



Alberta

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# Nutrient Management and Water Quality: Striving for Practical Solutions

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**Barry Olson**

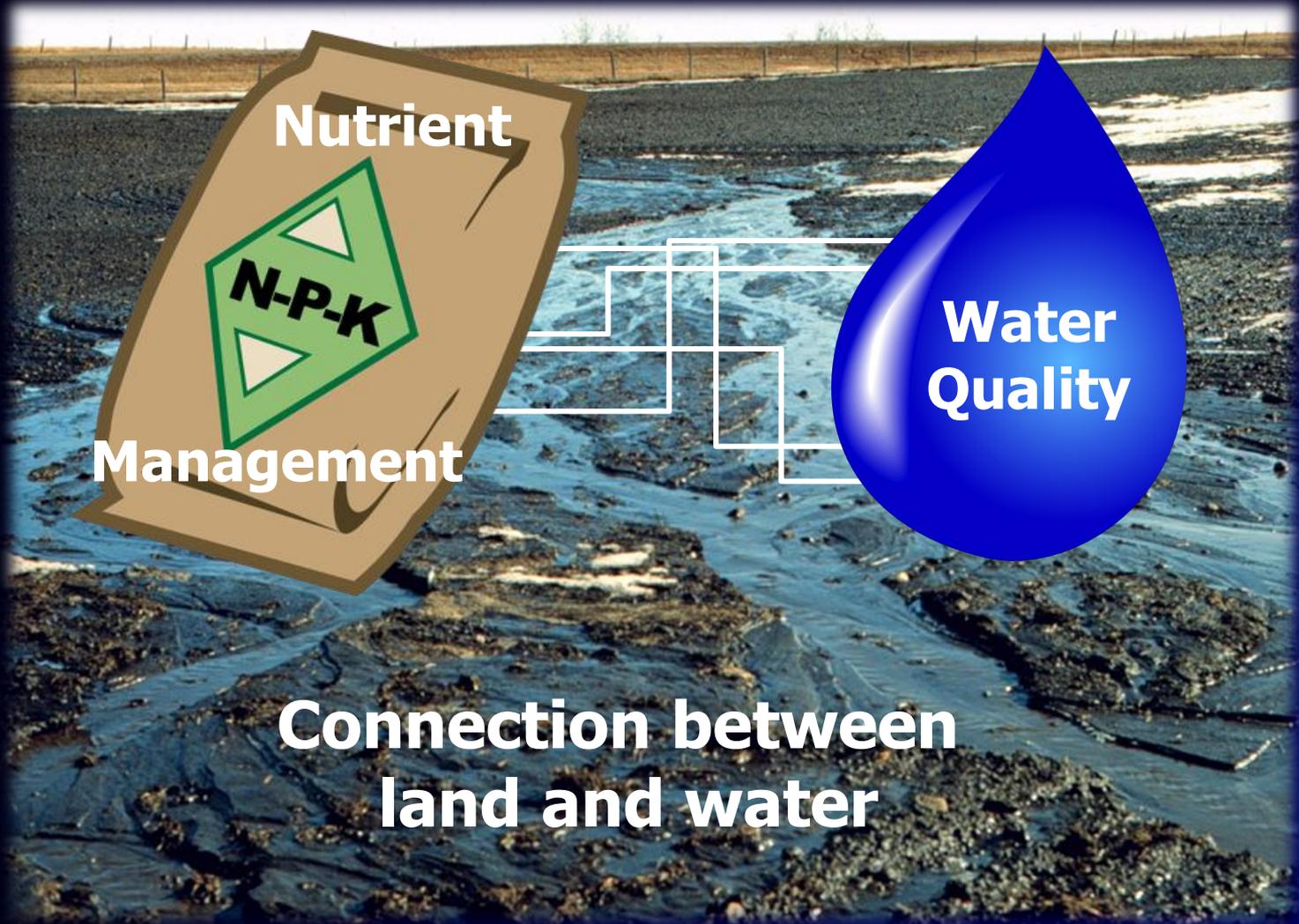
Water Quality Branch  
Irrigation and Farm Water Division  
Alberta Agriculture and Forestry

Getting the Most from  
Nutrient Management Workshop  
Lethbridge, Alberta  
February 23, 2017





