Reviewing Northern Capacity for Impact Assessment in Yukon Territory, Canada

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Northern 'capacity' has long been identified as a priority area for public policy in Canada and recognized as a major constraint to regional social and economic development. The concepts of capacity and sustainability often meet in impact assessment (IA) processes in Canada, which include environmental, social and economic aspects of development and where there has been an important evolution in the role of both communities and science in the process. In Yukon, the Yukon Environmental and Socio-Economic Assessment Board (YESAB) is the legislated mechanism for impact assessments. The establishment of YESAB provided sites for the inclusion of local perspectives and traditional knowledge in assessments; however, calls for enhanced northern research capacity to inform impact assessment and associated decision-making remain prominent. This paper explores the concept of 'capacity' in its various forms and considers its core relevance to ensuring effective IA processes associated with northern development. Through a literature review, we identify that ambiguity surrounding the concept of capacity requires careful policy attention to fully appreciate conditions that prompt appeals for increased northern research capacity and help minimize confusion amongst different actors and institutions working to build northern capacity.

Introduction

The term 'capacity' is commonly identified as central to sustainable natural resource management and socio-economic development (Kolhoff, Driessen & Runhaar, 2018; Konovalova, Kuzmina, Hansevyarov & Persteneva, 2016). In Canada, capacity has been formally acknowledged as an important factor in northern development since at least the 1970s (Buckler, Wright & Normand, 2009; de la Barre, 1979; Science Council of Canada, 1977). However, the concept of capacity tends to be ambiguous in practice, despite attempts to develop coherent definitions and identify common characteristics across disciplines (Brinkerhoff & Morgan, 2010; Condell & Begley, 2007; Simmons, Reynolds & Swinburn, 2011). This literature review seeks to unpack the concept of 'capacity,' and in particular 'research capacity' – on its own and as it relates to 'community capacity' and 'governance capacity' -- in northern Canada using the case of Impact Assessment (IA) in Yukon Territory. It begins by outlining the broad connections between scholarship on capacity,

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IA and sustainable natural resource management in Canada, the northern territories, and Yukon; focuses on how capacity is conceptualized in key disciplines; and concludes with a discussion of future directions.

Impact Assessment and Sustainability in Canada

The US Environmental Protection Agency (EPA) first initiated the practice of Environmental Impact Assessment (EIA) in 1970 as a "...decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions," (Cashmore, 2004: 404). In Canada, the Environmental Assessment Review Process (EARP) was put in place in 1972 to establish the federal position on environmental impact assessment (Gibson, 2000; Noble, 2009). The importance of considering the socio-economic aspects of development in the IA process very quickly came to the fore with the Berger Inquiry in 1977, completed as part of the impact assessment of the Mackenzie Delta Pipeline (Berger, 1977; Burdge, 2002; Gamble, 1978). Similar discussions occurred in James Bay, northern Quebec, around the same time (Berkes, 1988). The EARP continued as a Guideline Order after 1984, until the Canadian Environmental Assessment Act (CEAA) passed into legislation in 1992. This legislation harmonized the federal and provincial systems (to varying degrees) and facilitated impact assessment at regional levels (Gibson, 2000; Herring, 2005; Hickey, Brunet & Allan, 2010; Noble, 2009). The recognized need to incorporate local, regional and traditional knowledge in Canadian IA processes (Paci, Tobin & Robb, 2002; Sallenave, 1994; Stevenson, 1996) led to the adoption of more participatory and inclusive approaches (Burdge, 2002; Joyce & MacFarlane, 2001) and the inclusion of social impact assessments in larger processes as standard practice (Morgan, 2012).

