Ecosystem Based Management Challenges to EBM for Alberta and Saskatchewan Forests

Section D: High Level Systems

fRI Research Healthy Landscapes Program

November 30, 2021

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Informing Land & Resource Management

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D. High Level Systems

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This section covers topics related to the translation of guidance laid out by policies combined with more specific direction from frameworks. This level deals primarily with partnerships; who, how, when, and to what degree. Towards that, this section includes a broad range of main topics, including who wants EBM? Why do they want it? Why don't opponents want EBM? Is ignorance an issue? Is misconception an issue? Do supporters outnumber opponents? What about those who know little and have no opinion?

D1. Information Relevance

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Information about forests and human uses is increasing rapidly and technologies and communication processes are better than ever before. Paradoxically, many say they don't have enough public access to information and want more.

Information relevance provides the basis for forest management performance assessment. Developing integrated, quantitative EBM indicators and targets and the actions to achieve targets provides an opportunity for an organized, objective information system as a forest management foundation. A good first step would be a working list of EBM indicators and data needs that could be used as a base set for planning and targets, and for inventory and information programs.

Information provided to support conflicts about forests has too often been non-objective, with healthy amounts of political spin. All parties to the debate have been guilty of this, each putting forth information that, while not wrong, puts the best light on their values and objectives. It is small wonder that the majority of people now have deep levels of mistrust about forest information, regardless of the source (Robinson et al. 2001; Gorley and Merkel 2020). This is unfortunate because there are many sources of accurate forest information. Opportunities to form information partnerships with partners contributing and verifying information may help to build trust and confidence in information.

Challenges

> *"Competition and proprietary information can be a challenge for the energy sector to engage in EBM and similar cooperative processes. Having working groups helps to build trust, can the energy sector share and join with those? Higher level support to do that is not always there."* (Anonymous SME).

> *"When budgets get tight communication is one of the first things to be cut."* (Anonymous SME).

- Information challenges include transparency (who has access), understandability (availability of non-technical summaries and explanations), accuracy (is it measured, estimated, or modelled), comparability (can information be scaled up and down so it is in the same format), accessibility (how easy it is to get and use with preferred methods), reliability (is the source trusted), and currency (is it up-to-date).

- Most people have their own media (newsletters, magazines, policy briefs, report series, social media, etc.) to summarize and disseminate knowledge (Boyd et al. 2015). This is a challenge because the information sources differ and are likely to present different perspectives on EBM aspects.

RECOMMENDATIONS

> *"How do we translate an inherently complicated subject to easily understood concepts that will engage and attract acceptance? Social media provides an opportunity as well as a challenge."* (Anonymous SME).

- There are improvement opportunities in all areas of forest information. Transparency and accessibility are worth particular attention and exploration of technological opportunities for public data viewing and access that respects data ownership and confidentiality is an opportunity.
- Information partnerships are an opportunity to increase access and trust. In particular, information partnerships between organizations that have been traditional adversaries are worth exploring. Initiatives such as the CBFA provide opportunities to provide partnership-verified forest information.
- Non-partisan organizations such as fRI Research and the Alberta Biodiversity Monitoring Institute are information partnership examples to build on.
- State-of-the-forest reports such as the Saskatchewan 10-year forest reports (*Saskatchewan's 2009 State of the Environment Report and State of Saskatchewan's Provincial Forests* 2009; Government of Saskatchewan 2019), the federal State of the Park reports and Alberta LUF regional landscape assessments are opportunities to identify and expand EBM information.
- Forest education organizations such as Inside Education, Project Learning Tree, FPInnovations, and Woodlands Operations Learning Foundation are established valuable ways to increase public knowledge about forests. These organizations may provide opportunities to partner for EBM information.

D2 HUMAN INFRASTRUCTURE

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Most human uses of forest ecosystems are supported by various forms of infrastructure. Altering natural environments and ecosystems to create infrastructure is a form of disturbance which has no natural analogues. Infrastructure creation can be very significant: in Alberta the annual area cleared for oil and gas activities was at times in the past more than twice the annual area logged by the forest industry (Government of Alberta 1998). Infrastructure varies in intensity from vegetation clearing (road right-of-way, transmission line, etc.) to reconfiguration of landscapes (surface mine, reservoir, etc.), and lifespan from temporary one-time disturbances (pipeline, internal cutblock road, etc.) to permanent alterations (major highway, settlement, agriculture, etc.).

CHALLENGES

> *"Footprint is not natural, so we have to minimize and mitigate. There's broad agreement that ILM is good to do, but we're still not sure how to do it."* (Anonymous SME).

- Infrastructure disturbances remove or alter natural ecosystems within their footprint boundaries. The area occupied by infrastructure by category is an EBM indicator and a general direction objective is to minimize infrastructure area. There is considerable research that links infrastructure to ecological integrity risks.
- In addition to direct ecosystem removal and alteration, infrastructure fragments other natural ecosystems. This is especially true for linear corridors (roads, pipelines, seismic lines, transmission lines, railways, trails, etc.).
- Infrastructure footprints developed over many decades on an as-needed basis with relatively low levels of integration. This has resulted in more infrastructure than necessary to meet access needs and more effects on aspects of ecological integrity.
- Current restoration policies generally require replacing the same ecosystem type that was altered. This can be technically challenging (e.g., restoring some wetland ecosystems) and correspondingly expensive.

RECOMMENDATIONS

> *"Alberta is getting better at understanding ILM and how operators can work together. Technology is reducing the infrastructure footprint (e.g., seismic industry methods). Traditionally footprint creation was done in isolation, and that's not all on industry; government has been responsible for many of these things. ILM improves the triple bottom line. It's hard to work together on road plans but that creates definite improvement."* (Anonymous SME).

- Integrated ILM planning using a life cycle approach to minimize infrastructure footprint and ensure reclamation of footprint elements that are no longer needed.
- Cooperative initiatives to remediate infrastructure that does not meet current standards (stream crossings, etc.)
- Mitigation of infrastructure effects where necessary.
- Long-term infrastructure forecasting as part of land use and EBM plans.

D3 PRINCIPAL PARTNERS

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All forms of forest management, including EBM, are human constructs. Everyone has an inherent interest in EBM and EBM must be defined by people. This section describes the roles of major non-government organizations that have formal roles in land and resource management through some form of legal tenure.

D3.1 INDIGENOUS PEOPLES

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Indigenous people have legal and traditional rights and interests that transcend and overlap federal and provincial government authority. The federal government has ultimate responsibility for Indigenous people engagement in EBM, but the process has expanded to other levels of government and NGOs.

The United Nations Declaration on the Rights of Indigenous Peoples (United Nations General Assembly 2007) includes many aspects that pertain to EBM including Article 32.2: "*States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.*" The Government of Canada recently introduced legislation to implement UNDRIP in Canada.

Alberta has a process for Indigenous Consultations in Alberta and Saskatchewan has a First Nations and Métis Consultation Policy Framework.

CHALLENGES

> *"Like all groups, Indigenous people show the whole range and are all over the map in terms of interest and engagement. They are often torn by factions that want development and others that want to save the forests."* (Anonymous SME).

> *"Indigenous people have been doing some spring burning around communities, but burning hasn't been done much outside communities for other values. Some are interested in doing more, the concern is they have lost or are losing their expertise as elders pass on. Also they are still being discouraged from traditional burning and held back by issues like liability."* (Anonymous SME).

- EBM has precedents in Indigenous cultures (Berkes et al. 2000; e.g., Berkes 2018). Translation of EBM to and from Indigenous traditional ecological knowledge, ways of thinking, definitions, and descriptions is a challenge (McGregor 2008; e.g., Berkes 2018).
- Developed over many decades, the Indigenous engagement and consultation process is very complicated and has been widely criticized as inadequate (e.g., Smith et al. 1996; Youdelis 2016). The shortcomings of process and outcomes are recognized and governments, Indigenous governments and peoples, and others are continuing efforts to improve.
- Current forest management regimes largely reflect the interests of governments and industry rather than the interests of Indigenous peoples (Wyatt 2008), although there has been considerable local progress.
- Indigenous peoples don't have the recognition, respect, participation, and influence they are entitled to and this affects their willingness to engage in processes such as EBM.
- The capacity of Indigenous peoples to participate in EBM is limiting (Bullock et al. 2018; SME interviews).
- Existing engagement processes are mostly not serving well to further discussions about EBM (Nenko et al. 2018).

