

# HOW CAN WE RESTORE YOUR WETLANDS?

## INTRODUCING THE ALBERTA'S LIVING LABORATORY WETLANDS PROJECT

### WETLANDS ARE IMPORTANT

**What is a wetland?** Broadly defined, it's a piece of land that holds water long enough to develop aquatic processes – like bogs, sloughs, swamps, and marshes. In Alberta, many wetlands have been filled in over the years, largely because they were in the way of agriculture. Now, some of them need to make a comeback.

**Why should we want them back?** Even at their boggiest, wetlands can have a profound impact on the watersheds around them. Concerned about flooding? A wetland might reduce the risk of too much water coming too soon. Worried about phosphorus in your water supply? Wetlands can be surprisingly effective filters. Care about wildlife habitats? Hundreds of species consider wetlands home.

**Can we bring them back?** Yes, but we don't actually know whether the wetlands we restore are as good as the originals. One of the goals of this project is to restore wetlands, then monitor them over a long period of time so we can figure out whether the ones we put back function as well as the ones that were lost.

### WETLANDS ARE POLICY

**What's the government doing?** In 2013, the Government of Alberta launched the new Alberta Wetland Policy, which requires wetlands lost to development to be replaced with new wetlands of equal functional value. One of our aims is to develop scientific tools to understand and compare the value of those wetlands.

**What about land owners?** Many of the wetlands that can be restored are on privately-owned land, so this project will help build a greater understanding of how best to compensate land owners for potentially lost production.

### WETLANDS ARE COMPLEX

**Who has the answers?** No single expert can answer all these questions. That's why we're putting economists, ecologists, policy experts, and land owners together in the field. We're going to pay cash for dry wetlands, restore them, assess their contributions, and create tools to help this process repeat in future.

### OUR RESEARCH QUESTIONS

This interdisciplinary project assembles scientists and economists for collaborative work in the field.

Thanks to this diversity of expertise, our team is investigating a wide array of research questions. Below is a summary of some of the primary ones:

1. Where are the existing wetlands in Alberta, where are the wetlands that have been lost, and where are the wetlands that could be restored?
2. How do we assign value to current wetlands, and ones that could be potentially restored, under the guidelines of the new Alberta Wetlands Policy?
3. What is the true cost of restoring wetlands, including the compensation of land owners and the process of site selection?
4. Can the use of a Market-Based Instrument maximize the efficiency of a restoration project's budget?
5. What sorts of Market-Based Instruments might be most effective in promoting ongoing restoration of wetlands in Alberta?



# HOW GOOD IS YOUR WETLAND?

THE TOOLS DON'T EXIST, SO WE'LL CREATE THEM

## VALUING WETLANDS

With its Alberta Wetland Policy, the provincial government introduced a new system for assigning letter grades – A, B, C, and D – based on the functional value of wetlands. The policy also requires that any wetland lost be replaced by one of equal value (or multiple wetlands of a lower value).

Here's the problem: the policy is so new that the processes for assigning the category are still being perfected. This complicates matters for municipalities and land owners if they want to develop an area containing a wetland – they need to have a firm answer about whether it's an A or a D, so they can understand the cost involved with their offsetting restoration.

The tools we'll create as part of this project will help generate those answers. Combining detailed Light Detection and Ranging (LiDAR) aerial scans of the land surface with state-of-the-art data modelling and analysis techniques, our team will build a system for grading wetlands in accordance with the new Alberta Wetlands Policy. But this new tool won't just be able to grade current wetlands; it'll also be able to predict the potential value of currently-dry (or drained) wetlands could be if they were restored.

## UNDERSTANDING RESTORATION

Restoring wetlands is not a new process. For decades, agents across Alberta have been returning water to lands that had been ploughed over for rural or urban development, but there's never been an opportunity to scientifically monitor one of these wetlands closely enough to see how its performance compares to a naturally-occurring counterpart.

Thanks to the models that allow us to value existing and potential wetlands, we'll now be able to do something unprecedented: follow newly-restored wetlands from their creation, and assess their contributions to a watershed in objective, quantifiable terms.

