

OCEAN WILDERNESS IN THEORY AND PRACTICE

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DOCTOR OF PHILOSOPHY

By

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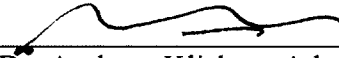
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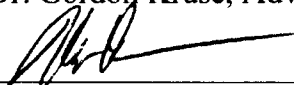
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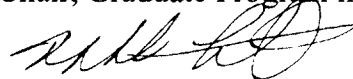


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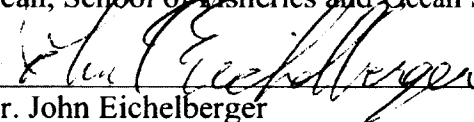


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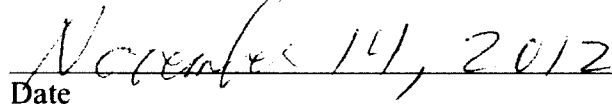
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Abstract

Wilderness preservation has been an important focus of resource conservation since the dwindling number of wild places was perceived by some as losing a valued part of our collective natural and cultural heritage. While wilderness preservation efforts have been almost entirely focused on the land, recently there has been growing interest in “ocean wilderness.” However, implementation has been constrained by the lack of a common vision of how “wilderness” is applied to the ocean, and how such areas should be managed and preserved. The purpose of this work was to identify and evaluate potential definitions of ocean wilderness and the values and qualities such areas possess, and to determine how they might be effectively identified and managed to preserve their wilderness character.

This research focused on articulating a robust definition for “wilderness waters,” within the context of how wilderness is currently conceived and articulated in law and policy, as well as evaluating how such areas might be most appropriately identified and managed. Extensive inventories were conducted of existing ocean wilderness areas, focused on North America, to determine what currently exists, how these areas are managed, and how future ocean wilderness designations should be prioritized. A survey was conducted, targeting resource managers and scientists, to identify preferences and perceptions of ocean wilderness and its potential stewardship. The survey results suggested that coastal waters possessed considerable values and qualities of wilderness, particularly areas adjacent to existing designated wilderness, that certain human uses might be appropriately permitted, and that there was much support for expanding the area of coastal waters designated as wilderness. The research also suggested that the North American Arctic might offer many opportunities for preserving ocean wilderness, in close collaboration with the Indigenous communities in this region. A number of recommendations were offered including that priority should be given to evaluating and designating areas adjacent to designated coastal wilderness areas, that the existing legal and policy framework in North America can be effectively used to expand the

“wilderness waters” system, and that more work needs to be done to build the constituencies of support essential to accomplish this task.

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Chapter 1 Ocean Wilderness – Introduction

“The ocean is a wilderness reaching around the globe, wilder than a Bengal jungle, and fuller of monsters ...”

Henry David Thoreau, *Cape Cod* (1865)

1.1 The Challenges Surrounding Ocean Wilderness

New ideas are rarely embraced easily. This seems particularly true when they diverge from what we, as a society, believe to be right and true, and especially – perhaps counter-intuitively – when the original idea is subject to broad interpretation. It requires a good deal of effort over time to arrive at a consensus on how that idea is defined and articulated, how it is interpreted and what appropriate actions are to be taken when that idea is translated into action. We become comfortable with the idea as we build societal constructs around the accepted interpretation. Conventions are established and institutions are constructed on the foundation of that interpretation. Within the realm of science, Kuhn (1962) termed such widely accepted and deeply held interpretations as “paradigms.” He held that “paradigm shifts,” which involve new ideas that challenge accepted wisdom, are not easily achieved. The conceptualization of wilderness as something that is found only on land is an example, in the Kuhnian model, of an “exemplar,” which he defined as “tacit knowledge acquired through practice.” It is a concept or idea learned through the study of science, not through learning and applying the rules by which science is conducted nor by the personal acquisition of empirical evidence. Exemplars are presumed to be true because we learn them as undeniable truths.

The notion that “wilderness” could be applied to ocean and coastal waters¹ is hardly a “new idea;” it was evoked by Thoreau in 1865 and has been actively discussed and advocated within the conservation community since the late 1950s. However, the

¹ Here, and throughout this dissertation, “ocean and coastal waters” is defined as areas of tidally-influenced marine waters from the shoreline to the open ocean. “Ocean wilderness” and “wilderness waters” are used interchangeably to mean areas of ocean and coastal waters formally protected as wilderness under law or policy.

idea of ocean wilderness has come and gone many times since this idea was originally proposed. Part of the reason why acceptance remains elusive is that the idea of wilderness tends to be firmly grounded on land. Yet, the ocean may be equally or perhaps even more mysterious and vast as the land areas we call “wilderness.” It may contain, as nature cinematographer Doug Peacock described wilderness, “something bigger and meaner than you are—something that can kill you” (Foreman 2000). As Nash (2001) so eloquently articulated, “a wilderness can be at once inhospitable, alien, mysterious, and threatening, as well as beautiful, friendly, and capable of elevating and delighting us.” Nash’s description could equally apply to land or ocean, but the history of the wilderness idea makes no such accommodation. The conception of wilderness embraced for this research has been put forward by Hendee and Dawson (2002); “wilderness is what we (as a society) think it is.” This definition comes with a formidable challenge, which is to figure out who “we” are, and what we are perceiving it to be.

Another element contributing to this punctuated history of ocean wilderness is the invisible, yet seemingly impenetrable, wall that many, if not most, humans seem to have constructed between land and sea. Land is familiar, visible, and where we live and work. The sea is a foreign territory, a place we cannot visit without some form of technology to sustain us, whether a boat or a scuba tank. We must even learn a new behavior – “swimming” – in order to survive our more intimate encounters with the sea, where the submerged land beyond the shore is too deep to stand. This behavior can only allow us to visit as long as we have the energy to sustain it.

Tuddenham (2010) has suggested that trying to separate land and sea within a cultural context is difficult, strengthening this invisible wall. However, many other organisms that live and thrive along the shorelines appear not to perceive this line of demarcation between land and sea. Seals and sea lions come to the land to warm in the sun, breed and to rear their young, going back to sea to find food when it is required. Seabirds nest on rocky cliffs above the sea, but abandon this temporary land-bound residence and return to the sea for foraging bouts and when their chicks have fledged. For humans, however, the invisible wall between land and sea seems impossible to scale,

even conceptually. It is not perceived in the same way as the boundary between meadow and forest, or even between the flowing waters of a river and its banks, as just another “ecotone” or place where two types of ecosystem come together.

The history of wilderness preservation, particularly in North America, also contributes to the challenge of expanding the idea of wilderness to include ocean and coastal waters. Early wilderness conservation efforts, led by intellectuals, writers, and conservationists from the eastern United States (US) who experienced the loss of wilderness in the “civilized” east, targeted the vast western lands as places where some of these still-wild areas, what remained of the “frontier,” could be preserved. During this early period of the wilderness preservation movement, the oceans were generally not considered places that needed preserving, as they were perceived as vast and boundless with unlimited resources. So, the institutions created to preserve wilderness were conceived and constructed for preserving land areas. When it became more evident that ocean conservation and management was necessary to protect valued resources, the institutions and conventions established to preserve wilderness were firmly entrenched in the terrestrial world, and it was difficult to even conceive of the application of “wilderness” to ocean and coastal waters. Given the land-centric nature of our collective concept of wilderness, it is no surprise that the history of ocean wilderness has been slow to develop and punctuated by many periods of seeming disinterest in the idea by the wilderness community.

There are likely many other reasons why shifting the paradigm of wilderness to include ocean and coastal waters has been so difficult, but one additional issue is particularly relevant to this treatise. While the idea of ocean wilderness had been proposed by conservationists a number of times in the 1950s and 1960s, in the late 1990s through around 2002, there was yet another rediscovery of the idea of ocean wilderness by the ocean conservation community. This was a time when the idea of the establishment of additional fully-protected marine reserves was coming into vogue with environmental advocacy groups. There were, and are, many sound and scientifically robust reasons why marine reserves are useful and appropriate tools to improve the

efficacy of ocean conservation. However, one approach these advocacy groups adopted to sell the idea of fully-protected marine reserves to the public, and particularly to some stakeholder groups who may not be inclined to support the idea, was to begin to call these areas “wilderness.” The strategy recognized the public’s deep, almost visceral, connection to their heritage of wilderness and sought to align marine reserves with wilderness to help promote the idea. This strategy was embodied in such initiatives as the Ocean Conservancy’s “Ocean Wilderness Challenge” (Rufe 2001).

Almost immediately, significant problems were encountered. The first was that the wilderness advocacy groups who toiled for many decades building the relatively strong public constituency of support for more “traditional” wilderness (i.e. on land) expressed strong opposition to this strategy promoted by their counterparts in the ocean conservation community. Those, who were long invested in the “traditional wilderness idea,” who had overcome great opposition and prevailed in the passage of the Wilderness Act of 1964 and had achieved much in the subsequent building of the National Wilderness Preservation System, were not prepared to accept the expansion of the wilderness concept to include ocean wilderness. The identification and establishment of marine reserves, and indeed all marine protected areas, is a process fraught with controversy and brings to the table politically powerful and well-funded constituencies of opposition. Given that establishment of wilderness is also inherently contentious, the likelihood of adding a new layer of controversy, and powerful opponents that come with it, into the debates regarding all wilderness was daunting to say the least. Clearly, it would be difficult, if not impossible, to make this strategy work without support of the traditional wilderness community.

Somewhat belatedly, presumably as a response to the rejection of the idea by the traditional wilderness community, the ocean conservation community began to assemble data on public perception of ocean as wilderness utilizing focus groups and surveys. While the results of these surveys were never publically released, they reportedly found that survey respondents were confused by the idea, not certain that the ocean could be “wilderness,” and generally expressed only limited support for the idea (David Festa,

National Marine Programs Director, Environmental Defense, pers. comm., 8 November 2004). Shortly thereafter, all content on environmental organizations' web pages and public documents related to ocean wilderness quietly disappeared. Whole partnership organizations formed around the idea of ocean wilderness were disbanded, and advocacy initiatives discontinued. Where marine protected area (MPA) management agencies had adopted the words "ocean" (or "marine") "wilderness" in descriptions of their protected areas in the web pages describing their sites, these references were removed as well. At this point, the ocean wilderness movement was a "flash in the pan," but an interesting one nonetheless. The "lessons learned" were very instructive.

The first "lesson learned" was that a robust definition was needed for "ocean wilderness." Fully-protected marine reserves could be wilderness, but they also might not be. They share many common goals, such as protection of the area in a natural state, set aside from active management, and may provide opportunities for appropriate recreation and solitude. However, marine reserves can be established in areas that are significantly affected by the influences of man's activities, in close proximity to development, and generally permit motorized access. They may protect wilderness values, but only incidentally, and they could prohibit certain activities, such as recreational fishing (commonly permitted in terrestrial wilderness) by virtue of their regulations prohibiting extractive activities. But wilderness also possesses intangible qualities difficult to quantify. There is a spiritual quality of wilderness that arises simply from its wilderness attributes. We care more about wilderness because of the rich tapestry of meaning that the term "wilderness" implies. It is connected to our history and heritage, a part of who we are as North Americans, and for some, it takes us back to a time long ago when self-reliance and survival were a real part of the "wilderness experience." It is these intangible qualities that make wilderness so compelling. To simply call something "wilderness" to make an area more attractive to the public cheapens the meaning. As the old Maine saying goes, "just because kittens are born in the oven doesn't make them biscuits."

There was no widely accepted definition for ocean wilderness nor any clear regulatory framework established for wilderness in ocean and coastal waters during this wave of interest in ocean wilderness at the beginning of the last decade. On land, the US Wilderness Act is reasonably explicit, or at least expresses clear intent, regarding which human uses are permissible and which should be prohibited. Building of structures, human habitation, motorized access, commercial activities are all generally prohibited, and appropriate recreational activities are allowed. Wilderness in ocean and coastal waters may require a different set of permitted and prohibited uses, particularly based on the practical realities of access (e.g. motorized access may be required in certain cases for safety reasons). Until such a definition and management framework can be objectively and robustly evaluated and adopted, “what it is” and how these areas should be managed remains an open question. There are many others.

Another “lesson learned” is that, if the idea is ultimately embraced, it will take time to carefully and effectively implement the expansion of the concept of wilderness to the oceans. This will almost certainly be an “evolution” rather than a “revolution.” Ultimately, the support of the terrestrial wilderness community would be essential. There would need to be a clear demonstration that the benefits of including more ocean wilderness in the National Wilderness Preservation System outweigh the costs. A successful strategy would likely involve finding ways to enhance support for wilderness both on the land and in the sea, to more seamlessly integrate these “wilderness waters” areas into the current wilderness system, and to avoid creating precedents that would potentially diminish opportunities for effective wilderness stewardship generally. More new constituencies of support than opponents would have to be brought to the table with proposals for ocean wilderness. Adopting transparent, inclusive, and science-based public policy processes to address these issues would be essential.

These events were the genesis of this research. The overarching goals of this work arise directly from these “lessons learned”:

- 1) To develop a robust definition that could be used as a basis for future discussions leading to a more broadly-adopted consensus definition;

- 2) To better understand and articulate an appropriate stewardship framework for areas defined as ocean wilderness that could effectively preserve wilderness values of the area;
- 3) To assess and evaluate the potential role of ocean wilderness in the context of MPA networks and systems, and;
- 4) To better understand the cultural dimensions of ocean wilderness, particularly as regards Indigenous peoples' perceptions of wilderness. Many Indigenous groups have long histories with areas defined as "wilderness," and could represent potential partners in identifying and co-managing future wilderness.

A detailed discussion of these research goals, and the underlying specific research questions that were used to guide this work, is provided in the following section.

In order to be successful in achieving these objectives, it is important to understand the context within which ocean wilderness could become a fully-functioning element of ocean conservation. One must understand the "niche" within which protected areas called "ocean wilderness" might function effectively and successfully contribute to conservation of ocean and coastal resources. The spatial, ecological, social and institutional systems into which ocean wilderness could be integrated operate at various scales and dimensions, and are indeed analogous to a kind of ecological niche space, which is defined in n -dimensions. Some may be based in the physical world, such as geography, but others are within a more socio-political context. Three are most relevant in the matter of ocean wilderness. The first of these is the wilderness context itself – that is, what are the foundations of the wilderness concept, its history and its political/policy framework? This is discussed in greater detail in the chapters to follow. Two other layers of context are also important, and relate to geographic and political or institutional systems. As discussed in Chapter 3, wilderness is something that has been defined and implemented in resource conservation programs throughout the world. It is useful and appropriate to understand this global context, particularly as it relates to how the term has been applied in cultures unlike our own. For the purposes of this discussion, however,

the focus of this treatment is the North American continent, arguably the place of origin of the modern wilderness preservation movement (Nash 2001) and widely considered global leaders in efforts to preserve wilderness. What happens in North America, for better or worse, tends to serve as a model for other similar programs around the world, but adapted to conform with the cultural norms and values of that country or region. Wilderness preservation programs in North America are part of larger and longstanding national protected areas systems. To potentially integrate ocean wilderness into these programs, it is essential to understand how these systems are structured and how they operate. Also, given that the existing wilderness management agencies in North America have currently only limited stewardship responsibilities for MPAs – being principally land management agencies – understanding the context of regional and national MPA systems in place in North America is also of some considerable significance. It is these MPA systems, as the primary authorities for ocean conservation and management, that may be the “best fit” for integration and expansion of ocean wilderness at a time in the future when we know more precisely what these areas are, and how they should be managed.

It is particularly the wilderness of the North, in the Arctic regions of North America, that could offer the greatest potential for implementing ocean wilderness. The Arctic is North America’s last frontier, and undeniably possesses superlative wilderness qualities. Vast and sparsely populated largely by maritime Indigenous cultures, isolated with a hostile and unforgiving environment, the Arctic is wilderness by any definition. It is perhaps the iconic wilderness. Unlike the Antarctic, which is a continent surrounded by oceans, the Arctic is a sea surrounded by coasts, where the ocean is far more the predominant feature. Importantly, it is also an area that is subject to very rapid environmental change as a result of global warming. Given the likelihood of increasing human use facilitated by reductions of sea ice cover, there is currently much interest in establishing protected areas to preserve the unique resources and qualities of the Arctic. Given the looming threats associated with climate change, it would seem reasonable to suggest that implementing a different type of marine protected area that has a focus on

preserving the wilderness qualities of such a place could present opportunities that may not be as clearly evident elsewhere. There are few protected areas in the Arctic, compared with other areas of the North American continent. Therefore, given the particular interest of the US and Canadian governments in the Arctic with regard to resource conservation and use, it seems to be an appropriate place upon which to focus this research.

Context is essential. It establishes the rules, standards and norms that are in effect, and must be understood and respected to successfully implement a new initiative, particularly one that challenges may preconceptions. As the Dali Lama offered in his “Eighteen Rules for Living” (<http://www.everydayminimalist.com/?p=3041>), “Learn the rules so you know how to break them properly.”

1.2 Study Objectives and Structure of the Dissertation

This study has four objectives considered essential to defining and operationalizing wilderness designations in ocean and coastal areas. Each of these objectives was further defined and articulated by posing a number of more specific research questions.

Objective 1: Develop a robust definition of ocean wilderness.

Research Questions:

- How has wilderness been defined and described in law and policy? Are there elements that could be described as “universal?” Which elements of these definitions are useful to expanding the idea of wilderness into coastal and ocean waters?
- What qualities might make an area “wilderness” in the marine realm and how might this be different than on land? What wilderness values are essential or important to preserves in ocean wilderness? Are there compatible uses of ocean wilderness, and if so, what are they?
- What is the legal and policy framework for designations of wilderness around the world and might these approaches inform the definition of

ocean wilderness?

Objective 2: Assess and evaluate the framework for existing wilderness waters management.

Research Questions:

- Which existing designated wilderness areas have wilderness waters included in the boundary, and how are those waters being managed?
- What might be an appropriate management framework for wilderness waters? Of particular importance, what types and extent of human use/impact would be consistent with an area's status as ocean wilderness? Are there use thresholds beyond which a site could not really be called "wilderness" and, does the different ownership framework for land versus ocean and coastal waters play a role in defining the appropriate management context?

Objective 3: Assess and evaluate the potential role of ocean wilderness in the context of MPA networks/systems.

Research Question:

- What opportunities and challenges are likely to arise as a result of expanding ocean wilderness designations for existing MPA programs and national MPA systems in North America, and particularly in the North American Arctic?

Objective 4: Assess and evaluate the relationships between the Indigenous people of the Arctic, the ocean environment, and their perceptions of wilderness.

Research Questions:

- How is wilderness perceived by Indigenous people, particularly those who live in the Arctic?
- What is the current and historical relationship of maritime Indigenous cultures with the sea and its resources?

- How is climate change in the Arctic affecting Indigenous communities, and what might the implications of these changes be on the prospects of establishing ocean wilderness in Arctic waters?
- What contributions might the effective integration of traditional ecological knowledge make to ocean wilderness management?
- Would co-management of ocean wilderness with Indigenous communities offer an appropriate framework for management of ocean wilderness in the Arctic? What is the current state of co-management in North America and what can be learned from this experience?

These four objectives formed the basis for the research, analysis, synthesis, conclusions and recommendations offered in this dissertation, which is structured as follows:

Chapter 1, **“Ocean Wilderness – Introduction”** (this chapter), provides background on why defining wilderness, especially in the ocean and coastal waters context, presents considerable challenges. It also chronicles the perils of not giving this careful consideration. This chapter also offers a summary of the organization of the document, the objectives of the study and the questions that helped guide its development.

Chapter 2, **“What’s in a Name? – Terrestrial Wilderness Definitions and their Implications for Defining Ocean Wilderness,”** surveys terrestrial wilderness definitions from around the globe, with special emphasis on wilderness definitions from North America, and analyzes the elements of those definitions likely to be important in developing a robust definition for ocean wilderness. It provides a history of ocean wilderness, summarizes past efforts directed at defining wilderness in an ocean and coastal context, and puts forward a draft definition for consideration. [Objective 1]

Chapter 3, **“What We Think it Is’ – Perceptions of Wilderness and their Application to Ocean and Coastal Waters,”** is focused on a survey, conducted in 2011 to ascertain the perceptions and perspectives of a select group of resource managers and scientists,

largely from US and Canadian agencies that have wilderness stewardship responsibility, on the idea of ocean wilderness as well as potential designation and management of such areas. The chapter includes survey methodology, a statistical analysis of the respondent data, and an interpretation of the results, along with a discussion of the limitations of the survey and conclusions. [Objective 1]

Chapter 4, “**What It Is Now’ – Existing Wilderness Waters,**” offers a detailed discussion of how wilderness stewardship agencies in the US and Canada currently address ocean and coastal waters in wilderness areas. It provides a comprehensive inventory and discussion of currently designated wilderness areas, as well as a summary of how these areas are managed. The chapter also describes and summarizes the results of a second survey, targeted at managers of these designated ocean wilderness areas regarding their knowledge, perceptions and beliefs with respect to the areas they manage, and offers their views on how the management of these areas might be improved and enhanced. The concluding section offers recommendations arising from the analysis of the survey results. [Objective 2]

Chapter 5, “**The North American and Arctic Context,**” offers descriptions and analysis of the various MPA programs in operation in the US and Canada, and the ongoing efforts in both countries to harmonize these programs into more unified and coordinated national systems. It includes a description and discussion of the various elements of the governance of the North American Arctic and the considerable challenges faced by the region as a result of global climate change. It concludes with an assessment of protected areas in the Arctic, and some observations regarding the prospects for establishing ocean wilderness in this region. [Objective 3]

Chapter 6, “**What it Might Be...,**” is focused on the potential for Indigenous co-management of ocean wilderness, with special emphasis on the Arctic. Overviews and analyses are provided regarding the history of Indigenous marine resource management

and the challenges that history poses. It also includes discussion of the potential contributions of traditional ecological knowledge to the management of ocean wilderness. More generally, this chapter addresses larger issues of ethnicity, race, culture, and gender relevant to the idea of wilderness, and their potential implications to ocean wilderness. It offers an overview of possible processes that could be implemented to effectively engage communities in such a multi-cultural landscape, and potential impediments to this engagement. The current state of Indigenous co-management in the Arctic is discussed and evaluated. The chapter concludes with a discussion of the prospects of Indigenous co-management of ocean wilderness in the Arctic, recommendations for how such co-management relationships could be more effectively implemented, and the challenges faced in attempting to implement these recommendations. [Objective 4]

Chapter 7, **“Toward an Ocean Wilderness Future’ – Conclusions and Recommendations,”** the concluding chapter of the dissertation, summarizes recent international efforts to develop a consensus definition of, and management framework for, ocean wilderness, and it offers a discussion of the need for and opportunities to build essential constituencies of support for designating and managing ocean wilderness. The final section offers specific recommendations for how ocean wilderness could contribute to “the enduring resource of wilderness” in North America and throughout the world, preserving, for future generations, the character, attributes, and resources of the places we value as wilderness.

1.3 Theoretical Foundation

Elements of this research can contribute to our knowledge and understanding of the “human-environment relationship,” the connection that people have with special places like wilderness and the implications of that connection with regard to how it influences behavior and actions related to resource conservation. Wilderness stewardship, research, and policy development activities of managers and scientists, for example, may be strongly influenced by their perceptions of the places they manage and study. The

public's connections to places they value are important in determining their inclination toward active engagement in the management decisions affecting that place.

There is a relatively large body of interdisciplinary literature that addresses the dimensions of "place" and the theoretical construct of "place attachment"—that is, how humans develop deep connections to places they value, appreciate, and seek to preserve, and, in turn, how this connection becomes an element of self-identity. Research has been conducted for more than 40 years (Lewicka 2011) that attempts to better understand how this connection is formed, fostered, sustained, and sometimes impeded (Sharpe and Ewert 2000), and what it might mean to effective stewardship and management of these areas.

Through this extensive research, largely within the disciplines of environmental psychology, social science, and environmental ethics, theories have been developed, tested, evaluated and discussed that have expanded and deepened the understanding of this connection. Much of this work is potentially relevant to the present research on ocean wilderness, as these are special places to which humans connect on an emotional level. Many of the findings reported in this body of literature can contribute to our collective knowledge and understanding of human-environment relationships. More particularly, it can provide a deeper understanding of the potential implications of "sense of place" and "place attachment" with regard to expanding our conceptions and perceptions of "places" we call wilderness to include ocean and coastal waters.

The conceptualization of "place" and theory of "place attachment," and their possible roles in management and stewardship of places humans value, has been described and extensively discussed in the many publications (e.g. Altman and Low 1992, Appleyard 1979, Cheng et al. 2003, Davenport and Anderson 2005, Eisenhauer et al. 2000, Ewert 1998, Greider and Garkovich 1994, Lewicka 2011, Payton et al. 2005, Schroeder 1996, Smith et al. 2011, Stedman 2003, Stuth et al. 1991, Williams 2002a, Williams 2008, Williams and Patterson 1996). Wilderness has been prominent in this research (Cordell et al. 2003, Ewert 1998, Higham 1998, Johnson et al. 2004, Lucas 1964, Schroeder 2007, Sharpe and Ewert 2000, Williams 2002b, Williams et al. 1992) and

more recently research related to place attachment in marine environments (Jones et al. 2012, Pita et al. 2010, Wynveen et al. 2010) has been added to this body of knowledge.

Cheng et al. (2003) offered the following definition of “place”:

Places are ‘fundamental means by which we make sense of the world and through which we act’ (Sack 1992). Places inform who we are and therefore how we are to behave; in short, to be *somewhere* is to be *someone*.

“Every river is more than one river. Every rock is more than one rock” (Greider and Garkovich 1994). River and rock are more than simply their appearance and composition.

Tuan (1974), in this seminal work on the theory of place, observed that the personal experiences of individuals and like-minded groups are at the core of place creation: “What begins as undifferentiated space becomes place as we get to know it better and endow it with value” Place, therefore, is both constructed from the meanings and values people convey to it, and, conversely conveys to individuals, and to groups of people who share this bond, meanings and values a part of their identity. As Greider and Garkovich (1994) posited:

‘Landscapes’ are symbolic environments created by human acts of conferring meaning to nature and the environment, of giving the environmental definition and form from a particular angle of vision and through a special filter of values and beliefs... These landscapes reflect our self-definitions that are grounded in culture.

Research on place attachment generally suggests that there are two primary components: “place identity” and “place dependence.” “Place identity” is “closely linked to the emotional and symbolic nature of the person-place relationship” (Sharpe and Ewert 2000). It addresses the identity conveyed by that place to the individual, providing “a sense of belonging that gives meaning to life,” through the emotional attachment to that place, and is generally considered an unselfconscious state where the full meaning cannot be communicated (Proshansky et al. 1983). “Place dependence” is a measure of the strength of attachment, and is based on two factors: “the degree to which the place

satisfies the needs and goals of an individual, and the availability of other settings to meet the needs of the individual” (Shumaker and Taylor 1983).

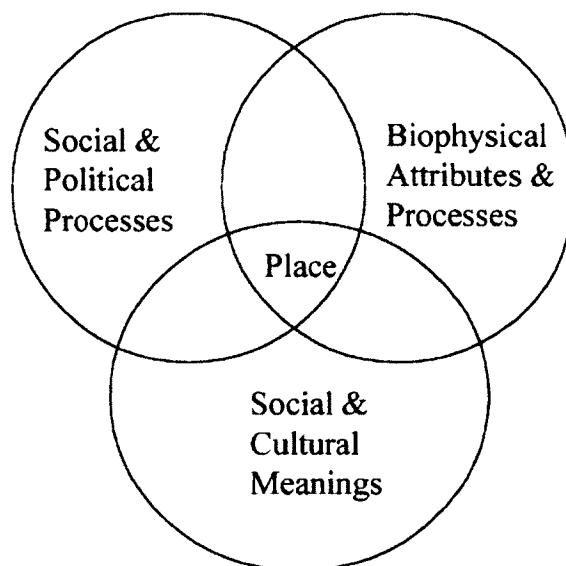


Figure 1-1: Schematic of Place as the Locus of Forces Affecting Human Action [from Cheng et al. (2003), based on Canter (1977), Relph (1976) and Sack (1992)]

Cheng et al. (2003) further illustrated this construction of “place” as shown in Figure 1-1, depicting three primary forces that define “space”: social and political processes, biophysical attributes and processes, and social and cultural meaning given to that place.

They also identify the implications of space as regards to its influence on the human-environment relationship:

- Place and its influence on individual action. This influence can be exerted through symbolic meaning, where ‘places take on an iconic quality, somehow permeating our collective consciousness and sub-consciousness, and motivating people to view places as benchmarks of experience, memories, and values.’ (Cheng et al. 2003). Places can also influence individual action through ‘people’s valuations of and behavior in a place are primarily driven by how the human mind processes information about

a geographic setting’, what Cheng et al. (2003) described as a “cognitive” influence.

- Place and its influence on collective action. Seeking to ‘impose social order by assigning certain meanings and shared expectations of appropriate behaviors’, collective action is driven by “place,” and ‘in turn, these place-based meanings and expectations of behavior are expressions of the group’s self-identification.’

According to Williams (2008), this growth of interest in “place” seems to be driven by the public’s disenchantment with the idea of nature as simply a commodity (see also Williams et al. 1992), the “public angst” regarding globalization and rapid societal change, and the greater number of people who are being exposed to these special places through visitation.

One dimension of this theory of “place” and the bonds humans form with these special places particularly important to this research on ocean wilderness is the observation of Sharpe and Ewert (2000). Citing the work of Williams et al. (1992) who compared place-attachment with what they termed “wilderness attachment,” Sharpe and Ewert concluded that “people develop attachments to the *concept* of wilderness, regardless of whether they have interacted with it at all.” Beyond the survey work of Williams and coworkers, the example of the intense public opposition to expanding oil drilling in the Arctic National Wildlife Refuge seems, at least anecdotally, to lend support to this contention. Very few of these oil-drilling opponents have ever visited this wilderness and are unlikely ever to visit given the remoteness of the area, yet they seem to exhibit some “place-attachment” to it. There are few existing formally-designated ocean wilderness areas, and most, like the Arctic Refuge, are remote and receive little visitation, and except for the few individuals who live in proximity to these areas. It is doubtful, therefore, that many people have developed place attachment to these ocean wilderness areas as a result of personal experience.

There are, however, places that people believe possess ocean wilderness attributes and qualities (Barr 2001, Chapter 4), and therefore, the implications of the findings from

the ocean wilderness survey are likely to have some relevance to our collective understanding of the theoretical constructs of “place” and “place attachment.” In turn, this theoretical context should be useful in interpreting the findings of this research. The perceptions, beliefs, and attitudes articulated by natural resource managers and scientists in the ocean wilderness survey (Chapter 3), can offer insight into this concept of “wilderness attachment” (Williams et al. 1992). The finding may also afford some sense of how this “wilderness attachment” might be expanded into new environments (i.e. from the terrestrial into ocean and coastal waters), and what stipulations and conditions survey respondents are likely to identify as essential to cross over the “invisible wall” between land and sea (i.e. what are the attributes and qualities of ocean wilderness, and which human activities may be compatible). The survey responses addressing the perceptions of ocean wilderness also illuminates the various dimensions of “wilderness attachment.”

This theoretical context of “sense of place” and “place attachment” is also potentially relevant to the “practice” elements of this research. The target audience for the ocean wilderness survey, natural resource managers and conservation scientists, was specifically selected because of their pivotal role in the potential implementation of the findings of this research. It is this “constituency” for ocean wilderness that arguably has the most significant role in determining whether ocean wilderness will be effectively incorporated into existing wilderness programs (see Chapter 4 for a more detailed discussion). Research comparing the perceptions of resource managers, stakeholders, and the public suggests that managers’ perceptions of the areas they manage are different from these other groups, and that such perceptions have a considerable effect on how managers’ believe that these areas should be managed, and what policies should be adopted to guide their stewardship (Bradley and Kearney 2007, Fazey et al. 2006). Place attachment has been found to play an important role in enhancing participation and effectiveness of public engagement, and can influence the creation and maintenance of trust (Payton et al. 2005). Given the considerable importance of both effective public engagement and trust in building constituencies of support for expanding the footprint of

wilderness waters (Chapters 6 and 7), those who advocate such an expansion should be deeply interested in understanding the implications of place attachment.

Perhaps straying just a bit further into the nexus between theory and practice, Cheng et al. (2003) offered six “propositions” that articulate these implications of place attachment on natural resource policy debates that have potential relevance to this research.

1. People’s perceptions and evaluations of the environment are expressions of place-based self-identity.
2. People perceive and evaluate the environment as different places rather than an assemblage of individual biophysical attributes.
3. Social groups that seemingly emerge around using, protecting, or altering the physical attributes of a location may be engaging in more fundamental processes of defining significant social and cultural place meanings.
4. People’s evaluations of, and responses to, natural resource management proposals are influenced by their identification with social groups organized around particular meanings of the places involved.
5. Groups intentionally manipulate the meanings of places hoping to influence the outcome of natural resource controversies.
6. The geographic scale of a place can change people’s perceived group identifications and therefore influence the outcomes of a natural resource controversy.

Concerning the implications of management policy development for places (like ocean wilderness), Cheng et al. (2003) concluded that:

Place is not an inert physical container for biophysical objects and human actions. Places are, in and of themselves, social constructs that defy ready definition, categorization, and measurement. Each place has a unique history among its inhabitants and visitors. Personalities, partnerships, feuds, compromises, out-migrants, and newcomers make a place what it is. In turn, place brings people in relation to one another in incomparable

ways, thereby affecting the biophysical attributes and processes in incomparable way.

Stuth et al. (1991), addressing the importance of the perceptions that managers possess, offered some concluding thoughts relevant to the particular importance of managers' perceptions.

The...manager's perception of the world is shaped by personal characteristics, experience, and education operating within the context of age, family status, beliefs and socio/cultural environments. Perception can be viewed as a mental filter that permits only certain facts to pass through to the analytical centers of the brain. Thus, perception is a major factor affecting a manager's decision-making ability because it is the mechanism through which the manager builds internal information bases whether accurate or inaccurate but generally incomplete. Perception plays a particularly strong role in the complex decision-making environment with which...management must work.

Clearly, the findings of the ocean wilderness survey (Chapter 3), especially the "sense of place" these managers have with regard to these special places, has both theoretical and practical application.

1.4 Addressing the "Punctuated" History of Ocean Wilderness

Great effort was made to maintain an objective viewpoint throughout the more than six years over which this research was conducted and reported in this dissertation. In conducting this research my goal was not to simply construct arguments that lend support to the idea of ocean wilderness. Rather, I endeavored to determine if the idea has merit and, if so, whether expanding the footprint of wilderness waters in ocean and coastal areas in North America is something worth pursuing, commensurate with the considerable investment of time and effort that would be required to make it a reality. In addition, as will be documented in Chapter 4, ocean wilderness currently exists in the coastal waters of North America. Seeking information to more effectively manage these

areas and robustly identify the attributes and characteristics of what could be appropriate candidate sites for future designations was also an explicit goal of this work.

Ocean wilderness is an idea that has received, albeit sporadically, intense deliberation, occasionally accompanied by the impassioned words of inspirational speakers and impassioned advocates largely from ocean conservation community. Quite interestingly, there is very little hard evidence of the voices of opposition, passionate or otherwise, just stories of quiet conversations largely out of the public arena, but this has been enough to quickly divert the advocates' attention to the next "great idea." There is a small body of published literature on ocean wilderness, mostly speaking to the potential opportunities resulting from the establishment of these areas; not a single paper offering a contrarian position was found.

The situation is analogous to a dusty car stored for a while in someone's garage. It starts with a little fiddling, runs pretty smoothly, but stops after a while for no apparent reason. No one has reached in to turn off the key, but the engine has sputtered and stopped. It may have simply run out of gas, but you really are not in desperate need of another car, and your spouse has arrived to remind you that you have much more important things to do, and you should have gotten rid of that heap long ago. So, you lower the hood and close the garage door, not bothering to diagnose the problem, but you know it runs, and it would be interesting to put it back on the road someday. Perhaps the fuel that ocean wilderness needs to continue to run is knowledge; a better sense of what we believe it is, how it might function, and what value it might offer to effectively preserving the last wild places on the earth.

While some progress has been made to better understand what we mean when we use the term "ocean wilderness" peaks of heightened interest and enthusiasm have not lasted very long. If the additional knowledge and insight acquired through this work helps to clarify some of the persistent issues and concerns that have contributed to this punctuated history of ocean wilderness, this work will have accomplished something useful. Knowledge alone is not enough, perhaps, but it is a good place to start.

Chapter 2 What's in a Name? – Terrestrial Wilderness Definitions and their Implications for Defining Ocean Wilderness

2.1 Introduction

Lessons from land, where there is a much longer and richer history of protected areas stewardship than the sea, are likely to be useful to guide and inform more effective management of ocean protected areas (Barr and Lindholm 2000, Lindholm and Barr 2001). For example, the US National Park Service (NPS) has existed exactly one century longer than the US National Marine Sanctuary Program. Both are protected areas programs, both operate nationwide, and both manage areas of the US that have been determined to be of special national significance. Lessons learned by the NPS over that century are likely to have significant application to national marine sanctuaries, notwithstanding the differences in the resources being managed and preserved.

There are few topics where this idea is more relevant than ocean wilderness. The concept of wilderness has been around since biblical times (Nash 2001), although it has been perceived differently with the passing centuries. Wilderness was originally viewed with fear and trepidation and later with awe and wonder (when it was becoming clear that wilderness was vanishing and we might want to save some of it). Wilderness preservation is built on an extensive foundation of scholarly analysis and on-the-ground experience. A substantial body of literature addresses terrestrial wilderness topics ranging from the practical to the sublime. This chapter provides a review of how this rich history, analysis and experience have been translated into statutes and policies that guide the preservation of wilderness around the globe, with special emphasis on North America. It also puts forward a definition for ocean wilderness that could provide the basis for developing a broader consensus of the term “wilderness” as it might be applied to ocean and coastal waters.

2.2 Learning from Terrestrial Wilderness Definitions

While the concept of wilderness is ancient, law and policy related to the protection and management of wilderness is a relatively recent phenomenon. In the US, the Forest Service administratively set aside the first wilderness area in 1924 (Martin and Watson 2002), but it was not until 1964 that the US Congress passed the Wilderness Act (P.L. 88-577), creating the National Wilderness Preservation System (NWPS). The NWPS now protects almost 110 million acres (approximately 445,150 square kilometers) of wilderness in the US in perpetuity (<http://www.wilderness.net>). Eidsvik (1989) conducted an extensive survey of international wilderness laws and policies, largely focused on identifying countries that have protected large tracts of land with wilderness-like qualities. A survey of international wilderness law and policy (Martin and Watson 2002) identified seven countries that had federal, state, territorial or provincial laws that explicitly address wilderness preservation and a number of others that have policies or other land-use laws that incorporate wilderness areas and zones. Other countries have adopted wilderness laws or policies since the Martin and Watson analysis, and so an updated inventory was required.

To conduct this inventory, copies of the available wilderness laws and policies were assembled largely from government-sponsored sources of legislation widely available on the Internet. Key information was extracted from the sections of those laws and policies that define what is meant by wilderness in that particular context. Table 2-1 contains information summarized by Landres et al. (2008b) from Chapter 2 of the International Wilderness Law and Policy Handbook (Kormos 2008), based on an original inventory conducted for this research. This inventory was further expanded and revised to incorporate newer or overlooked laws and policies, particularly those adopted since 2008. This summary identifies key elements and phrases from the statutory definitions provided and other relevant information including:

- any area/size requirements
- wilderness values identified or inferred from the definitions
- specific activity prohibitions included

- other comments potentially useful for clarification and/or relevant to understanding their potential applicability to defining ocean wilderness

Statutes and policies analyzed are from the United States, Canada, Australia, New Zealand, Finland, Iceland, Russia, Sri Lanka, Mexico, South Africa, Japan, Indonesia, Norway (Svalbard), and from a tribal government in the US that has designated a wilderness area on their lands. This definitive survey of documented international wilderness programs offers a comprehensive overview of how terrestrial wilderness has been defined. It provides a useful and appropriate database from which an extrapolation to ocean wilderness can be made.

