

(Cover Page to be designed by IDWR)

Rathdrum Prairie

Comprehensive Aquifer Management Plan

Note to draft reviewers: Many notes, questions, or comments have been italicized and placed between brackets, [*comment*]. Notes, questions, or comments may be in the text, in footnotes, or in the word comment boxes off to the right side of the page.

DRAFT OF September 12, 2010 – Version 13

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Abbreviations and Terms

This following list of abbreviations and terms may be helpful when reviewing this document.

afa	Acre feet per annum
CAMP	Comprehensive Aquifer Management Plan
Committee	Rathdrum Prairie Aquifer Comprehensive Aquifer Management Plan Advisory Committee
cfs	Cubic feet per second
DEQ	Idaho Department of Environmental Quality
GWMA	Ground Water Management Area
IDWR	Idaho Department of Water Resources (also abbreviated as "Department")
IWRB	Idaho Water Resource Board (also abbreviated as "Board")
M&E	Monitoring and Evaluation
mgd	Million gallons per day
the Plan	Rathdrum Prairie Comprehensive Aquifer Management Plan
RPA	Rathdrum Prairie Aquifer, Idaho
RP CAMP	Rathdrum Prairie Comprehensive Aquifer Management Plan
SVRPA ¹	Spokane Valley Rathdrum Prairie Aquifer, Idaho and Washington
USGS	United States Geological Survey

¹ Some prefer SVRP or SV-RPA.

Executive Summary²

The Rathdrum Prairie Aquifer in Northern Idaho is a valuable and significant resource to the region and the state of Idaho. Lying under parts of Kootenai and Bonner counties, the aquifer is a key part of the regional water resources which make the area a magnet for economic growth and an attractive place to live and work. The region produces approximately 8 percent of goods and services in the state of Idaho resulting in an estimated value of \$4.2 billion. Beyond the economic value to the state, the region provides cultural and social benefits throughout the bi-state Spokane Valley-Coeur d'Alene in Washington and Idaho.

The Rathdrum Prairie Comprehensive Aquifer Management Plan (Plan) provides a framework for long-range management of the aquifer. The Plan describes the overarching goals and recommended actions which can be implemented to successfully accomplish the stated goals for the local residents, the state of Idaho, and to promote productive regional cooperation to benefit the area over the next 50 years.

The Idaho Water Resource Board (IWRB) developed the following objectives for the statewide Comprehensive Aquifer Planning and Management Program are:

- Provide reliable sources of water, projecting 50 years in to the future
- Develop strategies to avoid conflicts over water resources
- Prioritize future state investments in water
- Bridge the gaps between future water needs and supply

Based on the four goals, the Rathdrum Prairie Comprehensive Aquifer Management Plan Advisory Committee (AC) developed the following vision for the Plan:

"Provide a sustainable source of high-quality groundwater for current and future economic, social, and environmental vitality, and preserve the exceptional quality and reliability of the Rathdrum Prairie Sensitive Resource Aquifer."

The Committee developed the following objectives to accomplish their vision.

Objective #1	Meet Future Demand for Water
Objective #2	Protect the Aquifer

² The objective of this section is to present the key findings and recommendations of the Advisory in 2-3 pages – such that busy legislators and others can quickly digest and understand the essence of this CAMP. The remainder of the CAMP will provide supporting documentation and more detail on the pieces presented here. This section will include the Key Points boxes found throughout this document, once they are finalized – emphasizing the vision and recommendations to achieve the vision. The five points presented here were agreed to by the Advisory Council at the July meeting, and will be integrated as appropriate.. Include the Vision from page 19 in the Summary.

Objective #3	Manage Multijurisdictional Conflicts
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Meet Future Demand for Water

Water demand by the year 2060 could rise from estimated current withdrawals of approximately 74,000 acre-feet to between 77,000 acre-feet (based on a low population-growth rate of 1.6% per year and aggressive water conservation) and 223,000 acre-feet (based on a higher population growth rate of approximately 3% per year and no water conservation). The area over the Rathdrum Prairie Aquifer has experienced both of these population-growth rates over multi-year periods in past decades.

The most likely 2060 water-demand projection ranges from approximately 101,000 and 163,000 acre-feet, depending on the level of water conservation. This projection is based on a moderate level of population growth (averaging approximately 2.3% per year) over the next 50 years.

The Rathdrum Prairie Aquifer is a highly prolific aquifer which fully satisfies the existing water needs and it is anticipated to meet future needs. However, to ensure that the water resources are put to optimum use to benefit the state of Idaho, this plan identifies actions which will protect the resource for future generations.

Protect the Aquifer

The Rathdrum Prairie Aquifer is a part of the larger Spokane Valley-Rathdrum Prairie Aquifer (SVRPA). The SVRPA is the sole source of drinking water for the residents living over the aquifer. The aquifer is vulnerable to water quality degradation which could influence the availability for beneficial use by local communities and residents. The protection of the aquifer from contamination is undertaken through a number of programs and authorities of local, regional and state entities.

The implementation of the Plan and all actions associated with the Plan will be assessed to ensure that water quality is maintained and coordinated with other responsible agencies and programs.

Manage Multijurisdictional Conflicts

The Plan addresses the long-term planning and management objectives and actions for the Rathdrum Prairie Aquifer located in Idaho. It is a part of the larger regional aquifer which is shared with the state of Washington. Additionally, the regional hydrological system is a dynamic interrelationship between the aquifer and the Spokane and Little Spokane Rivers in Washington. Although state authorities and planning programs do not cross the state and tribal boundaries, the larger regional interests and needs should be considered. The benefits of cooperation and

coordination among the sovereigns in the region far outweigh the potential costs of conflict.

Plan Implementation

To ensure that the valuable input of stakeholders continues during the implementation of these actions, this Plan establishes an Implementation Committee. The committee will assist IWRB staff by providing recommendations

Summary

Although the Plan is built upon a substantial base of technical information and stakeholder guidance, it is recognized that present-day solutions may be refined and improved as new information, regional activities, and technologies are developed. Accordingly, the Plan includes an adaptive management component which requires ongoing coordination between the IWRB staff and Implementation Committee. The Plan provides for continued effort to identify and address all water use needs affected by this Plan, including environmental considerations.

The Plan also recognizes that successful implementation requires sufficient funding. The Committee expects that the preliminary funding recommendations and structure may need to be refined or modified as further research is conducted about the funding needs and legal opportunities.

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1. Introduction

KEY POINTS:

- The Idaho Legislature passed House Bills 428 and 644 in 2008, establishing the statewide comprehensive aquifer planning and management effort and creating a fund to support the effort.
- The Rathdrum Prairie Comprehensive Aquifer Management Plan (RP CAMP) will provide the framework for water planning and management for the Rathdrum Prairie over the next 50 years.
- The CAMP process consisted of a facilitated Advisory Committee that developed recommendations for the Board.

Legislative mandate and direction from the IWRB

In 2008, the Idaho Legislature passed House Bills 428 and 644, establishing the statewide comprehensive aquifer planning and management effort and creating a fund to support the effort. The Idaho Water Resource Board and the Idaho Department of Water Resources initiated work in the Rathdrum Prairie to establish a framework and path forward which will lead to sustainable water supplies, optimum use of the aquifer and develop strategies to avoid future conflicts.

This effort was conducted under the leadership of the Idaho Water Resource Board (IWRB). The IWRB is the constitutionally established agency responsible for formulating and implementing the state water plan for optimum development of the water resources in the public interest. This plan is a component of the state water plan, which guides the development, use, conservation and management of water resources in Idaho.

The specific goals of the statewide CAMP program, and this specific CAMP, are to:

- Provide reliable sources of water, projecting 50 years in to the future
- Develop strategies to avoid conflicts over water resources
- Prioritize future state investments in water
- Bridge the gaps between future water needs and supply

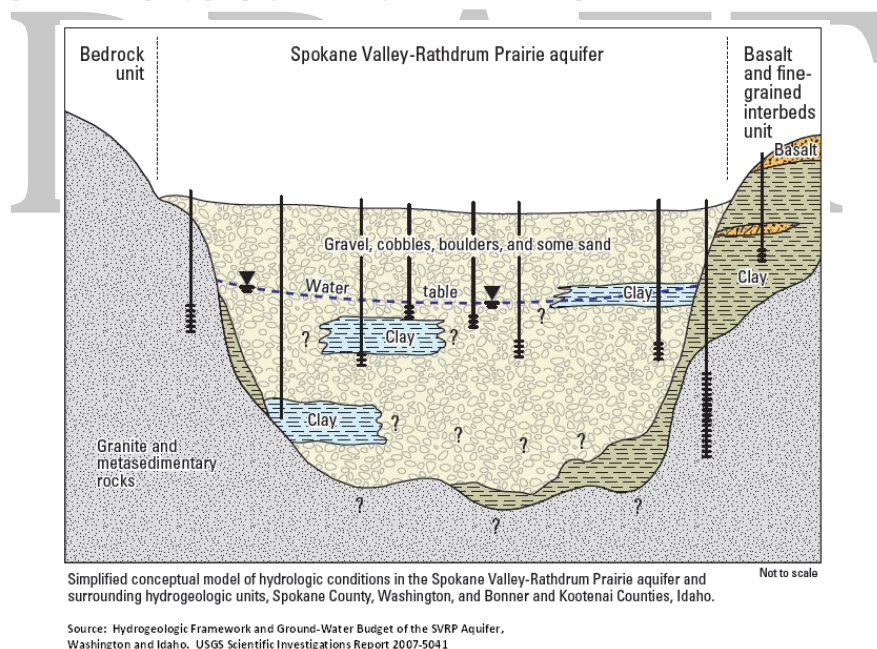
The IWRB recognizes that the long-term management of the water resources of the Rathdrum Prairie must be acceptable to the local community and take into account the social and economic interests of the residents and public interest. The long-range plan must also be consistent with the legal constraints and laws of Idaho. The Idaho Water Resource Board, using their legislated authority, created an Advisory Committee to consider these interests and develop recommendations for this plan. For a list of Advisory Committee members and meeting dates, see Appendix 1 & 2.

