INTERIM LEGISLATIVE COMMITTEE ON NATURAL RESOURCES

TREASURE VALLEY WORKING GROUP

FINAL REPORT

DRAFT

Members:

Representative Mike Moyle, Chair
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Table of Contents

1. INTRODUCTION

1.1. Background

The Idaho Legislature, through House Concurrent Resolution No. 56, directed the Interim Legislative Committee on Natural Resources to "conduct a study regarding water supply and management issues in the Moscow, Rathdrum Prairie, and Snake Plain Aquifers and the Bear River Drainage." The Treasure Valley Working Group was formed to review and formulate a plan for addressing ground water supply and management issues in the Treasure Valley. The members of the Treasure Valley Aquifer Working Group are

- Representative Mike Moyle, Chair
- Senator John Andreason
- Representative Darrell Bolz
- Representative Lawrence Denney
- Senator Brad Little.

1.2. Purpose and Objectives

The purpose of the Treasure Valley Aquifer Working Group is to make recommendations to the Interim Committee on Natural Resources on selected water matters. Specific objectives include the following:

1. Investigate the extent of ground water depletions from the Treasure Valley Aquifer and make recommendations for reducing or curtailing ground water depletions;
2. Recommend short-term and long-term management goals and objectives for the Treasure Valley Aquifer together with standards to determine whether the goals and objectives are being met;
3. Investigate and make recommendations regarding water supply measures or projects that should be implemented to achieve the short-term and long-term goals and objectives, including, but not limited to, a proposed recharge plan;
4. Study and recommend methods for funding implementation of Treasure Valley Aquifer management goals and objectives;
5. Evaluate and make recommendations regarding an administrative structure for ensuring that short-term and long-term goals and objectives are implemented; and
6. Develop performance benchmarks for implementation of goals and objectives.

The purpose of this report is to summarize Treasure Valley Working Group findings and to list Treasure Valley Working Group recommendations.

2. TREASURE VALLEY HYDROLOGY

The Treasure Valley of southwestern Idaho consists of the lower Boise River sub-basin, extending from the Boise Foothills to the Snake River (Figure 1). The Treasure Valley includes the cities of Boise, Nampa, Caldwell, Meridian, Eagle, Kuna, and a number of smaller communities. The central portion of the valley is drained by the Boise River; the southern portion of the area is drained by the Snake River.

Major hydrologic components include surface channels (rivers, streams, canals, laterals, etc.), a series of shallow aquifers, a deep regional ground water flow system in deeper aquifers, and an underlying geothermal aquifer (Petrich and Urban, 2004). In an average year, approximately 2 million acre feet of water enters the valley via the Boise River. Water also enters the valley as precipitation, runoff from the Boise Foothills, and irrigation water diverted from the Black Canyon Reservoir along the Payette River. Both Surface and ground water discharge to the Boise and Snake River. On average, and approximately 1 million acre feet leave via the Boise River near Parma. The amount can be highly variable on a year-to-year basis, but the long-term average flow in the Boise River leaving the Treasure Valley (i.e., Boise River at Parma) has not decreased during recent decades.

The Treasure Valley aquifer system consists of a complex series of interbedded, tilted, faulted, and eroded sediments, extending as far as 6,000 feet below ground surface (Wood and Clemens, *in press*). Ground water flows through these sediments in a series of shallow, local flow systems (with ground water residence times ranging from years to hundreds of years) and a deeper, regional flow system. Almost all wells are less than 1,200 feet deep.

The largest component of recharge to shallow aquifers is seepage from the canal system and infiltration associated with irrigated agriculture. Additional recharge sources include underflow from the Boise foothills, underflow from tributary sedimentary aquifers, and direct precipitation.

Shallow ground water levels rose in response to large-scale flood irrigation in the late 1800s and early 1900s. Shallow aquifer levels increased by as much as 80 to 100 feet in some parts of the valley. Water levels have remained at (or near) ground surface in many areas (at least seasonally), discharging to drains and other surface channels.