- Existing management systems (and EBM prospects) could be affected as the premise of federal and provincial government ownership and regulation of public forest lands is challenged (Vertinsky and Luckert 2010).
- Moving from current forest management regimes to EBM that fully incorporates Indigenous rights and interests in ways that secure free and informed consent and participation in EBM is a tremendous challenge.

RECOMMENDATIONS

> *"There are many positive signs of progress in getting Indigenous people engaged in forest management. Examples include First Nations timber allocations, ownership or equity in the forest industry, and co-management with governments and others. These are important starting points that need more long-term investment."* (Anonymous SME).

> *"The federal government wants to take a different approach to managing species at risk and as is putting a lot of resources into the new Indigenous partnerships initiative."* (Anonymous SME).

- Indigenous beliefs and interests broadly align with EBM, which provides a win-win opportunity to engage Indigenous peoples in EBM definition, planning, and implementation in ways that they are familiar with and support. A good first step might be a review of similarities and alignment between EBM and TEK that could then be used as a basis for joint discussions.
- Research and communication projects could be opportunities to raise shared knowledge by comparing western and Indigenous terms and concepts in relation to EBM. This will benefit both Indigenous and non-Indigenous participants by increasing understanding, identifying common ground, and pointing to gaps and differences to work on.
- Improvements to collection of traditional knowledge and incorporation into EBM.
- Build on existing engagement processes to increase Indigenous participation in EBM. The challenge is to move from acceptance, through approval, to possible co-management or co-ownership as legitimacy, credibility and trust with Indigenous communities increases (Wyatt 2008; Baker and Westman 2018).
- Indigenous involvement in oversight of forest management presents an opportunity to develop capacity and learning in communities.
- Explore collaborative arrangement opportunities in treaties and other formal agreements that establish roles and responsibilities, planning and management activities, influence on decision-making, forest tenures, and economic roles (Wyatt et al. 2013).
- Building respectful relationships, broad community engagement, bridging knowledge and value systems, flexible and holistic management systems, and clear and relevant measures of success can help to achieve respectful co-existence and equity in Canada's forest sector (Robitaille et al. 2017).

- Corporations have been proactive at engaging with Indigenous peoples in seeking their consent to resource extraction projects through negotiated Impact and Benefit Agreements (Papillon and Rodon 2017). These instruments could be explored for regional EBM.
- Corporations are developing corporate social responsibility and social performance frameworks (part of environmental social governance initiatives) to include a human rights based approach for engaging with Indigenous communities that will help to ensure respect for Indigenous rights relating to land, use of resources, and self-determination (Rodhouse and Vanclay 2016; Lagasio and Cucari 2019).
- The forest sector has had some success in engaging Indigenous peoples in business relationships (Wilson and Graham 2005; Zurba et al. 2016). Continued development of innovative partnerships and other instruments is an opportunity to improve and build capacity for Indigenous participation in EBM.
- Green shoots examples of successful Indigenous engagement and recognition such as the Great Bear Rainforest in B.C. (Smith et al. 2007; Thielmann and Tollefson 2009) and Sakâw Askiy Management Inc. in Saskatchewan are starting to appear. The opportunity is to find ways to continue to develop more initiatives in Alberta and Saskatchewan.

D3.2 Forest Sector

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The forest sector has generally been leaders in the development of EBM in commercial forest management in Alberta and Saskatchewan. Industry leadership is shared among a group of companies that have demonstrated commitment to continual improvement in forest management through SFM/EBM. There is an element of competition between companies and company leadership sometimes views EBM as a potential marketplace advantage (customer acceptance, market share, etc.) and a competitive advantage (reduced costs, supported AAC, etc.). This competition can be a challenge but it is also an opportunity and it is probably at least partially responsible for progress and innovation to date.

Challenges

> *"Companies are not on the same page about EBM even within themselves. This also applies where there are multiple companies with interests in an FMA"* (Anonymous SME).

- Forest companies are not all on the same page with respect to EBM.
    - There is no generally-accepted common definition of EBM, and companies interpret it differently.
    - Governments do not currently provide strong policy direction to pursue comprehensive EBM. Most policy is oriented toward SFM, which is a broader concept that encompasses EBM but doesn't require it, especially the NRV aspect.
    - Governments have not taken the lead to define EBM and require it in forest management, although they do have required EBM aspects.

  - There are no specific government requirements to implement EBM as a foundational framework, although there are many requirements that are consistent with EBM and Saskatchewan has endorsed EBM in forest policy.
  - Some companies are interested in EBM but prefer to let others take the lead and then follow in their footsteps.
  - Certification standards promote EBM and include mandatory EBM aspects, but not all companies are certified.
  - The level of commitment and engagement in certification varies between companies, with some doing just enough to qualify and others embracing the ideals and working on continual improvement.
  - Some companies indicated a willingness to do more but have hesitated because of lukewarm government interest and not wanting to get too far ahead of their peers.
- Companies have differing levels of:
  - Business models.
  - Interest in innovation.
  - Understanding of EBM.
  - Internal business case for EBM.
  - Commitment to EBM.
  - EBM expertise.
  - EBM leaders and champions.
  - Information needed to implement EBM.
  - Financial ability to develop and implement EBM.
  - Economic wood supply situations.
  - Perception that governments support and want EBM.
  - Support from local stakeholders
  - Requests from customers to implement EBM.
  - External attention and pressures to implement EBM.
  - Personal relationships, partnerships and collaborations that provide EBM allies and help to share costs.
- Smaller companies generally have lower EBM interest and capacity.
- At present, EBM is mostly a voluntary initiative for companies.
  - Smaller and medium companies are often reluctant to go beyond compliance. At least two of five factors may need to be present before they will do more: environmental impact of the firm's products and processes, customer power, customer interest, corporate/brand visibility, and community pressure (Lynch-Wood and Williamson 2007).
  - Internal factors may also significantly influence a company's willingness to go beyond compliance. For example, a company that self-brands as an environmental leader as part of its business model is more likely to be engaged in EBM than one that operates on a low-cost low-profile business model.

- In Alberta, smaller companies with allocations embedded in larger FMAs have a large influence on what the FMA-holder and GOA want to do and can do in relation to EBM. There are significant challenges related to trust, business models, tenures, interest, and capacity.
- Like most organizations, forest companies are not monolithic and individuals within companies may have widely different perspectives on the best ways to manage forests. In particular, companies may have individuals who believe timber should have priority in decisions, change and innovation is not needed, governments and customers aren't interested, there is no EBM business case, etc. These individuals can have a significant influence on a company's position and approach. Companies usually show a uniform position to outsiders, but internal discussion can be intense. This is not unique to forest companies; most organizations have similar internal dynamics.
- Companies are constrained in what they can do and what they are willing to do in relation to EBM by their legal tenure agreements and regulatory requirements. While there are many examples of companies going above and beyond legal compliance, there is hesitancy to do so for a number of reasons:
    - The cloak of the governance system and regulatory compliance, and a constrained imagination as to what is possible can be highly problematic and makes it difficult to imagine and propose innovation that cuts across multiple levels of governance (Parkins 2011).
    - Desire to get along with government agencies, some of whom are not supportive of EBM.
    - Uncertainty about whether EBM innovation proposals will be well-received by regulatory agencies and others, and costs and risks associated with proposing change.
    - Unwillingness to stand out from peers who may feel threatened by association.
    - Absence of business cases for proposing changes and improvements, including customer demands.

RECOMMENDATIONS

> *"The owners of some of the smaller operators have retired, mostly it's just the bigger ones left and they are more and more interested in integrated planning and operations. Business to business initiatives are opportunities. Government needs to remove some mandated designations that create barriers to EBM for mixedwood management."* (Anonymous SME).

> *"Some (many?) companies would do considerably more EBM if they had the support and permission to do so. This requires partnerships and has to start with governments being willing to change their policies and encouraging EBM."* (Anonymous SME).

- A number of Alberta and Saskatchewan forest companies are near the leading edge of EBM implementation state-of-the-art and are interested in further development. The opportunity is to identify the factors that are holding them back and develop options to rectify them.