2. Background³

Regional setting and hydrological system

The Rathdrum Prairie Aquifer is the Idaho portion of the regional Spokane Valley-Rathdrum Prairie Aquifer in Northern Idaho and Eastern Washington. The RPA underlies approximately 250 square miles in Kootenai and Bonner Counties. Approximately two-thirds of the entire aquifer lies under Idaho. A population of over 500,000 live above the SVRPA, with the Idaho population accounting for approximately 128,000 or about 25%. Approximately 8% of Idaho's economy is generated within the Rathdrum Prairie area.

The RPA consists primarily of thick layers of coarse-grained sediments deposited during a series of massive floods from ancient Glacial Lake Missoula. These floods deposited sands, gravels, cobbles, and boulders across the landscape, creating one of the most productive aquifers in the world. The highly transmissive nature of the Rathdrum Prairie Aquifer means that the impact of water use in one portion of the aquifer will rapidly propagate throughout the entire aquifer.



The water volume in the entire regional aquifer is estimated to be about 10 trillion gallons. Close to one billion gallons of water flow through the RPA aquifer each day.

³ See Appendix 3 for a Chronology of Studies and Events relevant to the Rathdrum Prairie Aquifer.

The Idaho Department of Environmental Quality (DEQ) estimates that the total flow at the Idaho/Washington border to be 750 cfs or 485 million gallons per day (mgd), with a range from 250 to 650 million gallons of water.

Comment [RD1]: Why use a DEQ reference when we are the water agency? Do we have one from the TVHP report? (Brian)

Comment [HH2]: May some of these numbers could be boxed, rather than in text.

Rathdrum Prairie Aquifer – By the numbers

Recharge to the entire Spokane Valley-Rathdrum Prairie Aquifer is approximately 1,000,000 afa.

The average annual inflow to the aquifer is approximately 1,500 cubic feet per second (cfs). Of the total inflow, the largest contributor is the Spokane River. Between the outlet at Coeur d'Alene Lake and Otis Gage (the gage nearest the state boundary), approximately 481 cfs infiltrates from the river to the aquifer. Additional contributions to the aquifer in Idaho include:

Lakes	249 cfs
Precipitation subsurface inflow & tributaries	151
Landscape irrigation	15
Septic system infiltration	10

Approximately 72,000 acre feet of water were withdrawn annually from the Rathdrum Prairie Aquifer in recent years. Community water systems used [34,400 AF](#) (47.7%); agricultural irrigation accounted for [24,700 AF](#) (34.3%); individual domestic wells used [8,800 AF](#) (12.2%); and commercial/industrial (self-supplied) totaled [4,200 AF](#) (5.8%). The estimated aggregate consumptive use (water that is lost from the local hydrologic system) was approximately 38,400 afa.

Ground-water surface water interaction

There is a strong relationship between the Spokane River and the SVRPA. From the outlet of Coeur d'Alene Lake to its confluence with the Little Spokane River, the Spokane River alternatively transitions between reaches that lose to the SVRPA and reaches that gain from the SVRPA. The Spokane River is perched above the aquifer through its entire reach in Idaho from the outlet of Coeur d'Alene Lake to beyond the border between Idaho and Washington. There is no direct connection between groundwater pumping in Idaho and the Spokane River flows. In Washington, however, there is a direct connection with several gaining and losing reaches of the river which result in water seeping from the river into the aquifer (losing reaches) or water discharging from the RPA into the aquifer.

Water quality

The overall quality of the RPA is very good. The highly permeable soils and gravels over the RPA make it susceptible to contamination. In 1980, the RPA was designated by the Environmental Protection Agency as a Sole Source Aquifer under the Safe Drinking Water Act. This designation requires all federally funded projects that have

the potential to contaminate the aquifer are subject to EPA review. In 1980, the RPA received additional protection from the state of Idaho under the Special Resource Water

Due to the vulnerability of the aquifer to contamination, ongoing protection programs have been implemented by local and state agencies. These programs have resulted in protecting or improving the ground water quality despite a significant increase in population over the RPA.

Future demand for water⁴

Critical to the development of the RP CAMP is estimation of future water demands. Water demand overlying the Rathdrum Prairie Aquifer Future water demand was projected for a 50-year time horizon (2060). This study included consideration of the potential impacts of climate variability during this time frame on water supply and demand in the area. A qualitative estimate of conservation and water demand was also included in the study. A basic assumption in the calculation is that the service area remains centered over the aquifer without additional exportation of water to outlying areas.

The primary conclusions from this analysis include the following:

The Rathdrum Prairie Aquifer area population growth is projected to grow from approximately 128,000 people to approximately 400,000 people by the year 2060, reflecting an average growth rate of approximately 2.3% per year. If population growth for the next 50 years is at the same 1.6% annual rate experienced between 1980 and 1990, the 2060 population overlying the aquifer will be approximately 286,000 people. If the population grows at a rate of 3% per year (which is less than the 3.7% annual growth between 1970 and 2007), the 2060 population overlying the Rathdrum Prairie Aquifer will be approximately 581,000 people.

Water demand by the year 2060 could rise from estimated current withdrawals of approximately 74,000 acre-feet to between 77,000 acre-feet (based on a low population-growth rate of 1.6% per year and aggressive water conservation) and 223,000 acre-feet (based on a higher population growth rate of approximately 3% per year and no water conservation). The Rathdrum Prairie Aquifer area has experienced both of these population-growth rates over multi-year periods in past decades.

The most likely 2060 water-demand projection ranges from approximately 101,000 and 163,000 acre-feet, depending on the level of water conservation. This projection is based on a moderate level of population growth (averaging approximately 2.3% per year) over the next 50 years.

Comment [RD3]: Lets add a summary chart from SPF's report. (Brian)
Hh – I'll work on this

⁴ See Appendix 4 for the executive summary of *Rathdrum Prairie Aquifer Water Demand Projections* by SPF Water Engineering. The full report can be found on IDWR's website at: http://www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/RP_CAMP/PDF/RP-WaterDmnd.pdf.

The consumptive use is water lost from the local hydrologic system (i.e., aquifer and Spokane River), mostly through evapotranspiration. The consumptive use is projected to increase from approximately 40,000 acre-feet in 2010 to between 59,000 and 76,000 acre-feet in the year 2060 under moderate population- and employment-growth rates. This range reflects the effects of different water conservation levels.

The water use for agricultural irrigation will likely decrease in time as irrigated agricultural land is replaced by more urban and suburban land uses. However, development of new residential and municipal irrigation on land that is currently non-irrigated will likely lead to an overall increase in total irrigation demand.

Conclusions concerning Climate Variability⁵

Annual average temperatures are projected to increase by approximately 3.2°F by 2040 and about 5.3°F by 2080. Annual precipitation may increase by approximately 2.3% by the year 2040, and by approximately 3.8% by the year 2080. The Rathdrum Prairie Aquifer area is expected to become wetter in the fall and winter and dryer in the spring and summer. Additional precipitation, to the extent it occurs in the fall, winter, and spring, will not reduce irrigation demand during summer months.

Evapotranspiration may increase by approximately 6% per degree centigrade over 2010 values. This could lead to potential evapotranspiration increases of between 12% and 19% by the years 2040 and 2080, respectively. Another study suggests possible potential evapotranspiration increases of 5% to 9% by the year's 2040 and 2080, respectively. Based on these predictions, irrigation demand could increase by 5% to 20% in the next 50 years.

Extreme temperature and precipitation events will likely increase in frequency. Extreme and/or extended drought periods will increase annual irrigation demands.

Water Conservation Potential

- Aggressive water conservation can help mitigate some of the projected future water use. Aggressive conservation can result in aggregate water demand that is approximately 60% of the non-conservation demand for a given population growth outcome in 2060.
- Aggressive water conservation could lead to a 52% reduction in per-household domestic water demand by the year 2060 (from 2010 levels).
- Per-household outdoor residential irrigation use could be reduced by up to approximately 33% from 2010 levels.
- Commercial and industrial use could likely be reduced by up to approximately 40% over the next 50 years compared to 2010 per-employee use rates.
- Specific water conservation measures are outlined in the report.

Comment [RD4]: Is this where we include Allan's analysis of future development on river flows, and some description of the potential conflicts this may lead to? We need to set this up so that the CAMP actions are viewed as a solution. (Brian)

Hh – I'll draft up a summary paragraph, and we should probably include Allan's memo as an appendix.

Comment [RD5]: Any summary charts we could add? (Brian)

Comment [RD6]: We may need to re-write this section as it does follow the format of the previous sections. (Brian)

⁵ See Appendix 5 for the Executive Summary of the Climate Change Study. [insert citation for full report when it is available.]

- Water reuse is a potential method to extend water supply, but does not bear directly on future Rathdrum Prairie water demands or aquifer withdrawals

Comment [RD7]: In could, by extending re-use to irrigation uses, reduce future withdrawals from the aquifer. It does, however, have an effect on downstream flows in the river by reducing the amount discharged to the river thru wastewater treatment plants. (Brian)

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3. Recommendations

SUMMARY OF KEY ACTION ITEMS:

Objective #1: Meet Future Demand for Water

Action Item #1: Meet ___% of future water needs by enacting water conservation measures

Action Item #2: Establish municipal water rights to protect water resource available for future needs

Action Item #3: Identify locally implementable water use improvement strategies and develop partnerships to implement them

Objective #2: Manage Multijurisdictional and other Conflicts

Action Item #1: Develop a framework for regional discussion and cooperation for SVRPA water issues which includes representation from all state and local government, water managers, local water users.

Action Item #2: Assess technical tools and data needs to support long-term cooperation and identify funding needs.

