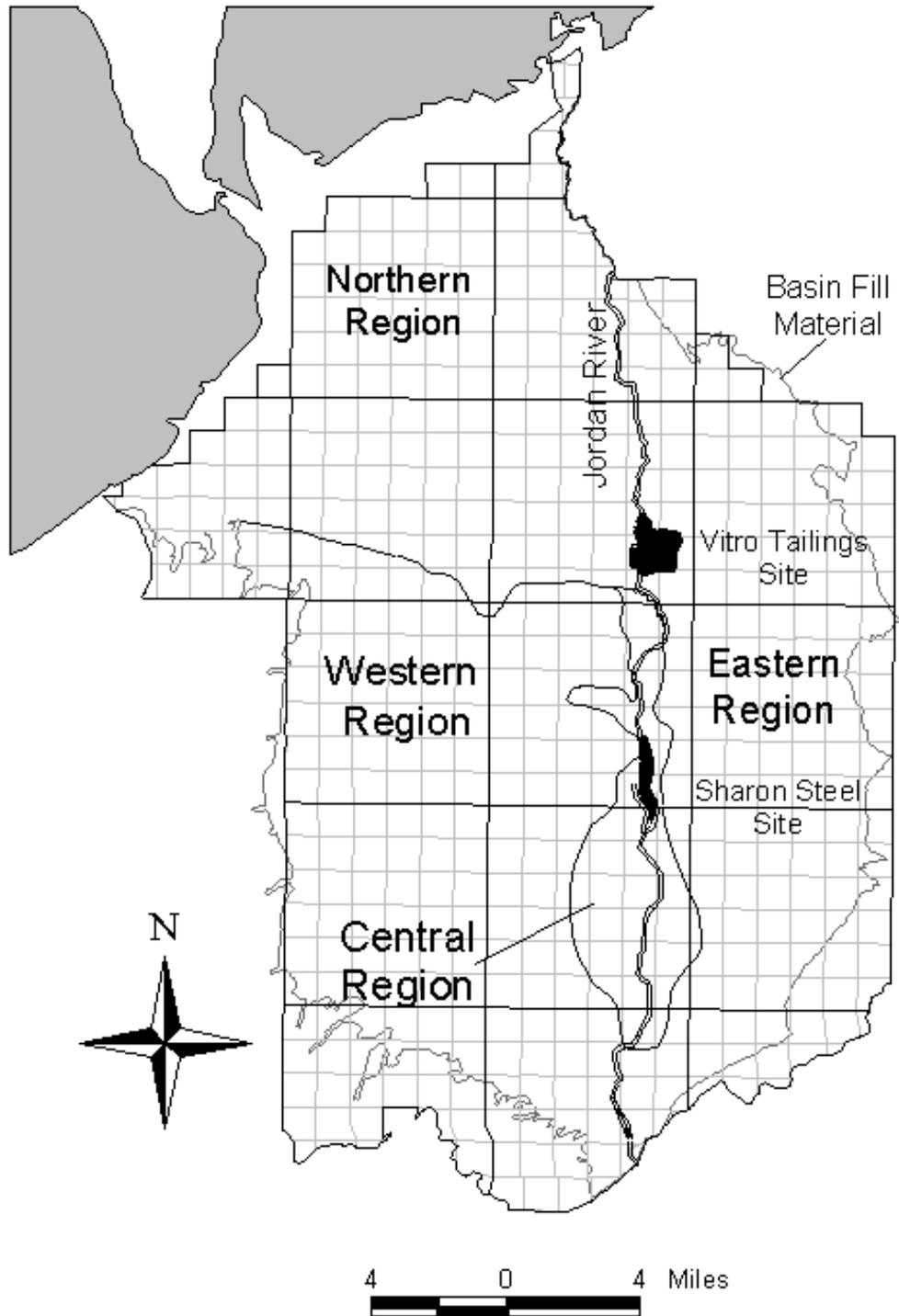


Figure 1. Salt Lake Valley Ground-Water Management Plan regions.

