Marine Environmental Grey Literature: A Case Study of the Gulf of Maine Council on the Marine Environment

by

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Submitted in partial fulfillment of the requirements for the degree of Master of Library and Information Studies

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DALHOUSIE UNIVERSITY SCHOOL OF INFORMATION MANAGEMENT

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Dedication

I dedicate this thesis to the following, without whose love and support it would have been impossible to complete:

My wonderful friends in the Dalhousie University MLIS program. Thank you for all the lunches, for all the laughs, for listening to my complaints, and for your encouragement.

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Abstract

This thesis is a case study of the Gulf of Maine Council on the Marine Environment (GOMC), an intergovernmental organization with a complex governance arrangement guiding its grey literature publication practices. To gain further understanding of the use of GOMC grey publications and their influence on public policy, in-depth interviews were conducted with 19 key GOMC Working Group Members. Barriers and enablers to production, distribution, and use of GOMC's publications were identified and contributed to an increased understanding of publishing in the grey genre. Insights about GOMC's publication practices, including the fragmented nature of the production process, the diverse methods of distribution of publications, and Members' understanding of the use of publications, are addressed by this thesis. Conclusions regarding how Working Group Members perceive the grey publishing genre are provided, including the observation that publishing in the grey genre is not a matter of concern when promoting awareness of publications.

List of Abbreviations Used

ACZISC	Atlantic Coastal Zone Information Steering Committee
COINAtlantic	Coastal and Ocean Information Network Atlantic
DFO	Department of Fisheries and Oceans
EPA	United States Environmental Protection Agency
ESIP	Ecosystem Indicator Partnership
GOMC	Gulf of Maine Council on the Marine Environment
GPAC	Global Programme of Action Coalition
HADD	Habitat Alteration, Disruption or Destruction
NOAA	National Oceanic and Atmospheric Administration
ODLIS	Online Dictionary of Library and Information Science
ODPX	Ocean Data Partnership and Information Exchange Network
RARGOM	Regional Association for Research on the Gulf of Maine
RSS	Really Simple Syndication

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Chapter 1 Introduction

A recent editorial in Nature (2010) stated "scientists...can and must continue to inform policy-makers about the underlying science and the potential consequences of policy decisions..." (p. 141). The editor's statement emphasizes the importance of communication between scientists and policy makers so that the most credible and timely scientific information is brought to bear on decisions on global issues. Current environmental concerns such as climate change and the health of the world's oceans require strategic and informed policy responses. The quantity of publications, i.e., knowledge, on scientific environmental subjects is growing rapidly to meet the current demand for informed understanding and policy-making that will help to solve the world's environmental crises. With this increased output of environmental science research, how do policy-makers determine what information is the most reliable and the most applicable to their needs? More importantly, are policy makers using the most timely and credible science as they strive to develop and implement policy and, if not, would an increased awareness of timely scientific information enhance their ability to make better decisions in order to protect the environment of our planet?

A large portion of today's scientific environmental information is published as grey literature, which is an under-utilized form of publication that can transmit knowledge to be used by both scientific and policy-making communities (Gefland, 2000; Hutton, 2008). Grey literature is simply defined as "that which is produced by all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers" (Third International Conference on Grey Literature, 1997, iii). Some types of grey literature are subject to a rigorous peer review process that is reflective of the high quality, substantially-funded research from which it is developed. However, the use of grey literature in general is hindered by both misconceptions about its quality and by the sheer volume of available information, which contributes to a lack of awareness of specific publications. Despite the prevalence of information published in various forms as grey literature, its diffusion and impact are rarely studied (MacDonald, Cordes & Wells, 2007) and its potential for influencing policy-making at the government level is not well understood (MacDonald & Wells, 2009).

While the broad and important question regarding the use and influence of scientific grey literature on policy and decision-making was the impetus for beginning this study, it was determined that before such a question could be answered, it was important to understand the publication and dissemination practices of organizations that produce grey literature. This point cannot be overstated; without detailed knowledge of how producing organizations understand the distribution and use of their own publications, there is no way to know if they are having the intended influence on target stakeholders. Before policy makers can be asked whether or not information in a marine environmental publication had any influence on their decision-making, it must first be understood if they were the target audience for that information. If they were, but further research indicates that they were not aware of that information, then the barriers to the dissemination process can be traced to their source and studied.

2

Data obtained in interviews with Working Group Members of the Gulf of Maine Council on the Marine Environment (GOMC) provided insights based on the perspectives of informed insiders into factors that influence the practices used to produce, disseminate, and promote awareness of grey literature. Conducting interviews with GOMC Working Group Members was a crucial step in the process of unraveling the complex issues of the use and influence of the organization's publications, and demonstrated the substantial contribution of the interview method for development of an understanding of the internal organizational factors that both enable and impede the publication process.

Successfully promoting the use of scientific grey literature for use in policy and decision-making begins with the producing organization. Intergovernmental groups such as GOMC face considerable challenges when they rely heavily on grey literature as their main method of publication. This study emphasizes the importance of grounding an understanding of these issues with the internal knowledge of the organization, as well as knowledge about GOMC's publication record.

1.1 Background

Issues of environmental import are not constrained by political borders and, as such, intergovernmental advisory bodies have been established to manage transboundary concerns. The Gulf of Maine Council on the Marine Environment (GOMC) is a bilateral, intergovernmental advisory organization that produces substantial quantities of information as grey literature and is the case study organization for this research. GOMC's 21 year history began in December of 1989 when the premiers of Canadian provinces of Nova Scotia and New Brunswick, and the governors of the American states of New Hampshire, Massachusetts, and Maine came together at the inaugural conference in Portland, Maine to discuss the potential of bi-national cooperation to deal with the environmental degradation of the Gulf of Maine/Bay of Fundy region (Springer, 2002).

The creation of the Council was in response to "both the perceived need for increased institutionalization of patterns of cooperation in the North Atlantic region, and the desire by state and provincial actors, both governmental and non-governmental, to play a more central role in the process" (Springer, 2002, p. 32). Currently, GOMC continues to play an important function in the environmental management of the Gulf of Maine and is considered by the Oceans Commission of the American federal government as one of its main coastal programs (MacDonald & Wells, 2009). Operating since 1989, GOMC has completed three, five-year action plans (and is currently in the middle of a fourth, five-year plan). A Working Group, several high-level permanent committees, and task forces carry out the work mandated by the Council (Chircop, VanderZwaag, & Mushkat, 1995; Pudden, VanderZwaag, Lowry, Kellam, & Dalhousie Marine and Environmental Law Institute, 2006).

GOMC is an excellent case study organization because of its close attention to the communication and dissemination of marine environmental information to managers, policy makers, non-governmental groups, industry leaders, and the general public, almost all of which is published as grey literature. MacDonald et al. (2007) state that "the Council, working by itself or in collaboration with others, has published widely, including conference proceedings, technical reports, conference background documents,

annual reports, action plans, newsletters, newspapers, magazines, fact sheets, brochures, maps in poster format, and a video" (p. 34). As the Internet has become more widely used as a medium for publishing, GOMC has transferred its early publications to its Web site, which includes a comprehensive and evolving list of both old and new publications.

As early as 1992, the Council recognized that "in order to effectively manage the Gulf of Maine as the ecosystem that it truly is, decision-makers must have access to data and information from sources throughout the entire Gulf of Maine system" (Tyler, 1992, p. 4). Since that time, GOMC has continued to make the publication of new information on key Gulf of Maine issues one of its top priorities. However, despite obvious successes (e.g., the *Gulf of Maine Times*), GOMC still struggles with issues of information dissemination and in describing publications for easy searchability and access (MacDonald et al., 2007). Such barriers to diffusion of information could potentially limit the influence of GOMC's publications in the policy spheres of the various jurisdictions and suggests that ongoing attention must be paid not only to the production of useful information, but also to its distribution and accessibility.

1.2 Looking Beyond Citation Analysis: Conducting Interviews

Through an analysis of citations to GOMC grey publications, MacDonald et al. (2007) clearly demonstrated that GOMC's grey literature publications were being cited in the broader literature: "500 citations were located after extensive searching using several citation tools" (p. 30). Although citations are an excellent, quantifiable measure of the use of GOMC publications, they are only one indicator of the use and influence of GOMC publications. By using a qualitative methodology that employs interviews with GOMC

personnel, the current study explored the dissemination and use of the organization's publications from an insider's point of view. This approach offers unique insights regarding the production, distribution, and use of grey literature.

Through an interview protocol (see Appendix A) that dealt with production, dissemination, awareness, and use, the participants were asked about their understanding of the publishing practices of GOMC. Interviewees were given the opportunity to provide anecdotal evidence of the use of GOMC's grey literature, as well as to address how changing technology and distribution methods have or have not affected the dissemination of such literature. The aspects of production, distribution, and use determined from the interview method enhanced the understanding of grey literature's potential to influence scientific knowledge and public policy, which led to recommendations for how GOMC information could be better disseminated, promoted, and utilized.

1.3 Understanding the Flow of Information: A Guiding Framework

Based on current understanding of the flow of information from within to outside GOMC, an interpretive framework (see Figure 1) was modified to account for the pathways and barriers to the production, distribution, and use of grey literature, and to guide the study as a whole. Developing an understanding of the use and influence of information in grey publications is a complex, multi-faceted process that encourages a broad range of questions spanning the production of scientific research all the way to the influence of grey literature on policy/decision-making. The interpretive framework provided context for the study's research questions by narrowing the scope of the larger

issue of the influence of grey literature publications by and on information users and producers (see small rectangles enclosed by black dashed outlines in Figure 1) to focus on issues of dissemination and use.



Figure 1. GOMC Information Pathway Guiding Research Framework (adapted from MacDonald et al., 2007)

The three elements of information flow (production, distribution, and use) probed most deeply by the interview questions during this study are enclosed by the white dashed outline in Figure 1. The box labeled "Use" is not fully enclosed in the rectangle with the white dashed line because it was not expected that the interview protocol would provide a deep understanding of the issue of use (i.e., only one question asked specifically for evidence of the use of publications and two other questions indirectly queried the use of GOMC information). The three elements, as well as the communication barriers between them (labeled as Barriers in Figure 1), were the focal point for data collection and analysis. Contextual factors, which influence the production, distribution, and use of GOMC information (labeled as Context in Figure 1) include the organizational structure and function of GOMC, the political and economic influences of Canada and the United States, the current environmental issues of the day, and pressures from the general public whose opinions could influence the priorities placed on issues in the Gulf of Maine/Bay of Fundy region. The interpretative framework evolved over the course of the project and is revisited in Chapter Five, where insights about the actual pathways and barriers to the flow of information within GOMC are revealed.

1.4 Research Questions

Seven major questions guided this case study of the Gulf of Maine Council on the Marine Environment:

- 1. How are publications produced by this organization?
- 2. What is the understanding of GOMC Working Group Members about publication practices within the organization?
 - a. In the opinion of Working Group Members, are the publication practices of GOMC contributing to the mandate of the organization?
- 3. Does the governance structure of the organization influence publication practices?
 - a. Does the bi-national structure of GOMC influence the distribution patterns of its publications?
- 4. How are the publications of GOMC disseminated?

- a. Is distribution/dissemination considered important by the interviewees?
- 5. What evidence of the use of GOMC publications is suggested by the interview participants?
- 6. How are grey literature publications valued?
 - a. How are they valued within the case study organization?
 - b. What does the above data tell us about the value of grey literature generally?
- 7. Based on findings from the case study, what suggestions can be made about alternative methods for promotion and dissemination of grey literature so that its influence is more pronounced?

Data analysis completed in this study provided a clearer representation of the processes of production, distribution, and use of marine environmental grey literature by intergovernmental organizations. Chapter Two presents a review of literature regarding the characteristics and history of grey publishing, the nature of intergovernmental groups that deal with science and policy development, the complexity of information dissemination processes, and the characteristics of useful and credible scientific information that is most relevant for decision-making. Chapter Three outlines the qualitative interview methodology employed in this study and details the process by which interviewees were selected and how the data was analyzed. Chapter Four contains results of analyses of the interview data, developed through the synthesis and organization of the interview transcripts using qualitative data analysis software. Chapter Five summarizes and discusses the analyses provided in Chapter Four, yielding unique

insights into characteristics of information dissemination by GOMC and highlighting the pathways and barriers to the flow of information.

Chapter 2 Literature Review

2.1 Introduction

Research documentation relevant to understanding the history of grey literature, the structure and function of intergovernmental organizations, the importance of dissemination practices to communicate information, how information is deemed useful, and assessing the gap between the production of scientific information and its use in decision-making was consulted for this study. This literature review provides context and highlights the ways that the research questions (outlined above, p. 8-9) address understanding of the production, distribution, and use of information published as grey literature by international, intergovernmental groups. The literature has revealed a number of challenges in the communication of scientific information, a sizeable portion of which is published as grey literature, to the relevant stakeholder groups. Addressing such challenges means analyzing the problem through a different lens; in this case, it requires studying through interview analysis what has previously been examined through citation analysis.

To date, much of the research on the use and influence of grey literature has relied on citation analysis (Hutton, 2009; Kousha & Thelwell, 2007; MacDonald, Cordes, & Wells, 2004; MacDonald et al., 2007). Citation analysis, while an excellent and quantifiable measure of use, does not tell the whole story. Other methods of determining use are necessary to understand the influence of grey literature in the context of policy and decision-making. Though current research literature seldom addresses methods besides citation analysis that might be used to assess the use and influence of grey literature, the literature does consider the current barriers that exist between science and policy and what needs to be done to surmount such barriers. A more thorough understanding of grey information usage has the potential to help bring the fields of science and public policy-making closer together.

Biermann and Bauer (2004) suggest that intergovernmental groups, which act as conduits between different levels of government, different agencies within governments, and different educational and outreach groups, have a significant role to play in the dissemination of important environmental scientific research. The Gulf of Maine Council on the Marine Environment (GOMC) is just such a conduit. As questions regarding the state of the planet's environment become increasingly important to answer, communication of scientific research on these questions grows in significance. How can it be assured that every stakeholder, from the general public to decision makers, has access to the most timely and relevant environmental information? A better understanding of the production, distribution, and use of the marine environmental grey literature published by GOMC provides greater insight about barriers currently hindering communication between user groups.

At its most basic level, grey literature is defined as any document that is not published by commercial publishers, but is prepared, in some instances "via thorough refereeing and review" by a large number of qualified experts (MacDonald et al., 2004, p. 25). A more comprehensive definition of grey literature is provided by the Online Dictionary for Library and Information Science (ODLIS), which describes grey literature in the following terms: Documentary material in print and electronic formats, such as reports, preprints, internal documents (memoranda, newsletters, market surveys, etc.), theses and dissertations, conference proceedings, technical specifications and standards, trade literature, etc., not readily available through regular market channels

because it was never commercially published/listed or was not widely distributed.

ODLIS notes that grey literature could lack editorial control, which could influence its reliability. This statement is supported by MacDonald et al. (2004) who suggest that because there are no firm publishing rules for grey literature, organizations like the Gulf of Maine Council on the Marine Environment "are not constrained in its dependence on this genre," with little attention being paid to whether publishing in this manner is effective (p. 26).

Grey literature, as a publishing genre in the scientific field, is more and more widely used (O'Dell, Dallman, Vesely, & Vigen, 2003). This proliferation requires further study and, for this reason, a case study on the Gulf of Maine Council on the Marine Environment was undertaken. As noted above, "GOMC, [is] an American-Canadian partnership, [that] has been working since 1989 to maintain and enhance environmental quality in the Gulf of Maine" (Gulf of Maine Council on the Marine Environment [GOMC], n.d.; MacDonald et al., 2007). As an intergovernmental organization (IGO), GOMC has the ability to transcend national boundaries in order to manage and sustain the complex ecosystem that is the Gulf of Maine/Bay of Fundy region. Members of the Council represent a variety of organizations at the state/provincial and federal levels. GOMC maintains ties with the academic community, industry personnel, as well as a number of NGOs, which makes it ideally situated to act as a communication hub within the region, facilitating important discussion and funding important research on the Gulf of Maine.

The challenges GOMC faces in terms of the dissemination and salience of its information are not uncommon when dealing with grey literature (McNie, 2007), a publishing genre that has traditionally fought many misconceptions about its quality (Farace, 1997). Traditionally, scholarly journals produced by commercial publishers and professional organizations have been the norm in scientific communication and are usually considered the "gold standard" in research as their content is always peer reviewed and rigorously edited. Some grey literature is both carefully reviewed and based on well-funded, expert research; nonetheless, it is still not as well used as articles in scholarly journals. While this pattern of use may be based on tenure and promotion in academic settings that is achieved by publishing in scholarly journals, or on issues of access and dissemination, it is clear that trends in scientific publishing do not support adherence to only traditional publishing practices (Renear & Palmer, 2009). The literature describes a current movement to open access journals and institutional repositories that are spurring researchers to turn to alternative publishing methods to put their findings out to users (Borgman, 2007; Cronin, 2005). It seems clear that Web-based technologies are having an impact on information sharing and scientific publishing, both for primary publications and grey literature/secondary publications.

The research literature highlights not only misconceptions about grey publications that still prevail (Farace, 1997), but also challenges organizations like GOMC face in

trying to bring the fields of science and policy-making closer together (Holmes & Savgard, 2008; McNie, 2007). In the face of unprecedented environmental problems, finding a means to bridge this divide is becoming urgent. The literature illustrates the current glut of information currently hindering communication flow between scientists and decision makers. The questions of what constitutes the "right" information and how scientific research can better respond to the environmental policy concerns of the day come up again and again in the literature (Lexmond, 2002; McNie, 2007; Mitchell, Clark, & Cash, 2006; Nutley, 2003). Intergovernmental organizations could offer answers to these questions. The literature suggests that not only do these organizations produce and consume information, but they can also act as knowledge brokers, opening the lines of communication between different stakeholder groups, translating science into lay language, and becoming a venue for policy discussion based on the science that the organizations are helping to produce (Biermann & Bauer, 2004; Donaldson, Eden, & Walker, 2006).

This literature review demonstrates that understanding the production, distribution, and use of GOMC's publications and their potential impact on public policy is based on assumptions about scientific communication and biases in publishing practices that must be identified, questioned, and in some cases replaced by current social and technological realities (Hutton, 2009).

2.2 The History of Grey Literature and its Future Role

As was noted above, many intergovernmental organizations produce large volumes of scientific research as grey literature. Earlier studies have found that grey literature publications produced by GOMC are being cited both in the primary literature and by other grey literature; yet, "a reliance on grey literature as the primary means of publication continues to pose hurdles for influencing scientific research, public policy, and public opinion... [and] the impact of this literature can be muted because of the limitations of its dissemination and perceptions of its quality" (MacDonald et al., 2007, p. 30-31). Misconceptions about grey literature are not limited to publications produced by GOMC. Agencies that produce publications outside of commercial publishing routes are often affected by this stigma (Farace, 1997); however, as scientific publishing continues to evolve in the digital era (mid-1990s to present), and as publishing on the Internet becomes more normalized and more prolific, will grey literature gain more acceptance? Does this potential acceptance depend on the dissemination and publication practices of the producing organization? This section looks at where grey literature has come from and its potential to influence the future of scientific publishing.

After considering developments in electronic dissemination technologies and network publishing up to 1997, Farace (1997) stated that grey literature "in the coming century will be perceived and judged by the contributions it makes in resolving scientific and technical, as well as social problems facing the public and private sectors" (p. 73). He noted that then current limitations in cataloguing techniques and non-standardized collection practices severely limited the effective dissemination of grey information, but that as information policy is rethought and "grey literature is allocated places in planning, management, and budgets...A more constructive approach will have to be taken, one less concerned with defending its [grey literatures] value, but rather in demonstrating it" (Farace, 1997, p. 73). Based on the findings of MacDonald et al. (2007), Farace's view of the importance of grey literature may have been overstated (Hutton, 2009). Grey literature, though it has become an increasingly important publication venue, has not necessarily made the significant contributions to the resolution of current scientific and technical problems that Farace foresaw.

Farace (1997) recognized that digital technologies had the potential to make Webbased grey literature much more useable and much more accessible than it had been in its print format. The ability of the Internet to increase the dissemination of information was also supported by Weintraub (2000) who stated that Internet-supported ease of access would "have implications for the formation of science policy and public attitudes in a more profound way than in the past" (p. 57). It is not yet clear what sort of impact grey literature produced in the digital age has had on the formation of policy or in influencing public perception; yet, MacDonald et al. (2007) suggest that the digital dissemination of grey literature by organizations like GOMC is definitely affected by the publication itself and whether or not it has been "effectively designed and described for searchability and heightened awareness" (p. 38). Further, the "speed of communication allowed by the internet has created a glut of information that has decreased users' abilities to discover relevant, timely information in the manner Weintraub envisioned" (Hutton, 2009, p. 10). Thus, good information management may be helpful in promoting the use of grey literature in policy-making.

Despite the fact that grey literature (as defined on p. 12-13) is more widely accessible than ever and that attitudes towards traditional scholarly publications are

changing due in part to the growing shift to open-access (Hutton, 2009), misconceptions about grey literature still persist that dilute its potential to influence environmental policy-making. During the Gulf of Maine Symposium held in St. Andrews, New Brunswick in 2009, scientists, industry leaders, and policy makers discussed the current knowledge about and state of the marine environment in the Gulf of Maine/Bay of Fundy region. Though the subject of grey literature was never explicitly raised, it was clear, based on the number of scientists at the symposium who were affiliated with a university, that scholarly publishing through journals and books remains one of the primary means of communicating marine scientific information. Scientists who have embraced the open access trend still don't seem to be giving much thought to where this information is housed, how accessible it is, and who is using it. One symposium participant can be paraphrased as saying that researchers are given to always pursuing the next question that arises from their studies without thinking about how the information they just produced could be used to enhance environmental policy or inform the public (personal communication, Oct. 9, 2009). Whether research findings are published as grey literature or in the traditional peer-reviewed, primary venues, they are thought about mostly in relation to the next research initiative.

While grey literature may still struggle against misconceptions of its quality, changes in current scientific publication practices may affect the use and influence of grey literature in the future. Renear and Palmer (2009) state that scientists are concerned with finding the most relevant information online and that they have always "read strategically, working with many articles simultaneously to search, filter, compare, arrange, link, annotate, and analyze fragments of content" (p. 828). The practice of strategic reading, or systematically locating the necessary information, has been hindered by the lack of advanced navigation tools and searchable indexed annotations, but "substantial improvements in hardware and software and an infrastructure of networked communications" (Renear & Palmer, 2009, p. 828), as well as the development of the semantic Web, will now make the escalating strategic reading practices of users more feasible.

Renear and Palmer (2009) identify two trends that are interacting to support strategic reading practices. First is "the wide-scale use by scientists of digital indexing, retrieval, and navigation resources" (p. 828) (such as Web of Science and Google Scholar) that can be employed to sift through large amounts of information without having to read it all in detail. The second trend is the emergence of ontologies within scientific disciplines to represent and link scientific data (Renear & Palmer, 2009). Ontologies are loosely defined as "computer-processible scientific terminologies [that] range from simple standardized vocabularies to sophisticated formal systems with logical axioms" (Renear & Palmer, 2009, p. 830) and are used to support information retrieval and mining text. By using discipline specific ontologies, which are becoming more widely available, scientists and other users of scientific information will be able to exploit an even wider range of digital information, mining it for what is most useful and "gathering information horizontally, not vertically" (Renear & Palmer, 2009, p. 829).

At this point, it may be prudent to ask how such advances in scientific publishing may support the role of grey literature in the future. Although it is not certain that advances in digital technologies and ontology-aware tools will improve the use of grey literature, Renear and Palmer (2009) state that "the infrastructures and services to support strategic reading practices will no doubt be promoted by open access and alternative publishing models, which are already being widely discussed in the academic community" (p. 832). As grey literature falls into the category of alternative publishing models, such a statement suggests that changes in scientific publishing also may enhance the use and influence of literature published by IGOs such as GOMC. However, future use of grey literature is contingent upon how it is currently being indexed and annotated. This will have to be improved if marine environmental grey literature published by GOMC is to be included in discipline specific ontologies that make such literature easier to access, as well as relevant to strategic online readers.

2.3 Intergovernmental Groups and Management of the Science/Policy Boundary

The Online Dictionary of Library and Information Science defines an intergovernmental body as an international organization created by cooperative action between two governments. The purpose of such an organization, as identified by the Department of Defense Dictionary of Military Terms, can be wide-ranging or narrow and can generally be established on a global, regional, or functional basis in order to promote interests that are shared by multiple governments. As noted above, GOMC is a binational, intergovernmental group whose aim is to promote and protect the environmental interests of the Gulf of Maine and Bay of Fundy region. The literature suggests that such international, intergovernmental groups have a role to play both in the production of information and in aiding the flow of information between user groups (Biermann & Bauer, 2004; Boyer & Crémieux, 1999; Donaldson, Eden, & Walker, 2006; Siebenhüner, 2008). As science spills out of research laboratories and into society more widely, it is important to recognize that intergovernmental groups can act as both producers and consumers of scientific research, as well as serving as brokers for "environmental information and scientific credibility" (Donaldson et al., 2006, p. 1061).

In its capacity as an intergovernmental organization, GOMC has the potential to fulfill the role of environmental information broker. This is especially true because of its extensive production of environmental grey literature, which as a publication product needs to be widely publicized to promote its dissemination and encourage its use. Yet, Biermann and Bauer (2004) suggest that there are several impediments to intergovernmental organizations fulfilling this role. Though low dissemination of grey literature is not specifically identified as a failing of intergovernmental groups, their effectiveness in promoting awareness of this literature seems to be dependent upon a number of internal and external factors, many of which can limit their ability to both produce and consume scientific information.

According to Biermann and Bauer (2004), the effectiveness of an IGO can be measured in three ways:

the output, that is the actual activity of an organization; the outcome, that is the change in the behavior of societal actors (such as governments, nongovernmental lobbyist groups, scientists, the mass media, or individual actors); and the impact, that is the changes in regard of policy targets, such as quantifiable improvements in the natural environment. (p. 191)

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Measuring both output and impact is very difficult because "linking observable environmental improvements to the specific influence of an international regime in a meaningful way is virtually impossible" with regard to complex environmental problems (p. 191). Though Biermann and Bauer (2004) suggest that measuring policy outcomes is the best way to judge effectiveness because of the general ability of an organization to assess behavioral change, such a metric is still limited because it is often difficult to separate the outcomes of the activities of an intergovernmental organization from the outcomes of the activities of the regime in which the agency is embedded. Did the agency affect change, or did general political developments, economic changes, or even an election affect the change?

Biermann and Bauer (2004) note that some intergovernmental organizations are more influential in advocating for environmental concerns than others. Varying levels of effectiveness can be explained by a number of structural variables including: (1) Formal competencies, or the "transfer in authority that states concede to an international organisation varies considerably...[f]or instance, some organizations are formally entitled to actively monitor regime compliance in member states while others depend on national reports of limited significance and reliability" (p. 192). Organizations with far reaching formal competencies are likely to be more effective; (2) Degree of regime embeddedness: Evidence suggests that intergovernmental agencies are far more effective the "weaker they are regulated within a given regime" (Biermann & Bauer, 2004, p. 192). In other words, Biermann and Bauer (2004) hypothesize that the more autonomous an organization may act, the more influential its actions will be; (3) Organizational structure: Given that problems in environmental policy are very complex, a management structure that is more flexible and less hierarchical seems to increase the effectiveness of an intergovernmental organization; (4) Problem of fit: An agency will be more effective if it is designed in a manner that allows it to tackle the problems it is intended to solve. The expertise and capacity of staff members are only utilized effectively if they are employing their skill sets in the appropriate domain; (5) Availability of resources: According to Biermann and Bauer (2004), it is not yet clear if an environmental, intergovernmental organization that is better funded will be more effective than one that is operating on a tighter budget. Studies of business administrations suggests that there is little correlation between funding and success; (6) Stakeholder involvement: It is generally expected that "organisations that value cooperation with relevant stakeholders [will] be more effective than organisations relying on their own authority, and [Biermann and Bauer] hypothesize that stakeholder involvement positively correlates with organisational effectiveness" (p. 192).

The variables listed above have the potential to influence the effectiveness of an IGO like GOMC. The ability that the Gulf of Maine Council has to promote the distribution, use, and influence of its publications could be significantly linked to its structure. Determining whether such a link exists is one of the questions addressed in this thesis. Yet, the structure of an intergovernmental organization is not the only factor that has the potential to influence its success; its function and the role it plays in communicating information across boundaries are also important. Though writing about non-governmental organizations rather than intergovernmental groups, Donaldson et al.

(2006) raise interesting points about the importance of boundary work that could easily be applied to IGOs. They argue that over time the boundaries between scientific communities and other stakeholders, such as NGOs and policy makers, have become impermeable and, in fact, have become "a strategic and deliberate practice" used to enhance the legitimacy of science and detract from the legitimacy of non-scientists (p. 1062). Donaldson et al. (2006) suggest the boundaries are drawn to suit the agenda of the information producers.

The boundaries between science and policy did not suddenly appear. In fact, in 1994, Sheila Jasanoff, who has researched the subject of governments' dependence on science advisors extensively, noted that it was good practice for science to create boundaries, which would significantly limit any controversy over scientific involvement in policy-making and would give the scientific results used in government decisions legitimacy:

The creation of such boundaries seems crucial to the political acceptability of advice. When the boundary holds, both regulators and the public accept the experts' designation as controlling and the recommendations of advisory committees, whatever their actual content, are invested with unshakable authority. (Jasanoff, 1994, p. 236)

Jasanoff (1994) saw the lines drawn between science and policy as a good thing, as a way to prevent nonscientists from "challenging or reinterpreting claims labeled as science" (p. 236). However, as early as the mid-1990s, Jasanoff (1994) began to recognize the importance of flexible and dynamic boundaries in science/policy interaction: "curiously,
however, the most politically successful examples of boundary work are those that leave some room for agencies and their advisors to negotiate the location and meaning of the boundaries" (p. 236).