Objective #3: Protect the Aquifer

Action Item #1: Assess all CAMP activities to ensure projects protect aquifer water quality.

Action Item #2: Establish an ad hoc committee to coordinate existing water quality programs and identify gaps or needs; develop framework for encouraging improvement in these areas of concern with appropriate authorities.

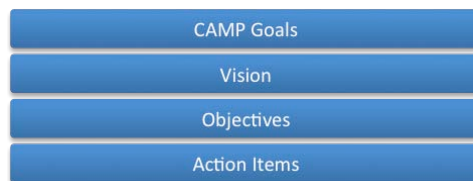
Based on the four CAMP goals adopted by the IWRB, the Advisory Committee developed the following vision for the RP CAMP:

“Provide a sustainable source of high-quality groundwater for current and future economic, social, and environmental vitality, and preserve the exceptional quality and reliability of the Rathdrum Prairie Sensitive Resource Aquifer⁶.”

⁶ This term, “Sensitive Resource Aquifer,” is not well understood or recognized by all Committee members. At the next Advisory Committee meeting, we will discuss whether to use this or another term, or whether the second part of the statement should be deleted.

Using the four CAMP goals and this vision, the Advisory Committee developed three main objectives and several recommendations for achieving the goals and vision. Figure 2 illustrates how the Committee moved from CAMP goals to RP Vision to Objectives to Recommendations. This figure represents the framework for the CAMP recommendations that follow.

Figure 2. Moving from CAMP goals to action items



Objective # 1: Meet Future Demand for Water

The Future Water Demand Study completed in 2010⁷ concluded that it is unlikely that projected growth over the RPA will create water demand that exceeds the aquifer's annual recharge rate. However, as the aquifer supplies communities in Idaho and Washington, meeting this objective should reflect regional implications.

The Board recognizes that water conservation is an important strategy to make more efficient use of ground water and reduce the need for future water supplies. The CAMP includes a broad-based, voluntary, incentive-based approach to enacting a water conservation program designed to meet a part of the projected future water needs.

The CAMP also includes a strategy of moving ahead with Reasonably Anticipated Future Needs water right applications for municipal water providers.

The Board recognizes the difficulty in predicting future growth and water needs and recommends periodic reviews and updates to the Rathdrum Prairie Aquifer Future Water Demand Study. The Board further adopts a policy of adaptive management of CAMP actions if actual water needs or related issues develop significantly different from the projections.

Action Item #1: Meet ___% of future water needs by enacting water conservation measures.⁸

In order to accomplish Action Item#1:

- Enact water conservation measures at the municipal level that promote water efficiency and reduced use. For example, [increase water use efficiency by](#)

⁷ citation

⁸ The Committee discussed adoption of the conservation standards described in the moderate conservation scenario in the Future Demand Study

Comment [DP8]: The Committee will need to discuss this at the next meeting. Reference Future Water Study Section 7 on page 60.

There is concern that this statement may be interpreted to mean a fixed percentage each year, which the law of diminishing returns will kick in far before 50 years making such conservation gains unaffordable. The plan seems to imply a 60% reduction in use through conservation (pg 11). The Committee needs to clarify intent and wording.

retrofitting low flow toilets and showerheads, replace turf for certain large open areas, install meters on any unmetered systems, leak detection and repair, others?

- Evaluate viability of agricultural water conservation as an option in this area.

Action Item #2: Establish municipal water rights to protect water resource available for future needs⁹.

To accomplish Action Item #2:

- In partnership with the municipal water providers in the Rathdrum prairie area, undertake studies necessary support Reasonably Anticipated Future Needs (RAFN) water right applications
- Initiate partnerships with municipal water providers to develop RAFN applications

Action Item #3: Identify local water use improvement strategies and develop partnerships to implement them

To accomplish Action Item #3:

- Assess local ordinances and land–use plans that may have an effect on water resources. Examples of strategies are:¹⁰
 - Use the city and county comprehensive land use plans, GWMA, conservation plans, agency education and aquifer studies as tools to encourage growth in areas to minimize impacts.
 - Encourage all land use policy to retain topsoil where possible over the RPA. This will enhance the conservation of water use, as well as provide additional buffer for contaminant travel.
- Assess actions described in the RP Rathdrum Prairie Ground Water Management Plan which should be implemented as part of the RP CAMP recommendations¹¹
 - Finalize Conservation Measures and Guidelines for Preparing Water Conservation Plans
 - Implement monitoring protocols for all water users
 - Collect and Analyze data to refine knowledge of water supply and water use

Action Item #4: Limit exportation of water from the basin. ¹²

Comment [sbt9]: Faucet aerators, low water commercial dishwashers, residential and commercial toilets (urinals), front loading commercial washers, demonstration gardens...

Comment [RD10]: Do we want to expand on this to include the options we discussed? (Brian)

Comment [DP11]: We need to describe for what purpose.

⁹ The Committee discussed Reasonably Anticipated Future Needs water rights within the context of meeting future demand as well as preventing future conflict.

¹⁰ Along with the strategies listed above, the Committee also discussed inventory and analysis of current analytic tools to evaluate how growth will impact the aquifer and how to best direct growth. This discussion also included a suggestion to determine if new analytic tools are needed.

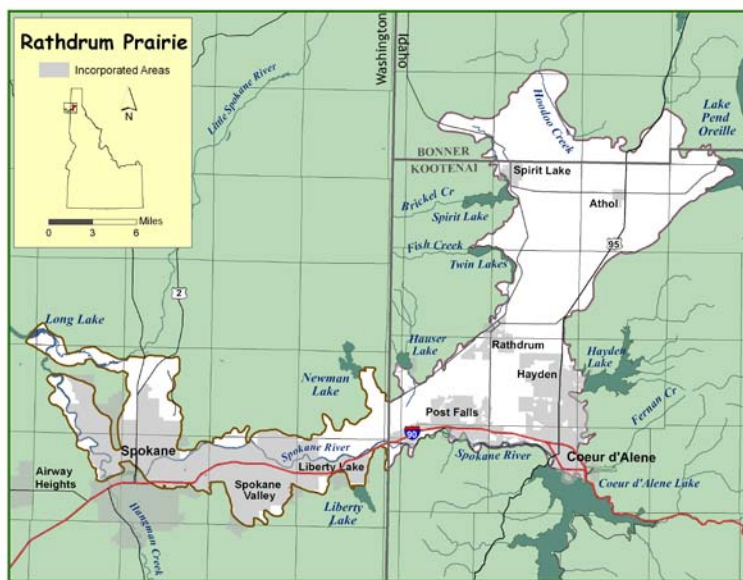
¹¹ See Appendix 7 for the Summary of Current Ground Water Management Plan Status

¹² Needs to be discussed by the Advisory Committee.

Objective # 2: Manage Multijurisdictional and Other Conflicts

The Rathdrum Prairie Aquifer is part of the Spokane Valley Rathdrum Prairie Aquifer, a regional water resource shared with the state of Washington. While studies show there is adequate water for Idaho needs for the duration of the current planning horizon, Idaho recognizes cooperation by stakeholders from both states on water issues is necessary to avoid future conflict that may compromise or complicate water management for both states.

Map 1 The Spokane Valley Rathdrum Prairie Aquifer with the Idaho-Washington state boundary.



A hydrologic analysis by IDWR determined that the most likely future water need projection on could potentially reduce flow in the Spokane River at the Spokane gage by approximately 31 cfs by 2060 due to reduction of aquifer discharge to the river. This could result in additional attention and scrutiny from downstream interests. See Allan Wylie's hydrologic analysis in Appendix 6.

One of the prominent features of the SVRPA is the connectivity to surface water. The interaction between the ground and surface water dictate that long-term management and planning must integrate both sources of water and may lead to conflict. Any surface water conflict issues that arise in the future will also relate to groundwater. As communities over the SVRPA grow, so will the potential for these conflicts.

Action Item #1: Develop a framework for regional discussion and cooperation for SVRPA water issues which includes representatives from state and local government, water managers, local water users, and other interest groups.

To accomplish Action Item #1:

- Establish SVRPA cooperation group to implement this recommendation, by inviting Washington to participate.

Action Item #2: Assess technical tools and data needs to support long-term cooperation and identify funding needs.¹³

Action Item #3: Develop criteria for future water augmentation projects in Idaho designed to meet regional needs.

Action Item #4: Develop protocols, standards, and rules for potential programs to address conflict.¹⁴

Objective # 3: Protect the Aquifer Quality

The Rathdrum Prairie Aquifer can be characterized as having sufficient quantity for Idaho's needs and good quality. However, the aquifer is vulnerable to contamination and the region must be vigilant in protecting this valuable resource. There are many threats to the water quality of the aquifer, and a number of agencies and authorities exist to protect and improve the water quality.

Nearly all communities on the RPA rely on water from the aquifer that currently needs no regular treatment before it is distributed. Because almost all domestic water users rely on the RPA and the quality of the water can be a limiting factor in meeting current and future water needs, the health of the aquifer is of paramount importance to this community.

Working within existing authorities and programs to protect and enhance the water quality of the RPA is the appropriate and cost-effective way to protect the water resources to meet future water needs.

Action Item #1: Assess all CAMP activities to ensure projects protect aquifer water quality.

Action Item #2: Establish an ad hoc committee to identify and coordinate existing water quality programs and identify potential gaps or needs; develop

Comment [DP12]: The Committee needs to discuss what suggestions they would like to make (if any) regarding how this framework should be developed or who from Idaho might participate in those conversations.

¹³ Committee members also suggested that as purveyors and municipalities consider the sum of their individual water rights and the projected demand for growth, each provider may not have the amount of water needed at a specific place and time. One member said these local jurisdictions need a venue to make sure they all understand local needs for water. This venue would also provide an opportunity for local jurisdictions to articulate local needs to IDWR so that IDWR understands local needs when engaging with neighboring states over water issues. The Spokane Joint Aquifer Board may be an appropriate model.

