

Wetlands and Water: Benefits, Costs and Possible Opportunities



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17 February 2022

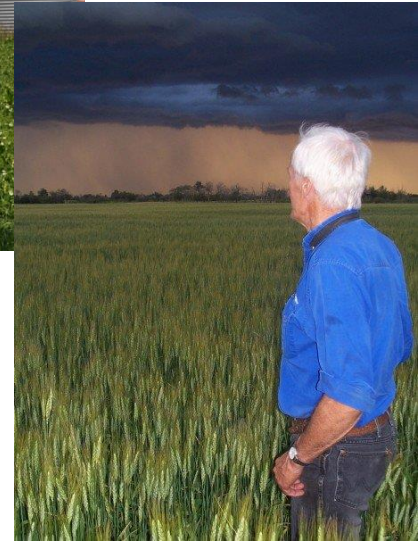


Workshop So Far

Priority 4 – Wetland and Wetland Loss

(links with other three: groundwater, access to water and water quality)

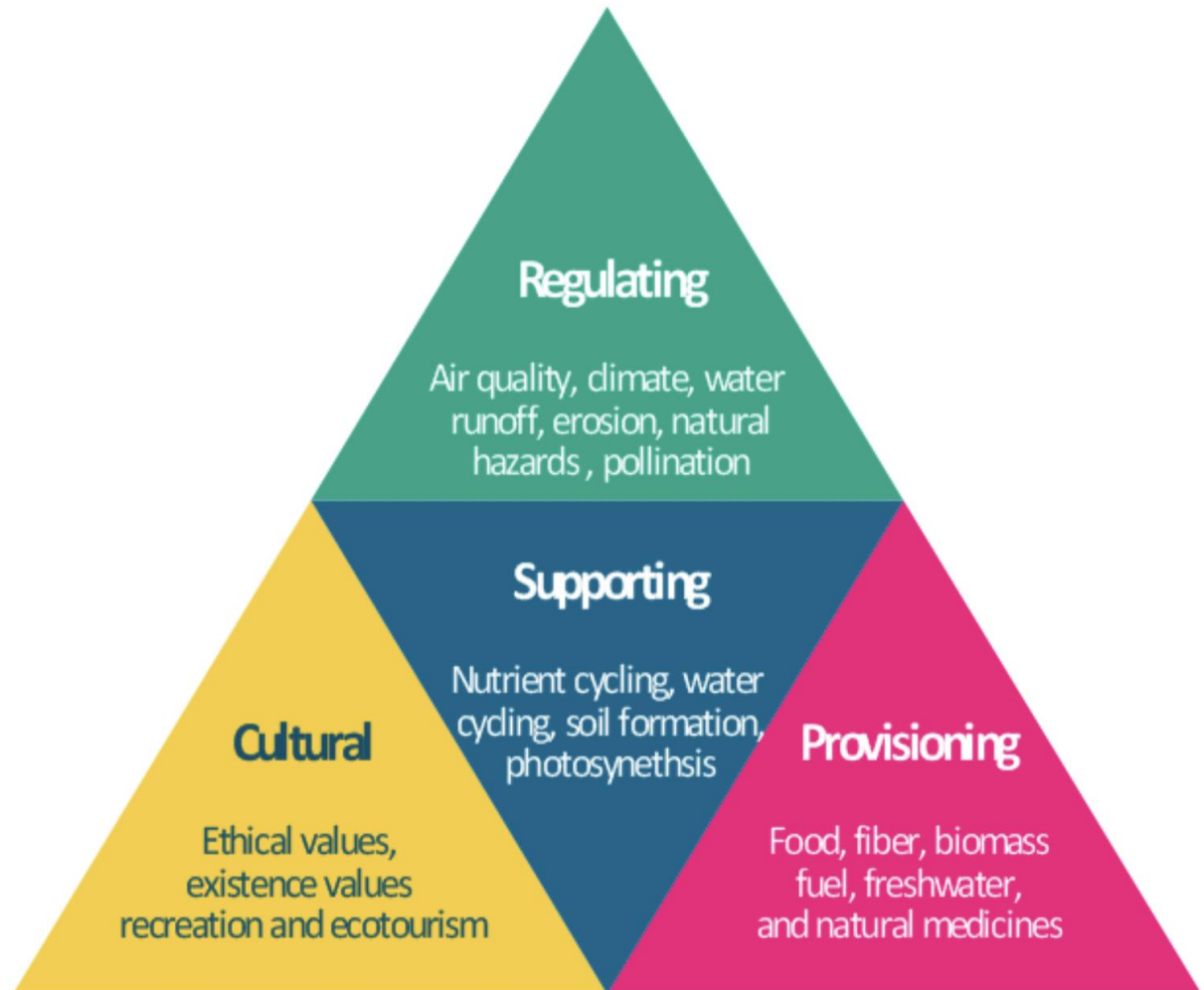
Background: Kingman, Alberta



“Natural Capital”

Ecosystem Services

the multitude of benefits that nature provides to society.



Natural Capital of Wetlands



- Water filtration 0.043 t/a/y N
0.009 t/a/y P
- Soil stabilizer 6.5 t/a/y
- Flood control 1200 m³/a/yr
- CO₂ sink ~ 4 t/a/y
- Biodiversity ducks as indicator

What does this mean to you??

At the current rate of loss, **every year:**

- **45 semi-truck loads of fertilizer**
- **9 million cubic meters of flood water**
- **50,000 tonnes of soil lost due to erosion**
- **6,000 cars on provincial roads**

And yet....

Familiar sight...



Familiar story...

Drainage increases the amount of land available to farm and improves access to all areas of a field

This increases production and makes crops more viable, especially in lowland areas that may be too wet to farm otherwise

Why? Multiple Perspectives



Photo: John K. Pattison-Williams

FLOODING

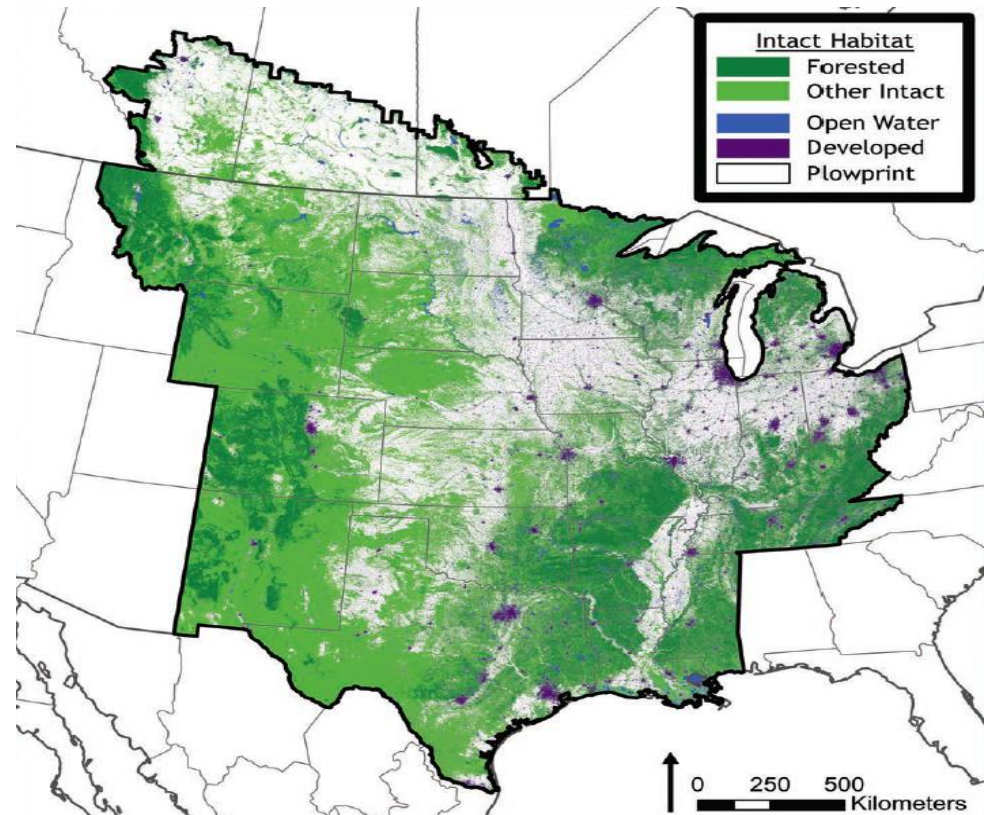
Unseeded acres
Nutrient export
Infrastructure damage

Downstream and upstream frustration



Significant financial resources
have been required to compensate
for these damages

LAND USE CHANGE



So...what do we do about wetlands?

