

Wetland Values and DUC Wetland Restoration Programs

2022 NSWA Wetlands Forum

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Presentation Objective:

To describe the benefits of wetlands to watershed health and function

To provide an overview of DUC Wetland Restoration programs and how they benefit landowners and municipal partners



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Understanding Natural Green Infrastructure – The story of the lowly “slough”



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A couple of important definitions



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Ecosystem Services are the benefits that humans receive from nature.

These benefits include provisioning services such as food and clean water; regulating services that affect climate, floods, and water quality; cultural services that provide recreational benefits; and supporting services such as soil formation.

- Millennium Ecosystem Assessment



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Green Infrastructure:

Green infrastructure is defined as the natural vegetative systems and green technologies that collectively provide society with a multitude of economic, environmental and social benefits. This includes:

- *Urban forests and woodlots;*
- *Bioswales, engineered wetlands and stormwater ponds;*
- *Wetlands, ravines, waterways and riparian zones;*
- *Meadows and agricultural lands;*
- *Green roofs and green walls;*
- *Urban agriculture;*
- *Parks, gardens, turf, and landscaped areas.*

Source: Green Infrastructure Ontario



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Natural Green Infrastructure:

We have introduced the term “Natural Green Infrastructure” in order to enhance societal understanding of the role of wetlands, grasslands and boreal forest as highly effective, sustainable and cost effective forms of green infrastructure.



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Wetland Ecosystem Services

Ecosystem Services Provided by Wetlands (a partial list):

- *Water Purification (Quality)*
- *Water Storage*
- *Flood Control*
- *Groundwater Recharge*
- *Carbon Storage*
- *Habitat*
- *Recreation*
- *Aesthetics*



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Within Alberta, Cumulative Effects Management is now recognized as an environmental management priority that has been embedded in the *Alberta Land Stewardship Act* and the *business plan priorities of AEP* and other departments.



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**In many ways, wetlands are the
“poster child” of cumulative
effects**



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How?

- The cumulative benefits , (including flood attenuation and water quality improvement) of intact wetlands are significant
- The cumulative impacts of wetland loss are substantial



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Although the impacts of our decisions regarding wetlands are cumulative in nature, our thinking doesn't go beyond the individual wetlands we choose to impact.

As a result we are unintentionally causing cumulative impacts through thousands of individual decisions



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The result

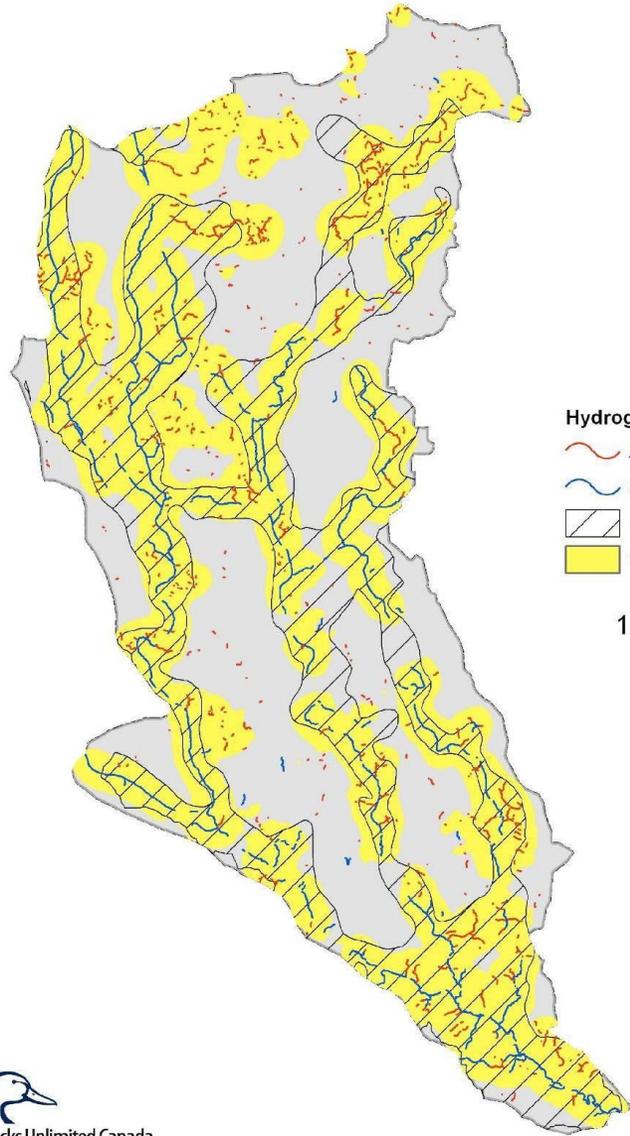
Historic and ongoing wetland loss (from thousands of individual decisions) has resulted in increased peak flows during spring runoff and heavy rainfall events - and therefore impacts to municipal built infrastructure