¹⁴ Actions #3 and #4 may be somewhat redundant, but we will discuss at the next meeting.

framework for encouraging improvement in these areas of concern with appropriate authorities.¹⁵

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¹⁵ The Committee discussed several water quality strategies that should be addressed by this ad hoc committee or other appropriate agency:

1. Mitigate the impacts of stormwater runoff.
2. Promote practices that prevent accidental or incidental releases of contaminants over the RPA.
3. Encourage accounting of wellheads over RPA and proper abandonment of unused wellheads.
4. Support continued monitoring and management of potential water quality issues contained in RPA source lakes and rivers.
5. Encourage wastewater disposal methods that benefit the RPA.
6. Prepare for emerging or unknown threats.

For a full description of the suggested agenda for this ad hoc committee, please see Appendix 9.

4. Additional Plan Components

In addition the objectives and action items listed in the Plan, additional actions are included to enhance coordination, decision-making, and aquifer management.

Plan Implementation Committee

Management of the Rathdrum Prairie Aquifer affects numerous stakeholders and the States of Idaho and Washington. Effective implementation of the Plan will require the participation and cooperation of stakeholders and governmental entities with jurisdictional authorities and responsibilities. An Implementation Committee will be charged with providing guidance and recommendations concerning the implementation of management strategies and review of goals and objectives. The Implementation Committee will provide a forum for discussing implementation, establishing benchmarks for evaluating the effectiveness of actions, coordinating with water users and managers, evaluating and addressing environmental issues and identifying and pursuing funding opportunities.

The Implementation Committee will include interest groups currently represented on the Rathdrum Prairie Advisory Committee. In addition, the Board will appoint at least one of its members to serve as a liaison between the Committee and the Board. The Implementation Committee will serve at the pleasure of the Board and provide a forum for public participation. Board's staff will facilitate the work of the Implementation Committee and provide the technical information needed for its deliberations. The Board will make all final decisions concerning Plan project priorities, implementation, and funding.

As various programs are implemented, additional monitoring or modifications will likely be needed. Specific projects may require site specific measurement and analysis, which are not currently available. Additional analysis will likely be required to assist the Board and The Implementation Committee.

Outreach and Education

During implementation of RP CAMP, the Implementation Committee will help develop and recommend funding mechanisms for a broad water education and outreach effort, building on existing outreach efforts and programs.

Implementation Plan and Funding

An Implementation Plan will be developed within the first year of Plan approval. The Implementation Plan will outline the sequence of implementation steps and identify research and funding requirements and sources, and monitoring and evaluation protocols. The Implementation Plan will also describe an operating

Comment [sbt13]: It is estimated that \$___million will be needed to implement the Rathdrum Prairie CAMP. It is anticipated that the Rathdrum Prairie water users will contribute 60% of the needed funds with the State of Idaho contributing the balance, consistent with prior CAMP efforts in other areas of the state.

protocol to ensure continued public involvement and participation. The Board's staff and/or contractors will work with the Implementation Committee and the Board to finalize and approve the Implementation Plan.

Funding Entities	Participation Targets
State of Idaho	40%
Water Users	60%

Comment [DP14]: We need language describing to what these targets are referring.

Comment [RD15]: Break out between the water users to be established? (Brian)
Hh – not sure how. Let's discuss

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5. Adaptive Management

This section sets forth an adaptive management strategy for implementation of the Plan. The goal of adaptive management is to support improved decision-making and performance of water management actions over time.

Key principles fundamental to this approach include:

1. Anticipating possible future uncertainties and contingencies during planning.
2. Employing science-based approaches to build knowledge over time.
3. Designing projects that can be adapted to uncertain or changing future conditions.

Adaptive management involves taking actions, testing assumptions, and then monitoring and adapting/adjusting the management approach as necessary. It is a way of taking action in a complex system with many variables and constant change. Developing perfect knowledge concerning any system, including the Rathdrum Prairie Aquifer, is impossible, and therefore an adaptive management approach is critical to the successful attainment of the qualitative and quantitative goals set forth in the Plan. Successful adaptive management requires patience and long term commitment, just as acquiring enough data to make decisions about program changes takes time.

The adaptive management strategy will allow the Board to:

- Develop protocols for revising management actions and/or quantitative targets as necessary.
- Compare costs and impacts of different actions in the Rathdrum Prairie Aquifer.
- Adjust funding allocation between projects to get the most “bang for the buck.”
- Concentrate funding on management actions that show results.
- Make adjustments and revisions to the Plan as new information becomes available or in response to changing water supply and demand needs.
- Proceed with flexibility depending on results and analysis of monitoring and measurement data.

Coordination & Implementation

Management of the RPA affects numerous stakeholders within Idaho and coordination with other interests including the state of Washington and tribes. Effective implementation of the Plan will require participation and cooperation of stakeholders and governmental entities with jurisdictional authorities and responsibilities. The Implementation Committee will be charged with providing

guidance and recommendations concerning the implementation of management strategies and review of objectives. The Implementation Committee will provide a forum for discussing Phase I implementation, establishing benchmarks for evaluating the effectiveness of actions, coordinating with water users and managers, evaluating and addressing environmental issues and identifying and pursuing funding opportunities.

The Implementation Committee will include interest groups currently represented on the RP CAMP Advisory Committee. In addition, the Board will appoint at least one of its members to serve as a liaison between the Committee and the Board. The Implementation Committee will serve at the pleasure of the Board and provide a forum for public participation. The Board's staff will facilitate the work of the Implementation Committee and provide technical information needed for its deliberations. The Board will make all final decisions concerning Plan project priorities, implementation, and funding.

Monitoring and Data Gathering

With data gathered through the monitoring process, the Implementation Committee and Board's staff will be able to assess the impacts of each management activity. In some cases, it may take a number of years to obtain sufficient data to achieve a comprehensive understanding of the effects of particular actions. Regardless, the success of the Plan depends upon the development and maintenance of state-of-the-art monitoring and evaluation tools that provide the information necessary to make sound planning decisions for the future. The Board will provide periodic reports to the legislature documenting the progress made on the implementation of the Plan.

Legislative Reporting and Plan Revision

The Board will provide periodic reports to the legislature documenting the progress made on the implementation of the Plan. The Board will evaluate the Plan after 10 years of implementation for Phase 1, and make planning recommendations to the legislature and Governor's office.

Appendices

Appendix 1: Advisory Committee members

Chris Beck, AllWest Testing and Engineering

Phil Cernera, Coeur D'Alene Tribe

Mike Clary, Hecla Mining

Bruce Cyr, Jacklin Land Company

Andy Dunau, Spokane River Forum

Mike Galante, North Kootenai Water District

Bruce Howard, Avista Utilities

Allen Isaacson, Sierra Club

Hal Keever, Stimson Lumber

Kermit Kiebert, North Idaho Chamber of Commerce

Paul Klatt, JUB Engineers

Kevin Lewis, Idaho Rivers United

Jim Markley, City of Coeur d'Alene

Alan Miller, Hayden Lake Irrigation District

Jonathan Mueller, Landmark/Architects West

Michael Neher, City of Post Falls

Todd Tondée, Kootenai County

Ron Wilson, East Green Acres Irrigation District

Ken Windram, Hayden Area Regional Sewer Board

Appendix 2: Advisory Committee meeting dates and locations

December 18, 2009 – Idaho Dept of Fish and Game, Coeur D’Alene

January 29, 2010 – Panhandle Health District, Hayden

March 5, 2010 – Library Community Room & Old Council Chambers, Coeur d’Alene

April 16, 2010 – Library Community Room & Old Council Chambers, Coeur d’Alene

May 7, 2010 – Library Community Room, Coeur d’Alene

June 4, 2010 – Library Community Room, Coeur d’Alene

July 19, 2010 – Library Community Room, Coeur d’Alene

September 17, 2010 – Library Community Room, Coeur d’Alene

October 15, 2010 – Library Community Room, Coeur d’Alene

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Appendix 3: Chronology of Studies & Events relevant to the Rathdrum Prairie Aquifer

Comment [MU16]: As directed by the AC, this appendix is to include complete references to all documents, web sites, etc... Can this be done via the next draft, before it goes back to the AC for review in September?

- 1976 Washington Department of Ecology adopt instream flows standards for the Little Spokane River
- 1976 Local Clean Water Act §208 studies completed to identify sources of pollution for the Rathdrum Prairie region
- 1977 Idaho Panhandle Health District adopts enhanced septic tank regulations for the Rathdrum Prairie Aquifer
- 1978 EPA sole source aquifer designation
SVRP Aquifer was the first aquifer in Idaho and the second in the nation to receive this designation.
<http://yosemite.epa.gov/r10/water.NSF/Sole+Source+Aquifers/SSA>
- 1978 USGS publishes *Spokane Valley- Rathdrum Prairie Aquifer, Washington and Idaho* by Drost and Seitz
- 1978 IDEQ adopts Water Quality Management Plan for Rathdrum Prairie. This plan was developed under CWA §208.
- 1979 Spokane County and the City of Spokane adopt *Water Quality Management Plan* consistent with Section 208, Clean Water Act
- 1980 IDEQ “special resource water” designation

1980 Spokane County and Panhandle initiate a groundwater monitoring program

1986-1988 PHD's Sewer Management Agreements result in complete sewerage of the Cities of Hayden, Hayden Lake, Post Falls and Rathdrum with the construction of the regional treatment plants in Post Falls and HARSB.

Comment [MU17]: Seems odd to me to have some entries with annotation and others without... I suppose we can keep it as is and get more advice from the AC... can you get one or more the AC members to help you flesh this out and complete it???

