Integrated coastal planning:
'Wicked' problems and 'clumsy' solutions

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Abstract: In response to increased pressure on coastal systems, integrated coastal management and planning has emerged as a comprehensive approach to involve multiple users within decision-making. The deliberative spaces in which public participation occurs consist of complex social processes where the 'wickedness' of integrated coastal management problems can be observed. Using Cultural Theory, conflicting rationalities within an in-class roundtable exercise were identified to expose the 'wicked' nature of coastal problems. In response to these conflicts, students within the roundtable exercise incorporated multiple perspectives into decision-making to reach 'clumsy' but integrated solutions. Observations of the roundtable exercise indicate that 'wicked' problems and 'clumsy' solutions offer an appropriate framework for navigating the deliberative spaces of integrated coastal planning.

Keywords: integrated coastal planning, wicked problems, clumsy solutions, Cultural Theory, public participation, deliberative spaces, roundtable forums.

Introduction

Activities in the coastal zone are inherently related: the interface between marine and terrestrial environments culminates multiple jurisdictions, forms of governance, and resource users (Kay & Alder, 2005). Increased pressure on coastal systems, from environmental to socio-economic causes, threatens the livelihoods of coastal communities. In Canada, this has lead to the acceptance of an integrated approach to coastal governance (Kearney, Berkes, Charles, Pinkerton & Wiber, 2007). The need to align planning and management efforts is reflected in Canada's Ocean Action Plan, which was developed in response to Canada's 1997 Ocean's Act (Berkes, Berkes & Fast, 2007). This approach seeks to reduce conflict between users and employ a broad perspective to the conservation and sustainable use of marine resources (Berkes et al., 2007). Managing a diverse range of human uses in coastal areas requires striking a balance between economic, social and environmental needs (Kearney et al., 2007). Integration between levels of government, the private sector and the

community is a concerted effort to address and develop solutions to the inherent complexity of the coastal zone (Kay & Alder, 2005). Integrated coastal planning utilizes stakeholder participation to achieve this holistic, collaborative approach. This form of planning rejects top-down hierarchical planning, which largely ignores the different perceptions and concerns of those involved (Hartmann, 2012). Instead, the heterogeneity of coastal systems indicates "no one-size-fits-all situation exists and that problems are unique, therefore governance cannot be standardized and local knowledge is essential to their solution" (Jentoft & Chuenpagdee, 2009, p.554). Understanding and managing public interest in democratic governance is a complex social process (Hartmann, 2010) that requires both the integration of multiple sectors and of diverse perspectives (Khan & Neis, 2010).

Deliberative spaces and collaborative planning

Deliberative spaces are "virtual and real sites where meaningful public dialogue and debate can occur" (p.529); they are the arenas of collaborative planning (Parkins & Mitchell, 2005). These spaces are largely based on Habermas' communicative theory, which states that if all participants are considered equal, any outcome of the discussion will be fair to all (Habermas, 1984). Guided by these ideals, spaces for collaborative planning are constructed, and equality is encouraged between those involved (Healey, 2003).   In practice however, the effectiveness of deliberative spaces to produce innovative solutions has been questioned across disciplines (e.g. Parkins & Mitchell, 2005; Kearney et al., 2007; Billé, 2008; Jentoft & Chuenpagdee, 2009; Berkes, 2011; Hartmann, 2012).

Natural resource management (NRM) has adopted collaborative planning to reduce conflict between resource users and achieve the ideal conversation theorized by Habermas. Parkins and Mitchell (2005) argue that emphasizing consensual outcomes has overshadowed the process of public debate, thus undermining the ability of deliberative spaces in NRM to produce long-term solutions. Consensus-based decision-making has been criticized for ignoring conflicting rationalities instead of acknowledging and managing them appropriately (Billé, 2008). Solutions based on consensus are often fleeting, providing only short-term relief from larger societal issues. Successful collaborative management involves acknowledging the conflicting worldviews that appear when multiple perspectives are integrated in coastal planning (Parkins & Mitchell, 2005). Emphasizing outcomes over process further ignores the theoretical basis of deliberative spaces as complex social interactions (Hartmann, 2012). Understanding the process of debate and discussion is a necessary precursor to producing reasonable, well-informed dialogue that can then be used towards decision-making (Parkins & Mitchell, 2005).

