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Institute

Workshop Goal  
To see if we can put a  
strategy that will improve  
municipal ability to  
collect wetland data  
prior to:

- ACCESSIBLE
- UNDERSTAND
- CURRENT
- CONSISTENT



## Municipal Wetlands Data / Survey Results

*Wetlands Datasets and Municipal Issues / Needs*

MOUNT ROYAL UNIVERSITY, CALGARY, AB  
February 13, 2020

Innovative Research. Engaged Communities. Healthy Landscapes.

# Municipal Wetland Data Workshop: Meeting Record

Guy Greenaway and Nicole Kahal

February 2020

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**WATER INNOVATION PROGRAM**

## **Municipal Wetland Data Workshop: Meeting Record**

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February 2020

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# Introduction

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Despite the widely-recognized importance of wetlands, the continuing loss of wetlands, efforts to restore wetlands, and the impact that land use decision-making has on wetlands, municipalities and other stakeholders in southern Alberta do not have access to wetlands data and information that serves their planning and decision-making needs.

There is a need for a wetlands data strategy that can support maintenance and restoration of the region's wetlands by ensuring there is standardized wetlands data, in a form usable for municipal planning and programming, extending across the Bow River Basin, publicly accessible and sustainably current over time. This requires a coordinated, regional approach to developing and maintaining such a data source.

It is not the case that wetlands data do not exist for the Bow River basin. There is, in fact, a plethora of associated data sources ranging from wet areas imagery, to the Merged Wetland Inventory, to drained wetland inventories, to site-specific biophysical assessments. In specific areas, detailed inventories, assessments, and modelling have taken place.

However, when a municipality comes to use (or require the use of) wetlands data, there is a mix of standards and accuracy, patchy accessibility, wide variations in the currency of data, and a lack of understanding of what is available. These circumstances lead to a low level of trust in the data in general. Neighbouring municipalities are often basing wetland-related decisions on very different information.

As well, municipalities do not generally have data in a form that is usable for their type of decision making<sup>1</sup>. For example, simple wetland maps with arbitrary buffers are routinely contested by proponents, wetland restoration programs do not have the data to prioritize their limited resources, and storm management ponds or dugouts may not be differentiated from multi-function wetlands. These issues are exacerbated by the increasing need to understand and plan for wetland complexes at a regional (multi-municipality) scale.

## ***Regional Wetlands Data Strategy Project***

In 2019, the Miistakis Institute initiated a the *Regional Wetlands Data Strategy* project seeking to address these issues by developing a clear understanding of: the municipal needs for

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<sup>1</sup> One source of information confirming this assessment is the Community Conserve website ([www.communityconserve.ca](http://www.communityconserve.ca)) where municipal personnel in Alberta can post and vote on environment and conservation issues of concern. The highest rank issue was "*Municipalities don't have access to good wetlands data.*"

wetlands data, the opportunities and challenges with the existing data, and a pragmatic method for collecting / creating / maintaining data and information that municipalities can use in wetland conservation and restoration.

To date, the tasks in this project have included:

1. Surveying and interviewing municipal personnel in the Bow River Basin as to the issues they see with their ability to access and use wetlands data, and the related needs they have.
2. Cataloguing wetlands data sets that are currently in use by, or are available to, municipalities in the Bow River Basin.
3. Convening a workshop to: 1) confirm that the conclusions of the initial issues, needs, and data surveys are correct; 2) raise awareness as to the existing and potential opportunities for municipalities regarding wetlands data; and 3) identify potential elements of a collaborative strategy for securing wetlands data that serves their need.

This report is the summary of that last task, a workshop which occurred on February 13, 2020, at Mount Royal University in Calgary, Alberta.

## Workshop context

To design the workshop, Miistakis first surveyed municipal personnel in the region regarding the idea and a potential agenda. A date was set and invitations were sent to targeted municipal personnel, as well as to the Chief Administrative Officers of all municipalities in the region. Both the Alberta Urban Municipalities Association and Rural Municipalities of Alberta carried a notice of the workshop in their newsletters.

The workshop was limited to people directly associated with a municipality (staff, managers, and councilors), as well as the Bow River Basin Council and the Oldman River Regional Services Commission. Despite not meeting the exact criteria of “municipalities in the Bow basin”, the latter two were invited due to their expertise and direct roles in supporting municipalities in the region.

In the end, approximately 25 people, representing 12 different municipalities in the region attended.