Most of the 33 statutes and policies reviewed offer at least minimally substantive definitions of what constitutes “wilderness” in these countries. Without question, these definitions retained fidelity to concepts underlying the etymological origins of the word (Nash 2001) as a place ungoverned, without the influence or control of man. Nearly all the definitions mentioned “natural state” or “natural conditions.” The majority of these statutes and policies include the condition of being “undisturbed by man,” with the US Wilderness Act noteworthy in its use of the much analyzed and deconstructed term “untrammelled.” The preservation of biodiversity was also mentioned, either directly or indirectly, as a core value in most wilderness definitions reviewed.

The issue of human interactions with wilderness, to some degree, was influenced by whether or not those humans happened to be a part of an Indigenous community. About half of the definitions reviewed stipulate or imply that wilderness should be an area where there is little or no human presence, particularly habitation, but Helman et al. (1976, cf Herath 2002) observed that all definitions in Australia “recognize Aboriginal occupation as a feature of wilderness.” The IUCN definition of wilderness (IUCN 1994) explicitly includes the statement “to enable Indigenous human communities living at low density and in balance with available resources to maintain their lifestyle” as a management objective of their “Wilderness Area” protected area category (Category 1b). The Special Act from the Province of Quebec was established for the express purpose

Table 2-1: Summary of International Wilderness Laws and Policies, including Key Elements of their Definition, Size, Values, Specific Prohibitions, and other Relevant Comments.

Canada					
Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
Canada National Parks Act of 2000	“any area of a park that exists in a natural state or that is capable of returning to a natural state”	Not identified	None	“may not authorize any activity to be carried on in a wilderness area that is likely to impair the wilderness character of the area”	Considerations of administration, user safety and convenience in authorizing activities
Ontario Wilderness Areas Act of 1990	preservation... in its natural state	limits areas to 260 hectares	<ul style="list-style-type: none"> • Educational • Science • Historic • Recreational • Aesthetic 	None	
Alberta Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act of 2000	Management and preservation of the animal and plant life and the environment	Not Identified	<ul style="list-style-type: none"> • Conservation • Ecological • Science • Educational 	<ul style="list-style-type: none"> • construct, maintain, repair or operate any public work, road, railway, aircraft landing strip, helicopter base, structure or installation • expend or authorize expenditure of any money for any of those purposes. • travel in a wilderness area except on foot • fish, hunt or trap animals • land an aircraft • deposit any litter, garbage or refuse • collect, destroy or remove any plant life or animal life (or bird eggs • excavate or remove fossils or other objects of geological, ethnological, historical or scientific interest • take into or use a horse or pack animal or any motorized vehicle, • introduce into, deposit, or add a material or substance that is or may be harmful to plant/animal 	<ul style="list-style-type: none"> • Act provides explicit authority to close or limit public access and to designate buffer areas • Authority to establish wilderness areas on public lands also in Alberta Public Lands Act of 2000 (land classification).

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
Saskatchewan Parks Act of 1986	<ul style="list-style-type: none"> • preservation of natural landscapes in a natural state • pursuit of outdoor recreational activities that are consistent 	Not Identified	<ul style="list-style-type: none"> • Ecological • Recreation • Ecological 	None	
An Act respecting hunting and fishing rights in the James Bay and New Québec territories (1978)	None	Not Identified	Aboriginal rights	None	Guarantee of aboriginal harvest rights in wilderness designated
Northwest Territories Territorial Parks Act of 1988	areas that contribute to regional biodiversity	Not Identified	Biodiversity	“industrial activity shall be prohibited to the extent that the Government of the Northwest Territories has the power to do so”	Appears to be part of a representative protected areas system, but not explicitly identified in Act.
NB Tourism Development Act Regulations	None	Not Identified	None	None	Campgrounds constructed in wilderness do not have to comply with the general req. for facilities (such as toilets) in other campgrounds

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
Manitoba Provincial Parks Act of 1993	protect representative or unique natural landscapes in an undisturbed state and provide recreational opportunities that depend on a pristine environment	Not identified	Recreation	<ul style="list-style-type: none"> • logging • mining • development of oil, petroleum, natural gas • hydro-electric power 	Differentiation of wilderness from "backcountry"- more recreation-focused.
Nova Scotia Wilderness Areas Protection Act of 1998	<ul style="list-style-type: none"> • provide for the establishment, management, protection and use of wilderness areas, in perpetuity, for present and future generations • maintain and restore the integrity of natural processes and biodiversity • protect representative examples of natural landscapes and ecosystems • protect outstanding, unique, rare and vulnerable natural features and phenomena, • provide reference points for determining the effects of human activity on the natural environment • provide opportunities for public access for sport fishing and traditional patterns of hunting and trapping <p>"wilderness recreation" means non-motorized, outdoor recreational activities that have minimal environmental impact, including nature-based tourism</p>	Not Identified	<ul style="list-style-type: none"> • Educational • Science • Wilderness recreation • Ecological • Scenic 	<p>Without exception...</p> <ul style="list-style-type: none"> • acquire a mineral/petroleum right; • hydro-electric development • transmission or distribution line, pipeline or tunnel; • forestry or aquaculture <p>Unless permitted...</p> <ul style="list-style-type: none"> • mineral or petroleum\ quarrying or mining; • build or maintain structure, facility, utility line or bridge • agricultural activities; • trail, road, railway, landing strip or helicopter pad; • operate a vehicle or bicycle; • camp, tent • alter the land surface • remove, destroy, or damage any natural object, flora or fauna, whether living or dead; • remove, destroy or damage any object of scientific, historical, archaeological, cultural or paleontological interest; • destroy or damage existing flora, fauna or ecosystems; • dump or deposit any litter, garbage or refuse • light or maintain a fire 	Statute/Policy

Table 2-1 (continued)

Australia					
Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
New South Wales Wilderness Act of 1987	<ul style="list-style-type: none"> • Include plant and animal communities substantially unmodified by humans and works • Capable of being restored to "substantially unmodified" • preserve the capacity of the area to evolve in the absence of significant human interference 	sufficient size to enable its maintenance	<ul style="list-style-type: none"> • Solitude, • Self-reliant recreation • Education • Ecological 	<ul style="list-style-type: none"> • erection of a building • the carrying out of a work in, on, over or under area, • the use of that area or of a building or work in that area, • the subdivision of that area • the clearing of vegetation 	Can apply to public and private lands... Bill filed in 2004 to amend to address management/eradication of invasive plant species and feral animals.
Western Australia Conservation and Land Management Act of 1984	<ul style="list-style-type: none"> • remoteness from settlement • remoteness from access • apparent naturalness – degree site is free from permanent structures... modern technological society; • biophysical naturalness – the degree site is free from influence... modern technological society. 	8000-20,000 ha	<ul style="list-style-type: none"> • Ecological • Biodiversity • Solitude • Self-reliant recreation • Baseline for future mgmt.. • Option Value 	<ul style="list-style-type: none"> • mechanized transport (except emergency response) • indigenous and non-indigenous cultural values are protected • Constructed walking tracks, signs, track markers and toilets • the taking of forest produce • permanent modern human habitation • structures (existing removed or allowed to deteriorate) 	"wilderness conservation areas" can include "waters of marine reserves, marine parks and other marine protected areas", but none established. ¹
Australian Capital Territory Nature Conservation Act of 1980	<ul style="list-style-type: none"> • Applies to public lands • Wilderness" not defined 	Not Identified	None	<ul style="list-style-type: none"> • excavate, except in accordance with a license • establish a track or road • use a motor vehicle except on a track or road that - <ul style="list-style-type: none"> • was formed for the use of vehicles having 4 or more wheels; • was in existence at the time of the declaration of the wilderness area. 	<ul style="list-style-type: none"> • If license issued to excavate, site must be restored to "former state" • Must also have a permit to "pick (protected) plants"...

1. http://www.recfishwest.org.au/content/media-releases/files/3330_111102__support_wilderness_conservation_areas.pdf Notable that "wilderness conservation areas" for Western Australia MPAs being strongly advocated by recreational fishing organizations.

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
Northern Territories Parks and Conservation Act of 2001	<ul style="list-style-type: none"> • "maintained in its natural state" • permitted activities must be consistent with management plan developed for that area 	Not identified	None	<ul style="list-style-type: none"> • no excavation shall be carried on; • no building or other structure shall be erected; • no works shall be carried out; • no timber shall be felled or taken; • no tracks shall be established; • no vehicle, aircraft or vessel shall be used, • "the killing of animals located in a...wilderness or the killing of animals for commercial purposes." • Can promulgate by-law "regulating or prohibiting the pollution of water in a manner harmful to wildlife in...wilderness areas"; • mining by preexisting right may be allowed. 	
South Australia Wilderness Protection Act of 1992	<ul style="list-style-type: none"> • the land and its ecosystems must not have been affected, or must have been affected to only a minor extent, by modern technology • the land and its ecosystems must not have been seriously affected by exotic animals or plants or other exotic organisms. • "modern technology" includes all forms of human technology except Aboriginal technology 	Not Identified	<ul style="list-style-type: none"> • Ecosystem • Cultural 	<ul style="list-style-type: none"> • mining prohibited, except for pre-existing leases and administrative discretion • grazing of stock and all other forms of primary production • construction or erection of roads, tracks, buildings or structures (except those that are specifically authorized by the plan of management of the wilderness protection area or zone). 	

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
Queensland Nature Conservation Act of 1992	<ul style="list-style-type: none"> • protect or restore the wilderness values, and the cultural and natural resources, of the area to the greatest possible extent • maintain the area to preserve its capacity to evolve in the absence of significant human interference • substantially undisturbed by modern society • remote at its core from points of mechanized access and other evidence of society 	"sufficient size to enable the long-term protection of its natural systems and biological diversity"	<ul style="list-style-type: none"> • Solitude • Appropriate, self-reliant recreation • Spiritual • Cultural 	Established for each site, consistent with Act, in management plan.	<ul style="list-style-type: none"> • Capacity to restore to meet key definitional elements can also make area eligible for wilderness designation • Herath (2002) mentions that Queensland has identified (in some source document other than their published statute) appropriate size and scope of wilderness defined as "the area beyond 1 day's walk, from any access point. In wilderness conditions, 1 day's walk is generally between 10 and 15 km. implies a minimum size ...of 40,000 ha."

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size
Victoria National Parks Act of 1975	Plant and animal community not substantially modified by influences of European settlement, or capable of being restored to such a state	“of a sufficient size to make maintenance in such a state feasible”

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Ecological, • Geological • Scenic • Archaeo-logical • Historical • Educational • Solitude, • Self-reliant recreation 	<ul style="list-style-type: none"> • roads, structures or installations • commercial activity or development • use of any form of motorized or mechanical transport • use of any non-indigenous animal • hunting • electrical structures (e.g. towers) • work on "foreshores" (e.g. piers, landings), • oil and gas mining 	<ul style="list-style-type: none"> • Can take measures for "the eradication of non-indigenous flora...and fauna for preservation and protection of any species", and "the removal of evidence of developments of non-aboriginal origin." • Some special provisions for installing navigational lights in coastal wilderness areas, as well as some exceptions, with conditions, for existing grazing, hunting, permanent "improvements" (e.g. camping sites), maintenance...

Table 2-1 (continued)

New Zealand					
Statute/Policy	Key Elements of Definition	Size	Values	Specific Prohibitions	Comments
The Reserves Act of 1977	indigenous natural resources shall be preserved	Not identified	<ul style="list-style-type: none"> • Conservation • Science • Cultural 	Nearly identical to National Parks Act ("livestock" instead of "animal")	<ul style="list-style-type: none"> • prohibited activity can be done in "emergency involving any person's protection or property" • Identical provisions in Conservation Act of 1987
National Parks Act of 1980	"indigenous natural resources shall be preserved"	Not Identified	<ul style="list-style-type: none"> • Conservation • Science • Cultural 	<ul style="list-style-type: none"> • No building or machinery shall be erected • No building, machinery, or apparatus shall be constructed or maintained • No animals, vehicles, or motorized vessels (including hovercraft and jet boats) shall be allowed to be taken into or used • no helicopter or other motorized aircraft shall land or take off or hover for the purpose of embarking or disembarking passengers • no roads, tracks, or trails shall be constructed 	<ul style="list-style-type: none"> • Explicit authority to liberate indigenous wildlife under permit • Research can be done under permit.

Table 2-1 (continued)

Statute/Policy	Key Elements of Definition	Size
General Policy for National Parks 1993 (Specially Protected Areas, Wilderness Areas and Amenities Areas)	provide opportunities for a wilderness experience involving challenge and self-sufficiency	"large enough and sufficiently remote and buffered to be unaffected, except in minor ways, by human influences"
Finland		
No. 62 Act on Wilderness Reserves (1991)	<ul style="list-style-type: none"> • preserve wild areas, • safeguard Lapp culture and indigenous livelihoods • develop the potential for diversified use of nature 	Not Identified

Values	Specific Prohibitions	Comments
Recreation	<ul style="list-style-type: none"> • tracking (trails) and other facilities will not be provided • Construction of roads in wilderness areas is specifically prohibited • Power and communication installations • Use of aircraft over wilderness, mining licenses, use of motorized craft discouraged. 	<ul style="list-style-type: none"> • Landing aircraft wilderness to control of introduced animals or facilitate approved scientific research) may be allowed by permit. • • Prospecting licenses may be permitted with minimal impact and mining license.
<ul style="list-style-type: none"> • Cultural • Ecological 	<ul style="list-style-type: none"> • “no permanent roads may be constructed in wilderness reserves” • “mining patents” may not be granted in wilderness reserves” 	<ul style="list-style-type: none"> • “reindeer herding, fishing, hunting and gathering” permitted if consistent with a mgmt. plan • “forests in wilderness preserves shall be preserved in their natural state or tended using natural forestry practices.”

Table 2-1 (continued)

Iceland		
Statute/Policy	Key Elements of Definition	Size
Nature Conservation Act of 1990	<ul style="list-style-type: none"> • An area of land at least 25km-squared in size, or in which it is possible to enjoy the solitude and nature without disturbance from man-made structures or the traffic of motorized vehicles on the ground, which is at least 5km away from man-made structures or other evidence of technology; (power lines, power stations, reservoirs and main roads, where no direct indications of human activity. • Purpose is to direct the interaction of man with his environment so that it harms neither the biosphere nor the geosphere, nor pollute the air, sea or water... intended to ensure, to the extent possible, that Icelandic nature can develop according to its own laws and ensure conservation of its exceptional or historical aspects... facilitate the nation's access to and knowledge of Icelandic nature and cultural heritage and encourage the conservation and utilization of resources based on sustainable development. 	No less than 25 square kilometers

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Solitude • Recreation • Historical • Cultural • Education • Ecological • Geological 	<ul style="list-style-type: none"> • motorized access • roads, buildings or structures 	<ul style="list-style-type: none"> • Subsistence and traditional uses are permitted • In practice, extent of application of this law is unclear. The Government of Iceland provides no information about the number or areas where wilderness has been created under the law. One area, Breidafjordur in the Westfjords Region that has a boundary that appears to include significant marine waters is identified, at least in part, as "designated wilderness" (Petersen et al. 1998).

Table 2-1 (continued)

South Africa		
Statute/Policy	Key Elements of Definition	Size
South Africa National Environmental Management: Protected Areas Act of 2003.	<ul style="list-style-type: none"> • “an intrinsically wild appearance and character or capable of being restored to such” • “undeveloped and roadless, without permanent improvements or human habitation” • “protect and maintain the natural character of the environment, biodiversity, associated natural and cultural resources and the provision of environmental goods and services” 	Not Identified
Japan		
Nature Conservation Law of 1972	"Area that preserves its original characteristics without any influence of human activities."	Not Identified

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Solitude • Cultural • Biodiversity • Conservation 	<p>“access...if allowed, may only be by non-mechanized means”</p>	<ul style="list-style-type: none"> • National Parks can also be designated as wilderness, along with nature reserves. • Can also designate wilderness, as a land classification, on state forest land through the National Forests Act of 1998.
<p>Not Identified</p>	<ul style="list-style-type: none"> • "Activities that negatively impact the ecosystem are strictly prohibited. 	<ul style="list-style-type: none"> • "areas free of human influence" • generally stand-alone areas, but many contiguous with other protected areas • generally "no entry"...access by permit for scientific research

Table 2-1 (continued)

Russia		
Statute/Policy	Key Elements of Definition	Size
Federal Law on Specially Protected Natural Areas of 1995	"On the territory of state nature zapovedniki, the following is completely withdrawn from economic utilization: specially protected natural areas, complexes, and objects (land, water, mineral resources, the plant and animal worlds) which have protected status; areas with scientific or environmental/ ecological educational significance as models of natural environment; typical or rare landscapes; and areas for the preservation of genetic funds of plants and animals."	Not Identified
Sri Lanka		
National Wilderness Heritage Areas Act of 1988	"preserving in their natural state, unique eco-systems, genetic resources; or physical and biological formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal values from the point of view of science or conservation; for enhancing the natural beauty of the wilderness of Sri Lanka and for promoting the scientific study and enjoyment thereof by the public."	Not identified

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Biodiversity • Conservation • Science • Education 	<p>Activities prohibited in SSNR include:</p> <ul style="list-style-type: none"> • activities altering hydrological regime • mineral exploration, mining • large-scale logging, taking medicinal herbs • grazing and other forms of agriculture • road building and construction of buildings (except as required for maintenance of the reserve) • unauthorized access, except for use of existing roadways and waterways • overflights lower than 2000 m. 	<ul style="list-style-type: none"> • scientific research, monitoring, and extractive uses permitted • term "wilderness" not used, but "State strict nature reserves (SSNR)"
<ul style="list-style-type: none"> • Scientific • Recreation • Conservation • Historical • Cultural 	<ul style="list-style-type: none"> • commercial uses • roads, buildings structures • agricultural activities, cultivation 	<ul style="list-style-type: none"> • scientific research permitted • private property must have public purpose, and in-holdings may be acquired

Table 2-1 (continued)

Mexico		
Statute/Policy	Key Elements of Definition	Size
Ecology Law of 1988, modified in 2006 (establishment of wilderness zone provisions in development)	"Areas where habitats, biotic communities and natural processes remain predominantly intact; where the footprint of industrial civilization and its infrastructure is not present; where human activities are developed without leaving evidence of their presence; and, are sufficiently ample to provide opportunities for the reconciliation of man as a specie, with nature." (draft language)	Not Identified
Indonesia		
National Act No. 5/1990 pertaining to the Conservation of Living Resources and Their Ecosystem Spatial Planning Act of 1992 Ministerial Decree P.56 on Zoning of National Parks	Not Identified	Not Identified

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Conservation • Ecological • Solitude 	<p>Not identified, but from draft definition, activities involving commercial and other human development would likely be prohibited</p>	<ul style="list-style-type: none"> • Private lands in wilderness zones can be certified as "wildlands"
<p>Not Identified</p>	<ul style="list-style-type: none"> • All activities except limited tourism prohibited 	<ul style="list-style-type: none"> • Permits limited tourism, including the development of trails and camping areas • Established as zones in National Parks . • wilderness designations include marine areas (see Clifton 2003, Fauzi and Buchary 2002)

Table 2-1 (continued)

Norway (Svalbard)		
Statute/Policy	Key Elements of Definition	Size
Act of 15 June 2001, No. 79, Relating to the Protection of the Environment in Svalbard" (Svalbard Environmental Protection Act; SEPA)	<p>Purpose of this Act is "to preserve a virtually untouched environment in Svalbard with respect to continuous areas of wilderness, landscape elements, flora, fauna and cultural heritage. Within this framework, the Act allows for environmentally sound settlement, research and commercial activity"</p> <p>Fundamental principles" "to include the full variation range of habitats and landscape types, help to maintain areas of special conservation or historical value, protect ecosystems on land and in the sea, contribute to the maintenance of wilderness and untouched nature."</p>	<p>Not specified, but applicable "to entire land area of Svalbard and its waters out to the territorial limit."</p> <p>Unger (2003) reports that Norway claims a territorial sea of 4 nmi. from the coastline, but was considering extending this to 12 nmi, increasing the protected water area by 35%.</p>

Values	Specific Prohibitions	Comments
<ul style="list-style-type: none"> • Conservation • Ecological • Recreation • Historical • Cultural • Geological 	<p>• motorized access is generally prohibited, but Unger (2003) reports that residents are permitted to use snow machines on snow-covered ground. Generally, motorized access is confined to special trails and roads. Vessel access to waters is permitted, but “shall take place in a way that does not harm, pollute or in any other way damage the natural environment or cultural heritage or result in unnecessary disturbance to humans or animals.” Use of “jet skis” is specifically prohibited. Extensive array of special regulations, including: tourist use, camping, traffic, harvesting, leash regulations for dogs, hunting, and pollution and waste. Structures and other human development activities are evaluated through environmental impact assessments and land use planning.</p>	<p>72% of the marine waters of Svalbard are protected under SEPA (32,042 km²). However, Unger (2003) suggests “the management of Svalbard’s marine environment still represents a major weakness in the Norwegian environmental policy for the archipelago.” Some marine species are exempted, and mgmt. not comprehensive. Threats include oil drilling, commercial fishing, and cruise tourism.</p>

guaranteeing Aboriginal harvesting rights in any wilderness designated in the areas described in this statute.

The US Wilderness Act is a notable exception to this presumption of Indigenous use and habitation, but in practice, particularly in Alaska, subsistence activities are routinely conducted by Alaskan Native communities in many, but not all, wilderness areas (Catton 1997). Certainly this distinction is no more obvious than in the Finnish Act on Wilderness Reserves, which was established in part with the intent of “safeguarding Lapp culture and Indigenous livelihoods.” Saarinen et al. (1995) noted that “the Finnish word for wilderness is *erämaa*, and in translation it means undeveloped lands between human settlements and agricultural areas that people visit to hunt, fish and gather natural resources directly from wild nature. This focus on human use, particularly by the Saami people, rather than strict preservation sets the Finnish wilderness statute apart from a number of the other wilderness definitions (Gladden 2001). With reference to language to the US Wilderness Act that speaks to the intersection of people and wilderness, Eidsvik (1989) posited:

From a conservation perspective, the key phrase must be “where the earth and its community of life are untrammelled by man”... Whether man remains or not is irrelevant as long as the time, space, and species’ relationships are retained.

He also proposed an alternative definition for wilderness that embraced this concept that the central issue is not presence or absence of man, but the degree of impact that humans have on wilderness: “Wilderness is an area where natural processes dominate and people may co-exist as long as their technology and their impacts do not endure.”

Opportunities for appropriate recreation appeared in the majority of wilderness definitions reviewed. Many statutes and policies were very explicit about what “wilderness recreation,” “self-reliant recreation,” and “appropriate recreation” were meant to be (Table 2-1). The Canadian Province of Nova Scotia, in their Wilderness Areas Protection Act of 1998, for example, defined “wilderness recreation” as “non-

motorized, outdoor recreational activities that have minimal environmental impact, including nature-based tourism.” In the Province of Newfoundland and Labrador, wilderness is set aside as “areas to which people may come and in which they may hunt, fish, travel and otherwise experience and appreciate a natural environment.” There was not a clear consensus among the Canadian Provincial definitions regarding hunting and fishing. In some, such as in the Province of Alberta, hunting, fishing and trapping in wilderness areas were prohibited (which could be overcome through a permitting process), but in others, such as the Mission Mountains Tribal wilderness, hunting and fishing were identified as a traditional use (but carrying or using a firearm was prohibited).

“Opportunities for solitude” is a core element of wilderness character (Landres et al. 2008a). This was mentioned often in these statutes and policies as an important element of defining wilderness areas.

Another notable consistency among the definitions reviewed is particular focus on areas being “in a natural state” or being “capable of being restored to such a state” (Table 2-1). The issue of “purity” was significant in the history of implementation of the US Wilderness Act particularly as related to the US Forest Service’s early interpretation of the Act (Scott 2004). In what became to be known as the “purity theory,” areas that had any history of human use and impact were determined by the Forest Service to be inappropriate for designation as wilderness. It took Congress’ passage of the “Eastern Wilderness Act” (P.L. 96-622) and other wilderness legislation relative to wilderness areas in the Eastern US to clarify this issue. It is likely that this controversy in the US heightened awareness of this issue when laws were drafted in other countries.

Approximately one third of the definitions reviewed specifically address the issue of the history of human disturbance and either qualify the provision (“substantially unmodified”) or allow for the effects of the wilderness designation to restore the area (“capable of returning to a natural state”). The US Wilderness Act is silent on the issue of restoration, and this has been the subject of some considerable debate among wilderness managers (Graber 1995). As global awareness of the management issue of

invasive species has increased, a number of the more recent revisions to these statutes (the 2004 Amendment Bill to the New South Wales Wilderness Act of 1987, for example) have included provisions permitting the eradication of non-indigenous plant and animal species in wilderness areas.

There is little apparent consensus on the appropriate size of wilderness areas beyond a few of the definitions mentioning that areas should be of a “sufficient size” to protect and maintain wilderness values and qualities (Table 2-1). As discussed by Nash (2001), the issue of size is an “additional frustration” in the task of defining wilderness. Nash noted Bob Marshall’s assertion that wilderness should be large enough that it “could not be traversed without mechanical means in a single day” (given that Marshall was legendary for his great speed while hiking and mountain climbing, such a measure could result in a significant area). Leopold (1986) proposed a standard that the areas should “absorb a two-week pack trip.”

Some of the suggestions for appropriate size of wilderness are somewhat less qualitative. Herath (2002) cited a standard reportedly in use in Queensland that sets the size as an area at least a one-day’s walk from any access point which he estimated, based on walking under wilderness conditions, to be an area of no less than 40,000 hectares (400 square kilometers). The US Wilderness Act established a minimum size of 5,000 acres (approximately 20 square kilometers), “or sufficient size for practical preservation.” Iceland set a minimum size for its wilderness areas at no less than 25 square kilometers, with signs of human development no closer than 5 kilometers from the wilderness boundary. Helman et al. (1976) suggested “50,000 hectares (500 square kilometers) with a buffer zone of similar size” and Mittermeier et al. (2003) went even further in their worldwide survey of wilderness areas by establishing a minimum size criterion of 10,000 square kilometers for inclusion in their inventory. On the other end of the spectrum, the Province of Ontario, limits its wilderness areas to no more than 260 hectares (2.6 square kilometers).

The final piece of information gleaned from this review of wilderness laws and policies is the specific prohibitions imposed on human activities that have the potential to

degrade wilderness qualities and values (Table 2-1). Definitions may provide a general sense of what is meant by “wilderness,” but specific prohibitions clearly establish the intended level of protection without regard to what hortatory language may be included in that definition. While perhaps not intuitively obvious, some “prohibitions” in statutes may not actually prohibit the activities they target if they can be permitted under the agency’s discretionary authority. How effective these limits on human activities might be in actually preserving wilderness values is linked to how many discretionary permits are issued for otherwise “prohibited” activities and whether these permitted activities have ecological impacts, either individually or cumulatively. The protection of the waters surrounding Svalbard seems to provide an illustrative example of the broad use of such discretionary authority (Unger 2003). While these waters are managed as wilderness, many human activities, including commercial fishing, occur without restriction under the law that established wilderness protection for this area.

For the vast majority of laws surveyed (Table 2-1), motorized or mechanized access is a commonly prohibited activity. Boats, aircraft, vehicles of all types, and in some places bicycles, are prohibited entry and use in most wilderness areas. Aircraft prohibitions are generally limited to landing (and presumably taking-off), but in New Zealand, under provisions of the General Policy addressing wilderness areas in National Parks, flying in airspace over wilderness is “discouraged.” Russia also limits overflights to no lower than 2,000 meters above Specially Protected Natural Areas (SPNA) – the equivalent of “wilderness,” although the term is not used there. Equally common are prohibitions on road construction and maintenance, as well as construction and maintenance of structures of any kind. The prohibition of these activities is consistent with the concept that wilderness should be free of the visible evidence of human presence, “unmodified by humans and their works,” as articulated in the NSW Wilderness Act of 1987.

Even if no permits are issued or provision for permitting prohibited activities is absent from the wilderness law or policy, low compliance and a lack of enforcement could render the prohibition meaningless. Fauzi and Buchary (2002) and Clifton (2003)

both discussed issues regarding such lack of compliance in marine “wilderness zones” established in coastal waters around island protected areas in Indonesia.

There are some universal attributes of terrestrial wilderness laws and policies from the countries surveyed. Nearly all expressly prohibit industrial and commercial activities, including mining, oil and gas development, pipelines and cables, hydroelectric development, and forestry. As much as possible, wilderness should be free of the artifacts of “civilization” and governed in a way that maintains its natural conditions. For areas that have been disturbed by humans, wilderness qualities and attributes can be restored by intentional inaction to allow the inherent resilience of natural systems to reclaim areas from their past disturbance history.

Even “management,” in the wilderness context, is a sign of human presence and influence. “Wilderness management” is sometimes considered an oxymoron. Perhaps these areas are more appropriately termed “unmanaged landscapes” (*sensu* Willers 1999). In keeping with this goal of preserving “natural conditions” – setting aside the important issue of how one would determine what the “natural conditions” for a particular area might be, particularly in this time of global climate change – human activities that have known adverse impacts are generally prohibited and others are carefully limited where the possibility exists of their having unintended impacts, individually or cumulatively. As Eidsvik (1989) recommended, human “technology and their impacts” should “not endure.”

Based on this review (Table 2-1), prohibitions on mechanized/motorized access, construction or maintenance of roads, structures, and industrial/commercial activities are likely to be the minimum requirements for wilderness area preservation. “Appropriate” recreation would be one of the activities that would warrant management oversight. Given all this, the US Wilderness Act seems to embody these characteristics and would be an appropriate model, with one important caveat, for a definition for ocean wilderness. The caveat with regard to the Wilderness Act is the one cited by Eidsvik (1989) with regard to people and wilderness. The challenges and opportunities related to this topic of Indigenous cultural preservation and wilderness is discussed in detail in Chapter 6.

As alluded to throughout this chapter, there are a number of places where wilderness has been formally designated in ocean and coastal waters, including at least thirteen sites in the US (see Chapter 4 and discussed below), and an undefined number of “marine wilderness” sites in Indonesia (Clifton 2003, Fauzi and Buchary 2002). In Canada, some national park boundaries include relatively small areas of adjacent coastal marine waters, which may be incidentally included within wilderness zones, but this could not be confirmed (Stephen Woodley, Chief Scientist, Parks Canada, 20 April 2010, personal communication). As discussed in greater depth in Chapter 4, while most of the wilderness zones in Canada may have been captured incidentally in the process of boundary delineation, the majority of wilderness waters areas in the US NWPS were designated with clear intent.

2.3 Definitions in the North American Context

Of importance to this work is the way that wilderness has been defined in the US and Canada. A deeper understanding of the US Wilderness Act, and the establishment of wilderness zones in Canada, offers important insights into not only the origins of the term, but how it has been put into practice in the North American continent.

Wilderness has been defined in many ways, both formally in law or policy (Table 2-1) and more broadly in scholarly discussions (including Callicott and Nelson 1998, Cronon 1996, Leopold 1986, Nash 2001, Oelschlaeger 1991, Olsen and Backes 2001). However, as Nash (2001) observed, “the definition of wilderness is complex and partly contradictory” and therefore interpreting this definition remains the subject of continued discussion and debate. The idea of wilderness as an evolving and dynamic concept is useful for the purposes of thinking about wilderness as it might be applied to areas not traditionally conceived as “wilderness,” such as ocean and coastal waters. The North American definitions are not rigidly bounded, nor subject to being considered something akin to *stare decisis* or “settled law.” That the concept of wilderness continues to remain somewhat “fluid” seems quite appropriate with respect to how it might be applied to the oceans and coastal waters.

In the United States, the Wilderness Act of 1964 (Public Law 88-577) contains the following definition:

A wilderness, in contrast to those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness of further defined to mean in this Act as an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions, and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and in confined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value [Section 2(c)].

The policy set forth in this Act was “to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” The long and always contentious struggle for passage of the Act has been comprehensively documented (Allin 1982, Scott 2004). The Act contains a duality that lends itself to broad interpretations. The first part of the definition has been described as stating the “ideal” (areas “where the earth and its community of life are untrammelled by man”). Whereas, the second sentence (“an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation...affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable”) offers more practical direction for identifying wilderness as defined. These “two definitions” both help to clarify, but also offer some ambiguity as to the intent of Congress regarding wilderness designations.

Since the passage of the Act, Congress has designated 757 wilderness areas totaling 109,505,482 acres (approximately 445,150 square kilometers), or about 5% of the terrestrial area of the United States (<http://www.wilderness.net>). Of this total area, it has been estimated that more than 100,000 acres (approximately 405 square kilometers) at thirteen designated wilderness areas include potentially significant areas of ocean and coastal waters (see Chapter 4). The fact that these “wilderness waters” have been incorporated into the system seems to suggest that water areas, particularly those adjacent to predominantly terrestrial wilderness designations, also fall within this “complex and partly contradictory” definition of wilderness.

There are a number of states in the US that have wilderness statutes, regulations and policies. Dawson and Thorndike (2002), building in part on the previous efforts of Stankey (1984), identified seven states with active wilderness programs (Alaska, California, Maryland, Michigan, Missouri, New York, and Wisconsin). Minnesota possessed the statutory authority to designate wilderness but had not done so, so it was not listed as “active” in this inventory. These state wilderness programs had preserved, as of 2002, 74 areas encompassing 2.4 million acres (approximately 9,700 square kilometers). The definitions used by these states was generally quite similar to the Wilderness Act. They diverged on the issues of size, reflecting the smaller size of protected areas managed by states, and were more flexible with regard to the history of past disturbance. Under the unimplemented Minnesota statute and in California, for example, sites can be designated as wilderness if the evidence of human disturbance could be eliminated by restoration. In Alaska, a wilderness can be designated for the purpose of restoring the area to a natural condition. A few states were reported as having designated individual areas with the name “wilderness.” Examples include the Bridgestone/Firestone Centennial Wilderness in Tennessee, and the Alakai Wilderness Area on the island of Kauai and the South Kona Wilderness Area – designated in 2011 – on the Island of Hawaii in the State of Hawaii. These areas, however, are not part of formally established state-wide programs. Also of special note are the iconic areas of the

Adirondack State Park in New York and Baxter State Park in Maine, both managed under a “forever wild” mandate set forth in their founding legislation.

Many of the management challenges in these state-designated wildernesses are quite similar to those being confronted by Federal wilderness managers. Dawson and Thorndike (2002) reported that the most commonly cited threats to preserving wilderness qualities by state wilderness managers from all seven major programs were “fragmentation and isolation of wilderness as ecological islands,” “increasing commercial and public recreational visits,” “motorized and mechanical equipment trespass and legal use,” and “aircraft noise.” Six of the seven programs also identified “exotic and non-native species,” “adjacent land management and use,” “inholdings of private and public lands,” “wildland fire suppression,” and “urbanization and encroaching development.” It seems quite apparent that, notwithstanding which level of government has wilderness stewardship responsibility for an area, similar challenges are confronted.

Canada and its “wilderness idea” parallel the conservation history of the US (Allin 1982, Scott 2004, Sellars 1997). As in the US, Canadian Federal land management agencies were initially reluctant to set aside wilderness areas. Canadian national parks were considered to be constituted largely of wilderness and these parks were established to effectively protect their wilderness qualities. In his comprehensive review of wilderness protection in Canada, McNamee (2008) observed that the Parks Canada perspective was that as Canadians are largely concentrated in a corridor near the US border, there were few threats to preserving wilderness qualities in remote national parks. Human use and habitation was concentrated in this border region. In the early 1990s wilderness bills, similar to the US Wilderness Act, were tabled in the Canadian Parliament. However, they were never successful largely because they were silent on the relationship between proposed wilderness areas and Aboriginal groups that lived there (McNamee 2008). Many, if not all, of the potential areas that would have been considered for wilderness designation under these proposed statutes had Indigenous ownership rights under land claim agreements with the Government of Canada. In 2000, the Parliament revised the Canada National Parks Act (c. 32, in Chapter 32/Section 14) to

state that “the Cabinet may declare any area of a park that exists in a natural state or is capable of returning to a natural state to be a wilderness area.” The statute also provided that Parks “may not authorize any activity to be carried on in a wilderness area that is likely to impair its wilderness character.” The revisions to the Act further established the requirement that when national park management plans are updated, potential wilderness designations are to be evaluated [Section 14(4)]. Currently, nearly all national parks have large wilderness zones established under their management plans, and between five and seven sites have been formally recognized as wilderness under law (Steven Woodley, Chief Scientist, Parks Canada, personal communication, 20 April 2010).

The definition for “wilderness zone” used in National Parks, adopted by Parks Canada (<http://www.pc.gc.ca/eng/docs/pc/poli/princip/sec2/part2a/part2a4.aspx>), is: “Extensive areas which are good representations of a natural region and which will be conserved in a wilderness state. The perpetuation of ecosystems with minimal human interference is the key consideration.” It could, as written, be used to zone marine waters as “wilderness” in Canadian national parks. CPAWS (2008) reports the total area of ocean and coastal waters in all National Parks as 716,305 hectares (7,163 square kilometers), but whether any marine waters areas have been zoned as wilderness could not be ascertained from either published sources or Parks Canada staff contacted for this research (Steven Woodley, Chief Scientist, Parks Canada, personal communication, 20 April 2010). A similar zoning scheme exists for National Marine Conservation Areas, also administered by Parks Canada, but unlike their terrestrial zoning categories, it does not include a “wilderness” zone.

Most of the Canadian Provinces also have wilderness statutes or policies (Table 2-1). The statutory authority and key elements of wilderness definitions are identified, as well as any relevant additional information. No available source could be located to clarify the extent to which wildernesses have been designated under these statutes and regulations. However, like their US state counterparts, most of these Provincial definitions embrace many of the key provisions of the US Wilderness Act, and their basic

approaches to wilderness stewardship is wholly consistent with the management frameworks established by the US states.

Definitions are a critical element of the future of ocean wilderness. If “wilderness is what we think it is,” then what we say it is in our statutes and policies reflects our perceptions, perspectives, and aspirations as a society. Clearly, when the US Wilderness Act was written and passed by Congress, we were thinking about the land. Review of the legislative history of the Wilderness Act suggests that this focus was Congress’ clear intent. The 1960s were a decade when the idea of wilderness was embodied in large tracts of primitive, roadless land in the Western states and Alaska. It was also a time when the oceans began to seem much smaller than they did before, and the resources they supported were perhaps not as resilient as we once believed.

2.4 Making the Leap to Defining Ocean Wilderness

At the time the US Wilderness Act was being debated, the American public was just beginning to comprehend the challenges ahead with regard to the need for more effective ocean conservation. Today, there are many documented examples of how humans have exceeded the limits of the capacity of both land and sea to accommodate sometimes even moderate levels of resource exploitation (Agardy 1997). It is not surprising, therefore, that our potential responses to this emerging concept of a more fragile ocean ecosystem should include the idea of wilderness designation for ocean and coastal waters. About a century after Thoreau (1865) offered his thoughts about the ocean as wilderness, similar ideas resurfaced. As summarized by Barr (2008), Wallis (1958) offered some ideas for advancing ocean wilderness stewardship within the National Park System, and Eissler (1968) suggested the idea of an “underwater wilderness system” modeled after what was contemplated in draft language for the Wilderness Act for the land. A few years later, Smith and Watson (1979) argued that “mankind should give serious consideration to underwater wilderness values.” At the 3rd World Wilderness Congress (WWC), Smith (1984) spoke of the need to consider designating coastal waters as wilderness, and at the following Congress, Foster and

Lemay (1988) developed the first of what has been three plenary sessions at the 4th, 8th and 9th WWCs dedicated to discussions of ocean wilderness. Papers have been published on the subject by Barr (2001, 2003, 2008), Rufe (2001), Sloan (2002). This notion has a long, sometimes contentious history. However, as many fisheries collapse, the climate changes, and more and more people are willing to admit the oceans are in trouble, it could be argued, as the early conservationists did for the land, that ocean wilderness should be given some serious consideration.

