




THE UNIVERSITY
OF BRITISH COLUMBIA



Extending British Columbia's Engineers and Geoscientists Professional Guidelines to Other Professional Disciplines



Preliminary Roadmap December 2021

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Municipal Natural Assets Initiative





Invest in Nature

The Municipal Natural Assets Initiative (MNAI) is a Canadian not-for-profit that is changing the way municipalities deliver everyday services - increasing the quality and resilience of infrastructure at lower costs and reduced risk. The MNAI team provides scientific, economic and municipal expertise to support and guide local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and developing leading-edge, sustainable and climate-resilient infrastructure.

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1 Introduction

In July 2021, Engineers and Geoscientists British Columbia issued its *Professional Practice Guidelines - Local Government Asset Management*, which describes the expectations and obligations of professional engineering and geoscience professionals as they practice in the field of local government asset management. The Municipal Natural Assets Initiative (MNAI) released a companion document, *Natural Assets Management Considerations for Engineering and Geoscience Professionals (NAM Considerations Document)*, that Engineers and Geoscientists BC's Council endorsed.

Together, the *Professional Practice Guidelines – Local Government Asset Management and NAM Considerations Document* will help standardize engineering and geoscience practice in asset management in B.C. and will help ensure that engineering and geoscience professionals are considering natural asset management in their planning and decision-making processes.

This preliminary roadmap builds on that work and provides initial insights for how other professional disciplines can also develop natural asset management (NAM) professional norms or guidance for their fields.

This roadmap recognizes the rights of Indigenous people to cultural practices relating to land and natural systems. It values the potential role of Indigenous peoples as land-keepers in the management of natural assets and the criticality of Indigenous knowledge of human-ecosystem relationships.

The term *local government* is used in this document to include all agencies, regional districts, municipalities, First Nations and Indigenous organizations delivering local government services.

2 Purpose

The purpose of this preliminary roadmap is to provide a basis for **engagement and discussion** with an initial group of five professional disciplines on how they can conceptualize natural asset management practices and incorporate them into their professional practice guidelines, norms or standards.

3 Terms

3.1. What are municipal natural assets?

The term *municipal natural assets* refers to the stock of natural resources or ecosystems that a municipality, regional district, or other form of local government could rely upon or manage for the sustainable provision of one or more local government services¹.

3.2. Why manage natural assets?

A growing number of local governments recognize it is as important to understand, measure, manage and account for natural assets as it is for engineered assets. Doing so can enable local governments to better provide *core services* such as stormwater management, water filtration, and protection from flooding and erosion, as well as *additional services* such as those related to recreation, health, and culture. Outcomes of what is becoming known as *municipal natural asset management* can include cost-effective and reliable delivery of services, support for climate change adaptation and mitigation, and enhanced biodiversity.

3.3. How to manage natural assets?

There are numerous ways for local governments to manage natural assets. The Municipal Natural Assets Initiative (MNAI) uses methodologies and tools rooted in standard asset management and provides a range of advisory services to help local governments implement them. MNAI has developed the methods and tools with significant investments, piloting, refinement, peer review, and documentation of lessons in multiple Canadian provinces. MNAI's mission is to make natural asset management a mainstream practice across Canada, and in support of this, for local governments to accept and use the methodologies and tools in standard ways across the country.

¹ mnai.ca/media/2018/02/finaldesignedsept18mnai.pdf

4 Scope, Methodology and Limitations

This roadmap is scoped to the following five professions, while recognizing that future work will need to consider many others:

- 1/ Planner
- 2/ Landscape Architect
- 3/ Forest Professional
- 4/ Geoscientist
- 5/ Biologist

For each professional discipline, the snapshots provide:

- Name of profession and jurisdiction to which analysis applies.
- High-level overview of the governance context in the profession and jurisdiction.
- Brief description of linkages between professional discipline and natural asset management in a local government context.
- Analysis about how NAM may be relevant to the profession's standards and guidance.
- Analysis of how NAM could be integrated in the profession's standards and guidance.

MNAI combined desktop research on the governance structures of these professional disciplines with stakeholder interviews to provide both a snapshot on their linkages with natural asset management, and a preliminary indication of how they can integrate natural asset management practices into their professional standards and guidance.

