Alberta Water Reuse Policy Development: Exploring Policy Development Options to Support Stormwater Use and Wastewater Reuse

ALBERTA waterSMART
Water Management Solutions

Presentation at the Alberta Water Council, Water Reuse Symposium

June 26th, 2014

Alberta WaterSMART

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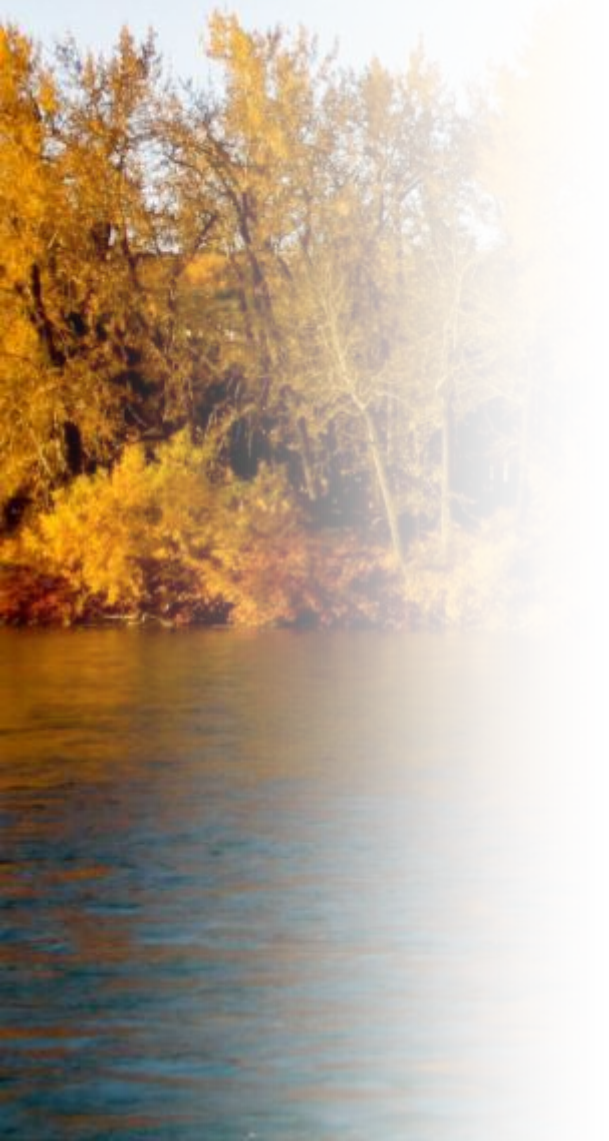
We are committed to improving water management through better technologies and practices, for the social, economic and environmental benefit of current and future Albertans, and then sharing these solutions with Canada and the world.

Website: **www.albertawatersmart.com**
Email: **info@albertawatersmart.com**

Outline



- Water is available through water reuse to support increased economic development. (Part 1).
- However, there are policy barriers that make it challenging to harness this water (Part 1).
- Therefore, changes to this policy are recommended and options are outlined herein (Part 2).

AI-EES Water Reuse Project Scope

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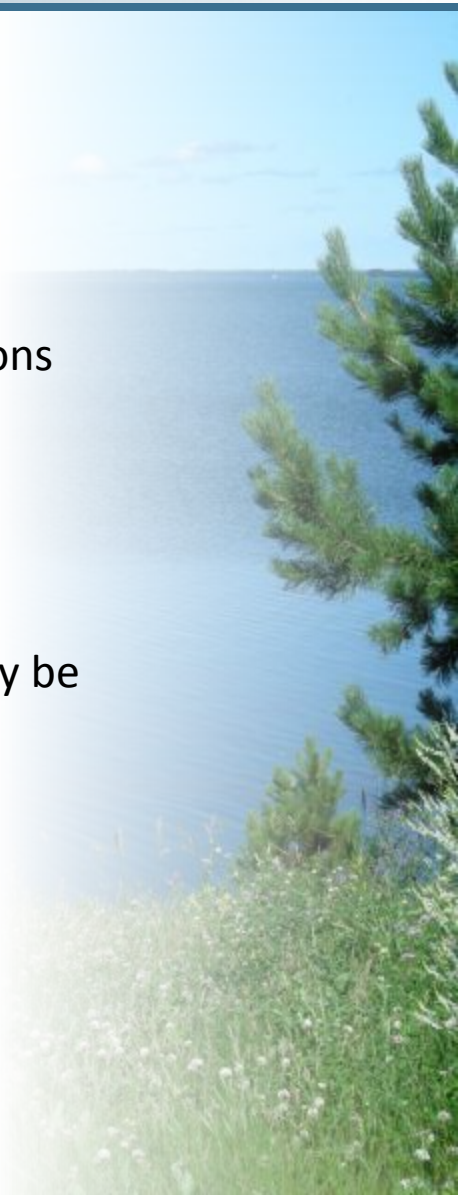
- Develop definitions for water and reuse.
- Determine water reuse and return flow linkage.
- Investigate three case studies to identify:
  - gaps in Alberta's regulatory framework and recommendations for updating it;
  - opportunities for flexibility in policy and regulation;
  - new technologies and recommendations on how standards should change; and
  - costs and benefits, and cost-allocation frameworks that may be used to inform decision making processes.
- Develop policy recommendations.
- Improve the management of reused water and storm water in the case study communities through reuse strategies and policies.