The suggestion to model a definition for ocean wilderness on the US Wilderness Act of 1964 was first proposed by Brailovskaya (1998) and subsequently carried forward by the present author (Barr 2001, Barr 2003, Barr and Lindholm 2000). Not only does this statute have a rich and comprehensive literature surrounding its writing and implementation, spanning more than half a century, but also it seems to possess the basic elements of what a wilderness definition generally should contain, based on this survey and analysis of international wilderness law and policy. Most importantly, there are already wilderness waters areas currently designated under the Act (as discussed in Chapter 4).

In addition to offering evidence of the potential utility of using the Wilderness Act as a model for the development of a robust definition for ocean wilderness, this survey also identifies certain issues that deserve particular attention. These are issues that would need further investigation and analysis to resolve interpretation specific to ocean wilderness within the context of the Act. Two immediately rise to the top of the list.

One is the issue of size. Recently there has been considerable effort applied to the issue “right-sizing” marine reserves and reserve networks. Examples of this work include the Channel Islands National Marine Sanctuary and Channel Islands National Park off California (<http://channelislands.noaa.gov/marineres/main.html>), the Tortugas Ecological Reserve in the Florida Keys National Marine Sanctuary (<http://floridakeys.noaa.gov/tortugas/welcome.html>), and the recent Representative Areas Program and rezoning of the Great Barrier Reef Marine Park in Australia (http://www.gbrmpa.gov.au/corp_site/management/zoning/index.html). Important lessons are being learned about

how large marine reserves should be to preserve resources and meet management goals for those areas. One lesson immediately applicable is the need for good geospatial data to facilitate a comprehensive understanding of the biogeography of the ecosystem within which the protected area and/or network is to be located. While this Australian research was not conducted explicitly to address ocean wilderness, it is likely to be quite applicable nonetheless, and could help provide a robust and scientifically supported basis for determining the appropriate size of wilderness waters designations. Surely, the “bigger is better” approach to terrestrial wilderness, focusing on walking distances and buffers from human development, offers a far less scientifically rigorous basis for “right sizing” of wilderness on the land than current approaches being used to establishing protected areas in ocean and coastal waters.

The other lesson is the issue of the human connection to ocean wilderness, particularly the often intimate relationship of Aboriginal people to wilderness. This has been a significant issue for terrestrial wilderness in places like Alaska, where subsistence harvest is not just a way to gather food, but part of the social, cultural and spiritual fabric of native communities (Berkes 1999). In addition to understanding the deep cultural connection between Aboriginal communities and terrestrial wilderness, our understanding of tribal and First Nations’ reliance on and connection to marine resources and ecosystems is expanding. There has been a significant increase in Aboriginal community participation in resource management in protected areas. Examples include Inuit whaling and sealing in the Arctic, tribal interests and participation in salmon fishing in the Pacific Northwest, and seabird egg collection by Native communities in Southeast Alaska. Most likely, these communities would not hesitate to become partners in the process of defining ocean wilderness, and more active participation could be encouraged as an essential part of how wilderness waters are identified and managed (as discussed in Chapter 6).

From a practical perspective, the NPS and US Fish and Wildlife Service (USFWS) are already implementing ocean wilderness under the Wilderness Act, as will be discussed in more detail in Chapter 4. In Glacier Bay National Park and Preserve, 215

square kilometers of marine waters have been added to the NWPS and are being managed as wilderness by the NPS. Relatively large areas of designated wilderness surround two islands in the Alaska Maritime National Wildlife Refuge (NWR) in Southeast Alaska, adjacent to another island wilderness area in the Yukon Delta NWR, coastal waters and embayments in the Arctic NWR, and one large area has been designated in Florida in waters of the Chassahowitzka NWR. There are other NPS units where wilderness has been designated in marine waters, including areas in Point Reyes National Seashore and Everglades National Park, but (until this present work – See Chapter 4) no comprehensive survey had been undertaken to identify how many marine waters areas have been designated as wilderness in national parks, seashores, monuments, wildlife refuges, and even coastal areas of national forests. Neither had it been widely known, beyond Glacier Bay National Park and Preserve, whether any of these additional wilderness areas in marine waters are being managed differently than the contiguous upland park areas, or even considered at all (also discussed in Chapter 4). However, the simple fact that ocean wilderness is already part of the NWPS offers a baseline for further analysis and discussion.

2.5 First Attempt at a Consensus Definition

The “International Wilderness Law and Policy Roundtable: Lessons Learned and Expanding Global Applications,” sponsored by the WILD Foundation, was convened in 2004. This workshop offered an opportunity for the author to assemble a group of experts with considerable knowledge, experience, and interest in the topics of marine conservation, marine protected areas, and ocean wilderness. The goal of this session was to attempt to develop a “first draft” of a robust definition of wilderness waters (Barr 2008). The Marine Experts Group, as it was called at the Workshop, included senior scientists and managers from the US National Oceanic and Atmospheric Administration, the NPS the USFWS, and the Australian Great Barrier Reef Marine Park Authority. It also included representatives from Parks Canada, the Government of Chile, academic scientists, and staff scientists and policy analysts from marine and wilderness non-

governmental organizations from the US and Canada. Included in this group were the majority of the authors of papers that comprise the currently small body of literature specifically addressing ocean wilderness, as well as those with expertise in and familiarity with terrestrial wilderness management. This group came together to specifically address the following questions:

- Can we develop a working definition for “ocean wilderness” and if so, what might be?
- What are the relevant wilderness values that might be most important in preserving ocean wilderness?
- What are other challenges and unresolved issues related to effectively addressing the designation and preservation of “ocean wilderness?”

Over three days, these questions were discussed and debated. Presentations were made regarding relevant research, policy development, and management activities. Given the scope of the questions before it, the participants made significant progress, and reached consensus on a number of key points.

Regarding existing authorities, the panel concluded that the US Wilderness Act is relevant and can be directly applied to management of ocean wilderness in areas of its jurisdiction (i.e. in US National Parks, National Wildlife Refuges, National Forests and lands under the authority of the Bureau of Land Management). This conclusion was interesting in that it directly contradicted the consensus reached by a previous panel of non-governmental organizations meeting to discuss the concept of ocean wilderness, as reported at the Roundtable (David Festa, National Marine Program Director, Environmental Defense, 8 November 2004, personal communication). There was little argument that the Act could be used for this purpose. However, concern had been expressed by these advocates at the previous workshop that the expanded use of the Wilderness Act as a mechanism for designating wilderness in ocean and coastal areas would create additional controversy about wilderness generally. It was felt that the expanded use of the Act would have a dampening effect on additional important terrestrial wilderness areas that had been proposed and were being actively pursued.

The Workshop's Ocean Experts group concluded that in developing definitions, it is essential to consider that ocean wilderness is "multidimensional" involving active consideration of the areas above, on, and below the sea surface. These areas might require differing management approaches, but they all should be included.

The group cautioned that outcomes are more important than words. Given the political sensitivity of "wilderness" and the divisive process that is likely to accompany any attempt to modify the Wilderness Act, a better strategy might be to protect wilderness values through zoning, without evoking the word "wilderness" in that process. This had reportedly been done successfully in the rezoning initiative at the Great Barrier Reef Marine Park (Jon Day, Director of Conservation, Biodiversity and World Heritage, Great Barrier Reef Marine Park Authority, 9 November 2004, personal communication).

After much debate and deliberation, the group came to consensus on a working definition for ocean wilderness:

Areas of the marine environment that are untrammled and generally undisturbed by human activities and dedicated to the preservation of ecological integrity, biological diversity, and environmental health. An area of ocean wilderness may provide:

- opportunities for quiet appreciation and enjoyment in such a manner that will leave these areas unimpaired for future generations as ocean wilderness; and
- continued opportunities for subsistence uses and Indigenous cultural practices.

This working definition seems to be fully consistent with terrestrial wilderness laws and policies summarized in this chapter, and provided another potential step forward in coming to some collective understanding of what is meant when the term "ocean wilderness" is used. The group also offered some insights into what they felt were essential wilderness values linked to the key elements of the working definition, summarized in Table 2-2.

Three other issues were identified as potential challenges and issues that require further analysis.

Table 2-2: Wilderness Values Underlying the Roundtable Working Definition.

Key Elements of Definition	Wilderness Value	Relevant Descriptive Terms
Untrammelled and generally undisturbed by human activities	Recreational Scenic Therapeutic	Challenge, risk, adventure, compatible hunting and fishing;
	Recreational Therapeutic	Remoteness, enjoyment without motorized water sports
Preservation of ecological integrity	Ecological	Intact flora and fauna, storehouse for biodiversity, allow for restoration, maintain unimpeded ecological community interactions
	Scientific	Research and monitoring
	Educational	Creating understanding and respect
Opportunities for quiet appreciation and enjoyment	Spiritual	Well-being, healing, inspiration,
	Artistic	Inspiration, imagination
Unimpaired for future generations as ocean wilderness	Existence	
	Moral	Peace values
	Historic	
	Symbolic	
	Economic	Allowing appropriate recreational activities
	Ecological	
	Spiritual	Well-being, healing, inspiration
Opportunities for subsistence indigenous cultural practices	Cultural	In perpetuity, perpetuating myth and legend
	Aboriginal Rights	Uphold treaty rights, laws, subsistence uses

- Recreational fishing should not be permitted simply because of political pressure. It can be effectively managed with gear, time and area access restrictions, and other traditional recreational fishery management measures, but how much active management should be undertaken in ocean wilderness?
- Motorized access to ocean wilderness is probably necessary for safety and practicality in most ocean areas, but where attributes, such as vessel size, draft, power, can be limited, they should be limited and non-motorized areas should be considered where appropriate.

- Determining how disturbed an area could be and still warrant designation as ocean wilderness was another unresolved issue. Echoing the Forest Service's "purity" debate of the early days of the Wilderness Act implementation, additional analysis would have to be conducted to address this question. Determining how much, how long, how frequent, how extensive would human disturbance have to be in an area, and how long would it take to recover to a "natural state," would be a prerequisite to being able to make a decision as to whether an area could be designated ocean wilderness. Having some sense of disturbance history and recovery rates would be essential, but may not be readily available in the majority of cases. Just "seeing" the extent of human disturbance might be difficult, as these areas are largely underwater and may require advanced undersea technology to characterize and map resources.

Since the Workshop, there have been sessions at each of the last two WWCs focused on marine wilderness. At the first session at the 8th WWC in Anchorage, Alaska, held in October 2005, the results of the Workshop were presented and discussed. The results of the Workshop have also been used to help support the work of the Marine Wilderness Collaborative (<http://www.wild.org/main/how-wild-works/policy-research/marine-wilderness-collaborative>), established by the WILD Foundation to advance discussion of the topic. The Marine Wilderness Collaborative conducted a marine wilderness session at the 9th WWC in Merida, Mexico, in November 2009, and discussion continued. But, true consensus on a working definition remained elusive. Progress has been made in reaching this goal, albeit in a very punctuated way, but this has been the history of ocean wilderness since the idea was first introduced in the late 1950s.

2.6 Conclusion

This review of international terrestrial wilderness laws and policies and the work of the Ocean Wilderness Experts Group offer important information and insights to help

clarify and illuminate the concept of ocean wilderness and the practice of ocean wilderness designation and preservation efforts. It is clear that the task of defining ocean wilderness does not have to start with first principles. Important lessons can be learned from the long and often difficult work of terrestrial wilderness scholars and managers, lessons that can be directly applied to the ocean. Those involved in protecting and managing ocean ecosystems have already begun to delve into the application of the wilderness concept to ocean waters and some significant steps toward more active implementation are being taken (as discussed in Chapter 7). Ever pragmatic, marine protected area managers are already preserving ocean wilderness in places like Glacier Bay National Park and Preserve, Papahānauōkū Marine National Monument, and the Great Barrier Reef, unwilling to wait for the theory to catch up to the pressing need. These are different means to the same end.

The definition developed at the Roundtable (with the “friendly amendment” suggested by Eidsvik (1989) – “Wilderness is an area where natural processes dominate and people may co-exist as long as their technology and their impacts do not endure.” – offers an appropriate and credible starting point for further discussion and debate. Ultimately (at least in the US) it is the visionary language of the Wilderness Act that will be most important in this discussion. It could be argued that there are seemingly few obstacles for using the Act as written to empower the designation of additional wilderness waters areas. While the language of the Act has not changed since Congress passed the law in 1964, wilderness management agency interpretation of that language has evolved to address new situations, technologies, and the continued encroachment of man on our last wild places.

Wilderness is wilderness, whether it is on a mountaintop, within the great boreal forest, or in the ocean. The wilderness values being preserved in the existing 100,000 acres (approximately 405 square kilometers) of wilderness waters are those common to all wilderness areas. Definitions of “wilderness character” (Landres et al. 2008a) appear to be directly applicable to wilderness waters. There is a rich history of critical thinking about the idea of wilderness that has been developed over the more than a century since

the Wilderness Movement began. This body of knowledge could inform, and guide how wilderness is identified and established in the ocean, and how effective stewardship of these areas can be achieved. Since the beginning, the idea of wilderness has been changing to conform with new environments, new management challenges, and regions where our thinking about preserving wilderness character and values needed to evolve to accommodate the new conditions encountered. The early debate about “purity” was resolved in the “Endangered Wilderness Act of 1978 (P.L. 95-237), regarding how wilderness should be evaluated in areas that had been modified by the human activity. The Wild and Scenic Rivers Act (P.L. 90-542) extended the protection of wilderness values to riverine ecosystems and riparian shorelines. The so-called “Eastern Wilderness Act” (P.L. 96-622) changed how expansive a wilderness needed to be, recognizing the limited geography of the East compared to the original Western wildernesses. The “Federal Land Policy and Management Act” (P.L. 94-579) added the Bureau of Land Management as another wilderness management agency. The Alaska National Interest Lands Conservation Act of 1980 (P.L. 96-48) set new standards for how wilderness would be managed in the remote Alaskan wildernesses. The legislative history of the Wilderness Act includes nearly 140 examples of “special provisions” (<http://www.wilderness.net>). These are attached to new designations and tailor the implementation of the Wilderness Act to particular conditions within these wilderness areas, or the political realities associated with that designation. Compromise, change and accommodation, without losing the original intent of the Wilderness Act, is a foundation element of wilderness preservation. These attributes have helped to keep the vision of wilderness stewardship thriving in the face of sometimes strong political opposition and a changing and dynamic environment.

In a recent and insightful paper by Young (2010), the idea of resilience, vulnerability and adaptation inherent in socio-ecological systems (Holling and Gunderson 2002) was extended and applied to governance systems:

With the passage of time, environmental and resource regimes become increasingly entrenched. Often, they fall prey to rigidification and suffer

from what observers have called institutional arthritis (Olson, 1982). The effect of this is to sap their resilience and to increase their vulnerability to various types of stress. Stresses, on the other hand, exhibit a tendency to proliferate and to become interactive and cumulative over time. The longer institutions remain in place, the more brittle and crisis prone they apt to become. Sooner or later, stresses will overcome the stress management capacity of regimes, paving the way toward the occurrence of changes that are non-linear and often abrupt.

If Young's argument is correct and resilience theory can indeed be appropriately applied to governance systems, then the compromise, change, and accommodation observed in this adaptive governance mechanism for wilderness stewardship contributes to its longevity and continued success. Expanding ocean and coastal wilderness waters may be something of "disturbance" to the system, but it could also continue to strengthen its resilience and adaptive capacity in the long view. System diversity and learning opportunities would be expanded, new constituencies will become engaged, and the stronger and more effective governance of wilderness could continue to offer future generations the opportunity to appreciate and benefit from wilderness, both on land and in the sea.

Coming full circle to the underlying theme of this discussion, the name that we use to label something is important. Oceans are "public waters" in common ownership and the public has an important stake in these deliberations. Provocative to some, evoking the term "wilderness" in this work is likely to be both necessary and appropriate. This idea may be contrary to the recommendations of the Ocean Wilderness Workshop's Marine Experts Group, who felt that "outcomes are more important than words," but in this case it is the words that may be more important. The public, as stewards and "owners," must be fully aware of this task and its implications so that they can effectively engage in the public policy process as informed and responsible participants. If this is a "bridge too far" and the public is ultimately unwilling to support it, they would do so more clearly understanding what is at stake and what they are trading off in the decision

making process. However, there should be little trepidation about the use of the word “wilderness,” as the public has a deep and visceral connection to the heritage of wilderness. As Edward Abbey (1977) once said “Wilderness needs no defense, only more defenders.”

CHAPTER 3 “What We Think it Is” – Perceptions of Wilderness and their Application to Ocean and Coastal Waters

3.1 Introduction: “What have we said it is?”

If “wilderness is what people think it is” (Hendee and Dawson 2002), it is essential to more clearly understand how people perceive wilderness in ocean and coastal waters. This is important, not only to better define the term “ocean wilderness,” but also ultimately to be able to better identify, designate and manage it effectively. The definition of wilderness, as Nash (2001) has suggested, “is complex and partly contradictory,” and therefore provides only an outline for the boundaries of this concept. The fact that there are a number of self-identified areas of “ocean wilderness” (Barr 2001) suggests there are those who believe they “know it when they see it.” Therefore, it is conceivable that a better sense of the resources, uses, qualities and attributes of wilderness waters can be more clearly articulated by quantitatively assessing the perceptions of those who have some knowledge of this topic.

Studies of human perception of wilderness – in the sense of untrammelled, beautiful natural landscape or environment – generally focus on illuminating attributes and qualities that we, as a society, most highly value in these areas. These studies seek to clarify and articulate the degree of importance various user groups, managers or other “experts,” and the public place on recreational use, ecological services, and appreciation of wilderness. Often this has been done comparing these somewhat less tangible values to the potential resource extraction value of the area (Hendee and Dawson 2002).

According to Hendee and Dawson (2002), core wilderness values include:

- protecting air, water and wildlife habitat quality
- preserving biodiversity and healthy ecosystems
- protecting unique or endangered plants and animals
- preserving “wildness” and “naturalness,” scenic beauty
- providing opportunities for solitude, spiritual growth, education, science recreation, economic benefits, subsistence

- preserving cultural and historical attributes of these areas

These values of wilderness are often shared by both users of wilderness (i.e. “use values,” largely related to recreational opportunities) and those who may never visit these areas but value them nonetheless (“non-use values”). The primary importance of understanding human perception of wilderness values is to inform and guide those responsible for wilderness stewardship in the identification, designation and management of these areas. Knowledge of the public’s perceptions of wilderness can also be important information for managers in helping to determine which uses might be compatible or incompatible with regard to effectively preserving wilderness quality.

A survey was conducted in 2011 as a part of this research to offer specific information regarding perceptions of wilderness relevant to ocean and coastal waters. This information includes what attributes of areas contribute to their perception as wilderness, and what ocean uses may be compatible or incompatible with maintaining the characteristics that give rise to those perceptions. This chapter first provides a review and synthesis of previous surveys relevant to ocean wilderness and second provides the details of the 2011 survey, which was targeted at protected areas managers and scientists, including methodology, results, analysis, and a discussion of the key findings. The goal of the survey, as stated in the preamble to the survey instrument, was “to better understand what characteristics of areas of the ocean and coastal waters seem to be consistent with our perceptions of wilderness generally. This information will help to better define what ‘ocean wilderness’ is and how, like our deeply-valued wilderness areas on land, these areas might be effectively identified and preserved for future generations.”

3.2 Context: Potential Insights from Existing Surveys and Research

3.2.1 The National Survey of Recreation and the Environment

Perceptions of wilderness, typically referring to terrestrial areas, have been analyzed extensively, particularly with regard to recreational uses of these areas. The National Survey of Recreation and the Environment (NSRE) is a survey conducted periodically since 1960 (USDA Forest Service and NOAA 2000) to “discover and

describe:

- participation by Americans in outdoor recreation activities
- opinions concerning management of both public and private forests and grasslands
- the importance and value of our natural environment
- uses and values of wildlife and wilderness
- people's lifestyles
- recreational trips people take away from home."

It is an extensive survey of public attitudes, activities, and aspirations, sampling over 75,000 households across the US. By comparing the results of these periodic surveys, trends in recreation use can help guide and inform resource management.

Assessing use and perceptions of wilderness is a part of the NSRE mandate. The NSRE poses more than 50 questions related to wildlife and wilderness use. Some of the findings of the most recently conducted NSRE, completed in 2000, included:

- About half of the respondents were aware of the National Wilderness Preservation System and more than 50% had visited a designated wilderness within the past twelve months.
- A majority of respondents "strongly agreed" that: wilderness should be protecting air and water quality (80%); protecting plant and animal species, particularly those that have scientific or human health value (76%); wilderness is important to maintain natural conditions in these areas (68%); and that the "trees, wildlife, free flowing water, rock formations, and meadows that wilderness protects have value themselves whether or not humans benefit from them" (73%).
- A vast majority of respondents felt it was "extremely important" or "very important" for benefits of wilderness designations to include "protecting water quality" (91%) "protecting wildlife habitat" (87%), "preserving unique wild plants and animals" (80%), "protecting air quality" (92%), "protecting rare and endangered species" (83%).
- Fewer respondents felt that wilderness is providing "extremely important" or

“very important” benefits related to “providing income for the tourist industry” (33%), “preserving natural areas for scientific study” (57%), and “providing spiritual inspiration” (58%).

- 70% of respondents “strongly favor” or “somewhat favor” the designation of new wilderness areas (in their state).

The NSRE also focuses on the “non-use” values of wilderness, finding:

- 84% “strongly agree” with the importance of “bequest value” (“I enjoy knowing that future generations will be able to visit and experience wilderness areas”).
- 74% of respondents believe that “existence value” is “extremely important” or “very important” (“Just knowing that wilderness and primitive areas exist.”).
- 73% feel that “option value” (or at least an element of option value related to opportunities for future visitation) is “extremely important” or “very important” (“Knowing that in the future I will have the option to visit a wilderness area or primitive area of my choice.”)

This survey also found that activities, often conducted in ocean and coastal waters were increasing in popularity, and that kayaking, canoeing, and “viewing or photographing fish” were among the fastest growing activities between 1995 and 2000. From a wilderness waters perspective, it is reasonable to presume that these activities could represent compatible uses. While public perceptions of “compatibility” of potential uses cannot be the sole determinant of whether particular uses should be permitted or prohibited in wilderness, such information can offer useful guidance.

Wilderness perception surveys are likely to be more robust if respondents have a broader knowledge of existing management policy and regulation, particularly what uses are permitted under the relevant statutory authority. It is also useful to identify what sources of information are relied upon to inform public opinion about wilderness, as well as how confident respondents are in the veracity of this information. The results of this most recent NSRE (USDA Forest Service and NOAA 2000) suggest that the level of wilderness knowledge of the public responding to the survey is generally inadequate:

- Less than half (46%) of respondents knew that Congress designated wilderness.

- About 40% of respondents believed that motor vehicle access was permitted.
- 68% believe that timber can be harvested from wilderness areas.
- More than half (54%) believe that all national park lands are designated wilderness, and that creating roads for recreational access is permitted (72%).

Other studies that address this issue (Burde and Fadden 1995, Cordell et al. 1998, Stankey and Schreyer 1987, Utter 1983, Young 1980, Young and Crandall 1979) offer similar findings. Shultis (1999) reported that New Zealanders seem to share a similar level of misinformation about legally permissible uses of wilderness areas.

With regard to potential sources of information, including resource agencies, media, and other users, few of these sources were believed to be accurate (“usually” or “always”) more than 50% of the time. Media is perceived as being even less accurate in offering reliable information regarding wilderness. Such information is not only useful to managers with regard to public awareness of wilderness and how this might be improved through interpretation and outreach efforts, but it is also quite valuable in guiding the appropriate interpretation of survey results. Clearly, if half of the public believes that road-building, motorized access and timber harvesting are generally permitted uses – activities that are, in fact, specifically prohibited in the Wilderness Act (except when specifically permitted in the designation of that area under “special provisions”) – then their perception of other potential “compatible uses” may be questionable.

The NSRE (USDA Forest Service and NOAA 2000) included a number of additional questions specifically focused on marine recreation. The report developed from the responses to these supplemental questions (Leeworthy et al. 2005) offered a detailed analysis of recreational activities in coastal and ocean waters. While this survey and analysis did not explicitly address ocean wilderness, it provided some insight into the recreation trends likely to have some effect on potential wilderness waters designation.

In a general overview, the authors analyzed nineteen activities [visiting beaches, visiting waterslides adjacent to beaches, swimming, snorkeling, scuba diving, surfing, wind surfing, fishing, motor boating, sailing, personal watercraft (jet ski) use, canoeing, kayaking, rowing, water skiing, viewing or photographing scenery, hunting waterfowl,

bird-watching, and viewing other wildlife] with regard to trends in future participation, and concluded that:

- Thirteen activities are expected to decline, in terms of the percentage of participation.
- Four activities (waterslides, scuba diving, hunting waterfowl, and rowing) are expected to increase.
- Two (surfing and wind surfing) are expected to remain constant.

Scuba diving, for example, was projected to increase by 2.4 million divers, but was also projected to decline in terms of the number of mean days of participation (-3.7%). The rate of visiting beaches is expected to decline (-0.4%) but the actual number of “visit days” is projected to increase by 10.3%. As a general trend, every activity analyzed exhibited such a projected trend in increases in “total number of days.” Therefore, demand for recreation in marine waters is increasing although the actual number of recreationists is decreasing. Of these activities, those involving motorized use would likely be problematic with regard to wilderness waters, and infrastructure requirements for some others (such as beach use) could present challenges.

This marine recreation survey (Leeworthy et al. 2005) also offered some insights into the potential effects of changing demographic characteristics in the US. In terms of age, the study concluded:

Over the longer-term forecast period, the proportion of the population 65 years old and older is projected to increase. Since age is negatively related to participation rates for all activities/settings except bird watching, the impact of the aging population decreases projected participation rates for all activities/settings except bird-watching...age is a statistically significant factor” in all projections (except hunting waterfowl).

As might be expected from much recent research on the topic (Louv 2008), participation of young people in marine recreation was also expected to decline. A similar trend was also found for “coastal county residence,” but projected increases in “household income” would likely fuel the increases in days participating in nearly all activities. The findings

regarding “race/ethnicity” were not conclusive, nor did there appear to be any significant effects related to gender or level of education.

A number of relevant, follow-up studies have utilized data from the NSRE. For example, Brown and Alessa (2005) conducted a meta-analysis of wilderness perception surveys from Alaska, including data from the NSRE, comparing key wilderness values identified for areas both inside and outside designated wilderness. They found that “intrinsic, aesthetic, future, and life-sustaining values” (non-use values) “to be relatively strong positive predictors of wilderness value, whereas economic and recreation values were relatively strong antipodal predictors of wilderness value.” The authors deemed these findings to be wholly consistent with the results of the NSRE. They suggested that “It may be possible to identify areas with perceived wilderness values without actually asking individuals about the specific location of wilderness,” thus avoiding the confounding influence of place and politics. This is an important finding for the purposes of this study. Additional research arising from the NSRE, in this case addressing the implications of race/ethnicity on wilderness values (Johnson et al. 2004) is discussed below.

3.2.2 Specific Studies of Wilderness Perceptions

Beyond the NSRE, there is a rich literature related to perception of wilderness, but all, except one (Shafer and Benzaken 1998), addressed terrestrial wilderness. The majority of these studies focused on the direct-use, recreational value of wilderness, but a significant number also addressed and attempted to quantify the non-use values (i.e. bequest, existence, option, and quasi-option) of wilderness areas. These examples of studies of perceptions of wilderness values help to illustrate the kind of insights such research can provide. They are not intended to represent a comprehensive overview of all such published studies, but each offers some observations and findings specifically relevant to discussions of wilderness waters.

Hendee and Dawson (2002) provided an extensive overview of wilderness use and user trends, touching on the idea of indirect use and non-use values. They described,

through numerous case studies, methodologies that can be utilized to assess these user trends, to identify wilderness perceptions, and discussed the potential value of this information to guide and inform wilderness stewardship. The authors provided an interesting insight about what is known about the “typical wilderness user”:

Characteristics of wilderness users are well known from many studies, and their characteristics are similar from area to area, even in different parts of the nation. In general, wilderness users, compared to the general population, tend to be young but with all age groups represented, predominantly male but with increasing numbers of women, from urban areas but largely near the wilderness area visited, are above average in income but rarely wealthy, well educated, and in professional or technical occupations or students.

Such characterizations are generalizations, but they are based on the interpretation of results of many studies (e.g. Hende and Stankey 1973, Roggenbuck 1988, Roggenbuck and Lucas 1987, Roggenbuck and Watson 1988, Watson et al. 1992). This generalized characterization is also largely consistent with the findings of the NSRE (USDA Forest Service and NOAA 2000), although the spectrum of users may be changing over time (Cordell et al. 2003) and therefore continued study and analysis is necessary and appropriate. No similar directed attempt to characterize of the user community in ocean wilderness has been undertaken, although the demographic findings of Leeworthy et al. (2005), discussed above, offered some potentially useful observations about the general characteristics of marine recreationists.

Internationally, perceptions of wilderness vary from country to country, attributable to the life experience of the respondents and factors that contribute to their “sense of place” unique to that country and its citizens. In a survey-based study of wilderness perceptions in Canada (Lutz et al. 1999), both urban and rural respondents valued preserving wilderness areas, but their perception of the wilderness qualities of images presented in the survey differed considerably, with rural respondents evaluating the images as “less wild” than their urban counterparts.

The Swiss possess a more “utilitarian” view of wilderness, often perceiving it “not useful to people,” contrary to findings in many other Western countries (Bauer 2005). Further, this questionnaire-based survey found that perception of value is highly linked to the natural state of the area and how much it is influenced by human activities. The author also concluded that feeling free from rules and regulations was an important element of Swiss perception of wilderness.

There are differences in perceptions of designated wilderness based on the nationality of tourists visiting New Zealand wilderness (Higham 1998, Higham et al. 2000). This research developed and calculated a “wilderness purism scale” (1 = “non-purist” to 4 = “strong purist”) based on survey results of international visitors’ preferences regarding various human activities and their desirability in designated wilderness. It was found that of the eleven nationalities represented in the list of respondents, visitors from Japan and Israel tended more toward the “non-purist” end of the scale, whereas visitors from Australia, Britain, and the US exhibited more “strong purist” perceptions of wilderness. In Finland, Fyhri et al. (2009) reported similar differences in a comparison of wilderness values of tourists and native Finns.

Another wilderness landscape preference survey from Finland (Hallikainen 2000) identified virgin forests and open bogs as most emblematic of wilderness in this country. The study found that:

Wilderness areas have to be vast, roadless, remote, peaceful, silent and at least near their natural condition. Ponds, streams, wooden trails across bogs and old cabins for common use are consistent with the idea of Finnish wilderness. Finnish people appreciate and use...wilderness areas mostly for picking berries or mushrooms, hunting, fishing and hiking. The experience of peace and silence is the most important motive to visit wilderness.”

Around 96% of the respondents perceived wilderness preservation and protection to be important and the three most significant values identified were species conservation, wilderness preservation for future generations (“bequest value”) and wilderness

recreation.

Finally, Van den Berg and Koole (2006) conducted a photo-based survey to determine preference for terrestrial wilderness attributes in Holland. The results of this survey indicated that the Dutch preferred forested wilderness over similarly undeveloped areas of rural, open terrain. Perhaps more significantly, they report that “place of residence, age, socio-economic status, farming background, preference for green political parties, and recreational motives were found to be systematically related to relative preferences for wild versus managed nature scenes.” This finding would appear to offer a clear delineation of the factors important in the formulation of “sense of place’ related to wilderness in Holland.

3.2.3 Wilderness Values, Demographics, and User Communities

Various demographic groups and wilderness user communities have been shown to hold differing perceptions of wilderness. Ethnicity/race has been identified as a factor in determining wilderness values important to native-born and immigrant communities (Johnson et al. 2004). In this study of wilderness values, using data from the most recent NSRE (USDA Forest Service and NOAA 2000), immigrant groups were found to be less likely than native-born white respondents to identify on-site direct use values as important, heavily favoring non-use values. Native-born African-American and white respondents differed considerably in perception of the importance of direct-use values, but showed little difference in their perception of the importance of non-use values. Such analyses are critically important, given the changing demographics of the US toward increasing minority populations. As Johnson et al. (2004) concluded:

The continuance of the National Wilderness Preservation System will ultimately depend to a great extent on the popular political support of all voting Americans and the varied perspectives they hold about wilderness. If support for passive use values and future use values are correctly assessed by our study, then political support for wilderness may not diminish appreciably in the future as America becomes more diverse.

Buijs et al. (2009) similarly found that native Dutch and immigrants to Holland from Islamic countries differed considerably in their wilderness landscape preferences.

Representatives of recreational user groups, sometimes engaged in arguably similar pursuits, have been found to possess considerably different perceptions of wilderness. Differences were reported between motor boaters and canoeists in an early study of wilderness perception in the Boundary Waters Canoe Area in Minnesota (Lucas 1964). The canoeists had a higher threshold for what they considered wilderness. In this survey, they mentioned the importance of a sense of solitude (higher use areas were considered as having fewer wilderness qualities), and the type of use encountered (motorboats were perceived to diminish wilderness quality more than other paddlers). Remoteness and other uses (e.g., logging) were judged to be considerably less important.

In contrast, motor boaters perceived wilderness qualities in areas with roads and buildings, and were considerably more tolerant than paddlers of high use areas in terms of this activity degrading the quality of the wilderness. In contrast with canoeists, motorboaters did not express any differences in perception regarding the type of boating activity encountered. While this was an early study and largely qualitative in its analysis, it has some relevance to perception of wilderness values in ocean and coastal waters where boating is likely to be the primary form of access.

In a survey focused on wilderness users in Shenandoah National Park, some differences in wilderness perception were identified between day and overnight users, but these differences were believed to be “a matter of degree” (Papenfuse et al. 2000). The two types of users differed in their expectations of their wilderness experience. However, these differences were believed to have little management relevance beyond recommendations for better informing wilderness visitors of how wilderness is formally defined and why certain rules and regulations have been enacted to meet the requirements established in the Wilderness Act.

“Wild” areas seem to be perceived differently than those that are simply in a “natural” state. Habron (1998) reported that perceptions of “wildness” of the Scottish countryside were less divergent than perceptions of “naturalness,” based on the results of

a photo-based survey among various groups who recreate and work outdoors. There is likely more to wilderness than simply whether an area is perceived to be relatively pristine.

The approach of using survey research to establish and articulate wilderness perception has been broadly applied. Much has been learned about how such information can guide and inform how we define wilderness, how it can be most effectively identified and designated, and what values are important to be sustained and preserved. At least for terrestrial wilderness, there is a rich and robust literature to identify “what we think wilderness is,” providing some potential guidance for which wilderness values and qualities may be important in other environments, including the ocean and coastal waters.

3.2.4 Surveys of Wilderness in MPAs

There has been only one survey conducted that specifically addresses the application of the idea of wilderness to marine protected areas. Shafer and Benzaken (1998), in research on perception of wilderness values in the Great Barrier Reef Marine Park (GBRMP), sought to identify whether users perceived the presence of wilderness in various sections of the marine park. This research was intended to assist in identifying wilderness suitable for formal designation. The study employed the metrics (i.e. “remoteness from settlement,” “remoteness from access,” “apparent naturalness,” and “biophysical naturalness”) from the Australian National Wilderness Inventory (ANWI; Australia Heritage Commission 2003) to assess the apparent wilderness quality of various areas within the Great Barrier Reef (GBR) marine protected area. This research was focused on the following goals:

1. Determine if users of the GBRMP were willing to ascribe the word “wilderness” to the resource and, if so, to what types of settings.
2. Determine the relative importance of recognized terrestrial wilderness attributes in potential GBRMP wilderness.
3. Determine if there was a relationship between the importance marine park users placed on wilderness attributes (e.g., remoteness) and regions of the

GBRMP where they believe wilderness exists.

The survey questionnaire targeted frequent users of the GBRMP engaged in either work or recreation activities.

Based on over four hundred responses, the authors found that more than 80% of respondents believed that wilderness was present in the marine park. It included attributes both above and below the surface of the water. The survey results confirmed that the respondents were active users, with 44% reporting that they had visited more than thirty different reefs in the park, that 85% had been visiting the GBRMP for more than three years, and that 74% had visited reefs in the park at least once a month. Respondents felt that wilderness existed in portions of the GBRMP, and that the presence of people and related development were most important in determining wilderness quality.

They also reported that absolute distances from people and access points were least important. These findings have considerable significance. As the authors observed, a sense of solitude and remoteness may be perceived in more limited geographic areas underwater, potentially closer to points of access and areas where human development is nearby. The authors suggested that this perception was a result of the different way the underwater environment is perceived, limited by water visibility and a greater sense of confinement resulting from observing the surrounding waters through a diving mask. However, on the surface this human presence is more evident as visibility is less limited, and greater distances would be required to achieve the same perception of wilderness quality. Clearly, this would make identification of boundaries for wilderness in ocean and coastal waters somewhat more problematic if wilderness was indeed both above and below the water's surface.

Inglis et al. (1999) offered some corroborative evidence of this perceptual difference between surface and "submerged" users in a preference study of snorkeler crowding in the GBRMP. Their study found that seeing six other snorkelers under the water elicited a perception of crowding, where on the surface, a snorkeler could encounter as many as 14 other snorkelers before a similar "crowding" threshold was

reached. The finding that the crowding threshold was more than two times higher than the threshold under the water may also be important in balancing out the spatial disparity suggested by Shafer and Benzaken arising from what they termed “psychological remoteness.”

The current research has attempted to duplicate some of the elements of this 1998 survey and a comparative analysis of the relevant wilderness attribute data was conducted. The results of this comparative analysis are reported at the end of Section 3.3.4.2, below.

3.3 The Ocean Wilderness Survey

Given the paucity of information regarding perceptions of ocean wilderness, a survey was designed and conducted in 2011 to gather additional information to assist in defining and establishing a management context for wilderness waters. This additional information includes identifying qualities and attributes of ocean and coastal waters perceived to possess wilderness qualities, and determining which human uses are perceived to be most and least compatible in wilderness waters.

The survey was published on-line through the “SurveyMonkey” website, and included questions regarding:

- the applicability of wilderness in coastal and ocean waters
- wilderness qualities and attributes that may be applicable and relevant
- ocean uses and their potential compatibility with wilderness
- perceptions of respondents regarding “use and “non-use” wilderness values
- respondent demographic information

A series of fifteen images that offered illustrative examples of areas of ocean and coastal waters that could be perceived to have wilderness qualities was also included in the survey. The survey was online for about three months. During that time 257 responses were received. Prior to making the survey available online, it was reviewed and approved by the Institutional Research Board of the University of Alaska (Appendix 1).

3.3.1 Sample

The survey was targeted at natural and cultural resource managers, natural scientists, social scientists, wilderness specialists and other professionals engaged in these and related disciplines. This target audience for the survey was selected for a number of reasons. This is a group that will have a profound influence on whether ocean wilderness can become a part of existing wilderness programs. While the public may (or may not) support the idea, unless and until the agency managers embrace the idea, it is unlikely such wildernesses would be identified and designated. Similarly, if decision-makers were to mandate such a program be pursued, it would only be fully successful if these agency managers and scientists were supportive. This group holds a key role in the potential implementation of the idea, and so their perceptions are particularly important. Given the forgoing discussion about the importance of well-informed respondents in perception surveys, these are also professionals who are knowledgeable about wilderness, and therefore it was presumed that this deeper knowledge would offer more informed responses.