Literature increasingly suggests problems in coastal areas are inherently 'wicked' (Jentoft & Chuenpagdee, 2009; Khan & Neis, 2010; Berkes, 2011). Wicked problems are "complex, persistent or reoccurring and hard to fix because they are linked to broader social, economic, and policy issues" (Khan & Neis, 2010, p. 351). Rittel & Webber (1973) developed the concept of wicked problems in response to the conventional planning approach that assumes a process with a defined beginning and end, effective for only 'tame' problems. They argue that wicked problems are most likely to challenge planners since their subjective and socially constructed components resist clear definition (Jentoft & Chuenpagdee, 2009). Cultural Theory addresses this 'wickedness' by illuminating the influence of conflicting worldviews on decision-making.

> Cultural Theory, also called the Theory of Sociocultural Viability, is a universal typology used across disciplines to analyze the involvement of individuals in social life. It is a tool to characterize both the social contexts and individual actions, both social relations and their justifications. The clue is that individuals internalize social relations, in such a way that their values and their beliefs legitimize the social interactions they are engaged in. The process of structuration of values and beliefs (either persistence or change) is part of social interactions, not external phenomenon. (Mamadouh, 1997, p.19)

Cultural Theory states that social relations can be organized into four different rational perspectives, or ways of life: individualism, egalitarianism, hierarchy, and fatalism. They are simultaneously contradictory and complementary, as each perspective is only a partial representation of reality. The limited number of rationalities affords a certain familiarity with the arguments of competing perspectives, providing an avenue for evaluation and criticism. It is therefore possible to learn about cultural biases and navigate actors' motivations in deliberative spaces. Cultural Theory also provides an explanation for change, since convergence on policy decisions is "the result of the continuing disequilibrium between competing rationalities" (Mamadouh, 1997, p. 21).

Once the wickedness of a problem has been acknowledged and the competing rationalities identified, 'clumsy' solutions can be assigned (Hartmann, 2012). Clumsy solutions combine the competing rationalities present within deliberative spaces to provide a holistic perspective of reality. By including all perspectives, the solution is more resilient since it cannot be surprised by conflict after its implementation (Verweij & Thompson, 2006). Clumsy solutions accept the inherent conflicts of collaborative decision-making, the disequilibrium of society (Mamadouh, 1997).

As coastal management increasingly adopts a collaborative approach through deliberative spaces, it is imperative that planners understand the social processes of debate and discussion. This article explores the effectiveness of deliberative spaces in addressing the complex problems associated with integrated coastal planning (ICP). To accomplish this, the process and output from three staged in-class roundtable discussions based in Clayoquot Sound, British Columbia is described. The framework provided by 'wicked' problems, Cultural Theory, and 'clumsy' solutions are then used to analyze the complex social processes occurring in the classroom.

Methodology

To investigate the deliberative spaces of ICP, undergraduate students were organized into staged roundtable discussions as part of an in-class exercise. They were asked to complete a management plan for the Clayoquot Sound study area that addressed the communities' concerns regarding their coastal resources. The groups were expected to provide possible solutions to stakeholder conflict in the area. Roundtables were chosen as the forum of deliberation since they rely on consensus-style decision-making. Consensus-style coastal planning is the most common mechanism of ICP exercises which attempt meaningful public consultation (Kay & Alder, 2005). Despite their emphasis on consensus, roundtables host the complex social processes of debate and discussion, making them an appropriate setting to observe deliberative spaces.

