

Ecosystem services decision support tools: exploring the implementation gap in Canada

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Abstract

This paper explores the degree to which the ecosystem services (ES) concept and related tools have been integrated and implemented within the Canadian government context at both the provincial/territorial and federal levels. The research goals of the study were to qualitatively assess the extent to which ES assessment is being integrated at different levels of government, consider the barriers to implementation, and draw lessons from the development and use of Canada's *Ecosystem Services Toolkit: Completing and Using Ecosystem Service Assessment for Decision-Making—An Interdisciplinary Toolkit for Managers and Analysts* (2017), jointly developed by a federal, provincial, and territorial government task force. Primary data were collected through targeted semi-structured interviews with key informants combined with a content analysis of ES-related documentation from government websites. Results indicate that while the term ES is found in documentation across different levels of government, there appears to be an ES implementation gap. Issues of conceptual understanding, path dependency, a lack of regulatory mandate, lost staff expertise, and competition with overlapping conceptual approaches were identified as barriers to ES uptake. Areas requiring further policy and research attention are identified.

Key words: governance, ecosystem services, implementation gap, natural resource and environmental management

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Introduction

Ecosystem services (ES) have been defined in a variety of ways and are often aligned with the conceptualization of nature's benefits to people (Pascual et al. 2017). The *Millennium Ecosystem Assessment* (MEA 2005) brought global attention and interest to the ES concept, resulting in the development of numerous decision support tools and assessment techniques (Wilkinson et al. 2013; Laurian and Crawford 2016; Woodruff and BenDor 2016). The underlying goal of the ES approach is to better understand the relationships among people, activities, and ES to inform environmental and natural resource decision-making at various scales. ES assessments may inform, for example, more complete accounting in cost-benefit analysis, landscape management, and public policy for human welfare and equity (Fisher et al. 2009). ES assessments consider ecosystem functions, how those functions generate benefits to humans, and how those benefits are distributed to society

(MEA 2005). It is therefore a broadly interdisciplinary and technical activity, requiring the expertise of an interdisciplinary team (Value of Nature to Canadians Study Taskforce (VNCST) 2017).

Government interest in the assessment of ES has grown globally in recent decades (Chaudhary et al. 2015; Rolf et al. 2017; VNCST 2017), offering a promising approach to purposefully consider and plan for the varied trade-offs that arise in environmental governance decision-making (Pascual et al. 2017; VNCST 2017; Jax et al. 2018; Keenan et al. 2019). However, there is a general absence of “on-the-ground”, examples of ES approaches being used systematically in policy decision-making by governments (Gómez-Baggethun et al. 2010; Laurans and Mermet 2014; Hansen et al. 2015; Langemeyer et al. 2016; Levrel et al. 2017), which some scholars have framed as a potential “implementation gap”¹ (Sitas et al. 2014).

Recent studies have elaborated on the practices and challenges of implementing the ES concept in various government decision-making contexts. Some of the barriers that have emerged include language, capacity, lack of internal champions, and that an ES approach is not mandated in most jurisdictions (e.g., Hauck et al. 2013; Saarikoski et al. 2018; Grêt-Regamey et al. 2017).

This paper explores the degree to which the ES concept and related tools have been integrated and implemented within Canadian government, at both the provincial/territorial and federal levels. We draw on a review of publicly available documents and the lessons learned from the development of Canada’s Ecosystem Services Toolkit (ES Toolkit). The ES Toolkit (*Completing and Using Ecosystem Service Assessment for Decision-Making—An Interdisciplinary Toolkit for Managers and Analysts* (Value of Nature to Canadians Study Taskforce (VNCST) 2017) is an innovative resource, jointly developed by a federal, provincial, and territorial government taskforce. As the only Canadian ES guide specifically developed for government staff, the ES Toolkit and its development offers an instrumental case of applying an ES approach for environmental and natural resource decision-making.