Project Methodology

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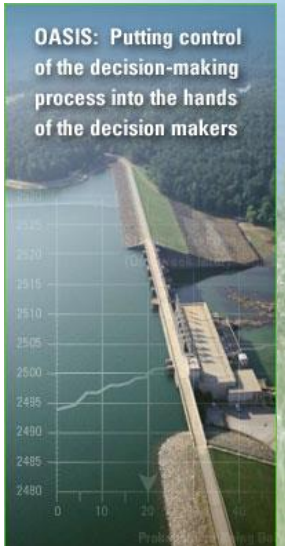
- Undertake research on water terminology and requirements pertaining to reuse.
- Conduct a global scan.
- Assess the potential.
- Illustrate potential impact with the Bow River Operational Model (BROM) and the Oldman South Saskatchewan Model (OSSK).

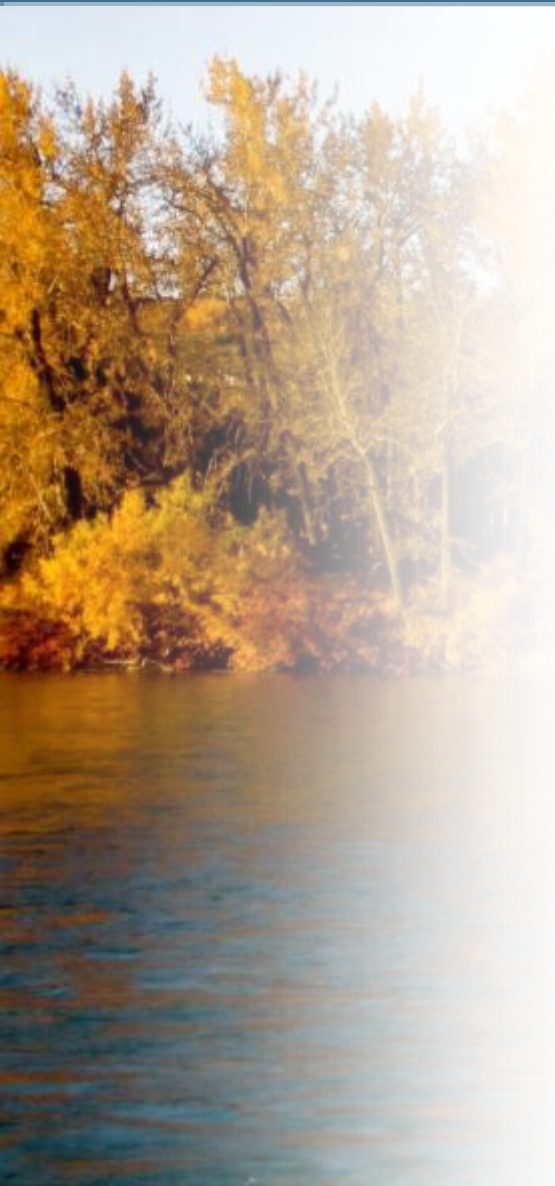
Government of Alberta
Environment

Provincial Water Quantity Coordinating Team (PWQCT)
Interim Accepted Practice
Authorizations Required under the *Water Act* for the Diversion of Storm Drainage

RMWEA / RMSAWWA
WATER REUSE COMMITTEE



Guiding Principles



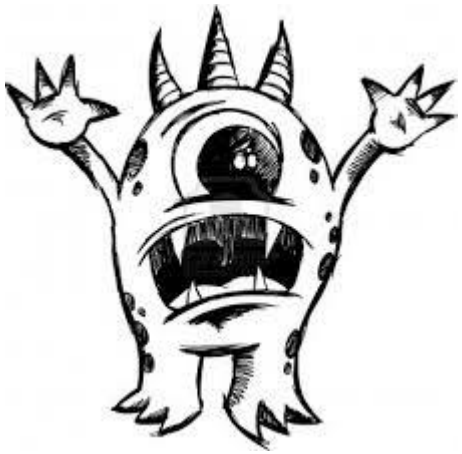
- Do no harm.
- Minimize environmental impact.
- Support beneficial reuse.
- Reuse for conservation and efficiency.
- Work within the *Water Act* and the *Environmental Protection and Enhancement Act* and other relevant legislation.
- Understand environmental baselines.
- Use cumulative effects management and implement with integrated resource management.
- Minimize re-licensing.
- Reduce Alberta Environment and Sustainable Resource Development (ESRD) and water user resource requirements.