# *What's the connection?*

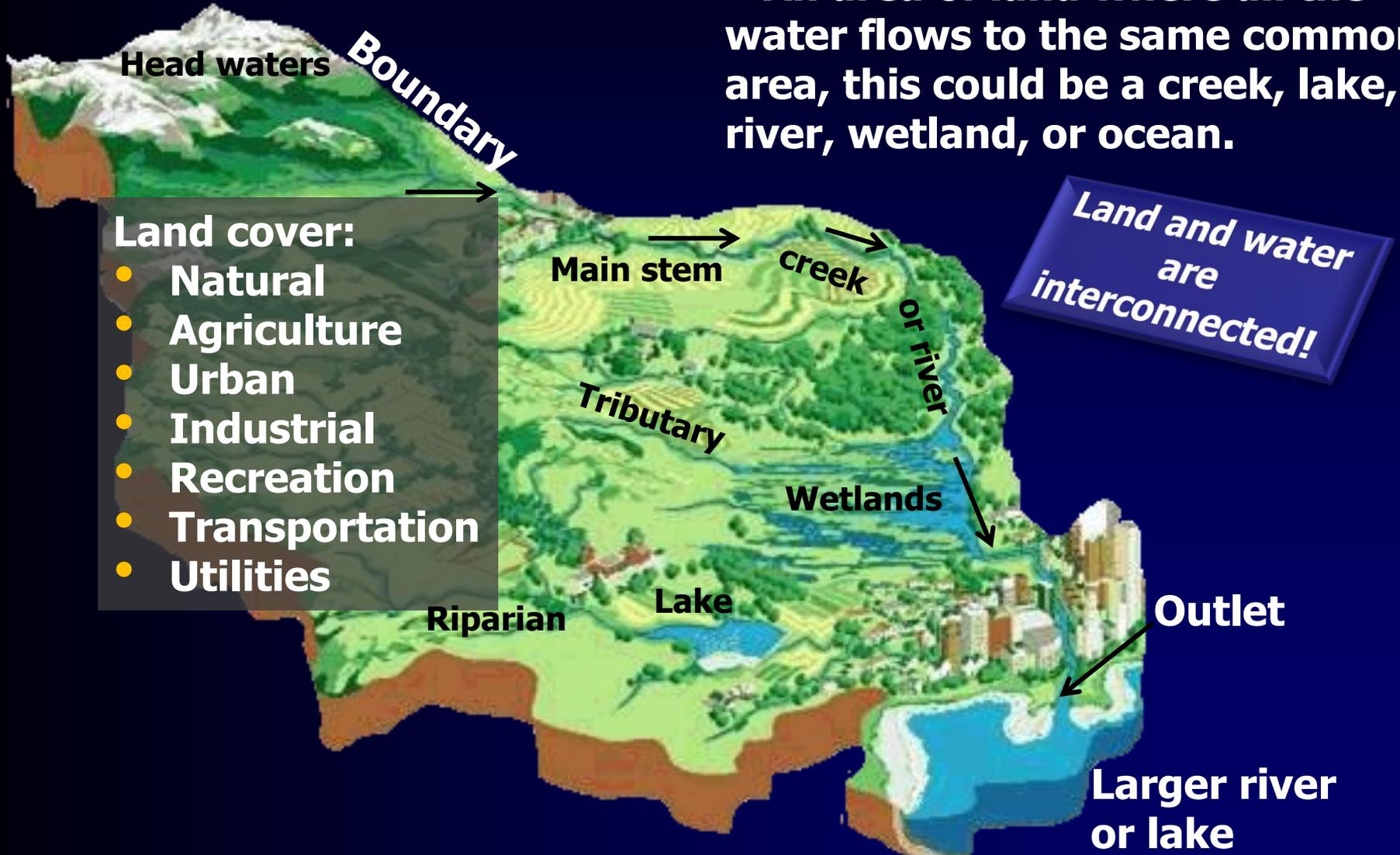


**Connection between  
land and water**



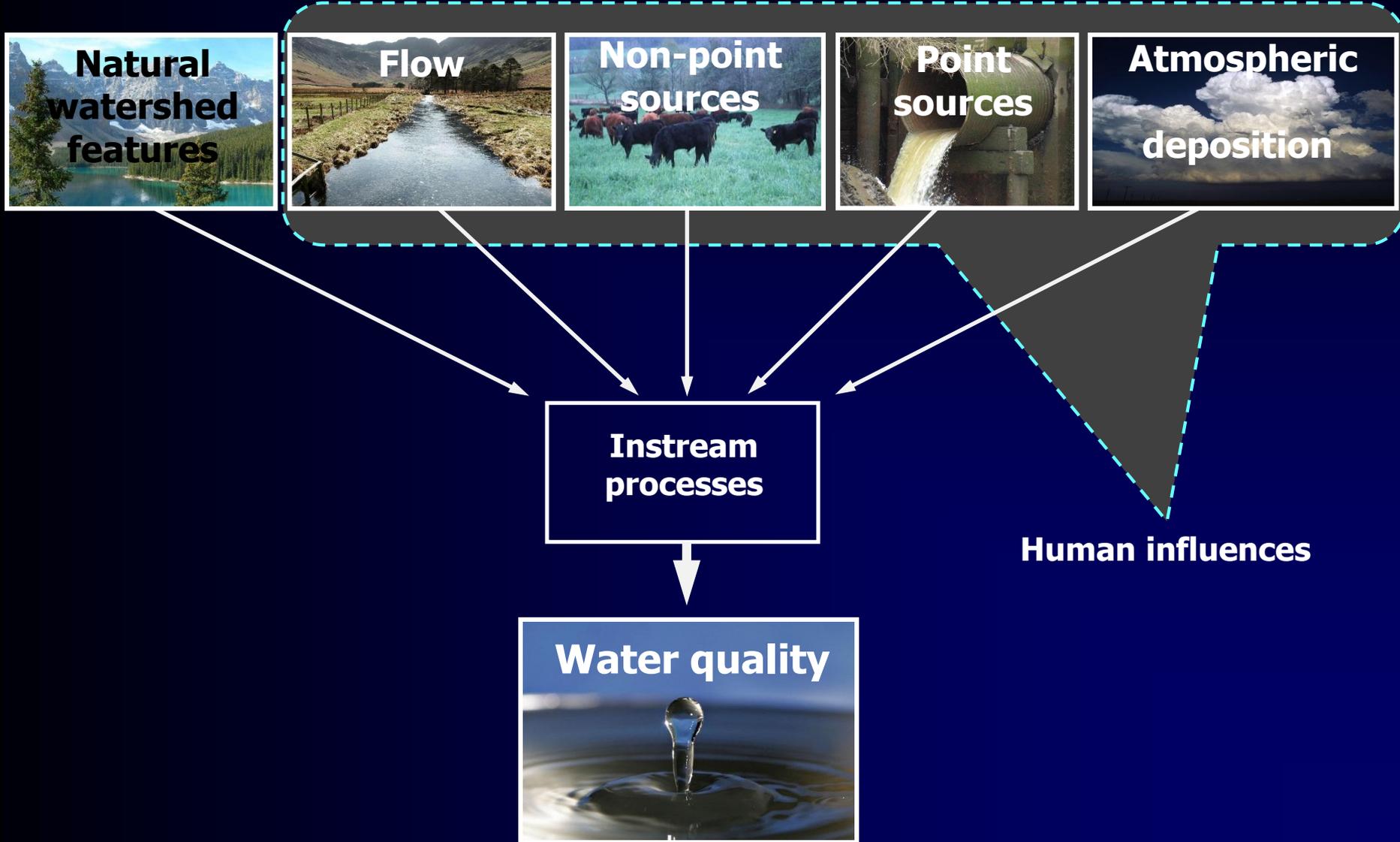
# ***Watershed***

– An area of land where all the water flows to the same common area, this could be a creek, lake, river, wetland, or ocean.



