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Strengthening Institutions for Stakeholder Involvement and Ecosystem-Based Management in the US Arctic Offshore

BY SHARMAN HALEY, LAURA CHARTIER, GLENN GRAY, CHANDA MEEK, JIM POWELL, ANDREW A. ROSENBERG, AND JONATHAN ROSENBERG

"The nation's current approach to managing the use of ocean resources is ad hoc and fragmented, with no systematic way to evaluate competing ocean uses and to inform and navigate the often difficult trade-off decisions they require. The nation needs a 'comprehensive, integrated, ecosystem-based' framework for coastal and marine spatial planning that "addresses conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources."

—Dr. Jane Lubchenco, NOAA Administrator,
"NOAA Annual Guidance Memorandum," August 2009

The dramatic run-up in oil prices between 2001 and 2008 fueled keen interest in oil and gas exploration worldwide. In Alaska, observers were startled by record-breaking bids totaling more than $2.6 billion for leases offered by the US Minerals Management Service (MMS) in a remote area of the Chukchi Sea. Shell Offshore Inc., which paid $2.1 billion for Chukchi leases, was eager to begin exploration activities both in the Chukchi and in the Beaufort Sea, where it is also a major lease holder. While federal agencies approved Shell's 2008 plan for exploration in the Beaufort (and state agencies concurred), no drilling occurred because of a legal challenge asserting that the environmental review process did not adequately consider potential for harm to migrating whales and traditional Iñupiaq hunting (*Alaska Wilderness League v. Kempthorne*, November 2008).

This is the latest example of failed ocean governance strategies in a thirty-year history of conflict over oil and gas development in offshore northern Alaska. The conflicts of interest among surface users (Iñupiaq subsistence hunters), subsurface owners (the state and federal governments that own the oil and gas rights), and the oil industry that wants to develop the resource is structural.

At the same time, there is a growing awareness that marine ecosystems in many parts of the world have been transformed by the loss of biodiversity, over-fishing, food web collapses, marine pollution, and ill-planned coastal development (Crowder et al. 2006; Pew Oceans Commission 2003; U.S. Commission on Ocean Policy 2004). These transformations are largely understood to stem from failures of governance (Crowder et al. 2006). At present, the governance systems managing human uses of the marine environment are fragmented along agency and jurisdictional lines; additionally, existing governance strategies are often not aligned with spatial and temporal characteristics of the marine system (Crowder et al. 2006).

In this chapter, we argue that as changing conditions in both the human and natural environments of the Alaska arctic offshore spotlight shortcomings in the existing management regimes, the time has come to rethink and redesign the fragmented array of institutions governing resource use in the region. The analysis and recommendations for further study that we present in this chapter are guided by a single, overarching assumption about good institutional design. Management of these valuable and fragile arctic resources requires the active and substantive inclusion of all stakeholders—national and local, public and private. Inclusion (understood as substantive participation in critical decisions on resource use) must be characterized by policymaking, policy implementation, and policy evaluation. In particular, we are concerned about the inability of current institutional arrangements to give central importance to the interests of place-bound stakeholders, namely, the permanent residents of the Beaufort and Chukchi coastal zones. These are the people who have the most direct and critical interests in the sustainable management of the resources and the strongest, most direct historical claim to the arctic offshore.

In political terms, what we propose is a more directly and comprehensively democratic approach to resource management than is currently available. Therefore, we begin our analysis by questioning the sufficiency of conventional notions of democracy based on norms of majority rule and representation and make an argument for participatory democracy even in areas normally thought of as bureaucratic, administrative, or technical. In the course of that discussion, we also explore ways in which the complexity of the challenges and the array of stakeholders could be better reflected in the institutional arrangements that bring stakeholders together to deliberate. We then suggest how ecosystems-based approaches can guide a process of discovering, constructing, and implementing new or substantially renovated

institutional arrangements that will avoid some of the failures that have already been witnessed in the region. These failures that are likely to become more frequent as oil and gas development go forward if institutions for participatory management are not strengthened.

Because the problems examined in this chapter are of relatively recent origin, we cannot propose specific recommendations for institutional strengthening. But we can offer ways of looking at the institutional challenges of governing a changing arctic offshore and suggest how lessons from management regimes in other regions may apply.