Table 1. Regional ground-water withdrawal limits

Region	Withdrawal Limit (acre-feet per year)	Maximum Withdrawal (acre-feet per year)
Western Region	25,000	35,000
Eastern Region	90,000	115,000
Central Region	20,000	30,000
Northern Region	30,000	40,000
Valley-Wide	165,000	220,000

Withdrawals in excess of the regional withdrawal limits will be allowed based on a credit system. The credit system will allow unused water (the difference between the amount of water withdrawn and the regional limit in any given year) to be withdrawn in any of the next four years provided that the maximum withdrawal limit is not exceeded. These maximum amounts are shown in Table 1.

2.2.2 Localized Ground-Water Withdrawals

In areas of the valley where withdrawals are considered to be excessive, based on water level declines, the state engineer will limit withdrawals in those areas according to the priority dates of the respective water rights. A decline of ten feet or more in five years is considered to be excessive draw down. Similarly, the state engineer will limit withdrawals in an area if he believes that excessive pumping has caused a definite and significant degradation of the water quality.

2.2.3 Ground-Water Withdrawals From the Shallow Aquifer

Additional withdrawals above the allowable withdrawal limits set forth in this section will be allowed if such withdrawals are from the shallow aquifer, provided that such withdrawals do not have an adverse effect on the aquifer or on other underground or surface-water rights and otherwise comply with Utah law.

2.3 Applications to Change the Point of Diversion, Place of Use, and/or Purpose of Use

Each change application will be evaluated based upon its own merits. The evaluation may consider, but will not necessarily be limited to, potential impact on the following: existing water rights, the aquifer system as a whole, and overall water quality. The following guidelines will be used when evaluating change applications:

- 1) Change applications which propose to transfer water rights historically supplied from the shallow aquifer to the principal aquifer will not be approved.
- 2) Change applications which propose to transfer water rights into the eastern or western regions will not be approved.

- 3) Change applications which propose to transfer water rights into a restricted area¹ will not be approved
- 4) Change applications which propose to transfer water rights into a management square² where the potential withdrawals under the existing water rights exceed the limits set forth in Table 2 and shown in Figure 2 below will not be approved.

Table 2. Management squares restricted to change applications

Region	Potential Withdrawal per Management Square
Western Region	4,000 afy
Eastern Region	12,000 afy
Central Region	6,000 afy
Northern Region	6,000 afy

- 5) Change applications to transfer water rights into a management square where the potential withdrawal limits, as outlined in 4 above, have been reached or exceeded will be critically reviewed if the applicant can show that:
 - a) there is sufficient reason to believe that existing water rights will not be impaired.
 - b) compensation or adequate replacement water will be provided to existing water rights if impairment occurs.
 - c) additional ground-water withdrawals will not significantly reduce water levels, degrade the water quality, or otherwise negatively impact the aquifer.

2.4 Proof of Appropriation/Change

In conjunction with all proofs of appropriation and proofs of change, the state engineer shall require that the total volume of water to be certified has in fact been developed and placed to beneficial use. The state engineer will review the total operation of a system or water user to ensure the intent of this requirement is met.

2.5 Well Spacing and Flow Rate

Each new well shall be designed so that, when pumped at its maximum flow rate, it will not cause more than 12 feet of draw down on an existing well. Users in a particular area may enter into an agreement to provide a variance from this requirement if it does not interfere with third party rights and upon approval of the variance by the state engineer.