From a more practical perspective, about eleven hundred potential respondents from this community of managers and scientists participated at a conference, held by the George Wright Society (GWS) during 11-14 March 2011 in New Orleans, LA. The GWS is a professional organization for protected areas managers (largely from the National Park Service, but also from other wilderness management agencies), and the survey could be effectively “advertised” at that conference to promote responses. At the conference, a booth was set up in a central location and manned throughout the conference with two computers available to take the survey (See Figure 3-1) and many business cards containing information regarding the survey were distributed to conference participants who did not have time to complete the survey at that time. As the survey was lengthy (more than 90 questions) and took between 30-40 minutes to complete, only a small number of surveys were actually completed at the booth. After the conference, email was sent to about 1000 of the conference participants with a link to the survey. Based on the timing of the completed surveys received, this e-mail follow-up



Figure 3-1: Survey Booth at George Wright Society Biennial Conference. 11-14 March 2011, New Orleans, LA.

generated the majority of the responses.

The link to the survey was also transmitted to the Wilderness Coordinators of the US Fish and Wildlife Service and National Park Service to send to colleagues, and also sent directly to staff at the NOAA Office of National Marine Sanctuaries. Finally, the survey was advertised on the web page of the WILD Foundation, and mentioned in their online newsletter, but this was well after the survey had been initiated and seemed to yield few actual responses. No identifying information was collected during the survey. It is difficult to determine the actual response rate, particularly given the “snowball” process used to seek out willing respondents. However, just taking the approximately 1000 participants of the George Wright Society conference contacted directly through e-mail as the total pool of potential respondents, the response rate was approximately 25%. Yun and Trumbo (2000) reported response rates for online surveys between 19-70%, so this response is at the lower end of that range. Given the length of the survey and the amount of time needed to complete it, as well as the fact that the GWS Conference participants targeted had not been solicited for surveys in the past, this was considered a reasonably good response.

3.3.2 Content of the Survey Instrument

Background information offering some context to assist in responding to the questions was provided before any questions were posed. This preface included definitions of wilderness used in the survey, as well as some history of the implementation of wilderness in ocean and coastal waters.

The survey began with some general questions regarding whether the respondent believed that “ocean wilderness” exists, and what elements of ocean and coastal waters could possess wilderness qualities (e.g. “surface of the water,” “airspace above the water,” “seabed, habitats, animals and plants under the water,” “islands and coastal lands nearby”). The next section asked respondents to evaluate the importance of key attributes of wilderness. To facilitate the comparative analysis with the Shafer and Benzaken (1998) survey, all of the wilderness attributes evaluated in the 1998 survey

were included, but the full list of attributes for this survey was expanded to address a broader suite of potential attributes. The section following this offered a list of potential activities that are commonly conducted in ocean and coastal waters (e.g., scuba diving, fishing, motor boating, kayaking, among others), and sought the respondent's opinion as to whether these activities would be compatible in wilderness waters.

The final section of the first part of the survey was included to directly address the perceptions of respondents with regard to non-use values of wilderness. A number of wilderness surveys in the literature have focused on the importance of these values (Porter and Tarrant 2005, Rolston 1985, Virden 1990, Walsh et al. 1984), but many other surveys published over the last three decades have included some questions related to non-use values (Brown and Alessa 2005, Cordell et al. 1998, Cordell et al. 2003, Higham et al. 2000, Johnson et al. 2004, Shuster et al. 2006, USDA Forest Service and NOAA 2000). In a time when the tradeoff between costs and benefits is a significant driver of conservation decision-making, assignment of monetary value to non-use of resources can be an important consideration.

In the next major section of the survey, the respondent viewed images of areas that depicted coastal and ocean waters and answered questions about their preferences for wilderness values and/or attributes in those photographs. The use of images in perception surveys is relatively common, particularly in assessing landscape values and preferences (Arriaza et al. 2004, Buijs et al. 2009, Damigos and Anyfantis 2011, deGroot and van den Born 2003, Dramstad et al. 2006, Fairweather and Swaffield 2001, Fairweather and Swaffield 2002, Fyhri et al. 2009, Kaltenborn and Bjerke 2002, Lindemann-Matthies et al. 2010, Palmer and Hoffman 2001, Parsons and Daniel 2002, Rogge et al. 2007, Shafer and Brush 1977, Soliva and Hunziker 2009, Stewart et al. 1984, Swaffield and Foster 2000, Wherrett 1999, Wherrett 2000, Zube et al. 1982). Such surveys are increasingly employing computer-generated images (Wissen et al. 2008) that can be more easily manipulated for purposes of experimental design. A recent paper by Barroso et al. (2012) suggests that photos used in landscape preference surveys "need to be clear and easily perceivable by the respondents," potentially using such digital manipulations to make

landscape features less “fuzzy” (i.e. reduce the complexity of landscape features and clarity of photographs). This guidance was used in the development of the images for the survey, and to the extent possible, in the analysis of the data collected.

The 15 color photographs used were either taken by the author using a Canon PowerShot A 710 IS digital camera or acquired from web-based sources. They depicted remote coastal and ocean waters predominantly from higher latitude areas from the United States, Iceland, and Chile. The images included both underwater scenes and “surface” pictures incorporating various scales and perspectives (i.e. some show open-water areas without land or islands, some depicted coastal waters with land in the distance, and some subjects were photographed in closer proximity).

Images were selected to address certain predetermined, informal hypotheses regarding how respondents would likely perceive them. For example, a few contained specific features, such as navigation aids, motor boats, or scuba divers, which were hypothesized to be attributes that would potentially degrade the wilderness quality of the scene (i.e. H_0 = human presence or signs of human activity would be perceived to degrade wilderness value).

Other images exhibited large, obviously remote areas of land and sea with no sign of human use or presence. In this case, H_0 = remote lands/waters would be perceived as wilderness. A number included some form of wildlife (e.g., pinnipeds, cetaceans, seabirds, sharks and other fish), where H_0 = presence of wildlife in natural setting would enhance wilderness quality. All photos included in the survey were shown as “full screen” as possible, given the limitations of the on-line survey tool, in Joint Photographic Experts Group (JPEG) format, and later converted to Tagged Image File Format (TIFF) for subsequent analysis.

The section of the survey containing the photographs and related questions begins with a sample image of an area with waters designated as wilderness (the Semidi Islands Wilderness in Alaska), and summarizing the questions that are asked related to the subsequent fifteen photographs. For each photo, respondents were asked to offer an opinion on whether the depicted scene looked to them like “wilderness.” Responses

options to this question (“Rank the following statement: “The area in this photograph looks like an area I believe would contain ‘wilderness waters’”) were evaluated on a Likert scale of “strongly agree” to “strongly disagree” with an additional option of “not sure.” The respondents were then asked to look carefully at the photograph and identify any “aspects or attributes” in the picture that would make them believe that the area is not “wilderness waters” or potentially detract from the wilderness value of the area. This “open-ended” question provided an opportunity for the respondent to offer individual comments on the image. These comments were used to develop a very coarse assessment of the “appropriateness” of the photograph (“image index” discussed in Section 3.3.3, below) in terms of how decisive the respondent felt he or she could be regarding whether the area was “wilderness” or not.

For all of the photographs, the respondent was asked: “If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being “wilderness waters?” This question was posed to test the hypothesis, H_0 = if coastal lands are designated wilderness, the adjacent waters would more likely be perceived as having high wilderness value as well. Lastly, for each picture that contained both land and sea areas, the question was posed: “Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as “wilderness?” For this question, the H_0 = the presence of land has no effect on the wilderness quality of the adjacent waters. Both of these questions offered response options of “yes,” “no,” and “not sure.”

The next section of the survey instrument sought to elicit the attitudes of the respondents to wilderness, generally, and to how those attitudes might extend to ocean wilderness. A number of these were posed as follow-up questions to ones previously presented in slightly different ways. A few of the questions related to the importance of non-use values in ocean wilderness to respondents, and others focused on the strength of preference for preserving wilderness values in ocean and coastal waters, and others related to compatible and incompatible uses of ocean wilderness. This suite of questions is further described and discussed in Section 3.3.3, below.

The final section of the survey was included to collect demographic information regarding the respondents. In addition to “age,” “gender,” “race/ethnicity,” and “education,” respondents were asked to identify their occupation/profession, how far from the coast (ocean or Great Lakes) they live and work, and the length of their residence. Additionally, they were asked about their wilderness use, how often they visit wilderness areas, and the reasons they visit.

3.3.3 Analysis

All survey responses were coded to facilitate analysis and summary tables of responses and descriptive statistics were developed for each of the questions. These include total number of responses, total number of missing responses, number and percentage of responses received. Following the analytical methodology used by Shafer and Benzaken (1998), Likert scale responses were treated as interval data and mean values were calculated for the analysis, but given the ordinal nature of the data, modes were also calculated and reported, and non-parametric statistical tests were employed where appropriate.

A comparison of the responses on important attributes of ocean wilderness from this survey and the GBRMP study was undertaken to provide insight into the potential ability to extrapolate the findings of both studies to more general conclusions. As the target audiences for these studies differed considerably, with the Shafer and Benzaken study focused on frequent users of the GBRMP, and this survey targeting an “expert” group of scientists and managers, the presumption was that the results would be somewhat dissimilar (or H_0 = Results of the analyses of the two ocean wilderness surveys are dissimilar). For the section addressing applicable wilderness values (Question 4), again following the methodology of Shafer and Benzaken (1998), mean values were subjected to factor analysis using principal components with varimax rotation.

Also for Question 4, addressing important attributes of ocean wilderness, as well as potentially compatible uses (Question 5), and the general ocean wilderness perception questions (Questions 61-83), the data were analyzed utilizing multi-dimensional scaling

(MDS) using Euclidian distance modeling on the raw data matrices, calculating stress (Kruskal's formula-1) and squared correlation (RSQ). These data were also subjected to hierarchical cluster analysis utilizing Ward's Method based on Squared Euclidian distance measurements among variables. All statistical analyses were conducted using the SPSS statistical package.

The responses to questions posed regarding the presented photographs were summarized and descriptive statistics were calculated based on responses along a five-point Likert scale from "strongly agree" to "strongly disagree" with an additional option of "not sure." Images were binned into "high," "medium" and "low" ocean wilderness quality based on mean and mode of responses, and subjected to hierarchical cluster analysis using Ward's Method based on Squared Euclidian distance measurements among variables. This analysis was undertaken to seek further insight regarding possible relationships among these images with regard to the perceived ocean wilderness quality of the areas depicted. Questions were also posed regarding the potential effect of the presence of land in the image, and whether that land was designated wilderness, on the respondents' perception of wilderness quality of adjacent waters. Means, standard deviations, and modes were calculated for these responses to assist in determining whether such an effect could be observed, and potentially, the strength of that effect.

After analyzing and coding the comments provided by respondents to the "open-ended" questions regarding the photographs, an "image index" was calculated. Deriving this index involved using the number of comments that related to issues of image scale and content (which related to the respondent's inability to make a determination whether the area depicted was "wilderness" or not). This number of comments was then divided by the number of non-responses or responses that suggested that "nothing in the picture degraded the wilderness quality," plus the number of comments that identified some attribute or element that the respondent felt degraded the wilderness quality of the area, times 100 (to normalize the index to a 100-point scale. ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. In essence, what this "image index" provides is an estimate of how the quality or content

of the photograph helped or hindered a decisive response to the question.

All photographs used were also analyzed guided by a methodology described by Wherrett (2000) for landscape preference survey images. While the image analysis software package used by Wherrett was unavailable for this research, a number of the parameters identified in this approach were obtained through a similar analysis using “ImageJ,” a public domain Java image-processing program (<http://rsbweb.nih.gov/ij>). Each photograph was re-sized to a common dimension (580 x 395 pixels), converted to TIFF format, and the size of each “landscape” feature of the photograph was determined by creating polygons around that feature and measuring the area with the relevant function of ImageJ. Generally, these features included “land,” “water,” and “sky,” but for some photographs, such as the underwater images, prominent features (kelp forests, sharks, divers) were included, with the substrate (such as coral reef or rocky bottom), and in one image an area of extensive sea ice, representing the “land analog.” Color and gray scale data were also collected for each photograph (gray mean, SD, mode, max/min values, and mean, SD, mode for red, green and blue elements). While Wherrett (2000) suggested that some measure of the resolution of the image be calculated, insufficient information was available for the images used to calculate such a value. This information is provided for each photograph in Appendix 2.

The next section of the survey was developed to gain insight into the respondent’s general perceptions about wilderness and wilderness waters. Twenty-two questions were posed as statements, and the subject was asked to respond along a five-point Likert scale from “strongly agree” to “strongly disagree” with an additional option of “not sure.” Responses to these questions are summarized in Appendix 3. A number of the questions were included to re-visit subjects of previous questions. An example is the question, “Whether or not I visit ocean wilderness, it is important for me to know that such areas exist,” which is a follow-up to the questions in the first section that focused on non-use values of ocean wilderness. Other questions relate to potential management issues and strategies. Examples include, “If wilderness waters are degraded unintentionally, management actions should be taken to rehabilitate the area,” and “non-native or exotic

species introduced into ocean wilderness should be removed.” The remainder of the questions relate to perspectives and perceptions of ocean wilderness. As examples, these include: “I am a strong supporter of preserving wilderness areas,” and “ocean and coastal waters areas designated as wilderness not used for the benefit of humans are a waste of natural resources.” One question was added specifically related to the perception of how solitude may be more important in the ocean wilderness context than how far that person actually is from human activity or developed areas (Shafer and Benzaken 1998): “If I feel I am alone in an area I believe is “wilderness,” this sense of being alone is more important than the actual distance I am from developed areas.”

The demographic data were subjected to analysis using non-parametric, Kruskal-Wallis 1-way analysis of variance (k independent samples as described in Habron’s (1998) methodology for identifying “within photograph variation”). This was done to determine if any of these potential interactions were significant factors in how the respondents answered the survey. The demographic responses were then coded. This involved data reduction (i.e. collapsing some of the responses into fewer groups) and closer interpretation of the responses (i.e. for questions containing an open-ended “other” category, some “other” responses were binned *post-hoc* into existing categories where appropriate, and some integrative categories were created from the data) to simplify analysis. “age” and “gender” were analyzed as submitted, with “age” coded generally in 10-year intervals. The rank order of the coded categories of demographic characteristics potentially provides some insight into the further interpretation of the observed effect (Wang 2007). For example, with regard to gender, rank order of “male” and “female” responses can be interpreted to indicate the relative difference in response to the question posed (i.e. rank order can indicate one gender expressing a stronger preference for a particular response than the other). “Race/ethnicity” was removed from the analysis because of the exceptionally high percentage of respondents in the “white” category. “Education” was reduced to three categories, with “PhD” and “professional degree” being combined into one category. “Occupation” involved an open-ended category of “other,” and responses in this category were reviewed and binned where the response

provided was similar to an existing category. Based on a number of similar responses in this “other” category, three new groups were created, “resource educator,” “resource planner,” and “graduate student.”

To simplify the analysis, categories within “distance of residence from coast” were combined to a more “near” and “far” scenario (“near” = “within 10 mi.” and “10-50 miles,” and “far” was any response greater than 50 miles). “Distance of office to coast” was similarly reduced to “near” = “on the water,” “Within 10 miles,” and “10-50 miles,” and “far” was greater than 50 miles. These “proximity questions” were included to attempt to determine if professionals living and working on the coast, with ocean and coastal waters nearby, held differing perceptions of ocean wilderness qualities and values to their “land-bound” counterparts, here differentiated by “coastal” and “inland,” respectively. “Frequency of wilderness visits,” which was asked to develop some sense of the respondents’ personal wilderness history, was coded directly from the categories used in the question, but the categories used in “purpose of wilderness visits” were combined to “work and mostly work” and “recreation and mostly recreation.” Summaries of the coding schemes is provided in Appendix 4.

3.3.4 Results

3.3.4.1 Does Ocean Wilderness Exist?

Almost 76% of respondents indicated that they visited a place on the ocean or in coastal waters that they thought was a “wilderness.” This is consistent with the results reported by Shafer and Benzaken (1998) for the GBRMP, who found more than 80% of the respondents to their survey felt wilderness existed in the Park.

3.3.4.2 Elements of Ocean Wilderness

The responses to questions seeking to identify which spatial elements of marine and coastal waters respondents perceived as essential elements of wilderness waters are summarized in Figure 3-2. All elements identified in the question (seabed and habitats, water surface, air above the water, nearby land) were perceived by respondents to be very

important in defining the spatial framework for wilderness in ocean and coastal waters. These findings are consistent with those of Shafer and Benzaken (1998) who found that 90% of their respondents felt that wilderness existed both above and below the water's surface of the GBRMP.

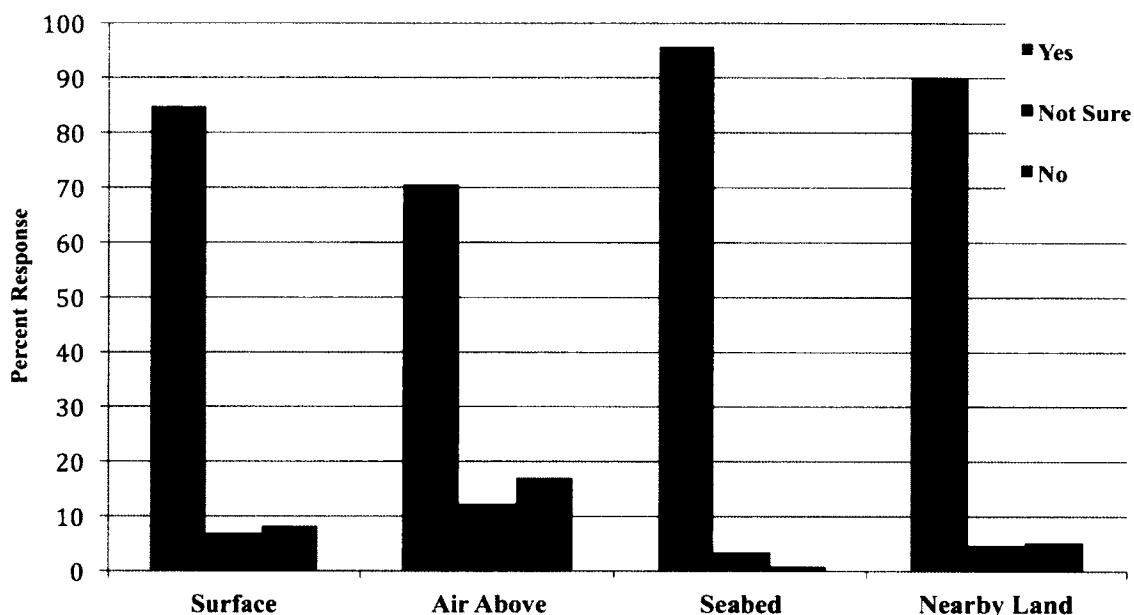


Figure 3-2: Dimensions of Wilderness. “If you have had this experience (or not had such an experience personally, but believe that ocean and coastal waters can have wilderness attributes and qualities) did you feel (or believe) the ‘wilderness’ included: the surface of the water; the airspace above the water; the seabed, habitats, animals and plants under the water; the islands and coastal lands nearby.”

3.3.4.3 Attributes of Ocean Wilderness

Of those (N=225) rating the importance of potential attributes of ocean wilderness, six attributes were identified by more than 80% of respondents as “extremely important” or “very important”:

- “amount of boat traffic” (81.8%)
- “amount of noise” (81.8%)
- “number of human-made structures” (86.2%)
- “‘naturalness’ of the area” (82.2%)

- “opportunities for solitude” (85.0%)
- “opportunities for preserving ecosystems and biodiversity” (86.3%)

Two other attributes were rated above 75%: “number of people in the area” (76.5%) and “‘wildness’ of the area” (78.8%). The remainder of the attributes evaluated, again for responses “extremely important” and “very important,” ranged from 52.9% (“opportunities for science/research”) to 23.1% (“distance from coastal access point”), with a mean value across all the attributes of approximately 60% rating the attributes extremely or very important. Table 3-1 provides the rank order of the attributes, as rated by the respondents to this survey.

Factor analysis was conducted to better understand the pattern of relationships among the attributes. It was found that the data could be reduced to five factors, which have been given descriptive names based on the items contained in that factor (Table 3-2). Some, such as “human presence,” were intuitive, but others were not. Where the factor described items that might not seem to “fit” with others identified, this is likely explained by the low extraction value for that item. For example, including “number of unique natural features” with “opportunities for cultural preservation,” “opportunities for historic preservation” and “opportunities for education” was likely the result of that item being almost equally loaded on component 2 and 3, and that it had the lowest extraction value of all the attributes examined. However, considering a further analysis of the Chronbach’s alpha values calculated when a reliability analysis is conducted on this factor alone, there would be little improvement of the “fit” of the factor if any of these items was deleted. deVaus (2004) suggests anything less than 0.30 is a weak correlation for item-analysis purposes, and none of these factors has a correlation value (i.e. if that item is deleted from the factor) of less than 0.76, so the underlying relationship may be stronger than the labels for the variables suggests.

Others like “numbers of rules and regulations,” upon some reflection, can be linked to the items extracted in that factor if it is interpreted as rules and regulations being something of a proxy for a “civilizing influence” on the area. If rules and regulations are

Table 3-1: Relative Importance of Wilderness Attributes (N=225)

Rank	Attribute	Mean ^a	SD
1	Opportunities for preserving ecosystems/biodiversity	4.44	0.906
2	"Naturalness" of the area	4.40	0.83
3	Number of human-made structures	4.39	0.839
4	"Wildness" of the area	4.32	0.859
5	Opportunities for solitude	4.31	0.834
6	Amount of noise	4.28	0.882
7	Amount of boat traffic	4.21	0.856
8	Number of people in the area	4.12	0.998
9	Distance from populated areas	3.51	1.13
10	Opportunities for science/research	3.43	1.23
11	Opportunities for spiritual growth	3.28	1.27
12	Number of unique natural features	3.18	1.3
13	Opportunities for education	3.05	1.2
14	Opportunities for cultural preservation	2.98	1.32
15	Number of rules and regulations	2.94	1.32
16	Opportunities for historic preservation	2.87	1.32
17	Distance from coastal access point	2.75	1.12

^aMean values are based on a five-point likert scale where 1 = "not important" to 5 = "extremely important."

established for the area and this is known to the visitor (or someone who is not actually visiting but considering the wilderness qualities of the area), it could be considered as limiting the sense of freedom to act in a manner unconstrained by human influences, what Shafer and Hammitt (1995) have described as "management confinement." A reliability analysis of this factor suggests that while the correlations are weak (i.e. if either "distance from coastal access point" or "distance from populated areas" were deleted, the Chronbach's alpha would be 0.309 and 0.374, respectively), the correlation of "number of rules and regulations" (0.526) would have less of an effect on the overall alpha (i.e. increases the alpha only slightly) for the factor, which would, despite the low extraction value of the factor generally, tend to support this interpretation

To further understand potential patterns of relationships among the attributes addressed in the survey question, the data were subjected to MDS using Euclidian. distance modeling on the raw data matrices (SPSS ALSCAL, ordinal level), calculating stress (Kruskal's formula-1) and squared correlation (RSQ), and are reported in

Table 3-2: Factors Formed Based on Importance of All Potential Attributes of Marine Wilderness Evaluated by Survey Respondents.

Factor Name (Item)	Item Loading	Factor Mean ^b	Alpha
Opportunities Preservation/Education			
Opportunities for Cultural Preservation	0.92	3.1	0.81
Opportunities for Historic Preservation	0.92		
Opportunities for Education	0.61		
Number of Unique Natural Features ^d	0.41		
Integrative Perceptions of Wilderness Quality			
“Wildness” of the Area	0.89	4.4	0.79
“Naturalness” of the Area	0.88		
Opportunities for Solitude ^d	0.65		
Human Presence			
Amount of Noise	0.75	4.3	0.77
Amount of Boat Traffic	0.82		
Number of People in Area	0.74		
Number of Human-Made Structures ^{c, d}	0.49		
Opportunities for Learning			
Opportunities for Science/Research	0.76	3.8	0.65
Opportunities for Preserving Ecosystems And Biodiversity ^d	0.66		
Opportunities for Spiritual Growth ^d	0.70		
Remoteness from “Civilization”			
Distance from Coastal Access Points	0.75	3.1	0.50
Distance from Populated Areas	0.75		
Numbers of Rules and Regulations ^d	0.53		

^a Factors were extracted using principle components with a varimax rotation. All eigenvalues are greater than 1 and each explains at least 5% of the variance in the factor solution.

^b Factor means are based on the mean value of the item(s) representing a given factor where 1 = “NOT IMPORTANT” and 5 = “EXTREMELY IMPORTANT.”

^c Note: “Number of Human-Made Structures” loaded approximately equally on Components 2 (0.41) and 3 (0.49)

^d Note: Item “Number of Unique Natural Features” had an extraction value of 0.241 (i.e. the proportion of the variable's variance that can be explained by the principal components was 24%), the lowest extraction value of all characteristics examined). Items also exhibiting relatively low Extraction Values were (in ascending order): “Number of Rules and Regulations” (0.450), “Number of Human-Made Structures” (0.524), “Opportunity for Spiritual Growth” (0.539), “Opportunities for Solitude” (0.540), and “Opportunities for Preserving Ecosystems and Biodiversity” (0.581)

Figure 3-3. These results were also subjected to hierarchical cluster analysis utilizing Ward’s Method based on Squared Euclidian distance measurements among variables

(Figures 3-4). This approach generally follows the methodology used by Fyhri et al. (2009) and Hallikainen (2000), who analyzed data similar to this study obtained in perception surveys of Finnish landscape preference and wilderness attributes.

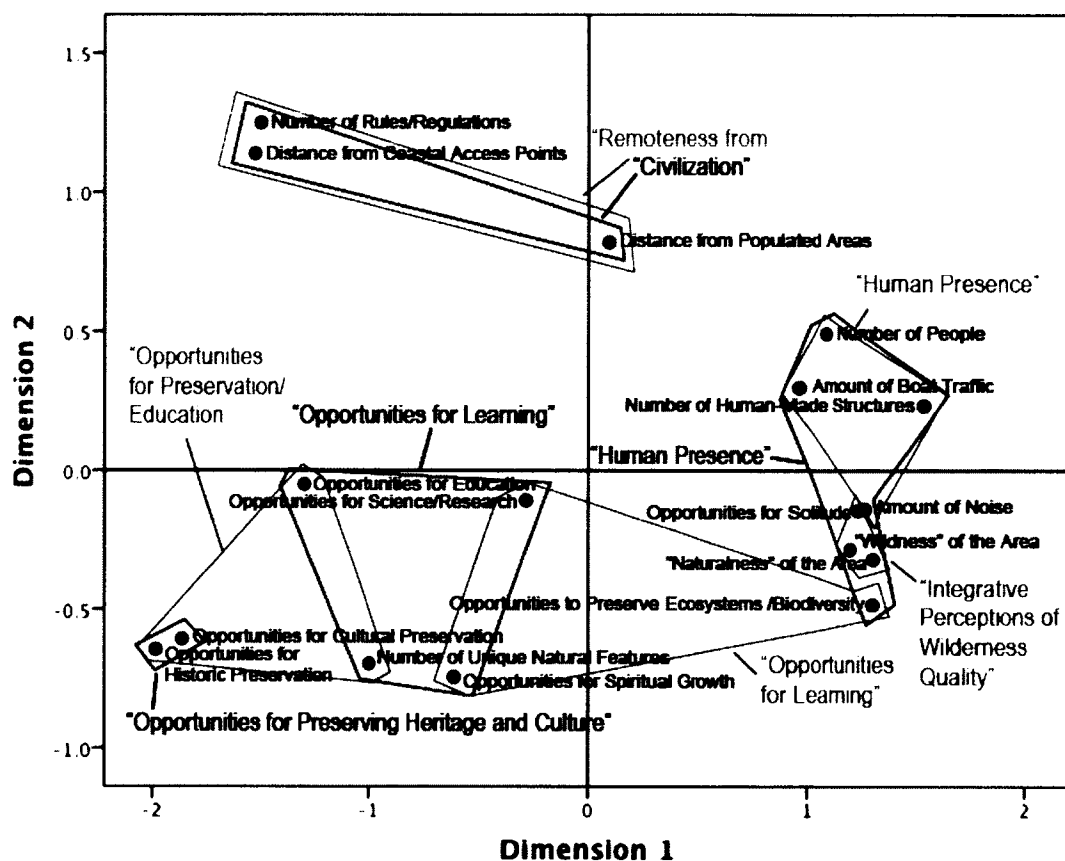


Figure 3-3: Representations of Dimensions 1 and 2 of the MDS Solution for Ocean Wilderness Attribute Preferences (Question 4), stress = 0.019, RSQ = 0.951.

The results of the MDS analysis appear to be generally consistent with the factor analysis. The attributes cluster similarly, and based on the mean values for each attribute, the dimensions can be interpreted as: Dimension 1 – increasing importance from left to right; Dimension 2 – increasing importance from bottom to top. The hierarchical

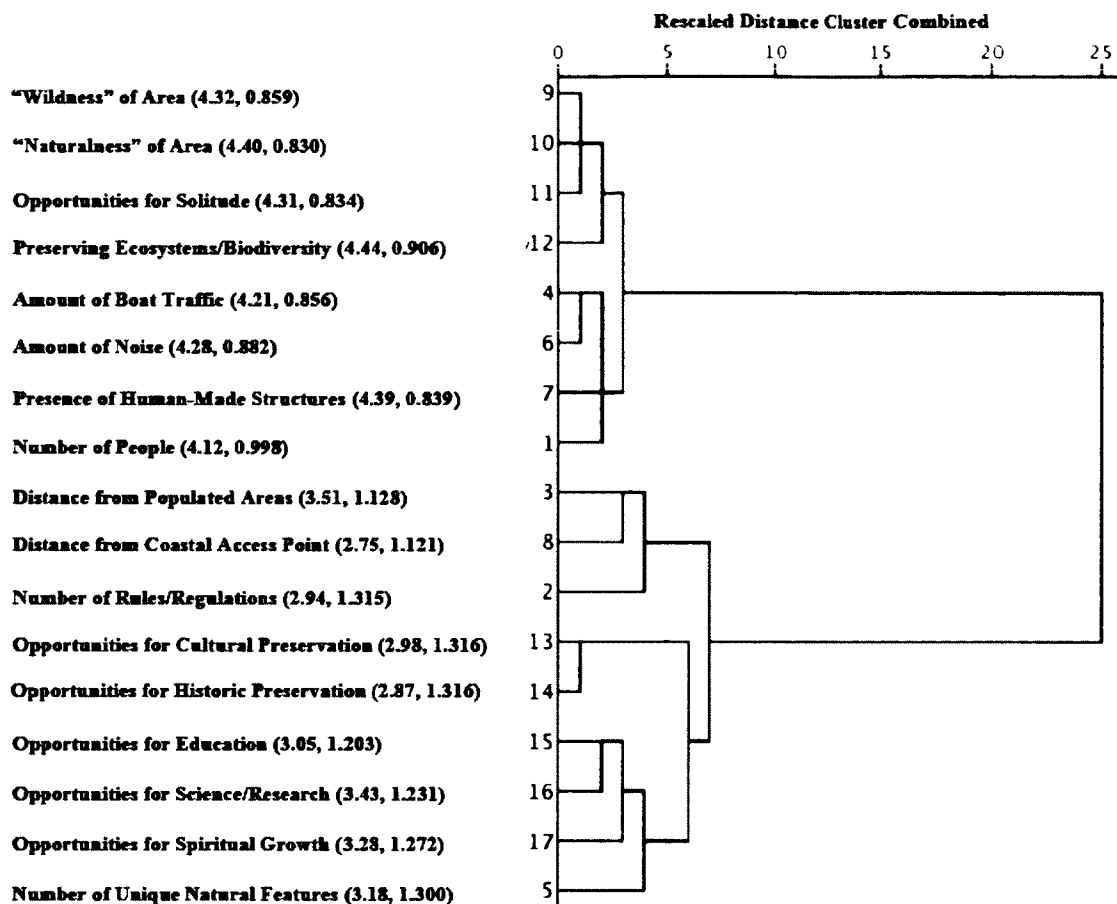


Figure 3-4: Dendrogram for Solution from Cluster Analysis of Importance Preferences for Wilderness Values (Question 4). Mean and Standard Deviation for Responses (EXTREMELY IMPORTANT=5, VERY IMPORTANT=4, SOMEWHAT IMPORTANT=3, SLIGHTLY IMPORTANT=2, NOT IMPORTANT=1) are provided for each value.

dendrogram clusters the attributes into four reasonably distinct groups, again with relatively good agreement with both the MDS and factor analyses.

In general, the underlying pattern of relationships among the attributes, based on the groupings indicated in the factor analysis (in red on the plot), is that "integrated perceptions of wilderness quality" ("wildness," "naturalness," and "opportunities for solitude") and "human presence" attributes ("amount of noise," "amount of boat traffic," "number of people in the area," and "presence of human-made structures") were rated

most important by respondents, and grouped accordingly. Attributes related to “remoteness from ‘civilization’” (“number of rules and regulations,” “distance from coastal access points,” and “distance from populated areas”) were rated as less important. Groupings assigned from the dendrogram generated in the cluster analysis (in black) are somewhat different, but generally conform in substance to those identified in the factor analysis.

To provide some additional insight in to the potential comparability of the results of the GBRMP wilderness survey (Shafer and Benzaken 1998) and this survey, the wilderness attributes shared by both surveys were analyzed separately. Given that these surveys were conducted in two different countries with somewhat divergent cultures, it might be expected that the most important wilderness attributes identified by respondents would be quite different, perhaps significantly. The survey of Shafer and Benzaken (1998) and this survey also were targeted at different potential respondents, as discussed above. Bradley and Kearney (2007) investigated visual preferences of foresters and forest stakeholders, and reported that respondents’ “preferences tend to follow the same general trend across all groups, with higher preference for less intense harvests...” and that “foresters tended to show significantly greater preference than most other groups for treatments where tree removal left moderate to large openings.” The authors attributed these differences between perceptions of managers and non-managers to how the scene (in the image used in the survey) was interpreted in terms of perceptions of potential damage to the forest ecosystem. Similar differences were found between wilderness users and non-users (Virden 1990).

A direct comparison of results from the GBRMP and this survey was undertaken to test the hypothesis: H_0 = Results of the analyses of the two ocean wilderness surveys will be dissimilar. Both surveys included the same specific questions related to rating the relative importance of potential ocean wilderness attributes. Table 3-3 (Table 2 of Shafer and Benzaken 1998) reports the results of their factor analysis. The same wilderness qualities were extracted from the responses to Question 4 of this survey, subjected to the same analytical procedure, and is reported above and reported in Table 3-4. The results

Table 3-3: Factor Analysis (Table 2, Shafer and Benzaken 1998)

Factor name ^a (Item)	Item loading	Factor mean ^b	Alpha
Human presence			
Amount of noise	0.85	4.1	0.78
Number of people	0.80		
Amount of boat traffic	0.80		
Number of structures	0.65		
Unique naturalness			
Presence of unique natural features	0.95	3.9	
Remoteness			
Distance from coastal access	0.92	3.6	0.83
Distance from population centers	0.89		

^aFactors were extracted using principle components with a varimax rotation. All eigenvalues are greater than 1 and each explains at least 5% of the variance in the factor solution.

^bFactor means are based on the mean value of the item(s) representing a given factor where 1 = "not at all important" and 5 = "extremely important."

Table 3-4: Factors Formed Based on Importance of Characteristics Associated with Marine Wilderness from this Survey.

Factor Name _a (Item)	Item Loading	Factor Mean _b	Alpha
Human Presence			
Amount of Noise	0.83	4.2	0.77
Amount of Boat Traffic	0.75		
Number of People in Area	0.75		
Number of Human-Made Structures	0.72		
Unique Naturalness			
Number of Unique Natural Features	0.93	3.2	
Remoteness			
Distance from Coastal Access Points	0.69	3.1	0.51
Distance from Populated Areas	0.76		
Sense of "Freedom"			
Numbers of Rules and Regulations	0.60	3.0	

^a Factors were extracted using principle components with a varimax rotation. All eigenvalues are greater than 1 and each explains at least 5% of the variance in the factor solution.

^b Factor means are based on the mean value of the item(s) representing a given factor where 1 = "NOT IMPORTANT" and 5 = "EXTREMELY IMPORTANT."

of these two analyses appear strikingly similar. Shafer and Benzaken reported that “number of rules and regulations” was removed from their analysis because it was loaded nearly equally on two factors, which was not the case for these data, although the item loading was the lowest of all the factors for this attribute. Given the similarities of the analysis of the other shared questions, discussed above, it would seem reasonable to suggest that these two surveys are favorably comparable (i.e. H_0 is rejected), and that this concordance may offer the opportunity to extrapolate the findings of both surveys to a broader context with respect to perceptions of ocean wilderness generally.

3.3.4.4 Compatible Human Use of Ocean Wilderness

Of the nineteen common uses of ocean and coastal waters that respondents were asked to rate in terms of their potential compatibility in ocean wilderness areas, four uses were consistently identified as incompatible while twelve were identified as being compatible (Table 3-5). The responses regarding use compatibility, graphically presented in Figure 3-5, suggest respondents seemed quite decisive. In no case was “not sure” the most frequent response, although for three activities (e.g. “guided recreational fishing,” “recreational fishing,” and “collecting plants and animals for food”) respondents seemed more ambivalent.

To further identify underlying relationships among the responses, these data were subjected to hierarchical cluster analysis (Figure 3-6). The human uses evaluated appear to sort into four distinct groups. The first group includes five activities typically permissible in wilderness, involving recreational activities pursued by individuals:

- Recreational Kayaking/Canoeing
- Recreational Snorkeling and Free Diving
- Wildlife Viewing by Individuals
- Recreational Scuba Diving
- Recreational Sailboating

Two others activities fall into this category:

- Subsistence/Sustenance Fishing

- Indigenous Activities related to Preserving Cultural Heritage

Table 3-5: Summary of Percentage Responses Regarding Perceptions of Compatibility of Potential Human Uses in Ocean Wilderness.

Human Use ^a (mode of responses) ^b	Compatible	Not	
		Sure	Incompatible
Commercial shipping (1)	4.0	13.4	82.6^c
Recreational motorboating (1)	13.4	13.8	72.8
Guided tours on motorboats (1)	26.2	17.2	56.6
Recreational sailboating (3)	73.1	11.7	15.2
Guided tours on sailboats (3)	71.0	16.1	12.9
Recreational Kayaking/Canoeing (3)	90.2	6.3	6.3
Guided tours with kayaks/canoes (3)	85.2	3.6	8.1
Recreational fishing (3)	58.5	6.7	28.1
Guided recreational fishing (3)	43.9	13.4	38.1
Commercial fishing (1)	2.7	17.9	88.7
Subsistence/sustenance fishing (3)	71.3	8.6	16.1
Recreational scuba diving (3)	72.6	12.6	14.3
Guided scuba diving tours (3)	67.4	13.0	17.0
Recreational snorkeling/free diving (3)	85.7	15.6	8.5
Guided snorkeling/free diving (3)	78.4	5.8	13.1
Wildlife viewing by individuals (3)	93.8	8.6	2.7
Guided wildlife viewing (3)	65.5	16.6	17.9
Collecting animals and plants for food (1)	39.3	18.3	42.4
Indigenous cultural activities (3)	79.5	13.4	7.1

^a Listed in order they appear in the Survey. ^b Mode calculated from all responses received, N=224.

^c Response is highlighted when dominant response is more than 2X the next highest response category.