It has also contributed to increased nutrient and contaminant export resulting in water quality concerns



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PFRA Effective Area Historic Hydrography Density Threshold

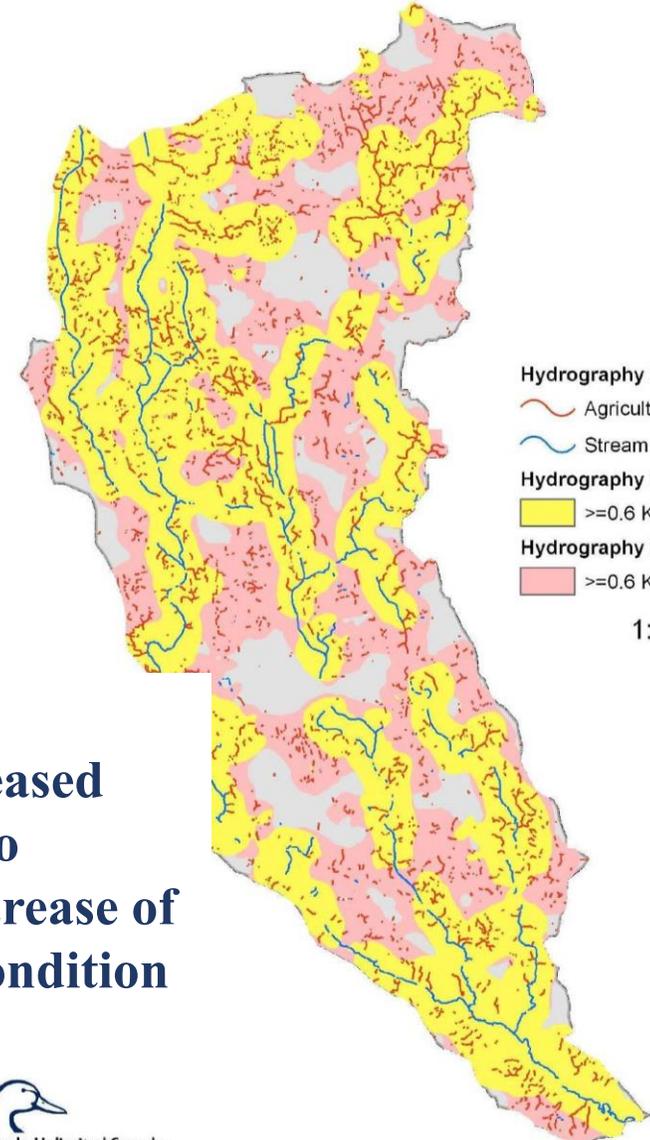


Hydrography 1968

- Agricultural Drain
- Stream
- PFRA Effective Area
- ≥ 0.6 Km. per sq Km.