***It was made clear to all participants at the workshop that they were not there to commit their municipality to anything, and their comments would be aggregated and not be attributed to any individual.*** All participants were given the opportunity to review the meeting record, and ensure it was true to this principle.

## Workshop website

Preparatory materials for the workshop were provided to participants in advance via a website, and all subsequent documents (presentations, reports) were provided back through the same site:

[www.wetlanddataworkshop.ca](http://www.wetlanddataworkshop.ca)

*(note: the initial website was intended to be temporary, and had the URL: <http://guy9590.wixsite.com/wetlandsworkshop>)*

## Presentations

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### Welcome and Context Setting

Miistakis began by welcoming participants and articulating the workshop goal:

*To see if we can plot a strategy that will improve municipalities' ability to secure accessible, usable, current, consistent wetlands data*

To further clarify the goal, each element of the desired data outcome was described:

**Accessible** – not hidden behind paywalls; not withheld by provincial government; not hidden behind non-disclosure or other restrictive agreements

**Usable** – supports municipal planning and conservation programs; supports municipal spatial data systems; at a resolution and projection appropriate for municipal-scale decision making; contains the necessary wetland class and supporting information

**Current** – is up to date, and has a mechanism to stay up to date

**Consistent** – is similar between municipalities; uses data standards consistent with the province, industry, and other municipalities; uses consistent classes and sub-classes

## Municipal Wetlands Data / Survey Results

Miistakis presented a summary of the background work completed to date for the project. This included the effort to catalogue the existing wetlands data sets in use by / available to municipalities in the Bow River basin, and the work surveying municipal personnel regarding their wetland-data needs and issues.

The actual reports, as well as the slide deck of this update, can be found on the project website: [www.wetlanddataworkshop.ca](http://www.wetlanddataworkshop.ca)

- [Dataset Survey](#)
  - *Wetlands Datasets in the Bow River Basin: A Preliminary Catalogue of Wetlands Datasets Available to Municipalities*
- [Issues & Needs Survey](#)
  - *Wetlands Data Needs and Issues: A Survey of Municipalities in the Bow River Basin*
- [Dataset/Needs PPT](#)
  - *Municipal Wetland Data / Survey Results: Wetlands Datasets and Municipal Issues / Needs*

## Guest Speaker Presentation

The workshop was lucky enough to have two of the foremost experts in this topic speak, each with extensive experience in both the policy and the practices related to wetland data in Alberta.

Irena Creed and Shari Clare<sup>2</sup> presented a synthesized presentation: *Policy, Potential, Practice and Power: How Municipalities Fit into the Wetland Management Puzzle* (also available on the workshop website).

*Policy* – spoke to the “complex and multi-jurisdictional environment” within which Alberta wetlands are managed, including the Alberta Land Stewardship Act, the Public Lands Act, the Water Act, the Municipal Government Act, and the policies and guidelines under these such as regional plans, wetland assessment guidelines, the Wetlands Policy, various municipal plans; then went deeper into the mitigation hierarchy, relative wetland value, Alberta Wetland Rapid Evaluation Tools, and the Alberta Wetland Classification System.

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<sup>2</sup> See short biographies for each speaker in Appendix XX

*Potential* – spoke to “why should and how can municipalities conserve wetlands”, including metrics of loss, value of isolated wetlands, the ‘portfolio’ of travel time distributions, the Nose Creek Watershed case, and the challenges that science can help managers overcome:

- FIRST, if we can’t map it, then we can’t manage it.
- SECOND, if we don’t protect a representative portfolio of functions, then essential functions and associated services will be lost.
- THIRD, if we don’t consider the type of connections to the drainage network, then our management actions may have unintended consequences.
- FOURTH, if we don’t consider management objectives that may differ across policies and across jurisdictions, then we place society at risk.

*Practice* – spoke to “tools and information municipalities need to effectively manage wetlands”, including wetland inventories, air photo imagery, satellite imagery, LIDAR, mapping standards, the Chestermere inventory, and the Parkland study,

*Power* – spoke to “how municipalities can be more involved in wetland management,” including using the power of the Alberta Land Stewardship Act, municipal statutory plans, not-restorative replacement options under the Wetland Policy, funding wetland data development, the provincial restoration directive, and accessing provincial data.

## Questions and Answers

*Question:* How important is time of year when conducting inventories?