For this analysis, Cultural Theory in congruence with the 'wicked' problems and 'clumsy' solutions framework has been selected. The 'wickedness' of coastal management problems suggests that traditional methods of consensus-based decision-making are unable to produce creative and flexible solutions (Durant & Legge, 2006). Consensus methods favour agreement and produce only short-term solutions. This analysis seeks to illuminate the role of conflict in deliberative spaces, where the issues debated are "highly complex and deeply contested" (p. 532) by the public interest (Parkins & Mitchell, 2005). Jentoft and Chuenpagdee (2009) assert that alternative forms of value, rationality, and knowledge are needed to address the uniqueness of wicked problems. Cultural Theory highlights the manifestation of competing rationalities throughout the decision-making process. Therefore, the ability of solutions to address the wicked nature of ICP problems can be evaluated based on the appearance of competing rationalities.

Results from the in-class roundtable discussions
In-class roundtable process
To arrange the in-class roundtable exercise, each undergraduate student was assigned a sector to represent throughout the group discussions and final presentations. Sectors present in the Clayoquot Sound study area were:

- Commercial shellfish
- Commercial finfish
- Aquaculture
- Sports/recreational fishing
- Wildlife viewing
- Recreational boating
- First Nations
- Local communities
- Conservation

There were three separate roundtables for the study area and all roundtables used the same outline for creating the integrated management plan expected at the end of the discussion.

The outline was distributed at the beginning of the roundtable discussions and identified the planning hierarchy to be followed by all groups. The planning hierarchy begins with a group definition of a vision statement, followed by goals or objectives, and finally action strategies to achieve those goals. Throughout the process, consistency is required to ensure the principles or direction is maintained (Kay & Alder, 2005). The roles of facilitator and recorder were deemed important, however each roundtable decided who to appoint and how to manage the responsibilities. Two of the three roundtables (G1 and G3) designated individuals to hold these positions throughout the process, and one group (G2) decided to rotate the roles at each meeting. The rotating approach proved ineffective as some people were more apt than others at fulfilling the roles and time was spent on dealing with differences in style. Interestingly, two of the three groups decided that the local communities' representative would be the facilitator as this sector also represented the interests of conservation and First Nations. These sectors were absent from the two groups because their representatives dropped the course after the roundtables were created.

Protocols for speaking around the table were initially decided on by the groups but soon eroded in favour of respectful and continuous dialogue without restriction. All groups used general consensus as the method for decision-making however the level of agreement differed between roundtables. The local community representative was chosen by G3 to hold the most decision-making power so that all

proposals had to be approved by this individual before they were included in the integrated management plan. This same group was missing a First Nations stakeholder representative, therefore the roundtable decided that the local community representative would attempt to communicate the interests of the missing sector within their assessment of the group proposals. The other groups used a consensus style where those in disagreement with proposals had to produce alternative solutions for the roundtable to consider before a decision was made. The external resources used in the roundtable process were not discussed in-depth in the presentations, however G1 consulted previous community management plans such as the "conservation economy" reports by Friends of Clayoquot Sound (Vodden & Kuecks, 2003) and the Socio-Economic Analysis of the Clayoquot Sound area by West Coast Aquatic, Inc. (Okey & Loucks, 2011).

The methods used by the different roundtables to define the outline of the plan were highly stratified, except for the aerial map of the study site used by all groups. G2 used a visual tool in the form of a bubble map onto which sector priorities were written and connected to identify areas of conflicts, resolution, and/or partnership to determine the components of the planning hierarchy. G3 had individuals write down their own wording for the vision statement or objectives and then common themes or words were selected and combined to create a collaborative output. This was used until the action strategies phase, when open discussion was used to propose ideas and reach consensus by agreement from the local communities' sector representative. The facilitator of the roundtable for G1, the representative of the local communities sector, connected the ideas voiced by all stakeholders until the statements were approved by consensus around the table and appropriately inserted into the planning hierarchy. As observed in the presentations, the roundtable that spent the most amount of time wording statements via the bubble map accomplished fewer steps in the planning hierarchy.