- Explore opportunities for companies to partner with governments, Indigenous peoples, local communities, NGOs and ENGOs, other sectors, etc.
- Saskatchewan has embraced EBM in policy but has only partially implemented EBM. There are many opportunities for Saskatchewan to work with internal agency alignment and coordination, forest companies, and others to improve implementation.
- Within each organization or agency one or more personnel in key management positions that are committed to EBM and act as champions are crucial. There is also need for good transition plans to recruit and replace new EBM champions when people move on.
- Corporate ESG policies are being used to enhance efficiencies, cut energy costs, reduce waste, increase profit margins, and gain more control over global supply chains through programs such as certification, audits, and codes of conduct (Dauvergne 2017). Forest companies on the leading edge of these trends have opportunities to use EBM to further their objectives.

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D3.3 Energy Sector

The energy sector is active over large portions of Alberta and Saskatchewan forests within the western Canada sedimentary basin (Porter et al. 1982). Surface infrastructures (seismic lines, roads, pipelines, wellsites, transmission lines, processing plants, oilsands mines, etc.) and their associated effects are the main energy sector impacts on forests. Water use is also very important.

The energy sector is separately regulated from the forest sector and has generally not been engaged in SFM and EBM. Energy companies are market-focussed and their business model with respect to forests has long been environmental responsibility through regulatory compliance, with the strongest management signal being market prices. That business model began to change as energy companies started to develop corporate stewardship and citizenship policies and were forced to respond to climate change concerns and market campaigns against their business and products.

> "*The energy sector has not really thought much about EBM, they have been preoccupied with all the troubles since the 2014 economic downturn. Energy companies don't see themselves as forest managers. They operate in forests, that's it. The potential to contribute to more resilient landscapes is not well recognized*" (Anonymous SME).

Challenges

> "*The energy sector is highly environmentally compliant. The problem is that some of the rules are wrong or not aligned with EBM*." (Anonymous SME).

> *"The sector is highly fragmented with multiple companies competing for the rights to develop multiple subsurface zones for different hydrocarbon resources. This creates maximum revenue for governments and also maximum surface disturbance due to the secretive and ad hoc progress of development on an as-needed basis driven by markets."* (Anonymous SME).

- As by far the largest economic sector associated with forests in Alberta and parts of Saskatchewan, the needs of the energy sector have long tended to "drive the bus" of resource management. Initiatives that were perceived to constrain energy development were viewed unfavourably by both the sector and governments. The challenge is to build confidence in the sector and governments that EBM can help to address and ensure resource access needs and assist with responding to international pressures against the sector.
- The sector is highly fragmented with multiple companies competing for the rights to develop multiple subsurface zones for different hydrocarbon resources. This creates "*maximum revenue for governments and also maximum surface disturbance due to the secretive and ad hoc progress of development on an as-needed basis driven by markets*" (Anonymous SME).
- Competition and proprietary information can be a challenge for the energy sector to overcome and engage.
- When the energy sector is booming there is some competition between the forest and energy sectors for skilled labour and resources (Brownsey and Rayner 2009).
- The energy sector does not participate in long-term planning other than for their individual developments and is not required to assess the effects of their activities at landscape and regional scales over the long term.
- Most of the regulatory constraint on the energy sector comes from lower-level regulation. Regulators see that as their ultimate method of control and traditionally neither the regulators nor the companies saw value in higher-level and larger-scale planning.
- "*The energy sector is highly environmentally compliant. The problem is that some of the rules are wrong or not aligned with EBM*." (Anonymous SME).
- Although small in terms of physical area, energy infrastructure is very widespread and has pervasive environmental and ecological effects. Infrastructure dispositions and development permits are held by many different companies all working in the same landscapes and integration is low due to the competitive nature of the industry.
- Companies were not required to restore and reclaim seismic lines to the original vegetative cover. There are probably more than 2 million km of seismic lines in the 2 provinces (Dabros et al. 2018). Natural ecological recovery in many ecosystems has been slow (van Rensen et al. 2015) and there is a large backlog of unrestored legacy seismic lines. Restoration costs average $12,500/km and research to determine the best restoration practices and effectiveness is in relatively early stages of being evaluated (Filicetti et al. 2019).
- Practices for reuse of existing seismic lines and creation of lower-impact new lines will reduce the effects of future seismic lines, but the total line footprint is still increasing.
- Motorized vehicle use on seismic lines can keep them from naturally regenerating to forest (Pigeon et al. 2016).
- Where the energy and forest sectors overlap in space there is some integration and coordination through a referral process but this tends to be late in the process and usually only occurs at small scales, which reduces integration effectiveness (Brownsey and Rayner 2009).

- ILM initiatives including regional access management plans are now supported in principle by both the energy and forest sectors, and at least nominally by Alberta. "*Efforts to implement access plans have failed because the provincial government has backed off due to loss of control, lack of trust, concerns about actually making more disturbance first to get less later, internal agency conflict, and risk aversion*." (Anonymous SME). There is still some resistance within the energy sector, related to the perceived possibility of additional regulations (Thorp et al. 2021).

RECOMMENDATIONS

> *"EBM has great academic ideas; we have to be willing to test them and take them down to practices on the ground. This provides opportunity to stop practices that are ineffective and develop new ones that do a better job for less cost."* (Anonymous SME).

> *"Perhaps there is opportunity to develop something like EMEND for the oil sands by partnering with COSIA."* (Anonymous SME).

> "*Energy companies are now hearing a lot from capital lenders about environment, social and governance (ESG) issues. Most of the discussion so far has been about greenhouse gases but also biodiversity. As companies make ESG commitments to secure capital there should be opportunities to engage them in higher-level plans and EBM as a way to implement their promises.*" (Anonymous SME).

> "*The 3 biggest issues right now are uncertainty, cost, and reputation. Uncertainty around approvals because of ecological values such as caribou is a big concern. Prices are low and companies are looking to find ways to be low-cost producers. They are concerned about their reputation, access to markets, and access to capital. EBM narratives, examples and value propositions would get attention. It will be critical to have the regulator bought in.*" (Anonymous SME).

- Because of the extensive sector presence in forest landscapes and the powerful political influence, successful engagement of the energy sector and their regulators represents a major opportunity to increase EBM support and implementation.
- There is an opportunity to raise awareness of EBM in the energy sector as a first step towards engagement and identification of value propositions (Box D2). . "*The 3 biggest issues right now are uncertainty, cost, and reputation. Uncertainty around approvals because of ecological values such as caribou is a big concern. Prices are low and companies are looking to find ways to be low-cost producers. They are concerned about their reputation, access to markets, and access to capital. EBM narratives, examples and value propositions would get attention. It will be critical to have the regulator bought in.*" (Anonymous SME).
- "*Energy companies are now hearing a lot from capital lenders about environment, social and governance (ESG) issues. Most of the discussion so far has been about greenhouse gases but also biodiversity. As companies make ESG commitments to secure capital there should be*

opportunities to engage them in higher-level plans and EBM as a way to implement their promises." (Anonymous SME).

- Canada's Oilsands Innovation Alliance (COSIA) is an energy sector initiative to "*enable responsible and sustainable growth of Canada's Oil Sands while delivering accelerated improvement in environmental performance through collaborative action and innovation*." (Canada's Oil Sands Innovation Alliance 2012). COSIA is active in many areas that are directly related to EBM. There are opportunities to engage with COSIA to promote bigger-picture EBM in the oil sands region. "*Perhaps there is opportunity to develop something like EMEND for the oil sands by partnering with COSIA*" (Anonymous SME).
- ILM to collectively manage and share footprint including roads is an EBM entry opportunity. The energy sector sees value in ILM planning if it will speed approvals and reduce the costs of getting them. Up-front investment in planning has to pay off in faster and more certain approvals and lower costs when it comes time to build roads, etc.
- "*EBM has great academic ideas; we have to be willing to test them and take them down to practices on the ground. This provides opportunity to stop practices that are ineffective and develop new ones that do a better job for less cost*." (Anonymous SME).
- There is opportunity to invite the energy sector groups to join EBM working groups to learn and build relationships and trust, which is necessary to build higher level support (Box D1).
- Seismic line restoration is a critical aspect of future ILM (Dabros et al. 2018). There are opportunities for governments, the forest and energy sectors, and other stakeholders to work together to restore legacy lines while ensuring access for societal needs. Tools include mechanical restoration, restoration concurrent with logging, wildfire management, prescribed fire, etc.