Background

International context

Canadian governments have long been learning from international experiences using ES concepts to support decision-making. In the United States, there has been a considerable federal agency interest in ES (e.g., the USDA Forest Service and the US Environmental Protection Agency) with ES valuation studies being used to inform planning and policy-making in some regions (Molnar and Kubiszewski 2012; McPhearson et al. 2014; Ruckelshaus et al. 2015). In the European Union the ES concept has been promoted through specific policies and actions, e.g., Biodiversity Strategy (EU 2011), the Green Infrastructure Strategy (EU 2013), and the Initiative on Mapping and Assessment of Ecosystems and their Services (MAES) (EU 2013), with an increasing focus on how to implement ES within EU governance processes (Hauck et al. 2013; Albert et al. 2014; Matzdorf and Meyer 2014).

Australia was an early leader in government use and implementation of the ES approach (Hansen et al. 2015; Rolfe et al. 2017); however, policy interest in the concept has since waned (Pittock et al. 2012; Plant and Ryan 2013). Some of the reasons identified for this decline in implementation have been an absence of a formal government framework, loss of leadership, complexity of the concepts and the language used, lack of standard accounting metrics and data for ES, and what some consider to have been too great an emphasis on the economic aspects of ES implementation (Plant and Ryan 2013; Albert et al. 2014; Chaudhary et al. 2015). Generally, the strength of uptake and implementation

¹The concept of an implementation gap relates to the differences between a theory or policy statement and its “real-world” application (Knight and Cowling 2006; Knight et al. 2008; Chan et al. 2012).

of ES thinking in Europe, the United States, and Australia has depended on political support, government leadership on the issue, the formulation of clear and enforceable policy, and the availability of relevant, accessible scientific expertise (Hickey et al. 2013; Plant and Ryan 2013; Wilkinson et al. 2013; Sitas et al. 2014; Chaudhary et al. 2015; Guerry et al. 2015; Kabisch 2015; BenDor et al. 2017; Thompson, Sherren and Duinker 2019).

Canadian context

In the years following the Millennium Ecosystem Assessment (MEA 2005), the ES concept was formally acknowledged by the government and began to appear across many provincial and federal agencies (e.g., environment, natural resources, agriculture, and forestry). Within the federal Environment and Climate Change Canada (ECCC), ES were formalised into economic valuations and cost–benefit analysis frameworks. ES assessments have also been piloted within British Columbia, Ontario, and Alberta for environmental and natural resource goals. Within the agricultural sector, the term ecological goods and services was popularised with the launch of the Alternative Land-use Services (ALUS) and environmental farm plans (ALUS 2009; Chalifour and McLeod-Kilmurray 2015). Within forestry environmental goods and services, ES has been used in presenting the full suite of services that forests and forest management produce (GoO 2020). These policy efforts were influenced by reports produced by environmental nongovernment organisations (NGOs), including the David Suzuki Foundation (2010), ALUS (2009), and Ducks Unlimited Canada (2009).

Because of environmental pressures, the Alberta government has perhaps been the most interested in experimenting with ES thinking in policy. In 2007, in coordination with the Alberta government, the Canada West Foundation (a policy think tank) hosted a workshop on ES with experts from Australia (Rae 2007) to learn and build expertise. ES was first integrated into the Alberta Land Use Framework for the South Saskatchewan Regional Plan with outside experts providing consulting services (GoA 2008), whereas the first full ES assessment focused on an ES Pilot on Wetlands (GoA 2012). Other relevant Alberta initiatives have included the Water for Life Strategy (GoA 2009), water marker considerations in southern Alberta (Bjornlund 2010), Alberta Wetland Policy (GoA 2012), and a focus on market-based instruments to manage trade-offs of landscape resources, such as conservation offsets (Seiferling 2015).