Reflections on the roundtable process are worth noting. The first group voiced the ease by which they were able to proceed through the planning hierarchy. This was attributed to the common vision of a 'conservation economy' although the definition of this term was not altogether clear. The second group did not complete the stages of the planning hierarchy and described the process as time-intensive, admittedly failing to represent the interests of their sector near the end of the proceedings. The idyllic and unrealistic nature of their integrated management plan was attributed to a heavy conservation bias prominent throughout the process. The third group also noted their conservation bias and indicated that a lack of knowledge removed any ability for a realistic or holistic plan.

In-class roundtable output

To discuss the outputs of the three Clayoquot Sound roundtable discussions, the common themes will be elaborated on followed by a discussion of the differences between the roundtables. During the presentations, two key themes were identified in the integrated management plans of the three roundtables. The first of these themes was a desire to equitably distribute economic benefits in the area. This was emphasized by all groups although in different forms. G1 decided a processing plant would create employment in the area for all demographics and distribute the added value in the region as opposed to the lower mainland.   G2 created a community initiatives fund, where a percent of revenue obtained in the area by government, industry, and local business would be gathered to support community-building activities in Clayoquot Sound. G3 decided that local industries and businesses would have 2/3 of their employees be locals and half of all management positions would be filled by locals.

All roundtables also identified a second theme: the importance of increasing local knowledge and control in a successful management plan. G1 created a board to collaborate research interests in the area while focusing on the importance of monitoring ecosystem health. This same group also emphasized building local capacity to increase the community's ability to make decisions and interact with sectors in the area. G2 decided that a baseline water quality monitoring and research facility was necessary to link human and ecological health, collect information on ecosystem variability, and increase local capacity for meaningful decision-making. G3 proposed a partnership between education and ecotourism as way for local people to engage with the sector. This group also decided that First Nations groups should be the local monitoring and enforcement agency, similar to the Haida watchmen program.

Analysis of integrated coastal planning through the roundtable process

Roundtables are dynamic spaces in which debate, understanding, and knowledge transfer occur (Parkins & Mitchell, 2005). These deliberative spaces also host the inherent conflicts present in every social situation. Instead of dampening conflict, 'wicked' problems demand its acknowledgement and 'clumsy' solutions hinge on its manifestation. Conflict therefore becomes the lens through which to evaluate collaborative planning. The effectiveness of stakeholder integration will first be explored by investigating coastal problems as 'wicked' due to their complexity and resistance to resolution.   Following this, Cultural Theory will be used to describe the influence of competing rationalities on integrated planning approaches. Finally, the appropriateness of 'clumsy' solutions for ICP will be elaborated upon.

Examples from the literature and the in-class round table discussions will be drawn upon to illuminate these issues.

Integrated coastal management as a 'wicked' problem
Integrated approaches to coastal management such as ecosystem-based management as well as fisheries and coastal governance have been shown to contain the characteristics of wicked problems (Jentoft & Chuenpagdee, 2009; Khan & Neis, 2010; Berkes, 2011). Fish stock degradation is one of the many threats to the Clayoquot sound area and can be conceptualized as a wicked problem since it involves the state, private sector, and general public who are rarely coordinated despite the frequency of their interaction (Jentoft & Chuenpagdee, 2009). Sources of conflict that often arise within the management of this resource include legitimacy, responsibility, and differences in power between stakeholder groups (Khan & Neis, 2010). Commercial resource extraction is related to national policy issues through the Department of Fisheries and Oceans (DFO) but also involves uncertainty from scientific knowledge, ecological carrying capacity, and a myriad of other factors (Khan & Neis, 2010). Further, unsolved questions regarding accountability, responsibility, and beneficiaries indicate the highly politicized components of this problem (Khan & Neis, 2010). This problem has the characteristics of a 'wicked problem' since the issue is linked to broader social, economic, and policy issues present at multiple scales (Berkes, 2011). There is no clear solution; therefore large amounts of time and energy are required to work through the issue.