Recharge to the deeper aquifers begins as downward flow through coarse-grained alluvial fan sediments in the eastern portion of the basin and as underflow at basin margins. Ground water then flows horizontally into the basin via permeable sediments.

Ground water residence times in deep aquifers range from hundreds to tens of thousands of years (Hutchings and Petrich, 1998). The youngest waters entered the subsurface a few thousand years ago and are found along the northeastern

boundary of the basin adjacent to the Boise Foothills. The oldest waters entered the subsurface between 20,000 and 40,000 years ago and are found in the western reaches of the basin near the Snake River.

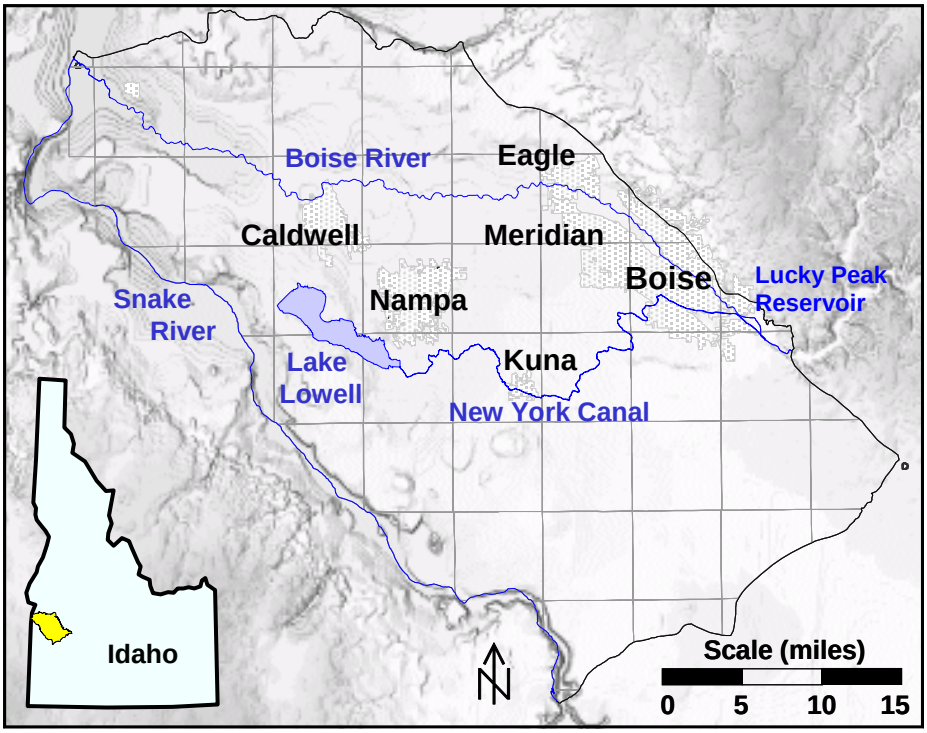

Figure 1: Treasure Valley area map.

Ground water generally flows in a westerly direction (Petrich and Urban, 2004). Water table contours in shallow aquifers reflect surface hydrologic conditions, such as mounding under the New York Canal, or discharge to the Boise River. Ground water contours in deeper zones indicate a more uniform westerly flow direction.

Ground-water levels are relatively stable in many areas, although water level declines have occurred in others (Petrich and Urban, 2004). Wells in two areas – southeast Boise and south of Lake Lowell – have experienced declines of approximately 30 feet and 65 feet, respectively. Water levels in these areas appear to have stabilized in recent years. Additional ground-water level declines have been observed in the areas between northwest Boise and Eagle and southwest Boise, Meridian, and Kuna. Most of the long-term declines in these wells have been less than 10 to 20 feet. Reasons for the declines include increased ground water withdrawals (i.e., pumping) in these areas and/or changes in local infiltration rates. Shallow wells may be especially sensitive to changes in local surface water irrigation patterns in areas where the water table is not in direct hydraulic connection with surface channels. Ground-water level changes are less likely in shallow aquifers in areas where the water table is controlled by drains.

