

**Learning from Experience to Operationalize Integrated Coastal and Marine
Management**

by

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This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

STATEMENT OF CONTRIBUTIONS

In the School of Environment, Resource and Sustainability, two forms of presentation of the doctoral dissertation are permitted: (1) a standard dissertation monograph, and (2) a manuscript option centered on three or four published or publishable learned journal-type manuscripts on related matters, packaged with introductory and concluding chapters that integrate the purposes/ research agenda and findings/implications, with the required result forming a conceptual whole. This thesis uses the manuscript option. Specific requirements relating to the manuscript option, which have been met, are as follows:

- The manuscript-based dissertation must reflect a consistent overall conceptual foundation and research agenda and the parts must be integrated to form a coherent package. The whole must be related to the overall purposes of the School of Environment, Resources and Sustainability (SERS) doctoral program, and the individual components of the dissertation must originate from the doctoral research.
- The manuscripts must be dominated by the intellectual effort of the student. While members of the advisory committee and others involved in the research may, as appropriate, be listed as secondary authors on individual manuscripts, the manuscripts must be written by the student, and the student must be the first author on each manuscript.
- Where multiple authorship occurs, there must be a preface statement in the thesis outlining the roles of the respective authors, and clarifying the extent and nature of the contribution of the student. Co-authors must sign the statement to indicate that they agree with the evaluation of the roles and contributions of the various authors.
- In no case can a co-author serve as an external examiner for the thesis.

Findings from this dissertation research are reported in three co-authored manuscripts (Chapters 2, 3, 4). These chapters have been prepared for submission to refereed journals. Only Chapter 3 has been submitted for publication and the abstract for Chapter 4 has been accepted by a special issue. References are provided below.

Chapter 2

Eger, S., de Loë, R., Pittman, J., Epstein, G. and S.C. Courtenay. (*In preparation*). Systematic Review of Governance in Recent Integrated Coastal and Marine Management Literature. *Marine policy*, not yet submitted

Chapter 3

Eger, S. and S.C. Courtenay. (*In Press*). Integrated Coastal and Marine Management: Insights from Lived Experiences in the Bay of Fundy, Atlantic Canada. *Ocean and Coastal management*, OCMA-D-20-00524.

- Three reviews received Sept 16, reconsider & possible re-review after revision & modification (resubmitted Oct 12).

Chapter 4

Eger, S., Stephenson, R., Flannery, W., Armitage, D. and S. C. Courtenay. (*Abstract accepted July 29, 2020*). Revisiting Integrated Coastal and Marine Management in Canada: opportunities for *regionalized governance* in the Bay of Fundy. *Frontiers in Marine Science*, Integrated Marine Biosphere Research: Ocean Sustainability, Under Global Change, for the Benefit of Society (Special Issue).

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I testify that I am the primary author of the manuscripts in my dissertation, and that the work was dominated by my intellectual efforts.

Sondra Eger (Student)

I testify that Sondra Eger is the primary author of the manuscripts in this dissertation, that the work was dominated by her intellectual efforts, and that I have met the four tests outlined above.

Simon Courtenay (Advisor)

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ABSTRACT

Integrated coastal and marine management (ICM) is a system of governance that moves beyond traditional sector-based management. ICM is compatible with the holistic vision of a social-ecological systems (SES) approach. Despite its global recognition, operationalizing ICM has proven difficult. As a consequence, few ICM initiatives have been implemented within coastal and marine SES. The purpose of this research is to examine which elements and characteristics of governance contribute to the operationalization of ICM initiatives and ultimately, sustainable coastal and marine social-ecological systems. This dissertation is driven by the following three research objectives: to synthesize progress with ICM initiatives internationally in relation to governance (Chapter 2); to assess past and current ICM initiatives and identify critical challenges to operationalizing ICM in the Bay of Fundy (Chapter 3); and, to identify opportunities for ICM and to develop a suite of recommendations for moving forwards ICM in the Bay of Fundy (Chapter 4).

Multiple methods were used to address these objectives. First, a systematic review of international literature on ICM initiatives was conducted revealing empirical evidence from international experience, and specifically, that a set of three core governance characteristics are important to operationalize ICM initiatives (Chapter 2): formal structures that form the legal basis for ICM through policy instruments (e.g., laws, acts, regulations); meaningful inclusion of diverse actor groups and knowledge types (e.g., social, cultural, traditional, local); and, innovative mechanisms, such as those other than sectoral top-down structural approaches. Next, semi-structured interviews (n=68) with participants who had experienced with ICM initiatives were undertaken within the Bay of Fundy region. Results from the interviews identified five critical challenges connected to an entrenched 'business as usual' mentality within conventional top-down centralized governance (Chapter 3). Critical challenges included: inconsistent commitment from legal authorities; inadequate capacity to sustain initiatives; inappropriate engagement of diverse actor groups; poorly supported informal structures and processes for horizontal integration; and, insufficient vertical integration of policies. Lastly, a comparative sub-regional case study approach of the Bay of Fundy (Lower Bay, New Brunswick and Upper Bay, Nova Scotia) yielded common opportunities to achieve the three core governance characteristics (Chapter 4). The opportunities for achieving core governance characteristics are to: learn from past experiences and keep trying new approaches; embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement; and, build capacity of local actor groups for more effective engagement in ICM. Therefore, the following policy pathways for ICM relevant to the Bay of Fundy are recommended: update federal policy statements such as the Oceans Strategy to incorporating past lessons; strengthen commitment to ICM in federal law through the Oceans Act; create provincial engagement strategy to enhance engagement of local actor groups; and, amend the Municipality Acts (provincial legislation) in both Nova Scotia and New Brunswick to encourage local capacity building and municipal engagement in ICM.

This dissertation highlights critical challenges, opportunities, and examples of policy recommendations to operationalize ICM initiatives from lived experiences in the Bay of Fundy. Additionally, practical suggestions are offered to enhance the role of local actors in complementing federal actions and progressing the operationalization and success of ICM initiatives. These results shape how we as scholars, practitioners, and managers conceptualize ICM as a governance approach to advance sustainability within coastal and marine SES. This research has advanced ICM theory and practice globally by offering a tool (e.g., the *Elements and Characteristics of ICM* framework) to unpack underlying governance for the successful operationalization of ICM initiatives (i.e., planning and development, implementation, monitoring and evaluation, and adaptation).

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Writing is a solitary practice, yet we do not write alone. The kinship of a writing community that inspires, supports, and listens deeply is such a gift.

Robin Wall Kimmerer, Braiding Sweetgrass

I would first like to acknowledge that I conducted my research in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. This territory surrounding the Bay of Fundy is covered by the "Treaties of Peace and Friendship" which Mi'kmaq and Wolastoqiyik (Maliseet) People first signed with the British Crown in 1725. The treaties did not deal with surrender of lands and resources but in fact recognized Mi'kmaq and Wolastoqiyik (Maliseet) title and established the rules for what was to be an ongoing relationship between nations.

Throughout my doctoral research I lived on the Haldimand Tract, lands that were promised to the Haudenosaunee of the Six Nations of the Grand River, and are within the territory of the Neutral, Anishinaabe, and Haudenosaunee Peoples.

I am privileged to have had the opportunity to explore these lands and to learn from the stewards who continue to care for the lands and waters. I would like to extend my deepest gratitude to the individuals who took the time to participate in this research—your insights and perspectives are valuable in shaping a desired future for the Bay of Fundy.

This work is a culmination of many special interactions, conversations, meetings and adventures with many folks...

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DEDICATION

We think science is an incredible tool, but I can tell you I don't need electronics to chase a herring. Follow the whales. He's a better scientist than I'll ever be.

Participant 61, 2018

For the herring and the whales and all who rely on them.

This dissertation is also dedicated to the bees, the trees, the sharks and anyone with hope for a wilder planet

TABLE OF CONTENTS

Examining Committee Membership.....	ii
AUTHOR'S DECLARATION.....	iii
Statement of Contributions.....	iv
Abstract.....	vi
Acknowledgements.....	viii
Dedication.....	x
List of Figures.....	xv
List of Tables.....	xvi
List of Boxes.....	xvii
EPIGRAPH.....	xviii
Chapter 1 Introduction.....	1
1.1 Problem Context.....	1
1.2 Research Focus and Objectives.....	2
1.2.1 Orientation of thesis.....	3
1.2.2 An Introduction to ICM.....	4
1.2.3 Theoretical Foundation.....	10
1.2.4 Empirical Context.....	13
1.3 Research Design and Methods.....	19
1.3.1 Systematic Literature Review.....	21
1.3.2 Semi-Structured Interviews.....	22
1.3.3 Case Study Comparison.....	23
1.3.4 Data Analysis.....	24
1.3.5 Ethical considerations.....	24
Chapter 2 Investigation of Integrated Coastal and Marine Management Progress Reveals Core Governance Characteristics for Successful Implementation.....	26
2.1 Introduction.....	26
2.2 Analytical Framework: Elements and Characteristics of ICM.....	27
2.3 Methods.....	29
2.3.1 Limitations of Approach.....	31
2.4 Results.....	31
2.4.1 Characterizing the data.....	31

2.4.2	ICM characteristics	33
2.4.3	Phases of Operationalization.....	35
2.4.4	Outcomes.....	35
2.5	Discussion.....	37
2.5.1	A combination of top-down and bottom-up engagement is important.	37
2.5.2	Innovative mechanisms can contribute to operationalizing ICM initiatives....	37
2.5.3	There are limited reports of outcomes being realized from ICM initiatives....	38
2.5.4	In practice, ICM initiatives appear to stall beyond the implementation phase. 39	
2.5.5	The Elements and Characteristics of ICM framework is useful for unpacking governance. 39	
2.6	Conclusions	40
Chapter 3 Integrated Coastal and Marine Management: Insights from the Bay of Fundy, Atlantic Canada		42
3.1	Introduction	42
3.1.1	Empirical Context	43
3.2	Methods	47
3.2.1	Elements of Governance: a proposed analytical framework.....	47
3.2.2	Approach and Analysis	48
3.3	Results and discussion of critical ICM challenges	50
3.3.1	Inconsistent commitment from legal authorities.....	51
3.3.2	Inadequate capacity to sustain initiatives	52
3.3.3	Inappropriate engagement of diverse actor groups	54
3.3.4	Poorly supported informal structures and processes for horizontal integration 55	
3.3.5	Insufficient vertical integration of policies	57
3.4	Conclusion.....	58
Chapter 4 Reviving Integrated Coastal and Marine Management in Canada: Opportunities in the Bay of Fundy		61
4.1	Introduction	61
4.2	Core ICM Characteristics.....	62
4.2.1	History of ICM in Canada.....	63
4.2.2	Conceptual Framing.....	66
4.3	Methods	67

4.3.1	Bay of Fundy Case Study Contexts	68
4.3.2	Interviews.....	68
4.3.3	Coding and Analysis	69
4.3.4	Supplemental Document Analysis	73
4.4	Results	73
4.4.1	Opportunity 1- Learn from past experiences and keep trying new approaches 74	
4.4.2	Opportunity 2 - Embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement.....	76
4.4.3	Opportunity 3 - Build capacity of local actor groups for more effective engagement in ICM.....	80
4.5	Discussion.....	83
4.5.1	Learning for improved formal structures	83
4.5.2	A spectrum of participation to support meaningful engagement	84
4.5.3	Local capacity for appropriate innovative arrangements	85
4.5.4	Parallel policy implementation for messy interconnections	86
4.6	Summary and Implications.....	87
4.6.1	Future Research.....	89
4.6.2	Conclusion.....	90
Chapter 5	Conclusion.....	91
5.1	Purpose of Research	91
5.2	Central Findings	91
5.3	Significant Contribution	93
5.4	Limitations.....	95
5.5	Insights for Practice: What’s next?.....	96
5.5.1	The Bay of Fundy and Canada.....	96
5.5.2	Global Implications	97
5.5.3	Future Research.....	98
5.5.4	Reflections.....	100
5.6	Concluding thoughts.....	101
REFERENCES	103
Appendix A	Semi-structured interview protocol and questions	122
Appendix B	Elements and Characteristics of ICM framework	124

Appendix C PRISMA diagram depicting inclusion of articles in the review.....	128
Appendix D Summary of coded themes relating to challenges and opportunities with illustrative quotations	129
Appendix E Lit of integrated initiatives mentioned by participants (n=60).....	132
Appendix F Documents included in supplementary document review relating to sub-regional case studies	134
Appendix G Overview of sub-regional case studies.....	137
GLOSSARY	139

LIST OF FIGURES

Figure 1 The cycle of operationalizing ICM (Based on Ehler, 2003 and Olsen, 2002)	6
Figure 2. Timeline of key ICM efforts/events in Canada from 1978-2020. *ESSIM = Eastern Scotian Shelf Integrated Management Plan; GOSLIM = Gulf of St. Lawrence Integrated Management Plan; PNCIMA = Pacific North Coast Integrated Management Area; Beaufort Sea Partnership Integrated Ocean Management Plan (IOMP).....	14
Figure 3 Sub-regional case study locations within the Bay of Fundy (Map created by S. Eger and R. Caballero, 2020).....	17
Figure 4 Human activities and significant ecological areas in the Lower Bay of Fundy, New Brunswick (Map created by S. Eger and R. Caballero, 2020)	18
Figure 5 Human activities and significant ecological areas in the Upper Bay of Fundy, Nova Scotia (Map created by S. Eger and R. Caballero, 2020).....	19
Figure 6 Empirical study locations (73) from 53 empirical articles	32
Figure 7 Type and proportion of ICM initiatives discussed within the review sample (n=69) (Legend top to bottom refers to sections clockwise from the top (MSP 7%).....	32
Figure 8 Most prevalent characteristics(elements) (mentioned in 33% or more) within both review and empirical articles (n=69)	33
Figure 9. Human Activities in the Bay of Fundy	45
Figure 10. Ecologically relevant areas in the Bay of Fundy	46
Figure 11. Overview of case-study interview analysis using core ICM characteristics to yield common opportunities for ICM in the Bay of Fundy	70
Figure 12. Examples of how to achieve core ICM characteristics in the Bay of Fundy ..	88

LIST OF TABLES

Table 1 Chapters that address research questions	3
Table 2 Criteria for Elements and Characteristics of ICM framework.....	12
Table 3 Overview of methods used within the dissertation	20
Table 4 Search string for the systematic review (Conducted Sept 17, 2019)	21
Table 5. Summary of research participants (n=68).....	22
Table 6. Summary of governance Elements and Characteristics of ICM framework	28
Table 7 Characteristics with 10% or greater difference in frequency between review and empirical articles (*Note: some articles were characterized as both review and empirical articles).....	34
Table 8 Potential case study exemplars based on the numbers of characteristics present and phase.....	35
Table 9 Elements of Governance	48
Table 10 Summary of research participants (n=68).....	49
Table 11. Outcomes of analysis using the 'Elements of Governance' as an initial coding framework	50
Table 12 Key insights from critical challenges in the Bay of Fundy in relation to the Elements of Governance	58
Table 13 Code definitions of pre-selected core ICM characteristics applied to individual subregional case studies in Round 1	67
Table 14. A summary of participants from two sub-regional case study within the Bay of Fundy (n= 51)	69
Table 15 Strongest sub-themes that emerged from raw transcript data for Round 2 of analysis.....	71
Table 16 Summary of common opportunities for ICM in the Bay of Fundy and their associated sub-themes	72
Table 17 Summary of results and their associated sub-themes (Letters from middle column, Figure 11).....	73
Table 18 Revised <i>Elements and Characteristics of ICM</i> framework–Bold = added to the framework from Chapter 2; * = core ICM characteristics that resulted from Chapter 2 and used to frame opportunities in Chapter 4.	95
Table 19 Examples of future opportunities for ICM research	99

LIST OF BOXES

Box 1 Selected definitions of ICM over time	2
Box 2 Examples of commonly pursued ICM initiatives.....	5

EPIGRAPH

Nightmare. I have been suffering from a recurring nightmare. It is of a major international conference sometime early in the next century, perhaps 2002. The topic is “Integrated Coastal Management, What Have We Accomplished?” and the conclusions are grim. The conference documents that much money has been spent by national governments, the donor community and NGOs. It catalogues an extraordinary proliferation of projects, programs and supporting initiatives that range across scales from local, national, regional and global initiatives—all justified as integrated coastal management. But it becomes painfully clear at the conference that there has been the extraordinary amount of reinventing of the wheel, that efforts have been conceived and implemented in unnecessary isolation, and that despite all the activity, the many formally adopted plans and weighty compilations of information, the measurable successes in reducing the problems that ICM programs individually and collectively have been designed to address is pitifully small. Where successes are real and well-documented in 2002, the scale is tiny compared to the magnitude of the problems. The conference finds that there has been great confusion over what to monitor, how to ascribe improvements to the efforts of ICM programs rather than other factors and little coherent testing of hypotheses. The absence of a common language or operational methodology makes it difficult to compare across projects and draw conclusions with any analytical rigor. The conference concludes that the cost-benefit ratio of ICM is unacceptable. The ICM process is declared inefficient and needlessly complex. The consensus is that it’s time to move on to something else.

(S. Olsen, *Increasing the Efficiency of Integrated Coastal Management*, *Coastal Management Report #22201996*. Coastal Research Center, 1996: p. 3)

Chapter 1

Introduction

1.1 Problem Context

Coastal and marine social-ecological systems (SES) are complex systems in which humans are interconnected with nature (Berkes and Folke, 1998). Humans value, and rely on coastal and marine systems for oxygen, sustenance, identity and employment among many other reasons (Belfiore, 2003; Hallett et al., 2016). Current governance of coastal and marine SES has led to negative, undesired management outcomes (Foley et al., 2010; Young et al., 2007) as outcomes are significantly influenced by systems of governance (Vodden, 2015). These complex systems are being threatened by cumulative impacts of both natural (e.g., natural disasters) and human drivers within and beyond coastal and marine SES (Olsen, 2003). Human drivers including direct impacts from development, transport, pollution, urban encroachment, and resource extraction within coastal and marine areas, and indirect impacts from sediment and nutrient runoff from land-based sources (e.g., agriculture) and implications of climate change (e.g., increase in temperature, acidity, hazards, and risk) are threatening ecosystem function and services coveted by humans (Crain et al., 2008; Organization For Economic Co-Operation And Development, 1993). These changes, in turn, impact the long-term sustainability of coastal and marine SES. The maintenance of coastal and marine ecosystem integrity and function is critical to achieving the sustainability of SES (Olsen, 2003).

To achieve sustainable coastal and marine SES, multiple objectives and incentives must be integrated to “meet the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development (WCED), 1987, p. 43). Sustaining coastal and marine SES involves embracing concepts that maintain ecosystem integrity and function while simultaneously pursuing economic development. Sustainability is considered to be synonymous with sustainable development within numerous scholars (Adger and Jordan, 2009). Biophysical system sustainability includes the maintenance of ecosystem integrity in perpetuity (i.e., structure and function of ecosystems as well as biodiversity) and is linked with social sustainability which involves maintaining human wellbeing over the long-term (Britton and Coulthard, 2013; White, 2010). Managing the complex coastal and marine SES requires a holistic approach that considers more than a single disciplinary perspective to reach sustainability (Halbe et al., 2013; Medema et al., 2008).

Currently, and for the past few decades, integrated coastal and marine management (ICM) is a promising and overarching governance concept that is being employed to facilitate enhanced coordination across sectors and levels for the management of coastal and marine SES. ICM indicates a transition from sector-based governance approaches to a more holistic and equitable consideration of values, interests, and activities (Foley et al., 2010; Sainsbury and Sumaila, 2003). Governance can be conceptualized in a multitude of ways (de la Torre-Castro, 2012). This research defines governance as the way individuals and organizations organize to steer social and political processes (e.g., decision-making) (Bennett and Dearden, 2014). Common to most conceptualizations of

governance is *governance arrangements, modes or forms* that refer to the formal and informal structures, actors, processes, and qualities (i.e., elements or components) used to make decisions (Folke et al., 2005; Fukuyama, 2016; Patterson et al., 2016). Examples include polycentric (Morrison, 2017), decentralized (Ngoran and Xue, 2017), collaborative (Ansell and Gash, 2008), adaptive (Armitage et al., 2009), interactive (Kooiman et al. 2008) and multilevel (Termeer et al., 2010) governance. This thesis focuses on the characteristics of governance to understand their relationship to ICM. Governance is broken down into characteristics in 1.2.3.1 and coastal and marine management interventions, or initiatives, such as plans, programs, and policies are the focus of this research.

Many nations have recognized the value of ICM through various legal and policy mechanisms (e.g., Canada’s Oceans Act, the European Union’s Marine Strategy Framework Directive, Australia’s Ocean Policy). These selected definitions in Box 1 highlight important concepts relating to ICM referenced throughout the thesis. For instance, the concepts and definitions in Box 1 highlight that ICM is connected to complex SES and considers multiple dimensions of a problem context – ecological, economic, cultural, and social. Additionally, ICM definitions acknowledge the importance of multiple actor groups within decision-making processes.

Box 1 Selected definitions of ICM over time

- “A dynamic and continuous process of administering the use, development and protection of the coastal zone and its resources towards common objectives of national and local authorities and the aspiration of different resource user groups” (Knecht and Archer, 1993)
- “Integrated management provides policy direction and a process for defining objectives and priorities and planning development beyond sectoral activities. It adopts a systems perspective and multi-sectoral approach which takes into account all sectoral interests and stakeholder interests and deals with economic and social issues as well as environmental and economic issues.” (Sorensen, 1993)
- “a participatory process for decision-making to prevent, control, or mitigate adverse impacts from human activities in the marine and coastal environment, and to contribute to the restoration of degraded coastal areas. It involves all stakeholders, including: decision-makers in the public and private sectors; resource owners, managers and users; non-governmental organizations; and the general public” (CBD, 2004, p. iii)

1.2 Research Focus and Objectives

The purpose of this dissertation is to examine how concepts, ideas and principles of governance contribute to the operationalization of ICM initiatives and ultimately, sustainable coastal and marine SES. Three main knowledge gaps concerning ICM are explored in this thesis and discussed later in this chapter: why ICM has not been widely operationalized; ICM literature has not clearly distinguished governance from management initiatives; and, purely top-down governance is insufficient to operationalize

ICM. These research opportunities shape the main questions of this research which are to investigate: *How, and to what extent, is integrated coastal and marine management (ICM) being operationalized? What role did governance play (or not play)? Are certain characteristics of governance more pertinent for operationalizing ICM than others?* These questions are addressed using a multi-scalar approach. Table 1 outlines the objective and approach taken in each of the core chapters. The core chapters build upon one another; for example, Chapter 4 draws on insights and contributions from Chapters 2 and 3.

Table 1 Chapters that address research questions

Chapter	Research Question	Objective	Approach
Chapter 2	How, and to what extent, is integrated coastal and marine management (ICM) being operationalized? Are certain characteristics of governance more pertinent than others for operationalizing ICM?	1 – To synthesize progress with ICM initiatives internationally in relation to governance	Systematic review (69 articles) (International)
Chapter 3		2 – To assess past and current ICM initiatives and identify critical challenges to operationalizing ICM	Empirical Case study Interviews (68) in Bay of Fundy (Regional)
Chapter 4		3- To identify opportunities for ICM initiatives and to develop a suite of recommendations for advancing ICM in the Bay of Fundy	Case Study Comparison: Document analysis and Interviews (51) within Bay of Fundy (Sub-regional)

1.2.1 Orientation of thesis

This dissertation addresses the research questions in the form of three stand-alone manuscripts (Chapters 2, 3, 4). The remainder of Chapter 1 introduces the main concepts and methods that frame the dissertation. In Chapter 2, an analytical framework synthesizes essential governance elements and organizes ICM characteristics from the literature. An international systematic review of the literature is performed to determine important ICM characteristics for ICM and results in the development of an analytical framework—*Elements and Characteristics of ICM*.

The Bay of Fundy in Atlantic Canada is used as an empirical case study in Chapter 3 and 4. The *Elements and Characteristics of ICM* framework is applied in Chapter 3 to ICM experiences in the Bay of Fundy to determine challenges at a regional scale. Chapter 4 presents opportunities for ICM at a local scale through sub-regional case studies within the Bay of Fundy as this is the scale implementation occurs. This dissertation concludes with a synthesis chapter that summarizes significant and original contributions to theory and practice, and highlights how the findings of this research inform future research concerning ICM through a governance lens.

1.2.2 An Introduction to ICM

“[A]ttainment of sustainability and resilience through successful ICM should be thought of as a journey and not a destination.”

Powell et al., 2009, p. 633

As a concept, ICM was formally acknowledged in the 1980s by United Nations Convention on the Law of the Sea (UNCLOS) (1982), which found that “the problems of ocean space are closely interrelated and need to be considered as a whole” (United Nations, 1982, p. preamble). Thirty years later the statement evolved to explicitly include integrated management:

The problems facing the marine environment are closely interrelated and cannot be tackled in isolation, but must be resolved through integrated management of resources and environmentally sound economic development (United Nations Convention on the Law of the Sea, 2012)

ICM requires bold, action-oriented initiatives that consider both the environment and human wellbeing (Bennett et al., 2019). The concept of *integrated management* has evolved substantially since its formal conception in the Rio Declaration in 1992 at the United Nations Conference on Environment and Development (UNCED), especially within the coastal and marine context. ICM has been pursued through numerous management initiatives beginning with integrated coastal zone management (ICZM), then moving to the ecosystem-based approach (EBA) and marine protected area networks. More recently, marine spatial planning (MSP) has become a popular approach (Birch and Reyes, 2018; Christie, 2005).

Box 2 Examples of commonly pursued ICM initiatives

Examples of ICM initiatives

- Marine (maritime) Spatial Planning (MSP): “a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that are usually specified through a political process.” (UNESCO, 2020)
- “MSP is a tool for improved decision-making. It provides a framework for arbitrating between competing human activities and managing their impact on the marine environment. Its objective is to balance sectoral interests and achieve sustainable use of marine resources” (Commission of the European Communities 2008, p. 2)
- Integrated Coastal Zone Management (ICZM): “a planning and management process which aims to balance multiple human activities and demands on coastal space and resources with the protection of dynamic and vulnerable coastal systems and the maintenance of the functions and services which they provide” (Humphrey and Burbridge, 1999, p. 1)
- Ecosystem-based management /approach - a strategy that manages the human activities that have an impact on ecosystems taking effects into account when making management decisions (Long et al., 2015)
- Marine Protected Area (MPA) Networks: “A collection of individual marine protected areas operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels, in order to fulfill ecological aims more effectively and comprehensively than individual sites could alone. The network will also display social and economic benefits, though the latter may only become fully developed over long time frames as ecosystems recover.” (WCPA/IUCN, 2007, p. 3)

Integration has also been described as coordination across and between both horizontal (actor groups, sectors and activities) and vertical (levels of government, management jurisdictions and geographical scales) dimensions of SES (Cicin-Sain, 1993; Cormier et al., 2019; Sorensen, 1997). Cicin-Sain and Knecht (1998) conceive five forms of integration as being important for ICM: intersectoral (across sectors), intergovernmental (across levels of government), spatial (across geographies), science-management (across disciplines) and international (across national jurisdictions). The term ICM is often used ‘naively’ without specifying what exactly is integrated and what degree of integration is desired (Kelly et al., 2019; Underdal, 1990). Furthermore, ‘integration’ is being framed in this dissertation as both the objective and the mechanism or process, to overcome conventional sector-based or siloed management. Broadly in the literature, integration has been considered to be the first principle of governance in the planning and management of human activities within particularly populated parts of the coastal environment, estuaries, and can relate to a variety of different concepts (e.g., social-natural science, land-sea, western-Indigenous knowledge, local-regional-national) (Carvalho and Fidélis, 2013).

Operationalizing ICM is important to achieve desired objectives and outcomes. The operationalization process for ICM involves four main phases: planning and development; implementation; monitoring and evaluation; and, adaptation (Ehler, 2003). Also known as the ICM policy cycle, operationalizing ICM requires feedback and iterative learning (Olsen, 1996) (Figure 1). The amount of time to operationalize an entire ICM cycle has not been widely reported. One example of a timeframe given for an ICM cycle was 6 years (2014-2020) for nations within the European Union to develop MSP through the Marine Strategy Framework Directive (MSFD); however, now a second phase for implementation is underway (OJ L 164, 25.6.2008, 2009). The difficulty of achieving all phases of operationalization is connected to the policy implementation gap in the literature (Ansell et al., 2017; Howes et al., 2017).

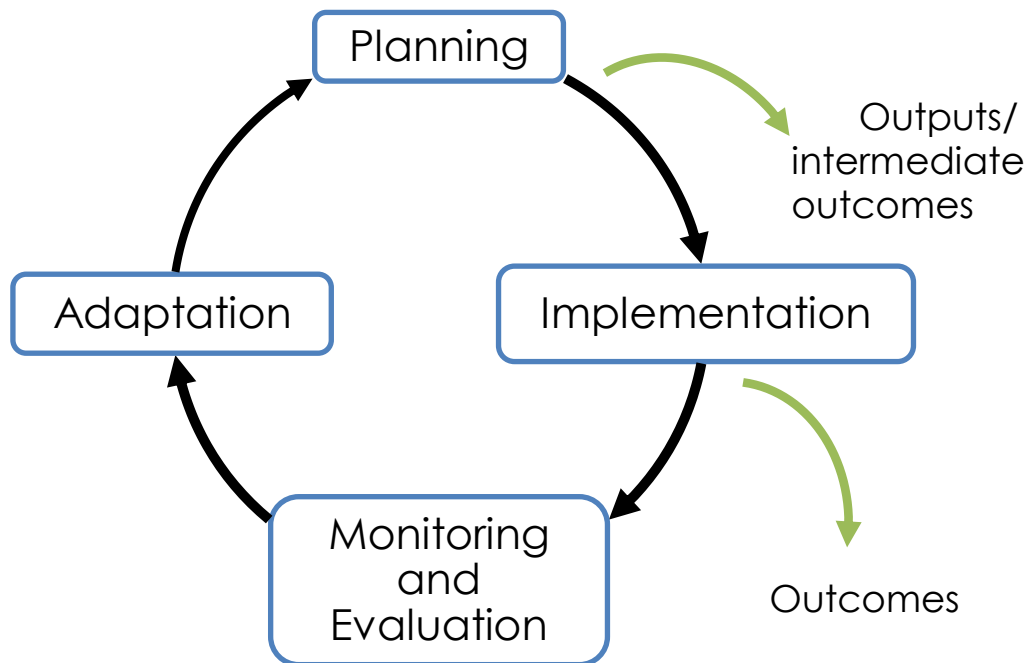


Figure 1 The cycle of operationalizing ICM (Based on Ehler, 2003 and Olsen, 2002)

1.2.2.1 Outputs and outcomes

It is important to distinguish outcomes from outputs. Desired outcomes of ICM are considered to be the “solutions to perceived problems and issues” (Burbridge, 2004, p. 65) and the “ultimate measure of success” (Stojanovic et al., 2004, p. 276). Further, outcomes are often determined in the early planning phases of operationalizing ICM. Outputs, or intermediate outcomes, are a result of the process and do not inform us about the effectiveness, success, or completion of all phases of operationalization of ICM. However, outputs are positive and important steps in moving the process forwards and eventually achieving initial desired outcomes (Olsen, 1996). Simply put, outcomes are closer to objectives or goals of a complete project whereas outputs can occur after any phase of the cycle. A current gap in the literature is the connection of governance to sustainable ICM outcomes.

Development outcomes are significantly influenced by systems of governance (Vodden, 2015). Current governance of coastal and marine SES has led to negative, undesired management outcomes (Foley et al., 2010; Young et al., 2007). Undesired management outcomes have included overfishing and the collapse of fisheries, prioritization of economic development over culture and community, pollution, eutrophication, endangered species, and loss of traditional livelihoods. Institutional constraints are often the primary source of difficulties that affect social and ecological outcomes (Nobre et al., 2017). To prevent undesirable outcomes for coastal and marine SES, ICM needs a greater focus on sustainability. A paper by Stephenson et al. (2017) proposed four pillars of sustainability to better incorporate human dimensions into fisheries policy, processes, and objectives: ecological, economic, social (including cultural), and institutional. Institutions are formal (e.g., administrative structures, policies), or informal (e.g., customs, practices, norms) rules that structure the way people interact with each other and the environment (Cortner et al., 1998; Stephenson et al., 2017). Institutions are key to issues of governance and participation that are the focus of this dissertation.

1.2.2.2 Participation of local actors in ICM

While consensus is lacking on the most appropriate form of governance to implement ICM (Ngoran and Xue, 2017), several authors have concluded that neither a purely top-down nor a bottom-up approach will be sufficient (Bennett et al., 2019; Rockmann et al., 2015, p. 158; Stohr et al., 2014). Evidence of the reality, and benefits, of both top-down (centralized) (Christie and White, 2007; Gilliland and Laffoley, 2008) and bottom-up (decentralized) approaches (Wever et al., 2012) exist in the wider context of oceans governance and management.

Communities are increasingly recognized for their capacity to catalyze and lead ICM initiatives. While there have been efforts to understand how coastal communities conceptualize ICM (Wilson and Wiber, 2009), opportunities remain to discover how to operationalize and enhance community engagement in ICM (Kearney et al., 2007). There are many definitions of community. For this research, a community is considered a place-bounded group, often made up of heterogeneous actor-groups that may have different values and interests (Kearney et al., 2007). Actors, or actor groups, are individuals and/or organizations with a stake in coastal and marine resources (Biermann et al., 2010; Vallejo and Hauselmann, 2004). Actor groups that make up communities may include owner-operator fishers, tourism operators, concerned community members, non-governmental organizations (NGO) or energy companies.

In addition to *who* should be involved in ICM an important consideration is *how*, or what strategies or level of engagement, is it appropriate for community actors. There are many ways to incorporate coastal community actors with diverse perspectives and capacity into ICM initiatives (Flannery et al., 2019; Morf et al., 2019). Perceived benefits of increased participation of local or community actors have led to the exploration of new combined approaches between governments and non-state actor groups (McKinley and

Fletcher, 2010; Rockmann et al., 2015). There remains a gap to be filled with regard to governance approaches that facilitate ICM initiatives.

There is ample evidence of the benefits of including civil society or local actor groups in natural resource management and ocean governance. Short term benefits might include increased equity and legitimacy of the decision-making process (Hahn et al. 2006) while long term benefits might be a reduction in conflicts between actor groups, improved implementation, and scale-appropriate solutions (Portman et al. 2015). Despite the clear advantages of diverse actor participation in coastal and marine decisions, there are drawbacks that often include increased expenses because it takes a long time to build trust and relationships and to obtain and consider feedback or to achieve consensus on decisions (Benz and Eberlein, 1999). Furthermore, participants may experience fatigue or burnout (Giebels and Teisman, 2015). Another difficulty is when the leaders of participatory processes have a narrow view of participation or are not trained or adequately equipped to facilitate participatory processes that may result in a mismatch of engagement strategy (Lockwood et al., 2010), poor timing (i.e., not early enough or continuous throughout the decision-making process) (Chuenpagdee and Jentoft, 2007; Gilliland and Laffoley, 2008; Gopnik et al., 2012), or failing to accommodate the needs of participants (i.e., relating to accessibility, location). Additionally, participants may not be representative of the community (Koehler and Koontz 2008), power dynamics between actor groups are not acknowledged (Giebels and Teisman, 2015), and unfruitful discussions (Mintzberg et al. 1996; Benz and Eberlein 1999) or a decision-making deadlock (i.e., inability to come to an agreement or make a decision) may occur (Giebels and Teisman, 2015). If participation efforts are poorly done, i.e., not addressing the above considerations, there is a risk of losing the trust and cooperation of actors (Reed, 2008).

1.2.2.3 ‘Governance Gaps’

Governance has been highlighted as the weakest aspect of implementing any kind of ecosystem-based management requiring strategic coordination across sectors and departments (Foley et al., 2010; McCrimmon et al., 2011; Stephenson et al., 2019; Taljaard et al., 2012). For example, “both governance and management arrangements are currently poorly suited to balance diverse and often conflicting management objectives” in coastal areas (Granit et al., 2017, p. 676). Additionally, the connection of governance to integrated outcomes is limited (Smythe, 2017; Sterling et al., 2017).

ICM approaches are being advanced without consideration of the complex implications of current governance and institutional regimes (Kelly et al., 2018). A set of knowledge gaps relating to governance or ‘governance gaps’ are introduced in this section and explored throughout the dissertation. Gaps are considered to be direct challenges or limitations identified in the literature relating to ICM.

1. ICM has not been widely operationalized. Despite global efforts to achieve ICM in some form, few ICM initiatives have progressed beyond the planning phase to subsequent stages of implementation, evaluation and monitoring, and ultimately adaptation (Buono et al., 2015; Ye et al., 2015). Insufficient governance has been used as a frequent explanation for why ICM is not being operationalized (Ngoran and Xue, 2017;

Stephenson et al., 2018; Stephenson et al., 2019). There is growing evidence that this may be due to the inability of governing regimes to achieve integration within current institutional structures but limited explanation about what aspects of governance in particular (Kelly et al., 2019; Link and Browman, 2017; Ngoran and Xue, 2017; Taljaard et al., 2012). Overall, appropriate governance for facilitating integrated management initiatives has not been well researched (Kelly et al., 2018), perhaps due to its high complexity (Christie et al., 2009). Globally, it is well-established that conventional centralized and sectoral-based governance is no longer appropriate for addressing complex problems nor for realizing balanced and equitable outcomes (i.e., including social, economic, cultural, ecological considerations) (Rhodes, 1996; Salamon, 2002; Stoker, 1998).

The state of knowledge of governance needed for ICM as well as what is preventing the operationalization of ICM initiatives is explored in Chapter 2.

2. ICM literature has not clearly distinguished governance and management interventions. The literature has begun to acknowledge the importance of governance to facilitate management interventions and to help to support their success (Kelly et al., 2018; Kirschke and Newig, 2017). However, it has been observed that many organizations and practitioners still conflate governance and management (de la Torre-Castro, 2012; Muthiga, 2009; Stephenson, Wiber, et al., 2019). Broadly, governance is the context in which the operationalization of management initiatives, or interventions, takes place (Bennett and Dearden, 2014; Folke et al., 2005; Fukuyama, 2016; Lebel et al., 2006; Patterson et al., 2016). This thesis focuses on governance as elements and is discussed more in the next section. Management, therefore, typically involves the operational decisions taken to achieve specific outcomes” (Armitage et al., 2015, p. 240) with ICM initiatives being an initiated response to change behaviours or practices concerning a certain issue. The *Elements and Characteristics of ICM* framework is then developed to help gain insight into specific governance dimensions that enable or hinder the operationalization of ICM and is applied in Chapter 3.