- Biophysical science matters
- Finance and economics matter
- Human perspectives matter (both local and beyond)

ECONOMICS: Business Case Approach

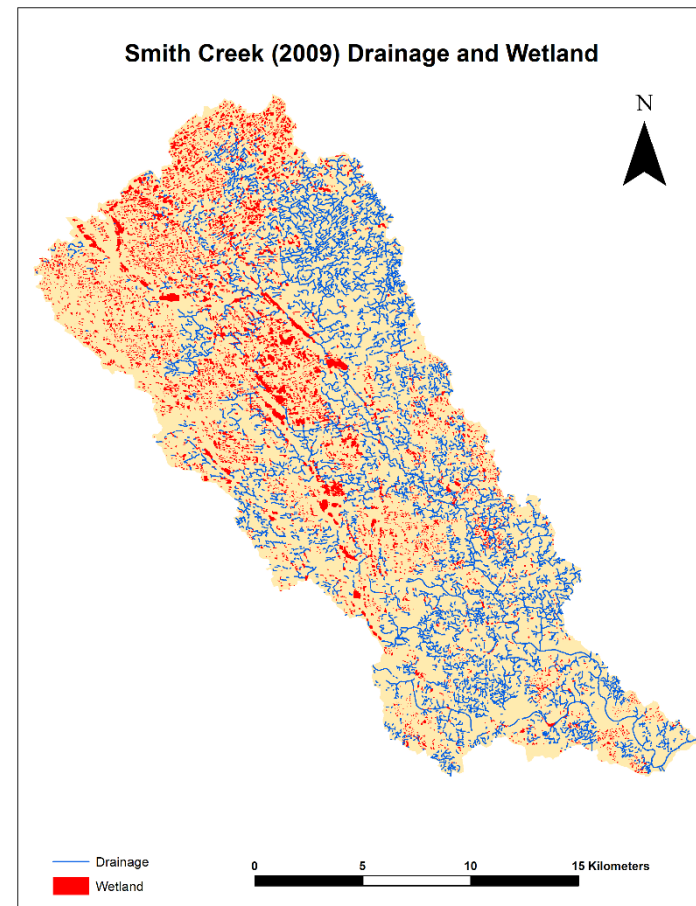
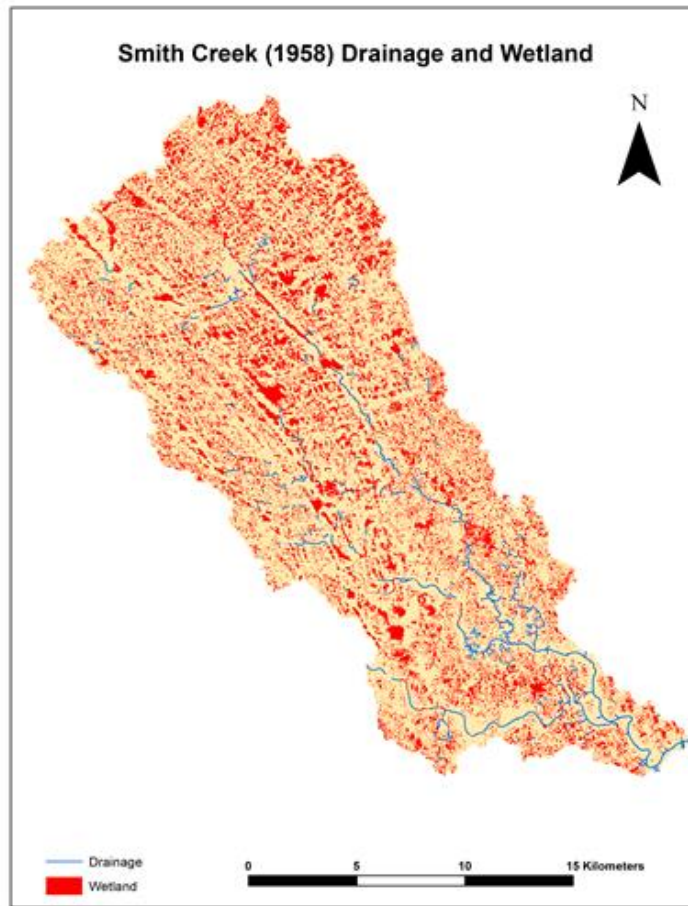
A story to justify a financial investment

Purpose:

1. Capture Existing Knowledge
2. Support Wise Land Use Decisions
3. Vehicle for moving policy forward
4. Consistent messages to different audiences

$$ROI_{Land\ Use} = \frac{\frac{\sum_{t=1}^T [C + N + P + Bio]}{(1+r)^t}}{\frac{\sum_{t=1}^T [(Profit - Inputs)_{crop} + Restoration]}{(1+r)^t}}$$