Due to this investment of time and energy, students in the classroom voiced their exasperation near the end of the roundtable proceedings and one group admitted to the planning process taking much longer than initially expected. In acknowledging the wickedness of coastal planning, stakeholders become aware of the time commitment associated with their involvement and that the likelihood of reaching a consensus is minimal (Frame, 2008). Realizing the wicked nature of these problems also prepares those involved for the differences in problem perception and definition between multiple perspectives (Jentoft & Chuenpagdee, 2009). Further, comprehensive management is needed to sustain the length of debate and discussion required to solve wicked problems (Berkes, 2011). The students' dedication to portraying their sectors admittedly petered out near the end; however, in actual situations, entrenched values and expectations present added complexity to integrated planning (Hartmann, 2012). Cultural Theory provides a method for reducing the number of possible expectations or rationalities to a manageable number, allowing participants to have meaningful dialogue through

debate and discussion (Hartmann, 2012). The application of this theory to ICP will be discussed in the following section.

Competing rationalities in deliberative spaces

The four competing rationalities of Cultural Theory explain the failure of consensus-based decision making to produce robust solutions to coastal problems (Khan & Neis, 2010). Successful solutions to societal problems usually consist of "creative and flexible combinations of different ways of organizing, perceiving, and justifying social relations" (Verweij et al., 2006a, p.1). Contending policy perspectives represent four different ways of organizing social relations: individualism, egalitarianism, hierarchy, and fatalism (Khan & Neis, 2010). These four rationalities or expectations contradict each other and are represented in every social system (Hartmann, 2012). The four rationalities help to identify the motives behind arguments in a deliberative forum but they "also enable the telling of different rational stories about a situation that are rational on their own, but appear to be irrational from the perspective of the other rationalities" (Hartmann, 2012, p. 8). People arguing from different premises are anchored in alterative forms of organizing and for this reason will never agree (Verweij et al., 2006a). This inherent conflict present in social situations demonstrates why consensus-based decision-making fails to produce innovative and sustainable solutions to coastal problems, as with roundtable discussions (Billé, 2008). ICP requires the elements of wisdom and experience provided by each rationality (Verweij et al., 2006a) to understand stakeholder perspectives and produce robust solutions (Hartmann, 2012).

As was evident in the roundtable proceedings, competing rationalities in coastal planning present a formative challenge to reaching consensus. The 'wicked' problem of commercial stock collapse in Clayoquot Sound can again be used as a foil to understand how different rationalities perceive attempts to rebuild the fisheries sector. From an individualist perspective, privatizing fisheries and relying on markets promotes stewardship, reduces over capacity and encourages economic growth (Khan & Neis, 2010). If not privatized, a 'tragedy of the commons' situation is likely to occur, resulting in over-harvesting (Khan & Neis, 2010). This perspective was present in the roundtable through certification schemes that rely on market mechanisms to promote sustainable harvesting methods. From an egalitarian perspective, however, privatization does not result in stewardship and furthers economic disparities between large-scale and small-scale fisheries, shown to contribute to the erosion of livelihoods in coastal communities (Davis & Wagner, 2006). Egalitarianism was also prominent in the roundtable through proposals to use local First Nations as resource stewards, increasing their control and building capacity to contribute to community development. The hierarchical rationality

insists that fisheries are best protected through technocratic planning and management in conjunction with highly centralized monitoring and enforcement (Khan & Neis, 2010).

The hierarchical perspective also appeared during the roundtable in response to stock collapse. Students of one group decided to make the DFO a co-chair within the integrated management process, alluding to the legitimacy of top-down planning and management (Hartmann, 2012) and the enforcing role of the government. The final rationality of Cultural Theory, fatalism, is a defeatist approach where resistance to the degrading trend is futile due to the fragility of nature, diverse social norms and perspectives, market globalization, and lack of trust between stakeholders. This rationality was not overly prominent at the roundtable however a lack of knowledge legitimized inaction towards stock degradation (Verweij et al., 2006a). Despite the alleged conservation bias of all roundtable groups in the classroom discussion, the four rationalities were present and conflicted throughout the process. Solutions proposed by the groups were all rationalized and indicate the complexity of managing social perspectives in coastal planning. To move beyond the barriers conflicting rationalities present to consensus, 'clumsy solutions' have been proposed by planners (Hartmann, 2012) and will be addressed in the final section of this analysis.