However, the dendrogram seems to suggest that the linkage between these latter activities and the more recreational pursuits is less strong than that calculated for the others in this group (but as strong between these two activities). It is interesting to note that throughout the survey, Indigenous activities related to sustaining cultural heritage values were perceived as appropriate for ocean wilderness areas. This is consistent with permitted uses in many terrestrial wilderness areas, particularly in Alaska where the legal framework for wilderness in most designated areas specifically includes this class of uses as permitted, but not unrestricted. The next group could be characterized as the “likely compatible” category, largely including recreationally-focused activities, but those

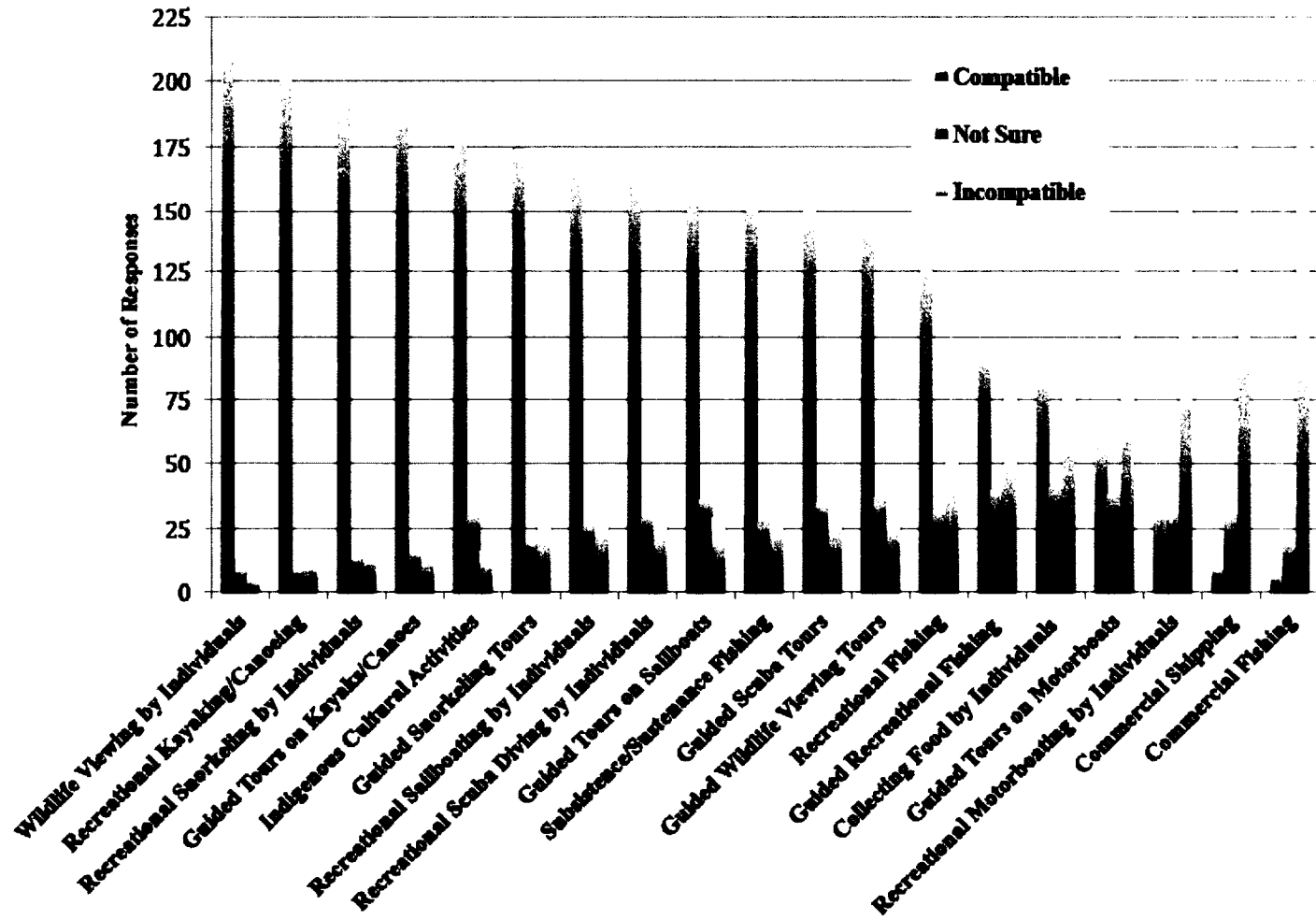


Figure 3-5: “Rate the following activities in terms of whether they should be allowed to occur in areas you believe to be ‘ocean wilderness.’”

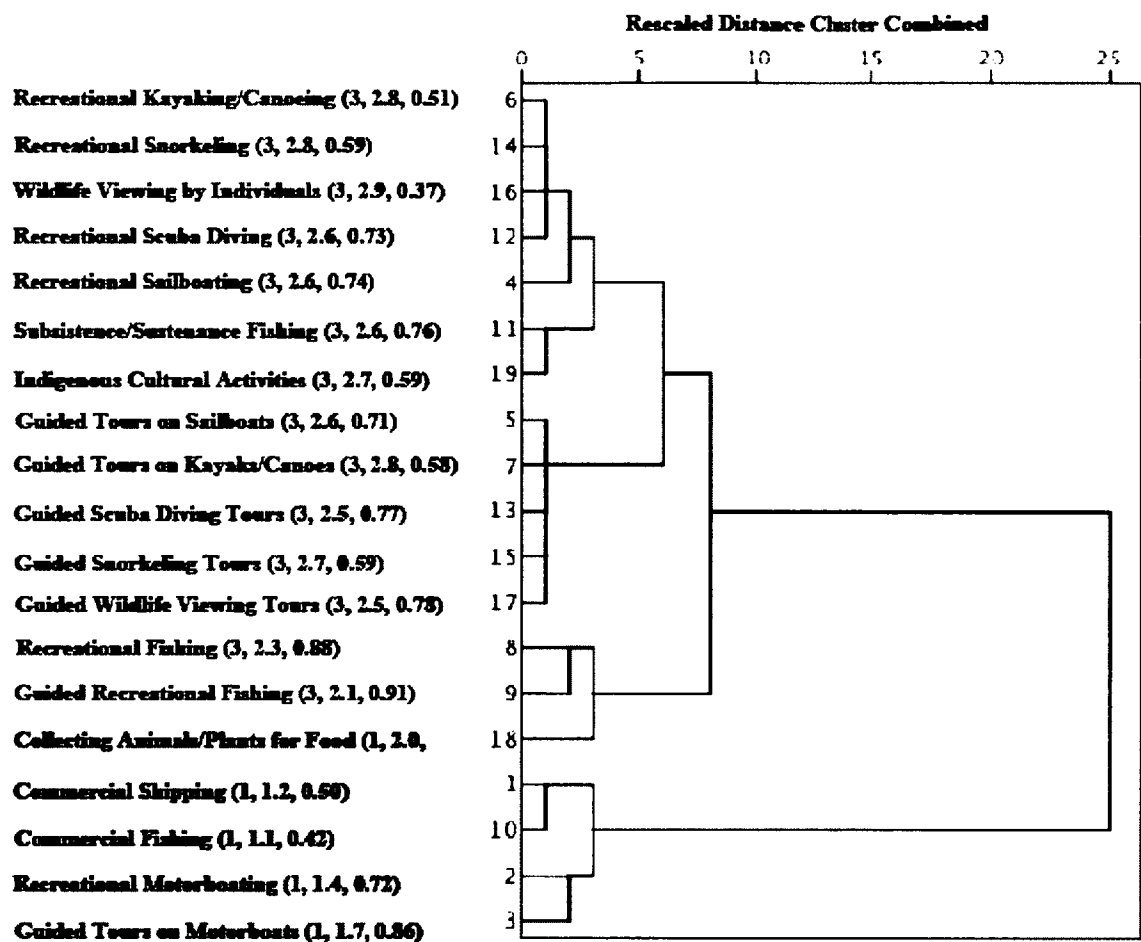


Figure 3-6: Dendrogram for Solution from Cluster Analysis of Use Compatibility Preferences (Question 5). Mode, Mean and Standard Deviation for Responses (“COMPATIBLE”=3, “NOT SURE”=2 and “INCOMPATIBLE”=1) are provided for each use evaluated. Uses perceived by respondents to be incompatible (based on mode of responses) have been highlighted.

conducted in organized groups, including guided tours where participants watch wildlife, canoe or kayak, scuba dive or snorkel, and sail. This is an interesting group to interpret. A number of these activities are routinely conducted in coastal and ocean waters from motorboats (e.g. wildlife watching – the question explicitly mentioned “commercial whale watching” as an example - as well as scuba and snorkeling trips) where “recreational motorboating” and “guided tours on motorboats” both received ratings

as “incompatible.” The third group is a transition “might be compatible or incompatible” group. Based on the modal response, two of the three activities in this group were perceived as compatible (“recreational fishing” and “guided recreational fishing”) while the other (“collecting plants and animals for food”) had a calculated mode of 1 (“incompatible”). Notwithstanding that responses submitted for “collecting plants and animals for food” and “guided recreational fishing” were nearly evenly split between “compatible” and “incompatible” (39% vs. 42%, and 44% vs. 38%, respectively) and their calculated means were nearly identical, they nonetheless fell clearly into “incompatible” and “compatible,” not “not sure,” based on their calculated modes. A fourth group was identified in the dendrogram (“commercial fishing,” “commercial shipping,” “recreational motorboating,” and “guided tours on motorboats”) as “incompatible.” This group was definitively perceived as not appropriate for ocean wilderness, as might be expected since they unambiguously represent uses of motorized transportation, which is traditionally excluded from wilderness (except for limited use in certain areas).

A MDS analysis using Euclidian distance modeling on the raw data matrices (SPSS ALSCAL, ordinal level), calculating stress (Kruskal’s formula-1) and squared correlation (RSQ) was also conducted on the responses to this question. The plot generated (Figure 3-7) was generally consistent with the pattern and groupings provided by the cluster analysis. Dimension 1 can be interpreted as increasing perception of incompatibility of the human use, and Dimension 2 with increasing incompatibility from top to bottom. The groupings of potential uses are discrete, and generally consistent with those identified in the hierarchical cluster analysis.

To acquire some sense of the strength of these relationships, and as a test of the perceived discreteness of the categories identified, a contingency table analysis (in which chi-square and gamma coefficient values were calculated for each pair of use types), was conducted comparing those human uses identified by respondents as “compatible” with

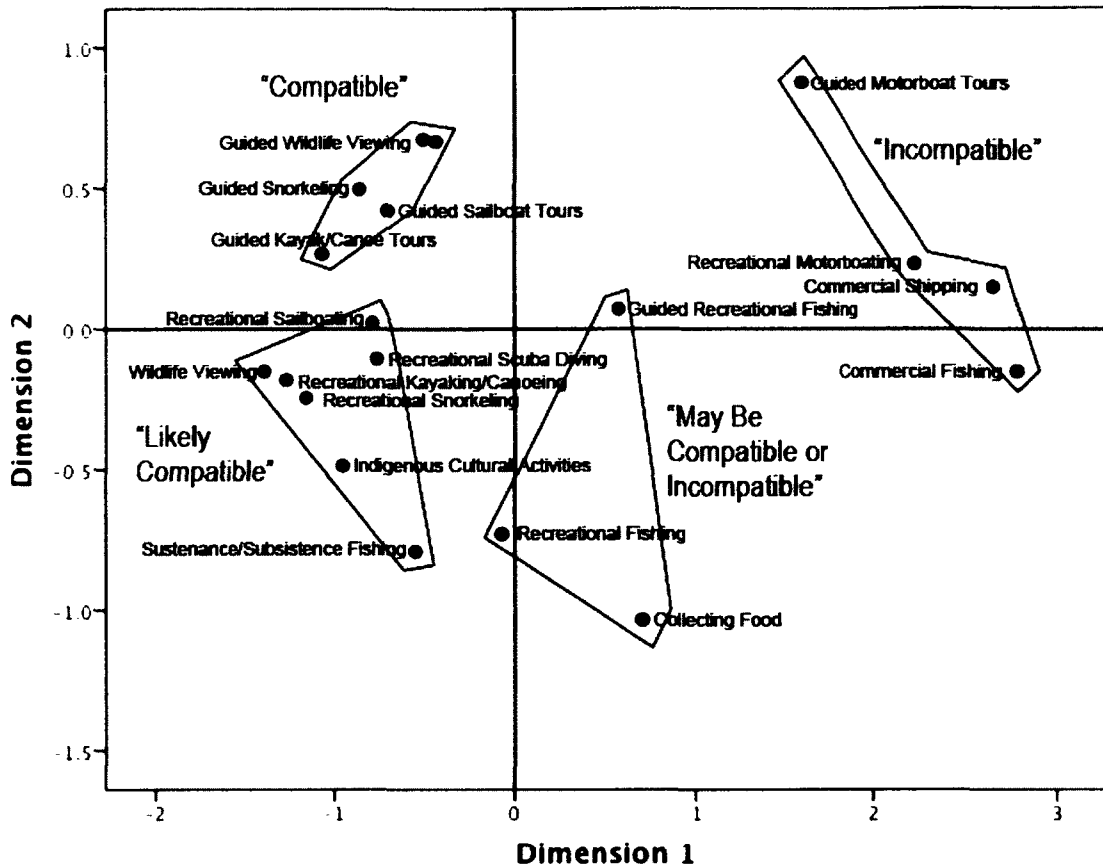


Figure 3-7: Representations of Dimensions 1 and 2 of the MDS Solution for Use Compatibility Preferences, stress = 0.062, RSQ = 0.987.

those perceived to be “incompatible.” Table 3-6 provides the results of that analysis. Clear interpretation of the details of the analysis is difficult, because it suggests some correspondence between uses that seem contradictory (e.g. a highly significant gamma coefficient between “wildlife viewing by individuals” and “commercial shipping,” although this could be a strong negative interaction). The results seem to suggest that those uses clearly perceived as “compatible and “incompatible” are independent, and therefore discretely different from one another. When the respondents’ perception of the use becomes less definitive (on the MDS plot, this would be the uses that fall near the 0/0 location on the x and y axes, such as “collecting animals and plants for food” and

Table 3-6: Statistical Relationships between “Compatible” and “Incompatible” Potential Human Uses of Ocean Wilderness. Values are reported as “chi square significance/gamma coefficient significance” (* = significant at 0.5 confidence level, **= significant at the 0.1 confidence level). Uses on vertical axis are those identified as “compatible” (Mode=3) by respondents, listed in decreasing mean value of responses. Uses on the horizontal axis are those identified as “incompatible” (Mode=1), and are also listed in decreasing mean value of all responses (left to right).

	Collecting Food	Guided Tours Motorboats	Recreational Motorboating	Commercial Shipping	Commercial Fishing
Wildlife Viewing by Individuals	*/**	NS/NS	NS/NS	NS/NS	NS/**
Recreational Kayak/Canoe	*/**	NS/NS	NS/*	NS/NS	NS/NS
Guided Tours Kayak/Canoe	NS/*	**/**	NS/**	NS/**	NS/NS
Recreational Snorkeling	**/**	NS/NS	NS/**	NS/NS	NS/*
Indigenous Cultural Activities	**/**	NS/NS	NS/NS	NS/NS	NS/NS
Guided Snorkeling	NS/NS	**/**	/*	NS/**	NS/NS
Subsistence/Sustenance Fishing	**/**	*/NS	*/NS	NS/NS	NS/*
Recreational Scuba Diving	**/**	*/NS	**/**	NS/*	NS/NS
Guided Tours Sailboats	**/*	**/**	**/**	NS	*/NS
Recreational Sailboating	**/**	**/NS	**/**	**NS	**/NS
Guided Scuba Tours	**/NS	**/**	/*	*/**	NS/NS
Guided Wildlife Viewing	**/NS	**/**	**/**	**/NS	NS/NS
Recreational Fishing	**/**	NS/NS	**/**	NS/NS	**/**
Guided Recreational Fishing	**/**	**/**	**/**	*/NS	**/**

underlying relationship between specific pairs of use types. The lines between “compatible” and “incompatible” are not as distinct as might appear to be in the plots and dendrograms presented. This uncertainty would, and properly should, affect the confidence with which the information from the survey is used in the formulation of management policies for ocean wilderness, but perhaps not to the extent the respondents’ perceptions should be ignored or discarded.

3.3.4.5 Non-Use Values of Ocean Wilderness

Lending support to the proposition, discussed above, that non-use wilderness values are increasing in importance, or at least highly valued generally (Figure 3-8), the respondents rated option value (76.3%), quasi-option value (72.2%), bequest value (91.9%), and existence value (95.9%) of ocean wilderness as “extremely important” or “very important.”

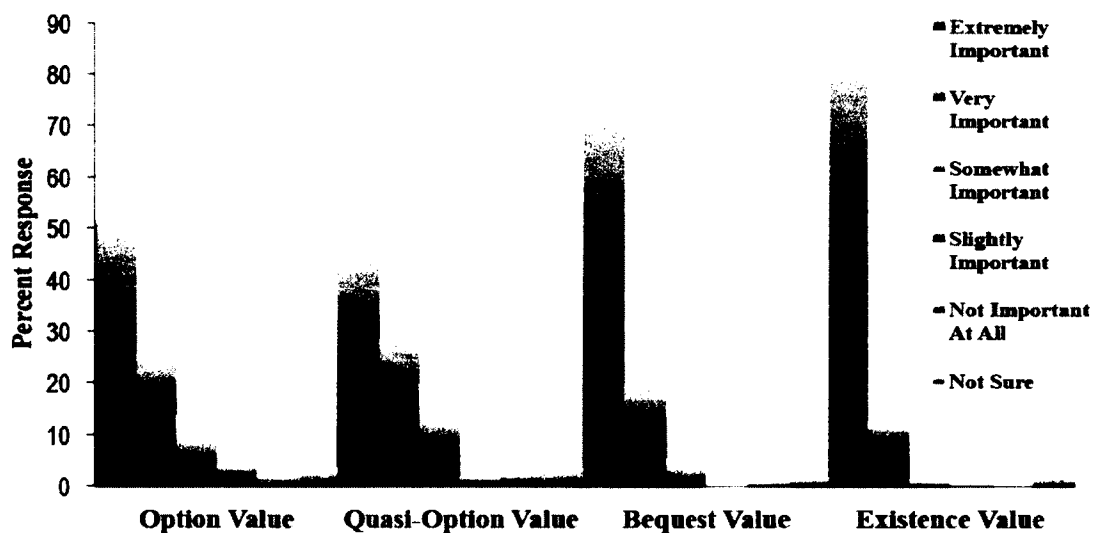


Figure 3-8: Perceptions of Importance of Non-Use Values of Ocean Wilderness. Results from the survey question: “Rate these values in terms of your own values and beliefs.” (N=224)

3.3.4.6 Perceptions of Ocean Wilderness Quality from Photographs

Respondents had a relatively positive preferences regarding the potential for ocean wilderness in the photographs provided. Of the fifteen photographs presented (Table 3-7), thirteen were perceived to be areas that contain wilderness waters, being rated as “strongly agree” or “agree” (based on the calculated mode of the responses), and only two were seen to fall into the “not sure” category. Generally, based on a hierarchical cluster analysis using Ward’s Method based on Squared Euclidian distance measurements among variables (Figure 3-9), the images fall into three groups, somewhat arbitrarily described as possessing “high,” “medium” and “low” wilderness quality.

The “high ocean wilderness value” group were images of areas free of signs of human presence, all possessing some land or islands in the image, and clearly remote and seemingly pristine. Only one of these photos contained any obvious wildlife (Hall Island on the Alaska Peninsula included a Steller Sea Lion haulout site). Three of the “medium ocean wilderness value” group were also images containing islands or land (Breidafjordur, an MPA in Iceland; Seahorse Island, a coastal barrier island along the Chukchi Sea coast in Alaska; and an image of sea ice off Barrow, Alaska), but also included areas of open ocean (a photo of the Cordell Bank National Marine Sanctuary off Northern California, containing many seabirds and an offshore area of the Bering Sea that included a juvenile Humpback whale). The sixth image in this category was an underwater photograph of a productive coral reef in the Papahānauōkūākea Marine National Monument (PMNM) in the Northwestern Hawaiian Islands (NWHI). Again, in all these images, signs of human activity or history of human use were absent, and they were seemingly remote from development.

The third group was all images that contained what were interpreted by respondents as signs of human activity and use. Two photographs from the Francisco Coloane Marine Park in Chile, an MPA managed by the Chilean Ministry of Environment (although not designated wilderness), included visitors being transported by small zodiacs and the other included a navigation aid (a lighted, green marker on the shoreline along the Strait of Magellan). The third photo was from the Monterey Bay

Table 3-7: Summary of Respondent Preferences of Wilderness Quality of Images Presented in Survey.

	Mean^a	Mode
Perceived High OW Quality	4.52	
FCMP Chile (no zodiacs)	4.50	5
Aleutian Islands AK	4.57	5
Barren (Nord) Island AK	4.41	5
Hall Island AK	4.46	5
Glacier Bay AK	4.65	5
Perceived Medium OW Quality	4.22	
Bering Sea AK (HBW)	4.18	4
Breidafjordur, Iceland	4.34	5
CINMS CA (seabirds)	4.01	4
Seahorse Island AK	4.27	4
PMNM HI (reef)	4.30	5
Barrow AK (sea ice)	4.21	5
Perceived Low OW Quality	3.69	
FCMP Chile (zodiacs)	3.95	4
MBNMS CA (scuba diver)	3.91	4
NWHI HI (reef and shark)	3.54	3
FCMP Chile (navigation aid)	3.35	3

^a From analysis of responses to photographs used in survey (Questions 7-60). Mean and Mode for coded responses (STRONGLY AGREE=5, AGREE=4, NEUTRAL=3, DISAGREE=2, STRONGLY DISAGREE=1) to "Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters."

National Marine Sanctuary off Central California that contained a scuba diver in a kelp forest.

The final image in this group, from the Northwestern Hawaiian Islands, was of a reef with a Galapagos Shark swimming nearby. This is a relatively pristine area in the Central Pacific, has little human activity and the images shows no signs of historic use. Its inclusion in this group is somewhat puzzling. The responses to the open-ended

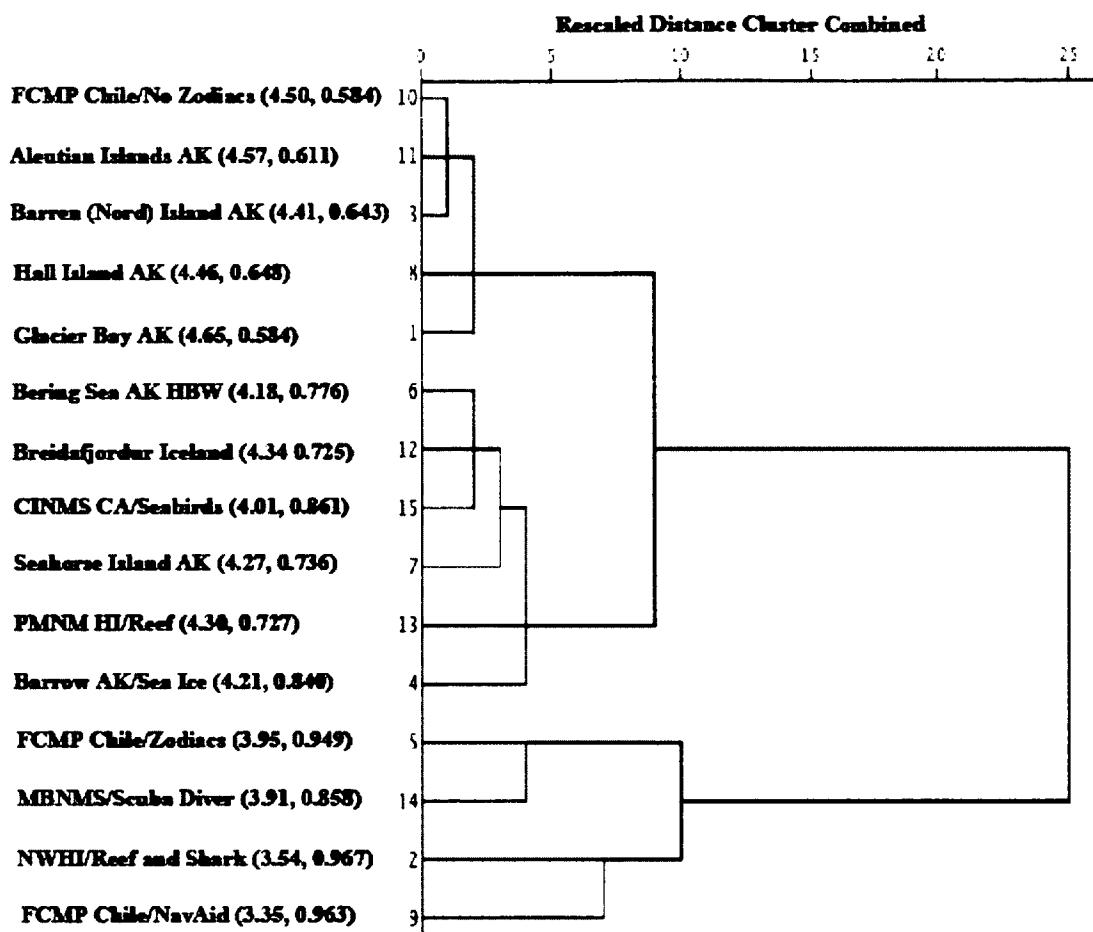


Figure 3-9: Dendrogram Solution from Cluster Analysis of Photographs Used in Survey (Questions 7-60). Mean and standard deviation for coded responses (STRONGLY AGREE=5, AGREE=4, NEUTRAL=3, DISAGREE=2, STRONGLY DISAGREE=1) to “Rank the following statement: “The area in this photograph looks like an area I believe would contain “wilderness waters” are provided for each image.

question related to this image (Question 12) seem to suggest that the reef was perceived as being degraded from coral bleaching as a result of climate change, or perhaps from physical disturbance, and that it lacks any other obvious reef fish one typically finds on coral reefs. Limited relief and structure characterize such deeper reef areas in this region, and the NWHI are what has been termed a “predator-dominated ecosystem” [i.e. biomass is dominated by large predatory fish – sharks, Giant Trevally (jacks), and grouper]. Therefore, while a great diversity of smaller fish are common and prolific throughout the reefs of PMNM, it is not unusual, when such an apex predator is present, for the smaller

fish on that reef to be elsewhere as these low topography reef areas lack effective places for those fish to hide. One potential observation that the inclusion of this photo in the “low ocean wilderness quality” group may provide is that the perception of the status of the health of the ecosystem. This would be typically determined from the observed diversity of organisms on the reef, and diversity and topography of the reef itself. Equally, a deeper knowledge of the different types of unimpaired reef ecosystems in an area is also a critically important element of determining whether these areas are perceived as having wilderness character. The majority of the respondents were largely scientists and managers of terrestrial protected areas and may not possess such knowledge. These results, taken collectively, seem to suggest that wilderness qualities are perceived in coastal and ocean water areas, and that there may be a bias in this perception toward areas with adjacent lands or islands.

The additional questions regarding each photograph lend support for the importance of both land and sea being present in the area. Table 3-8 summarizes the responses to questions related to the potential importance of land and islands (i.e. H_0 = The presence of land, islands, and especially designated terrestrial wilderness on those lands and islands, enhances the wilderness quality of adjacent coastal waters areas). Clearly, based on the responses, it does indeed have a considerable effect.

With regard to the presence of land or islands, the respondents overwhelmingly fail to reject this null hypothesis. While two of the areas (Glacier Bay – which is a designated wilderness area in the US, and Breidafjörður – which also includes designated wilderness under Icelandic law) received a “would not affect” rating, this was interpreted as it “would not affect” the perception of the area as wilderness because the areas so obviously possess wilderness qualities. Support for this interpretation come from the inclusion of these two areas in the “perceived high ocean wilderness quality” group, and from many of the responses to the open-ended questions (Questions 8 and 41, respectively) regarding these photographs. For Question 8, regarding the Glacier Bay Wilderness photo, 68% of the respondents perceived nothing in the image that would degrade the wilderness quality of the area, and only 16% suggested that there were

Table 3-8: “Does the presence of land, and designated wilderness on that land, affect preference of adjacent waters as “ocean wilderness?”^a

Image^b	N	Presence of Land?		Designated Wilderness?	
		Mean/SD	Mode	Mean/SD	Mode
Glacier Bay AK	217/219	1.96/0.966	1	2.38/0.883	3
NWHI (reef/shark)	218	----- ^c		2.34/0.866	3
Barren (Nord) Is. AK	218/216	2.06/0.982	3	2.44/0.861	3
Barrow AK (sea ice)	214	----- ^c		2.37/0.888	3
FCMP Chile (zodiacs)	214/214	2.05/0.978	3	2.40/0.860	3
Bering Sea AK (HBW)	215	----- ^c		2.26/0.925	3
Seahorse Is. AK	213/208	2.07/0.964	3	2.40/0.879	3
Hall Is. AK	212/211	2.17/0.967	3	2.41/0.881	3
FCMP Chile (navaid)	211/211	1.96/0.960	3	2.43/0.856	3
Breidafjordur Iceland	212/212	1.93/0.959	1	2.33/0.910	3
FCMP Chile (no zodiacs)	212/212	2.11/0.967	3	2.39/0.888	3
Aleutian Islands AK	211/211	2.18/0.966	3	2.36/0.907	3
PMNM HI (reef)	212	----- ^c		2.29/0.932	3
MBNMS CA (diver)	211	----- ^c		2.38/0.883	3
CBNMS CA (seabirds)	208	----- ^c		2.34/0.891	3

^a Specifically, questions were: 1) “Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as ‘wilderness?’” 2) “If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, ‘wilderness waters?’”

^b Images listed in order presented in survey.

^c Question related to presence of land was not asked when image was either underwater or just showed the surface of the water with no land in view.

elements in the image that the respondent believed degraded wilderness quality. As regards the photograph of Breidafjordur, more than half (56%) saw nothing that degraded the wilderness quality of the area depicted, while 17% identified degrading elements. A greater number of respondents took issue with scale and quality of the Breidafjordur image (26%) vs. similar concerns regarding the photo of Glacier Bay presented (12%), but found “high” wilderness value in the image from the Icelandic MPA nonetheless.

With regard to whether designated wilderness on nearby lands and islands influenced the respondents’ perception of the wilderness quality of the adjacent waters, the response seems unambiguous. Clearly, the presence of existing terrestrial wilderness

on adjacent lands is of some consequence to how the waters seaward of the shoreline of these areas is perceived. Given that all existing designated wilderness waters areas in the US (and elsewhere) are connected in some direct way to designated terrestrial wilderness, this response is consistent with current practice.

To provide respondents with an opportunity to provide specific comments on the images being evaluated, each series of questions related to each image included an open-ended question: “What aspects or attributes do you see in this picture that you would make you believe this is not “wilderness waters,” or detract from the possible wilderness value of the area.” The greatest number of comments, of the 1132 substantive comments offered by respondents, fell into the “none” (416), “nothing” (108) or similar negative response (84), suggesting that there was nothing noted in the image being viewed that the respondent felt degraded the wilderness quality of the area represented. Of the substantive comments, there were many that suggested that the scale of the picture was inadequate to make a determination (i.e. the image represented too small an area to allow some assessment of the wilderness quality of the area). Many of the respondents also suggested that what was not in the picture was too important to allow the respondent to make a determination of the wilderness quality of the area represented. Respondents, implying that the picture was somehow attempting to create the illusion of wilderness, quite commonly stated that the image represented a view of the area just outside some human-made structure or development. It was suggested by a few respondents, regarding the underwater pictures, that some of these were taken in aquariums, not from the natural environment. Another less frequent observation was that as some of the images were taken from a motorized vessel, and therefore the presence of the vessel was evidence that the picture was not taken in an area that could be wilderness.

Eighteen (about 1% of the open-ended comments) took issue with the idea of using images to identify wilderness waters. One illustrative example is: “...determining wilderness based on a photograph would be an aesthetic determination, not one based on other important values (e.g. ecological diversity, noise levels) or larger landscape context (e.g. location related to major shipping channel).” A very few of the open-ended

comments (six, or less than 1%) questioned the idea of the application of wilderness to ocean and coastal waters. Examples included: "...the vastness of the water makes me think that it couldn't possibly be wilderness..." and another respondent felt that the survey was "...stretching definition of wilderness to include water, in this case, ocean." The specific results of the open-ended question analysis for each image is included in Appendix 2.

The scores derived from the image index analysis (Table 3-9) suggest that the quality and scale of the images may have had some influence on the responses, although the precise degree of influence can only be subject to general observation. The mean "image index" for the "high" category of images was generally half that of the "medium" group. This is interpreted that the issues of scale and quality for these "high" group images were less confounding for respondents than the "medium" group. However, given the clear identification of the medium group as "agree" (i.e. that generally respondents agreed that the image depicted could be identified as wilderness waters), the effect of this higher mean index value was likely not very significant, but may have contributed to one of more of the images not being rated higher (i.e. "strongly agree") and placed in the "high" category.

The images identified in the "low" group have a slightly higher mean image index value than the "high" group, slightly closer to "high" than "medium," so the respondents found these images less problematic to evaluate. This is somewhat intuitive in that the images in the "low" category are there because they contain a relatively prominent feature (e.g. scuba diver, navigation aid, motorboats) that would generally be inconsistent with wilderness regulations, and therefore the quality or scale of the photograph would be less important, as the focal point of the image is that prominent feature. The relatively high index value (33) for the "NWHI HI (reef and shark)" image may be associated with the difficulty many respondents found evaluating this image. There were a relatively large number of responses regarding this image that seem to support such an interpretation.

Table 3-9: Image Analysis related to Open-Ended Responses and “Field of View” Estimates.

	Mean^a	Mode	Image Index^b	Field of View^c
Perceived High OW Quality	4.52	5^d	12.8^c	3^f
FCMP Chile (no Zodiacs)	4.50	5	15	3
Aleutian Islands AK	4.57	5	7	3
Barren (Nord) Island AK	4.41	5	21	3
Hall Island AK	4.46	5	14	3
Glacier Bay AK	4.65	5	7	3
Perceived Medium OW Quality	4.22	4^d	22.5^c	2^f
Bering Sea AK (HBW)	4.18	4	22	2
Breidafjordur, Iceland	4.34	5	34	3
CINMS CA (seabirds)	4.01	4	20	2
Seahorse Island AK	4.27	4	16	3
PMNM HI (reef)	4.30	5	22	1
Barrow AK (sea ice)	4.21	5	21	1
Perceived Low OW Quality	3.69	4^d	16.0^c	1^f
FCMP Chile (zodiacs)	3.95	4	5	3
MBNMS CA (scuba diver)	3.91	4	18	1
NWHI HI (reef and shark)	3.54	3	33	1
FCMP Chile (navigation aid)	3.35	3	8	2

^a From analysis of responses to photographs used in survey (Questions 7-60). Mean and Mode for coded responses (STRONGLY AGREE=5, AGREE=4, NEUTRAL=3, DISAGREE=2, STRONGLY DISAGREE=1) to “Rank the following statement: “The area in this photograph looks like an area I believe would contain “wilderness waters.”

^b From the analysis of coded responses to open-ended questions related to images. [“Image Issues of Scale/Content” / (“Did Not Diminish” + “No Response”) + “Element/Attribute that Diminished” X 100] Provides a coarse estimate for how the quality or content of the photograph helped or hindered a decisive response to the question. Larger index value denotes greater likelihood of image quality or content potentially hindering the respondent’s decision.

^c Fields of View were estimated from each image: 10-100 meters=“1,” 100-1000 meters=“2,” >1 km=“3”

^d “Grand” Mode of Modes for images in “Perceived OW Quality” category.

^e Mean for Image Index values for images in “Perceived OW Quality” category.

^f Mode for Field of View estimates for images in “Perceived OW Quality” category.

With regard to the field of view, the images in the “high” category have a calculated field of view mode of “3,” where all images in this category were estimated as having a field of view greater than one kilometer. The “medium” group had a mode of “2” and the “low” category a mode of “1,” although both these groups contained images with mixed fields of view, and all groups contained both images of land and water, underwater, and off-shore, sea surface photographs. This suggests a preference in the responses for larger areas being perceived as possessing greater qualities of wilderness. This preference would be consistent with the general notion of wilderness as being areas of considerable geographic size.

These interpretations are somewhat speculative but seem intuitively relevant given the characteristics of photographs presented, and norms associated with wilderness. Qualitatively, the “field of view” and “image index” analysis offers some insight in many of the factors that contributed to the responses submitted. Other analyses were conducted regarding image quality and composition, including color and composition analysis (modified from Wherrett 2000). The color analysis results are not reported here, but the composition analysis is provided in the Image Summary Tables in Appendix 2. Neither provided similar insights to that were offered by results of the “image index” and “field of view” analyses.

3.3.4.7 Attitudes Regarding Ocean Wilderness

In response to questions concerning attitudes regarding various ideas about ocean wilderness respondents seemed to be highly supportive of the concept of ocean wilderness, affirming its inherent values and qualities and the importance of its preservation (Figure 3-10). The questions eliciting the largest number of “strongly agree” and “agree” indicate some internal consistency of responses. Questions 62 and 72 are follow-up questions related to perception of the importance of non-use values (“bequest” and “existence” values, respectively). The respondents’ perception of the considerable importance of these values is echoed in these results. Question 82 offers clear indication of the inclination of respondents toward wilderness preservation

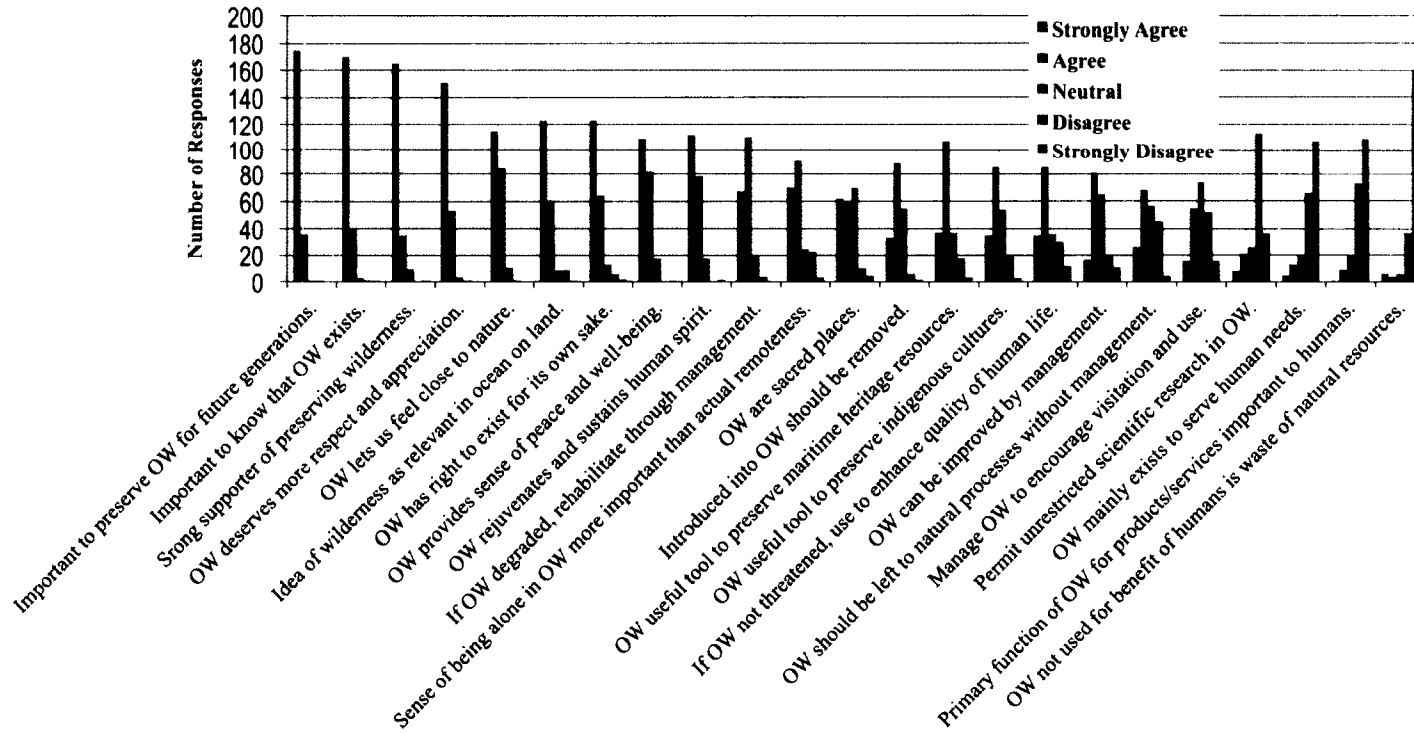


Figure 3-10: Summary of Responses related to Attitudes regarding Ocean Wilderness, Listed in Descending Order of Mean Response.

generally while Question 75 and Question 81 extends and reinforces this perception with regard to ocean wilderness areas. Questions 65, 66, 68, and 74, intrinsic values and qualities of ocean wilderness, all received high “strongly agree” and “agree” responses. Questions posed that offered a more utilitarian and anthropocentric view of wilderness (Questions 63, 64, and 70) received the greatest number of “strongly disagree” and “disagree” responses. Somewhat surprisingly, given the target audience of scientists and managers, the idea that research should be permitted without restrictions, (Question 77) was rejected, with just less than 2/3 of the responses falling into the “disagree” or “strongly disagree” categories.