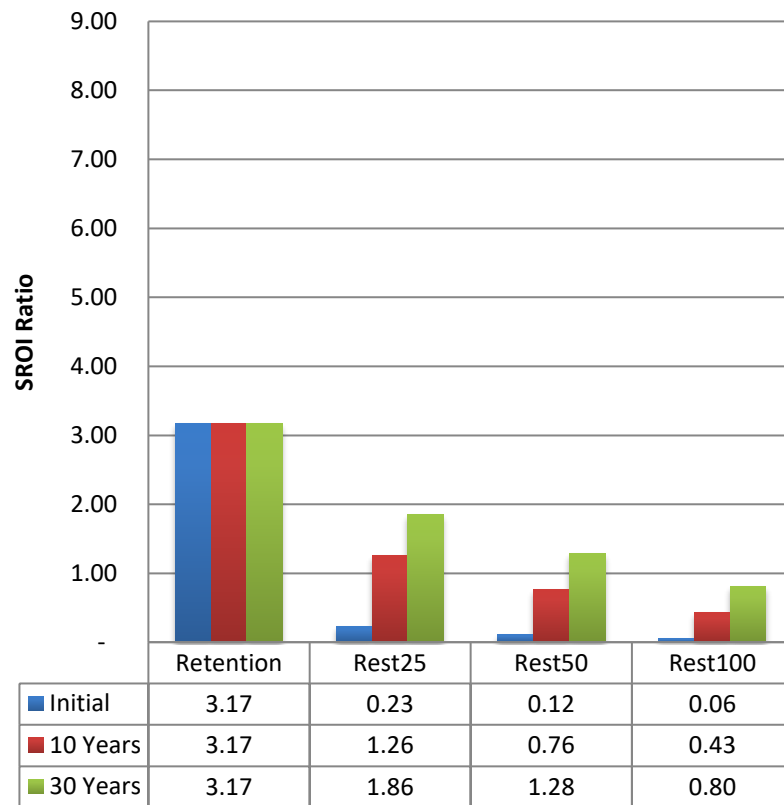
EXAMPLE 1: Smith Creek, Saskatchewan



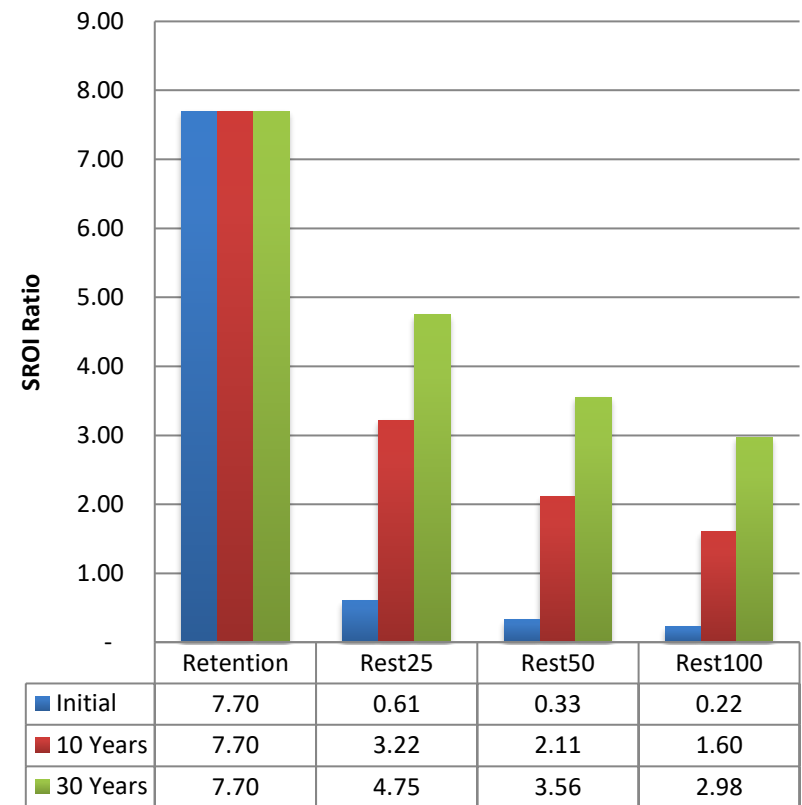
Downstream runoff causing financial and social problems!