*Answer:* Essential. Depends on the attribute you are looking at. If everything, you need snapshots throughout each season, which is essential for capturing biodiversity. An early spring image during a wet year is good to see basins at their max capacity, but would over-map seasonal, temporary, and ephemeral wetlands. A spring image from dry year would be good. LiDAR is most accurate when everything is dry to give best relief.

*Question:* Over mapping or under mapping – if assuming all depressions are or were wetlands, are you reconciling this with other data?

*Answer:* If luxury of time, then yes, they would ground truth. If it’s needed depends on the question. You might want to ground truth 10% of wetlands. But if you need high accuracy, then maybe you need a different strategy. They don’t just take every depression as a wetland with LiDAR. There is a complexity of using spectral and depression data, ways of thinking intelligently about this and looking at different cover types.

*Question:* Wetland policy (A, B, C, D rankings) – how do you account for function in the value?

*Answer:* Wetland policy scores based on function and restores based on area. For an A value replaced with a D, you have to replace 8 times the area, which is only accounting for area and not function.

Municipalities need to be empowered to create more push on wetland issues. Not an easy thing to do, province doesn't necessarily have to respond the way municipalities want, but they will respond.

*Question:* What would it cost to do some of the wetland inventory mapping for a municipality like Fiera did with North Saskatchewan Watershed Alliance?

*Answer:* Per sub-basin, creating wall to wall landcover classifications, with wetlands classification in there: most will cost around \$70-80k for SPOT and LiDAR (but data not in this cost, as NSWA received data for free from the province).

Strength in numbers, come together as collaborative – these numbers can come down.

*Question:* Sustainability? What is the cost of updating?

*Answer:* With using machine learning – training data selection is very time consuming. You can, with some caution, re-use some training data for an update, but essentially you are recreating classifications each time. There isn't much efficiency, as you are re-doing each time. As technology continues to improve, the cost will continue to come down.

## Issues and Needs Discussion

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### Structure

Prior to the workshop, Miistakis had distilled the feedback from the survey, and pre-created 'flip chart' sheets that were posted around the room to guide discussion. In each case, the discussion was aimed at 'correcting the homework', asking participants:

- Are the items listed the right ones?
- Is the prioritization accurately represented?
- Do some need to be removed?

The symbols indicated the following:

- \*\* scored numerically in the top third
- \* scored numerically in the middle third
- [no \*] scored numerically in the bottom third

It is important to note that even the bottom third items were indicated as important in the surveying, so no item on these lists can be said to have been deemed 'unimportant.'

## Wetlands Data *Issues*

### Access

- \*\*Data is too expensive to gather / update (responsibility for who pays varies)
- \*\*We have limited capacity (computer, personnel, knowledge)
- \*\*We are unclear what data is available
- Municipalities may not have permission to access existing wetlands datasets

### Reliability/Variability

- \*\*It is outdated
- \*Reliability varies (conservation groups, development proponents, provincial governments, municipal governments, landowners; all have biases)
- \*Accuracy varies (different resolution, currency, extent [gaps], methods)
- \*Wetlands themselves can change (year-on-year, seasonally, after storm events)
- No reliable way to identify where wetlands are

### Applicability

- \*\*The data fields do not serve our purposes
- \*The classification system does not work for our needs
- Data resolution is too coarse for our purposes

### Roles / Responsibilities

- \*The role of municipalities in wetlands management (and data collection) is unclear, and possibly unrealistic
- \*The role of the provincial government regarding wetlands data is unclear
- \*Role of other stakeholders (biologists, hydrologists, verifiers, etc.) is unclear
- \*Development applications trigger detailed consideration of wetlands

### Additions at the workshop

- Roles and responsibilities of municipalities – the ‘vision’ of municipalities: what and why?
- Developers tool for land development/ wetland loss, support for conversation
- Timing of data availability
- Can’t ‘avoid’ with no data!
- Environmental Reserve can be a wetland (interm. ephemeral) Class III, IV, V
- Can map wetlands you think are crown and environmental reserve
- Can’t quantify benefits
- Need to value benefits
- Need council buy-in, community buy-in
- Info integration across municipal department
- Need to use familiar tools
- Purpose of data – drives buy in
- Logistics of data – storage, etc.

