



**WETLANDS
BEST
MANAGEMENT
PRACTICES
WORKSHOP**

PROCEEDINGS

**WHAT WE HEARD, WHAT WE LEARNED
AND WHERE WE'RE GOING NEXT**

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Ducks Unlimited Canada
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Executive Summary

A 1.3 billion-acre landscape defined by water and wildlife that those flying overhead describe as a shimmering blue ripple that comes alive each morning as the sun rises. This landscape, the boreal forest, is worthy of our attention and our conservation efforts. By establishing a united and respected voice of industry, government, non-profit and other stakeholders for planning and operating best management practices for working in and around Canadian boreal wetlands we have an opportunity to work together to achieve mutual wetland conservation goals.

These proceedings describe the findings of the Wetland Best Management Practices (BMPs) Workshop held on January 20th & 21st 2016 in Edmonton, Alberta hosted by Ducks Unlimited Canada (DUC). Over 100 participants from various industries, governments, consulting companies and not-for-profit organizations listened to presentations and engaged in discussions about planning and operating practices that could be adopted to effectively manage Canadian boreal forest wetlands. The purpose of this workshop was to: 1) promote the sharing of information about effective planning and operating BMPs for working in and around boreal wetlands; and 2) identify user preferences to help guide the creation of boreal wetland BMP Information Management and Exchange System (IMES) to promote the sharing of information among stakeholders. The focus of this report is on the discussions held during the workshop relating to wetland BMP information participant needs. As a practitioner or like-minded organization, we invite the reader to take note of the key findings and next steps with respect to developing and implementing wetland BMPs for the boreal forest and exploring the development of an IMES for wetland BMP information.

Workshop Presentations and Discussions

Information was shared and exchanged at the workshop in a number of formats including presentations and demonstrations on information management and exchange, table top discussions on motivations for attending and approaches to sharing BMP information, government and industry keynote presentations, and BMP presentations on a range of topics (*e.g.*, roads, transmission lines, pipelines, integrated land management). From these sessions we heard a diversity of thoughts and opinions about why wetlands and wetland BMPs are important to companies and organizations working in the boreal, what a successful future would look like, what's currently going well, current gaps and challenges, and next steps with respect to wetland conservation, wetland BMPs, and a wetland BMP IMES. A number of themes came up consistently through table top discussions, presentations, private conversations, IMES questionnaires, and evaluations. A sample of these themes included regulatory challenges, developing

and promoting effective and accessible information sharing, improving communication among companies and across sectors, creating the room and knowledge base for innovation, increasing understanding about BMP effectiveness and cost, and promoting and delivering wetland education at all company levels.

Key Findings

We learned much from what we heard and used this information to identify: (1) key workshop conclusions; (2) directions for a BMP IMES; (3) knowledge gaps in the form of questions that were raised but not easily answered; and (4) polarities that will need to be balanced as we move forward.

1. Key Workshop Conclusions

The discussions, presentations, and conversations demonstrated that there is interest in wetland BMPs and in a way of managing and sharing wetland BMP information. There is also a desire, expressed across industry sectors, to go above and beyond the current regulatory minimums so that we get to a place where ‘doing the right thing’ is the norm not the exception. Participants spoke about need to break down existing communication barriers – whether these be company or organization silos, industry silos, or a desire to keep information private. They expressed hope at getting to a place where sharing challenges and failures was as acceptable and common place as sharing successes.

2. Directions for an Information Management and Exchange System

There is interest in working collaboratively both to develop BMPs and to explore the development of a wetland BMP IMES. Participants were clear that a BMP IMES is not a project that DUC, or any other one entity, should undertake alone and that a working group composed of government, industry, non-profits and other stakeholders should be established to work on this. With respect to what participants want in a BMP IMES, we heard a number of (often divergent) suggestions; however, common to most discussions was the recommendation to start small, simply, and to build on an existing platform such as WetlandNetwork.ca if possible. We also heard from numerous participants that computer system or not, there is a continued need for face-to-face interaction and different types of opportunities for developing and sharing BMP information. The workshop demonstrated that there is a community of practitioners, regulators, and other stakeholders who have a common interest in wetland BMPs and a BMP IMES and who are interested in building on the momentum developed at this workshop.

3. Knowledge Gaps

The workshop also taught us about what we don't know and we identified a number of hard questions that were left unanswered or partially answered, that represent some of our known knowledge gaps. When it comes to wetland BMPs in the boreal forest, the following quote may apply:

“As we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know”. – Donald Rumsfeld^[1]

Some of the questions that were asked that highlight our known knowledge gaps include, but are not limited to – ‘What are key current regulatory concerns and challenges that influence the uptake and application of BMPs, and how can these challenges be overcome?’; ‘Where can I go to find information about wetland BMPs?’; ‘How can we reduce the disconnect between what happens at the planning and operations levels with respect to wetland BMPs?’ Addressing these questions will help fill known gaps and may help us discover the unknown knowledge gaps.

4. Polarities

There are no black and white answers in the application of wetland BMPs. Workshop participants expressed many diverging opinions that can be framed as polarities. Polarities are of interest because they represent topics on which individuals or the collective are divided in what they want, and successfully addressing the spectrum of needs will require a non-traditional approach. Some examples of polarities include the divergence between those who want BMPs to be incorporated into regulations and those who think they need to be separate from regulations in order to innovate or those who want a BMO IMES to include a decision support process where they will be given guidance on what BMP to use while others want to be presented with options that *they* can choose from. These polarities pose the challenge of meeting different and sometimes seemingly incompatible needs, but they are also present an opportunity to apply alternative problem solving approaches that allow for flexibility and innovation.

Recommendations and Next Steps

Based what we heard and learned from the workshop, we have identified recommendations for the BMP community and next steps for DUC. A few of these recommendation include: the development of a collaborative network that is able to work together to support and promote the development of wetland BMPs; that there be more support for and implementation of wetland and wetland BMP education and outreach; and the establishment of a collaborative working group to explore and inform the development, management, and funding of a wetland BMP IMES. We also think that there are steps

that can be taken by individual companies, such as establishing internal BMP programs and sharing the value and lessons learned from these programs with others. And by government, such as clearly establishing and communicating where wetland BMPs fit into current and future regulatory regimes.