In 2017 an ES Toolkit was developed as part of a federal, provincial, and territorial taskforce initiative to support the incorporation of ES assessments into various government applications (Value of Nature to Canadians Study Taskforce 2017). The ES Toolkit was developed over three years with the explicit intent to be “a technical guide to ecosystem services assessment and analysis that offers practical, step-by-step guidance for governments at all levels, as well as for consultants and researchers” (Value of Nature to Canadians 2017, p.2)². The ES Toolkit is web-based to allow practitioners to seek out the most pertinent information and advice.

Methods

This study was conducted following a grounded theory approach (Glaser and Strauss 1967), considered particularly suitable for exploratory research into policy issues.

Primary data were collected through 10 key-informant interviews conducted in 2020 with a purposive sample of ES policy experts who were involved with the development and (or) implementation of Canada’s ES Toolkit in government (see Table 1). Each interview followed a semi-structured format

²The ES Toolkit is housed within Environment Canada and Climate Change (ECCC). ECCC is also a partner for the ResNet project and the ES Toolkit is being used as a guide for project researchers and partners to consider.

Table 1. Profile of expert key informants interviewed.

| Affiliation | Other affiliations (at time of ES Toolkit development) | Location | ES Toolkit Contributor |
|------------------------|--|------------------|------------------------|
| Academic | Federal, Consultant | Ontario | Yes |
| Consultant | Academic, Provincial | Ontario | Yes |
| Federal government | — | Ontario | Yes |
| Federal government | — | Ontario | Yes |
| Federal government | Academic, Consultant | Ontario | Yes |
| Provincial government | — | Alberta | Yes |
| Provincial government | — | British Columbia | Yes |
| Provincial government | — | Ontario | Yes |
| Provincial government | ES Consultant/ Academic | British Columbia | Yes |
| Researcher/ Consultant | ES Expert Consultant | Quebec | Yes |

Note: ES, ecosystem services.

and lasted approximately 50 minutes. Because of the high degree of first-hand experience working with the ES Toolkit among our sample, 10 interviews were enough to reach a level of data saturation (Saunders et al. 2018), as no significant new information on ES implementation was arising from additional interviews (Crouch and McKenzie 2006). Interviews were conducted over the phone or an internet-based meeting platform (interview questions presented in Supplementary Material). All interviews were recorded and fully transcribed, then reviewed by the participant for accuracy. Data collection protocols were reviewed and approved by the McGill University Research Ethics Board (#20-06-026).

Interview transcripts were reviewed and inductively coded following a similar protocol to Thompson et al. (2019). Based on the research objective, as reflected in the interview schedule, the resulting themes all related to the barriers to implementing ES concepts in government, with a particular focus on the ES Toolkit (2017).

To maximize the reliability of our findings, we sought to triangulate the perspectives of the expert sample of respondents by investigating the use of ES concepts within Canadian (federal, provincial, and territorial) government websites. The first step involved a web search of each provincial and territorial government and federal department involved in the ES Toolkit to establish the raw number of ES references. Individual searches were completed for the following ES-related terms: “ecosystem services”, “ecosystem goods and services”, “environmental goods and services”, “ecological goods and services”, and “ecological service” (the variations of the ES term used over the past two decades). The term “environmental services” was not used given the broader set of uses and meanings (e.g., services provided within the environment field). For this research a 10-year timeframe, from 2010 to 2020 (May), was used. Content analysis was employed to generate meaningful categories for our research goals (Krippendorff 2004; Norton 2008). Content analysis has been effectively employed in a number of other studies on the use of ES in governments (Presnall et al. 2015; Geneletti and Zardo 2016; Jacobs et al. 2016).