Policy Options

- System Wide Options
- Policy
  - Right to Use: Clarify the right to use water
  - River Requirements: Clarify the impact of reuse on river requirements including Apportionment Agreements, Aquatic Health, and Downstream Users
- Regulation
  - Efficient Implementation: Implement a transparent licensing and approval process with integrated resource management

System Wide Barriers

- The linkage between reuse and return flow is not well understood.
- Misalignment or non-existence of definitions creates angst in the system.
- The current system does not address the potential for integrated and cumulative impacts related to water planning and decisions.



System Wide Policy Options

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- Establish scientifically determined aquatic health objectives
  - Seasonality.
  - Impacts to timing and location of diversions and discharges.
- Establish clear definitions
  - Source, purpose, use and type, end fate, consumptive and non-consumptive, stormwater, rainwater, greywater.
  - Communicate within GoA and to Albertans.
  - Return flow:

AUMA

CAPP
CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

Bow River Basin Council

Reduce Reuse Recycle

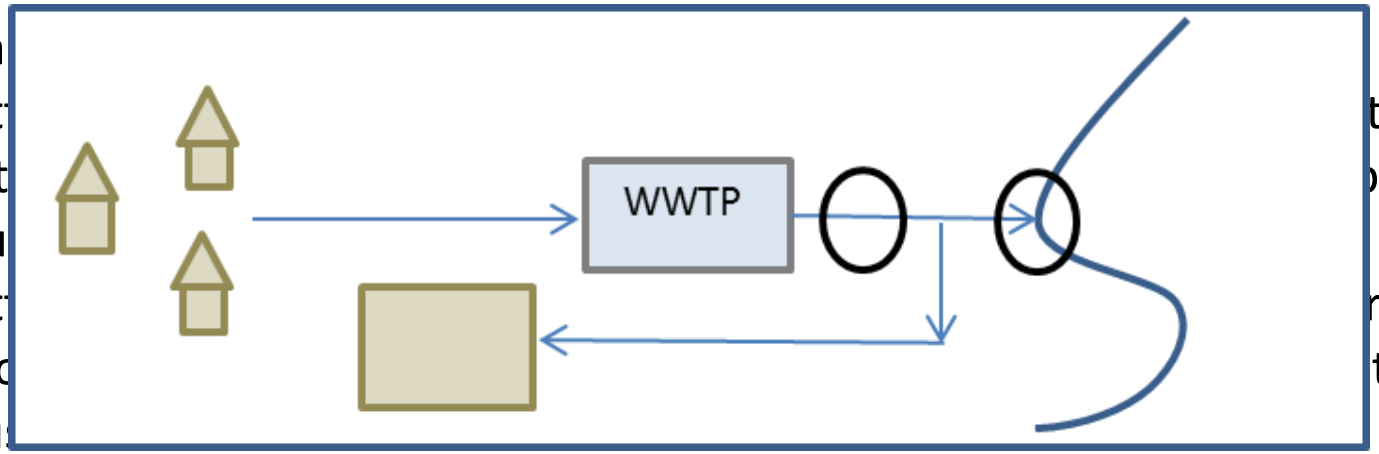
Alberta Irrigation Projects Association

System Wide Policy Options

- Establish and communicate the concept of environmental net effects; consider all environmental impacts, including air, land and water impacts.

Sources: http://www.mercurynews.com/portlet/article/html/render_gallery.jsp?articleId=24226908&siteId=568&startImage=1; http://jhlcivil.com.au/qenos-recycled-water-pipeline/

Right to Use Barriers



- There a … once.
- No writt … turn flow aft … pose (i.e. mu …
- No writt … r timing c … ts initial u…
- The right to use stormwater and rainwater is unclear.
- The *Water Act* indicates that a diversion license is not required if the sole purpose is for "drainage", or if continued drainage of water results in "no impact" to existing household users, traditional agriculture users, or licensees. However, no written public policy indicates what constitutes drainage, or how the conditions of meeting "no impact" are satisfied.

Right to Use Policy Options

- Implement a policy that formally recognizes reuse as a management option.