Appendices [A](#) and [B](#) provide a stakeholder interview schedule and a sample of the interview questionnaire.

This roadmap is based on a limited number of stakeholder interviews; therefore, the **snapshots, findings and recommendations are indicative**. Additional engagement will be essential to validate and expand the findings.

Furthermore, it was not possible within the scope of this project to explore all professions within all provincial contexts.

At a future stage and subject to resources, it will be important to expand this effort to more professional disciplines.

4.1. Planner

Aspects	Details
<p>Governance</p>	<p>At a national level, the Canadian Institute of Planners (CIP) is a professional organization responsible for advocating at national and international levels for members, developing public policy positions, and providing services to members.</p> <p>It serves as a national umbrella for the 11 Provincial and Territorial Institutes and Associations (PTIAs) which regulate the planning profession across Canada. As the national body for planning, the CIP also provides codes of conduct and practice for planners, as well as numerous resources on current trends in planning and allied professions.</p> <p>The CIP advocates for:</p> <ul style="list-style-type: none"> ■ Healthy communities ■ Climate change ■ Indigenous planning ■ International outreach ■ Equity, diversity, and inclusion <p>The Professional Standards Board for the Planning Profession in Canada (PSB) administers the certification process of professional planners on behalf of the PTIAs and the CIP.</p>
<p>Professional discipline and NAM</p>	<p>Planners play diverse roles. They administer the land use development process, prepare and adopt land-use plans and bylaws, help formulate land-use plans, and identify long-term visions for local governments. The interviews for this roadmap suggest that planners tend to view processes and projects through a ‘big picture’ lens. According to one interviewee, they may make decisions based on the land-use principle of “<i>generating the highest and best-use economic activities values.</i>”</p> <p>With respect to natural assets, there is an opportunity for planners to consider the protection of, for example, wetlands and trees in urban contexts within the legislative tools for development permits areas. Land use, environment and policy-based planners are more likely to be involved. Generally, planners do not currently conceptualize natural assets as providing a wide range of core local government services, but this is changing.</p>

Aspects	Details
Professional discipline and NAM cont'd	<p>CHALLENGES</p> <p>Perception of natural assets within local government</p> <ul style="list-style-type: none"> ■ Planning policies usually consider natural assets as providing services for recreational and aesthetic purposes only. ■ Interviewees noted there are no standardized tools to help local governments understand the costs and benefits involved in natural asset management, although this may be a consideration across professions. ■ Most local governments are still catching up on built or engineered assets from an asset management perspective and awareness of the need to include natural assets in this context is low. <p>Lack of resources in the local governments</p> <ul style="list-style-type: none"> ■ Local governments may be risk-adverse. Many have limited in-house capacity, skills and knowledge related to inventory and use of natural assets. It may be difficult for them, given capacity constraints, to understand the benefits and possible approaches to integrating and using natural assets in service provision. Therefore, they may tend to focus on built assets for ease of managing budgets, programs and service delivery. <p>Lack of understanding of complexity of issues and integration across different disciplines on natural assets</p> <ul style="list-style-type: none"> ■ This can hinder cross-disciplinary collaboration on the management of natural assets. <p>Scope of work for planners</p> <ul style="list-style-type: none"> ■ Planners have a wide breadth of work, and some planning specializations have emerged outside general land-use planning, for example, social housing planners and cultural planners. Natural asset management does not yet figure in these specializations. ■ There is a corresponding need to identify a category of planners who can be considered qualified and trained to address natural asset management. <p>Lack of tools to understand benefits / service values of natural assets</p> <ul style="list-style-type: none"> ■ The lack of tools to determine the service value of natural assets and their benefits makes it difficult for planners to conceptualize the importance of natural asset management and the values that natural assets may bring. <p>OPPORTUNITIES</p> <p>The realities of climate change may cause planners to address and consider the role of natural asset management.</p> <p>Perception of natural assets within local governments has started to change as there are examples of local governments that have recently included considerations of ecosystem services or natural infrastructure in their policy documents.</p>

