



Alberta's Water Research and Innovation Strategy 2014:

A Renewal

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PREAMBLE

Alberta's Water Research and Innovation Strategy 2014: A Renewal is a provincial framework to guide Alberta's research and innovation system in responding to challenges faced by the province's water resource system. Like the original Water Research Strategy, released in 2006, this new strategy identifies focused actions for government and publicly funded agencies to address key Alberta priorities. This renewed strategy, *Alberta's Water Research and Innovation Strategy 2014: A Renewal*, builds on the work that has taken place, reflects changes to the contextual environment and responds to today's knowledge needs as it relates to water priorities in Alberta.

MESSAGE FROM THE MINISTERS



Honourable Don Scott
Minister of Innovation and
Advanced Education



Honourable Kyle Fawcett
Minister of Environment and
Sustainable Resource Development

On behalf of the Government of Alberta, we are pleased to present *Alberta's Water Research and Innovation Strategy 2014: A Renewal*.

Water is Alberta's most critical resource. We depend on it for life itself, for the well-being of our environment, for our energy and agricultural sectors and for our recreational activities and the industries they support.

Through research conducted by the Alberta government and its partners, important knowledge about our water resources and how we can achieve sustainable growth and protect the environment has helped to guide our policies and regulations for water resources.

Alberta's Water Research and Innovation Strategy 2014: A Renewal provides a roadmap for water research going forward. This renewed strategy accounts for changes in Alberta's research system since the original strategy (2006) to better reflect today's environment, enhance our ability to respond to changing demands on our water resources and increase opportunities for economic growth.

The actions outlined in this strategy will build on our position as a leader in the field of water research and support our long-standing commitment to scientific excellence. In developing this renewed strategy, the provincial government conducted an extensive review of relevant studies and feedback provided by stakeholders on the knowledge needs related to Alberta's water resources.

As the Ministers responsible for Alberta's innovation system and for our environment and sustainable resources, we are proud to support a strategy that draws on Alberta's scientific excellence and encourages collaboration across governments, research organizations, post-secondary institutions and the private sector.

We thank all the partners that contributed their knowledge and expertise to *Alberta's Water Research and Innovation Strategy 2014: A Renewal*. With knowledge and a collaborative spirit we can, together, ensure safe, sustainable water resources for a prosperous Alberta.

DEFINING THE CONTEXT

The role and importance of water to the future of Alberta cannot be underestimated. Its connection to human health, to ecosystems, to Alberta's economy and to the unique beauty of the Alberta landscape demands concerted effort and attention to assure our province's continued prosperity.

The Government of Alberta's policy vehicle for managing Alberta's water resources since 2003 has been *Water for Life: Alberta's Strategy for Sustainability* (Water for Life), renewed in 2008. Water for Life recognizes that achieving the goals of safe, secure drinking water; healthy aquatic ecosystems; and reliable quality water supplies for a sustainable economy, requires a strong foundation of knowledge:



“Albertans will have the knowledge needed to achieve safe drinking water, efficient water use and healthy watersheds.”

Knowledge gained through research and innovation is key to well-informed policy, management decisions, and water management practices.



“Water has become a centre point.”

Recognizing the importance of a focused research and innovation agenda to the policy, practices and management priorities of Alberta’s water resource system, the Government of Alberta responded to the Water for Life strategy in 2006 by approving and funding *Alberta’s Water Research Strategy*. Based on a systems and multidisciplinary approach, the original, focused water research investment has led to outcomes in:

- Developing new technologies and processes for early identification of microbial and pathogenic contaminants at a watershed;
- Identifying and meeting the needs of urban water and wastewater treatment facilities in addressing current and emerging research questions through national collaborations;
- Developing, testing and implementing new approaches and tools for the assessment and management of wetlands in the settled regions of Alberta;
- Developing new approaches, processes and tools that enable water management stakeholders to participate in the development and implementation of sustainable improvements in water management outcomes;
- Developing an improved understanding of the connections between landscape and water management within a watershed, leading to a greater flexibility in water management options and improved security of water supplies;
- Assessing advanced treatment options for municipal and industrial effluents, including the treatment of oil sands produced waters; and

- Piloting new and existing technologies focused on reducing the water and energy requirements in Steam Assisted Gravity Drainage (SAGD) operations.