Some of the steps DUC will take include establishing a BMP IMES working group composed of DUC, industry, government and other stakeholders to help us explore and inform the path of a potential BMP IMES. We will work toward building a network of contacts with an interest in developing and evaluation potential wetland BMPs and we will work collaboratively with this network to identify information gaps and to facilitate collaborative research and evaluation of BMPs. As well, DUC will continue to act as a conduit for information exchange through a diversity of ways including workshops, wetlands training, guides and handbooks, case studies and demonstrations, and other forms of information sharing.

These next steps reflect not only DUC's conservation goals, but also represent steps towards meeting some of the gaps and challenges identified by workshop participants. We believe that collaboration and partnerships are key to DUC achieving these next steps, and we invite you to join us so that together we can achieve our common objectives related to wetland conservation.

For more information on the workshop, workshop proceedings, or the DUC BMP program, please contact Ducks Unlimited Canada – 17915 118th Avenue NW, Edmonton, Alberta, T5S 1L6, phone: 780-489-2002, email: wbf_bmp@ducks.ca.

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1. Introduction

Ducks Unlimited Canada is a not-for-profit science-based organization. We conserve wetlands and other natural spaces for waterfowl, wildlife and people. DUC's conservation vision is to conserve a mosaic of functionally integrated landscapes capable of sustaining healthy wetlands and populations of waterfowl and other wildlife. DUC has identified Canada's boreal forest as a high priority landscape for conservation because of its known importance to waterfowl as breeding, staging, molting and migrating habitat. DUC's National Boreal Program aims to achieve its conservation goals by supporting two principal avenues of conservation: establishing protected areas and implementing sustainable land use practices compatible with conserving waterfowl and waterfowl habitat.

One method for helping achieve sustainable land use is to implement a suite of best management practices (BMPs) that help ensure the highest environmental standards are met. DUC's Boreal BMP Program was developed to help industry's growing efforts to implement practices that support the responsible management of wetlands, waterfowl and waterfowl habitat. DUC is working collaboratively with other organizations (*e.g.*, industry, government, academia) to identify and understand the potential impacts of industrial activities on wetlands, waterfowl and waterfowl habitat and we have been collating planning and operating practise that are/can be used to mitigate potential impacts. We have been evaluating practices and using our collective wetland and waterfowl knowledge to help improve existing practices and develop new ones.

To aid in our efforts we developed an internal wetland BMP database. External interest in this database led us to believe that other organizations were challenged by locating, accessing, managing and tracking up-to-date BMP information and that BMP information management and exchange was key to the success of BMP implementation and sustainable development. A survey of external stakeholders indicated that some companies lack access to the tools required to evaluate, adopt and implement effective BMPs. In addition, survey participants indicated that they would like information developed and delivered through a number of methods including hardcopy reports, databases, workshops, demonstrations, seminars, and webinars.

As a follow up to that initial BMP information management and exchange needs assessment DUC hosted a two-day Wetlands Best Management Practices (BMPs) Workshop in January 2016. Over 100 participants from various industries, governments, consulting companies, and not-for-profit organizations listened to presentations and engaged in discussions about planning and operating practices that could be adopted to effectively manage Canadian boreal forest wetlands. The purpose of this workshop was to: 1) promote the sharing of information about effective planning and operating BMPs for working in and around boreal wetlands, and; 2) identify user preferences to help guide the creation of boreal wetland BMP Information Management and Exchange System (IMES) to promote the sharing of information among stakeholders.

Day 1 of the workshop focused on information management and exchange. It included presentations on how companies collect, manage, store, and share BMP information; demonstrations of IMES websites and a questionnaire related to these demonstrations; and discussions about challenges and opportunities relating to the sharing of BMP information. Day 2 of the workshop provided opportunities for exchanging BMP information. Day 2 included government and industry keynote presentations,

followed by three roads plenary presentations, a panel question-and-answer period with keynote and plenary speakers, and fourteen concurrent BMP presentations on a range of topics including pipelines, well pads, emerging technologies, and integrated land use planning. This report summarizes what was heard and learned primarily during discussions that occurred on first day of workshop in relation to developing and sharing wetland BMP information, provides recommendations on what needs to be done to build on the momentum generated at the workshop, and outlines steps DUC is and will take to meet its goals in relation to wetland BMPs and sustainable land use. Summaries of workshop presentations will not be provided in this document but can be found on the workshop website: <http://wfbmp.wix.com/duc-bmp-program>.



2. What We Heard

Over the course of the workshop there were opportunities for structured as well as unstructured discussions. In this section we summarize what we heard from the Opening Table Top discussions, the Information Management and Exchange System (IMES) discussions, and the IMES Questionnaires.

2.1 Opening Table Top Discussions

After the [opening remarks](#) by Kevin Smith, Manager of DUC's National Boreal Program, we asked participants to engage in table top discussions about the following questions: 1) Why did you come?; 2) What did you want to get out of the workshop?; 3) What is important to you about wetland BMPs?; 4) What is your vision for where we will be with respect to wetland BMPs in 2020?; and 5) How would we know if we got it right? Below are summaries of these discussions. Complete moderator notes can be found on the workshop [website](#) (Appendix 1).

2.1.1 Why did you come?

Participants attended the Workshop for a number of reasons and most participants expressed multiple motivations for attending, including:

- The desire to share knowledge and information with others
- The opportunity to learn from the experiences of others
- Increasing corporate awareness of the importance of wetlands
- Networking opportunities
- The impending Government of Alberta wetland policy implementation in the Green Zone of the province
- Curiosity

Participants attended for the opportunity to present new ideas and share their work with others. Many participants expressed a desire to learn about what others are doing, regulatory updates and changes, collective information and knowledge gaps, and how industry is meeting existing regulatory requirements and guidelines. A number were interested in taking what they learned back to their colleagues who were unable to attend. Participants less familiar with DUC were also interested in learning more about DUC's mandate and the work we are doing in the boreal forest. As well, there was an interest in general wetland knowledge. Some participants noted a specific interest in hearing from industries that they don't normally have the opportunity to interact with and in learning about others' perspectives on wetland issues and BMPs.