Aspects	Details
<p>Professional standards and guidance and NAM</p>	<p>Planners have competencies rooted in standards, planning policies and their implementation.</p> <p>OPPORTUNITIES</p> <p>There could be a corresponding opportunity to promote natural asset management practices through:</p> <ul style="list-style-type: none"> ■ A short and concise guidance note on natural asset management integrated into existing professional standards and made relevant to what planners currently do. ■ Education and training such as continuous professional training credits. <p>Interviewees noted that encouraging planners to work with other disciplines in the context of natural assets as helpful.</p>
<p>Other comments</p>	<p>Local governments need to justify their spending to taxpayers. Historically, the benefits that natural assets deliver have been considered difficult to quantify and/or not understood at all. This may have contributed to planners, and possibly others, defaulting to engineered solutions.</p> <p>Other measures to promote natural asset management in the planning profession could include:</p> <ul style="list-style-type: none"> ■ Provincial obligations on local governments to identify the natural assets upon which they rely, develop an inventory list, and implement natural asset management plans. ■ Standards, templates and tools to conduct technical and financial analysis of natural assets and nature-based solutions. This could help: <ul style="list-style-type: none"> □ Change the mindset among planners. □ Build confidence among the key stakeholders of their understanding of the functions and values of services from natural assets. □ Local governments continue to monitor service levels and maintenance cost of natural assets.
<p>Recommendations</p>	<p>Facilitate the integration of natural asset management practices with planners through:</p> <ul style="list-style-type: none"> ■ Identifying the type of planners that are best equipped to address natural asset management. ■ Working with the Canadian Institute of Planners to develop guidance notes on natural asset management. ■ Providing education and training on natural asset management for planners through continuous professional development. ■ Advocating for planners to work with other professional disciplines to facilitate an understanding of natural asset management.

4.2. Landscape Architects

Aspects	Details
<p>Governance</p>	<p>At the national level, the Canadian Society of Landscape Architects (CSLA) is a professional organization that advocates for its members on issues such as urban design, urban renewal, sustainable development, human health and well-being, climate change, and cultural heritage. The CSLA delivers programs and services for its members that:</p> <ul style="list-style-type: none"> ■ Increase public awareness and promote the profession. ■ Provide opportunities for professional development. ■ Support education and research through the accreditation of undergraduate and graduate landscape architecture programs, recognition of student achievement, and provision of scholarships. <p>The governance and regulation of landscape architects varies in each province. Three of the CSLA component organizations rely on the passing of examinations that the Council of Landscape Architectural Registration Boards (CLARB) sets. The CLARB promotes professional standards for landscape architects. Their members are the licensure boards across the US and Canada. CLARB prepares, administers and scores the Landscape Architect Registration Examination. The exams cover the following four areas:</p> <p>Section 1: Project and Construction Management</p> <p>Section 2: Inventory and Analysis</p> <p>Section 3: Design</p> <p>Section 4: Grading, Drainage, and Construction Documents</p> <p>In British Columbia, Ontario and Alberta, landscape architects are regulated according to the provincial Architects (Landscape) Act.</p>
<p>Professional discipline and NAM</p>	<p>Landscape architecture is the design profession concerned with the design, planning, management, and stewardship of the land. The work of landscape architects often touches on urban design and planning, site planning, storm water management, restoration, parks and recreation planning, green infrastructure planning, and private or residential master planning and design. The goal is to achieve environmental, social, or aesthetically pleasing spaces by investigating existing social, ecological, and geological conditions in the landscape.</p> <p>Part of a landscape architect's work includes designing and managing natural assets and ensuring they function as intended.</p>