Importantly, local capacity has become a recurring challenge identified in the transition towards more participatory and localized IA and sustainable development (Nuttall, 2002). Shifting accountability for IA processes to regional and local contexts was meant as a mechanism for encouraging regional development through providing more local control over development projects (Angell & Parkins, 2011; Arctic Council, 2004; Armitage, 2005; Huskey & Southcott, 2016). Concurrently, the shift away from 'minimal damage' towards 'maximum desirable net gains' requires project proponents to more explicitly consider local sustainability in their permit applications (Gibson, 2000). To a large extent, requiring community participation in the IA process has contributed to the popularity of local approaches to natural resource management in the circumpolar North, such as co-management agreements (Barker, 2005; Ellis, 2005; Gibson, 2000; Joyce & MacFarlane, 2001; Robards & Lovecraft, 2010). However, barriers to the quality of available scientific knowledge, the recognition of traditional knowledge, differences in knowledge systems, assumptions of community homogeneity, and the 'insider-outsider dialectic' all contribute to the challenge of meaningful participatory assessment processes (Caine, Salomons & Simmons, 2007; Ellis, 2005; Greig & Duinker, 2011; Nadasdy, 2003; Natcher, Davis & Hickey, 2005; Staples & Natcher, 2015). For example, Prno and Slocombe (2012) recognized a shift in decision-making towards community inclusion for northern mineral development, accompanied by implications for community ability to participate in decision-making processes. According to Raik (2002), the success of co-management and co-production relationships rely on the capacity of all participants, and so "…should be of keen interest for co-management," (Raik, 2002: 2). Similarly, Booth and Skelton (2011) considered First Nations participation in assessment processes in B.C. from

industry and government perspectives, citing a lack of capacity as one of the major limitations. Calls for capacity building with regards to IA are commonly justified in the academic literature.

Impact Assessment and Capacity in the Canadian North

The rapid and sustained social and economic development of the Canadian North continues to challenge the capacity of local actors to fulfill legislated obligations. The relationship between the territorial and federal government also continues to change through the devolution of various responsibilities (Abele, 1987; Bielawski, 1984; Dacks, 2004; Hodgins, 2009). In 1979, the Science Council of Canada (SCC) argued that IA processes were under-supported by national capacity building programs (de la Barre, 1979). The pre-1990 politics of assimilation heavily influenced discussions of northern development in terms of giving a greater voice to local communities, but only through certain avenues (Angell & Parkins, 2011). Interestingly, the SCC recommendations were echoed by a House of Commons Standing committee in 1997, which underlined the development of territorial capacities as a requirement for future northern development, and supported the argument that local voices have been purposely directed through chosen mechanisms (Graham, 1997).

Since 1990, the discussion around sustainable development and local empowerment has changed considerably, particularly after the implementation of the Umbrella Final Agreement and the establishment of Nunavut (Angell & Parkins, 2011). In 2008, the Minister of Indian Affairs and Northern Development commissioned a review of northern regulatory systems. The resulting report pointed out that new regulatory bodies, such as those facilitating IA processes, were aimed at giving voice to local populations but lacked the corresponding increase in institutional, community, and research capacities (McCrank, 2008). Similar work done on boards established by land-claims and settlement agreements, including wildlife and resource management boards, have identified the ongoing presence of constraints on Indigenous participation in natural resource management (White, 2008). Research on the social impacts associated with increased research funding, a common capacity building strategy in northern Canada, has largely focused on economic impacts and community-researcher interactions, with little formal evaluation of local capacity outcomes (Abele, 2009; Brunet, Hickey & Humphries, 2014; Carr, Natcher & Olfert, 2013; Gearheard & Shirley, 2007; McCrank, 2008; Pfeifer, 2018). The research agenda for northern environmental assessment presented by Noble, Hanna, and Gunn (2013) included capacity for meaningful engagement as a major theme. Other work has focused on the incorporation of traditional knowledge, another aspect of research capacity, into the northern IA process either through proponent submissions or through public review, with mixed results (Angell & Parkins, 2011; Bowie, 2013; Usher, 2000). Research into, and evaluations of, the impact of capacity building activities on northern development continues to be limited (Angell & Parkins, 2011; Carlson, 2016; Pfeifer, 2018).