Box D1: EBM Value Propositions for the Energy Sector (from SME interviews)

- Easily-understood explanations of the EBM concept.
- Value propositions that speak to energy sector interests and needs.
- Ways to join strategic landscape-scale strategic planning initiatives, some have been good.
- Partnership opportunities that energy sector can join (e.g., regional access plans).
- Ways to share information that preserve competition confidentiality and proprietary information.
- Sharing of sector expertise (e.g., forest sector expertise in site preparation and planting for restoration).
- Regulator support for EBM is essential.
- Reform regulatory framework towards outcomes and away from costly ineffective practices.
- Like comprehensive approach in principle if it reduces uncertainty.

D3.4 Commercial Fishing, Trapping and Guiding

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Commercial harvest of fish and wildlife occurs in both Alberta and Saskatchewan. Alberta closed commercial fishing in 2014. Saskatchewan commercial fishing is governed by the Fisheries Regulations. Trapping in Alberta is restricted to holders and partners of area-based Registered Fur Management Areas. Trapping in Saskatchewan forested areas is restricted to holders of a Fur license for an area-based Trapping Block Zone in the Northern Fur Conservation Area. Commercial-supported hunting in Alberta is based on hunting permits allocated to guide-outfitters for specific Wildlife Management Units. Saskatchewan uses Allocated Outfitting Areas.

Many commercial wildlife activities have high levels of Indigenous participation, with communities and individuals practising traditional lifestyles.

CHALLENGES

> *"We didn't want to push EBM too fast due to social acceptability. Local people are not that interested in really big harvest or fire events. Social pressures will always constrain what we can do."* (Anonymous SME).

> *"Large harvest event planning is familiar to industry and government but not so much to others. It doesn't matter until it's in your backyard. We have to remember we're not the only people and players out there. There's huge impact on others, and we need to be considerate of the weight we carry not necessarily who has the biggest power wins."* (Anonymous SME).

- Many of the area-based commercial wildlife allocations in both provinces are smaller than the scale of natural disturbances, especially wildfires. Disturbance levels can be very high from large wildfires or logging events. This can create economic and lifestyle hardship for trappers and guides. The challenge is to find ways to deploy large disturbances while providing economic opportunity for trapping and guiding and supporting lifestyle values.
- Trappers and guides use roads and seismic lines built by others and may not support reclamation. This can be a challenge.
- It can be a challenge to engage trappers and guides in big-picture forest management.

RECOMMENDATIONS

> *"Use design as a tool to reduce NIMBY issues. Put the big events where there are fewer conflicts with other users, do smaller and more retention where there are other human values. Combine to achieve a good overall result that reduces conflicts and still gets ecological benefits."* (Anonymous SME).

> *"Sometimes it gets political and it's even more challenging when it's an Indigenous trapper with a long history in one area. It's not easy for people to move somewhere else because of a fire or logging. Dialogue and respect are the only way to resolve these."* (Anonymous SME).

- Trappers and guides may never have heard of EBM but their philosophy and interests may be supportive. There is opportunity to establish good communications and dialog with groups and individuals to explore common interests.

- Opportunities to overcome NIMBY reactions to large disturbances could arise from discussions based on common interests.

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Others

This project did not review documents or include interview representatives for other sectors including mining, tourism, trapping, guide outfitting, commercial users, local communities, private land owners, NGOs (except ENGOs), public groups, and others.

D4. Partnership Types

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From an EBM perspective, "neighbours" has several different dimensions. Geographic neighbours define adjacency, as with neighbouring FMA areas, or an FMA area to a park. Overlapping neighbours include tenure to the rights of different natural resources on the same piece of land (e.g., the energy sector and the forestry sector), and also different companies within the same sector.

D4.1 Geographic Neighbours

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Most DFAs that could be used for subregional EBM planning were defined using administrative rather than ecological boundaries, and the ecosystems within DFAs are part of larger ecological units. This means that DFA managers must work together to implement EBM for larger ecological units.

Challenges

> *"EBM is relatively new in practice so it's not too surprising that not much has been done on cooperating with neighbors. Everyone has enough on their plate with their own direct interest. Leadership is needed to identify the value and establish precedent."* (Anonymous SME).

- Governments have traditionally not been focussed on managing for ecological units. This is starting to change with initiatives such as watershed planning and species at risk recovery planning. However, these processes are usually disconnected from mainstream land and resource planning. Government leadership is needed to establish an ecological context framework and incorporate into policy and planning.
- Managers typically control or have responsibility for EBM for only those portions of ecological units within their DFA.
- There are few requirements, incentives or business reasons for managers to work with neighbours to coordinate EBM across administrative boundaries for entire ecological units, so coordination and partnership occurrences are relatively few. There are some examples of working with neighbours and these are mainly because of good working relationships or specific issues of common interest such as caribou range plans.

- The basic status quo is that DFA managers recognize and provide a narrative or quantitative tabulation of external ecological context, which is a start but does not go far enough to reach full EBM.
- Because so little has been done, there are few examples that show where working with neighbours demonstrably improved overall EBM implementation and outcomes.
- Larger-scale ecological unit EBM is particularly important for watershed planning, species at risk planning (caribou, some fish species), fire threat, forest insects like mountain pine beetle, invasive species, etc. These significant challenges are not well-addressed using current processes.
- Few higher-level plans and legal requirements incorporate EBM that provides direction or information that could assist with engaging geographic neighbours.
- Information for ecological contexts may not be available and may be in different formats and resolutions. Acquiring information from others can be complex and time-consuming.

RECOMMENDATIONS

> *"Caribou range plans are an obvious opportunity for cooperating with neighbors. Unfortunately, current processes are working more to drive them apart than together, but there's still time to change course."* (Anonymous SME).

> *"Few are aware, but there are quite a few examples of neighbors working together on values of common interest. And there's opportunity for much more to be done that would benefit multiple partners."* (Anonymous SME).

- Use of ecological contexts could be expanded if provincial governments and others take the lead on defining ecological contexts and providing assessments in higher-level plans and processes.
- Because large-scale realignment of DFA boundaries is unlikely and probably undesirable, the best approach to define EBM for larger ecological units is likely for the DFA managers that have portions of units to work with each other. The process could include several levels:
    - Establishing communications and relationships to discuss common interests related to EBM and opportunities to cooperate or collaborate such as shared indicators and measurement standards.
    - Exchange of information between DFA managers to provide context to DFA EBM plans and support roll-up of knowledge to larger ecological units.
    - Reporting and considering possible external contexts as preparation for implementation processes to address them by outreach to other DFA managers.
    - Trans-boundary planning and collaboration for shared EBM aspects that need or could benefit from collective action to achieve better outcomes (species at risk recovery plans, border-crossing disturbance events, etc.).
- The Alberta government completed a series of regional landscape assessments to support the Land-use Framework (e.g., Forcorp Solutions Inc. 2012) They were compiled for regions but

could be recompiled for other ecological units. The information would be useful to DFA managers who want to place their areas in larger ecological context or initiate discussions with neighbours.

- The Saskatchewan government state of the forest reports (*Saskatchewan's 2009 State of the Environment Report and State of Saskatchewan's Provincial Forests* 2009; Government of Saskatchewan 2019) report on several EBM indicators. This is a good example of back-end EBM monitoring that could be linked to and used to support front-end EBM planning.
- Data initiatives in both provinces could be used by the provincial governments to provide ecological unit status and context to inform EBM progress, direct government-led EBM planning at larger scales, and identify trans-boundary issues to DFA managers.

D4.2 Overlapping Neighbours

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Overlapping neighbours refer to organizations other than the DFA manager(s) that have some form of legal interests and activities within DFAs. These include other government agencies, Indigenous peoples, embedded allocations to other forest companies, other industries, private land owners, commercial operators, trappers, grazing disposition holders, and others.

Most DFAs, including protected areas (e.g., transportation corridors), have at least a few overlapping neighbours, and some have many. While most commercial forest tenures are held by a single forest company or through a cooperative joint arrangement, many tenure areas have embedded allocations to other companies. For example, an FMA whose primary holder has rights to deciduous timber may have other companies who have rights to coniferous timber. To be comprehensive EBM must consider and account for all human uses within each DFA.

Challenges

> *"EBM is being held back by continuing with status quo approaches rather than adapting. Silos and self-interest get in the way of finding solutions that work and are better than the status quo."* (Anonymous SME).

> *"Fire, logging, and human footprint are the big processes in Alberta and Saskatchewan forests, and they are all managed separately. This is a big problem."* (Anonymous SME).