2.1.2 What do you want to get out of the workshop?

Participants' desired outcomes from the workshop strongly reflected their reasons for attending and above all included learning what others are doing and sharing their work, including:

- Acquiring practical tools and practices, learning more about DUC, learning more about policy (specifically the new Government of Alberta wetland policy)
- Learning about what's new and improving
- Gaining a better understanding of wetlands
- Learning how to minimize impacts

- Moving beyond silos and discussing how to get buy in
- Sharing what they are doing and using the workshop as an opportunity to present ideas to particular sectors.

Many participants felt that the workshop would be a good networking opportunity and were looking forward to meeting with particular companies and groups or were looking forward to the opportunity to meet, learn from, and share with companies and organizations from different sectors that they get few opportunities to interact with. Many participants were interested in learning more about the new Government of Alberta wetland policy and some were specifically interested in learning about how the compensation requirements will influence their work. Participants were also interested in learning about how other companies and organizations share BMP and wetland knowledge internally.

2.1.3 What is important to you about wetland BMPs? Why do you care?

- Supporting conservation efforts
- A passion for wetlands, wildlife and the boreal forest
- Desire to see effective regulation and sustainable development
- Recognizing the power of social license

2.1.4 BMP 2020? What does it look like?

- Better communication and information sharing
- Knowing more than we do now
- Increased awareness of the importance of wetlands and the need for tools to conserve them
- More compliance with regulations and better alignment and application of regulations relating to wetlands

Comments relating to improved communication and information sharing included the desire for multi-sectoral BMPs that are consistent and used across the country; transparency about success, challenges and failures; better information dissemination; equal access to knowledge; catalogue of BMPs; improved methods for filtering information; and understanding how information has been applied in other situations.

Participants hoped that in 2020 we would know more than we do now and that there would be fewer uncertainties, more science based information to support BMPs, and a complete and comprehensive wetland inventory across the country.

Participants also hoped for a better understanding of wetlands by all staff, from operators to CEOs and that this increased awareness would lead to better and more comprehensive decision making. Increased awareness among all staff could come, in part, from incorporating wetlands into corporate training. Participants also noted that a cradle to grave approach that considered the entire lifespan of a practice or project is something we should all be working towards.

Many participants also spoke to desired regulatory improvements including more enforcement and consequences resulting in good compliance, incentives and desire to do it right the first time, alignment of regulations across all industry sectors or lack of alignment with regulatory requirements varying based on relative impact, and consistent application of regulations.

2.1.5 BMP 2020? What if we got it right, how would we know?

- Meeting ecological goals and social license needs
- BMPs are common, accepted, and widespread
- Information is spread effectively within and among companies and organizations;
- Observable changes from where we are today

Participants identified healthy wildlife, reduced footprint, more avoidance and minimization (versus compensation), and meeting ecological goals and social license needs as potential future indicators that we are doing a better job with BMPs in 2020 than we are doing today.

Many felt that we need to get to a point where BMPs are the norm, BMPs are widely accepted and implemented more often, reclamation certificates are more common, companies are not just adopting BMPs but are taking innovative approaches to developing them, and more companies are in regulatory compliance.

Many participants felt that ‘getting it right’ would require more effective communication and information sharing as well as a better understanding of how BMPs work. Transparency, successful partnerships and maintaining relationships were identified as indicators of good communication. Fewer unknowns, better understanding of cumulative effects, better connection between cost and effectiveness, staying on budget, and understanding how to offset costs were all items participants felt would improve that state of BMP knowledge and adoption.

Another indicator that we ‘got it right’ would simply be that we are in a different place in 2020 than we are today – that we are having different conversations, balancing innovation and prescription, continually improving, and demonstrating progress.

2.2 Information Management and Exchange System (IMES) Presentations and Demonstrations

To help set the stage for discussions regarding what users want and need from a potential BMP IMES Bev Gingras from DUC gave a presentation about “Innovative Information Management to Support Innovative Conservation” and Jaret McDonald from SaskPower talked about “SaskPower Transmission and Distribution Environmental Best Management Practice for Working In or Near Water: Need, Development, Implementation, Outcomes and Continuous Improvement”. Following these presentations were demonstrations of existing online information management systems to provide concrete examples of the type of system DUC is proposing and to help facilitate discussions about a potential wetland BMP IMES. Terri McHugh from fRi Research demonstrated the [Alberta Land-Use Knowledge Network](#) system and the [fRi Research website](#). Next, Neill Gilbride from Environment Canada demonstrated [WetlandNetwork.ca](#), an information sharing system managed by the North American Wetlands Conservation Council. Lastly, Kathryn Mutz demonstrated the system she manages as part of the [Intermountain Oil and Gas BMP Project](#), a system containing both voluntary and involuntary practices for the oil and gas industry in the Intermountain West area of the United States.

Following the presentations and demonstrations the participants were asked to engage in discussion related to wetland BMPs, IMES presentations and demonstrations, and how their company/ organization manages wetland BMP information or environmental BMP information more generally. Specific questions discussed were: 1) What is working well?; 2) What are the challenges each of us are facing?; 3) What are the gaps?; and 4) What are the next steps? Below are summaries of these

discussions. Presentations, demonstrations and complete moderator notes can be found on the workshop [website](#) (Appendix 1 and 2).

2.2.1 What's working well?

While many of the discussions around what's working well evolved into discussions of gaps and challenges, participants did identify a number of items that are positive indicators of progress, including:

- Conversations about wetlands and wetland BMPs are occurring
- Many challenges are shared across companies and industries
- Information sharing is becoming increasingly common
- Increased support for and credibility of BMP information
- Relationships are being built within and across sectors
- Technology is facilitating information management and sharing

Perhaps the most basic of these indicators is that conversations about wetlands *are occurring* and that companies are recognizing the value of this sort of event and are paying and encouraging their employees to attend.

Participants also found value in the increased understanding that they are not alone, and that there is a room full of people with similar problems as them from across a range of industry sectors. They felt that the practice of information sharing is becoming more common, and that relationships are being built across sectors, and noted increased collaboration between industry and research institutions.

Because more people are recognizing the value of wetland BMPs and adopting them, participants are starting to see the same or similar practices pop up in different places, which lends practices credibility and support. As well partnerships between companies and research institutes have led to field trials that can provide support for BMPs.