Background

Due to their unique characteristics, the Chukchi and Beaufort Seas have escaped many, though not all, of the problems encountered in more temperate seas (MMS 2008). For most of the twentieth century, multiyear sea ice provided a barrier to significant industrial activity in the Arctic Ocean (Rayfuse 2007). As the open water period available to industrial use increases (Walsh 2008), new users are expected to follow. Significant and emerging challenges include climate change and the restructuring of seasonal sea ice habitats, ocean acidification, growing marine traffic, and the prevention of oil spills in a challenging operating environment (ACIA 2004; AMSA 2009).

For thousands of years, the Beaufort and Chukchi Seas served as the near-exclusive hunting preserve for the Iñupiat. There is no tradition here of multiple user groups coexisting. The introduction of new stakeholders—currently oil and gas interests, with shipping, fishing, and tourism in the offing—not only creates the potential for conflict but also taxes existing management and regulatory institutions and raises concerns about the long-term viability of the arctic marine ecosystem. Existing management authorities have now reached the limits of their abilities to effectively include all stakeholders, and important regulatory and management decisions have become increasingly contentious. While the courts provide a last resort for stakeholders who feel they have been excluded from decision making over oil and gas exploration and leasing, resort to legal challenges represents a regulatory failure that is expensive and suboptimal for all stakeholders.

As in other parts of the United States, many human uses of the Alaska marine environment are governed by a patchwork of rules stemming from various sectors of federal, state, and local governments. Orderly development of new and existing multiple human uses in the Chukchi and Beaufort Seas will require new governance, policy, and management tools. Prominent marine scientists have advocated reform centered on ecosystem-based management (McLeod et al. 2005). Young

et al. (2007) recommend place-based management arrangements that encompass integrated management of all human uses of the marine environment occurring in spatially delineated areas identified through a public process, taking into account biophysical, socioeconomic, and jurisdictional considerations. Jurisdictions around the world have begun to experiment with ocean governance and management tools designed to foster compatible, sustainable uses of the seascape.

In an earlier paper (Haley et al. 2009), we describe in detail the current institutions for stakeholder participation and conflict resolution in oil and gas management. Here we explain why innovations in ocean governance incorporating principles of ecosystem-based management, participatory democracy, and complex systems should be given serious consideration for their ability to protect ocean resources and manage conflict.

Social-Ecological Complexity in Arctic Alaska

For millennia the Iñupiat have sustained themselves in a harsh environment by hunting and gathering marine mammals, birds, fish, and vegetation. Observing this long social-ecological history, Dasmann has called the Iñupiat an "ecosystem people" because of their deep connections to and dependence on the local ecosystem for their survival and identity (Dasmann 1975). Change, from disturbances to the natural environment and contacts with other peoples, has been a regular feature of that history. But in the twentieth and twenty-first centuries western influence, especially since the discovery of oil in Prudhoe Bay, has added complexity and accelerated the rate of change. Broad environmental trends, including climate change, further complicate the situation in ways that are both fundamental and immediate (Chapin et al. 2009).

These changes challenge the capacity of existing institutional resources. To remain effective, institutions need to account for increasingly complex and dynamic social and ecological relationships and facilitate working relationships across multiple levels of governance and among increasingly diverse sets of stakeholders (Berkes and Folke 1998; Dale et al. 1998; Levin 1998). The challenges that are the subject of this chapter are relatively new to northern Alaska, but existing social science theory can guide the design of stronger, more effective governing institutions for Alaska's arctic offshore.

Participatory Democracy and Complex Systems

Our argument here is quite simply that complexity is the challenge, and democratization is the way to address it. Recent scholarship on the politics of ecosystem

management demonstrates the benefits of participatory and deliberative methods of decision making for finding equitable solutions to conflicts over natural resources; but there is still room for argument over the best ways to design democratic institutions. Although those arguments cannot be settled here, by using complexity and democratic theories we can elaborate a set of principles for effective management of complex social-ecological systems for Arctic Alaska.

In Table 6.6.1, we list general criteria for building institutions that are both efficient and effective in dynamic, complex social-ecological systems (Farrell 2004; Rosenberg 2007). These guidelines address three issues at the heart of democratic decision making: (1) "Representation" addresses the fundamental political questions of who participates, how, and how effectively; (2) "Institutional design" relates to the search for processes capable of responding to changing relationships among stakeholders and the challenges of simultaneously addressing local, national, and international concerns; (3) "Problem articulation" refers to the need to comprehend the different ways that stakeholders perceive what is at stake for them and the different ways they communicate and pursue their interests.