- Support for updating
- Longer term data strategy needed
- Capacity – data management/process, will they need a specialized personnel?
- Data/expertise back to consultants world
- Other implications behind data

## Wetlands Data Needs

### General information and context

- \*\*Size, dimensions, boundaries, permanence
- \*\*Connectivity to other wetlands and water bodies
- \*Connections to other municipalities, wetlands in the region
- \*Water volumes
- \*Ecological information
- Drained wetlands
- Dollar values

### Support for

- \*\*Site-specific development decisions
- \*\*Plans, both for specific area and cross-municipality (e.g., ASP, MDP)
- \*\*Wetland conservation efforts (retain/protect, restore, offset)
- Stormwater management

### Comparability

- \*\*Useful classes
- \*Common datasets
- \*Data standards

### Additions

- User-friendly, understanding, consistent expertise
- \*\* More emphasis on drained wetlands – restorable wetlands
  - There was a suggestion to re-frame this as historical dataset
  - Irena highlights difference between historical and drained. Historical can mean what would have been there on a pristine landscape, can't pinpoint wetlands from a historical photo, can make an estimate not spatially.
  - Shari emphasizes that if you know where wetlands have been impacted (water being diverted, ect), those are wetlands that could be restored to meet our obligation to replace.
- Support for wetland banking
- \* More emphasis on dollar valuation

- Suggestion to separate wetland retention and wetland conservation. Particularly in an urban environment. May relate back to how a municipality will weight the different characteristics in wetland valuation
- \* Stormwater management
  - Licensing implementation
- Inform/educate private property wetlands
  - to be able to tell land owners how decisions are made
- Reduce costs for landowners and municipalities
- ABRWET/ Stewart Kantrud correlated
- Developing buffer/ guidelines
- Water chemistry (phosphorus, algal blooms, land use connections)

## Parking Lot

During the surveying, a number of points arose that were important, related wetland conservation, but did not relate (directly) to wetland data. These were captured on pre-created flip chart sheets as well, and posted in the room.

### Education and Awareness

- Many landowners believe in a “right’ to drain or impact wetlands
- Lack of understanding regarding relationship of the Water Act and Wetland Policy
- Planners approve developments without understanding/knowing that wetlands need to be considered
- Education needed for land owners about what is defined as a wetland, what regulations are in place to protect them, and why

### Enforcement, Assessment, and Inspection

- Lack of enforcement of wetlands-related regulations
- Unclear who is responsible for identifying that a wetland may be impacted by a development
- Identifying wetland drainage / impacts for proposed developments is different than agricultural operation draining wetlands in a field

### Government of Alberta roles (non-data)

- Provide regulatory backstop
- Provide clarity on wetland policy
- Provide support in quasi-legal circumstances (MGB, SDAB)
- Provide education resources

# Moving Forward

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## Context

As noted at the beginning, the goal of the workshop was “to see if we can plot a strategy that will improve municipalities’ ability to secure accessible, usable, current, consistent wetlands data.”

Again, the survey information was used to pre-create a flip chart sheet, this one with a proposed ‘ideal situation’:

*Wetlands Data That is:*

- Readily available to all municipalities
- Up-to-date, and regularly updated
- Not cost-prohibitive
- Consistent classes and data standards (across municipalities, between municipalities and GoA, standardized data protocols)
- Usable in advanced modelling
- Accurate to the [ ] level (lot? quarter?)
- Capable of being integrated into municipal asset management regime
- Held and served by [ ]
- Includes information about [ ]
- Paid for by [ ]

## Discussion

The discussion did not make any substantive changes to this, but instead focused on summarizing: 1) what municipalities need, 2) what specific actions are required, and 3) to whom Miistakis’ recommendations should be directed.

### What municipalities need?

- Cost clarity
- Equitability – beholden to decisions of neighbors
- Clear answer to ‘why?’ benefits
- Data catalogue (clarity)
- User manual – questions data could answer
- ‘Shari tool kit’
- Get ahead of the curve
- Scenario information using the same data
- Data and dollars

## What specific actions are required?

- Get SPOT and LiDAR data from Government of Alberta
  - Approaches: 1) get data together, ask GoA 2) go to GoA first
- Workplan: SSRP [South Saskatchewan Regional Plan], responsibility ... but, missing good data on wetlands
- Ask for data
- Ask for money
- Write letter asking for data
- Test the standard
- 'Proposal' to GoA – step 1 in delivering on our regional plan requirements: data
- Try to access restoration \$ (i.e., help them spend it)
- Leverage data and data sharing
- Nose Creek Watershed Partnership – explore partnership/ test case
- Reaching out beyond Bow River Basin (Oldman River Regional Services Commission, North Saskatchewan Watershed Alliance)