Participants thought that workshops work well for information transfer and thought that an information exchange system should be more than just an online system and include a human, face-to-face component. Participants also pointed to the Government of Alberta's new wetland policy as a positive step that allows for creative compensation and considers the possibilities of BMPs as mechanisms to aid in minimization of impacts.

2.2.2 What challenges are each of us facing?

Participants identified a wide variety of challenges that fell under a few key themes, including:

- Meeting regulations and approvals
- Disconnect between the planned and the practical
- Difficulty in standardizing BMP information
- Public and First Nations consultation
- Motivation to use BMPs
- Wetlands knowledge gaps
- Information management and sharing

Many participants spoke to a diversity of challenges relating to regulations and approvals. Some felt that the approval process for major projects is onerous and that regulations are often lagging behind not only best practices but industry standards. They also felt that regulations can be prescriptive and limit

innovation. Participants also pointed to potential distrust between regulators and industry and felt that for BMPs to be innovative and become common place this relationship will need to improve.

A commonly felt challenge amongst participants was the disconnect between planning and delivering practices due to communication and knowledge gaps between planners, operators and regulators; the speed at which project requirements can progress and change between planning and operation; recognition that one size doesn't fit all; and a disconnect between what is practical on paper vs. feasible in the field. BMPs need to be communicated in a way that is clear, consistent, and accessible to all users.

The variable applicability of BMPs presents a challenge in developing a sense of consistency, as well as understanding when a particular practice is appropriate and applicable. There was a desire by some for standardization across departments, sectors and tenures of policy, BMPs, terminology and definitions, and data sources/ inventory for decision making.

As was common throughout all discussions, participants felt that information access and sharing was both extremely important and an ongoing challenge. Participants pointed to difficulties in finding and accessing BMP information and felt that industry needs to be more open about failure.

Participants identified challenges relating to public and First Nations consultation to do with timing, engaging First Nations in BMP discussions, incorporating traditional knowledge into project planning and delivery, engaging with the 'right' people, and general coordination and cooperation amongst all parties.

Participants often encountered challenges to do with the motivation (or lack of) for using BMPs and pointed to the voluntary nature of BMPs as sometimes creating challenges in garnering support and will to implement. Some participants suggested that BMPs are a potential vehicle for gaining social license, and others felt that integrating BMPs with certification could increase adoption.

Participants identified wetland knowledge gaps as a challenge to identifying and implementing appropriate wetlands BMPs. Some of these gaps include poor knowledge of wetland succession, limited understanding of below ground water flow, terminology, lack of science to support both BMPs and some ecological aspects of wetlands, and a lack of understanding across all staff members of wetland – function, type, identification, and value. Participants also noted that boreal wetland BMPs are not as prevalent as BMPs for some other ecoregions and that the transferability of existing BMPs from other ecoregions to the boreal is often unknown.

2.2.3 What are the gaps?

Participants identified a number of gaps that fell under a few key themes, including:

- Understanding BMP cost – gathering, documenting and sharing information
- Understanding BMP effectiveness – gathering, documenting and sharing information
- Understanding where BMPs fit in the legislative landscape
- Regulatory alignment among jurisdictions and industries
- Who is responsible – for evaluating, managing, sharing, etc. BMPs and BMP information?
- Education and awareness training

Understanding the cost of a BMP was widely agreed to be a very important piece of information when evaluating and deciding whether to implement a particular practice. However, cost is consistently a missing piece of information. Participants are particularly interested in better understanding the short

term vs. long term trade-offs in cost savings including evidence to support claims that spending more upfront can help reduce long term maintenance and other costs.

Gathering, documenting and sharing information about BMP effectiveness is another set of gaps that needs to be filled, including when and where a BMP has been successful and whether an approach is transferable to other regions. Participants felt that a BMP would appear more credible if the government was part of its development.

Understanding where BMPs fit in the legislative landscape is a current gap along with determining who accepts the risk of failure. Some participants felt that BMPs need to be incorporated into regulation to promote widespread uptake, while others felt that BMPs should not be regulated because there needs to be room for choice, flexibility, innovation, and opportunities to go beyond compliance. Perhaps one of the most interesting analogies discussed was that ‘you can’t legislate good parenting’. Many participants felt that regulations set the bar at consistently low levels and that to encourage ‘good parenting’ you have to create a culture where going above the bar is the norm, where the necessary tools are available, and where there is pressure from peers and the public to ‘do the right thing’.

Some participants pointed to issues with regulatory alignment across jurisdictions and noted that the rules are often different among provinces. Other participants felt that regulations are sometimes too closely aligned across industries despite different industries having very different types of footprints (e.g., transmission line vs. pipeline).

Another gap participants identified was a series of ‘who’ gaps – who organizes an information management and exchange system? Who decides what a BMP is? Who decides a BMP is old or no longer relevant? Who accepts the risk and liability of a BMP failing? Who uses BMPs? Who tracks who is using what BMPs? Who tracks success and failure? Who tracks who is using an IMES?

2.2.4 Moving forward: What should be our next steps based on collective business outcomes and organizational priorities?

Discussions about next steps relating to a BMP IMES are discussed in the following section. Participants also felt that there were some next steps, or at least priorities, with respect to BMPs including:

- Promoting technical innovation
- Conducting cost benefit analyses of BMPs and building a business case for BMPs
- Developing BMPs for northern environments
- Sharing failures (and successes!)
- Better documentation of practices that have been used or trialed
- Wetland and BMP education and awareness training

2.3 The Development of a Future IMES

Below we summarize participants thoughts expressed during the course of the first day of the workshop regarding the development of a future wetland BMP IMES. According to the notes taken during the discussions, different participants appreciated different aspects of the information management systems demonstrated; however, there were a number of common sentiments. Many felt the best approach would be to start simple and suggested that DUC use an existing platform such as WetlandNetwork.ca to allow for a quick start with relatively low costs while avoiding ‘reinventing the

wheel'. Participants stressed that a wetland BMP IMES would be a huge undertaking for DUC that would require constant maintenance and upkeep to remain useful and relevant.