Table 6.6.1: Requisite capabilities of democratic institutions for managing complex, adaptive social-ecological systems.

Representation
- Provide multiple and open-ended methods of stakeholder (self-)identification and inclusion.
- Continually assess and compensate for the obstacles that formal and informal venues place on the full participation of particular groups of stakeholders.

Institutional design
- Accommodate diverse identities, interests, and discourses.
- Access multiple modes of communication and problem solving.
- Address multiple levels of policymaking, including interdependencies among institutions and organizations.
- Be receptive to multiple sources and types of information.
- Recognize the impossibility of complete and final resolutions.
- Accept the inevitability of conflict.
- Create capacity to contend with additional perturbations, shocks, and issues that will result from the impacts of global change.

Problem articulation
- Recognize a multiplicity of problems emanating from the same source.
- Address the underlying sources of conflict while addressing specific disagreements.
- Gather, exchange, and communicate knowledge of the worldviews and histories of participants and apply them to institutional processes and design.

Participatory and Deliberative Democracy

When environmental management became a global concern in the 1960s and 1970s, governments relied mainly on regulations made at the national level and "top-down" enforcement by newly created regulatory agencies such as the US Environmental Protection Agency. Academics and practitioners have since learned the value of supplementing or replacing these methods with participatory and "bottom-up" approaches. Recent research shows that when stakeholders' interests are taken into consideration and their identities respected by policymakers and regulators, they are more likely to trust and cooperate with management institutions. Compliance with environmental regulations goes up and the costs of enforcement go down. Without trust and "buy-in," stakeholders are more likely to ignore, resist, challenge, or actively undermine the efforts of even the best-intentioned resource managers. Therefore, effective resource management requires institutions that provide effective venues for stakeholder participation to convert the separate interests of disparate groups into a set of shared goals and values (Ager et al., 2005; Janicke 1996; Lipschutz 1996). Broadly speaking, this requires the democratization of policy implementation as well as policymaking.

For managing ecosystems, however, formal democratic institutions and processes—such as elections, legislatures, interest groups, political parties, and the rule of law—may be necessary. However, these will not be sufficient to ensure sustainability, even in established democracies such as the United States and Canada (Janicke 1996). New, more flexible, and innovative institutional arrangements are needed to (1) provide more substantive and reliable opportunities for stakeholders to have direct input into the decisions that affect them; (2) give stakeholders opportunities to influence the ways that decisions are made; (3) create multiple mechanisms for reaching compromises and ameliorating conflict; (4) enhance capacity for recognizing and correcting errors in both decisions and decision-making processes as they occur; (5) identify and include additional stakeholders as well as prepare stakeholders of different backgrounds, cultures, and educational levels for constructive interaction; and (6) provide stakeholders and the general public with timely and reliable information (Chambers 1993, 1995; Rosenberg 2007).

Complexity and Democratic Institutions

In global systems, political issues generally manifest themselves at one or more of three levels: the international (or global), national, and local. Traditionally, formal institutions such as governments, international organizations, and nongovernmental organizations—in their attempts to make, implement, or influence

policy—focus their efforts on only one of those levels. The requirements of environmental management, however, will usually span all three, especially when an ecosystems management approach is required.

For institutions that need to bridge multiple levels, complexity theory offers some general guidance. Complexity helps us understand why conventional approaches to democracy are unlikely to be sufficient, why even the most carefully designed institutions obsolesce quickly with changing circumstances, and what might be done about it.