## Direct recommendations to ...

- Council
- BRBC
- Government of Alberta
- AUMA/ RMA
- CMRB
- Red Tape Reduction Ministry
- Irrigation Districts – will consider
- Duck's Unlimited Canada

## Commentary

The following comments of note arose during the discussion:

- The Government of Alberta share data with WPACs as there is a specific agreement for what they are to do.
- Unclear about why provincial reluctant to share, but that WPACs and municipalities collectively asks for the data, the GoA would have to respond.
- Government is under-resourced, and waiting for solutions to 1) deal with the problem of wetland management, 2) expend \$ from compensation fund. GoA won't come to municipalities, but may be open if municipalities come to them.
- Suggestion that municipalities come together and request collectively for data, to get ahead of the curve and become early adopters of what's soon to be the standard, and become municipalities that could test the standard.

- Calgary Metropolitan Region Board has new ESA policies; municipalities may not have the capacity to map all ESAs, but recognize its needed (wetlands included in ESAs)
- We want to consider bringing in other municipalities to join the effort; the more municipalities in Alberta work together on this, the better. Want to avoid a situation where multiple municipalities or watersheds come up with the definitive answer.
- First Nations Reserve does not have to follow the provincial wetland policy because it is on federal land. They could potentially be valuable partners; in Ontario, first nations are leading the creation of the nutrient markets, empowered to model the way for some nature-based solutions.
- Sticky note commentary
  - For roads under WAIF? Does this not apply to class of road?
  - Constructed wetlands can lead to a secondary slump

## Next Steps

Throughout the Moving Forward discussions, there was general agreement with the idea of trying to do something collective, that a common approach to wetland data is a good strategy, that the Government of Alberta has a significant role to play, that there are benefits to collectively making an ask to Government of Alberta, though there is still a question mark around funding something like this.

This information will underpin the next steps in Miistakis' *Regional Wetlands Data Strategy* project. At the meeting, Miistakis committed to undertake the following:

- Develop this meeting record (and associated materials) and provide them back to the participants;
- Give participants the opportunity to review the document before it is made public to ensure it accurately represented their discussion;
- Reach out to other groups (potentially other municipalities, Ducks Unlimited, irrigation districts, NSWA, CMRB, or other relevant municipal stakeholders);
- Create a proposal for consideration by municipalities in the Bow River basin for moving forward with a collective plan for securing wetlands data; and
- Convene a small group of people from the attendees to support that task.

# Appendices

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# Appendix 1: Agenda



## AGENDA

### MUNICIPAL WETLANDS DATA WORKSHOP

#### Using Wetlands Data in Municipal Planning and Wetland Conservation

February 13, 2020; 10:00am – 3:30pm  
Rm EC 2075, Roderick Mah Continuous Learning Centre  
Mount Royal University, Calgary

Time	Activity
10:00 - 10:15	Welcome and Overview
10:15 - 10:45	<b>Presentation 1: The Current Situation</b> Results of data cataloguing survey, and municipal surveys and interviews by the Miistakis Institute
10:45 – 12:15	<b>Presentation 2: “Policy, Potential, Practice, and Power: How Municipalities Fit into the Wetland Management Puzzle”</b> Irena Creed, University of Saskatchewan Shari Clare, Fiera Consulting
12:15 - 1:00	<i>Lunch Break</i>
1:00 - 2:00	<b>Discussion 1: Issues and Needs</b> Confirmation of the issues and needs Group discussion of needs
2:00 – 3:00	<b>Discussion 2: Securing municipally-relevant wetlands data</b> Group discussion of potential collaborative strategy
3:00 - 3:30	<b>Wrap up and next steps</b> Determining next steps
3:30	<i>Adjourn</i>



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## Appendix 2: Participant list

### Participants

- Madeleine Baldwin, Oldman River Regional Services Commission
- Mark Bennett, Bow River Basin Council
- Quincy Brown, City of Calgary
- Vanessa Carney, City of Calgary
- Clint Goodman, City of Airdrie
- Amanda Legros, Town of Cochrane
- Julie McLean, Foothills County
- Dana Mears, Town of Cochrane
- Russel Muenchrath, Wheatland County
- Michael Murray, Bow River Basin Council
- Prabh Sodhi, Rocky View County
- Jen Stenseth, Town of Okotoks
- Carrie Stettner, City of Chestermere
- Réanne Pohl, Mountain View County
- Stefan Price, Town of Cochrane
- Geoff Tiffin, County of Newell
- Kendra Tippe, Municipal District of Bighorn
- Sandi Riemersma, Palliser Environmental
- Kim Unger, Town of High River
- Ethan Wilson, Town of Strathmore
- Hailey Winder, Oldman River Regional Services Commission
- Sheri Young, Town of Okotoks