Smith Creek Results

Flood Returns

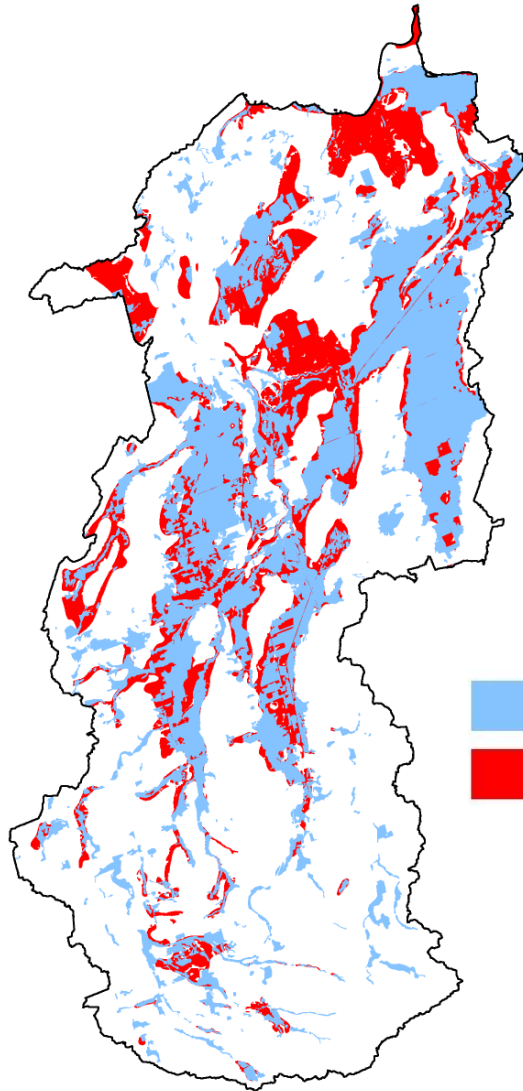


Social Returns



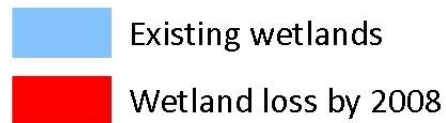
EXAMPLE 2: Black River, Ontario

2008



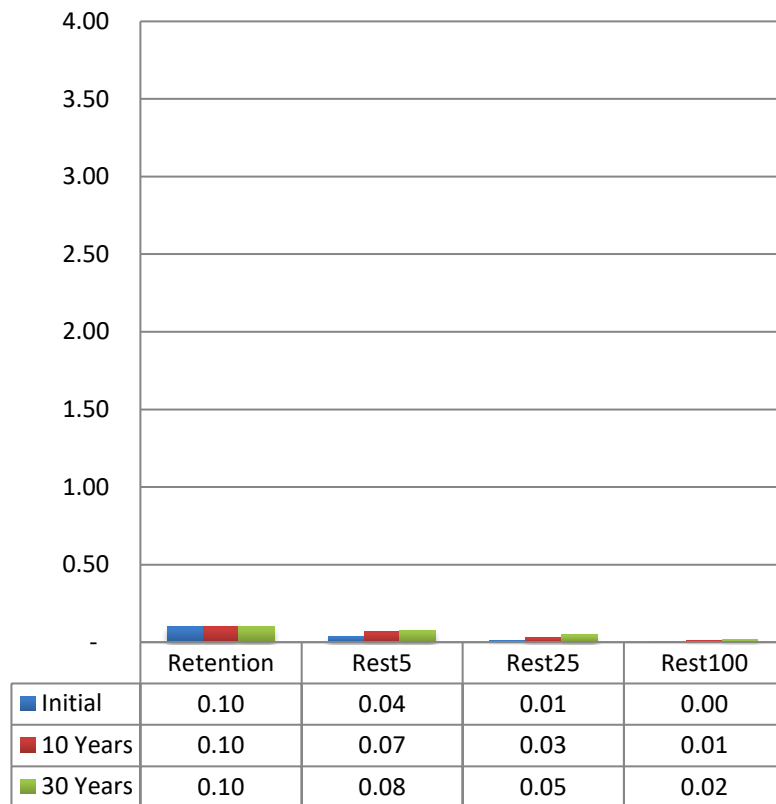
2008: 7,590 ha remain

46% wetland loss

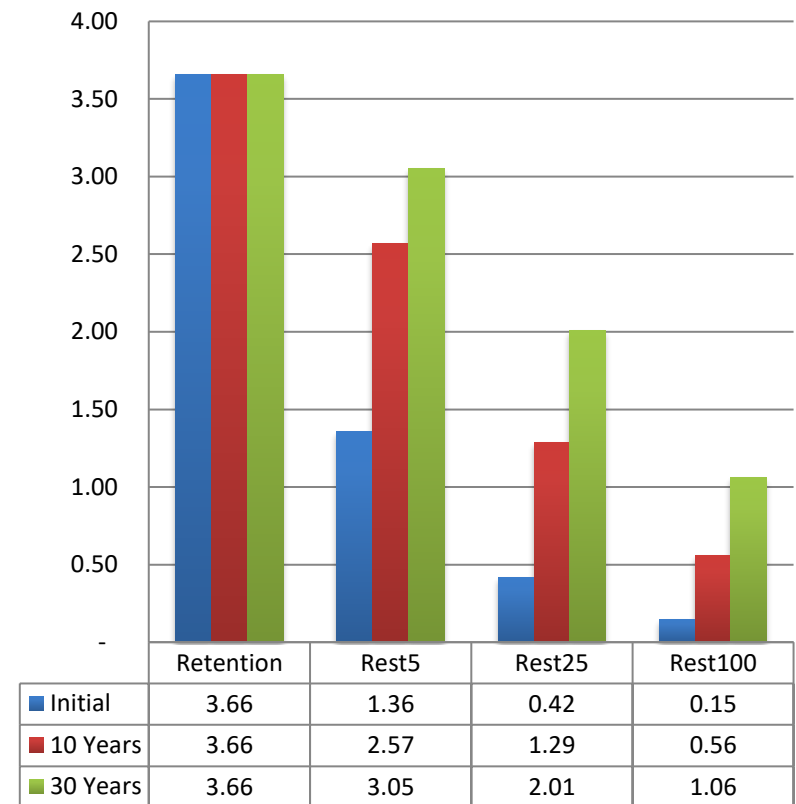


Black River Results

P and N Returns



Social Returns



- Still comparable to water treatment facility upgrades

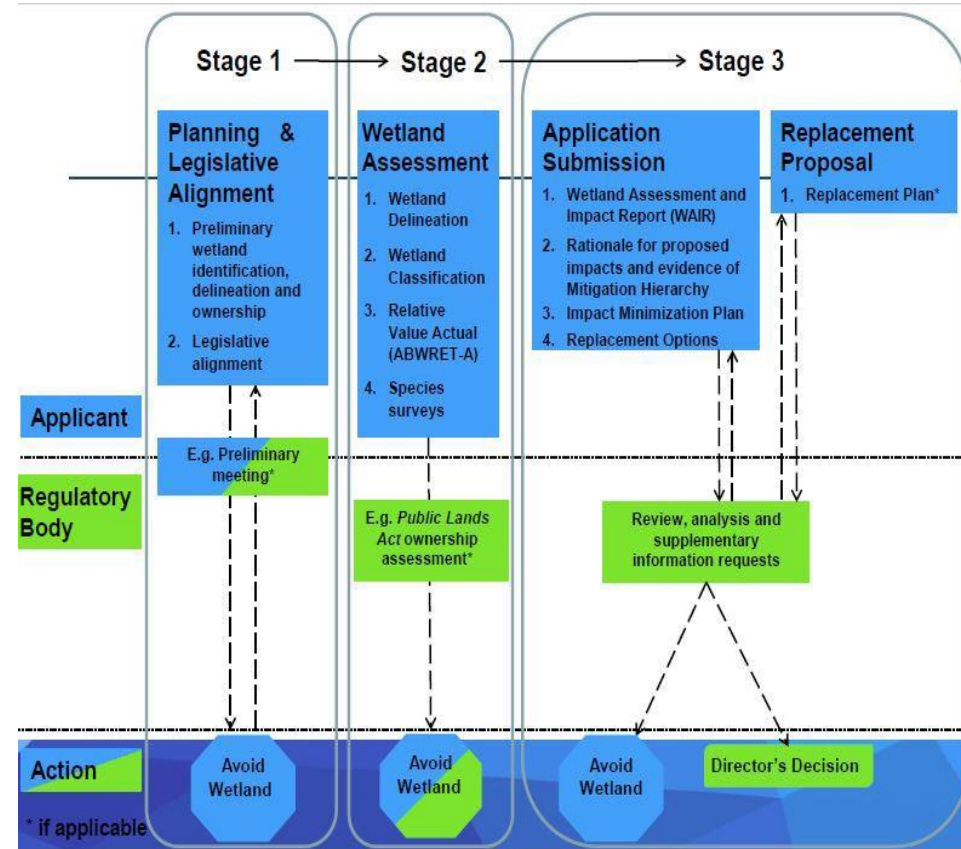
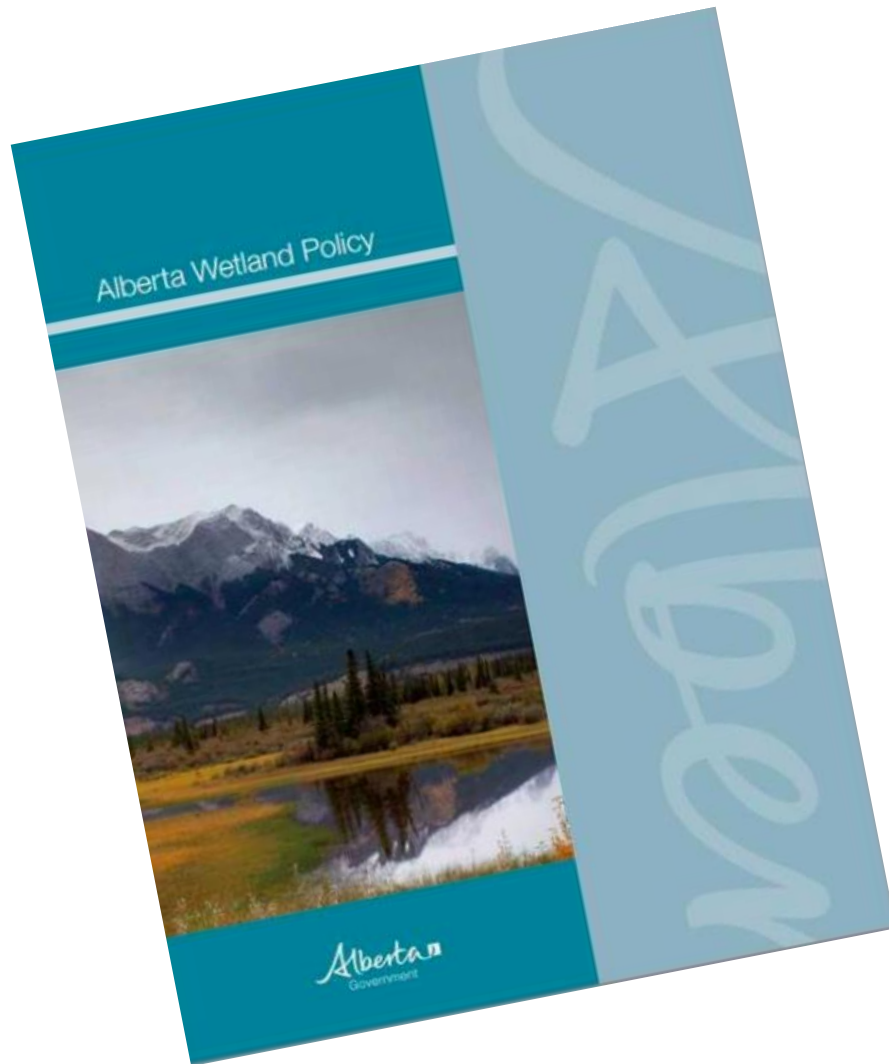
Loss and Restoration Scenarios

- **In 2008 the Sutton WPCP removed 2,480 kg of TP. Losing approx 25% of existing wetlands would negate this municipal investment in water treatment**
- **Proposed plant upgrades**
 - **Will remove an additional 62 kg/yr.**
 - **If just 52 ha of wetlands are lost - negate this additional removal capacity.**

COMMON THEMES

- Restoration is financially and socially expensive
- Keep what's already on the land
- Risk and liability: lawsuits, inability for insurance
 - Locally
 - Interprovincially
 - internationally

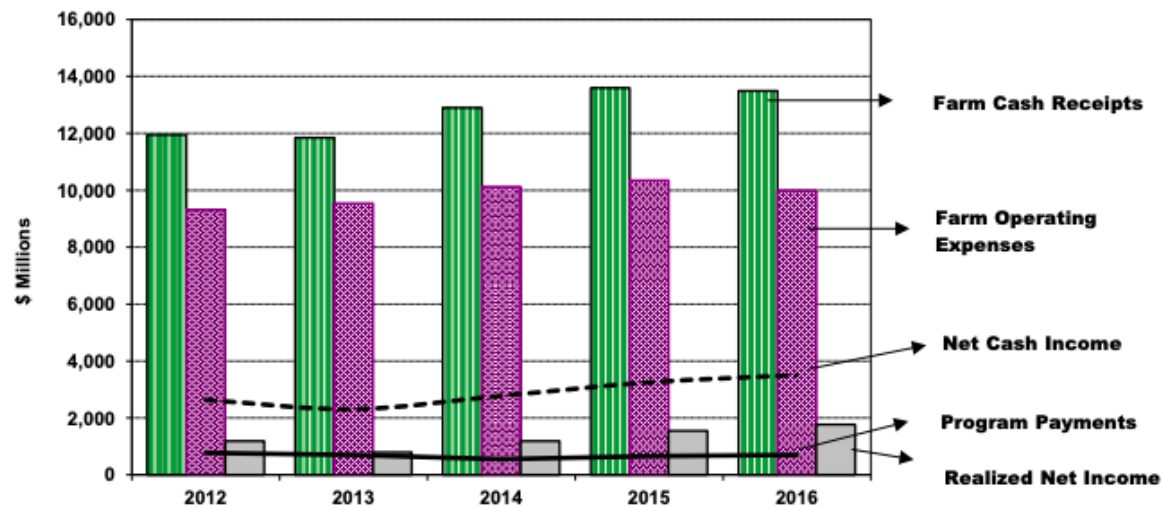
Regulation: Province of Alberta



CHALLENGE: Uncertainty in Agriculture

Three bad years
High off-farm income
High debts
Increasing land prices
Static grain prices (?)