We'll also be able to test different variations when it comes to restoring wetlands. Should we leave buffer areas around wetlands? Are wetlands more successful if certain types of plants are introduced? The wetlands we restore as part of this project will become living laboratories, and the lessons we learn during the restoration process will be applicable for future restorations across Alberta, and beyond.

## FUNCTIONAL VALUE

With the new Alberta Wetlands Policy, the government has moved to a system of assessing wetlands based on their functional values:

1. Biodiversity
2. Water Quality Improvement
3. Flood Reduction
4. Human Value

As per the policy, all wetlands in the province will be graded – A, B, C, or D – based on each value group.

In addition to these values, the policy also considers the abundance of wetlands within a given area.

For instance, in areas with fewer wetlands, and a track record of wetlands being lost, any wetland might be more valuable.

In areas where there are many wetlands, and no track record of loss, each individual wetland might not be graded as highly.

The goal of the policy is to grade wetlands in a way that acknowledges their real-world contributions, not just their theoretical potential.

This project aims to help inform the grading process, by quantifying the ecological benefits of wetlands, and establishing living laboratories to contribute to learning in the years ahead.



# DONE WITH THAT WETLAND?

WE MIGHT PAY CASH, IF YOU SET THE RIGHT PRICE

## MARKET-BASED INSTRUMENTS

Understanding the science of wetland restoration is vital for this project, but it's only half of the story. In order to restore dry wetlands, we need to have a clear and fair system in place for compensating land owners. The economists on our team are applying an innovative solution using what's known as a 'Market-Based Instrument'.

In plain language, a Market-Based Instrument (or MBI) involves money changing hands, and in this case, the transaction is for the ecosystem services provided by a wetland. Our aim is to test a completely voluntary system in which land owners can state how much they would need to be paid for restoration, but in a market-based environment that maximizes the efficiency of the restoration budget.

The MBI that our economists have selected for this purpose is a reverse auction.

## REVERSING THE AUCTION

Anyone who has solicited multiple bids for a service (for instance, contractors bidding to renovate your house) will be familiar with the process of a reverse auction:

1. Our scientific team will provide land owners in our area of study with information about any dry wetlands on their property. Based on our modeling, we'll also let them know how good each wetland might be if it were restored.
2. Weighing the potential benefits of a wetland on their property against the potential loss of taking that land out of production, the owner can then decide whether he or she would be willing to offer. If the answer is yes, he or she can come up with a bid indicating how much he or she will need to be paid, and a schedule for payment.
3. A variety of land owners will submit their bids, offering drained wetlands on their property for restoration at whatever price they think is fair. We'll assess all of the dry wetlands offered based on price and potential functional value (being cheapest doesn't necessarily guarantee a bid will be accepted), then decide how many can be selected within our fixed budget.
4. Contracts will be signed, payments will be made, we'll restore the wetlands, and our long-term monitoring process will begin.

## A MARKET FOR 'ECOSYSTEM SERVICES'

If you wanted cleaner water in your river, one solution might be to build a water treatment plant upstream. If you were concerned about potential flooding, you might build a dam upstream. There would be costs associated with the construction and operation of both of those facilities, but assuming the price was fair, the benefits would make both projects worthwhile.

What happens when the facility you need to construct is a wetland?

The fact that a wetland isn't made of concrete doesn't change the fact that it's a significant addition to someone's land, which could have an economic or operational impact for decades to come.