- Tenures and allocations of overlapping neighbours range from one-at-a-time permits, annual licenses, several years, to decades or more. Involving short-term neighbours in EBM is challenged by their tenure length, which likely influences their potential EBM interest.
- Overlapping neighbours typically obtain their approvals from different agencies than those responsible for overall DFA management and the agencies may have no knowledge, experience, or interest in EBM.
- Overlapping neighbours typically have much shorter time horizons for planning and activities. They don't use long-term planning processes and have little knowledge and experience with them. This makes it difficult for them to contribute information about their future plans.

- Overlapping neighbours with low levels of coordination result in interference and waste in infrastructure development such as building separate and uncoordinated road networks (Luckert 1993; Vertinsky and Luckert 2010).
- Referral or similar processes between government agencies and between commercial and industrial users may not exist or may not work well in terms of timeliness and effectiveness.
- Referrals usually do not include EBM as a consideration.
- Reaching agreement on EBM among companies with different interests may be difficult.
- Not all organized human uses are involved in land-based forest management planning. In particular the energy sector tends to plan on an as-needed basis. There are examples where the energy sector plans in advance, but not long term.

RECOMMENDATIONS

> *"Regulations and other restrictions pile up and don't necessarily achieve good outcomes. Collaborative plans with specified outcomes and activities are probably better. They require people to get out of their comfort zone and negotiate in good faith."* (Anonymous SME).

> *"ILM road plans focused on main road networks that include and optimize stream crossings, road spacing, soils and landforms, etc. are a way to bring people together on the same landbase."* (Anonymous SME).

- DFA managers already provide information about overlapping neighbours in their management plans. It should be possible to build on this to better encompass the level of input needed to plan and implement EBM.
- Existing examples of involvement and cooperation between organizations (Box D2) provide templates that could be followed to expand participation.
- DFA managers can forecast potential future activities of non-involved neighbours, especially those whose activities are relatively minor and predictable. This information can be incorporated into DFA EBM plans and updated with regular plan revisions.
- Forest companies have processes to interact with and involve other commercial interests that operate in their tenure areas. In some cases, this involves coordination or collaboration (Box D2).

Box D2. Al-Pac Integrated Landuse Services – An example of overlapping neighbour collaboration.

An initiative since 1999 dedicated to reducing the ecological impact of cumulative industrial activities through the implementation of Integrated Landscape Management strategies on the Al-Pac FMA. This collaborative effort between Al-Pac and resource companies has resulted in the construction of fewer roads, initiated research on the effects of industrial activities on forest ecosystems, assisted in the development of science-based best practices and has helped coordinate harvest operations with oil and gas activities.

https://alpac.ca/index.php/forest-sustainability/integrated-landscape-services

- Better cooperation between neighbours can lead to win-win outcomes. For example, coordinated actions to manage road networks may reduce total roads length by 30–60% or more (Thorp 2008; Silvacom Ltd. 2017), which benefits both ecological integrity and human wellbeing by reducing access costs.
- Engaging neighbours in EBM discussions may lead to opportunities that would not be evident or possible if the status quo divided approach continued.

D5 Social Challenges

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Social challenges are aspects of societies, institutions, organizations, groups, and individuals that support and implement EBM. Meeting social challenges is necessary to get things done, and at the same time economic and environmental dimensions have to be addressed. The triple bottom line (TBL) is an accounting framework that incorporates three dimensions of performance: social, environmental and financial (Slaper and Hall 2011) A TBL framework can be adapted to the needs of different actors, policies, projects and the comprehensive framework that is EBM.

Management of forested lands and ecosystems has evolved over time in response to growing human populations and demands for economic and social uses of forests coupled with concerns about degradation of biodiversity and ecological services such as water and global ecological cycles. Collective knowledge and societal recognition of the challenges has also changed over time and so have efforts to reconcile them by changing how forests are managed. Even so, widespread calls persist to improve management of ecological integrity in forests and their multiple uses to support human wellbeing, and to do a better job of managing the diversity and balance among wellbeing aspects (Robinson et al. 2001; Sheppard and Meitner 2005).

Ecological sustainability is the fundamental basis for economic and social sustainability and must be conserved to achieve economic and social goals (Dale et al. 2000). Ecological approaches such as EBM cannot achieve ecological sustainability unless they are integrated into a human context (Pfister 1993). Strategies that are not based on sound ecological principles will ultimately fail and so will ecological approaches that ignore socioeconomic values, political realities, and ethical issues (Spence et al. 1996).

All forest values are social values because they have worth to some portion of society. Desired ecological conditions and the means to achieve them are socially defined. Scientific concepts including the definition of an ecosystem and criteria for healthy ecosystems are values judgments (Norton 1991). Some values are more easily measured than others which leads to disputes about the relative values of values (Knafo et al. 2011) . Comparing tangible economic values such as goods, jobs, and the value of easily measured services such as tourism and non-tangible values such as ecological services and issues of social importance is not straightforward and has contributed to imbalances in weighting and political decisions about priorities.

The human dimensions side of EBM is not always given the attention it deserves, but successful incorporation of human interests is essential for successful EBM. Existing administrative units and boundaries represent some of the human contexts that need to be considered. They are part of a complex network of human interests that must be consider for EBM implementation.

Major forest management challenges to ecological integrity include alterations to ecological processes (especially fire regimes), ecological conditions simplified and departing from NRV, and biological consequences impacts such as increasing human uses, species at risk, and threats from invasive species. Human wellbeing challenges include increasing populations, development, and demand for goods and services from forest ecosystems coupled with threats related to catastrophic natural disturbances, climate change, and productive capacity of forest ecosystems. There are also issues related to affordability and societal agreement to EBM including inclusion, transparency, and equity between societal groups. Regarding equity, Robinson et al. (2001) said that "*Responsive forest management should serve the outspoken, unspoken, and unborn citizen*." To that I would add that EBM is not possible without substantial societal consensus or acceptance.

CHALLENGES

> *"The path we are on is unsustainable, there are some really big unresolved issues like fire, rising consumption, species at risk, and climate change. We aren't going to fix these unless we take some risks and move to EBM."* (Anonymous SME).

> *"People are fixated on trying to get to perfection rather than improvement. Many also have the impression that there are no consequences to doing nothing."* (Anonymous SME).

A common reaction is that EBM is too big and too complex, maybe daunting to even consider what to do. It's not surprising that people might then dismiss EBM as too academic, uncertain, not widespread and therefore not yet useful (Boyd et al. 2015). People might be satisfied with making progress in small ways, they see benefits to continuing with incremental progress and see no reason to act more purposefully.

Furthering EBM will require a groundswell of support calling for and leading change. There is an opportunity to build support by addressing the general psychological barriers termed Dragons of Inaction (Gifford 2011):

- Limited cognition or understanding of EBM and how it could benefit humans. This involves strategic thinking about when we could, and should, take more action.
- Entrenched ideologies which are broad, umbrella-like sets of beliefs. EBM as an ideology may be incompatible with others, especially those devoted to single values, issues, and management actions. The good news is that EBM is compatible with multiple worldviews and would benefit from translations relevant to those, including especially conservation and Indigenous belief systems. There are opportunities to build relationships through shared understandings.
- Comparison with others. Humans have a tendency to be influenced by others to gauge correct and normal behaviour and monitor inequities and power structures. For EBM, overcoming lowest common denominator practices and ensuring competitiveness are very important.
- Sunk costs are the existing choices that limit alternative choices. For EBM these are the long-established institutions, investments, and diverse human uses that must be considered as part of change initiatives.
- Discredence or disbelief about EBM and how it could improve forest management. This includes issues of trust, contrarian behaviour, and reality perceptions.
- Perceived risks are powerful reasons not to change. For EBM perceived risks associated with change could be compared to risks associated with maintaining the status quo.
- Limited behaviour includes tokenism. Commitments to implement EBM abound in government policy documents, but many have been in place for decades with little progress. Similarly, some EBM initiatives have been criticized as "rationales to continue business as usual with no real change" (SME interviews).

RECOMMENDATIONS

> *"EBM is excellent as a theoretical construct. We need a common language, goal, currency, and conceptual framework to discuss common objectives. EBM is good to discuss values conflicts and bring people together. Its premise is to head off train wrecks."* (Anonymous SME).

> *"By definition EBM is comprehensive and attempts to reconcile all values by bringing people together and giving everyone a voice. It looks for the best outcomes instead of winners and losers. That's better than what we do now."* (Anonymous SME).