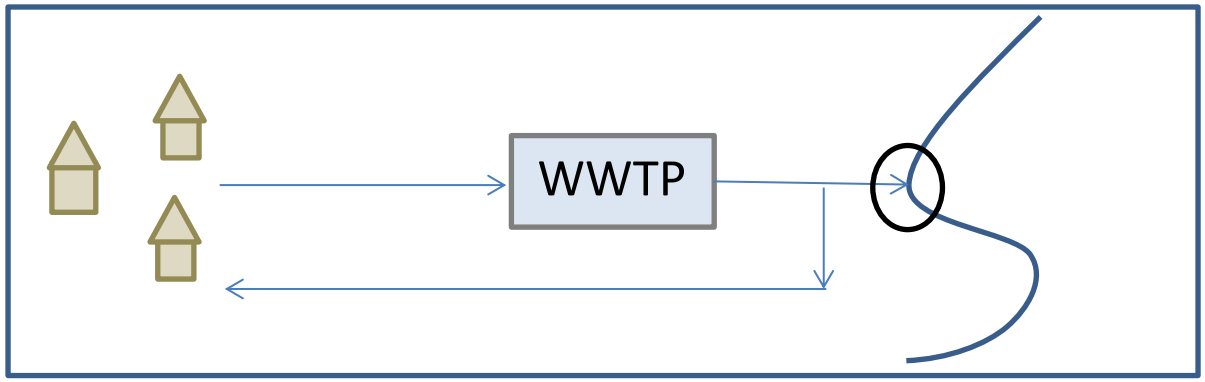
- Standardize licences:
  - Return flow
  - End fate
  - Water source

- Existing licenses would only be reviewed during a renewal period.

Return Flow: *Water that has been diverted under the terms of the Water Act licence for a specific purpose but does not get consumed in the process and is returned to the environment (Water Conservation and Allocation Policy for Oilfield Injection (GoA, 2006)).*

Right to Use Policy Options

- Adopt the concept that location or timing of right to use water remains with the license holder until the licensed purpose has been spent or when it reaches the final “end fate” receiving environment, (i.e. the river).



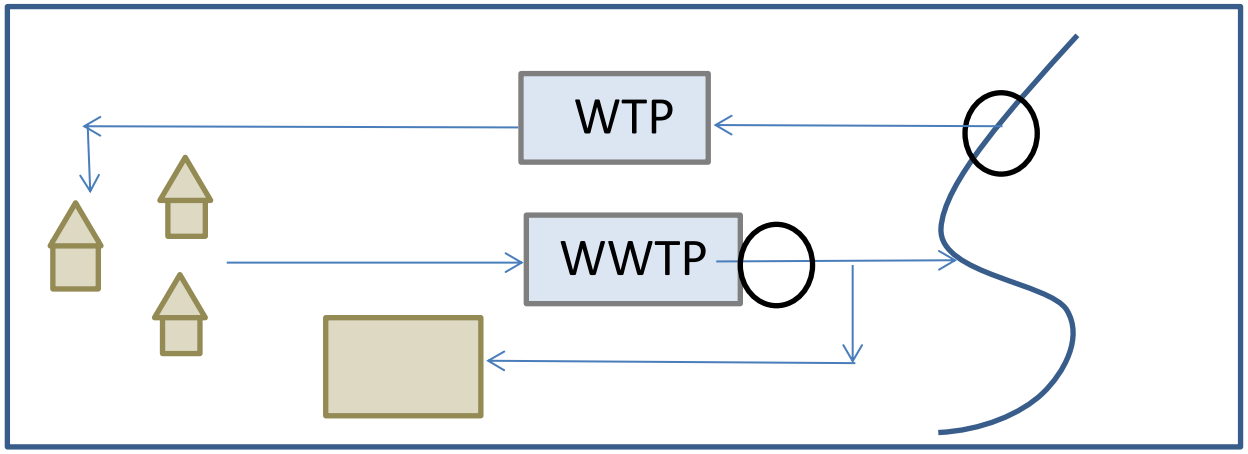
- Adopt a definition for end fate.

End Fate: *The final discharge receiving water body or water cycle component where the right to use the license is returned to the Crown (i.e. atmosphere, lake, Athabasca River, tributary of the Athabasca river).*

Right to Use Policy Options

- There is no cabinet approved policy definition for **source water or water source.**
  - Is a water source only a natural water body?
  - Or the manufactured water body?
  - Is runoff a source? Or stormwater?

- Natural source for existing licenses.
- Option for manufactured source in a new license.



Right to Use Policy Options

Consider adopting a definition for all purposes which are identified on licenses.