3. Purely top-down governance is insufficient to operationalize ICM. There is general agreement that all actor groups, individuals, authorities, and/or organizations with a stake in coastal and marine resources, are needed for effective implementation of ICM and resulting initiatives (Bowen and Riley, 2003; Ehler, 2003; Ngoran and Xue, 2015), but bottom-up approaches face several capacity and legitimacy issues in practice (Innes and Booher, 2004). While there have been efforts to understand how coastal communities conceptualize ICM (Wilson and Wiber, 2009), opportunities to enhance local participation in ICM have been unfulfilled (Kearney et al., 2007). The importance of the movement away from hierarchical state-based governance towards the inclusion of actors across multiple sectors and scales has been acknowledged for some time (Kooiman, 1993; Rhodes, 1996) and has been explored in other problem contexts (e.g., climate change and urban sustainability governance). In the context of ocean governance more broadly and the quickly emerging blue economy, Bennett et al. (2019) establish that inclusive and responsible governance of public, private and state actors is needed to navigate the complex decisions that lie ahead (see also van Tatenhove, 2011). As ICM is highly context-dependent, there remains a fundamental gap regarding the appropriate degree, and mechanism of participation, through which state and non-state actors are

involved (Jessen, 2011; Smythe, 2017). A transition to innovative, multi-actor governance mechanisms is likely to be relevant for operationalizing ICM by facilitating the presence of core characteristics of governance that are identified in Chapter 2 and explored further in Chapter 4 using a case study comparison within the Bay of Fundy.

1.2.3 Theoretical Foundation

As current sector-based approaches are insufficient for managing the complex coastal and marine SES, a holistic approach that considers more than a single disciplinary perspective to reach sustainability is needed (Halbe et al., 2013; Medema et al., 2008). A holistic approach allows multiple objectives and priorities within SES to be considered (e.g., economic, ecological, social, or cultural). This research uses ICM to attain a holistic and ecosystem-based understanding of coastal and marine SES (Birch and Reyes, 2018; Glaeser et al., 2009). In order to understand the current state of ICM and how to move towards sustainability, two main bodies of literature are drawn upon: governance for sustainability and ICM. The governance for sustainability literature guides the incorporation of multiple disciplines (including both social and natural sciences) and actors perspectives (such as decision makers and resource harvesters) into research design and focuses on enhancing positive and sustainable outcomes (Gibson, 2017; Meadowcroft, 2007). ICM literature includes diverse disciplinary perspectives, conceptualizations, tools, definitions, and approaches as there have been many used over time. In particular, ICM literature is considered to be closely related to sustainable development and ecosystem-based concepts as they all consider natural and social systems as linked and support the achievement of multiple objectives – ecological, social, economic, cultural (Long et al., 2015; Stephenson et al., 2017). This theoretical foundation also allows a focus on governance concepts and ICM insights concerning the role of local actor groups in operationalizing management interventions within complex SES (Kearney et al., 2007; VanderZwagg, 2012).

A pragmatic approach was taken to combining these bodies of literature. This approach was guided by place-based, real-world problem contexts relating to operationalizing ICM initiatives (Creswell, 2014). Pragmatism influenced the design of this research as it allowed for the research question to guide whether qualitative or quantitative methods were appropriate (Creswell, 2014). Moreover, pragmatism provides a useful system for understanding social research in general (Morgan, 2014). Overall, this dissertation is inherently interdisciplinary as the intention was to be based upon participatory principles by engaging with academic and non-academic experts, and coastal community members to determine how to move towards sustainable coastal and marine SES within the Bay of Fundy.

1.2.3.1 Elements and Characteristics of ICM framework

Research since the 1990s has identified a number of core ICM characteristics, considered here to include considerations, guidelines, and principles designed to advance the operationalization of ICM. Seminal papers include Sorenson (1997), Ehler (2003), Stojanovic et al. (2004), Gilliland and Laffoley (2008) and Dickenson et al. (2010). Many international organizations have also developed practitioner guidelines (CBD, 2004; IUCN, 1993; UNESCO, 2006; United Nations Environmental Programs (UNEP), 1995;

World Bank, 1996). During an extensive literature review of these documents, patterns of characteristics were observed as important to achieving ICM. Patterns of characteristics from the ICM literature are organized using Elements of Governance, a conceptual framework that breaks down governance qualities, structures, actors and processes. The resulting analytical framework — *Elements and Characteristics of ICM* -- forms the theoretical foundation of the research approach taken in this dissertation and guides the data collection and analysis in the core manuscripts (Chapter 2, 3, 4). The *Elements and Characteristics of ICM* framework is described below and summarized into Table 2.

Qualities are overarching concepts, values or principles that are grounded within the other Elements of Governance. For example, values such as accountability, transparency, inclusiveness, and equity have been recognized as qualities that assist governance systems to move towards environmental and social sustainability (Kemp et al., 2005; Kooiman et al., 2005; Lebel et al., 2006). Other qualities that support characteristics relating to sustainability are precaution and adaptation, inter- and intra- generational equity, democratic governance, immediate, and long-term integration (Gibson, 2017; Lockwood et al., 2010). The governance principles for sustainability are similar to qualities of ICM (Stojanovic et al., 2004). Qualities pervade all geographic and governance scales.

Governance *structures* are formal (i.e., various policy instruments at different scales of governance) and informal (i.e., norms, relations, behaviours, interactions) networks and institutions arrange the way people interact with each other and the environment (Cortner et al., 1998). Such structures need to be flexible and responsive to local contexts in which activities occur while remaining applicable at a broader scale to consider complexity and connections throughout the system (Carpenter et al., 2012). Integrated management demands both horizontal and vertical linkages between/within actor groups and sectors. These linkages are often achieved through both formal (e.g., laws, regulations, legislation, policies) and informal structures such as multi-actor committees, organizations, advisory groups, and working groups (UNEP/CBD, 2005).

Actors are considered to include individuals and organizations from local to global scales who have a stake in coastal and marine resources, who participate in governance processes or who currently work within governance processes (Biermann et al., 2010; Vallejo and Hauselmann, 2004). Governance inherently involves multiple actor groups (both state and non-state), especially in coastal and marine SES with multiple incentives and competing activities (Kooiman et al., 2008). Ensuring multiple actors, covering all relevant interests, are involved in governance frameworks can promote good governance characteristics such as transparency (Wingqvist et al., 2012).

Governance *processes* can range from actor engagement to implementing policy, plans and programs, and how to adapt them given new information. Engagement here is defined as a spectrum of approaches that share and help understand the impacts of decisions on various actor groups ranging from one-way communication to having some authority over decision-making (e.g., information, consultation, deliberation, collaboration, decision-making, process responsibility) (Morf et al., 2019). Processes that facilitate the inclusion of multiple actors and support the navigation of diverse interests

are likely to lead to social and environmentally responsible outcomes (Vallejo and Hauselmann, 2004).

Table 2 Criteria for Elements and Characteristics of ICM framework

Governance Element	Criteria	Characteristics
<i>Qualities</i>	<ul style="list-style-type: none"> • What are these ICM initiatives trying to integrate (objectives, activities, etc.)? • Are principles of sustainability being considered (ecological; economic; social (including cultural), and; institutional (formal and informal) (Gibson, 2006; Stephenson et al., 2017)? 	<ul style="list-style-type: none"> • Good governance values • Proactive or precautionary • Democratic • Operational objectives • Strategic objectives or vision • Regional scale/ boundaries • Connection to local context • Multiple, balanced objectives • Multi-inter-, or trans- disciplinary approaches • Evidence-based decision-making • Adequate resources
<i>Structures</i>	<ul style="list-style-type: none"> • Is ICM legally supported? • Is there a strong policy basis? • Other formal or informal norms? 	<ul style="list-style-type: none"> • Flexible, responsive (adaptive) structures • Formal structures • Innovative mechanisms (e.g., structures or arrangements) • Vertical linkages and horizontal linkages • Multi-level, poly-centric or nested • Enforcement
<i>Actors</i>	<ul style="list-style-type: none"> • Who is leading the ICM initiative? • Who is participating/involved? How and to what degree? • What is the degree of engagement of community actors and resource users? • What is the degree of engagement of non-government organizations? • What is the degree of engagement of Authorities (State and Indigenous)? 	<ul style="list-style-type: none"> • Meaningful inclusion of diverse actor groups and knowledge types • Capacity building or development or empowerment • Clear expectations, roles and responsibilities • Common vision/goals/problem-framing • Political support, will or buy-in • Early and ongoing engagement
<i>Processes</i>	<ul style="list-style-type: none"> • What type of processes were used to operationalize the ICM initiative? • Who is involved at what stage (i.e., actors)? • What can be learned from past policy, programs and plans (PPPs) relating to ICM 	<ul style="list-style-type: none"> • Indicators for monitoring and evaluation • Conflict acknowledgement, mitigation or mediation/resolution

	<p>and planning regarding implementation challenges?</p> <ul style="list-style-type: none"> • Planning and development – what outcomes did they want? • Implement – who is leading this and how? • Evaluation and adaptive management – yes or no? who? how? • What were the outcomes? 	<ul style="list-style-type: none"> • Learning or knowledge co-production/integration -focused • Iterative, reflective, reflexive or adaptive communication
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1.2.4 Empirical Context

This dissertation addresses the guiding research question at three different scales to inform ICM practice in Canada: international (Chapter 2), regional (Chapter 3), and sub-regional (Chapter 4).

A challenge faced by Canada, as well as other nations globally, is the transition from policy to implementation of ICM. There remains an opportunity to learn from previous empirical experiences both within Canada and internationally (Christie et al., 2009; McKinley and Ballinger, 2018). Figure 2 provides a timeline of ICM milestones in Canada since 1978. More information about the current governing regime of coastal and marine SES in Canada is forthcoming in Chapter 4. An assortment of efforts towards ICM have been tried in Canada since the promulgation of the Oceans Act (Oceans Act, 1996); however, ICM remains difficult to operationalize.

For all of the excellent co-operation that went into establishing oceans jurisdictions, the truth is that Canada’s policies for actual management of our oceans areas have been piecemeal, fragmented, and scattered. The same spirit of partnership, co-ordination, co-operation and innovation that enabled Canada to gain authority over ocean resources must now be used to manage those resources (Office of the Auditor General, 2005, p. 5)

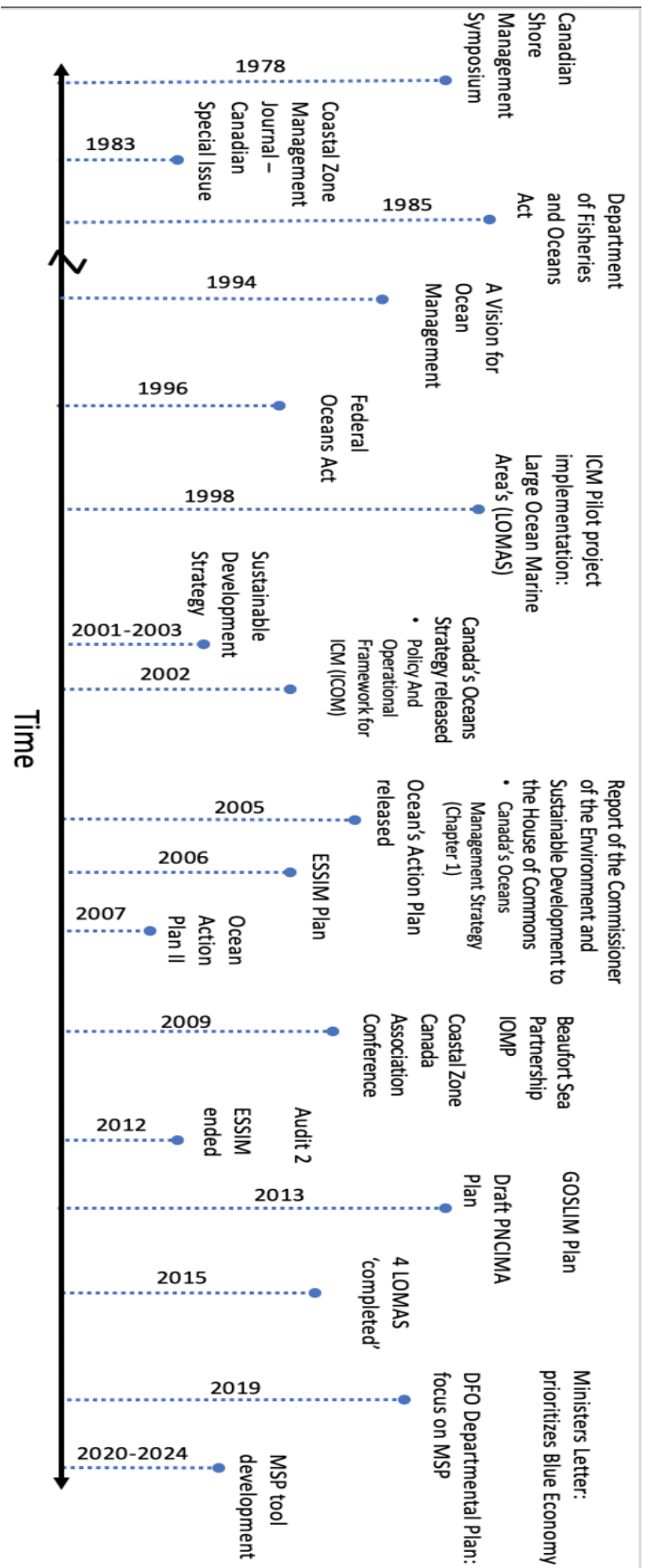


Figure 2. Timeline of key ICM efforts/events in Canada from 1978-2020.

*ESSIM = Eastern Scotian Shelf Integrated Management Plan; GOSLIM = Gulf of St. Lawrence Integrated Management Plan;
 PNCIMA = Pacific North Coast Integrated Management Area; Beaufort Sea Partnership Integrated Ocean Management Plan (IOMP)

Recently, the Department of Fisheries and Oceans, the responsible authority for implementing ICM, re-expressed ICM as a priority through commitments to establishing MSP (see Minister of Fisheries, Oceans and the Canadian Coast Guard, 2019). As seen in Figure 2, the last widescale effort towards ICM was in the early 2000s with the creation of the Large Ocean Management Area (LOMA) pilot projects that lost momentum after a few years.

Scholars look to common governance-related challenges to explain the *paralysis* with ICM progress in Canada over the past two decades. One recommendation includes new thinking of the coast as “a zone of integration of both watershed and oceans management rather than a line of separation for jurisdictions and mandates” (Ricketts and Hildebrand, 2011, p. 12). A significant opportunity rests in building a governance perspective of ICM including how to appropriately implement ICM with multiple-actor groups (Kelly et al., 2019).

The *Ocean Strategy* (Canada, 2002; Canada’s Ocean Strategy: Our Oceans, Our Future, 2002) also outlines suggestions to foster collaboration with other ministries, Indigenous Peoples, and coastal communities. The *Strategy* indicates that it should evolve through adaptive management processes as lessons are learned (Chircop and Hildebrand, 2006). In 2005, the *Oceans Action Plan* documented the governance of Canada’s oceans are “still not equipped to deal with modern-day challenges” (Office of the Auditor General, 2005, p. 2).

1.2.4.1 Bay of Fundy, Atlantic Canada

The Bay of Fundy is used as a case study to investigate progress and experiences regarding ICM initiatives as well as to understand the added complexity of the Bay of Fundy context. This section briefly introduces the region and explains why it was chosen as the empirical context to carry out this research. The Bay of Fundy in Atlantic Canada is home to a plethora of activities, values, and cultures tied to coastal and marine spaces. There is a rich history of pursuing integrated management efforts within the Bay of Fundy (e.g., Atlantic Coastal Action Program, Coastal CURA, Region Ocean’s Plan). St. Andrews New Brunswick, on the shores of Bay of Fundy, Canada’s oldest marine research station continues to investigate the integration of activities and objectives for the region. Preliminary contacts through these known initiatives and institutions contributed to scoping the context of this research by providing local knowledge, and in some cases, collaborating with the research program.

The Bay of Fundy in Atlantic Canada has the highest tides in the world and is home to many diverse and ecologically significant ecosystems (e.g., seagrasses, mudflats, estuaries). Many areas in and around the Bay of Fundy are ecologically significant or protected areas. Over the past decades, the region has experienced a range of anthropogenic pressures including renewable energy research and development, coastal development, shipping lane expansion, and oil and gas refinery construction and operation. Additionally, nature tourism, intensive fishing of multiple species, a growing aquaculture industry, and large marine transport and cruise port directly support local economies (Sinclair et al., 2017; Stephenson et al., 2017).

Although often unintentional, activities may cause undesirable impacts/outcomes. Ecological impacts have included habitat degradation (e.g., coastal marshes and mudflats), and stress on species at risk including inner-bay Atlantic salmon (*Salmo salar*) and the northern right whale (*Eubalaena glacialis*) (Sinclair et al., 2017). Social concerns include limited or lost access to coastal and marine areas (e.g., displacement of local fishing by salmon aquaculture, privatization, and consolidation) (Bennett et al., 2018; Wiber et al., 2010) and transboundary tensions (e.g., lack of jurisdictional clarity in the ‘grey zone’, Lobster Fishing Area 38B, due to border disputes between Canada and the USA) (Walters, 2007). Additionally, young people leave rural areas to pursue jobs and higher education which shifts community structures and dynamics (Ommer et al., 2007). Undesirable outcomes have arisen, causing conflicts among actor groups and spurring the recognition of the importance of considering social-ecological systems as linked and integrated approaches to mitigate negative cumulative effects and inequitable trade-offs.

1.2.4.2 Embedded case studies within the Bay of Fundy

Chapter 4 uses case studies to gain a deep insight into nuances relative to specific contexts (Newing, 2010; Ritchie and Ellis, 2010). The Upper Bay and Lower Bay case studies (sub-regions) lie within the Bay of Fundy region in Atlantic Canada. These cases were selected for the need for ICM-related activities and/or history of previous ICM-related efforts based on information gathered during interviews. The language of Upper (instead of Minas Basin) and Lower Bay (South Western New Brunswick region) is used in the present study as they each encompass different activities that influence the sustainability of the sub-region. For example, boundaries of the Lower Bay sub-region extend to the Port of Saint John as transport is a significant activity in the Lower Bay as shown in Figure 3. Similarly, the Upper Bay includes Minas Basin as well as Minas Passage due to ongoing tidal energy research and development in addition to highly valued fisheries throughout the area. The selected sub-regions are constrained by provincial and national boundaries to maintain a focused research scope, remain manageable for data collection, and allow for a ‘deep dive’ into local realities.

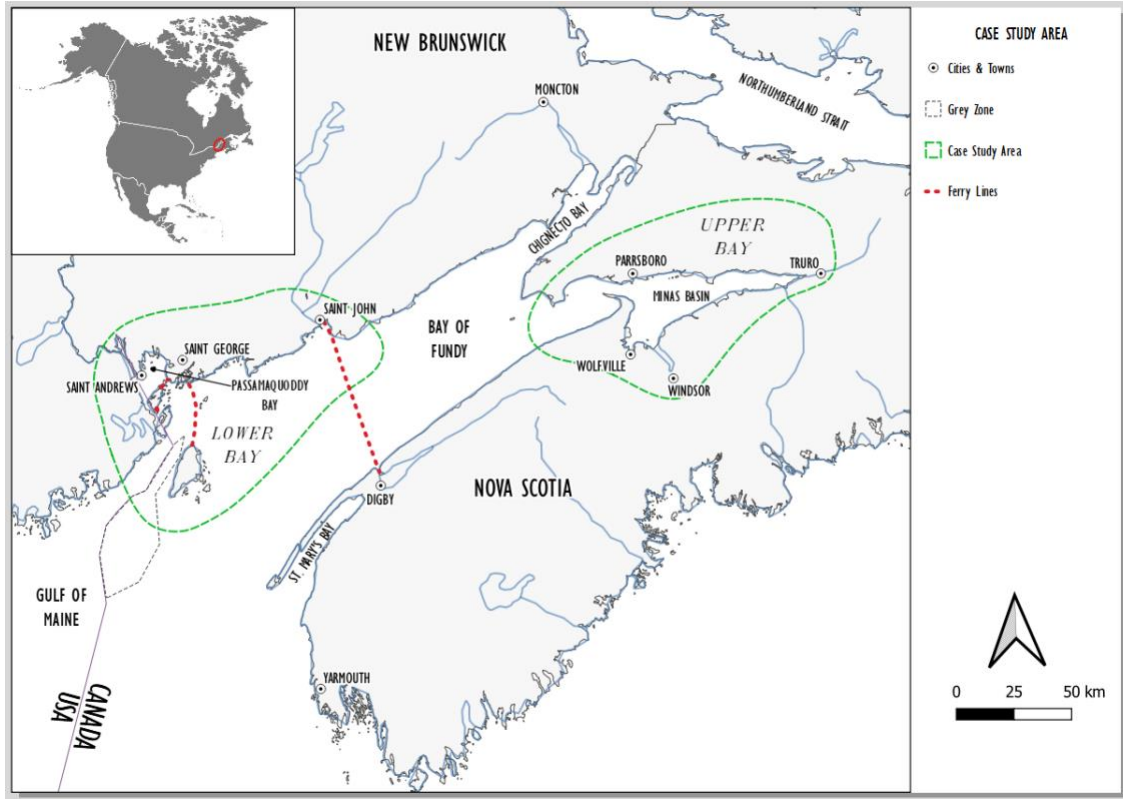


Figure 3 Sub-regional case study locations within the Bay of Fundy (Map created by S. Eger and R. Caballero, 2020)

Although there are some similarities between the Upper and Lower Bay contexts, these case studies were chosen as they allowed for the examination and comparison of ICM approaches across activities, jurisdictions, cultures, and ecosystems. Similarities between sub-regional studies include conflicts between actor groups (e.g., conservation and resource harvesting) and increasing pressure from activities (e.g., shipping, coastal development, climate change). Further, each sub-region is comprised of multiple community types such as rural, urban, and Indigenous Territories, unique ecological considerations, and different impacts although there was some overlap of rural migration to urban centres. A major issue of contention in the Upper Bay is the conflict between research into the development tidal power and the existing harvest fisheries whereas in the Lower Bay an important issue is the impact of the salmon pen aquaculture industry on harvest fisheries. Features and current activities are shown for each sub-regional case study in Figures 4 (Lower Bay) and Figure 5 (Upper Bay).

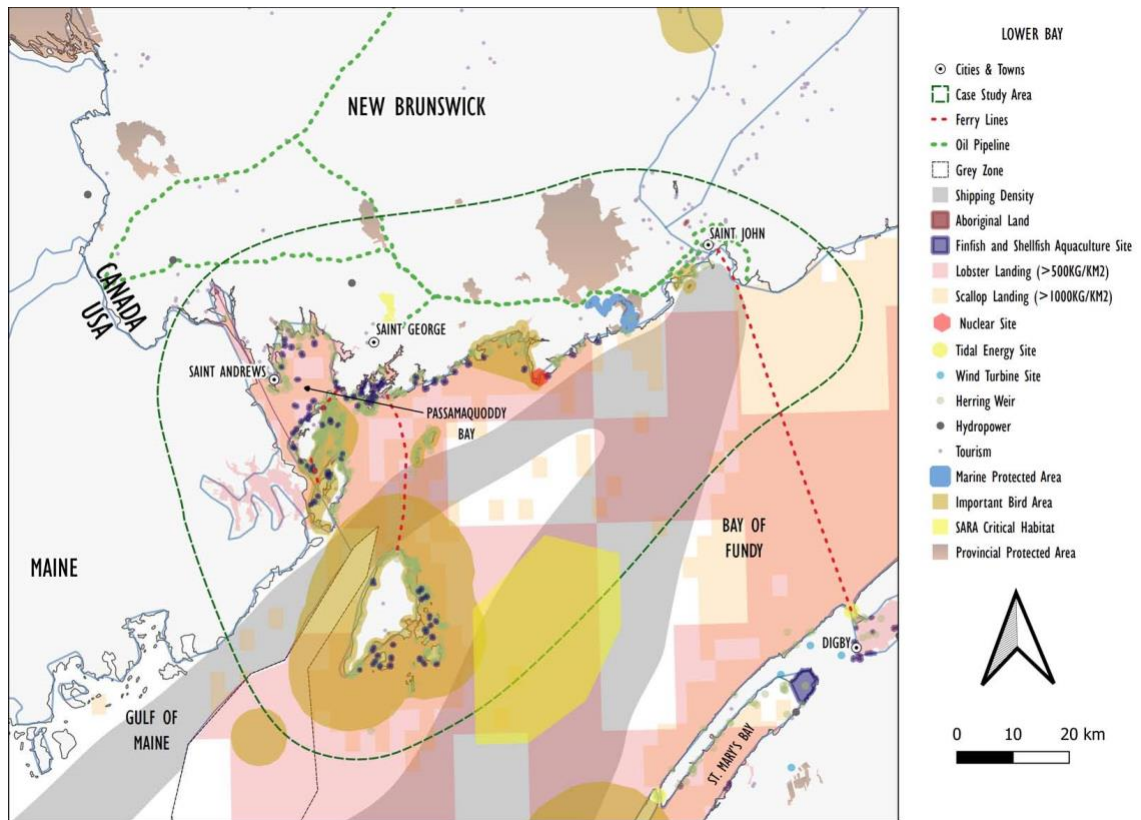


Figure 4 Human activities and significant ecological areas in the Lower Bay of Fundy, New Brunswick (Map created by S. Eger and R. Caballero, 2020)

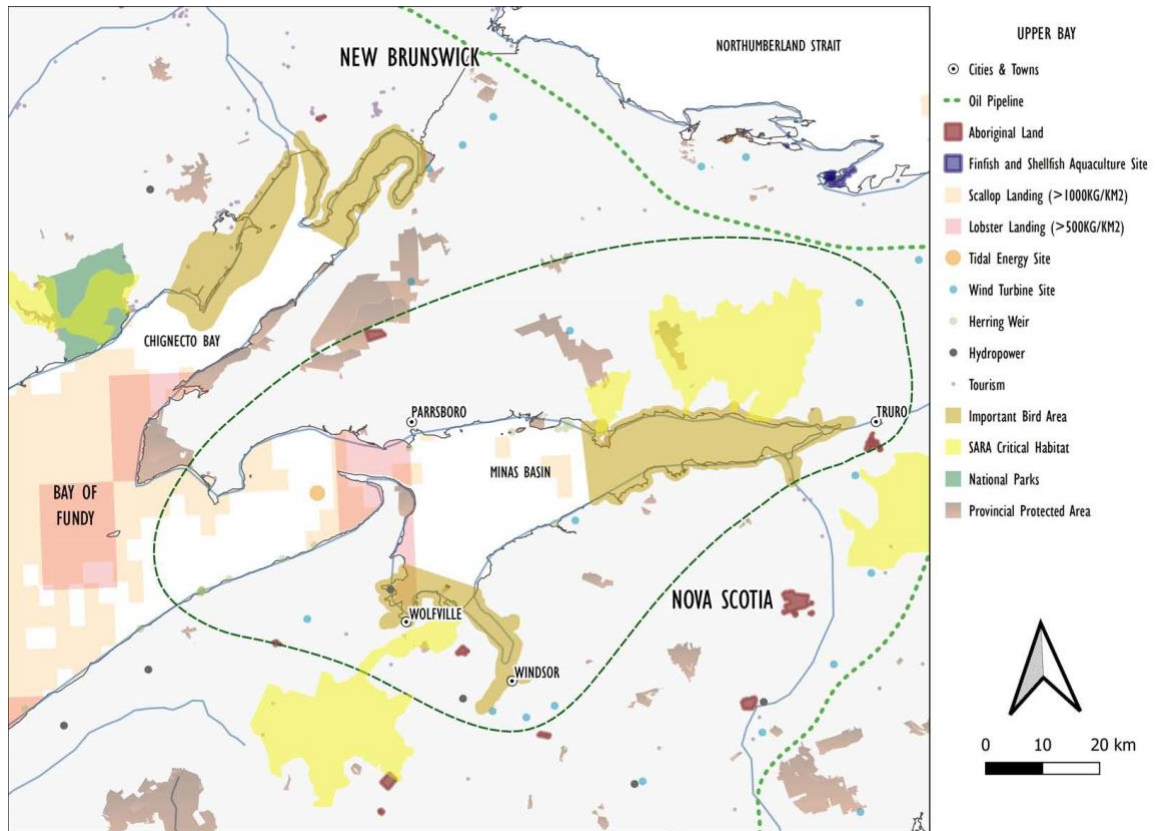


Figure 5 Human activities and significant ecological areas in the Upper Bay of Fundy, Nova Scotia (Map created by S. Eger and R. Caballero, 2020)

1.3 Research Design and Methods

A qualitative methodology was applied throughout the dissertation. Qualitative research allows for the exploration of opinions, experiences and feelings of participants and is therefore appropriate for addressing research questions that involve learning from previous ICM experiences, both from the literature and through interviews (Yin, 2016). An abductive approach, defined as a combination of inductive and deductive approaches, is used in this thesis. An abductive approach, also referred to as a hybrid approach, allows researchers to begin with a broad theoretical basis and cultivate theory throughout a continuous research program (Timmermans and Tavory, 2012). Abductive analysis includes the elements of evaluating or assessing current state of knowledge within a particular field (deductive analysis) as well as the re-conceptualization of that knowledge, production of new knowledge, and contribution back to theory in an innovative way (inductive analysis) (Timmermans and Tavory, 2012; Yin, 2016). Therefore, a hybrid approach offers an alternative to purely inductive or deductive approaches to reasoning and allows for iterative movement between data, and the development or modification of theory (Bryman, 2016; Dubois and Gadde, 2002). This research uses an abductive approach to collect and analyze data, allowing for existing theories and knowledge concerning governance for sustainability and ICM to be:

- captured through the creation of the *Elements and Characteristics of ICM* framework (1.2.3.1);
- deductively applied to international and regional scales (Chapters 2 and 3);
- inductively analyzed using thematic analysis allowing for the generation of new insights from existing concepts (Chapters 3 and 4)
- revised into the *Elements and Characteristics of ICM* framework from empirical studies (5.3)

Most of the analysis involved in this research is inductive. For example, open-ended questions were deemed most appropriate for addressing the research questions and objectives as they allowed for participants interpretation of concepts. Benefits of using an inductive approach include consideration of context, flexibility and the generation of theory. However, such an approach has also been associated with “the tendency to overlook the obvious and perpetually reinvent the wheel, which can result in failure to build knowledge” (Finfgeld-Connett, 2014, p. 342). These limitations were avoided by also using deductive analysis throughout the dissertation.

Table 3 Overview of methods used within the dissertation

Chapter	Method	Examples of References for Method chosen	Relation to Elements of Governance Framework	Data analysis approach
2	Systematic review of international ICM literature	Petticrew and Roberts, 2005	Deductive application of Elements of Governance framework to literature	Inductive and deductive thematic analysis
3	Semi-structured interviews with regional participants from past ICM efforts	Bailey, 2007; Maxwell, 2012	Inductive application of characteristics to investigate critical challenges of ICM	Inductive and deductive thematic analysis
4	Multiple Case study enquiry of sub-regions within the Bay of Fundy	Bryman, 2009; Yin, 2016	Three core ICM characteristics from Chapter 2 were applied to a comparative regional case study to inductively determine opportunities	Qualitative thematic analysis; document analysis

As shown in Table 3, a hybrid approach is apparent through the application of the Elements of Governance and *Elements and Characteristics of ICM* framework in the core chapters of this dissertation. First, the analytical framework- Elements of Governance – (1.2.3.1) was applied deductively in Chapter 2 to undertake a systematic review of the literature to identify ICM characteristics and synthesize progress on ICM internationally.

A main result of this review was the identification of core ICM characteristics for operationalizing ICM. Next, the Elements of Governance were used to structure the inductive coding and subsequent qualitative thematic analysis in Chapter 3. Data were organized and reorganized to eventually yield emergent themes that resulted in a set of critical challenges being faced within the empirical context of the Bay of Fundy. Finally, three core ICM characteristics identified in Chapter 2 were applied deductively to interview data from sub-regional case studies within the Bay of Fundy. Common opportunities for ICM at the sub-regional scale emerged.

The following sections provide more details and rationale for the various methods selected for this research and how the *Elements and Characteristics of ICM* framework was applied (Table 3).

1.3.1 Systematic Literature Review

A systematic review was employed to analyze a large number of cases at an international scale to provide breadth and depth on ICM initiatives. Systematic reviews help answer targeted research questions in a repeatable way (Petticrew and Roberts, 2005). The focus of this systematic review was to determine the present understanding of governance arrangements that have facilitated the operationalization of ICM and lead to sustainable outcomes (Chapter 2). Table 4 provides the search string of relevant key words to address the research purpose. Similar methods were consulted to tailor the review process (e.g., Luederitz et al., 2016; Pittman and Armitage, 2016; Plummer et al., 2012).

Table 4 Search string for the systematic review (Conducted Sept 17, 2019)

Search String	Scopus	Web of Science
((coastal or marine or maritime or ocean or sea) AND (plan* or develop* or implement* or evaluat*) AND (positive or desire* or sustain* or long-term or health* or wellbeing or secure*) AND (outcomes or result or lesson) AND (integrate* or ecosystem-base* and management) and (governance))	(TITLE-ABS-KEY) 82	(TOPIC) 114

A total of 69 peer-reviewed journal articles were included from Scopus and Web of Knowledge databases and organized using Zotero. Chapter 2 provides more detail on inclusion and exclusion criteria. To determine which characteristics of the *Elements and Characteristics of ICM* framework were discussed most in the literature, each characteristic was recorded as present or absent from each article (Krippendorff, 2004). The presence was noted when the characteristic was directly evident or alluded to (indirect) within the peer-reviewed journal article.

1.3.2 Semi-Structured Interviews

Semi-structured interviews were undertaken to identify challenges and opportunities for ICM initiatives within the Bay of Fundy (Objectives 2 and 3). Interviews function to acquire information beyond general opinions (Maxwell, 2012) and semi-structured interviews allow flexibility for a particular question or theme to be tailored to the knowledge and interests of the interviewees through open-ended questions (Bailey, 2007). Interview participants were selected based on their experience and expertise relating to integrated coastal and marine SES within the empirical context of the Bay of Fundy in Atlantic Canada.

To identify potential participants, a preliminary stakeholder map was created to assess the scope, and understand the context and actors within the Bay of Fundy before conducting interviews (Almutairi et al., 2019; Cvitanovic et al., 2016; Ginige et al., 2018). Stakeholder mapping is useful in environmental research and helps guide the recruitment of study participants (Mitchell et al., 1997). The stakeholder map depicted foundational contacts from known ICM initiatives as well as provided by past collaborators across sectors to further identify participants through snowball sampling. Snowball sampling is a type of purposeful sampling that assumes social networks will influence the recruitment of key informants for this study and therefore is subject to sampling bias (Biernacki and Waldorf, 1981). The intention was not to gain a representative sample of experts across the relevant actor groups but to explore a range of perspectives from actors' experiences with ICM initiatives. Participants were limited to those identified through snowball sampling with experience and interest in past, present or future integrative management interventions in the Bay of Fundy for professional, personal, or cultural reasons.

A total of 68 interviews were conducted in the summer of 2018. Research participants provided information on both past and current ICM experiences (n=68) Table 5 provides a summary of research participants. A subsection of interviewees (n=51/68) from Upper and Lower Bay provided additional information on how to progress ICM in the future (Appendix A). Informant information lacked personal identifiers and consent for participation was collected before conducting each interview. Protocol and example questions for semi-structured interviews are described in Chapter 3. Questions were based on the *Elements and Characteristics of ICM* framework criteria and focused on participant's experiences with ICM initiatives through a governance lens. Interviews were digitally recorded and then transcribed, organized, and coded. Transcripts were then reviewed for accuracy, summarized, and sent back to participants to verify content.

Table 5. Summary of research participants (n=68)

Actor Group	# Participants
Resource User	4
Engaged Citizens	4
Non- governmental Organization	13
First Peoples Groups/Authorities	5

Provincial Authority	11
Federal Authority	9
Municipal Authority	2
Private- Research/Consulting	6
Private - Industry	4
Academia - Content Expert	5
Academia- Partner	5

Throughout the interviews, a spontaneous document review was also used as a supplementary source of evidence for the embedded case studies (Hox and Boeijs, 2005). Documents (e.g., grey literature, peer-reviewed journal articles, project webpages) suggested by interview participants were reviewed to better understand the Bay of Fundy context. In many cases, these documents confirmed and elaborated on information provided by interviewees. For example, when a participant referred to a document, time frame, initiative, or role of an actor group involved in ICM initiatives, details were corroborated after the interview through a review of relevant documents. At times, information and details from the document review between interviews impacted the way subsequent probing questions were asked and to whom they were asked.

1.3.3 Case Study Comparison

Multiple cases are commonly used to understand phenomena. A multiple case study enquiry was performed at the sub-regional scale within the Bay of Fundy to gain insights into both practical and conceptual elements needed for the successful operationalization of ICM. This method elicits rich narratives that showcase an understanding of the local context (Maxwell, 2012). Specifically, case studies will allow for an in-depth investigation of a complex real-world problem context (Bryman, 2009; Yin, 2016). Within the broader case of the Bay of Fundy region, an embedded multiple case study approach was conducted to explore patterns of themes between cases (sub-regions) (Finfgeld, 2003; Finfgeld-Connett, 2010). To further investigate ICM experiences and future opportunities for ICM at the local scale, data were narrowed from 68 semi-structured interviews from the Bay of Fundy region into sub-regions totalling 51 (23 Upper Bay; 28 Lower Bay) (Chapter 4).