- Opportunities relate to each of the dragons of inaction listed above:
    - Strategic thinking and options about when we could, and should, take more action to increase EBM cognition and understanding (Section A2).
    - Opportunities relate to developing comparisons with status quo practices and EBM alternatives.

- For EBM sunk costs are the long-established institutions, investments, and diverse human uses that must be considered as part of change initiatives. Opportunities are to define and implement EBM that considers sunk costs as part of potential future outcomes.
- Opportunities to increase belief about EBM and how it could improve forest management include comparisons, demonstrations, and open discussions about the pros and cons of options.
- Opportunities to overcome limited behaviour include robust definitions with quantitative outcomes and activities that can be used to verify implementation and judge success.

D5.1 Champions

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> *"A big challenge is to overcome resistance from individuals in key positions that actively oppose EBM. These people are powerful anti-champions."* Anonymous SME).

> *"There aren't enough EBM champions and there's an ongoing need to develop more. Organizations of all spectrums have to buy in and encourage their people to become champions."* (Anonymous SME).

A champion is someone who leads both internally and externally by committing themselves and their organizations to improving outcomes that benefit their organizations, but also serve the greater good. Champions focus on motivating top performance and helping their organization evolve to meet future needs. EBM champions are able to see the possibilities and translate them into bold actions that innovate, catalyze change, and inspire others (Thompson 2009). Successful EBM implementation is associated with charismatic and effective leadership and local champions (Slocombe 1998; Sterling et al. 2017). Top-level commitment and leadership is needed to ensure lower levels take action (Slocombe 1998).

Challenges

- EBM champions are needed at multiple levels within and between organizations. Identifying, cultivating, and empowering people with the necessary knowledge, skills, and interest is a challenge.
- In particular, opinion leaders and decision-makers at relatively high levels within organizations are needed to support and authorize EBM and assign resources to EBM implementation.
- EBM champions that have or can establish good relationships among peers and across boundaries with other organizations are needed to look for EBM integration and innovation opportunities.
- EBM champions with the science and technical background from multiple disciplines who are knowledgeable about EBM and able to work with others in different disciplines and in non-technical backgrounds.

- EBM communications expertise.
- Talented leaders typically have high workloads and competing demands for their time which makes it a challenge to devote time to consider EBM and initiate and lead change and inspire and lead others to participate and benefit.
- Processes are needed to ensure continuity of EBM programs when established champions move on.

RECOMMENDATIONS

> *"We need champions to identify and remove roadblocks. Start with an EBM gap analysis, here's where we are at, then show how different approaches can help them deliver on their mandate. Who would be the audiences for concept papers? Build a groundswell of support so the tide overwhelms the naysayers."* (Anonymous SME).

> *"Champions in and across government agencies who will help further EBM within the bureaucracy would help. Champions outside of government are also needed (energy sector, ENGOs, Indigenous, etc.)."* (Anonymous SME).

> *"EBM needs champions in different positions that can get others to see that risks are low and better outcomes can arise. Many see change as a fundamental risk, we have to find ways to reduce perceptions of risk with EBM and champions are a key part of that."* (Anonymous SME).

- There may be opportunities to develop more multi-level and multi-purpose EBM networks, forums, institutes, think-tanks, communication lists, etc. to foster and nurture development of EBM champions. A good first step would be to see if there are existing leaderships and management processes that could be used to jump-start initiatives.
- People who "get" EBM, see the values, are passionate and inspiring leaders with vision and energy, and in organizational positions of influence, are needed to lead EBM implementation. Committed individuals with strong leadership abilities are able to forge partnerships with key individuals in other agencies and with public interests. The opportunity is to find ways to identify people and seek their input into developing more.
- Identify and cultivate champions that have the knowledge and capacity to undertake the boundary and practice work of a different institutional process (Zietsma and Lawrence 2010). For example, people with knowledge and experience between sectors and agencies.
- People who understand and recognize integration opportunities and multiple win possibilities across organizations and disciplines.
- Champions can help to develop committed and knowledgeable organizations, which support EBM implementation (Butler and Koontz 2005).

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D5.2 RELATIONSHIPS AND TRUST

Successful EBM implementation requires collaborations between multiple stakeholders across social, political, jurisdictional, and natural boundaries (Grumbine 1994; Stern and Coleman 2015). Collaboration depends on relationships based on trust, and one of the most important EBM challenges is low levels of

trust (Andison et al. 2019). Trust drives collaboration, conflict resolution, and achievement of objectives and targets (Figure D1; Ostrom 2003; Fulmer and Gelfand 2012). Lack of trust and distrust limits dialogue and negotiation and increases risks of failure to come to implementable consensus or equitable democratic majority. Widespread conservation conflicts that generate mistrust are intensifying as a result of growing pressures on natural resources and concomitant demands for greater conservation (Young et al. 2016; Baynham-Herd et al. 2018).

Trust means accepting some level of vulnerability because there is always a risk of betrayal or failure. Societal issues such as inequality and poverty influence trust perceptions. The absence of trust can take two forms, mistrust and distrust. Mistrust reflects doubt or skepticism about the trustworthiness of the other, while distrust reflects a settled belief that the other is untrustworthy (Citrin and Stoker 2018).

CHALLENGES

> *"Trust dissolves in an instant and takes a long time to rebuild. There's little trust among forest management players, and it's going in the wrong direction."* (Anonymous SME).

> *"The CBFA is an example of a process that was showing some promise before it fell apart. There's potential for more processes like that but right now the caribou specter is hanging over us, which will muddy the waters on any other conversation until that is resolved."* (Anonymous SME).

- There are usually low levels of trust in complex and wicked natural resource management problems (Smith et al. 2013).
- Trust is a social capital element that is integral to effective natural resource management but remains relatively unexplored in environmental social sciences (MacKeracher et al. 2018). Because trust is a major challenge to EBM implementation in Alberta and Saskatchewan (Andison et al. 2019), there is need for additional exploration to further define the existing trust situation in relation to EBM in terms that can be used to develop future solutions.
- Societal levels of trust in government, institutions, and other trustees have been declining for many decades (Dalton 2005; Citrin and Stoker 2018). This challenges forest management in general and prospects for EBM implementation in particular.

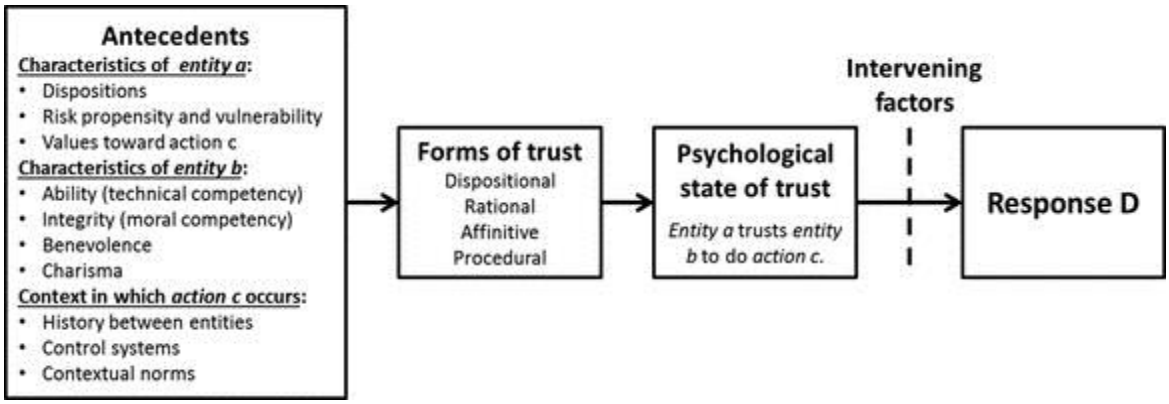

Figure D1. Basic framework illustrating key components of trust theory (Stern & Coleman 2015). Entity "a" is a trustor and entity "b" is a trustee. Dispositional trust is a general, context-independent predisposition to trust others. Rational trust is based on expectations of reciprocity or personal benefit in an interaction that involves an exchange. Affinitive trust is based on the trustor's perceptions of the benevolence, integrity, and other social characteristics of the trustee and their interactions. Procedural trust is based on the interactions between positive control systems and other forms of trust.