Aspects	Details
Professional discipline and NAM cont'd	<p>CHALLENGES</p> <p>Local governments' mindset and culture</p> <ul style="list-style-type: none"> ■ Many local governments may be reluctant to explore natural asset management and tend to provide “business as usual” services. This may be a barrier to landscape architects fulfilling their potential to ensure the health and functioning of natural assets. ■ Landscape architects try to advocate in this respect but may have limited influence, depending on their roles in projects. <p>Awareness of natural asset management among other professionals</p> <ul style="list-style-type: none"> ■ Engagement and collaboration with other professionals are important but is often lacking. <p>Engineering-led, low-bid nature of projects</p> <ul style="list-style-type: none"> ■ Projects are often engineering-led with with priority given to low-bid tenders. This can result in fewer opportunities for interdisciplinary teams to work together and pose barriers for professionals – including landscape architects - to take a holistic look at the role of natural assets in projects. <p>Perception about natural assets and their management</p> <ul style="list-style-type: none"> ■ Many people have the perception that maintaining and managing natural assets is expensive and/or unaffordable; in other words, that there is no case for natural asset management. This can inhibit the work of landscape architects. <p>The need for metrics</p> <ul style="list-style-type: none"> ■ Metrics could demonstrate the tangible benefits that natural assets offer, such as how they provide land stability, absorb rain in storm events, provide mitigation of greenhouse gases, and provide habitat for birds and animals, shade, wind protection, and beautification. <p>Membership base</p> <ul style="list-style-type: none"> ■ CSLA has a small membership base and lacks resources to promote and advocate for natural asset management.
Professional standards and guidance and NAM	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> ■ A mission for CSLA is to address climate change. There is an opportunity to develop and include the role of natural asset management. ■ CSLA’s website publishes papers on nature-based solutions; there is an opportunity to expand and enhance this. ■ There is an opportunity to develop professional Guidance Notes on natural asset management.

Aspects	Details
Other comments	<p>Suggestions on how to further promote natural asset management amongst landscape architects include:</p> <ul style="list-style-type: none"> ■ Build momentum and recognition of natural asset management; it may be beneficial to use existing international standards and definitions, e.g., IUCN Global Standard for Nature-based Solutions. ■ Facilitate inter-disciplinary collaboration on natural asset management amongst different professional disciplines by carrying out workshops to share understanding and values on natural asset management.
Recommendations	<p>Facilitate the integration of natural asset management practices with landscape architects through:</p> <ul style="list-style-type: none"> ■ Working with CSLA to create a section on its website on what the expectation of natural asset management would be in addressing climate change. ■ Developing guidance notes on natural asset management that is relevant to landscape architects.

4.3. Forest Professionals

Aspects	Details
Governance	<p>At a national level, the Canadian Forestry Accreditation Board (CFAB) is responsible for accrediting Canadian post-secondary forestry programs to meet academic requirements for professional certification.</p> <p>The forestry profession’s governance and regulation vary in each province.</p> <ul style="list-style-type: none"> ■ The Association of BC Forest Professionals (ABC FP) is responsible for registering and regulating British Columbia’s professional foresters and forest technologists. ■ The Canadian Federation of Professional Foresters Associations is an organization with membership from each of the provincial forestry regulators in Canada plus the Canadian Institute of Forestry, which represents those provinces in which forestry is not a self-regulated profession. The federation works on issues of common interest to the professions, such as mutual recognition, labour mobility, recognition of continuing education, and codes of conduct.

Aspects	Details
Governance cont'd	<p>IN B.C.</p> <ul style="list-style-type: none"> ■ Only those registered with the ABCFP are legally permitted to practise professional forestry in B.C. The ABCFP establishes the conditions or requirements for registration and establishes, monitors, and enforces standards of practice. ■ There are 36 Professional Forestry Practice Areas within the general Practice of Professional Forestry; the one relevant to NAM is Forest Ecosystem Assessment, Planning and Stewardship. ■ The ABCFP and Engineers and Geoscientists BC have a Joint Practice Board which is composed of experienced professional engineers, geoscientists, and forest professionals who work together to provide standards, guidance, and other direction to professionals on forest roads and crossings (bridges and large culverts). ■ The Office of the Superintendent of Professional Governance (OSPG) is the centre of provincial expertise for professional governance of regulatory bodies outside the health sector. The Superintendent is the head of the OSPG, and with a focus on public interest, is authorized by the Professional Governance Act (PGA) to carry out various functions including overseeing the governance of regulatory bodies under the PGA, conducting research and promoting best practices, administering the Professional Governance Act including enforcement, and publishing information that is related to professional governance and deemed in the public interest.
Professional discipline and NAM	<p>Forest professionals play important roles in land management, conservation and rehabilitation. They provide advice in relation to trees, forests, forest lands, forest resources and forest ecosystems.</p> <p>CHALLENGES</p> <p>Interdisciplinary nature of natural asset management</p> <ul style="list-style-type: none"> ■ When working with other professionals such as planners and engineers, forest professionals find that the others may not completely understand how ecosystems work and not consider systems as a whole. ■ Natural asset management requires a common understanding on NAM among and across the different professionals, e.g., forest professionals and planners. <p>Awareness of the profession of urban forestry and what it can offer</p> <ul style="list-style-type: none"> ■ There is a need to raise local government awareness of the role and full value of forest professionals in urban settings. ■ There is a need for greater inclusion of forest professionals on multi-disciplinary local government teams.