Since 2006, the environment and context for water research has changed, within government, the research and innovation system and the general public. Policy agendas, such as Alberta's Land Use Framework, have redefined knowledge needs at a regional level. The formation of Alberta Innovates has changed Alberta's research and innovation landscape. Water has become a central point in the social license to operate for many of Alberta's industrial sectors. In response to these changes, government and stakeholders realized a need to update Alberta's approach to water research.

Alberta's Water Research and Innovation Strategy 2014: A Renewal (Strategy) provides new direction and focus consistent with the continuing knowledge needs of *Water for Life* (Figure 1). It capitalizes on the strengths of researchers, practitioners and technology developers, and guides research investments. The Strategy promotes collaboration and action among government departments and other water-related organizations to integrate water research and innovation across research and policy domains.

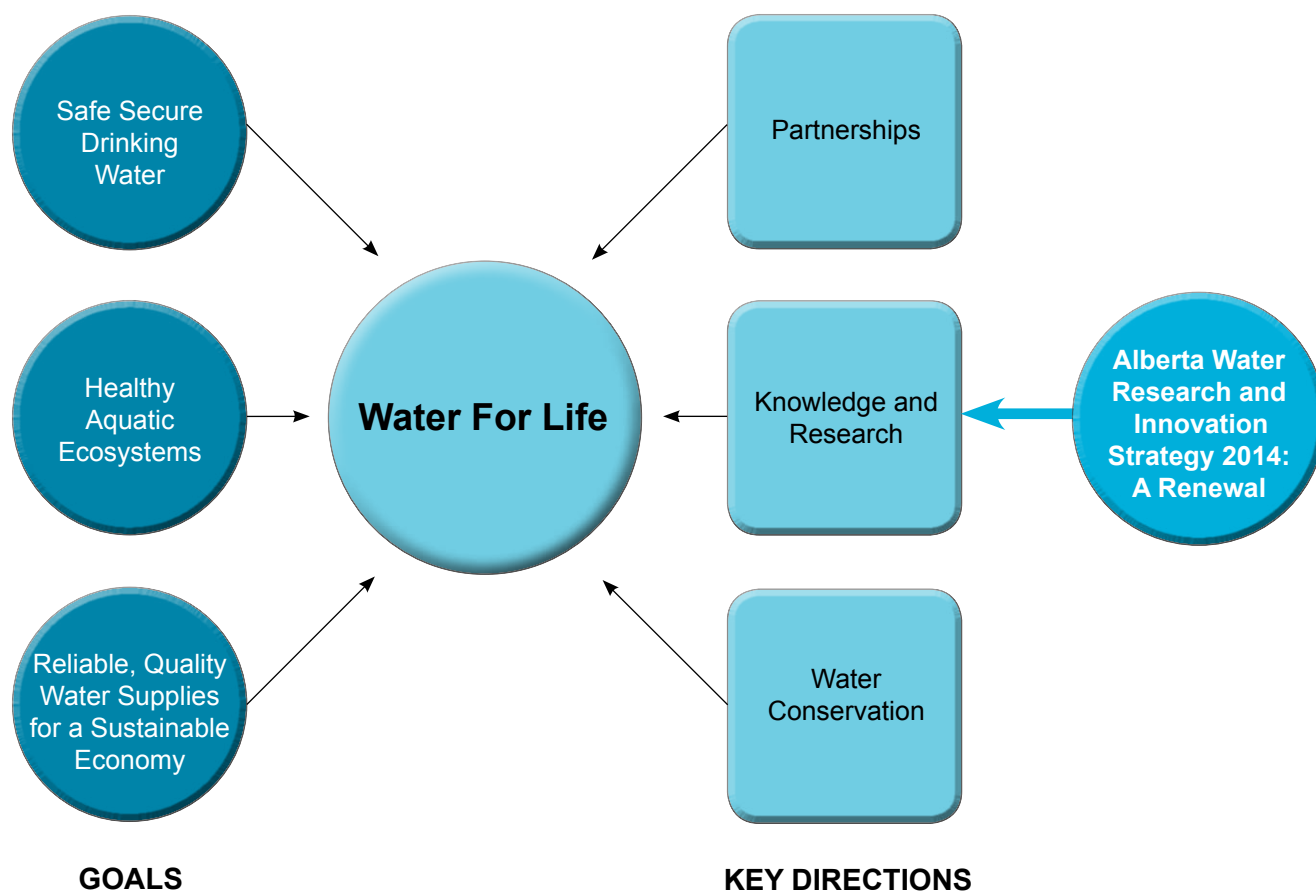


Figure 1.

