



Agriculture Water Management

Module 2 & 3 AG H₂O onward

What's It All About?
The Impact of Drainage Today

AgH2Onward

Module 2 & 3

What's It All About? - The Impacts of Drainage Today



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Module Outline

Recap: purpose of Agricultural Water Management Strategy is responsible drainage

- Considering extremes
- Water quantity
- Water quality
- Habitat quantity & quality
- How to consider wetlands

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A primary focus in Agricultural Water Management is to MITIGATE IMPACTS



SCIENCE

SCIENCE

SCIENCE

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Provincial Snapshot

- ▶ Fires
- ▶ Floods
- ▶ Unseeded crop losses & in unexpected locations
- ▶ Tornadoes & Hail
 - ▶ CCHA –“Hail activity in Saskatchewan is up over the five-year average. The same is true in Alberta.”

Southwest Saskatchewan communities trying to stay positive following wildfire

More wildfires in southwestern Saskatchewan, a few less have been confirmed than in a month of a single wildfire elsewhere and few communities have more than \$100,000 in insured with personal injuries.

THE CANADIAN PRESS/ALBERTA JOURNAL (Updated October 22, 2017)

Farm Credit Canada highlights three disruptors in 2020

The federal ag lender says climate change, protectionism and automation are the issues to watch this year

By Mark Stoforen Team

Published January 27, 2020

3 mins

Spring seeding progress ahead of schedule amid worsening drought

By Brian Cressy

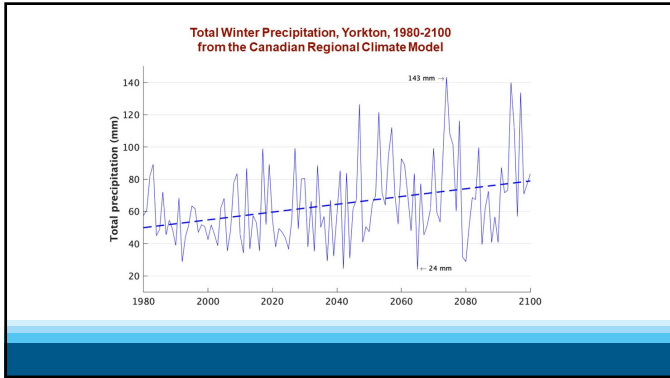
Published May 30, 2017

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Published: May 30, 2014

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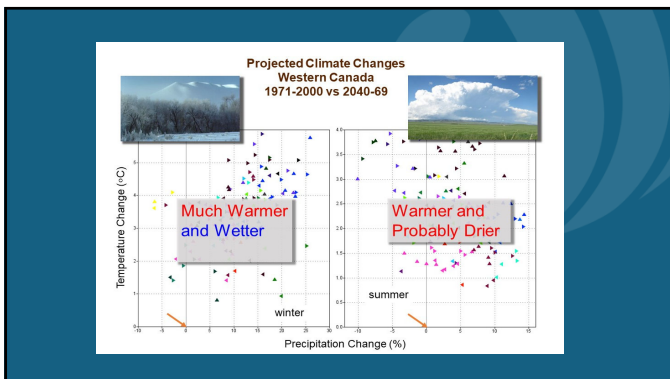
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UNDERSTANDING OUR CHANGING CLIMATE

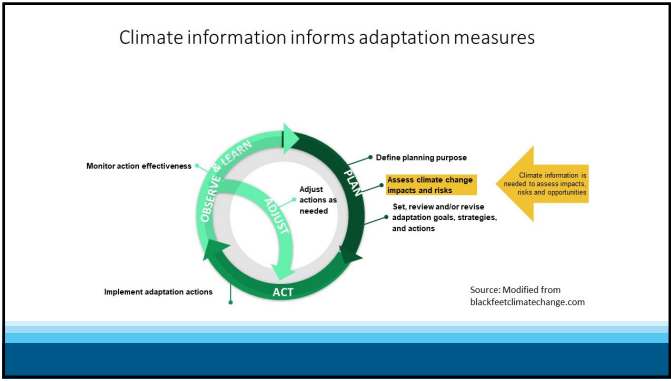
YouTube : Water Security Agency

A link to Understanding our Changing Climate video can be found in the Additional Resources section of Module 2&3

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- This is why we need improved, responsible drainage.
- BUT, on the flip side does that mean “more” will be going downstream and what are the impacts?
- We need to address this.
- Drainage can manage flooding, but also storage is needed to handle downstream impacts and help with managing droughts.



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Within the Agricultural Water Management Strategy:

Goal:
Responsible drainage while minimizing the Impacts on Water Quantity, Water Quality and Habitat while considering soil health.