1988 IDEQ publishes Rathdrum Prairie Aquifer Technical Report

http://www.deq.state.id.us/water/data_reports/ground_water/rathdrum_prairie_aquifer_beg_thru_chap2.pdf

2000 Original Spokane Valley-Rathdrum Prairie (SVRP) Atlas published

2001 Newport Generation, Cogentrix Energy, and Avista Utilities apply for water rights to drill wells to extract cooling water for natural gas turbine power plants

2001 CDA Basin Environmental Improvement Project Commission

<http://www.basincommission.com/> The Basin Environmental Improvement Commission (sometimes referred to without the word "project" in the title) was created by Idaho legislature under the Basin Environmental Improvement Act of 2001 ([Idaho Code Title 39, Chapter 81](#)). In this chapter, it is the policy of the State to provide a system for environmental remediation, natural resource restoration and related measures to address heavy metal contamination in the Coeur d'Alene Basin. The Commission is made up of representatives of the State of Idaho, the three Idaho counties in the Basin, the Coeur d'Alene Tribe, the State of Washington, and the United States of America. The Commission became operational in March of 2002 with the execution of the order from the director of the Idaho Department of Environmental Quality and participation of the Coeur d'Alene Tribe, Benewah, Kootenai, and Shoshone Counties, and State of Idaho. In August 2002, the State of Washington and Federal Government joined the Commission through the execution of a [Memorandum of Agreement](#) agreed to by

the seven governments.

2002 Idaho Department of Water Resources denies moratorium on permits from the aquifer

2002 Idaho Department of Water Resources designates the Rathdrum Prairie Groundwater

2002 Groundwater Management Area Technical Advisory Committee, IDWR

The Rathdrum Prairie Ground Water Management Area was designated in December 11, 2002. The Groundwater Management Plan was adopted September 15, 2005. Did not find online reference to the technical advisory committee associated with this (though there was definitely a technical advisory committee associated with the SVRP Hydrological Project).

2003 Spokane Valley-Rathdrum Prairie Aquifer Study (USGS) - 2003

The three main agencies involved in this project/study has references listed here along with the way that each agency refers to the project:

IDWR – Spokane-Valley Hydrological Project

<http://www.idwr.idaho.gov/WaterInformation/projects/svrp/>

DOE – Spokane Valley-Rathdrum Prairie Aquifer Study

http://www.ecy.wa.gov/programs/wr/ero/svrp_summit.html

USGS – Spokane Valley-Rathdrum Prairie Aquifer Study

<http://wa.water.usgs.gov/projects/svrp/>

Funding for the project was acquired in part during late 2003, and the Memorandum of Understanding among USGS, IDWR, and WDoE is dated December 2003. The major product of the study is a numerical groundwater model that Washington and Idaho can use to cooperatively manage the SVRP aquifer and adjacent rivers and lakes. Information gathered by partner agency scientists and contractors has expanded and refined our understanding of the aquifer and its interaction with local lakes and the Spokane and Little Spokane rivers, and water use region wide. There are several different committees in the

organizational structure of the project: the Management Advisory Committee, the Technical Advisory Committee, and the Policy Advisory Committee.

2004 SVRP Aquifer Atlas updated

<http://www.spokaneaquifer.org/aq.htm#atlas>

2005 IDWR adopts Groundwater Management Plan – 2005

http://www.idwr.idaho.gov/WaterInformation/GroundWaterManagement/RathdrumPrairie/rp_gwma.htm

2005 Avista files application to FERC to relicense hydroelectric power dams

2006 Aquifer Protection District, created by the Kootenai County Commission

In 2006, Kootenai County voters overwhelmingly approved the formation of the state's first Aquifer Protection District to ensure the area can continue to pay for the programs and services necessary to protect the aquifer. Private property owners in the district pay no more than \$12 a year for aquifer protection programs and services. Commercial property owners pay no more than \$24 a year.

The Aquifer Protection District has funded PHD's management of critical materials at fixed locations, water quality sampling and sewage management. An advisory board appointed by the Kootenai County Board of Commissioners recommends to commissioners how the money raised should be spent each year.

<http://www.phd1.idaho.gov/environmental/rathdrum.cfm>

2007 USGS publishes "Hydrogeologic Framework and Water Budget of the SVRP Aquifer" and "Groundwater flow model for SPVRP Aquifer" – 2007

2007 Spokane River Forum created to facilitate informed dialogue water issues in the region

2007 Idaho Department of Water Resources and Washington Department of Ecology sign a Memorandum of Agreement to preserve and maintain the SVRP Aquifer and Groundwater Flow Model created by the US Geological Survey

2008 Legislature approves House Bill 428 and 644

This legislation establishes CAMP program and funding for 10 basins including TV and RP. The legislation authorizes characterization and planning efforts for ten different basins in the next 10 years.

<http://www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/CAMP.htm>

2008 Rathdrum Prairie Wastewater Master Plan (JUB Engineers)

http://www.postfallsidaho.org/pzdept/RathPrairieMasterPln/RPWWMP08/TM3_Final_Draft.pdf

2008 North Idaho Adjudication begins

The purpose of the general adjudication of water rights is to make a complete and accurate record of all existing water rights. The term “adjudicate” means to settle judicially. A water right adjudication can be described as a “fair, comprehensive, technically correct and legally sufficient determination of existing water rights.”

<http://www.idwr.idaho.gov/WaterManagement/NorthIdAdju/>

2009 Idaho Water Resources Board starts the process to development the RP CAMP

2009 Based on settlement agreements with Coeur d’Alene Tribe and State of Idaho, among others, FERC issues new 50-year license for Avista’s Spokane River hydro project, including the Post Falls dam.

2009 Kootenai County Comprehensive Land Use Plan

Prior update was in 1994. The current draft was published in March of 2009.

<http://www.kcgov.us/departments/planning/newcompplan.asp>

2009 Coeur d'Alene Lake Management Plan

In an effort to address the many issues facing Coeur d'Alene Lake, the Coeur d'Alene Tribe (Tribe) and the State of Idaho Department of Environmental Quality (DEQ) collaboratively developed the 2009 Lake Management Plan (2009 LMP) with the goal: to protect and improve lake water quality by limiting basin-wide nutrient inputs that impair lake water quality conditions, which in turn influence the solubility of mining-related metals contamination contained in lake sediments. The United States Environmental Protection Agency (EPA) assisted the Tribe and DEQ in developing the LMP by convening and participating in an Alternative Dispute Resolution (ADR) process.

http://www.deq.state.id.us/WATER/data_reports/surface_water/water_bodies/cda_lake_mgmt_plan.cfm

2009 Spokane River Forum Survey

During 2009, the Spokane River Forum conducted a survey by asking community members their priorities along the Spokane River. The results from that survey are expected to be available in late 2009. <http://www.spokaneriver.net/>

2010 Washington TMDL

Submission of TMDLs to EPA scheduled for December 2009. EPA approval is scheduled for January 2010.

http://www.ecy.wa.gov/programs/wq/tmdl/spokaneriver/dissolved_oxygen/status.html

Still requires more research.

(The groups or documents listed below still need more information before placement in the chronology.)

Burlington Northern refueling depot. This project galvanized public interest in the aquifer

and its protection.

Comment [DP18]: Jim added this one. We need to find someone who knows when it was approved/built.

Meetings among selected mayors and other elected officials

Idaho nondegradation policy

Regional Water Conservation Collaboration

Bi-state Aquifer Protection Council

The Bi-State Aquifer Protection Council is an informal organization with members composed mostly of regulatory personnel and water purveyors from Idaho and Washington. The organization is administered jointly by the Idaho Department of Environmental Quality and Spokane County. (dates needed.)

CDA Basin Environmental Improvement Project Commission

University of Washington/San Diego State NSF proposal

University of Idaho/Tribes NSF proposal –

One interviewee shared a one-page summary of this proposal, yet that summary does not give enough explanation to outline relevant information to the Rathdrum Prairie Aquifer. An inquiry has been made with Mike Chappell, and more information is forthcoming.

Coalition of Local Elected Officials

Many interviewees referenced a coalition of mayors from Coeur d'Alene, ID, Post Falls, ID, and Spokane, WA. The general comments included the caucus' purpose was addressing water conservation measures in the region, and general comments were that much of the caucus activity had recently slowed. At the same time, many felt this working group was a prime venue to continue regional water discussions. Interviewees gave no dates for the caucus' inception.

Spokane River Stewardship Partners – (unknown date of origin)

The partnership includes Spokane County, the cities of Spokane, Coeur d'Alene and Post Falls, the Liberty Lake Sewer and Water District, Hayden Area Regional Sewer Board, Avista and Inland Empire Paper Co.

The partners are members of our communities who are tasked with investing both public and private funds to implement measures to improve water quality. These public and private partners are uniquely positioned to provide the leadership

necessary to maintain and improve the health of our precious river. As partners, they are working together and with government agencies, tribes, conservation groups and the public to address water quality concerns and provide the technical expertise to meet some of the most stringent water quality standards in the world.

<http://www.spokanriver.net/?p=1846>

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Appendix 4: Executive Summary of Future Demand for Study¹⁶

Water demand overlying the Rathdrum Prairie Aquifer (the Idaho portion of the Spokane Valley-Rathdrum Prairie Aquifer) was projected for 5-year increments between 2010 and 2060. The projections were made for the Idaho Water Resource Board (IWRB) and the Idaho Department of Water Resources (IDWR) as part of the Idaho Statewide Comprehensive Aquifer Planning and Management Program (CAMP).

Approach

The approach for projecting future water demand consisted of

1. Reviewing historic population growth trends and growth rates;
2. Estimating existing water demand based on community water system data, water right information, USDA crop data, and other information;
3. Reviewing climate projections from the University of Washington Climate Impacts Group relative to the northern Idaho area;
4. Quantifying water conservation potential;
5. Evaluating selected potential water-demand constraints;
6. Projecting future population and employment growth;
7. Projecting future water demand for indoor domestic, municipal, commercial, industrial, and irrigation uses; and
8. Developing "water-demand scenarios" to evaluate possible future water-demand outcomes that take into account various population growth rates, levels of water conservation, and the potential impact of climate variability.