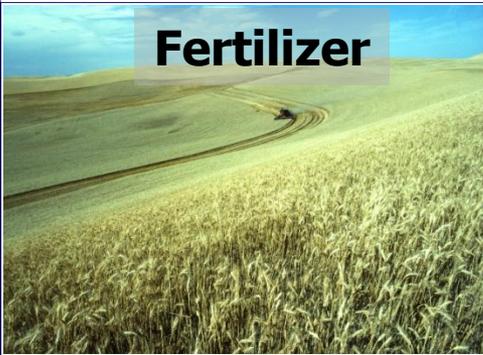


# *What determines water quality?*





# *Nutrient losses*



**Manure spreading**

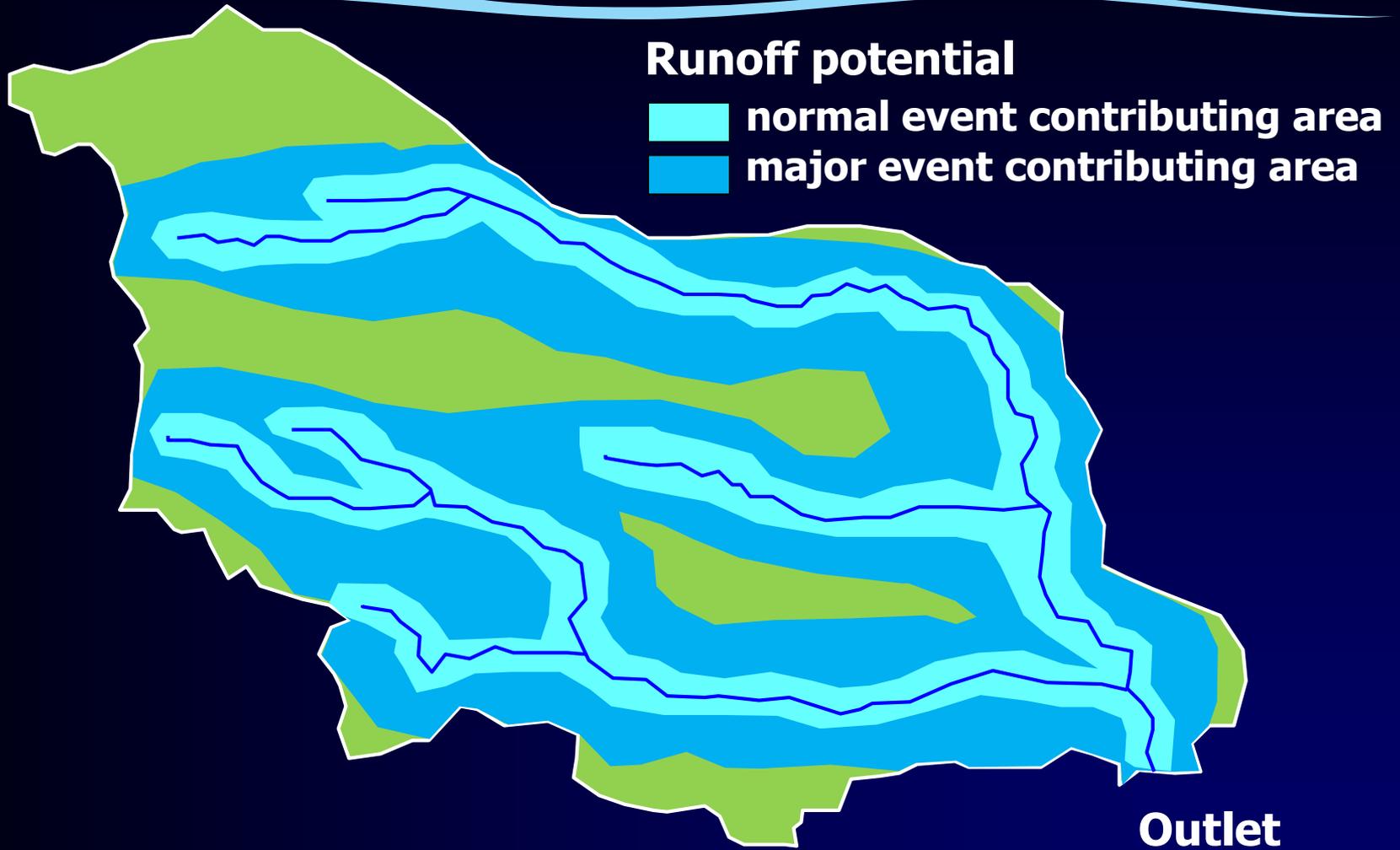