Participants identified collaboration as the key to moving forward with a BMP IMES and many felt that this was something that DUC should not undertake alone. In line with this, participants thought that funding of a BMP IMES should be collaborative, and suggested developing a working group composed of industry, government, NGO's, and other stakeholders to provide input as one of the first steps stemming from this workshop. Some participants also indicated that determining the long term goals of a system early on is important as well as considering who will be responsible for the long term maintenance and management of a system.

2.3.1 What do participants want in a BMP IMES?

Information

- Important components of a BMP IMES include: GIS capabilities, mapping, case studies, both academic and non-academic information, research and monitoring data, construction diagrams and technical aspects of a BMP, cost information etc.
- Links to regulations and/or legislation the BMP supports
- Efficacy assessments of BMPs and connection of a BMP with the primary objective it is trying to meet
- Interviews with field-based operations staff to better understand what's happening in the field
- Information on when and where a specific BMP has been used previously and the outcomes/success (sharing lessons learned)
- Identify the source of documents to lend credibility to a practice and potentially allow users to follow up with the original author/ practitioner
- Other media sources: *e.g.*, videos, presentations, workshop proceedings
- Forms to document the use of BMPs so that the application and results of the application could be documented and tracked in a standardized way
- Depth and breadth of information

Structure

- A system to rate and prioritize BMPs
- Ability to search BMP by type (*e.g.*, construction, operation, ecoregion, watershed, wetland type, geographic region, by the problem it is solving etc.)
 - Broad to fine grained filters
 - Articles stored based on many search criteria's to allow for easy browsing
 - Search by keywords
 - Well organized with good taxonomic structure (hierarchical system), the behind the scenes organization of material needs to be well thought out
 - Better search capacity than google – i.e. easier and quicker to get at specific types of information
- Simple interface that is easy to navigate and maintain
- Documents to be held within a BMP IMES and not linked to external sources
- Up to date information with the newest prioritized or identified and old or out of date information removed or archived

Access and Use

- Widely accessible and easily shared
- Users should be able to communicate their own BMP information via a network administrator
- Administrator would play a role in ensuring the technical quality and reliability of the information submitted
- A BMP IMES needs to be used and continually updated to remain useful

Other

- Decision making process within a system - some participants desired a BMP IMES with decision making capabilities while others want to be able to pick and choose from a list of BMPs and identify what will work best for them
- Face to face collaboration is a very important part of BMP development, sharing, and implementation, and a system should not overlook non-web-based components (*e.g.*, webinars, workshops etc.)
- Collaborative development – both of the system and the BMPs it contains
- Collaborative funding – some participants felt a user fee should be applied, others wanted a BMP IMES to be freely accessible

2.4 Summary of IMES Questionnaire Results

Following the IMES demonstrations and table top discussions we asked participants to answer a questionnaire about what they felt was important in a future wetland BMP IMES. Questions touched on the demos, applicable features they thought would be important in a BMP IMES, types of information they felt was needed to make a decisions about a specific practice, and whether they were interested in sharing and collaborating with DUC on this project. For a complete list of results please visit our workshop [website](#) (Appendix 1).

The majority of questionnaire respondents thought that the fRi Research website was the most effectively organized, the most effective at filtering, sorting and searching, and the easiest to navigate. WetlandNetwork.ca was the second preferred website with respect organization, searching, and navigation. Some participants liked different aspects of each of the websites.

In a future IMES the majority of respondents felt it was important to be able to submit and rate/evaluate information by sending it to a system host, be able to download information, and to request information be added to the system. The majority of respondents did not feel it was critical to submit and rate/ evaluate information in real time. Most felt that the ability to customize content for internal use was important along with a site to be optimized on mobile devices. Respondents were divided on whether they thought an open forum discussion space was important. In terms of information to support users work, respondents thought that the availability of scientific articles, case studies, literature reviews, events/ news and videos/ pictures was all important or very important to include in a BMP IMES. The majority of respondents felt that when choosing BMPs to implement/ require/ recommend it was important or very important that the BMP(s) be recommended by industry, government, and NGOs and wanted science or expert evaluations of BMPs yet a number of respondents (30/45) also felt that a list of unevaluated potential practices would be helpful.

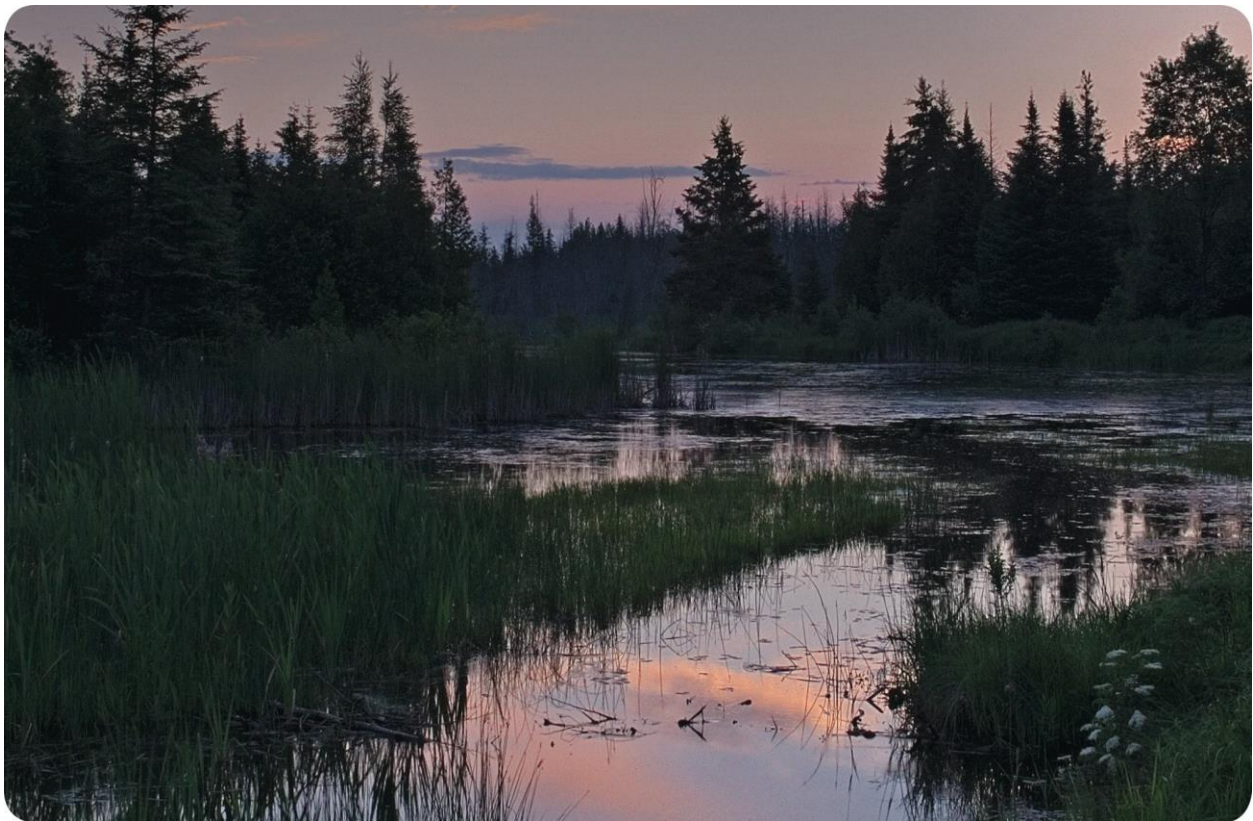
In terms of a wetland BMP IMES, 39/46 respondents stated that they were likely or very likely to share practices with others using a system. When asked about financial support most were unlikely to invest in