Conventional legislative and administrative responses to resource management problems reduce complex issues to lists of discreet problems that can be parceled out to experts in specialized agencies. (See our discussion of the limits of sectoral approaches below.) For efficiency's sake, agencies develop standard operating procedures that may work well for a while but will eventually limit their ability to respond to new stakeholders, changing interests, and problems that spill over into the jurisdictions of other agencies and other levels of governance. When institutions become rigidly attached to standard operating procedures, even small changes in their working environments can present huge challenges to their continued effectiveness. Such changes can originate in any of the many social or natural subsystems that make up complex ecosystems. Examples of these changes include the introduction of new economic activities, small movements in the human population, variations in wildlife populations, slight rises in water temperature, or slight declines in air quality. In complexity and chaos theories, the problem is illustrated by the classic metaphor of a butterfly's beating wings disturbing distant weather systems in ways that change local climate and overwhelm the institutions that measure, predict, and respond to weather-related events. But whereas in complex natural systems, the perturbation can be traced to the initial states that lead to a kind of chain reaction, in complex social systems the potential points of origin are several and difficult to isolate. Therefore, to maintain their effectiveness, institutions hoping to manage the effects of socioeconomic as well as natural perturbations must be willing to constantly reevaluate and adjust their own procedures, internal hierarchies, and relationships with other actors (Byrne 1998:18–19).

Managing complexity presents powerful challenges to democratic institutions, calling for radical and difficult-to-specify responses that may challenge the meanings and methods of democratic participation. We summarize these challenges as three problems of democratic governance: the *representation problem*, the *institutional design problem*, and the *issue articulation problem*.

The Representation Problem

Although participatory democratic theory explains why active participation by all stakeholders is important, it does not solve participation's most central problem: how to provide effective and *equitable* representation for all. Representation is multidimensional. It is not simply a matter of finding the right numbers and proportions of stakeholders and giving them a place at the table. Representation also requires an evolving set of political processes capable of accommodating different styles of deliberation, knowledge systems, and skill sets. It requires venues for decision making that are accessible (physically and culturally) to all stakeholders.

Unequal representation is a political problem and therefore a problem of the distribution of power. The complex scientific and administrative challenges presented by ecosystems management have historically led to a concentration of power in the hands of "experts" (scientific, economic, and administrative) whose methods of deliberating and communicating information can be incomprehensible to other stakeholders. Their work is often carried out in locations that are physically or culturally inaccessible to the stakeholders most directly affected by the policies they make. When "non-expert" stakeholders feel excluded, they may question the legitimacy of "expert" findings, policy recommendations, and institutions. Such "legitimacy gaps" lead to various forms of active or passive resistance on the part of the stakeholders whose cooperation is essential to effective governance.

Legitimacy gaps can be bridged by institutions that make a place for the excluded stakeholders and empower them by valuing their knowledge, skills, ways of knowing, and interests (Farrell 2004:472). Furthermore, participation cannot begin or end with a voice in reforming current policies. New or reformed institutions should allow all stakeholders to participate directly in all aspects of policymaking and implementation from the design of new participatory processes, to the making of policy, to the oversight and evaluation of management plans. Institutional flexibility is also essential. Complexity means that change is constant in ecological, social, and political relationships; policy and regulatory failure is inevitable (over the short run); and most actions have unintended and unanticipated consequences. To remain relevant and viable, institutions must remain representative by constantly responding and adjusting to unexpected changes (Little 2008:24).

The Institutional Design Problem

The ability of all stakeholders to comprehend, communicate, and act on information is critical to effective democratic institutions. There is a natural affinity between complexity and democracy because knowledge about complex problems is broadly distributed among stakeholders, and no single group will, by itself, comprehend "the whole truth" (Farrell 2004:475).

Democracy is undermined by what economists call "asymmetric informa-tion"—the unequal access among stakeholders to the information they need to pursue their interests—which can create or reinforce asymmetries of power within institutions. Knowledge may be power, but only if that knowledge influences po-litical decisions that affect one's interests. In remote and culturally distinct regions such as Arctic Alaska, local stakeholders can be severely disadvantaged by asym-metries of information. A privileged place is given to western scientific knowledge and national economic interests in managing arctic resources. This information asymmetry locates power in an alien world of "experts" working in governmental agencies and faraway corporate headquarters. While some such institutions have democratized over time, debate within them is mainly over contending views with-in scientific communities (Farrell 2004:472–473), and the perspectives of "non-expert" stakeholders are undervalued, overlooked, or actively excluded. Therefore, even institutions that invite the formal participation of local stakeholders can still be quite hierarchical.

To fully embrace complexity, institutions need to flatten hierarchies among different types of stakeholders by putting all sources and types of information on equal footing. That will not be easy to do since, as "expert" institutions, these hierar-chies have been built into the institutions from their beginnings. Therefore, institu-tional strengthening begins not by convening experts to tinker with the organiza-tional structures of existing institutions but by establishing new, original, and open processes for collecting and translating the different "storylines" of stakeholders who use a wide array of methods for gathering and communicating information.