The economic development timelines associated with primary industries in northern Canada have often reduced the positive impacts of resource development on northern community capacity, leaving regions exposed to the variability of boom-and-bust economies (Banta, 2006; Leadbeater, 2007). For example, work done on the Mackenzie Valley Environmental Impact Review Board (MVEIRB) by Galbraith, Bradshaw and Rutherford (2007) identified limited capacity as a major deficiency in the northern IA process. There have since been calls for a comprehensive federal

northern policy that addresses this lack of capacity (Gilmore, 2016; Ogden, Schmidt, Van Dijken & Kinnear, 2016; Simon, 2017), particularly as the effects of global climate change manifest at local levels. For example, local capacity to accommodate the opening of the Northwest Passage shipping route, and the regulatory needs that will accompany it, or the degradation of permafrost resulting in increased mineral exploration, are of increasing policy concern (Barber et al., 2008; Fenge & Penikett, 2009). In response, the territorial governments and national organizations have released science agendas and strategies to inform assessments and associated decision-making, underlining the need for northern research capacity (Table 1) (Territorial Governments, 2016).

Table 1. Northern Canadian science and research policy documents emphasize the need to develop capacity.

Title	Organization/Author	Year	Mentions of capacity
Building a Path for Northern Science	GNWT's Science Agenda	2009	11
A pan-northern approach to science	GNWT, YG, NT	2016	19
Government of Yukon Science Strategy	Government of Yukon	2016	6
Knowledge Agenda: Northern Research for Northern Priorities	Government of Northwest Territories	2017	8
National Inuit Strategy on Research	Inuit Tapiriit Kanatami (ITK)	2018	22

Since 2011, various government departments and national organizations, including the Conference Board of Canada, through the Centre for the North, have attempted to address the question of various northern capacities including labour force (Martin, 2011), economic potential (Auditor General of Canada, 2014b; The Canadian Chamber of Commerce, 2013), governance capacity (AANDC & CPC, 2013), and the ability of communities to participate in IA (Auditor General of Canada, 2014a). Another progress report on northern capacity was produced by the Canadian Polar Commission, focusing on adaptive and community capacities and outlining shortcomings in labour force, forestry, and environmental monitoring (Canadian Polar Commission, 2014). Within this context, IA often serves as a connection between development, primary industry, and governance, acting as both an instrument for the empowerment of communities in decision-making, while also facilitating clashes between knowledge systems and political visions for development (Bowie, 2013; Morgan, 2012).

Impact Assessment and Capacity in Yukon

IA in Yukon offers an interesting example of network governance[1], with multiple actors interacting within a complex landscape of overlapping formal and informal authorities and responsibilities. The traditional territories of 14 First Nations often overlap with each other, as well as sharing interests with the Yukon and federal governments in some decision-making processes, including natural resource management in certain areas. The Yukon Territory was established in 1898, after the influx of Klondike gold stampeders caused concern for Canadian sovereignty (Abele, 2009; Coates, 1985). In 1979, 'responsible government' was granted to the territorial legislature. The Council for Yukon Indians (CYI, now Council for Yukon First Nations) at that time chose to work with existing territorial structures for service support, while negotiating individual self-

government agreements between each First Nation and the federal government, that included the delineation of settlement lands (Abele, 1987). The IA process in Yukon was negotiated and established as part of the Umbrella Final Agreement, taking the form of federal legislation in the Yukon Environmental and Socio-Economic Assessment Act (YESAA) in 2006 (Noble, Hanna, & Gunn, 2013). YESAA federally established the independent Yukon Environmental Socio-Economic Assessment Board (YESAB), through which all development projects in the Yukon are reviewed, including mining and infrastructure projects. First Nations interests and local public review are included in recommendations provided to the 'decision-body' who renders the final decision, which varies depending on the project. The Board of Directors for YESAB include an Executive committee, with representatives nominated by the Council for Yukon First Nations (CYFN) and Yukon Government, who then confer with the federal Minister of Environment to appoint a chair. Four additional board members are nominated as follows: two nominees from CYFN, one from Yukon Government, and one directly appointed by the federal Minister. District offices located throughout the territory are intended to engage with community contexts. Certain major projects are forwarded to an executive committee for assessment (Government of Canada, 2003). A comparison of territorial, provincial, and federal environmental assessment legislation shows that YESAA shared a very similar distribution of mandatory requirements with the federal CEAA (Hickey, Brunet & Allan, 2010).