3. WORKING GROUP DISCUSSIONS

The Treasure Valley Working Group met on April 20, May 28, July 20, August 24, and October 26, 2004. Presentations and topics discussed include the following:

April 20, 2004

- Treasure Valley Hydrology – Christian Petrich, SPF Water Engineering, LLC
- Treasure Valley Water Issues – Paul Castelin, Idaho Department of Water Resources

May 28, 2004

- Water Issues Facing Treasure Valley Communities – Nancy Merrill, Mayor of Eagle
- An Irrigation District Perspective on Water Issues in the Treasure Valley – Daren Coon, Nampa-Meridian Irrigatin District
- Implications of Urbanization on Water Use – Christian Petrich, SPF Water Engineering, LLC
- Lower Boise River Basin Planning Efforts – Mary McGown, Idaho Department of Water Resources

July 20, 2004

- Water Issues from a Municipal Perspective – Scott Rhead, United Water Idaho
- Status of Water Right Processing in the Lower Boise River Basin – Gary Spackman, Idaho Department of Water Resources
- The Role of Water Storage in Meeting Future Water Needs – Jerry Gregg, U.S. Bureau of Reclamation

August 24, 2004

- Water Quality in the Treasure Valley – Barry Burnell, Idaho Department of Environmental Quality
- TMDLs in the Treasure Valley – Michael McIntyre, Idaho Department of Environmental Quality
- Waste Water Treatment and Boise River Water Quality – Robbin Finch, City of Boise
- Information on the Statewide Ground Water Monitoring Program, Results for the Treasure Valley – Kenneth Neely, Idaho Department of Water Resources

October 26, 2004

- Review of Working Group findings
- Outline and discussion of Working Group recommendations

Summaries of these presentations and ensuing discussions can be found at http://www.idwr.state.id.us/Committee/Treasure%20Valley/Previous%20Meetings.htm.

4. GENERAL FINDINGS

This section lists findings that were presented to the Working Group or that arose during Working Group discussions. The findings are grouped into the categories of water supply, water levels, urbanization, conjunctive administration, vulnerability to flooding, system storage, and water quality.

4.1. Water Supply

- In general, there is sufficient water for a growing population, but water is not always available where and when it is needed.
- There is an abundant amount of surface and ground water in the western portion of the Treasure Valley.
- Approximately 1 million acre feet of water leave the Treasure Valley via the Boise River on an annual basis, although this amount varies substantially from year to year. This amount includes surface water flow in the Boise River, tributary flows into the Boise River (including irrigation return flows), and ground water discharge into the Boise River or tributary channels.
- ESA constraints (e.g., salmon and steelhead flow augmentation in the lower Snake River) are limiting development of water currently leaving the basin.
- There currently is a backlog of approximately 300 unprocessed Applications for Permit to appropriate ground water.
- There currently is uncontracted water in the Boise River reservoir system that is being used by the U.S. Bureau of Reclamation for flow augmentation in the lower Snake River.
- Idaho Water Resource Board will soon be moving to complete a comprehensive basin plan for the lower Boise River. This plan will provide a policy framework and specific recommendations for water resource development and management.

4.2. Water Levels

- Ground water levels in many parts of the Treasure Valley are stable (or have seen minimal declines).
- Treasure Valley aquifers are susceptible to water level declines from increased withdrawals in some areas, especially in some deeper zones.
- There have been substantial water level declines in southeast Boise and in an area south of Lake Lowell, although water levels in these areas appear to have stabilized.
- Some ground water declines have occurred in the area between Eagle, Kuna, and Boise. These declines have generally been less than 10 to 20 feet, and may represent new pumping equilibria in response to increasing withdrawals.
- Some areas have experienced local limitations in aquifer capacity (resulting in well interference).
- Shallow aquifer levels in many areas are influenced by local irrigation and/or withdrawals, fluctuate in response to irrigation and pumping, and/or are controlled by surface topography (e.g., water levels in the central portion of the valley are at least partially controlled by agricultural drains).
- Decreases in recharge from irrigation or increases in shallow withdrawals may lead to decreased drain flows in these areas.