Empirical case studies and embedded case study comparisons are beneficial as they concentrate on the local situation. A limitation of a case study approach, however, is that it is difficult to extrapolate findings to other cases (Stake, 2005). Studying multiple cases can increase the relevance to other contexts (Stake, 2003) and overcome the limitation of being unable to generalize beyond the study context (Flyvbjerg, 2006). The multiple case study approach within the Bay of Fundy region allows for a strong and in-depth regional approach to highlight the limitations and opportunities at federal, regional and local levels. Therefore, these findings are potentially relevant to other regions within Canada, but weaker internationally. However, international researchers and practitioners can still benefit from the conceptual framing taken in this research to approach ICM (Chapter 1.2.3) as well as gain insight from the proposed policy recommendations for the Bay of

Fundy region (4.5) and adapt to their specific regional context. In particular, findings are likely relevant to regions and nations with similar political, socio-economic, and cultural dimensions such as the USA, Australia, and Europe.

1.3.4 Data Analysis

Qualitative thematic analysis was used in all three core chapters: a systematic review, semi-structured interview transcripts, case study comparison, and supplementary document analysis. Thematic analysis is a common method used to organize and report data to determine patterns (themes) and is a “descriptive and nuanced account of the data” (Braun and Clarke, 2006, p. 79). The *Elements and Characteristics of ICM* framework was used to gain an in-depth understanding of governance and ICM from empirical studies through multiple rounds of coding (Rodgers et al., 2009; Snilstveit et al., 2012). In the coding process, characteristics were identified both directly, and indirectly from interview transcripts and often required the researcher to ‘read between the lines’ to relate to various aspects of the research topic (as is customary in thematic analysis) (Braun and Clarke, 2006). Text passages were organized and reorganized into categories, sub-themes, and themes that led to main challenges and opportunities (Yin, 2016). In some cases responses directly referred to characteristics, but in others, the participants alluded to a related idea (indirectly) requiring the researcher to make an inference about the meaning of the passage and its relation to the coding scheme.

Systematic review articles were coded for the presence and absence of framework characteristics whereas categories and themes relating to the *Elements and Characteristics of ICM* framework were inductively deduced from coding interview transcripts (Braun and Clarke, 2006; Saldana, 2015; Yin, 2016). In the case of the case study comparison, three core ICM characteristics were chosen to frame Chapter 4 to focus on opportunities and how to achieve them. Once again, for the cross-case comparison sub-themes were inductively synthesized into patterns or themes (i.e., relating to opportunities) between the embedded Bay of Fundy cases (Finfgeld, 2003; Finfgeld-Connett, 2010).

Case study data (interviews and document analysis) were triangulated to fully explore the context-specific nuances within each of the sub-regional case studies (Yin, 2018). Triangulation is “an opportunity for cross-checking one set of results with another on the same issue” (Schensul and LeCompte, 2012, p. 250). Multiple and independent sources of evidence from interviews and document analysis data were used in triangulating data.

1.3.5 Ethical considerations

Conducting research with local actors requires attention to ethical considerations. In my research, it is important that informal local and cultural norms were adhered to and that, where feasible, local individuals and organizations were collaborated with to help navigate and understand cultural and social aspects within case study communities. Also, given that conflicts currently exist between actor groups in the Bay of Fundy (e.g., aquaculture and fisheries; government authorities and community groups; NGOs and industry), I underwent facilitation training in Fall 2018 to strengthen my active listening

and conflict management skills. Ethical procedures were adhered to in all aspects of my research to the best of my ability. The study was approached with an open-mind, strong facilitation skills, and an inclusive demeanor. These preparations helped ensure this research remained informative without creating or inflaming existing conflicts between actors.

This research was approved by the Human Research Ethics Committee with the University of Waterloo's Office of Research Ethics for adherence to the University of Waterloo's Statement on Human Research, its Guidelines for Research with Human Participants, and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, 2nd Edition (TSPS 2).

The research was conducted in conjunction with the Huntsman Marine Science Centre, staff from Department of Fisheries and Oceans (Bedford Institute of Oceanography and St. Andrews Biological Station), First peoples (e.g., Sipekne'katik Band and Peskotomuhkati), and coastal community organizations (e.g., Fundy North Fishermen's Association).

Chapter 2

Investigation of Integrated Coastal and Marine Management Progress Reveals Core Governance Characteristics for Successful Implementation

2.1 Introduction

The concept of integrated coastal and marine management (ICM) has been broadly employed in the pursuit of sustainable development - the goal of maintaining or restoring ecological integrity (i.e., protecting biological diversity and productivity) and enhancing the quality of life while developing economies - in coastal and marine social-ecological systems (SES) since the early 1980s (Burbridge, 2004; Cicin-Sain and Belfiore, 2005; United Nations, 1982). ICM offers an alternative to sectoral management of coastal and marine social-ecological systems. Recent literature is in broad agreement that governance remains a major challenge to advance ICM (Kelly et al., 2019; Link and Browman, 2017; Ngoran and Xue, 2017; Rodriguez, 2017). Ocean governance systems have been considered to be “the set of regulatory processes and institutions through which human factors influence actions and environmental outcomes” (Wood et al., 2013, p. 31). In this thesis, ocean governance systems takes a broader definition that includes ICM as a subset of governance designed to overcome single sector management by facilitating integration (e.g., of efforts, objectives, actors and processes), in its various forms (e.g., horizontal, vertical, interdisciplinary, land-sea, etc.) in order to achieve sustainable social-ecological outcomes. The operationalization of ICM initiatives involves the completion of the following main phases: planning and development, implementation, monitoring and evaluation, and adaptation (Ehler, 2003). A wide array of ICM initiatives exist and are considered to be management interventions. In this research, ICM initiatives include ecosystem-based management or approach (EBM), marine protected area (MPA) networks, marine spatial planning (MSP) and integrated coastal zone management (ICZM).

While ICM is a promising approach, there remain challenges that prevent the operationalization of ICM initiatives and that require further investigation (Cormier et al., 2016; Smith et al., 2017). Existing challenges include meeting the needs of coastal communities, reconciling stability and flexibility (e.g., short- and long-term priorities), and balancing centralized control and devolution of responsibilities (Glavovic, 2016). Despite general agreement among scholars that governance is a critical and neglected area as it relates to ICM, few direct assessments of governance in ICM initiatives exist in the literature. In many cases, governance is referred to indirectly or as a supplementary focus. To achieve desired outcomes associated with operationalizing ICM, there is an opportunity to (1) identify Elements of Governance and (2) to determine the importance to advancing ICM initiatives. In relation to ICM, outputs (or intermediate outcomes such as relationship building) are a result of the process and do not inform us about the effectiveness of an initiative, whereas outcomes are the “solutions to perceived problems and issues” (Burbridge, 2004, p. 65) and are often considered the “ultimate measure of success” (Stojanovic et al., 2004, p. 276).

Among the few analyses of governance in ICM initiatives, Burbridge (2004) acknowledged that governance structures (e.g., policies, institutional arrangements) are instrumental but do not necessarily guarantee the maintenance of the initiative or its success (i.e., the achievement of desired social-ecological outcomes). Stojanovic and Ballinger (2009) identify considerations for more effective governance in ICM initiatives, which include enhancing formal structures to acknowledge partnerships and collaborations, especially those at the local-regional level. Connecting governance to outcomes has been discussed in contexts other than ICM. For example, Nobre et al. (2017) used Ostrom's (2009) institutional design principles to determine their association with desired, collective outcomes, to identify factors affecting governance, and to make policy recommendations.

The present study builds on previous explorations of governance that enable the operationalization of ICM. Thus, the purpose of this review is to synthesize progress with ICM initiatives internationally in relation to governance. International, peer-reviewed literature is explored to address the following objectives: (1) to determine core characteristics of governance for ICM; and (2) to identify examples of outcomes that have been achieved from ICM initiatives. This research furthers the understanding on the role and importance of governance in the operationalization of ICM initiatives.

First, ICM characteristics from the literature are synthesized and presented in an analytical framework. Second, a systematic review was used to analyze ICM literature. The current state of the literature on governance in ICM is then presented. The paper concludes with a discussion of the core characteristics required to operationalize ICM.

2.2 Analytical Framework: Elements and Characteristics of ICM

Many ICM characteristics have been identified since the early 1990s through considerations, guidelines, and principles. During an initial scoping review of ICM literature, patterns of ICM characteristics emerged from seminal papers such as Sorenson (1997), Ehler (2003), Stojanovic et al. (2004), Gilliland and Laffoley (2008), and Dickenson et al. (2010). Many international organizations have also developed practitioner guidelines (CBD, 2004; IUCN, 1993; UNESCO, 2006; UNEP 1995; World Bank, 1996).

Here, a framework that disaggregates governance into elements (i.e., qualities, structures, actors and processes) is proposed and used to organize the common characteristics synthesized from the ICM literature. The resulting summary of the *Elements and Characteristics of ICM* framework (Table 6 and the discussion that follows) was developed using a compilation of recommended characteristics for moving towards ICM. An explanation of each characteristic with associated references can be found in Appendix B. In many cases, references occur multiple times throughout the framework as authors often recognized more than one characteristic in their contributions. The objective of the framework was to guide a detailed systematic review, to determine how prevalent these characteristics are in recent international ICM literature, and to gauge their importance for the successful operationalization of ICM initiatives.

Table 6. Summary of governance Elements and Characteristics of ICM framework

<i>Elements</i>				
	Qualities	Structures	Actors	Processes
Characteristics	<ul style="list-style-type: none"> • Good governance values • Proactive or precautionary • Democratic • Operational objectives • Strategic objectives or vision • Regional scale/ boundaries • Connection to local Context • Multiple, balanced objectives • Multi-inter-, or trans-disciplinary approaches • Evidence-based decision-making • Adequate resources 	<ul style="list-style-type: none"> • Flexible, responsive (adaptive) structures • Formal structures • Innovative mechanisms (e.g., structures or arrangements) • Vertical linkages • Horizontal linkages • Multi-level, poly-centric or nested • Enforcement 	<ul style="list-style-type: none"> • Meaningful inclusion of diverse actor groups and knowledge types • Capacity building or development or empowerment • Clear expectations, roles and responsibilities • Common vision/goals/approach/problem-framing • Political support, will or buy-in • Early and ongoing engagement 	<ul style="list-style-type: none"> • Indicators for monitoring and evaluation • Conflict acknowledgement, mitigation or mediation/resolution • Learning or knowledge co-production/integration -focused • Iterative, reflective, reflexive or adaptive

Qualities are overarching concepts, values or principles that are grounded within the other Elements of Governance. For example, values such as accountability, transparency, inclusiveness, and equity have been recognized as qualities that assist governance systems to move towards environmental and social sustainability (Kemp et al., 2005; Kooiman et al., 2005; Lebel et al., 2006). Other qualities that support characteristics relating to sustainability are precaution and adaptation, inter- and intra- generational equity, democratic governance, immediate, and long-term integration (Gibson, 2017; Lockwood et al., 2010). The governance principles for sustainability are similar to qualities of ICM (Stojanovic et al., 2004). Qualities pervade all geographic and governance scales. Nonetheless, the implementation of ICM should be focused on the regional geographic scale to frame and consider social and ecological systems adequately (Jentoft and Chuenpagdee, 2009). Additionally, greater emphasis on regional governance may better support the involvement of diverse regional actors and networks, regional institutions and interactions between the governing system and the system being governed (Campbell et al., 2016; de la Torre-Castro, 2012).

Governance *structures* include formal (i.e., various policy instruments at different scales of governance) and informal (i.e., norms, relations, behaviours, interactions) networks and institutions that structure the way people interact with each other and the environment (Cortner et al., 1998). Such structures need to be flexible and responsive to local contexts in which activities occur while remaining applicable at a variety of scales to consider complexity and connections throughout the system (Carpenter et al., 2012).

Integrated management demands both horizontal and vertical linkages between/within actor groups and sectors. These linkages are often achieved through both formal (e.g., laws, regulations, legislation, policies) and informal structures such as multi-actor committees, organizations, advisory groups and working groups (UNEP/CBD, 2005). Scholars suggest governance structures should be nested over multiple scales to account for the complexity and connections within the social-ecological system (SES) (Charles, 2010; Taljaard et al., 2012). However, achieving connections both between and within scales remains a challenge in practice (Granit et al., 2017). It is also important to note that coordination over multiple scales as well as across human activities in coastal and marine systems, will influence the legitimacy of governance (van Tatenhove, 2011).

Actors are considered to include individuals and organizations from local to global scales who have a stake in coastal and marine resources, who participate in governance processes or who currently work within governance processes (Biermann et al., 2010; Vallejo and Hauselmann, 2004). Governance inherently involves multiple actor groups (both state and non-state), especially in coastal and marine SES with multiple incentives and competing activities (Kooiman et al., 2008). Ensuring multiple actors, covering all relevant interests, are involved in governance frameworks can promote good governance characteristics such as transparency (Wingqvist et al., 2012). Furthermore, ICM should be designed to facilitate collaboration between authorities at multiple scales and effectively engage actors to participate, thereby enhancing the legitimacy of coastal and marine decision-making processes (Molnar et al., 2009; Nowlan, 2016).

Governance *processes* can range from actor engagement to implementing policy, plans and programs, and how to adapt them given new information. Engagement here is defined as a spectrum of approaches that share and help understand the impacts of decisions on various actor groups ranging from one-way communication to having some authority over decision-making (e.g., information, consultation, deliberation, collaboration, decision-making, process responsibility) (Morf et al., 2019). Processes that facilitate the inclusion of multiple actors and support the navigation of diverse interests are likely to lead to social and environmentally responsible outcomes (Vallejo and Hauselmann, 2004). Overall, processes should aim for effectiveness (i.e., ability to achieve objectives) and efficiency (i.e., ability to act quickly and with limited resources) (Vallejo and Hauselmann, 2004) without marginalizing or creating undesirable tradeoffs for certain actor groups (Ritchie and Ellis, 2010). Also, processes help actors share their perspectives and learn about the SES and how their decisions will affect it. Iterative learning facilitates adaptation and improves outcomes (Crona and Parker, 2012; McLoughlin and Thoms, 2015; Muro and Jeffrey, 2008). Within ICM there is a demand for enhanced participation of diverse actor groups (Flannery et al., 2019; Morf et al., 2019; Stephenson, 2012).

2.3 Methods

A systematic review was undertaken to identify core ICM characteristics within recent literature. Systematic reviews are appropriate to synthesize research and answer targeted research questions in a repeatable way (Petticrew and Roberts, 2005). Using the well-known PRISMA flow of information process, data were cleaned, scoped, and documents were classified, reviewed and finally analyzed (Moher et al., 2009) (Appendix C). Similar

approaches have been used in other environmental management review papers (see Luederitz et al., 2016; Pittman and Armitage, 2016; Plummer et al., 2012).

A search string was designed to capture publications explicitly relating to governance and ICM within the Scopus and Web of Knowledge databases (Table 4). The search string was confined to title, abstract and keywords to keep the number of hits manageable (Moher et al., 2009) as a preliminary search produced over 3400 articles. This review was conducted with the intention to apply findings to Canada in subsequent phases of the research program (Chapters 3 and 4). Titles and abstracts of resulting articles were screened using the following criteria to narrow the sample down to 100-150 articles:

- Focused on articles that referenced a type of ICM initiative as well as governance directly;
- Included articles published between 2010 and 2019 (September);
- Limited to peer-reviewed journal articles (no conference proceedings or reviews);
- Constrained to topics and subjects relevant to the broad field of integrated management ;
- Limited to articles published in the English language; and
- Included case studies from developed nations/regions (e.g., nations that are not considered to be small island developing states or less economically developed).

Next, articles from both Scopus and Web of Science databases were downloaded into Zotero, a reference management tool, where duplicates were then removed and further screened by reading the entirety of remaining articles to confirm their relevance. Zotero was also used to screen for inclusion criteria. Articles were excluded for the following reasons: discussed governance but not integrated governance; included governance but not coastal initiatives; took place in non-coastal urban settings; narrowly focused on the ecosystem or environmental assessment; specifically focused on climate adaptation; related to ICM initiatives without governance implications; or, broadly called for ICM as an implication of the study but without reporting on a specific ICM initiative.

All articles meeting the inclusion criteria were coded deductively using the *Elements and Characteristics of ICM* and the phases of ICM (i.e., planning and development; implementation; monitoring and evaluation; adaptation). To determine which characteristics of the *Elements and Characteristics of ICM* framework were discussed most in the literature, each characteristic was recorded as present or absent from each article (Krippendorff, 2004). The presence was noted when the characteristic was directly evident or alluded to (indirect) within the peer-reviewed journal article.

To begin, ten papers were chosen at random to review and adjust the coding scheme. If a characteristic was not present in the initiative, but was recognized as important in the discussion, for example by acknowledging that it needed to be improved, then it was marked as present. Results were then analyzed using frequency counts and proportions. The prevalence of the characteristics discussed within the review articles could be interpreted with several different meanings. For instance, the characteristics mentioned could have been of interest to the researchers and/or funding agencies at the

time the articles were conceived and/or written. The mention of a characteristic in an article was interpreted to reflect the importance of that characteristic in operationalizing the ICM initiative. Text around where the characteristic was mentioned was reviewed for context (i.e., to ensure that the characteristic was being referred to in a positive way).

2.3.1 Limitations of Approach

There are several important limitations of this study. First, there may be other articles, books and reports writing about governance that were not included in the review. Furthermore, articles that related to the search string indirectly, implicitly or using different terms that were not included in the review to keep the sample size manageable. For example, terms relating indirectly to governance included synonyms from particular phases (i.e., planning, implementation, monitoring or assessment and adaptation) (Arkema et al., 2014), particular governance arrangements (including multi-level, community-based, decentralized, or polycentric) (Beitl, 2017), or specific characteristics themselves such as power, participation, and policy) (Benham and Daniell, 2016). This study was limited to include direct and explicit reference to integration and governance as there were far too many articles for the review to remain manageable otherwise. The search string allowed us to select articles that focused on various approaches to ICM while also including works that commented broadly on governance and management.

Second, it is likely that more helpful and salient case studies exist but have not been reported through peer-reviewed journal articles, in English, or mention governance directly. Additionally, some of the empirical cases in the analysis may have progressed onto other phases or have experienced outcomes after being published. Third, characteristics were difficult to correlate with specific phases of ICM operationalization (i.e., planning, implementation, monitoring and evaluation, adaptation). ICM characteristics may have been coded for their presence within both empirical case studies as well as recognized as important in surrounding text, i.e., theory and discussion. Instead, the findings within characteristics, phases and outcomes are considered separately.

Lastly, this review does not focus on measuring the timelines of ICM initiatives, i.e., how long they have been running. Therefore, in the case that the initiative began only a year before the publication came out, it would not be surprising that it was still in the planning phase.

2.4 Results

2.4.1 Characterizing the data

This review analyzed 69 peer-reviewed journal articles published from 2010-2019 to explore reference to governance and the degree of operationalization of ICM initiatives in recent ICM primary literature. On average, 3-7 articles were published per year peaking in 2017 with 12 articles. Nearly half of the 69 articles appeared in one of two journals: *Ocean and Coastal Management* (26%) and *Marine Policy* (22%). Most articles were empirical (n=53) and incorporated data from 73 case study locations, with some articles (88%) referencing multiple case studies across 22 countries. The most common case

study locations were Australia (14%), China (8%), United States of America (7%), and Canada (7%) (Figure 6).

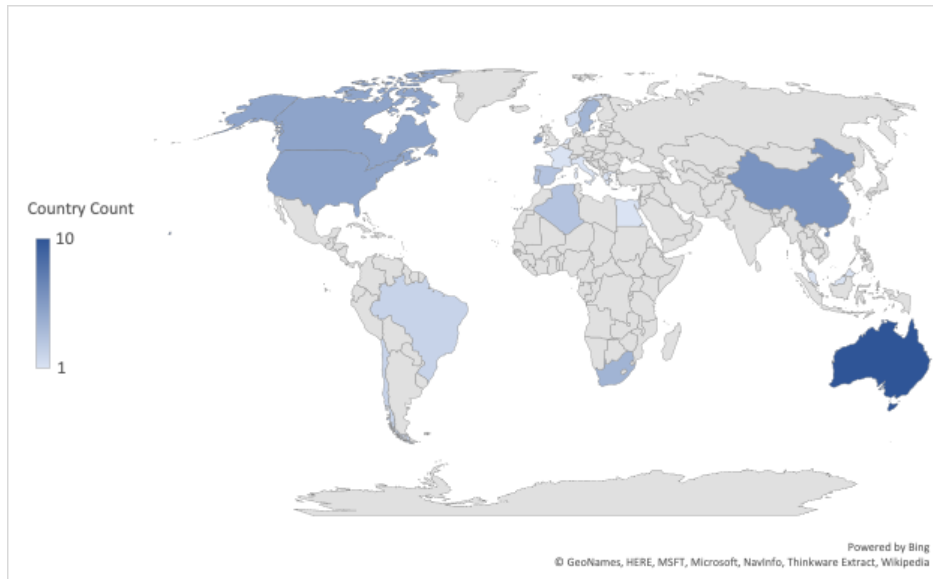


Figure 6 Empirical study locations (73) from 53 empirical articles

A variety of ICM initiatives were included within the review articles as illustrated in Figure 7. Ecosystem-based management was referenced most frequently (22%) followed by Integrated Coastal Zone Management (19%). The term ICM was also referred to directly in 16% of the articles.

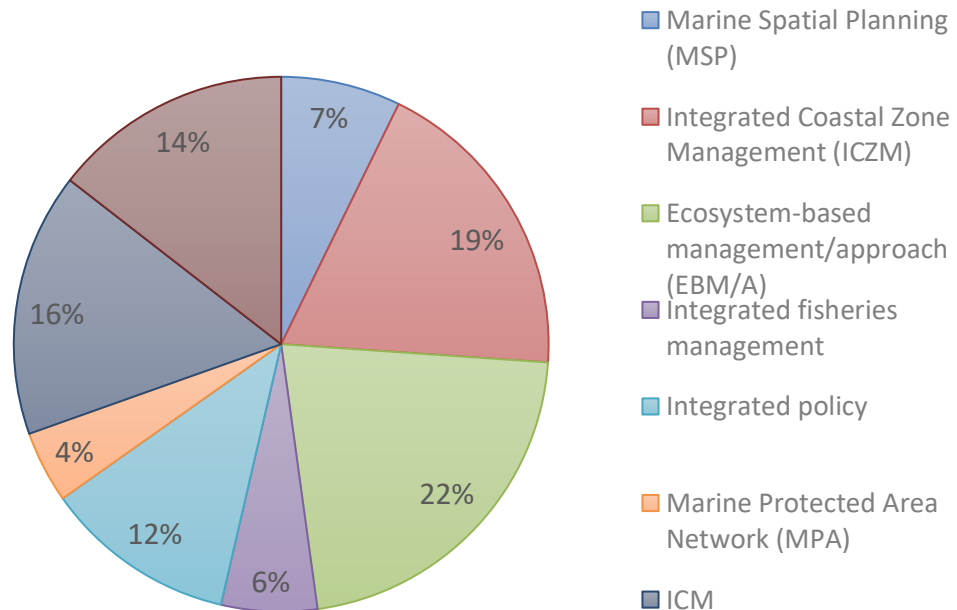


Figure 7 Type and proportion of ICM initiatives discussed within the review sample (n=69) (Legend top to bottom refers to sections clockwise from the top (MSP 7%))

2.4.2 ICM characteristics

The first objective was to quantify references to the *Elements and Characteristics of ICM* listed in Table 6. Figure 8 shows the characteristics present in at least one third (33%) of the articles that were reviewed. The most prevalent characteristics include:

- effective inclusion of diverse actor groups and knowledge types (80%);
- formal structures (70%);
- innovative mechanisms (e.g., structures or arrangements) (62%);
- horizontal linkages (58%);
- iterative, reflective or reflexive (57%);
- multiple, balanced objectives (57%);
- connection to local context (52%).

Among the least referenced characteristics were:

- proactive or precautionary (16%);
- democratic (14%);
- early and ongoing engagement (12%).

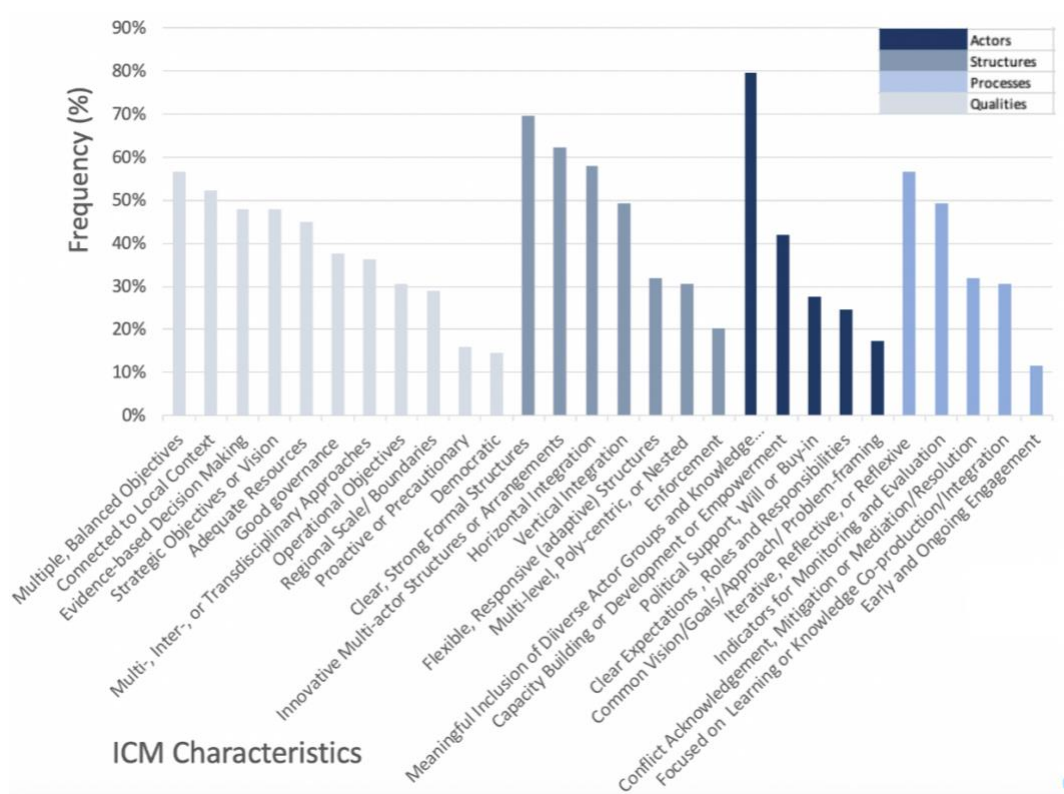


Figure 8 Most prevalent characteristics(elements) (mentioned in 33% or more) within both review and empirical articles (n=69)

To distinguish whether differences exist between empirical and review articles in their reference to the importance of governance, characteristic frequencies were summarized (Table 8). Seven characteristics were found to differ more than 10% between review and empirical articles. Most notably, *multi-level or polycentric* governance structures were referenced 16% more in review articles than empirical articles. The next highest was *capacity building, development, or empowerment* which was mentioned 15% more frequently in empirical articles than in review articles. The absence of the top three characteristics (from Figure 8) from this table indicates that they were prevalent in both empirical and review articles with less than 10% difference in frequency. Therefore, there is an agreement on a core set of ICM characteristics: *meaningful inclusion of diverse actor groups and knowledge; formal structures; innovative multi-actor mechanisms*. However, in reality, conventional governance does not adequately support these characteristics directly. By focusing on planning and implementation on these core characteristics, ICM will more likely be able to progress.

Table 7 Characteristics with 10% or greater difference in frequency between review and empirical articles (*Note: some articles were characterized as both review and empirical articles)

Characteristic	Review (n=34/69)	Empirical (n=53/69)	Difference
Regional scale/boundaries	41%	28%	-13%
Multiple, balanced objectives	50%	60%	+10%
Evidence-informed decision-making	56%	43%	-12%
Capacity building, development or empowerment	32%	47%	+15%
Multi-level or polycentric	44%	28%	-16%
Enforcement	15%	25%	+10%
Indicators for monitoring and evaluation	38%	49%	-11%

In addition, characteristics that had not been coded for in the initial framework emerged during the review. Most importantly, leadership was considered important in six articles (Brooks and Fairfull, 2017; Jessen, 2011; Kelly et al., 2019; Klain et al., 2014; Merrie and Olsson, 2014; Wamsler et al., 2014). Other emergent characteristics included access to information for local actor groups including public education and awareness (Taljaard et al., 2012), acknowledging rights to tenure as suggested by Ostrom (1990) (Aziz et al., 2016; Nobre et al., 2017), explicit consideration of trade-offs (Pendred et al., 2016; Ramirez-Monsalve et al., 2016), and trust (Gelcich et al., 2019).

Case studies with the potential to be considered exemplars of ICM initiatives are identified in Table 9. These cases have been selected because they acknowledged the most ICM characteristics, and they had progressed beyond the planning phase.

Table 8 Potential case study exemplars based on the numbers of characteristics present and phase

Author, year	ICM initiative type	Country/Region	Characteristics present	Phase
Smith et al 2017	EBM	Australia	19	Monitoring/evaluation
Ngoran and Xue 2017	ICM	Cameroon	17	Implemented
Giebels and Teisman 2015	EBM	Netherlands	16	Monitoring/evaluation
Klain et al. 2014	Fisheries	Canada	15	Implemented
Jones et al. 2010	EBM	Canada	15	Implemented
Boumaour et al. 2018	ICZM	Mediterranean and Algeria	15	Implemented
Cinnirella et al. 2014	EBM	Mediterranean	14	Implemented
Ioppolo et al. 2013	ICZM	Mediterranean	14	Monitoring/evaluation

2.4.3 Phases of Operationalization

The second objective of the review was to determine whether, and to what extent, ICM initiatives were being operationalized. Among the empirical cases reporting an applied ICM initiative, 27% reached the planning and development phase, 56% were fully or partially implemented, 15% of case studies had completed the monitoring and evaluation phase and 2% (three case studies in China) reported undergoing at least one iteration of adaptation.

While there are many governance characteristics listed in *the Elements and Characteristics* of ICM framework, commonalities were identified among the initiatives that made the most progress towards becoming operationalized were tallied and characteristics were compared. The most common characteristics shared by these empirical articles were innovative mechanisms (78%), horizontal integration (67%), adequate resources (67%), multiple and balanced objectives (67%), connection to local contexts (67%), and indicators for monitoring and evaluation (67%). This provides further evidence that there are common characteristics for operationalizing ICM initiatives.

2.4.4 Outcomes

Twenty-three percent (19% review, 81% empirical) of authors described specific outcomes, relating to the ultimate objectives, of ICM initiatives. However, upon closer

review, some of the stated outcomes (i.e., the ultimate result of the initiative) were in fact outputs (i.e., results from the process itself rather than the ICM being operationalized). The report of outputs rather than outcomes could help incentivize nations to commit to ICM despite the complexities and difficulties with its operationalization and achieving initial objectives. Few articles referred to outcomes explicitly, illustrating there are not many ICM initiatives achieving initial objectives or progressing past implementation. In the articles where outcomes were referenced, authors tended to describe them quite generically. This indicates that the specific monitoring and evaluation of initial objectives may not be occurring, or that there is limited information on specific outcomes and how they were achieved. Below is a list of instances where outcomes were mentioned.

- Greater participation of local actors (Actors) in decision-making was explicitly mentioned as an outcome from an ICM initiative (Nobre et al. 2017)
- The importance of operational objectives (Qualities) for achieving desired outcomes and objectives (Cormier et al., 2019)
- Reflexivity (Processes) led to broader consideration of sustainability-oriented objectives (Monteiro and Partidário, 2017)
- Various types of knowledge and values (Actors) led to improved solutions for complex problems (Buchan and Yates, 2019)

When a tangible outcome was connected to a characteristic of ICM, it was possible to gain insight into what specific elements or characteristics of governance helped facilitate their achievement. For example:

- Inclusivity and equity (Qualities) leads to a more balanced distribution of benefits (Barnett, 2018)
- Rules that are not considered legitimate (i.e., those externally imposed instead of involving those who are affected by them) (Qualities, Structures) likely affect compliance and outcomes (Nobre et al., 2017)

In some studies, ICM initiative outputs included the development of ICM characteristics themselves. This indicates that the process of ICM (moving through each phase) is perhaps being impacted by the preceding phases, or even more likely that certain ICM characteristics are critical to facilitating others that then assist the initiative progress through subsequent phases.

- Clearly defined governance frameworks (Structures) led to transparency, legitimacy and sustainability of the initiative (Qualities) (Smith et al., 2017)
- “Environments that facilitate communication” (i.e., innovative multi-actor mechanisms that provoke deliberation) (Structures) lead to the co-production of knowledge, collaboration and efficiency (Process, Actors)(Jean et al., 2018, p. 2)
- Formal agreements (Structures) for an initiative can enable decisions to be made collectively by actor representatives (Actors) (Nobre et al., 2017)
- Actors that share common objectives (Qualities, Actors) “will facilitate the design and implementation of an equitable and efficient REDD+ program.” (Qualities) (Aziz et al.,

2016, p. 15). REDD+ is also known as reducing emissions from deforestation and forest degradation program.

2.5 Discussion

This review of 69 primary publications from 2010-2019 reveals that numerous governance characteristics are being discussed in the context of ICM. Most ICM characteristics (Table 6) have been considered both directly and indirectly to some degree, within both empirical and review articles. Further, certain characteristics seem more important than others to the operationalization of ICM. The present study is among the first to attempt to take stock of outcomes that have been achieved from ICM initiatives. Based on the systematic review, the following insights contribute to building an understanding of the importance of governance within ICM.

2.5.1 A combination of top-down and bottom-up engagement is important.

Inclusion of *diverse actor groups and knowledge types* (80% of articles) and *strong, formal structures* (70% of articles) were the most discussed characteristics within the reviewed articles. The high prevalence of these two characteristics implies that state leadership is required alongside robust engagement from Indigenous governments and communities and non-state actors (e.g., industry, non-governmental organizations). Robust engagement may manifest in a spectrum beyond one-way communication to two-way information flows (e.g., through deliberation rather than informing or consulting), memoranda of understanding or more formalized co-governance arrangements. In the United Kingdom, for example, *The North West Coastal Forum* is a regional coastal partnership for actor groups to interact across spatial scales and is considered to be effective for facilitating stakeholder engagement (Buchan and Yates, 2019).

Broadly, the shift from *government to governance* can be seen in combined approaches with the participation of multiple actor groups in oceans governance through shared or multi-level governance arrangements (Rhodes, 1996; Salamon, 2002; Stoker, 1998). As Vodden (2015, 177) states, "actors and institutions at the [coastal] watershed scale can facilitate multi-level relationships offering a middle ground between top-down and bottom-up processes, and among the multi-layered spatial scales of collaborative governance." There remains a need to understand the possibilities and legalities surrounding shared arrangements for ICM and how to determine what balance is most suitable for a given context.

2.5.2 Innovative mechanisms can contribute to operationalizing ICM initiatives.

Mechanisms, e.g., structures or processes, that facilitate horizontal (58%) and vertical (49%) integration were frequently mentioned in the ICM literature review. However, Glaser and Glaeser (2014, p. 2039) points out, a major challenge is "the identification of the cross-level and cross-scale interactions and links which each will play vital roles in shaping coastal and marine social-ecological dynamics and outcomes." Results of the present study similarly show that innovative mechanisms (62%), i.e., non-conventional structural approaches such as self-organized management groups or deliberative fora, may be needed to facilitate these linkages. The inference is that *diverse actor groups and knowledge types* (80%) have a role to play in facilitating and assisting

in achieving integration. For example, ‘shadow’ or informal networks can be effective incubators of novel ideas for governing social-ecological systems as they “can prepare a system for change by exploring alternative system configurations and developing strategies for choosing from among possible futures”(Olsson et al., 2006). This is important as each system searches for an appropriate balance of actor groups within a combined approach. Shadow networks and informal networks often emerge through self-organization of non-governmental actor groups, often challenging the conventional governance regime (i.e., centralized government), which can lead to innovative structures (Olsson et al., 2006; Schmidt, 2017).

Furthermore, among the most operationalized initiatives, commonly shared characteristics were identified. The most prevalent shared characteristic was *innovative structures* (78%) that facilitate a wider consideration of objectives, perhaps through multi-actor committees or fora that enable deliberation and broad-spectrum participation. The overwhelming presence of innovative structures indicates that it is perhaps a precursor to operationalizing ICM initiatives. Examples of innovative structures from the review include integrating Canadian Fisheries Research Network Comprehensive Fisheries Sustainability Framework into Integrated Fisheries Management Plans to facilitate the consideration of diverse objectives, beyond economic and ecological (Barnett, 2018). Another example of an innovative structure is the Australian Ocean Policy, a policy framework that “attempted a significant departure from traditional single-sector management arrangements with its focus on [ICM]” (Smith et al., 2017, p. 3).

2.5.3 There are limited reports of outcomes being realized from ICM initiatives.

Broad and idealized outcomes, such as sustainable coastal and marine SES have not been a focus in the ICM literature as not many initiatives have been entirely operationalized. However, some articles report that intermediate outcomes, or outputs, including transparency, legitimacy, compliance, and co-production of knowledge have been achieved (Nobre et al., 2017, Barnett 2018, Jean et al. 2018). Twenty percent of articles in this review refer to outcomes or outputs, of ICM initiatives in some way. In some cases, outputs were identified and led to, or facilitated, other ICM characteristics. For example, there is evidence that ICM initiatives stimulated the development of partnerships and collaborations and (re)building trust among actor groups (Cormier et al., 2019; Gelcich et al., 2019; Rockmann et al., 2015).

One explanation for the low reporting of outcomes in literature on the importance of governance in ICM initiatives could be that government scientists and managers, which have frequently led these initiatives, have little motivation to publish in peer-reviewed journals. Alternatively, it may be that most recent ICM initiatives have not yet achieved their outcomes or considered the outputs being realized through the process itself. In the few instances where outcomes were reported, their description tended to be vague and the connection of outcomes to governance characteristics was not emphasized. For example, authors claimed characteristics led to a broader consideration of sustainability-oriented objectives (Monteiro and Partidário, 2017) and improved solutions for complex problems (Buchan and Yates, 2019). As well, some characteristics are interconnected so it is hard to determine which, if either, is important to ICM. Understanding the scope of outcomes that are possible to achieve through ICM initiatives is important to show decision-makers

and practitioners the potential benefits. Desired outcomes such as achieving social, economic and ecological objectives while still supporting multiple activities may impact the likelihood ICM initiatives are pursued and supported by authorities and funding agencies. A better understanding of specific actions that can lead to desired outcomes would build credibility and legitimacy for ICM initiatives.