Fig. 2 Alberta Farm Income Indicators, 2012-2016



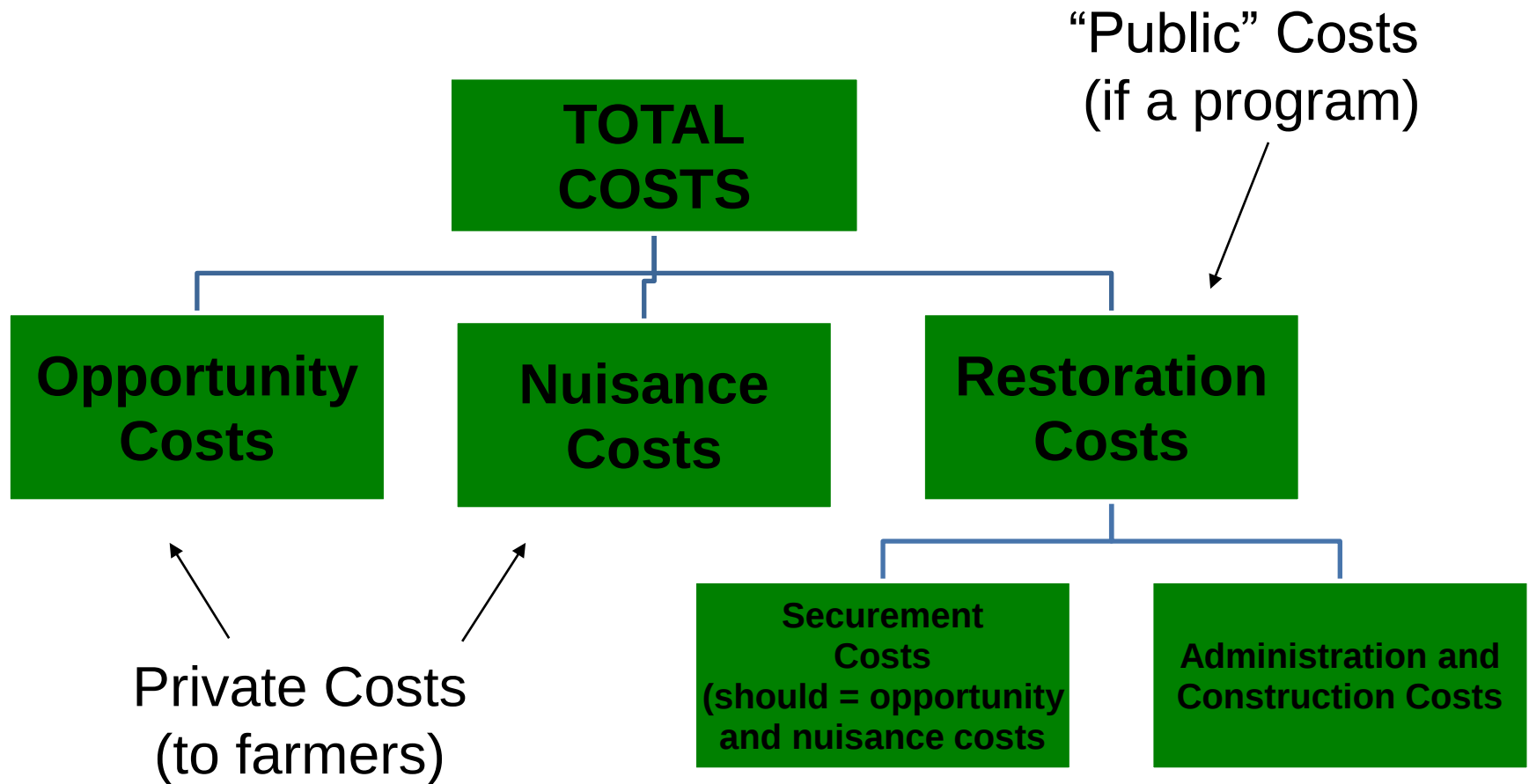
2021 Farm Cash Receipts Second Quarter

Alberta Highlights

Agri-Food Statistics Update: Issue FI21-3

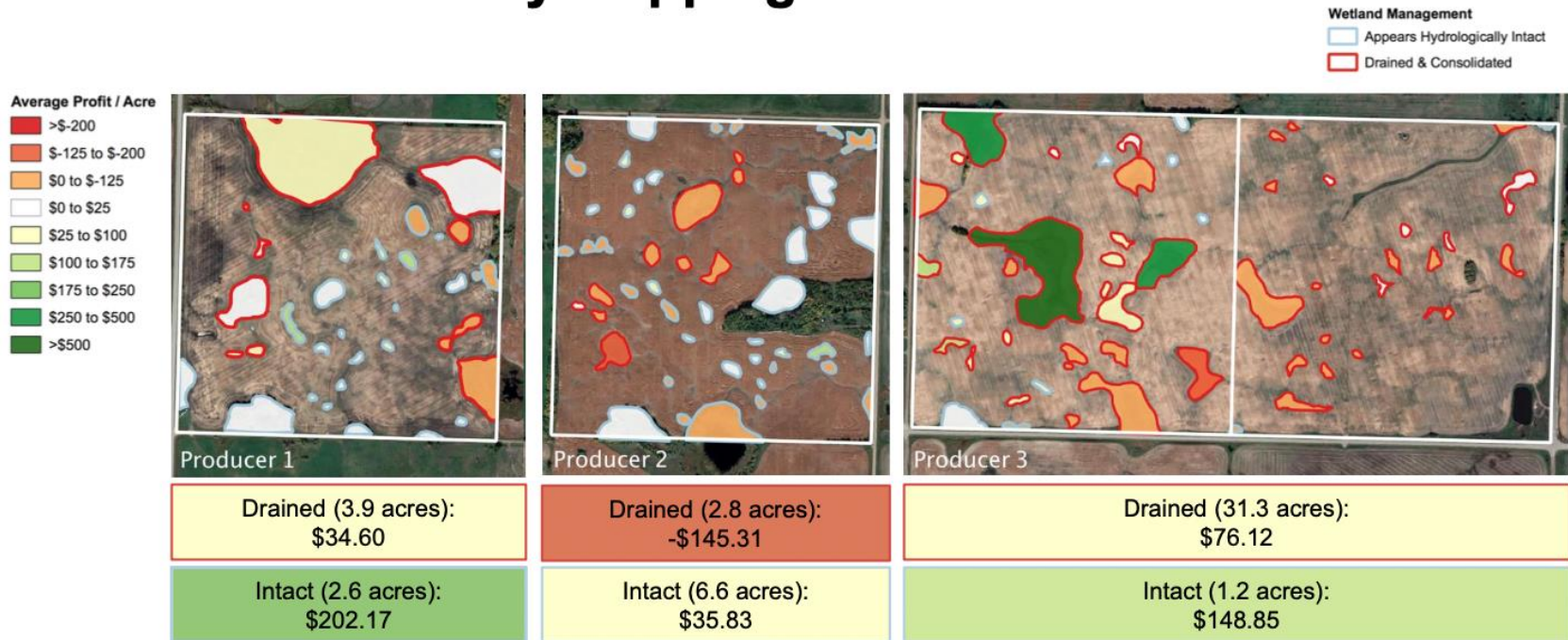
Increase acreage
Increase productivity
Keep rural communities alive
Frustration with government