Municipal water use: *Purposes usually served by water within a city, town, or village, including but not limited to household and sanitary purposes, watering of lawns and gardens, and fire protection.*

City of Calgary Bonnybrook WWTP supplies effluent
(Photo from Associated Engineering newsletter, ISSUE #3 2013)

Shepard Energy Center
https://www.enmax.com/generation-wires/generation/natural-gas-powered/shepard-energy-centre

Right to Use Policy Options

Consider reuse of return flow from an existing license as part of the original diversion for which the license holder was granted the license.

License Status	Change	Action
Existing license	Purpose	Amend license, identify third party
	Boundaries or system works	Amend license, identify third party
New License		Indicate all purposes, third party, and how water is provided to party through works

Right to Use Policy Options

For example, where a municipality applies for a license, or amends the license, such that part of their return flow may be used by an industrial sector:

Source: Bow River
Purpose:

- *Municipal (40,000 m3/day)*
- *Industrial Injection (Company X) (5,000 m3/day)*

Total municipal effluent generated (11,000 m3/day)
Return Flow (6,000 m3/day)
End Fate: Bow River (X m3/day); deep well (X m3/day)

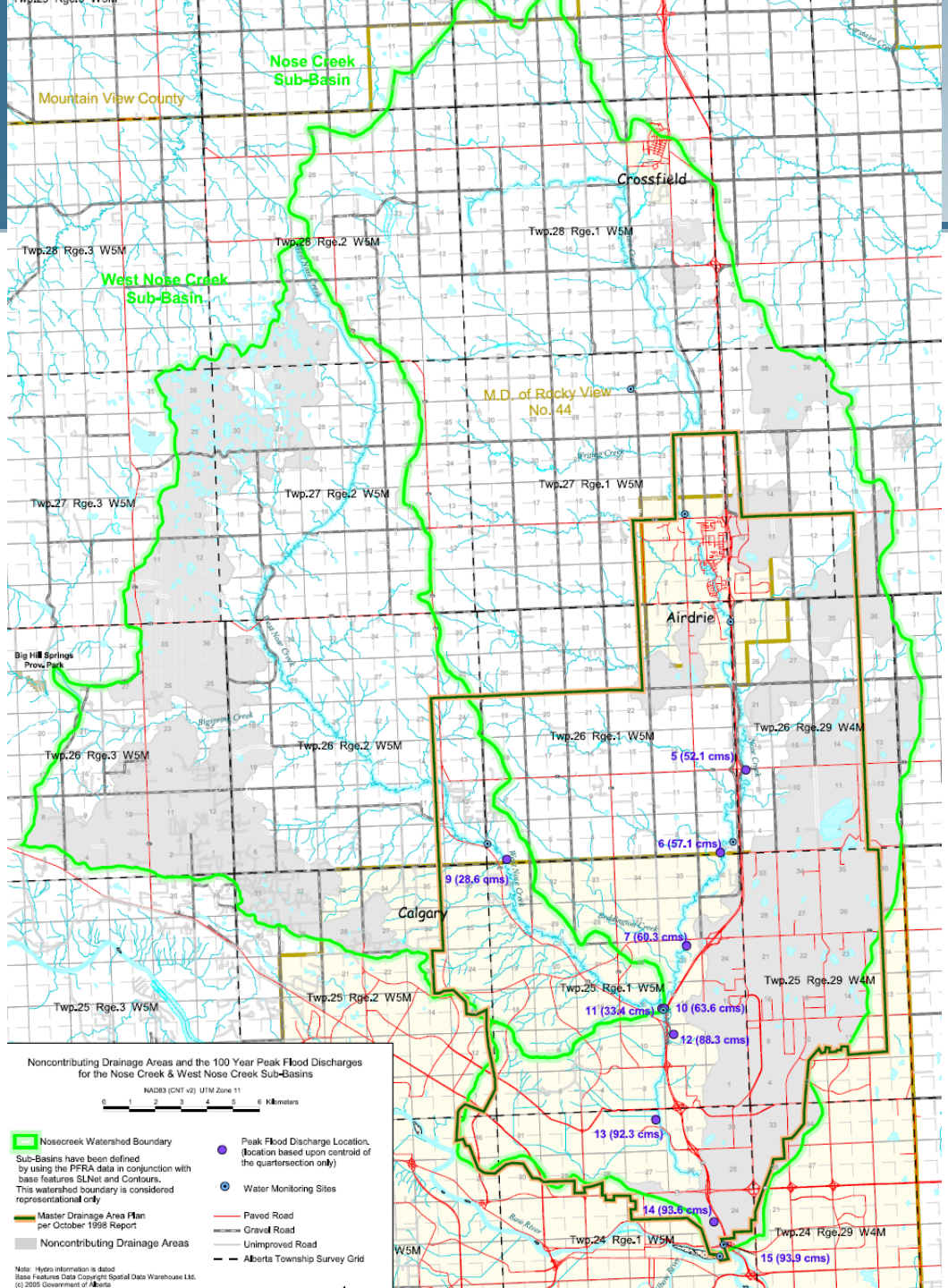
Right to Use Policy Options – Environment

- Adopt the concept that licence holders are entitled to use a portion of water that would, under natural or licensed conditions, flow into a river, for an initial (in the case of stormwater), second, or multiple use if it can be shown there is **no negative impact to river requirements**.

