

# Survey of Urban Water Use Management in the Bow River Basin

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## Introduction

### *Why This Survey*

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Management of the use of the waters of the Bow River Basin, a sub-basin of the South Saskatchewan River Basin in Southern Alberta, is complex and challenging. Although management is difficult, it is critical to ensuring a safe water supply for the hundreds of thousands of people who live in the basin and use its waters in a multitude of ways: for municipal purposes, irrigation, recreation, hydropower generation, industrial processes and appreciation of nature. It is also critical in supporting the fragile ecosystem that includes the many plants, animals, birds and insects all that either live within or near the water, drink the water, or depend on it for part of their life cycles. All these aspects of water use need to be safeguarded—for now and for the future.

As the river system is a dynamic, interactive system, every human use of water has an effect on other water uses as well as the ecosystem. Our goal in sound management is to prevent these effects from being negative ones.

This report specifically examines municipal water use in the Bow River Basin. The purpose of this examination is to review our current systems and practices for water use management and to recommend improvements, all to help the safeguarding of our precious lifeline—the Bow River system.

# Acknowledgements

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Thank you to all the municipalities that contributed to this report either by providing data or reviewing the document. This level of municipal commitment is critical to our effectiveness as a whole in protecting our water supply and ecosystem in the Bow River Basin.

Thank you also to the Council's committee members who worked on this project: Council Chair Menno Homan, EcoLinks Engineering Inc.; Judy Stewart, former councillor with the Town of Cochrane; Al Taylor, Calgary Area Outdoor Council; Jim Rouse, Trout Unlimited; Barry Bohn, City of Calgary; and Brock Rush, Peter Watson and Pat Lang, all of Alberta Environmental Protection.

Thank you also to the other Alberta Environmental Protection staff who provided data; to Kim Eastlick, EBA Engineering Consultants Ltd. who designed and analyzed the survey questionnaires; and to Chris Campbell, Campbell & Associates Ltd., who conducted the survey and wrote the final report.

# Foreword

All forms of life in the Bow River Basin depend on the availability of adequate, high-quality water from the rivers flowing through the basin. We depend on the rivers for drinking water, domestic water, agriculture, hydropower generation, industry and recreation, all which contribute to the survival and lifestyle of the hundreds of thousands of people living in the basin.

We must guard our rivers and use them carefully. They are a limited renewable resource with a limited capacity to assimilate the effects of all our uses. They require our ongoing vigilance and good management to ensure a healthy ecosystem and sustainable use in spite of our ever-increasing demands on them.

This report, the *State of Urban Water Use Management in the Bow River Basin*, is part of the ongoing vigilance by the Bow River Basin Water Council, an advisory

*For the purposes of protecting and improving the waters of the Bow River Basin and with respect to any social, cultural, economic and environmental aspects of:*

- *the quality and quantity of groundwater and surface water*
- *riparian zones*
- *the effects of human activity and land use on surface water and groundwater quality and quantity*

*in the Bow River Basin, the Bow River Basin Water Council will:*

- 1. Maintain a forum for all stakeholders to share perspectives*
- 2. Participate in water use management and basin planning*
- 3. Prioritize stakeholder water issues, develop action plans, and organize and encourage implementation of cooperative water use management strategies*
- 4. Monitor, evaluate and report on programs to the Minister, stakeholders and the public*
- 5. Recommend improved water use management procedures and performance measures*

Council on the Bow River system established in 1992 to report to Alberta's Minister of Environment. The Council has the broad mandate of encouraging cooperative and effective strategies for water use management. The Council includes representatives from urban and rural municipalities; irrigated agriculture; recreational, industrial and other interests; First Nations peoples; and the provincial and federal governments (see Appendix A for more information on the Council).

This report tells us how, and how well, we are managing our use of water within the urban towns and cities of the basin. From this information we can take steps to improve our approaches and methods, and reduce our impacts on the water source. As a followup, the Council is providing this report to the municipalities within the basin, and hosting a workshop to address the information and recommendations.

This *Survey of Urban Water Use Management Report* is a followup to tncil's first report on the overall state of the Bow River ecosystem, published in 1994. This first report showed that while we have made significant strides in addressing a wide variety of Bow River use issues, major challenges to river use management are still before us. One of the key challenges is continuous improvement in the management of urban sewage and stormwater (runoff from urban streets and land). This report is a step in addressing that challenge.

M.T. Homan, P.Eng., MBA  
Chair, Bow River Basin Water Council

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# Executive Summary

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This report provides an overview of a survey on how 26 urban municipalities within the Bow River Basin manage their land use, water supply and consumption, sewage and stormwater.

Municipal water use and disposal are clearly under provincial government authority as specified by legislation. Municipalities are responsible for, at a minimum, meeting provincial requirements. They are able to voluntarily exceed these requirements and take management measures to ensure strong water stewardship.

Based on the information from this survey we can determine how, and how well, we are managing our use of water within these urban centres. From this, we can take steps to improve our approaches and methods, and reduce our impacts on our water source—our lifeline.