1. See Endnotes.
 2. See Endnotes.

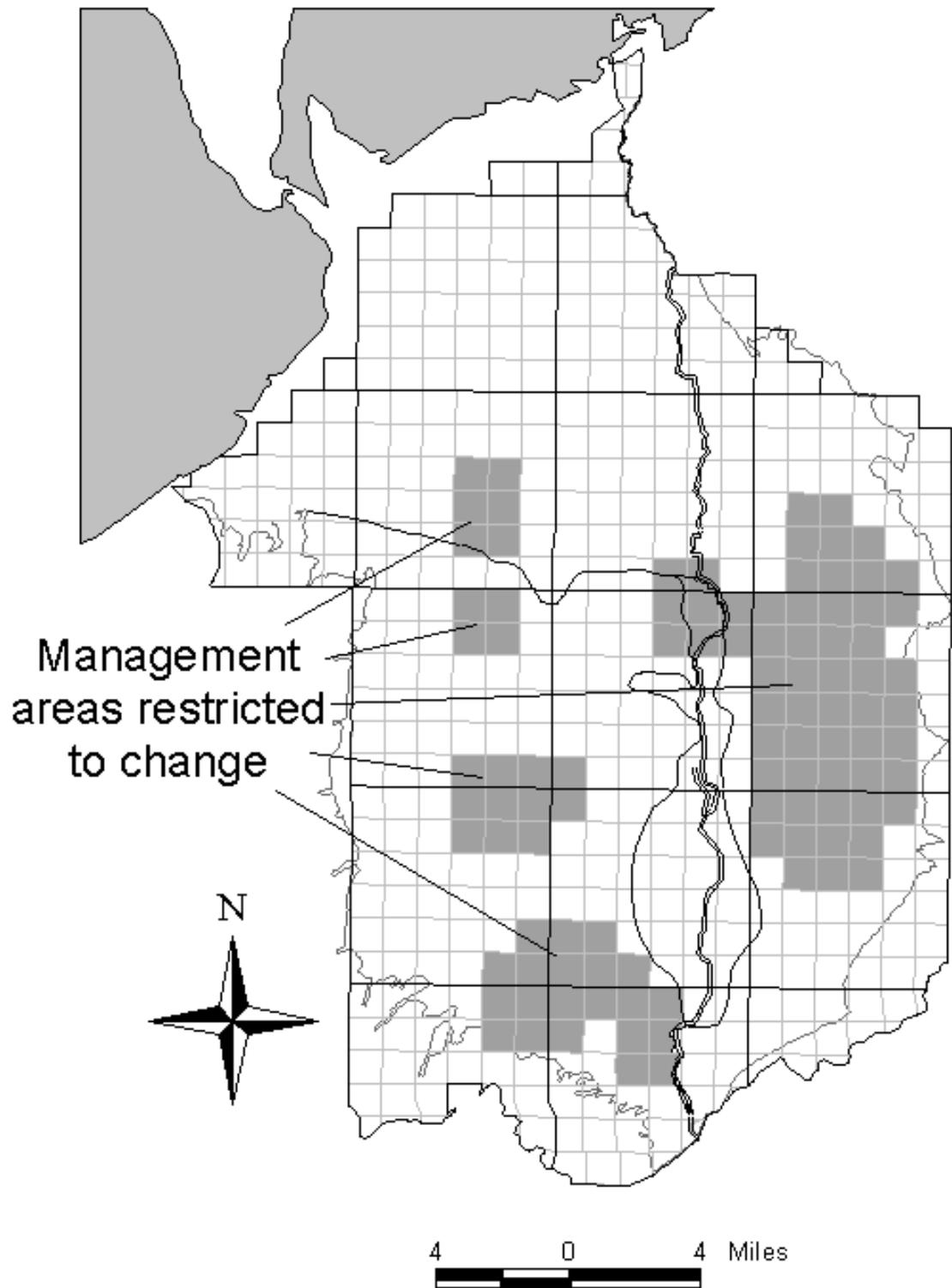


Figure 2. Management squares with potential withdrawals above limits shown in Table 2.

2.6 Segregation Applications

All future segregation applications will be critically reviewed on their individual merits, according to current statutory provisions.

2.7 Extensions of Time for Water Right Applications

The state engineer will critically review all future extension requests on approved applications to appropriate and change water pursuant to Section 73-3-12 of the Utah Code. In reviewing extension requests, if the state engineer finds unjustified delays or a lack of due diligence, he shall reduce the priority date, grant the request in part, or deny the extension of time request.

2.8 Ground-Water Remediation Projects

The state engineer will evaluate each proposed ground-water remediation project based upon its own merits. In order to allow for remediation of ground water the state engineer may allow withdrawal amounts in excess of those withdrawal limits outlined in Table 1 above or allow changes which would exceed the limits set forth in Table 2 above if he finds that it is in the best interest of the public and the aquifer system.