Table 2 provides a summary of the results of the web search including the raw number of search results associated with the ES terms. The exact number of ES occurrences by government are first

Table 2. Government evidence of ecosystem services (ES) website use by number and theme.

| Government | Raw ES web reference | Clean ES web reference | Communication: presence of ES term | Economic values: ES values or valuation | ES approach recommended: promoted in documentation | ES assessment: pilot or program | ES mandated: regulation or legislation |
|--|----------------------|------------------------|------------------------------------|---|--|---------------------------------|--|
| Federal | | | | | | | |
| Agricultural and Agri-food Canada | 372 | 206 | Yes | Yes | Yes | Yes | — |
| Environment and Climate Change Canada | 349 | 241 | Yes | Yes | Yes | Yes | Yes |
| Fisheries and Oceans Canada | 129 | 70 | Yes | Yes | Yes | Yes | Yes |
| Indigenous and Northern Affairs Canada | 8 | 2 | Yes | — | — | — | — |
| Parks Canada | 45 | 24 | Yes | — | — | — | — |
| Natural Resources Canada | 202 | 79 | Yes | Yes | Yes | — | — |
| Provinces/Territories | | | | | | | |
| Alberta | 64 | 32 | Yes | Yes | Yes | Yes | Yes |
| British Columbia | 289 | 92 | Yes | Yes | Yes | Yes | — |
| Manitoba | 429 | 89 | Yes | Yes | Yes | Yes | — |
| New Brunswick | 154 | 62 | Yes | — | — | Yes | — |
| Newfoundland and Labrador | 26 | 12 | Yes | — | — | — | — |
| Northwest Territories | 96 | 34 | Yes | Yes | — | — | — |
| Nova Scotia | 131 | 78 | Yes | — | Yes | Yes | — |
| Nunavut | 23 | 6 | Yes | — | — | — | — |
| Ontario | 687 | 221 | Yes | Yes | Yes | Yes | Yes |
| Prince Edward Island | 149 | 41 | Yes | — | — | — | — |
| Quebec | 99 | 54 | Yes | — | Yes | — | — |
| Saskatchewan | 23 | 14 | Yes | — | — | — | — |
| Yukon | 23 | 13 | Yes | — | — | — | — |

presented, followed by the number of relevant ES occurrences, cleaned for repetition, to remove pre-2010 results and documentation not directly associated with that government or its contractors. To understand the use of ES within the various government contexts, thematic categories were generated inductively from the cleaned data (Braun and Clarke 2006).

Results and discussion

On implementing ES in government decision-making

Most key informants mentioned challenges related to having government ES work kept internal to organizations, not always released publicly, and rarely published in academic journals. One key informant described their sense of why this is the case: “Perceptions are that this ES work could create a risk for the government or create new issues that they are not willing to tackle” (Consultant). This finding was supported by our content analysis, with many government documents and websites mentioning the importance of ES; however, few, if any, of those provided details related to assessment or implementation in decision-making. This finding also supports previous research noting that ES concepts have been addressed both explicitly and implicitly in public government documents but have not been influential on decision-making processes ([Value of Nature to Canadians Study Taskforce 2017](#); [Lam and Conway 2018](#); [Thompson et al. 2019](#)).

Within the federal government, ES remains mandated within the Economic Analysis Directorate of ECCC and is used in other government departments to varying degrees. While the publicly available evidence of the integration of ES within governments departments is low, there have been some sector- and resource-specific examples. Within the agricultural industry, ES has been integrated through the federal Growing Forward program ([AAFC 2013](#)) and the ALUS in Prince Edward Island, Quebec, Ontario, Manitoba, Saskatchewan, and Alberta ([ALUS 2009](#)). Within the provincial arena of wetland management there has been broad interest in the Wetland Ecosystem Services Protocol United States ([Adamus 2011](#)).