There are two general categories of factors that will shape future water demand: (1) exogenous factors over which local policies have limited influence and (2) local factors over which public policy and private incentives can have substantial influence. Exogenous factors include the strength of the national or global economy and national demographic trends that strongly influence regional population and job growth. Although local governmental policy can have some influence over these factors, the local economy is largely driven by national or global factors. One needs to look only at the recent economic recession to see that some of these national or global factors are difficult to control other local level. Exogenous factors also include potential effects of climate variability, over which local policy-making will have very little direct influence.

In contrast, regional land-use policies, building codes, governmental policies, water delivery pricing, and other local measures can have substantial influence on future

¹⁶ This section was taken directly from the executive summary of *Rathdrum Prairie Aquifer Water Demand Projections* by SPF Water Engineering. The full report can be found on IDWR's website at: http://www.idwr.idaho.gov/waterboard/WaterPlanning/CAMP/RP_CAMP/PDF/RP-WaterDmnd.pdf. [There may be a better way to structure this citation.]

water demand. Local and state government, local water purveyors, and area residents have substantial influence over these factors.

Thus, future water-demand scenarios were constructed to reflect the effect of both exogenous (external realm) and local influences (policy realm) on future water use. First, three primary scenarios were developed to reflect three different population growth scenarios: low population growth, medium-level ("baseline") population growth, and high population growth. Then, three sub-scenarios were constructed within each of the population-growth scenarios to reflect various water conservation levels. The three primary population-growth scenarios, each with three water conservation sub-scenarios, result in nine different projections of potential future water demand. Finally, the effects of potential climate variability were illustrated with a scenario representing baseline population growth and moderate water-conservation.

Conclusions

The primary conclusions from this analysis include the following:

1. Water demand by the year 2060 could rise from estimated current withdrawals of approximately 74,000 acre-feet to between 77,000 acre-feet (based on a low population-growth rate of 1.6% per year and aggressive water conservation) and 223,000 acre-feet (based on a higher population growth rate of approximately 3% per year and no water conservation). The Rathdrum Prairie Aquifer area has experienced both of these population-growth rates over multi-year periods in past decades.
2. The most likely 2060 water-demand projection ranges from approximately 101,000 and 163,000 acre-feet, depending on the level of water conservation. This projection is based on a moderate level of population growth (averaging approximately 2.3% per year) over the next 50 years.
3. The consumptive use is water lost from the local hydrologic system (i.e., aquifer and Spokane River), mostly through evapotranspiration. The consumptive use is projected to increase from approximately 40,000 acre-feet in 2010 to between 59,000 and 76,000 acre-feet in the year 2060 under moderate population- and employment-growth rates. This range reflects the effects of different water conservation levels.
4. The water use for agricultural irrigation will likely decrease in time as irrigated agricultural land is replaced by more urban and suburban land uses. However, development of new residential and municipal irrigation on land that is currently non-irrigated will likely lead to an overall increase in total irrigation demand.

Population and Employment Projections

5. The Kootenai County population grew from approximately 22,300 people in 1940 to 134,400 people in 2007. Bonner County grew from 15,700 people in 1940 to approximately 41,000 people in 2007.

6. Annual population growth rates in Kootenai County (most of which overlies the Rathdrum Prairie Aquifer) have ranged from 1.6% (between 1980 and 1990) to 5.4% (between 1970 and 1980). The average annual growth rate between 1970 and 2007 was 3.7%.

7. The Rathdrum Prairie Aquifer area population growth is projected to grow from approximately 128,000 people to approximately 400,000 people by the year 2060, reflecting an average growth rate of approximately 2.3% per year. If population growth for the next 50 years is at the same 1.6% annual rate experienced between 1980 and 1990, the 2060 population overlying the aquifer will be approximately 286,000 people. If the population grows at a rate of 3% per year (which is less than the 3.7% annual growth between 1970 and 2007), the 2060 population overlying the Rathdrum Prairie Aquifer will be approximately 581,000 people.

8. Employment over the aquifer area is projected to increase from approximately 53,000 employees in the year 2010 to 183,000 employees in the year 2060. The largest employment sector will likely continue to be wholesale and retail trade.

Existing Water Use

9. Existing water use was estimated with data from 20 community water systems ranging in size from approximately 39 to 46,000 people; these 20 community water systems serve approximately 72% of the total Rathdrum Prairie population. Data from the 20 community water systems were used to extrapolate water use to 70 additional community water systems that serve approximately 19% of the study area population. Estimates of self-supplied domestic water use for the remaining 9% of the population were made based on household domestic use rates estimated from community water system data. Self-supplied industrial water use estimates were based on IDWR water right information. Agricultural water use rates were estimated based on irrigated acreage, USDA crop information, and precipitation-deficit data.

10. Approximately 72,000 acre feet of water were withdrawn annually from the Rathdrum Prairie Aquifer in recent years. Of this, an estimated 34,400 acre-feet were withdrawn by community water systems, 8,800 acre-feet were withdrawn by individual domestic wells, 4,200 acre-feet were withdrawn for self-supplied commercial and industrial uses, and 24,700 acre-feet were used for agricultural irrigation. The estimated aggregate consumptive use (water that is lost from the local hydrologic system) was approximately 38,400 AFA.

11. Approximately 67% of the projected 2010 ground water withdrawals are used for the irrigation of residential, commercial, institutional, and agricultural lands. Other residential uses (14%), commercial, industrial, and institutional uses (14%), and unaccounted water (5%) constitute the balance.

Water Supply Characteristics

12. The Rathdrum Prairie Aquifer, part of the larger Spokane Valley-Rathdrum Prairie Aquifer, consists of unconsolidated sediments that are primarily coarse-grained sand, gravel, cobbles, and boulders deposited by immense floods.

13. The highly transmissive nature of the Rathdrum Prairie Aquifer means that the impact of water use in one portion of the aquifer will rapidly propagate throughout the entire aquifer.

14. Recharge to the entire Spokane Valley-Rathdrum Prairie Aquifer is approximately 1,000,000 acre feet per year.

15. The existing Rathdrum Prairie Aquifer consumptive water use (consumptive use is a measure of aquifer impact) is approximately 38,000 AFA, or approximately 3.8% of the 1,000,000 acre feet of aggregate Spokane Valley-Rathdrum Prairie Aquifer recharge.

16. It is unlikely that ground water availability in most portions of the Rathdrum Prairie Aquifer will limit future water demand over the next 50 years. A projected consumptive use of approximately 71,000 AFA in the year 2060 (based on medium population and employment growth and medium levels of water conservation) represents only about 7% of the Spokane Valley-Rathdrum Prairie Aquifer recharge (although, recharge rates are not equivalent to water available for use). Given the transmissive nature of the Rathdrum Prairie Aquifer sediments, it is likely that this amount of water could be withdrawn from the aquifer (except for, perhaps, along the basin margins where the aquifer is less thick than in central portions of the Rathdrum Prairie).

Potential Environmental Constraints

17. Aquifer water quality is good in most areas and does not presently pose a constraint on future ground water demand.

18. Future water demand may, however, be limited by the ability to discharge treated municipal effluent.

19. A portion of the Rathdrum Prairie agricultural land will almost certainly be maintained for the land application of treated municipal effluent. Residential or municipal irrigation, to the extent that it occurs on currently non-irrigated land, will contribute to a likely increase in overall irrigation demand.

Climate Variability

20. Annual average temperatures are projected to increase by approximately 3.2°F by 2040 and about 5.3°F by 2080.

21. Evapotranspiration may increase by approximately 6% per degree centigrade over 2010 values. This could lead to potential evapotranspiration increases of between 12% and 19% by the years 2040 and 2080, respectively. Another study suggests possible potential evapotranspiration increases of 5% to 9% by the year's

2040 and 2080, respectively. Based on these predictions, irrigation demand could increase by 5% to 20% in the next 50 years.

22. For most of the projections in this study, we assumed a 10% increase in future irrigation demand as a result of increased evapotranspiration. However, the effects of a 5% increase and a 20% increase in future irrigation demand were also evaluated for a moderate population-growth and conservation-level, scenario. A 5% increase in irrigation demand would result in an overall water demand that is approximately 3% less than the demand projected based on a 10% increase in irrigation demand. A 20% increase in future irrigation demand would result in an overall aquifer demand that is approximately 6% greater than the demand projected based on a 10% increase in irrigation demand.

23. Annual precipitation may increase by approximately 2.3% by the year 2040, and by approximately 3.8% by the year 2080. The Rathdrum Prairie Aquifer area is expected to become wetter in the fall and winter and dryer in the spring and summer. Additional precipitation, to the extent it occurs in the fall, winter, and spring, will not reduce irrigation demand during summer months.

24. Extreme temperature and precipitation events will likely increase in frequency. Extreme and/or extended drought periods will increase annual irrigation demands.

Water Conservation Potential

25. Aggressive water conservation can help mitigate some of the projected future water use. Aggressive conservation can result in aggregate water demand that is approximately 60% of the non-conservation demand for a given population growth outcome in 2060.

26. Aggressive water conservation could lead to a 52% reduction in per-household domestic water demand by the year 2060 (from 2010 levels).

27. Per-household outdoor residential irrigation use could be reduced by up to approximately 33% from 2010 levels.

28. Commercial and industrial use could likely be reduced by up to approximately 40% over the next 50 years compared to 2010 per-employee use rates.

29. Specific water conservation measures are outlined in the report.

30. Water reuse is a potential method to extend water supply, but does not bear directly on future Rathdrum Prairie water demands or aquifer withdrawals.

Appendix 5: Executive Summary of Climate Change Study

(forthcoming)

Comment [MU19]: Can this get integrated in the next draft?