**Cattle wintering**

**Direct access**

**Fertilizer**



# ***Critical source areas***

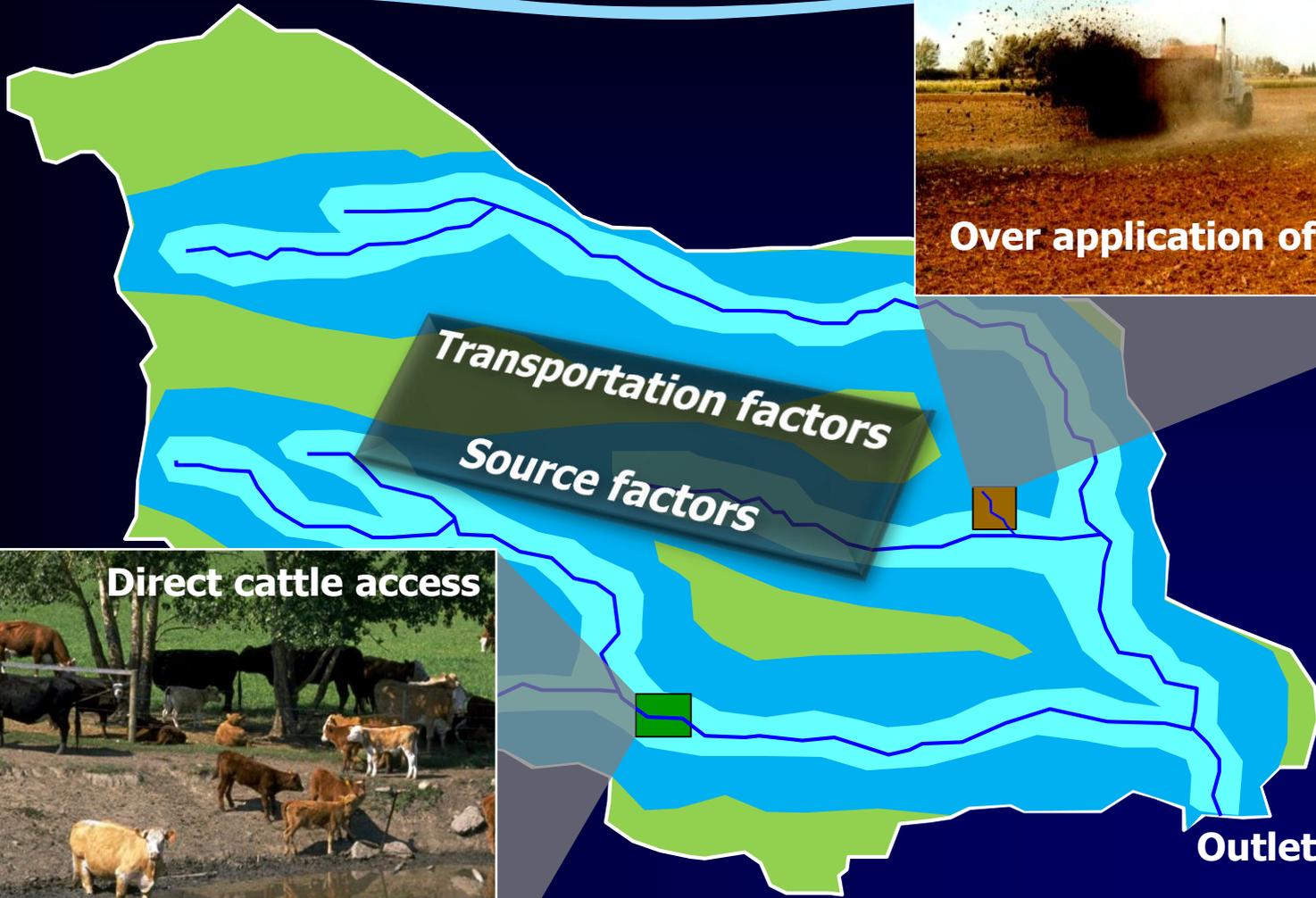