Table 3 provides a detailed overview of the total number of ES-related documents identified from each government website, including the raw search number and a cleaned number that reflects actual ES language being used by that government or its contractors. Based on the content analysis, five categories emerged including: (1) general communication relating to ES, (2) reference to economic values or valuation of ES, (3) recommendations to for an ES approach, (4) pilots or programs that include ES assessments, and (5) ES mandated within government regulation or legislation. While ES has been used as a communications tool by each government group, the formal integration of ES appears low. A key informant reflected on the role of ES in their work as follows:

“Ecosystem services information is mandated for consideration in a number of environmental regulations, such as species at risk. We use cost–benefit analysis as a decision support tool to incorporate ES into our policy and regulatory analysis.” (Federal)

Respondents mentioned that ES are also being used in other federal agencies, including Agriculture and Agri-food Canada (AAC) and Statistics Canada. Within AAC, for example, there have been biophysical studies completed that integrate the ES framework to understand how ES are modified or enhanced by certain practices. However, the majority of the AAC focus had been on financial compensation schemes for farmers to implement more sustainable practices, such as the ALUS programs. As their website describes: “ALUS helps farmers and ranchers produce ecosystem services on their land” ([ALUS 2020](#)). Statistics Canada, through the United Nations System of Environmental Economic Accounting group, has developed a System of National Accounts Satellite Accounts for some ES and the stock of natural capital (e.g., forests). While this work has been evolving for over a decade, the accounts are not mandatory and have had inconsistent uptake by government agencies.

At the provincial/territorial level of government, the formal use of ES frameworks to support decision-making in some jurisdictions was described as in place but inconsistent. In British Columbia, the Ministry of Environment and Climate Change’s Environmental Economics for Environmental Monitoring, Reporting & Economics department undertakes ES analyses to support

Table 3. Ecosystem services (ES) implementation barriers within Canadian government contexts.

| Theme | Sub-theme issues | Relationship to ES implementation gap | Noted by key informants (out of 10) |
|---|---|---|-------------------------------------|
| Conceptual understanding | Language | ES is too technical and does not fit within the common day-to-day government lexicons. ES uses too much jargon for everyday policy use. ES requires interdisciplinary approach which is not common in most governments. | 10 |
| | Knowledge exchange | The ES approach (generally) and the ES Toolkit (specifically) are considered too complex for uninitiated to use. There are different ways of expressing and knowing knowledge. There are disciplinary differences in how knowledge is produced and known. | 6 |
| | Using similar terminology to ES | The ES language and approach is inconsistent within the literature. ES has many similar and emerging and competing concepts including green infrastructure, designing with nature, nature-based solutions, and natural capital design. | 5 |
| Lack of regulatory or institutional mandate | | Other environmental, natural resource, and land-use regulatory tools are already available and mandated. Weak mandate to implement ES in government decision-making creates a significant barrier. Staff need a reason to use the ES approach. | 9 |
| Internal capacity | Internal skills, expertise | Few examples of ES trained experts exist in the Canadian government context. Capacity issues include skills, budgets, time, and focus. | 6 |
| | Institutional memory loss | People change jobs, governments change, mandates change, people retire; this leads to low institutional ES capacity and memory. There is a lack of formal ES capacity building within government. | 8 |
| Government leadership | Internal champions | There is a lack of internal government champions to support and promote ES work. The departure of ES champions has resulted in lost support for ES. | 9 |
| | Institutional, economic, and political shifts | Sudden changes in budget and priority shift resource quickly. There is a lack of flexibility to institutionalize ES frameworks. | 7 |
| Path dependency | | Legacy effects of informal norms and pre-existing ways of framing and knowing can lead to a path dependency. Government staff are more comfortable with policy and regulatory approaches. | 6 |

the development of policy and regulation, as noted by a key informant: “While we do not use ecosystem services terms all the time, the assessment of ES is required within our work mandate. Specifically, the Parks group is working to integrate ES” (Provincial). In Ontario, the provincial government and many municipalities were involved with the well-known Ontario Greenbelt study assessing the ecosystem services and values of the greenbelt area ([Government of Ontario 2020](#)). A key informant noted that while there is an Ecosystem Services Ontario website that is regularly updated, there has been more recent government interest in Natural Capital Accounting, with the province developing its own natural capital accounts, modelled off the Statistics Canada work. In Alberta, Alberta Environment and Parks led a two-year pilot project on wetlands to assess the value of the ES approach for general government use and to inform the new Wetland Policy ([GoA 2013](#)). This was a collaborative project that engaged seven Alberta departments and the City of Calgary, Town of Chestermere, and Rocky View County, as the wetlands for the pilot were within their jurisdictions ([GoA 2012](#)). According to key informants in the provincial government, a number of ES assessments within Alberta are underway.