Definitions:

- 1. Impacts**
 - ▶ Effects due to drainage that result in unreasonable harm or a reduction in the ability to use a resource such as land, water or infrastructure.
 - ▶ Total Volume
- 2. Risk**
 - ▶ Likelihood and consequence of an impact.
- 3. Mitigation**
 - ▶ Doing something to avoid, eliminate or reduce the impact.

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1) Water Quantity

- ▶ Impact = Flooding
- ▶ Flooding occurs when:
 - ▶ Capacity of downstream channel or waterbody is overwhelmed



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Two Components of Water Quantity Impact

- ▶ Peak Flow
- ▶ Total Volumes

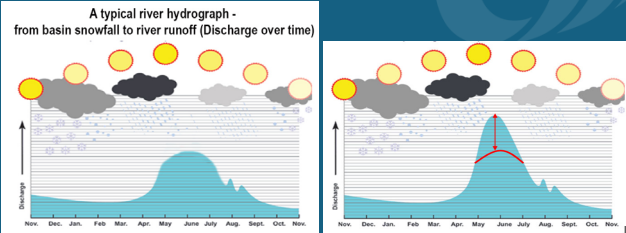


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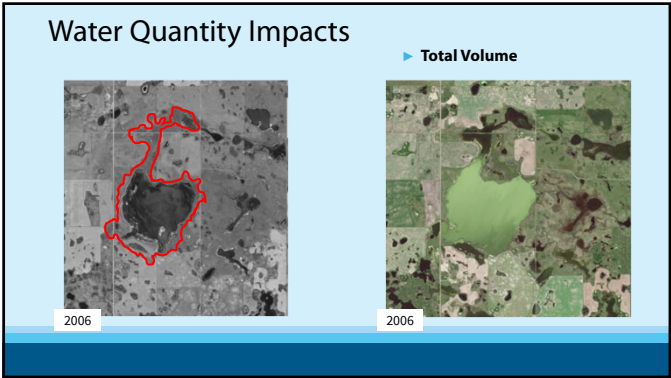
Water Quantity Impacts:

- ▶ Peak Flow – is the highest point on the hydrograph when the rate of discharge is greatest.

A typical river hydrograph - from basin snowfall to river runoff (Discharge over time)



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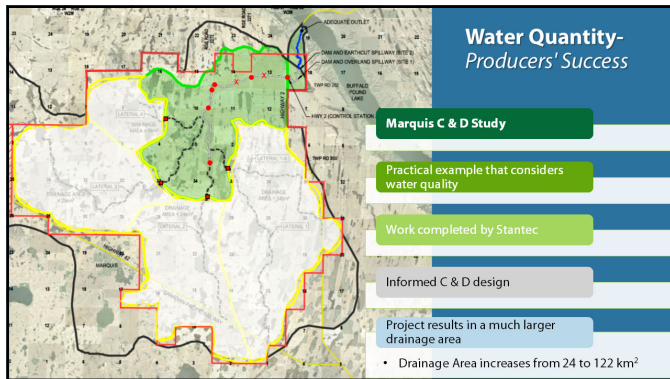
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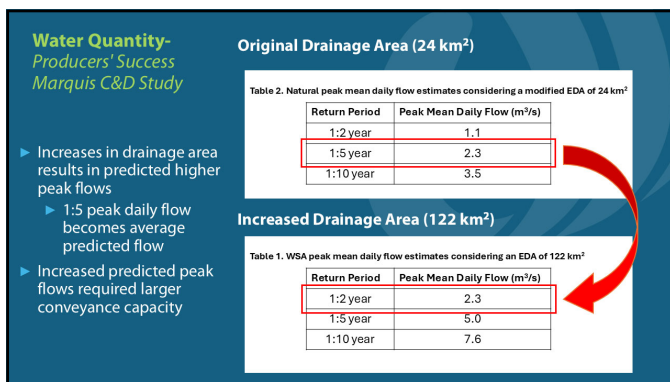
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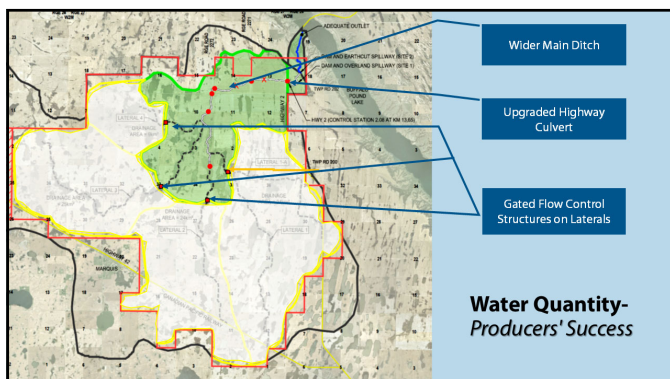
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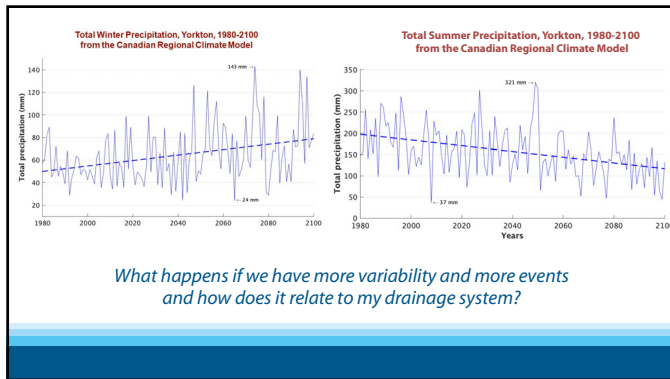
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2) Water Quality