CHALLENGE: Agricultural Costs of Wetlands



EXAMPLE 3: Profitability Mapping

Results: Profitability Mapping



Results: Summary

Average (\$/acre)					
Producer	Input Cost	Field-level Profit	Profit Excluding Wetland Basins	Profit within Drained Basins	Profit within Intact Basins
1	\$323.50	\$257.70	\$264.43	\$34.60	\$202.17
2	\$274.67	\$234.70	\$254.45	-\$145.31	\$35.83
3	\$297.78	\$147.28	\$155.57	\$76.12	\$148.85
All Producers	\$298.65	\$192.06	\$203.98	\$55.46	\$90.91



Primary Findings

- Drained wetlands

- 56% of basins yielded a financial loss (90% for Producer 2)
- 70% of basins produce less than the desired \$100/acre benchmark

- Intact wetlands

- 30% of basins yielded a financial loss
- 55% of basins produce less than the desired \$100/acre benchmark



Primary Findings - Interviews

- Producers were not surprised to learn that wetland basins produced lower yields, but were surprised by the magnitude of losses in some areas of their fields
- All producers indicated that the results will not dissuade them from continuing with the status quo
 - There was still a general sense that draining and consolidating wetlands leads to higher productivity on average and over the longer term
 - Field-level operational efficiency was identified as an critical factor influencing decision-making



CHALLENGE: Mixed Messages (Alberta)

Drainage is Good

Irrigation Districts Act (1914)

Drainage Districts Act (1921)

Water Resources Act (1931)

Irrigation in Alberta

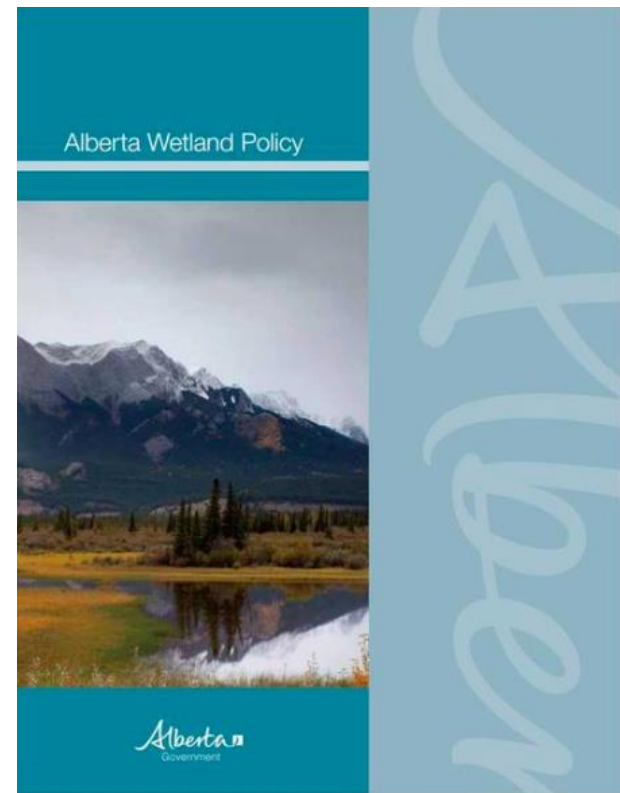


Source: Government of Alberta

Drainage is Bad

Alberta Water Act (1999)

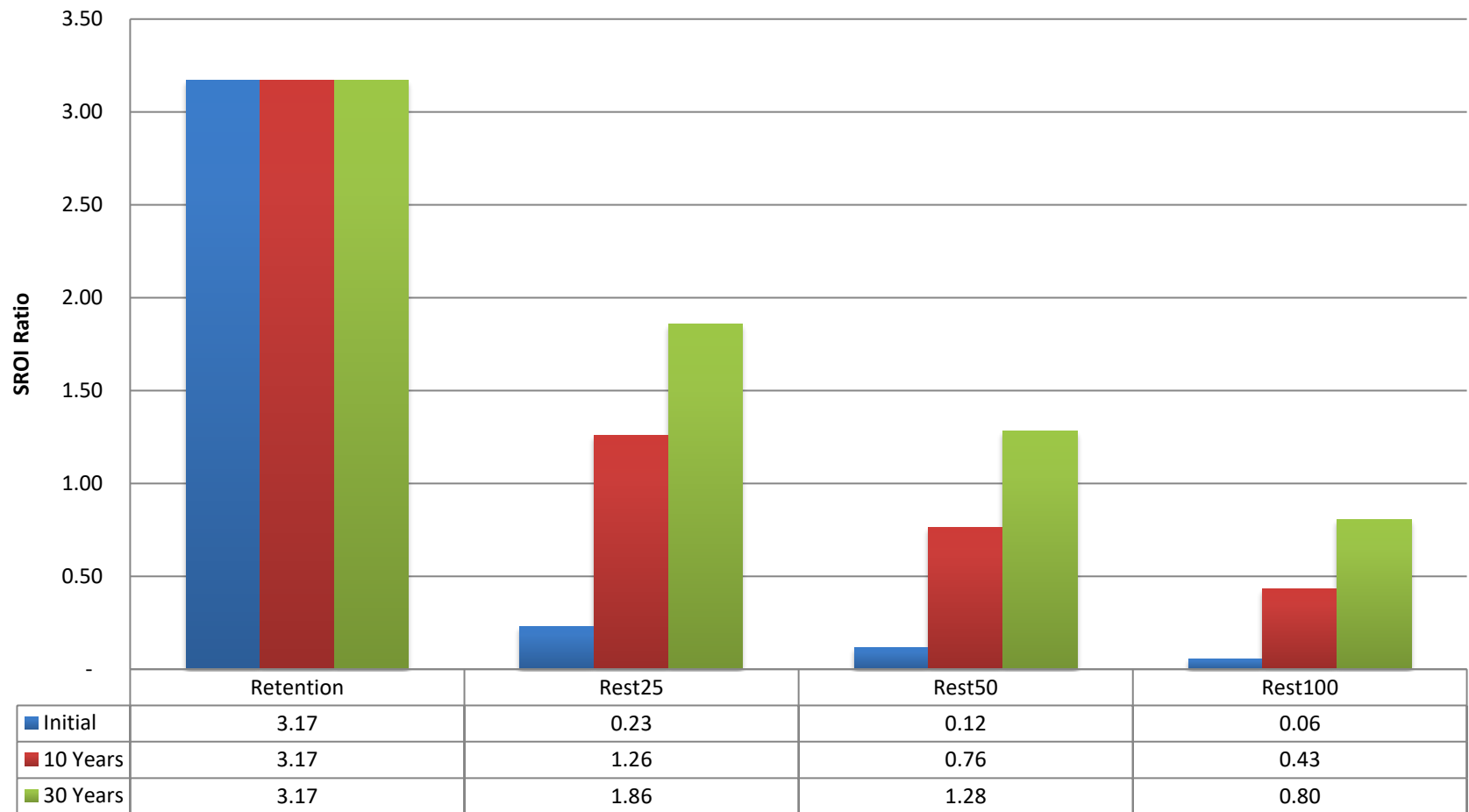
Wetland Policy (2013)