2.5.4 In practice, ICM initiatives appear to stall beyond the implementation phase.

Data analysis supports the claim that progress with ICM has been slow and that few initiatives have progressed past the implementation phase (either fully or partially) (Ricketts and Hildebrand, 2011; Turner and Essex, 2016). This proportion may not be representative of the field of ICM as it only represents the degree that ICM initiatives discuss governance as indicated in article selection criteria. This finding is not necessarily surprising given that ICM initiatives may be still in early phases, not yet making it to monitoring and evaluation, or adaptation phases. As we are beginning to understand ICM as a broader governance approach that includes a range of initiatives, it is crucial to measure and monitor progress to determine if programs are achieving their desired results and outcomes and to scale up what works (PEW Charitable Foundation, 2014). In the context of ICM initiatives, there remains a need for further research and understanding of the phases of monitoring, evaluation and adaptation (iterative learning).

2.5.5 The Elements and Characteristics of ICM framework is useful for unpacking governance.

The framework facilitated the evaluation of recent literature to conclude that there is a general consensus among ICM scholars on certain characteristics that are likely important in achieving ICM. The approach taken in this review to assess the ICM characteristics is similar to the approach taken with the Institutional Analysis and Development (IAD) framework principles for managing a commons (Ostrom, 1990). The IAD framework has been beneficial in measuring success (achievement of desired outcomes) (Baggio et al., 2016; Klain et al., 2014; London et al., 2017; Quinn et al., 2007). The benefit of creating a specific framework tailored to ICM demonstrates the importance of appreciating the interconnectedness of governance and management, and the implications of certain characteristics for outputs and outcomes of initiatives.

Cox et al. (2010) evaluated IAD principles empirically and proposed a reformulation of the principles based on insights from their review. Cox et al.'s (2010) approach was useful and resulted in a revision of the framework by separating primary and secondary characteristics based on prevalence in the reviewed articles as well as by adding leadership (*Actors*) as a new characteristic. Numerous similarities between the primary characteristics listed in the revised framework and 'Principles for Integrated Marine Planning' from Dickenson et al. (2010) as well as the 'Features of Integrated Management' from Stephenson et al. (2019) are noted. Similarities include formal structures, effective inclusion of diverse actor groups/knowledge types, shared vision (strategic), multiple balanced objectives, indicators for monitoring and evaluation (process for ongoing review and learning), and an iterative, reflexive and adaptive process.

Lastly, the *Elements and Characteristics of ICM Framework* could certainly be used to investigate governance dimensions of ICM initiatives in a broad range of socio-cultural, economic, ecological and geographical settings. Although this review focused on more developed nations to fit with the authors' research program, there has been progress within small island developing states and less economically developed country case studies. For instance, there is evidence of ICM characteristics being relevant within the developing state context. For example, connection to the local context (Andrachuk and Armitage, 2015; Corral and Manrique de Lara, 2017), diverse participation, strong legal incentives (González-Bernat and Clifton, 2019), regional-scale boundaries (Osterblom and Folke, 2013), novel governance arrangements (Osterblom and Folke, 2013; Wongthong and Harvey, 2014; Wood et al., 2013) and political will (Wongthong and Harvey, 2014) have been demonstrated through other research.

2.6 Conclusions

A lack of progress in the operationalization of ICM initiatives motivated the investigation into the importance of governance within ICM. A systematic review of the recent ICM literature guided by a framework of governance elements (i.e., qualities, actors, structures, and processes) was performed. The analysis confirmed that ICM scholars are referring to many characteristics of governance when discussing the outcomes of ICM initiatives. Certain governance characteristics appear to be important for ICM operationalization and, relatedly, the extent to which ICM initiatives have been operationalized. The finding that relatively few ICM initiatives have been operationalized suggests that governance characteristics need to be more closely considered upfront when ICM initiatives are being planned. Doing so could amplify opportunities for other characteristics to emerge, increasing chances for the initiative to succeed. To this end, evidence of outputs and outcomes that have been achieved from ICM initiatives were provided. Some characteristics, such as inclusion of *diverse actor groups and knowledge types* and *formal structures* are more frequently discussed than others. As far as identifying the prevalence of codes, that coincide with the significance of ICM characteristics, ICM in practice will continue to improve moving forward.

Based on the results of the review, it would appear that some governance characteristics should be prioritized over others when operationalizing ICM initiatives. These are meaningful inclusion of diverse actor groups and knowledge types; formal structures; innovative mechanisms. The main insights generated by the systematic review suggest the following:

- A combination/balance between top-down and bottom-up involvement is important.
- Innovative structures contribute to operationalizing ICM initiatives.
- There are limited reports of outcomes being realized from ICM initiatives.
- In practice, ICM initiatives appear to stall beyond the implementation phase.
- The Elements and Characteristics of ICM framework is useful for unpacking governance.

This research contributes to an emerging understanding of how to govern for positive sustainable coastal and marine social-ecological system outcomes. These

findings have implications for how we set up governance to achieve management objectives and successfully operationalize ICM. For ICM initiatives to succeed, overarching governance will likely need to adjust in many contexts. For example, formal and innovative new structures that facilitate horizontal and vertical linkages need more attention to build momentum for integrated approaches (e.g., within various branches of government, involving the active participation of both government and non-state actors, including structures that create a clear expectation of roles and mechanisms to achieve ICM).

The *Elements and Characteristics of ICM* framework facilitated the analysis of governance within the ICM literature, specifically relating to ICM initiatives. This research developed and used the framework to unpack ICM as governance to better understand the current state of literature and practice. A review of recent ICM literature confirmed the relevance of using a framework to unpack governance elements concerning ICM and revealed the additional characteristic of leadership to be important. The *Elements and Characteristics of ICM* framework may have a practical application in the design and monitoring of future ICM initiatives and may also contribute to standardizing information that is most relevant when sharing lessons and comparing initiatives across a variety of contexts. Future research could focus on whether more than one governance characteristic is needed to reach a particular outcome, other characteristics, or clusters of characteristics. Understanding the link between characteristics and outcomes could provide further evidence that some ICM characteristics are more critical than others –either because they directly achieve desired outcomes, or they help achieve other characteristics relevant for operationalizing ICM initiatives. These insights may be helpful to governance scholars, elected officials, managers and practitioners who find themselves juggling multiple incentives and activities in coastal and marine spaces. The success of this analysis of governance in ICM suggests that more detailed evaluations of the relationships among governance characteristics are needed. Gaining a better understanding if core governance characteristics correlate with particular phases of ICM as well as the resulting outputs.

Chapter 3

Integrated Coastal and Marine Management: Insights from the Bay of Fundy, Atlantic Canada

3.1 Introduction

This research explores critical challenges for implementing integrated coastal and marine management (ICM) initiatives. Specifically, the lived experiences with ICM initiatives across a diverse set of actor groups (e.g., government and Indigenous authorities, civil society, non-governmental organizations) were unpacked to better understand the scope of governance challenges. The Bay of Fundy (Canada) was selected as a regional case study due to increasing human activities and a long history of previous efforts towards ICM. In the Bay of Fundy, as in many other regions, sector-based or ‘siloes’ management strategies as presently practiced constrain the ability to effectively manage complex coastal and marine social-ecological systems (SES).

Limitations of a siloes management style include the following: (1) the lack of consideration of cumulative social and ecological impacts from human activities (Sinclair et al., 2017; Stephenson et al., 2017, 2019; Xue et al., 2004); (2) inadequate consideration of human dimensions of coastal and marine social-ecological systems (SES) (Carpenter et al., 2009; Perry, 2011); (3) conflicts between resource users; (4) loss of biodiversity and ecosystem services (i.e., decline of valued resources and environmental degradation) (Crain et al., 2008; OECD, 1993); (5) privatization of ocean space and access (Bennett, 2018), and; (6) unjust trade-offs (Ritchie and Ellis, 2010; Stephenson et al., 2019).

Coastal and marine area activities are growing in number and size. As a consequence, practitioners, managers, and researchers have called for human activities to be assessed and managed across sectoral and disciplinary boundaries (Lloyd et al., 2013; Portman, 2011; Smith and Jentoft, 2017; Stephenson, 2012). Many nations have also recognized the value of integrating management through various policy arenas (e.g., Canada’s Oceans Act, the European Union’s Marine Strategy Framework Directive, Australia’s Ocean Policy).

ICM is an overarching governance concept, which provides a mechanism to transition from sector-based siloes towards a more holistic and equitable consideration of values, interests and activities (see Foley et al., 2010; Sainsbury and Sumaila, 2003; Visbeck, 2018). Integration has also been described as coordination across and between horizontal dimensions (actor groups, sectors and activities) and vertical dimensions (levels of government, management jurisdictions and geographical scales) of SES (Cicin-Sain, 1993; Cormier et al., 2019; Sorensen, 1997). Despite global efforts to achieve ICM in some form, few ICM initiatives progress past the planning phase on to implementation, evaluation and monitoring, and even fewer advance to subsequent, adaptive iterations (Buono et al., 2015; Ye et al., 2014).

There is growing evidence that the failure of many ICM initiatives to progress past the planning phase may be a consequence of a ‘governance gap’ or, rather, the inability of governing regimes to achieve integration within current institutional

structures (Kelly et al., 2019; Link and Browman, 2017; Ngoran and Xue, 2016; Rodriguez, 2017). The literature has begun to acknowledge the importance of governance in facilitating management initiatives and in helping to support their success (Kelly et al., 2018; Kirschke and Newig, 2017). Governance is the overarching context that steers and coordinates actor groups in society to make decisions that direct and guide management (Bennett and Dearden, 2014; Folke et al., 2005; Fukuyama, 2016). Management, therefore, typically involves “the operational decisions taken to achieve specific outcomes” (Armitage et al., 2015, p. 240; Bennett and Dearden, 2014). Many organizations and practitioners use governance and management interchangeably to refer to the context within which their initiatives (i.e., programs, policies, projects) exist (de la Torre-Castro, 2012; Muthiga, 2009). The various ways governance is conceptualized, both as modes or arrangements (e.g., hierarchical, polycentric, collaborative, network governance) and as elements (i.e., qualities, formal and informal structures, actors, processes) are noted.

This chapter focuses on the Elements of Governance (e.g., qualities, structures, actors, processes) to investigate the critical challenges faced in operationalizing past and current ICM initiatives. ICM initiatives work towards some degree of integration. Examples include marine spatial planning; integrated coastal zone management; ecosystem-based approaches; marine protected area networks; other area-based conservation measures; and management tools and integrated fisheries management plans. ICM initiatives also incorporate a diverse range of responses from a committee to policy to, finally, a plan or program that seeks to advance the overall objective of ICM.

Initiatives are often initiated by management in response to predicted or experienced undesirable social or ecological system changes such as conflicts between stakeholder groups for resources and access, or decline in valued resources (e.g., fish species, habitat, or services) (CBD, 2004). The success of these initiatives, and the achievement of their broader ICM objectives relating to social and ecological system sustainability, depends on an inclusive and integrated operationalization strategy.

3.1.1 Empirical Context

The current governing regime of coastal and marine SES in Canada remains sector-based despite progressive efforts to achieve integration through the Oceans Act (Oceans Act, 1996; Stephenson et al., 2019). The Oceans Act is a formal structure which tasks the Minister of Fisheries and Oceans, in collaboration with other agencies, to promote the integrated management of marine resources and to move beyond a fractured regime (i.e., where transport, fisheries, recreation, conservation, and resource development are coordinated through separate agencies). The Bay of Fundy can be used as a case study to explore progress and experiences regarding ICM initiatives as it is a site of past and current experiences. In doing so it is important to acknowledge the added complexity of the Bay of Fundy context. For instance, in addition to the Canadian Federal Government being responsible for marine areas and resources, New Brunswick and Nova Scotia Provincial Governments have jurisdiction of the coast and nearshore areas. The United States of America at the mouth of the Bay adds further challenges for governance and subsequent management. Moreover, Indigenous governments have the right to be

consulted as an authority on both coastal and marine activities as Aboriginal titles within the Maritime Provinces have never been ceded (Hamilton, 2016; Newman, 2017).

ICM, or integrated coastal and oceans management (ICOM), is referenced in the Oceans Act to promote promotes the integrated management of oceans and marine resources;” (Oceans Act, 1996, p. 1) and

The Minister,..., shall lead and facilitate the development and implementation of plans for the integrated management of all activities or measures in or affecting estuaries, coastal waters and marine waters that form part of Canada or in which Canada has sovereign rights under international law (Government of Canada, 1996, Article 29, p. 15)

Subsequent documents provide principles and operational directions for managers and bureaucrats to work towards integrated management of Canadian coasts and oceans. As outlined in Canada’s Oceans Strategy (*Policy and Operational Framework for Integrated Management of Estuarine, Coastal, and Marine Environments in Canada*, 2002), integrated management is presented both as a management initiative and as a governance coordination structure. Canada’s Oceans Strategy (2002, p.26) acknowledges implications for the

[C]oordination of government policies, regulatory approaches and management actions, the building of vertical and horizontal linkages to achieve more collaborative and balanced decisions, as well as agreed mechanisms for problem -solving in support of consensus-based planning and decision-making

Canada’s Oceans Strategy also recognizes a range of approaches used to accomplish its goals including multi-actor advisory and formalized management bodies, including co-management.

Since the promulgation of the Ocean’s Act in 1996, efforts towards ICM have been limited and have largely stalled (Jessen, 2011; Marshak et al., 2017; VanderZwaag et al., 2012). Early experience with ICM initiatives in Canada included a pilot project to create integrated marine plans through large ocean management areas (LOMAS). Lessons from these experiences are found in academic, practitioner, and government literature. Since the early 2000s, practitioners and researchers alike have indicated that limitations to the LOMAs are often related to governance (Guenette and Alder, 2007; Kearney et al., 2007; Office of the Auditor General, 2005). In particular, the ‘paralysis’ attributed to ICM is thought to be a consequence of a lack of priority given by the federal government (Ricketts and Hildebrand, 2011). This has been ascribed to the enabling and non-regulatory nature of the Oceans Act and its deficient prescription (Bailey et al., 2016; Hutchings et al., 2012; Jessen, 2011; Ricketts and Harrison, 2007).

The Bay of Fundy in Atlantic Canada is an ideal context to further examine ICM as the region is experiencing an increase in anthropogenic pressures. This region also has previous experience with promising initiatives that are considered to be integrated in some way (e.g., Atlantic Coastal Action Program, Coastal CURA, Region Ocean’s Plan). Human activities in the Bay of Fundy include renewable energy research and development in Minas Basin, Minas Passage and Digby Neck; coastal development; shipping lane expansion, potential pipeline construction in the Saint John Harbour area;

tourism; a multitude of fisheries, and; industrial aquaculture (see Figure 9) (Sinclair et al., 2017; Stephenson et al., 2017). Pressures of human activities can cause some undesirable impacts as values and cultures are closely tied to the coastal and marine space. Ecological impacts include habitat degradation (e.g., coastal marshes and mudflats) and stress on species at risk including the inner-bay Atlantic salmon (*Salmo salar*) and the northern right whale (*Eubalaena glacialis*) (Sinclair et al., 2017). As seen in Figure 10, many areas in the Bay of Fundy are ecologically significant or protected.

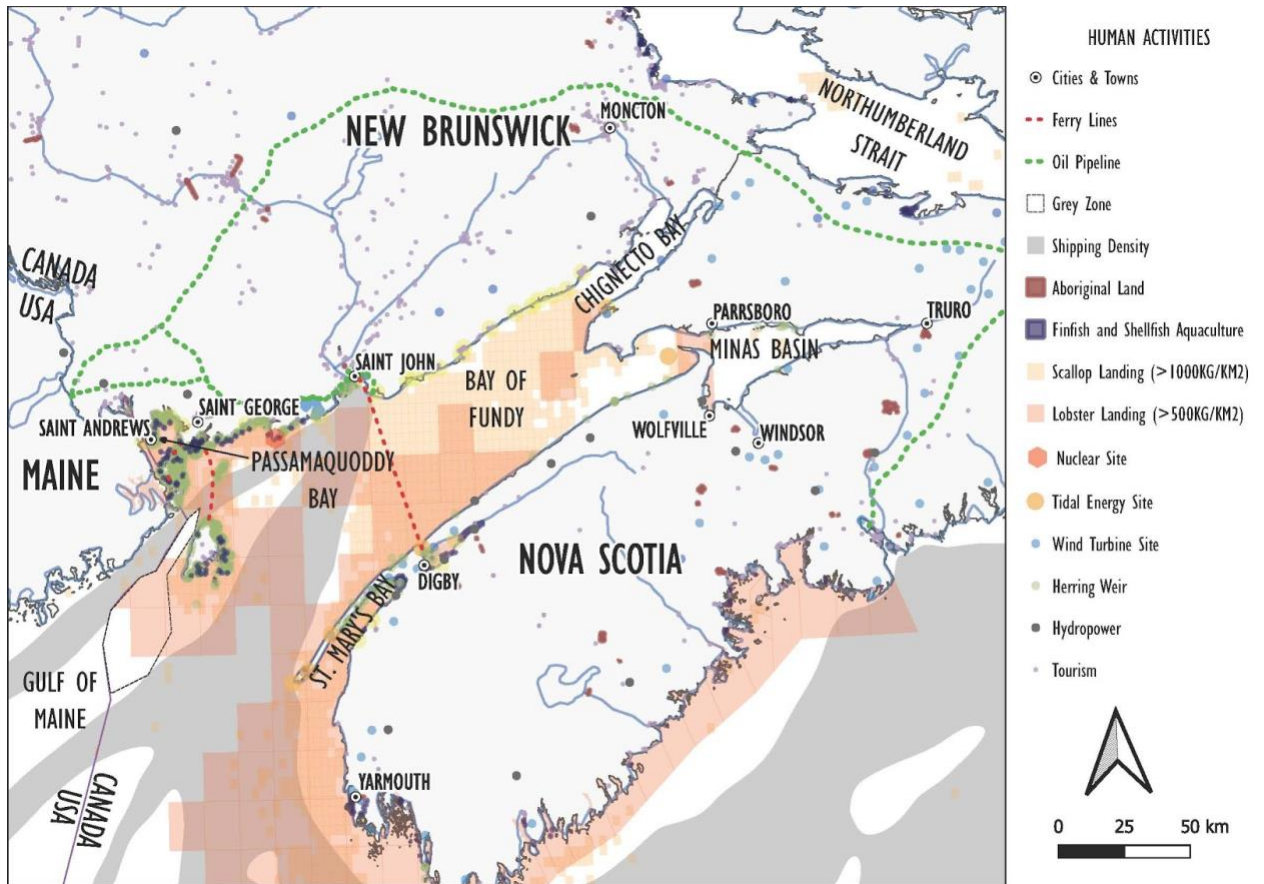


Figure 9. Human Activities in the Bay of Fundy

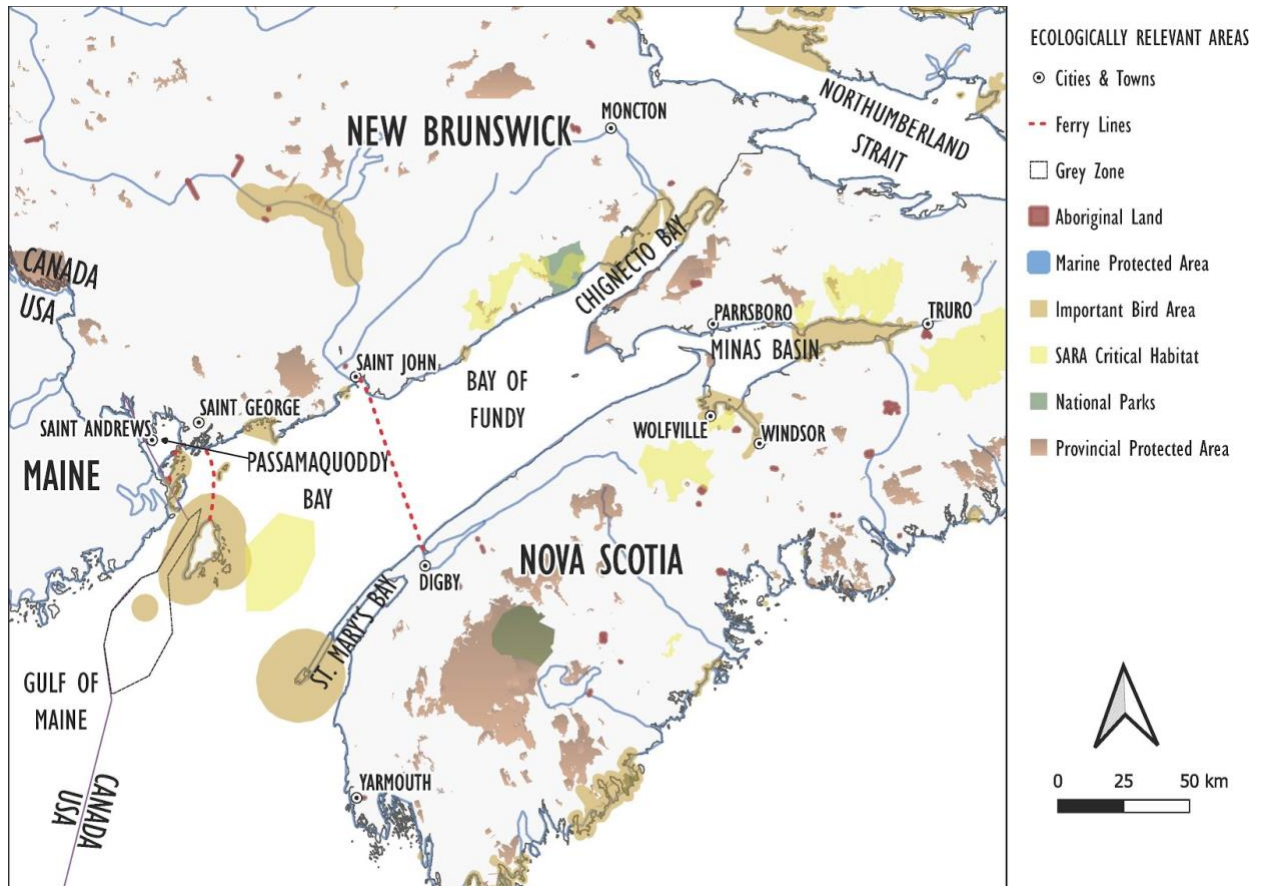


Figure 10. Ecologically relevant areas in the Bay of Fundy

Although often unintentional, social concerns include limited or lost access to coastal and marine areas (e.g., displacement of local fishing by salmon aquaculture, privatization and consolidation) (Bennett et al., 2018; Wiber et al., 2010). The lack of jurisdictional clarity in the ‘grey zone’, Lobster Fishing Area 38B, due to border disputes between Canada and the USA has also caused transboundary tensions (Walters, 2007). Additionally, young people leaving rural areas in pursuit of jobs and higher education has created a shift in community dynamics (Ommer et al., 2007). Because of these undesirable outcomes, conflicts among actor groups have arisen and spurred the recognition of the importance of considering social-ecological systems as linked. Given this understanding, integrated approaches that seek to mitigate negative cumulative effects and inequitable trade-offs are essential.

The following sections describe an analytical framework used to unpack the ‘governance gap’ within ICM; the methodological approach taken in the Bay of Fundy; the resulting emergent themes from semi-structured interviews; and, implications for future integrated efforts. Critical governance challenges are revealed and possible actions to better support ICM initiatives within the Bay of Fundy context, and other geographical areas with similar problem contexts and activities, are suggested.

3.2 Methods

3.2.1 Elements of Governance: a proposed analytical framework

Many ICM initiatives have been neither easy nor straightforward which has resulted in the initiatives not becoming operational and thereby failing to meet initial goals (Glavovic, 2016; Levin et al., 2013; Smith et al., 2017). Research relating to ICM has evolved substantially over the past few decades (Birch and Reyes, 2018). Specifically, references to governance challenges are becoming more prevalent (e.g., Kelly et al., 2019; Kelly et al., 2018; Sander, 2018; Stephenson et al., 2018; Stephenson, Wiber, et al., 2019). Both scholars (e.g., Douvère, 2008; Olsen, 1996; Taljaard et al., 2012) and organizations (e.g., World Bank, Global Environment Facility, IUCN, CBD, UNEP, UNESCO) alike have produced principles, guidelines, and frameworks for operationalizing ICM initiatives in practice; however, none have been widely accepted. Based on the general approaches in these guidelines, and as seen in the adaptive management cycle, ICM is cyclical and iterative (Gunderson and Holling, 2002) and operationalization includes the following sequence of phases: planning and development, implementation, monitoring and evaluation, and adaptation (Ehler, 2003; Olsen, 2002).

Given the scope of this paper, and to further investigate the idea that governance is the main impediment to operationalizing ICM initiatives, the review of the literature is limited to seminal and recent works engaging with Elements of Governance needed to achieve integration within SES. Here, governance is disaggregated into its elements (i.e., qualities, actors, structures and processes) as they capture common dimensions of governance expressed by scholars (e.g., Stoker 1998, Lebel et al. 2006). Although there are numerous frameworks proposed for unpacking environmental governance (Bennett and Satterfield, 2018) and social-ecological system sustainability (Gibson, 2017), existing frameworks are incomplete for addressing governance with the ICM context. Therefore, the Elements of Governance--the framework used in this study—was constructed based on findings of an initial scoping review and subsequently used and refined in a systematic review of the literature (Table 10). Seminal papers highlighting ICM characteristics include Sorenson (1997), Ehler (2003), Stojanovic et al. (2004), Gilliland and Laffoley (2008) and Dickenson et al. (2010). The Elements of Governance and their characteristics inform semi-structured interview protocol and data collection to conceptualize governance within the Bay of Fundy case study.

Table 9 Elements of Governance

	Description	Characteristic examples	References
<i>Qualities</i>	Overarching concepts, values or principles that are grounded within other Elements of Governance	Good governance values (participatory, accountable, transparent, responsive, equitable and inclusive, etc.); precautionary; balanced objectives; strategic vision	Kemp et al., 2005; Kooiman et al., 2005; Lebel et al., 2006; UNDP, 1997; Gibson, 2017; Lockwood et al., 2010
<i>Structures</i>	Formal (i.e., laws, regulations, legislation, policies) and informal (i.e., norms, relations, behaviours, interactions) networks and institutions that structure the way people interact with each other and the environment	Horizontal and vertical linkages; clear, strong formal structures; innovative structures	Cortner et al., 1998; UNEP/CBD, 2006; Carpenter et al. 2013;
<i>Actors</i>	Individuals and organizations from local to global scales who have a stake in coastal and marine resources, who participate in governance processes or who currently work within the governance process	Meaningful inclusion of diverse actor groups and Knowledge types; capacity building; common vision;	Biermann et al., 2010; Vallejo and Hauselmann, 2004; Kooiman et al., 2008; Newell et al., 2012; Perry et al., 2010
<i>Processes</i>	Range from actor engagement to implementing policy, plans and programs and how to adapt them given new information	Early and ongoing engagement; monitoring and evaluation; conflict management; learning; adaptive	Stojanovic and Ballinger 2009; van Rijswijk 2014; Ostrom 1990;

3.2.2 Approach and Analysis

This qualitative research used semi-structured interviews to identify challenges to operationalizing ICM initiatives using actor experiences within the Bay of Fundy. As recommended for environmental research, a preliminary stakeholder map was created to assess the scope and understand the context and actors within the Bay of Fundy such as who has the authority and who is being impacted by decisions before conducting interviews (e.g., Almutairi et al., 2019; Cvitanovic et al., 2016; Ginige et al., 2018). Additionally, stakeholder mapping helped guide recruitment for study participants (Mitchell et al., 1997).

Following the stakeholder mapping exercise, snowball sampling began with 2-3 key actors identified through previously known ICM initiatives. Participants were limited to those identified through snowball sampling with experience and interest in past or future integrative management initiatives in the Bay of Fundy for professional, personal, or cultural reasons. Participants were not necessarily representative of various actor groups and spoke about ICM from their own perspectives.

As a result of snowball sampling, participants included in the study were affiliated with the following groups: engaged citizens; local industry such as traditional and aquaculture fish harvesters, processing plant staff, fishers associations; provincial and federal government authorities including forestry, energy and fishery departments; First Peoples organizations and authorities; and, environmental non-governmental organizations. A summary of the research participants can be found in Table 11.

Table 10 Summary of research participants (n=68)

Actor Group	Number of Participants
Resource User	4
Engaged Citizens	4
Non- governmental Organization	13
First Peoples Groups/Authorities	5
Provincial Authority	11
Federal Authority	9
Municipal Authority	2
Private- Research/Consulting	6
Private - Industry	4
Academia - Content Expert	5
Academia- Partner	5

Elements of the governance framework were used to frame the authors’ thinking and focus the study. The framework guided the semi-structured protocol focused on each participant’s experiences with ICM initiatives by probing for responses relating to the various Elements of Governance: qualities, actors, structures and processes. Sixty-eight interviews were conducted between May and August of 2018. Interviews were audio-recorded then transcribed using TEMI online automatic transcription software. Transcripts were then reviewed for accuracy, summarized and sent to participants for verification.

Lessons learned from previous ICM experiences were identified using thematic analysis of the participant semi-structured interviews. Thematic analysis was selected for “identifying, analyzing and reporting patterns (themes) within data and provid[ing] a descriptive and nuanced account of the data” (Braun and Clarke, 2006, p. 79). QSR NVIVO software was used to organize data, code interview transcripts, and facilitate qualitative thematic analysis of interview data (Guest et al., 2011; Yin, 2016). This was done using an evaluation coding style during the first round of coding (as described in Saldana, 2012), meaning codes were first grouped at the conceptual level into broad categories from the Elements of Governance framework (e.g., qualities, actors, structures, process) and subcategories (Table 12) to synthesize participants’ experiences with ICM initiatives (Merriam, 1998; Stake, 1995).

Table 11. Outcomes of analysis using the 'Elements of Governance' as an initial coding framework

Elements of Governance	Examples of emergent subcategories
<i>Qualities</i>	<ul style="list-style-type: none"> • Little connection to local contexts • Objectives/Purpose • How was the initiative catalyzed? (e.g., proactive/reactive) • Resources (e.g., were they sufficient?) • Staff/Support (e.g., paid coordinators, volunteers, part of job) • Types of knowledge/expertise considered
<i>Actors</i>	<ul style="list-style-type: none"> • Who was a part of the initiative (e.g., was anyone left out, what was the role of local actor groups?) • Who had an influence (i.e., authority, power dynamics)? • Capacity • Access and availability to participate, representation • Who supported the initiative (e.g., was there political will or government buy-in, what local actor groups participated)? • What were the different incentives?
<i>Structures</i>	<ul style="list-style-type: none"> • Formal institutions (i.e., legal basis) • Informal institutions (i.e., rules, norms) • Multi-actor groups (i.e., steering committees, advisory boards, etc.)
<i>Processes</i>	<ul style="list-style-type: none"> • How are actors being engaged? • Is conflict considered/mediated? • Evidence of adaptation, iterations or learning from experience • Business as usual/status quo

Subsequent rounds of coding functioned to iteratively organize subcategories into emergent interconnected themes and subthemes (Appendix D) focusing on common, recurrent ideas relating to lessons and challenges (Palys, 1992). Upon multiple iterations of reviewing the data from different perspectives and following the analysis protocol, common meaning and patterns emerged among the subthemes.

3.3 Results and discussion of critical ICM challenges

This section explains the emergent ideas from the thematic analysis that considers the Elements of Governance Framework more broadly and highlights some of the interrelatedness. Descriptive results from the interviews are first presented followed by a description of critical challenges (themes) that resulted from the iterative analysis. Illustrative quotations from participants are used to support the following critical challenges identified in the Bay of Fundy:

- inconsistent commitment from legal authorities;

- inadequate capacity to sustain initiatives;
- inappropriate engagement of diverse actor groups;
- poorly supported informal structures and processes for horizontal integration;
- insufficient vertical integration of policies.

Despite numerous examples of local efforts to drive and sustain ICM initiatives within the Bay of Fundy, little evidence exists of ICM being fully operationalized. The 68 semi-structured interviews elicited experiences from participants across 60 initiatives they considered to be integrated in some way and relevant to the Bay of Fundy either directly or indirectly (Appendix E). Examples of local efforts include organizations that embody various types of integration and that include members from the Bay of Fundy area or that conduct efforts and events within or are relevant to the region. Additionally, some initiatives mentioned are policy measures, programs, or groups that value and practice integration and impact the Bay of Fundy.

Given the different ways to conceptualize integration and ICM, there are many ways ICM initiatives have been employed and differing degrees to which a specific type of integration was an objective. For example, initiatives varied in scale, in focus (narrow vs broad), in who was leading them (provincial or federal government 38%, civil society, NGOs or industry 28%, multiple 33%), and ranged from being practical to aspirational and proactive to reactive. All initiatives mentioned, however, were largely, if not completely, reactive in the sense that they sought to address existing conflicts between actor groups (e.g., the tidal energy sector and traditional fishers in the Minas Basin), among activities (e.g., aquaculture, herring fisheries and conservation in South Western New Brunswick), or arising from the recognition of negative cumulative impacts (e.g., North Atlantic Right Whale deaths, wild salmon declines, alewife food fishery collapse, contaminated shellfish, lobster deaths, marine debris). Almost a third of initiatives mentioned through interviews had already ended or stalled (28%) and a few initiatives (10%) have been proposed or are forthcoming. Most initiatives focused on ecosystems as a whole (57%), while others focused on fisheries (21%) or other issues (22%) including aquaculture, transport, renewable energy and Indigenous communities. These findings indicate many ICM initiatives are being tried, but Elements of Governance are missing to support the full operationalization of initiatives.

3.3.1 Inconsistent commitment from legal authorities

The largest challenge for ICM initiatives, as identified by participants, is inconsistent and unsustainable buy-in from leaders resulting in an unsustained commitment from legal authorities over time (i.e., provincial and federal government departments). These challenges impact all Elements of Governance and all phases of operationalization. The current governing regime gives ultimate decision-making authority to ministers who set new mandates, priorities, and commitments. This results in an uncertain and historically unsustainable commitment to ICM. In the Bay of Fundy, staff and mandate changes as well as conflicting objectives between departments have prevented sustained buy-in and participation from authorities. These mandates change

with the electoral cycle and the political landscape. Priorities and political will can be heavily influenced by external drivers such as international agreements (e.g., Convention of Biological Diversity conservation targets). Conflicting jurisdictional priorities (such as between provincial and federal agencies) can also influence priorities.

Without commitment, ICM initiatives have little ability (authority or capacity) to impact day to day behaviours and operations within governing and regulatory agencies. Commitment can be in the form of a mandate, memorandum of understanding, or collaborative agreements. For example, one interviewee noted: "You kind of have to talk to the people that are regulated in the first place because you asked them to implement a management measure that cannot be implemented in the daily operations of what they do" (Participant 23, 2018). With the final say being dictated by authorities, the security of ICM initiatives over time is uncertain. One participant offers the following comparison when talking about commitment and capacity (especially financial) provided by a government department on an initiative they are working on: "when you are dancing with a bear, it's not you that decides when to stop" (Participant 8, 2018). Lack of commitment is further driven by international, national and provincial political agendas. Participants from both local and regional scales suggest that there needs to be a strong formal governance structure to ensure ICM is a priority over time: "an ICM initiative requires a long-term commitment of time and resources." (Participant 46, 2018).

Long-lasting institutional instruments that can withstand political change are recognized as important, but can take much longer than a political cycle to operationalize. As González-Bernat and Clifton (2019) found, the presence of political will should support participatory and legal incentives concerning the management initiative. A sustained commitment, and cooperation, from government leaders, is essential to the success and sustainability of ICM initiatives (Christie, 2005; Office of the Auditor General, 2005; Rutherford et al., 2010). Additionally, agencies must be prepared to, and capable of, implementing integrated strategies. Future research surrounding organizational readiness to lead and carry out innovative strategies would be helpful to reduce challenges surrounding the capacity of lead agencies. As stated by Peterson et al. (2005, p. 58), "The department's [DFO] current organizational structure is quite reflective of the specialization orientation and is likely to shift only slowly to reflect the integrated approach." For the Bay of Fundy and Canada, it would be prudent to evaluate organizational capacity to assess areas in which capacities need to be built. Additionally, action should be taken to ensure agencies are becoming more capable of implementing ICM as well as to strengthen formal structures for long-lasting commitment to ICM from legal authorities.

3.3.2 Inadequate capacity to sustain initiatives

ICM capacity challenges are extensive and broadly inter-related but most relevant to the *actors* element of governance. Participants frequently referred to challenges relating to capacity, including limited expertise (e.g., natural and social sciences methods and considerations, engagement and facilitation skills), insecure funding and resources, the lack of dedicated staff for administration, coordination and engagement and insufficient knowledge of the system (across social, ecological, cultural objectives). Local knowledge

(e.g., cultural and environmental) is vital to understanding the context within which ICM initiatives are taking place. According to one source, stakeholder participation is viewed by some, “as valuable or as influential or more influential than the hardest science” (Participant 54, 2018). Despite being critical, local perceptions and contributions are often overlooked by those leading engagement processes. One fisher shared he felt perceived and underestimated by other actors, “They only see the redneck. They don't see the wisdom” (Participant 36, 2018). Another participant summarizes the capacity challenge:

A key element here that needs to be put in place is that we have no institutional capacity, or institutional resource, to help build capacity in communities and organizations, to be able to fully engage around these things. To be able to play a meaningful role in shaping your destiny as a community you need to have the sort of human capacity to do that... the issue of capacity, to organize effectively is the biggest stumbling block of all (Participant 62, 2018)

Further, without dedicated staff, ICM initiatives in the Bay of Fundy have largely relied on local citizens or champions (often inspired bureaucrats), who help organize and administer meetings and activities, but only in a volunteer capacity or as a side interest. As one participant noted, "one thing we have learned [with regards to] partnerships for MPAs, like education and outreach, is the government doesn't really have a mandate for that, and it's always off the side of our desk" (Participant 45, 2018).