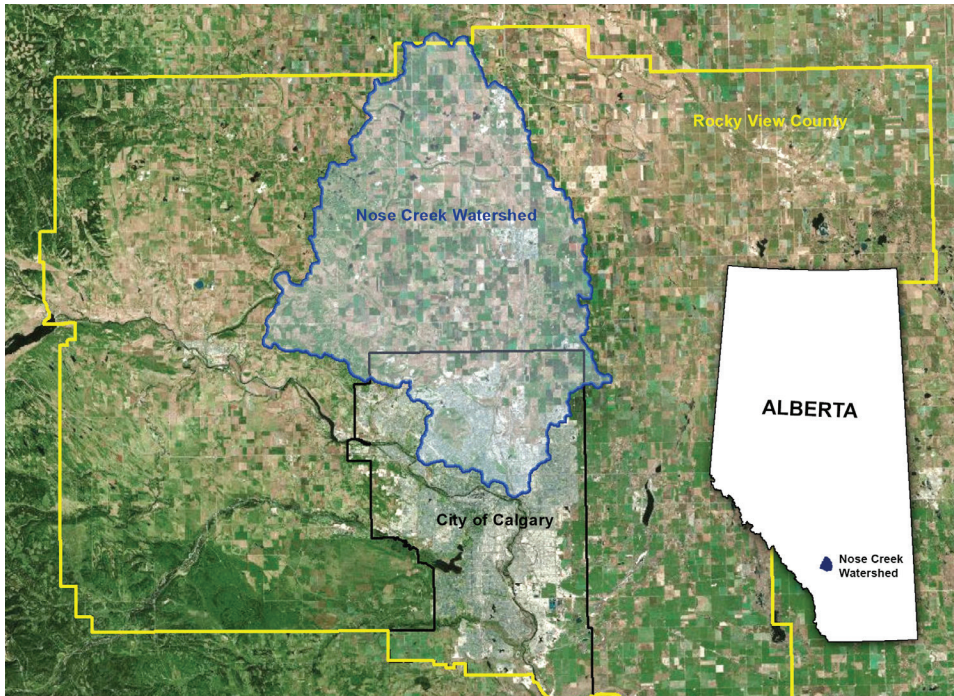
If land owners are going to allow the restoration of wetlands on otherwise-productive property, they need to be truly viable investments. This project will compensate land owners for the benefits (often called 'Ecosystem Services') their wetland provides to their watershed.

Because we're just beginning to fully quantify the benefits of wetlands, we don't have many historical prices to draw on for Ecosystem Services. Establishing a system that allows those services to be fairly priced through a market-based process is another of this project's primary objectives.



# A LIVING LABORATORY

THE NOSE CREEK SUBWATERSHED IS A MICROCOSM OF DEVELOPING URBAN ALBERTA



## LAND USES COLLIDE

For this project, we'll be restoring wetlands in the Nose Creek subwatershed, which encompasses Rocky View County and a slice of north Calgary. This area offers a microcosm of many of the development issues Alberta will face in the coming decades: in one county, we can see the collision of urban areas, ex-urban (country residential) zones, farms, equestrian land, and ranches.

With so many different types of land use occurring in the area, concerns may arise with water quality and stormwater management. In theory, the restoration of wetlands in the Nose Creek subwatershed should help mitigate some of these problems, and the process of restoring wetlands in an area with so many different interests should allow us to test the viability of our reverse auction system.

But the Alberta Land Institute doesn't confine its research to theory. By putting experts from many different disciplines into the field together, we'll be able to collect more data about wetlands restoration than has previously been available. That information will help land owners, developers and municipalities as they navigate the new Alberta Wetlands Policy, and can inform the Government of Alberta's direction on wetlands for years to come.

## OUR RESEARCH TEAM

**DR. PETER BOXALL (CO-PRINCIPAL INVESTIGATOR)** is a Professor of Environmental and Resource Economics and Chair of the Department of Resource Economics and Environmental Sociology at the University of Alberta.

**DR. IRENA CREED (CO-PRINCIPAL INVESTIGATOR)** is the Canada Research Chair in Watershed Sciences and Professor at Western University in the Department of Biology with cross-appointments to the Departments of Earth Sciences and Geography.

**DR. SHARI CLARE (CO-INVESTIGATOR)** is an adjunct Professor in the Department of Resource Economics and Environmental Sociology at the University of Alberta, and a Senior Biologist and Founding Director of Fiera Biological, an Edmonton-based, multi-disciplinary biological consulting firm, specializing in ecological land-use planning, policy development, and wildlife research and management throughout western Canada.

**DR. VIC ADAMOWICZ** is the Research Director with the Alberta Land Institute.

**STACEY O'MALLEY** provides logistical, research support for the research team as the Research Program Manager.

**For more information on this project, contact the Alberta Land Institute:**

[www.albertalandinstitute.ca](http://www.albertalandinstitute.ca)  
[albertalandinstitute@ualberta.ca](mailto:albertalandinstitute@ualberta.ca)  
780-492-3469