The location and meaning of the boundaries between science and policy have been widely debated. Research completed in the past 10 years seems to build on Jasanoff's concept of a supple boundary and suggests that such strongly demarcated boundaries work only to enhance the divide between science and its users, often labeling traditionally published material as sound and non-traditional forms of information (e.g., grey literature) as unscientific, thereby undermining the latter's credibility in policy debates. Donaldson et al. (2006) view current boundaries as extremely problematic. While the boundary may act as a useful geographic metaphor, "it is important not to reify the boundary but to recognize that it is always shifting and unstable, dependent upon continual renegotiation...The boundary is more properly seen as...a grey area which may, moreover, be very different for different issues" (p. 1063). Navigating the boundary, therefore, is a difficult task for which an IGO, like GOMC, may be well suited. With its ability to provide science translation, its knowledge of concurrent and pervasive environmental concerns, its wide variety of personnel of diverse backgrounds, and its ability to draw from the resources and environmental knowledge of two well-respected nations, GOMC could act as a driving force to make the boundary between science and policy more permeable and more accessible.

2.4 Disseminating Information: Understanding Production, Distribution, and Use

Successfully navigating the boundary between science and decision-making requires significant focus on effective communication and dissemination of research to all invested end-users (Elliott et al., 2003; Hoornbeek, 2000; Scott, 2000; Whitson & David, 2001). The communication process is nonlinear, it is iterative, and involves establishing a dialogue with a diverse set of stakeholders to ensure that the information that is being produced is relevant for their needs (Scott, 2000). As Scott (2000) states, "research without communication does not exist" (p. 12), a statement supported by Webber (1991/2) who notes that the immediate and obvious reason for the importance of dissemination is that policy knowledge that is left in the hands of the producer is entirely ineffective. However, researchers cannot expect that policy makers will have time to seek out knowledge to inform every decision that they make and, as a result, it is important to give careful thought to the means by which information is disseminated to non-scientists.

Forming a strategy for dissemination of information begins in the production phase, where according to Hoornbeek (2000), environmental agencies develop information for two broad purposes:

First, they create information that will direct or justify particular program activities, such as the establishment of specific regulatory requirements. These types of information development activities may be called *program support* information efforts, or *regulatory support* efforts if they focus on providing information to support the use of regulations. A second type of effort seeks to assess the status or trends associated with environmental conditions and/or activities [benchmarking efforts]. (p. 148)

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Benchmarking efforts (used to inform debate, to aid in setting priorities for future actions, or to help evaluate progress in achieving previously specified goals), as well as program or regulatory support efforts, require that the agency defines the objectives of the publication early in the production process (Hoornbeek, 2000).

Targeting a specific audience is particularly important in the development of regulatory support information, types of which include technical and policy analyses, implementation guidance, and site information, including permitting and enforcement (Hoornbeek, 2000). "Regardless of the specific form it takes, program support information is directed toward definable target audiences [and] it is developed to guide or instigate behaviors that are defined in advance" (Hoornbeek, 2000, p. 149-150). Public sector employees are generally targeted to receive this type of information because of their ability to influence the decision-making process.

Benchmarking information generally seeks to assess the status or trends of the environment or environmentally oriented activities and, as such, the audiences for this type of information differ from that of program support efforts and are quite broad (Hoornbeek, 2000). "While benchmarking studies are frequently transmitted to high-level agency officials or legislators, they may also be provided to the general public and to stakeholders who have interests in the area being studied" (Hoornbeek, 2000, p. 149). The identities, occupations, and specific reactions of the people who receive and react to the information provided are often less clear than is the case with regulatory support information (Hoornbeek, 2000). Partly because of these ambiguities about audience, the specific policy consequences of benchmarking information are not generally known in

advance. Benchmarking efforts will often inform debate, but they do not usually determine specific solutions to environmental problems (Hoornbeek, 2000). GOMC produces both benchmarking and regulatory support information to inform its stakeholders and, as a consequence, it is important to assess who the publication might benefit and whether the subject is best suited to program support or benchmarking efforts.

After the development phase concludes, information must then be disseminated to the identified audience(s). "Dissemination efforts represent a constellation of actions designed to enable audiences to take advantage of...program support, and/or benchmarking information. As a result, dissemination efforts can determine the success or failure of all other forms of information effort" (Hoornbeek, 2000, p. 152). Hoornbeek (2000) notes that dissemination efforts can take many forms, including focused, or targetspecific distribution, or less formalized distribution such as Web sites, newsletters, hotlines, and clearing houses. When dissemination initiatives are less formalized, their potential for impact becomes uncertain (Hoornbeek, 2000). Many audiences may benefit from this highly accessible information, but this assumes that there is an audience for the information in the first place. GOMC often uses an informal dissemination scheme in order to reach a broad audience of interested stakeholders throughout the Gulf of Maine region. Hoornbeek (2000) suggests that such a strategy is not ineffective as some interested parties will be reached, but others, not specifically targeted during dissemination efforts, will be missed. The question of who received the information and who did not is very difficult, if not impossible, to answer completely. Clearly defining an

audience and developing a publication based on a perceived need means that a targeted and potentially traceable dissemination effort can take place.

One group that is often the target of a dissemination strategy is policy makers. "The policy consequences of dissemination efforts vary, depending on the content of the material to be disseminated...and they take on the audience and policy consequence characteristics of the types of information they are disseminating (program support, benchmarking...etc.)" (Hoornbeek, 2000, p. 153). If policy makers are not specifically targeted during the distribution phase and instead the information is placed in a newsletter or on a Web site, then the potential policy implications of that information depend on who accesses the publication and how they use it. Usually, the influence of information that is used in this manner cannot be defined in advance. Without a strategy for distribution that outlines who should receive the report, there is no way to know if dissemination efforts are successful and it becomes more difficult to measure the usefulness that this information has for stakeholders, including decision makers.

Elliott et al. (2003) note effective dissemination strategies have been understudied and that effective communication to users will be increasingly difficult if the capacity to disseminate information successfully is not fully researched. "Essentially, four categories of factors have been shown to affect the success of dissemination efforts: (a) characteristics of the dissemination object, (b) environmental factors, (c) factors associated with users, and (d) relationships between producers and users" (Elliott et al., 2003, p. 272). These four categories are supported by Scott (2000) who states that the characteristics of the scientific fields that practice effective information dissemination are:

 They have a clear statement of goals. 2. Their members communicate frequently and across greater distances and/or institutional boundaries. 3. Their main problem is broadly anchored – that is, it relates clearly to a greater number of other more familiar issues that are of interest to key audiences. 4. Their members manage to popularize their principal issues or findings (via mass media coverage for example), leading to a more eclectic mix of resources and personnel. (p. 13)

The characteristics of effective dissemination outlined by both Elliott et al. (2003) and Scott (2000) make clear that environmental, human, and organizational factors can influence the dissemination efforts of an organization.

Environmental factors that may have an impact on an organization's ability to disseminate information effectively include the influence of and information from interorganizational networks, the economic situation of the day, and "societal issues and priorities which manifest themselves in public opinion as well as in the mass media" (Elliott et al., 2003, p. 272). The last of these is particularly important in the current political climate in democracies where, more and more, public opinion influences government decisions on important current issues. If an organization is disseminating information considered to be a "hot button" issue by the public, it is very likely that its relevance will increase and its dissemination will be wide (Scott et al., 2007; Stojanovic, Ball, Ballinger, Lymbery, & Dodds, 2009).

Human factors, including attitudes and behavior of individuals, that can potentially influence an organization's ability to disseminate new information effectively include: "(1) the individual's position and seniority in the organizational hierarchy; (2) attitude toward the proposed innovation; (3) individual concerns and motivations (e.g., related to performance, group norms); ...and (4) the need for new solutions" (Elliott et al., 2003, p. 272). Human factors that influence dissemination are more likely to have a positive impact in an organization where member aspirations are well-aligned with each other and everyone is working towards the same goals. In the case of GOMC, the serious nature of environmental concerns and the need to find adequate solutions may contribute to the positive impact of human factors on effective dissemination practices.

Lastly, organizational factors that influence dissemination efforts include "(1) the degree of formalization of tasks in the organization, (2) the organizational climate, (3) the type of clients served and associated expenses, (4) the availability of sufficient material and human resources, and (5) the centralization or dispersion of power" (Elliott et al., 2003, p. 272). The availability of resources is particularly important for effective dissemination of information. Where funds are scarce, there is an obvious limit to the ways that an organization can distribute information to stakeholders. In the case of the Gulf of Maine Council, cuts in funding in 2008-09 meant that the *Gulf of Maine Times*, its high quality newspaper that was distributed in print copy to thousands of people throughout the region, was limited to only a digital release. At this point it is unknown how this change from print to digital might impact the use and influence of the

publication, but due to lower visibility, the change may affect use by the audience that the *Gulf of Maine Times* reaches.

Measuring how well research is disseminated is very difficult. Although it can be better understood through surveys of end-users, researchers, or research managers, and case studies of the dissemination strategies of individual programs, it may well be that no single method will be able to adequately track dissemination pathways (Lyall, Bruce, Firn, Firn, & Tait, 2004). Dissemination is not simply a "bolt-on" exercise at the end of research, but neither can the independent and authoritative nature of scientific research be compromised by directing the resulting information to one specific audience, like a decision maker (Scott, 2000). It is clear that dissemination efforts should be considered at every stage of the publication process, from conceptualization, all the way through to popularization of the material so that it is suitable for the target audience (Scott, 2000). Only if this process is considered carefully will the end-user find the information useful. Identifying useful information is discussed fully below.

2.5 Identifying Useful Information: Salience, Credibility, and Legitimacy

Publication is currently a pervasive and widespread phenomenon, in part because technically it is easily achieved. Individuals and organizations take advantage of widely accessible technologies and processes to generate annually an almost uncountable number of publications. A vast quantity of this literature, some of which is immensely important both for the organizations that produce it and for policy decision makers, and general readers, is published outside commercial and scholarly systems (MacDonald & Wells, 2009). This grey literature can be very difficult to find, and thus may be overlooked even when the publications can be of great value. Production of grey literature is central to the publishing practices of many organizations (O'Dell et al., 2003). But is that literature ever used to maximum efficiency? Is grey literature considered useful information? What qualities should information possess to be deemed useful in the first place?

In the scientific domain, information is considered useful (i.e., an original and valuable contribution to the field of study) if it is produced by a publisher (commercial or professional association) that demands a rigorous peer review process. However, grey literature, as noted above, is often produced outside such circles and therefore may not meet this traditional standard. The literature suggests there are other standards (outside of those laid out by commercial publishers) by which to measure the usefulness of information, including salience, credibility, and legitimacy (McNie, 2007; Mitchell et al., 2006). These terms, as used in the literature, bear some definition.

First, the idea that environmental information must be salient, or relevant, to the audience seems obvious; still, potential users often fail to be influenced by information because it has been produced without any thought regarding the decisions it might affect (Mitchell et al., 2006). "Information must be responsive to local conditions and concerns, must link to issues on which decision makers focus and over which they have control, and must be timely, coming before – but not too long before – relevant decisions get made" (Mitchell et al., 2006, p. 314).

McNie (2007) describes salient information as information that is "contextsensitive" (p. 19), meaning that the information is responding to specific demands of decision makers. According to McNie (2007), salient information "considers ecological, temporal, spatial, and administrative scales and timeliness" (p. 20). Scale mismatch is highlighted as particularly important from the decision maker's perspective because, as an example, "policy makers in a small town are unlikely to find global climate models relevant to their decision-making needs because of the mismatch of scale information" (McNie, 2007, p. 20). The mismatch of scale of information highlights the necessity of "information brokers who self-consciously recognize and redress the disconnect between large-scale assessments and local-level decisions" (Mitchell et al., 2006, p. 317).

Second, credible information is defined by McNie (2007) as dependable, high quality, and accurate. Primary journals claim to be credible due to the peer review and editorial system employed. But, "while peer review is often considered the sine qua non of credible information, other approaches also satisfy the credibility criterion, for example, government sponsored-research, industry sponsored-research and collaborative projects between several actors, and the like" (McNie, 2007, p. 20). By this definition, the grey literature produced by GOMC, which is government-sponsored research or syntheses that is often conducted collaboratively, would be considered credible information. As well, GOMC-sponsored reports are most often reviewed by specialists and selected Working Group Members prior to approval and release (P.G. Wells, personal communication, November 30, 2009).

The literature suggests that one of the difficulties underlying acceptance of grey literature in the scientific and decision-making spheres is that "policymakers and other audiences cannot evaluate the message content and must assess credibility through the proxies of credentials and process" (Mitchell et al., 2006, p. 318). Audiences tend to lend credibility to sources that have produced reliable information in the past, that are considered to have the most expertise in the field, that are trustworthy, objective, and are well reviewed. It takes a long time to build up this level of trust among users of an information source (Mitchell et al., 2006). Interestingly, Mitchell et al. (2006) suggest in many cases audiences are looking for "local credibility" (p. 318) in information sources and that they "frequently dismiss scientists and scientific groups with the best scientific credentials because those individuals or groups lack local expertise" (p. 318). This perspective can, of course, be questioned; however, in relation to the literature produced by GOMC, such an approach suggests that publications focussed on the Gulf of Maine/Bay of Fundy region should be considered credible to information seekers and be well used.

Third, in order for information to be deemed useful it must be legitimate. "Legitimacy involves the perception by relevant audiences of an assessment process as 'fair,' having considered the values, concerns, and perspectives of that audience" (Mitchell et al., 2006, p. 320). In other words, is the information free of bias (McNie, 2007)? Crucial to legitimacy is that if information is produced in order to support a policy, all the stakeholders affected by that policy should be involved in the research and assessment process (Mitchell et al., 2006). "Relevant stakeholders that are not included view such assessments as illegitimate, since such assessments tend to ignore or misidentify core concerns and tend to define problems, their causes, and responsibility for their resolution in ways that such audiences are unwilling to accept" (Mitchell et al., 2006, p. 321).

The literature notes that promoting only one of the three attributes of salience, credibility, and legitimacy could potentially undermine the other two. Whether the three are balanced in a dynamic tension needs to be determined in an assessment of the usefulness of information based on these characteristics (McNie, 2007; Mitchell et al., 2006). McNie (2007) suggests that ultimately the usefulness of information is determined by whether the information was actually used by decision makers to affect relevant change, to determine policy, or to expand alternatives in the decision-making process. While this characterization may be the ultimate metric, the usefulness of information is not easy to measure. McNie (2007) neither expands further upon this point, nor shares ways and means that such a metric could be employed.

Salience, credibility, and legitimacy are clearly necessary attributes of useful information. Based on these criteria, information available as grey literature has the potential to shed some of the traditional misconceptions that have hindered its use in the policy-making sphere. Yet, scientific grey literature may still need to be based on the value demands of decision makers in order to be perceived as salient. The next section of the literature review will highlight this challenge, as well as others that hinder the interoperability of scientific information in the public policy process.

2.6 Bridging the Gap: Understanding Science's Impact on Policy-making

Today's most serious environmental problems can most effectively be addressed by integrating scientific research more fully into the policy-making process (Donaldson et al., 2006; Lexmond, 2002; McNie, 2007; Nutley, 2003; Scott et al., 2007; Stojanovic et al., 2009; Tew, 2002). Achieving the integration of the spheres of science and policy is, of course, much easier said than done. Lexmond (2002) notes that in order for environmental policy to be successful it must be "based on a combination, and integration, of legal, technical, political, technological, scientific and economic factors, while also acknowledging the prevailing ethical and societal and individual values" (p. 6-7). Such intensive integration on several levels requires that both scientists and policy makers be willing to adapt their respective disciplines to meet each other's needs. Nutley (2003) suggests that adaptation and integration will require a serious investment in the research process by policy makers, some re-thinking of the complex and politically driven policy process, and the development of mechanisms and partnerships to bring research and policy closer together.

The literature identifies a number of different methods by which policy can be more closely linked to science and while every author agrees that the end goal will see the two more closely aligned, their ideas on how this will be achieved differ greatly. Lexmond (2002) believes that very often policy makers have a high degree of scientific illiteracy. The inherent differences existing between the two domains have fostered stagnancy within the realm of decision-making and an under-utilization of scientific information. Lexmond (2002) suggests five factors affect the ability of scientists to effectively contribute to the policy-making process. First, the results of many investigators are misinterpreted by policy makers, due to a lack of critical understanding of the basics of the relevant discipline. "Second, essential and relevant research is compromised due to lack of funding, or conditions attached to funding that artificially determine, direct, or limit the scope and nature of the research and participating disciplines," (p. 86) the result of which is scientifically and economically unjustified research and policy priorities. Third, investigators are perceived as biased because they are employed or funded by agencies that are seen to have an interest in the research outcome. Fourth, "while non-investigators may be somewhat overwhelmed with the amount of information available regarding environmental issues from various sources, what disconcerts them is the prevalence of conflicting information" (p. 87). Finally, a "significant number of research projects are uncoordinated and sectorally driven, with minimal exchange of information among researchers, disciplines, sectors, governments, agencies, and other actors who would benefit from co-operation or contribute to the value of data in some way" (p. 87).

The reasons for the potential misunderstanding and under-utilization affecting the use of science in policy-making could potentially be seen as information issues. Policy makers need the best available science in order to make the most informed decisions, but how are they to determine what the "best" science is? Lexmond (2002) suggests that science is outpacing the policy-making system, and often too much information on a subject results in decision makers not finding it necessary to choose the most appropriate, or up-to-date science. In fact, sifting through the mass of information on a particular environmental issue and trying to interpret the scientific terminology often leads to an inaccurate summarization of reports, the misinterpretation of data, and a reliance on scientific information largely shaped by the political agenda (Lexmond, 2002).

There seems to be little doubt that the differences between the policy and science spheres have played a large part in influencing their relationship and have been a largely unrecognized force in shaping the development, processes, and substance of environmental law and policies. "Through a better understanding of how scientists operate and an appreciation of the divergences and similarities between the two domains, the actors in both domains, through co-operation and improved communication, can [improve] environmental management" (Lexmond, 2002, p. 156). Much of the literature suggests that improved communication and cooperation can indeed bring science and policy closer together, yet unlike Lexmond, the literature gives science a substantially larger role to play in building those bridges.

McNie (2007) states that "In order to better serve decision makers, the connections or linkages between both the supply of, and demand for, scientific information need to be enhanced so that scientists produce information that is both needed and used by decision makers in their policy decisions" (p. 18). In McNie's view, the onus for creating better and more usable policy is shared between science and policy and she challenges scientists to produce information directly related to the environmental policy decisions of the day. McNie (2007) argues that policy makers are focused too narrowly on increasing the general supply of scientific information rather than increasing science that is specific to a particular policy question and therefore, "scientists may not be producing information considered relevant and useful by decision makers, and may simply be producing too much of the wrong kind of information" (p. 18).

The literature suggests that stronger linkages between science and policy would be supported by a critical evaluation process that measures whether or not new environmental policies were supported by the best science (Holmes & Savgard, 2008; McNie, 2007). Evaluation should be based on a detailed review of a policy to determine whether all relevant information was used or considered, whether the science was understood and interpreted correctly, and whether all the risks were adequately addressed (McNie, 2007).

Though evaluation is a critical step to understanding the importance of science to the policy-making process, many organizations do not have a formal system of evaluation in place (Holmes & Savgard, 2008; McNie, 2007). Evaluation that is done tends to use informal processes of feedback or counts readily measured things, for example, the number of publications, or the number of media (i.e., radio) contributions. "For research institutes, some limited evaluation of impact may be included in periodic evaluations of the organization as a whole" (Holmes & Savgard, 2008, p. 24), but in general, there seems to be some methodological difficulties with evaluating the impact of a research project and its ability to affect change at the decision-making level. Holmes and Savgard (2008) note it is likely that there will be more than one research project influencing a policy and, therefore, it is difficult to assess the effectiveness of just one of those inputs. Very often impacts are seen long after the completion of the research project and "a lot of research is aimed at building conceptual understanding rather than at instrumental use, which is generally easier to evaluate" (Holmes & Savgard, 2008, p. 24). Yet, despite the difficulty in evaluating the influence of research on policy, evaluation is a critical phase.

Evaluation measures have the potential to provide "valuable lessons to enable improvement of [the] processes of research programme planning and management and to establish the value derived from research investment" (Holmes & Savgard, 2008, p. 29-30).

While evaluation is often noted as a crucial step in the application of research in the policy process, it is certainly not the first step. Long before evaluation comes the necessity of including all stakeholders/users in the planning process in order to facilitate the interaction between industry, NGOs, the general public, scientists, and policy-makers (Holmes & Savgard, 2008; Irvine, 2009; Nutley, 2003; Scott et al., 2007; Stojanovic et al., 2009). Identification of potential users, and an evaluation of their different needs and concerns, should be carried out at the start of a project. Continued engagement of potential users through the research and dissemination stages is necessary to ensure that the solutions generated by the researchers remain relevant to the ever-changing scientific and environmental questions of users (Holmes & Savgard, 2008; Irvine, 2009).

Stojanovic et al. (2009) have noted that several attempts have been made in the UK to initiate stronger relationships between the groups listed above by developing research strategies focused on the coastal environment, which included every stakeholder in the research development process right from the earliest stages. Coordination and communication of scientific research was "approached through active partnerships with universities and the wider research community" (p. 901), which widened the knowledge base of many of the research projects and increased their salience within the wider community and within policy development circles. Research strategies that attempt to

incorporate interdisciplinary thinking within their planning and management approaches seem better able to see beyond silo perspectives that often hinders scientific enquiry. As Stojanovic et al. (2009) note:

Scientific enquiry can occur with little or no interaction with policymakers or coastal stakeholders. In this way, "governance" and "knowledge production" can operate within their own separate cycles. Yet interdisciplinary scientific input, including natural sciences, socioeconomics and humanities, have an important role to play in society through moderating value judgments and increasing knowledge of coastal systems. (p. 901)

By bringing together traditionally disparate disciplines to engage in knowledge sharing, a substantial increase in the value research holds for policy makers occurs because of its relevance to such a broad audience. Yet, the process of engaging diverse interests and stakeholders is a long and complex endeavor. Irvine (2009) notes that during the process of developing Canada's Wild Salmon Policy, scientists became more aware of the necessity of including economists, social anthropologists, First Nations, the fishing community, and scientists from outside the government in order to build the most comprehensive and inclusive policy. In describing the process, Irvine (2009) states:

Scientific public policy requires input from multiple disciplines, not only during the formulation of the policy, but also during implementation...[Though] our first draft policy was publically released in 2000 [and] included a statement that DFO [the Department of Fisheries and Oceans] expected to finalise the policy later that year, the policy was not completed for another five years. It is clear that we did

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not initially have a realistic impression of the magnitude of the task we were undertaking. (p. 142)

Based on this statement by Irvine (2009), it is clear that policy-making requires multiple levels of engagement and cannot be forced or rushed. Making the process as transparent and open as possible will benefit the long-term objectives of the policy, which is of course, implementation.

Scott, et al. (2007) see the value of scientists working together with a wide variety of professional societies to promote research of conservation biologists in the policy sphere. However, the authors' study points out that while scientific research may not always be influenced by the environmental policy concerns of the day, conservation biologists themselves often have a preferred policy or management stance that comes across clearly in the research that they submit to peer-reviewed journals. Scott et al. (2007) argue that the value-laden language that appears in these publications deters policy makers from using the research in the political arena because the conclusions and recommendations of the scientists do not always conform to the opinions of the policy makers, or the general public who often influence decision-making. This conclusion highlights the continued need for scientists to communicate their research findings in value-neutral language and to engage in dialogue with decision makers and industry so that information and research can be used to influence policy-making and address today's most serious environmental concerns (Scott et al., 2007).

An acknowledgment that policy-making is a messy and politically driven process and that the "relationships between research, knowledge, policy and practice are always likely to remain loose, shifting and contingent are crucial to the integration of research evidence into the policy-making process. Initiatives to improve the linkages between policy and research need to be designed with this in mind" (Nutley, 2003, p. 16). Nutley (2003) argues that much can be gained from opening up the policy-making process to include a variety of users and stakeholders. An active and engaged citizenry is more apt to fuel the dissemination of research knowledge and promote its use in decision-making; however, Nutley (2003) cautions that it would be remiss to believe "that research can provide definitive answers to policy questions and that policy processes can and should be based on a rational model of decision making" (p. 14). The two spheres cannot be bridged so easily. It is important to recognize the limitations of the research evidence base and focus on ways the limitations can be mitigated. For example, setting research priorities would allow for gaps in the knowledge base to be filled and would focus on addressing the policy questions of the day; however, some consideration should be given to curiosity-driven research, which often fuels innovation and upon which new insights depend (Nutley, 2003).

The idea that a significant gap exists between policy-making and science is a prevalent theme in the literature. The literature also emphasizes that this gap needs to be effectively bridged by whatever means are deemed necessary in order to adequately address serious environmental problems of our day. The bridge metaphor is perhaps an oversimplification of the work required to bring such traditionally disparate fields together. Nutley (2003) argues that "simple models of the policy/ research relationship –

where evidence is created by research experts and drawn on as necessary by policy makers – fail as either accurate descriptions or effective prescriptions" (p. 16).

Nutley advises that one, grand policy/research bridge is not enough to adequately address the issue. Too many interested and invested groups, too many users with input into policy concerns, too much or too little scientific information on a subject all prevent merely one bridge as the solution. In fact, Nutley (2003) proposes not one, but several policy/research bridges:

Multiple, demountable footbridges seem preferable to a few uni-directional motorways. Research (and researchers) needs to travel in many directions and research often has greatest impact when delivered personally. If more permanent bridges are deemed necessary for specific policy areas, because of their centrality within the overall social policy agenda, then it may be helpful to think in terms of those suspension bridges which rely on a central, intermediate pillar to support a wider bridging structure. (p. 15)

Nutley suggests that an intermediary could take on the role of the central pillar, assisting in the exchange of information and supporting the different bridges between science and decision-making. The Gulf of Maine Council on the Marine Environment, as an intergovernmental organization, could potentially act in such a capacity, if it has not done so already.

Nutley (2003) concludes that perhaps the bridging analogy is not completely accurate as it suggests there is an on-going gap between research and policy-making that will have to be spanned continually. "An alternative is to think about how the research and policy (and practice) fields can be brought closer together so that they naturally come into contact with one another at key points. This is the aim of various partnership approaches to improving research utilization" (p. 15). This statement highlights the vital role of communication and collaboration among multiple user groups in order to bring scientific research and policy-making closer together.

2.7 Summary

It is clear that considerable work has been undertaken to address the continuing gap between science and policy-making and that recognition has been paid to the increasing importance of using the best and most appropriate science to address environmental concerns during the decision-making process. Grey literature has an important niche in such a process, yet, there is still much that needs to be studied regarding production and dissemination of this information, as well as the stigma associated with grey publications, in order to ensure use of such literature produced by intergovernmental bodies like GOMC. To better understand the challenges related to the production, distribution, and use of grey publications, interviews were conducted with GOMC Working Group Members. The qualitative method used to collect and analyze these interviews is discussed in the next chapter.

Chapter 3 Methodology

3.1 Introduction

The current challenges facing information producers and users seem to suggest that analyzing the use and influence of marine environmental information must be undertaken using multiple methods that are able to assess the evolving and dynamic nature of publishing online. While citation searching and citation analysis tell one story of the use of GOMC's publications (MacDonald et al., 2004), interviews with GOMC Working Group Members regarding their views about the dissemination of GOMC publications may tell another. This study employed a qualitative methodology whereby data was collected through interviews with Members of the Working Group of the Gulf of Maine Council. The literature highlights the advantages of using a qualitative method like interviews because it allows the researcher to learn about different understandings and perspectives that would not otherwise be available (Holstein & Gubrium, 2003; Lambert and Loiselle, 2008). The literature also suggests that qualitative data analysis software aids in the organization of interview data and contributes to the validity of using such methods (Bourdon, 2002; Brannen, 2005). Conducting interviews with human subjects is a complex and nuanced task, and the research literature offered words of advice both for conducting interviews and using qualitative data analysis software (Shuy, 2003).

Using a qualitative methodology makes it possible to acquire evidence of the production, distribution, and use of grey literature publications from the perspective of key informants within GOMC's primary Working Group. Interview methodology is

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frequently used in the realm of social science research because it is the best means to determine the understanding and views of informed insiders (Brannen, 2005).

Though it is difficult to obtain a single, all-encompassing definition of qualitative research, Snape and Spencer (2003) emphasize key elements that generally give qualitative research its character. First, qualitative research aims to provide an "in-depth and interpreted understanding of the social world of research participants by learning about their social and material circumstances, their experiences, perspectives and histories" (Snape & Spencer, 2003, p. 3); second, small sample sizes are chosen based on specific criteria; third, data collection methods generally involve close contact between the researcher and the subjects which allows data collection to be interactive and for emergent issues to be probed; fourth, data are rich and extensive; and fifth, analysis "is open to emergent concepts and ideas which may produce detailed description and classification, identify patterns of association, or develop typologies and explanations" (Snape & Spencer, 2003, p. 5). Through interviews with Members of the Working Group of GOMC, the characteristics outlined above guided data collection and analysis.

It is clear from the description of qualitative methodology summarized above that much can be learned by conducting interviews, but the analysis of such interviews is often complex and nuanced (Holstein & Gubrium, 2003; Lambert & Loiselle, 2008). Holstein and Gubrium (2003) inform interviewers about the challenges related to conducting interviews, including "those relating to research subjects, technical concerns, analytic options, and representational issues" (p. 5). Interviewers need to be especially conscious of both how the researcher and his/her viewpoints can become embedded in the interview process and also how the simulated environment of the interview can change the interviewee and the way that he/she responds to the questions (Holstein and Gubrium, 2003).