Aspects	Details
<p>Professional discipline and NAM cont'd</p>	<p>Lack of a demand-side legislation / regulation</p> <ul style="list-style-type: none"> ■ Having legislation and regulations could help drive demand for natural asset management; for example, requiring the assessment of natural assets, similar to the way fire hazard assessment for properties built in surrounding forests is required. <p>The need to make natural asset management and its benefits more explicit</p> <ul style="list-style-type: none"> ■ It is important to demonstrate the benefits of natural assets more explicitly. The management of stormwater runoff, for example, is readily understood and modelling and valuation could demonstrate the related values. <p>Stakeholders need to learn and recognize the benefits of natural assets</p> <ul style="list-style-type: none"> ■ With the involvement of the right professionals, time and projects, local governments should learn to think about the benefits of natural assets (e.g., forests) in a broad sense that includes social, ecological, and economic benefits. ■ Difficult to quantify natural asset attributes. ■ Sometimes depends on the level of public interest. <p>OPPORTUNITIES</p> <p>Knowledge, and developing codes, standards and tools</p> <ul style="list-style-type: none"> ■ There is an opportunity for local governments to identify the natural assets under their ownership and upon which they rely and the objectives/services provided by these natural assets. ■ Similar to the use of building codes for the built environment, there is an opportunity to develop a set of codes and standards for natural assets which the professionals can use as a basis to inspect and sign off. This would likely be done at a provincial scale. ■ Good standards, tools and guidance on improving natural asset management would help determine what information is needed on, for example, wetlands in forests, and make implementing natural asset-based solutions easier.
<p>Professional standards and guidance and NAM</p>	<p>Currently, forest professionals learn about natural asset management through:</p> <ul style="list-style-type: none"> ■ Education (e.g., UBC); forest professionals need to learn about urban forestry. ■ Newsletters could raise the awareness of natural asset management.

Aspects	Details
Other comments: a case study example	<p>qathet Regional District, in collaboration with the City of Powell River, undertook a capital project using forested natural assets to support storm water management services. Rather than fixating on the details of the proposed engineered design, the project team took a step back and recognized the opportunity to use a natural asset solution, which helped save forests and taxpayer money.</p> <p>Key questions from the project were:</p> <ol style="list-style-type: none"> 1/ Can the natural forest asset provide the service at the level it needs to provide? 2/ What are the financial costs of using the natural asset to provide the service? 3/ What will the long-term impacts to the natural asset be?
Recommendations	<p>Facilitate the integration of natural asset management practices with forest professionals through working with ABCFP to explore:</p> <ul style="list-style-type: none"> ■ How to promote natural asset management among the forest professionals. ■ Ways to increase awareness among local governments and other professional disciplines of the role and value of forest professionals.

4.4. Geoscientist

Aspects	Details
Governance	<p>Geoscientists Canada is the national organization of the nine provincial and territorial regulatory bodies that govern Canada’s professional geoscientists and geoscientists-in-training. Geoscientists Canada co-ordinates the development of high national standards of admissions, competency, practice and mobility to ensure a skilled, versatile, reputable and accountable geoscience profession.</p> <p>Most of the governing power lies with the provincial bodies; geoscientists register with the provincial / territorial associations. Geoscientists Canada provides some consistency by bringing the different bodies together, but the legal power is with the provincial bodies.</p>