Problem Articulation

Different stakeholders may believe that they are addressing the same issue, but they experience the problems and opportunities of ecosystems management quite dif-ferently. For example, to some stakeholders, an environmental problem will present itself as a management problem; to others a technical problem; to others a matter of social, cultural, or ethnic discrimination or a recent manifestation of a historical wrong; to others an economic asset or liability; to others a conflict between "mod-ern" and "traditional" uses of knowledge and resources; and to others a problem of intergovernmental or international relations. Conventional institutional arrange-ments are usually limited, by design and mandate, to recognizing and addressing only one facet of a complex problem.

Complexity theorists use the concept "path dependence" to explain problems that arise from the different ways that stakeholders articulate a problem and the limitations of conventional institutions. Path dependence means that the historical experiences and "storylines" of stakeholders shape their customary approaches to

problem articulation and problem solving. Different stakeholders will give different meanings and priorities to the same items on an organization's agenda. The challenge to institutions is to find ways to help stakeholders see their different articulations as facets of the same problem. This is a capacity that few specialized institutions possess. Institutions must learn to embrace uncertainty and accept rather than simplify complexity. As Little (2008) points out, "political actors are never dealing with a settled, static set of issues on which other actors concur" and "political attempts to deal with or resolve contentious issues are never complete (p.24–25)." Problem-solving activities can provide remedies for a time, but they should not be expected to produce final solutions. In other words, change is constant, conflict is inevitable, and all solutions are temporary. Therefore, democratic approaches must solve the problem of problem articulation by providing multiple ways of addressing the underlying causes of conflict among stakeholders; they will need the flexibility to adjust their processes as conditions, actors, and interests change.

Institution-building for the Alaska Arctic offshore that follows the precepts of participatory democracy and complexity theory will be more an act of discovery than an act of creation. Recommendations for institutional design that come from complexity approaches are purposely vague. Essentially they are as follows: (1) Do whatever it takes to redistribute power in ways that will allow "ecosystem peoples" to articulate and pursue their interests in a constantly shifting landscape of institutions, processes, and stakeholders. (2) Recognize that the "truth" is distributed across multiple levels and stakeholders, and that each fragment or version of the truth must be included in problem identification and articulation *before* it can be represented effectively in problem solving.

Special Challenges and Opportunities

In the recent Norwegian Polar Institute report "Best Practices in Ecosystem-Based Management in the Arctic," a range of special considerations for the Alaska Arctic offshore region are identified. These considerations reflect the complexity of existing management and social structures and the special characteristics of the natural and human environments, including "ice-covered waters, trans-boundary cooperation, fisheries management, exploitation of petroleum under severe climatic conditions, long-range transport of pollutants, indigenous communities, socio-economic growth and sustainability issues, and the impacts of climate change" (Håkon Hoel 2009:8). In addition, Hopcroft et al. (2008) issued a comprehensive report outlining data gaps for this entire region, and a 2009 joint report of the Department of the Interior Minerals Management Service and the US Geological Survey also identified data gaps for the Outer Continental Shelf (USDOI 2009). These reports

highlight the need for greatly improved data collection, management, and distribution for the Arctic. Fortunately, there is a high level of interest among arctic stakeholders in collaboration around data needs. For example, in 2009 the Alaska Ocean Observing System and the North Pacific Research Board spearheaded this effort with an Arctic Research and Monitoring Workshop aimed at promoting collaboration between various groups involved in marine research in the region.

The arctic ecosystem is also unique in the extensive and distinctive place-based knowledge of subsistence users. The knowledge of subsistence communities will be a key part of filling data gaps for the Arctic. It will be especially important for meeting the need for finer scale data to inform decisions about access to resources and areas within the region that may have multiple and competing uses and could be generate conflict among stakeholders. This "human dimension" of planning processes, while widely acknowledged to be a critical part of any institutional analysis of the resource management problems, is unfortunately also often the largest data gap (Douvere and Ehler 2008). Resource management institutions need to be innovative, boundary-crossing, and holistic. But even those that embrace the rhetoric of participatory and holistic approaches will fall short if they do not make subsistence users and local communities key participants in defining and implementing meaningful goals and methods of governance.