With a resource-based economy that depends heavily on the 'boom-and-bust' cycle of commodity prices and rates of development, including the highly variable mining sector (Petrov, 2010; The Conference Board of Canada, 2017; Tukker, 2016), Yukon and First Nations governments rely quite heavily on the IA process to support and guide sustainable economic development (Noble & Hanna, 2015). In addition to labour shortages, changes to the CEAA in 2012 included amendments to YESAB operations and changes to assessment timelines which have stressed local capacity (Banks, 2014; Rodon & Therrien, 2015). International discussions around environmental, strategic, and health impact assessment and Aboriginal and public participation often include references to Yukon as a positive example of multi-governmental collaboration but few academic publications have focused directly on the territory and its IA processes (Kwiatkowski, Tikhonov, Peace & Bourassa, 2009; Udofia, Noble & Poelzer, 2017). The context of Yukon Territory therefore offers an interesting landscape to further examine the role of research capacity in northern impact assessment processes, as the general need for capacity has been well outlined in government documents and popular media.

But What is Capacity?

Defining 'Capacity'

The concept of capacity has been identified as being overused and highly variable both within and between disciplines, despite considerable efforts to clarify the concept (Analoui & Danquah, 2017; Brinkerhoff & Morgan, 2010; Gadsby, 2011; Lauzon, 2013; S Louafi, 2016; Raik, 2002; Simmons, Reynolds, & Swinburn, 2011; Suarez-Balcazar, Balcazar, Iriarte, & Taylor-Ritzler, 2008). Contributing to the ambiguity of the term, capacity can be (and often should be) built at many scales, from individual to collective, occupying "…a nether world between individual training and national development" (Morgan 2003, as cited in (Brinkerhoff & Morgan, 2010)). Considering capacity development at the scale of individuals, organizations and institutions allows for a more

systemic perspective, which can be useful for addressing development strategies that transcend scale (Brinkerhoff, 2010). Capacity as a goal and a concept has been examined in fields such as public administration, international development, education, health and agriculture, and is often tied directly to development goals and governance processes (Analoui & Danquah, 2017; Grindle & Hilderbrand, 1995; Ika & Donnelly, 2017; Selim Louafi, 2016; Wetterberg, Brinkerhoff & Hertz, 2015). Distinctions are broadly made across disciplines between adaptive, community, governance, policy, and research capacities, though they tend to overlap considerably in practice. This suggests the need for a more refined working lens specific to the capacities engaged in the context of IA in order to help assess and improve capacity building efforts (Kolhoff, Driessen & Runhaar, 2018).

The Components of Capacity

The term 'capacity', here understood to mean the ability of a system to function and adapt, often considers two components: capability and competence (Chaskin, 2001; Fowler & Ubels, 2010; Frank & Smith, 1999; Howlett & Ramesh, 2015; Morgan, 2006; Wu, Ramesh, & Howlett, 2015). Within this definition, *capability* is the availability of appropriate resources for a particular problem, while *competence* is the knowledge and understanding necessary to utilize these resources (Wu, Ramesh & Howlett, 2015). The concept of capability extends beyond conventional resources like financial and human to include resources such as access to knowledge and institutional authority (Araral et al., 2015; Howlett & Ramesh, 2015). For example, Chan, Kirsop and Arunachalam (2005) have illustrated how the capabilities of post-secondary institutions, including access to journal subscriptions, can affect regional economic and political development. International development organizations have often focused on the capability component of capacity, since these challenges can be the easiest to overcome, often in the form of technology transfer (Analoui & Danquah, 2017; Lansang & Dennis, 2004). There is, however, a general movement away from this approach towards more community-instigated capacity development strategies for growing local competence (Bockstael & Watene, 2016) through wider knowledge system development (Lansang & Dennis, 2004), such as agricultural and health extension (Coutts & Roberts, 2003). It is broadly understood that the combination of competencies and capabilities will influence the overall capacity of any system at any level, from the individual to the network scale (Howlett & Ramesh, 2015; Van Loon, Driessen, Kolhoff & Runhaar, 2010).