- Projects must be considered on a case by case basis. Benefits should be weighed against reductions and changes in timing of return flow, and resulting impacts on river requirements.

- Matters and factors to evaluate net environment impact should include:

  - Original source, original end fate, volume consumed, quality returned, timing of return, impact on river water quality.



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Colorado

Water reuse is only approved on the portion of the water right that is **considered fully consumptive**.

Historical return flows on in-basin water supplies must be maintained in timing, quantity and rate of flow. Water for reuse is no exception.

Return flows from non-tributary **groundwater (NTGW) and trans-basin surface water sources** are usually reusable.

All harvest and capture of it is illegal including rooftop harvesting. Stormwater is presumed to contribute to in stream flow needs.

Right to Use Policy Options – Environment

Matters and Factors	Guidelines
Existing, potential and cumulative effects on the aquatic environment.	No significant adverse effect on the aquatic environment.
Existing, potential and cumulative effects on any applicable instream objective and/or WCO	No significant adverse effect on existing instream objectives and/or Water Conservation Objectives.
Net Diversion	Quality and timing of return flow should be benign or beneficial for environment.

Right to Use Policy Options – Management and Tracking

- Allow the management of water and wastewater within a license holder's boundaries by the licence holder. Leave the responsibility of tracking of effluent volumes used and returned, and quality of returns, with the license holder as part of annual reporting.

    - Reduce municipal and AESRD resource requirements for every reuse or stormwater use project.
    - Through a Water Management Plan (Director Approved) or regional license – requirements for developing a WMP are available online.

Establish a process to document the volume of water used for reuse purposes.

Right to Use Policy Options – Management and Tracking

A water management plan can be developed by anyone. It can be a single issue such as a lake cleanup or involve multiple issues in a major river basin. However, any person developing a water management plan must follow the Framework for Water Management Planning.

http://environment.gov.ab.ca/info/library/6367.pdf

Right to Use Policy Options – Stormwater

Do not develop a definition for drainage, but develop a definition for stormwater within Director approved policies that may be implemented at a local scale.

- Stormwater Definition:
  clearly communicate different water types embedded within stormwater
  - naturally flowing
  - water created through impervious surfaces (available without license).

http://www.edmonton.ca/environmental/natural-areas.aspx

Right to Use Policy Options – Stormwater

- Measuring “no impact” to downstream users
- Consider the following conditions:
  - Discharge to environment is not allowed based on water quality regulations or guidelines and would otherwise require significant investment for treatment facilities;
  - Conveyance requires significant development of infrastructure, large/long disturbances of land; and, or
  - Infiltration rates of the stormwater collection facility are much lower as a result of the drainage than the pre-development infiltration rates.