Ironically, perhaps, in addressing the three problems of democratic resource management outlined above, the underrepresented may need to be "overrepresented" at least for a time. National economic interests may favor the aggressive pursuit of new energy sources in the Alaska Arctic and elsewhere. And, to the extent elected federal and state officials represent a majority of the citizenry, it may be argued that that position was arrived at democratically. But it is undemocratic in the sense discussed if the decision process did not involve a full consideration of the uniqueness of the ecosystem and the relative costs of development to different groups of stakeholders. In other words, participatory democracy demands that a position be based on a full and equitable hearing of everyone's account of what is at stake.

For cultural, legal, historic, and geographic reasons, the close relationship between indigenous peoples and the ecosystems they are coupled to warrants the recognition of special status within a governance regime. Local actors, embedded in the system that is to be governed, have the greatest stake in the outcomes of the policy process (Stringer et al. 2006). Environmental policymaking in the United States has a long history of protecting minority or "disproportionately affected" populations from government action through environmental justice provisions. The special interests of indigenous peoples in the United States are to be protected by the trust relationship between their governments and the federal government as defined through treaties, legal precedents, policy directives, and public law (Case 2002). Furthermore, "ecosystem peoples" such as the Iñupiat have local ecological

expertise that is a valuable complement to western scientific knowledge for hazard assessment and management decisions, particularly where the scientific data are sparse to nonexistent (Eicken et al., Chapter 7.5, this volume). Another distinctive feature in the present case is that under the Alaska Constitution, home-rule governments such as the (Iñupiaq majority) North Slope Borough have primary jurisdiction over all planning and regulatory matters not preempted by state law. The North Slope Borough Wildlife Department has, over the last thirty years, built up incomparable scientific expertise on the wildlife and ecosystems of the Beaufort and Chukchi Seas to inform management decision making in the region.

Ecosystem-Based Management

A new, more directly democratic institutional design must simultaneously address complexity in the ocean ecosystem.

The concept of ecosystem-based management has received increasing attention in the past several years as the need to move beyond conventional sector-by-sector management has become more apparent (McLeod and Leslie 2009). This is not because sectoral management is inappropriate. Rather, it is because it is insufficient to meet current challenges presented by human activities and the long-term sustainability of healthy marine ecosystems, including the human communities that depend on those healthy ecosystems.

Sectoral management is characterized by setting goals for a single, sometimes complex, sector of human activity such as fisheries, transportation, or energy and then developing management plans for the set of activities within the sector. Impacts on the environment broadly or conflicts with other sectors are dealt with as adjuncts to the principle goals for the sector itself. For example, energy management plans have primary goals with regard to energy production, fisheries management for sustainable fisheries production, and so forth. Conflicts may be considered by the managing agency in the context of broad environmental assessments such as under the National Environmental Policy Act (NEPA), or addressed politically based on an implicit tradeoff between the sectors. So, if energy infrastructure or operations conflict with fishery production, there is no clear mechanism for resolving the conflict because each sector is managed under a separate mandate. The overarching statutes such as NEPA do not give guidance or clear standards for resolving conflicts among sectoral agencies. It is not clear that sectoral management can deal with the cumulative impacts of multiple human activities affecting a marine ecosystem.

Ecosystem-based management (EBM) calls for an overall framework for management planning and decision making that is cross-sectoral. First and foremost,

the goal for an EBM approach to management is conserving and maintaining a marine ecosystem in a healthy, resilient condition such that it can provide a full suite of ecosystem services to support human well-being (McLeod et al. 2005). The services that support human societies have been categorized (Millenium Ecosystem Assessment 2005) as provisioning services (e.g., food, water), supporting services (e.g., biodiversity), regulating services (e.g., climate regulation), and cultural services (e.g., traditional uses). A full suite of services includes all of these, though sectoral management plans tend to focus mostly on provisioning services. In an EBM approach, maintaining the capacity of the ecosystem to provide these services now and in the future includes the concept of sustainability inherently.