Technical challenges are also associated with conducting in-depth interviews. Gulf of Maine Council personnel were located in three states and two provinces, leading to a question about whether telephone or face-to-face interviews should be conducted. Shuy (2003) suggests that interviewing over the telephone has often been the dominant approach largely due to cost efficiency compared to in-person interviews, which typically require travel and more time. However, Shuy (2003) does not suggest that one method is better than the other; he only notes that advantages and disadvantages apply to both types of interviews.

Face-to-face interviews were preferred for this study, but four of the 19 interviews conducted took place by phone. The latter interviews were largely the result of time and travel constraints of the researcher, as well as the unavailability of some interested participants during the time that the researcher was able to attend the Working Group meetings. The advantages of in-person interviews, as Shuy (2003) notes, are that responses will tend to be more accurate owing to the fact that people often feel most natural and able to speak as they normally would when they are having a face-to-face conversation. There is also greater likelihood of the respondent providing self-generated responses that are a product of the natural conversation. In-person interviews can also prompt more thoughtful responses, achieve higher response rates, and are generally better for engaging the participant more fully as there are less distractions.

On the other hand, telephone interviews also have advantages. Shuy (2003) notes that telephone interviews have reduced interviewer effects, and achieve better uniformity in the delivery of the questions, a greater standardization of questions, and faster and more efficient results. Depending on the interviewee, conducting an interview via the telephone may reduce the anxiety of the participants because they are isolated from the interviewer who is not able to scrutinize their facial expressions and body language. The research literature shows that both methods are effective and so it was expected that interviews conducted via telephone or in person would both provide accurate and informative results.

Through interviews, this study discovered the understanding and opinions of GOMC Working Group Members regarding the publications that the organization produces. Interviewees were well placed to offer insights into the production, dissemination, and use of grey literature publications because of their direct involvement in decisions about projects that resulted in published information. A focus on GOMC had the added advantage of Dalhousie University's close proximity to the Gulf of Maine/Bay of Fundy region, which facilitated face-to-face interviews of Working Group Members who live and work in the region. The following sections outline in further detail the methodology employed in this study regarding the sample of interviewees, the interview instrument, data collection and analysis, and limitations of the study.

3.2 Ethics Approval

The research questions arose out of research conducted by the *Environmental Information: Use and Influence* (EI: UI) research team based at Dalhousie University. With the expectation that interviews would form the next stage of the investigation into the use and influence of grey literature produced by intergovernmental organizations, the research team applied for ethics approval from the Social Sciences and Humanities Research Ethics Board at Dalhousie University and received approval on 22 April 2009. The application outlined the purpose of the study, the recruitment methods, and provided the interview protocol that the research team had devised. That process and interview protocol were followed in this research.

3.3 Sample

As a bi-national organization, the governance structure of GOMC includes members from the Canadian provinces of Nova Scotia and New Brunswick and from the American states of Massachusetts, Maine, and New Hampshire. Each jurisdiction is represented by the Council's federal and state/province member agencies (GOMC, 2006). For example, representative federal agencies include the Canadian Department of Fisheries and Oceans and the United States Geological Survey. Representative province/state agencies include the Nova Scotia Department of Environment in Canada or the New Hampshire Department of Environmental Services in the US (GOMC, n.d.). To achieve inclusive understanding of the publication practices of GOMC, potential participants were invited for interviews based on both their location and their government affiliation so representatives from all jurisdictions would be invited to participate in the interviews. The multi-jurisdictional nature of GOMC presented challenges in obtaining participation from all jurisdictions and from Working Group Members employed at both federal and state/province government levels; these limitations are discussed in more detail in section 3.7.

Interviews for this study were conducted with Members of the GOMC Working Group. The Working Group, which reports to the top level of the Council (ministers, deputy ministers, commissioners, and other managers), was selected because of the Members' active experience with the Council, and their knowledge of the working processes and projects of GOMC. The Council's Working Group includes one representative for each state, province, and federal government, as well the Canadian and US co-chairs from each of the Council's committees (GOMC, n.d.). Currently the Working Group consists of 26 Members. The names of potential interviewees were selected from the Gulf of Maine Council Web site (http://www.gulfofmaine.org), both from the People Finder section of the site, as well as the listing of current Working Group Members found under the "Committees" link. All current Working Group Members were invited for an interview, as well as former Members who were known to have an interest in the project. The names of former Members were determined through discussion with Peter Wells, who is a current Member of the GOMC Working Group and is on the advisory committee for this thesis.

Potential participants were contacted directly via an emailed letter (Appendix A). The letter outlined the purpose of the study, invited GOMC Working Group Members to participate, and informed them that they could withdraw from the interview process at any time. The letter explained that the interview would take approximately 45 minutes and would be conducted at a time convenient for the interviewee. The initial goal for sample selection was to interview at least two Working Group Members from each of the Council's five jurisdictions so that 10-12 interviews would take place. The final sample for this study was determined entirely by the voluntary participation of the Working Group Members and, as a result, 19 interviews were conducted between June 2009 and December 2009, a number that exceeded expectations. Table 1 shows the composition of the final sample of interviewees.

	United States		Canada		Total	
Federal	4			6		10
State/ province	Maine 1	Massachusetts 0	New Hampshire 2	New Brunswick 2	Nova Scotia 2	7
Other	2					2
Total	9			10		19

 Table 1. Sample Showing Federal, State/Province, and Other Representation

Some Working Group Members (current and former) did not agree to an interview and, as a result, the sample has no representative from the state of Massachusetts. However, almost an equal number of American and Canadian participants (nine from the US and 10 from Canada) and almost an equal number of federal and provincial/state/other participants (10 federal and nine provincial/state/other) make up the sample. This composition allowed the interview data to be queried to determine if the interviewees' insights and knowledge about the production, distribution, and use of GOMC's publications varied at different levels of government and between the United States and Canada.

3.4 Instrument (Interview Protocol)

The interview protocol (Appendix B) was designed to collect data on the understanding and knowledge of Members of the GOMC Working Group regarding the production, promotion, distribution, and use of GOMC's publications. Based on the governance structure of GOMC, two sets of interview questions were designed. One was directed to current or previous Members of the GOMC Working Group Secretariat, that is, individuals who have served as chair of the Working Group and a second was directed to all other Working Group Members. This distinction was deemed necessary because of the different roles of Members of the GOMC Working Group. Of the 19 interviews, four current or former Members of the Secretariat were interviewed with the GOMC Working Group Secretariat Protocol, while the remaining 15 current Members of the Working Group were questioned using the protocol for all other Working Group Members. The two protocols are very similar as both sets of questions were based on the themes of production, distribution, and use of publications. The Working Group Secretariat Protocol included four questions regarding distribution of information and one question related to use of GOMC information not included in the second protocol.

A beta-test interview was completed in June 2009, to confirm the suitability of questions and to test the process of conducting interviews. The test interview was conducted by phone. Although this arrangement was the less common method for interviews (15 interviews were conducted in-person and four over the phone), the betatest verified that the digital voice recorder worked well in such circumstances and the interview questions were suitable and did not need revision. Since the interview questions were not modified, the beta test interview was included in the data analysis.

Interviews were recorded with a digital voice recorder and transcribed using Digital Voice Editor 3 software. Voice recognition software was not used because the beta-test confirmed that such software did not respond well to more than one voice in a recording, hindering accuracy of the transcript. To confirm accuracy of transcriptions, they were read by the thesis supervisor in relation to the audio recordings.

Based on the nature of this research project, the interview questions were considered non-invasive and unlikely to make participants feel uncomfortable in any way. This perspective was verified during the beta-test interview and held true for all other interviews, as participants seemed comfortable answering all the questions. The interview protocol was designed to protect the identity of participants if they so chose and as a consequence full disclosure was encouraged. Each interviewe was given a copy of the transcript of his/her interview prior to data analysis to allow the participants an opportunity to confirm the accuracy of the transcript. Two participants provided feedback on their transcripts, and eight others responded that no changes or additions were needed. Responses were not received from the nine other interviewees. When an interviewee provided feedback, both the original copy of the transcript and the revised copy were maintained. At the beginning of each interview, each participant signed a consent form (Appendix C) which stated that the research data is only available to the investigator and supervisors and that it is contained in a secure filing cabinet for five years after which it will be destroyed, in accordance with requirements established by the Dalhousie University Social Sciences and Humanities Research Ethics Board.

While some interviewees agreed via the consent form that their names could be released as part of this study, others did not. As a result, in order to provide consistency throughout this thesis, all interviewees were assigned a letter code to protect identities. In Table 2 below, interviewees are listed as they are identified throughout this thesis, along with the period of time they have worked with GOMC and their nationality. These later contextual factors were considered in the data analysis.

3.5 Data Collection

Data collection occurred both in-person and over the phone with, as stated above, 15 face-to-face interviews and four by phone. All interviews were conducted by the author of this study who attended a meeting of the Working Group in Halifax in June 2009 along with Peter Wells to introduce the research project to the Working Group and encourage their participation in the interviews.

After this initial contact, the researcher attended the October 2009 meeting of the Working Group in St. Andrews, New Brunswick, as well as the Gulf of Maine Symposium, to conduct face-to-face interviews with the United States representatives. An email message was sent to the Council Coordinator, as well as the then current Chair of the Working Group to secure their assistance in encouraging participation from Members.

Working Group Member	Time Worked with GOMC (in years)	Nationality	
А	≈ 18	Canadian	
В	≈.5	Canadian	
С	10	American	
D	≈ 11	American	
Е	8.5	Canadian	
F	8	Canadian	
G	2	American	
Н	10	Canadian	
I	19	Canadian	
J	18	Canadian	
K	8	Canadian	
L	20	American	
М	~ 5	Canadian	
N	6	American	
0	3	Canadian	
Р	5	American	
Q	4.5	American	
R	6	American	
S	13	American	

Table 2. Interviewee Codes and Contextual Factors

Another email message was sent to all current Working Group Members, which described the purpose of the research, its benefit to GOMC, and invited their participation. Seven interviews were conducted at the St. Andrews meetings, six with representatives from the United States and one with a Canadian Member. Completing interviews in this setting was convenient for both the participants and the researcher. Participation by Members of the Working Group in St. Andrews also encouraged additional Members to agree to be interviewed. In-person interviews were held in Halifax and Dartmouth with Canadian Members of the Working Group, three phone interviews were conducted with American Working Group Members and one with a Canadian representative.

Interviews generally lasted between 30-45 minutes and consisted of asking the participant questions from the interview protocol along with occasional probing questions in order to elicit additional information prompted by a response or to seek clarity from the interviewee. Participants were made to feel as comfortable as possible and encouraged to ask questions if they did not understand the interview protocol. Respondents answered freely, which provided a rich data set. Data collection was concluded in December 2009.

3.6 Data Analysis

The interview transcripts were coded for data analysis using NVivo, a qualitative data analysis software package. NVivo was a useful tool because it assisted in the organization of data into themes for further analysis. This software offered a convenient way to store all the interview transcripts in one location, which further protected the

confidentiality of the participants (Hicks, 2007). In addition, NVivo has been employed previously by researchers in the School of Information Management at Dalhousie who could assist in learning its use. Welsh (2002) states that NVivo aids in thoroughness of data analysis by its search feature, which facilitates the interrogation of the data, and helps to "gain an overall impression of the data which has not been unduly influenced by particularly memorable accounts" (para. 2).

The interview transcripts were uploaded to NVivo and the data were then coded into themes. Taking Bazeley's suggestions regarding relying too heavily on only establishing themes in the interview data (Bazeley, 2007), the themes were critically examined during data analysis. The coding process went through two iterations: the first resulted in micro-level themes which proved difficult to link together to form an organized and comprehensive understanding of the data. After consultation with a professor in the School of Information Management, the themes (see Appendix D) were recast as higher, more general levels so that linkages could be more easily determined and patterns could emerge (Sandra Toze, personal communication, February 11, 2010). The second iteration of themes provided the means by which to organize the data to better understand the production, distribution, and use of GOMC publications from the perspectives of Members of the Working Group.

After coding was completed, the query function in NVivo was used extensively to ask questions of the data. For example, the words "protocol" or "publications protocol" were entered into the query function to identify participants who mentioned the *Publications Protocol* (described further in Chapter Four). In addition, free text queries

and three other queries (coding, matrix coding, and coding comparison) were used during data analysis.

3.7 Limitations of the Methods

While qualitative methodology allowed for in-depth analysis of the understanding of Members of the GOMC Working Group with regard to GOMC's publication and distribution practices, broad generalizations about grey literature and its use cannot be made from the interview data. However, considering GOMC's mandate and governance structure, which typifies many intergovernmental organizations, it was possible to make some assumptions about the nature of the production, distribution, and use of grey literature produced by other similar organizations and to suggest further lines of research which could determine the validity of the assumptions.

The quantitative methods employed in this study were used in a descriptive fashion. The sample size for this study is small, hence a difference of two or three responses can have a large impact on understanding drawn from the interviews. Caution was used in all instances where quantitative measures were employed to ensure that the meaning of the responses was understood.

It should also be noted that though the interview protocol did address the issue of the use of GOMC's publications, this theme was not covered comprehensively. Only one question directly sought evidence about the use of GOMC's publications, of which Working Group Members were aware. This study aimed to understand the production, distribution, and use of grey literature from the perspective of the producers themselves,
leaving larger questions about the use and influence of GOMC's publications information for further study.

As discussed in Section 3.3, the goal of obtaining representation from each of the federal and state/provincial Working Group jurisdictions was not achieved. Participation in the study was voluntary. An attempt was made in December 2009 and January 2010 to increase representation from underrepresented jurisdictions, but no response was received. As a result, comparisons among some jurisdictions were not possible.

Chapter 4 Analysis of Results

This chapter is organized around the themes of production, distribution, use, and context of information, which were the four categories that shaped the interview protocol. The protocol questions (see Appendix B) addressing each theme are outlined in Table 3. Analysis of responses to the interview questions are presented within chapter sections below; since interviewees did not always answer questions in a linear fashion and their responses sometimes overlapped questions, the analysis does not follow the strict order given in the table.

The research questions that guided this study (see p. 8-9) and addressed each theme are also listed by question number in Table 3. The Table shows how the research questions are related to the concepts of production, distribution, use, and context and by reading the columns top to bottom, the relationships between the interview questions and guiding research questions are laid out. Conclusions regarding research questions 6, 6a, 6b, and 7, which probe the interviewees' views about the value of grey literature and alternative methods for its dissemination in general, draw on all the responses to questions about production, distribution, and use (see Table 3). The research questions are revisited in Chapter 5 where conclusions of the study are given.

Each section presents findings determined with the help of NVivo qualitative data analysis software followed by additional synthesis. Understanding the information flow pathways was enhanced by identifying both barriers and enablers to the dissemination process. Interviewee responses about barriers and enablers to production, distribution, and use are discussed in sections 4.1, 4.2, and 4.3.

	Production	Distribution	Use	Context
	(Section 4.1)	(Section 4.2)	(Section 4.3)	(Section 4.4)
Working Group	4, 5	6, 7, 8, 9, 10,	12, 13	1, 2, 3, 5
Protocol		11, 14		
questions				
Secretariat	4, 5	6, 7, 8, 9, 10,	15, 16, 17	1, 2, 3, 5
Protocol		11, 12, 13, 14,		
questions		18		
Guiding	1, 2, 2a, 6, 6a,	4, 4a, 6, 6a,	5, 6, 6a, 6b,	3
research	6b, 7	6b, 7	7	
questions				

Table 3	8. Intervi	ew Protoco	l and G	uiding 1	Research	Ques	tion as	Re	lated	l to	Th	emes
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4.1 Production

Interviewees were asked how the current publication process of GOMC worked. This yielded varied and often surprising responses. The majority of participants agreed that the impetus for the production of a publication (the process by which a publication is conceptualized, researched, and written for publication) came from the committees and sub-committees of GOMC's primary Working Group. Twelve of the 19 respondents stated that the idea for a publication was initiated at this level. Working Group Member A noted that more often than not the committees are the driving force behind the work of the Council: "it's definitely driven, from my view, from the bottom up in terms of the committees that address real problems and do real work and then that feeds up through the Working Group and then the Council." Responsible directly to the Working Group, the committees, which are often made up of volunteers, initiate and move the publication process forward. Currently, the most active committees and sub-committees are Habitat Conservation, Habitat Monitoring, Habitat Restoration, Gulf of Maine Mapping Initiative, Gulfwatch Contaminants Monitoring, Ecosystem Indicator Partnership, and the Climate Change Network (P.G. Wells, personal communication, March 1, 2010). In addition, a number of other committees are currently largely inactive because of a lack of funding, or personnel. A full list of the GOMC committees and sub-committees is available at www.gulfofmaine.org.

Though the initiative for production comes mainly from the committee level, where the idea for the *subject* of the publication arises was not obvious in the interview data. Subjects, of course, fit within the overall work of a specific committee, but does that committee identify an audience for each publication or perceive a need in the community of stakeholders that can be addressed by a publication? Working Group Member J stated that an idea for publishing came from identification of a "perceived need," while Working Group Member D noted that GOMC has been "fairly good" at identifying audiences for its publications. These views were qualified, however, by Working Group Members H and K who both thought GOMC could do a better job at targeting audiences for reports and engaging users in a dialogue to assess their needs. These contrasting responses indicate that some committees may initiate the publication process without a clear idea of readership, while other committees make a conscientious effort about identifying their users.

While many interviewees agreed the impetus or idea for a publication is largely driven by the committees or sub-committees, Figure 2 highlights the lack of consensus amongst interviewees about the path a publication takes from its conception to its release.



Figure 2. Steps in the Production Process as Identified by Interviewees

Differences of opinion occurred regarding whether or not the Working Group was required to approve each publication and if yes, at what stage in the production process; whether the *Publications Protocol* (see Appendix E), a set of guidelines for production and dissemination approved by the Working Group, is used by the Working Group and committees or if they are even aware of it; and who is required to review a publication and at what stages in its development, specifically, is a contractor used in the production and review process (see Figure 2). In cases where interviewees stated that contract support is used for a publication (Members A, D, & K), they often stated it only happened when funds were available to hire outside help. This money can come from an agency with which a committee member works and which often contributes in-kind support to the publication process (P.G. Wells, personal communication, March 1, 2010).

Based on the variety of different viewpoints expressed during the interview process, it was very difficult to ascertain any commonality in the stages in the process of production as information flows from an idea, to a publication, through to its release (see Figure 2). This difficulty in determining whether publications followed a similar path was especially evident with regard to approval by the Working Group. Only one interviewee mentioned that publications are "presented to the Working Group" and "the Working Group either accepts it or rejects it" (Member P), while the other respondents who mentioned approval of publications did not explicitly state at what point in the process it took place. This confusion was not unusual among interviewees. Working Group Member Q, who has been closely involved in the publication process, still has trouble understanding it and expressed a concern that lack of clarity could hinder production:

Q: So a group produces a report and then two things happen: One, there's a review process that currently is hard to figure out how to work with it and that's supposedly what's now become the Outreach Committee. So for example, ESIP has a four page fact-sheet that we needed reviewed and we could not get any response from the committee about reviewing it...So it's a very erratic process at the moment.

Some of the confusion regarding the production process could be reduced by the *Publications Protocol* (see Appendix E) if Working Group Members were more aware of its existence. This document was mentioned directly by Working Group Members D, K,

L, and N, and indirectly by Members I and S and is designed as a set of guidelines and standards for every document produced by the Council. However, the existence of this document was not apparent to a majority of the interviewees (13 out of 19). Though its primary function is to ensure that every publication meets the standards of the Council, i.e., the logo is correctly placed, citations are correct, the proper contributors are acknowledged, and no contentious material is released without the approval of the affected jurisdictions, the actual role that the *Publications Protocol* plays in the preparation of a publication is indefinite. It is unclear whether Working Group Members even consider it helpful, or how often committees producing reports use it in order to guide publication.

Even those Members who are aware of the *Publications Protocol* described it in uncertain terms. Working Group Member D stated "I can't remember exactly what the *Protocol* is..." and Working Group Member K remarked "I don't know what it is off the top of my head." The overall lack of awareness of the *Publications Protocol* is surprising because the guidelines in the document could potentially help to streamline the production process. The express purpose of the *Publications Protocol* is to "ensure consistency in presentation and organizational identity of quality documents that are professional in both content and appearance" (GOMC, 2008a, p. 1). This document seems to be exactly what is necessary to prevent the "erratic" production process that Working Group Member Q described.

Greater awareness of the *Publications Protocol* alone does not guarantee more efficient production of information, however. What also needs to be clarified is who is

responsible for ensuring adherence to the *Publications Protocol*. Responses from interviewees suggested that the committees believe it is the job of the Secretariat, the Working Group, or one of the Council's service committees, such as Education and Outreach, to ensure that the standards laid out in the *Publications Protocol* are followed. Working Group Members K, S, Q, D, R, and O suggested that the Education and Outreach Committee has to ensure that a publication is fit for release, but Member O stated that "unfortunately, [Outreach] hasn't been particularly active," which has contributed to a review process "which is currently hard to figure out" (Member Q). The co-chair of the Outreach Committee stated that although publications were referred to her, the Council Coordinator was actually the final arbiter in the process and approved the release of publications. She was the only person to state this was the case, which suggests that the process is unclear to Working Group Members and that not only do Members need to be made aware of the *Publications Protocol*, but they also need to ensure that it is used. Although the *Publications Protocol* was approved by the Working Group, its use in the production and review process remains unclear in the minds of the interviewees.

The *Publications Protocol* itself provides a partial answer to the above questions. The *Protocol* puts primary responsibility for the review of documents in the hands of the project manager of the committee or sub-committee that produced a report. However, because there is a general lack of awareness of the *Protocol* and its actual use and effectiveness in production is unclear, producing committees do not always initiate the review process or ensure that it is carried out. The ad hoc nature of the current review process was confirmed by Working Group Member K:

K: usually, most folks don't review [the *Protocol*] very closely, they'll sort of rely on the lead liaison, mainly out of the Outreach Committee, or if there's a Management and Finance Committee Member that is on the [producing] committee, or has been working closely with it, will just ask and say, what's the status of this, does it fit the *Protocol* and the criteria? Yeah, it does, okay, released.

Failure to adhere to the guidelines of the *Publication Protocol* may lead to a lack of accountability regarding the standards for GOMC's grey literature documents. Even if only one person, e.g., the project manager, is responsible for ensuring the *Protocol* guidelines are met, is this person aware of this responsibility? The low number of Working Group Members who mentioned the *Publications Protocol* suggests that this role is not clearly defined.

The *Protocol* more than simply guides the placement of the GOMC logo and how a document should be properly referenced, it also outlines procedures for the types of editorial review a document should receive, as well as measures to ensure adequate distribution of a publication. The *Protocol* requires the project manager to receive a review of a planned publication from the committee or sub-committee, and to arrange with the Secretariat Team for "review of statements or conclusions with possible policy implications," to ask the US or Canadian Gulf of Maine Associations to review funding statements included in the document, and finally to request the Outreach Committee to review the "logo, mission statement, credits, and date" (GOMC, 2008a, p. 2).

The *Publications Protocol* also contains guidelines for distribution and mentions specific organizations that should receive a print copy of the publication, including the national libraries of the US and Canada. When asked about specific organizations that received copies of publications, not a single interviewee identified these libraries. In fact, Working Group Member N stated that she didn't "know if any got into the library, and if anyone would read them if they were there." This statement may indicate the general lack of awareness of the guidelines in the *Publications Protocol*, and may suggest that Working Group Members have not considered that the benefits of thoughtful and targeted distribution, like to a library, could increase access to publications and increase the uptake of GOMC information.

The *Publications Protocol* makes clear that "the project proposal must contain a distribution plan with associated funding requirements, which must be approved by the Working Group" (GOMC, 2008a, p. 2). None of the interviewees mentioned that they specifically submitted a distribution plan to the Working Group; however, Working Group Member K noted that every committee had to submit a work plan for the year and that it "would outline say, we're going to produce this handbook on Salt Marsh Restoration." While a work plan provides a broad overview of a committee's publication activities, it is not specifically written to outline how and to whom a publication will be distributed. Though Working Group Member O claimed that the intended audiences for her committee's publications were outlined in the *Action Plan* and they were distributed

based on statements in this document, a review of the *Action Plan* confirmed no mention of a specific distribution plan as is set out in the *Publications Protocol*. Both the *Action Plan, 2001-2006* and the *Action Plan, 2007-2012* provide a general outline of the potential audiences for GOMC publications; however, because the function of the *Action Plan* is to sketch the broad aims of the Council over a five year period, a specific distribution strategy for every committee is not listed, nor are target audiences defined for publications (GOMC, 2002, 2007). Working Group Member O was the only interviewee to describe the function of the *Action Plan* as a document that specifies the audiences for publications, which suggests that the audience description given in an *Action Plan* is too general to really aid in the distribution of publications. Submission of a distribution plan as required by the *Publications Protocol* would enable a producing committee to think carefully about an intended audience for a publication based on the needs of stakeholders in the Gulf of Maine region.

4.1.1 Enablers to Production

Throughout the interview process, the participants made clear that in the course of producing information, GOMC does a number of things well. Enablers to the production process were defined by positive statements made by Working Group Members. Positive responses in this case meant: a) statements of affirming language, e.g., Working Group Member D: "I would say that in general, the Council has been *fairly good* for identifying the audiences for its publications"; b) expressions of optimism, e.g., Working Group Member I: "So, now a few years ago we introduced, if you're going to produce a publication you got to identify who it's for and how you're going to distribute it...*Hopefully* we're still sticking to that"; and c) expressions of certainty regarding the

nature of the process and its effectiveness, e.g., Working Group Member N: "*I know* there was a protocol developed because it was an issue that it [the publication] be credible and...referenced properly."

Positive statements were always considered in the context of the response as a whole, meaning that if one sentence of a response was negative, but the remainder was decidedly positive, the response was classified as a description of an enabler. For example, in response to a probing question about how the target audience for a publication was defined, Working Group Member I stated:

I: we printed a whole bunch [of publications] and then we sort of half-assedly sent them out and ended up...with box-loads of reports. We had no idea [about] the distribution part of it. So now, a few years ago, we sort of introduced, if you're going to produce a publication you got to identify who it's for and how you're going to distribute it...Hopefully we're still sticking to that.

Though the first two sentences refer negatively to the ad hoc processes of production and distribution, it is clear from the last sentence that Working Group Member I believes the Council is trying to improve its practices by implementing guidelines for production. Therefore, taken in the context of the full response to this question, the above example can be considered as describing an enabler. Enablers to production are listed in Table 4 in the order they are discussed in the text, and not by priority.

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Enablers	Barriers
Publications Protocol	Audience needs not fully understood
• Multiple levels of review	
	Audience not identified
Contractor support	 Debote over an identified
• Identification of an audience	• Debate over an identified audience. Is more inclusivity required?
• Identification of a need for information	• Unclear production
• Commitment and involvement by GOMC Members	standards/practices set out in the <i>Publications Protocol</i>
• Submission of a work plan	• Unclear review process

Table 4. Enablers and Barriers to the Production of GOMC Information

The *Publications Protocol*, considered at length above, requires some additional discussion as an enabler to production. Working Group Members who have some knowledge of the document perceive it as an enabler to the publication process. The *Protocol* outlines several steps in production including review of the manuscript, distribution strategies, and details regarding the logo, the publication sponsors, and the mandate of the Council, all of which must be included in the publication. Sixteen of the 19 responses regarding the production process of GOMC information could be considered positive and therefore are expressions about production enablers. Of those 16, six mentioned the *Publications Protocol* as an enabler to production because of the guidelines it provides. While these six respondents believed the *Protocol* served an important role in preparation of publications, they were not able to remember any details

about the document. This lack of awareness was considered a barrier to production and will be discussed more fully below in Section 4.1.2.

The *Publications Protocol* outlines multiple levels of review to apply in the production phase of publications, which Working Group Members identified as enabling publication. Interviewees who directly or indirectly made reference to the usefulness of the *Publications Protocol* were not alone in noting that peer review was a key component to the production process. For example, Working Group Member F stated that peer review was conducted by Members of the Council and Working Group and also "sourced by experts" and "reviewed by a number of people outside the Council." Working Group Member C, who also did not acknowledge the existence of the *Publications Protocol*, noted that publishing was "a very collaborative process" which included "substantial peer-review." Working Group Member D, who did mention the Publications Protocol, but could not remember what it included, stated that every publication had "lots, and lots, and lots of input from lots of people." Despite the general lack of knowledge about the editorial review guidelines prescribed by the *Publications Protocol*, Working Group Members referred to multiple levels of review applied to GOMC publications and pointed out that the production of information is an iterative process with a high priority placed on peer review in order to enhance the credibility of the documents.

The quality of GOMC publications is enhanced during the production process by contracted support. For the most part, committees are responsible for coming up with the ideas for and preparing the content of publications. Contractors may be employed for translating the science in the document into a form for the general public (Member H), for peer review (Member F), and for copyediting and printing (Member H). In some cases, entire documents were created by contractors (Members A & M), but this method of production is largely dependent on funding available from the producing committee.

The identification of audiences for publications is another enabler (two of 16 responses) (see Table 4, p. 73). As Hoornbeek (2000) points out, identifying an audience for a publication at the production stage is especially important since it provides direction and purpose for a publication, as well as establishing a measurable target once a publication has been disseminated. While some of GOMC's publications are intended for general public awareness and public education about marine environmental issues, some publications could also be destined for specific audiences which may include policy makers of the member states and provinces or scientists worldwide. Encouraging use begins in the production phase when an audience is identified and a strategy is developed to ensure that the information reaches the designated readers.