http://www.mpe.ca/project_experience/projects.php?view=21

Right to Use Policy Options – Stormwater

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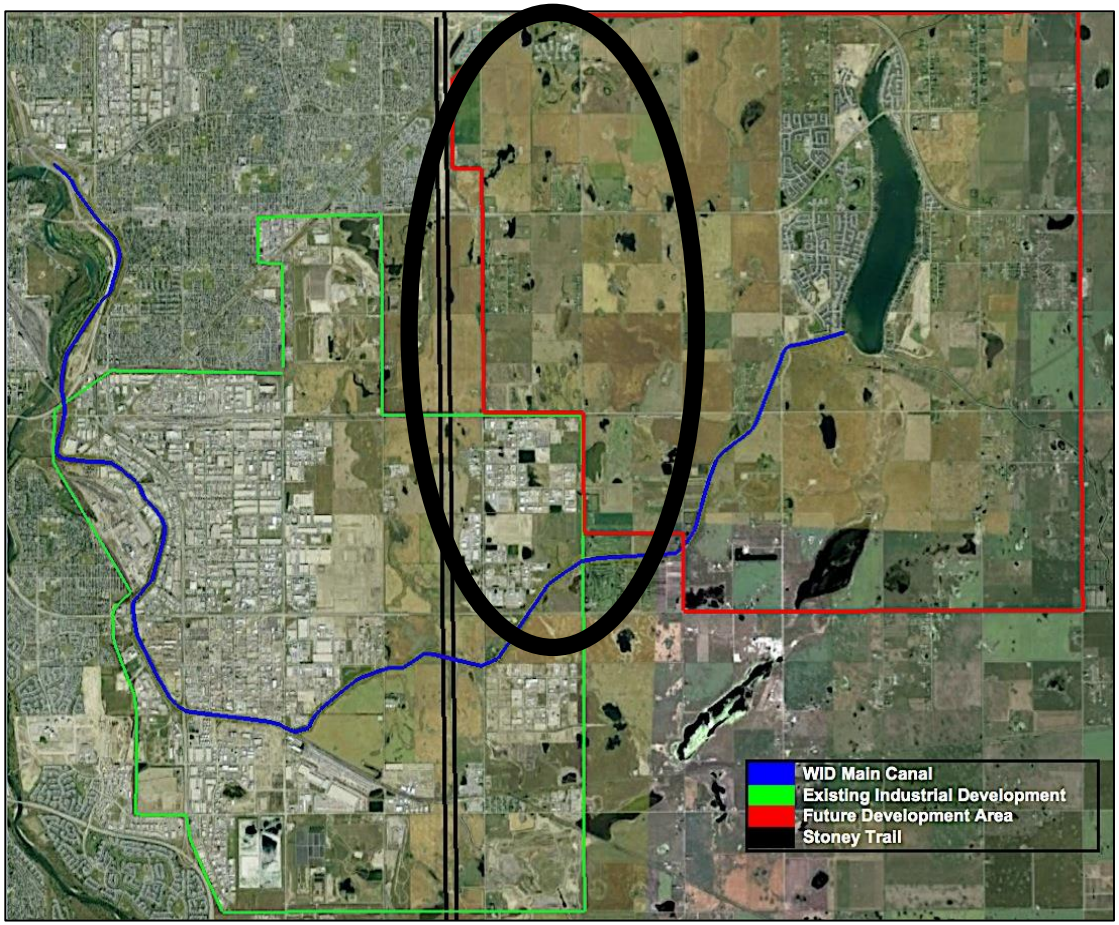
"Rocky View County (RVC) staff are working in the Dalroy area to deal with overland flooding of nearly 15 homes. Dalroy is located 28 km east of the City of Calgary and one km east of Highway 9. As of press time, the County's drainage infrastructure in the area was at capacity according to the County." April 14, 2014 Rocky View Weekly



River Requirements Barriers

- River requirements include apportionment agreements, aquatic health, and downstream users.

- The impact of changing inputs to the river systems due to various uses of surface water, stormwater, rainwater and groundwater is unclear.

River Requirements Policy Options

- Clarify if stormwater is required to meet aquatic health objectives.
- Clarify if water sourced from groundwater is required to meet river requirements, and what impact this has on licensing and approvals.

Picture from:
http://cenews.com/article/7946/epa_strengthens_npdes_program_to_protect_u.s._waters

River Requirements Policy Options

Jumping Pound Creek Integrated Watershed Management Plan

"(Sandi) Riemersma said use of groundwater could effectively double without affecting the creek, however, increased use would have to be managed in a way that does not further burden areas that are already considered high use or high risk."

(Rocky Mountain Outlook – Bighorn adopts creek watershed plan)

http://www.rmoutlook.com/article/20120419/RMO0801/304199988/bighorn-adopts-creek-watershed-plan

Increasing groundwater use allows for a potential doubling of the population (1,381 to 2,762) in addition to some growth in recreation, agriculture and oil and gas activity.

The significant contribution of groundwater (baseflow) to streamflow in the Jumpingpound Creek watershed is recognized and reflected in land use decisions.

River Requirements Policy Options

- Determine how aquifer recharge may benefit regional aquifer systems. Consider aquifer recharge as a water reuse activity in a water reuse policy.

- Support the use and development of tools to more effectively identify water reuse risks and opportunities (matching water quality to use, fit for purpose, water balance calculations, cumulative effects, connection of groundwater aquifers and surface water).

Implementation Barriers

- There is currently no licensing and approval process for water reuse projects.
- Current policy does not support integrated water management through reuse.
- Definitions within existing policy and among stakeholders are unclear and do not allow for implementation of effective reuse policy.

Implementation Policy Options

- A process for approving of water reuse projects, and management of return flows must be outlined, with end fate as a major consideration.
- Projects must be considered on a case by case basis.
- A policy and regulatory tool for approving different purposes of stormwater use must be identified (Authorization? Water Management Plan?).
- Require water reuse feasibility assessments for new diversion approvals to determine the net environmental impact of reuse versus diversion. Require significant license holders to identify potential reuse opportunities, especially those that are high water use and non-consumptive activities.