3.3.4.8 Respondent Demographics

Response summaries from each of the demographic questions posed in the survey are provided in Appendix 4. The demography of the respondents did not appear to be a significant factor in the responses, but 28 of the 108 substantive (i.e. non-demographic) questions in the survey, approximately 26%, were identified as having statistically significant results when evaluated using non-parametric Kruskal-Wallis analysis of variance. Interactions were statistically significant when the probability was less than or equal to $p=0.05$ for the Kruskal-Wallis statistic (H) calculated from the analysis. The coded categories for each demographic type are also identified in Appendix 4.

With regard to “age,” five questions were influenced by the age of the respondent. Four of the five have moderately high H-values, relative to others reported in the analysis, and one is highly significant ($p<0.01$) although the H-value for that question is low. Based on the rank order of the categories:

- Respondents age 70+ were less likely to perceive the airspace above the water as being an element of the wilderness in that area. Those of age 60-70 were more likely to include this element.
- Respondents in their 30s and 40s were less likely to believe that ocean wilderness offered opportunities for cultural preservation, while the

age 70+ respondents were much more likely to feel this was an important opportunity.

- Respondents age 70+ were considerably less likely to find “Subsistence/ Sustenance Fishing” and “Recreational Snorkeling/Free Diving” a compatible human use in ocean wilderness, but the latter perhaps a less strongly held perception.
- Younger respondents, in their 20’s and 30’s, do not seem to perceive as strongly as other age groups that ocean wilderness provides the sense of being “close to nature.” The 70+ respondents appear to more strongly identify with this statement.

It should be noted that the low number of respondents in the 70+ group might have affected the outcome of the “age” analysis. This group submitted three responses for three of the questions evaluated, and one only received two responses.

Gender differences were also found in four questions. All H-values were relatively low and the majority of the probabilities reported for these questions were just below the threshold for significance. Based on the rank order of the categories, generally male respondent were less likely to perceive the opportunity provided by ocean wilderness designations to preserve ecosystems and biodiversity. Male respondents also appear to be less sanguine about “option” and “quasi-option” non-use values of ocean wilderness, and females are more likely to believe wilderness waters are “sacred places.”

With regard to educational status of the respondents, some interactions were observed. When evaluating the image of the NWHI reef and shark, Masters-level respondents were less likely to believe that designated wilderness on lands near the area depicted would affect their perception of this reef as ocean wilderness. Bachelors-level respondents were more likely to perceive this potential linkage. Evaluating the wilderness quality of the image of Breidafjordur in Iceland, respondents with Masters degrees were less likely to perceive this as potential wilderness, whereas Bachelors’-level respondents were more likely to believe this area could be ocean wilderness. PhD-level respondents were, characteristically perhaps, far less likely to feel that ocean wilderness

could be “sacred places,” where respondents with Bachelors degrees were more enthusiastic regarding the potentially sacred nature of ocean wilderness. Those respondents with Bachelors’ degrees were considerably more inclined to embrace the intrinsic right of wilderness waters to exist, while those with Masters degrees and PhDs were less certain. Respondents with Bachelors’ degrees were more supportive of active management when wilderness waters are degraded than were PhDs. The H-values, and probabilities for this demographic type generally were indicative of weaker relationships than those observed from the “age” responses although still statistically significant.

Professional positions (“occupation”) identified by respondents produced somewhat complex yet, for some questions, intuitively reasonable results. Those respondents identifying themselves as “resource managers,” “resource educators,” and “wilderness specialists” strongly perceived “number of human-made structures” (presumably negatively, although the question was not phrased to elicit the direction of the response) as an important attribute of ocean wilderness. Those identifying as “social scientists,” “cultural resource managers,” and “graduate students” were less likely to consider the presence of human-made structures as important a metric for determining wilderness quality. Cultural resource managers (not surprisingly) and graduate students strongly held the belief that ocean wilderness offered opportunities for cultural preservation, whereas Natural Scientists were less likely to embrace the concept. Scientists, both natural and social, appeared to be less likely than natural and cultural resource managers, wilderness specialists, and graduate students, to believe that “recreational fishing” was a compatible use in wilderness waters. This same pattern generally held for “commercial fishing,” except wilderness specialists appeared to offer responses that were more in accord with managers. However, given the overall negative response to the question of compatibility of “commercial fishing,” these differences might be interpreted as slightly varying magnitudes of how incompatible this activity was perceived. The H was high for this question, and the p value was highly significant, which underscores the differences among the professions with regard to this response. Social scientists, somewhat inexplicably, seemed to be less likely to believe “wildlife

viewing by individuals” was compatible in wilderness waters than other professions responding to this question. Cultural resource managers appeared to be very supportive of the idea that ocean wilderness can be used as a tool to preserve Indigenous culture, while natural resource managers, natural scientists, and wilderness specialists were considerably less enamored of the concept.

The Kruskal-Wallis statistics related to “occupation” generated from the responses to these questions were notably high compared with previous demographic categories evaluated (except for perhaps “age”). This potentially reinforces the widely-held notion that resource professionals, and scientists who work with them, are highly opinionated, despite claims to the contrary.

Except for one question identified as significant for “office” but not “residence,” there was nearly full concordance for the “proximity questions” identified as significant and the responses in terms of mean rank, so the focus of analysis and interpretation of the results can appropriately be on “coastal” vs. “inland.” A difference can be observed, and it may be best described as a “land-bias.”

Most of the questions identified in the calculations as significant were related to the potential effect of nearby land and the presence of designated wilderness on that land as regards whether the adjacent waters could be identified as wilderness. In all cases (Questions 35, 46, 47, 50, 51) “inland” respondents were significantly more likely to be influenced by nearby land and designated wilderness in determining whether adjacent waters were wilderness than their “coastal” counterparts. For those who are most familiar with the land, and the wilderness there, the presence of land and wilderness seems to be a “grounding influence” on their perceptions of what could be, and what might not be, ocean wilderness. One image, of the offshore area in the Bering Sea that includes a sounding juvenile Humpback whale, is also flagged in the analysis as significant ($p=0.026$). Interestingly, this is the only picture presented in the survey of offshore waters where land can be faintly seen, through haze, on the far horizon. In this case the “inland” respondents are somewhat less likely to identify this as having high quality as wilderness waters than “coastal” respondents, notwithstanding that the mode of

the responses as to whether this area was wilderness waters was “4” (corresponding with an “agree” response) and that this image had the highest calculated mean response value in the “medium perceived OW quality” category (see Table 3-7).

Significant differences were also noted between “coastal” and “inland” responses for “option value” (Question 3) and “number of man-made structures,” and “naturalness” of the area” (Question 4), with “coastal” respondents less inclined toward these values and attributes. Perhaps this is a “shifting baselines” situation, where “coastal” respondents have greater familiarity with a broader array of coastal and ocean environments than their “inland” counterparts, and therefore have a higher threshold for what they perceive to be important in terms of the values and attributes. In any case, the potential difference between “inland” and “coastal” respondents is notable.

The final element of the demographic analysis is the history and familiarity of respondents with wilderness. Questions were posed that sought information regarding the number of visits respondents make yearly to wilderness areas, and the reasons for those visits. Overall, the distribution of responses to the first question is bimodal, with peaks at “1-2 times/year” (37.4%) and “>5 times/year” (40.3%), with “never” (4.7%) and “3-5 times/year” (17.8%) representing the troughs. As regards the purpose of the visits, “as a part of my work” is the least (2.4%), “for recreation” (21.9%), “both work and recreation, but mostly for work” (33.8%). The highest response rate is “for work and recreation, but mostly for recreation”(41.9%). For the purposes of the analysis, “work” and “mostly for work” were binned and coded together, as were “recreation” and “mostly for recreation” (55.7% and 44.2%, respectively). Therefore, the post-survey analysis is focused, like the “coastal” and “inland” comparison, on “recreation” vs. “work.”

Six questions were identified as significant for “number of visits.”

- Respondents differed in their perception of “existence value” (Question 3), with those in the “troughs” (“never” and “3-5 visits/year”) appearing less inclined to rate this non-use value high than the “peak” groups (“1-2 visits/year” and “>5 visits/year”).

- The “3-5 visits/year” group was significantly less likely to believe “number of human-made structures” (Question 4) was as important an attribute in ocean wilderness as others with different histories of wilderness use.
- As regards “opportunities for preserving ecosystems and biodiversity” (Question 4), the “peak” groups appeared to embrace this idea more strongly than the “troughs.”
- The “never” and “>5 visits/year” groups appeared to be less likely to feel that “ocean wilderness can rejuvenate and sustain the human spirit” (Question 65), and only the “3-5 visits/year” group showed any inclination toward a positive perception that ocean wilderness “should enhance human quality of life” if not threatened (Question 69).
- Both the “never” and “>5 visits/year” groups tended toward disagreeing with the idea that ocean wilderness had an intrinsic right to exist (Question 74).

These results are difficult to interpret, as they seem to follow no obvious pattern or fit some logic model that would help to better understand the responses, unlike the results of the analysis of other demographic questions. The H-values and probabilities are not notably lower than other demographic question analyzed, and the rank means offer little illumination of underlying relationships. There are statistically significant differences observed, but their meaning remains elusive.

The analysis of “purpose of visits” is only a little less enigmatic than the wilderness visitation history of respondents. Except for one question flagged as significant, “recreation” visitors generally exhibit higher rank mean values than those whose visits to wilderness are “work.” The “recreation” group is more inclined toward “option value” (Question 3), “number of human-made structures” and “‘naturalness’ of the area” (Question 4) than the “work” group. As regards the significant questions related to the photographs:

- “Work” respondents are more favorably inclined to identify the offshore Bering Sea image (Question 25) as ocean wilderness.
- The “recreation” respondents, however, uniformly more highly value “presence of land” and “presence of designated wilderness” on adjacent land than the “work” group.

A possible interpretation could be that the recreationists are exhibiting a form of the “land-bias” observed in the results of the “coastal” vs. “inland” analysis, as described above. Given that past history of recreation for respondents is likely to be dominated by visits to terrestrial wilderness, such a “land-bias” might be relevant here. Given the overwhelming preference exhibited in the responses generally regarding the apparent importance of land and designated wilderness to the perception of wilderness qualities in adjacent waters (see Table 3-5) the results here may be a matter of degree. Arguably, work, after all is said and done, is work, and going to someplace for work is not the same thing as choosing to go there to enjoy one’s surroundings and be “re-created.” Perhaps the work group is being more conservative in their views because of the added responsibility of viewing an area from a “work perspective.” For whatever reason, the differences between these groups are significant, but like the mystery of the responses resulting from the analysis of wilderness visitation history of respondents, the underlying reasons for those differences, and ultimately the implications for robustly defining ocean wilderness, remains without a satisfying explanation.

3.3.5 Discussion

The Ocean Wilderness Workshop, held during the 2005 International Wilderness Law and Policy Roundtable (see Chapter 3), established a proposed definition of ocean wilderness, and identified issues related to potentially compatible and incompatible human activities with respect to the definition established by the group. That Workshop can be viewed as a “focus group,” representative of the primary target audience of this survey, which was described and discussed in the preceding chapter. There is a

convergence of similar ideas between the product of that “focus group” and the responses to this survey. Some common themes include:

- Ocean wilderness is “multidimensional,” involving the sea surface, the waters below, the seabed, habitats, animal and plant life there, and perhaps even the air above the water.
- Ocean wilderness is an area relatively free from human disturbance, are places where visitors can feel free from “civilization.”
- Wilderness waters are important even if they are not routinely visited. Non-use values like existence and bequest value seem to be most important, and other intrinsic values may also be significant.
- Many human uses are likely to be compatible, even some that would not be permitted in terrestrial wilderness, but there is a “bottom line” largely forming around commercial activities and some uses requiring motorized access, activities that have the potential to degrade the wilderness quality of the area.
- Activities of Indigenous communities, particularly those related to the preservation of Indigenous culture, seem to be a valued element, and even generate some enthusiasm, within the collective aspirations of the dominant culture for ocean wilderness.
- Sustaining and preserving ecosystems and biodiversity seems to be another primary goal for ocean wilderness.
- Linkages to the land, and land-based wilderness, may be another important element of defining what is wilderness, and what is not.

The comparison of results from the Shafer and Benzaken (1998) survey to those reported in this chapter suggests striking similarities in terms of the key attributes that may help define ocean wilderness. These, combined with the key findings of the Workshop, speak to the potential for extrapolation of these common themes to many different areas, and many types of ocean and coastal wilderness ecosystems in waters around the world.

There seemed to be little equivocation from survey respondents. “strongly agree” and “agree” responses were observed in 80-90% of responses for many of the questions that examined preferences for the preservation of ocean wilderness and the wilderness qualities of ocean and coastal waters. When presented with images of areas that could be ocean wilderness, the respondents seemed to be very carefully and critically evaluating what they saw (and more often than not what they did not see). When the presence of humans was evident, whether structures, vessels or development, the responses clearly reflected this as a degradation of the wilderness value of the area. The images of motorized zodiacs full of visitors and navigation aids along shipping corridors in remote areas near the Strait of Magellan in Chile were clearly perceived as “low value” areas of potential wilderness. Conversely, areas where human use was not apparent, particularly areas in Alaska where the lands and islands are designated wilderness, were perceived as “high value” areas with potential as ocean wilderness.

Certain subtleties of interpretation were identified, including the idea that images are somewhat inadequate for confidently evaluating wilderness value of the areas represented due to a lack of information on the history of human use over time, where the water’s surface masks many of the signs of that history. The respondents sent a clear message that, while wilderness is present in coastal and ocean waters, it may be importantly tied to adjacent lands that possess wilderness qualities, and especially if they are formally designated as wilderness. There is also a discrete set of human activities that, similar to terrestrial wilderness areas, may be incompatible to preservation of the wilderness qualities of that area.

Six attributes of wilderness waters, were considered to be “extremely important”: “amount of boat traffic,” “amount of noise,” “number of human-made structures,” “‘naturalness’ of the area,” “opportunities for solitude,” and “opportunities for preserving ecosystems and biodiversity.” Two other attributes were also highly rated: “number of people in the area,” and “‘wildness’ of the area.” Recognizing the limitations of interpreting means and standard deviations generated from coded “Likert” responses, all the lower bounds of the ranges of the means for these attributes (i.e. one SD below the

mean) would still fall well into the positive range of the spectrum of potential responses. These attributes were also identified as important in the GBRMP survey, and were largely consistent with the findings of the Workshop “focus group.”

Not unexpectedly, “commercial shipping” and “commercial fishing” were deemed most “incompatible” by respondents, followed closely by “recreational motorboating,” and “guided tours on motorboats” (see Figure 3-5). At the other end of the compatibility spectrum, “wildlife viewing by individuals,” “recreational kayaking and canoeing,” “recreational snorkeling and free diving,” “guided tours using kayaks and canoes,” and “Indigenous activities related to preserving cultural heritage” were all perceived to be highly compatible. Many of the “guided” activities evaluated were rated lower than that same activity conducted by individuals, which is likely a response to the general incompatibility of commercial activities in terrestrial wilderness. This is a question that would have, upon reflection, benefited considerably from some revision to clarify the means of access implied in the question. For example, recreational scuba diving, and similarly snorkeling and free diving, are often conducted from motorboats, although can be undertaken by entering the water from the land. Guided wildlife viewing (particularly commercial whale watching, which was specifically identified as an example in the question) is almost always done on motor vessels, yet 66% of respondents identified this activity as compatible. The uncertainty injected in the evaluation that arises from not specifically identifying mode of access may be, in part, another reason for “guided” activities falling toward the middle (“not sure”) of the use spectrum. However, relatively important information can be gleaned from the analysis of the responses received to help guide and inform wilderness waters designation and management.

The responses to the questions related to the importance of non-use values of ocean wilderness were some of the least equivocal of any in the survey. Both “bequest” and “existence” values were considered to be extremely important (see Figure 3-8). Building a constituency of support both within the target audience of the survey (resource professionals and scientists) and the public will rely heavily on people placing high value on the knowledge that these areas exist, and that they are preserving a part of our natural

heritage for future generations. These findings were supported in the “perceptions” section of the survey (Fig 3-10). While the enthusiasm of respondents waned a bit for “option value” and the somewhat obscure “quasi-option value” (76% and 72%, respectively rating these as “extremely” or “very” important), this is also not terribly surprising. Option and quasi-option values speak to the opportunity to use resources known (option) and unknown (quasi-option) some time in the future. Many who support wilderness stewardship believe in perpetual preservation. It might be argued that the relatively high value placed on these “option” values results from the trade-off that many wilderness advocates recognize in having something about the area that would offer greater appeal to those less enthusiastic about wilderness designations generally. Clearly, however, the non-use values of ocean wilderness seem to have received strong endorsement by the survey respondents.

Employing photographs in surveys to determine landscape value is not without its critics. The use of images as surrogates for natural landscapes [described by Jacobsen (2007) as “representational validity”] in perception surveys has been extensively debated in the literature. Many questions have been raised regarding such use (Hull and Stewart 1992, Kroh and Gimblett 1992, Palmer and Hoffman 2001, Zube et al. 1974). Perceptions of landscape preference have been shown to be greatly influenced by many factors, largely related to the multi-sensory, sequential experience of human-environment interactions. On-site evaluations of landscape preference are closely linked to the personal experience of visitation. Hull and Stewart (1992) observed that:

Landscape views experienced on-site are embedded in spatially and temporally proximal views. They blend into one another as the viewer moves through the environment. The on-site viewer has control over which views to gaze upon, over the rate of travel among the views, and has the opportunity to attribute meanings to particular views according to events occurring on-site. The on-site viewer has a purpose and motivation for viewing the landscape that may be different from the motivation of a photo-based landscape experience. Moreover, the on-site viewer is

experiencing a host of other stimuli including, perhaps, emotions, cognitions and/or physical fatigue not resulting from the landscape stimuli but from the social or other contextual factors associated with the on-site experience. The photo-based viewer has a very different context.

Empirical studies comparing these experiences in controlled experiments have found that people may respond differently to an on-site landscape experiences and photo-based simulations (Kroh and Gimblett 1992).

Photo-based simulations may also be subject to other influences that can potentially confound interpretation. It has been suggested that perceptions of photographs viewed on a computer screen can potentially be influenced by the size and resolution of the screen on which the image is viewed, and the graphic format of the image can also add complexity to analyzing results of surveys. However, Wherrett (1999) found that monitor sizes did not seem to be a confounding factor, and found no significant differences among various screen and color resolutions of the monitors used in his analysis. Using poor image quality photographs can cause respondents to get tired or irritated (Wherrett 2000), but this research suggested that results are rarely affected by this irritation.

The use of images to identify landscape, and wilderness, quality was determined to be sufficient for purposes of this research. Many studies, evaluating the use of photographs as landscape surrogates, have concluded that images can be appropriately used for such a purpose (Daniel 2001, Daniel and Meitner 2001, Fyhri et al. 2009, Green 2005, Kane 1980, Kellomäki and Savolainen 1984, Palmer and Hoffman 2001, Rogge et al. 2007, Shafer and Brush 1977, Shafer and Richards 1974, Shuttleworth 1980). As summarized by Meitner (2004):

It appears that slides and photographs can be useful and inexpensive analogs to on-site evaluation, but only in certain conditions. When the task at hand is simply to rate visual characteristics (i.e. scenic beauty) of a fairly typical natural environment, photographs and slides would appear to serve the objective well.

In the survey conducted here, the use of photographs provided opportunities to offer images targeted at testing specific hypotheses, such as whether the presence of humans and signs of human development degraded perception of wilderness quality, and the relative perceived wilderness quality of open ocean vs. coastal vistas. Also, the practical reality of relying a photo-based survey rather than on-site evaluations was a factor in this decision, given the time available to complete the research and the greater potential cost and logistical considerations of adopting an on-site evaluation approach. Methodological challenges such as image quality and size, color saturation, compositional difference, and computer monitor resolution on which the image is viewed were considered and addressed, to the maximum extent possible, in the presentation of the photographs in the online survey instrument, as discussed in Section 3.3.2, and in analysis of the image responses, provided below.

It is interesting to note that a few of the attributes of wilderness identified by respondents as “extremely important,” such as “amount of noise” and “opportunities for preserving ecosystems and biodiversity,” may not be easily determined from simply viewing a photograph. However, the largely unambiguous responses provided suggest that this was not a significant issue for respondents in terms of offering an assessment the potential wilderness quality of that area.

A number of insights can be found in the photographic image responses. There is little doubt that respondents favored images of coastal waters with lands and/or islands. The highest rated photographs all contained such features. The statistical analysis suggested two distinct groups of images, described here as “perceived high ocean wilderness quality” and “perceived medium ocean wilderness quality” (see Table 3-7), were identified by respondents as having significant qualities and attributes of wilderness. Only the “medium” group included images of offshore areas. While the absolute difference in the ratings between the “high” and “medium” group was small (Table 3-9), and therefore both groups were perceived as having considerable wilderness qualities and attributes, this difference is notable with respect to the implications of “coastal” and “offshore” areas as regards perceptions of ocean wilderness quality. The analysis of the

responses to the questions involving altering the perception of wilderness quality of the images as a result of the presence of land and designated wilderness on that adjacent land and islands (summarized in Table 3-8) reinforces this linkage. In retrospect, it would have been better to phrase this question of the effect of land on perception of wilderness quality in such a way as to clarify if it was a positive or negative effect (i.e. would the presence of land enhance the perception of adjacent waters as wilderness). As it was phrased, the precise meaning of “affect” in this question can only be inferred.

Notwithstanding this, the presence of designated wilderness on adjacent land areas unambiguously influenced the perceived wilderness value of the coastal waters nearby, and where land or islands were observed in the images, respondents were inclined to look on adjacent waters more favorably as potential wilderness. In the search for wilderness in the oceans, offshore and high-seas areas, including the deep sea (Ramirez-Llodra et al. 2011), have been identified as potential candidate areas. The results of this survey seem to suggest that, to the contrary, coastal waters, particularly those adjacent to designated wilderness, may be more likely to exhibit values, attributes and qualities of wilderness worthy of formal designation. This is an important finding of this research in helping to guide and inform future wilderness waters designations.

Based on the results of the analysis of “open-ended” responses related to the photographic images, as summarized in Table 3-9, “field of view” and “image index” offer another insight with regard to the scale of ocean wilderness areas. The responses suggest that larger areas, represented by photos with larger fields of view, are more likely to be identified as possessing wilderness qualities. Such a perception is consistent with the traditional idea of wilderness as encompassing vast areas. However, considering the number of comments received that speak to the inadequacy of photos to provide information about what is outside the field of view (i.e. human uses, past, present, and future in the lands and waters adjacent to the area represented in the photograph), the predilection for respondents to favor images that show larger areas may simply be a response to this common dissatisfaction expressed in the open-ended questions. Images with wider fields of view provide more context information about the area represented,

and the “image index” results seem to lend some support to this interpretation. Images perceived to possess higher ocean wilderness quality had generally greater fields of view and respondents seemed less constrained by the characteristics of the image in offering this perception (Table 3-9). As mentioned above, Shafer and Benzaken (1998) speculated that the perception of remoteness was perhaps more important than actual distance from human development, and therefore potentially smaller, discrete areas could be set aside to preserve the wilderness character of ocean waters. This question of optimal geographic scale of ocean wilderness areas is important and warrants additional, targeted research. However, for the purposes of this study, the notion of “bigger is better” is sufficient in terms of guidance for potential future identification and designation of wilderness waters. This approach is consistent with the findings of this survey and compares favorably with more traditional views of the appropriateness of identifying as large an area as possible, given potential conflicts over competing uses, in designations of wilderness.

The “perception” questions (Questions 61-83) offered insights into more general beliefs of respondents with respect to ocean wilderness. Again, there was little equivocation in the responses. Based on the strength of the responses, findings from the survey include:

- Preserving wilderness is a deeply held value of those who responded to the survey.
- The idea of wilderness is believed to be as relevant in the water as on land.
- Ocean wilderness is perceived to deserve greater attention and appreciation.
- Ocean wilderness has an intrinsic right to exist.
- Wilderness waters are important in nurturing spiritual growth and well-being, providing opportunities to “feel close to nature.”
- Ocean wilderness may offer the potential to preserve maritime and cultural heritage values that such areas possess, particularly indigenous cultural values.

- Utilitarian ideas that wilderness is only valuable for the goods and services it can provide, that it is wasted being left undeveloped, and should be used only to serve human needs were soundly rejected.

One question (“If I feel I am alone in an area I believe is ‘wilderness,’ this sense of being alone is more important than the actual distance I am from developed areas.”) was specifically posed to address the idea put forward by Shafer and Benzaken (1998) of “psychological remoteness.” Approximately 76% of the respondents “strongly agree” (33%) or “agree” (43%) with this statement, lending considerable support to the notion that the perception of remoteness is enhanced for that segment of visitors who are experiencing the underwater environment (when scuba diving, for example). As mentioned previously, this may be an important consideration in defining the geographic scope of potential wilderness waters designations.

Some statistically significant effects were identified from the analysis of the demographic information provided by respondents to the survey, and offer perspective on the complexities of interpretation of the results. All of the demographic characteristics evaluated influenced the responses to 26% of the questions to some degree. While statistically significant, few of these effects could be interpreted as consequential to the overall analysis and outcome of the survey. A number of the effects were intuitive (e.g., cultural resource managers, historians and archaeologists were more inclined to value ocean wilderness as places where Indigenous cultural heritage can be preserved) while others (e.g., effects observed related to wilderness use history) eluded simple explanations.

3.4 “Ocean Wilderness Attachment”

As discussed in Chapter 1, Williams et al. (1992) posited that a strong emotional bond, a form of “place-attachment,” can develop between wilderness recreational users and wilderness generally, beyond simply an attachment to a particular place we call “wilderness.” They state, based on the analysis of the survey they conducted: “The distinction between place attachment (valuing the setting as an end in itself) and

wilderness attachment (valuing a setting as a member of a class of settings) appears generally valid.” While the ocean wilderness survey conducted as a part of this research was not specifically developed to address whether respondents possessed a similar affinity to the idea of ocean wilderness, the results obtained provide some evidence that such an attachment may exist between the managers and scientists who responded to this survey and ocean wilderness, valuing these areas as “a member of a class of settings.”

The survey design, results, and analysis reported by Williams et al. (1992) was very specifically targeted at determining if respondents had developed an emotional attachment to specific places or to the idea of wilderness more generally. Questions were posed in the survey that were intended to demonstrate or refute that such a difference in attachment could be demonstrated. As described by the authors:

Respondents were asked to choose between "I came here because I enjoy this place itself' (place mode), "I came here because this is a good place to do the outdoor activities I enjoy" (activity mode), or "I came here because I wanted to spend more time with my companions" (group mode).

Each of these questions was illustrative of the various motivations that wilderness users might have for their perception of the areas they were asked to evaluate. The ocean wilderness survey, conducted for this research, did not include such questions, nor had, as one of the hypotheses it was testing, such an objective. However, there were a number of questions in the ocean wilderness survey that have relevance to the underlying focus of attachment (i.e. whether the attachment was to the place or to ocean wilderness more generally).

With regard to whether any emotional bond of attachment between the respondents to the ocean wilderness survey and ocean wilderness was in evidence, the respondents seem to clearly recognize and value ocean and coastal waters areas as wilderness. More than 75% of the respondents reported that they had visited an area they believed to be ocean wilderness, and overwhelmingly perceived that the wilderness attributes and qualities of these areas were present in all spatial elements of that place, from the air above to the seabed below. They had very clearly stated preferences for the

types of attributes that such areas possess and the types of human uses that would be compatible with preserving the wilderness values of those areas. They ascribed strong “non-use” values to these areas, particularly those related to “bequest” and “existence.” The “ocean wilderness preferences” expressed by respondents also seem to suggest strong attachment. More than 85% of the respondents “agree” or “strongly agree” with the statement that “the idea of ‘wilderness’ is as relevant in ocean and coastal waters as it is on land.” Approximately 87% agreed or strongly agreed with the idea that ocean wilderness has a intrinsic right to exist, and more than 95% believed that humans should afford ocean wilderness greater “respect and appreciation.” Responses to statements that ocean wilderness “rejuvenates and sustains the human spirit,” that such areas “provide a sense of peace and well-being” and “allow us to feel closer to nature” all reported “agree” and “strongly agree” responses approaching 90%. Considering such strong and consistent preferences expressed by respondents, a potentially robust case can be made that an emotional attachment to wilderness is suggested by these results.

The findings related to the assessment of the wilderness qualities of the images that respondents were asked to evaluate is another line of evidence for an “ocean wilderness attachment.” None of the locations of the areas depicted in the images was identified in the survey, and therefore the responses to the questions related to whether these areas possessed wilderness qualities and attributes was unlikely to have been influenced by the personal experience of the respondent with that particular area. A majority of these respondents were regular visitors to wilderness, with almost 60% visiting wilderness more than three times per year and 66% of these respondents reporting more than five times per year. However, the probability that any of these respondents actually visited (or were aware that they had visited) any of the places represented in the images was small. Many of the images were of places with few visitors and in distant countries, including Iceland and the Patagonia region of Chile. Even the images from the US used in the survey were of very remote areas that receive little visitation. In their evaluation of the 15 images offered, the respondents identified five of the images as possessing “perceived high wilderness quality,” and another six as

having “perceived medium wilderness quality,” rejecting only images that included obvious (or perceived to be obvious) signs of human presence and activity. Therefore, it is reasonable to suggest that if some emotional attachment was indeed present, as the results of the survey seems to suggest, the filter of perception through which respondents evaluated the images would have been more influenced by an attachment to wilderness as a class, and ocean wilderness in particular, rather than to “place attachment.”

There is additional evidence related to the expansion of the perception of wilderness to ocean and coastal waters notable in the results of this survey. When asked whether the presence of designated wilderness on adjacent lands might influence the respondents’ perception of the coastal waters areas depicted in the images, the response was unambiguously positive for all fifteen images evaluated. This suggests that the respondents’ affinity for and attachment to wilderness, generally, includes not only the more familiar land, but can be expanded to include the adjacent waters as well.

Again, it should be emphasized that this analysis can only provide possible evidence of “ocean wilderness attachment,” as the survey would have had to include specific questions, such as those posed by Williams et al. (1992) as discussed above, in order to arrive at any definitive conclusions regarding place attachment, or “wilderness attachment.” However, the results of this survey offer some support to the idea that “wilderness attachment” is generally valid, as concluded by Williams and co-workers, and may also be relevant to ocean wilderness a type of place to which people can develop strong emotional attachment.

3.5 Conclusion

The survey reported in this chapter was conducted to offer insights into “what we think it is.” Such surveys provide important information for better illuminating our collective understanding of terms like “ocean wilderness” and “wilderness waters.” They offer additional insights, like the Ocean Wilderness Workshop “focus group” and the survey of Shafer and Benzaken in the GBRMP, into the complexity of perceptions, beliefs, and opinions. However, surveys are only windows to this collective

understanding. They are necessary, perhaps, but certainly not sufficient to comprehensively define the words we use for describing what we mean when we use these terms. They are limited to the perceptions of the survey's target audience – and perhaps only a self-selected portion of that audience (Yun and Trumbo 2006) – which in this case represents arguably a critical, but certainly not the only, community with a potential stake in the future of ocean wilderness. While the group surveyed may not be representative of all the constituencies with an interest in wilderness waters, they are likely to have a significant role in future implementation of ocean wilderness identification, designation and management. The striking similarity of results between this survey and the GBRMP wilderness survey of Shafer and Benzaken (1998), as well as the similarity in the findings of the Ocean Wilderness Workshop “focus group,” suggests some potential for broader extrapolation of these results. While the demographics of the respondents to the survey suggest that they are a reasonably valid representation of the target audience, it is most unlikely that they reflect the racial, cultural, or educational profile of the public at large. For example, as the survey respondents largely represented only one race/ethnicity, the results offer no useful insight into the extremely important issue of how other cultures might perceive wilderness waters. Despite the potential limitations, it is reasonable to suggest that these findings provide useful guidance in terms of “what we think it is,” at least for the “we” reflected in demographic profile of survey respondents. In the realm of public policy development, certainty is elusive. If any information is available that can provide greater understanding of the “human-environment relationship” underpinning the policy being developed, this would be a most welcome situation.

In this case, the relative clarity of perspective and overall lack of equivocation of the respondents' preferences regarding the questions posed offers such insight. “What they said it is” conforms in many ways with the often and widely expressed perspectives of the traditional wilderness community. There was a clear sense from the responses that these perspectives were directly applicable to ocean and coastal waters. The attributes of ocean wilderness, the potential compatibility of likely human uses, the values identified

in this survey as “extremely” and “very” important can be used with some confidence, recognizing the limitations of such surveys, to guide and inform the identification, designation, and stewardship of wilderness waters, both those currently designated, and any that might be established in the future.

Chapter 4 “What It Is Now” – Existing Wilderness Waters

4.1 Introduction

As a visionary statement, the Wilderness Act of 1964 (P.L. 88-577, 16 U.S.C. 1131-1136) is unrivaled in American law. Visionary statements are, by definition, long on vision, but short on specificity. It is left to the implementing agencies to interpret this vision and incorporate it into their management programs. This interpretation has evolved as a lengthy and sometimes rambling process. It is often advanced and clarified as a result of the resolution of specific issues and challenges encountered in the day-to-day management of the National Wilderness Preservation System (NWPS), establishing precedents that have been adopted over time as a part of the administrative history of the Act. It is also interpreted in the development and implementation of regulations promulgated under the Act, and in the various agency-wide management policies developed by the implementing agencies to guide and inform their wilderness stewardship.

The implementation of the Wilderness Act has not been, by any means, a smooth trajectory for any of the wilderness management agencies (Sellars 2000, Scott 2004). There are currently more than 750 designated wilderness areas in the US with very different characteristics and management requirements, administered by four different agencies: National Park Service (NPS), US Fish and Wildlife Service (FWS), US Department of Agriculture Forest Service (USDA Forest Service) and the Bureau of Land Management (BLM). While all wilderness is designated under the Act, each of these management agencies operates under somewhat different agency missions and mandates, affecting how they view the scope and intent of the management of wilderness under their authority. Ecological changes in wilderness resulting from drivers, such as climate change and encroachment of human development, have created challenges that were not contemplated by those who so carefully crafted the language of the Act. The ebb and flow of political ideologies with each new administration leave legacies of interpretation that have unquestionably affected the stewardship of wilderness. The Wilderness Act has

stood the test of time, but only because the implementing agencies have embraced the idea of the evolving interpretation of the language that empowers the designation and management of wilderness. Even after almost half a century, however, the debates continue.

During this nearly fifty years of implementation of the Wilderness Act, some areas of coastal and ocean waters had been included in the boundaries of wilderness designations. However, no systematic inventory of wilderness waters had been conducted prior to this research. Clearly, it is important to know which wilderness areas include coastal and ocean waters, the amount of water area that is designated, the extent to which they are illuminated by the public record regarding these designation processes, and the justifications for including such waters. This information is essential to articulating the current status of wilderness waters within the NWPS, and developing a better understanding about current management frameworks that may exist for these areas. To provide this information, a systematic inventory was conducted as part of this research. This chapter provides the results of that inventory, as well as an analysis of the legislative and policy framework that have evolved with regard to coastal and ocean waters areas in designated wilderness. The chapter also reports the results of a survey of managers of these wilderness waters areas. This survey was conducted to determine the scope and extent of current management activities, perceptions of the managers regarding the wilderness values and qualities of the areas over which they have stewardship responsibilities, and to achieve some sense of what training and information these managers feel they need to more effectively preserve these qualities and values.

4.2 Legislative and Policy Review of Wilderness Waters

Designating ocean and coastal waters as wilderness has not been one of the issues about which there has been much debate in the legislative arena. This lack of controversy is likely due to the small percentage of coastal and ocean waters areas that have been included within the NWPS and the relative obscurity of these areas to most in the wilderness community.

The language of the Wilderness Act seems to suggest that the framers' intent was largely focused on the land. Despite this terrestrial focus in the history of the implementation of wilderness designation throughout North America, more than 1.1 million acres (approximately 4,466 square kilometers) of wilderness waters have been formally designated in the US and are officially part of the NWPS. Therefore, the flexibility unquestionably exists to consider ocean waters as wilderness as the term "wilderness" is currently defined. No references in any of the definitions provided for any wilderness program would absolutely prohibit the inclusion of ocean and coastal waters in their wilderness systems.

It could also be argued that few of the foundational elements of our wilderness concepts could not be extended to ocean wilderness. The four principal elements of wilderness character, as defined in Landres et al. (2008), are:

- 1) Untrammeled – wilderness is essentially unhindered and free from modern human control or manipulation;
- 2) Natural – ecological systems within wilderness areas are substantially free from the effects of modern civilization;
- 3) Undeveloped – wilderness retains its primeval character and influence, and is essentially without permanent improvement or modern human occupation; and,
- 4) Solitude or Primitive and Unconfined Recreation – wilderness provides outstanding opportunities for solitude or primitive and unconfined recreation.

A reasonable case could be made that each of these elements of wilderness character could be equally applied to areas of land or sea. The definitions of the general characteristics of wilderness provided by Landres et al. (2008) contain no element that would exclude consideration of ocean and coastal waters. Certainly, the results of the Ocean Wilderness Survey reported in the preceding chapter lend support to the idea that areas perceived as wilderness waters possess these elements of wilderness character.

The recreational, scenic, therapeutic, ecological, scientific, educational, spiritual,

artistic, moral, historic, cultural, and existence values mentioned in the Act and cited routinely as “wilderness values” could all also be core values of ocean wilderness. This, too, is supported by the findings of the Survey, and many are explicitly mentioned (Chapter 2, Table 2-2) as core values by the Ocean Wilderness Experts Group at the 2004 Wilderness Law and Policy Roundtable.

Most people, particularly many wilderness managers and advocates, see “wilderness” only through the filter of its historical implementation. If the goal of the Wilderness Act is “to secure for...present and future generations the benefits of an enduring resource of wilderness,” why should ocean wilderness not be a fundamental part of this “enduring resource?”

The Act is nearly silent on the matter of designating waters, and the underlying submerged lands, as wilderness. There are numerous references to “Federal lands,” including a provision in the definition [Section 2(c)] that areas be “at least 5000 acres” of “undeveloped Federal land.” The word “land” is mentioned in the Wilderness Act approximately 28 times, but as the seabed is considered “submerged lands” [as defined in the Submerged Lands Act (43 U.S.C 1301)], the references to “land” could reasonably be interpreted as applicable to terrestrial and marine areas equally.

The Act’s requirement that these lands must be public lands (i.e. under Federal ownership) seems to be no additional impediment. All submerged lands within the US Exclusive Economic Zone (EEZ) have been traditionally considered under public ownership, notably with regard to application of the Antiquities Act, which contains a similar requirement (Barr and Van Dine 2006). The Federal Lands Policy and Management Act (P.L. 94-579) also specifically and unambiguously defines submerged lands on the Outer Continental Shelf as “public lands.”

Given that terrestrial wilderness stewardship extends to the overlying airspace, in the form of restrictions on overflights by aircraft, the three-dimensionality of the ocean environment again seems to pose no special obstacles. As discussed in more detail later in this chapter, the water’s surface, water column and seabed in existing wilderness waters are all managed as part of the designated wilderness.