# Critical source areas



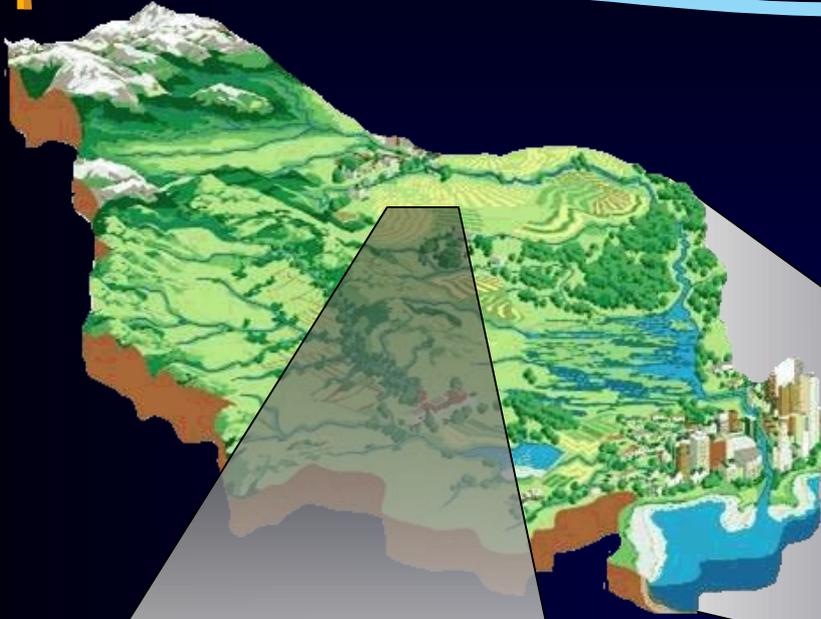
Over application of manure

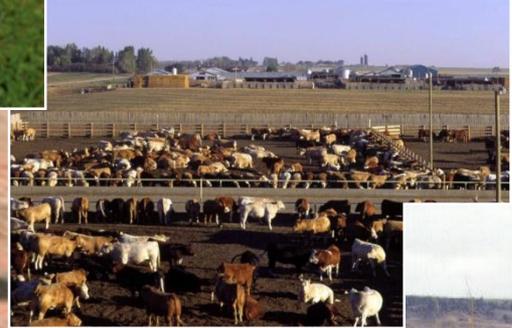
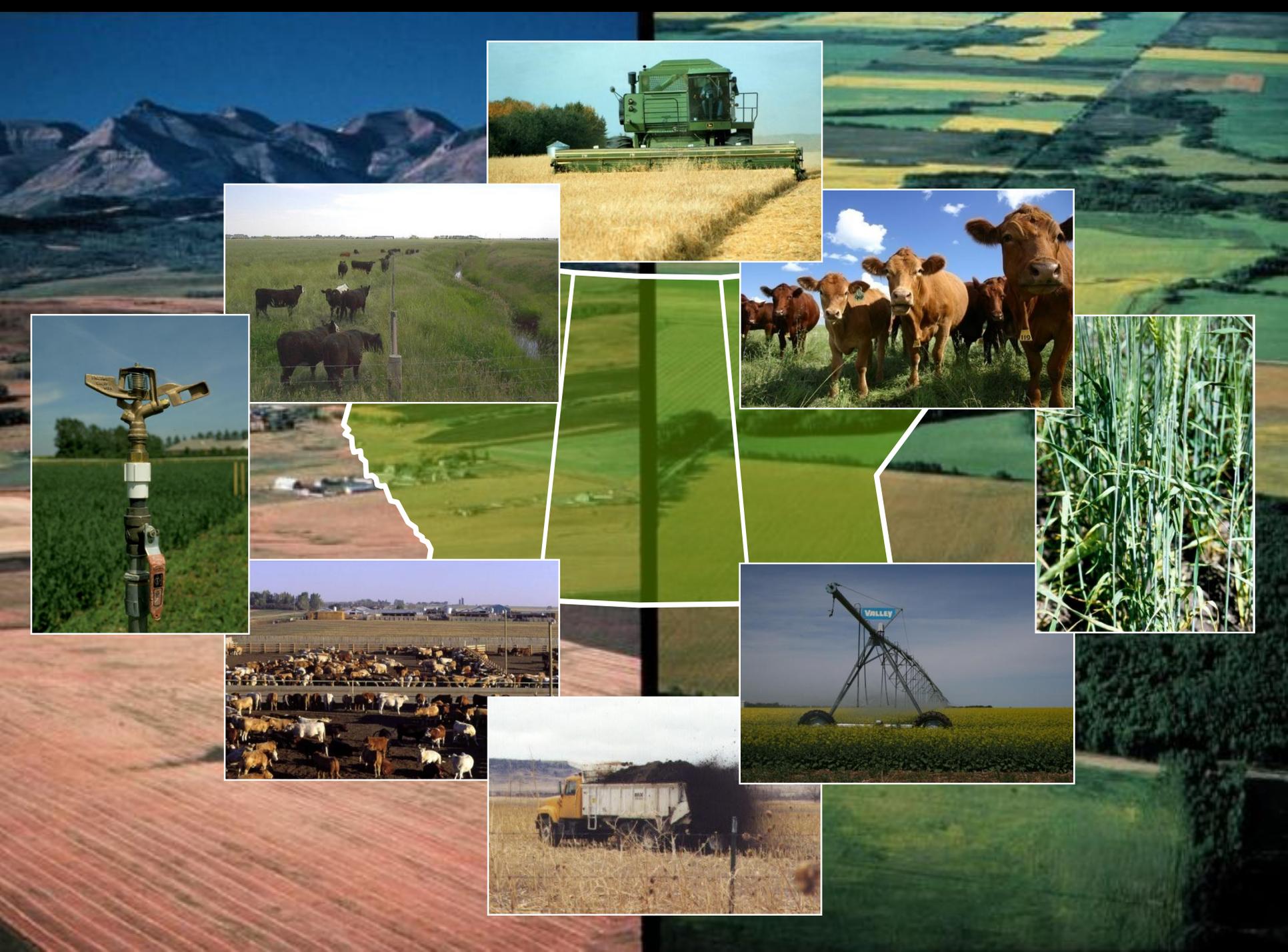