such a system, with only 11 likely or very likely to contribute financially. About half of respondents were likely or very likely to collaborate in developing a system and most were willing to test a new system.

2.5 Evaluations

Overall, workshop participants who handed in a workshop evaluation thought that their objective for this workshop was met: 5/19 strongly agree, 13/19 agree and 1/19 was neutral. The majority of respondents agreed or strongly agreed that the table top discussions, concurrent sessions, plenary, keynote, and BMP presentations were effective formats for delivering this information. Only one or two were neutral in their response and no participants disagreed. Opinions about the IMES demos were much more divided with 8/19 agreeing or strongly agreeing, 6/19 neutral, and 5/19 disagreeing or strongly disagreeing. Ten out of twelve thought the closing conversations were effective and 11/16 felt the Pecha Kucha presentations were an effective approach. All respondents agreed or strongly agreed that the facilitator created a safe environment for thought and discussion.

Participants major learning, insights and discoveries from the workshop were surprisingly similar. Over the course of the workshop many participants realized that we are all at the early stages of working with and managing BMPs and that no one individual or company has all the answers. Participants also recognized that despite the diversity of participants, at the end of the day we are working towards a common goal. When participants were asked what they liked best about the workshop the most common answer was the plentiful opportunity for interaction, networking, and discussion with a diverse group of participants.



3. What We Learned

Through presentations, table-top discussions, questionnaires, evaluations and individual conversations we heard a lot of interesting observations about opportunities, gaps, challenges, long term goals, and next steps. From the many intertwined themes that we heard, we learned both about what we know and what we don't know. In the following section we discuss some of our conclusions based on what we heard, some of the big challenging questions that were raised throughout the workshop, and examples of the divergent opinions (polarities) that emerged from the diverse group of participants.

3.1 Key Workshop Conclusions

1. There is an appetite for practitioners to dissolve silos and engage in a partnership for the common good of boreal wetlands.
2. The time is right for a self-organized united voice in setting a gold standard of BMPs for boreal wetlands.
3. This cannot be accomplished in isolation. "Go at it alone" project days are over if this community/initiative is to be mobilized.
4. There is an immediate need for basic principles that are recognized as effective practices (seal of approval) amongst practitioners. A process for defining, identifying, and evaluating wetland BMPs is also required. Identifying practices that don't meet conservation objectives would be a good start.
5. More wetland outreach and education is needed to help increase practitioners' understanding of wetland ecology and value.
6. There is a need for wetland information including wetland inventories, hydrology, ecosystem services, and BMPs and this need is being driven by new and increasing policy/regulatory and social license requirements.
7. Having BMP information collected in a single, well organized, and easy to access and navigate location would aid organizations wishing to implement BMPs on the landscape. However, a complex BMP IMES may require a significant investment in resources and may not be needed at this time. Piggy backing on an existing platform such as WetlandNetwork.ca may be an appropriate, relatively low cost and low effort starting point.
8. In addition to a BMP IMES there are knowledge exchange activities worth engaging in including meetings, workshops, reports, field tours, and collaborative research projects.
9. Often in relation to BMPs, there are things we know and things we don't know. Lifecycle costs and benefits of implementing BMPs are areas where we need more research to close knowledge gaps.

3.2 Questions that Surfaced at the Workshop

1. What are key current regulatory concerns and challenges that influence the uptake and application of BMPs?
2. Where do BMPs currently fit in the regulatory spectrum? Where would they be best situated?
3. How do we best bring First Nations into the conversation moving forward?
4. How do we do a better job of recording and sharing our successes, challenges and failures?
 - a. BMP effectiveness
 - b. BMP cost

5. Where can I go to find the information about BMPs that I am looking for?
6. How can we continue to raise awareness about wetlands and wetland BMPs across all organizational levels from CEOs to operational staff? How can I ensure buy-in to using BMPs across all levels of staff?
7. If we develop a BMP IMES who will be responsible for the various stages – for development, for populating, for updating, for evaluating the information that goes in and deciding what is no longer relevant, for ensuring its long term viability?
8. How can we reduce the disconnect between what happens at the planning and operations levels with respect to BMPs?
9. How can we raise the overall bar, so that doing *more* than the bare minimum that the regulations require is the norm?
10. What are our objectives and needs? Are there enough commonalities among these diverse objectives that a single (multifaceted) solution can meet the objectives?
11. Can we adapt an existing system to meet our BMP IMES needs and objectives?
12. How do we move from BMP development to implementation?
13. What role will face to face interaction and in person collaboration play with respect to BMP information sharing?
14. What steps do we need to take to get towards our vision of BMP 2020?