In the case of participating in ICM initiatives in a volunteer capacity, participants identified that burnout and participation fatigue can become an issue and expressed frustration, exhaustion and skepticism when recalling their experiences, with some that went on for as long as a decade. In the Bay of Fundy, volunteer fatigue and an ever-changing succession of champions (leadership) were perceived as being a threat to the sustainability of the ICM initiative by numerous participants across resource users and academia. For example, champions included committed fishers and civil society members who constantly prioritized ICM initiative, often losing money at their own business to commute to and attend meetings. In some instances, the funds of these champions were used to support the ICM initiative or collaborative work with others to sustain it. When these champions retired, passed away, or moved the ICM initiative suffered or stalled as in the Minas Basin Working Group).

Similarly, several participants expressed that chasing funding often required significant time and resources only to obtain short-term funding related to particular government programs of the day. Nevertheless, the effort can be worthwhile. Debris-Free Fundy, for instance, gained a paid full-time coordinator and has been able to see small-scale positive changes from their work. These positive changes include reducing the amount of single-use plastic used in coastal community businesses, empowering residents and schools to engage in plastic-free challenges, removing abandoned fishing nets and ropes (termed ghost gear) from the Bay of Fundy and preventing the discarded fishing line from entering the marine system.

Regardless of who catalyzed or led the ICM initiatives, the initiatives were susceptible to ‘boom and bust’ cycles as both provincial and federal governments change frequently depending upon the political climate, and mandates often change with every

electoral cycle (<4 years), making it challenging to ensure sustained buy-in and safeguard resources.

Capacity-related challenges such as funding (Foster et al., 2005; Glavovic, 2016) and staff resources (McKinley and Ballinger, 2018; Sowman and Malan, 2018) can prevent ICM initiatives from being operationalized in their entirety. The lack of adequate support around implementation (McKinley and Ballinger, 2018), sectoral capacity constraints relating to ICM (Taljaard et al., 2019), inadequate institutional capacity (Sowman and Malan, 2018) and lack of capacity in coastal science and management (UNEP/CBD, 2005) are also reported as challenges to ICM in the literature.

3.3.3 Inappropriate engagement of diverse actor groups

The interviews revealed three aspects of disengagement: decisions are happening away from the local context; not all actor groups have been recognized as relevant stakeholders or have been engaged either inappropriately or ineffectively in decision-making; and, if actors are engaged in decision-making, it's not being done meaningfully (i.e., fails to support two-way communication).

Many decisions relating to the Bay of Fundy for government programs or businesses occur away from the local context. While a growing number of coastal and marine activities in the Bay of Fundy are bringing positive economic benefits (e.g., aquaculture, fisheries harvesting and processing, and renewable energy), the trend is for business' administrations to leave the region. This exodus results in consolidation, a loss of jobs and loss of connection to the impacted area. For example, local markets have no fish to sell because it is all exported (e.g., Participant 5, 2018) and owners are operating from other cities, provinces, or countries (e.g., Participant 31, 2018). The desire of businesses to connect with local communities was echoed by local participants who believe that more opportunities for actor groups to deliberate and share perspectives, incentives, values and objectives (i.e., enhanced engagement) would help decision-makers to connect more meaningfully with the local context. For example, a senior bureaucrat commented: "Communities want jobs and to grow, and for young people to stay, but they are also worried about the activity and how it will impact their environment and their way of life. The industry needs to be integrated into communities, it's good business practice" (Participant 65, 2018).

Historically, not all actor groups have been recognized as relevant stakeholders; neither have they been engaged either appropriately or effectively. Specifically, local actor groups, such as resource users and citizens, who are experiencing the effects of decisions, have often been marginalized, have not had a clear role or have had little influence on ICM initiatives. The results have been a lack of democratic voice, failure to adequately consider local context and diverse (non-scientific or ecological) knowledge, inequitable trade-offs with activities and actor groups, conflicts between resource users, and lack of trust.

Research participants gave many examples of inadequate recognition of actors. A private consultant who has worked in the Bay for decades noted that "Industry and government have just gone ahead with whatever development they wanted to, without

considering the implications to people's health and livelihood as well as the history and lifestyle that people have grown up with" (Participant 60, 2018). One participant from the NGO sector remarked on the resulting feeling communities are left with after they have been 'engaged': "there's, unfortunately, a bit of skepticism, fatigue, they're jaded about the process of providing their input only to have it go nowhere" (Participant 67, 2018).

Moreover, the timing and types of engagement strategies being used are not always appropriate for the context or the actor group *being engaged*. For example, most engagement strategies are led by authorities as part of a legal obligation to 'consult' with First People's organizations and small-scale fishers or fishing associations. However, engagement frequently occurred after a decision had already been made or involved only one-way information flow considered education, outreach, or even as a participatory process. One participant recalls how they reacted at a local meeting, where she had expected to contribute a personal perspective, only to find out that the meeting did not allow for deliberation: "Why did you ask us here? This isn't a consultation. This is a lecture" (Participant 37, 2018). Many participants referenced one case in particular where local actor groups expressed their discontent with an unsatisfactory 'consultation' process. In 2017, The Bay of Fundy Inshore Fishermen's Association put up a billboard to protest the way tidal turbine research and development in Minas Basin was being carried out (Maclean, 2017). The general impact of inadequate engagement is a lack of trust between actor groups.

Ensuring the comprehensiveness of actor groups and knowledge is increasingly being shown as imperative within coastal and marine governance processes and decision-making, not only to ensure democracy and environmental justice but also to consider trade-offs and to connect to local contexts (Bennett, 2018; Flannery et al., 2016). The challenge in realizing this, however, is not unique to the Bay of Fundy. It feeds directly into the debate around re-democratizing ICM initiatives to avoid undue influence of powerful actors on decisions/agendas and to be more relevant to the local scale and in-line with local values (Flannery et al., 2016, 2019; Flannery and Cinnéide, 2012).

3.3.4 Poorly supported informal structures and processes for horizontal integration

In the absence of leadership from federal authorities, there has been a surge of informal efforts towards various aspects of integration surrounding the Bay of Fundy. 'Informal' here means not initiated or led by legal authorities or connected to the 'call for ICM' from Canada's Oceans Act (1996), but rather efforts that were opportunistically and loosely connected to other mandates or driven by bottom-up approaches from actor groups other than government agencies. Such informal efforts have taken the shape of innovative, multi-actor structures (e.g., committees, advisory, or coordination groups) that coordinate across objectives and feed into ICM initiatives despite being set up for another, narrower purpose (e.g., Bay of Fundy Ecosystem Partnership and Marine Resource Center were set up for information exchange). Even though informal ICM initiatives rarely fulfilled their original purpose, or even made it to the planning or implementation phase, these innovative, informal structures have been responsible for much of the 'success' or desired outcomes experienced with ICM in the Bay of Fundy. For example, bringing diverse actor groups together has contributed to building

relationships, creating future partnerships, deliberating about objectives and sharing different values and perspectives (Chapter 3). As a result, these informal structures and processes have functioned to build trust between actor groups and create a forum for conflict mitigation and mediation.

As with many of the integrated initiatives mentioned by participants, the informal, integrated initiatives and organizations were often ‘championed’ (driven or sustained) by individuals who had the foresight, openness and motivation (e.g., funding, connections, willingness to try something new) to push beyond the status quo. Champions have largely included local actors being involved with or being impacted by decisions or other activities and want to improve their circumstances. At times, champions have also been bureaucrats who have a mindset for some type of integration (e.g., systems thinking, equity and trade-offs) and the interconnections between activities (e.g., Atlantic Coastal Action Program). Further evidence of innovative and informal structures catalyzed by government agencies in the Bay of Fundy include the Regional Committee on Coastal and Oceans Management (RCCOM) and the Marine Resource Planning Committee (which later became the Marine Advisory Council). Both of these examples promote actor groups across scales and sectors to interact but not to the extent of becoming a decision-making body.

Overall, participants were in favor of collaborative arrangements and partnerships for ICM initiatives. They indicated that complementing and leveraging the capacity of multiple actor groups would lead to more sustainable ICM initiatives over time. The importance of more than one actor group having authority to lead recognizes that complex coastal and marine SES problems cannot be solved or directed by only one actor group. These groups have evolved in spite of the following challenges: absence of leadership and commitment from legal authorities, and lack of authority, influence or adequate capacity. Capacity includes insufficient resources, staffing, expertise (3.3.2). One participant summarizes this idea:

If a community group on its own that comes up with an idea on its own, wants to do something on its own, I don't think it has much of a chance until the governance structure is made in a way that it would accept it...without a change in governance, without the authority of their government, without them being empowered, I don't think you can do anything... (Participant 38, 2018).

Although relevant actors need a process that allows them to contribute, this does not mean they will always be in a position to strongly influence decision makers who also serve broader, collective interests that may have conflicting incentives and objectives. Therefore, new governance arenas for deliberation are needed to explore these tensions and provide more locally-relevant decision-making that is required for ICM (Jentoft, 2007; Rosen and Olsson, 2013, p. 195; Vince, 2008). Further, Brooks and Fairfull (2017) recognize that innovation within organizational cultures is a precondition to the success of integrated initiatives. Moreover, there is no overarching vision, strategy or mandate between departments or actors nor minimum institutional requirements established (e.g., centralized forum) where these interactions can take place (Brooks and Fairfull, 2017; Celliers et al., 2015). Actor groups other than centralized government agencies may have the capacity to lead and sustain ICM in the Bay of Fundy, but informal and innovative

structures and processes are not necessarily seen as legitimate by legal authorities. Strong priorities for the Bay of Fundy are thus to recognize and support the informal structures working towards an integrated agenda and to continue to explore combined approaches that utilize state and non-state actors. One example might be to delegate some responsibility or authority to local actor groups or committees.

3.3.5 Insufficient vertical integration of policies

The embedded relationships within and between provincial and federal government agencies are identified as a large contributing factor to the lack of operationalization of ICM initiatives in the Bay of Fundy. Such relationships are shaped by formal structures that guide departmental interactions (e.g., coordination of multiple activities in the same location) and hierarchies within departments. These structures impact vertical integration and how management initiatives are designed and carried out. For instance, there are no common long-term goals or visions concerning coastal and marine management. Instead, jurisdictional complexity and often competing incentives, for example, maintenance of traditional livelihoods and renewable energy expertise, between federal, provincial and First Peoples authorities have created an overall lack of harmonization of activities throughout the Bay. One participant from a provincial agency summarized their frustrations on this topic: "It shouldn't be us against them [federal/provincial]. We should all be in it together having the same common objective and expected outcomes of the exercise" (Participant #2, 2018).

The lack of harmonization of efforts between provincial and federal government agencies has contributed to unclear decision-making processes for coastal and marine activities and ICM initiatives (e.g., unclear authority, influence, roles and responsibilities of actor groups). Participants from both the federal government and the NGO community have perceived this as "the black box" of analysis and decision-making (Participant 45 and 59, 2018). Also, local non-state actors are unable to see the impacts or influence of their efforts on decision-making: "How has that data informed policy, and if it has informed policy, has that actually changed? Because otherwise, what is the point of what we're doing, what any of us are doing, if the information generated cannot get to those people making the decisions?" (Participant 52, 2018). Furthermore, the rights of First Peoples have not been adequately considered. The Reconciliation agenda and principles (Minister of Justice and Attorney General of Canada, 2018) are just beginning to appear within ICM initiatives. For example, in the summer of 2018, DFO announced that in collaboration with the Peskotomuhkati (Passamaquoddy) Nation, DFO will embark on an instream fish habitat restoration to recover the alewife food fishery in the St. Croix River (DFO, 2018).

To build vertical coordination, to help actor groups work together at different scales), a sustained mandate, long-term planning and harmonization of objectives between jurisdictions are all necessary. One study found that over 20 federal departments will be necessary to implement the Oceans Act (Rothwell and Vanderzwaag, 2006). The need for coordinated vertical and horizontal integration is well known within strategic, integrated and collaborative approaches such as ICM (Alves et al., 2013; Berkes, 2004; Lebel et al., 2006; Stori et al., 2019; Young, 2002). A 'business as usual'

culture and status quo policy instruments are preventing a *whole of government approach*, as explained in a recent study by Stephenson et al. (2019, p.136). The study argues that these challenges are due to a lack of incentive to facilitate cohesive implementation: “the current organizational and governance culture related to the management of coastal activities has tended to inhibit integration.” This *whole of government approach* is also recognized as a pre-requisite to integrated approaches by Foster et al. (2005, p. 403). Additionally, structures should be nested across jurisdictional scales to connect strategic visions to tangible objectives (Hall et al., 2011). Experiences from this study and others highlight the need for changes at the organizational level, within day-to-day operations of relevant governing agencies (i.e., DFO, Nova Scotia Department of Energy, New Brunswick Department of Agriculture, Aquaculture and Fisheries) and relevant actor groups from various activities such as new bodies or committees to connect jurisdictions, departments and actor groups as needed (Buono et al., 2015).

Final outcomes of the discussion are key insights that related emergent challenges to the Elements of Governance. Table 13 provides a summary of insights and which challenges they are related to.

Table 12 Key insights from critical challenges in the Bay of Fundy in relation to the Elements of Governance

Elements of Governance	Key Insights for ICM
<i>Qualities</i>	Consistent resourcing (money, staffing, knowledge) (3.3.2) and common vision (3.3.1; 3.3) are foundational
<i>Actors</i>	Diverse actor groups require the capacity to meaningfully participate (3.3.2; 3.3.3)
<i>Structures</i>	The support of informal structures may lead to more enduring outcomes (3.3.1; 3.3.4)
<i>Processes</i>	Multi-actor spaces facilitate the consideration of trade-offs and strengthen the connection to the local scale (3.3.4; 3.3.5)

3.4 Conclusion

Lived experience of interviewees who have been involved in coastal and marine management initiatives in the Bay of Fundy support the hypothesis that a *governance gap* is impeding progress toward ICM. Interview analysis reaffirms challenges for operationalization of ICM initiatives expressed in the review of the literature including a lack of coordination of all levels of governments (Jessen, 2011) and limited incentives or requirements to carry out ICM (Rothwell and VanderZwaag, 2006). This research explored critical challenges for the operationalization of ICM initiatives within the Bay of Fundy. By investigating different lived experiences across multiple scales, this study has provided a more comprehensive understanding of what has worked in ICM initiatives and what has not.

Interview data indicated that there have been many different attempts to move towards ICM within the Bay of Fundy, with some having some positive impacts/outputs but none having achieved integrated management in its idealized form with horizontal

and vertical integration across governance and management. The following challenges suggest that ICM initiatives are being pursued to ensure that appropriate Elements of Governance are in place:

- unsustainable commitment from legal authorities;
- inadequate capacity to sustain initiatives;
- inappropriate diverse actor group engagement;
- unsupported informal structures for horizontal integration; and,
- insufficient vertical integration of policies.

Findings within the Bay of Fundy in Atlantic Canada reaffirm particular challenges expressed within the literature including coordination with all levels of government (Jessen, 2011) and limited incentives or requirements to carry out ICM (Rothwell and VanderZwaag, 2006). Identifying common challenges across a diversity of jurisdictional, cultural and social contexts is pertinent to addressing a way to operationalize ICM.

The current coastal and marine governing regime impedes achieving sustainable and equitable SES outcomes. Specifically, formal and informal structures that facilitate horizontal and vertical integration linkages and enhance coordination among departments and actor groups are needed. Without sustained commitment and capacity of legal authorities, transitioning from a ‘business as usual’ or ‘path-dependent’ model towards effective management of coastal and marine SES in the Bay of Fundy will be difficult. Until a large cultural shift occurs within government agencies to better equip them to lead and engage with integrative efforts, ICM initiatives will likely remain dependent on individual champions who will face problems of limited capacity, succession, and inconsistent buy-in from authorities. An opportunity exists for multi-actor arrangements to contribute to leading and operationalizing integrative initiatives. Alley and Topelko (2007, p. 2) write:

Ocean’s governance in Canada is moving away from the traditional approach whereby a single authority is empowered to make decisions, towards a shared governance system whereby decision-making responsibility, power, and accountability is shared by partnering agencies.

Overall, these findings contribute to the growing body of research recognizing the importance of governance dimensions in supporting and facilitating the operationalization of ICM initiatives. Future research should therefore investigate:

- how to overcome critical challenges, for example, appropriate contexts for incremental vs transformational changes (i.e., how are others overcoming governance challenges?);
- what alternatives exist to current centralized governance models to enhance coordination, stakeholder participation and knowledge sharing (e.g., what lessons can be learned from relevant governance modes or arrangements such as multi-level, interactive, collaborative governance);

- how to determine the appropriate engagement for various actor groups, and;
- what are practical approaches to clearly acknowledging and addressing power structures within ICM initiatives and ICM as a governance mode more broadly?

Untangling governance from management was necessary to identify five critical challenges for ICM. As both the theory and practice of ICM are rapidly expanding, the findings of this chapter are relevant for other nations to consider before operationalizing ICM initiatives.

Chapter 4

Reviving Integrated Coastal and Marine Management in Canada: Opportunities in the Bay of Fundy

“There is then some evidence of the shift from government to collaborative coastal governance, but the shift is slow and partial and its continued momentum in question”

K. Vodden, 2015

4.1 Introduction

ICM addresses multiple objectives across multiple activities and therefore has been broadly attempted in the pursuit of sustainable development to maintain or restore ecological integrity (e.g., biological productivity, biodiversity, and habitat) and to enhance the wellbeing while pursuing economic development (Burbridge, 2004; Cicin-Sain & Belfiore, 2005). ICM offers a holistic and strategic form of governance that can be achieved through various governance arrangements. ICM is being employed worldwide and helps move beyond conventional sector-based approaches to contribute to the sustainability of complex and dynamic social-ecological systems. There is however no general agreement on what characteristics of governance are most appropriate for implementing ICM initiatives (Ngoran & Xue, 2017).

Broadly, the shift from *government to governance* can be seen in combined approaches with the participation of multiple actor groups in oceans governance through shared or multi-level governance arrangements (Rhodes, 1996; Salamon, 2002; Stoker, 1998). There is agreement among scholars that neither a purely top-down nor a bottom-up approach will be sufficient (Bennett et al., 2019; Rockmann et al., 2015; Stohr et al., 2014). In the wider setting of oceans governance and management, top-down (centralized) (Christie & White, 2007; Gilliland & Laffoley, 2008) and bottom-up (decentralized) practices (Lane & Stephenson, 2000; Wever et al., 2012) have been documented. For example, a review of recent ICM literature found the following characteristics to be important for operationalizing ICM: government commitment through formal structures, meaningful actor engagement, and innovative (multi-actor) structures (Chapter 3). Additionally, recent research reveals that a vital challenge for coastal and marine governance is how to fit it to the local realities of coastal communities (Young et al., 2018). The present study focuses on core ICM characteristics that have been identified from the literature and applies them to experiences in the Bay of Fundy to identify opportunities for the future.

As we prepare to enter the United Nations Decade of Ocean Science for Sustainable Development (2021-2030)(United Nations, 2020), there is an immediate need to synthesize learnings from past efforts and to alter the present approach for achieving multiple objectives within the coastal and marine social-ecological systems. In particular, lessons from governance approaches between governments and non-state actor groups that can overcome challenges to operationalizing ICM initiatives are beneficial. Here, we

aim to better future opportunities to achieve core characteristics of ICM moving forward. Within the geographic context of the Bay of Fundy region, which has a rich history of past and ongoing experiments in management, we adopt a governance perspective to examine opportunities for operationalizing ICM and to identify insights that may inform other regions looking to implement ICM policies. This present study provides perspectives from local and regional actors and rights holders from two sub-regions within the Bay of Fundy where there have been many previous efforts towards ICM. This timely and empirical research based in Atlantic Canada contributes to the wider debate on participation within ICM and offers ‘food for thought’ to authorities and practitioners who are working to develop and implement initiatives (e.g., policies, plans and programs) within coastal and marine social-ecological systems (SES) across the globe.

The paper is structured in three parts. First, we summarize the core governance characteristics for ICM from the literature on the status of ICM globally and in Canada. Second, we introduce two case study contexts within the Bay of Fundy and describe how the case study comparison was conducted. Third, we synthesize opportunities for operationalizing ICM and present differences between case study experiences. Lastly, we discuss themes that emerged from the analysis and propose a common pathway forward for the Bay of Fundy to inform current actions being taken in Canada in relation to the operationalization of ICM (i.e., planning, implementing, monitoring and evaluation, adaptation).

4.2 Core ICM Characteristics

In practice, decision-makers and practitioners must consider underlying governance to better facilitate the operationalization of ICM initiatives (Chapter 2). Governance is defined here as the way actor groups in society interact and coordinate to steer social and political processes (Bennett and Dearden, 2014). The following core governance-related characteristics have been recognized as critical to operationalizing ICM initiatives.

First, formal structures are considered to be the legal basis for ICM through policy instruments (e.g., laws, acts, regulations). For example, ICM policy can generate top-down commitment and leadership from authorities (e.g., government departments) to develop a holistic strategy for the management of coasts and oceans (e.g., Christie and White, 2007; Gilliland and Laffoley, 2008). Additionally, formal structures can acknowledge a diverse set of actors who should be involved when operationalizing ICM initiatives. Formal structures can also indicate standards to ensure expectations are met and trade-offs are considered (e.g., stakeholder mapping and analysis, scenario planning) (Pomeroy and Douvere, 2008). In a comparative policy study of Brazil and Indonesia, Wever et al. (2012) found that ineffective formal structures prevented the implementation of ICM. Other nations where formal structures have catalyzed action towards ICM include Canada (Ocean Act), USA (National Marine Act) and European Union (Marine Strategy Framework Directive). Further, several countries have also established formalized mechanisms for how local, non-state actors can participate in decisions relating to coastal and marine areas: Norway (Buanes et al., 2005); Australia (Vince, 2008, 2014); and China (Xue et al., 2004).

Second, meaningful inclusion of diverse actor groups and knowledge types (e.g., social, cultural, traditional, local) has been recognized as another key feature in operationalizing ICM (Flannery et al., 2018; Stephenson et al., 2019). Kooiman et al. (2008, p. 3) state that “broad societal participation in governance is an expression of democracy”. In the present paper, participation is conceptualized broadly as an umbrella term for a spectrum of approaches or strategies for understanding and sharing perspectives on the impacts of decisions (Arnstein, 1969; Hurlbert and Gupta, 2015; Morf, Kull, et al., 2019; Twomey and O’Mahony, 2019). The value of local actor participation in coastal governance and management (e.g., ICM initiatives such as MSP) has been well established (Flannery et al., 2018; Pomeroy and Douvere, 2008; Ritchie and Ellis, 2010). Furthermore, communities, defined here as a place-bounded group of heterogeneous actor groups with different values and interests, are increasingly being recognized for their capacity to catalyze and lead ICM initiatives. For example, Wiersema (2008) argues that the participation of multiple actors has been beneficial for obtaining social license, understanding the complexity of environmental problems, and identifying actionable goals that are needed to move towards effective results.

Third, innovative mechanisms (e.g., structures or processes), distinct from sectoral top-down approaches that are being applied within the specific context of ICM have been identified as an important characteristic of governance. These include both informal and formal arrangements or forums that allow, or even require, particular constituencies to interact and contribute to decision-making. It remains critical to determine the appropriate balance of state and non-state actor group participation that is suited to local context. In most nations as well as for ICM, government authorities tend to ultimately have the legal responsibility for decisions. Innovative multi-actor mechanisms (i.e., structures or processes) can help ensure that ICM initiatives are relevant to the local situation and often involve a forum where local actors, authorities and decision-makers can interact (as identified in Chapters 2 and 3) (Parlee and Wiber, 2014). These forums can include multi-actor structures, integrative policies, advisory groups, committees and deliberative spaces (UNEP/CBD, 2005) (Chapter 2). Given the growing experience with ICM globally, there is value in exploring new mechanisms (i.e., combined approaches) to enhance participation of non-state actors, which promotes good governance values and assists in achieving transparency (Wingqvist et al., 2012).

The discussion has evolved over the years around who should participate in ICM and how (Flannery et al., 2019; Kearney et al., 2007) and two differing views can be seen in the ocean governance literature. First is whether the government should decide how local actor groups participate (Ehler and Douvere, 2010) or second, whether local actor groups should decide for themselves (Fudge, 2018; Ritchie and Ellis, 2010).

4.2.1 History of ICM in Canada

As many other nations, Canada has been slow to move from concept to practice concerning ICM. In 2005, the audit from the Office of the Auditor General suggests progress has not been made due to the lack of ICM being a consistent priority of the federal government (Office of the Auditor General, 2005). Implementation of ICM in Canada has varied over time, being described as “slow” (Office of the Auditor General, 2005, p. 12), “from glacial to hectic” (Ricketts and Harrison, 2007), “progress or

paralysis” (Ricketts and Hildebrand, 2011) and “from leader to follower” (Jessen, 2011). At the time of promulgation (January 31, 1997), Canada’s Oceans Act was the first attempt to acknowledge the need for ICM within national legislation/policy. A history of ICM in Canada depicts the actions and events relating to ICM beginning in the late 1970s (Figure 2).

For instance, Canada’s pursuit of ICM has largely been associated with the conceptualization of five large ocean management areas (LOMAS) beginning in 1998. The following four of the five LOMAS currently have plans, although none have been fully operationalized: Beaufort Sea, Pacific North West, Gulf of Saint Lawrence, and Eastern Scotian Shelf (Bailey et al., 2016; McCuaig & Herbert, 2013; Ricketts & Hildebrand, 2011) (Figure 2). The reason for Canada’s inability to realize the original vision for ICM in the Oceans Act and subsequent policy documents (i.e., Ocean Action Plan, Ocean Strategy and Policy and Operational Framework for ICOM, Ocean Action Plan I) has been attributed in part to piecemeal, fragmented and scattered policies (Office of the Auditor General, 2005). The most recent development with ICM are current departmental plans and ministers’ letters that focus on the blue economy and marine spatial planning to achieve integration.

Canada acknowledges the importance of involving multiple actor groups in decision-making for their coasts and oceans through the *Oceans Act* and its supporting documents and policy instruments (Canada, 2002; Oceans Act, 1996; Minister of Fisheries, Oceans and the Canadian Coast Guard, 2019; Minister of Justice and Attorney General of Canada, 2018). The preamble of the Oceans Act (1996) clearly states the intention of implementing an integrated approach that is to be achieved through the coordination of both state and non-state actor groups and within government departments/ sectors:

WHEREAS the Minister of Fisheries and Oceans, in collaboration with other ministers, boards and agencies of the Government of Canada, with provincial and territorial governments and with affected aboriginal organizations, coastal communities and other persons and bodies, including those bodies established under land claims agreements, is encouraging the development and implementation of a national strategy for the management of estuarine, coastal and marine ecosystems

Further, the subsequent *Ocean Strategy* (Canada, 2002; Canada’s Ocean Strategy: Our Oceans, Our Future, 2002) also outlines suggestions for fostering collaboration with other ministries, Indigenous Peoples and coastal communities and indicates that the *Strategy* itself is meant to evolve as lessons are learned through adaptive management processes (Chircop and Hildebrand, 2006). In 2005 the *Oceans Action Plan* recognized that the governance of Canada’s oceans is “not equipped to deal with modern-day challenges” (Office of the Auditor General, 2005). Instead, envisioning ICM as a cross-sectoral and collaborative approach to decision-making that "encourages the direct involvement of resource users and coastal communities" is needed over the long term (Vodden, 2015, p. 18). The reality that each government department has its own mandates, resources and priorities makes it challenging for one department to have sole

responsibility, and capacity/ability, for implementing ICM (Jessen, 2011; Nursey-Bray, 2016).

As presented in the statement of core ICM characteristics (section 1.2), the Office of the Auditor General reported that both top-down and community-driven efforts toward ICM are required; yet, as of 2005, the *Oceans Strategy* had failed to provide specific “responsibility for leadership”(Office of the Auditor General, 2005, p. 9). Unfortunately, as noted by the Coastal CURA partnership (2019), there has not been a substantial change since:

Despite the existence of policies that encourage the Department of Fisheries and Oceans (DFO) to work “in partnership” with local stakeholders (such as the Oceans Act), opportunities for representation of local voices are still greatly lacking when assessing the costs and benefits of a decision to these communities.

Scholars have identified that strong political presence and support are needed in addition to active local-regional engagement of the community and non-governmental institutions (Guenette and Alder, 2007). Along with other nations, Canada has learned that definitions and legal support for achieving effective participation of affected actors is variable and remains a critical challenge in practice (Charles, 2010; Twomey and O’Mahony, 2019; Wilson and Wiber, 2009) (see Chapter 3). Ongoing criticisms of previous ICM efforts in Canada include the weak policy basis that exists for ICM and the need for more governance mechanisms to support leadership, community participation and engagement in coastal and ocean resource management (Charles, 2010; Jessen, 2011; Vodden, 2015). A limitation of the *Oceans Act* is that it “has not adequately provided the mechanisms for ensuring a strong role for communities in integrated coastal and ocean management”(Kearney et al., 2007, p.79). Scholars have acknowledged that coastal communities and local actors (e.g., Indigenous peoples and small-scale fish harvesters) must have priority for access to coastal and marine resources and spaces to avoid negative tradeoffs (Bennett, 2018; Bennett et al., 2018). As a result of these lessons, we are beginning to see novel governance arrangements throughout Canada for navigating emerging coastal and marine social-ecological system issues through an ICM approach (e.g., PNCIMA). Making these new arrangements functional remains a work in progress.

Recently, Canada has seen a renewed commitment to take an integrated approach to manage coastal and marine systems. In 2019, two particular initiatives support ICM: the mandate letter from the Prime Minister to the Minister of Department of Fisheries and Oceans (DFO) (Prime Minister of Canada, 2019); and, a commitment to implementing the G7 Charlevoix Blueprint for Healthy Oceans, Seas and Resilient Coastal Communities (G7, 2018). The 2019-20 DFO Departmental Plan include various objectives and language that support ICM (i.e., MSP) (Minister of Fisheries, Oceans and the Canadian Coast Guard, 2019, p. 17).

DFO will initiate Marine Spatial Planning (MSP) in five marine areas. MSP is a process that will bring together relevant authorities to better coordinate the use and management of marine spaces to achieve ecological, economic, and social objectives. One of the key features of these MSP processes will be the establishment of Indigenous-federal-provincial governance structures. The goal for each planning area will be the development of a marine plan that sets out the long-term spatial objectives and includes shared accountabilities for implementation. This process will not replace existing regulatory processes but will offer a forum to advance cross-sector planning.

There remains an opportunity to learn from past experiences to identify and create new governance mechanisms to achieve core ICM characteristics.

4.2.2 Conceptual Framing

The present study used a hybrid analytical approach to analyze interviews for core ICM characteristics (Dubois & Gadde, 2002; Timmermans & Tavory, 2012), to compare resulting themes between the two sub-regional case studies, and synthesize opportunities for the Bay of Fundy (Yin, 2018). Hybrid approaches, referred to by some as abductive, offer an alternative to purely inductive or deductive approaches, letting the researcher move between theory and data to develop or modify theory (Bryman, 2016;

Dubois & Gadde, 2002). The hybrid method we selected first adopted the *Elements and Characteristics of ICM* framework from the previous chapter (Chapter 3) and allowed for opportunities (themes) to emerge inductively and be explored and compared within and between case studies.

The Elements and Characteristics of ICM is an analytical framework representing patterns of characteristics important for achieving ICM observed from an extensive literature review of ICM literature. For example, seminal papers and practitioner guidelines included Sorenson (1997), Ehler (2003), Stojanovic et al. (2004), Gilliland and Laffoley (2008), CBD (2004); IUCN, (1993); UNESCO (2006); UNEP (1995); and, the World Bank (1996). Patterns of characteristics from the ICM literature are organized by breaking down governance qualities, structures, actors and processes. The framework was then used in a systematic review to deductively determine how prevalent these characteristics are in recent international ICM literature, and to assess their importance for the successful operationalization of ICM initiatives. As a result of this review (Chapter 2), three core ICM characteristics stood out:

- formal structures that span political cycles;
- meaningful inclusion of diverse actor groups and knowledge types; and,
- innovative multi-actor mechanisms.

The corresponding definitions of each of the identified core ICM characteristics used to analyze interview transcripts are derived from key references from the literature and presented in Table 14.

Table 13 Code definitions of pre-selected core ICM characteristics applied to individual subregional case studies in Round 1

Core ICM Characteristics	Definition	Examples of key references
<i>Formal structures that span political cycles</i>	Legal basis for ICM through policy instruments (i.e., laws, acts, policies, regulations) (e.g., European Union Marine Strategy Framework Directive)	Olsen et al. 1997; Cicin-Sain and Knecht 1998; Cicin-Sain and Belfiore 2005; Dickinson et al. 2010; Taljaard et al 2011
<i>Meaningful inclusion of diverse actor groups and knowledge types</i>	Participation/engagement of multiple heterogeneous actor groups, perspectives and knowledge (e.g., cultural, social, traditional)	Ehler 2003; Burbidge 2004; O'Boyle and Jamieson 2006; Ehler and Douvère 2009; Dickinson et al. 2010; Stephenson et al. 2019
<i>Innovative mechanisms (e.g., structures or processes)</i>	Non-conventional ICM mechanisms (e.g., structures or processes) or conventional mechanisms being applied within the context of ICM (e.g., multi-actor structures, integrative policies, advisory groups, committees, deliberative fora).	Cicin-Sain 1993; Arkema et al. 2006; Dickinson et al. 2010; Carvalho and Fidelis 2013; Staples and Hermes 2014

4.3 Methods

A case study approach is appropriate to gain deep insight into a phenomena (Ritchie and Ellis, 2010). Given the focus on governance, the use of case studies encouraged contextual nuances to emerge between and within case studies (Newing, 2010). This is an appropriate approach for this study as ICM implementation is

highly contextual (Cicin-Sain and Knecht, 1998). Sub-regional case studies were identified by local participants during interviews (Chapter 3).

4.3.1 Bay of Fundy Case Study Contexts

The Bay of Fundy has the highest tides in the world and includes many diverse and ecologically significant ecosystems (e.g., seagrasses, mudflats, estuaries). Although the Bay of Fundy was not chosen as a Large Ocean Management Area (LOMA) pilot project for implementing ICM in the early 2000s, over 60 integrated management initiatives (e.g., an organization, a research initiative, a management initiative or a body) have been identified (Chapter 3). These 60 ICM initiatives were identified by interview participants as being integrated in some way. The Upper Bay in Nova Scotia and the Lower Bay in New Brunswick were selected primarily due to previous experience with ICM initiatives and/or strong efforts for local participation in ICM initiatives. For example, previous ICM initiatives in the Upper Bay include Minas Basin Working Group Community Forums and South Western New Brunswick Marine Resource Planning, more recently known as the Marine Advisory Committee, in the Lower Bay. The terms Upper Bay and Lower Bay include activities that influence the sustainability of the sub-region. For example, Lower Bay boundaries expand beyond the boundaries of South Western New Brunswick to include the Port of Saint John where there is significant transport activity. The Upper Bay includes Minas Basin as well as Minas Passage due to ongoing tidal energy research and development as well as the presence of valued fisheries throughout the area (e.g., lobster and scallops). As shown in Figure 3, each case is constrained by provincial and national boundaries to focus the scope of the research to remain manageable for data collection, and allow for a ‘deep dive’ into local realities.

4.3.2 Interviews

Participants from both Lower Bay (LB) and Upper Bay (UB) were purposively identified to include those who held strong connections or previous experience with ICM initiatives in either of the embedded case studies. Participants were chosen through snowball sampling and held perspectives from a variety of backgrounds (e.g., academia, government authorities, First Peoples, private sector, non-governmental organizations, and civil society). In total, a sample of 51 semi-structured interviews were analyzed from Chapter 3 with a variety of participants who have experience with ICM within each case study sub-region (Table 15). While empirical case studies and comparisons are beneficial as they concentrate on the local situation (Stake, 2005), we acknowledge that purposive sampling requires caution regarding the generalization of results to a wider population (Bernard, 2006).

During the interviews, participants recalled their experiences with ICM and expressed their own views. To understand opportunities for future ICM efforts within each embedded case study, interview questions were asked from a governance lens and sought to elicit participants experiences with ICM initiatives with a focus on lessons and the future. Examples of questions include: *From your perspective, are there any lessons from your experience with ICM? How do these lessons apply to future initiatives? If there was an opportunity to advance ICM in this area, what would you suggest (i.e., what are the next steps)?* Interviews were audio-recorded, treated as confidential, and did not identify participants in the findings.

Table 14. A summary of participants from two sub-regional case study within the Bay of Fundy (n= 51)

Participants	Upper Bay (UB), Nova Scotia	Lower Bay (LB), New Brunswick
Academia- Content Expert	2	0
Academia - Partner	3	1
Private - Industry	1	3
Private - Research/consulting	1	5
Municipal Authority	1	1
Federal Authority	1	3
Provincial Authority	6	4
First Peoples Authority or Organization	3	1
Non-governmental Organization	4	5
Resource User	1	1
Civil Society	0	4
Total	23	28

4.3.3 Coding and Analysis

This study used thematic analysis, a common method employed to organize and describe data into categories or subthemes (Braun & Clarke, 2006; Saldana, 2015; Yin, 2016) to identify categories and patterns relevant to ICM opportunities in the Bay of Fundy and to synthesize emerging themes. A full account of each case study relative to opportunities was reported by organizing and re-organizing text passages into sub-themes and themes to determine how the core characteristics (Table 14) related to opportunities within each case study (Yin, 2016). In some cases, participants framed opportunities as next steps or suggested lessons from previous experiences to be considered. For the most part, the codes and sub-themes were not verbalized directly as opportunities. Data analysis required the researcher to read between the lines in order to interpret data relative to various aspects of the research topic, as in customary when using thematic analysis (Braun & Clarke, 2006).

Coding and analysis of interview transcripts were supported by computer-assisted qualitative data analysis software. For example, Temi (www.temi.com), an online transcription software program, was used to create written transcripts of audio-recorded interviews. Participants were given the opportunity to revise their interview transcripts upon request. The coding process for organizing data and identifying themes and sub-themes from the interviews was also facilitated by QSR NVIVO, a data management software.

The analytical procedure for coding core ICM characteristics for each of the two sub-regional case studies was based on the *Elements and Characteristics of ICM* framework described in the previous section. An overview of the results of the multi-round analysis process is illustrated in Figure 11 and described further below. The resulting opportunities flow from the pre-selected core ICM characteristics (Chapter 2) used in the first round of coding (Table 14).