Aspects	Details
<p>Governance cont'd</p>	<p>Geoscientists Canada's members are:</p> <ul style="list-style-type: none"> ■ Engineers and Geoscientists British Columbia ■ Association of Professional Engineers and Geoscientists of Alberta ■ Engineers and Geoscientists New Brunswick ■ Engineers Geoscientists Manitoba ■ Association of Professional Engineers and Geoscientists of Saskatchewan ■ Professional Geoscientists Ontario ■ Geoscientists Nova Scotia ■ Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists ■ Professional Engineers and Geoscientists of Newfoundland and Labrador <p>The scope and membership base of the nine regulatory bodies varies. Under five of nine regulatory bodies, geoscientists and engineers are regulated by the same organisation. In Quebec, geologists are governed by the Ordre des géologues de Québec (OGQ) who are not members of Geoscientists Canada; geomorphologists are not regulated in Quebec.</p>
<p>Professional discipline and NAM</p>	<p>From a general perspective, geoscientists are already actively involved in managing, characterising, and designing restoration of natural assets for local and provincial governments. Geoscience professionals include geotechnical engineers, hydrogeologists, and geomorphologists.</p> <p>CHALLENGES</p> <p>Engineering-led, low-bid nature of projects</p> <ul style="list-style-type: none"> ■ Asset management projects are often engineering-led and focused on the built environment. Procurement frequently favours low-bid tenders, offering less incentive for respondents to propose innovative approaches involving more multidisciplinary teams and incorporation of natural assets. <p>Lack of natural asset management awareness and practices among local governments</p> <ul style="list-style-type: none"> ■ Decision-makers within local governments may not have awareness and knowledge of natural asset management. <p>Monetizing natural assets and their benefits</p> <ul style="list-style-type: none"> ■ It is currently not standard practice to place monetary values against natural assets. The value of these assets is therefore not realized.

Aspects	Details
<p>Professional discipline and NAM cont'd</p>	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> ■ Ontario local governments are required to incorporate green infrastructure assets into their asset management plans by 2023 according to O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure. Green infrastructure assets are defined in the regulation as “an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs.” ■ The CEO of Geoscientists Canada signed a joint response to the Public Sector Accounting Board in June 2020 supporting the ability of public sector entities to reflect natural assets on their financial statements (https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2021/07/2021-06-30-PSAB-Joint-Response-ICCA-KMPG-MNAI-Natural-Assets.pdf). The CEO of Professional Geoscientists Ontario had brought the discussion to Geoscientists Canada, which facilitated this outcome. ■ Professional Geoscientists Ontario has recently convened a Sustainability and Climate Change ad-hoc Subcommittee and has publicised both the joint response to PSAB and MNAI’s “Natural Assets Management Considerations for Engineering and Geoscience Professionals” in its newsletter.
<p>Professional standards and guidance and NAM</p>	<p>Suggestions to integrate natural asset management practices with geoscientists include:</p> <ul style="list-style-type: none"> ■ Modify the NAM Considerations Document specifically for geoscientists. ■ Engage Professional Geoscientists Ontario in the above process, building on previous support and interest. ■ Provide education and training on natural asset management for geoscientists through continuous professional development (this may vary among provinces depending on how geoscientists are being governed). <p>In Ontario, there are several existing guidelines that are relevant to geoscientists involved in the characterization and management of natural assets, including:</p> <ul style="list-style-type: none"> ■ Ontario Streams Assessment Protocol (OSAP). ■ Natural Channel Systems: Adaptive Management of Stream Corridors in Ontario, including Natural Hazards Technical Guides for River and Stream Systems: Flooding Hazard Limit, Erosion Hazard Limit and Hazardous Sites Technical Guides (MNR 2002). ■ Low Impact Development Stormwater Management Planning and Design Guide.

Aspects	Details
Other comments	<p>Other views/suggestions:</p> <ul style="list-style-type: none"> Local governments have limited resources available to address natural asset management. Establish a multidisciplinary board to advocate natural asset management projects and their contributions. Set natural asset management as an essential requirement so decision-makers in governments, project initiators, professionals, and communities must work together.
Recommendations	<p>Facilitate the integration of natural asset management practices with geoscientists through:</p> <ul style="list-style-type: none"> Modifying the NAM Considerations document specifically for geoscientists. Providing education and training on natural asset management for geoscientists through continuous professional development.

4.5. Biologists

Aspects	Details
Governance	<p>Biologists conduct basic and applied research to extend knowledge of living organisms and in some cases to manage natural resources.</p> <p>In B.C., the College of Applied Biologists (CAB) regulates the profession of biologists and makes sure that a member practicing applied biology in B.C. has the necessary knowledge and skills. Specifically, the CAB:</p> <ul style="list-style-type: none"> Awards title of professional biologist and registered biology technologist. Sets conduct and performance standards that hold members accountable. Ensures the competence of its members through compulsory rules for continuing professional development, audits, investigations, discipline procedures. Evaluates and comments on legislation pertinent to the purpose of the CAB from an apolitical perspective.