- Trust declines when governments, institutions, and others fail to meet promised or expected goals or follow prescribed norms (Citrin and Stoker 2018). These include noncompliance with regulatory requirements, lack of regulation or processes to address perceived shortcomings, broken promises, etc.
- Multiple, complex goals and disconnected governance and planning coupled with increasing human pressures lead to forest policy debates characterized by contention and competition over individual values or activities, which are strongly associated with mistrust and distrust.
- Low levels of trust in public land management agencies and minimal space for public involvement create perceptions of a closed policy network that is dominated by government and industry and provides minimal space for other interests (Miller and Nadeau 2020). The challenge is to expand policy networks to be more inclusive, transparent, and fair.
- Approvals of controversial forest-related projects or activities despite opposition or rejections of popular projects despite support erodes trust (Youdelis 2018). The erosions are compounded by not providing explanations or rationales for decisions that help those who didn't get what they wanted or expected understand the decision.
- Trust issues are exacerbated by factors such as:
    - Perceptions that outcomes have been pre-determined and decisions have already been made.
    - Hidden agendas or perceptions of hidden agendas.
    - Polarization associated with political partisanship.

  - Resistance to messages from sources viewed as unreliable or unconvincing in terms of ability, integrity, benevolence, and charisma (Stern and Coleman 2015).
  - Absence of information or nondisclosure of information.
  - Misinformation including "spin" and dishonesty.
  - Suppressing, co-opting, and disciplining dissent.
  - Uncivil communication.
  - Simplistic argumentation.
  - Insincerity.
  - Personal inclinations and experience history related to trust.
  - Clashing of values including diverging beliefs about whether social services or public goods should be managed publicly or privately (Youdelis 2018).
  - Lack of transparency especially about decisions but also information, etc. People do not like black box decision-making and lack of access to information.
  - Winner and loser mindset, determination to win, disinterest in others interests or wellbeing. Transactional versus relational processes and decisions.
  - Positional bargaining focused on activities and not outcomes.
  - Organizational distance which makes it difficult to understand and empathize with the interests and point-of-view of other EBM participants.
  - Miscommunication and failure to recognize and rectify miscommunication.
  - Risk aversion including reluctance to innovate.
  - Satisfaction or dissatisfaction with the status quo.
- Unequal power relationships are a significant factor in trust relationships
  - Powerful actors that use direct or backdoor political pathways to influence decisions in their favour are seen as insincere.
  - Positive steps undermined by others coming in from outside because of silos and actors not being involved in processes but still wielding power over decisions (Andison 2010).
- Very few groups or individuals fully trust the information they see on forest management, regardless of the source (Gorley and Merkel 2020). In contemporary discourse the rise of partisan spin, misinformation, outright lies, fake news, etc., coupled with declining levels of societal trust in general (Dalton 2005), has profoundly affected trust structures. The challenge is to provide reliable and trusted forest information from trusted sources.
- People tend to read and rely on information provided by sources that reinforce their own worldview and opinions. This tendency further divides society and challenges understanding the perspectives of others and looking for common ground.
- Some people and organizations in positions of influence are viewed by others as hostile to EBM which reduces trust and impacts willingness to engage and working relationships.
- People who represent organizations in long-term group processes such as public advisory committees may gain interpersonal trust through the process but have difficulty transferring

that trust to their organizations, who may feel they have been coopted by the process (Parkins 2010).

- Individuals vary considerably in their circumstances and inclinations that influence their inclination to trust or distrust. Ensuring diversity of opportunity and processes to address individual needs is a challenge.

RECOMMENDATIONS

> "*EBM is done to different degrees, even between forest companies. It seems sometimes that they are using it as a justification for what they are already doing. As a concept we have to continue to strive in that* [EBM] *direction.*" (Anonymous SME).

> "We have a trust battle. There are people stuck in positions on all sides, we have to pull those people trying to find solutions together to keep the ball rolling. Get the right people in the room at the right time and problems get solved." (Anonymous SME).

> *"One advantage EBM has is that it's an intuitively attractive option and has a lot of potential goodwill. It has to be sold, people have to understand it and believe it's better that what's being done now."* (Anonymous SME).

- EBM is a large, complex, enterprise with many diverse participants and interested parties getting information from many sources. Trust-building requires effort and resources and good opportunities for dialogue between stakeholders (Young et al. 2016; e.g., MacKeracher et al. 2018). Opportunities to efficiently use limited financial and human resources to communicate effectively and use targeted engagement to build trust where needed should be investigated (MacKeracher et al. 2018). Effective communication and attention to perceptions and attitudes of local stakeholders helps build trust (Sterling et al. 2017). A possible first step would be to review existing EBM communication platforms in each province and others that could be expanded in scope to identify opportunities to increase EBM communication. This could include targeted communication and follow-up outreach to particular actors where increased trust is needed to implement EBM.
- As a comprehensive, inclusive, integrated, collaborative process, EBM is designed to engender credibility and trust, and there should be opportunities to begin rebuilding overall trust levels through EBM implementation. One opportunity might be to develop communication messages about how EBM delivered through land use regional and subregional plans with quantitative targets and adaptive management loops could be used to gauge performance and help to build trust.
- There may be a research opportunity to characterize current trust levels in forest management in Alberta and Saskatchewan. Identify the specific aspects of trust strengths and weaknesses and ask what could be done to increase or maintain trust. The results could be used to support EBM in areas needing improvement.

- EBM does not resolve inherent conflicts over forest management, but it does offer space to discuss them openly and look for less contentious outcomes. This aspect of EBM provides opportunities for conversations about trust and what might be done through EBM to build trust.
- EBM opportunities that can help to address trust challenges:
    - Quantitative indicators and targets that can be used to assess performance against activities and outcomes.
    - Use of scenario analysis to compare management alternatives.
    - Decisions accompanied by explanations for choices increases transparency and helps stakeholders to feel more invested in the process
    - Information transparency including access.
    - Processes to plan, implement, monitor, and review EBM implementation.
    - Collaboration and partnerships to build relationships and trust.
    - Ongoing communication.
- Opportunities to address trust challenges associated with power relationships include:
    - Clearly-described processes with decision-making pathways, authorities, and accountabilities to better define participant expectations and opportunities. Involving others in defining fair processes can reduce conflict and support trust.
    - Looking for and implementing collaborations and partnerships that could beneficially change power relationships. Willingness to share knowledge and policy implementation power with local stakeholders who are dependent on and knowledgeable about natural resources helps to build trust (Young et al. 2016).
    - Vertical and horizontal engagement and support for EBM to minimize end-around behaviours.
- Trust is fostered by established, longstanding relationships and most business is implemented with longstanding colleagues and partners who are known to deliver on commitments. The opportunity is to expand existing relationships and networks to include others in trust relationships. A good initial step could be to catalog and review existing relationships and develop new relationships to fill recognized gaps.
- Partners act in transactional versus relational ways depending on whether or not they are in for the long run or just coming and going. The opportunity is to grow transactional relationships over time to build more trust, interactions, and mutually beneficial partnerships.
- Organizational differences can be sources of trust misalignment. Events or workshops that convey normative practices and operating procedures to potential EBM partners could reduce organizational distance between partners and help to generate new partnerships based on common interests and trust relationships (Bacon and Williams 2021).
- Trust is closely linked to credibility. Credibility is established over time by consistent behaviours and actions that are verifiably confirmed, preferably by independent 3rd party actors and transparent verification information. EBM provides multiple opportunities to establish and maintain credibility among participants. These include many verification processes already in

use which could be expanded to incorporate more EBM aspects. Examples include self-inspections and reporting, external audits, 3rd party audits, information platforms, processes to report performance inadequacies or failures, citizen science, watchdogs and ombudsmen, independent and transparent science panels, etc.

- Trust is supported by verification that participants are honest, act in good faith, and deliver on their commitments. Robust monitoring and reporting on EBM activities and outcomes provides opportunities to establish strong verification processes, which will help to build trust over time.
- Personal histories play an important role in the general propensity to trust or distrust. EBM may provide a catalyst to begin to rebuild trust through a common initiative.
- Elements that increase trust in processes include joint development of procedures, transparency in decision-making processes, responsiveness, and the equitable distribution of benefits and risks where possible, which in turn help to create a basis for other forms of trust (Stern and Coleman 2015).
- Build trust within planning frameworks by considering the needs of individuals who trust agencies and also distrusting individuals who are more likely to become involved in public involvement processes (Smith et al. 2013).