In reference to the federal, provincial, and territorial ES Toolkit (2017), eight of the key informants noted that it was a comprehensive manual and included the most up-to-date information about ES application in Canada. For example: “It has a much wider range of tools and useful descriptive background on the tools that other decision support systems. As a result, it would be useful for a wide range of natural resource and environmental management situations” (Consultant). However, evidence of implementation is lacking. Some key informants suggested a need to evaluate the ES Toolkit to see if it has met its intended use and audience: “A concentrated effort like that for the design of the [ES]Toolkit, would provide a shared space to experiment, learn from each other, observe the usefulness and challenges” (Federal). Most noted that the ES Toolkit is an intimidating document, especially for novice ES staff, for example: “The [ES] Toolkit would excite the nerds but would terrify a new user. There is simply too much there and if you do not have a specific entry point then the 280-page report is an issue” (Academic). Further, “I worked on it. We worked very diligently to make it simple, useful, and comprehensive. When I went back to look at it for this interview, I thought ‘Yes, it is simply too long’ ” (Provincial).

On barriers to ES policy implementation

Despite notable efforts to develop ES thinking in Canadian government decision-making, the consensus among our respondents is that there was an ES implementation gap, with eight describing implementation gaps in Canadian government contexts and eight mentioning a gap between theory and practice. This supports previous research conducted in other jurisdictions (de Groot et al. 2010; Frank et al. 2012; Guerry et al. 2015), suggesting that there may be more universal governance issues at play (Sitas et al. 2014; Filion et al. 2015). Table 3 presents the main themes arising from our analysis of barriers contributing to an implementation gap, each of which is further discussed below.

Conceptual understanding

Within this theme are related issues that contribute to the ES implementation gap in Canadian governments. These include issues with the complexity of the ES approach (Chaudhary et al. 2015) and the emergence of concepts and approaches that are similar to, and seemingly in competition with, the ES concept and approach (see also Wilkinson et al. 2013; Kabisch 2015; BenDor et al. 2017; Thompson et al. 2019). Confusion with ES language and terminology was identified, with respondents noting that one of the most common complaints about ES is that it is too technical and does not fit within the common lexicons that are used in day-to-day government work. All our key informants raised this issue, for example: “ES terminology has been fraught since the beginning. It is jargon and doesn’t meet government staff where they are. We tried to stop using the term and speak about the final benefits, the desired state, instead” (Consultant).

Another issue related to knowledge exchange between various parties (see also Sitas et al. 2014):

“One of the biggest issues with a successful ES application is at the beginning. The ability to articulate what information we have and what information we need to inform a clear objective is fraught with different ways of expressing and knowing knowledge. We don’t know that we are not using the same terms in different ways. We have started a project and only realised later that we had not been on the same page about baseline information” (Provincial).

Reconciling different understandings or usages of terminology is a well-known challenge in environmental governance (Lamarque et al. 2011). Another informant noted: “There are always knowledge differences from a disciplinary, departmental, or issue-specific context. This is not just about what we know but also about how knowledge is captured and used” (Consultant). On the issue of potential confusion and even competition between ES and other related approaches, the results of

our interviews and content analysis revealed this to be a significant challenge. For example, Green Infrastructure, under its various terms “designing with nature”, “natural infrastructure”, “nature-based solutions”, “natural capital design”, and “green building” was a concept that all the key informants mentioned as potentially superseding ES. For example: “What is interesting to observe is the emerging high-profile use of natural infrastructure and nature-based solutions that has ES basically embedded. It is really an alternate framing of ES for particular outcomes” (Provincial). This represents both an opportunity and a challenge for ES implementation.