Clumsy solutions for wicked problems in coastal planning
In showing that problems related to ICP are 'wicked' and that inherent conflicts of multiple rationalities challenge consensus approaches, deliberative forums can be seen as spaces for debate and discussion. There must be some way to integrate the wicked components and plural perspectives to achieve robust and holistic solutions to these challenges. Policies that creatively combine all these opposing perspectives on problem definitions and resolutions are known as 'clumsy solutions' (Khan & Neis, 2010). Clumsy solutions predict the appearance of each rationality over time and cannot be surprised by the unexpected since they are 'polyrational' by design (Verweij & Thompson, 2006). It follows that a clumsy solution can never be perfect or ideal since the rationalities contradict each other (Hartmann, 2012). Since clumsy solutions express plural viewpoints and reflect the values of the general population (Verweij et al., 2006a), they are necessary for an integrated approach to coastal problems (Khan & Neis, 2010). In response to fish stock degradation, a social-ecological approach focusing on rebuilding entire commodity chains from ocean to plate has been discussed in fisheries management literature (Khan & Neis, 2010). This research uses a clumsy solution approach to effectively transition from

collapsed, poorly managed fisheries to sustainably rebuilt fisheries (Khan & Neis, 2010), and will be used to analyze the output of the in-class roundtable discussions.

The roundtable discussions represented a staged decision-making process based on real problems voiced by the residents of Clayoquot Sound. While the results of these deliberations are grossly over-simplified solutions to the problems at hand, they indicate the need for innovative and holistic ideas for ICP. Although not explicit, the student groups attempted to create a livelihoods framework, a potentially useful tool for a clumsy solution approaches described in the literature. Livelihoods frameworks are holistic and integrated accounts of "natural, physical, human, financial, and social capital necessary to deal with vulnerability in the event of resource depletion, natural disasters and environmental change" (Khan & Neis, 2010, p. 352). Capacity building, diversification, and conservation incentives were apparent in the roundtable discussions and indicate an attempt towards an integrated assessment of resource depletion in the area (Khan & Neis, 2010). One group proposed that all economic enterprises in the area contribute a percentage of revenue to the community initiatives fund designed to encourage economic diversity and build social capital. Another group proposed that higher education become a sector of the local economy in order to diversify the economic base of the area, increase incentive for local education, and reduce dependency on resource extraction. The third group decided to encourage foreign funding, despite the desire for local control, to encourage sustainable aquaculture technologies. These solutions obviously lack depth and knowledge regarding their implementation; however, they indicate the ability for integrated approaches to decision-making. The different perceptions of the stakeholder groups, apparent from fundamental differences in opinion, incorporated valuable knowledge and judgment for initiating clumsy solutions using the holistic livelihoods framework in Clayoquot Sound.

Conclusion
In light of recent advances towards integrated coastal planning and management, participatory government presents an essential contribution for involving stakeholders in the decision-making process. Roundtable discussions are a method of facilitating these collaborative initiatives and are important spaces for debate and discussion around the 'wicked problems' of ICP. It is important to realize the inherent conflicts due to polyrational perspectives present in all social situations in order to develop robust and integrated 'clumsy solutions' to problems on the coast. Equal representation of the public interest will be increasingly tested by the 'super wicked' problem of climate change (Lazarus, 2009). The major social issues associated with this must also be integrated in coastal planning if a holistic solution is to be realized. By acknowledging the legitimacy of all worldviews, clumsy

solutions provide a framework to limit dominance by any one perspective (Verweij et al., 2006b). The current inability of the framework to address power dynamics within social systems emphasizes that clumsy solutions are certainly not a panacea for integrated management, however they provide one of many routes to achieving equality and justice for future generations (Khan & Neis, 2010).

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