1:140,000

Hydrography Density Threshold 1968 Vs. 2005



Hydrography 2005

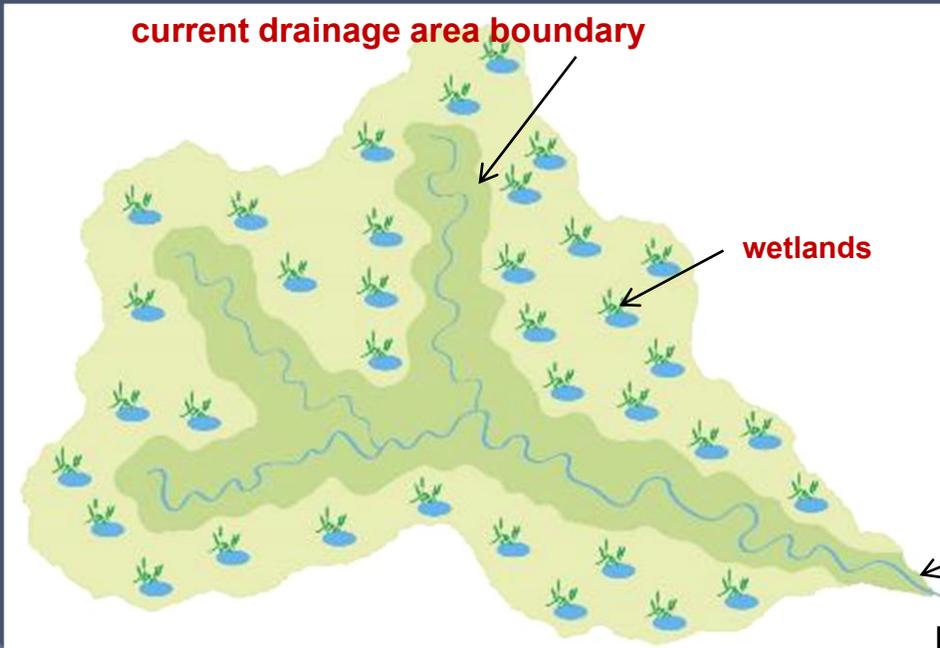
- Agricultural Drain
- Stream
- Hydrography Density Threshold 1968
- Hydrography Density Threshold 2005

1:140,000

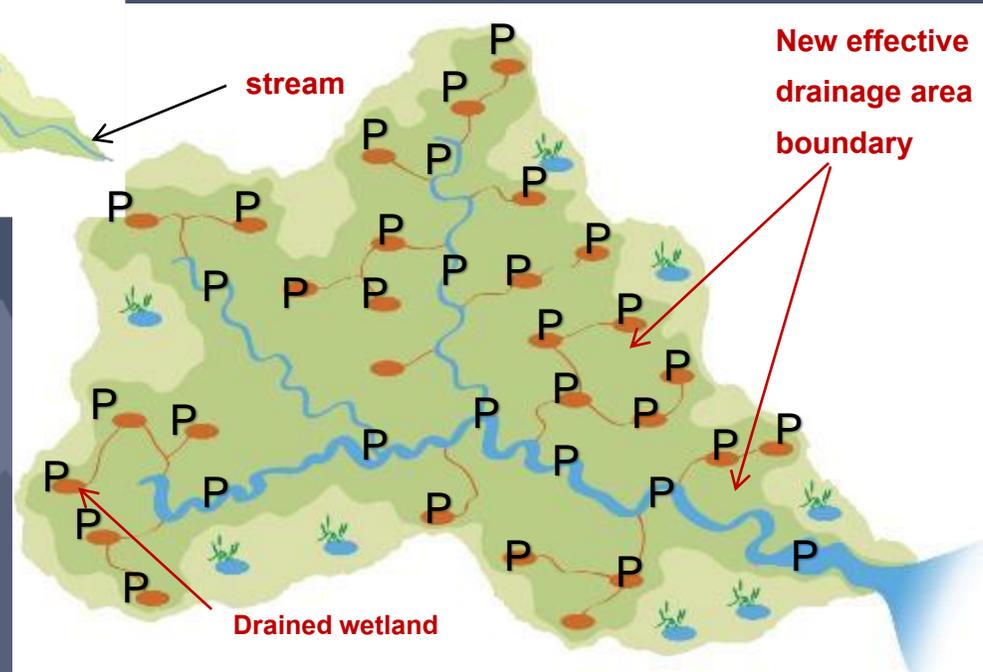
How Much?

**Over a 37 year period
contributing area increased
from 14,668ha (1968) to
22,507ha (2005), an increase of
53.4% over the 1968 condition**

Cumulative Wetland Loss Increases Annual Streamflow Volumes and Nutrient Export Volumes



Wetland loss converts areas that were acting as nutrient sinks to critical source areas for nutrient export



What it Means:

Research in the Broughton's Creek watershed (Manitoba) indicated the following impacts of wetland loss between 1968 and 2005 (37 years):

A **31 %** increase of land draining from the watershed

A **31 %** increase in nitrogen & phosphorus export from the watershed

Peak runoff or rainfall event flow increased by **18%**

Total watershed outflow increased by **30%**

Average annual sediment loading increased by **41%**

28% reduction in waterfowl production potential



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WETLAND LOSS AT HOME

In Alberta approximately 64% of wetlands have been lost in the settled area (white zone).

Losses continue at about 0.5% annually.

Comparatively, 0.4% of the Amazon rainforest is lost annually.