Lack of regulatory mandate

Most governments have deeply entrenched regulatory, policy, and planning processes that guide how issues are assessed and decisions are made (Sitas et al. 2014). The results from our analysis revealed that there was a lack of formal policy mandate to use ES in decision-making, with the exception of ECCC’s Regulatory Economic Directorate. One key informant noted: “The ES approach has not been institutionalized within government. It is not part of government mandates and therefore becomes something that staff or a department must choose to employ” (Provincial). This was supported by another informant who added: “It is critical that the ES approach be integrated into government processes or assessments so that it becomes a ‘shall’ versus voluntary” (Consultant).

A weak mandate to implement ES in government decision-making was described as a significant barrier, because government staff have other mandated policy and planning processes they need to follow. Further, it was mentioned that senior management have little incentive to encourage additional processes when resources and timelines for decisions are tight. This issue was also raised in the context of the ES Toolkit: “Staff have to have a reason to use it and there are no specific mandates to use the Toolkit or ES generally” (Provincial).

Government leadership

Our results suggest there is a lack of internal government champions to support and promote ES work (see also Plant and Ryan 2013; Albert et al. 2014; Chaudhary et al. 2015). Nine of the key informants acknowledged the importance, and lack of, an internal, high-level champion. For example:

“ES work is not mandatory; therefore, there must be an ADM [Assistant Deputy Minister] or higher that gets it. The problem is that at the highest levels, people are moving around a lot for experience and promotion.” (Federal).

“You need sustained champions within government. I have been championing this for around 20 years. I am in the minority of people working on ES that are still doing so. People change jobs, governments change, mandates change, people retire. This has led to low institutional ES capacity and memory” (Provincial).

Another leadership issue pertained to the reported constant shifts in government priorities. The political, economic, and—sometimes—institutional settings within governments are always in flux (Chaudhary et al. 2015). Many informants noted that sudden shifts in budget and priority had meant a lack of flexibility to introduce or opportunity to institutionalize ES frameworks, for example: “Whether it is a flood, recession, a fire, or some other unanticipated event, government change their priorities and budgets to the hot issue at the time” (Provincial).

Internal capacity

Issues of capacity, including skills, budgets, time and focus are not unique to ES implementation. However, when this is coupled with the lack of institutional mandate, capacity issues can become a severe hindrance to ES integration. Within the Canadian context, a concern raised by six of the key

informants was the loss of ES expertise as government workers retire and institutional knowledge is lost.

“In the 3 years since the Toolkit was published, we have lost our key ES contacts in BC, Yukon, NWT, Alberta, and internally (within ECCC). This is a severe blow to the ES file for governments” (Provincial).

The results also highlighted variable capacity in different jurisdictions.

“The capacity within governments in Canada for integrating ecosystem services into their policies and programs has been limited to date, but in several departments of the federal government there are staff working on ecosystem services across a breadth of issues such as conservation, forestry, agriculture and others” (Federal).

This was supported by another participant.

“In smaller jurisdiction they just don’t have capacity—time, money or the skills. While some are supportive of the ES approach, it is not embedded into their current processes and they do not have capacity on ground to take this on” (Consultant).

Path dependency

Path dependency is described as the preference and tendency for policy actors to maintain the same processes and approaches that they have historically used (Page 2006). Informal structures, such as professional norms and practices and organizational routines and standard operating procedures, play a major role in how formal rules are interpreted and implemented on the ground (Loft et al. 2015). Waylen et al. (2015) used the term “sticking points” to denote the legacy effects of informal norms, pre-existing ways of framing and knowing that can lead to a path dependency. As two key informants noted, environment departments are often staffed with a higher proportion of engineers and natural scientists who have become familiar with certain processes and procedures: “The idea of incenting them to try a new way (such as ES) is difficult” (Provincial). Path dependency can be associated with a lack of a formal institutional mandate for change: “The issue is staff are busy, trained in certain disciplines and are comfortable with their processes and procedures. Asking them to learn something new, that requires so much interdisciplinary work, is a real challenge” (Provincial).