Direct cattle access



# *At what scale?*

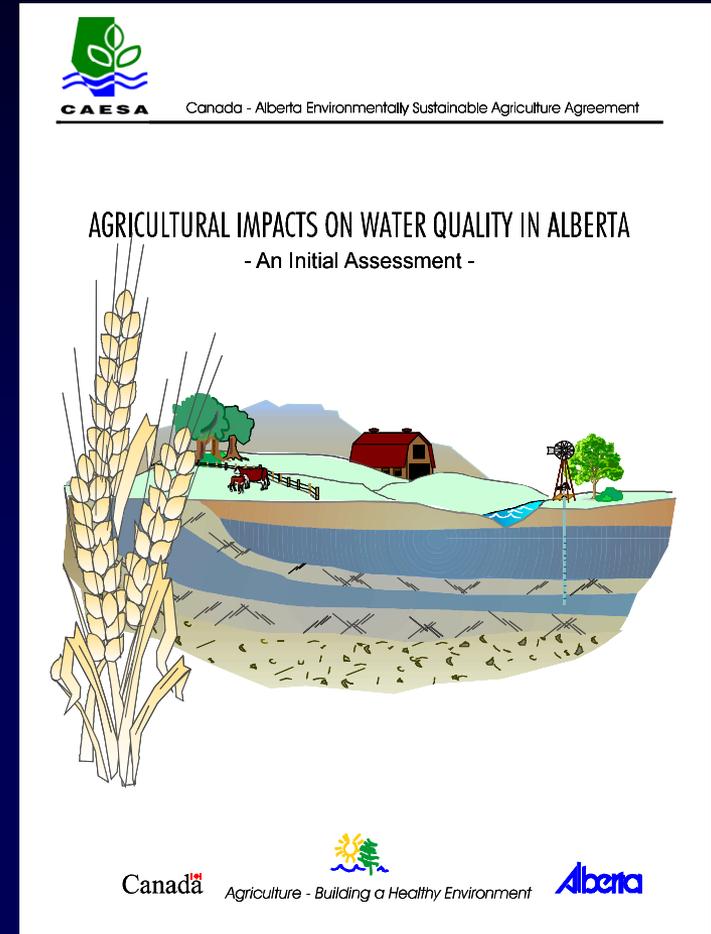






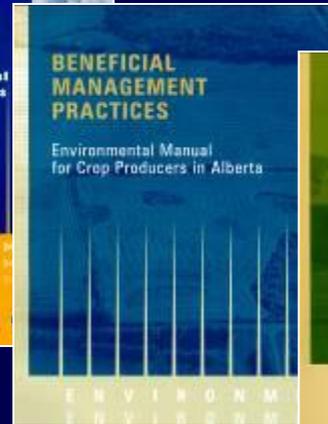
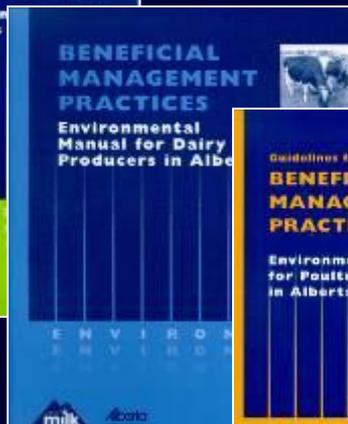
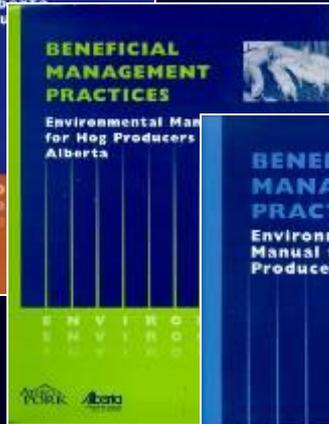
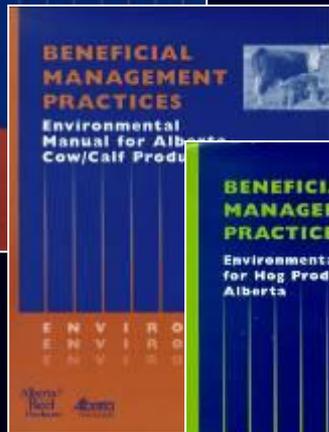
# *Agriculture impacts on water quality in Alberta: An initial assessment (1998)*

- CAESA five-year program 1992-1997.
- Agricultural practices **are contributing** to the degradation of water quality.





# Beneficial management practices (BMPs)





# Nutrient BMP Evaluation Project

**(2007-2012)**

Evaluate the environmental effectiveness and economic considerations of applying BMPs in two watersheds.