## *Key Findings*

### *Land Use*

- Calgary dominates the urban municipalities in the Basin in terms of population and urban area with 89 percent of the population of the responding communities.
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  - Water supply appears generally adequate (indicated by 17 of 22 respondents). However, significant growth in water use by intermediate-sized communities, especially those
- A slightly greater percentage increase in population in the future is expected in intermediate-sized communities (populations between 1,000 and 100,000), largely surrounding and upstream of Calgary; however, Calgary will remain the major population centre.
  - Ten communities, including Calgary, allocate over 50 percent of their urban area to green space and undeveloped lands. However, future development will likely increase this intensity of development with potential to increase stormwater volume and resulting water pollution unless some form of stormwater treatment is used.

### *Water Use and Supply*

- Per capita water use is generally above Alberta's average of 454 L/d which suggests opportunity for conservation. However, this information needs to be considered after regional environmental effects on water use, such as aridity, have been considered.
  - Population growth is forecast to significantly increase water consumption in intermediate sized-communities. However, the forecasted reduction in per capita water usage in Calgary nearly offsets the increased demand resulting from population growth for the 26 responding centres.
- surrounding Calgary, may impact local groundwater resources or raise issues related to surface water allocations.

### ***Wastewater Treatment***

- Largely a result of the influence of Calgary, a relatively high standard of municipal wastewater treatment exists in the Bow River Basin.
- All communities reported at least basic wastewater treatment (as defined in Appendix D); six communities, representing well over 90 percent of total wastewater volumes in the Basin, are using advanced treatment. Also, over 90 percent of sewage sludge is disposed of on land.

### ***Stormwater Management***

- Stormwater quality management facilities are not widely used in the Bow River Basin. Less than 10 percent of the urban land area in the responding communities is provided with adequate stormwater quality enhancement features.

### ***Solid Waste Management***

- Solid waste management is not reported to be a problem. Landfill sites are adequate and toxic roundups, waste bylaws and educational programs are widely used throughout the Basin.

### ***Environmental or Water Quality Management Policies***

- A limited number of environmental or water quality management systems appear to be in place. Only 10 of 26 responding communities reported having water quality policies and bylaws in place, and only 3 reported having comprehensive environmental management programs.

### ***Improvement Needs and Plans***

- Eleven communities reported having plans or objectives in place for improving environmental programs.

### ***Management Resources***

- Only about one-half of the communities reported having adequate staff and finances for wastewater and solid waste management programs.
- Less than 40 percent reported having adequate resources for stormwater management programs.

### ***Monitoring***

- Most communities monitor sewage effluent quality; however, stormwater and receiving water body qualities were monitored much less frequently.
- Many of the smaller centres relied on Alberta Environmental Protection to scrutinize their monitoring results.

### ***Emergency Response Plans***

- At least some form of emergency response plans are in place for 14 of the 26 communities reporting.

### ***Water Supply and Quality Perceptions***

- Water supply and quality are not generally perceived as problems by responding communities.

### ***Need for Facilities***

- Growth and regulation are creating needs for water supply, wastewater treatment or stormwater management infrastructure in 13 communities. In many cases, financing will be an issue in developing needed facilities.

### ***Need for Information***

- There was quite a variation in needs for information on water quality management. Ten communities reported no information needs and others indicated a need for information for political leaders, administrative staff or the general public.

### ***Recommendations***

The following recommendations will provide guidance to the municipalities, their residents and the provincial government, who, acting together, can improve urban water use management and reduce its impacts on the Bow River system.

1. All land use planning should recognize that the way land is used affects water quality of surrounding water bodies. This should be addressed through appropriate planning, zoning, and land control techniques.
2. Calgary should continue working toward its water conservation goals for the future. Intermediate-sized communities (populations between 1,000 and 100,000) should also establish water conservation goals as significant growth in water use by these communities is predicted.
11. A workshop of municipalities and the provincial government should be held to discuss how municipalities
3. Groundwater and/or surface water sources should be investigated to ensure water supply will be adequate for urban growth.
4. The adequacy of wastewater treatment facilities should be monitored closely to ensure water quality protection, and wastewater treatment facilities are upgraded as necessary.
5. Many communities, particularly those with significant new or anticipated development and population growth, and particularly Calgary with its large land area, should address stormwater management now to prevent pollution rather than having to remedy it later.
6. The prudent and effective management of solid wastes from urban communities should be continued.
7. The need for more systematic processes for planning, implementing and measuring performance of urban water use management programs should be investigated.
8. All communities should become knowledgeable on water quality guidelines and monitor their systems for compliance.
9. A survey similar to this one should be undertaken on a regular, scheduled basis to monitor progress in urban water use management.
10. Information from previous and current water quality monitoring programs should be used to advise leaders and the public on a regular basis about needs for water quality improvement initiatives in the Bow River Basin.

currently manage water quality and how this can be

improved, municipal concerns and how the Bow River Basin Water Council can assist.

*Information or extra copies of this report may be obtained from:*

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