Aspects	Details
Professional discipline and NAM	<p>CHALLENGES</p> <p>Lack of standardised NAM toolkits and multidisciplinary professionals to connect with local governments</p> <ul style="list-style-type: none"> ■ Need key practitioners to coordinate and facilitate the process on how NAM would come together and conceptualize the framework. Local governments do not know who to connect with for more information. <p>Lack of natural asset management awareness and practices among local governments</p> <ul style="list-style-type: none"> ■ Decision-makers within local governments may not have awareness and knowledge on natural asset management. <p>Monetizing natural assets and their benefits</p> <ul style="list-style-type: none"> ■ It is important to put monetary values against natural assets to change the mindset within local governments. <p>OPPORTUNITIES</p> <ul style="list-style-type: none"> ■ Land Trust Alliance conducts a Symposia Series that could build NAM knowledge for practitioners.
Professional standards and guidance and NAM	<p>The CAB uses a competency framework of seven Professional Competences to align registrants’ skills, capabilities, knowledge, and competence with their professional practice. The areas of competences covered in the framework include:</p> <ul style="list-style-type: none"> ■ Records/Data Management & Informatics ■ Professional accountability ■ Communication ■ Scientific knowledge & concepts ■ Laws, regulations & policy ■ Standards and practices ■ Project &/or Work Product Management
Other comments	<ul style="list-style-type: none"> ■ Local governments should include natural assets in their budgets to determine resources allocations on an annual basis. ■ Include professionals such as biologists and forest professionals within local governments to raise governments’ awareness and understanding of natural assets.

Aspects	Details
Recommendations	Facilitate the integration of natural asset management practices with conservation biologists through: <ul style="list-style-type: none"> ■ Working with the land trust sector to explore how to promote natural asset management. ■ Providing education and training on natural asset management for biologists through continuous professional development. ■ Exploring ways to increase awareness of conservation biologist professionals among local governments and other professional disciplines.

5 Initial recommendations and observations

5.1. Recommendations

The interviews with key stakeholders identified approaches that could facilitate the integration of NAM practices into the professional disciplines considered in this preliminary roadmap. These approaches include:

- Provision of guidance
- Training as part of continuing professional development
- Multi-disciplinary workshops
- Seminars / symposiums for knowledge sharing
- Good practice case studies

Professional Discipline/ Means of Support	Provision of Guidance Note	Training as part of Continuing Professional Development	Multi-disciplinary Workshops	Seminars / Symposiums for Knowledge Sharing	Good practice case studies	Remarks
Planners	+	+	+	+	+	The Guidance Note to be developed should be concise and targeted to the sub-set of planners whose jobs are relevant to NAM.
Landscape Architects	+	+	+	+	+	
Forest Professionals			+	+	+	
Geoscientists	+	+	+	+	+	Modify the NAM Considerations Document for Geoscientists.
Biologists		+	+	+	+	

5.2. Observations

Stakeholder interviews also revealed the following observations:

- Including natural assets as an integral part of local government asset management programs:** It is important for all local governments to value, protect and manage natural assets as an essential part of their asset management processes. There is divided opinion from professionals on whether local government should be legislated to undertake asset management planning, including natural assets.
- Standards and Toolkits:** Design standards and levels-of-service targets should be established for natural assets. This would provide service delivery managers in local governments an understanding of the technical requirements, potential benefits, and expected level of service delivery associated with natural assets. The service delivery managers also need to understand the lifecycle costs of adopting natural asset-based solutions as part of their service delivery. Therefore, more standards, technical and financial analysis tools associated with the use of natural assets could be valuable for local government decision-making processes.

- **Procurement:** Local governments could consider natural assets in procurement processes. Service delivery managers and procurement staff could consider how natural asset considerations would impact procurement from multiple perspectives including scope definition, budget, and skills and competencies requirements for the successful delivery of the projects. This would likely require additional tools.

6 Possible next steps

A key next step is to use this preliminary roadmap as a basis for discussion and engagement with the professions reviewed, with a view to determining how they can better conceptualize natural assets and incorporate them into their professional practice guidelines, norms or standards.