### Presenters

- Shari Clare, Fiera Biological Consulting
- Irena Creed, University of Saskatchewan

### Miistakis Institute

- Guy Greenaway, Miistakis Institute
- Nicole Kahal, Miistakis Institute
- Tracy Lee, Miistakis Institute

## Appendix 3: Speaker bios

### **Irena Creed, PhD** *Professor, Associate Vice-President Research*

Irena Frances Creed is a Professor of the School of Environment and Sustainability and Associate Vice-President Research at the University of Saskatchewan.

She earned her bachelor of science, master's and PhD degrees at the University of Toronto. Prior to coming to USask in September of 2017, she was a professor and Canada Research Chair at Western University. As an ecosystem scientist, her wide-ranging research interests include planetary health, climate change, ecology, hydrology, biogeochemistry, sustainability, communities-at-risk, and the science-policy interface. She has researched environmental issues across Africa, Asia, Europe and North America.

Irena has co-authored six national and international reports and 150 peer reviewed publications, including recent publications in top journals such as *Nature Geoscience*, *Nature Sustainability*, the *Proceedings of the National Academy of Sciences*, *Global Change Biology*, and *Frontiers in Environmental Science and Ecology*. In addition, she has contributed to two international peer-reviewed reports on the state-of-science— one for the U.S. National Academy of Sciences and the other for the Global Forest Expert Panel and the International Union of Forest Research Organizations based in Austria. Irena has given over 40 invited, plenary, and keynote addresses in the last five years alone.

Irena currently holds adjunct positions at Western University and at the United Nations University Institute for Water, Environment and Health.

Her work has been recognized with many awards and honours, including receiving an honorary doctorate from the Swedish University of Agricultural Sciences in Uppsala, Sweden and being inducted as a Fellow of the Royal Society of Canada in 2019.

### **Shari Clare, PhD, PBIOL** *Director, Sr. Biologist, Fiera Biological Consulting*

Shari Clare is a professional biologist and one of the co-founders of Fiera Biological Consulting Ltd., a small environmental consulting firm based in Edmonton. Shari has over 20 years of experience working in Alberta, and specializes in watershed and wetland management, systematic conservation planning, and wetland ecology and management. Over the last decade, Shari has focused a great deal of her professional and academic work on creating better tools and policies for managing wetlands, including more accurate inventories and standardized methods for assessing wetland and riparian habitat condition using GIS and remote sensing technology. She has expertise in developing and critiquing environmental policy, and in ecosystem service assessments and the use of market-based instruments to improve environmental outcomes. Her work as a consultant gives her considerable insight into how government law and policy influences the decision-making of both the regulators and the regulated, and she has a number of publications examining the successes, barriers, and unintended outcomes of wetland policy implementation in the province of Alberta. Shari is also a firm believer that municipalities are essential players in improving wetland conservation and restoration outcomes in the province.

## Appendix 4: Policy excerpts

Two resource documents were circulated at the workshop, both excerpts from Government of Alberta policy documents related to wetlands. This “Alberta Wetland Policy and Classification Excerpts” can be found on the [www.wetlanddataworkshop.ca](http://www.wetlanddataworkshop.ca) web site.

### Wetland Management System

This excerpt from Alberta Wetland Policy was circulated because it:

- 1) describes the wetland mitigation hierarchy, and
- 2) explains the Relative Wetland Value scoring.

### Alberta Wetland Classification System

This excerpt from Alberta Wetland Classification System was circulated with Miistakis-added highlighting to show how the current system correlates to the more-familiar “Stewart and Kantrud” system (Class I to VII) still in use in many municipal policies.

### References

Alberta Environment and Sustainable Resource Development (ESRD). 2015. *Alberta Wetland Classification System*. Water Policy Branch, Policy and Planning Division, Edmonton, AB.

Alberta Environment and Sustainable Resource Development (ESRD). 2013. *Alberta Wetland Policy*. Government of Alberta. Edmonton, AB.

Stewart, Robert E. and Harold A. Kantrud. 1971. *Classification of Natural Ponds and Lakes in the Glaciated Prairie Region*. Resource Publication 92. Published by the Bureau of Sport Fisheries and Wildlife. Washington, DC.