Conceptual Frameworks for Understanding Capacity

There are many conceptual frameworks available to help understand capacity. Potter and Brough (2004) offer a framework for systemic capacity building in the context of health policy that separates four hierarchical types of capacity, including: tools, skills, staff/infrastructure, and institutions. They then examined the interactions between nine sub-capacities that include: performance, personnel, workload, supervisory, facility, support service, systems, structural, and role capacities. Kirchhoff (2006) applies and expands this framework to the IA context in Brazil, using the systemic approach to add human, scientific, technological, organizational, institutional and resource capabilities to the previous findings. Fowler and Ubels (2010) review two of the leading frameworks for understanding capacity in international development: European Centre for Development Policy Management (ECDPM) with the 'five capabilities' framework; and Community Development Resource Association (CDRA), which identifies six elements of capacity. Gupta et al. (2010) approaches adaptive capacity through an institutional (social rule)

perspective, identifying six dimensions to consider: variety; learning capacity; flexibility for self-initiated change; leadership; resource availability; and fair governance. Van Loon, Driessen, Kolhoff, and Runhaar (2010) divide the capacity of IA into six capacities: institutional, organizational, human, scientific, technical, and resource. Kolhoff, Driessen and Runhaar (2018) applied this same division of capacities to IA organizations in the context of low and middle income countries (LMICs). Wu, Ramesh, and Howlett (2015) provide a conceptual framework that addresses the analysis and measurement of policy capacity, describing a nested model of policy capacity that includes political capacity, analytical capacity, and operational capacity. These various frameworks all identify multiple types of capacity that interact and build off of one another, but often use different terminology to describe similar concepts.

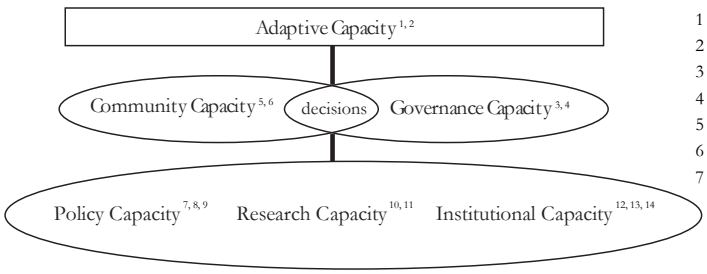
Interacting Capacities

The classification of capacity into different types is one source of confusion that is not easily remedied as the terms tend to have definitions that overlap and interact, either as distinct types of capacity or as foundations for larger capacities. Fischer and McKee (2017) examine linkages between organizational, infrastructural and personal capacities, finding that community capacities and capitals interact; are key to understanding community situations; are understudied; can be negative, if not destructive, presenting obstacles to overcome; and are heavily impacted by local engagement. Kolhoff, Driessen and Runhaar (2018) connect IA performance and capacity development, focusing on the assessment of key capacities for IA processes, including organizational, human, scientific, technical, and resource capacities. Van Loon, Driessen, Kolhoff and Runhaar (2010) build on concepts outlined in both Potter and Brough (2004) and Kirchhoff (2006) to establish a model of interacting 'sub-capacities' and discuss the potential effect of uncoordinated development of these capacities within an organization. They consider capacities in a hierarchical structure, where sub-capacities, such as research capacity, are foundational to the development of more complex capacities, such as governance capacity. This same breakdown of capacities was used by Kolhoff, Driessen and Runhaar (2018) to develop an assessment tool specifically for the IA process in low and middle income countries.