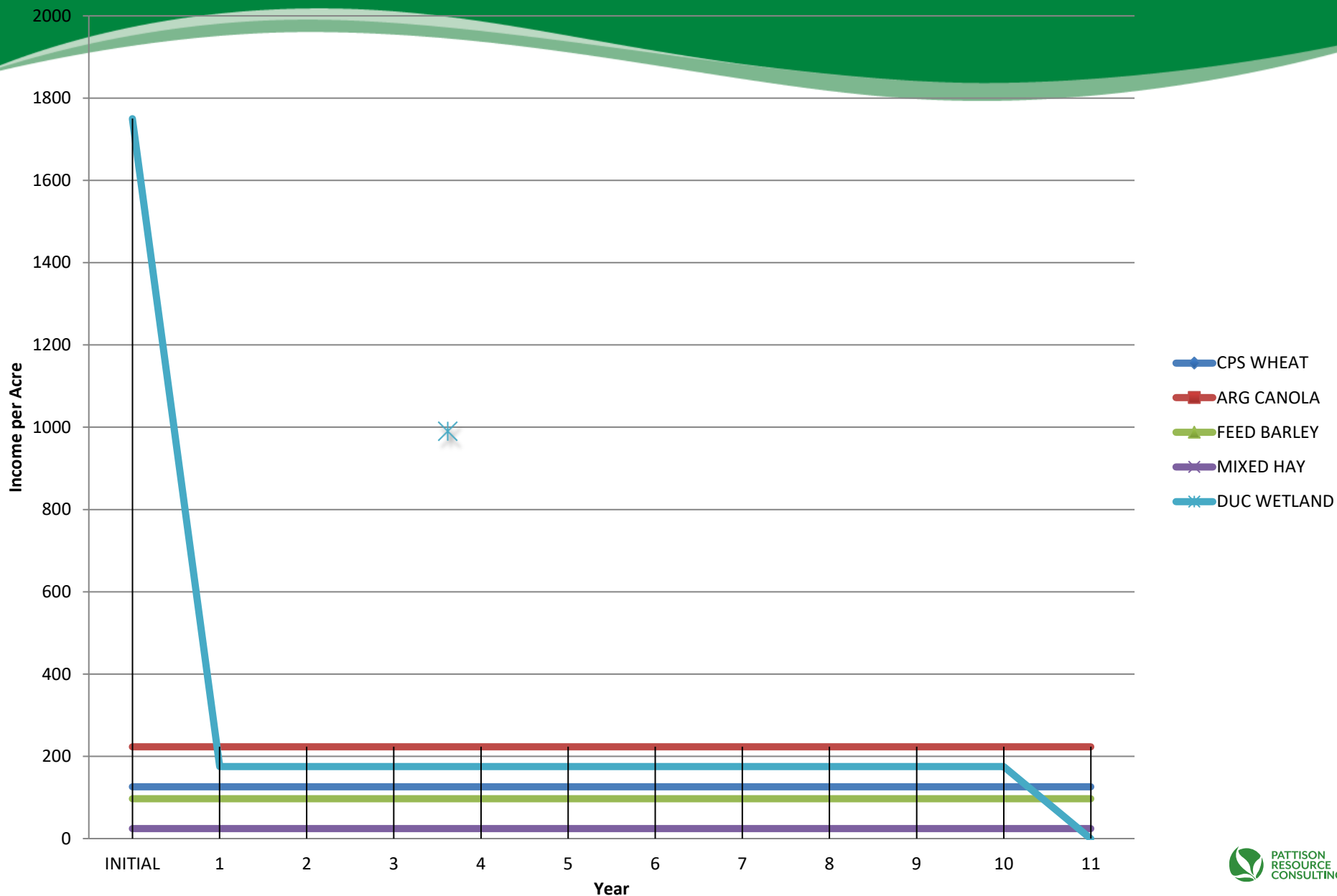
FUTURE CONSERVATION OPPORTUNITIES?



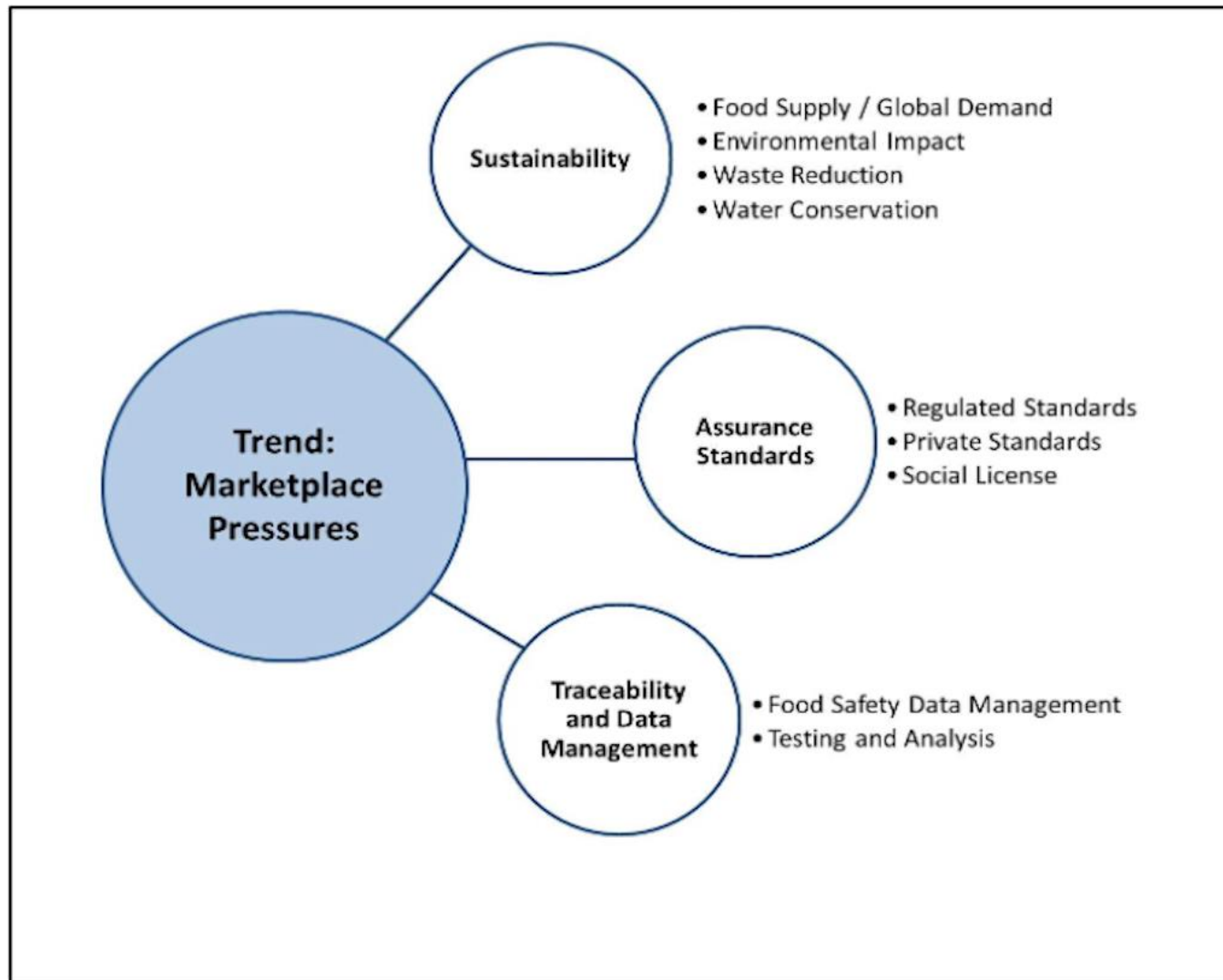
Economic Instruments: Payment for Ecosystem Services