Water for Life: Alberta's Strategy for Sustainability (2003, 2008) recognized the importance of knowledge and research as a key direction needed to deliver on its goals. *Alberta's Water Research and Innovation Strategy 2014: A Renewal* supports the continuing knowledge and research needs of Water for Life.

SETTING THE STRATEGIC FRAME



Alberta's Water Research and Innovation Strategy 2014: A Renewal is a provincial framework to guide Alberta's research and innovation system in responding to the challenges faced by the province's water resource system.

Alberta's water research and innovation system encompasses the people, institutions and activities that are engaged in generating and applying high-quality knowledge that results in innovative policy, practice, products and services within Alberta's water resource system, which in turn, supports benefits to Albertans such as: healthy communities and quality of life, economic prosperity and healthy environment and ecosystems.

The interconnectedness and interdependence of these complex systems (research and innovation and water resource) creates opportunities for knowledge to bring about improvements in the water resource system and to create demand for knowledge from the research and innovation system. This interrelationship is demonstrated in Figure 2.

Within this context of interconnectedness and interdependence, *Alberta's Water Research and Innovation Strategy 2014: A Renewal* provides a direction for water research and innovation in Alberta for the coming decade and beyond. This strategy is intended to:

- Provide a systems-based, strategic approach that focuses investment in water research and innovation on those areas that have direct relevance to Alberta;
- Capitalize and build on strengths that Alberta has established through past investments, ensuring Alberta's water resource system remains robust; and
- Encourage the effective mobilization of knowledge enabling innovative policies, practices, products and services in order to capture the benefits of Alberta's investments in water research.