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What wetland loss means for watershed health and function:

- Water quality decline in lakes and rivers
- Increased impact and frequency of flooding and drought
- Increased infrastructure repair and replacement costs due to flooding (which impacts municipal budgets)
- Loss of critical wildlife habitat and biodiversity



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So how is DUC supporting watersheds, municipalities and landowners?



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Our work is guided by science and is supported by ongoing research on wetland functions and values for society

A Business Case for Wetland Retention and Restoration

Urban expansion, Transportation Infrastructure, Resource Development, Agriculture.

What if we stop or go slow for the wetlands that we have been destroying? What are the benefits of wetland retention, restoration, and expansion? This report provides the answers. It shows that wetlands provide a wide range of benefits to society, including water filtration, flood protection, and habitat for wildlife. It also shows that the costs of wetland loss are high, and that the benefits of wetland retention and restoration are significant.

Retention and restoration policy can save money, protect and restore wetlands, and provide a wide range of benefits to society.

	Initial Year	100 Years	300 Years
Retention	6.91	6.91	6.91
20% Restoration	1.26	3.32	6.64
50% Restoration	0.73	2.29	3.64

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Ecosystem Services Approach Pilot on Wetlands

Integrated Assessment Report

October 2011

Government of Alberta

Water Quantity and Quality Benefits from Wetland Conservation and Restoration in the Broughton's Creek Watershed

A RESEARCH REPORT SUBMITTED TO DUCKS UNLIMITED CANADA

WATERING TENDERS: TED WANG, SHANE CARSON, TERRY RICHARDS, PETER BARRON

1. Department of Agriculture, University of Alberta, Canada
2. Department of Agriculture, Saskatchewan Forestry Centre, Canada
3. Saskatchewan Forestry Centre, Saskatchewan Forestry Centre, Canada
4. Ducks Unlimited Canada, Saskatoon, Saskatchewan, Canada
5. Ducks Unlimited Canada, Regina, Saskatchewan, Canada

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Improving and Testing the Prairie Hydrological Model at Smith Creek Research Basin

J. Pomroy, K. Shook, X. Fang, S. Dumanski, C. Westbrook, T. Brown

CENTRE FOR HYDROLOGY, UNIVERSITY OF SASKATCHEWAN

UNIVERSITY OF SASKATCHEWAN



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Over the years, our traditional programs have evolved to provide **significant financial incentives** to private landowners for provision of ES



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**Ultimately watershed health
and function benefit**

**And so do landowners and
municipalities**



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How Do They Benefit?

Watershed water quality and quantity are improved

Municipalities and their ratepayers benefit from the ES provided - including reduction of built infrastructure maintenance and repair costs caused by flooding.

Landowners receive compensation for provision of ES.



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Annual Landowner Payments for ES via DUC Programs in AB:

Conservation Easements: \$1.8m/yr for 3100 ac.

Wetland Restoration: \$2.6m/yr for 900 ac.

Forage Program: \$240,000/yr for 12,000 ac.

RLCP – 1600 ac/yr sold at approx. 25% discount

Total annual ES Program compensation: \$4.64m

Total annual conservation programs: 19,200 acres



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Current DUC Wetland Restoration Programs



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**Before we get too far down the road
lets make sure we know what we mean
when we use the term *wetland
restoration***

**wetland restoration is simply that –
restoring previously drained wetlands**



**It is not building new wetlands where
they didn't exist before nor is it
enhancing the function of an otherwise
intact wetland**



What really is Wetland Restoration?

Drained small wetland





Step 1 Locate former basin margin



Step 2. Locate drainage



Step 3. Restore natural hydrology

Project example: Hendel



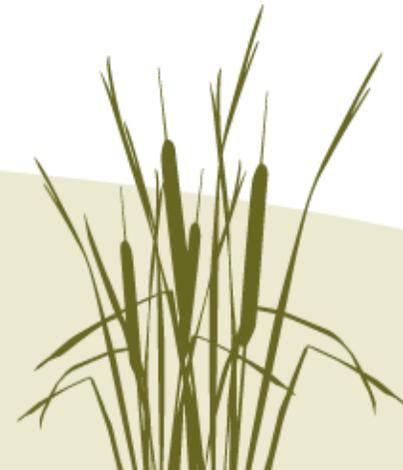
Restored small wetland



Restored small wetland

Why Wetland Restoration (WR)?