In the context of IA in Yukon, the capacities at play generally include adaptive, community, governance, policy, research, and institutional capacities (Figure 1). Definitions for each of these are explored further in Table 2. Adaptive capacity, or the ability of a community to respond to stress, has gained attention as concerns around the impacts of climate change become increasingly important to community sustainability. Community and governance capacities interact to enable collective decision-making for large groups, which rely on the ability to gather and process information; the ability to make and implement policy; and the ability to synthesize information or knowledge into multi-organizational collaboration, or research capacity, policy capacity, and institutional capacity respectively. As a contributing capacity, research capacity is an important foundation upon which other capacities often depend. IA sees the interaction of community and governance capacities, while performing the function of research capacity, providing recommendations after assessing available science, local and traditional knowledges.

For the purposes of this paper, research capacity, captured by various terms in the frameworks previously mentioned, is defined as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development (Cooke,

2005; Kaseje, Edwards & Mortley, 2016; Trostle, 1992). As a distinct concept, research capacity has become an important economic and social consideration for the development of governance and community capacities, including the empowerment of communities and the health and diversity of their economies (Andrews et al., 2011; Chan, Kirsop & Arunachalam, 2005; Cooke, 2005; Lansang & Dennis, 2004; Velho, 2004).



1 Brooks and Adger 2004
2 Wesche and Armitage 2010
3 Bakvis 2000
4 Rodriquez-Pose 2017
5 Labonte and Laverack 2001
6 Chaskin 2001
7 Riddell 2007
8 Painter 2002/Peters 1996
9 Howlett and Ramesh 2016
10 Trostle 1992
11 Albert and Mickan 2003
12 Healey 1998
13 Phelps and Tewdwr-Jones 2000
14 Shroff, Javadi, Gilson, Kang, and Ghaffar 2017

Figure 1. Interaction between six types of capacities involved in impact assessment.

Research capacity has also been seen as necessary for the development of other larger capacities alongside policy and institutional capacities, contributing to community, adaptive and governance capacities (Howlett & Ramesh, 2015; Lalor & Hickey, 2014; Riddell, 2007). One strength of IA processes depends on availability and access to viable and pertinent knowledge and the abilities of participants to utilize that knowledge (Greig & Duinker, 2011). The connection between community, governance and research capacities is highlighted in the IA context, where community and public participation in the IA process generally improves assessments through the inclusion of more knowledge, as long as these groups have the means to do so. Calls for increased northern capacity, meant to provide an impetus for addressing capacity needs, often lack specificity with regards to the types of capacity needed. The importance of research capacity for the effective implementation of the IA process and for the development of larger capacities therefore deserves further exploration.

Avenues for Future Research

The Canadian IA process has evolved through three distinct phases: 1) the direct application of science to assess potential impact; 2) the inclusion of community consultation within the IA process; and 3) a movement towards community-based and participatory research. Movement into a fourth phase could be explored, where the development of research capacity and community capacity concurrently becomes a focus, allowing the community to set their own research agenda, then use the results of that agenda to more effectively engage in the IA process, and associated decision-making. Recently, there has been a general acknowledgement that northern researchers should, where appropriate, be consulting communities in how certain research is done and in co-designing the research agenda itself (Brunet, Hickey & Humphries, 2014). The development of a community's research capacity has the potential to benefit both local and research communities through a critical reflection on the roles and responsibilities in the research process. Likewise, the ability of IA processes to incorporate, interpret and apply traditional ecological knowledge to assessments is also a form of research capacity and represents an important component of the

assessment process (Paci, Tobin & Robb, 2002). The fluidity of the concept of northern capacity needs to be carefully managed in the development of IA in Yukon Territory to more fully appreciate the stresses that prompt local appeals for increased capacity and minimize confusion in the future (Black, 2015; Brinkerhoff & Morgan, 2010; Condell & Begley, 2007; S Louafi, 2016; Simmons, Reynolds & Swinburn, 2011).