BMPs at the field scale **improved** water quality, but generally at an **economic cost.**





## ***Challenges to adopting BMPs***

- **Interest**
- **Available time and priorities**
- **Convenience/practical**
- **Experience and awareness**
- **Education**
- **Age/gender**
- **Cost/resources**
- **Community involvement (e.g., watershed groups)**
- **Legislation**
- **Incentive programs**





# ***Growing Forward 2: 2013-2018***

**Federal-provincial-territorial partnership with a mandate to drive an innovative, competitive, and profitable Canadian agriculture and agri-food sector.**

## **Environmental Stewardship Programs:**

- Confine Feeding Operation Stewardship**
- On-farm Stewardship**
- On-farm Water Management**
- Agricultural Watershed Enhancement**
- Irrigation Efficiency**



**Growing Forward 2**   
A federal-provincial-territorial initiative



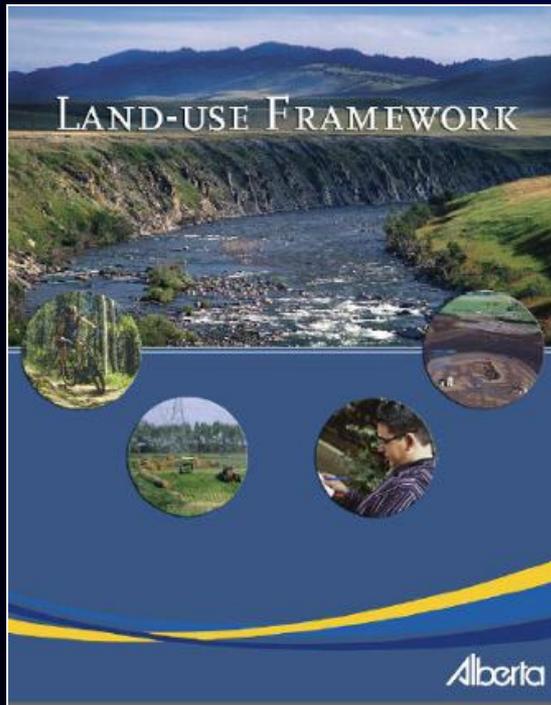
**Next**

**federal-provincial  
Agriculture Policy Framework  
(2018-2023)**



# *Alberta's Land Use Framework*

- **Cumulative effects approach.**
- **Legislated water quality objectives are being implemented.**
- **All industries and water users will be expected to comply.**





# ***Nutrient Objectives Project (2016-2019)***

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**In agricultural watersheds with BMPs, what are the 'target' in-stream nutrient concentrations we are trying to achieve?**

**How do we know when we have succeeded?**

## **Objectives:**

- **Establish a framework for setting achievable nutrient objectives in agriculturally-dominated watersheds.**
- **Relate nutrient 'objectives' to regional nutrient 'thresholds' and aquatic ecosystem health/services.**

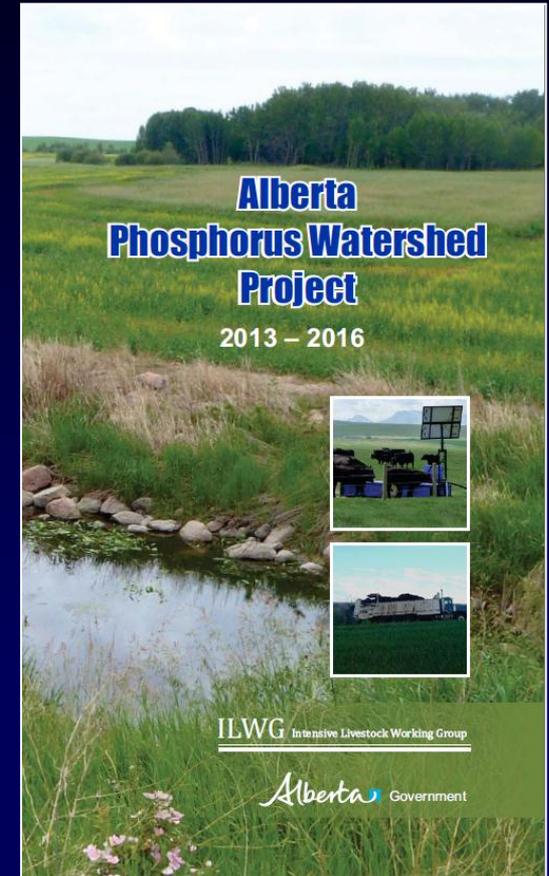
**Alberta Agriculture and Forestry  
Alberta Innovates  
University of Alberta  
University of Calgary**



# Alberta Phosphorus Watershed Project

## Purpose

- To assess whether water quality can be improved at a sub-watershed scale through the wide-spread adoption of BMPs by producers.