4.3. Urbanization

- The Treasure Valley is currently home to approximately 410,000 people.
- The Treasure Valley population is projected to reach approximately 1.2 million people by 2050.
- Domestic, Commercial, Municipal, and Industrial (DCMI) demand for water is projected to increase from 105,000 acre feet to 190,000 acre feet by 2025 (IDWR).
- Urbanization leads to changes in types of water use, seasons of water use, and water sources utilized.
- Urbanization (i.e., changes in land use) can lead to changes in shallow-aquifer recharge.
- Municipal suppliers require increasing amounts of potable-quality water (because of an increasing population) to supply domestic water, fire flows, and lawn and landscape irrigation.
- Most municipal water currently comes from ground water sources.

- Increasing amounts of municipal water may come from surface water sources because of lack of adequate quantity or quality of ground water in some locations.
- One way of reducing urban ground water demand is through the use of surface water for urban irrigation. Pressurized irrigation systems are increasingly being used to deliver surface water for urban irrigation. The State Water Plan supports the use of pressurized irrigation with surface water, as do Ada County and numerous Treasure Valley communities.
- There is increasing use of pressurized irrigation systems. For example, Nampa-Meridian Irrigation District alone has installed systems serving 212 subdivisions covering 3,534 acres. The District has contracts to deliver water with the City of Nampa and the Ada County Highway District. Many of these systems are constructed by developers, but some have been built in existing neighborhoods through Local Improvement Districts (LIDs).
- One of the unintended benefits of pressurized irrigation systems is that leakage from conveyances (canals, laterals, etc) carrying water to the point of pressurization can contribute to shallow aquifer recharge. Some of these conveyances may also provide an opportunity for managed recharge during the non-irrigation season.
- The season of use for urban irrigation may be different than the agricultural irrigation season. Some residential turf irrigation may begin earlier in the year and extend later into the year.

4.4. Conjunctive Administration

Conjunctive Administration (CA) is the coordinated administration of surface and ground water in areas where surface and ground water are interconnected. In the Treasure Valley, there is a direct hydraulic connection between many surface channels (including the Boise River) and underlying aquifers.

- A comprehensive strategy for implementation of conjunctive administration is being developed by IDWR for the portion of the Treasure Valley tributary to the Boise River upstream of Star Bridge.
- A CA strategy in the Treasure Valley may be more difficult to develop than in the Eastern Snake River Plain because of a more complex, 3-dimensional aquifer system and more diverse uses of water.
- CA is not currently as urgent in the Treasure Valley as it is in the Eastern Snake Plain Aquifer (ESPA) because injury to senior rights have not been documented.
- CA may provide options for expanded use of shallow aquifers.

4.5. Vulnerability to Flooding

- Increasing development in the Boise River floodplain has led to greater vulnerability to flooding.
- Even minor blockage (e.g., 10-20%) at key bridges could lead to exacerbated flood damage.

4.6. System Storage

- There may be opportunities for increased storage in existing Boise River system reservoirs. Increased storage could also contribute to reduced flood risk.
- Managed aquifer recharge and Aquifer Storage and Recovery (ASR) can provide additional surface water storage and enhanced water quantity for extraction. Opportunities for managed recharge and ASR have not been fully explored.