The personal effort Working Group Members commit to the publication process has a positive impact on the production phase and was also considered an enabler (see Table 4, p. 73). Continuous work occurs at the committee level, which is fueled by the interests of the Working Group and the commitment of Members to the goals of the organization, which in turn drives the production of information. The Working Group expects a certain amount of output from every active committee, which is written into the *Action Plan* and acts as an impetus for production of publications. However, most committee chairs and their members usually do not need an incentive to produce publications and it is the committee that comes up with the idea, does the writing, puts a publication together, arranges for the review, and finds the funding to support its production and release (Members P & R). Without the hard work of committee members, the focus of the Working Group Members who chair those committees, and the flexibility of the production process itself not much would get done (Members K & L). As Working Group Member N stated, producing publications is the primary means of increasing awareness of the challenges the marine environment faces in the Gulf of Maine/Bay of Fundy region: "it's the only way really, this kind of organization really has to get that information disseminated, so…I am glad that we aren't more formal about the process." Members' ability to be creative and involved in the production processes gives them a large stake in the development of a publication and also in the organization as a whole.

Just as commitment to, and involvement in, the production process fosters a high level of accountability, so too does the submission of a work plan. "Each year the Council approves an annual work plan that describes the activities, schedules, and budgets [of the Working Group and its committees] and sets priorities for the year" (GOMC, 2008b, p. 39). The annual work plan is designed to facilitate the completion of the goals of the *Action Plan*, which sets five year aims for the Council as a whole. Working Group Member K stated that "all committees have to submit a work plan for the year," which would list the potential publications of the committee for the year. The work plan is a good way to outline the broad goals and objectives of each committee, but "a major ongoing challenge for the volunteers on the Council's committees/subcommittees proved to be developing detailed narratives, milestones and budgets that could then be turned into funding proposals" (GOMC, 2008b, p. 39). Without describing the contents of a publication, the potential audience for a publication, a detailed distribution plan, and a budget for the cost of production and distribution, the work plan may not be specific enough to support the production of information. The work plan is a limited enabler to production, but has the potential to be more effective if the committees and subcommittees of the Working Group had the "time to prepare detailed narratives" for the production of information to be included in the work plan (GOMC, 2008b).

4.1.2 Barriers to Production

Though the Council does a number of things well in the production process, significant barriers were identified by the participants in their responses to the interview questions (see Table 4, p. 73). A barrier was defined as such if, in answering a question, the respondent commented on the production process in a negative way. Negative in this context means: a) the respondents used unenthusiastic language, e.g., Working Group Member H: "[*Tides of Change*] was prepared without having researchers, or managers say hey, I need a document like this to tell me that I'm doing a good job or a bad job. That type of dialogue is *lacking* within the Council and that reflects what actually comes out for publications..."; b) conveyed a certain degree of pessimism through their responses, e.g., Working Group Member K: "we've *never really done a good job* defining what our target audiences are..."; and c) expressed uncertainty about the process and the effectiveness of the production phase, e.g., Working Group Member G: "there is *some sort* of formal approval process through, *I don't know*, the Secretariat I think, and then it's published, magically."

Negative responses were always considered in the context of the response as a whole, meaning that if one sentence of a response was positive, but the remainder was decidedly negative, the response was classified as a description of a barrier. For example, in response to the question that asked how print and digital publications were distributed differently, Working Group Member D stated:

D: *Gulf of Maine Times* as a publication, that's the publication that's going out to the broadest mailing list that we have available when it was a print publication. Now that it's online, it's going to the broadest email list that we have available to us. Um, and I don't, I think that is an area in which we have not really, I think figured all, all the ins and outs of yet. What do we need to send to that whole audience? What do we not? I mean what's valuable news?

The first two sentences of the above statement indicate that Working Group Member D believes that the broad distribution of the *Gulf of Maine Times* enables the dissemination process, but questions the effectiveness of such a broad distribution when GOMC has not identified what the audience considers valuable news. The questioning nature of Working Group Member D's response indicates that failure to identify the audiences for publications is a barrier to production in the mind of this Working Group Member. Barriers to production are listed in Table 4 in the order that they are discussed in the text, and not priority.

Ten of the 19 interviewees gave negative responses to the question about the process of producing information. The theme running most strongly through these negative responses was that audiences were not readily identified in the production phase

and the needs of perceived audiences were not addressed when decisions were made about the type of information to produce (see Table 4, p. 73). There is a diverse set of stakeholders in the Gulf of Maine region and Working Group Member K noted how difficult it was to produce a publication that could be useful to all audiences:

K: it's such a diverse groups of folks and interests around the table and region you know that we create this *Habitat Primer* that was originally designed to inform management, well management doesn't read those things...it's just a real challenge to produce something that's specific enough for decision makers to use, that's relevant for the whole region, but it also relevant for specific jurisdictions and where those decision makers sit.

A question arises whether the goal is to provide a publication general enough to meet everyone's needs, or should a more targeted approach be taken? Working Group Member H argued that a focused approach is necessary, but that this tact is hindered by not fully understanding the needs of the audience before producing a publication:

H: *Tides of Change*, it was supposed to be a state of [the environment] report on certain activities. Well, it was prepared without having researchers, or managers say "hey, I need a document like this to tell me that I'm doing a good job or a bad job." That type of dialogue is lacking within the Council and that reflects what actually comes out for publications...

The Gulf of Maine Council could plan to reach specific constituencies such as policy makers, or its publications could be better suited for the promotion of marine environmental education of a general audience. The fact that some Working Group Members suggested GOMC was good at identifying an audience and some the opposite may mean that the Council is undecided about the kinds of uses it wants for its publications and the types of audiences it intends to reach. Working Group Member O stated that despite the *Action Plan* loosely defining policy makers as the audience for her committee's publications, the Group continually debates whether this is the right and only audience:

O: we certainly have an identified audience in terms of the *Action Plan*, but we continually debate if we should expand that audience and who it should be because you know, we're supposed to be informing researchers and decision-makers, but yet you know, if you started talking to local people, or just general public, you know, understanding indicators and the health of the Gulf of Maine is important, but we can't do everything for everybody, so I guess then we always

fall back to what was in the *Action Plan* as our identified audience[s]. Working Group Member O suggests that perhaps policy makers are not the only readers who would benefit from the committee's published output.

The *Publications Protocol* is described as an enabler by some Working Group Members while others noted that lack of awareness of the *Protocol* is a barrier. Five of the 10 respondents who spoke negatively about the production process expressed confusion over the production criteria, or could not remember the content of the *Publications Protocol*. The production process was described as "clunky" (Member Q) and "labourious" (Member N), which suggests a lack of awareness of any production guidelines. Moreover, two of the 10 respondents stated that they could not find the right individual or committee to review their draft publication. Since the *Publications Protocol* provides guidance on this aspect of the publication process, better circulation of this document could alleviate confusion regarding the review of publications.

4.2 Distribution

Over the course of conducting the interviews, it became clear that GOMC's publications were distributed in a variety of ways, with no single strategy guiding the dissemination of each document. Every interviewee agreed that both the Council and Working Group "definitely have a role, [though] sometimes it's not as carefully followed" (Member S) and that there are no distribution guidelines or methods to follow. This statement is supported by Working Group Member F, who commented rather boldly: "I don't think there's a really formalized method you know." The multijurisdictional character of GOMC contributes to the absence of either a formal or single approach to distributing both print and digital publications. Nonetheless, a variety of methods are employed, if not always applied in every instance. Surprisingly, most interviewees were not concerned about using informal distribution methods. Working Group Member H implied that having no strategy is actually a type of strategy in and of itself and that Members take a lot of personal responsibility for making sure that publications are distributed.

The informality of the dissemination activities allows individual Members of the Working Group to be creative in how they promote awareness of the publications. When publications were produced mostly in print format (prior to cuts in funding to GOMC and the avid use of the Web as a primary means of distribution), Working Group Member E reported that dissemination occurred by "lugging a box of publications around and handing them out to everybody." Digital publications have presented a new means of distributing copies: "I'm an aggressive forwarder" is how Working Group Member I described his practice of maximizing personal networks to pass on copies of GOMC's publications. Working Group Members were able to develop their own methods of dissemination that worked best for them, which increases the likelihood that publications were being distributed to broad networks of interested stakeholders. Such personalized distribution methods mean that many types of distribution were identified during interviews. It should be noted that except for Working Group Member G, all Working Group Members use more than one type of distribution to disseminate publications. Table 5 lists, in alphabetical order, the types of distribution methods that the Working Group Members applied to both digital and hard copies.

The 15 types listed in Table 5 demonstrate the rich and diverse methods employed by GOMC Working Group Members to disseminate information. Clearly, every Member sees him/herself as having a role to play in the distribution of reports and many take that role very seriously. For instance, Working Group Member E identified six different types that he employs to achieve wide dissemination. During the initial stage of data analysis, an assumption was made that without a concrete distribution strategy the dissemination of GOMC publications would be seriously impeded.

Types of Distribution	Working Group Members
At meetings or conferences	A, D, H, I, N, O, Q, R
Based on an interest in the subject of a publication	B, D, E, F, J, K, O, P
By agencies within each jurisdiction (print copies only)	C, D, H, K, L, N, P, Q, R S
By GOMC Councilors	Е
By Members of the producing committee	A, E, J, K, M, Q, S
By Members of the secretariat	М
By serendipity	L
By Members of the Working Group	E, R
Emailing or forwarding a publication to a user	B, C, D, E, F, I, N, O, P, R
Person-to-person (handing a document to another person)	B, E, H, N, P
Putting a publication on the Web site	C, I, J, O, S
Using internal and external marketing or advertising	H, K, Q, R
Using the postal system (mail)	F
Via a library (using a library as a point of access)	J, P
Word of mouth (talking about information in documents)	D, E, G, H, M, S

 Table 5. Distribution Types Identified by Working Group Members

It was thought that distribution would be based on a standard list developed by each jurisdiction which outlined the types of individuals and organizations who would receive

publications. However, this assumption did not take into account the individual or committee-based initiative that drives the creation of many GOMC publications, which leaves the onus for distribution in the hands of the committee that created the document.

Though interviewees held different views about how well the Council identifies the audience for a publication *before* it is produced, it is clear from Table 5 that the subject of the publication and the interest it creates factors into personal distribution methods. Eight of 19 interviewees stated that the subject of the report is an important factor in its distribution. This method highlights the thoughtful, diverse means by which Working Group Members attempt to reach broad readership for GOMC publications; however, wider dissemination could be attained by targeting interested groups during the production phase, which would provide a strategy for distribution beyond the net of personal and professional contacts of Working Group Members.

Table 5 also demonstrates that Working Group Members actively engage in physically handing out publications, taking copies to meetings and conferences, and talking about publications as a means of distribution. Working Group Member I stated that "a lot of it [information sharing] happens when we're at the table together...people are bringing reports [and] there's always a table full of publications," which suggests meetings and conferences are one of the primary locations for dissemination. Because Working Group Members have a stake in the distribution of publications, particularly those produced by their committees, they undoubtedly broaden the distribution network by putting documents in the hands of interested colleagues. According to Working Group Member N, physically handing out copies was important because it forced the distributer to wear his/her "GOMC hat," to take ownership of the information he/she was distributing, and to broker the information across disciplinary boundaries. She stated: "It's not just disseminating what that group did but, actually the value added, here's where we can work together, here [is] a cross board-walk between several different groups that have similar priorities and different strengths..."

Working Group Members also acknowledged that publications are physically distributed by the representative agencies of Working Group Members within each GOMC jurisdiction. However, this type of distribution seems to be used only for print publications and interviewees often referred to it in the past tense as a practice that was used more frequently before Web-based distribution became common and funding cuts reduced the printing budgets. Working Group Member K stated that prior to using its Web site for distribution GOMC had "in the past sometimes produced quite nice printings of the *Habitat Primer* [which] is nice and glossy...[and was] typically distributed [by] allocat[ing] a certain number to each jurisdiction." Working Group Member E supported this statement when he noted that "in the past, [distribution] was lugging a box of publications around and handing them out to everybody..." While less physical distribution is done currently by the agencies within each jurisdiction, this method is still used because some publications will always be printed (Member N). Working Group Member D stated that the *Gulf of Maine Habitat Primer*, published in 2005, was "one of those where they went to jurisdictions, the jurisdictions developed a list of who they wanted to send stuff to and so it went out and then they actually mailed them out or they handed them out." This method of distribution is only effective if the

representative agencies of the Council are willing to hand out the publications, which was not always the case. Further discussion on this point is given in Section 4.2.2, Barriers to Distribution.

Interviewees also acknowledged that the members of the committee which produced a publication play a large role in its distribution. Seven respondents named this method as a type of distribution (see Table 5). Working Group Members E, K, and M all noted that distribution was largely committee driven and relied on the "knowledge, experience, and expertise" of committee members whose awareness of both the content and audience of the report is invaluable (Member E). Working Group Member K stated that committee members are most likely to know who would be interested in the subject or content of the document: "the committee distributes it and...it's very informal, like if I receive something and I think it would be of interest to someone in my department, I'll forward it." Working Group Member K's comments highlights that distribution methods—in this case by the producing committee members, by the subject or interest in the publication forwarded to colleagues via email—are used in tandem with the goal that publications are distributed broadly. The informality of the distribution process allows for creativity in dissemination and relies heavily on the personal motivation of the Working Group Member in order to be successful.

The most frequent type of distribution mentioned by interviewees was emailing or forwarding a publication to a user (see Table 5). More than half of the respondents (10 of 19) stated this was a primary means of distribution mostly due to the ease of use. Since publications produced by GOMC are now made available on its Web site in pdf format, a copy of a pdf or the Internet URL (Web link) to the document can easily be distributed via digital methods. Working Group Member B stated that with "electronic versions [of documents] I'll just forward them on to anybody and everybody that's working in that field." Working Group Member Q noted she was more discriminating in her email distribution:

Q: [I] put together email lists of colleagues by interest or geographic area. So if...a new publication came out on say shellfish contamination, I would have a group of people that I would send that out to and say hey, I just want to make you aware that the Gulf of Maine Council put this information out and it might be of interest.

The electronic networks of personal and professional contacts are "being used more and more" for distribution according to Working Group Member E, which facilitates easy dissemination of information to a large audience. Member E stated that he would distribute a relevant publication to the Atlantic Coastal Zone Information Steering Committee, "which in turn spreads out again into broader networks." Information is distributed to personal digital networks and from there penetrates the networks unconnected to the original distributer.

The ease with which publications are distributed by digital means is now made possible by their availability on GOMC's Web site; however, only five interviewees mentioned putting publications on the Web site as a means of distribution (see Table 5). This is likely because "simply putting [a publication] on someone's Web page doesn't draw any traffic to the publication" (Member L). Working Group Member M stated that though his committee's reports were indeed placed on the Web site, he "wasn't totally convinced they're in the best place" and people looking for the reports "might have a bit of a difficultly finding [them]." In fact, he was disappointed with himself for not seeking any other avenues outside the Web site for distribution. Member M recognized that the Web site, though an excellent repository for information, does not guarantee wide dissemination and that it must be used in concert with other promotional tools and techniques to be truly effective.

Distribution of publications by GOMC councilors, Members of the GOMC Secretariat, serendipity, the postal system, Working Group Members, and via libraries were mentioned by only one or two interviewees (see Table 5). Members of the GOMC Secretariat and Members of the Working Group often have multiple roles with the Council and may serve as the chair of one of the committees. In this latter capacity, they may have a larger responsibility in distribution than in their role as part of the Secretariat or Working Group. Even though only Members E and R specifically mentioned Working Group Members serving as a conduit for distribution, all Members are active in distribution of publications. The cost of mass mailing seems to be a deterrent for using the postal system for distribution, but Working Group Member F stated that some groups preferred print communications and she was happy to accommodate them. Working Group Member L commented on the serendipitous distribution of documents by stating that the informal means by which documents were distributed meant it was largely left up to individuals on the Council "to think of creative ways" to disseminate reports. Finally, the limited use of libraries as a point of distribution was of little concern to most

interviewees. This perspective will be discussed in more detail in Section 4.2.2, Barriers to Distribution (p. 110).

Distributing publications at meetings and conferences is an example of a type of dissemination employed by both American and Canadian representatives on the Council (see Table 6. Meetings/Conferences), but the frequency of the types of distribution the Working Group Members used varied between the two groups of representatives. For example, of the 10 Working Group Members who listed that distribution was carried out by representative agencies from each jurisdiction (see Table 6), only two were from Canada, which suggests this strategy was less effective on the Canadian side of the border. By way of illustration, Canadian Working Group Member F spoke about the difficulty of distributing print copies of the *Gulf of Maine Times* sent to her agency:

F: we used to get the *Gulf of Maine Times* in, in packets and we were asked to disseminate them and we found that very difficult. And when they were sent to our office, they were sent in a rather large mailing so we had a large number of copies and in a lot of cases they just sat and they weren't read and it was a shame to have the expense of making those copies

Distribution based on interest in a subject is a method used by eight of the 19 interviewees (see Table 5); but, more Canadian Working Group Members mentioned this way for disseminating publications than Americans (six Canadians vs. two Americans, see Table 6). The difference could simply be due to the American Working Group Members not thinking of such a method during their interviews; yet, it could also indicate that Canadian representatives have a clearer sense of the audiences for publications than their American counterparts. While more Canadian Members than Americans listed this means of distributing publications, there is no evidence to suggest that Canadians use this strategy more effectively than Americans.

Types of Distribution	Canadian Working	American Working		
	Group Members	Group Members		
At meetings or conferences	A, H, I, O	D, N, Q, R		
Based on an interest in the subject of a publication	B, E, F, J, K, O,	D, P		
By agencies within each jurisdiction (print copies only)	Н, К	C, D, L, N, P, Q, R, S		
By GOMC Councilors	Е			
By Members of the producing committee	A, E, J, K, M	Q, S		
By Members of the secretariat	М			
By serendipity		L		
By Members of the Working Group	E	R		
Emailing or forwarding a publication to a user	B, E, F, I, O, P	C, D, N, P, R		
Person-to-person (handing a document to another person)	В, Е, Н	N, P		
Putting a publication on the Web site	I, J, O	C, S		
Using internal and external marketing or advertising	Н, К	Q, R		
Using the postal system (mail)	F			
Via a library (using a library as a point of access)	J	Р		
Word of mouth (talking about information in documents)	Е, Н, М	D, G, S		

Table 6. Types of Distribution by Nation

Committee-based distribution is a second type that shows a marked difference across national borders. In this case, five of the seven interviewees who identified committees as a hub of distribution were from Canada, which suggests that American Working Group Members place a lower priority on this distribution method than the others that they mentioned.

A similar number of American and Canadian Working Group Members listed all of the other types of distribution, which suggests that the two groups undertake distribution of GOMC's publications in much the same way (see Table 6). For example, few Canadian and American Working Group Members see libraries as a method for making publications more widely accessible to potential users. The absence of prescribed distribution methods has prompted multiple strategies for disseminating publications by the Working Group Members and while this situation has fostered creativity and to some extent accountability, some interviewees expressed concern that a heavy reliance on informal distribution contributed to weaknesses in the process. Working Group Member R stated that the question of a distribution role was an "excellent" one since "we've run up against this with everything that we've tried to do, all the way up to right now trying to get the word out about the Gulf of Maine Times." In her view, the distribution process was "hit or miss." In fact, in some instances, many copies of some of GOMC's publications never made it beyond the storerooms of Working Group Members. Member D recounted that when his office moved "about five and half years ago...[he] purged literally dumpster loads of old Gulf of Maine Council documents." Working Group

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Member L drew attention to the lack of efficiency in the distribution of print copies when he said:

L: we'd print...five thousand copies of something and we would somehow equitably provide boxes to each jurisdiction in hopes that they would disseminate it and we learned that often those boxes were propping doors open, or were serving as step stools under somebody's desk.

Not only did copies of some GOMC publications languish in the printing shop boxes, Member J noted that she "found it was difficult to maintain...[distribution] records for every publication" within her responsibility. It was not within the capacity of that provincial government agency to record all the individuals and organizations that received copies of publications. Even now that publications are posted on the Council's Web site, Working Group Member M described this Web-based distribution "as sort of a minimal, minimal access..." and was "not convinced that that was enough..." The Web site is only an effective means of distribution if awareness of GOMC publications is promoted. Potential stakeholders are unlikely to take advantage of GOMC information if they are not made aware of it, encouraged to access it, and find the Web site easily navigable and searchable. Another Member summed up an overall concern regarding the Working Group not adopting specified distribution strategies as follows:

L: I think...that sometimes we might print one thousand copies of something and when those thousand copies are gone we conclude that we were successful in disseminating the report. We rarely have the opportunity to go back and evaluate whether or not those people that got it, read it, used, it, found it of any value. You know...like many organizations, we under-invest in evaluating whether or not the publications had the desired result.

Being able to fully evaluate the influence of a publication is directly related to planning for distribution and outlining a target audience in the production phase. It is not cost effective for printed reports to languish unused as office door stops, nor is it entirely sufficient to deposit a report on a Web site and expect it to be used. Working Group Member L explicitly expressed concern regarding this Web-based means of distribution: "simply putting it on someone's Web page doesn't draw any traffic to the publication, there has to be a concerted strategy." Working Group Member L does not believe that GOMC has given extensive thought to this matter, although taking such an approach has not been purposely avoided. Instead, the "capacity of the organization to do that in a rigorous way is not there" and, like many organizations, the dissemination of its information is largely by "serendipity" (Member L).

One way to promote publications and to ensure that people go to the Web site is to actively encourage awareness of GOMC publications. Interviewees were asked if Members take any steps to promote such awareness of publications and if so, what those steps have been. In their responses, many Members recognized that promoting awareness entails more than just simply distributing reports; rather boosting awareness means encouraging the uptake of the Council's information and finding connections between other related efforts and the initiatives and work of the Council. When asked about the promotion of awareness, 17 of 19 interviewees provided a response. Sixteen of the 17 believed that the Council and its individual Members took steps to promote awareness. Their responses indicated that extensive personal initiative was especially important. As Working Group Member S stated:

S: There are some who do a fantastic job kind of being the Council's legs and voice out there in the world wherever they happen to go and I think that on some level we are not making it easy for them because unless we have a little postcard, or something for them to give out at a meeting, you know, they're providing a presentation or mentioning it, it's about as far as they can take it and it's amazing how effective they've been doing that and I just keep thinking how much more effective they could be if they had better tools to do so, like a postcard, or handing out CDs, or whatever, environmentally speaking, seems like the best way to proceed.

Working Group Members have a large stake in promoting material they had a part in producing and, as a result, they do not need a lot of encouragement to promote awareness. Working Group Member L made this plain: "it's ludicrous to think then that someone would spend a year working on a publication and not rigorously disseminate it." Yet, as Working Group Member S suggested, promotion efforts could be enhanced by providing tools like a postcard, meaning a postcard size promotion sheet with the image of the cover of the publication on one side and an abstract on the other, or a CD of the publication. These marketing strategies would combine promotion of awareness with distribution efforts, which has the potential to increase the effectiveness of dissemination by GOMC Members. Interviewees also indicated that the *Gulf of Maine Times*, as well as newsletters sent out by individual committees, play a role in promoting awareness. When a new publication is released, a note about it could be placed in the *Gulf of Maine Times*, along with the URL on the GOMC Web site, so that people can locate a copy of the online version (Member J). The newsletters sent out by individual committees act in a similar fashion, regularly updating readers who have subscribed to the newsletter about the publications of the committee. Although an excellent means by which to promote awareness, one interviewee did not think it was being used to its full capacity. She stated:

O: I think it [the *Gulf of Maine Times*] could be used more effectively than it has been because quite often it's doing stories around the Gulf of Maine, but we've often talked about to support the *Gulf of Maine Times* in the editions that are reporting, why can't we have an insert on ESIP and you know, that would go with the rest of the stories, but...I don't know, that's never seemed to have flowed.

Working Group Member B agreed and claimed the purpose of the *Gulf of Maine Times* is aligned with promoting GOMC publications connected to a topic in the newspaper. He noted that "for the *Times*, well I think for all [publications], it's about raising the level of awareness and education on a particular issue or topic in the Gulf of Maine." His response indicates that perhaps the *Gulf of Maine Times* could be used more often as a vehicle to promote the awareness of the different publications released by GOMC.

Not only could the *Gulf of Maine Times* be used more widely to promote awareness of GOMC publications, but Members themselves could be more attuned to the types and variety of publications that the Council as a whole has produced. While many Members take steps to promote publications with which they are familiar, there seems to be a general lack of awareness of all of GOMC's publications despite the report by Cordes et al. (2006). Working Group Member Q pointed out that one of her main promotion efforts is to remind her Gulf of Maine Council colleagues about their role in marketing the publications of GOMC:

Q: as committee chair I will remind on a regular basis like I try on a quarterly basis, so when we have a steering committee call, or sub-committee calls, for those groups to remind [them] to be sure that they continue to send out, or remind people that the fact sheet exists or that new information is there. And then at the Council meeting when I go when the councilors are there, I remind them that there is this whole treasure trove of publications and they can be part of the marketing strategy [laughs] and they need to tell other people and help to distribute them.

It seems that although 16 of 17 interviewees commented on the steps they took to promote the awareness of publications, these efforts may have been focused on documents produced by their own committees, or on an area of interest as opposed to the "treasure trove" of GOMC publications.

Since the Council does not have the capacity to undertake marketing or promotion on a large scale at the present time, responsibility for promoting awareness of GOMC's publications rests largely with Working Group Members. Working Group Member K noted there used to be a "person who was in charge of drafting a press release that would send it to the relevant jurisdictions' newspapers, but that hasn't happened for the last
couple years now." Currently, funding constraints prevent allocating resources to preparation of press releases, thus, the onus for promotion rests with the Working Group Members of GOMC. Interviewees expressed concern that personalized promotion effort results in information not being marketed to people outside the close networks of Working Group Members. Working Group Member C considered distribution to be limited because "we [Working Group Members] often work in silos, we're disseminating to our colleagues who happen to be the converted, who happen to be the scientists, [and] happen to be the educators..." While potentially broader distribution can be encouraged by dissemination within personal networks, it is by no means certain that interested, yet unconverted, stakeholders are reached.

All the grey literature publications produced by GOMC are now put on its Web site, which serves as the primary means of distribution. Thirteen of the 19 interviewees explicitly stated that the Web is their preferred distribution method. Not only are the grey publications posted to the Web site, but email is also used to forward publications and links to publications to prospective users. Working Group Member Q described the audience for this digital distribution as her "personal" or "professional" networks. As Table 5 shows, the subject of a publication and who might be interested in it heavily influences distribution to either of these networks (six of the eight Working Group Members who disseminated publications based on the subject or interest were also in the Email/forward group). Most interviewees stated they did not have a standard list of personal or professional contacts to which they would always forward publications, as this approach was considered inefficient. Only people Working Group Members considered to be most interested in the subject of the publication would receive an email link or copy. This personalized distribution strategy ensures that GOMC's publications reach an audience outside of the Council, yet it raises a question about who is missed by such a method and also a question about only disseminating publications to already interested and motivated user groups. As Working Group Member B stated:

B: Unfortunately, science reports are still read by scientists and academics and so I see them being of limited value for the general public and users of the Gulf of Maine because really, in this context, the Gulf of Maine Council, we're really researchers, scientists, policy people, and also users, but we're just a tiny fraction of the users, whereas there's probably 99.5% of other people, other users who would not have access to the science literature.

This statement also prompts a question regarding the possibility of reaching audiences outside Member networks. To reach wider readership, audiences outside such networks need to be considered in promotional initiatives and the importance of placing collections of GOMC's publications in various libraries needs to be considered (Cordes et al., 2006).

The shift to Web-based means of distribution does not mean that print publications have an insignificant role to play in the organization, but this role, however important, is diminished because of printing and mailing costs. According to interviewees, print publications have continued value because they have to potential to reach a different audience than Web-based publications. As Working Group Member B states, it is easy to leave a print copy of a report in a staff lunchroom, or a dentist's waiting room, which means somebody outside the Council might pick it up and read it, which cannot occur with a digital report:

B: I think it's a great idea to have a hard copy because once you're done with it, you can leave it behind and if that means leaving it in the lunchroom in the larger organization say like our agency...I think leaving something like the *Times* [*Gulf*]

of Maine Times] on the table in the lunchroom would have a great impact.

Working Group Members J and S also commented on the benefit of holding a print publication in their hands and despite the general trend toward reading on the Web, they still preferred to read print documents. In the case of the Gulf of Maine Council, print documents are also valuable because they are often well designed. Publications, like the *Marine Habitat Primer, Tides of Change* and the *Action Plan 2007-2012* have been carefully prepared to include colour photographs, and maps, which make them very readable, as well as informative.

The shift from print to digital publications has coincided with recent advances in Web 2.0 technologies which make it possible to distribute information in additional ways, some of which the Gulf of Maine Council is taking advantage of through RSS (Really Simple Syndication) feeds for the News page, the *Gulf of Maine Times*, and the Publications page. The Ecosystem Indicator Partnership (ESIP), a committee that operates under the Working Group, also has an RSS feed for its page on the GOMC Web site so that interested stakeholders are kept informed of the committee's progress. Offering RSS feeds ensures that interested stakeholders who have signed up to receive updates will always be informed about the latest publications produced by the Council. This feature encourages timely uptake of information and extends distribution. Many Internet users expect Web sites to offer available, easy-to-use Web 2.0 technologies. GOMC's employment of RSS feeds aligns very well with the expectations of these users.

Three interviewees (Members A, H, & M) talked specifically about Wiki technology, though this Web 2.0 feature is not being used presently by the Council. These Members were particularly concerned about stakeholders' engagement with the Council's information and recognized that though wiki technology is available, the Council is not taking advantage of it. Working Group Member M, who works with one of the more active committees of the Council, commented that his committee produces reports not just to sit unread on a Web site, but to be used and engaged with. In his view, interested users would benefit by tapping into the body of knowledge this committee generates as well as learning about the work of the committee more generally. He described the potential value a wiki offers for promotion of end-user engagement with the work of the committee:

M: How do you get somebody kind of taping into the process...we're more interested in something like a Web forum, or [something]...along the wiki style...we want the [Committee] to draw Members in, but we're drawing them in for two reasons: one is, we know that people are interested in the information we have, but we're also interested in what they have and how do they get stuff in.