Round 1: Core ICM characteristics
(Eger et al., *in preparation*)

Round 2: Strongest five sub-themes from case study analysis

Round 3: Common opportunities (themes) between case studies

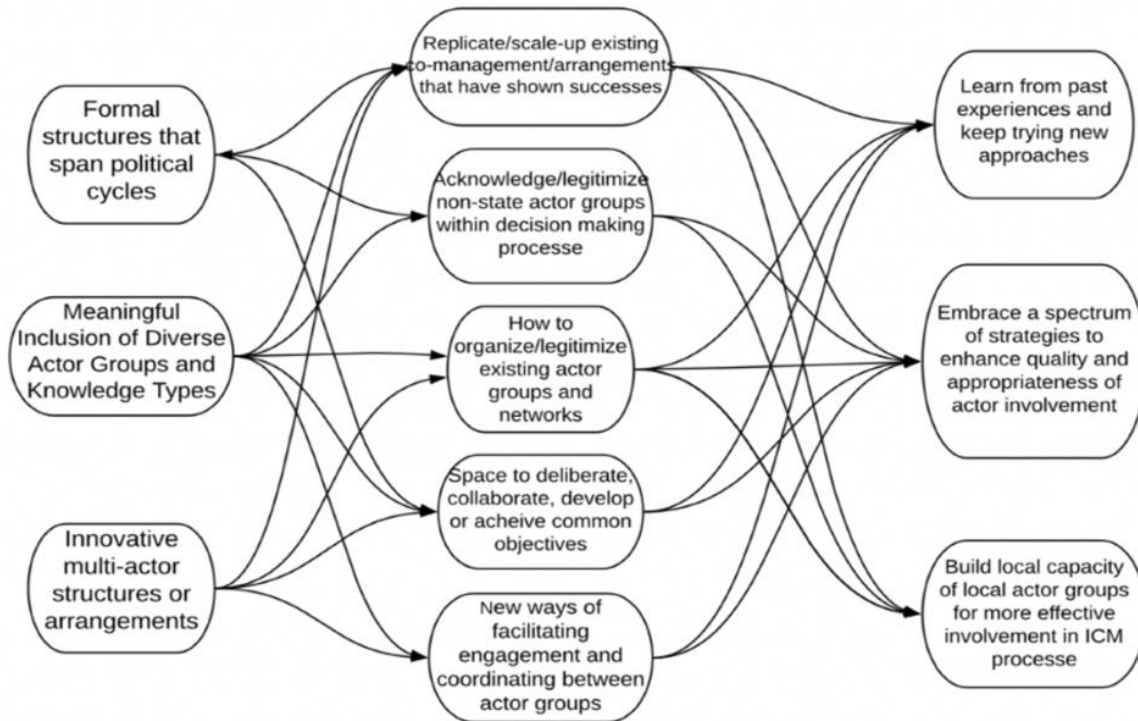


Figure 11 Overview of case-study interview analysis using core ICM characteristics to yield common opportunities for ICM in the Bay of Fundy

It is important to note that each of the three distinct rounds was analyzed independently. Each reorganization of raw data (i.e., text passages from case study interviews) led to fewer outliers as the sub-themes/themes reorganized. Coding stopped once each separate theme threatened to lose independence should another round occur (Braun and Clarke, 2006). The interactions between rounds of analysis in Figure 11 demonstrate the connections of raw data between rounds and reflect the interconnectedness of raw data to a broader theme. In other words, the links shown as arrows in Figure 11 between the core ICM characteristics, sub-themes and final themes (opportunities) indicate that participants supported opportunities related to a cluster of themes. However, the connections among core characteristics, subthemes, and themes do not mean that other links were not present; rather, the selections represent the main factors as indicated by frequency of textual responses.

Round 1 applied three core ICM characteristics, depicted on the left in Figure 11, deductively to both Upper and Lower Bay case study interview transcripts. Round 1 resulted in relevant text passages relating to potential opportunities to be coded to each of the three core ICM characteristics. Using thematic analysis, Round 2 then reorganized the text passages from Round 1 further into related categories within each sub-regional case study and ultimately resulted in a list of overarching sub-themes. The most prevalent subthemes--sub-themes with the highest frequency of coded text passages—are shown in Figure 11 to help clarify the coding and analysis process while Table 16 provides illustrative examples of raw data that make up the sub-themes.

Table 15 Strongest sub-themes that emerged from raw transcript data for Round 2 of analysis

Strongest Sub-themes	Illustrative transcript examples
(A) Replicate or scale up existing co-management/arrangements that have shown successes	<ul style="list-style-type: none"> • ESSIM stakeholder advisory committee (UB 42; UB 45) • Marsh bodies in Nova Scotia (UB 47) • Finfish Aquaculture community liaison (UB 65)
(B) Acknowledge/ legitimize non- state actor groups within decision- making processes	<ul style="list-style-type: none"> • [Y]ou need to have a strong coordinating, leading entity that will take it forward and you need that support system as much as you think it's going to be ground up, it's ground up and top down meeting in the middle (LB 53) • Should require minimal standards for engagement at national level (UB 49) • Use CVC in decision making (LB 24)
(C) How to organize/legitimize existing actor groups and networks	<ul style="list-style-type: none"> • You need to bring the right people together and then it needs to have some teeth and you need to think about where do you want to be five to 10 years from now, what do you want that to look like? And then work backwards. So that you can work forwards (UB 9) • We need to know how to organize - Timing, personalities, motivations and ability to work well together are important for making an initiative work - suggests that it needs to be a marrying of top down leadership/directive and bottom-up interest (UB 45);
(D) Space to deliberate, develop, or achieve common objectives	<ul style="list-style-type: none"> • We should all be in it together having the same common objective and expected outcomes of the exercise (LB 2) • The idea of shutting out opposing viewpoints just because they can be intimidating or offer a differing opinion isn't what governance and leadership is about. Listening to those people, oftentimes giving them a platform, but understanding that it's part of the dialogue (LB 58) • There are a lot of community minded people who are open to a lot of things who would like the opportunity to deliberate. This is what is lacking in a consultation is that there is no time to deliberate (LB 27)
(E) New ways of facilitating engagement and coordinating between actor groups	<ul style="list-style-type: none"> • I really think you have to rethink the process of working with local communities when you are exploring things like MSP or integrated coastal management (UB 10) • Perhaps there are lessons to be learned from Land Trusts regarding the importance of building relationships and creating objectives with local communities... the methods used for each project are developed alongside the communities and often very personal given the group, organization or individuals involved (LB 30) • It definitely has to be an ongoing process and very flexible (UB 51) • Should make use of tools such as municipal land use planning to create long-term development plans. There remains opportunity to provide forums to bring people together (UB 56) • We need a new way of doing business (LB 27) • Partnerships with academia and community-based organizations have seen successes ... [for example] the striped bass association (UB 19)

Finally, Round 3 compared the sub-themes from each of the case studies in a cross-case analysis to identify thematic patterns (Finfgeld, 2003; Finfgeld-Connett, 2010). This resulted in an amalgamation of sub-themes to yield several distinct opportunities (Braun and Clarke, 2006). Opportunities were determined based on the abundance of participant statements relating to each theme. Themes with the most linkages or interconnections with subthemes were selected to highlight commonalities as evidence from both case studies was apparent within each of the three common opportunities (themes), i.e., relevant to both the Lower Bay and the Upper Bay sub-regional case studies (Figure 11). Table 17 explains the three main common opportunities that emerged from the analyzes and synthesizes evidence for each.

Table 16 Summary of common opportunities for ICM in the Bay of Fundy and their associated sub-themes

<i>Common opportunities (themes)</i>	Opportunities (sub-themes reorganized into new related themes)	Examples of sub-theme evidence within themes (Table 2)
<i>Learn from past experiences and keep trying new approaches</i>	<ul style="list-style-type: none"> • New formal structures are needed to facilitate ICM and improve the quality of actor group engagement within decision-making processes • An authority that can bring all actor groups together should lead and make ICM a responsibility for actor groups • Insights from similar cases which have tried an innovative multi-actor arrangement should be synthesized • Successes, e.g., allow for trade-offs to be more balanced among actor groups, from unconventional combined approaches should be shared and celebrated 	A, C, D, E
<i>Embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement</i>	<ul style="list-style-type: none"> • Coastal communities need to be more involved in ICM decisions and processes • Actor groups want to be more actively involved in determining their own future and helping to achieve it. • The type and timing of local actor engagement depend on the local context. 	A, B, C, D, E
<i>Build capacity of local actor groups for more effective engagement in ICM</i>	<ul style="list-style-type: none"> • Local actor groups can be better organized to participate more effectively in addressing environmental issues and operationalizing ICM • Actor groups have shown their ability to be organized and influence in the past • Local governments could help build the capacity of local actor groups 	A, B, C

4.3.4 Supplemental Document Analysis

In parallel to interviews, an ad hoc document analysis was conducted by reviewing documents relating to core ICM characteristics or context-specific variables such as history, past initiatives, actor groups and policy. Document analysis was also used to triangulate interview data with sources to provide depth to the study and confirm validity. Details of documents that contributed to the document analysis can be found in supplemental materials (Appendix F). Multiple dimensions of context were compiled to provide a rich understanding of each of the two sub-regional case studies. A review of documents revealed distinct differences within the two subregions, although there were some similarities in terms of socio-cultural context. Appendix G summarizes various contextual aspects of each case study to reveal similarities and differences. These details were relevant as interview transcripts were reviewed and text passages were coded and compared throughout the three rounds of analysis.

4.4 Results

A document review and a multi-round cross-case analysis yielded three emergent common opportunities for the Bay of Fundy:

- learn from past experiences and innovate;
- embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement; and,
- build capacity of local actor groups for more effective engagement in ICM.

These opportunities suggest that there is a wealth of knowledge and experience relating to ICM that could be more closely integrated into policies that support ICM at the regional and sub-regional levels. Table 18 explains the three main common opportunities that emerged from the analysis for achieving the core ICM characteristics in the Bay of Fundy analyses and elaborates using evidence below.

Table 17 Summary of results and their associated sub-themes (Letters from middle column, Figure 11)

<i>Commonalities among opportunities between case studies</i>	<i>Opportunities (sub-themes reorganized into new related themes)</i>	<i>Examples of sub-theme evidence within themes</i>
Learn from past experiences and innovate	<ul style="list-style-type: none"> • New formal structures are needed to facilitate ICM and improve the quality of actor group engagement within decision-making processes • An authority that can bring all actor groups together should lead and make ICM a responsibility for actor groups • Insights from similar cases which have tried an innovative multi-actor arrangement should be synthesized 	A, C, D, E

	<ul style="list-style-type: none"> • Successes, e.g., allow for trade-offs to be more balanced among actor groups, from unconventional combined approaches should be shared and celebrated 	
Embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement	<ul style="list-style-type: none"> • Coastal communities need to be more involved in ICM decisions and processes • Actor groups want to be more actively involved in determining their own future and helping to achieve it. • The type and timing of local actor engagement depend on the local context. 	A, B, C, D, E
Build capacity of local actor groups for more effective engagement in ICM	<ul style="list-style-type: none"> • Local actor groups can be better organized to participate more effectively in addressing environmental issues and operationalizing ICM • Actor groups have shown their ability to be organized and influence in the past • Local governments could help build the capacity of local actor groups 	A, B, C

4.4.1 Opportunity 1- Learn from past experiences and keep trying new approaches

Case study participants sought a better understanding of the tools and strategies that have been useful for previously attempted ICM initiatives -- in particular, mechanisms that provide a basis for multiple actor groups to come together and develop ICM objectives, engage in decision-making, or help with implementation because past initiatives have not come to fruition. Leadership from both provincial and federal governments was proposed to organize ICM processes and decision-making since they currently have the ‘authority and ability to pull people together’ (UB 64). Further, formal structures (i.e., via various policy instruments) are important for ICM to endure over time and political cycles. Several participants from both case studies reflected that unless government authorities make ICM and interactions with local actor groups mandatory for industries (e.g., tidal, aquaculture, shipping), they will continue to not voluntarily take the responsibility on themselves. In some cases, industry is ‘doing what they can’ but will only do what they are regulated to do (LB 57). For example, the aquaculture industry will remove salmon culture pens that are no longer in use only if required (LB 59). To move towards these new mechanisms or formal structures needed for effective engagement and deliberation, conventional governance systems need to have a stronger role in facilitating them. From the experience of participants in both the Upper and Lower Bay, new combined mechanisms and structures are needed as people are not satisfied from the approaches that have been tried.

LB 53: [Y]ou need to have a strong coordinating, leading entity that will take it forward, and you need that support system; as much as you think it’s going to be ground up, it’s ground up and top-down meeting in the middle.

UB 45: [w]e just don’t have the sustaining integrated management, ... nationally or regionally. Each region is basically implementing the Oceans Act in different

ways, but...shouldn't we have Natural Resources Canada, DFO, Environment Canada, Parks Canada all at the table nationally and directing what we do and how we work in the regions? And First Nations too?

Participants from both cases incorporated local history in their narratives and mentioned the need to learn from past experiences in or adjacent to the Bay of Fundy. It was acknowledged by participants in the Lower Bay how different actors are participating in ICM initiatives. The Lower Bay also acknowledges that current systems have not been sufficient for achieving ICM initiatives in an integrated way. There are also previously created tools and resources that give insight into the various actor groups, values and community priorities within the case. In the Upper Bay there is significant potential to build upon previous work such as the community forums led by the Bay of Fundy Ecosystem Partnership - Minas Basin Working Group. This working group held multiple workshops with communities surrounding the Minas Basin to determine what values and priorities local actor groups had for coastal and marine areas (Tekamp, 2003). Participants suggested that updating the outcomes of these efforts and revisiting how to address ongoing priorities in the coastal and marine realm was prudent. Additionally, participants mentioned innovative partnerships that were emerging to build research and management, for example, collaboration between the Marine Institute of Natural and Academic Science (MINAS), Sipekne'katik First Nation (Indian Brook) First Nations, and the Ocean Tracking Network for conducting species monitoring in the Upper Bay.

In the Lower Bay, participants recalled the development of the community values criteria (CVC) as a valuable output from the Marine Resource Planning initiative (MRP) that existed from 2004-2009 (Jones and Stephenson, 2019). The CVC was a framework created by the MRP process involving numerous participants to recognize local-scale values and to evaluate proposed activities in the Lower Bay (LB 24, MSFD, 2009). Although CVC criteria were never used as envisioned, participants believed it worthwhile to incorporate the CVC into future decision-making for activities within the sub-region (Parlee and Wiber, 2018). The MRP process subsequently evolved into an advisory body (i.e., the Marine Advisory Council (MAC)) that has since been dissembled (Jones and Stephenson, 2019). Nonetheless, the experiences and lessons from the MAC contributed to the understanding of how different actor groups interact and made progress in determining how to embed community values within coastal and marine decision-making in their area. Although there was a difference between the extent of experience with ICM initiatives in Upper and Lower Bay, both case studies realized that future opportunities should take into consideration past lessons.

One clear finding that relates to having new or more effective ways to deliberate and engage is that many local groups want to have a more meaningful role, in the process, for example at times this would look like a stronger 'voice' (i.e., more influence), in ICM decision-making. Each group has different capacities to consider which need to be considered in the way they are approached, engaged, and involved (LB 26). As the current governance regime in the Bay of Fundy leaves responsibility and authority to ministers, priorities and interests of the various elected officials continue to drive policy agendas and priorities. Participants called for lessons to balance top-down and bottom-up interactions between authorities and local actor groups. Insights into these combined

arrangements have been provided by scholars, practitioners and program evaluators (Flannery and Cinnéide, 2012; Hall et al., 2011; Office of the Auditor General, 2005). They had also realized that the current model of 'business as usual' is not working and that decision-makers have not sufficiently prioritized nor provided sufficient resources to aid progress with ICM.

LB 27: I think going forward, that's one of the things that we're going to look for is we need to have that direct involvement with a decision.

UB 11: It became obvious very soon into the process that force, the government and the corporations that are going to put turbines in the water weren't really listening. They just wanted us to tell them it was okay. They didn't care...They're still not going to change their project depending on what you say. They already have it set in stone.

New approaches do not necessarily mean reinventing the wheel but may instead embrace the idea that we should be critically reflecting on what has been done previously should be critically reflected on, for instance, what was the result and how next time it will go better in the same or different context (Canada's Ocean Strategy: Our Oceans, Our Future, 2002). Participants identified existing community-based and co-management efforts that have shown success and perhaps could be replicated or scaled up in other areas or for other issues/objectives (Kearney et al., 2007; Parlee and Wiber, 2014). In the Lower Bay, participants referenced that the novel co-management of shellfish harvesting with fishermen's associations, and the desire to try to replicate a similar model for ground fisheries (LB 26) (Wiber et al., 2010). Fishermen's associations are fairly well established in the Lower Bay with democratic representatives who speak for their actor group (e.g., Grand Manan Fishermen's Association, Fundy North Fishermen's Association). In the Upper Bay, participants had experience engaging with or knowing about the Bras d'Or Lakes Collaborative Environmental Planning Initiative (CEPI). CEPI is an innovative arrangement between the Unama'ki Institute of Natural Resources, an organization representing five Mi'kmaq Chiefs. CEPI is creating collaborative management plans and addressing environmental management issues around the Bras d'Or Lakes (Naug, 2007). While conventional approaches remain focused on ecological and economic objectives, the use of unconventional approaches in Canada (e.g., CEPI) might allow for the more appropriate consideration of social and cultural objectives (LB 44, LB 63).

4.4.2 Opportunity 2 - Embrace a spectrum of strategies to enhance quality and appropriateness of actor engagement

The provincial and national scales at which decisions are being made for many coastal and marine activities is not seen as appropriate for coastal communities. Participants acknowledged that the current distribution of power to government authorities at national and provincial scales has made it difficult to consider community values and for community actors to participate effectively (e.g., consultation, involvement, collaboration, partnerships and empowerment) (IAP2, 2002) (LB 59). In particular, the fact that communities are not homogenous and have differing worldviews needs to be better addressed by decision- and policy-makers through more thoughtful engagement processes (Kearney et al., 2007). One participant said he believes that rural

people have the impression that people in Ottawa, Halifax or Fredericton think they are experts and do not try to understand the knowledge locals have (LB 36). Further, there is not a strong sense from participants that they could ever have a true impact on the decisions that are happening (LB 26). One practical approach mentioned by participants for provincial and federal representatives to avoid coming into a community with a preconceived notion about what their priorities are is stakeholder mapping (UB 8). Stakeholder mapping is a tool used to scope out different actors, their incentives and their influence relating to a particular problem, and/or geography or interest (LB 10, LB 27). Once relevant actor groups, and ideally their representatives, are identified it is then important that the expectations of each actor group are clear, and that their unique capacity is recognized and supported appropriately. A recent lesson from the Minas Basin tidal energy development was that the consultations with actor groups show that place matters and local priorities matter.

UB 43: [W]e've been very place focused. [These meetings] held in Parsborro area where we're based, have not included broader stakeholder concerns across the Bay of Fundy is something that requires more of a geographic spread in our engagement efforts. Everything's connected.... So we're definitely trying to focus more on a broader level impact in our engagement strategies than we were in years past.

LB 10: You need to determine at the very outset what is up for debate. To what extent will any consultation influence decisions - your stakeholders should know that....It really frustrates me that there are people with real concerns and livelihoods and traditions and histories of either working on the land or living adjacent to these communities, that I don't feel is honored and respected through the consultation processes or by government officials. I really think you have to rethink the process of working with local communities when you are exploring things like MSP or integrated coastal management or whatever.

Interviews transcripts revealed the desire of participants to be actively involved in determining their own future as well as motivation to participate in achieving it. This means that decision-making processes require transparency so there is a clear understanding of how actor groups can best contribute (e.g., who is responsible, for what, and how) and the degree to which actor groups will contribute to and shape the result (e.g., a decision being made). Participants in both case study areas were able to identify various actor groups with current capacity to help operationalize ICM, and that some groups are more suited and capable of participating than others. Moreover, participants from both case studies were interested in exploring how to increase involvement of the First Peoples in coastal and marine management. In the Lower Bay, the Peskotomuhkati First Peoples (Passamaquoddy) and actor groups from both sides of the Canada- USA border have recently committed to restoring alewife fishery on the St. Croix River (DFO, 2018). In the Upper Bay specific recommendations were for MINAS, a local collaboration between fishermen and academia, to work with Sipekne'katik First Nation (Indian Brook) to manage and maintain one of the last traditional fishing weirs in the area (i.e., Bramber Weir).

LB 58: Having that diversity of ownership, for lack of a better term, is part of what made it successful because it gives you windows into a lot of different segments of the population rather than always living within an echo chamber of your own beliefs.

UB 51: It's just hard with so many different levels of government involved and who actually can make decisions and make it in a timely manner. It definitely has to be an ongoing process and very flexible, but people get really upset and then they can't see beyond their issue.

Participants' experiences provided insights into diverse strategies being used within combined approaches and highlighted opportunities for stronger engagement. Both directly and indirectly, participants referred to multi-actor forums that allowed for deliberation and facilitate the sharing of different views within a community. An Indigenous participant referenced the relevance of The Taku River Tlingit First Nation (TRTFN) Case Law in the Bay of Fundy that found “On the spectrum of consultation required by the honour of the Crown, the TRTFN was entitled to more than minimum consultation under the circumstances, and to a level of responsiveness to its concerns that can be characterized as accommodation” (*Taku River Tlingit First Nation v. British Columbia*, 2004). Other landmark cases in Canada relating to Indigenous title include the *R. v. Marshall* (*R. v. Marshall*, 1999) case in Nova Scotia regarding a treaty right to fish. Examples of what could be accomplished in these forums with diverse actor groups include determining common objectives and clarifying expected outcomes from both the participation process and the initiative itself (LB 2). Specific between-actor actions could also involve co-visioning or scenario-planning, co-creation of actor engagement plans, collective and strategic long-term planning. Additionally, participants recognized that particular forums could function to (re)build trust between actor groups within or between different activities and direct the groups' shared incentives and capacity to contribute (i.e., resources, power, staff, mandate). Often within these forums, champions and representatives from different actor groups were identified. Results also indicated that there is a large diversity of what these forums could be because of incentives, motivation, and capacity of actor groups in the sub-region. For example, one participant reflects that engagement strategies for integrated management in the area have ranged from 'loose group getting together every few months for pizza' to 'you are the decision-making authority'... or "they have to get our piece of paper with our signature” (UB 42). The following quotations from participants indicate that involving local actor groups is rarely a one step process suggesting strategies used should be more than a one-time effort.

LB 64: Let's come into the room, leave our opinions at the door and listen to one another – [that's] step one.

UB 65: The key is, is once the decision's made it doesn't mean that you stop the engagement process. There's that ongoing progress that needs to continue to happen otherwise companies and activities never get integrated into communities.

In both the Lower Bay and Upper Bay case studies, the general sentiment was that opportunities for involving diverse actor groups were not sufficient or appropriate. Where the two case studies differed was for what the appropriate next steps towards ICM might

be. When asked about successful models of participation, participants focused on examples that allowed for communication between actor groups (i.e., two way or back and forth). Further, comments frequently called for formal structures. One participant from a non-governmental organization suggested there should be a requirement to meet minimal standards for engagement at provincial and/or national levels, “if you don't listen to people, you're not likely to be successful” (UB 49). Another individual mentioned the value of fishermen liaisons from the communities in the Lower Bay who reported directly to (then Minister of Fisheries and Oceans) Romeo Leblanc to connect decisions he was making to ‘the place and the people’ (LB 62). Despite extensive ICM experiences, participants in the Lower Bay shared that they were tired and jaded from spending volunteer time in a process that has not been effective at meeting their expectations due to a lack of effective engagement in the ICM process.

LB 27: There are a lot of community-minded people who are open to a lot of things who would like the opportunity to deliberate. This is what is lacking in a consultation is that there is no time to deliberate.

Whereas the Upper Bay had less extensive experience and participants showed an enhanced willingness to proactively participate to help shape multiple and integrated objectives for the region. Particularly with the development of renewable energy and intensive fishing efforts. One participant reflects that currently, they are being excluded and that local actors have valuable perspectives to share.

UB 58: The idea of shutting out opposing viewpoints just because they can be intimidating or offer a differing opinion isn't what governance and leadership is about. Listening to those people, oftentimes giving them a platform, but understanding that it's part of the dialogue.

Participants also identified other models that are headed in the right direction such as the Striped Bass Association is a partnership between academia and community-based groups (UB 19). Many participants had positive comments on the intention and the process of the Regional Committee on Coastal and Oceans Management (RCCOM) and the Eastern Scotian Shelf Integrated Management (ESSIM) Stakeholder advisory committee. With regard to ESSIM, comments surrounded the flow of information back and forth across different levels which allowed for many relationships to be built (UB 42). As with the RCCOM, some comments pointed to the need to explore a high-level formal structure (e.g., agreement or commission) to span government mandates, keeps provinces accountable, and provides a high-level structure for oceans management in Canada that will be sustained over the course of multiple political cycles (e.g., European Commission)(UB 45). Although the idea to develop local ICM spaces or forums was supported by many participants, one participant acknowledged that these groups will likely continue to lack authority and that it is important to recognize the different streams of government (i.e., both elected representatives and the civil service). Successful ICM in the Bay of Fundy requires high-level commitment, from those who hold legal authority within the coastal and marine realm which include the federal government, the two Provincial governments (i.e., New Brunswick and Nova Scotia), and First Peoples groups (LB 4).

LB 38: It starts with the willingness to give up some power and authority from the center.... it's got to be rooted in community.

UB 45: It just seems like issues ebb and flow and we just don't have the sustaining integrated management or marine spatial planning, whatever you want to call it, a national or regional structure... We don't have that here.

Although the above points were generally supported by participants from both case studies, there were clear differences between the Upper and Lower bay regions in participant attitudes towards ICM. In the Lower Bay, there was an impression of defeat and lack of motivation from those who had been involved in previous multi-actor group efforts because expectations had not been met in the past (e.g., Southwestern New Brunswick Marine Advisory Committee). As a result, there were many recommendations for smaller, tangible efforts that remained reactive to current issues. Pursuing specific, actionable objectives is a better way to bring different actor groups together moving forward (LB 4). One participant spoke about building trust among actor groups by tackling 'low hanging fruit' before preparing to take on more complex issues such as integrated programs (LB 32). Some success has been seen with marine debris because it was an issue "common to all stakeholders"(LB 33). In other words, the usual suspects (i.e., engaged representatives of various actor groups) would need to rally around a specific problem (i.e., marine debris, protection of the endangered North Atlantic Right Whale (*Eubalaena glacialis*), or spatial protection) or a defined purpose. Who you bring around the table is dependent on the objective (LB 26). Participants from the Upper Bay were more optimistic and open to coming together to deal with large, interconnected issues. Suggestions to support future ICM efforts included scenarios or visioning workshops with multiple actor groups on topics of concern to ICM, how to integrate First Peoples, and proactive efforts. One suggestion was for a strategic advisory panel for renewable energy to bring the right representatives together and discuss where everyone wanted to be in 5 or 10 years, then to work backward to determine how they would get there (UB 9). Participants from both case studies alluded to the idea of 'a one-stop shop' with representatives from local actor groups in a single place to provide knowledge and advice such as context-specific data for government authorities, industries, and decision-makers that could impact their communities.

4.4.3 Opportunity 3 - Build capacity of local actor groups for more effective engagement in ICM

Capacity needs to be built into community actor groups to participate in operationalizing ICM and addressing environmental issues. Participants from local actor groups recognized the need to become more organized as a group. Participants from government in particular suggest that it is beneficial to their programs and processes when actor groups are already organized. The ability to organize was connected to three components listed by participants relating to capacity: local development (LB 62), financial support (UB 22) and education/knowledge (UB 43). Within both case study regions, a fundamental opportunity emerged around strengthening the ability for actor groups to be involved in ICM. Specifically, achieving a democratic representation of actor groups was a prominent theme. Participants from government authorities expressed

that having democratic processes for selecting representatives within actor groups enhances the legitimacy of the actor group and thus the recognition by government agencies. In the case of NGOs and industry, these representatives were often full-time staff members. In other actor groups such as tourism, small-scale livelihoods, and engaged citizens, representatives were likely to be volunteers and unlikely to have been selected through any particular process.

As it currently stands, participants expressed that enhanced representation was needed within their actor groups. Currently, many actor groups involved a vocal minority being led by individuals with strong personalities, rather than people who truly represented the group (UB 68). Another example of misrepresentation was when members were assumed to be representative of their group (e.g., tokenism) which has happened frequently with Indigenous consultation. A participant who fishes and identifies as Indigenous was mislabeled as a representative or leader. He exclaims "I *don't* speak for my band" (UB 19). Further, A participant that works with, and for, First Peoples expressed that "the consultants don't work for us" and that it is a current limitation of the system that avoids effective engagement of the actor group (UB 22).

Enhanced representation of actor groups was frequently brought up in both case studies as a concept that would assist in ensuring effective consideration of priorities, values and objectives.

UB 68: The success stories are those that have representation.

According to a participant from the Lower Bay, actor groups should organize and have effective representation in order to build capacity.

LB 62: Communities have been marginalized and need to build capacity to govern themselves before engaging. It is important to be able to know how to organize and mobilize once there is something to work towards... A key element here that needs to be put in place and that is we have no institutional capacity or resources to help build capacity in communities and organizations. To be able to fully engage around these things, to be able to play a meaningful role in shaping your destiny as a community, you need to have the sort of human capacity to do that... the issue of capacity, to organize effectively is the biggest stumbling block of all.

Both case studies have actor groups who have shown they are capable of organizing, leading, engaging and influencing various activities and processes within coastal and marine systems. Between case studies, however, actor groups may have different motivations and abilities to influence or catalyze change. In the Upper Bay, there is evidence of the strength and influence of local communities who opposed the process, not necessarily the objective, of Tidal energy development in Minas Basin and Minas Passage. One group in particular, the Upper Bay Fishermen's Association, demonstrated motivation and influence that resulted in a delay of tidal energy development progress for almost a year (Maclean, 2017). In the Lower Bay, actor groups have also shown their interest in leading change in their community. The motivation of some individuals and groups from the Lower Bay, many of whom were volunteers, was sustained through their continued participation in the Marine Advisory Committee for 10 years or more.

Several government participants, they felt that some actions by actor groups disrespected or undermined the process that had laid out for local engagement. An elected official recounted that there are always groups that avoid the formal processes in place and who directly lobby the Minister, undermining the process, while other actor groups are trying to engage/ influence through the allocated channels (UB 22).

LB 5: Some fishermen have tremendous influence on the Department of Fisheries and Oceans. But, there are other fishing groups that have zero [influence] and are treated very badly. Clam fishermen is one of those groups.

UB 10: And that's exactly what happened with the fishing community. Their [Fundy Fishermen's Association] power to influence was, you know, underestimated and they just thought they could have them go to a few meetings to see and just hear what they had to say. There wasn't as much [access] as they needed for an emotional [support] or irrational or whatever. That's perhaps why they chose such a radical way to influence this whole process. And they were able to.

In both case studies, an enhanced role of local or municipal governments was proposed to facilitate or lead local development and capacity building. The general sentiment from participants was that "leaders need to understand the perspectives of the community" (LB 60) and that municipal governments could carry out and connect local values to higher-level priorities (UB 45). One participant stated that when an individual from the municipal government was in a leadership role it was easier to support them (LB 63). Participants commented on a multitude of roles that local governments could take on including having a larger, more defined role in implementing coastal and marine planning. This may require the decentralization of some provincial, or even, federal authority/responsibility to a more localized level. One participant suggests to 'move DFO out of Ottawa' as more localized governance, as seen with municipal land use planning, would be more appropriate to create long-term development plans that satisfy local, including Indigenous, provincial and national objectives (UB 56). Another possibility would be for local governments to play a brokering role between actor groups at the local/sub-regional level by creating spaces that allow for a diverse set of views to be heard and common objectives to emerge between actor groups at the local level (UB 19, LB 62). Local governments could also educate local actor groups on the decision-making system within which they are embedded (UB 43). Lastly, the development of rural economies is seen to help strengthen the independence and autonomy of local actor groups over local decisions (UB 65).

UB 22: There's a lack of capacity in communities for addressing environmental issues. There's no funding support, there's nobody to enforce it. There's nothing to enforce here in Nova Scotia unless they're actually implemented by the community, but they don't have the capacity to even undertake the work to identify the areas, let alone implement bylaws and then enforce them...if we continue at this rate, Nova Scotia is going to be drained and then we're, you know, we're going to be the ones holding the bag for those seven generations who have nothing.

LB 22: So that's where that body [one stop shop] can be really powerful so you do reach consensus on things you would never get on the bilateral stuff between Fredericton and the individual stakeholders. So you get the body to say, you know,

this is what we think about this... when that body speaks as one and says to the Minister, there were fisherman and aquaculture and ‘we all think this about that’. Then the Minister needs to reflect what they are asking.

These instances outline potential roles that local governments could play in moving towards ICM through the organization of local actor groups while maintaining connections with broader coastal and marine objectives (UB 69). However, governments remain hesitant to cede decision-making power or responsibilities to other actor groups and legal implications remain unclear. Opportunities lie with communities to enhance communication and organization of their priorities and capacities. Graham et al. (2006, 15) provide an interesting view of power and how the capacity of actor groups can assist in obtaining some:

Typically, power is something that is not simply given away by government. Community organizations need to recognize the importance of showing a commitment to claiming, or re-claiming, power. For example, if a community develops its own management plans and then states clearly: ‘This is how we will manage our fishery. This is what we will do.’– this can help make the government listen.

4.5 Discussion

This chapter sought to synthesize past experiences of ICM through in-depth and embedded case studies within the Bay of Fundy. Using core ICM characteristics (Chapter 2), data analysis uncovered three opportunities for the Bay of Fundy region, common to both the Upper and Lower Bay sub-regions. These results support the inclusion of both state and non-state actors across scales. A main finding of this study indicates that there are embedded interconnections between the core ICM characteristics and thus, they should be achieved in parallel (Figure 11). The caveat is that the opportunities may be achieved differently in the Lower Bay and the Upper Bay (i.e., based on history, capacity and objectives of local actor groups). More serious attention should be paid to how local actors are being involved in coastal and marine governance and management and to better support co-creation of forums for multiple-actor groups.

As seen in Figure 11, subsequent analysis of each case study relative to the core ICM characteristics conceptual framing revealed similar opportunities. Therefore, policy recommendations were made at the regional level and focus on the importance of being able to tailor and accommodate unique contexts within each sub-region. The commonalities between case studies may be due to overlapping aspects of context seen in Table 14 such as history with integrated initiatives, development activities, cultural preferences and similar population characteristics (i.e. rural, First Peoples).

4.5.1 Learning for improved formal structures

The main opportunity for achieving *formal structures that span political cycles* was to learn from past experiences and keep trying new approaches (Chapter 3). This study found that many lessons have been learned over the years and iterative policy updates are crucial for avoiding past pitfalls. Despite these lessons pointing towards combined approaches, we continue to make decisions and plan coastal and marine systems in a

predominantly top-down way at national and regional scales. Given this reality, learning what has been done in the past and having it inform how to move forward is especially important at regional and sub-regional scales.

These lessons should, in turn, be reflected through current governance regime (i.e., formal structures and processes). Some notable lessons for the Bay of Fundy can be derived from previous ICM initiatives in Atlantic Canada such as the CoastalCURA, South Western New Brunswick Marine Advisory Committee, Eastern Scotian Shelf Integrated Management and Bras d' Ors Lakes (Jones and Stephenson, 2019; Naug, 2007; Parlee and Wiber, 2018). Conversations continue to emerge surrounding community-based and multi-stakeholder approaches to environmental management to overcome the inefficiencies of central government efforts which emerged in the Bay of Fundy beginning before the Oceans Act and which have continued until the present day (Kearney et al., 2007; Wiber et al., 2010). In Canada, the development of structures to support the evolution of active participation of non-state actors in ICM has not occurred on a broad scale and there remains a need to explore alternative shared-governance models and enhance collaborative ICM processes (Heemskerk, 2001; Jessen, 2011; Office of the Auditor General, 2005) (Chapter 3). This exploratory process can also be aided by documented experiences with ICM initiatives elsewhere in Canada (e.g., PNCIMA, Beaufort Sea) as well as from other nations (e.g., Australia, China, USA) (Chircop and Hildebrand, 2006; Hildebrand and Norrena, 1992; Jessen, 2011; McCann, n.d.).

4.5.2 A spectrum of participation to support meaningful engagement

To gain the *meaningful inclusion of diverse actor groups and knowledge types*, a spectrum of participation strategies must be embraced, especially by ICM process leaders, to meaningfully engage all relevant actor groups within and between sub-regions given their various capacities, histories, and objectives). This idea of participation as a continuum has long been recognized in literature through numerous typologies (Gustavsson et al., 2014; Perry 1995), ladders (Twomey and O'Mahony, 2019) and essential ingredients (Pomeroy and Douvere, 2008; Senecah, 2004). So why is not it being used in practice? Most recently, Morf et al. (2019) investigated the participation ladder within a transboundary MSP context and concluded the following dimensions are relevant for determining an appropriate strategy:

- reasons and purpose of involvement (why);
- depth and breadth of involvement;
- intensity of involvement and influence in relation to roles (how much); and
- methods, timing and frequency of involvement (how, when, how often).

One aspect that remains underemphasized is how the appropriate type of participation strategy for individual actor groups along the continuum can change as knowledge/awareness, capacity, and motivation can shift over time as participants within actor groups depart and join (Zaucha and Gee, 2019).

To determine what is appropriate for each context, the leaders or 'initiators' of the ICM initiative, along with the local actor groups, should determine jointly what type of

interaction is “necessary, appropriate and desirable” (Rockmann et al., 2015, p. 161). For example, practitioners and policy-makers can help ensure that an appropriate process and balance is struck between actor groups in ICM by including local, non-state actors to decide how they themselves want to participate (e.g., strategic co-creation of engagement plans (Cvitanovic et al., 2016; Ritchie and Ellis, 2010). For example, studies in Norway and Canada suggest that actor participation can be advanced through strategies such as scenario-modeling (Hall et al., 2011; Jentoft, 2005). Additionally, agendas need to be created outside the political realm for MSP to be effective (Flannery et al., 2019), consistent with the idea that local actors play a role in determining how they should be involved (Buanes et al., 2005; Flannery and Cinnéide, 2012; Ritchie and Ellis, 2010).