Finally, many more acres of wetlands are protected under the Wilderness Act than ocean areas, particularly in National Wildlife Refuges where the primary focus is on preserving wetlands as habitat for migratory waterfowl. The presence of overlying water does not seem to be at issue in terms of interpreting the Wilderness Act definition. Seemingly, it is, only the implementation history of wilderness that has created the perceptual nexus between “dry” lands and the idea of wilderness.

Section 4(d)(1) of the Wilderness Act, regarding “special provisions” related to use of wilderness, specifically mentions “motorboats,” so its application to waters must have been intended, at least to some extent, as an element of wilderness areas. Section 4(d)(5), establishing the Boundary Waters Canoe Area, suggests as *prima facie* evidence that at least inland waters were to be included in wilderness under the Act.

Congress later clarified and expanded the Wilderness Act in new legislation. The so-called “Eastern Wilderness Act” of 1975 (P.L. 93-622) mentions “waters” within the scope of this wilderness legislation in Sec. 9, the all-important “Authorization of Appropriation.” The Alaska National Interest Lands Conservation Act of 1980 (ANILCA; P.L. 96-487) also specifically mentions “waters” in Section 102(1), explicitly defining “land” as “land, waters and interests therein.” However, Section 103(a), of ANILCA states that “boundaries of areas added to the National Park, Wildlife Refuge and National Forest System shall, in coastal areas not extend seaward beyond the mean high tide line.” The Congressional intent to exclude coastal and ocean waters from protected areas established under ANILCA was reasonably clear. However, closer investigation has revealed that at least four of the areas protected under ANILCA include submerged lands (see Wilderness Waters Inventory, below) not only within the park or refuge boundary, but within the designated wilderness in that park or refuge. The individual statutory language establishing wilderness areas has generally, but not always, included specific reference in the language, or by reference on the official map of the designated area, to waters where such areas are part of the designated wilderness.

Each wilderness management agency has developed a wilderness policy and/or regulations to guide the management of wilderness under their jurisdiction. All of these

agency policies include reference to "waters" within the scope of their wilderness definition. The BLM wilderness regulations (BLM 2000) include "waters" within their wilderness management guidance, but do not go so far as to propose any specific management direction for waters in designated wilderness. Section 6.3.11.3 of the NPS policy, "Wilderness Preservation and Management" (NPS 2006), offers the following guidance: "The NPS will manage all waters included within wilderness boundaries, and the lands beneath these waters (if owned by the United States) as wilderness, in keeping with established jurisdictions and authorities." The FWS wilderness policy (FWS 2008) mentions "waters" a number of times, including specific references regarding reviews of areas for potential designation and more generally, includes "waters" as an element of wilderness within the scope of this policy. The one reference to a management issue is provided in the FWS and USDA Forest Service wilderness policies. The FWS policy states that fish will not be introduced (i.e. stocked) into "wilderness waters that do not naturally support fish populations." On the other hand, the Forest Service's wilderness policies (USDA Forest Service 2007) include a directive, in Section 2323.34d, to "inventory suitable waters for present or potential fisheries as part of wilderness management prescriptions," but provides guidance on how those waters, including "barren waters" (the object of the FWS management prohibition), could be stocked with fish. The Forest Service policy appears to be largely focused on interior waters that might be important recreational fisheries, but again nowhere precludes the possibility of including coastal or ocean waters in Forest Service wilderness.

4.3 Jurisdiction over Submerged Lands and Wilderness Designations

As is the case with many jurisdictional issues particular to land-based protected areas programs, the central concern seems to be whether the area is under Federal ownership (Barr 2001). This is part of this is agency culture. Terrestrial protected areas programs like NPS and FWS manage lands in fee-simple Federal ownership, and only recently have begun to engage public and private partners in collaborative management

(e.g. Boston Harbor Islands National Recreation Area). Ownership conveys rights that afford managers greater authority to implement proposed management actions.

However, a larger part of this “need to own” relates to legal jurisdiction. Flynn (2004) posited that the FWS and NPS have clear jurisdiction within the territorial sea (i.e. within 12 miles of the coast), and the NPS may have, albeit untested, jurisdiction in all waters “under the jurisdiction of the United States” [NPS Organic Act, 16 U.S.C., Sec. 1a – 2(h)]. However, many of the agency policy statements express reluctance to press the issue of at-sea jurisdiction. Also, nearly all of the existing wilderness waters (see Wilderness Waters Inventory, below) are within “state waters,” an area generally within three nautical miles of the coast. The management of these submerged lands was conferred to the states in the Federal Submerged Lands Act of 1953 (SLA; 43 U.S.C. §§ 1301-1303, 1311-1315), and therefore wildernesses established after the date that the law was enacted are likely to be subject to state ownership of the submerged lands therein. As Flynn (2004) observed: “...it is clear that, vis-a-vis the states, the federal government does not now ‘own’ the submerged lands and waters to the extent that such rights have been ceded to the states” (through the SLA), although the area remains in U.S. ownership vis-a-vis other nations.”

Determining federal “control” may be somewhat more elusive. The reference to the word “control” here is important because jurisdiction, for most Federal protected area programs, rests as much on “control” as it does on ownership. The Courts have provided some additional clarity when it has reviewed this issue. In *McGrail & Rowley v. Babbitt* (986 F. Supp. 1386, S.D. Fla. 1997), a case involving access by a charterboat company to waters adjacent to wilderness islands in Florida, the court found that the FWS has the authority to regulate the commercial use of State land and waters. In a June 2005 decision regarding the State of Alaska’s jurisdiction in Glacier Bay National Park and Preserve (NP&P), the U.S. Supreme Court (*Alaska v. United States*, on Exceptions to Report of Special Master, No. 128, Orig. Argued January 10, 2005 - Decided June 6, 2005) upheld the Federal ownership of submerged lands within the Park, but largely as a result of the Park being established prior to the passage of the SLA.

The challenge of designating ocean wilderness areas within state territorial waters, involving conflicts with states with regard to their jurisdiction over submerged lands, will continue to be an issue. This is particularly at issue in Alaska, with the State continuing to object to Federal regulation of submerged lands (Sullivan 2010). In many cases, wilderness management agencies are unwilling or unable to convince the state to cede their authority and title over to the Federal agency managing that wilderness area. In some of those situations, the administrative agency may treat those areas as if they were excluded from the designation, whether or not the official boundary of the wilderness includes these lands. An example of this is the Chassahowitzka Wilderness on the West Coast of Florida. A description of management for this area includes the statement:

“Since the waters within the Citrus County portion of the wilderness area are classified as navigable waters by the State of Florida, they are not included in the wilderness designation, and therefore, motorboats may operate there.”

(www.wilderness.net/index.cfm?fuse=NWPS&sec=wildView&WID=114&tab=Area%20Management).

Examination of the official wilderness files of the US Fish and Wildlife Service for the Chassowitzka Wilderness indicates, contrary to the published statement of policy for this wilderness, that the designated boundary for this area included these disputed waters. There were no special provisions regarding the use of motorboats in the Act designating the site (Designation of Wilderness Areas within the National Wildlife Refuge System, P.L. 94-557). Additional research needs to be conducted to determine how pervasive this “administrative special provision” process is for the sites containing wilderness waters, but it is likely to be a major issue in future designations.

Another noteworthy document, insofar as policy related to wilderness waters is concerned, is a 1975 letter from the Department of the Interior (DOI) to Sen. Henry Jackson, Chairman of the Committee on Interior and Insular Affairs. This letter was written in response to questions raised at a hearing of the Public Lands Subcommittee on

9 October 1974 related to “water and wilderness proposals.” In this letter, signed by then Acting Assistant Secretary of the Interior, Douglas Wheeler, the Department offered considerable insight into the DOI thinking, at the time, on the inclusion of waters in wilderness and more specifically, the issue of submerged lands:

One specific question which has been asked frequently at wilderness hearings is how we justify recommending submerged lands for wilderness designation without the water column above them. The extent to which the Department controls water columns bordering on its parks and refuges varies according to the statute or Executive Order which established the area. In cases where the Department controls the water column as well as submerged lands beneath it, we have generally tried not to separate the two in formulating wilderness proposals. In cases where we have control over submerged lands only, we have often recommended wilderness designation of these lands, even though it is entirely possible that activities could occur in the overlying water that are both beyond our control and incompatible with the solitude expected of a wilderness area. We believe that designation in such cases can be useful, however, as an added protection of the submerged lands.

Most of the remainder of that letter specifically focuses on the many conditions under which motorboating might be permissible in wilderness when the water’s surface and water column are excluded from the wilderness boundary.

Designation and management of wilderness within State waters may require special agreements and co-management arrangements to achieve effective stewardship of the wilderness waters in coastal areas, such as that being implemented in the Florida Keys (see below). Expanding the scope of the wilderness system to include more ocean and coastal waters is likely to require some new thinking about appropriate management frameworks for these areas that are “Federal lands,” but not in the traditional form of land ownership. While debate regarding this issue will undoubtedly continue, the

“ownership” challenge could be ultimately overcome by forging more effective and sustainable Federal/state partnerships.

Official agency documents seem to support the idea that waters, both inland and coastal, can be included in wilderness designations. There are, in fact, a number of sites that have sometimes extensive wilderness waters included within their boundaries, but until this research was conducted, the extent of wilderness waters throughout the NWPS was relatively unknown.

4.4 Wilderness Waters Inventory

To develop a better sense of the scope and extent of ocean and coastal waters included in areas currently designated as wilderness, an analysis was conducted of available, published information regarding designated wilderness under the jurisdiction of Federal agencies, particularly units of the National Park System and National Wildlife Refuges. Upon completion of an initial review of this information, it was clear that the published information available through the World Wide Web “wilderness.net” portal and both paper copies and web publications from agency sources would be insufficient to conduct such an inventory. However, wilderness management agencies are required, under provisions of the Wilderness Act, to maintain files on each of the wilderness areas designated by Congress. In addition to all designated sites, these files generally include areas that have been proposed, actively being evaluated, or have been determined by the Agency, after a formal review, to be suitable for wilderness designation and have been recommended to Congress for their consideration. They are to include an “official” map of the site, a description of the designated or proposed boundaries, the “wilderness suitability determination” (i.e. the proposal for the site forwarded to Congress for its review), and other documentation regarding the designation and management of that site. These are “paper files” and, at the time this inventory was conducted in 2006, had not been digitized or indexed. While not all of the required information was found in these files, they were usually complete enough to acquire reasonably clear delineations of the

“official” boundaries of the wilderness areas, and for most, insights into why the site was determined to be suitable for designation as wilderness.

Since the completion of the background research for this inventory in 2006, some of the information contained in these files has been digitized and made available on the “wilderness.net” website (<http://www.wilderness.net>). Additional wilderness has also been designated by Congress and added to the NWPS. This web resource was used as the basis for updating the inventory, through 2012, and consulted for a supplemental, more detailed inventory of an area in Alaska, including the Aleutian Islands, Bering Sea, and Arctic coast. This sub-sample of the NWPS was selected because of its relevance to the Arctic focus of this research. The supplemental inventory was undertaken both as a way of checking whether sites with wilderness waters were overlooked in the original survey (or were not identifiable from the information consulted in the “master files), and to develop some better sense of how many existing wilderness areas in the Arctic region have seaward boundaries that extend only to “mean high water” (MHW). Given the results of the Ocean Wilderness Survey (see Chapter 3) with regard to the identified importance of linking coastal waters that may have wilderness value to nearby designated terrestrial wilderness areas, these “MHW wildernesses” could represent appropriate candidate sites where wilderness waters designations might be considered at sometime in the future.

4.4.1 Methods

The “master” wilderness files were consulted at the headquarters offices of the National Park Service and the Fish and Wildlife Service. Sufficient detailed information could be gleaned from these files to acquire a reasonably accurate assessment as to which sites contained “wilderness waters,” defined as tidally-influenced estuarine, coastal and ocean waters included within the designated wilderness boundaries. Of particular interest in these files were the official maps of wilderness, referenced in the statutory language designating each wilderness area, and any written description of that boundary contained in the file. All of the maps in the files were professionally hand-drawn, but given that the

areas being mapped were usually quite large, the resolution of the boundary lines was problematic. Therefore, only areas where the boundary was obviously drawn to include water areas (e.g. closure lines for embayments, boundary lines parallel to the shoreline offset by a consistent distance) were captured in the inventory. By consulting other documentation in the files, it could be reasonably determined that the inclusion of water areas within the wilderness boundary was not likely to have been incidental, or an artifact of the way in which the boundary was drawn. The inventory based on documents from the the “master” files was supplemented with whatever additional web-based information could be found for that wilderness area, collected subsequent to the review of those files. This inventory was conducted as part of this research, and summarized in Barr (2008).

The supplemental inventory of Arctic wilderness areas, as described above, was conducted online in 2010 using the resources contained in the “wilderness.net” data set for designated wildernesses in this region. The data consulted from that site included digital boundary maps and various site-specific documentation available in that database, including but not limited to the statutory language designating the site, special provisions that are applicable to the designation, and a few wilderness plans and site assessments. This information was also supplemented with other web –based sources of information, particularly the agency-sponsored web offering regarding that protected area and wilderness (in the relatively few cases where wilderness-specific information was provided by the agency).

4.4.2 Results

The sites identified in Table 4-1, adapted from Barr (2008), represent the most significant examples of currently existing wilderness waters. Where it could be determined, the size of the area of wilderness waters was estimated from available “official” maps, if more precise dimensions had not been calculated previously.

In a few cases, particularly some refuges with “marshlands,” it was very difficult to determine if the waters were tidally influenced. In one case, the Gulf Islands National Seashore, available boundary information contained in the 2004 Wilderness Plan

(<http://www.nps.gov/guis/pphtml/documents.html>) for that site states that the seaward wilderness boundary is limited to MHW. However, in the Superintendent's 2003 Compendium of regulatory actions from that year (<http://www.nps.gov/guis>), Section 1.5 – 7 states that “Horn Island and Petit Bois Island, including the lakes, ponds, lagoons and inlets are within the designated wilderness area of Gulf Islands National Seashore and are required to be closed to all motorized vessels.” Much of this uncertainty, according to the 2004 Wilderness Plan is summarized in the following:

There is no written legal description of the Gulf Islands Wilderness. In establishing the Gulf Islands National Seashore the Congress made general reference to “islands” and did not use a legal description of aliquot parts or metes and bounds. Instead Congress referred to: Ship Island, Horn Island, Petit Bois Island; “the Mississippi islands;” “the islands;” or “the three islands.” It may be that Congress recognized that these islands

Table 4-1: Wilderness Waters in Designated Wilderness (adapted from Barr 2008)

Agency	Site	State	Total Acres	Wilderness Waters (a.)	Notes
FWS	Chassahowitzka NWR	FL	Refuge - 30,843 Wilderness- 25,579	c. 11,600	Waters of Homosassa Bay in Gulf of Mexico.
FWS	J.N. “Ding” Darling NWR	FL	Refuge- 6,407 Wilderness- 2,619	2,825	Embayments, mangroves and tidal creeks.
FWS	Blackbeard Island NWR	GA	Refuge – 5,618 Wilderness- 3,000	(unknown)	Marshes, tidal creeks.
FWS	Wolf Island NWR	GA	Refuge-5,125 Wilderness- 5,125	(unknown)	Marshes and tidal creeks.
FWS	Monomoy NWR	MA	Refuge- 7,604 Wilderness- 3,224	c. 1,000	Wilderness boundary appears to be MLW, some marshlands.
FWS	Alaska Maritime NWR	AK	Refuge- 3,467,757 Wilderness- 2,576,320 ¹	264,405	Simeonof and Semidi Wildernesses (16,749 a. and 244,656 a., respectively).

Table 4-1 (continued)

Agency	Site	State	Total Acres	Wilderness Waters (a.)	Notes
FWS	Arctic NWR (Mollie Beattie Wilderness)	AK	Refuge- 19,200,000 Wilderness- 8,000,000	c. 26,000	Shallow bays and lagoons (Egaksrak Lagoon, Siku Lagoon, Pingokraluk Lagoon, Demarcation Bay) along the Beaufort Sea coast.
FWS	Yukon Delta NWR (Nunivak Wilderness)	AK	Refuge- 19,000,000 Wilderness- 600,000	c. 106,300	Includes waters and submerged lands extending one mile from island's Southern coast.
NPS	Everglades NP (Marjory Stoneman Douglas Wilderness)	FL	Park - 1,508,537 Wilderness- 1,296,500	625,000	Wilderness includes submerged lands but not surface waters.
NPS	Gulf Islands NSS	MS	Seashore- 139,175 Wilderness- 3,800	(unknown)	According to official map, wilderness includes lagoons and inlets on two barrier islands. ²
NPS	Point Reyes NSS (Phillip Burton Wilderness)	CA	Seashore- 71,068 Wilderness- 26,025	8,213	43 USC 1340(h) prohibits oil and gas leasing within 15 mi. of wilderness, unless CA permits.
NPS	Lake Clark NP&P	AK	Park- 2,619,733 Wilderness- 2,619,550	c. 5,000	Upper reaches of Tuxedni Bay... State of AK objected to inclusion of any tidelands in wilderness designation.
NPS	Glacier Bay NP&P	AK	Park- 3,283,000 Wilderness- 2,658,000	53,270	Wilderness waters subject to special management. Total marine waters in Park- 607,399 a. (largest in NP System).

Notes:

1. Alaska Maritime NWR includes eleven designated wilderness areas, but only two (Semidi and Simeonof) have been identified as containing wilderness waters.
2. Gulf Islands (2011) GMP states: "Wilderness...ends at the mean high tide mark, and does not extend over submerged lands within the seashore boundary."
(http://www.nps.gov/guis/parkmgmt/upload/GUIS_DraftGMPEIS_Aug2011-1.pdf)

move. If fixed in space by a survey, in the fullness of time, these islands could move beyond the limits of the legal description and future generations would have only open sea for their enjoyment.

If the authors of the Gulf Islands Wilderness Plan are correct in their observation about Congress' intent regarding the potential migration of the islands, the greater flexibility is

likely to be balanced against the lack of certainty in jurisdiction. There does not appear to be any lingering question of jurisdiction on the part of the NPS, as they were not shy about taking the somewhat extraordinary step of closing these waters to motorboating. But, the question of specific jurisdiction could at some point, if challenged in court, make protecting wilderness values in these areas considerably more difficult.

This issue of “flexible” boundaries has significant implications for management in the face of global climate change. As the ranges of species and their habitats respond to changes in climatic conditions, protected areas, both on land and in the ocean, with specific, fixed boundaries may not always contain the resources they were established to protect.

As a part of this inventory, wilderness information regarding wilderness holdings of the USDA Forest Service and BLM was also reviewed (<http://www.wilderness.net>). No examples of tidally influenced wilderness waters were found at any of the wilderness areas under these agencies’ jurisdiction. All of the Forest Service and BLM sites on the coast or encompassing islands have seaward boundaries that are very specifically MHW, confirmed, for Forest Service wilderness, by Don Fisher, Forest Service Wilderness Coordinator (personal communication, 6 June 2005).

This inventory represents the only systematic, comprehensive survey of its type, and as it is reviewed and circulated among site managers, a portion of the uncertainty will be iteratively reduced as clarifications are obtained. It should be formally reviewed by the relevant wilderness management agencies to confirm or reject the interpretation of the information provided in the Inventory, as recommended in Chapter 7. However, in its current form, it provides as clear a picture as possible of the scope and extent of coastal and ocean wilderness waters currently incorporated into the National Wilderness Preservation System.

The supplemental inventory of wilderness areas in the Arctic region yielded some interesting results. Two additional wilderness areas were identified that included wilderness waters. The Molly Beattie Wilderness, within the Arctic NWR, has approximately 26,000 acres (approximately 105 square kilometers) of ocean and coastal

waters within its designated boundary. This includes a number of shallow bays and lagoons (Egaksrak Lagoon, Siku Lagoon, Pingokraluk Lagoon, Demarcation Bay) along the Beaufort Sea coast of the refuge. Current Comprehensive Management Plan's Draft Wilderness Review (http://arctic.fws.gov/pdf/ccpdapp_h.pdf) identifies all other areas of coastal waters within the Coastal Plain Wilderness Study Area as "exemplary," meeting all criteria for wilderness designation, and stated intention to manage the area as "Proposed Wilderness" under the current 1988 CMP or Revised Plan, if adopted.

The other wilderness identified as containing wilderness waters is the Nunivak Wilderness, located off the Yukon and Kuskokwim Deltas. The 1987 Draft Comprehensive Management Plan for the Refuge (FWS 1987) states "The southern half of the island (including submerged lands extending generally one mile from the shoreline) was designated as wilderness in ANILCA." This area was calculated to be approximately 106,300 acres (approximately 430 square kilometers). These sites have been added to Table 4-1.

This inventory identified a total of twelve designated wilderness areas in this region, beyond the four identified in Table 4-1, and the results are summarized in Table 4-2. Eleven were within National Wildlife Refuges and one in the Katmai National Park and Preserve, at the southern-most extent of the area analyzed. While the total linear extent of the "MHW" boundary could not be calculated from available information, as most of the refuges and parks have complex shorelines with many small islands, the eight sites with "MHW" boundaries offer a considerable selection of potential "wilderness-adjacent waters" (as described in Chapter 3) into which the terrestrial wilderness designation could be appropriately extended.

As an element of the research needed to conduct this supplemental inventory, the "wilderness.net" database (<http://www.wilderness.net>) was consulted with regard to new wildernesses designated by Congress since the original inventories were completed. Fifty-five new wilderness areas were designated since 2007. A few of these were in coastal states, but none of the new areas was located close enough to the coastline to have included either wilderness waters or have a "MHW boundary." Therefore, it can be

Table 4-2: Wilderness Areas in Arctic Region with “MHW Boundaries”

Wilderness Name	Agency	Unit	Wilderness Size (a.)	Notes
Chamisso Islands Wilderness	FWS	Alaska Maritime NWR	455	Located in Kotzebue Sound at entrance to Eschscholtz Bay. Includes Chamisso and Puffin Islands (MHW boundary). Productive seabird nesting/feeding areas, with whales, seals, and walrus in Spafarief Bay, south of the islands.
Bering Sea Wilderness	FWS	Alaska Maritime NWR	81,340	St. Matthew, Hall and Pinnacle Islands included in designated wilderness (MHW boundary). Most isolated of all US wilderness, and largest seabird concentrations in North Pacific. Gray and Bowhead whales in waters adjacent.
Aleutian Islands Wilderness	FWS	Alaska Maritime NWR	1,300,000	ANILCA Wilderness designated throughout the Aleutians Islands archipelago, including more than 90 major islands, accounting for about 57% of the land area of the Aleutians. This designation is largely, if not entirely focused on the land areas of the islands (MHW boundary). Some boundaries of smaller islands are shown on maps as in water, appear to be just offsets from coast.
Bogoslof Wilderness	FWS	Alaska Maritime NWR	175	Located approx. 40 km. North of Unalaska Island. Important seabird nesting/feeding habitat and Stellar sea lion and fur seal rookeries. Map has insufficient detail to determine if any waters are included, and boundary description mention only land, so appears to be a “MHW boundary” site.
Becharof Wilderness	FWS	Becharof NWR	400,000	On Shelikof Strait side of Alaska Peninsula. Encompasses considerable “MHW boundary” areas.
Izembek Wilderness	FWS	Izembek NWR	307,982	ANILCA Wilderness at the tip of the Alaska Peninsula. Highly productive area for migratory waterfowl, seabirds, marine mammals. Entirely focused on land area with a large percentage of MHW boundaries.
Unimak Wilderness	FWS	Aleutian Islands NWR	910,000	ANILCA Wilderness located directly adjacent to Izembek Wilderness. Important habitat for waterfowl and shorebirds. Like Izembek, focused on land areas with significant coastal (MHW) boundaries.
Katmai Wilderness	NPS	Katmai NP&P		ANILCA Wilderness, on Shelikof Strait side of Alaska Peninsula, adjacent to Becharof Wilderness. Includes only “MHW boundaries” for all elements.

reasonably concluded that the inventories reported here are comprehensive and based on the most currently available information as regards designated wilderness waters included in the NWPS.

To make this supplemental inventory as comprehensive as possible, all established Federal protected areas in this region were reviewed and evaluated to determine whether coastal lands and waters have been included in their designated boundaries. While no “coastal” wilderness is currently designated at these sites, some include designations of areas away from the coast. These areas represent potential opportunities for designation of wilderness waters at some time in the future when management plans are updated, and wilderness suitability of the areas within that park or refuge are re- evaluated. Four additional sites that included extensive “MHW boundaries were identified, as described in Table 4-3.

Table 4-3: Designated Federal Protected Areas in Arctic Region with “MHW” Boundaries

Name	Agency	Size (a.)	Notes
Selawick NWR	FWS	Refuge- 2,150,162 Wilderness- 240,000	Boundary borders Hotham Inlet off Kotzebue Sound. Includes extensive river delta wetlands
Togiak NWR	FWS	Refuge- 4,103,047 Wilderness- 2,274,226	Extensive shoreline of Kuskokwim Bay and Bristol Bay.
Bering Land Bridge National Preserve	NPS	Preserve- 2,700,000 Wilderness- 0	Boundary surrounds Ikpec Lagoon, portions of Arctic Lagoon, and other coastal embayments adjacent to the Chukchi Sea on North coast of Seward Peninsula.
Cape Krusenstern National Monument	NPS	Monument- 649,085 Wilderness- 0	Boundary encompasses Imik, Kotlik and Krusenstern Lagoons. Interesting to note that also included within boundary are port facilities for Red Dog Mine.

4.4.3 Discussion

One of the key findings of the survey reported in the previous chapter was the perceived importance of “wilderness-adjacent waters” (i.e. areas just offshore of

designated wilderness). One clear message from the inventories conducted for this study, summarized above in Tables 4-1 and 4-2, is that there are many wilderness areas under the jurisdiction of all four wilderness management agencies that have “MHW” wilderness boundaries. Add to this the other protected areas in this region that also have “MHW boundaries” (Table 4-3), including coastal embayments and lagoons, but either do not currently include wilderness designations or have wilderness designated in only inland areas, the potential pool of candidate wilderness waters areas expands considerably. While not all of these waters are likely to be suitable for designation as wilderness, as a result of pre-existing uses or human development, certainly some might be worthy of consideration.

The management of waters adjacent to wilderness is likely to have a significant effect on whether wilderness values are preserved effectively in the terrestrial wilderness area. The obvious issue is the use of motorized vessels in adjacent waters. There is little doubt that a visitor standing on a bluff within the wilderness overlooking waters which are not similarly protected would find the solitude wilderness is supposed to provide elusive if a boat was operating nearby. Visitation to such a wilderness would be likely concentrated on the water, along the shoreline, in the coastal areas, and access to and from these wilderness areas would likely be predominantly from the water. For example, according to the Glacier Bay General Management Plan (NPS 1984), around three-quarters of the visitors arrive by cruise ship, and the waterways are the primary access for nearly all visitation. Such geographically concentrated use presents a significant challenge in preserving wilderness values, particularly if only land areas are included in designated wilderness.

Other activities occurring in the coastal waters abutting designated wilderness can also be problematic. USDA Forest Service Wilderness Coordinator Don Huff (personal communication, 6 June 2005) highlighted a problem encountered at Misty Fjords National Monument in southern Southeast Alaska, which has many miles of boundary adjacent to coastal waters. The issue was the salvage of beach logs – logs escaped from log rafts that float with higher tides to beach and shoreline areas - with motorized

equipment and mechanical transport, both of which are prohibited for that purpose "above the mean high tide line." Another example arose with removal of marine debris by volunteers supervised by the Olympic Coast National Marine Sanctuary (Robert Steelquist, personal communication, 15 May, 2005) from beaches in wilderness areas of the Olympic National Park. In each case, better communication and effective coordination between wilderness managers and the agency responsible for the waterside activity would have helped to insure that wilderness values were clearly understood by all and preserved effectively.

A partnership that seems to exemplify this approach, as mentioned previously, is in effect in the Florida Keys. A collaborative management framework was established between the State of Florida and the Great White Heron and Key West National Wildlife Refuges which manages human uses of the "backcountry" waters and submerged lands throughout the Refuges (State of Florida and FWS 1992). An agreement between the State and FWS, signed in 1992, conveyed to the FWS "the right to manage for public purposes" all islands, tidal lands, and submerged lands throughout the Refuges. This agreement included a management plan that established special use restrictions for the areas around the islands of the refuges. This so-called "Backcountry Management Plan" established prohibitions on the use of personal watercraft, airboats, water skis, aircraft landings, and hovercraft operation in specified areas of the Refuges. It also identified and designated idle speed, no motor, and access buffer zones "for the protection of wildlife." While there is designated wilderness throughout the Refuges – indeed nearly all of the islands are so designated – wilderness is mentioned only once in the management agreement, in the last section in the part of the plan citing "Resource Problems" (Part II, Sec. 9). This section states that "the wilderness values in some areas of the refuges are being degraded by litter, noise, overcrowding, habitat degradation, and loss of solitude." However, neither the agreement itself nor the referenced supporting documents suggest that preserving wilderness values is one of the purposes of the agreement, avoiding any possible conflict with the putative Congressional prohibition on "buffer zones."

As the grantee of these rights, the FWS can implement management measures for these water areas and submerged lands surrounding the Refuge wilderness, but in collaboration with the State of Florida, who retains ownership, and who may be called on from time to time to assist in assuring compliance with the FWS use restrictions. In the *McGrail & Rowley v. Babbit* case cited previously, the FWS management of these waters was challenged, and the court concurred that the FWS had jurisdiction (although from the decision, it seems that the court based its finding not on the grant of management authority from the State of Florida, but on a more fundamental authority flowing from the Property Clause of the Constitution). Given that this partnership has existed for two decades, a more detailed analysis of the effectiveness of the implementation of the agreement would yield very valuable “lessons learned” that would help guide the development and implementation of similar partnership arrangements.

In the marine context, such a collaborative management approach could be considered a form of integrated coastal and ocean management (ICOM), defined as: “A continuous and dynamic process by which decisions are made for the sustainable use, development, and protection of coastal and marine areas and resources... designed to overcome the fragmentation inherent in both the sectoral management approach and the splits in jurisdiction among levels of government at the land-water interface” (Cicin-Sain and Knecht 1998).

Developed through an inclusive and transparent public policy process, ICOM provides a framework for decision making within an ecosystem-based management context.

While some might consider this a distinction without a difference, adopting a strategy of establishing use restrictions as an element of an ICOM framework within areas adjacent to designated wilderness would be one way to avoid the designation of “buffer zones.” Congress has been very explicit, in a number of laws designating wilderness areas, as to their clear and unambiguous intent to prohibit the establishment of buffer zones around these areas. Scott (2004) cited an example of such language from a 1984 law establishing wilderness in Washington State:

Congress does not intend that designation of wilderness areas...lead to the creation of protective perimeters or buffer zones around each wilderness. The fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness shall not, of itself, preclude such activities or uses up to the boundaries of the wilderness areas.

Starting with the Endangered Wilderness Act of 1978 (P.L. 95-237), Congress has consistently adhered to this “no buffer zone” policy. Hendee and Dawson (2002), mentioned reports from both the House of Representatives (H. Rep. 96-1126) and the Senate (S. Rep. 98-465) that make clear Congress’ intent that only areas designated as wilderness should be managed as wilderness. Uses should not be prohibited or restricted in adjacent areas to preserve wilderness values. If the area is critical to preserving wilderness values and qualities, according to Congress it should be within the boundary.

Notwithstanding this often reinforced intent, Congress has also seen fit to create or allow implementing agencies to establish a number of exceptions to this “no buffers” position. In the Boundary Waters Canoe Area Wilderness legislation (P.L. 95-495), Congress adopted an overflight restriction implementing an Executive Order (No. 10092) regarding this activity, issued by President Truman. This is of particular interest in that, in many ways, adjacent airspace could be considered a direct analog of adjacent waters. It is a different medium from land, and involves a different mode of motorized transport but involving similar potential impacts to wilderness values.

Going back to the water, with regard to the Phillip Burton Wilderness at the Point Reyes National Seashore, Congress inserted a provision in the Submerged Lands Act [Section 1340(h)] that states:

The Secretary shall not issue a lease or permit for, or otherwise allow, exploration, development, or production activities within fifteen miles of the boundaries of the Point Reyes Wilderness [Phillip Burton Wilderness] ... unless the State of California issues a lease or permit for, or otherwise allows, exploration, development, or production activities on lands

beneath navigable waters ... of such State which are adjacent to such Wilderness.

This is clearly in waters adjacent to the wilderness, and was included in this law for the purpose of protecting wilderness values of this area. Therefore, Congress' intent to prohibit buffer zones does not appear to be universal, particularly with regard to adjacent air and water areas, but generally buffers are the exception. More recently, Congress, in its 2006 designation of the "Northern California Coastal Wild Heritage Wilderness Act" (P.L. 109-362), reaffirmed the "no buffers" position, again including language in this Act that states [Section 4(1)]: Nothing in (this Act) creates protective perimeters or buffer zones around any wilderness area designated', and "...the fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness area designated by (this Act) shall not preclude the conduct of those activities or uses outside the boundary of the wilderness area." In this one issue, Congress has been quite consistent.

While exceptions can be found, adopting a more collaborative ICOM approach to managing these adjacent waters would seem to represent a potentially less challenging path for sites where formal designation of ocean wilderness remains elusive. This notion of recognizing wilderness and wilderness values in regional land-use planning is not a new concept. Hendee and Dawson (2001) made a point of this:

Wilderness does not exist in a vacuum – what goes on outside of, but adjacent to a wilderness can have substantial impacts inside its boundary.

Conversely, the designation of a tract of land as a wilderness can substantially affect the management of adjacent lands.

Further to this point, Hendee and Dawson (2002) recommended that:

The best protection for wilderness from impacts originating on surrounding lands is through comprehensive land-use planning that anticipates potential conflicts and addresses the complementary and competitive relationships between wilderness and adjacent lands.

With increasing interest in regional ecosystem-based management (CEQ 2005, U.S. Commission on Ocean Policy 2004), developing "seamless networks" of marine

protected areas (Barr 2004, Davis 2004) and increasing numbers of areas where ICOM is being implemented (Sorensen 2002), this may be a fortuitous time to inject wilderness into these deliberations.

4.5 How are Existing Wilderness Waters Managed?

Consistently, when site managers of wilderness were asked about special management measures that have been implemented to preserve the values of wilderness waters, the standard response is something to the effect that these areas are managed “consistent with agency wilderness policy.” While undeniably a true statement, given that all these agency policies are largely silent on the management of wilderness waters it is unclear what this really means on the ground. What this probably means is that, to the extent practicable, the agency has applied the general provisions and prohibitions contained in the Wilderness Act (e.g. minimum requirement, prohibiting motorized and commercial access, more generally trying to preserve the wilderness values applied to terrestrial wilderness area) to the management and preservation of these areas.

In a management context, land and water are quite different (Barr 2001). Waters are more uniformly accessible, but that access requires some sort of vessel. Perhaps most importantly, the ownership of waters is different, and therefore what a manager can and cannot do, both legally and practically, is constrained. Entire industries, including commercial fishing, whale watching, cruise ships, and other coastal tourism activities, have been developed around this idea of unrestricted access to a “commons”. Few direct terrestrial analogs exist to these ocean-based commercial activities. When an area is in fee-simple ownership, the property rights that accrue to the owner, even on public lands, allow great discretion in terms of such things as right of access. Coastal and ocean waters are a common-pool resource, owned by none but also owned by all. Applying terrestrial management policies to these waters is somewhat challenging, as these policies have been formulated within the land-based ownership context.

One of the more difficult issues that have to be regularly confronted by wilderness managers – an excellent illustrative example of a central management issue for ocean

wilderness – is that of “motorized access.” Such access is prohibited under Section 4(c) of the Wilderness Act. However, in section 4(d), “Special Provisions,” the Subsection (1) states:

Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary of Agriculture deems desirable.

Therefore, under this special provision, if motorized access is an “established use” in that area, it may be (but is not required to be) allowed to continue. This is true only if the law establishing the wilderness contains the stipulation that “...any reference to the Secretary of Agriculture” (in the Wilderness Act) “shall be deemed to be a reference to the Secretary who has administrative jurisdiction over the area. This may seem like an arcane point of the law, but special provisions address, beyond motorized access, activities including prospecting and mining, oil and gas exploration and development (subject to existing valid rights), water resources development projects, and commercial services. Nearly 140 laws implementing wilderness designations have created “special provisions” (<http://www.wilderness.net>). These special provisions have been both somewhat controversial in that they have set aside fundamental prohibitions in the Wilderness Act of 1964, and are perceived by some as diluting the protection afforded to wilderness areas across the system. Different wilderness management agencies have different policies and interpret the Act, and statutes designating wilderness areas, somewhat differently. An agency could be inclined to allow or deny such activities based on these divergent agency cultures, policies and interpretations. The 1975 DOI letter to Congress on motorboat activity in wilderness (discussed above) does an excellent job of describing the many ways the Wilderness Act general prohibition on motorized access can be overcome, and therefore it is not too surprising that many existing wilderness waters areas permit motorboat use rather than prohibit it.

ANILCA also added a “special provision” of sorts, related to traditional uses on Alaska Federal Public lands within the jurisdiction of this Act. Subsection 3121(b)

states: "...the Secretary shall permit on the public lands" (including wilderness) "appropriate use for subsistence purposes of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation." The State of Alaska has broadly interpreted the ANILCA "special provision" on motorized access. An example of this is contained in a 2003 letter from the State of Alaska (Gilbert 2003) to the Glacier Bay NP&P regarding an Environmental Impact Statement on vessel access:

ANILCA's specific protection of motorized access also sets Alaska parks apart from those in the lower 48. Even in wilderness areas, motorized access can be prohibited only upon a finding that such use would be detrimental to the resource. 16 U.S.C. Section 3170, Section 1110(a). See also 43 CFR 36.11(d) and (h). Section 1110(a) of ANILCA explicitly protects access for "traditional activities," a term which remains largely undefined in the act or by regulation. The state considers the long history of tourists and amateur naturalists making visits to explore Glacier Bay to be a traditional activity in the Park. Today's visitors follow in the tradition of the early adventurers who visited the bay on sightseeing steamship excursions. While more recent visitors enjoy greater comforts, the purposes for visiting remain the same – to sightsee or recreate in this exceptional environment. Others, particularly local area residents, have long visited the area to fish or take advantage of other resources. We recommend that the Service acknowledge that these are traditional activities associated with Glacier Bay.

There are wilderness areas, like those in the Gulf Islands National Seashore and Glacier Bay, where the discretion to permit motorized access has not been exercised. As mentioned previously, the Gulf Islands has closed waters that they have interpreted to be included in the designated wilderness to vessel activity explicitly to preserve wilderness values. Glacier Bay has an extensive zoning system in place within wilderness waters in the Park that generally restricts access to canoes and kayaks. More often than not,

however, the agencies have used their discretionary authority. In Everglades National Park, for example, the 1997 Visitor's Survey (Littlejohn 1997) found that about 30% of the visitors to the park used a boat during their visit and motorboats (42%) were the most commonly used type of boat. There is a major boating route call the "Wilderness Waterway" within the wilderness area of the Park. There are some speed restriction areas, and personal watercraft are prohibited throughout the Park. However, few examples of the web-based education and outreach information available about boat use in the Park could be found that specifically cite the wilderness designation as the rationale behind the restrictions. Part of the reason why there is so little apparent link between wilderness and motorboats at Everglades is that there is limited jurisdiction over the water's surface, where submerged lands are included in the wilderness designation but not the water column (NPS 1979). Congress asked for a study of motorboat use in the park in 1979, but it does not appear, from the NPS wilderness files, that such a study was conducted.