River Requirements Policy Options

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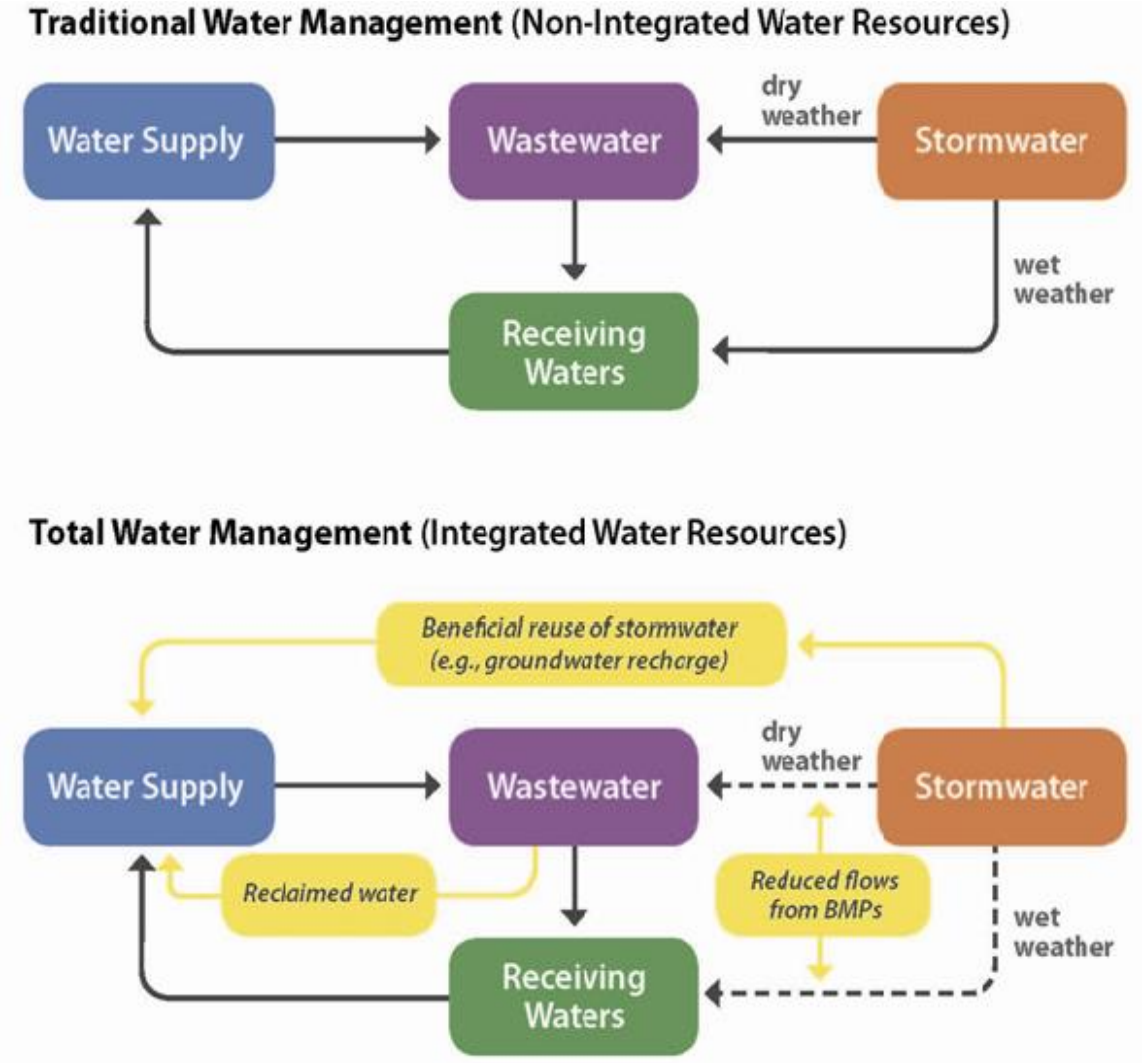

Traditional versus Integrated Water Management (adapted from O'Connor et al., 2010)

Summary

- Water is available to support increased economic development
  - The amount of return flow in Alberta is significant.
  - Some volume of return flows could be used without violating Apportionment Agreements.
  - Water reuse activities have the potential to improve the environment under numerous circumstances.
  - There are numerous wastewater treatment facilities not currently returning treated wastewater, or are returning on a seasonal basis.
  - Groundwater, stormwater and mine tailings water could be used where there is no net impact.

- However, there are policy barriers that make it challenging to harness this water.
  - Right to use
  - Meeting river requirements
  - Efficient Implementation

- Therefore, changes to this policy are recommended.

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