More generally, the role of policy capacity in governance and community capacities has been well developed and there hints at the role of research capacity in larger governance processes (Howlett & Ramesh, 2015; Marsh & Smith, 2000). However, further exploration into the relationships between research capacity and policy, institutional, governance and community capacities in the context of IA would be helpful. Potentially fruitful areas for future research include: 1) identifying the different dimensions of northern research capacity and their relation to IA-related policy, institutional, governance, and community capacities; and 2) examining the role of research capacity in the governance of Yukon Territory, where institutions and organizations have often been legislated, without adequate consideration of human, scientific and resource capacities to deliver. In order to achieve this, a better understanding of the different dimensions of research capacity, and how it interacts with other functions and capacities within a system, such as network governance, needs to be developed. Such an understanding would also help respond to wider calls for increased northern research capacity (Graham, 2016; Irlbacher-Fox & Gibson, 2010; Simon, 2017); the need for concrete assessments of the impacts of capacity building activities on northern natural resource governance (Angell & Parkins, 2011; Carlson, 2016; Noble & Hanna, 2015); and for enhancing the effectiveness of IA for sustainable development in the Yukon.

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Notes

1. Network governance: Collaborative decision-making engaging different groups with different expertise, agendas and values that engage in problem-solving for complex problems, including environmental and development issues (Klijn, 2010; Kooiman, 1993).

Table 2. Specification of defining characteristics for various types of capacity that appear in the wider literature.

Capacity	Defining characteristics The ability to:	Sources
Adaptive	- Collective ability to respond to environmental, economic, and social stress - Collective community resources and skills - Directly related to vulnerability and resilience	Brooks and Adger (2005), Gallopín (2006), Smit and Wandel (2006), Magis (2010), Wesche and Armitage (2010), Wamsler and Brink (2015)
Community	- Sustained collective ability to collaborate, problem-solve and function - Commitment, resources and skills for community engagement and the maintenance of community well-being - Empowerment and identity	Labonte and Laverack (2001), Chaskin (2001), Kwan, Frankish, Quantz, and Flores (2003), Smith, Littlejohns, and Roy (2003), Craig (2007), MacLellan-Wright et al. (2007), Merino and de los Ríos Carmenado (2012), Matarrita-Cascante, Trejos, Qin, Joo and Debner (2016)
Governance	- Collective ability to make decisions and manage relationships - Includes political, economic, financial, technical, and managerial or organizational aspects	Woodhill (2010), Araral, Pelizzo, Burkhanov, Chen, Janenova and Collins (2015), Ramesh, Saguin, Howlett and Wu (2016)
Institutional	- Ability to use, appraise, and synthesize evidence towards policymaking - Range, density, and collaborative ability of a network of organizations	Healey (1998), Phelps and Tewdwr-Jones (2000), Shroff, Javadi, Gilson, Kang, and Ghaffar (2017)
Policy	- Ability to assess and make collective choices - Perform policy functions including knowledge acquisition, utilization, and implementation - Includes analytical, operational/managerial, and political capacities	Bakvis (2000), Riddell (2007), Howlett and Ramesh (2015), Angel (2015), Howlett and Ramesh (2015), Wu, Ramesh, and Howlett (2015), Ramesh, Saguin, Howlett, and Wu (2016)
Research	- Ability to undertake high-quality research and produce, use, maintain and disseminate results and knowledge - Includes policy, resource, and program management	Crisp, Swerissen, and Duckett (2000), Albert and Mickan (2003), Lansang and Dennis (2004), Velho (2004), Segrott, McIvor, and Green (2006), Condell and Begley (2007), Leitch (2009), Gadsby (2011), Kahwa, Edwards, and Mortley (2016), (Fellesson & Mählck, 2017)

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