4.7. Water Quality

- In general, water quality is good.
- Ground water quality concerns include locally elevated concentrations of nitrate, bacteria, volatile organic compounds (VOCs), and pesticides. Certain local surface waters have been identified as water-quality limited.
- Some water quality concerns stem from naturally-occuring constituents such as arsenic and radiological elements.
- Secondary concerns include elevated concentrations of manganese and iron.
- Nutrient loading in surface water is not a problem in the Boise River but it is in the Snake River.
- Approximately 1/3 of the ortho-phosphate loads to the Boise River come from shallow ground water discharge.
- Sediment loading is a concern associated with non-point sources.
- Bacteria TMDLs require reduction from non-point sources – recent data show substantial progress.
- “Designated uses” of surface waters such as the Boise River and tributary streams and associated quality criteria drive TMDL and NPDES requirements.
- There appears to be broad recognition that some “designated uses” may not be correctly designated. Efforts are underway to re-designate stream reaches using “Use Attainability Analyses” (UAAs).

5. RECOMMENDATIONS

The Treasure Valley Working Group has compiled a list of recommendations for the full Interim Legislative Committee on Natural Resources. The recommendations are organized by the topics listed in the Purpose and Objectives (Section 1.2).

5.1. Investigate the Extent of Ground Water Depletions from the Treasure Valley Aquifer, Recommendations for Curtailing Depletions

Based on the results from the Treasure Valley Hydrologic Project, ground water levels in a substantial portion of the Treasure Valley are stable or have experienced long-term declines of less than 10 to 20 feet (see Section 4.2). Some ground water level declines are to be expected as hydraulic response to increases in ground water withdrawals, and are not necessarily cause for widespread concern. Areas of substantial decline (southeast Boise and an area south of Lake Lowell) appear to have reached or are reaching equilibrium conditions. No additional measures are needed for curtailing depletions in these areas because current strategies are working.

Our recommendations are to:

1. Continue measuring of ground water levels throughout the Treasure Valley on a periodic (e.g., quarterly) basis.
2. Conduct mass ground water level measurements of at least 300 wells (similar to those conducted as part of the Treasure Valley Hydrologic Project) every five years.
3. Consider installing permanent, dedicated, multi-level ground water monitoring wells in areas of growing urban development to monitor potential changes in ground water levels and water quality
4. Produce periodic reports describing water level trends.

5.2. Short- and Long-Term Management Goals

Two primary short-term and long-term water management goals in the Treasure Valley are to

1. Ensure an adequate supply of high-quality water in the Treasure Valley for irrigation, commercial, municipal, industrial, recreational, and wildlife purposes.
2. Prevent or minimize the risk of potential flooding along the Boise River Corridor.

5.3. Measures to Achieve Management Goals

In general, there is an adequate amount of water available in the Treasure Valley for a growing population. However, water is not always available where and when it is needed. The following recommendations will help ensure adequate water supplies in the context of changing land uses.

1. *Quantify water use changes associated with urbanization of agricultural land*

   Precise changes in the quantity and timing of water use before and after urban development are unclear. Studies that quantify changing water uses in an urbanizing environment have been conducted in other parts of the country, but not in the Treasure Valley under unique Treasure Valley climatic and hydrologic conditions.

   Such a study could be structured to compare water use on two relatively identical acreages as one of the parcels undergoes urbanization. Alternatively, a study could focus on the measuring water use on properties prior to and following urbanization. Either way, multiple locations could be selected in different parts of the valley to evaluate different conditions. A study such as the one proposed here should have meaningful participation by various surface and ground water users.

2. *Conduct an inventory of opportunities for managed recharge and Aquifer Storage and Recovery (ASR)*

   Summer is the time of maximum water use and tightest supply. Managed recharge and ASR during non-irrigation seasons could be used in the Treasure Valley to enhance water supply during the summer irrigation season. The first step in evaluating managed recharge opportunities is to inventory possible sites. This would be particulary applicable for the area tributary to the Boise River east of Star Bridge (which is the primary candidate area for conjunctive administration).

   ASR is a form of managed recharge. An inventory of potential managed recharge sites could also include a list of potential ASR sites in which the same water being recharged could subsequently be extracted.