- Impact = water has significant change or no longer suitable
- Significant change occurs when:
 - Something is carried by or dissolved in the water.
 - Depends on the concentration and load.

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Concentration

amount of 'contaminant' per unit water

e.g. **Erosion** = Contaminants/sediment added to water and suspended

Some contaminants can be dissolved and not visible to the plain eye

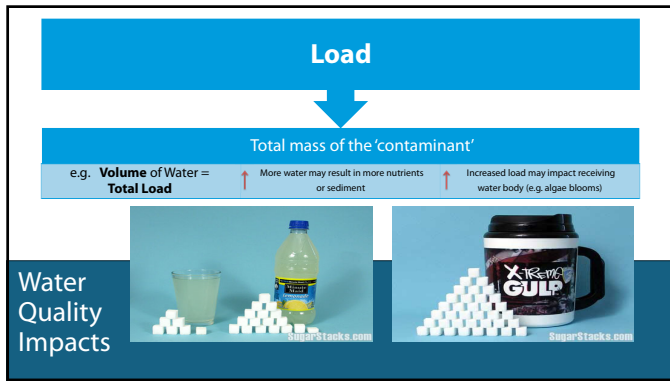
Diluted ← **Concentrated**

A little bit of salt **A lot of salt**

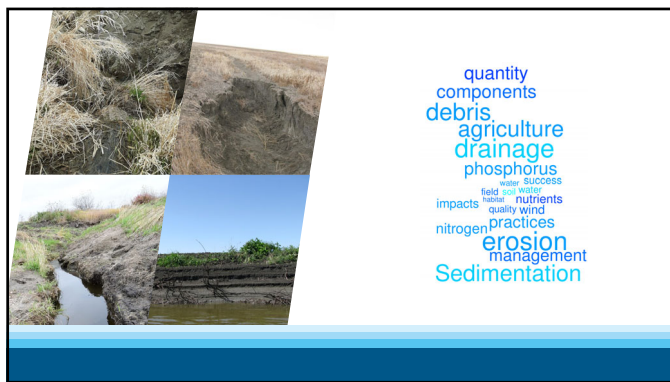
Diluted **Concentrated**

Water Quality Impacts

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NPK

How we look at nutrients has changed...

Agriculture practices have been a catalyst for change...

The main nutrient in relation to drainage HAS changed...

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Water Quality Impacts

Examples of when impacts may occur:

- ▶ water is not allowed to filter and settle before going downstream
- ▶ dissolved phosphorus present in water
- ▶ field nutrient management not balanced
- ▶ cumulative amounts of nutrients downstream
- ▶ water reaches terminal basin or an end point
- ▶ higher flows or increased velocities increase (erosion)
- ▶ the initial draining of a wetland



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How do we know that drainage can negatively impact water quality?

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Water Quality- Producer's Success



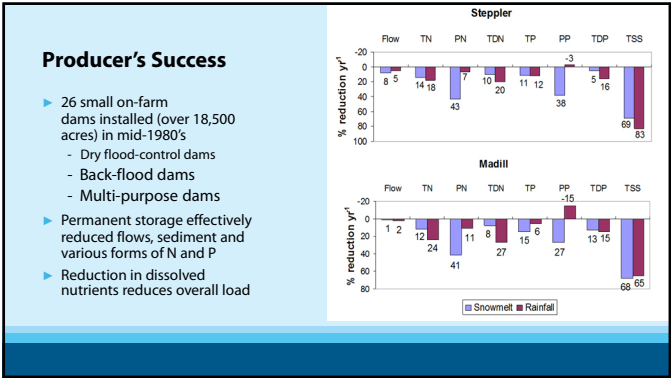

South Tobacco Creek

Location: Edge of the Manitoba Escarpment

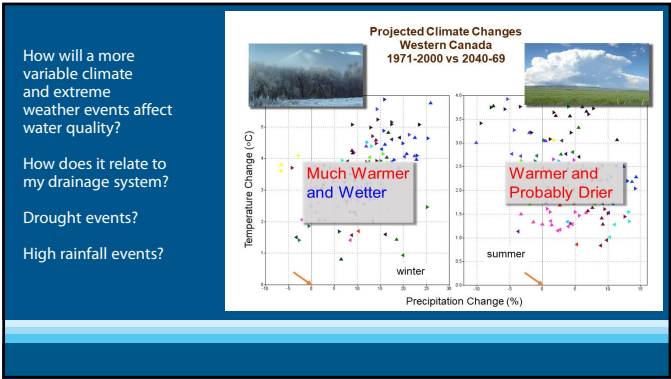
- the watershed drops 590 ft over 6 miles!