"Getting stuff in" is crucial to this particular interviewee because the environmental concerns his committee is dealing with are changing so rapidly that new information comes to the fore every day. Engaging users, benefiting from their knowledge, and also providing a venue to continuously provide updates on issues means that stakeholders do not have to wait until the next publication is released to become informed and encourages people to return to the GOMC Web site for the most up-to-date and relevant information and discussion.

4.2.1 Enablers to Distribution

Just as with production, participants identified both enablers and barriers in the distribution process (see Table 7, p. 102). Enablers to distribution were defined by positive statements made by Working Group Members. Positive in this case included responses a) using affirming language, e.g., Working Group Member N: "I think it's *still more effective* to actually hand somebody something and do a little verbal interpretation as you disseminate that report as opposed to mailing it blindly..."; b) statements conveying a degree of optimism, e.g., Working Group Member A: "I take my...[organization's] stuff [to meetings] and...reach an audience that I could not reach otherwise. And even if I only managed to get to meetings once every year, that's an *incredible opportunity*"; and c) comments expressing certainty regarding the nature of the process and its effectiveness, e.g., Working Group Member E: "one of their [the Working Group Members'] responsibilities is to make sure that the information, including publications gets spread through as broad a network as possible."

Positive responses were always considered in the context of the response as a whole, meaning that if one sentence of a response was negative, but the remainder was decidedly positive, the response was classified as a description of an enabler. For example, in response to a question about whether or not Working Group Members fulfill a role in the distribution of reports, Working Group Member N stated: "it helps the Members of this organization to take more ownership by actually doing the personal distribution even though it's a little clunky in terms of how many do you actually get out..." Though the distribution process is described as clunky, which could be considered a barrier, the ownership that Working Group Members take through personal distribution outweighs this disadvantage and personal responsibility was considered an enabler. Enablers to distribution are listed in Table 7 in the order that they are discussed in the text, not by priority.

Enablers	Barriers
• Effective personal distribution by GOMC Members	• Lack of promotion of awareness of publications
• Diverse means of dissemination, i.e., postcards, CDs, email, Web site	• Reluctance to adopt new technologies, e.g., wikis
• Effective promotion of awareness of publications	• Low number of print copies available, which limits access
• Adoption of information technology, e.g., RSS feeds	• Minimal promotion via the Web site, i.e., new publications are not highlighted
• Good contacts with stakeholders	• Publications not placed in central repositories, i.e., libraries
 Identification of a target audience Sharing knowledge in a 	 No distribution strategy (lack of accountability for where and how publications are distributed).
• Sharing knowledge in a publication, but not a copy of the publication itself	 No records of distribution
	• Lack of funding

Table 7. Enablers and Barriers to the Distribution Process

As shown in Table 7, 15 of 19 interviewees responded positively when questioned about the distribution process. In the Working Group and Secretariat interview protocols, six and nine questions respectively relate to distribution. The positive responses were drawn mainly from those questions; however, as mentioned at the beginning of Chapter 4, interviewees did not always respond to questions in a linear fashion and comments often spilled over into responses to unrelated questions.

Working Group Members identified personal distribution methods and a diverse means of dissemination as major factors in enabling the distribution process (see Table 7, p. 102). These characteristics were discussed at some length in section 4.2 (see Table 5 above at p. 83). While no distribution strategy was prescribed for each publication, Working Group Members clearly used whatever means were at their disposal to distribute publications widely. They take advantage of the multiple means of dissemination, mostly choosing to employ digital methods such as emailing a link to a colleague, or forwarding a copy of a document to a contact in another department or organization. Working Group Members also tend to take hard copies of documents to various meetings and conferences and generally try to spread the word about a publication by talking about it amongst their friends and colleagues.

Another factor defined as an enabler is the idea of promotion of awareness of publications. As discussed in Section 4.2, most Working Group Members saw themselves as advocates for awareness. Eight of the 15 respondents who spoke about enablers mentioned some facet of promotion of awareness (see Table 7, p. 102). Whether by taking publications to meetings, or broadening distribution by giving out print copies at their office, or believing that one of the mandates of the Working Group is to facilitate distribution, interviewees actively engaged in promotion in order to enhance dissemination.

The other factors listed in Table 7 (see p. 102) were mentioned only once by any interviewee. Two of the 15 respondents who identified distribution enablers acknowledged technology as a boon to distribution, particularly emphasizing the fact that GOMC has started to use RSS feeds on its Web site. Working Group Members actively maintain good connections with interested user groups, which enables distribution. Working Group Member B, for example, stated that he used GOMC's publications specifically to stay in touch with NGOs in his community:

B: I'll send them a copy of it [publication] or send them a little email and say go to this site, there's a really good article on such and such a topic and since you guys are doing such great work there, I think it would be appropriate for you to have a look at it.

Connecting with stakeholders by this means can encourage further distribution of information, as well as its use. Good connections with users are also maintained by attending workshops and conferences. Working Group Member S noted that she could always tell when "someone had been to a particular meeting like the New England Fisheries Management Group, because I would get a ton of calls and they would want a copy of the *Alewives* brochure. So somebody was talking it up and it resulted in some demand for it."

Commitment to attending meetings and workshops where publications can be promoted and distributed is a good venue for reaching target audiences. Working Group Member D stated that GOMC had "in general, been fairly good for identifying the audiences for its products [and] creating products for the audience that's specified at the outset of developing that project." Though this statement stands in contrast to other interviewees who did not think that GOMC was particularly good at identifying audiences for its publications, Member D firmly stated that by designating recipients, such a practice aided in distribution.

Speaking about the information inside a publication without actually distributing it enables the distribution process. Working Group Members discussed the practice of talking about a publication with interested users as a means to encourage dissemination. Working Group Member G stated that "there are times when we don't necessarily distribute a physical report but we're constantly brokering the information that's inside that report." This claim suggests that distribution of knowledge is perhaps much wider than the distribution of physical copies and implies that some users may be kept informed of GOMC information by word of mouth instead of actually reading documents. Working Group Member H noted that "word of mouth rather than formal letters saying, hey this document is available" is the primary means of communicating awareness about publications. It is very likely that the transfer of knowledge based on word-of-mouth communication is widely used, but considered such a natural means of information sharing that many interviewees did not think to mention it. Probably, Working Group Members talk about their work with the Council in a variety of contexts, which naturally promotes the dissemination of information.

4.2.2 Barriers to Distribution

Several barriers to distribution were identified by the participants in their responses to the questions in the interview protocol (see Table 7, p. 102). A barrier was defined when a respondent commented on the distribution process in a negative way. In this context negative means: the respondent a) used unenthusiastic language, e.g., Working Group Member A: "*unfortunately* I don't think that's the majority just yet, but it's hard for me to judge that. But most of the people that I interact with don't know this new technology, *aren't interested*, find it a *burden*..."; b) conveyed a certain amount of pessimism through his/her response, e.g., Working Group Member B: "I was *very disappointed* to hear that we're going to an electronic version of the *Times* because I think having a hard copy really makes people attach themselves...to the resource"; and c) expressed uncertainty about the process and the effectiveness of the distribution phase, e.g., Working Group Member F: "*I don't think* there's a really formalized method you know, if I give you five copies of these, this is who you have to send it to..."

Negative responses were always considered in the context of the responses as a whole, meaning that if one sentence of a response was positive, but the remainder was decidedly negative, the response was classified as a description of a barrier. For example, in response to the question regarding the process by which GOMC documents are distributed, Working Group Member J stated:

J: We were starting to put a process in place where we would keep a record of exactly who we were sending the report to and the problem is you don't always follow that strictly within government agencies. At least in my department I found it was difficult to maintain those records for every publication.

The fact that a process was initiated to keep a record of distribution (an enabler), does not outweigh the difficulties associated with keeping those types of records in government agencies. Because there was no capacity to maintain distribution records, this statement was classified a barrier. Barriers to distribution are listed in Table 7 in the order discussed in the text, and not by priority.

While effective promotion of awareness of publications is seen as an enabler, the lack of such promotion is a barrier (see Table 7, p. 102). One Working Group Member expressed views about the effect the high turnover in the Council has on awareness, which describes a barrier to distribution:

Q: Unfortunately with enough turnover in the Council people seem to forget that we have this whole history of publications. I mean the Council's almost twenty years old and there's a tremendous treasure trove and there's only a few people on

the Council that are long enough term that know what all those publications are... This response implies that the interviewee was concerned that organizational knowledge of the group is lost as older Members leave and newer Members take up their responsibilities. While no other Working Group Members commented in the same manner as Q, the degree to which Working Group Members are knowledgeable about GOMC and its activities can affect their ability to promote awareness of the publications.

Whether new information technologies were adopted or not determines whether information technology was noted as an enabler or a barrier according to interviewees. Four of the 15 respondents spoke of information technology in terms of a barrier because of the lack of uptake of Web 2.0 technologies on the Council's Web site. Two of the four who did not think that technology was being readily adopted were reluctant users themselves and preferred not to deal with the hassle of newer, Web-based means of distribution. Working Group Member I stated that when he hears about newer technology, he automatically shuts down:

I: as soon as you start saying wiki and RSS and COINAtlantic I mean I just automatically turn off. I do not want to hear about it, I do not want an explanation of how it works, I don't care how it works...

This statement suggests that while there is the potential for Working Group Members to take advantage of new Web 2.0 technologies to enhance distribution and facilitate engagement with readers, reluctance to try new methods occurs among some Members. Working Group Member H noted that there was "reluctance" and a "lack of awareness" about new technology which has kept Members from embracing new technology. He suggests that as younger individuals become involved with the Council, the technological tools will be "broadened and probably utilized more."

As information technology changes and financial resources diminish, it seems inevitable that fewer print copies of GOMC publications will be released. Three of the 15 respondents noted that there is the potential to lose part of GOMC's audience by releasing publications primarily in digital formats. This scenario is especially applicable to GOMC's newspaper, the *Gulf of Maine Times*, which has been mailed routinely to thousands of people in the region. Recently, funding restrictions have limited the release of the *Gulf of Maine Times* to an online newspaper, which Working Group Member B sees as detrimental to the distribution of GOMC information:

B: I was very disappointed to hear that we're going to an electronic version of the *Times* because I think having a hard copy really makes people attach themselves, allows them to attach themselves to the resource. I don't know if it's a human senses thing where there's a tangible item in front of you that you can associate with and you also associate with the issues that are in that tangible item of the newspaper. I don't think the electronic media does that with a Web page...

Whether moving to an electronic version of the *Gulf of Maine Times* will have a negative impact on readership is not yet known. Potentially, the digital medium will reach a new generation of users who are more familiar with reading online using computers or other digital devices, but that is yet to be seen. Although the *Gulf of Maine Times* may no longer be produced in print format, some publications always will be. Working Group Member N noted that the *Action Plan* will almost certainly be printed and, as result, the Members of the Working Group need to ensure that distribution of physical publications does not become a forgotten means of dissemination.

Two interviewees (Working Group Members L & M) noted that minimal access to publications via the Web site is another technology-related barrier. This factor was discussed in Section 4.2 (p. 87-88) and will receive further treatment in discussion of barriers to use (see Section 4.3.2 below at p. 130). Working Group Member M suggested that publications new to the Web site need to be promoted more vigorously than they are now to increase awareness in a timely fashion. Member L stated that GOMC was "not displaying good practices in having a good library" as the Publications page on the Web site is a "mishmash" and its disorganization may be off-putting to some users.

Interviewees had mixed opinions about ensuring that GOMC publications were placed in central repositories, namely, a state/provincial or federal library. Of the 15 responses classified as barriers, only two Working Group Members said that they took publications to their agency's library. At the same time, only one commented negatively on the fact that this practice was not followed. Working Group Member L stated that not placing documents in a library was a "serious shortcoming":

L: There was a period of time that we identified those seminal public libraries around the Gulf of Maine and made a conscious effort to be sure that those publications ended up in those libraries, but I think as we, you know for a variety of reasons, one of which you know, moving into the digital era...started producing fewer hard copies, I don't know that we ever followed through on being sure those libraries, the Maine State Library, the Boston Library, you know the major, the major repositories I don't know that we do that and probably in hindsight you know, that's a serious shortcoming.

Despite the fact that most GOMC publications are posted on the Web site, longterm preservation of the publications is not guaranteed. The potential for materials to be lost when not properly housed or archived was mentioned by Working Group Member C:

C: I know from New Hampshire if we publish stuff, grey literature stuff, or project specific stuff and it's no sooner published than it's lost. We don't put it on

our Web site because our Web, our IT folks say oh, there's no room on the hard drive [laughs]...

Interviewees mentioned the absence of formalized distribution strategies, which identify specific recipients of publications, as another barrier (see Table 7, p. 102). An informal distribution process allows for Members to be creative and flexible in choosing their methods of dissemination; however, Working Group Member K noted that the creativity and flexibility that the organization encourages, sometimes leads to a lack of accountability in the distribution process:

K: often times because of the way we've strived as an organization to be, and also because of recently more of the funding issues, we've wanted to or relied upon that sort of bottom up, here's the report, now you distribute up the line. But there's no accountability in terms of did you distribute this report? Who did you distribute it to? How or when?

Working Group Member L was also unsatisfied with distribution efforts and said that despite the fact that GOMC will commonly produce a "print on demand version [of a report] and point...people to that report," there is no strategy for dissemination and as a result questioned "are we probably under serving both our audiences' needs and our desires to get information out? Yes." Working Group Member M recognized the potential benefit of a distribution plan when he said: "if there was a distribution mechanism or communication plan for this kind of thing that's a little bit more rigorous I think it [distribution] probably will be more effective." It is possible for GOMC to continue to

encourage Members to creatively disseminate publications and still have a set strategy for dissemination to some key individuals and groups.

Another barrier related to distribution is the lack of record keeping regarding the distribution of publications. Working Group Member J noted the difficulty of keeping such records when she stated:

J: [My department was] starting to put a process in place where we would keep a record of exactly who we were sending the report to and the problem is you don't always follow that strictly within government agencies. At least in my department I found it was difficult to maintain those records for every publication.

The capacity to maintain records of the distribution of GOMC documents did not exist in the Member's primary job location at the provincial government level. It is likely that many Working Group Members cannot devote as much time to their work with the Council as they would like, which makes detailed activity, such as keeping records of distributed publications, impractical.

Interviewees mentioned a lack of funding as a barrier to distribution. Printing as well as mailing publications throughout the region is very costly. The distribution of hard copy publications relies mainly on the Members of GOMC themselves to take publications to meetings, workshops, and conferences. Working Group Member R stated that one of the largest current difficulties in the publication process is finding one of the representative agencies on the Council to support the printing. "Who has the funding, who has the capacity to make it happen" (Member R), is often the question that every producing committee has to ask when it is ready to release and distribute a publication. However, interviewees did not despair about the Council's current financial situation, noting that the Council has been through similar economic struggles previously and always managed to persevere. Working Group Member C remarked on the adaptability of the Council by stating that the "emphasis [mandate] of the Council has changed somewhat over time with the arrival of substantial ear-marked money from the US side, and now with the departure of the ear-marked money from the US side, things are changing again." The dynamic nature of the Council has required it to be adaptive to change and willing to promote distribution of its publications by its Members in new ways now that there are fewer resources for printing and mailing.

4.3 Use

Three questions in the interview protocol addressed the issue of the use of GOMC's publications. Based on the types of responses it became clear that although Working Group Members were very interested in the evidence of use of GOMC's publications as a means of showing "the benefit of the Council" (Member K), they often found it difficult to provide explicit examples of use. Despite the somewhat vague responses to these questions, a careful review of all the examples of use highlighted categories or types of use. Table 8 lists these types, as well as the Working Group Members whose responses fit these categories. Fourteen of 19 respondents provided examples of use. Though many Working Group Members did not give specific details, they did indicate a general type of usage as described in Table 8. The types of use are listed in alphabetical order and not by priority.

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Types of Use	Working Group Members
By professors at regional universities	K, L, R
Cited by other reports	E, O, P, Q, S
By GOMC affiliated agency of publishing author or committee	J
By industry/government (e.g., Meramec Dam removal on the Skowhegan River)	C, F, R
In legislation (e.g., Salt Marsh Restoration Protocols in New Hampshire)	D, F, S
By not-for-profits	L
By individuals reported by word of mouth from colleagues outside of GOMC	A, K, N

Table 8. Types of Use of GOMC Publications

The most prevalent type of use, as indicated by Table 8, is citations to GOMC publications by other reports (also see MacDonald et al., 2007). While five of the 14 respondents who provided examples of use mentioned they had knowledge of this type, only Working Group Member Q could be explicit about what reports were cited and by whom:

Q: I have seen a number of reports that have been done by the US Geological Survey on aquatic habitats and such issues, which quote the Gulf of Maine Council reports like *Eel Grass*...and the *Salt Marsh* [*Gulf of Maine Salt Marsh* *Monitoring Protocol*] one, those get used frequently along with the *Tides of Change*...they are part of a scientific discourse about restoration and conservation efforts.

Other Working Group Members who mentioned citations as a type of use knew that the GOMC reports were cited "quite a bit" (Member S), but most respondents did not provide more details. Frequent requests for some publications and their application in educational contexts (the Gulf of Maine poster showing ocean currents, for example) suggested to Members that the publications were being used (Member K).

The next most common types of use of GOMC publications described by Working Group Members were use by industry/government, in legislation, by universities, and by individuals who provided word of mouth accounts. Use by industry and government, as well as use in legislation require further attention. Working Group Member F mentioned "snippets" from a GOMC publication on barrier removal (e.g., causeways or culverts) were employed in current projects, and noted that the *Stream Barrier Removal Monitoring Guide* was being used in a number of projects in New Brunswick and was being reviewed for a dam removal project in its initial stages. Working Group Member D stated that the *Gulf of Maine Salt Marsh Restoration Monitoring Protocol* was embedded in New Hampshire legislation, which required that research grant recipients conducting restoration projects ensure their grants were compliant with that protocol.

Specific examples of use, like those provided by Members F and D, were rarely given by interviewees, who instead could only vaguely describe the use of publications

by universities (Members K, L, & R), or how they noticed them on the office bookshelves of a colleague (Member E). Interestingly, although GOMC's mandate includes a large public education and outreach component, only one Working Group Member mentioned use of its publications by not-for-profit groups (Member B), and none of the interviewees provided explicit examples of use by the general public. Use of publications by these latter types of groups is particularly difficult to evaluate because extensive follow up with potential stakeholders is required to determine if GOMC publications were deemed useful. Working Group Members believed that awareness of GOMC publications was high among the sizeable number of individuals who are associated with the Council in a variety of capacities, but the degree to which that awareness extends beyond those individuals was more a matter of interest than certainty. As Working Group Member I phrased it, "normally it's just off [the publication] goes, it could have been deleted, it could have been read, it could have been valued, I don't know...we all push a lot of information out there and hope it...sticks or it's relevant or it's used." Another Member emphasized this perspective more concretely:

K: we have a five or six page handout on [the] American Eel...and its status in the Gulf of Maine. So, I gave that to our pelagics advisor, fisheries advisor and he found it very informative, a good synopsis and was quite impressed with it...now he never told me like that changed how [he] recommended to the minister what our position is on it...but he found it informative in terms of getting his knowledge, in terms of playing that role as an advisor to the minister on that issue. Though Working Group Member K knew that the pelagics advisor was influenced by *American Eels*, he did not know what impact, if any, it may have had beyond that point. Interest in learning more about whether GOMC's publications are used and what influence they have is high among Working Group Members. One interviewee succinctly stated, "you'd think a twenty year old organization would have done more evaluation of the use of its publications...I don't think we've evaluated [use] in the past and impact of any kind of our publications, which is a huge problem" (Member N). This view was echoed by Working Group Member L: "certainly we have no evaluation procedure, we have no rigorous tracking procedure."

A lack of evaluation measures was found to be one of three challenges Working Group Members faced in describing use. Most Working Group Members had only a vague understanding of how documents were used and five interviewees provided no examples of use at all, which confirms that little evaluation work has been done. Although interviewees did not directly state evaluation measures were absent, they made observations like "I can't comment on who uses it" (Member A), or "I would really like to see an active review of the documents that are published..." (Member F), or "now how many folks actually read it, especially a Councilor, I doubt it" (Member K). Working Group Members generally do not have a clear understanding about how documents are being used outside the Council. While commenting on how detrimental this lack of understanding can be for an organization, Working Group Member L noted it is not unusual:

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L: Do we have any strategy to ensure wider dissemination? No. So, as a result of that, are we probably under serving both our audiences needs and our desires to get information out? Yes. We rarely have the opportunity to go back and evaluate whether or not those people that got it read it, used it, found it of any value. You know we don't, like many organizations, we under-invest in evaluating whether or not the publications had the desired result.

Evaluating the dissemination, use, and influence of GOMC publications is very difficult; however, understanding these processes is important for accounting for the productivity of the organization, especially with regard to gaining the attention of potential funding bodies. Initial steps in assessing these processes have been undertaken by Cordes et al. (2006) and MacDonald et al. (2007).

The second challenge to describing use was a limited understanding of how users engage information, or what types of information they need, which is closely related to a lack of evaluation measures. Working Group Member H described a system of limited communication between information users and producers:

H: I don't know whether there's been enough resource managers aware of these documents and awareness before the preparation of these documents of what's the required need of managers for programs. I think there's a disconnect between senior management, management tools and techniques, and some of the work of Council, Working Group, and/or committees.

Working Group Member H's remarks indicate that a dialogue needs to be established between information users, such as resource managers, and GOMC committees to discover what types of information would help users make more informed decisions. Such a dialogue would increase GOMC's capabilities to produce useful and appropriate scientific documentation for managers, and would increase the assurance that GOMC's publications had an audience.

While considerable attention has been devoted to distribution, much less effort has been focused on engaging users. Working Group Member M argued this very point when he stated:

M: there are currently enough active mechanisms centered mostly around the Web site, but I think there's enough mechanisms that you know, the information can go in, it can be stored, and it can be accessed. I think the challenge is that next step that we talked a bit about, which is how do you then apply it, how do you then draw it in to other conversations...

With numerous distribution mechanisms available, the greater challenge becomes promoting GOMC's publications, expanding the range of their potential use, showing evidence of their actual use, and demonstrating their value. With a vast variety of sources of information currently available for access and use, it becomes important to find ways to make GOMC information the first source people consider.

Not identifying target audiences for publications was the third challenge to describing use and came up frequently in the interviews (five of 11 respondents who commented on use). This particular issue also figured in discussion of barriers to production and to distribution. Not specifying a target audience was an impediment to all phases of the publication process. For publications to be most useful, they should be produced in response to a perceived need (e.g., the proceedings of a conference or a workshop provide a record of knowledge and discussion; a monitoring report provides a statement on the health of the Gulf of Maine; and an annual report highlights what GOMC accomplished and what the organization's next steps are). This need denotes an audience for a publication and automatically aids in developing a distribution plan to a group who will very likely consider the publication useful. Further points about the importance of identifying target audiences were given in sections 4.1 and 4.2 above (see p. 75 and p. 98 respectively).

4.3.1 Enablers to Use

Enablers to use were defined by positive statements made by Working Group Members. Positive responses in this case were defined as: a) using affirming language, e.g., Working Group Member B: "I think it's a *great idea* to have a hard copy because once you're done with it, you can leave it behind"; b) conveying a certain degree of optimism through responses, e.g., Working Group Member F: "taking that protocol [*Stream Barrier Removal Monitoring Guide*] as an example, *I am advocating* within our division using that as our *standardized protocol* for any works that remove barriers whether they're in fresh water or estuarine systems"; and c) expressing certainty regarding the nature of the process and its effectiveness, e.g., Working Group Member O: "the *Action Plan*...at least for ESIP, *I know* it lays out who the audience is."

Positive responses were always considered in the context of the response as a whole, meaning that if one sentence of a response was negative, but the remainder was decidedly positive, the response was classified as an enabler. For example, in response to a question about awareness of evidence of the use of GOMC publications, Working Group Member I stated:

I: we all push a lot of information out there and hope it sticks or its relevant or its used, but you can't determine, all you can do is make people aware of its availability and make it as readily available [in] a variety of forms because all access and use information differently, so that [pushing information out] would seem to be a logical strategy.

Working Group Member I seemed to wish there was a better way to increase the uptake of information rather than just "pushing it out there," but because of the difficulty associated with determining actual usage, he accepts that GOMC is doing the best it can to promote the use of its information. In this instance, this statement described an enabler. The enablers to use identified by the participants are outlined in Table 9 (p. 122) in the order that they are discussed in the text, and not by priority.

Positive responses regarding the use of GOMC's information were given by 12 of the 19 interviewees. Five of the 12 believed that when influential and respected Members of the Working Group passed out information at different meetings and to their personal and professional contacts use of GOMC publications increased (see Table 9, p. 122). Working Group Member L noted that some Members "place a premium on thoughtful distribution," while Working Group Member S stated that some Members do a very good job of being the Council's "legs and voice out there in the world." Individuals who are well known and well respected in a field have the ability to encourage uptake of information, not only because they are consummate and dedicated promoters, but also

Enablers	Barriers
• Influential and respected Members encourage uptake	• Publications page on GOMC Web site is ineffectively organized for retrieval
• GOMC Members encourage internal use	• New publications are not visible or highlighted for long enough on the
• Peer-review	Web site, which limits accessibility and awareness.
• Readability of publications	• Grey literature has "tainted"
Briefing note attached to document	credibility
• Web site use tracked	• Scientific information is not well translated for general users
GOMC reports incorporated into state/province legislation	

because people tend to assign credibility and quality to material used by an expert.

Table 9. Enablers and Barriers to the Use of GOMC Publications

In his response, Working Group Member A commented on just such a person: "So in terms of increasing influence, I mean Peter Wells increases influence of Gulf of Maine Council publications just because he's Peter Wells and when he mentions it and when he knocks on your door...it's invaluable." An active and long-time Member of the Gulf of Maine Council whose knowledge and experience of marine issues, particularly marine toxicology in the region, Peter Wells has earned the respect of both people in the field and his colleagues at GOMC. As a consequence, his distribution and use of GOMC information encourages its use by others. It should be noted that despite the increased

credibility that comes from promotion of publications by respected experts, there are still questions related to the quality of grey literature, which impacts levels of use. Working Group Member N noted that sometimes the credibility of grey literature is "tainted." She went on to qualify this perceived barrier to use by identifying the potential of the *Publications Protocol* to increase the credibility of GOMC publications by providing some guidelines for peer-review and dissemination. The stigma about the quality of grey literature may limit use and will be discussed in more detail in Section 4.3.2 (see p. 130-131).

Three of the 12 respondents who identified use enablers mentioned the importance of Working Group Members encouraging internal use of the publications to enhance the overall awareness of the Council's publications (see Table 9, p. 122). Working Group Member O stated that the Council coordinator had recently increased sending out reminders "to the listserv, [about] this is a new publication, [saying] here's something that might be of interest to you," which she finds very useful and assists in her ability to disseminate more promptly. Working Group Member F consistently reminds her colleagues within her own agency about Council publications directly related to the work in their fields. She regularly promotes and encourages use of these publications, especially the *Stream Barrier Removal Monitoring Guide* and the *Gulf of Maine Salt Marsh Restoration Monitoring Protocol*, two environmental areas directly relevant to her department.

Not only is internal use encouraged, but in the case of one committee, some internal use was expected when the publications were released. Working Group Member

M stated that the anticipated use aimed to drive activity and to encourage an iterative and ongoing process:

M: the documents were meant to support further actions by individuals and, and therefore the process would keep going. Just to give you one very specific item, one of the reports is on habitat restoration and how to incorporate, how potentially to incorporate climate change in habitat restoration. That document sits there as a starting point for further discussion especially within the Habitat Restoration Committee on how to incorporate that.

Regardless of this expected usage, the publications produced by the Working Group Member and his committee were not used internally as much as he would have liked. Though he talked about the publications at meetings and put them up on the Council's Web site, he noted he still could have done more to promote their use and wished that they could have been highlighted more effectively on the Web site. This "limited access" (Member M) will be discussed further in Section 4.3.2, Barriers to Use (see p. 130).

Though the internal process of technically reviewing GOMC's publications is often haphazard, still multiple levels of review often occur, which was identified as an enabler to use (see Table 9, p. 122) because peer review is often one of the characteristics of useful information (McNie, 2007). Working Group Member F and her committee worked on the *Stream Barrier Removal Monitoring Guide*, which is a frequently used document in habitat restoration. She stated that the high quality peer review that went into that document has enhanced its value and encouraged use and also allowed her department to set the terms of any removal projects within its jurisdiction: F: I am advocating within our division using [the *Stream Barrier Removal Monitoring Guide*] as our standardized protocol for any works that remove barriers whether they're in fresh water or estuarine systems...what that does is, it allows us, because these are peer-reviewed...we can say to a development proponent who are coming to us and they want to do a particular activity that's going to result in a HADD [Habitat Alteration, Disruption or Destruction] then we can say okay this is the way we'd like you to do it, these are the mitigations, this is

the compensation we're expecting and this is the technique we'd like you to use... Not only was this document well reviewed, but the committee produced it based on a perceived need in the habitat restoration community, i.e., the audience was anticipated. These practices have not been applied to all of GOMC's publications. In this case though, the publication was prepared for and distributed to a specific audience, which further encouraged its use.

The readability of GOMC publications was also noted by interviewees as an enabler to their use. The *Gulf of Maine Times*, GOMC's quarterly newspaper, which is now an entirely online publication, is considered by Working Group Member M to be "a nice summation document of various topics" and promotes the newsworthy quality of marine environmental information in the region. The *Gulf of Maine Marine Habitat Primer*, published in 2005, as well as all the *Action Plan* documents published by the Council since 1992, have been of very high quality with beautiful colour photos and detailed maps (Member Q). GOMC has conscientiously reached out to the stakeholders in the region by including photos of the people who live and work in the Gulf of Maine in

the *Action Plan*(s). Beautiful print publications draw the eye of potential readers and encourage them to pick up the documents.