ILWG

Alberta  
Government

Red Deer County

Kneehill  
County

Mountain View  
COUNTY

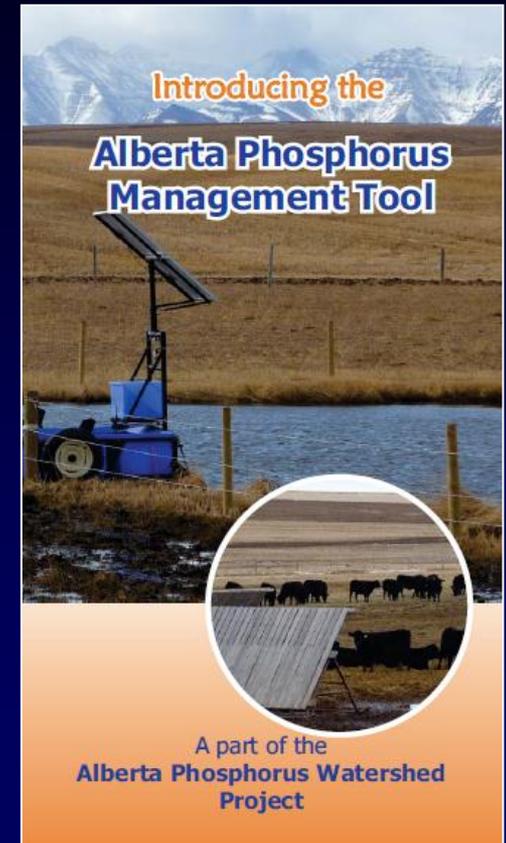


# Alberta Phosphorus Management Tool (APMT)

- Is a risk-based assessment tool, which focuses on **phosphorus loss** from farm operations and provides BMP options to mitigate risks.

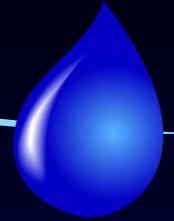
Series of questions: Yes/No or risk levels

Excel based





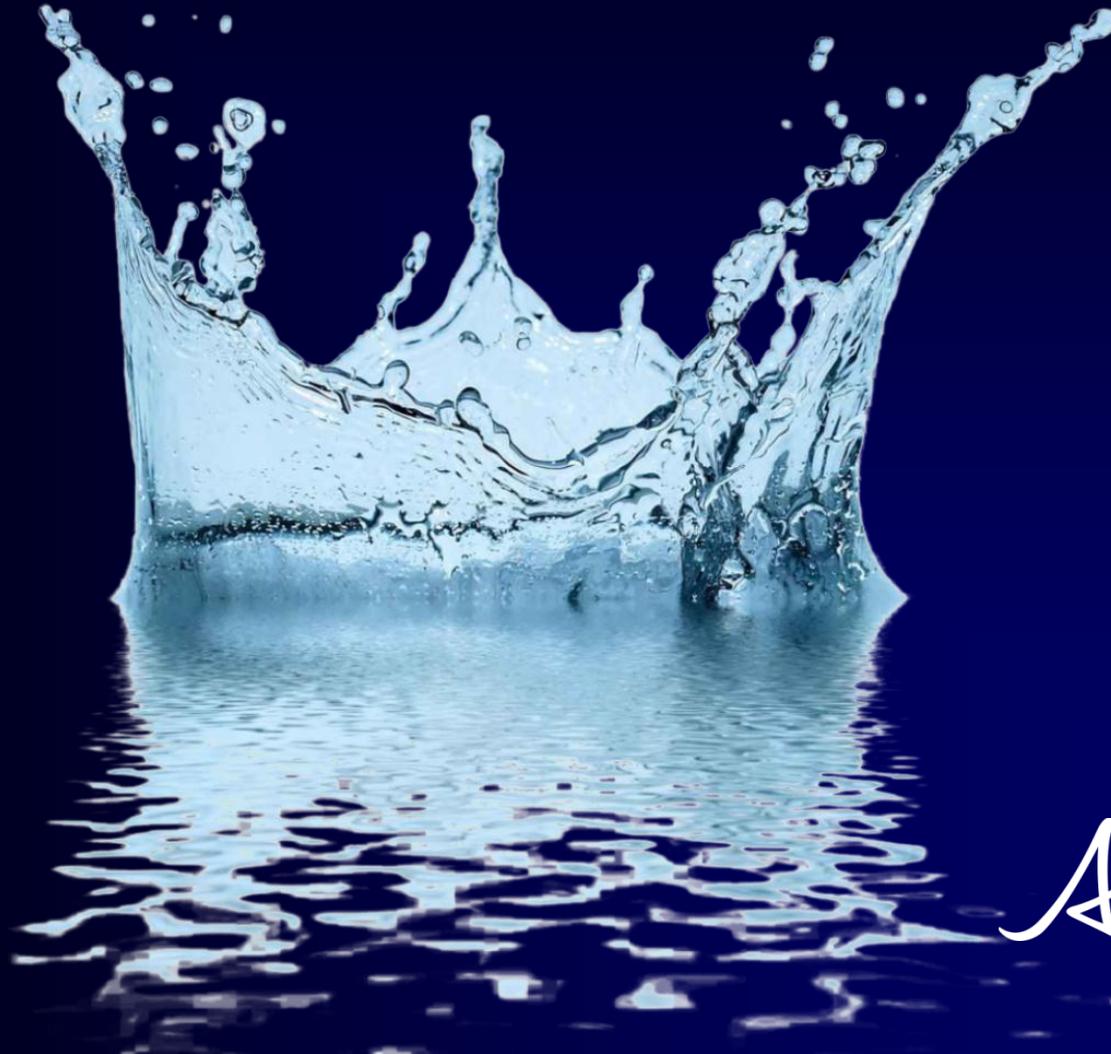
## *A few summary points*



- Agriculture can have negative effects on water quality (**nutrients**).
- The **4Rs** approach to nutrient management is a good start ... (crop focused)
- The management of **livestock** need to be part of the solution (manure management)
- Critical source areas (**transport and source factors**): surface water drainage and groundwater vulnerability
- Nutrient BMP **adoption** can be slow: education/awareness, incentive programs, other economic instruments, credit trading, etc.
- Practice change at the **farm/field** level

*Thank you*

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*Alberta* 