DRAFT

Appendix 6: Analysis of Future Demand during Low Flow Periods

[This is the brief description of model runs conducted by Alan Wylie at IDWR.]

MEMO

State of Idaho
Department of Water Resources
322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098
Phone: (208) 287-4800 Fax: (208) 287-6700

Date: 27 May 2010
To: Helen Harrington and Sandra Thiel
From: Allan Wylie
cc: Rick Raymondi and Sean Vincent
Subject: Impact of projected 2060 demand on Spokane River

Helen and Sandra:

The Rathdrum Prairie CAMP Committee asked me to conduct a transient analysis of the impact of the SPF 2b population growth and consumptive use prediction (medium growth with moderate conservation efforts) on the Spokane River and present my findings at the June 4 meeting. I am preparing this memo because I will probably be either involved in a hearing regarding an Eastern Snake Plain Aquifer water call, or ensnared in the aftermath of the hearing and unable to attend the June 4 meeting.

Method

The SPF scenarios provide average projected consumptive use for 2060, not monthly projections, so I needed to shape the steady state scenario I presented at the April 16 meeting into a monthly transient file for use in the Spokane Valley Rathdrum Prairie (SVRP) Model. To accomplish this, I apportioned the 2060 steady state file to match the Idaho portion of the 2005 consumptive use for the SVRP Model. Table 1 shows the Idaho portion of the 2005 consumptive use from the SVRP aquifer model along with the shaped SPF 2060 consumptive use estimate and the difference between the two files.

Table 1. 2005 water budget for SVRP model and the 2060 monthly water budget.

Month	2005 (ac-f)	Projected 2060 (ac-f)	Difference (ac-f)
January	1,161	1,638	476
February	975	1,337	363
March	1,180	1,641	461
April	4,318	6,762	2,445
May	4,189	6,518	2,328
June	7,119	11,365	4,246
July	11,829	18,985	7,156
August	7,658	12,222	4,564
September	3,316	5,216	1,900
October	1,512	2,228	716

November	981	1,370	389
December	943	1,284	341
SUM	45,181	70,566	25,385

The impacts of the projected growth on the Spokane River can be simulated either by running the model with the 2005 consumptive use and again with the 2060 consumptive use and then differencing the outputs, or by running the model with the difference between the 2005 and 2060 consumptive use. I chose to work with the difference.

Results

Figure 1 shows the direct impact on the river. The direct impact is a result of the change between the 2005 aquifer model consumptive use and the SPF estimate for year 2060. The additional water use lowers the water table causing either increased seepage from or decreased gains to the Spokane River. The maximum change in impact is about 31 cfs in late summer and early fall. Late summer or early fall is when the seven day low flow typically occurs in the Spokane River.

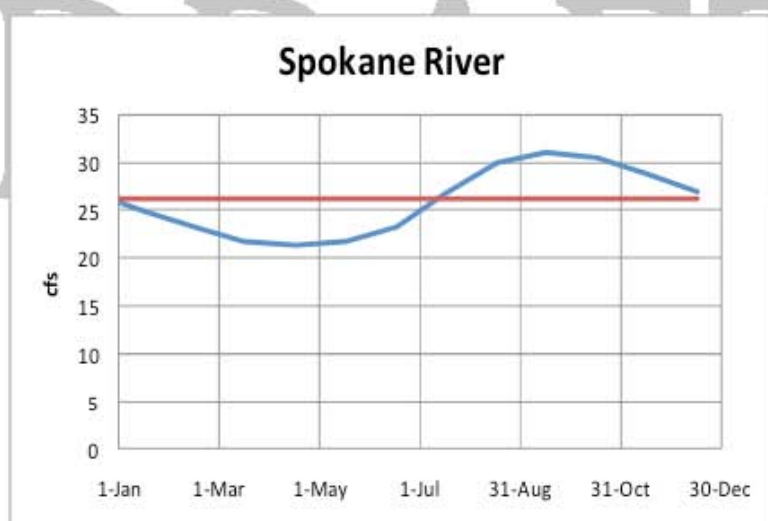


Figure 1. Direct impact on the Spokane River; red=steady state, blue=transient.

Figure 2 presents an impact on Lake Coeur D' Alene that results in an indirect impact on the Spokane River. This is where increased water use in Idaho lowers the water table resulting in increased seepage from Lake Coeur D' Alene. This water leaks from the lake into the aquifer to replace water that has been consumptively used, the water that leaked out of the lake can't be discharged through Post Falls Dam into the Spokane River. Because discharge from the lake is controlled at Post Falls Dam, the timing of this impact

does not appear to be critical. Although the magnitude of the impact is small and would be difficult to quantify, it does represent a decrease in the supply of water that can be released to mitigate downstream impacts.

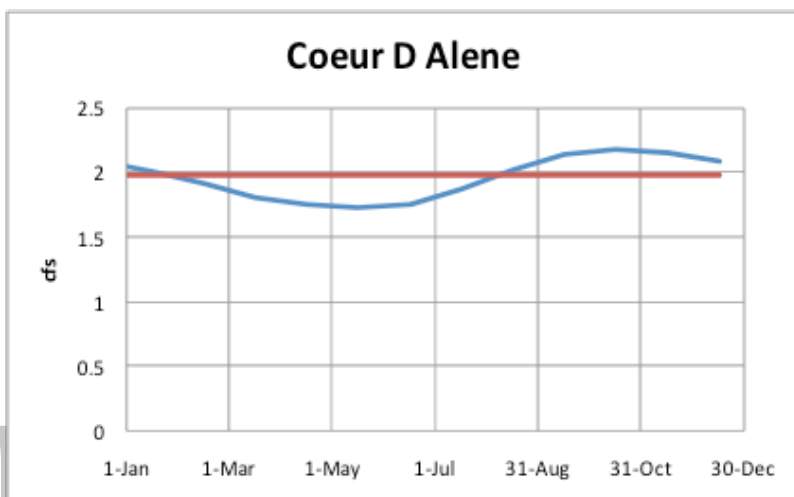


Figure 2. Impact on Lake Coeur D' Alene that results in an indirect impact on the Spokane River; red=steady state, blue=transient.

Conclusion

The transient impacts of SPF scenario 2b were estimated by shaping the 2060 annual consumptive use similar to the consumptive use for 2005 used in the SVRP aquifer model. The difference between the 2005 consumptive use in the SVRP aquifer model and shaped scenario 2b was input into the ground water model. The resulting simulation indicates that the maximum direct impact on the Spokane River would be about 31 cfs and should occur during late August and early September.

The model indicates that Lake Coeur D' Alene will also be impacted by growth in Idaho. Although the impact is small and on a large lake, it does represent a decrease in water than can be released to mitigate downstream impacts.

Allan Wylie

Appendix 7: Summary of Current Ground Water Management Plan **Status**

On September 15, 2005, the Director of the Idaho Department of Water Resources adopted the *Rathdrum Prairie Ground Water Management Plan*. The plan was based on a recommended plan developed by the Rathdrum Prairie Ground Water Management Advisory Group. The plan set forth goals and actions which were intended to guide water resource management “to balance the protection of existing ground water uses and water quality with the opportunity for future development, while encouraging water conservation.” ([A copy of the full plan is available at: http://www.idwr.idaho.gov/WaterInformation/GroundWaterManagement/RathdrumPrairie/PDFs/Final%20Order%20Rathdrum%20GWMA.pdf](http://www.idwr.idaho.gov/WaterInformation/GroundWaterManagement/RathdrumPrairie/PDFs/Final%20Order%20Rathdrum%20GWMA.pdf).)

Since the plan was adopted, some actions have been accomplished, others await implementation. As a part of the RP CAMP, the management plan provides a framework for management actions which would benefit the RP CAMP implementation. The following review of the goals and actions set out in the plan is intended to guide the recommendations for implementing CAMP.

Goal 1: Technical Data and quantification of water availability.

Actions to meet this goal included participation in the SVRP Hydrologic Project; continuing data acquisition; and adaptation of permitting conditions as new data was analyzed. Additionally, IDWR was directed to obtain hydrogeologic data as new wells are completed. All actions have either been accomplished or are in place.

Goal 2: Technical Data and quantification of water use.

Two actions defined under this goal were the establishment of a water measurement district and investigation of starting an adjudication. Since the Northern Idaho Adjudication was initiated successfully, IDWR determined that the establishment of a water measurement district, as an interim measure prior to the adjudication, was not practical. Upon completion of the adjudication, establishment of a permanent area-wide water district will be established.

Goal 3: Management ground water resources efficiently and fairly for all users.

Two actions identified included the establishment of a water district and evaluation of transfer applications to ensure consistency with local public interest and conservation of the resource. Both these actions are or will be implemented. As stated above, a permanent area-wide water district will be established once the adjudication is completed.

Goal 4: Encourage water purveyors, regulatory agencies and local and regional governments to plan and incorporate plan principles.

This goal did not lay out actions which IDWR could implement but to show support and encouragement. Elements within this goal included encouragement for

Comment [MU20]: Not sure what the context or purpose of this is, and I don't recall where it is referenced in the report itself... I recall that Helen and company were going to provide this update ... is that it? Should it be included in the report somewhere?

Comment [DP21]: It is reference in the report in the quality section in recommendation #3.

Comment [DP22]: Should we attach a full copy of the plan to this document? LET'S ASK THE AC

municipal water providers to undertake long term plan under the Growing Communities Doctrine statute. Local jurisdictions were encouraged to require community water systems over individual wells. Through RP CAMP, these elements could be encouraged more explicitly. RP CAMP could make stronger statements regarding these elements.

Goal 5: Encourage water conservation efforts by all users of the resource.