This roadmap project highlighted that more needs to be done to promote the management of natural assets as a norm in local governments, such as:

- Senior leadership recognition of natural assets and the services/potential services each natural asset provides.
- Flexibility in the procurement process, scope definition and budget estimation, and provide opportunities to consider natural asset-based solutions.
- The more and better information we have on natural assets, the easier it is to develop nature-based solutions.
- The ability to compare options and provide justification to favour natural assets, and the ability to monetize the values/benefits that natural asset-based solutions could bring is important.

In light of the above, the following stakeholder groups and/or professional disciplines could be engaged in future roadmap projects:

- Senior administrative leadership team in local government.
- Service delivery managers in local government.
- Procurement and supply chain professionals.
- Information and recording professionals.
- Finance and accounting professionals.

References

MNAI (July 2021). Natural Assets Management Considerations for Engineering Professionals document. *MNAI EGBC Companion Guide March 2021.pdf*

Appendix A – Stakeholder Interview Schedule

Professional Discipline	Corresponding Advisory Group Member(s)/Others	Interview Date and Time
Geoscientist	Joanne Eyquem (Geoscientist)	18 June 2021
	Tom Elliot (Hydrogeologist)	18 June 2021
Planner	Michael Drescher	17 June 2021
	Kim Fowler	16 July 2021
Landscape Architect	Jane Welsh	16 June 2021
	Colleen Mercer Clarke	16 July 2021
Forestry Professional	Mike Wall	16 June 2021
	Mike Larock, Paul Nuttall (Association of BC Forest Professionals)	3 August 2021
Biologist	Tim Ennis	14 June 2021

Appendix B – Interview Questionnaire

Project	Natural Asset Management (NAM) Roadmap Project to Extend EGBC Norms to Other Professional Disciplines
Name of Interviewee	
Professional Discipline	
Date and time of the interview	
Venue	

Part A: Governance

Purpose

To identify how the selected professional discipline is being governed at both provincial and national levels (if applicable), and to understand the dynamics and inter-relationships between the relevant organizations/professional bodies.

- A.1.** What are the professional bodies/organizations, at both provincial and national levels, that govern your professional discipline?
- A.2.** What is the governance structure? Describe the dynamics and inter-relationships of the professional bodies/organizations mentioned in A1.
- A.3.** Are there any other relevant organizations that have influence over how your professional discipline is being governed?
- A.4.** Do you know if any of the above-mentioned professional bodies/organizations has a good understanding of NAM and is working towards addressing the issues? If yes, please provide details.

Part B: Your professional discipline and NAM

Purpose

To develop an understanding on how the management of natural assets is relevant to the selected professional discipline.

- B.1.** How do you think about natural assets?
- B.2.** How does your profession handle and manage natural assets?

- B.3.** Describe how NAM would fit into your existing practices.
- B.4.** From your perspective, what would be the benefits and disbenefits (if any) of incorporating NAM practices?
- B.5.** What are the opportunities and barriers? How can we best capitalize on these opportunities and overcome the barriers?
- B.6.** What kind of support (internal/external, short-term/long-term) may be required to promote NAM in your professional discipline?
- B.7.** When thinking about NAM and, in your opinion, what kind of interdisciplinary considerations should be taken into account?
- B.8.** Do you think NAM is important to your profession and why?
- B.9.** Would you like to provide any additional comments that may help further illustrate the linkages between your professional discipline and NAM?

Part C: Professional standards & guidance and NAM

Purpose

To identify existing relevant professional standards and guidance and discuss how NAM could be integrated in these standards and guidance.

- C.1.** What are the standards and guidance that govern how your profession does its work? Which professional bodies/organizations mentioned in Part A are responsible for these standards and guidance? How often do they get updated?
- C.2.** Based on our discussion in Part B, would you suggest NAM practices be integrated in these professional standards and guidance, and how?
- C.3.** In your opinion, what kind of issues/challenges may be encountered if NAM practices are integrated in these professional standards and guidance? How can these be resolved?
- C.4.** Aside from professional standards and guidance, do you have any other suggestions on how the adoption of NAM practices can be encouraged in your professional discipline?

Part D: Other Comments

- D.1.** Please provide any additional comments/information that are relevant to this Roadmap Project.

Municipal Natural Assets Initiative