Focusing attention for management planning on an ecosystem scale, as opposed to traditional jurisdictional boundaries, enables consideration of the positive and negative interactions of different sectors of human activities within an ecosystem and cumulative impacts of those activities on the health and resilience of the system. This is particularly important because cumulative impacts may not be additive, but multiplicative or have threshold effects triggering a radical system change (Halpern et al. 2007). In a sector-by-sector approach, the impacts of one sector on another are only considered implicitly and resolved politically without full information and often at a great distance from place-bound stakeholders. In an EBM approach, tradeoffs between sectors must be explicit and clearly evaluated. Ecosystem-based management is inherently interactive with stakeholders. It is iterative, rather than a stand-alone scientific advisory process. Typical management decisions and activities such as setting of goals, choosing ecosystem boundaries, prioritizing services and features, scenario modeling, and valuation all need ongoing stakeholder input to bring information to the table, give perspective on options, and to continually test policy solutions in a real-world context. As new information becomes available, the EBM process must continue to adapt.

Approaches to Ocean Governance

How, then, do we move from an interesting theoretical puzzle to institutions that embrace complexity, rectify historical inequities, and formulate policies that will reflect the range and intensity of stakeholder preferences?

Orderly development of new and existing multiple human uses in the Chukchi and Beaufort Seas will require new governance, policy, and management tools to better understand sources of and methods for addressing conflict and fostering ocean ecosystem resilience. There are many conventional approaches that would strengthen local stakeholder involvement and potentially reduce conflict. These approaches include strengthening local powers under the Alaska Coastal Zone

Management Act (CZMA), expanding co-management, establishing a regional citizens' advisory council, or establishing marine protected areas. However, the task of managing multiple, sometimes competing, uses in the ocean is more complex than these available tools (Crowder et al. 2006). More comprehensive approaches in other US and foreign jurisdictions include integrated oceans management, marine spatial planning, or ocean governance (Crowder et al. 2006; Rutherford et al. 2005; Young et al. 2007). Similar to the CZMA, ocean governance would not replace existing institutions (e.g., for oil and gas development, fisheries, marine mammal conservation, shipping, etc.) but would overlay a process of determining where compatible uses could occur. It would then design monitoring programs to manage for or against particular ecosystem thresholds (Crowder et al. 2006), such as a particular noise level or a level of disturbance to subsistence activities.

Initiatives at the federal, state, local, and international levels are converging to promote new institutions for ocean governance. In a memorandum dated June 12, 2009, President Obama established the Ocean Policy Task Force with a mandate to develop ocean policy recommendations, stating, "To succeed in protecting the oceans, coasts, and Great Lakes, the United States needs to act within a unifying framework under a clear national policy, including a comprehensive ecosystem-based framework for the long-term conservation and use of our resources" (Obama 2009). The task force recommended the following strategies to implement this policy vision (CEQ 2009a):

- Adopt ecosystem-based management as a foundational principle for the comprehensive management of marine and coastal environments.
- Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management.
- Increase knowledge to continually inform and improve management and policy decisions as well as the capacity to respond to change and challenges; better educate the public about the marine environment.
- Better coordinate and support federal, state, tribal, local, and regional management of the marine environment; improve coordination and integration across the federal government and, potentially, the international community.
- Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.

Among the stated goals and principles are reducing user conflicts, streamlining regulatory processes, and increasing certainty for new investments, with commitment to adaptive and flexible ecosystem-based management and to stakeholder

engagement. The planning process would be implemented by nine or more regional bodies (corresponding to defined large marine ecosystems) composed of states and federally recognized tribes, including Alaska Native villages (CEQ 2009b). It remains to be seen how this might be implemented in the Alaska Arctic.

Some states did not wait for federal leadership. Several coastal states have been building constituencies for ocean policy, outlining visions, and initiating plans prior to federal policy development. Massachusetts developed an ocean management task force in 2003, charged with developing recommendations for managing human uses of the ocean. This effort created a foundation for initial studies and planning activities, which then led to a comprehensive policy, the Oceans Act of 2008. The Oceans Act required the Massachusetts secretary of energy and environmental affairs to develop a comprehensive plan to manage human uses of the marine environment in state waters through the state's Office of Coastal Zone Management. The act also required the state to develop the plan through a scientific and stakeholder process. To that end, as of August 2009, Massachusetts has held a series of public hearings, created an Ocean Advisory Commission made up of government agencies and select stakeholders and advised by an Ocean Science Advisory Council with expertise in marine sciences and data management. The state has also completed a draft management plan and convened two public workshops to gain feedback on the plan (Massachusetts 2009).