3. *Encourage the use of surface water for urban irrigation when and where it is available*

   Use of surface water for urban irrigation reduces the need for using ground water for the same purpose. If water savings accrue in the process of urbanizing formerly flood-irrigated land, create ways (or encourage existing ways) of making water savings available for other uses. “Saved” water could be made available for other uses only if the the integrity of the current surface water delivery system is maintained.

4. *Encourage the use of the shallow aquifer ground water through regulatory and financial incentives*

   Encouraging the use of the shallow aquifer water instead of the deep aquifers, particlularly for urban and agricultural irrigation, conserves deeper ground water for other uses.

5. *Create incentives for the use of single community wells instead of multiple individual wells for new residential developments*

   Reducing the number of new wells in Treasure Valley aquifers reduces the long term risk of potential (a) ground water contamination and (b) co-mingling of ground water among different aquifer layers.

6. *Encourage flow and water level monitoring*

   Flow monitoring devices (e.g., totalizing flow meters) should be installed on all new wells (especially non-domestic wells). The flow meters should be read and reported on a periodic basis. Encourage all new wells to be equiped with water level sounding tubes or other water measurement devices.

   Point-of-use metering should also be encouraged (a) for those public water systems that currently do not meter use and (b) for pressurized surface water irrigation systems.

7. *Explore opportunities for increased surface water storage by raising dams at existing reservoirs*

   Increased storage of water at existing Boise River Reservoirs (Anderson Ranch, Arrowrock, and Lucky Peak) could provide (a) additional water for DCMI and irrigation uses when it is needed most (summer) and (b) more flood control.

8. *The State currently is considering a proposal to purchase approximately 220,000 acre-feet of water rights from high-lift pumpers on a willing seller, willing buyer basis. Most (if not all) of this water is intended for exchanges in the upper Snake River basin. However, some of the water should be allocated for exchanges in the Boise and Payette basins.*

   Purchase of water rights from high lift pumpers, if successful, would contribute to firming up delivery of the U.S. Bureau of Reclamation (USBR) flow augmentation goal of 427,000 acre-feet. Consideration should be given (with USBR cooperation) to exchanging water purchased with State funds for currently uncontracted storage water in the Boise and Payette drainages.

9. *Explore ways to reduce or limit floodplain development*

   Continued floodplain development increases the risk of catastrophic

damage from potential flooding in the Boise River. Counties and cities along the Boise River should develop an aggressive comprehensive strategy to limit floodplain development to reduce the risk of potential future flood damage. One approach would be to develop this comprehensive strategy as part of the Lower Boise River planning process.

10. *Consider options for channel maintenance that would lead to flood risk reductions*

    Review current channel maintenance activities, and consider options for additional maintenance that could reduce recreational hazards and flooding potential.

11. *Develop guidelines for municipalities regarding water rights on agricultural land that is being urbanized*

    Individual Treasure Valley communities are being asked to review an increasing number of applications for new developments. Some of the same communities must find ways to supply potable water for these new developments. At least one community now requires that water rights associated with land that will be developed to be transferred to community ownership.

12. *Review the existing definition of domestic use under Idaho Code §42-111 and the associated exclusion from the requirement to apply for a water right contained under Idaho code §42-227; determine the need for possible revisions*

    When considering the domestic use issue the legislature may also want to investigate the need to document and inventory existing domestic water rights. If the need to document and inventory existing domestic rights is established, a funding strategy for doing so should be identified. …

13. *Review the current enforcement strategy regarding domestic water rights*

    Lacking resources to do otherwise, IDWR currently investigates alleged abuse of a domestic right only if a complaint is filed. A more comprehensive enforcement strategy may be warranted.

14. *Provide education for valley residents regarding water conservation, such as approaches to water-efficient landscaping*

    Providing education about water use will help ensure efficient resource use.

6. TECHNICAL REFERENCES

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