Working Group Member J noted that a briefing note attached to a document when it is distributed encourages use, particularly among policy makers who may not have time to read a full publication. In Working Group Member J's view, the Working Group takes care to produce an overview of each document upon its release and "certainly want to have an introductory letter to accompany a distributed report otherwise they [the receiver] wouldn't know who it was coming from or what the purpose was." Of those Members of the Secretariat, only interviewee J made this point (the question of the value of a briefing note for encouraging use of publications was only asked in the Secretariat Protocol), but the point was supported by Working Group Member P who indirectly suggested that presenting the information in a report in a shortened format encouraged its use by decision makers within her department. Working Group Member P explained:

P: I'll pull out the meeting notes and say this is what happened and then it'll go up the chain, but it'll get massaged to a different format for higher up. It goes through a transition, as somebody said, if you can't get it done in three bullets and a take away [laughs]...

Knowing that staff in senior positions in her department will only have time to read brief notes and one important message about a publication, Member P facilitates its transition from a full document to a briefing note, which helps to keep her superiors informed and engaged in the work of the Council. Four current and former Members of the GOMC Secretariat were interviewed for this study. A question about whether or not GOMC tracked its Web site usage was only addressed to these Members (Member S did not respond to questions from the Secretariat Protocol directly, but commented on Web site use when asked to provide evidence of the use of GOMC publications). All four interviewees responded in the affirmative, noting that such a process helped the Council to understand the use of GOMC information better because it allowed tracking visits to the Web site and evaluating how successful promotion and distribution had been based on these numbers. Working Group Member J noted the importance of tracking Web site use:

J: There was a study a couple of years ago on traffic on the Gulf of Maine Web site and there was a presentation...and it did show access and downloading of publications, number of hits to the Web site, and publications that were most popular.

Working Group Members L and S both stated that a mechanism had recently been put in place on the Web site to ask users to fill in selected personal information before downloading a publication so that GOMC could understand better "who had that publication, where it went, and what might be happening with it" (Member S). An attempt was made to corroborate the responses of Members L and S (to locate the publication(s) that used this mechanism), but no such publication was found on the Web site. It is possible that such a tool is no longer in use. Despite the fact that Web site use is being tracked, none of the four interviewees stated that the statistics were currently being examined in an attempt to understand the use of publications better. Carefully evaluating the use of the Web site, specifically hits to the Publications Page, is one form of evaluation that could demonstrate the value of the Council's information products for the Gulf of Maine region.

Another enabler to the use of GOMC information is the incorporation of a GOMC publication into legislation. Working Group Member D noted the *Gulf of Maine Salt Marsh Monitoring Protocol* has been incorporated into the legislation and regulatory processes in the state of New Hampshire and "if you want to restore a salt marsh, you have to use the *Protocol*." Working Group Member F also stated the *Protocol* was well used on the Canadian side of the border, not because it was embedded in legislation, but because it is so well reviewed. She stated she easily recommended the *Protocol* for restoration projects based on the peer-reviewed science and because the publication gave her department the ability to "expect a [restoration project] to be done in a particular way," which expedites the process and forces a high level of accountability from groups involved in a project.

4.3.2 Barriers to Use

For the purposes of this study, a barrier to use was defined when a respondent commented on the matter of use in a negative manner. The term negative, in this context, means: a) a respondent used unenthusiastic language, e.g., Working Group Member B: *"Unfortunately*, science reports are still read by scientists and academics and ah, so I see them being of *limited value* for the general public and users of the Gulf of Maine"; b) an interviewee conveyed a degree of pessimism through a response, e.g., Working Group Member C: "we publish stuff, grey literature stuff, or project specific stuff and it's *no sooner published that it's lost*"; and c) a respondent expressed uncertainty about the

process and the effectiveness of the use of GOMC information, e.g., Working Group Member A: "when you asked me about distribution, use, and influence, my first thought is *how do you* deliver things to people, but again to engage people is that critical step, *finding some way* to engage people..."

Negative responses were always considered in the context of the responses as a whole, meaning that if one sentence of a response was positive, but the remainder was decidedly negative, the response was classified as a description of a barrier. For example, in response to the question regarding awareness of the evidence of use of GOMC publications, Working Group Member F stated:

F: it's important that they're [the *Stream Barrier Removal Monitoring Guide* and the *Gulf of Maine Salt Marsh Restoration Monitoring Protocol*] actually used. And I think your question about who I've passed it on to and who's using it, is an extremely good question because that's one thing I haven't accurately tracked and all I can do is think about the projects that I'm involved with, but to say that I know where the protocols are being used...I can't say that.

While it is clear that Working Group Member F has knowledge of how the publications produced by her committee are being used by the specific projects she has worked on (an enabler), the fact that she cannot say how these publications are being used on a broader scale is of great concern to her and therefore, this statement was used to identify a barrier. Perceived barriers were identified by 11 of 19 interviewees, several of whom provided multiple types. Barriers to the use of GOMC information are listed in Table 9 (see p. 122) in the order discussed in the text and not by priority. The Publications page of the GOMC Web site was described as a potential barrier to the use of GOMC information. Though the Council places all its publications on the site, the publications page is not organized in an easily searchable fashion. Publications are loosely arranged chronologically in reverse date order shortly after they are produced. Searching by subject categories is not offered and occasionally a report will only be made available on a committee's page of the Web site and not in the general publications section. Working Group Member L best summed up the state of the Web site:

L: the Council has a publications page on its Web page and it's a mishmash, it is something that we've talked many times about. We started by simply, whenever we had a publication, putting it in there...when there were ten things there it was fine, now that there are eighty, or one hundred, or more. It requires somebody to actually look at every title and somehow divine, "oh that's sort of what I was looking for." So the Council is not displaying best practices here in having a good library.

Since one of the core activities of the Council is to produce publications on key marine environmental issues, then organization of the publications on the Web site may need to be a priority, as it has been for the Bay of Fundy Ecosystem Partnership, an affiliated organization.

The assumed tainted credibility of grey literature and scientific information not well translated for outside users were barriers mentioned by one interviewee each (see Table 9, p. 122). Working Group Member N stated that the lack of quality stigma associated with grey literature might hinder the use of GOMC publications. The fact that no other Working Group Members raised this issue suggests people internal to the organization do not consider the quality of the information to be a stumbling block for use. Working Group Members in their work in different government departments most likely produce and use many grey publications. There may be no misconceptions of the quality of grey literature in this environment because of its wide use. Working Group Member N likely commented on the fact that outside of government agencies, or intergovernmental organizations, grey literature is often deemed to be not peer reviewed and therefore of lesser quality. Yet, Working Group Member N qualified this potential barrier by stating that GOMC is attempting to address the stigma associated with grey literature by using the *Publications Protocol*. In her opinion, the quality of GOMC publications was not in question because of the review process; however, because so few interviewees were aware of the Publications Protocol some concern about the quality of GOMC information may still exist. Acknowledging and advertising the multiple levels of review of a publication has the potential to reassure users that GOMC information is of the highest quality.

Working Group Member B expressed concern over the ability of GOMC to achieve science translation. This concern may be related to the relatively short period that the Member has worked with the Council. Member B stated that "science reports are still read by scientists and academics and so I see them being of limited value for the general public and users of the Gulf of Maine." GOMC has tended to devote considerable effort in recent years to science translation to make scientific information accessible to the general user (P. G. Wells, personal communication, March 1, 2010). However, Working Group Member B may not yet have experienced that type of work, or may have had knowledge of individuals or organizations outside the Council that had not been able to use GOMC information easily because of the technical language and concepts. Inaccessible scientific reports can be a barrier, and Working Group Member B emphasized the importance of pursuing a dialogue with audiences in order to understand their information needs and produce publications accordingly.

4.4 Organizational Structure and Context: Impact on Publication

For an intergovernmental organization to be effective, it is important that all members of the organization work towards the same goals. In this study, the serious environmental problems facing the world's oceans and the importance of the Gulf of Maine/Bay of Fundy region for the east coasts of Canada and the United States emphasized the need for collaborative approaches crossing geographical and political jurisdictions. Yet, despite the merits of collaboration, it was initially assumed that the complex structure and function of GOMC would have negatively influenced the efficiency of the organization's publication practices. GOMC's working processes, such as the Secretariat that cycles between jurisdictions on a yearly basis, and the changing political scenes in Canada and the United States, have the potential to affect publication practices. Analysis of the interview data shows that contextual factors generally have a positive impact on the publication process. Seven of 19 interviewees believed that GOMC's organizational structure contributed constructively to the communication of information among jurisdictions. Though the same number believed that GOMC's working processes resulted in a "steep learning curve" each year because of the rotation
of the Secretariat (Member J) and the "process oriented" approach of the Council imparted some inefficiency (Member N), a direct link between these negative views regarding the organizational structure of the Council and publication practices was not obvious. More positive responses showed that the benefits outweighed potential detriments arising from the working processes of GOMC.

Working Group Member N stated that the jurisdictional nature of GOMC has contributed to lasting partnerships and contacts that help to make the Council more successful in its communication efforts to maintain environmental sustainability in the region:

N: I would say that we just recently started a new contract with the Keeley Group and if we hadn't chosen that group which includes all the old contractors, we'd be working with a totally new set of people and I think it would be very different. So our ability to maintain some of those contractors who have institutional knowledge has made it work.

In the opinion of Working Group Member N, GOMC's working processes have helped rather than hindered the communication of information, a view shared by Working Group Member S who stated that the Council's processes contributed to transboundary communication and participation:

S: you get a lot of different perspectives that you otherwise wouldn't. For instance, there might be a case where Canada has explored a particular issue much more than the States have. [It] might be kind of controversial or shunned right out of the gate on this side of the border so it gives me a better opportunity to say...look at how well accepted that is in Nova Scotia and why is it that they have been able to overcome the resistance, or the barriers to that.

The interviewees who criticized the organizational structure of GOMC did so in such a way as to suggest that the challenges associated with working with such an organization may be unavoidable because of the difficulty of trying to maintain equality of leadership from the two nations. Working Group Member Q noted that the processes can sometimes lead to inefficiency as GOMC can never truly establish an uninterrupted organizational rhythm because of the shifting Secretariat:

Q: I think that the processes suffer from inconsistent organization and what I mean by that is that it seems that having rotational leadership which changes annually causes maybe six months of trying to figure out what's going on and then six months of performing and then going back that way. So if you looked at organizational development which is forming, storming, norming and performing, this group goes back and forth between norming and performing.

GOMC focuses a large portion of its activity in "forming" and "storming" stages which prevents consistent performance levels, and could have a negative impact on project initiation and hence, publication practices. As only one respondent commented in the fashion of Working Group Member Q and responses of most interviewees do not support that Member's perspective, it seems that in the understanding of Working Group Members the interests of the organization are well enough established and the mandate is well enough suited to support the goals of the agencies affiliated with GOMC that a negative impact resulting from its working processes has little effect on the dissemination of information.

A question arose about whether the structure of the Council composed of both state/provincial and federal members, as discussed in Chapter 3, produced differences between these two levels of government regarding the production, distribution, and use of GOMC information. To ascertain if there was a difference between the views of the two groups, the number of federal members who identified barriers and enablers to the phases of production (see Tables 10 and 11), distribution, (see Tables 12 and 13) and use (see Tables 14 and 15), was determined and compared to the number of state/provincial members who also identified barriers and enablers to the three stages.

Enablers	State/Provincial	Federal
Publications Protocol	2	2
Multiple levels of review	4	2
Contractor support	1	3
Identification of an audience	1	1
Identification of a need for information		1
Commitment and involvement by GOMC Members	1	3
Submission of a work plan	1	1

 Table 10. Enablers to Production Identified by State/Provincial and Federal GOMC

 Working Group Members

Table 10 shows state/provincial and federal representatives held similar views

regarding the types of enablers to production, i.e., two Working Group Members from

each level of government identified the *Publications Protocol* as an enabler. The only marked differences were regarding multiple levels of review, contractor support, and commitment and involvement by GOMC Members. Twice as many state/provincial representatives identified multiple levels of review as an enabler and three times as many federal representatives identified contractor support and commitment by GOMC Members as enablers. The data do not indicate why these differences occur. The role each Working Group Member plays in the production process influences the types of enablers used to increase productivity.

Barriers	State/Provincial	Federal
Audience needs not fully understood	3	
Audience not identified	1	1
Debate over an identified audience. Is more inclusivity required?	1	
Unclear production criteria/unaware of standards/practices set out in the <i>Publications Protocol</i>	3	3
Unclear review process	1	1

Table 11. Barriers to Production Identified by State/Provincial and Federal GOMC Working Group Members

Table 11 provides a comparison of the barriers to production identified by state/provincial and federal representatives. As is shown in Table 11, both levels of government identified similar barriers to this phase of the publication process, the only marked difference being that three state/provincial representatives identified audience

needs not fully understood as a barrier whereas no federal members did. The data did not indicate a reason for this difference.

Enablers	State/Provincial	Federal
Effective personal		
distribution by GOMC	1	4
Members		
Diverse means of		
dissemination, e.g., reports,	2	Λ
postcards, CDs, email, Web	3	4
site		
Effective promotion of	2	3
awareness of reports	Z	3
Adopting technology, e.g.,		1
RSS feeds		1
Good contacts with	1	
stakeholders	1	
Identifying a target audience	1	
	1	
Sharing knowledge that is		
inside the report, but not the		1
physical report itself		

Table 12. Enablers to Distribution Identified by State/Provincial and Federal GOMC Working Group Members

When comparing enablers to distribution identified by each level of government representatives, the only noticeable difference was one state/provincial representative compared to four federal representatives who recognized effective personal distribution methods as an enabler (see Table 12). Federal employees may have a larger number of networks than provincial/state employees because they deal with whole nations, regions, as well as provinces/states. Provincial/state employees may have a narrower, or more local suite of contacts or networks. Table 13 sets out barriers to distribution identified by each type of government representative. The table shows that state/provincial and federal members share similar views about the types of barriers that impede distribution; yet, three times as many federal representatives identified reluctance to adopt new technologies as a barrier, compared to one state/provincial representative, twice as many state/provincial members identified lack of funding as a barrier, and twice as many federal members identified no records of distribution as a barrier. These differences are hard to understand. Working Group Members are more likely to acknowledge barriers that they have encountered, which could be different for every individual.

Barriers	State/Provincial	Federal
Lack of promotion of awareness of publications	2	1
Reluctance to adopt new technologies, e.g., wikis	1	3
Fewer hard copies available, which limits access	1	
Minimal access via the Web site, e.g., new publications are not highlighted	2	1
Publications not placed in central repositories, e.g., libraries	1	
No distribution strategy	3	2
No records of distribution		2
Lack of funding	2	

 Table 13. Barriers to Distribution Identified by State/Provincial and Federal

 GOMC Working Group Members

Under the theme of use, enablers identified by both levels of government were compared (see Table 14). Differences are seen regarding views on members encouraging internal use (twice as many federal representatives), peer-review (twice as many federal representatives), and tracking Web site use (four times as many state/provincial representatives) (see Table 14). The question about whether or not Web site use was tracked was only included in the Working Group Secretariat Protocol. Only state/provincial Working Group Members can serve as the Secretariat, which explains why no federal representatives identified this as an enabler. Federal Working Group Members, who have larger networks for distribution, may know of more instances where GOMC publications were used, which might explain why they made more positive statements that were considered enablers.

Enablers	State/Provincial	Federal
Influential and respected Members encourage uptake	2	2
GOMC Members encourage internal use		2
Peer-review		2
Readability of publications	1	1
Briefing note attached to document	1	1
Web site use tracked	4	
GOMC reports incorporated into state/province legislation	1	1

 Table 14. Enablers to Use Identified by State/Provincial and Federal GOMC

 Working Group Members

Table 15 lists barriers to use that were noted by the representatives of the two government levels. No differences between responses by state/provincial representatives and federal representatives were evident. Representatives of both levels of government acknowledged that describing use was a challenge and several barriers hinder the use of GOMC publications (see Table 15).

Barriers	State/Provincial	Federal
Publications page on GOMC Web site is ineffectively organized for retrieval	1	1
New publications are not visible or highlighted long enough on the Web site, which limits accessibility and awareness.	2	1
Grey literature has assumed "tainted" credibility		1
Scientific information not well translated for general users	1	

Table 15. Barriers to Use Identified by State/Provincial and Federal GOMC Working Group Members

Tables 10, 11, 12, 13, 14, and 15 demonstrate that often Working Group Members from both levels of government similarly understood how production, distribution, and use were enabled and hindered. While the interview data identifies areas where differences are apparent, it does not often provide evidence to explain this disparity. This section clearly shows that further research into the contextual questions of GOMC's organizational structure and governing politics is needed to increase understanding of the publication practices of the organization.

As noted earlier, the organizational structure of GOMC includes both Canadian and American representation because of shared interest in the environment of the Gulf of Maine/Bay of Fundy region (Springer, 2002). Because of differences between representative government agencies and the political culture governing environmental organizations in the two countries, the distribution of information could be influenced by the bi-national structure of GOMC. However, the interview data do not reveal obvious difference between the two countries. The often individualized nature of the distribution of GOMC's publications allows representatives from both sides of the border to use their own strategies to disseminate information. In general, very few interviewees spoke about specific individuals or organizations to which they distributed publications. One Canadian (Member J), and one American (Member P) sent copies of publications to their respective agency's library, one Canadian (Member G) sent publications to specific government agencies, i.e., Nova Scotia Department of Transportation, and one Canadian (Member B) distributed publications to NGOs, but did not specify which ones. Rather than supplying names of specific recipients, interviewees stated they distributed publications through their personal or professional networks to individuals they believed might be interested. Although there may be differences in the characteristics of the networks in the two countries, distribution in this ad hoc, personal manner does not seem to be influenced by national borders.

Chapter 5 Discussion

5.1 Introduction

Specific insights about GOMC's publication practices, including the fragmented nature of the production process, the personal and diverse methods of distribution, and Working Group Members' understanding of the use of publications, are addressed in this Chapter. More generally, conclusions regarding how Working Group Members perceive the grey publishing genre are provided, including the observation that publishing in the grey genre is not a matter of concern to these Members when promoting awareness of publications. The research questions and the guiding framework posed at the beginning of the study are revisited in this chapter to demonstrate how data from in-depth interviews with GOMC Working Group Members has informed understanding of the pathways and barriers to the flow of information within an intergovernmental organization. Initial conceptions of information pathways are reassessed in a modified guiding framework (see Figure 3, p. 172).

This study demonstrated the value of using the interview method as a means to build a better understanding of how intergovernmental organizations, which aim to influence decision-making, produce, disseminate, and promote the awareness of their publications. Understanding these activities is integral to assessing if, how, and where the processes of communicating scientific information are operating during the flow of information from conception to use. Insights gained through this study provide the foundation for building a more thorough understanding of how the fields of science and policy can be connected effectively.

5.2 Research Questions

1. How are publications produced in this organization?

Previous studies show that to successfully bridge the boundary between science and policy-making significant focus on effective communication and dissemination of research to all interested end-users is required (Elliott et al., 2003; Hoornbeek, 2000; Scott, 2000; Whitson & David, 2001). Producing scientific environmental information for consumption by non-scientists is challenging and entails an organization pinpoint early on in the production phase the expected influence the intended information will have, the audience is it intended for, how it is going to be distributed, and how its success or failure will be measured once it is disseminated (Hoornbeek, 2000). Hoornbeek (2000) states extensive planning is needed to produce a publication; yet, the interview data suggested that Working Group Members did not always identify an audience for publications and often a formal plan for distribution was not developed. The process by which publications move from an idea, through review, and eventually to release is very fragmented. The process is largely in the hands of the persons or committees producing the publications and distribution is a personalized effort that relies on many different methods of dissemination by Working Group Members. The implications of fragmentation could mean the publication process lacks consistency, standards, and accountability about where and to whom publications are distributed, which in turn could influence readers' opinions about the quality of the grey publications being produced.

2. What is the understanding of GOMC Working Group Members about publication practices within the organization?

Interviewee responses indicate that Working Group Members place a high value on the publication of GOMC's information. Communication is a major component of the Council's mandate and many Working Group Members have a personal stake in the dissemination of publications. Members' responses to the question about the purpose of GOMC publications highlighted the importance placed on publishing. Interviewees discussed the necessity of producing publications in order to "promote education and awareness" (Member H), "promote transboundary communication" (Member S), or to encourage communication with "decision makers and stakeholders in the Gulf of Maine [and engage in] science translation" (Member G). There is no doubt that publishing, whether in print, or on the Web, is vital to GOMC.

Making new information more easily visible and interpretable and its significance more obvious for decisions and policies is a significant challenge. This matter can be a translation issue lying at the intersection of environmental science, communication, policy, and management (Holmes and Clark, 2008; Tribbia and Moser, 2008). It should be noted that GOMC has produced some communication products developed with potential users clearly in mind, e.g., GOMC's *Gulf of Maine Times* and fact sheets on various marine issues, both of which are examples of publications designed for public education, and the organization sometimes works closely with communication specialists and science translation writers in order to reach policy makers. Yet, some Working Group Members were not convinced that GOMC was doing enough to target specific audiences for its publications, or if it even had the capacity to do so. The expense and time to produce publications means that a report specific enough to target policy makers may be of little use for education and awareness of the general public and vice versa (Member K). How GOMC chooses between audiences when its mandate includes information sharing with both is a matter that has been debated by the Working Group.

2a. In the opinion of Working Group Members, are the publication practices of GOMC contributing to the mandate of the organization?

Publishing information is an integral part of the communication strategy and mandate of the organization. Eighteen of 19 of respondents indicated that the mandate of the Gulf of Maine Council involved some aspect of supporting the communication of information across regions, jurisdictions, and national borders in order to promote the health and sustainable use of the Gulf of Maine and Bay of Fundy region. The mission statement and guiding principles of GOMC support this understanding of the Working Group when they state that the Council will actively engage in "Public information and participation-based planning and management [that] is committed to a participatory process that informs and engages the public in setting priorities, forming policies, and pursuing efforts to conserve the Gulf's environment" (GOMC, n.d.).

3. Does the governance structure of the organization influence publication practices?

Initially, it was assumed that the complexities of the structure and function of an intergovernmental organization would have an impact on the efficiency of GOMC's publication practices. The working processes of the organization, which include a rotating secretariat that annually cycles between jurisdictions and a political system with shifting economic pressures in both Canada and United States, are potential hindrances to

publication and yet interviewee responses did not indicate this was the case. According to Working Group Members N and S, the working processes of GOMC have not hindered the information flow, but instead have contributed to transboundary communication and participation. Environmental regulations or legislation that creates controversy on one side of the border may be unopposed on the other, which allows GOMC to act as a venue for discussion and debate, addressing the resistance and barriers to environmental regulations while considering how such obstacles can be overcome. The potential negative impact of the complex working processes of the Council has little affect on the dissemination of information as the interests and mandate of the organization support the goals of the agencies that are affiliated with GOMC.

Elliott et al. (2003) and Scott (2000) both note that environmental, human, and organizational factors impact the success of information dissemination efforts by a group. Social, political, and economic factors manifest themselves in public opinion, which often plays a large role in driving policy and decision-making forward (Elliott et al., 2003). Such a perspective often applies directly to GOMC, and to all environmental intergovernmental organizations, whose information dissemination success is influenced by whether or not the subject of publications is considered a "hot-button" issue. Recently, climate change has claimed a large portion of the environmental spotlight, which could detract from the influence of GOMC publications that deal specifically with other issues. In contrast, Mitchell et al. (2006) suggest that many audiences are looking for "local credibility" (p. 318) in information sources and "frequently dismiss scientists and scientific groups with the best scientific credentials because those individuals or groups

lack local expertise" (p. 318). This situation suggests that the region-specific environmental literature produced by GOMC should be considered credible and useful to information seekers. The work undertaken by the numerous active committees listed on GOMC's Web site (www.gulfofmaine.org), emphasizes the effort the Council has made to combine "hot-button" environmental issues with issues specific to the Gulf of Maine/Bay of Fundy region. For example, one of the most active committees of the Council is the Climate Change Network, a crosscutting committee that deals with the impact of climate change on the Gulf of Maine, bringing together a socially and politically charged issue with regional interests.

The human factors listed by Elliott et al. (2003), which include the attitudes and behaviours of individuals who work in an organization, also apply to GOMC and seem to have a positive impact. The attitudes, behaviours, and motivation of Working Group Members are decidedly positive, which ensures that the Working Group is working towards achieving the same environmental goals. The majority of Working Group Members talked about the high level of personal effort that they committed to distributing and promoting awareness of GOMC information. Engaged and dedicated Working Group Members contribute to the overall success of publication practices, as well as the organization as a whole. Working Group Member D noted that commitment and involvement are the driving forces behind developing ideas for publication and that the success or failure of GOMC is completely reliant on "who shows up to the table." According to Working Group Member I, the success of the Council "has to do with the relationships that have been built and the willingness of people to come to the table and talk and share ideas..." Addressing the critical environmental problems in the Gulf of Maine has linked the goals and objectives of Working Group Members, contributing to organizational success based on human factors.

The availability of sufficient material and human resources is an organizational factor (Elliott et al., 2003) that impacts GOMC. Cuts in funding over the last several years have limited the budget for the production and distribution of publications, particularly those in print format. Working Group Member R noted that distributing print copies often relies on procuring in-kind support from one of the agencies of Working Group Members. Securing funding of this kind is often dependent on the personal motivation of the individual or committee producing a report. Cuts in funding also impact the types of editorial and contract support that can be used in the production of a publication. Working Group Members D and L stated that contractor support for assistance in drafting reports, editorial review, and printing could only happen when money was available. GOMC's heavy reliance on Web-based distribution is partly due to lack of funding; however, digital dissemination methods have become so prolific in today's society that most Members use the Internet as their preferred means of distribution regardless of the printing budget.

3a. Does the bi-national structure of GOMC influence the distribution patterns of its publications?

The literature suggests that international, intergovernmental groups have a role to play not only in the production of information, but as a link between different user groups, aiding the flow of information across disciplinary boundaries (Biermann & Bauer, 2004; Boyer & Crémieux, 1999; Donaldson et al., 2006; Siebenhüner, 2008). Biermann and Bauer (2004) state there are impediments to intergovernmental groups fulfilling this role, several of which apply to GOMC. For example, the authors explain that it can be difficult to measure successful information dissemination efforts of an intergovernmental organization because the outcomes of the activities of the group cannot be separated from the outcomes of the regimes in which the organization is embedded (Biermann & Bauer, 2004). In other words, it is hard to know if GOMC affected environmental change through its actions, or if it was the actions of the federal governments of Canada and the United States that really drove change forward. The Gulf of Maine "environmental regime is not regulatory. Rather than effecting compliance through regulation, it provides mechanisms for building consensus and coordination to harmonize domestic environmental law, policy and management" (Chircop, et al., 1995, p. 325). The Canadian and United States governments have not transferred authority to GOMC and therefore it does not have the power to actively monitor regime compliance within the Gulf of Maine/Bay of Fundy region (Biermann & Bauer, 2004). The literature suggests that the more authority an organization has and the weaker it is regulated within a regime, the more effective it will be. In the recent past, GOMC has relied largely on funding from the federal agencies that are Members of the organization, most notably the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) in the United States. The necessity of federal money to support GOMC activities might indicate that the organization relies heavily on the national regimes that govern it, which could decrease its ability to act autonomously. Despite this however, the management structure of GOMC has given its Members the flexibility to

drive the Council's projects forward if funding can be secured, which has fostered adaptability and creativity in the publication process that contributes to both the effectiveness of the organization, and its longevity as an IGO (Member L). Biermann and Bauer (2004) note that, given the complexity of environmental issues, a flexible and adaptable management structure is one of the best ways to increase productivity and effectiveness within an IGO.

4. How are the publications of GOMC disseminated?

GOMC's dissemination practices have changed since its establishment in 1989. Interviewees suggested that though limited distribution of printed publications still occurs (Member E), the primary and preferred means of dissemination is via the Internet. The literature supports the idea that new Web-based technologies and alternative publishing practices are now having an impact on information sharing and scientific reporting (Borgman, 2007; Cronin, 2005; Renear & Palmer, 2009). Traditional publishing is changing to suit the needs of the digital user; however, several interviewees stated that there is still some reluctance among Council Members to embrace newer technology that could aid in dissemination. This hesitation to change, according to Working Group Member H, can be overcome as younger people who have more familiarity and training with Web-based dissemination practices begin to work with the Council. Members A, H, M, and R all recognize the crucial role that technology will play in the successful dissemination of GOMC publications in the near future and continue to encourage the Working Group to explore new digital methods.

4a. Is distribution/dissemination considered important by the interviewees?

Working Group Members are active in the distribution phase, consistently employing creative, personal methods to disseminate information to broad audiences. Though interviewees did not comment directly on the importance of distribution to the overall publication process, their responses indicated that individual initiative was the driving force behind the success or failure of dissemination. Interestingly, only one respondent stated that he did not think that he fulfilled a role in the distribution of publications. His response could indicate that this Working Group Member does not have enough time or is not sufficiently motivated to disseminate publications, or that he has not been involved in the production of publications. As digital distribution becomes more and more widely used, continuing attention to distribution and promotion of awareness of publications is important. Simply putting a publication up on the Web site is not enough to ensure its uptake (Members L & M) and there is a risk that Members could become complacent in promotion efforts if they conclude that posting to the Web site alone is sufficient dissemination. Limited focus on dissemination introduces several challenges, including how to ensure that crucial environmental information reaches active citizens who wish to protect the health of the ocean, the possibility of reallocation of funding for promotion and distribution to other areas, which further decreases the breadth of dissemination, and the possibility of losing the personal initiatives of Working Group Members to distribute publications. As soon as one Member assumes that he/she does not have a role in distribution, there is a risk that other Members will agree. The publications produced by GOMC are its primary means of spreading the word about the

environmental issues that impact the Gulf of Maine/Bay of Fundy region and, therefore, the importance of good dissemination efforts should be constantly encouraged.