In the Bay of Fundy specifically, authorities in the Bay of Fundy could expand their understanding of actor participation (i.e., consultation, engagement, involvement, and empowerment) (IAP2, 2002). As an example, this could be done through the creation of a provincial policy or engagement strategy (in Nova Scotia and New Brunswick) to recognize a spectrum of options through guidance and tools such as scenario planning or development (Glaser and Glaeser, 2014), and stakeholder mapping and analysis (Hall et al., 2011a; Smith et al., 2017). Stakeholder mapping will help understand the capacity and influence of actor groups and ensure participation mechanisms are appropriate for the scale, context and actor group (Cvitanovic et al., 2016). International and national objectives may be prioritized over a democratic, equitable and just process that leverages local capacities. Such a focus would assist in strengthening and empowering local actor groups to understand how they can best participate in ICM processes should be a key focus to ensure local interests are accounted for.

4.5.3 Local capacity for appropriate innovative arrangements

Another opportunity in the Bay of Fundy is to build capacity of local actor groups for more effective participation in ICM processes. Empowering and building capacity for bottom-up approaches is important because actor groups need to be organized and to have a forum where they can determine how they want, and are able, to participate (Brandes and O’Riordan, 2014; Fudge, 2018; Jentoft and Chuenpagdee, 2009; Wever et al., 2012). Similarly, the creation of *innovative multi-actor mechanisms* are likely to be better suited to sub-regional actor groups when the groups themselves can leverage their skills and expertise effectively. It was found that actors, fora and arrangements in the Bay of Fundy varied between sub-regions. Additionally, local actor groups might benefit from an improved understanding of the decision-making system (e.g., legal conditions, processes in place to provide feedback) to legitimize group organization (i.e., representation) and to learn how to participate in policy discussions more effectively (Buchan and Yates, 2019; Flannery and Cinnéide, 2012; O’Boyle and Jamieson, 2006; Underdal, 1990).

Innovative multi-actor mechanisms (i.e., structures or processes) have the potential to help amplify voices of marginalized or underrepresented groups and might include new coastal partnerships or inter-industry-bodies, merging agencies together or creating super-agencies. Innovative multi-actor structures that support the inclusion of non-government actors are becoming more common and are currently needed in the Bay of Fundy (Chapter 2). Shipman and Stojanovic (2007) found to operationalize or *mature*

ICM: local capacity must be built; responsibilities must be clarified; and, democracy within ICM processes should be enhanced. Also, they state the policy vacuum that “leaves local authorities with little or no effective guidance on how to deal with many complex issues in an integrated manner” must be overcome (Stojanovic, 2007, p. 381). Overcoming these obstacles require that legislation be created for local governments to establish legally constituted partnerships (e.g., joint steering committees with local and national governments) as well as to better align policies towards support regional and sub-regional ICM approaches. As with combined approaches, institutional innovations and sustained leadership are also required to enhance capacity for integrated governance at the national level to support initiatives at local and regional levels (Charles, 2010; Lockwood et al., 2010) (Chapter 3).

4.5.4 Parallel policy implementation for messy interconnections

Policies supporting core ICM characteristics should be implemented in parallel as they are intertwined and, in some cases, can facilitate or even depend on each other. For example, formal structures could help facilitate the meaningful inclusion of diverse actors and knowledge types as well as help ensure early and ongoing engagement. Therefore, there will be overlap and connections between opportunities and core ICM characteristics as well as within the characteristics themselves as a result of contextual factors (Figure 11). These interconnections result from contextual factors. Although formal policy recommendations are recommended for the Bay of Fundy, capitalizing on opportunities for regional governance will require greater efforts from both local actor groups and government authorities to avoid being constrained by the same challenges (Chapter 3). For example, legal authorities can strengthen formal structures to support core ICM characteristics and ensure efforts for ICM continue beyond one political cycle. Formal structures can also help local actor groups receive the opportunity to participate in a meaningful way, appropriate to their unique context. Local actor groups, on the other hand, can increase the legitimacy of their groups to authorities by becoming better educated about how the process they want to be involved with works and what legislation is involved, by organizing their individual groups (e.g., capacity building through organization and representation), and by focusing on the objectives that actor groups share at the sub-regional scale. It should not be assumed that an actor group in one sub-region will have the same capacity in another. Further, policies that consider local context, withstand political cycles, and account for lessons learned can support the organization of local actor groups to participate in ICM in addition to providing high-level strategic guidance (e.g., this could be clearer through amendments to the *Oceans Act*). Given the findings of this chapter, there is some apprehension about internationally-led ICM initiatives, such as UNESCO MSP Global program (UNESCO, 2020), as the scale at which they are working is much beyond the sub-regional setting. Additionally, other international targets such as Aichi Target 11 and Canada’s Target 1 have elicited the prioritization of conservation objectives instead of the achievement of multiple balanced objectives, including conservation and protection.

By 2020, at least 17 percent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed,

ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes (Convention on Biological Diversity, 2013, p. 23)

By 2020, at least 17 percent of terrestrial areas and inland water, and 10 percent of marine and coastal areas, are conserved through networks of protected areas and other effective area based conservation measures (Government of Canada, 2011)

As stated by Manuel and MacDonald (2020, p. 136), “The 10-year gap between the ICOM and current MSP initiatives shows that marine planning and management in Canada is vulnerable to changing government priorities.” Because formal structures can support actor participation through innovative multi-actor fora implementing policies that support all core ICM characteristics is likely to help Canada catch up to other nations who are now leading the charge in ICM (e.g., China, Australia, USA)(Chapter 2). Policies for core ICM characteristics need to be more flexible, open and creative. New governance structures must be innovative and able to adapt conventional top-down decision-making from government authorities and must integrate language and guidance into policies. Context matters: capacity, history, objectives, legal responsibilities, involved actors and their incentives remain key reasons why there is no universal framework to engage or evaluate participation in ICM. Challenges with participation are sometimes attributed to rigid governance regimes (Kelly et al., 2019). Flexibility for learning and adaptation to incorporate past lessons from regional, national and international experience have not been applied to current policies, strategies, action plans or guidelines (e.g., Ocean Strategy, Ocean Action Plan, Oceans Act, etc.). In the Bay of Fundy, combined approaches for coastal and marine decision-making have been recognized and utilized in many diverse initiatives (e.g., BOFEP proceedings and CoastalCURA). Finding the right degree and type of strategy or arrangement that is best for interactions between actor groups remains a challenge (Rockmann et al., 2015). In particular there has been ample recognition of opportunities of First Peoples to be more strongly involved in coastal and marine governance and management in Canada (Bennett et al., 2018; Kearney et al., 2007).

4.6 Summary and Implications

There is renewed interest in achieving ICM, through MSP, in Canada. In the Bay of Fundy, ICM initiatives have not yet been operationalized due to the jurisdictional complexity (provincial, federal and Indigenous authorities), the plethora of activities, and divergent incentives for accessing and using marine spaces and resources. This study investigated whether there are unique opportunities for pursuing ICM in the Bay of Fundy using an embedded sub-regional case study analysis. A synthesis of local experiences indicated that participation in ICM must be grounded in local context. For example, the diversity of groups, capacities and incentives/objectives within communities could be more broadly recognized to better match the timing and type of participation strategy used with individual actor groups. A multitude of actors will add relevance and capacity to decision-making in the subregions. Implementing the recommended policy insights should facilitate ICM progress in the Bay of Fundy, and presumably more broadly, by more closely considering appropriate governance dimensions. The absence of

an equitable process for considering tradeoffs or implications at the local context has led to conflicts between actor groups/activities in the Lower Bay (e.g., aquaculture industry and weir fishermen in Lower Bay) and in Minas Basin (e.g., fishermen and renewable energy development). There have been also some successes, positive outcomes and lessons from local ICM experiences that should be celebrated, shared, replicated and scaled up across the Region.

Opportunities to strengthen top-down structures and processes while also building bottom-up capacity were identified for operationalizing ICM in the Bay of Fundy region. Figure 12 depicts how the main findings uncover how these opportunities, common to both sub-regions studied within the Bay of Fundy and relate to the core ICM characteristics (inner circle). As shown in the second inner ring, lessons from past ICM experiences and combined approaches need to be updated within existing policy instruments. Next, meaningful inclusion of actors requires consideration of context-specific details that differ between actor groups within the Bay of Fundy. Last, we need to build local capacity so actor groups can effectively participate in appropriate, innovative structures for multiple actor groups to deliberate and implement future integrated management efforts. Opportunities to achieve core ICM characteristics are shaped by the history, capacity, motivation/ incentives, and objectives of the sub-regions. Although opportunities for ICM in the Bay of Fundy lie at the regional scale, policies that incorporate the differences at the sub-regional level should be considered. In the outer ring, opportunities point to actions for both government and local actor groups to work on simultaneously to achieve the core ICM characteristics within the context of the Bay of Fundy.

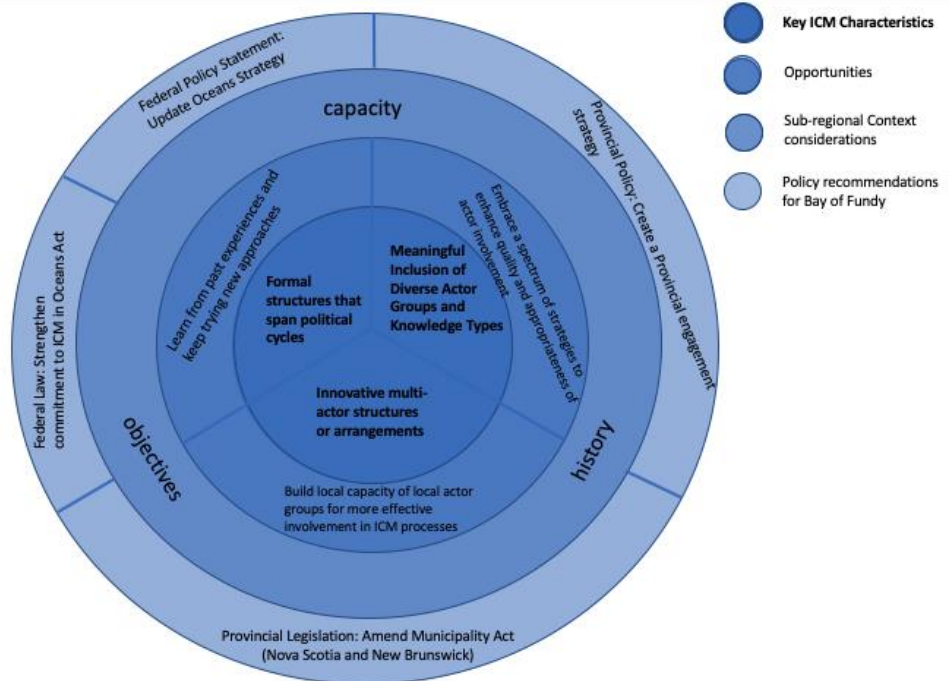


Figure 11 Examples of how to achieve core ICM characteristics in the Bay of Fundy

Four examples of policy recommendations that were raised by participants and examples of how to pursue common opportunities are provided for the Bay of Fundy. These actions would pursue an appropriate balance between government and non-state actor groups in ICM (outer ring of Figure 12):

- Update federal policy statements to incorporate lessons
 - E.g., Revise the Oceans Strategy to include lessons from previous experiences
- Strengthen commitment to ICM in federal law
 - E.g., through Canada's Oceans Act
- Create a provincial engagement strategy to enhance engagement of local actor groups
 - E.g., Engagement guidelines or standards for activity development in Nova Scotia and New Brunswick
- Enhance role of local governments to support capacity building and local actor engagement in ICM
 - Amend Municipality Acts (Provincial legislation) in both Nova Scotia and New Brunswick

Policy instruments would likely be implemented together as core ICM characteristics, as well as the opportunities to achieve them, are significantly interconnected. We conclude that the bio-regional approach that has been proposed for MSP in Canada (Minister of Fisheries, Oceans and the Canadian Coast Guard, 2019) will need further refinement and an enhanced connection to the local level for determining how communities will participate in MSP as well as what management and governance structures are appropriate given the objectives and capacity at the sub-regional scale. This study contributed further evidence for supporting key governance features for ICM. These features (strong formal structures, meaningful and diverse actor engagement and innovative (multi-actor) structures) should be included in governance frameworks that seek to operationalize ICM initiatives. Only when governance is focused at a local scale, a scale that allows non-state actors to complement authorities' efforts, will ICM policies be fully, and stably, implemented.

4.6.1 Future Research

The present study suggests that alternatives to the presently used centralized ICM governance model is needed to implement ICM policies. Coordination of local actor participation and knowledge-sharing have to be a management priority, i.e., DFO cannot implement ICM alone. It has been assumed that the current governance regime for managing coasts and oceans in Canada has had the capacity for integration (Nurse-Bray, 2016). In practice, however, sectoral silos remain and governance processes for ICM often do not meaningfully include local actor groups. A predominant recommendation in the field of oceans governance has been collaborative (co-) management (including adaptive co-management) and co-governance as desirable models for dealing with environmental change and involving non-state actors in decision-making processes (Armitage et al., 2009; Plummer and Armitage, 2007). There is no single combination of top-down and bottom-up, or non-state and state actors for any given ICM context (Klain et al., 2014; Young et al., 2018). Further investigation is required to better understand

“stakeholder views on policy and legislation development and implementation” (McKinley and Ballinger, 2018, p. 260).

The common opportunities to achieve core ICM characteristics in the Bay of Fundy indicate that more research could be focused on ‘how’ to achieve an appropriate balance between state and non-state actor groups for a combined governance approach needed to implement ICM policies. How do managers and planners determine what is appropriate for each community or actor group? From a practical standpoint, it would be prudent to synthesize best practices for assessing capacity of institutions at different geographic scales and to reexamine existing lessons for ensuring local actor groups can participate and contribute to decisions on how they should participate, in ICM processes in a meaningful way. Additionally, what do flexible and responsive policies look like for ICM in combined governance systems? Study participants overwhelmingly recognized that a diverse set of actors is needed to operationalize ICM.

Looking internationally there are many case examples that merit attention given the questions noted above. Perhaps most notably, nations in the European Union have been pursuing marine strategic planning and other ICM initiatives such as ecosystem-based approaches, since 2008. The Marine Strategy Directive Framework, now ending in 2020 includes experiences across a wide range of contexts, including those that are similar enough to Canadian contexts (e.g., transboundary, socio-economic interests, activities, etc.) to extract and apply/incorporate some lessons and strategies.

4.6.2 Conclusion

The common opportunities found in this study, while not necessarily new, suggest change is needed at the sub-regional scale in order to realize ICM for the Bay of Fundy. Theory and lived experience both call for a combined approach to ICM that capitalizes on all relevant actor groups. We have suggested, in the case of ICM in the Bay of Fundy, that the missing link is governance and, specifically, updating, amending and creating formal structures that reflect on local, lived experiences. Further, these structures or policy instruments have the potential to hold all groups to a high standard for navigating ICM initiatives – especially those that determine expectations, roles and responsibilities of each actor group. There are undoubtedly geographic, historic and cultural aspects to the Bay of Fundy that are unique and cannot be extrapolated to other regions seeking to achieve core ICM characteristics. However, the generic lessons from these sub-regional case studies provide insight about how to achieve an appropriate, combined, and universally applicable governance approach needed for ICM. The main lesson appears to be to apply what has been learned from past local attempts at integrated initiatives to generate policies that will allow future generations to live more sustainably within coastal and marine SES.

Chapter 5

Conclusion

5.1 Purpose of Research

The purpose of this research was to examine how governance contributes to the operationalization of ICM initiatives and ultimately, sustainable coastal and marine social-ecological systems. Guiding research questions included *how, and to what extent, is integrated coastal and marine management (ICM) being operationalized? What role did governance play (or not play)? Are certain characteristics of governance more pertinent than others for operationalizing ICM?* In particular, the following three research objectives were addressed:

- Objective 1: To synthesize progress with ICM initiatives internationally in relation to governance (Chapter 2);
- Objective 2: To identify critical challenges to operationalizing ICM in the Bay of Fundy (Chapter 3); and,
- Objective 3: To identify opportunities to achieve a combined governance approach needed to operationalize ICM initiatives and to develop a suite of recommendations to advance ICM in the Bay of Fundy (Chapter 4).

These objectives were addressed through the exploration of recent ICM literature (Chapter 2), the synthesis of critical challenges from lived experiences (Chapter 3), and the analysis of opportunities from sub-regional case studies to yield policy recommendations (Chapter 4). The major outcomes of this dissertation, including significant and original contributions to knowledge, are discussed and reflected on in this final chapter. The dissertation concludes with recommendations for future research and practice are provided in this final chapter.

5.2 Central Findings

Central findings articulated in chapters 2, 3, 4 include that ICM has rarely been fully operationalized, and has not matured, based on regional lived experiences in the Bay of Fundy (Chapter 3) and international literature (Chapter 2). Additionally, a combined governance approach with the engagement of both bottom-up and top-down actor groups is beneficial for the operationalization and maintenance of ICM. However, there is no single combined approach that would support all ICM initiatives. The central dissertation findings related to each research objective (1.2) are discussed below.

Objective 1: To synthesize progress with ICM initiatives internationally in relation to governance (Chapter 2)

This review of 69 primary publications from 2010-2019 revealed that most ICM characteristics (Table 5) have been considered both directly and indirectly to some degree, within both empirical and review articles. The systematic review generated the

following insights and contributed to enhancing the understanding of governance within ICM (2.5):

- A combination of top-down and bottom-up engagement is important;
- Innovative structures can contribute to operationalizing ICM initiatives;
- There are limited reports of realized outcomes from ICM initiatives;
- In practice, ICM initiatives appear to stall beyond the implementation phase; and
- The Elements and Characteristics of ICM Framework is useful for unpacking governance.

A main contribution of work relating to Objective 1 is the identification of three core characteristics of governance that appear most pertinent for operationalizing ICM: meaningful inclusion of diverse actor groups and knowledge; formal structures that facilitate top down leadership; and, innovative multi-actor mechanisms. Based on the prevalence of these core characteristics within the most operationalized initiatives, ICM is more likely to progress and to be sustained over time (2.5.2) if these characteristics are included. In reality, however, conventional governance regimes do not adequately support these core ICM characteristics and continuing to support informal ICM initiatives and building a culture of integration within existing institutions will ease the necessary transition.

Objective 2: To identify critical challenges to operationalizing ICM in the Bay of Fundy (Chapter 3)

Over 60 ICM initiatives were identified from participants in the Bay of Fundy. Most initiatives that were considered integrative did not stem from ICM policy but rather other programs and policies which took a more holistic approach that considered multiple objectives (e.g., economic, ecological, social, or cultural). Five critical governance challenges emerged, providing insight into why there are not fully operationalized ICM initiatives in the Bay of Fundy. These challenges are (3.3):

- unsustainable commitment from legal authorities;
- inadequate capacity to sustain initiatives;
- inappropriate engagement of diverse actor groups;
- insufficient vertical integration of policies; and
- unsupported informal structures for horizontal integration.

The findings suggest that, among all the challenges for operationalizing ICM, these specific challenges are most critical within the Bay of Fundy. In particular, previous efforts indicate that underlying governance characteristics must be thoughtfully considered and developed to progress the operationalization of future efforts.

Objective 3: To identify opportunities for ICM initiatives and to develop a suite of recommendations for advancing ICM in the Bay of Fundy (Chapter 4)

The identification and addressing of challenges that impede the operationalization of ICM (Objective 2/ Chapter 3) highlighted common opportunities to advance ICM. In Chapter 4, the three core ICM characteristics identified from Objective 1 (Chapter 2)

were used to analyze a cross-section of local interviews across two sub-regions of the Bay of Fundy to reveal three common, general areas of opportunity (4.4):

- to learn from limitations and failures;
- to try new approaches to enhance the diversity and quality of actor engagement strategies; and
- to build the capacity of local actor groups.

Lastly, addressing Objective 3 resulted in the identification of a suite of policy recommendations to foster the development of the three governance characteristics in practice that are critical for operationalizing ICM in the Bay of Fundy (4.6):

- Update federal policy statements to incorporate lessons
 - E.g., Revise the Oceans Strategy to include lessons from previous experiences
- Strengthen commitment to ICM in federal law
 - E.g., through Canada's Oceans Act
- Create a provincial engagement strategy to enhance engagement of local actor groups
 - E.g., Engagement guidelines or standards for activity development in Nova Scotia and New Brunswick
- Enhance role of local governments to support the building of local capacity and engagement of local actors in ICM
 - Amend Municipality Acts (provincial legislation) in both Nova Scotia and New Brunswick

While these policy recommendations are intended to be broadly applicable to the Bay of Fundy, Canada and even other global cases, how they are implemented will differ from place to place. Results of interviews reported in Chapter 4 provided evidence that the sub-regional scale dictates how to pursue the above common opportunities, as history, capacity and objectives influence the ability of actor groups to be involved in ICM initiatives.

This dissertation provides a multi-scalar analysis of ICM through a governance lens. The central finding highlighted throughout this dissertation is the need for a combined approach - engagement of both state and non-state actors in governance - to operationalize ICM initiatives. There appears to be no single recipe for a combined governance approach, as the regional and sub-regional contexts dictate what is an appropriate type, and degree of engagement for state and non-state actor groups. Nevertheless, this research indicates that certain core governance characteristics merit primary focus over others when planning ICM initiatives.

5.3 Significant Contribution

This research contributes to the understanding of why ICM has not been widely operationalized. 'Operationalized' is considered to be the completion of the progressive stages of planning and development, implementation, monitoring and evaluation, and adaptation of an ICM initiative. This dissertation provides empirical evidence in support of the hypothesis forwarded by scholars over the past few decades that ICM has not been fully operationalized because of the failure to consider and incorporate appropriate underlying governance (Buono et al., 2015; Kelly et al., 2019; Ye et al., 2015).

First, this study furthers our understanding of the ‘governance gap’ between ICM policy at the national scale and implementation at the local-regional scale. Governance and management, as they relate to ICM, are untangled from one another to acknowledge the difference and connections between the concepts. Specifically, this study labels core ICM characteristics, offers insights into governance-related challenges, and provides opportunities for operationalizing ICM initiatives.

Second, identifying ICM as governance resulted in gaining an in-depth understanding of particular governance characteristics that are important for progressing ICM. This approach distinguishes ICM (governance) from ICM initiatives (management) and emphasizes how governance influences the success of management initiatives as has been called for by numerous authors (Bennett and Satterfield, 2018; Kelly et al., 2018; Kirschke and Newig, 2017).

Third, combining top-down (e.g., national government) and bottom-up (e.g., local actor groups or governments) approaches with both state and non-state actors provides unique insight into the importance of involvement across different levels and what shapes the ability of local actor groups to be effectively involved in successful ICM. The appropriate balance between actor groups appears to vary as a function of capacity, history and objectives at the sub-regional scale. The lived experiences of participants revealed through the empirical case studies within the Bay of Fundy made apparent the value of multiple actor groups being involved in ICM.

Additionally, policy recommendations for the Bay of Fundy, described in Chapter 4, reflect a practical contribution of this research. This aligns with previous findings that purely top-down governance from state actors has not been sufficient for operationalizing ICM and that local actors have been underemphasized in theory and underutilized in practice (Ehler, 2003; Kearney et al., 2007; Ngoran and Xue, 2015).

Finally, this research developed the *Elements and Characteristics of ICM* framework from existing literature and applied it to analyze data from the Bay of Fundy case study. The framework was used to systematically unpack governance to develop theory and guide the practice of ICM. By scoping governance down to core ICM characteristics, ICM initiatives should stand a better chance of success and sustainability over time. These lessons could prove useful to ICM practitioners and researchers working elsewhere. A revised Elements and Characteristics of ICM framework that resulted from the dissertation is presented in Table 18 and shows primary and secondary characteristics derived from the systematic review in Chapter 2.

Table 18 Revised *Elements and Characteristics of ICM framework*

Bold = added to the framework from Chapter 2; * = core ICM characteristics that resulted from Chapter 2 and used to frame opportunities in Chapter 4.

		Elements			
		Qualities	Structures	Actors	Processes
Characteristics	Primary	<ul style="list-style-type: none"> • Good governance values • Strategic objectives or vision • Connection to local context • Multiple, balanced objectives • Multi-inter-, or trans-disciplinary approaches • Evidence-based decision-making • Adequate resources 	<ul style="list-style-type: none"> • *Formal structures • *Innovative mechanisms (e.g., structures or processes) • Vertical linkages • Horizontal linkages 	<ul style="list-style-type: none"> • *Meaningful inclusion of diverse actor groups and knowledge types • Capacity building, development or empowerment 	<ul style="list-style-type: none"> • Indicators for monitoring and evaluation • Iterative, reflective or reflexive
	Secondary	<ul style="list-style-type: none"> • Proactive or precautionary • Democratic • Operational objectives • Regional scale/boundaries 	<ul style="list-style-type: none"> • Flexible, responsive (adaptive) structures • Multi-level, poly-centric or nested • Enforcement 	<ul style="list-style-type: none"> • Clear expectations, roles and responsibilities • Common vision/goals/approach/problem-framing • Political support, will or buy-in • Early and ongoing engagement • Leadership 	<ul style="list-style-type: none"> • Conflict acknowledgment, mitigation or mediation/resolution • Learning or knowledge co-production/integration - focused

5.4 Limitations

Researching with communities or local actor groups has limitations. For instance, Dodson et al. (2007) caution about the abuse of power from local representatives/leaders and the potential vulnerability of participants (e.g., community members). To avoid this, this research was cleared through ethics and measures were put into place to avoid these pitfalls. Following the notion that communities are heterogeneous, opinions may differ depending on many factors, interests, values, priorities, and how informed actors are. Thus, the participation of many actor groups is necessary to fully gain an understanding of the problem context and opinions within any given community. This was done through snowball sampling and sampling of individuals from many scales and sectors. It takes time to build relationships and establish trust with residents and actors in communities such as those in the Bay of Fundy (Love, 2011). Since I was only present in these communities for one field season, May-August 2018, I acknowledge I may not have been

led to all experts and relevant community actors. Additionally, there may have been unintended selection biases as it wasn't possible to interview all members of each actor groups and it is also possible that I did not get completely candid responses from research participants (Chapter 3 and 4).

A primary limitation within my analyses could also stem from my positionality as a researcher that led to abductive approach and choice to focus on local engagement, although it emerged as a core characteristic for ICM in Chapter 2. The deductive application of the Elements and Characteristics of ICM framework to systematic review in Chapter 2 and interview data in Chapters 3 and 4 limits the possibility of results as I was limited in what was being coded for – in this case what elements/characteristics of governance are relevant for ICM. A limitation of this approach is that emergent themes are limited to the scope of the thematic definition in the codes that relate to the framework. In an attempt to counter this limitation with deductive analyses, inductive stages in the systematic review (Chapter 2) and interviews (Chapter 3 and 4) were also conducted to allow for patterns to emerge beyond the themes that were initially coded for. For example in Chapter 2, leadership was a characteristic that was added to the framework as it was brought up in numerous systematic review articles. However, it is important to acknowledge that other opportunities might have emerged if the coding of interviews in Chapter 4 weren't coded directly to the three core ICM characteristics that emerged in Chapter 2.

5.5 Insights for Practice: What's next?

5.5.1 The Bay of Fundy and Canada

Similar to other regions around the world, the Bay of Fundy has been working towards ICM for decades through different types of initiatives (e.g., EBA, MSP, ICZM) with limited success. In the case of ICM in the Bay of Fundy, more attention to governance is required to make progress. As explained in Chapter 3, it is clear that a combined approach that capitalizes on all relevant actor groups (both state and non-state) is needed for coastal and marine SES in the Bay of Fundy. Among the specific recommendations for the Bay of Fundy, the potentially most significant pathway is through the creation or amendment of formal policy instruments to better support a combined approach (Chapter 4). Two regionally feasible recommendations emerged for provincial (Nova Scotia and New Brunswick) action; one is to create provincial engagement strategies to enhance involvement of local actor groups and another is to amend Municipality Acts (provincial legislation) to support local capacity building and municipal engagement in ICM. Although this would strengthen efforts towards ICM and promote the integration of capacities and knowledge types, there is still a strong need to learn from our past experiences and continue to build institutional capacity so ICM is sufficiently supported over the long-term.

Given that there is presently renewed political will for ICM, opportunities exist to critically analyze coastal and marine governance regimes to prepare for an effective MSP process (Minister of Fisheries, Oceans and the Canadian Coast Guard, 2019; Prime Minister of Canada, 2019). Formal structures, such as policy instruments, emerged as a second critical recommendation that could more effectively support ICM in practice. It

was identified through this research that formal structures can support the other core ICM characteristics by catalyzing innovative multi-actor structures and facilitating the meaningful engagement of diverse actor groups (Chapter 4). For example, specific formal structures relevant to the Bay of Fundy, such as the Municipality Acts, provincial engagement strategies for New Brunswick and Nova Scotia, and Canada's Federal Oceans Act (4.6), would aid in the concurrent pursuit of multiple objective. In Canada and Atlantic Canada, the inadequacy of formal structures that support ICM has been previously pointed out by scholars (Chircop and Hildebrand, 2006; Hall et al., 2011; Jessen, 2011; Kearney et al., 2007; Vodden, 2015). In particular, formal structures that create and enforce standards for meaningful engagement of locally relevant actor groups, such as First Peoples and resource harvesters and users, are crucial. Formal structures that support ICM and span political cycles could aid in advancing progress with ICM in the Bay of Fundy region (4.5.1). Further, any amendments should ensure that policies can be tailored to the local context.

5.5.2 Global Implications

This study has contributed to the growing literature on integrated coastal and marine management and highlighted the importance of core governance characteristics to operationalize ICM initiatives. Previous to this study, governance of coastal and marine SES had been well-researched; however, governance, as it relates specifically to ICM, is referred to inconsistently across the literature. This dissertation consolidates an understanding of ICM in three ways. These insights are likely relevant to other regions within Canada as well as internationally to nations with similar social-ecological contexts.

1. The construction of an *Elements and Characteristics of ICM* framework.

The *Elements and Characteristics of ICM* framework tool developed for this thesis in Chapter 2 was used successfully to investigate past ICM initiatives in the Bay of Fundy through a governance lens. Specifically, the framework can be used as both a conceptual lens and analytical tool to understand how to overcome governance challenges that are impeding the operationalization of ICM, as shown in the Bay of Fundy (Chapter 3 and 4). The framework, further refined through its application to empirical case studies, should prove useful to other regions in Canada, and perhaps internationally (Table 17).

2. Identification of three core ICM characteristics.

The three core ICM characteristics identified (Chapter 2) provide a general focus for preparing ICM initiatives to progress through the various phases of operationalization. More attention must be paid to ensure that the three core ICM characteristics are in place prior to working towards other characteristics and before attempting to operationalize ICM initiatives. These three core ICM characteristics are most likely foundational, not only because they are essential in their own right, but also because their presence is likely to facilitate or lead to the development of other ICM characteristics. As seen in the Bay of Fundy, for example, formal structures can support innovative multi-actor structures and facilitate the meaningful engagement of diverse actor groups (Chapter 4). These

characteristics are perhaps relevant in any regional governance context trying to operationalize any ICM initiative with similar social-ecological contexts.

3. Context-based policy recommendations.

Opportunities and specific policy recommendations will need to be tailored to the capacities, objectives and histories present at the sub-regional scale. This study builds on previously offered core principles or characteristics for ICM with empirical evidence across multiple scales. In the Bay of Fundy, adopting the three core ICM characteristics would contribute to the proactive consideration of governance when pursuing ICM initiatives. Further, the three core ICM characteristics will aid in improving the acceptability of ICM initiatives by providing a streamlined approach for the context-specific design of ICM and support the subsequent implementation, monitoring and adaptive iterations. Additionally, other nations, or regions might also achieve the three core ICM characteristics to aid in ensuring their regional governance is appropriate for ICM. These findings offer insight to help ensure that governance is appropriate to succeed in operationalizing ICM initiatives and achieving management objectives.

The following benefits to the following communities in the Bay of Fundy are intended outcomes of the research and proposed policy recommendations:

- Local actor groups - by building relationships and collaborating through the sharing of actor perceptions, knowledge sharing, conflict mitigation;
- Non-government organizations (including private, NGOs, etc.) - by engaging and collaborating with them over the course of the research;
- Department of Fisheries and Oceans- by sharing recommendations for achieving sustainability within the Bay of Fundy;
- International community - through the theoretical contributions to ICM literature;
- Local colleagues and collaborators- by sharing research findings and lessons from the study with the intention on applying them within their own research/practices or fields.

5.5.3 Future Research

While it has often been assumed that the current governance regimes for coastal and marine systems have the capacity for integration (Nursey-Bray, 2016), the present research highlights real constraints (Chapter 3) and opportunities (Chapter 4) around this assumption. Future research priorities should adequately assess this assumption using an interdisciplinary approach in three main areas. First, more insight into legal and political contexts is needed to integrate sectors to achieve the three key objectives identified in this dissertation. Second, further investigation would be useful to determine an appropriate balance, and roles, including local actor group capacity, for combined governance approaches would be useful. Third, as the previous two areas are specific to context there is more knowledge to be gained about general processes from existing experiences.

To elucidate governance dimensions of ICM, certain areas (e.g., core ICM characteristics) should be focused on when gaining insights from experiences. In Canada, there is an array of promising combined approaches (e.g., co-management and co-governance) and their associated structures (e.g., Memorandum of Understanding, multi-

actor fora) between the federal and provincial Governments and First Peoples authorities across the country (e.g., MAPP, PNCIMA) (Hall et al., 2011). Due to the surge in interest and funding related to issues involving First Peoples in Canada, there are expanded opportunities for exploring new combined approaches to better support the operationalization of ICM initiatives.

Globally, many examples merit attention. The European Union has been pursuing marine strategic planning, including MSP and other ICM initiatives such as EBA, since 2008 following the Marine Strategy Directive Framework (MSFD) (European Union, 2014). MSFD experience illustrates how far different nations with different histories, priorities and capacities have sought to operationalize ICM in practice. Although many nations have developed and approved marine spatial plans, many plans are in the midst of being implemented. Additionally, as nations move into implementation there is much interest in the development of monitoring and evaluation moving forward. Now ending in 2020, the MSFD has catalyzed the first few phases of ICM to be pursued by many nations across a wide range of contexts (i.e., history, priorities and capacities). Based on current literature, international practice and the gaps highlighted through this research, Table 19 presents research priorities that should come next for work in the interdisciplinary field of ICM.

Table 19 Examples of future opportunities for ICM research

Examples of future research opportunities	Brief explanation
<i>Assess and enhance the ability for organizations to have capacity for ICM.</i>	An investigation into how to better prepare as an organization to achieve integrated objectives would be valuable for considering the presence of essential governance characteristics prior to mobilizing management interventions. For example, understanding organizational readiness for organizations and institutions to change governance as it takes time for existing systems to accept new priorities and harmonize sectoral regulations and mandates (Guenette and Alder 2007; Gissi et al. 2019). E.g., do we have social scientists and facilitators on staff?
<i>Determine next steps for transitioning or transforming governance to better facilitate the operationalization of ICM initiatives</i>	Exploring a wider systems approach required for establishing, transitioning, transforming the governance systems (i.e., characteristics) (Glaser et al. 2010; Kelly et al., 2019). For instance, climate change literature has investigated how to adapt governance for uncertainty and multiple overlapping socio-economic objectives.
<i>Connect monitoring and evaluation with results-based management literature to support the need for evidence-informed policy-making.</i>	Program evaluation is often difficult in practice, is often difficult and gets displaced by day-to-day management activities (Day, 2008). There remains an opportunity to strengthen the connection between core ICM characteristics and desired outcomes when developing monitoring and evaluation measures for ICM initiatives. Measuring outputs as well as outcomes from operationalizing ICM may help motivate the government to commit to ICM and take a leadership role (Belcher et al., 2017; Day, 2008).

There remain opportunities to update, amend and create formal structures that reflect what has been learned from experience. Extracting and applying/incorporating some lessons and strategies from global nations with similar contexts to Canada (e.g., transboundary, socio-economic interests, activities, etc.) would be pertinent to the continuation of knowledge advancement regarding how to set up governance for successful operationalization of ICM. Perhaps these insights into a close consideration of governance would help spare Canada, and perhaps other nations from yet another decade of stagnated progress with ICM and strengthen a path towards sustainable coastal and marine SES.

5.5.4 Reflections

Based on my experience in conducting this research I offer a few reflections about the research process and continued efforts in the Bay of Fundy.

This PhD journey has allowed me to continue my professional development in an interdisciplinary context. For example, I have become more of a patient and thoughtful researcher by building on my natural science knowledge and honing my social science skills through holistic thinking. I collaborated with regional and local organizations and performed new methods to drive my interdisciplinary research and work across different knowledge, and sectoral silos. Through this research, I have become even more motivated to develop and connect theoretical understandings to practical work. In particular, one area that stood out to me through this process is the idea that people working within organizations or institutions would benefit from a deeper understanding of their own capacity to work towards multiple objectives. For example, this dissertation has led me to new bodies of literature including institutional capacity, governance transformations and organizational readiness that I look forward to integrating in future work. Creativity, flexibility and patience are among the other skills I have fostered during my PhD experience. Navigating the many challenges of graduate school (including riding a non-stop rollercoaster of emotions) has led me to some important lessons and has permitted me to be more comfortable with seeing myself as an interdisciplinary researcher. For example, I am able to contribute a holistic perspective and acknowledge interconnections within a variety of contexts and audiences. I have also learned to be a better listener and how to be respectful of other perspectives and worldviews.