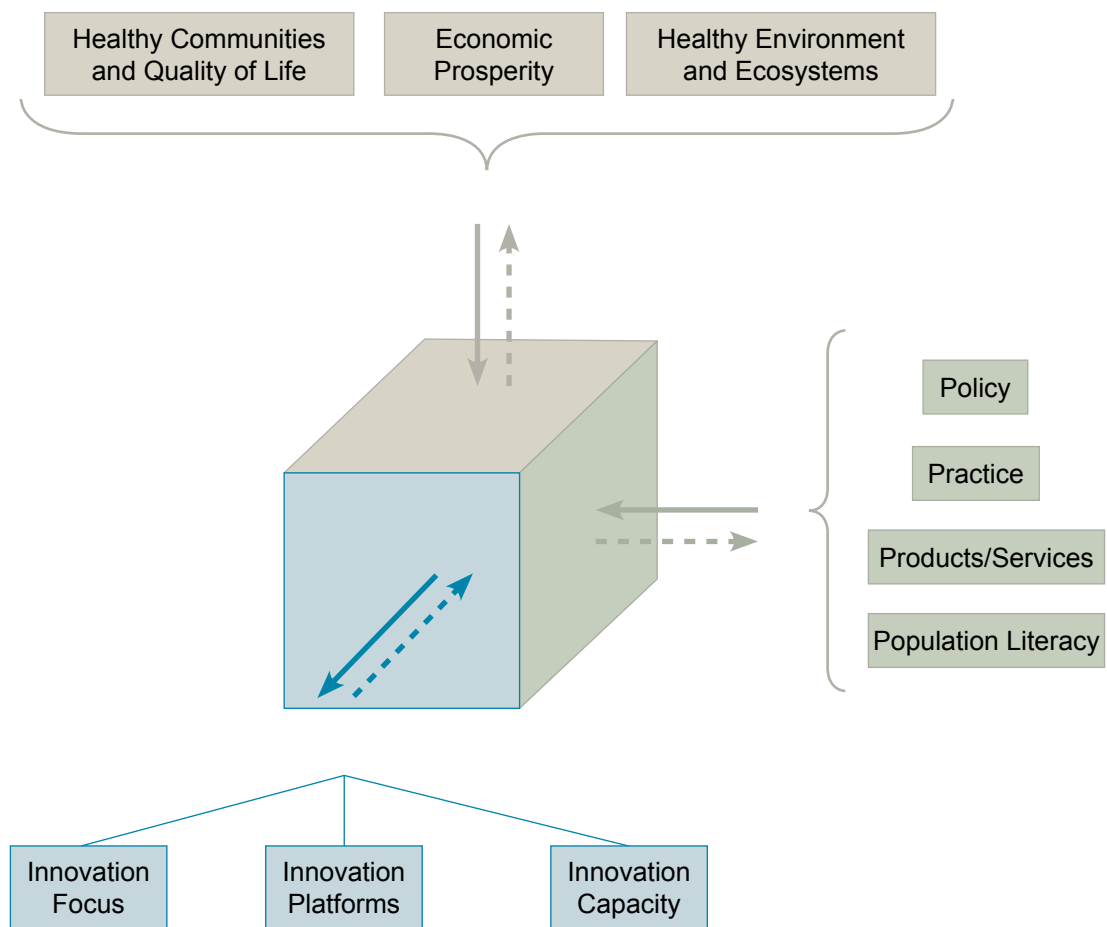


Figure 2.

The goals / outcomes of Alberta's water resource system, as defined by *Water for Life*, inform the research and innovation system, creating the demand for new knowledge and technology. The outcomes associated with the water research and innovation system ensure that knowledge is created and applied that leads to a high-performing, innovative and responsive water resource system. The outcomes from the two complex systems need to be aligned in order to generate advances in policy, practice, products and services that result in the goals articulated by *Water for Life*. This complexity, interrelationship, and interdependence between two complex systems (research and innovation and water resource) provide the contextual frame for *Alberta's Water Research and Innovation Strategy 2014: A Renewal*.



ALBERTA'S WATER RESEARCH AND INNOVATION STRATEGY 2014: A RENEWAL

Purpose:

Alberta's water research and innovation system creates and applies relevant, reliable and credible knowledge that leads to a high-performing, innovative and responsive water resource system.

Principles:

Relevant

Research and knowledge generated will be seen as supporting the priority needs identified by Alberta's water resource system.

Collaborative

Alberta's approach to water research will elevate the quality and focus of engagement with the Canadian and international research community, as well as with pan-Alberta, pan-sectoral academic, government and industry partners.

Transparent

Alberta's open and transparent approach to water research and innovation will result in credible and reliable information and knowledge to inform policy and management actions.

Adaptive

Alberta's water research and innovation system will be flexible and responsive to the dynamic contextual environment in which it operates.

Quality

A foundation of excellence in research and innovation underpins investments made in Alberta's water research and innovation system, in support of identified priority needs.

Innovation Focus		Innovation Platforms		Innovation Capacity	
<i>Investments in water research and innovation generate relevant, credible and reliable knowledge that support the strategic needs of Alberta's water resource system.</i>		<i>Technological and organizational environments are conducive to discovery and application, fueling innovation in Alberta's water resource system.</i>		<i>Water research (knowledge generators) and receptor (knowledge users) capacity enables knowledge to be effectively mobilized to create innovative solutions to Alberta's water resource system.</i>	
A C T I O N S					
IF-1	Implement mechanisms that engage government, academia, and industry in the assessment of water research and innovation priorities, key opportunities and principle initiatives.	IP-1	Maintain and enhance critical provincial innovation infrastructure that supports leading-edge water research and innovation.	IC-1	Recruit and retain researchers and practitioners in water-related sciences and applications, with specific emphasis on advancing trans-disciplinary environmental sciences.
IF-2	Enable the appropriate business environment and partnership opportunities to increase investment from private enterprise in innovative products, processes and services that improve water-related environmental outcomes.	IP-2	Support timely, affordable access and use of existing research infrastructure and commercialization capacity in Alberta and other jurisdictions.	IC-2	Develop appropriate post-secondary trans-disciplinary programs to produce graduates that have the necessary skill sets to work in complex water resource environments.
IF-3	Engage in public discussions on water research and technology advances and challenges, using researchers, sector leaders and thought leaders to increase public awareness, engagement and debate on water resources issues.	IP-3	Foster pan-Alberta knowledge and action networks and communities of practice to share evidence-based information, activities and best practices.	IC-3	Encourage Alberta researchers and technology development organizations to be engaged in relevant national and global water-related networks.
IF-4	Invest in trans-disciplinary team-based research and innovation in areas of strategic priority to facilitate the emergence of innovative water policy and practice.	P-4	Improve access to water data and information to enable research in areas of strategic priority.	IC-4	Accelerate the movement of discoveries and new applications into practice, commercial products and services by enhancing receptor capacity in industry and government.