Structurally, the Oceans Act did not change the jurisdiction of the state's Division of Marine Fisheries to alter fisheries policy but instead allows the state to plan other uses for their compatibility with fishing and vice versa. The act also builds on the state's Ocean Sanctuaries Act, in that the ocean management plan is aided through the authority of the state to delineate marine protected areas. Ehler and Douevre (2009a) note that most marine spatial management initiatives begin with new authorities for planning but implement the new ocean plan through existing authorities and offices, such as the state coastal zone management program.

The Environmental Law Institute (2008) has begun to explore the role of existing stakeholder bodies in promoting ecosystem-based ocean management, building on their significant local expertise. In particular, it has considered the role of federally chartered marine mammal co-management groups such as the Alaska Eskimo Whaling Commission.

Several regions in North America and around the world have developed trans-boundary planning or governance entities to aid in marine spatial management. The Gulf of Maine Council on the Marine Environment was established in 1989 by regional governments linking the coasts and people of Nova Scotia, New Brunswick, Maine, New Hampshire, and Massachusetts. The council was established as a regional forum to exchange information and engage in long-term planning. Recent activities include the development of an action plan for 2007 to 2012,

a partnership to further the use of ecosystem indicators, and a habitats mapping exercise (GMCME 2009). The council does not implement ocean management plans but serves as a site of social learning and collective action to inform planning and managing within jurisdictions.

In the eastern Beaufort along the coasts of the Yukon and Northwest Territories, the Canadian government, territorial governments, and the Inuvialuit have built upon co-management institutions designed in the 1984 Inuvialuit Final Agreement (IFA) to govern resource development while protecting the environment and subsistence cultures. The co-management structures have enabled the development of a multi-stakeholder process for marine spatial planning within the Canadian portion of the Beaufort Sea, called the Beaufort Sea Integrated Management Planning Initiative. Parties to the initiative include the Fisheries Joint Management Committee, the Inuvialuit Game Council, the Inuvialuit Regional Corporation, Fisheries and Oceans Canada, Indian and Northern Affairs Canada, and the Canadian Association of Petroleum Producers.

An earlier model for holistic, ecosystem-based management is the Integrated Management of the Marine Environment of the Barents Sea and Sea Areas off the Loften Island plan adopted by the Norwegian Ministry of Environment in 2006. The plan sets forth an overall framework for both existing and new activities (IMMEBS 2010).

The cases referenced above, and complementary technical efforts such as marine spatial planning and ocean zoning, deserve further study. In each of these approaches, we see movement toward addressing the three core problems of governance in complex systems: representation, institutional design, and problem articulation. These approaches show potential to compensate for some of the weakness of existing institutions, but it remains to be seen whether they can provide the adaptation to rapidly changing conditions and a multiplicity of interests demanded by arctic offshore ecosystems. The tenets of complexity theory and participatory democracy suggest that each institutional arrangement should be uniquely designed and highly responsive to changes within its particular environment. It should not be expected that these examples will provide ready-made templates for institutional strengthening in the Alaska Arctic offshore. However, they may help answer some of the basic questions that still need to be explored: To what extent can reform of existing institutions at the local and/or regional levels correct problems of efficacy in managing complex marine social-ecological systems? What can the creation of new institutions meant to overlay or complement existing institutions contribute? What is the relationship between particular approaches to institutional (re)design and more effective and equitable inclusion of place-bound stakeholders? Can a greater emphasis on the interests of local stakeholders be sustained against

pressures coming from stakeholders with conflicting goals and their own claims to democratically obtained legitimate authority over offshore resources?

Conclusion

There is no silver bullet to resolve the longstanding conflicts over the scope, timing, and terms of development for offshore oil and gas in Arctic Alaska. But strengthening institutions for local involvement in marine resource planning and governance may help. Instituting an ecosystem approach in planning and governance will also help to protect Arctic Ocean resources and resilience in an era of rapid change and uncertainty. The Environmental Law Institute recently assessed the feasibility of developing a marine ecosystem-based management (EBM) program in Arctic Alaska (Mengerink et al. 2009). It concluded that the Beaufort and Chukchi Seas were the best place to start, and that targeted education and outreach are the necessary first steps toward building the requisite constituent support.

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