D5.3 Conflict Resolution

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EBM implementation is challenged by the need to resolve active conflicts about forest management. Historical forest management conflicts (Section B: High Level Frameworks) led to EBM improvements and it may be that resolving ongoing conflicts in Alberta and Saskatchewan will lead to similar outcomes.

Current forest-related conflicts in Alberta and Saskatchewan include ENGO-led protected area campaigns and market campaigns against the forest sector and the energy sector (Hoberg 2019). There are also local conflicts related to particular areas and activities.

Challenges

> *"Some government circles view EBM as a potential hindrance that could obstruct economic development of other commercial non-forestry natural resource activities."* (Anonymous SME).

> *"NIMBY is a factor wherever people have gotten used to forests in a particular way. Human time horizons are much shorter than forest cycles. It's hard to convince people to accept local change. They won't be around to see things return to how they have it now."* (Anonymous SME).

> "*Positional thinking slows down the process—some groups have an agenda with a specific objective they are not willing to compromise."* (Anonymous SME).

- Extended conflicts create entrenched antagonisms between the institutions, but also in personal animosities between individuals, which are difficult to overcome (Smith et al. 2007).
- Opponents may actually have a strategic interest in increasing process costs and delays as a way to discourage proponents (Hoberg 2019). This use of delay tactics can work both ways for any

conflict (Wilson 1998). Conflict-driven delays obstruct constructive progress and provide cover to put off positive steps to resolve conflict through initiatives such as EBM.

- "*Positional thinking slows down the process—some groups have an agenda with a specific objective they are not willing to compromise*." (Anonymous SME). Some actors would rather no decision be made than one they are not willing to accept (SME interviews).
- When there is doubt about causes and solutions for problems, the human tendency is to blame someone else and push for others to change their behaviour while resisting change in personal behaviour. This defensive behaviour leads to entrenched positional attitudes, which stand in the way of developing workable EBM solutions.
- Effectively managing any public problem is challenged by transfer, receipt and integration of knowledge across participants in ways that reduce conflict instead of exacerbating conflict.
- Overcoming participant mindsets can be a challenge (Weber and Khademian 2008). For example, participants may engage in processes purely to represent or defend their self-interests or organization interests rather than genuinely seeking consensus-based solutions.
- Internal pressures and crises can result in EBM being conducted as a collateral activity rather than as a deliberate and central focus. In turn this can lead to uneven and incomplete adoption of EBM, including cherry-picking.
- Resolving conflicts is integral to obtaining societal approval for EBM, building upwards from simple legitimacy, to credibility (a form of public approval), and finally to trust (a form of co-ownership) (Dare et al. 2014; Gehman et al. 2017).

RECOMMENDATIONS

"Broad agreement is often there but there's no formal process to recognize and realize that and government doesn't like to give up control. Effort has created a lot of trust between individuals. Relationships bear fruit over time, keep trying." (Anonymous SME).

"Some of the CBFA work has had a huge influence on caribou range plans. It's nice to see fingerprints of what you did a few years ago coming to fruition." (Anonymous SME).

"The Sakâw Askiy partnership of five forest companies and two First Nations is an example of what can be done when traditional adversaries resolve their differences." (Anonymous SME).

- As a high-level management framework, EBM can foster discussions between adversaries to look for opportunities to resolve conflict based on shared understandings and interests. For example, through interest-based CBFA discussions the forest and ENGO sectors were able to agree to pursue EBM (Canadian Boreal Forest Agreement 2015; Andison et al. 2016).
- When coherent higher-level policies and plans are in place there is less likely to be strong opposition to project-based assessments and reviews (Hoberg 2019). Creation of land use plans

that incorporate EBM at regional and subregional scales has the potential to reduce future project opposition.

- Key ingredients to successful conflict resolution, particularly for wicked natural resource problems, include: (Fischer et al. 1991; Weber and Khademian 2008; Balint et al. 2011).
    - Face-to-face interactions to build relationships between individuals and groups.
    - Developing relationships and affinities to develop shared values or intentions.
    - Shared problem definition.
    - Mutual understandings of the interests of others.
    - Concerns for others.
    - Shared criteria for evaluating alternative courses of action.
- Increased trust through fair processes where stakeholders have influence makes conflict resolution more likely (Young et al. 2016).
- The process used to produce the Great Bear Rainforest agreement in B.C. had five components (Smith et al. 2007):
    - Strategic logging deferrals/moratoriums during negotiations
    - An independent science committee.
    - Agreement to implement EBM.
    - Commitment to a new diversified economy.
    - Government-to-government agreements between Provincial and Indigenous governments.
- Individuals and organization units with primary or partial responsibilities to seek and facilitate EBM collaboration across organizational and governmental boundaries, between the public and private sectors, and between officials, professionals, and members of the public (Weber and Khademian 2008).
- Build collaborative problem-solving capacity by adopting a common approach (Weber and Khademian 2008):
    - Understand the task in basic terms and communicate it clearly.
    - Balance innovation with accountability.
    - Engage public, private, and political landscapes as part of capacity building.
    - Cross boundaries frequently and with ease.
    - Utilize established relationships based on experience and trust, and work to create new trust-based relationships as essential dimensions of capacity.
    - Employ substantive policy knowledge; know the task and environment from the inside, out—experience counts.

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D5.4 Capacity

Capacity is the resources needed to implement EBM. Capacity includes people, institutions, technology, tools, funding, expertise, knowledge, education, training, monitoring, communication, etc.

CHALLENGES

> *"Furthering EBM should be gradual and not an abrupt paradigm shift. Government doesn't have the capacity to engage in dramatic change, nor the political mandate. If politicians don't have it on their agenda, they are reluctant to embrace unknowns. Politicians are driven both by ideology and concerns of constituents."* (Anonymous SME).

> *"Some understand that fires are natural and they tolerate wildfires. Wildlife has evolved with fires and are adapted; they depend on fires and the conditions they create. This foundation of EBM needs to be emphasized. There's no core of people to work with and get it out there."* (Anonymous SME).

- Capacity includes finding time between being busy with day-to-day challenges and responding to crises to think strategically about EBM and take action.
- EBM aspects to be implemented need to be confirmed before assessing capacity to implement and developing capacity programs.
- Capacity for implementing new EBM aspects will need to be reassigned or developed.
- Capacity building efforts tend to focus on specific projects rather than on capacity building that is funded and sustained over time instead of short project time horizons.
- EBM complexity is seen as a challenge that can be overwhelming and beyond the capacity of organizations to visualize and implement (Boyd et al. 2015).
- Building comprehensive knowledge and accessibility is necessary to plan and implement EBM.
- Capacity for specific activities associated with EBM may be lacking. For example, expertise to conduct prescribed burning. Indigenous people had extensive prescribed fire traditions but may have lost some of their direct knowledge. Parks Canada has considerable knowledge and experience. Provincial agencies have lower capacity. In addition to human capacity, equipment and funding are needed to conduct prescribed fires. These too may be limiting and would need to be increased.

RECOMMENDATIONS

> *"Building capacity takes time and starts with building and sustaining relationships. There's not going to be a magical new pool of funds to build capacity, but a lot can be done with existing structures. A helpful step would be to identify major capacity needs."* (Anonymous SME).

> *"It's not enough to help people understand natural dynamics and a fire driven system. For many adults their mind is made up: don't confuse me with facts. We need to work on young people and getting EBM into the school curriculum is an opportunity to do that. The next generation will be more open."* (Anonymous SME).

- A research project to assess the most pressing EBM capacity needs, current capacity levels, and options for increasing capacity where gaps are identified.

- The most successful capacity-building efforts meet local needs and maintain and expand capacity over time. Use partnerships to identify and develop these.
- There is already tremendous human capacity in the practice of forest management but most of it is being used for purposes not directly related to EBM. Many people are engaged in day-to-day functions that could likely be replaced by or adjusted to EBM practices with no change in overall resource needs and allocations. The opportunity is to train people to conduct EBM functions and then shift capacity and practice to the EBM equivalent of the previous job functions. For example, people who do field layout of traditional logging plans can shift to layout of EBM logging events.
- Knowledgeable human resources to develop and deliver education, training, and skill development at the individual level to increase implementation capacity.
- Opportunities to partner with and expand existing capacity-building initiatives, especially eLearning.
- Sharing in the responsibility and capacity provision of strategic subregional EBM land use planning.
- Delegated control of forested lands to P3 initiatives, Indigenous, local communities, etc.

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