- 64% of our wetlands have been lost – we need to restore some!
- Wetland retention is predominately a legislative initiative and requires different tools
- The mitigation process provides a mechanism to fund WR
- Restored natural wetlands provide a very high level of success in terms of function – they reestablish quickly and function reliably



Why Wetland Restoration?

Wetland restoration is the priority of restorative replacement under the AB Wetland Policy (AWP).

Creation and enhancement are other forms of approved restorative replacement *but are different* and are a lower priority of the AWP



Why Wetland Restoration?

- The mitigation process enables wetland restoration (as the primary means of restorative replacement) in AB where avoidance and minimization cannot be achieved
- DUC utilizes mitigation and other funds to compensate landowners who wish to restore drained wetlands on their property

Why Wetland Restoration?

AND Its important to remember where the money comes from when allocating mitigation funds

Mitigation funds are derived directly from natural wetland losses that have been approved by AEP

Funds directed to practices other than wetland restoration do not directly achieve the Alberta Wetland Policy goal and outcomes

Why Wetland Restoration?

Wetland restoration (WR) is DUC's core business We have 80+ years of experience



Why Wetland Restoration?

And that supports a policy who's goal is:

“to conserve, restore, protect, and manage Alberta's wetlands to sustain the benefits they provide to the environment, society, and the economy.”



Wetland Restoration

DUC restores an average of 900 ac (364 ha) per year through voluntary paid agreements with private landowners.

This puts ES dollars in landowner's pockets (diversifying their income) and supports the sustainability of the agriculture sector.

Based on historical and ongoing loss rates we (unfortunately) have a large inventory of potential wetland restoration opportunities



The *physical act* of wetland restoration is not difficult



**It's the task of securing opportunities
and undertaking all other steps in the
process that takes time, effort, expertise
and the right tools**

It's a big job!

**We have a dozen full time staff dedicated
strictly to WR in AB plus engineering
support!**



DUC's Program Options



Wetland Restoration Lease Program



Wetland Restoration Lease Program

Wetlands are more than sloughs
Sloughs, marshes, ponds, field water. Wetlands are areas that hold water either temporarily or permanently. Some wetlands hold water year-round while others hold water for one or two months.

What is wetland restoration
Wetland restoration re-establishes small ponds and sloughs using methods like plugging ditches with earthen plugs or dams. DUC focuses on complexes of small sloughs that are typically 1/2 to 2 acres in size on a broader landscape.

DUC's Wetland Restoration Lease program
DUC compensates landowners based on current fair market value for restored wetland areas under a 10-year lease. As part of DUC's program, restored wetland areas stay under the management of the landowner. These areas may be hayed or grazed but they cannot be drained, altered or tilled during the term of the agreement. DUC's lease pays landowners significant compensation for this restriction.

Financial benefits
The program lease provides an upfront payment followed by a stream of 10 annual payments. Payments are based on current land values in the area and on the surveyed area of restored wetlands. DUC completes all the wetland restoration construction at no cost to you.
Landowners and cattle producers who have drained wetlands on grazing lands are often a very good fit for this program.
Farmers should consider this program as a partial source of financing for new land.

Starting the process
The first step is for DUC to complete a aerial photography assessment using current and historic photography to determine the presence and/or absence of wetlands and the presence of linear ditch works. If the initial assessment is positive, DUC undertakes field inspections to verify the presence and areas of drained wetlands which serves as the basis for lease agreement negotiations.
DUC will consider lands that have been drained or partially drained for the program.

Environmental benefits
Restored wetlands provide the following environmental benefits and services:
• greater biodiversity (waterfowl, wildlife, vegetation, etc.)
• carbon storage
• watershed flood & drought protection
• improved water quality through phosphorous and nitrogen sequestration

The wetland restoration lease program is a significant financial opportunity that landowners should consider for their land & for their future.

For more information, contact:
Ducks Unlimited Canada
1 866 479 3825

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- **10 year term**
- Restored wetland area must be **unaltered** (no tillage, no drainage, no infilling) – *can graze/hay no need to fence out*
- Land owner payment based on **appraised fair market value** of area land
- DUC total landowner compensation based on the **“restored area”**
- 50% of payment upfront after restoration is complete & 50% built into NPV stream of annual payments
- ***After the term of the lease the restored wetland is subject to the same regulatory requirements as any other wetland***

Partnered Wetland Restoration

Many municipalities have recognized the value of wetland restoration but may lack the capacity, expertise or desire to undertake the work themselves

Here's where DUC can help!