Two action items were identified: conservation plans required for municipal purveyors and support for establishment of an aquifer-wide water conservation advisory committee. An addition list of measure was compiled for IDWR encouragement and assistance. This list included economic support for developing conservation plans; water conservation demonstration projects and educational activities; support for price structures to encourage water conservation; and, investigating strategies for using reclaimed wastewater. IDWR has implemented the requirement for conservation plan submission, but final a final guidance document has not been completed. *Draft Water Conservation Measures and Guidelines for Preparing Water Conservation Plans* has been prepared and is available on the IDWR web pages, but has never been finalized. No actions have been taken to implement the other actions or suggestions. This may be another area where the RP CAMP could make strong statements regarding these elements.

Additional Actions

Seven additional actions were identified:

1. New domestic wells required to authorized through permit (no Start Card). Implemented.
2. Protection against loss or forfeiture if non-use is due to conservation plan. Implemented, but unused.
3. Proper abandonment of wells, with consideration of use as monitoring well. Implemented.
4. Monitoring required for new wells, if deemed appropriate. Implemented.
5. Investigation of managed recharge. Not implemented.
6. Continued advisory committee activity. Regular meetings not held.
7. Annual review of plan and 5-year report to IDWR Director. Not implemented.

Appendix 8: Full description of potential recommendations to prevent conflict from the Advisory Committee.

Potential Recommendation #1 Develop a plan for regional engagement that supports both Idaho and Washington management of the SVRP Aquifer. The plan for regional engagement should allocate funding to the appropriate agencies or organizations to assemble a group of individuals who will define currently modeling predictions, management goals, and methods of measuring for success.

- The committee that developed the plan for the USGS model built relationships that may be useful in building policy pieces that correspond to the work accomplished in the modeling process. The ongoing development of Dissolved Oxygen Total Maximum Daily Load (DO-TMDL) process may offer lessons on what to avoid in collaboration. The USGS process illustrates the optimal process for collaboration.
- Focus on development of a process that is fair and equitable for Idaho and Washington.
- IDWR should work in conjunction with the WA DOE to assemble a manageable-sized group of people, 8-10 individuals, from both Washington and Idaho. During a year-long process, this group should develop the framework and groundrules for the development of a process
- Idaho and Washington have different definitions and measurement standards. The group of people tasked with developing a regional engagement process should develop clarity and raise awareness of these differences before detailed modeling discussions begin. To the extent possible, the group should resolve these differences by agreeing on, or developing new, definitions and standards.
- Develop a framework that defines what both states currently understand in regards to the modeling and what both states agree to in terms of measuring what each state wants to achieve through water management. Idaho has considered future growth and has modeling that suggests minimal impact downstream from that future growth. Part of the framework should document Washington and Idaho's goals for conservation and increased efficiencies in water management and identify an effective way of measuring progress towards those goals. The purpose of this task is to develop a shared understanding of how each state intends to manage water and why. Some elements of the framework may include:
 - Realistic expectations of the per-capita water use for Idaho and Washington.
 - Minimum expectations of resource use and management in Idaho and Washington.
 - Identification of locations where the negative effects of pumping can be minimized.
- Agree that any level of conservation achieved on one side of the border should be similarly, or greater, implemented and achieved throughout the SV-RPA.

Comment [MU23]: reframe and put active voice upfront... Clarify and raise awareness of different ...

Potential Recommendation # 2: Create a mechanism to increase awareness of local water needs by assembling local water purveyors, municipalities, and state agencies on a regular basis.

- IDWR should consider whether the Spokane Joint Aquifer Board model is appropriate for this kind of assembly in the RPA.
- This group should consider whether to apply for a Reasonably Anticipated Future Needs water right.
- Assess the true effectiveness of recharge options to increase aquifer beneficial use to support aquifer sustainability while meeting non-degradation standards
- This assembly should share data to the extent that IDWR understands local needs when engaging with neighboring states over water issues.

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Appendix 9: Full description of strategies that should be addressed by the ad hoc committee on water quality.

Strategy # 1: Encourage the support and development of existing and future applicable programs to monitor, enhance, and model water quality concerns.

- Emphasize continuance and expansion of existing programs and plans, **which have been successful in protecting and enhancing the quality of the aquifer**. In some cases we need to bolster or enforce other plans that have not been implemented to their full potential. Develop new plans to fill voids or areas that need to be addressed.
- Continue funding for long term monitoring to provide for trend analysis of RPA health
- Encourage development of fate and transport models to enhance response to contamination events and long term planning to avoid contamination.
- Explore whether there are mechanisms to modify the USGS model so that it can determine when and where quality problems will occur. This may require modifying the models so they can be applied at a micro level.
- Develop and expand existing aquifer programs to include basin wide consideration, such as threats to water quality on a watershed basis. The Aquifer Protection District is an example of such a program.
- Ensure programs relating to water quality and aquifer protection should not be subject to short-term changes in departmental or administrative leadership. Create programs that support long-term vision.

Comment [DP24]: There is concern that the appropriate agencies maintain control over what they are tasked with doing. This suggests that they should be locked into policy without the ability to make changes as new information arises. Not sure how to modify... SOUNDS LIKE A GOOD TOPIC TO DISCUSS WITH AC ... MM

Strategy # 2: Mitigate the impacts of stormwater run off. Stormwater runoff from developed lands can contain a variety of pollutants that can adversely affect water quality. As land development increases, the Advisory Committee recognizes that mitigating the impacts of stormwater run off is essential to protecting the quality of water in the aquifer.

- Promote pretreatment methods for stormwater.
- Encourage permitting agencies to review and improve stormwater permits at regular intervals. Review operations and maintenance overview of systems, and ensure they are maintained as intended.
- Promote the use of best management practices in development design. Although this is not a comprehensive treatment mechanism, the Advisory Committee believes this alternative is more desirable than mere collection in urban areas, which is difficult to deal with.
- Monitor for an increase of chloride or other contaminants in runoff. Develop

Comment [DP25]: Jim Markley is going to find out what kind of chloride salts are used or if there is a generic name for all of them.

strategies to address the timing issue of chloride increases following a freeze and use of road salts.

- Consider how to assess and approach the effects of nutrient pollution from both developed and agricultural lands.
- Develop incentives to retrofit non-conforming systems.
- Identify pollutions that create serious problems and identify programs that help reduce and eliminate those pollutants.
- The Advisory Committee encourages utilization of future technologies that enhance the stormwater treatment strategies for the RPA.

Strategy # 3: Promote practices that prevent accidental or incidental releases of contaminants over the RPA.

- Support and expand regular monitoring programs with vigilance to the risk of incidental releases of industrial pollution. Encourage coordination and communication between those regulatory groups to enhance the protection of the aquifer.
- Where applicable, require increased monitoring and reporting of petroleum pipelines by owner and operation entities.

Strategy # 4: Encourage accounting of wellheads over RPA and proper abandonment of unused wellheads. Wellhead contamination is possible if well head construction lacks a seal and allows for contamination.

- Include consideration of wellhead contamination in continued or enhanced regulations and in periodic water quality threat assessments.
- Support proper decommissioning of private wells that should no longer be in use. Support creation of incentives for decommissioning.
- Cap unused wells in a way that will maintain viability but seal against potential contamination (instead of decommissioning).
- Create an educational program to support public awareness of the issue through a coordinated effort with local jurisdictions as a health and safety issue.

Strategy # 5: Support continued monitoring and management of potential water quality issues contained in RPA source lakes and rivers.

- Determine whether monitoring of lake metals is being completed at the appropriate

scale and time intervals (both length and frequency of testing).

- Encourage support or increased resources for monitoring of lake metals.
- Ensure that the prospect of catastrophic events involving the Lake are considered, such as a sudden shift from aerobic to anaerobic conditions.
- Ensure that potential contamination due to dredging is considered in light of potential problems with heavy metal migration.
- Apply for grants to study the potential for mobilization of contaminants in CDA lake.
- Encourage support or increased resources for monitoring of lake contamination.

Strategy # 6: Encourage wastewater disposal methods that benefit the RPA.

- Develop strategies to maintain standards of nondegradation that can include waste water reuse such as purple pipe. Evaluate these uses on a consumptive/non-consumptive use basis to meet overall RPA objectives.
- Fund studies to determine whether application of Class A treated water below the root zone can be used as potential recharge to the aquifer.
- Determine the permissible land use density that would not degrade the RPA greater than septic use per 5 acres. Account for the aggregate impact of contamination.
- Promote individual wastewater treatment that does not degrade the aquifer. Avoid damaging the water quality with wastewater disposal systems.
- conversion from septic tanks (while maintaining low density development)
- Develop better monitoring or consider study on impacts from septic systems.

Comment [DL26]: Confirm that there is agreement on the committee regarding this recommendation WE WILL BE DOING THAT ALL AROUND, CORRECT? mm

Comment [DP27]: Describe what is being promoted – “conversion to ???”
Promote wastewater disposal that does not harm the aquifer.
Promote individual wastewater treatment that does not degrade the aquifer.
Avoid damaging the water quality with wastewater disposal systems.
Improve wastewater treatment systems.

Strategy # 7: Prepare for Emerging or unknown threats. Traces of personal care products and pharmaceuticals in our water systems are a growing concern, and issues may emerge in the edges of the aquifer where there is less dilution due to the slow moving areas. The Advisory Committee is also concerned about activities beyond the regulatory boundary of the aquifer that may threaten water quality in the future. To address this issue, the Advisory Committee proposes the following:

- Expand regulations beyond aquifer boundaries to maintain water quality at a watershed scale.
- Develop strategy to address overarching federal regulations that may conflict with regional or local needs. (i.e. Pipeline Safety Act)
- Encourage testing for and regulating new compounds that may be proven or

suspected of causing potential harm.

- Continue or enhance existing water quality monitoring programs.
- Encourage modification of existing, or development of new models to assist in determining or predicting water quality impacts on the RPA. Continue funding for long-term monitoring to provide trend analysis of RPA health and for the development of fate and transport models to enhance the response to contamination events.

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