MEASURING SUCCESS

This Strategy is committed to the principle of transparency. Putting in place a robust mechanism for measuring success will support and demonstrate this principle. In addition, regular monitoring and reporting will support the principle of adaptability of the Strategy itself. An oversight mechanism will be established to demonstrate accountability for delivery of the Strategy across multiple organizations.

A reporting and evaluation framework consisting of three perspectives is proposed that will enable demonstration of:

1

Progress on Actions: assessing achievement of the actions directed at outcomes within the Strategy. Progress against actions can readily be measured on an annual cycle. As such, this type of reporting presents opportunities for adjustments or refinements to the actions as required.

2

Achievement toward Enabling Outcomes: reporting on the effectiveness of the Strategy in enabling advances and detecting the aggregate effect of a number of actions toward realizing the enabling outcomes for water research and innovation. Evaluation reporting requires a longer reporting cycle, such as every three years, to be most effective in assessing change toward the enabling system-level outcomes defined in the Strategy

3

Assessment of Effectiveness and Impact: evaluating the overall effectiveness and impact of the Strategy in contributing to the outcomes of the water resource system in Alberta. This perspective of reporting has a longer time horizon, reflecting the understanding that it takes time to see change in the broader water resource system from knowledge generated and applied from today's investment.

Figure 3 presents the three perspectives / frames for reporting on the system outcomes of the Strategy using a logic model approach. Subsequent reporting and evaluation perspectives are informed by earlier reporting and evaluation results.