Convert Drained Wetlands to Cash

Ducks Unlimited Wetland Restoration Lease Program

A pool of money is created as wetlands throughout the province are impacted by development and infrastructure projects, due to the Alberta Wetland Policy. Dollars collected by the province are turned around and put into wetland replacement projects on the landscape. Wheatland County is a high priority area for wetland replacement due to the many activities occurring in our Bow and Red Deer river watersheds, giving our landowners a unique opportunity to convert previously drained wetland areas to cash if they choose.

Rather than choosing to pursue wetland replacement activities through our own operations, Wheatland County recognizes the existing work of Ducks Unlimited Canada (DUC) and has chosen to instead promote the opportunities they offer in our region. Please read on for information about DUC's wetland restoration program, and other opportunities available to our landowners.

What is DUC's Wetland Restoration Lease Program?

- Wetland restoration re-establishes small ponds and sloughs by plugging ditches with earthen or engineered dams - lands must have been drained or partially drained to qualify.
- Landowners are compensated based on fair-market value for the area of wetlands restored under a 10-year lease. There is an upfront payment followed by 10 annual payments.
- DUC completes all work at no cost to the landowner.
- Restored areas stay under the management of the landowner and may be hayed or grazed.
- This program offers a significant financial opportunity, especially where drained sloughs are only capable of producing marginal crops or are on grazing lands.

Other DUC Programs

- Landowners in areas with good habitat potential for waterfowl that are qualified through DUC can access \$100 per 50lb bag of grass seed plus per acre payments through DUC's Forage Program.
- DUC is a registered land trust, meaning they can register conservation easements to help protect the natural features of land while still allowing haying and grazing. Conservation easements are a voluntary option for interested landowners to get financial benefit to continue managing land in the same way.

Derek Hallgrimson is DUC's representative for the Wheatland County area. Please contact him with any questions that you have about DUC's programs at d_hallgrimson@ducks.ca or 403-361-0280.



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Partnered Wetland Restoration

The wetland restoration process involves a lot more than simply putting fill in a ditch!



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Wetland Restoration Tasks

- Identification of restoration opportunities
- Landowner engagement
- Project design and engineering
- GOA Approvals
- Third party agreements
- Landowner agreements
- Project construction
- Landowner payments
- Long term O&M



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What DUC Offers Municipalities

Proactive targeting for WR opportunities	X	Relationship building with Landowners	X
Landowner negotiations	X	Wetland Inventory / Wetland Drained Imagery	X
Field truth potential WR projects	X	RTK Surveying	X
Landowner agreements	x	Landowner Payments	x
GIS mapping	X		X
ABWRET Assessments	X	Third Party Agreements	X
Engineering Design	X	GOA Approvals / Water Act Applications	X
Construction	X	Monitoring and Maintaining	X



These are all services DUC can provide for municipalities

What's in it for DUC?

Restored wetlands are our return on investment



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Native Plant Solutions

- Native Plant Solutions (NPS) is a consulting arm of DUC. Our team provides wetland and upland expertise to private clients on a fee-for-service basis.
- Our team includes experts in ecology, soil science, biology, hydrology, engineering design and construction. We also have the ability to draw on the expertise of all practitioners in DUC.
- All net revenue generated by NPS is utilized to further work in conservation, habitat restoration and research.



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NPS Services

1. Advisory and Consulting Services:

Provision of wetland and upland expertise technical guides, wetland management plans, mapping, performance/functional assessments, etc.

2. Wetland and Upland Development:

Design, construction, commissioning and maintenance of upland and wetland facilities.