- ▶ Water would come off high ground fast
- ▶ Sediments and nutrients were being carried downstream, in addition to flooding

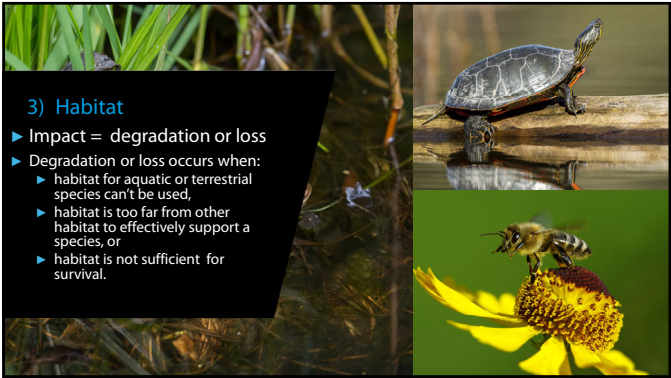
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Think of it as a change in
habitat quality **OR** change
in habitat quantity

Habitat Impacts

Examples of when impacts may occur:

- ▶ Converting wetlands to cropland
- ▶ Channelization of streams
- ▶ Alterations in hydrology or how the area functions

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- ▶ Channelization of streams
- ▶ Alterations in hydrology or how the area functions

[illegible]

Maintaining Habitat - Producers' Success



The collage consists of five images. The top left image shows a snowy field with tall, dry grasses. The top right image shows a map of a wetland area with various colored polygons (blue, green, red, yellow) and a yellow boundary line. The bottom left image shows a body of water with reeds and a white egret. The bottom center image shows a field of tall, dry grasses. The bottom right image shows a field of tall, dry grasses under a clear blue sky.

[illegible]



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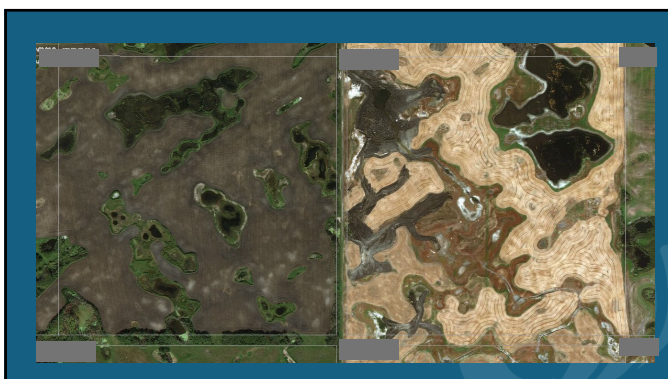
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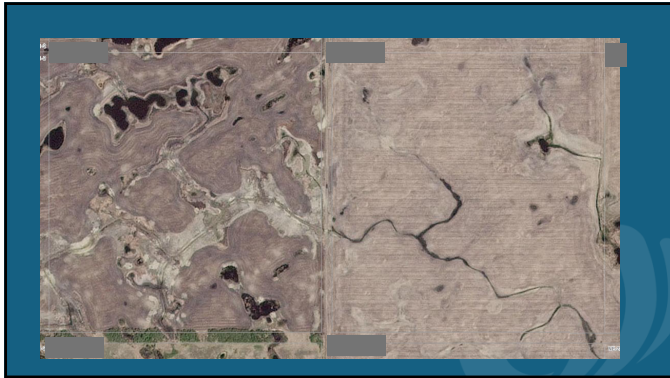
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Let's look at wetlands in cropland

From the ground?
From above?
Where are the wetlands?



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Let's look at wetlands in cropland

From the ground?
From above?
Where are the wetlands?



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Let's look at wetlands in cropland

From the ground?
From above?
Where are the wetlands?



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Module Summary

- ▶ More variability and extreme weather events are expected for Saskatchewan; this could amplify the impacts of drainage if not properly mitigated (adaptation)
- ▶ The Agricultural Water Management Strategy considers the impacts of drainage:
 - ▶ Water quantity
 - ▶ Water quality
 - ▶ Habitat quantity & quality
- ▶ Understanding what is considered a wetland helps plan good water management

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