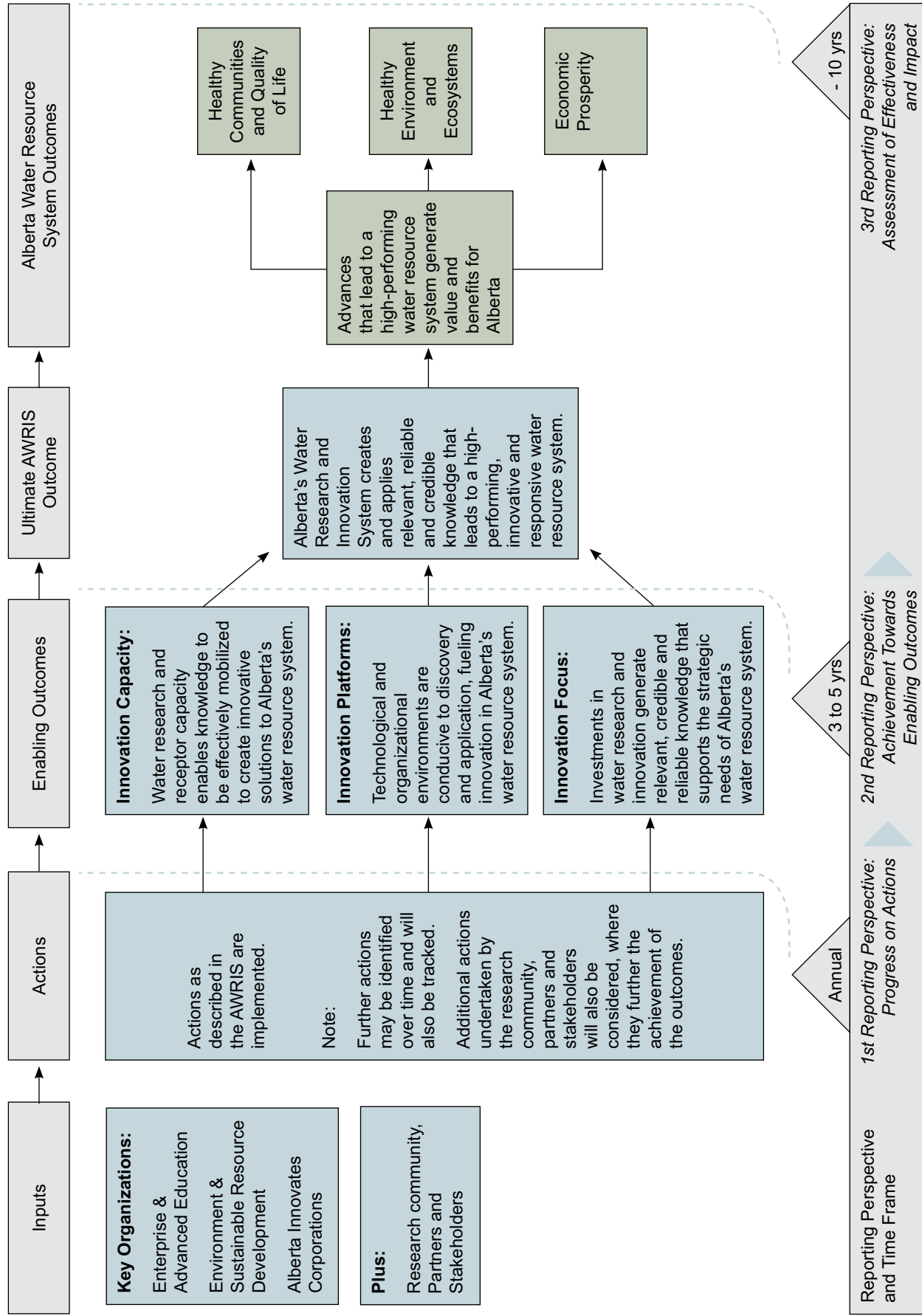


Figure 3 An evaluation framework for measuring progress and assessing impact of the Alberta Water Research and Innovation Strategy 2014: A Renewal. Results from previous reporting perspectives inform the subsequent reporting perspective.

CREATING A SUSTAINABLE FUTURE

Water has always been key to Alberta's development. Decisions made about water will play a critical role in shaping Alberta's future. Resolving challenges related to water, its availability or scarcity, its quality, its impact on Alberta's economy, the needs of its citizens and the management of the environment, will be compelling factors for the future.



“It is safe to say that while Alberta's economy is fuelled by energy, it runs on water.”

In 2011, Alberta's GDP was \$295.3 billion and much of this production directly requires water. The most obvious water-related goods are energy (27.6 per cent of GDP), manufacturing (6.4 per cent, including forestry) and agriculture (1.8 per cent). Including business and commercial services (9.5 per cent), tourism and consumer services (4.7 per cent) and health (5.1 per cent), over half (55.1 per cent) of Alberta's GDP is water dependent.

As the province moves into the future, maintaining an effective water resource system to deliver good quality water for people, for the economy, and for the environment will be critical. Knowledge – the generation and effective application of it to meet known and emerging water resource challenges – will be key to Alberta's long-term success. Whether the challenge is related to improving access to high-quality water and wastewater treatment services for rural populations, or improving protection for the headwaters of Alberta's major river systems, or resolving water use and reuse issues facing

Alberta's economic sectors, new insights and technologies generated through a focused research and innovation agenda will be at the centre of Alberta's ability to respond.

Continued investment will guide the development of solutions to support economic development, protect the water system for Alberta's population needs and support the continued development of global market opportunities for Alberta companies.

The province's previous investments and leadership in water research and innovation has positioned it well for the future. Through continued investment, Alberta's water research and innovation system will create and apply relevant, reliable and credible knowledge that enables an innovative and responsible water/natural resource management system. This knowledge will support positive change in Alberta through innovative policy, innovative practices, innovative products and services, as well as increased population literacy. Specific actions undertaken through implementation of the Strategy will enable Alberta to be a leading jurisdiction in achieving key water-resource-system outcomes (healthy communities and quality of life, economic prosperity, healthy environment and ecosystems) through the range of activities that lead to:

- Secure water for people, nature and the economy in an Alberta that continues to grow;
- Good quality water to maintain critical environments and sensitive ecosystems in times of abundance and drought;
- Inclusive, comprehensive and collaborative watershed stewardship and ecosystem management that serve all stakeholders within a watershed;
- Improved conservation, efficiency and productivity of water use by industries and Albertans; and
- A broadening of the economic base through the development of Alberta companies introducing new water-related technologies.

In aggregate, *Alberta's Water Research and Innovation Strategy 2014: A Renewal* aligns Alberta's research and innovation system to support the province's system needs for water-related knowledge to achieve the goals identified in Water for Life: safe, secure drinking water; healthy aquatic systems; and reliable quality water supplies for a Sustainable Economy.