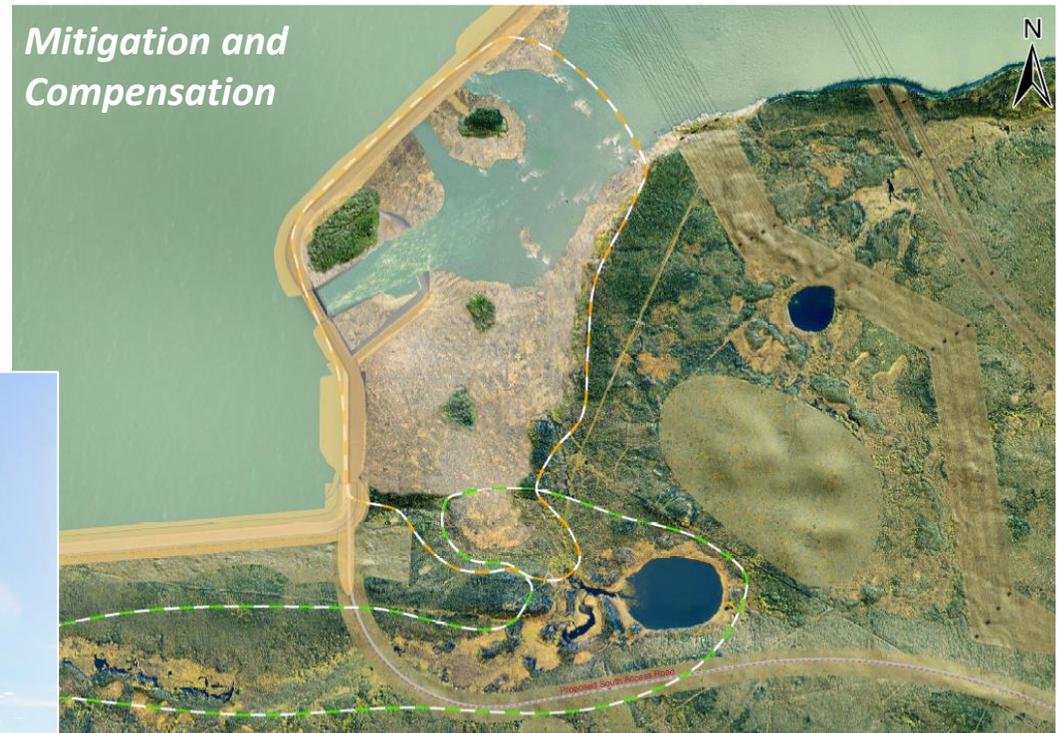


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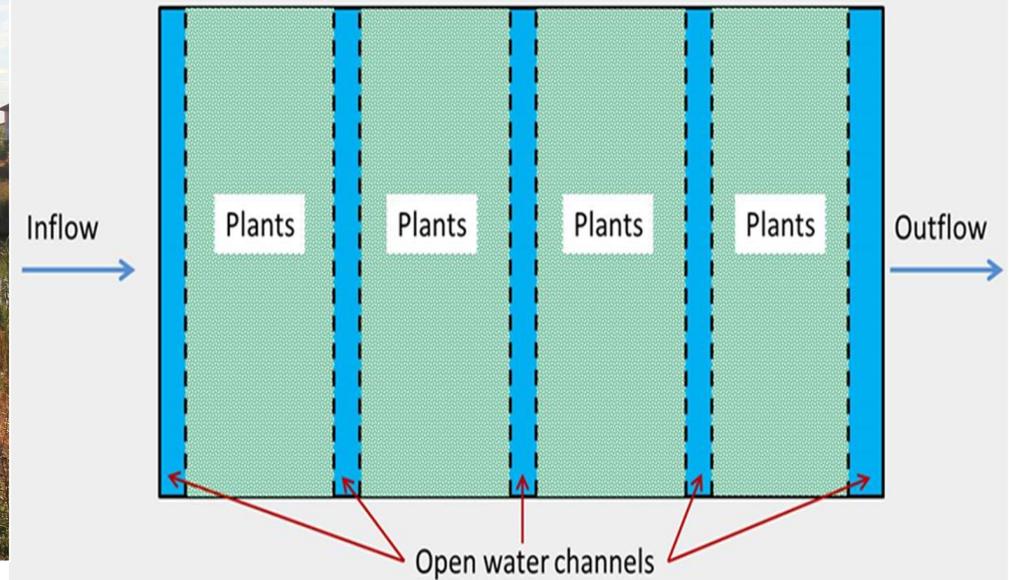
Wetland Development



Constructed Stormwater Wetlands



Mitigation and Compensation



Treatment Wetlands

Upland Development



In Closing:

- **Natural infrastructure – including wetlands - represents an important and valuable contributor to watershed health and function**
- **DUC conservation programs reward landowners for provision of natural infrastructure - and therefore ES**
- **DUC has the capacity and expertise to assist municipalities in wetlands restoration and management**
- **DUC is supporting and partnering with the agricultural sector to help it achieve its commitment to sustainability**



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Thank you!



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