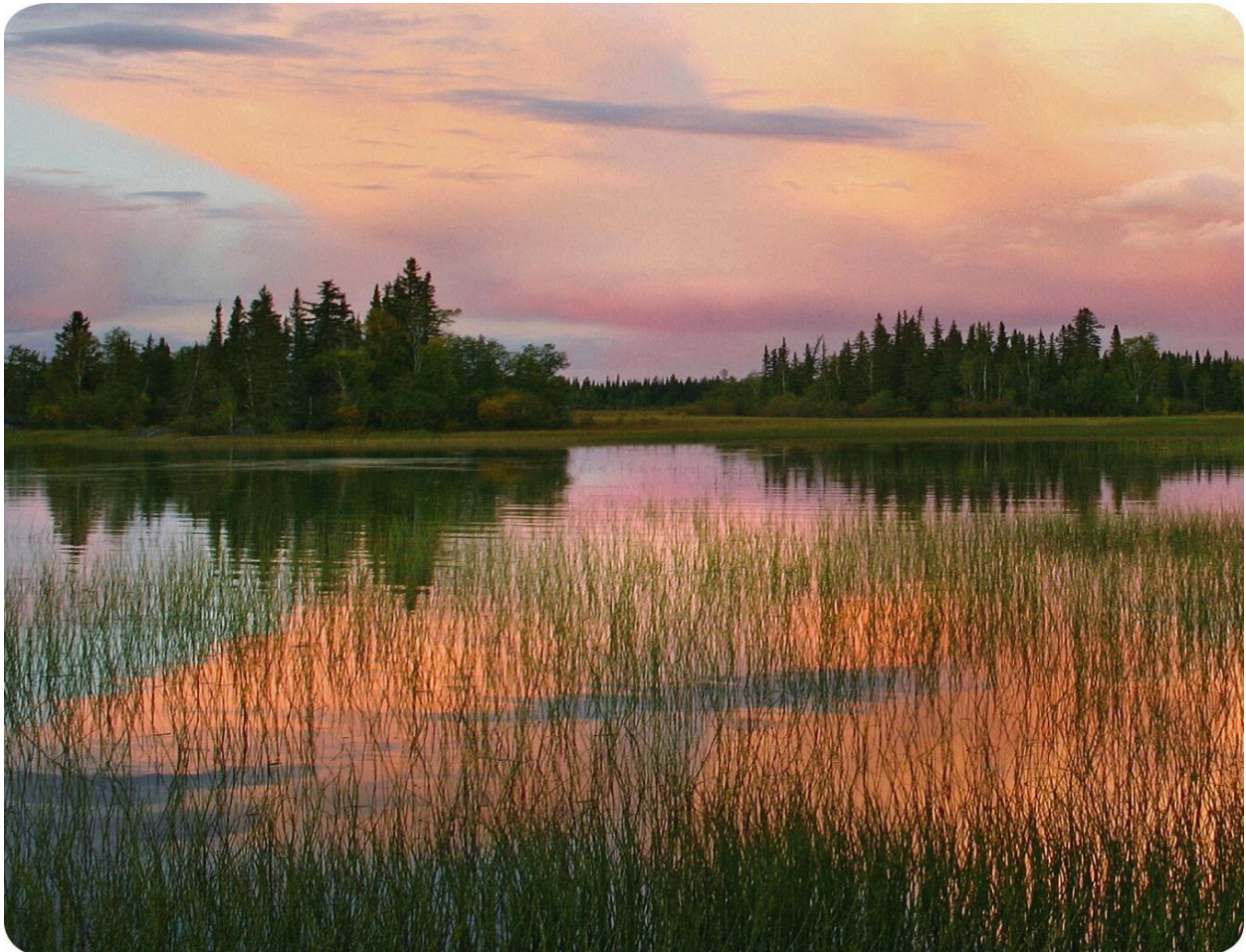
3.3 Polarities Identified at the Workshop

We have included this section as a warning of the presence of polarities that may be at play in the administration and application of BMPs. When trying to resolve polarizing problems we tend to frame potential solutions dualistically. That is, we often identify a ‘right’ solution and label the other(s) ‘wrong’. Of course, the ‘right’ solution usually reflects our preferred position or values. When we attempt to address the situation, we insist that our preferred value is the all-purpose cure. Polarities are ongoing, chronic issues that are unavoidable when tackling complex problems, and attempting to address them with traditional problem solving skills often only makes things worse. We assume that past attempts of managing BMPs may have succumbed to these challenges and that because of this acknowledging polarities will be important for future conversations. In lieu of a one size fits all approach, we need to consider creating new cultural norms of good practice that allow for flexibility and balance of different and sometimes opposing needs.

The following are polarities identified based on statements made by workshop participants

- COMPLIANCE vs FLEXIBILITY and PRESCRIPTIVE vs INNOVATIVE
 - “I want to be told what I need to do and what is best for my situation.” / “I want to be able to choose what is best from a range of available options.”
 - “BMPs should be incorporated into regulations so that they are more widely adopted.” / “BMPs should not be incorporated into regulations because there needs to be room for flexibility and innovation.”
 - “I want recognition for going above and beyond and applying BMPs.” / “I think BMPs and going above and beyond regulations should be the bare minimum.”

- **SPECIFIC DETAIL vs GENERAL**
 - “I want BMPs to include detailed information about the methods, use, and results.” / “I don’t want to get bogged down with too much detail.”
- **DECENTRALIZED vs CENTRALIZED, MY REGION vs THE COUNTRY**
 - “I want BMPs that are applicable to my specific region and situation.” / “I want BMPs to be aligned across the country.”
- **CONFIDENTIALITY vs TRANSPARENCY**
 - “I want more information about BMPs.” / “I don’t know how to find and access the right information or the best sources.”
 - “I want detailed information about other companies and organizations BMPs including successes, challenges and failures” / “I’m not sure my company or organization would be willing to share our BMP information, particularly our failures.”
- **USER PAY vs USER SHARE (FREE)**
 - “I want a BMP IMES to be funded collaboratively” / “I think there should be a user fee/ a BMP IMES should be freely accessible.”
- **SIMPLE vs COMPLEX**
 - “I want a BMP IMES to be simple to develop, maintain, and navigate.” / “I want to be able to search using a multitude of criteria and approaches.”