Unfortunately, COVID-19 has resulted in the collapse of several opportunities to network and disseminate dissertation results back to participants and collaborators (e.g., presenting and participating as a guest speaker at the Bay of Fundy Ecosystem Partnership (BOFEP) Annual Science Conference in Truro, Nova Scotia). I have been approached by Oceans North to adapt the in-person BOFEP workshop into an online survey and forum and continue to connect my thesis outcomes to practical action in the Minas Basin. Additionally, I will produce a policy brief focusing on how to advance the integration of local actor groups into coastal and marine governance. Policy recommendations for pathways towards ICM in the Bay of Fundy will be created and circulated to collaborators and participants. In lieu of meeting in person with a federal bureaucrat involved in decisions on the upcoming MSP and Blue Economy programs in

Canada, I will be creating a placemat (i.e., federal government policy brief) on how to augment action on ICM in Canada using specific evidence from international systematic review (Chapter 2) and the Bay of Fundy case study (Chapters 3 and 4).

It seems that opportunities to solve complex issues through integrated management initiatives are not unique to coastal and marine SES. Throughout my research and in conversations with colleagues from other departments, I have heard that Elements and Characteristics of ICM are often misaligned or insufficient for addressing complex, or wicked, problems. Rather, these problems require a transdisciplinary team and coordination of multiple sectors and scales that is not well facilitated by conventional governance arrangements. After observing many individuals attempting to do everything related to ICM, I have drawn the conclusion that individuals frequently work beyond their expertise and have trouble reaching out to other qualified people (such as social scientists or professional facilitators for engaging local actor groups).

Despite the challenges, I am a firm believer that we need to continue to pursue integrated approaches because individual perspectives and sector-based approaches are not effective if desired objectives (e.g., economic development, community wellbeing, ecosystem integrity, conservation, etc.) are to be more balanced. Insights from this research show that a combined capacity of diverse actor groups across scales can lead to more desirable outcomes and that a commitment is needed to continue to work, not only hard, but also smarter including ongoing critique of conventional approaches. I believe this new knowledge will make a difference if I continue to listen to the wisdom of others and combine my abilities with those who have different skill sets.

5.6 Concluding thoughts

This research stemmed from the acknowledgment of governance as an ongoing challenge for operationalizing ICM. Available evidence suggests ICM initiatives challenge institutional norms, and therefore integration among sectors towards common objectives has not been easy or straightforward. The stagnated progress made towards ICM in the Bay of Fundy, which may be indicative of progress across Canada, is concerning given the once promising nature of ICM in federal legislation (i.e., the Oceans Act was considered advanced at the time of its inception). However, there remains hope within the positive outcomes achieved through novel and inclusive structures to integrate across sectors, objectives, jurisdictions, scales or actor groups and through whispers of the possibility of an upcoming MSP agenda/directive.

Critically examining the underlying characteristics of governing regimes for ICM initiatives is likely to lead towards sustainable outcomes. Working towards a sustained commitment for ICM that can withstand political cycles and include previously absent actor groups from the process remains critical. Facilitated through the *Elements and Characteristics of ICM* framework, this research advances the understanding of ICM and governance in current literature and practice both within Canada and internationally. As a result, this dissertation provides another piece to the puzzle by bridging these concepts, and literature (e.g., confirming that certain governance characteristics are most relevant to operationalizing ICM as well as suggested a few new characteristics to be considered

moving forwards). Further, this work contributes to existing knowledge of both ICM theory and practice by advancing understanding of ICM as governance.

Broadly, I am happy to have had a chance to contribute to the growing theory and practice of ICM with the hopes of realizing integrated management initiatives and moving towards sustainable coastal and marine SES.

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Appendix A

Semi-structured interview protocol and questions

Note: Questions with Asterix * were asked in every interview, other questions were used to probe as necessary.

Thank you for agreeing to talk with me today. You have been identified as a key individual to talk with about your experiences with integrated coastal and marine management (ICM) in **the Bay of Fundy** [although it may not fall directly within your current position's purview/mandate].

Summary (2-5 mins)

Ecosystem health and coastal communities continue to be affected by many activities in coastal and marine areas. There is growing evidence suggesting that governance moves beyond the sector-based management of different activities and towards integrated initiatives. [Integrated can be conceptualized in many ways, I'm open to your interpretation]. In Atlantic Canada, there have been difficulties implementing integrated initiatives.

The purpose of this interview is to take stock of previous ICM initiatives within the Bay of Fundy and understand the challenges and opportunities for moving forward.

-I am particularly interested in the connection between governance, management, operationalization and outcomes of ICM initiatives.

The interview should take 45 mins-1 hour. Please let me know if you would like to skip any question.

Introduction and experience with ICM (5-10 mins)

1. *How have you been involved with coastal and marine management?
 - a. *How Long?*
 - b. *How is your agency involved with coastal and marine management?*

Lessons from ICM experiences (20-30 mins)

2. *What ICM initiatives are you familiar with in the Bay of Fundy?
 - a. Have you worked on an integrative initiative? In what capacity?
3. I have some follow up questions for each initiative:
 - a. How did this initiative come about?

- i. *Official or unofficial mandate?*
 - b. Who supported this initiative?
 - c. What was integrated about them?
 - d. What were the objectives for these initiatives?
 - i. *Were they long-term or short-term objectives?*
 - ii. *How were the objectives identified?*
 - iii. *Was there a mechanism for conflict resolution?*
 - iv. *Were trade-offs considered?*
 - 1. *Were both social (economic and cultural) and environmental impacts considered?*
 - e. *Who was involved in these initiatives? How (degree of participation, one or two way information exchange)?
 - i. *What was the role of each actor involved (government, non-governmental, resource users)?*
 - ii. *Who else should have been involved?*
 - iii. *Who had the most influence?*
 - iv. *Was there conflict? If yes was it addressed? If addressed, was it effective?*
- 4. *What were the outcomes of ICM initiatives/efforts?
 - a. *What phase did the initiative achieve (plan, implemented, monitoring and evaluation, adaptive management)?*
 - b. *Environmental? Social? Economic?*
- 5. Was the initiative successful? Why or why not?
 - a. *If they were successful, who or what contributed?*
 - b. *If not, what challenges prevented?*
 - c. *Were they in line with your understanding of sustainability?*
- 6. *From your perspective, are there any lessons?
 - a. *How do these lessons apply to future initiatives?*

Appendix B
Elements and Characteristics of ICM framework

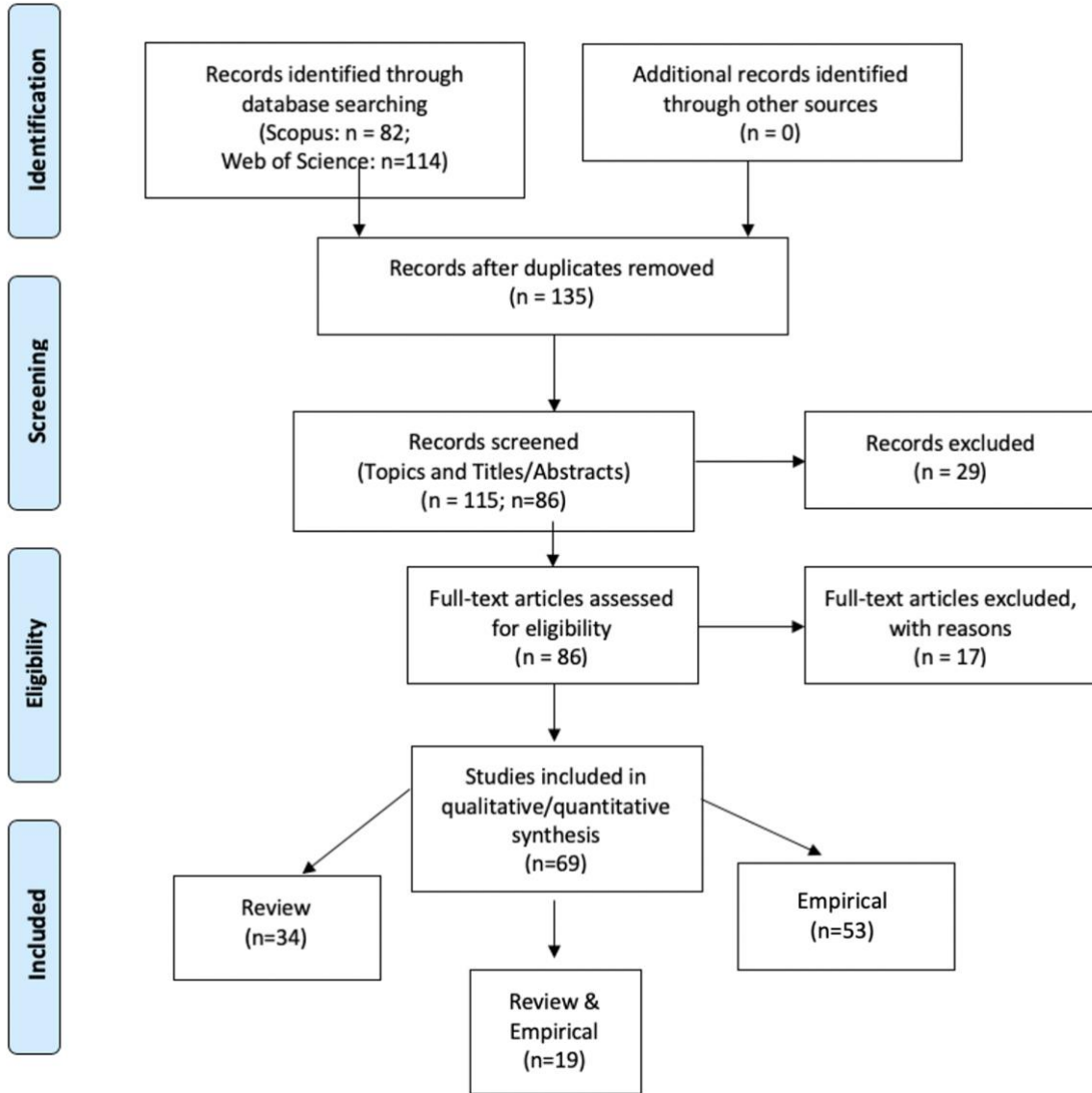
	Characteristics for ICM	Explanation	ICM
<i>Qualities (Values)</i>	<i>Good governance values</i>	A commonly used concept relating to a bundle of qualities needed for responsible governance (e.g., transparency, equity (balance trade-offs, inter and intra generational), accountability, etc.)	Stojanovic and Ballinger 2009; Dickinson et al., 2010; Cicin-Sain and Belifore 2003 Gilliland and Laffoley 2008; Stojanovic et al., 2004; Kenchington and Crawford 1993; Glavovic 2006; Satumanatpan et al. 2014; Staples and Hermes 2014
	<i>Proactive or precautionary</i>	Creation of ICM prior to conflicts or social-environmental issues arising, rather than as a response	Stojanovic et al. 2004
	<i>Democratic</i>	Value social equality and support the principles of democracy	Olsen and Tobey 1999
	<i>Operational objectives</i>	Tangible milestones are outlined	Olsen et al. 1997; Stojanovic et al. 2004; Collie et al. 2012; Satumanatpan et al. 2014
	<i>Strategic objectives or vision</i>	The establishment of broad, conceptual goals for sustainability over the long term	Dickinson et al., 2010; Stephenson et al. 2019; O'Boyle and Jamieson 2006; Burbidge 2004; Hollick and Mitchell 1991; Arkema et al/ 2006; Tobey and Vlok 2002; Stojanovic et al. 2004; Yao 2008; Ehler and Douvere 2009; Rodriguez 2017
	<i>Regional scale/boundaries</i>	Indicate the scope of boundaries at the regional scale	Foster et al. 2005; Stojanovic et al., 2004; Olsen et al. 1997; Yao 2008; Rodriguez 2017; Satumanatpan et al. 2014
	<i>Connected to local contexts (place-based)</i>	Connected across scales (from high level priorities to local contexts)	Stojanovic and Ballinger 2009; Dickenson et al., 2010; Kenchington and Crawford 1993; Olsen et al. 1997; Olsen and Tobey 1999
	<i>Multiple, balanced objectives</i>	Balanced objectives (i.e., principles of sustainability being considered (ecological; economic; social (including cultural), and; institutional (formal and informal)	Dickenson et al. 2010; O'Boyle and Jamieson 2006; Stephenson et al., 2017; Stojanovic et al., 2004; Hollick and Mitchell 1991; Olsen et al. 1997; Taljaard et al 2011; Rodriguez 2017

<i>Structures (What)</i>	<i>Multi-, Inter-, or Transdisciplinary Approaches</i>	Draws on more than one discipline or approach (e.g., natural and social sciences)	Chircop 2000; Koehn et al. 2013; Leon and Robles 2002; Smith 2002
	<i>Evidence-based decision-making</i>	Value science (e.g., use the best science available, spatial plans, evidence-based tools, etc.)	Tobey and Vlok 2002; n Taljaard et al 2011; Ehler and Douvere 2009
	<i>Adequate Resources</i>	Sufficient funding and staff is secured for the initiative	Ehler 2003; Stephenson et al. 2019; Burbidge 2004; Taljaard et al 2011; Ehler and Douvere 2009; Collie et al. 2012; Satumanatpan et al. 2014; Staples and Hermes 2014
	<i>Flexible, responsive (adaptive) structures</i>	As new information arises, structures can modify or adjust accordingly.	Brooks and Fairful 2017; Hall et al., 2011; Ehler 2003; Stephenson et al. 2019; Kenchington and Crawford 1993; Carpenter et al. 2013
	<i>Formal structures</i>	Legal basis for ICM through policy instruments (i.e., laws, acts, policies, regulations) (e.g., European Union Marine Strategy Framework Directive)	Cicin-Sain and Knecht 1998; Dickinson et al. 2010; Ehler 2003; Stephenson et al. 2019; Cicin-Sain and Belfiore 2005; Olsen et al. 1997; Taljaard et al 2011; Collie et al. 2012; Rodriguez 2017; Staples and Hermes 2014
	<i>Innovative mechanisms (e.g., structures or arrangements)</i>	Non-conventional ICM mechanisms (e.g., structures or processes) or conventional mechanisms being applied within the context of ICM (e.g., multi-actor structures, integrative policies, advisory groups, committees, deliberative fora).	Olsen and Tobey 1999; Tobey and Vlok 2002; Yao 2008; Satumanatpan et al. 2014; Dickinson et al. 2010; Cicin-Sain 1993; Cicin-Sain and Knecht 1998; Carvalho and Fidelis 2013; O'Boyle and Jamieson 2006; Foster et al. 2005; Cicin-Sain and Belifore 2005; Hollick and Mitchell 1991; Arkema et al. 2006; Staples and Hermes 2014
	<i>Vertical linkages</i>	Communication, coordination and integration across local, provincial and national institutions and policy instruments (e.g., laws, legislations, regulations, policies, etc.)	Olsen and Tobey 1999; Christie et al 2005; Cicin-Sain and Knecht 1998
	<i>Horizontal linkages</i>	Communication, coordination and integration across multiple institutions (e.g., sectors or departments) at one governance level	Olsen et al. 1997; Tobey and Vlok 2002; Taljaard et al 2011; Cicin-Sain and Knecht 1998

	<i>Multi-level, poly centric, nested</i>	Multiple interacting authority structures or governing bodies at various scales (e.g., nested) or within a specific location	Carvalho and Fidelis 2013; Hall et al., 2011; Christie et al 2005; Satumanatpan et al. 2014
	<i>Enforcement</i>	A mechanism to ensure that behaviors and actions match intentions/laws	Xue et al. 2005; Ehler 2003; Olsen et al. 1997; Ehler and Douvere 2009; Satumanatpan et al. 2014
	<i>Meaningful inclusion of diverse actor groups and knowledge types</i>	Participation/engagement of multiple heterogeneous actor groups, perspectives and knowledge (e.g., cultural, social, traditional)	Carvalho and Fidelis 2013; Dickinson et al. 2010; Ehler 2003; Jamieson et al. 2001; O'Boyle and Jamieson 2006; Burbidge 2004; Kenchington and Crawford 1993; Hollick and Mitchell 1991; Olsen et al. 1997; Olsen and Tobey 1999; Tobey and Vlok 2002; Stojanovic et al. 2004; Yao 2008; Taljaard et al. 2011; Ehler and Douvere 2009; Satumanatpan et al. 2014; Staples and Hermes 2014; Stephenson et al. 2019
	<i>Capacity building or development or empowerment</i>	Investment in the improvement of skills, knowledge and resources of an actor group (e.g., organize local actor groups, gain democratic representation)	Ehler 2003; Olsen et al. 1997; Olsen and Tobey 1999; Tobey and Vlok 2002; Yao 2008; Taljaard et al 2011
	<i>Clear roles and responsibilities</i>	Each actor group has a clear understanding of their role and impact/ influence (e.g., all actors know who has authority, who has influence/power)	Ehler 2003
	<i>Common vision/goals/approach/problem-framing</i>	Actor groups have a common understanding of the issue at hand and how to address it	O'Boyle and Jamieson 2006; Taljaard et al 2011
	<i>Political support, will or buy-in</i>	Elected officials or government leaders endorse ICM	Olsen et al. 1997; Christie et a. 2005; Collie et al. 2012; Burbidge 2004; Arkema et al. 2006; Satumanatpan et al. 2014
<i>Processes (How)</i>	<i>Early and ongoing engagement</i>	Actors are engaged early on and frequently in the ICM process	Carvalho and Fidelis 2013
	<i>Indicators for Monitoring and evaluation</i>	There is a clear intention to observe the progress of the initiative over time (e.g., often through established indicators)	Carvalho and Fidelis 2013; Ehler 2003; Dickinson et al. 2010; Taljaard et al 2011; Ehler and Douvere 2009; Rodriguez 2017; Satumanatpan et al. 2014
<i>Actors (Who)</i>			

<i>Conflict acknowledgement, mitigation or mediation/resolution</i>	Processes account for conflict in both identifying them and working to resolve them.	Ehler 2003; Cicin-Sain and Knecht 1998; Cicin-Sain and Belfiore 2005; Olsen et al. 1997; Yao 2008
<i>Learning or knowledge co-production/integration-focused</i>	Processes acknowledge the value and work to embed the creation of new knowledge, learning from experience and /or disseminating lessons	Olsen et al. 1997; Rodriguez 2017
<i>Iterative, reflective, reflexive or adaptive</i>	Processes are continuous, cyclical and contain feedback mechanisms	Carvalho and Fidelis 2013; Brooks and Fairfull 2017; Dickinson et al. 2010; Ehler 2003; O'Boyle and Jamieson 2006; Stephenson et al. 2019; Stojanovic et al., 2004; Olsen et al. 1997; Olsen and Tobey 1999; Tobey and Vlok 2002; Taljaard et al 2011; Ehler and Douvere 2009; Collie et al. 2012; Rodriguez 2017

Appendix C
PRISMA diagram depicting inclusion of articles in the review



Appendix D
Summary of coded themes relating to challenges and opportunities with illustrative quotations

Challenges (Themes)	Sub themes	Illustrative quotations
<i>Unsustainable commitment from legal authorities</i>	<ul style="list-style-type: none"> • Inconsistent support and leadership/buy-in (e.g., mandate changes) • Influenced by external drivers (e.g., political agendas, international agreements, conflicting jurisdictional priorities) • Succession/frequent change of decision makers (e.g., ministers) 	<ul style="list-style-type: none"> • "You kind of have to talk to the people that are regulated in the first place because you asked them to implement a management measure that cannot be implemented in the daily operations of what they do."(Participant 23, 2018) • " When you are dancing with a bear, it's not you that decides when to stop" (Participant 8, 2018)
<i>Inadequate capacity to sustain initiatives</i>	<ul style="list-style-type: none"> • Expertise • Knowledge • Secure funding and resources • Rare to have allocated staff (e.g., administrative) • Chasing funding opportunities based on government priorities (mandate of the day) • Dependent on champions, i.e., staff or volunteers, to catalyze and sustain initiatives • Side of desk' mentality 	<ul style="list-style-type: none"> • "One thing we have learned is that partnerships for MPA, like an education and outreach, say the government doesn't really have a mandate for that and it's always off the side of our desk." (Participant 45, 2018) • "A key element here that needs to be put in place and that is we have no institutional capacity, institutional, sort of resource to help build capacity in communities and organizations, to be able to fully engage around these things, to be able to play a meaningful role in shaping your destiny as a community, You need to have the sort of human capacity to do that... the issue of capacity, to organize effectively is the biggest stumbling block of all." (Participant 62, 2018)
<i>Inappropriate diverse actor group engagement</i>	<ul style="list-style-type: none"> • Insufficient connection to local context/ inappropriate scale of decision-making • Exclusion of certain knowledge types (local, cultural) and actor groups (especially those impacted by decisions on the ground) • Unclear role or expectations of actor groups in processes 	<ul style="list-style-type: none"> • "It's hearing all these perspectives, but then actually the outcome is, is making as many people as happy as possible, not just industry or government." (Participant 6, 2018) • DFO in Ottawa is "isolated to the realities on the ground" (Participant 62, 2018) • "They don't have an ocean in Ottawa" (Participant 21, 2018)

	<ul style="list-style-type: none"> • Trade-offs not considered • Inadequate timing and types of engagement being used (e.g., Tokenism) • Inadequate types of engagement opportunities (e.g., one-way communication; tokenism) • History of broken trust (e.g., between government and local actor groups) • No conflict mediation within processes 	<ul style="list-style-type: none"> • "... I think is what's lost in the decision-making process is that the people who are making the decisions haven't actually been on the ground." (Participant 26, 2018) • "We aren't a homogeneous community within this catchment area." (Participant 32, 2018) • "Why did you ask us here? This isn't a consultation. This is a lecture." (Participant 37, 2018). • "Communities want jobs and to grow, and for young people to stay, but they are also worried about the activity and how it will impact their environment and their way of life. Industry needs to be integrated into communities, it's good business practice." (Participant 65, 2018) • "Industry and government have just gone ahead with whatever development they wanted to, without considering the implications to people's health and livelihood as well as the history and lifestyle that people have grown up with." (Participant 60, 2018).
<p><i>Insufficient vertical integration of policies</i></p>	<ul style="list-style-type: none"> • Conflicting mandates and competing incentives (i.e., sector based management is deeply embedded within practices) • Little cohesion at federal and provincial level between federal and provincial level between departments (jurisdictions) • No long-term vision or goals • Unclear understanding of roles, responsibility and influence of actor groups within decision-making processes • Limited transparency of how decisions are made • Lack of accountability 	<ul style="list-style-type: none"> • "So I think it's less about devolving authority into the local level than it is about increasing connectivity across constitutional jurisdictions." (Participant 28, 2018) • "There's so many different people that have perceived or realistic ownership of a certain area that they don't want to let other people make decisions about it." (Participant 51, 2018) • "...it doesn't matter how good or strong or sensible your arguments are, they cannot really be persuaded because the mandate says 'this is what you have to do'." (Participant 36, 2018) • "I had no, no knowledge that DFO would have certain levels of authority that would change how we were able to make our decision-making." (Participant 41, 2018) • "It shouldn't be us against them [federal/provincial]. We should all be in it together having the same common objective and expected outcomes of the exercise." (Participant 2, 2018)

		<ul style="list-style-type: none"> • "How has that data informed policy and if it has informed policy, has that actually changed? Because otherwise, what is the point of what we're doing? What any of us are doing, if the information generated cannot get to those people making the decisions." (Participant 52, 2018). • "So restructuring and decentralization - both of those things need to happen" (Participant 62, 2018)
<i>Unsupported informal structures for horizontal integration</i>	<ul style="list-style-type: none"> • Informal efforts not recognized as legitimate • Single actors cannot accomplish integration on their own • Not supportive of bottom-up structures • No motivation to share responsibility with other actors 	<ul style="list-style-type: none"> • "Integrated management and [marine] protected areas, they are collaborative, they don't work if people don't want them to... you need support, you need relationships..." (Participant 45, 2018)

Appendix E
Lit of integrated initiatives mentioned by participants (n=60)

Initiative Type	Name
Body (e.g., plan, program, policy, co-management arrangement)x	Annapolis Basin Working Group
	Atlantic Coalition for Aquaculture Reform (ACAR)
	Bay of Fundy Fisheries Council
	Cumulative Effects Working Group (CEWG) (federal)
	Fisheries Resource Conservation Council (FRCC)
	Coastal Economy Initiative
	Fixed Gear Council
	Gulf of Maine Council of the Marine Environment
	Marine Debris Working Group
	Canada -Nova Scotia Off-shore Petroleum Board (CNSOPB)
	Progressive Protection Council
	Seafood Value Chain Roundtable (SVCRT)
	North Atlantic Right Whale Fisheries Mitigation Working Group
	South Western New Brunswick (SWNB) Marine Advisory Council (MAC)
	Regional Committee on Coastal and Oceans Management (RCCOM)
	Eastern Scotian Shelf Integrated Management (ESSIM) stakeholder advisory committee (SAC)
Bras d'Ors Lake Collaborative Environmental Planning Initiative (CEPI)	
Friends of Port Mouton Bay	
Management initiative (e.g., plan, program, policy, co-management arrangement)	Annapolis Clam Diggers
	AROM (Aboriginal Aquatic Resource and Oceans Management)
	Atlantic Ecosystem Initiative (AEI)
	Atlantic Integrated Commercial Fisheries Initiative (AICFI)
	Minas Bay Biosphere Reserve (Proposal)
	Coastal 2000
	St. Andrews Climate Adaptation Plan
	Oil spill response planning (Coast Guard)
	Renewed Marine Spatial Planning Mandate
	Ocean Protection Plan
	Habitat Stewardship Program for Species at Risk
	Ecosystem-based Integrated Resource Management (Nova Scotia Forestry)
	Federal Marine Protected Areas Strategy
	Nova Scotia Coastal Protection Act (2019)
St. Croix Food Fishery (Alewife) Restoration	

	South Western New Brunswick (SWNB) Resource Planning Initiative
	ACAP St. Croix Comprehensive Environmental Management Plan (CEMP) and Caring for Our Coasts (2013 Plan Update)
	Striped Bass research and management in Minas Basin
	WWF Marine Spatial Planning Program and Workshop
	Lobster recruitment index project
Organization (e.g., non-profit, business, association, etc.)	Atlantic Coastal Action Program (ACAP) - St. Croix
	Atlantic Coastal Action Program (ACAP) St. John
	Clean Annapolis River Project (CARP)
	Eastern Charlotte Waterways
	Bay of Fundy Marine Resources Center
	Bay of Fundy Ecosystem Partnership (BOFEP)
	Coastal Livelihoods Trust
	Nova Scotia Environmental network
	Canada's Ocean Supercluster
	Fundy Ocean Research Centre for Energy (FORCE)
	Charlotte Coastal Tourism Association
	Conservation Council of New Brunswick
	Coastal Zone Canada
	Ocean Tracking Network
Research initiative (e.g., funded for research, research output)	Minas Basin Working Group
	M.I.N.A.S (Marine Institute of Natural and Academic Science)
	Coastal CURA
	Canadian Water Network (CWN)- Canadian Watershed Research Consortium (CWRA)
	Canadian Fisheries Research Network (CFRN)
	Herring Science Council
	Strategic Environmental Assessment – Bay of Fundy
	Writing the Rules of Ecological Fisheries Management in the Bay of Fundy.

Appendix F
Documents included in supplementary document review relating to sub-regional case studies

Relevant to LB, UB, or Both	Type	Author/ Organization	Year	Reference
UB	Report	Musselman. Bay of Fundy Ecosystem Partnership (BOFEP)	2003	Minas Basin Watershed Profile – Robin Willcocks-Musselman. Technical Report #2
Both	Film	A Film by Sarah Bood for the Coastal CURA	2012	A Coastal Partnership. A Coastal Partnership: Maritime Stories of Integrated Management
Upper Bay	Report	Musselman, Orser, Brylinsky, Hinch. BOFEP	2003	Planning for action in the Minas Basin Watershed
Both	Report	Department of Fisheries and Oceans	1996	By the Sea: A Guide to the Coastal Zone of Atlantic Canada.
Both	Film	Martha Stiegman and Sherry Pictou	2007	In the Same Boat. 39 mins. vINT049
Both	Court Cases	Government of Canada	-	The Haida Nation and Taku River; R v. Marshall; Tsilhqot’in Nation v. British Columbia.
Both	Report	Bay of Fundy Fisheries Council and Conservation Council of New Brunswick	2000	Bay of Fundy Marine Resource Centre, and Conservation Council of New Brunswick. Writing the Rules of Ecological Fisheries Management in the Bay of Fund. 30p
Both	Newsletter, Proceedings	Bay of Fundy Ecosystem Partnership	2018	Annual science meeting proceedings
Both (LB)	Theses	Clarke Mercer (2010) and Courtney Parlee (2016)	2010; 2016	Rethinking responses to coastal problems: an analysis of the opportunities and constraints for Canada; Resolving conflict over risk management in the marine environment: strengthening governance institutions.
LB	Slideshow	Southwest New Brunswick Marine Resource Planning Steering Committee	2009/ 2011	Southwest New Brunswick Marine Resources Planning. “The Preferred Future of the Bay” Recommendations Toward a Community Based Plan for the Management of Marine Activities and Space in Southwest New Brunswick Bay of Fundy. Phase II

LB	Report	Gulf of Maine Council	2018	Framework for Action. 2018-2022. Gulf of Maine Council on the Marine Environment. http://www.gulfofmaine.org/2/wp-content/uploads/2014/06/GOMC-Framework-for-Action-2018-2022-2.11MB.pdf
Both	Report	World Wildlife Fund – Atlantic Region	2015	Bay of Fundy Scoping Study; Exploring Ocean planning in the Bay of Fundy
Both	Website, Terms of Reference	Spirit of the Lakes Speaks: Bras d’Or Lakes Collaborative Environmental Planning Initiative	2018	Spirit of the Lakes Speaks: Bras d’Or Lakes Collaborative Environmental Planning Initiative
Both	Report	Ecology Action Program. Graham.	2008	Integrated coastal zone management in the Bay of Fundy: Implications for tidal power.
UB	Report	East Coast Environmental Law. Mitchell and Ward.	2015	Aquaculture Regulation in the Post Doelle-Lahey Era: An Analysis of Nova Scotia’s New Regulatory Framework.
UB	Report	Provincial Coastal Management in Nova Scotia – A Legislative Review	2012	East Coast Environmental Law. Kraft.
Report	Workshop Report	World Wildlife Fund Department of Fisheries and Oceans.	2011	Summary of the Regional Workshop on Marine Spatial Planning: A Technical Learning Session.
Both	Report	ACZISC Secretariat and Marine and Environmental Law Institute of Dalhousie University	2005-2006	Overview of Current Governance in the Bay of Fundy / Gulf of Maine: Transboundary Collaborative Arrangements and Initiatives
Both	Website and publications	Coastal CURA	Accessed 2019	http://www.coastalcura.ca/
Both	Plan	DFO	2018, 2019	Departmental Working Plan 2018-2019; 2019-2020
	Audit	Office of the Auditor General	2005	Report of the Commissioner of the Environment and Sustainable Development to the House of Commons,
Both	Journal Article	Stephenson et al.	2019	Canadian Fisheries Research Network: Framework elements of operational candidate objectives
Both	Journal Article	Rutherford, Herbert and Coffen-Smout	2005	Integrated ocean management and the collaborative planning process: The Eastern Scotian Shelf Integrated Management (ESSIM) Initiative.

Both	Journal Article	Hall, MacLean, Herbert and Coffen-Smout	2011	Advancing objectives-based, integrated ocean management through marine spatial planning: Current and future directions on the Scotian Shelf off Nova Scotia, Canada
LB	Output/ Framework	Marine Resource Plan Development Steering Committee	2009	The preferred future of the bay’’: recommendations towards a community based plan for the management of marine activities and space in Southwest New Brunswick Bay of Fundy. (Community Values Criteria)
UB	News Article	Buckley, D.E. Bedford Institute of Oceanography, Dartmouth, Nova Scotia. Pp.2, 6.	<u>1977</u>	The Effects of the Canso Causeway on the Marine Environment of the Strait of Canso and adjacent Bays.
Both	Journal Article	McLeave, Xiongzi and Huasheng	2003	Lessons learned from ‘decentralized’ ICM: an analysis of Canada's Atlantic Coastal Action Program and China's Xiamen ICM Program

Appendix G
Overview of sub-regional case studies

<i>Aspects of Context</i>	Lower Bay (LB), New Brunswick	Upper Bay (UB), Nova Scotia
<i>Examples of previous ICM initiatives</i>	Southwestern New Brunswick Marine Advisory Committee; Debris Free Fundy; Marine Planning Initiative	Tidal energy strategic environmental assessment; Minas Basin Working Group Community Forums (Bay of Fundy Ecosystem Partnership); WWF MSP Workshop
<i>Examples of key legislations for coastal and marine social-ecological systems</i>	National Legislation: Ocean Act, Fisheries Act, Canada Marine Act, Canada National Parks Act, Canada Wildlife Act, Canada Environmental Assessment Act (2019), Canada Environmental Protection Act, Migratory Birds Convention Act, Species at Risk Act, Indigenous Law Treaties (constitution Act s.35), Navigable Waters Protection, National Marine Conservation Areas Act, Canada Shipping Act	
	Provincial Legislations: Community Planning Act (2017), Coastal Areas Protection Policy (through Watercourse and Wetlands Alteration Regulation), Clean Water Act (1989), Parks Act, Protected Natural Areas Act, Clean Environment Act, Marshland Reclamation Act, Fish and Wildlife Act,	Provincial Legislations : Fisheries and Coastal Resources Act (1996), Beaches Act, Coastal Protection Act (2019 not yet in force), Provincial Parks Act, Endangered Species Act, Nature Reserves Protection Act, Special Places Protection Act, Environment Act, Provincial Parks Act, Special Places Protection, Wilderness Areas Protection Act
<i>History</i>	Out migration from rural towns to cities, general distrust in government from past spatial protection efforts, measures taken by communities to have local voices heard (e.g., billboards, rallies, DFO occupation)	
	Save our Science Rallies, Energy East pipeline halted, crash of alewife in St. Croix River/Estuary	Building of dyke infrastructure/systems in coastal areas, Canso Causeway construction, Tidal turbine company goes bankrupt and ordered to remove turbine
<i>First Peoples</i>	Mi'kmaq First Peoples have the Brothers Indian Reserve No. 18 and Peskotomuhkati First Peoples (Passamaquoddy) who have a land claim at St. Andrews but have no reserves or official status in the province. Territory extends from New Brunswick into the state of Maine.	Mi'kmaq First Peoples have communities in: Millbrook, Kluskap (Glooscap), Sipekne'katik (Indianbrook). Priorities include clarifying the Indigenous ceremonial and food fisheries

<i>Primary community/local actors</i>	Primarily rural areas, some urban areas (Saint John, Truro, Wolfville)	
	Remote islands (e.g., Deer, Campobello, Grand Manan) (some only accessible by ferry); fishing industry (harvesters and processors), conservation and research sector	Acadian settlers, Academic institutions (Acadia University and Mount Allison University), traditional weir fishermen, bait fish,
<i>Ecologically relevant areas/habitats</i>	SARA Critical habitat (e.g., Atlantic salmon), important bird areas, large tidal variation	
	SARA Critical habitat (e.g., northern right whales), eelgrass habitat; Musquash Marine Protected Area	SARA Critical habitat (e.g., striped bass, wolffish), mudflats (intertidal zone), highest tides in the world
<i>Economics/ main income sources</i>	Fisheries exports (lobster, herring, scallops), seasonal tourism (e.g., whale watching, tidal bore rafting, kayaking, bird watching), significant amount of disability and unemployment	
	Aquaculture (finfish and shellfish)	
<i>Ongoing/developing human activities</i>	Lobster, finfish and shellfish aquaculture, tourism, forestry and agriculture, bird watching, hydropower	
	Herring (weirs), scallops, clams, whale tourism, shipping/transport, cruise ship port (Saint John); whale watching tourism; oil pipeline; dulce (Grand Manan), nuclear plant	Groundfish, recreational bass fishing, tidal energy development; wind turbines
<i>Drivers of change/ potential threats</i>	Ghost gear and plastic pollution, climate change, coastal development, marine spatial protection	
	North Atlantic right whale sightings and fishery closures, oil and gas port, salmon pen aquaculture	Renewable energy development (tidal), conflicts between Indigenous and non-Indigenous fishermen (re: Indigenous ceremonial and food fisheries)

GLOSSARY

Concept (Abbreviation)	Brief Definition
Actor Groups	Individuals, authorities, and/or organizations with a stake in coastal and marine resources (Biermann et al., 2010; Vallejo and Hauselmann, 2004). For example, actor groups may include owner-operator fishers, government authorities, industry sectors, non-governmental organizations, and Indigenous rights holders.
Elements and Characteristics of ICM	A synthesis of characteristics needed for ICM from the literature organized through the Elements of Governance framing.
Elements of Governance	The basis to the conceptual framework guiding this research which is applied to ICM throughout the dissertation. Elements provides the context (e.g., who, how and with what values) within which decisions are made and therefore impact how activities are managed. Elements in this research are conceptualized as qualities, actors, structures and processes.
Engagement	A spectrum of approaches to sharing and understanding the impacts of decisions on various actor groups ranging from one-way communication to having some authority over decision-making (e.g., consultation, involvement, collaboration, partnerships and empowerment) (IAP2, 2002).
Governance	Governance can be conceptualized in a multitude of ways (de la Torre-Castro, 2012). In this research governance is the way actor groups in society (i.e., individuals and organizations) interact and coordinate to steer social and political processes (e.g., decision-making) (Bennett and Dearden, 2014).
Institutions	Formal (e.g., administrative structures, policies) or informal (e.g., customs, practices, norms) rules that structure the way people interact with each other and the environment (Cortner et al., 1998).
Integrated Coastal and Marine Management (ICM)	A holistic and strategic type of governance that seeks to move beyond conventional sector-based approaches and to balance complex coastal and marine social-ecological system objectives to maximize equitable benefits. ICM requires bold action oriented initiatives that consider both the environment and human wellbeing (Bennett et al., 2019).
ICM initiatives	Management interventions that work towards achieving multiple objectives (e.g., social, ecological, economic, cultural). Such initiatives often include multiple actor groups and sectors within the operationalization process. ICM initiatives include ecosystem-based approaches, marine spatial planning, integrated coastal zone management, and networks of protected areas.
Management	The operational decisions and actions that are taken to achieve specific outcomes (UNDP, 1997, p. 240)
Operationalization	With regards to ICM initiatives, there are four iterative phases that are required: planning, implementation, monitoring and evaluation, and adaptation (Ehler, 2003; Olsen, 2002)