Limitations and assumptions

We acknowledge there are limitations with this research. First, a relatively small sample of key informants were interviewed in comparison to the over 50 government staff and ES experts listed as contributors to the ES Toolkit. However, our purposive sample was comprised entirely of Canadian ES policy experts who possessed privileged experiences and expert opinions of direct relevance to our research topic and objectives. Based on the high quality, diversity, and relevance of our research participants, combined with the document analysis, our ability to infer substantive policy insights is high. In addition, the research relied on publicly available (web-based) government documents to reveal the extent to which ES were being used. Government websites are not always a comprehensive and updated area to understand what governments are working on and how they are managing issues. Additionally, while the ES Toolkit process started in 2013, the final document was released in early 2017. This constitutes a short timeframe between the release of the ES Toolkit and our exploratory assessment.

Conclusion

The integration of the ES approach as a decision support tool in Canadian government contexts has been steadily progressing, but implementation remains limited. Results of this study suggest that there is likely an ES implementation gap between the theory and potential benefits of using ES and the implementation of ES frameworks in government decision-making. To further explore this gap, a follow-up search of government websites could be expanded to include a broader set of ES categories (e.g., regulatory ES and cultural ES) and a search for related terms, such as “designing for nature” and “green infrastructure”.

The 2017 ES Toolkit was designed by Canadian government staff and ES experts to enhance the implementation of ES in decision-making. While the ES Toolkit is considered a comprehensive and relevant resource for various environment and natural resource decisions, the extent to which it is being used to support decision-making remains unclear and is likely to be minimal. Barriers to uptake of the ES framework in Canadian government were found to be generally consistent with those previously identified in the contexts of Europe, the United States, and Australia. For example, a lack of legal mandate, clear guidelines, institutional support, and training were identified as barriers requiring further attention.

Specific steps can be taken to further the uptake of the ES concept in decision-making and policy. First, ES experts and researchers should continue to assess opportunities to clarify and reframe ES concepts. This could include breaking up the ES concept into its component parts to leverage initiatives that currently have more political momentum, such as green infrastructure. Second, ES could be used to address some of Canada’s numerous and pressing environmental needs, such as climate change adaptation. The recent Intergovernmental Panel on Climate Change report (IPCC 2021) included dire warnings to the global community to sharply reduce fossil fuel use and to implement greener governance policies. The ES approach offers a helpful suite of tools to this end. Third, government decision-making can be directed towards enhancing nature’s assets to produce and provide important climate change and broader environmental solutions for Canada. If using ES concepts is to improve or resolve ecosystem governance dilemmas, better documentation of implementation experiences will be needed for potential policy learning and transfer. Greater discourse among government and nongovernment decision-makers is also needed to consider ES approaches as suitable tools for framing discussions and for assessment for decision-making.

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Author contributions

GLK, JMH, JB, and GMH conceived and designed the study. GLK performed the experiments/collected the data. GLK analyzed and interpreted the data. GLK, JMH, JB, and GMH contributed resources. GLK, JMH, JB, and GMH drafted or revised the manuscript.

Competing interests

Gillian Kerr worked for Alberta Environment and Parks for 12 years and developed and led the Ecosystem Services team. She was also a lead Alberta contributor on the ES Toolkit. Ethics approval was obtained for this research from McGill University, Research Ethics Board 4 Certificate of Ethical Acceptability of Research Involving Humans, REB File #: 20-06-026.

Data availability statement

All relevant data are within the paper.

Supplementary material

The following Supplementary Material is available with the article through the journal website at doi:[10.1139/facets-2020-0090](https://doi.org/10.1139/facets-2020-0090).

Supplementary Material 1

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