5. What evidence of the use of GOMC publications is suggested by the interview participants?

The analysis of the interview data identified seven types of use of GOMC publications (see Table 8). The most prevalent type was citations to GOMC publications by other reports, with the next most common types as use by industry/government, in legislation, by universities, and by word of mouth; however, specific examples of types of use were rarely provided by interviews. The Members' responses indicated that use of publications is particularly difficult to evaluate because it requires obtaining evidence through a variety of methods, including extensive follow up with possible stakeholders to enquire if they are using GOMC publications.

Despite providing vague examples of use, Working Group Members believed that awareness of GOMC publications was high among the sizeable number of individuals who are associated with the Council in a variety of capacities, i.e., within the representative agencies of the Council, educational institutions like Acadia University, and environmental not-for-profit groups which are focussed on the Gulf of Maine region. The degree to which that awareness extends beyond those individuals was a matter of interest but uncertainty.

6. How are grey literature publications valued?

Questions about the quality of grey literature continue to be an issue that can hinder the use of this information by both general users and decision makers. Farace (1997), while noting the general stigma against grey literature as not peer-reviewed, believed that "in the coming century [grey literature] will be perceived and judged by the contributions it makes in resolving scientific and technical, as well as social problems facing the public and private sectors" (p. 73). Unfortunately, grey literature has not achieved the heights that Farace believed it would (Hutton, 2009) and the opinion of its poor quality persists in some quarters; however, scientific publishing of all kinds continues to evolve in the digital era and as publishing online becomes more prolific, grey literature has the potential to gain more acceptance.

Grey literature is a widely used publication genre, but its ability to make significant contributions to the resolution of current scientific and technical problems that Farace foresaw is hindered by the sheer mass of ever-expanding scientific information on the Web. Why would a user choose information produced by GOMC over any other provider? According to interviewees, this question is an issue directly related to marketing and promotion and has very little to do with the grey genre per se. This issue is discussed in more detail below in Section 5.3.4, General Conclusions about Production, Distribution, and Use (p. 169).

6A. How are they valued within the case study organization?

Interestingly, only one of the 19 interviewees stated that the "tainted" quality of grey publications could influence its use by stakeholders (Member N). Though GOMC publishes largely in the grey genre, the "color" of the literature, whether it be grey or white (primary literature), did not seem to be important to interviewees.

6B. What does the above data tell us about the value of grey literature generally? Analysis of the interview data suggests that internal Members of the Gulf of

Maine Council worry less about the fact that publications are grey and more about how they can increase uptake of the information that is contained within them. Perhaps this indicates that in general, the stigma against grey publications is diminishing and concern is shifting to the promotion of awareness. This view is supported by MacDonald et al. (2007) who suggest that the dissemination of grey literature by organizations like GOMC is affected by the publication itself and whether or not it has been "effectively designed and described for searchability and heightened awareness" (p. 38). While effective marketing and promotion will certainly increase the likelihood that a user will choose a GOMC publication over another information source, ease in finding the publication while searching the Internet cannot be overlooked. In an era where the Web has become the primary tool for information dissemination (Weintraub, 2000), GOMC may want to closely examine the meta tags and meta data embedded in its Web pages to ensure that publications are easily found. A number of features can be added to a Web page that will increase the likelihood Google's search algorithm will find it and give it a high priority compared to similar information sources (K. Lawson, personal communication, March 30, 2009).

5.3 Conclusions

Table 16 provides a summary of the conclusions presented in Section 5.3 in the order they are described in the text.

	Conclusions
	• Understanding of the production process is fragmented
Production	• Production is an iterative process, often with multiple levels of review
	• Members' personal stake in a publication process drives production
	• The information needs of audiences are important, but not always diligently considered during the production phase
	 Working Group Members use multiple personal distribution methods, which foster creativity and pride in the process
	• Varied approaches to distribution demonstrate that a single approach is too limited. Multiple methods are needed
Distribution	• Working Group Members have a responsibility and are expected to distribute publications
•	• Promoting awareness of publications is an important matter, and given development of the Internet, GOMC needs to give further attention to the searchability of its publications
	• New digital dissemination tools are being employed although some reluctance to adopt new technologies exists within GOMC
	• Several uses of GOMC publications were identified and occurred in a variety of contexts (public education, academia, government)
Use	• Evaluation of the use of GOMC's publications is complicated; therefore assessing use is difficult
	• Though interviewees could provide some examples of use, understanding of the use of publications was limited
	• Working Group Members did not mention evaluative tools GOMC has employed, even though some evaluation has been done
	• GOMC developed the <i>Publications Protocol</i> to enhance publication practices, but it has yet to be adopted widely
	 Publishing in the grey genre is not a matter of concern in promoting awareness of publications
General	• While the levels of review of publications are known internally, this quality control is less obvious to readers of GOMC publications
	• GOMC's broad mandate hinders the production of publications that can meet the information needs of all perspective audiences.

Table 16. Summary of Production, Distribution, Use, and General Conclusions

5.3.1 Production

Interviewee responses indicated that their understanding of and opinions about the production of GOMC information were fragmented (see Figure 2, page 65). Though some agreement about some aspects of the process occurred, a consensus about how and when those activities took place was not present. No matter which path is followed as an idea moves towards publication, Working Group Members agreed that: 1) preparation of a publication is an iterative process, i.e., "you know there was a lot of back and forth in getting that approved" (Member N); 2) each publication requires extensive input and collaboration, i.e., "then there was lots and lots and lots of input from lots of people…who helped to provide content…that's true of almost all of the publications that I've been familiar with…" (Member D); and 3) each publication receives multilevel approval and peer review, i.e., "A publication will be referred to…the Management and Finance Committee…and the Outreach Committee…" (Member R).

Though the Council handles a number of the aspects in the production process well, there is no certainty that consistency in publication practices occurs. Working Group Member M described the process as inefficient: "I must admit I'm not completely convinced that all the mechanisms that we're trying to use...are working the way they should," and Working Group Member L described production as inconsistent: "I would say like most organizations it's serendipity. It is the individual who helps put a report together, thinks of ways to disseminate it, in creative ways, in ways that might be responsive to the target audience." Furthermore, some Working Group Members expressed a concern that GOMC was not identifying an audience, or addressing the information needs of the audience at the outset of preparing a publication (Members B, D, F, H, K, & O). It is difficult to define target audiences for a publication, beyond the sponsoring agencies, before developing an understanding of the kinds of information particular groups of readers need, just as it is difficult to understand their information needs if they have not been identified as the recipient groups in the dissemination plan(s).

Initially, it was assumed that the production process would be more structured because of GOMC's heavy reliance on publications to promote awareness of what the organization is doing and what it has accomplished (Member N). Yet, because publishing is largely driven from "the bottom up" (Member K), the committee that produces a publication is largely responsible for production and distribution, which has resulted in many different means of dissemination. GOMC is both creative and flexible in its publication practices, which enhances a feeling of ownership of publications by Members and ensures that informal means to produce and distribute grey publications are somewhat effective; however, not applying publication standards may further enforce the stigma that exists in the minds of some that grey literature is of poor quality. It is important for the producing organization to ask itself how users might view the information and how it might increase the use and influence of its publications by ensuring consistency in the production and review processes. In the case of GOMC, the Publications Protocol already exists to assist in standardizing the production and distribution phases.

5.3.2 Distribution

Grey literature produced by intergovernmental bodies on marine environmental and fisheries questions is an increasingly significant component of the global knowledge base (Borgman, 2007). But barriers to the use and potential influence of this literature persist, even with the possibility of employing new sophisticated search engines for data retrieval (Renear & Palmer, 2009). Finding what is needed at the appropriate time, whether it be a database, a primary paper, or a technical report, remains a major problem in coastal and ocean affairs (M. Butler, personal communication). Working Group Members use rich and diverse personal methods to distribute GOMC information. Fifteen different types of distribution were identified over the course of interviews (see Table 5), which demonstrates that though there is no single set strategy for dissemination, all Members see themselves as having a role to play in the distribution of reports and many take that role very seriously.

Personalized methods meant that many types of distribution were used by the interviewees (see Table 5). The most frequent was emailing or forwarding a publication to an interested individual, which was employed by virtually every Working Group Member. Member I referred to himself as an "aggressive forwarder," which described his practice of maximizing personal networks to pass on copies of GOMC's publications. Since GOMC's publications are available online, forwarding publications by e-mail is easily accomplished. GOMC's dynamic distribution process highlights that no single approach to distribution is as effective as multiple and varied means; yet, some concern was raised that without a formalized dissemination strategy targeting specific individuals and organizations, dissemination of GOMC information would be limited to the personal networks of Working Group Members who are already aware of environmental issues in the Gulf of Maine/Bay of Fundy region. Working Group Member E noted that some distribution was expected from every Working Group Member: "one of their

responsibilities is to make sure that the information, including publications gets spread through as broad a network as possible...using each of our own individual networks." Yet, distributing primarily through "individual networks" could limit the depth and breadth of dissemination. Working Group Member B stated that GOMC Members "often work in silos, disseminating to our colleagues who happen to be the converted, who happen to be the scientists, happen to be the educators and policy-makers..." Member B thought that GOMC could consider adopting a distribution strategy that reached a broader base of interested users in the Gulf of Maine region.

The physical distribution of publications, though not as widely used as in the past, is still practiced and encourages Members to take ownership of the information being distributed, and broker that information across disciplinary boundaries (Member N). Interviewees acknowledged that physical distribution was especially efficient in reaching out to colleagues in disparate fields because though these people might not be on an email distribution list, they often attend interdisciplinary workshops and conferences where a publication can be placed in their hands.

The informality of distribution methods contributes to creative and active dissemination by Working Group Members. It is unknown whether or not the efficiency of distribution could be enhanced by establishing guidelines for which organizations and individuals receive copies of publications; however, the lack of formal distribution strategies needs to be considered in terms of the best way to promote the use of this grey literature. Generally, users cannot simply search for grey publications in commercially controlled databases like *Elsevier's Science Direct* and, as a result, a distribution strategy

should ensure that print or digital publications reach a central information repository (a library, or a digital repository), as well as other key organizations and individuals who could act as access points for publications.

The Ocean Data Partnership and Information Exchange Network (ODPX), which was developed by the Northeast Coastal and Ocean Data Partnership and is currently funded by the U.S. Environmental Protection Agency, is an example of a digital repository that could help to consolidate environmental information on the Gulf of Maine and enhance access for users. ODPX is a regional initiative and the Council is one of the organizations receiving grant funds to participate by providing data collected by GOMC's Gulfwatch Contaminants Monitoring Sub-Committee. As of October 2009, it was considered likely "that Gulfwatch data will be drastically curtailed due to lack of funding" and that by using the ODPX, the current data could be fully documented and archived, which will make it "web-accessible using web services/exchange network protocols for the foreseeable future" (GOMC, 2009, p. 31). Working Group Members saw the potential of ODPX for promoting the use of "data-driven products for understanding and management of the Gulf of Maine ocean environment" and at the October Working Group meeting, Members discussed not only archiving of Gulfwatch data, but development of "robust data flows using ODPX in support of ESIP indicator tools" (GOMC, 2009, p. 31). Information management matters are currently important to GOMC, which is developing ways to consolidate and streamline dissemination of information.

Interviewees suggested that promoting awareness of publications has become an important issue for GOMC. As was mentioned in Section 5.2, simply putting a publication on the Web site does not necessarily mean it will be found and used (Members K & L). Distribution of information is often constrained by insufficient material and human resources within an organization to support dissemination efforts. Intergovernmental groups may be unable to implement communication strategies, especially when a dissemination role and appropriate personnel are absent in the organizations. Once a work is published by an intergovernmental body, attention typically moves rapidly to other projects rather than allocating additional resources to advertise and disseminate publications of completed initiatives.

While many Members take steps to promote the publications their committee produced, there seems to be a general lack of awareness of all of GOMC's publications. Working Group Member Q pointed out that one of her main promotion efforts is to remind her Gulf of Maine Council colleagues about their role in marketing the publications of GOMC:

Q: as committee chair I will remind on a regular basis like I try on a quarterly basis, so when we have a steering committee call, or sub-committee calls, for those groups to remind [them] to be sure that they continue to send out or remind people that the fact sheet exists or that new information is there. And then at the Council meeting when I go when the councilors are there, I remind them that there is this whole treasure trove of publications and they can be part of the marketing strategy [laughs] and they need to tell other people and help to distribute them.

As the primary means of circulating information, the Gulf of Maine Council cannot afford for its own Members to be unaware of its publications. Promotional efforts need to be extended so that awareness of GOMC information is encouraged. GOMC will find it difficult to adequately encourage use of its publications by the general public and other stakeholders, if the Working Group and Council Members themselves are not aware of the publications. However, application of best practices for distribution and promotion of new publications may actually be outside an organization's general scope and interest (Members K & L). Using some of the digital tools described below may encourage potential users to choose GOMC's information over other possible sources.

Distribution methods have changed since GOMC's inception in 1989. As mentioned above, current information distribution is now achieved primarily through the Web and interviewees indicated that they are thinking about ways to take advantage of new digital distribution methods. While embracing digital technology could mean using wikis, Web forums, and digital newsletters to further distribution efforts, these are only one level of technology to support access and use. GOMC was a very early adopter of the Internet as a tool for information promotion and, more recently, of RSS (Really Simple Syndication) feeds on its Web site (Member A). However, more could be done to ensure that the information is digitally indexed, so it is easily searchable by scientists and decision makers. GOMC could consider using discipline specific ontologies (useful for representing and linking data and information, and helping users to mine the large volumes of marine scientific information on the Web) to support the retrieval of its information (Renear & Palmer, 2009). Given the continuing development of the Internet, GOMC needs to regularly give thought to the searchability of its publications, including the descriptive meta tags embedded in the design coding of its Web site. Such tags would increase the likelihood that GOMC's Web site will appear in the first 10 results of a Google search.

5.3.3 Use

The interview data analysis identified seven types of use of GOMC publications (see Table 8). GOMC publications are used by industry and government, in legislation, and in education. Interviewees found it difficult to assess whether or not GOMC information was being used in public policy contexts because their awareness of use was often limited to only one venue. Working Group Member K described this complex issue:

K: we have a five or six page handout on [the] American Eel...and its status in the Gulf of Maine. So, I gave that to our pelagics advisor, fisheries advisor and he found it very informative, a good synopsis and was quite impressed with it...now he never told me that changed how I[he] recommended to the minister what our position is on it...but he found it informative in terms of getting his knowledge, in terms of playing that role as an advisor to the minister on that issue.

Though Working Group Member K knew that the pelagics advisor was influenced by *American Eels*, he did not know what impact, if any, it may have had beyond that point. Even if use and influence are known at some levels, a publication's ultimate use in policy decisions is difficult, if not impossible, to assess.

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Interviewee responses demonstrated that while Working Group Members were sure that publications were being used, their understanding of the influence of GOMC information was limited. Working Group Members believed that awareness of GOMC publications was high among the sizeable number of individuals who are associated with the Council in a variety of capacities, but the degree to which that awareness extends beyond those individuals was more a matter of interest than certainty. As Working Group Member I phrased it, "normally it's just off [the publication] goes, it could have been deleted, it could have been read, it could have been valued, I don't know…we all push a lot of information out there and hope it…sticks or its relevant or its used."

Adequately evaluating the influence of information in publications requires extensive research and engagement with stakeholders, processes which generally have to be contracted out and are costly for the organization. The cost of hiring research support, which includes significant expenses associated with human resources and the need to ensure there are interested people within the organization who are willing to use evaluation measures on their publications, are severe impediments to the evaluation process. Attention needs to be given to how the organization promotes itself and its materials so that it draws information seekers to its Web site. To gain an understanding of the production, distribution, and use of GOMC publications requires taking into account the human factors that influence engagement with the organization's information, e.g., sufficient marketing, developing a relationship with users to assess their information needs, and using current Web technologies users have come to expect.

Interestingly, though interviewees could not identify any instances where evaluation methods were employed by the Council, a review of GOMC publications revealed that GOMC has worked with the National Oceanic and Atmospheric Administration (NOAA), the Regional Association for Research on the Gulf of Maine (RARGOM), and Urban Harbors Institute (contracted survey developers) to evaluate the needs of coastal managers in the region and assess their information and technology needs (Ernst, 2004; Ernst, Keeley, & Tripp, 2004). A Web-based survey in 2004 of 63 regional coastal managers revealed that the management topics of "greatest importance" over the next five years are habitat change and land use" (Ernst, 2004, p. 2). The survey asked participants to identify what types of "research, information, and technical support" were needed for dealing with these issues. In terms of habitat change, "most managers want improved methodologies and data for conducting cumulative impact assessments and better indicators of habitat health" (Ernst, 2004, p. 2). Managers' information needs in the area of habitat restoration included "trends for analyses, ecological and physical baselines, and inventories" (Ernst, 2004, p. 2). Early on, GOMC and its partners recognized that the "level of understanding of the Gulf of Maine was not adequate to resolve many of the day's coastal management issues" (Wiggen & Mooers, 1992). Surveying coastal managers contributed to a "system-wide understanding of the GOM" and validated the need for holistic research of the region rather than piecemeal studies by individual investigators (Ernst, 2004).

It is not certain how the results of the 2004, Ernst et al. study influenced the publication practices of GOMC, but it does demonstrate that the Working Group

Members are interested in evaluating the needs of users. Since 2004, GOMC has produced over 15 publications regarding habitat restoration and conservation, and land use, the most notable examples being: 1) *The Gulf of Maine Habitat Restoration Strategy* (GOMC, 2004); 2) *In Pursuit of Data: Populating the Coastal Development Indicators* (Mendelson, 2004); 3) *Salt Marshes in the Gulf of Maine: Human Impacts, Habitat Restoration, and Long-term Change Analysis* (Taylor, 2005); 4) *The Gulf of Maine Marine Habitat Primer* (Tyrrell, 2005) and 5) *Identifying Coastal Habitats at Risk from Climate Change Impacts in the Gulf of Maine* (Horton & McKenzie, 2009) (Cordes et al., 2006). This output indicates that GOMC focused its publishing efforts on habitat change and land use, the two priority issues that coastal managers identified in the evaluative survey.

At the Working Group meeting in St. Andrews, New Brunswick, on October 3, 2009, the current Chair of the Working Group outlined his vision for the new direction of GOMC. He spoke about improving internal communication within GOMC, both between the Councillors and the Working Group and between the Working Group and its committees. Improving internal communication was the first step in addressing his major concern, namely GOMC no longer had the capacity to maintain its external partnerships which had been integral to the Council's success. In fact, the current capacity of the Council was considered unsustainable and there was not enough volunteer support for complex project coordination (Diers, 2009). The inability of the Council to maintain external partnerships, such as the Northeastern Regional Association of Coastal Ocean Observing Systems and the Gulf of Maine Research Institute is worrisome. Stojanovic et

al. (2009) suggest that bringing the fields of science and policy-making closer together relies upon engaging stakeholders from different disciplines and backgrounds to enhance communication and trust between information producers and consumers. The Working Group chair stated that although the Council would still "act as an organizer of people, a promoter of good ideas, a convenient place to store stuff (the Web site), and a venue for international policy conversation," it would no longer coordinate projects because only the particularly well-championed and well funded committees had this capacity, which may not always be the case based on turnover in the Council and further cuts to its budget (Diers, 2009). GOMC's ability to act as a venue for international policy conversation is limited by cutting ties to external partners with connections to and influence on regional decision-making. Moreover, discontinuing coordination of projects possibly means reduced publishing efforts based on the work of committees and even less content, review, and editorial support for new publications. Based on this proposed new vision, GOMC's identity may change, but hopefully the capacity to encourage project partnerships with groups outside the Council will not disappear.

Stronger linkages between science and policy can be achieved by a critical evaluation process that measures whether or not new environmental policies were supported by the best science (Holmes & Savgard, 2008; McNie, 2007). Comprehensive evaluation entails a detailed review of a policy to determine whether all relevant information was used or considered, whether the science was understood and interpreted correctly, and whether all the risks were adequately addressed (McNie, 2007). Evaluating a publication in this manner is a difficult task. Holmes and Savgard (2008) and McNie (2007) state that despite the critical importance of using evaluation methods to assess the science used in policy-making, most organizations (like GOMC) have not set up such a system of evaluation. Any evaluation tends to be very informal (Holmes & Savgard, 2008), a view corroborated by Working Group Member L who stated "sometimes we might print one thousand copies of something and when those thousand copies are gone we conclude that we were successful in disseminating the report."

Holmes and Savgard (2008) note "[f]or research institutes, some limited evaluation of impact may be included in periodic evaluations of the organization as a whole" (p. 24), but in general, there are often methodological difficulties with evaluating the impact of a research project and its ability to affect change at the decision-making level. Holmes and Savgard (2008) suggest it is likely more than one research project influences a policy and, therefore, it is difficult to assess the effectiveness of just one of those inputs. Hence, impacts are seen a long time after the completion of the research project and "a lot of research is aimed at building conceptual understanding rather than at instrumental use, which is generally easier to evaluate" (Holmes & Savgard, 2008, p. 24). The time commitment involved in conducting evaluation is also a barrier. If the effects of information in a publication are not seen for many years, how can an organization even be sure that evaluation uncovered all the effects? Despite the obvious difficulties that GOMC faces in consistently applying evaluation tools, it is a process that can show potential funding bodies the productivity of the organization. Evaluating use and influence will demonstrate what, if any, policy decisions were made using GOMC
publications, which reveals their value for enhancing the environmental health of the Gulf of Maine.

What if evaluation measures determine that no influence occurred at the level of decision-making? A negative result is often as telling as a positive one and in the case of GOMC would draw attention to the importance of understanding target audiences and aid in establishing a dialogue with potential users to build an understanding of their information needs. If one of the Council's intended audiences is policy makers, but their publications are not exerting influence at this level, GOMC can focus on the phase of the publication process where barriers to information use exist. Was the target audience determined at the start of the process? Was distribution aimed at policy makers? Did adequate promotion of the information occur during dissemination? All of these questions might be answered by using evaluation tools.

5.3.4 General Conclusions about Production, Distribution, and Use

Though interviewees' understanding about the production of information is fragmented, they verified that many of GOMC's publications receive multiple levels of peer-review, which confirms that some types of scientific and environmental management grey literature are rigorously reviewed and of high quality. In fact, only one interviewee commented at all on the perceived low quality of grey publications. Working Group Members were less concerned about the publication genre and more interested that adequate attention was being paid to promoting awareness of GOMC information among potential users. Working Group Member M made this perspective clear when he said: "I think there are enough mechanisms that the information can go in, it can be stored, and it can be accessed. I think the challenge is that next step that we talked a bit about, which is how do you then apply it, how do you then draw it in to other conversations?" In Member M's view, more effort needs to be focused on promoting user engagement with the information to increase the use of the publications.

Though Working Group Member L suggested that the "color" of the publishing genre was less important than access to and awareness of the literature, there are still challenges associated with overcoming the general stigma that labels grey literature as lower quality than primary literature. As public servants, many interviewees have been so accustomed to working with grey literature in their professional lives that it is not an exception in publishing. Their reliance on, and use of, grey literature may in fact cause more harm than good when designing publications for searchability and awareness, as well as acknowledging the multiple levels of review of GOMC publications. Interviewees noted the high quality of the publications the organization produced, but that quality may not be apparent to users because the peer review is not obvious. While ensuring users become aware of the review process may be problematic, an eventual goal would be to have information users associate the Gulf of Maine Council logo with quality and peerreview. However, until such branding becomes commonplace, GOMC should list the levels of review each publication underwent within each document.

It is important for governmental and intergovernmental groups to think critically about how grey literature is perceived by general information seekers. Applying some strict production, distribution, and promotion standards, including identifying a target audience, increasing accessibility by putting copies of publications in a central repository (library or digital center), and tracking individuals or organizations which received a copy of the publication so that its use and influence can be more easily evaluated, could potentially increase the uptake of GOMC information. Recently, GOMC developed a *Publications Protocol* designed to promote application of standards and increase the effectiveness of production and distribution of publications, but the benefits of this *Protocol* have yet to be fully realized. Making use of an already existing system is costeffective and has the potential to increase efficiency and productivity of the organization, while at the same time increasing consistency in publication practices that contribute to the perceived quality of the information by users.

5.4 Summary of Barriers and Enablers

Barriers and enablers to production, distribution, and use of GOMC's publications were identified during data analysis and are summarized here by revisiting the Guiding Framework presented in Chapter 1. The Revised Guiding Framework (see Figure 3) includes the concept of enablers to the flow of information, which were identified by interviewees as things that facilitated the processes of publication by GOMC. In addition, the Revised Framework includes barriers *outside* of aspects of the processes of production, distribution, and use, upon which the study was centered. Barriers to the flow of information between production, distribution, and use, which are indicated as solid boxes labelled "Barriers" in the centre of the figure, are unchanged in the Revised Framework.

A modification to the Framework Diagram is the introduction of the concept of enablers (see white arrows within the rectangle demarcated by a white dashed line in Figure 3). Interviewees identified enablers to the flow of information, as well as barriers. Enablers allow Working Group Members to achieve success with their publishing initiatives by enabling the flow of information from production, through distribution, on to use. The enablers have been discussed at length in Chapter 4 and include the



Figure 3. Revised Guiding Framework

promotion of awareness of publications, personal effort in the distribution phase, and information uptake encouraged by influential and respected Working Group Members. In the development of the Guiding Framework at the beginning of this study, it was assumed that inhibitors, i.e., barriers, to the flow of information between production and distribution, and distribution, and use were not insurmountable, but what enabled the flow was at that point unknown. Data analysis revealed that within GOMC, it is the Working Group Members themselves who facilitate the flow of information between the publication phases. Most barriers are surmountable (e.g., by streamlining the production process, or keeping a record of where GOMC documents are distributed), especially because of the dedication of many Working Group Members to GOMC's mandate to produce information that can improve the environmental health of the Gulf of Maine/Bay of Fundy region.

The original Guiding Framework hypothesized that barriers to the flow of information between the processes of production, distribution, and use existed within GOMC's publication practices. Barriers to effective information flow (shown in the Revised Framework as solid boxes labelled "Barriers" in the centre of Figure 3) from production to distribution include unclear production criteria, a lack of promotion of awareness of publications, lack of funding to support the processes, and no distribution records (see Tables 4 and 7 for a full list of barriers). Examples of barriers that interrupt or impede the flow of information between distribution and use include failure to place publications in a central repository and inadequate visibility or highlighting of new publications placed on GOMC's Web site (see Tables 7 and 9 for a full list of barriers to distribution and use).

Some of the barriers between production and distribution, and distribution and use are difficult to overcome. For example, the level of funding the organization receives from its federal and state/province representative agencies is dependent on the political and economic situation of the regimes within which GOMC is embedded. GOMC's ability to fulfill its mandate is curtailed by reduced funding and as a result, publication

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activity may decrease as money is allocated to other priority issues identified by the Council and Working Group (Diers, 2009).

Reduced funding and the degree of regime embeddedness are not only barriers to distribution and use, but also contextual factors that influence publication practices. Contextual issues, labelled at the bottom of the Revised Framework, remain unchanged from the original Framework diagram (Figure 1). While it is clear those contextual factors, such as the organizational structure and function, the political and economic influences of Canada and the United States, and pressures from the general public, can influence information production, the extent to which they do is unknown. The interview protocol did not probe interviewees about contextual factors, such as where funding comes from for GOMC projects, or how the interests of their representative agencies are addressed by the Council. Though some interviewees brought up such issues of their own accord, the majority did not, which highlights the necessity of further study in this area (see Section 5.6, Future Research, p. 186).

Reassessing the original Guiding Framework in light of the interview data analysis demonstrated interviewees also identified communication issues that fell *outside* of aspects of the processes of production, distribution, and use, upon which the study centered. In Figure 4, such barriers to publication are highlighted in the Revised Guiding Framework. Interview questions focused on assessing the factors that affected publication and flow of GOMC information (e.g., How does the current publication process of GOMC work? and Do Working Group Members fulfill a role in distribution of reports?). Nonetheless, the Working Group Members pointed out that the process of production does not operate in isolation from factors not considered by the interview protocol, such as establishing the target audience(s) for a publication or assessing the information needs of projected users (Members H, K, L, & N). The interviewees are aware that by not addressing the information needs of users, a barrier to the processes of production, distribution, and use occurs (see Figure 4). An understanding of the information requirements of stakeholders provides a focus for producing relevant information in a suitable form, encourages distribution of the eventual publication to particular user groups, and increases the likelihood that the information will be used.



Figure 4. Barriers to Production and Distribution Originating Outside the Focus of the Study

Not identifying target audiences or pursuing a dialogue with users to assess their

information needs are barriers within GOMC's ability to change. Permeable barriers are

represented by the black dashed vertical line intersecting the arrows in Figure 4. Bridging the gap between unknown information requirements of users and the ideas that producers turn into publications through the organization's publication practices is achievable, so this barrier is seen as permeable with some effort. This type of barrier to effective communication can be overcome through dialogue with stakeholders to determine the types of information they need in decision-making. As noted earlier, GOMC, in partnership with the National Oceanic and Atmospheric Administration (NOAA), the Regional Association for Research on the Gulf of Maine (RARGOM), and Urban Harbors Institute undertook a study of coastal managers in the region to assess their information and technology needs (Ernst, 2004; Ernst et al., 2004). More research of this sort could help to reduce factors that impede effective flow and use of information.

Interviewees also noted that measures of the influence GOMC's publications had on either information users (e.g., decision makers) or information producers (e.g., scientists) have not been completed. The absence of this line of analysis is a barrier to understanding the *influence* of publications. Since Working Group Members were asked questions focused on the themes of production, distribution, and use of GOMC's publications, the matter of the influence of the publications, for the most part, fell outside the parameters of the study. Figure 5 highlights the type of barrier just described, which interviewees drew attention to, but occurred largely outside the focus of the research. Working Group Members were asked to provide evidence of the use of publications, but several went beyond use and commented on the influence publications have had on stakeholders (Members A, F, H, K, L, & M). Just as in Figure 4, permeable barriers are represented by a dashed black vertical line intersecting the information flow arrows in Figure 5. In this case, the permeable barrier to understanding influence can be overcome by employing evaluation tools, while recognizing that measuring the influence of information is a complex undertaking. Interviewees' responses provided insights about portions of the Guiding Framework outside the focus of this study, which demonstrated how all the stages in the flow of published information are intricately linked.