Income Reliability



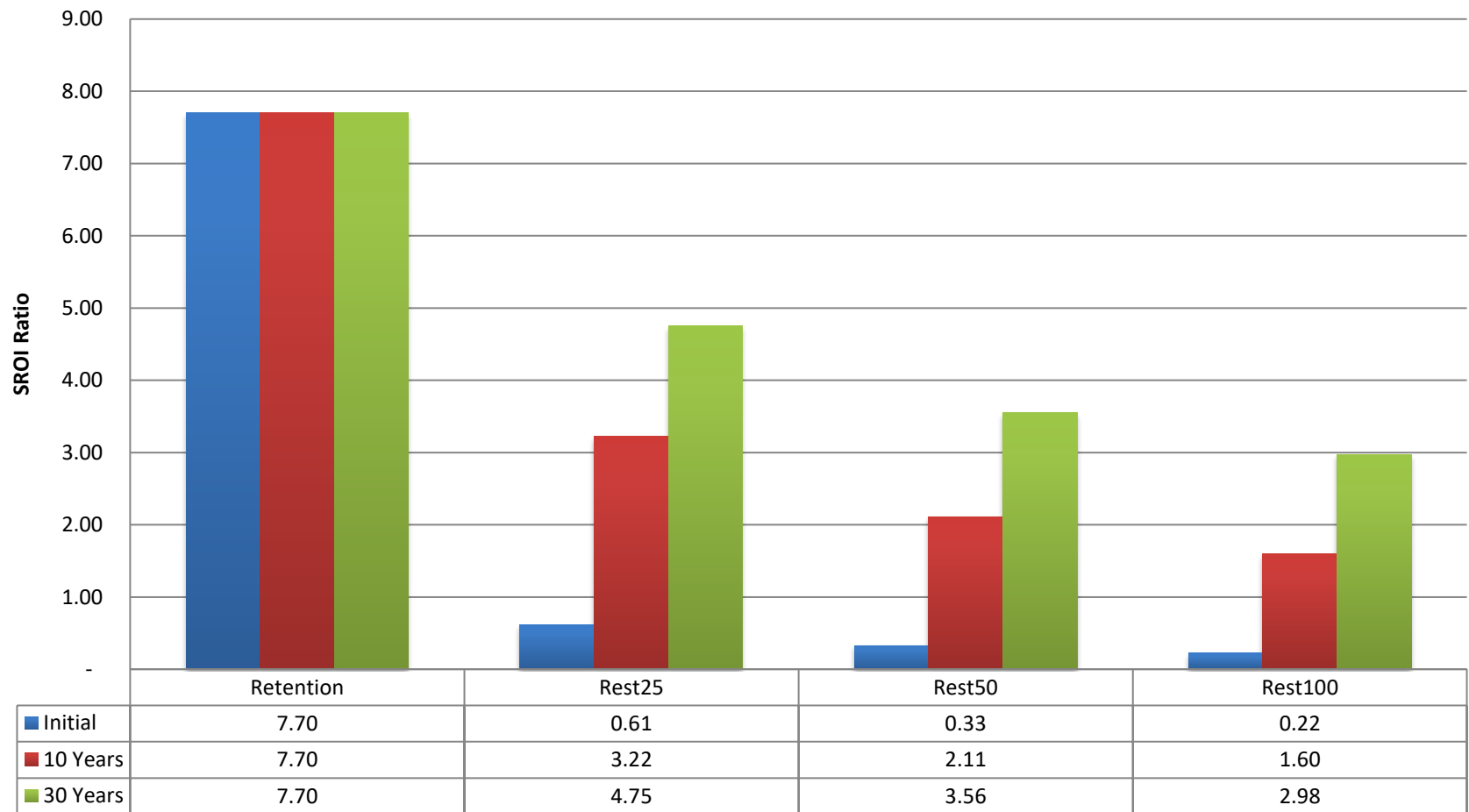
Market Access



Market Access, Canadian Response

- No programs in Canada that *financially* penalize agricultural producers for draining wetlands, even if such action is illegal under government frameworks.
- Lots of Round Tables: Canadian Roundtable for Sustainable Beef; Canadian Roundtable for Sustainable Crops; Roundtable for Sustainable Soy
- Certified Sustainable Beef Framework (2017), the first global standard of this kind.
- Canadian Food Print Initiative
- The ISCC-Plus system is active for Canadian producers to access the EU biofuels market. Small price premium explicitly prohibits wetland conversion.
- Increasing role of sustainability standards for Canadian agriculture will be about market access opportunity, not price premiums.

Societal Benefit: “Good Neighbours”

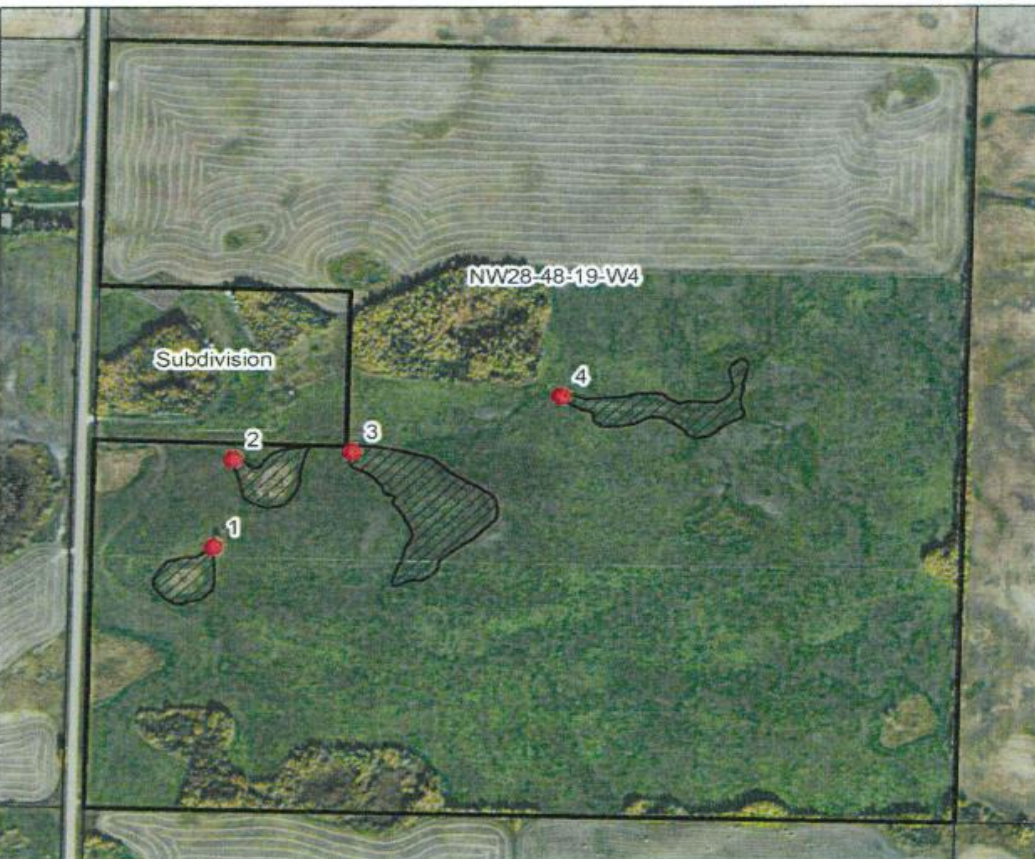


Immediate Action

1. Climate Smart Solutions funding
2. Wetland Policy and Approvals
3. Conservation Easements (DUC)
4. Grassland Support (Nutrien pays for seed, \$35 acre payment)
5. Roundtable for Sustainable Crops

Personal Choice

Pattison-Williams Lease # 12043



Legend

 Seg. 1 - Wetland - Ditch Plug - 4.75 ac

 Ditch Plug Location



CONCLUSIONS

- Water and wetlands are complicated issues
- Business Case Approach is important
- Flood damages to downstream farms and municipalities
- Power dynamics between rural and urban perspectives
- Private and public property rights

Acknowledgements

- Institute for Wetland and Waterfowl Research
- The Canada Research Chairs program
- Canada Excellence Research Chair in Water Security
- Department of Resource Economics and Environmental Sociology, University of Alberta
- Centre for Hydrology, University of Saskatchewan
- Prairie Habitat Joint Venture
- Fiera Consulting
- Photo Credit: Marilylle Soveran and Davin Martinson

Questions?