4. Recommendations for Moving Forward

Below we present recommendations for achieving common goals related to wetland BMPs based on what we heard and what we learned during the workshop. We suggest that these recommendations be considered and, where appropriate and applicable, acted upon by all individuals and organizations interested in working towards wetland conservation and sustainable land use in the Canadian boreal forest. We discuss how DUC will act upon some of these recommendations in the following section (5). We recommend:

1. A wetland BMP Information Management and Exchange System is needed but it needs to be not just a website but a network or community of people and places that is inclusive and collaborative. This community must work together to promote the development and use of wetland BMPs.
 - a. Connecting, maintaining and supporting a network of contacts including industry, government, and other groups with an interest in developing and evaluating potential wetland BMPs.
 - b. Maintaining an on-going open invitation to like-minded organizations and colleagues who want to participate, contribute, and/or learn.
 - c. Developing, maintaining and supporting BMP “centres of excellence” such as the [Evergreen Centre for Resource Excellence and Innovation](#); places where wetland related BMPs can be developed and showcased.
2. More support for and implementation of outreach education and awareness regarding boreal wetlands in general and wetland BMPs specifically. Webinars, seminars, and field tours should be used to help educate and train practitioners.
3. Continuing the forward momentum generated by this workshop, by creating future opportunities for face to face knowledge exchange including annual or bi-annual follow-up events to this workshop.
 - a. These events should be hosted across Canada and should be open to and attended by all industries, governments, and other groups with an interest in wetlands and sustainable land use in the boreal forest.
 - b. Those groups (*e.g.*, First Nations) missing from this workshop should be identified and included in future event invitations.
4. Establishing a collaborative wetland BMP IMES working group to explore and inform the development, management, and funding of a potential BMP IMES. The information that DUC has captured in this report and elsewhere should be used to help design the BMP IMES.
5. Establishing a collaborative working group to develop a process to standardize definitions, evaluate wetland BMPs, and to promote the implementation of this process.
6. That the wetland BMP community determines what is known and what is unknown in relation to wetlands and wetland BMPs. We recommend identifying wetland conservation goals and objectives and then mapping out the information we currently have and the information we need to meet these goals and objectives.
7. Companies, governments and other organizations continue to invest in wetland inventories and wetland research including research on wetland hydrology, wetland ecosystem services, and potential impacts of development on wetlands and the local and landscape level.

8. Investing in and implementing more research, pilot studies, case studies by companies, governments and other organizations to determine the lifecycle costs and benefits of implementing wetland BMPs. We also recommend sharing the results of these projects including challenges and failures.
9. That companies establish an internal adaptive management environmental BMP program similar to the one established by [SaskPower](#) and that they communicate the lessons learned and value of these programs with other companies.
10. That governments clearly establish and communicate where wetland BMPs fit into current and future regulatory regimes. Government support of wetland BMP development, implementation, and monitoring is crucial to sustainable development of the boreal forest.



5. Ducks Unlimited Canada's Next Steps

Considering what we heard and learned from workshop participants and DUC's own conservation priorities, we have identified a series of next steps that DUC intends to take to continue the forward momentum generated from the workshop. These steps will help DUC meet our conservation goals, while addressing some of the gaps and challenges identified by workshop participants.

1. DUC's next step will be to lead the establishment of a BMP IMES working group composed of DUC, industry, government, and other stakeholders to help us explore and inform the path of a potential BMP IMES. This group will:
 - use the information gathered from wetland BMP Information Management and Exchange Needs Assessment project and this workshop to determine the content and structure of a boreal wetland BMP IMES
 - explore the potential of building off an existing platform (like WetlandNetwork.ca) and explore the option of developing a new system only if needed
 - engage in conversations on the best approach for funding a BMP IMES
 - advise on the implementation of a BMP IMES
2. In addition to an electronic IMES, DUC will work towards building a network of contacts from industry, government, and other groups (*e.g.*, [Evergreen Centre for Resource Excellence and Innovation](#), [FPInnovations](#)) with an interest in developing and evaluating potential wetland BMPs. With help from our collaborators, we will identify who was missing from this workshop, individuals and groups, and seek to include them in future conversations.
3. DUC will help improve the state of BMP knowledge by working collaboratively with organizations within this wetland BMP community to identify information gaps and areas for innovation and improvement and to facilitate collaborative research and evaluation of new and existing practices. We will look for funding opportunities to help achieve these objectives.
4. We will also work with other organizations (*e.g.*, Canadian Standards Association) to standardize terminology and evaluation processes in relation to wetland BMPs.
5. DUC will continue to contribute to the ongoing development of wetland inventories and support research on wetland hydrology, wetland ecosystem services, and potential impacts of development on wetlands at the local and landscape level. This work will be done with the support of our existing and new partnerships.
6. DUC will continue to act a conduit for sharing and exchanging information among this wetland BMP community through a diversity of ways including, but not limited to, workshops, wetlands training, guides and handbooks, case studies and demonstrations. For example, DUC recently presented a summary of the BMP workshop to over 50 staff from a variety of Government of Saskatchewan departments. We will consider working with other groups to organize a wetland BMP workshop on a regular basis depending on the interest of the wetland BMP community and funding available.

We believe that collaboration and partnerships are key to the successful achievement of these next crucial steps and to moving towards the BMP 2020 vision that many workshop participants described. We invite you to join us on this path so that together we can achieve our common objectives related to wetland conservation.

Appendix 1: Workshop Moderator Notes, Questionnaires and Evaluations

Moderator notes for Opening table top discussions can be found [here](#)

Moderator notes for Information Management and Exchange discussions can be found [here](#)

Notes from the Keynote and Roads Plenary Speakers can be found [here](#)

IMES Questionnaire responses can be found [here](#) and summarized responses can be found [here](#)

Workshop evaluation responses can be found [here](#) and summarized responses can be found [here](#)

Appendix 2: Workshop Presentations

Abstracts, bios and presentations for the Information Management and Exchange System presentations and demonstrations can be found [here](#)

Abstracts, bios and presentations for Keynote presentations can be found [here](#)

Abstracts, bios and presentations for Roads Plenary presentations can be found [here](#)

Abstracts, bios and presentations for Concurrent BMP presentations can be found [here](#)