Figure 5. Barriers to Distribution and Use Originating Outside the Focus of the Study

5.4.1 Implications for Other Organizations Relying on Grey Literature Publications

The Revised Guiding Framework provides a lens through which to view the grey literature publication practices of organizations similar to GOMC. Publication by other environmental intergovernmental groups may be enabled or hindered in parallel ways. Typically, marine scientific information must be synthesized into a readable format (translation) and then utilized by decision makers so that it affects positive environmental change (mobilization) (Payne, 2010). The Revised Guiding Framework could serve as a model to help understand knowledge translation and mobilization of information produced by intergovernmental organizations, like GOMC. Implications arising from this study about publishing grey information by other organizations include the following:

- If organizations do not regularly consider the information needs of audiences of grey literature, they will likely discover that by identifying and assessing the information needs of audiences, information uptake will increase.
- As the study of GOMC has shown, once a work is published, attention often moves to other assigned projects rather than allocating resources to advertise and disseminate the work. In order to ensure use of publications of intergovernmental bodies, promoting awareness should be seen as important as producing them.
- As the interviews of GOMC Working Group Members demonstrated, distribution of publications is enabled by using diverse methods, including thoughtful dissemination of both print and digital copies. Relying solely on digital

distribution, or simply putting publications on an organization's Web site, does not guarantee effective dissemination.

- Formal guidelines for producing and distributing publications may help to streamline and increase the effectiveness of these processes. Such guidelines might specify who in the organization is responsible for peer-review and also list the recipients, individuals and/or organizations, of copies of particular types of publications.
- The recent reliance on the Internet for information dissemination demands that producers of grey literature give attention to the searchability of their publications, particularly of how metadata and descriptive meta-tags embedded in a Web site facilitate searchability.
- Users have come to expect Web 2.0 interactive features on Web sites, which may
 influence how they choose to use an organization's Web site. Thus, as some
 GOMC committees have begun to discover, distribution and use of information
 could be enhanced by employing Web 2.0 technologies, like RSS feeds.
- Although organizations like GOMC may not have the capacity to employ evaluation tools, periodically evaluating the use of their publications could strengthen publication activities by providing insights regarding such matters as ineffective distribution or lack of awareness.

As the interviews with GOMC's Working Group Members confirmed, perceptions of the quality of grey literature are not a matter of concern in publishing in this genre. Like GOMC, members of other intergovernmental groups may be public servants who use and produce high quality grey publications on a regular basis, which may lead them to overlook how users might perceive the quality of grey literature (e.g., not peer-reviewed).
Organizations like GOMC, which rely on grey literature as a primary means of communicating information, can overcome questions of the quality of their publications by clearly noting the quality control techniques, e.g., peer review, used in the preparation of each publication.

5.5 Limitations

As stated in Section 3.7 (p. 60-61), limitations of this study include: 1) Though a qualitative methodology of in-depth interviews results in a rich dataset, a sample of 19 individuals does not allow for broad generalizations about grey literature and its use to be made from the interview data to other contexts. However, considering GOMC's mandate and governance structure, which typifies many intergovernmental organizations, some assumptions about the nature of the production, distribution, and use of grey literature produced by other similar organizations can be made based on this study and suggestions about further lines of research, which could determine the validity of the assumptions can be outlined (see Section 5.6, p. 181); 2) This study was largely of a descriptive nature and a difference of two or three responses can affect understanding drawn from the sample size in this research; 3) Though the interview protocol addressed the subject of use of

GOMC's publications, this theme was not covered comprehensively. Only one question directly sought evidence on this point. This study aimed to understand the production, distribution, and use of grey literature from the perspective of the producers themselves, leaving larger questions about the use and influence of GOMC's publications information for further study; 4) The goal of obtaining representation from each of the federal and state/provincial Working Group jurisdictions was not fully achieved. As a result, comparisons among some jurisdictions were not possible; 5) Interview data analysis demonstrated that the interview protocols did not probe the political and organizational contextual factors that might influence the publication practices of GOMC. In Section 4.4, Organizational Structure and Context: Impact on Publication (p. 133), responses characterized as barriers and enablers given by federal representatives were compared to responses by state/provincial representatives. The comparison demonstrated that some differences between these two groups did exist; however, the interview data did not offer an explanation of why. The extent to which national politics, level of government, and the organizational structure of the Council (which must deal with government changes and national and jurisdictional differences) influence production, distribution, and use cannot be explained by this research.

5.6 Future Research

This study provides a foundation for further investigation of the use and influence of grey literature publications. Several questions raised by this research will have to be investigated before a comprehensive understanding of use and influence can be achieved. Areas, or questions for further research, include the following: Is it within the capacity of intergovernmental organizations, like GOMC, to procure/engage the material and human resources required to achieve science translation for effective communication to policy makers?

IGOs face communication challenges to successfully navigate the boundary between science and policy-making. Donaldson et al. (2006) note that this boundary shifts and can be unstable, at times extremely permeable while at others solid and unyielding. GOMC's ability to provide science translation (Member H) for policy makers as well as members of the general public shows it is possible to successfully navigate the boundary; however, while the structure and function of GOMC may be suited to this role, it may not currently be within the capacity of the organization to focus exclusively on communicating with policy makers.

As noted above, the then current chair of the Working Group (from New Hampshire) outlined his vision for the future of GOMC at the October 2009 Working Group meeting. He acknowledged that he would like the organization to become a "venue for international policy conversation," but he did not elaborate on how to achieve this goal (Diers, 2009). GOMC would first have to acknowledge that it *could* play a part in bridging the gap between science and policy, and second, it would have to target policy makers as an audience for information, to ensure the translated science was directly related to policy concerns of the day. In specifying such an audience, or in tailoring its information production in this way, sometimes a fear arises that the legitimacy of the science will be compromised by being molded to fit a policy agenda (McNie, 2007). Since GOMC does not undertake primary research to any great extent (Members E & M), the concern about compromised science only applies to particular

committees, e.g., Gulfwatch (P.G. Wells, personal communication, March 1, 2010). GOMC can play a valuable role of translating primary research into summary publications for non-scientific audiences. Focusing on decision makers as an audience would ensure that policy was informed by legitimate science essential for resolving environmental issues.

2) Does the broad mandate of intergovernmental organizations like GOMC, which promotes information sharing with multiple different stakeholders, hinder the publication of information for policy decisions?

While the communication of marine scientific and environmental management information is encompassed by GOMC's mandate, it seems that the type of information being communicated, whether for public education purposes, or for policy-decisions, changes continually. What audiences does GOMC want to reach with its information? Does GOMC intend its publications to influence policy and decision-making? Working Group Member D noted how difficult it was to get an audience with policy makers and that decision-making itself happens on many levels, making it difficult to ensure that particular information reaches the right individual. Would it be easier for GOMC to focus on a general audience and try to influence environmental decisions from a ground-up level? Questions of this nature depend on the character and mandate of the organization and how it wishes to define its role in promoting scientific knowledge for policy change. GOMC could narrow its focus and only produce information to influence policy-making and yet, the broad mandate of the organization, which does not pigeon hole its information production in any single direction, has likely contributed to the longevity and success of the organization. Questions related to organizational identity of environmental

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IGOs may be difficult to answer definitively because these organizations are accountable to fluctuating politics and economics of the regimes that govern them and as a result, there is always some uncertainty about the future of the organizations and their direction (Biermann & Bauer, 2004).

3) In what ways do intergovernmental organizations facilitate (or hamper) the communication of information across jurisdictions and national borders?

Working Group Member S stated that the structure of an intergovernmental group can promote transboundary communication:

S: there might be a case where Canada has explored a particular issue much more than the States have...So that publication [on a particular issue] is going to have a much more well-rounded or in-depth look at something that might be kind of controversial or shunned right out of the gate on this side [American] of the border...it gives me a better opportunity to say well...look at how well accepted that is in Nova Scotia and why is it that they have been able to overcome the resistance, or the barriers to that?

Further research is needed to determine and assess the different ways by which intergovernmental groups facilitate the flow of information through the complex crossjurisdictional, multi-stakeholder arena of policy-making.

4) How effective are personalized methods of distribution in promoting and achieving information use? What audiences are reached by such methods and who is missed? What are the implications of findings to these questions?

In the case of the Gulf of Maine Council, the individualized nature of the

distribution of publications means that Working Group Members, on both sides of the border, use their own strategies to disseminate information. The implications of using personal distribution methods are not easily obvious. Could broader information dissemination be achieved by employing a bi-national distribution plan, or by using the means already employed by Working Group Members? Who is receiving publications and who is missed? These questions can be investigated by interviewing a wide range of stakeholders (individuals and groups) in the Gulf of Maine/Bay of Fundy region regarding their use of information generated by GOMC and its influence.

5) To what extent are contextual factors, such as Canada/US relations and organizational structure, reflected in GOMC's publication processes?

The organizational and operational framework of GOMC warrants study as it may affect publication practices. Bi-national, organizational issues such as the organization's historic reliance on US federal funding sources were indirectly noted by interviewees. For example, Working Group Member C stated: "the emphasis [mandate of the Council] has changed somewhat over time with the arrival of substantial ear-marked money from the US side and now, with the departure of the ear-marked money from the US side, things are changing again." This view raises questions regarding whether priority is given to the issues of the representative agencies that provide financial resources, or whether the process of applying for and obtaining financial support has changed. While evidence that the bi-national structure of GOMC influences production and distribution practices did not emerge from this study, further research on broader contextual factors related to the two countries may determine that economic, cultural, and political factors affect production and distribution strategies, as well as other publication practices, applied in Canada and the United States.

6) What groups and individuals are information users and producers in the Gulf of Maine/Bay of Fundy Region?

The original and revised Guiding Frameworks for this study (see Figure 1 and Figure 3) vaguely defined information users as stakeholders and information producers such as scientists, NGOs, and industries. More specific descriptions of who uses and produces information in the region could help to build understanding of the contextual factors that influence the publication process. For example, are particular interest groups both consumers and producers of information, and if yes, how do they influence the publication practices of organizations like GOMC? Are the information needs of some user groups given preferential treatment because of the nature of their relationship with the producing organization? How often are specific interests given priority based on resources, power, or even a history of good relationships between groups? Do some information users not want GOMC to publish on particular topics based on the values, ethics, or history of the organization? Producing and communicating information may be directly connected to the dynamics of power and relationships that exist between special interest groups that produce and consume information.

7) To what extent does the establishment of organizations similar in mandate to GOMC influence its publication practices?

The formation of marine environmental groups with similar mandates to GOMC, including the Northeastern Regional Association of Coastal Ocean Observing Systems and the Regional Association for Research on the Gulf of Maine has been encouraged by desires to support and sustain the coastal environment of the Gulf of Maine/Bay of Fundy region (P.G. Wells, personal communication, June 25, 2010). Like GOMC, these organizations are committed to communicating marine scientific information to stakeholders in the region, which may influence the extent and the type of publications GOMC produces. Increased publication and information exchange by other groups may force GOMC to question the role of publications for achieving its mandate.

8) Given the rapidly changing information landscape of today, what role should organizations like GOMC play?

The information landscape has changed substantially since GOMC's creation in 1989. More organizations in the Gulf of Maine/Bay of Fundy region are producing marine environmental information and making it accessible via the Internet, providing multiple sources of information for users to choose. At GOMC's June 2010 Council meeting in Portland, Maine, questions were raised about whether current publication practices are sustainable and what role, if any, publications will have in this new digital information landscape (GOMC, 2010). Could GOMC meet its mandate without producing publications particularly if marine scientific information production became the responsibility of other organizations in the region? Other comparable organizations could face similar questions regarding their organizational identity in the dynamic digital age. 9) How can the influence of grey literature publications be more fully explored?

The interview protocol used in this study did not fully probe interviewees' understanding of the influence of publications (noted by the two boxes labeled "influence" in the Guiding Framework; see Figure 3). In fact, interviews with members internal to an organization may not provide data to understand influence adequately. Surveys and interviews of stakeholders and information users will likely be the only means to determine the influence of a publication and in what sphere(s). Assessing the policy implications of a particular document is complicated by activities such as information within the document having been presented to a decision maker in a different form (e.g., included in a research report, or condensed in the form of a briefing note). Content and citation analysis of such documentation could serve as a measure of the influence of grey literature.

10) How could the findings from this study be extended to studies of other intergovernmental groups?

This study demonstrated that interview methodology results in a very informative dataset. The methodology could be applied in studies of other such organizations to gain insights into the barriers and enablers to the flow of information.

5.7 Recommendations

Suggestions for enhancing the promotion and dissemination of GOMC's grey literature to increase its potential use and influence include the following:

• Before proceeding with the production of a publication, a work plan should be developed that outlines the purpose and subject of the publication, the target

audience (whether general or specific), the proposed methods of distribution, and the cost associated with this phase.

- When a publication has gone through a review process, this fact should be highlighted in the publication.
- Guidelines, which standardize the steps in the production process and outline to which individuals and organizations a publication should be distributed, should be established. Members of the organization should be apprised of their importance and, wherever feasible, meeting the terms of the guidelines should be required before a publication can be released.
- Due consideration should be paid to the costs of externally marketing new publications. Reliance on significant personal efforts by members of the organization may be required to effectively promote the publications.
- As the GOMC Web site can serve as a focal point of access for individuals seeking marine environmental information, particularly as it relates to the Gulf of Maine, more attention on effectively highlighting new publications on GOMC's homepage and improving searchability of its Web site are warranted.
- Not only should copies of publications be placed in a digital repository, but print copies should also be placed in a national or regional library to increase the opportunity for long term access. By placing a copy of each publication in a reputable repository, GOMC can avoid losing its investment in published materials due to potential Web site downtimes or failures.

• An attempt should be made to document the distribution of both print and digital publications with regard to recipients and numbers of copies disseminated. In addition, tracking software should be used to assess traffic on the publications sections of the GOMC Web site. This suite of data can be used to evaluate usage of the information and its value to readers. An understanding of how the organization's information is used can show government sponsors and potential funders the value of organization to the stakeholders it serves.

5.8 Summary

While developing an understanding of the use and influence of grey literature publications is a challenging and complex task, studying the production, distribution, and use of scientific information from the perspective of informed insiders responsible for their publication does provide valuable insights regarding the lifecycle and flow of information as it moves from an idea through to release of a publication. Conducting interviews with GOMC Members was a crucial step in the process of unraveling the complex subject of the use and influence of scientific grey literature. These interviews brought to light internal organizational factors that both enable and impede the flow of information through the publication process. This thesis shows that building an understanding of how scientific grey literature may be used in and influence policy and decision-making begins with a strong understanding of publishing practices of the producing organization, which can only be acquired through in-depth interviews of key informants.

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Appendix A–Recruitment Notice

Recruitment Notice

Environmental Information: Influence on Decision Making

You are invited to participate in a research project being conducted by Dr. Bertrum MacDonald and Dr. Peter Wells of Dalhousie University, Halifax, Nova Scotia. The purpose of the *Environmental Information: Influence on Decision Making* study is to investigate the distribution and use of publications produced by governmental and intergovernmental organizations focussed on marine environmental issues. The study entails detailed case studies of three organizations including the Gulf of Maine Council on the Marine Environment (GOMC). It is expected that this investigation of organizations that study and produce substantial reports on marine environmental protection will bring to light the pathways (and barriers) to the flow of scientific information to policy decisions, and may offer insights and recommendations for enhancing the use of science on matters of global importance.

You have been invited to participate in this study because of your role as either a Member of the secretariat that supports the Gulf of Maine Council on the Marine Environment (GOMC) or a Member of the Working Group or Council of GOMC. Members of the research team will be attending the meeting of [*insert GOMC or Gulf of Maine symposium*] in [*insert location of meeting*]. A Member of the research team will contact you at the meeting and if you agree to participate, you will be interviewed at a time convenient to you during the meeting. In the interview of approximately 45 minutes you will be asked questions about pathways of GOMC's published technical reports and practices followed to increase awareness of the reports.

If you wish further information about the research initiative, we will be happy to respond to your questions, including providing a copy of a paper on our initial findings regarding publications of GOMC.

Bertrum H. MacDonald, PhD

Professor of Information Management, School of Information Management

Peter G. Wells, PhD

Adjunct Faculty Member, School for Resource and Environmental Studies and Marine Affairs Program

Appendix B–Interview Protocol

Interview Protocol–Gulf of Maine Council on the Marine Environment (GOMC) Case Study

Interview Questions–Working Group Secretariat Personnel

a) Role with GOMC

1) What is your affiliation with GOMC? How long have you fulfilled this role? (Number of years? Over what period?)

2) When and how did you become aware of GOMC?

b) Knowledge of GOMC and its publications

3) Please describe your view of the mandate & working processes of GOMC?

4) How does the current publication process of GOMC work? For, example, select a recent GOMC report or other publication and outline the stages in its preparation and publication.

5) What is the purpose of GOMC's publications from the standpoint of the Council and its secretariat?

c) Mechanisms for distributing and assessing publications of GOMC

6) What is the process by which GOMC's documents are distributed? To illustrate your response, discuss a recent report in your response.

7) Please outline to what types of organizations or individuals the secretariat would distribute this publication? Libraries? Research institutes? Government Agencies? NGOs?

8) Do your distribution methods vary depending on the location of the recipient organization or individual?

9) Is the report distributed to policy decision makers of the Member states and provinces? Is a summary (briefing note) prepared to accompany the report?

10) In the distribution process for the reports, is a distinction made between print and digital copies of the document? If so, how are the reports distributed differently?

11) Is the process that you have just described typical for all publications produced by GOMC? Is a distinction made between reports and meeting documents?

12) Is this method of distinction applied to all of GOMC's publications, or does the method depend on the subject of the publication?

13) Is the distribution method adjusted based on interest or demand for a report? For example, would an additional print run of a report be completed to meet demand or would you refer inquiries to the Council's website for a copy?

14) Have the distribution methods applied by your agency or jurisdiction changed over the past five years? If so, please explain the rationale for the change?

15) Does the secretariat keep a record of informal requests for GOMC's publications? If so, is this information used to provide feedback or request advice from GOMC?

16) Are you aware of any evidence of the use of GOMC's publications? Does the secretariat track any evidence of the use of GOMC's publications within GOMC? Outside GOMC?

17) Does the secretariat monitor traffic on the GOMC website? Do you have statistics that show access to and/or downloading of publications?

18) Does the secretariat take any steps to promote awareness of GOMC's publications? If yes, please describe the method(s).

19) Finally, with regard to our research are there aspects of distribution, use, and influence of GOMC publications that you think we should pursue that would be of benefit to GOMC?

Interview Questions–Council or Working Group Member

a) Role with GOMC

1) What is your affiliation with GOMC? How long have you fulfilled this role? (Number of years? Over what period?)

2) When and how did you become aware of GOMC?

b) Knowledge of GOMC and its publications

3) Please describe your view of the mandate & working processes of GOMC?

4) How does the current publication process of GOMC work? For, example, select a recent report and outline the stages in its preparation and publication.

5) What is the purpose of GOMC's publications from the standpoint of your role as a scientific Member?

c) Mechanisms for distributing and assessing publications of GOMC

6) Do Members of the GOMC Council and Working Group fulfill a role in the distribution of its reports? Please outline that role.

7) Select a particular report [*interviewee's choice*] and what steps you took to distribute that report? Is that distribution process typical for GOMC's reports?

8) For that report, outline to what types of individuals or organizations was the report distributed?

9) In distributing copies of recent reports have you made a distinction between print and digital copies of the documents? If so, what is the distinction?

10) Have you made a distinction between distributing reports and meeting documents? If so, to what types of individuals or organizations have you distributed copies of meeting documents?

11) Have these distribution methods changed over the past five years? If so, please explain the rationale for the change?

12) Do you keep a record of requests for GOMC's publications?

13) Are you aware of any evidence of the use of GOMC's publications?

14) Do Members take any steps to promote awareness of GOMC's publications? If yes, please describe the method(s).

15) Finally, with regard to our research, are there aspects of distribution, use, and influence of GOMC publications that you think we should pursue that would be of benefit to GOMC?

Appendix C–Consent Form



Faculty of Management

School of Information Management

Consent Form

You are invited to take part in a research study entitled "Environmental Information: Influence on Decision Making." Your participation in this study is voluntary and you may withdraw at any time. The study is described briefly below. This description tells you about the risks, inconvenience, or discomfort which you might experience. Participating in the study might not benefit you, but the findings from the study may be informative for organizations whose mandate and publishing practices rely on grey literature, i.e., reports and documents produced outside of the networks of mainstream commercial and academic publishers. You should discuss any questions you have about this study with [insert name of interviewer].

The purpose of the *Environmental Information: Influence on Decision Making* research study is to investigate the distribution and use of publications produced by governmental and intergovernmental organizations focussed on marine environmental issues. The study entails detailed case studies of three organizations including the Gulf of Maine Council on the Marine Environment (GOMC). It is expected that this investigation of organizations that study and produce substantial reports on marine environmental protection will bring to light the pathways (and barriers) to the flow of scientific information to policy decisions, and may offer insights and recommendations for enhancing the use of science on matters of global importance.

This study is being conducted by Dr. Bertrum H. MacDonald and Dr. Peter G. Wells of Dalhousie University, Halifax, Nova Scotia, Canada. You are invited to participate in this study because of your role as either a Member of the secretariat that supports the Gulf of Maine Council on the Marine Environment (GOMC) or a Member of the Working Group or Council of GOMC.

If you agree to participate in this study, you will be interviewed by [*insert name: co-investigator or research student, a Member of the research team.* The interview will last approximately 45 minutes and you will be asked questions about pathways of GOMC's published technical reports and practices followed to increase awareness of the reports.

With your permission the interview will be audio recorded. Following the interview, a transcript will be prepared and forwarded to you by email and you will be asked to verify the accuracy of the transcription. When the transcription has been verified, the audio recording will be erased. Should you prefer that the interview not be audio recorded, the interviewer will make notes of your responses during the interview and following the interview you will be asked to verify the accuracy of the notes.

With your permission, your responses to questions may be included in reports and publications arising from this research. Further, with your permission, responses that may be included in reports and publications arising from this research will be attributed to you.

Participation in this study should be of minimal risk to you. The probability of any harm occurring because of disclosing information regarding the distribution pathways of published technical reports of GOMC is no greater than risks encountered by you in your daily work life.

If you wish for your responses to be treated anonymously, a numeric code rather than your name will be assigned to the transcript and notes from this interview. All transcripts and notes from this research will only be accessible to the co-investigators and their research students, and will be retained in secured cabinets at Dalhousie University for five years after which they will be destroyed.

You will be provided with a copy of this consent form as a record of your participation in the study. Questions regarding this research may be addressed to Dr. Bertrum MacDonald (phone: (902) 494-2472, e-mail: bertrum.macdonald@dal.ca) or Dr. Peter Wells (e-mail: oceans2@ns.sympatico.ca).

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study you may contact Patricia Lindley, Director of Dalhousie University's Office of Human Research Ethics Administration, for assistance at (902) 494-1462, patricia.lindley@dal.ca.

Appendix D–Coding Scheme

- Production Process

 Review before Release
 Impetus for Production
- 2. Organizational Structure
 - 2.1. Working Processes
 - 2.2. Enablers
 - 2.3. Barriers
- Organizational Goals
 3.1. Purpose of Publications
 3.2. Mandate
- 4. Issues
 - 4.1. Limited Access
 - 4.2. Lack of Evaluation Methods
 - 4.3. Lack of Awareness
 - 4.4. Funding or Lack of Funding
- Improving Publication Practices
 Suggestions for further EIUI Research
 General Suggestions
- 6. Evidence of Use
 - 6.1. Track Web Access
 - 6.1.1. Yes
 - 6.1.2. Unsure
 - 6.1.3. No
 - 6.2. Record of Requests
 - 6.2.1. Yes
 - 6.2.2. No
 - 6.3. Examples of Use
- 7. Enablers
 - 7.1. To Use
 - 7.2. To Production
 - 7.3. To Distribution
- 8. Distribution Process
 - 8.1. Types of Individuals or Organizations Distributed to
 - 8.2. Promotes or Does Not Promote Awareness of Publications
- 8.3. Preferred means
 - 8.3.1. Hard Copy
 - 8.3.2. Digital
- 8.4. Methods
 - 8.4.1. Personal Strategy
 - 8.4.2. Other
- 8.5. Distribution of Meeting Documents
- 8.6. Change Over Time
- 9. Distribution By Jurisdiction
 - 9.1. Virginia
 - 9.1.1. State or Provincial
 - 9.1.2. Other
 - 9.1.3. Federal
 - 9.2. Nova Scotia
 - 9.2.1. State or Provincial
 - 9.2.2. Other
 - 9.2.3. Federal
 - 9.3. New Hampshire
 - 9.3.1. State or Provincial
 - 9.3.2. Other
 - 9.3.3. Federal
 - 9.4. New Brunswick
 - 9.4.1. State or Provincial
 - 9.4.2. Other
 - 9.4.3. Federal
 - 9.5. Massachusetts
 - 9.5.1. State or Provincial
 - 9.5.2. Other
 - 9.5.3. Federal
 - 9.6. Maine
 - 9.6.1. State or Provincial
 - 9.6.2. Other
 - 9.6.3. Federal
- 10. Context
 - 10.1. Time Worked with GOMC
 - 10.2. Jurisdiction
 - 10.3. State or Provincial

- 10.3.1. Nova Scotia
- 10.3.2. New Hampshire
- 10.3.3. New Brunswick
- 10.3.4. Massachusetts
- 10.3.5. Maine
- 10.4. Other

10.4.1. Maine

- 10.5. Federal
 - 10.5.1. Virginia
 - 10.5.2. Nova Scotia
 - 10.5.3. New Hampshire
 - 10.5.4. New Brunswick
 - 10.5.5. Massachusetts
 - 10.5.6. Maine
- 10.6. Awareness of GOMC
- 10.7. Affiliation with GOMC
- 1. Barriers
 - 1.1. To Use
 - 1.2. To Production
 - 1.3. To Distribution

Gulf of Maine Council on the Marine Environment Publications Protocol • April 8, 2008

All publications and other external communications and educational materials produced or sponsored by the Gulf of Maine Council on the Marine Environment (GOMC) or either of its US or Canadian Gulf of Maine Associations must adhere to this protocol. It has been developed to ensure consistency in presentation and organizational identity of quality documents that are professional in both content and appearance. This protocol does not apply to recipients of GOMC grants; however, grant recipients do need to credit the "Gulf of Maine Council on the Marine Environment" for funding. **GOMC LOGO**

All materials must display the official GOMC logo.

The logo can be downloaded from the GOMC website (<u>www.gulfofmaine.org/logo</u>) and is available in green/blue and grayscale.





Size and placement of the logo shall be established by the project manager.

When appropriate, logos of other sponsoring/contributing agencies or organizations should be included. This decision is to be made by the project manager.

MISSION STATEMENT

• All materials shall include the GOMC mission statement.

"The Gulf of Maine Council on the Marine Environment was established in 1989 by the Governments of Nova Scotia, New Brunswick, Maine, New Hampshire, and Massachusetts to foster cooperative actions within the Gulf watershed. Its mission is to maintain and enhance environmental quality in the Gulf of Maine to allow for sustainable resource use by existing and future generations."

• It should be prominent and located near the GOMC logo.

• The project manager will establish the text option and its placement. The guidelines listed below should be followed.

Recommended font style and size are Veranda (Microsoft Verdana) 8 points or larger.

Text should stand alone - it should not be integrated with other text in a paragraph.

It should NOT go in a preface, acknowledgements, or footnote.

Inside title page of a multiple-page report is recommended.

Anywhere on a fact sheet or short document, as determined by the layout person, as long as it is prominent and near the logo.

FUNDING STATEMENT

All materials must include the following text:

CREDITS

All materials must acknowledge authors, editors, researchers, photographers, and artists.

DATE

All materials must include the month and year of publication. For workshop or conference reports and proceedings, this is the date that the publication was finished and made available. The date when the workshop or conference was held should go in the preface, executive summary, or introduction. If there are deemed to be valid reasons, an exemption from this requirement may be provided by the project manager.

EDITORIAL REVIEW

• Project managers are required to develop a review plan and coordinate participation as outlined below by the respective Committee or Subcommittee, Secretariat Team, US or Canadian Gulf of Maine Association, and Outreach Committee.

Technical review by Committee or Subcommittee.

Secretariat Team review of statements or conclusions with possible policy implications. Secretariat Team may seek guidance from the Working Group or Council.

US or Canadian Gulf of Maine Association review of funding statement to ensure that all funding agencies have been appropriately credited.

Outreach Committee review of logo, mission statement, credits, and date.

• Committee or Subcommittee co-chairs must inform Secretariat Team when review has been completed.

• Secretariat Team acknowledges completion of review process and notifies the Working Group and Council.

DISTRIBUTION

• Project proposal must contain a distribution plan with associated funding requirements, which must be approved by the Working Group.

• Print copies of all materials should be distributed to the following:

US and Canadian Gulf of Maine Associations (two copies each), GOMC Central Registry, Maine State Planning Office (one copy), US National Library, <u>http://www.loc.gov/index.html</u> (one copy), and

Canadian National Library, http://www.collectionscanada.gc.ca/index.html (one copy).

ELECTRONIC ACCESS

All materials must be produced in a format that is compatible with the GOMC website. Documents should be either in HTML or Adobe PDF format. Images should be in JPG or GIF format. Databases and spreadsheets should be in MS Excel, MS Access, or tab-delimited ASCII format. Production costs to meet this requirement should be included in the distribution plan.

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