2.9 Aquifer Storage Recovery (ASR)

The state engineer will evaluate each proposed ASR project based upon its own merits. In general, withdrawals credited from aquifer injection will not count towards the withdrawal limits outlined in Table 1 above.

2.10 Metering and Annual Reporting of Ground-Water Withdrawals

All ground-water wells that have the right to potentially withdraw 50 acre-feet or more annually shall be equipped with a meter capable of measuring the instantaneous flow rate and total volume pumped from the well. All water users meeting the above criteria shall be required to submit an annual report to the state engineer by March 1 of each year setting forth the quantity of water diverted for each of their wells during the previous calendar year. Such reports shall summarize the monthly withdrawals for each well operated. If the water user submits an accurate and complete annual Utah Water Use Data Form it shall fulfill this requirement.

Owners of all ground-water wells that have the right to potentially withdraw 250 acre-feet or more annually, shall submit a water quality report for total inorganics every three years. Copies of the inorganic analyses performed as per Department of Environmental Quality, Division of Drinking Water requirements, will satisfy this reporting requirement.

2.11 Monitoring Activities and Aquifer Status Update

The Division will monitor the water quality reports submitted by the water users and give an updated, valley-wide water quality summary every 5 years or as often as is sufficient to show emerging water quality trends. The Division will also provide water use information such as valley-wide, regional and localized withdrawals and will update the water rights priority lists periodically.

Endnotes

1. *Restricted Areas*

There are two (2) restricted pumping areas currently in the plan which are associated with the following contaminated sites:

- Vitro Tailings Site
- Sharon Steel Site

as shown in Figure 1. In order to protect the quality of the water by preventing changes in the vertical hydraulic gradient and mobilization of contaminants at these contaminated sites, the transfer of water rights into these areas will not be allowed. The restricted areas will be monitored to insure that current pumping in the area does not change hydraulic gradients. Restricted areas are based on available data and may change as new data is obtained. New restricted areas may be added to the plan after a request is made to the state engineer, an evaluation of the data supports such designation, and the public has had an opportunity to review the data.

2. *Management Squares*

A management grid has been set up based on the U.S. Public Land Survey’s system. Under this system, the land is divided into township, range, and section. Each section is a square measuring approximately one mile on each side. In this management plan, one management square consists of any four sections, in a two section by two section configuration.

Using this method, the squares overlap each other such that each section is actually part of four different management squares. Figure A, below, illustrates how section 11 is part of four different management squares.

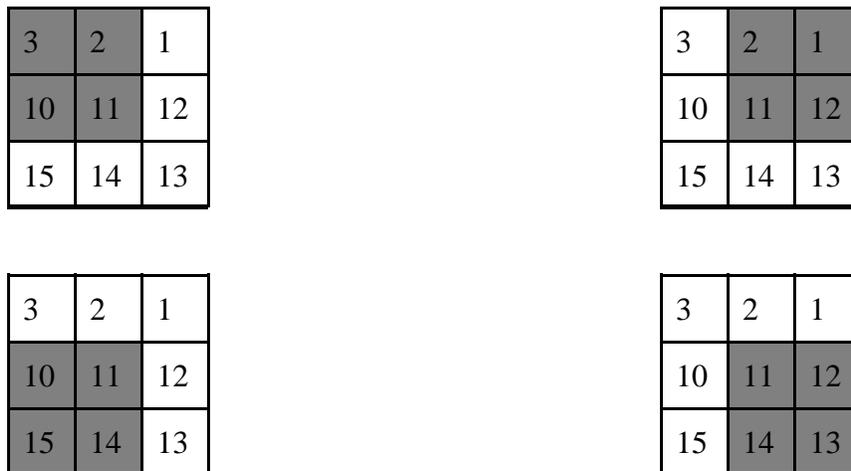


Figure A. Management squares for evaluating change applications.

Draft – Proposed Salt Lake Valley Ground-Water Management Plan, May 17, 2000