Recently, the Park has been investigating the impacts to the seabed from "prop scarring" (SFNRC 2008). Adverse impacts to seagrass beds, and the many organisms that rely on seagrass as an important habitat, from "prop dredging" has been long known and well documented (Zieman 1976). These "prop scars" are extensive within the wilderness areas of the Park, and are clearly impacts to the seabed, which is part of the designated wilderness. The "management implications" discussion in this 2008 report seems to overlook the implications of the wilderness designation. As the potential management responses are being developed as part of the ongoing update of the General Management Plan for the Park, it is presumed that the designated wilderness waters in Everglades National Park will become more of a consideration in these deliberations, but this is a good case study regarding the challenges of wilderness waters designations that include only the seabed.

The larger question of the practical reality of motorboat access in future wilderness is an excellent illustrative example of a wilderness waters management issue. Clearly, the evolution of motorized access in existing wilderness seems to suggest that

the use of motorboats is largely inevitable, except under prescribed circumstances where the imposition of restrictions on vessel use can be clearly justified, and where the public is willing to accept such restrictions, or can come to accept them over time. Whether or not “freedom of the seas” is legally relevant in the coastal waters where these existing wildernesses are located, it is a perception that without question is indelibly etched into the psyche of many of those who own and operate vessels.

Motorized access to wilderness waters is but one of a host of management issues to be addressed by wilderness managers when and if the ocean becomes a larger element of the NWPS. There are many extractive uses, including but certainly not limited to mining, oil and gas exploration and development, and commercial and recreational fishing that will loom large, as they have with marine protected areas generally, in future decisions regarding the establishment and management of ocean wilderness. A recent paper by Thurstan et al. (2012) also highlighted the potential adverse impacts from “non-consumptive” activities (e.g. scuba diving, sailing, scientific research, kayaking, wildlife viewing) if improperly managed. Therefore, even what would appear to be relatively benign human uses must be carefully evaluated as to their potential to degrade wilderness quality in ocean wilderness.

4.6 Wilderness Waters Management Survey

While there are 13 sites listed in Table 1, there are really only a few that include sufficiently large water areas to justify special management attention, and where there seems to be clear intent, in the wilderness legislation, that these ocean and coastal waters should be a significant element of that wilderness. The sites that stand out are Chassahowitzka NWR, Alaska Maritime NWR, Everglades NP, Point Reyes NSS/Philip Burton Wilderness, and Glacier Bay NP&P, Arctic NWR, and the Nunivak Wilderness in Yukon Delta NWR.

Published information regarding these sites, and others with currently designated wilderness waters, is insufficient to acquire a clear picture of management of wilderness in these areas. Some additional work was required to engage current managers of these

wilderness waters to gain additional insight into current management practices, perspectives about the ocean wilderness areas they manage, and to get a sense of the needs they might have to enhance their efforts.

To this end, a survey was designed and conducted as a part of this research, targeted at six of the sites identified in the inventory as having currently designated wilderness waters. Substantive responses were provided for five of these six sites, and have been summarized below. The survey instrument was reviewed and approved by the Institutional Research Board of the University of Alaska Anchorage and documents related to this review are provided in Appendix 4.

While this sample size is insufficient to permit statistical analysis, some interesting insights can be found in the responses. The responses are summarized as follows:

Knowledge of the Area:

- Managers have specific knowledge of the size and boundaries of their designated wilderness waters and generally have this information in their GIS systems.
- Four of the five respondents accurately identified their wilderness as not being subject to special provisions in the establishing legislation which suggests that managers are generally cognizant of the regulatory framework for their wilderness.
- Four of the five respondents felt that they had “not as much” resource information about their wilderness waters as they had for the terrestrial wilderness at their site. Managers felt that the information they had available to support their management of wilderness waters was “insufficient.”

Management of the Area:

- The response to questions involving whether and how the wilderness waters were identified to the public were mixed. A few sites have specific visitor information available on wilderness at the site (and in their Web-

based information), showing boundaries on park/refuge maps (and in one case navigation charts), while the majority did not have these boundaries or supplementary information identifying and interpreting wilderness waters at the site in any of the material distributed to visitors.

- Three of the five respondents reported specific areas within their wilderness waters that were closed (either seasonally or permanently) or subject to use restrictions.
- All but one of the sites had some form of management plan for their wilderness (either a wilderness plan or as part of the GMP/CMP). Three of the four with planning documents characterized these plans as “old,” “outdated,” and “drafty.”
- All sites reported specific instances where issues or situations arising in wilderness waters have led directly to implementing a management action to address that issue.
- Two of the five respondents identified that they had conducted “minimum requirements analysis” for projects in their wilderness waters

Research and Monitoring:

- In four of the five sites, permits have been issued for research projects in their wilderness waters, and the fifth acknowledged that they would consider permitting research if proposed.
- Four of the five sites did not have routine monitoring stations located in their wilderness waters.
- No specific parameters were monitored only in their wilderness waters at any of the sites.
- At only one site specific restrictions or conditions on research permits were applied specifically because the proposed work was to be conducted in waters designated as wilderness.

Human Uses of Wilderness Waters:

- Respondents could report very specific information regarding human uses in their wilderness waters at only one site. Human use data, if they are available, is more generally at the scale of the park/refuge.
- Respondents at three of the five sites believed that only “some” of the visitors to the site knew that they were in designated wilderness waters, one felt that no visitor was aware of this designation, and the remaining site suggested that different user groups were variously aware or unaware of the wilderness designation.

Manager’s Views and Perceptions of Wilderness Waters Management:

- When compared with other management responsibilities, three of the sites felt effective management of wilderness waters was a “high” priority, one “medium,” and one “low.”
- All would take training on wilderness waters management if offered, and all but one respondent felt that this training would be a “high” priority compared with other training they might seek out.
- When asked what change they would make in the way they currently manage wilderness waters, the responses included: collect more information, clarify what is meant by “wilderness waters,” move boundaries and establish more special use zones, and increase visitor awareness of wilderness waters.
- All responded affirmatively to whether they actively discussed management of wilderness waters with colleagues, and whether they would like more opportunities to do so.
- All but one respondent felt that “sufficient” time was spent on management of wilderness waters at their site. Only one respondent felt the time currently allocated was “not enough.”

- Nearly all respondents felt that the greatest needs in more effectively managing wilderness water were funding, trained personnel, and better resource information.
- Three of the five respondents felt that designations of wilderness waters should be expanded at their site, one believed that it was sufficient as it is, and one would reduce the area of designated wilderness waters at their site.

Generally, the findings of this survey, while limited, seem to suggest that there is some awareness by managers of the presence of designated wilderness waters in the sites for which they have stewardship responsibility. However, except for one or perhaps two sites, these wilderness waters are not subject to specific management actions taken to protect wilderness character and values. Managers have limited specific knowledge about wilderness water areas but would welcome the opportunity to learn more to manage them effectively. The capacity to do more is limited primarily by a lack of data and information to support management, and dedicated funding. Emphasis by the wilderness management agency on improving the effectiveness of the management of wilderness waters generally at all the sites with ocean management stewardship responsibilities would seem to be lacking, and receiving more support could empower site staff to seek opportunities to improve site management of these areas.

Protected areas managers have a daunting task with the prospect of managing these wilderness waters areas. Their time is already consumed by visitor and administrative facility design, construction and maintenance to support interpretation and education, resource management, and needed research and monitoring. It is much to expect that they would easily embrace the enhanced responsibility of effectively managing this part of their park or refuge about which they know little, and are not generally emphasized by their respective protected areas systems as an important components of their management responsibilities. Add to this list that wilderness waters are *terra incognita* with respect to their own training and experience, and it is not surprising that managers seem reluctant to take on this challenge, especially when financial support and appropriately trained staff dedicated to this specialized task are

limited. What is surprising, based on the results of this management survey, is that the majority of the managers of these existing wilderness areas would like to do more, and do it more effectively despite these challenges and obstacles.

4.7 Conclusion

The US National Wilderness Preservation System includes at least 13 sites with wilderness waters, encompassing more than 1.1 million acres (approximately 4,466 square kilometers), about 1% of the total area of designated wilderness in the NWPS. Therefore, the question of whether such designations can be done under the existing statutory language of the Act seems moot. Whether there should be more, and how best to build capacity to effectively manage these areas seem to be the relevant questions to be addressed. Do these areas have “value-added” in terms of enhancing the qualities and values of wilderness designated at these sites?

Taking both the results of the management survey and the larger ocean wilderness survey (discussed in Chapter 3), it could be argued that these results seem to suggest that there is overwhelming support for expanding this element of the wilderness system, and that attention might be focused on building capacity within the wilderness management agencies to enhance management effectiveness. If “what we are thinking” is that wilderness includes ocean and coastal waters, particularly those adjacent to designated terrestrial wilderness areas, it would seem that additional attention could appropriately be directed at identifying, designating and managing such areas. Where such areas exist, attention could be focused on obtaining essential research, monitoring, management and training, recognizing that this will take time given the resource limitations under which protected areas managers must operate.

There is a particular need to include wilderness waters in site management planning. At sites where there are waters adjacent to designated terrestrial wilderness, wilderness suitability determinations could provide the appropriate mechanism to address coastal areas adjacent to wilderness when these processes are conducted. “Backcountry” and wilderness plans should specifically address their special management needs. When

general or comprehensive management plans are developed or updated, wilderness waters should not continue to be overlooked. For sites where wilderness waters have been designated, plans should be developed that specifically address preservation of their wilderness qualities and values, and management actions specified in those plans that will accomplish this goal.

Training focused on the management of wilderness waters was clearly identified in this survey as something managers would welcome as a priority. There is currently little, if any, mention of this topic in the very excellent wilderness training provided by the Arthur Carhart National Wilderness Training Center. The Arthur Carhart Center was established to "foster interagency excellence in wilderness stewardship by cultivating knowledgeable, skilled and capable wilderness managers and by improving public understanding of wilderness philosophy, values and processes." This Center would be an ideal venue to develop and offer such training, which would not only provide a mechanism to offer current information on wilderness waters to managers, but could be exceptionally valuable as a way to bring wilderness waters managers together to share their experience and help to improve our state of knowledge regarding effective wilderness waters management.

As remote places, wilderness is all too frequently "out of sight, out of mind." It is even a greater challenge when many of the qualities and values being protected are in, and under, the water. However, the Wilderness Act confers a stewardship responsibility on the managers of these areas, notwithstanding whether the area is on land or in the sea. Wilderness management agencies have a duty to provide this effective stewardship. This will be challenging and take some time and effort, but the managers (and the scientists who help to improve our understanding of wilderness) seem to be ready to take on this challenge. Adding new sites may or may not be part of the agenda, but based on this inventory, there are many sites that have considerable potential should adding new sites become a part of the "enduring wilderness future." However, improving management effectiveness of the existing sites should be pursued. Effective stewardship of what we already have should not be viewed as "optional."

Chapter 5 North American and Arctic Context

5.1 Overview: MPA Systems and Programs in North America

If ocean wilderness is to become more widely recognized and adopted, it would be a type of marine protected area (MPA). Ocean wildernesses and other MPAs are elements of larger regional and national networks and systems, identified and established by Federal, state, provincial and territorial governments in the US and Canada. More encompassing international frameworks for MPA collaboration also exist, but they are few in number and are limited in terms of their scope and effect.

Worldwide, it has been estimated that more than 4,435 MPAs have been established, covering 2.35 million square kilometers of the ocean, all entirely within Exclusive Economic Zones (EEZs, UNEP-WCMC 2008, Wood et al. 2008). This represents only 0.65% of the world's oceans or around 1.6% of EEZ areas. Only 12.8% of the 2.35 million square kilometers protected is preserved as "fully-protected marine reserves," which translates to just 0.08% of the world's oceans and 0.20% of EEZ waters.

Global initiatives have emerged to encourage both the designation of additional MPAs, and to better organize and manage protected areas in regional and national networks and systems. The Convention on Biological Diversity (CBD 2006) established a goal to protect at least 10% of the world's ecological regions, including marine and coastal areas, by 2010, and "the establishment, by 2012, of comprehensive, effectively managed, and ecologically representative national and regional systems of protected areas." This CBD goal reinforced a previous agreement, the Johannesburg Plan of Action, Section IV, *Protecting and Managing the Natural Resource Base of Economic and Social Development*, c. 32., adopted at the World Summit on Sustainable Development (WSSD) in 2002. This Plan of Action recommended the establishment of representative national MPA systems, by 2012, comprised of MPAs consistent in designation with international law and based on scientific information (Smith et al. 2006). There was broad support for a recommendation at the 5th World Parks Congress in 2003 to "greatly increase the marine and coastal area managed in marine protected areas by

2012; these networks should include strictly protected areas that amount to at least 20-30% of each habitat” (Wood et al. 2008).

This is a monumental task by any measure. However, the signatories to these agreements and initiatives, and those countries who have more informally adopted the intent of these agreements, are clearly lagging far behind the progress needed to achieve the goals. As Wood et al. (2008) commented:

The global distribution of protected areas is both uneven and unrepresentative at multiple scales, and only half of the world's marine protected areas are part of a coherent network. Since 1984 the spatial extent of marine area protected globally has grown at an annual rate of 4.6%, at which even the most modest target is unlikely to be met for at least several decades.

Canada is a signatory to both the WSSD Agreement and the CBD, and the US – while a signatory to neither international accord – has embraced the idea of a national MPA network consistent with the spirit of these agreements. This would appear to be a potentially motivating force for the establishment of national MPA systems in North America.

It is interesting to note that around 80% of the world’s MPAs are proximate to at least one other area, with the majority of these (85%) connected to at least 10 other sites (Wood et al. 2008). However, a conservative estimate by Wood and co-workers reveals that only 18% of these “connected” sites are part of any established network or system. So, while *de facto* networks and systems may exist, this worldwide effort to create networks and systems of MPAs does not yet seem to be contributing substantively to attaining the goal of more MPAs managed as networks. Both the existence of this observed proximity and interconnectedness of MPAs and the world-wide motivation to establish more MPAs and networks would seem to be favorable to enhancing progress toward achieving these goals.

5.2 Definitions and National System Development in North America

Since it was formally adopted in 1994, the World Conservation Union (IUCN) definition of “MPA” has been: “Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment” (Resolution 17.38 of the IUCN General Assembly, 1988, reaffirmed in Resolution 19.46, 1994; Kelleher 1999). In 2008, the IUCN, as a part of the process of updating and modifying the system for categorization of protected areas (Dudley 2008), adopted a new definition for “protected area”:

A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

The 2008 definition has been proposed, although not yet formally adopted, to replace the 1994 definition (<http://groups.google.com/group/wcpamarine-summit/web/consultation-on-marine-guidance-for-the-iucn-protected-area-categories-system>) eliminating the more targeted definition for MPAs, and thereby making all protected areas fall within this single definition. While this definition is an important international benchmark for what a protected area is, most countries – and nearly all MPA programs within those countries – develop their own definitions which may or may not comport with that of the IUCN’s (although, as will become apparent below, some countries do seek consistency).

While the IUCN categories (Dudley 2008) could be a way forward to resolve issues of inconsistent terminology (Barr 2010), most countries adapt rather than adopt this terminology, and in the US they are nearly completely ignored. Such consistent terminology will be essential as national MPA system frameworks are developed and implemented. Transparency and consistency will be very important in effectively engaging the ocean user communities who are generally not all that supportive of MPAs and seem to be able to wield considerable political influence in their opposition to ocean protection.

In the US, an *ex post facto* “National System of Marine Protected Areas” is under development that includes a common definition for “MPA.” Like many places around the world, the US has had protected areas systems (e.g. National Park System, National Marine Sanctuary System, National Fish and Wildlife Refuge System) in place and operating for many decades. Therefore, much of what is involved in national system development in the US (and North America generally, see below) is figuring out how all the pieces might fit together – i.e. how to create a “system of systems.”

The “Framework for the National System of Marine Protected Areas” (MPA Center 2008a) defines an MPA as: “Any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” This definition is taken directly from the Executive Order on Marine Protected Areas (Executive Order 13158 of May 26, 2000) that established the mandate for the national system. This broad definition includes MPAs designated by any US governmental entity that focus on “lasting protection” (i.e. this definition precludes areas intended for temporary protection, with some exceptions); the primary goal of this definition is the protection of natural and/or cultural resources. Like the IUCN definition, it is intentionally broad so as to include as many existing MPAs as possible. It is currently in use as one of the criteria by which sites are determined to be eligible to be included in the US national system.

The Canadians are also engaged in developing an *ex post facto* national system of MPAs (Government of Canada 2011) but are structuring their effort differently than the US. The Canadian approach, led by the Department of Fisheries and Oceans (DFO), is to establish a national system comprised of bioregional MPA networks developed for each of Canada’s thirteen bioregions. One criteria for an MPA to become part of a bioregional network is that it must conform to their definition of an MPA, which is: “A clearly defined geographical space recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values, that is situated partly or wholly in Canada’s

marine environment.” With the exception of the last phrase, this tracks precisely the new IUCN definition adopted in 2008.

Therefore, both the US and Canada are formulating national systems of MPAs, albeit using different approaches. Both have the potential to achieve this goal, and are aware of potential benefits that accrue from such systems. Each provides a lengthy list of these benefits in their framework documents, but taken together, a common rationale for a national system emerges:

- Systems offer greater opportunities for collaboration of all types, for environmental protection, and for insuring that representative areas of each type of ecosystem is represented and replicated, which are both important elements of MPA networks and increase system resilience [Barr (2002), IUCN-WCPA (2008), Skilbred et al. (2006)]. This is the argument that “the whole is greater than the sum of the parts”.
- Such systems can contribute to fostering sustainable fisheries (as well as other important ecosystem services).
- Systems, and the policies under which they operate, may offer greater predictability and transparency for ocean users.
- Systems can help enhance public awareness, build constituencies of support for marine conservation, help coastal communities (both aboriginal and non-aboriginal), maintain cultural and economic identities, and promote and enhance non-extractive recreational uses and tourism.
- Specifically, MPA systems enhance opportunities for interagency cooperation and collaboration.

There are some challenges, however, to establishing such *ex post facto* national MPA systems. Many existing systems are already reaping these “benefits” – articulated in the national MPA system plans – they have found to be of value to their programs. For example:

- There is already significant interagency coordination among these programs in the US, albeit less so in Canada, and the current level of collaboration among protected areas agencies reflects the reality of available resources and level of interest and need.
- Most of these systems are already managed with the benefit of significant public engagement, and the managers of these existing systems consider this engagement to be “transparent and inclusive.” More importantly, the public engagement process is entirely under their control, which may not be the case if such activities involved managers of national MPA systems.
- Their systems are in place, and even if those who coordinate the national MPA systems are able to identify “gaps” in marine conservation and potential new sites to fill those “gaps,” the existing internal agency system planning has been and will continue to address whatever “gaps” need to be filled consistent with their agency’s mission and mandate. Again, few resources exist or are likely to be made available for adding any new sites to fill these “gaps.”
- Based on the ongoing monitoring and evaluation programs being conducted by these agencies, the managers of existing systems perceive that they are already providing appropriate protection for marine ecosystems.
- Fishery management agencies in both countries do not seem to want these MPA programs “on their turf” and have been, particularly in the US, some of the biggest critics of the MPA programs’ efforts with regard to sustaining fish populations and their habitats.
- These national system initiatives themselves are very poorly funded, and tend to cause funds and resources to be diverted from those agencies that need them to sustain their own ongoing operations in the “zero-sum” game that defines Federal budget processes.

This situation represents a substantial but not insurmountable obstacle to implementing these national system frameworks, at least in the foreseeable future. The MPA implementing agencies are “set in their ways” and will have to “buy in” a bit more aggressively for these comprehensive national system frameworks to become even marginally successful. This may not come easily when the tangible benefits remain elusive, and with budgets being severely cut in the US (and a similar situation is emerging in Canada). The agencies are currently participating, albeit nominally, in these initiatives, to the extent they need to so that they can respond to any political pressure, but it is reasonably clear this level of participation is not sufficient to complete the task. These are the challenges of implementing *ex post facto* national MPA systems.

There are few in the MPA community who would argue against establishing national MPA systems. Indeed, if this were not the case, national system development would not have been a focal point at the WSSD in 2002, embraced at the 5th World Parks Congress the following year, nor adopted by the CBD in 2006. However, developing a framework for a national system is only one step in this process, and both the US and Canada have done this. It is a significant accomplishment to have gotten this far, but having an effective and fully-functioning, comprehensive national system is extremely challenging, and requires significant resources and optimal collaboration to be fully successful.

5.3 US and Canadian MPA Programs: Building Blocks for the National Systems

Both the US and Canada have multiple MPA programs that comprise their nascent national systems. These are protected areas systems that have been in place for decades, and in a few cases (e.g. the Canadian and US National Parks) for more than a century. Each of these programs operate under sometimes markedly different mandates but have jurisdiction over marine waters in the protected areas they manage and share, to various extents, a marine conservation objective as part of their mission.

5.3.1 Canadian MPA Programs

Canada has three principal Federal MPA programs and National Parks that contain “significant marine areas,” succinctly outlined in CPAWS (2008) and summarized in Table 5-1 below.

At the most basic level, concerns have been expressed about the commitment of agencies to complete the task of building the MPA national system. In Canada the 2005 Annual Report of the Commissioner of the Environment and Sustainable Development (CESD 2005) states:

Implementing the Oceans Act and subsequent oceans strategy has not been a government priority. After eight years, the promise of the Oceans Act is unfulfilled. Fisheries and Oceans Canada has fallen far short of meeting its commitments and targets: it has finalized no integrated management plans and has designated only two marine protected areas.

This report reviewed the establishment of MPAs under the Oceans Act and concluded:

For the three cases examined, we found that the evaluation process took five to seven years. At this rate, it will take many years to put in place a national system of marine protected areas. The length of time being taken to designate MPAs brings into question whether the Department’s commitments and targets can be met.

CPAWS (2008) offers similar observations regarding the depth of commitment the implementing agencies to the both the establishment of individual MPAs under the various programs, and the full realization of the Canadian national MPA system. The Department of Fisheries and Oceans (DFO), Canada’s principal fishery management agency – but also responsible for this national MPA coordination – is devoting considerably less funding and attention to this work than is needed, based on the progress made to date (CPAWS 2008). Coordination among these key programs has been problematic since before the Oceans Act was adopted (CPAWS 2008). As an example, Ocean Act MPA sites need not be representative (i.e. habitats present in that MPA

Table 5-1: Canadian Federal MPA Programs

Program	Agency	Statutory Authority	Process for Establishment	Purpose of Establishment/ Scope of Authority	Number of Sites	Number of Sites in Arctic
"Oceans Act MPA" (OA MPA)	Department of Fisheries and Oceans	Canada's Oceans Act of 1996 (c. 31)	Administrative, generally identified through integrated bioregional planning. Extensive public engagement and consultation.	Conserve: unique habitats; endangered or threatened marine species and their habitats; commercial and non-commercial fishery resources (including marine mammals) and their habitats; marine areas of high biodiversity or biological productivity; and, any other marine resource or habitat requiring special protection. Multiple-use consistent with goals of management plan.	7 (with 5 in process)	1-Tarrium Niryutait MPA off Mackenzie Delta in Beaufort Sea (Danley Bay proposed addition to this site)
National Marine Conservation Areas (NMCA)	Parks Canada	National Marine Conservation Areas Act of 2002 (c. 18)	Administrative, generally identified through integrated bioregional planning process, based on "representative areas." Extensive public engagement and consultation. Sites established with conservation goals and preliminary management strategies identified [including marine reserve(s)], with full management plan developed over 5 years	"protecting and conserving representative marine areas for the benefit, education and enjoyment of the people of Canada and the world." Multiple-use consistent with conservation goals for site. Ocean uses can be prohibited or regulated, but commercial fishing is managed by DFO.	3 have been established (but none has completed final management plan) 2 sites established under separate authority managed as NMCAs	None (Lancaster Sound in process)

Table 5-1 (continued)

Program	Agency	Statutory Authority	Process for Establishment	Purpose of Establishment/ Scope of Authority	Number of Sites	Number of Sites in Arctic
National Parks (NP), National Park Reserves (NPR) ⁴	Parks Canada	Canada National Parks Act (c. 32)	Statutory designation by the Parliament of Canada. Management developed within 5 years of establishment. Feasibility study conducted with public engagement and consultation. Sites identified consistent with representative National Parks System Plan.	“for their benefit, education and enjoyment, subject to this Act and the regulations, and the parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations.” “Maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes shall be the first priority...” Authority is more restrictive of human activities than NMCA	15 contain “significant marine areas” but unclear whether any of these sites are managed as MPAs. ¹	5 of 8 NP and NPR in Arctic region are coastal and/or include marine areas within boundary. ² 4 additional sites in process for Arctic. ³
Marine Wildlife Areas (MWA), Migratory Bird Sanctuaries (MBS), National Wildlife Areas (NWA)	Canadian Wildlife Service (Environment Canada)	Canada Wildlife Act (c. W-9), Migratory Bird Convention Act of 1994 (MBS)	Administrative authority by Minister of the Environment, with public engagement and consultation.	“for wildlife research, conservation and interpretation”. MBS focuses on protection of migratory birds and their nesting habitats. NWA restricted to within territorial waters, but MWA can be throughout Canadian EEZ.	No MWA currently established, 13 NWA and 51 MBS with “significant marine areas” ¹	9 MBS established adjacent to Arctic coast. 1 NWA (and one NWA in process) ¹

Notes: 1. CPAWS (2000)

2. http://www.pc.gc.ca/progs/np-pn/recherche-search_e.asp?p=1

3. <http://www.pc.gc.ca/does/v-g/nation/nation103.aspx>

4. National Park Reserves (NPR) is an area set aside as a national park pending the settlement of an aboriginal land claim

represent one or more of all types of habitats in that ecoregion), although the current process has been recently described by DFO as creating a bioregional representative system (MPA News 2011). According to DFO's website (<http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/purpose-but-eng.htm>) the purposes of the Oceans Act MPAs are to protect and conserve:

- commercial and non-commercial fishery resources and their habitats;
- endangered marine species and their habitats;
- unique habitats;
- marine areas of high biodiversity or biological productivity; and any other marine resource or habitat necessary to fulfill the Minister's mandate.

No specific purpose of representation is mentioned. The National Marine Conservation Area program is founded on and focused intently upon building a representative system. The adoption of this key strategy of representivity by DFO, when it is not a requirement or even an explicit element of their authority, may offer that agency an endpoint for their system that is somewhat better defined and potentially more tractable than identifying and establishing sites consistent with the purposes mandated in the Oceans Act. However, with the national MPA system already committed to representation through the NMCAs, it could be argued that the Oceans Act MPAs established under their original statutorily mandated purposes would likely result in a more comprehensive and inclusive national system. How much coordination among the implementing agencies occurred prior to DFO adopting this strategy is unclear, but based on past history of the level of coordination occurring with regard to policy development (CPAWS 2008), it appears to have been insufficient.

It has been my personal observation, over many years of working extensively with Canadian Federal MPA agencies, that DFO is also very reluctant to allow other agencies to take a leadership role in some regions where that other agency has a greater stake in developing MPA coordination, and potentially more resources to allocate to the effort. This seeming intransigence on the part of DFO has resulted in Parks Canada and

the Canadian Wildlife Service apparently engaging in national system development activities only to the extent they must, for political reasons. As alluded to above, even development of the national system framework has been largely an internal DFO process with somewhat limited participation of the other key programs. Clearly, this coordination will have to improve significantly to realize progress toward implementing the national system framework in Canada. Creating these thirteen bioregional plans is no small task and no one agency has the resources to accomplish this effectively, nor can any one agency do this unilaterally and expect cooperation in its implementation of those plans.

Agencies, as institutions, sometimes evolve over time in a way that creates barriers to collaboration. A modest body of literature describes these institutional barriers to effectively implementing collaborative governance mechanisms in terrestrial ecosystems (Ascher 2001, Cortner et al. 1998, Elmqvist et al. 2004, Imperial 1999, Imperial 2005, Imperial and Kauneckis 2003, Slocombe 1998) and an even smaller collection of papers address these issues for ocean and coastal ecosystems (Young 1998, Juda and Hennessey 2001, Imperial and Yandle 2005, Rudd 2003, Rudd 2004). However, little research has been conducted where this issue has been the primary focus of discussions specifically regarding *how to overcome* these institutional and cultural barriers to interagency collaboration. As Allin (1982) observed regarding the evolution of wilderness governance, sometimes competition between agencies can be a good thing, driving organizations to change and adapt when they would not otherwise consider the possibility that being more agile would be in their best interest. However, in most cases, more can be achieved through effective collaboration. This issue of institutional barriers to collaboration is particularly problematic when looking at the emerging need to integrate networks of MPAs into broader coastal and marine area management (Cicin-Sain and Belfiore 2005), and will continue to be a barrier to implementation of such mechanisms as the implementation of national MPA systems. As is so often the case, critical social science needs lag far behind our knowledge in other relevant disciplines.

5.3.2 MPA Programs in the United States

In the US, there are three principal Federal MPA programs; a fourth, the National Estuarine Research Reserves (NERR) is a Federal/state partnership program. CRS (2009) provides an excellent overview of these programs, which are summarized in Table 5-2, below.

The National Marine Sanctuary Program (NMSP) has received considerable criticism principally related to its capacity to protect the resources that the Sanctuaries were designated to preserve. Brax (2002) broadly criticized the basic framework of management of marine resources generally, describing the “diffused” system of Federal oversight of the marine environment as a “disjointed web” of laws. Specifically regarding the NMSP, he suggested that it has been hindered in its work by a lack of funding and political support, and concluded that the National Marine Sanctuary Act has “too many shortcomings” to appropriately serve as the primary implementation for, in his view, much needed fully-protected marine reserves. Owen (2003), in his “disappointing history of the National Marine Sanctuary Act,” suggested:

For years it [NMSP] languished at the hands of unsympathetic presidential administrations. NOAA proved to be a reluctant and ineffectual instigator of the designation process, and few of our current sanctuaries came into existence without substantial help from Congress. While those designations enjoyed widespread political support, and the resulting program seems to arouse little political antipathy, the sanctuaries that currently exist are widely criticized for providing insufficient resource protection. Huge areas of ocean remain unprotected.

Chandler and Gillelan (2004), in their comprehensive history of the NMSA and the NMSP, found that the Program fell short of many expectations. They noted that sanctuaries are currently designated in only half the bioregions that comprise the waters of the US EEZ, making the system far less comprehensive than it was originally envisaged. This particular issue, they suggested, has been greatly exacerbated by the

Table 5-2: US Federal MPA Programs

Program	Agency	Statutory Authority	Process for Establishment	Purpose of Establishment/ Scope of Authority	Number of Sites	Number of Sites in Arctic
National Marine Sanctuaries (NMS)	Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS)	National Marine Sanctuaries Act (16 U.S.C. §§ 1431, et seq.)	Generally administratively established under the authority of the Secretary of Commerce, but can be designated by US Congress. Potential sites are identified in various ways, are placed on Site Evaluation List, and are assessed to determine whether they meet the designation standards. A management plan is developed, under significant public engagement and consultation, prior to designation.	Designated to provide comprehensive and coordinated conservation and management for areas of the marine (and Great Lakes) environment "of special national significance"... focused on preserving and restoring the conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or aesthetic qualities of the area. Multiple-use management, but many sites have fully protected marine reserves within boundaries.	13 NMS and 2 Marine National Monuments in NMS System. ¹	None
National Parks (NP)	Department of the Interior, National Park Service (NPS)	National Park Service Organic Act (16 U.S.C. §§ 1, 2-4), Antiquities Act of 1906 (16 U.S.C. §§ 431-443).	Established by Act of US Congress, by Secretary of Interior upon recommendation of NPS, after technical review and public engagement and consultation. (see Note 1 regarding establishment of National Monuments)	Designated to preserve the lands and resources "unimpaired for future generations" and to foster public use and enjoyment. NP generally prohibit commercial, extractive activities, providing recreational opportunities and resource protection. Marine areas of NP generally 3 nmi. of shore.	39 National Parks "contain 3 million acres of ocean and coastal waters and more than 4,000 miles of coastline." ²	None ³

Table 5-2 (continued)

Program	Agency	Statutory Authority	Process for Establishment	Purpose of Establishment/ Scope of Authority	Number of Sites	Number of Sites in Arctic
National Wildlife Refuges (NWR)	Department of the Interior, US Fish and Wildlife Service (USFWS)	National Wildlife Refuge Administration Act (16 U.S.C. § 668dd), Antiquities Act of 1906 (16 U.S.C. §§ 431-443).	NWR are established by acts of Congress. Executive order, or secretarial order issued by the Secretary of the Interior, based on recommendation of the USFWS after technical analysis and extensive public engagement and consultation.	"...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." ⁴	more than 140 refuges in coastal areas, some including expanses of marine waters. ²	3 NWR in Arctic that include not only significant marine waters, but each includes designated wilderness in those water areas.
National Estuarine Research Reserves	Collaborative program between States and NOAA	S. 315 Coastal Zone Mgmt. Act (16 U.S.C. §§ 1451, et seq.)	Established by NOAA and State where site is located, based on representative system plan. Involves significant public engagement and consultation.	"providing a laboratory for research and education programs, and creating a network that permits research for comparing biological or other characteristics across units of the system" ²	28	None

- Notes:
1. Marine National Monuments are established by Presidential proclamation under the Antiquities Act of 1906 (16 U.S.C. §§ 431-443), and managed by resource agencies as identified in the proclamation. These areas are usually managed as part of the management agency's protected areas system, and most often are also designated under the agency's primary authority subsequent to the proclamation, as the Antiquities Act is not generally considered a "management authority," but a mechanism to provide expeditious protection to areas threatened by human use.
 2. CRS (2009)
 3. None meeting the standards for inclusion in the US National MPA System (<http://www.mpa.gov>)
 4. <http://www.fws.gov/refuges/about/mission.html>

prohibition on new designations in amendments to the NMSA in 2000, which Congress believed necessary given reduced budgets and the need to address the management of existing sites more effectively. They also mentioned a “lack of a preservation mandate,” resulting in the perceived lack of effective resource protection opportunities offered in a multiple-use management area, and cited a number of examples where the NMSA provides conflicting and sometimes contradictory guidance. They concluded that:

The Act is now so constrained by its own architecture that it stands little chance of ever producing the comprehensive system of marine preservation areas envisioned by early visionaries, who hoped to create a system of marine wilderness preserves analogous to the terrestrial wilderness system.

The managers of the NMS System have responded to these criticisms with a number of initiatives including addressing the Congressional prohibition on new sites, the establishment of the comprehensive marine reserve network at Channel Islands NMS, proceeding on major site expansions in American Samoa, Thunder Bay NMS, and the Gulf of the Farallones/Cordell Bank NMS, and establishing a new comprehensive system of monitoring, evaluation, and reporting of site management effectiveness (<http://sanctuaries.noaa.gov>). Issues raised by critics of the NMS System regarding budget limitations and conflicting statutory language remain, but these are being addressed by the National Marine Sanctuary Foundation and others in the NGO advocacy community (<http://www.nmsfocean.org/policy-advocacy>).

While it is very difficult to find fault with something famously described by author and conservationist Wallace Stegner as “America’s best idea,” the NPS has received criticism for its inattention to the marine waters areas in their parks. In response, an “Ocean Stewardship Strategy” (Davis 2004) has been developed to guide the NPS in its efforts to effectively manage its “marine” national parks. National Parks and National Wildlife Refuges avoid many of the criticisms regarding resource protection directed at the Sanctuary Program, which has a “multiple-use management” mandate, because they generally provide a greater level of protection for their resources, prohibiting commercial

extractive human uses and focusing primarily on their conservation mandates.

With regard to agency collaboration, a number of initiatives have been implemented to foster greater partnership among the MPA management agencies in the US. The “Seamless Network” (http://sanctuaries.noaa.gov/management/ocean_action/) was created in 2007 to bring together these agencies, to share resources and to promote collaboration. While this initiative was not fully successful due to budgetary constraints and agency cultures that were just beginning to embrace the value of collaboration, the Seamless Network serves as a reminder that collaboration is important, that partnership initiatives have the full support of agency leadership that a considerable number of effective partnerships have already been established. The National MPA Center, established as a joint DOI/NOAA office under Executive Order 13158 to oversee the design and implementation of the US National MPA System, has also played a role in fostering collaboration among the MPA implementing agencies (<http://www.mpa.gov>).

There are other programs in the US and Canada at the Federal level that have some limited involvement in establishing areas in ocean and coastal waters that can be considered MPAs. One example is areas identified by the Bureau of Ocean Energy Management (BOEM) that are set aside during their environmental assessment process from being leased for oil and gas development. Another is areas where human activities are restricted for reasons other than conservation (such as areas closed by the Department of Defense for security and safety reasons), sometimes referred to as *de facto* MPAs (MPA Center 2008b). Additionally, the few existing ocean wilderness areas in the US (Barr 2008) that are located in National Parks and National Wildlife Refuges would presumably be eligible for inclusion in the national MPA System and would likely be incorporated when and if the refuge in which the wilderness is located in is inscribed into the system. However, the programs noted above, and the many state, provincial, tribal and other programs that exist (but unfortunately too extensive to discuss in this review), are included in both framework documents and are intended participants in the systems. These programs constitute the foundational elements for the national systems in the US and Canada, with a proviso...that being with regard to area-based fishery management.

5.4 The Controversy over Fishery Management Areas

Both the US and Canadian national system frameworks provide opportunities to include areas designated under their fishery management authorities [the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 94-265, 16 U.S.C. §§ 1801, et seq.) and the Canadian Fisheries Act, 1985 (c. F-14), respectively) in their National MPA Systems. In the US, there is a special category – “sustainable marine production” areas – that was created to incorporate these areas (MPA Center 2008a). However, there has been some long-standing disagreement as to whether fishery management areas are indeed MPAs. UNEP-WCMC (2008) summed up the issue:

Perhaps the most difficult issue is deciding whether marine areas managed for extractive purposes qualify as MPAs. The new IUCN definition of protected areas, whilst losing the specific reference to the marine environment, provides a clearer demarcation between conservation focused sites and those where the primary uses are extractive such as fisheries management areas. It would not preclude the inclusion of fishery protection zones provided biodiversity conservation is paramount. Category VI of the IUCN protected area categories in fact allows for protected areas 'managed mainly for the sustainable use of natural ecosystems', and fishery management areas could be interpreted in this way. It could also be argued that an MPA established for fisheries purposes and in which trawling is prohibited will inevitably contribute to the protection of biodiversity.

So, for practical (and perhaps even more importantly, political) reasons, fishery management areas that focus on “conservation” (a word that has an interesting history within the deliberations over the IUCN definition), as opposed to ones established to defer take until a species has recovered from overfishing, would be eligible for inclusion in both national systems.

The implementation of *ex post facto* national MPA systems is like a jigsaw puzzle. What we have now is most of the pieces of the puzzle still in the box, a few of the easy “edge” pieces providing a sort of outline of the picture, but many, many more pieces have yet to be fit in their proper place. The picture will emerge, eventually, but only if there is sufficient curiosity as to whether the puzzle picture matches the one provided on the box, and enough motivation for the people doing the puzzle to complete it.

5.5 The Special Challenge – and Opportunity – of Marine Reserves

Nearly all of the constituent programs of the two national systems generally designate multiple-use MPAs, which require rigorous and effective management to sustain the resources of those areas. Marine reserves, sometimes called “fully-protected marine reserves” provide greater protection to particularly vulnerable areas because they prohibit human activities, particularly extractive or consumptive uses, but because of these *a priori* outright prohibitions, the designation of marine reserves is usually quite contentious. As a practical matter, it is extremely difficult to say “no” when the inevitable political pressure is brought to bear on agencies during the process of designation as a result of some user groups’ objections to MPA establishment. This makes understanding how to design effective reserves, the value of networking reserves, and demonstrating effective reserve implementation all the more essential.

For the purposes of this discussion, “marine reserve” is defined as “an area of the sea in which all consumptive or extractive uses, including fishing, are effectively prohibited and other human interference is minimized to the extent practicable” (Sobel and Dahlgren 2004). Both Palumbi (2002) and PISCO (2007) offered similar definitions, with the key element being the prohibition of consumptive or extractive uses. Marine reserves are a critical element (COMPASS 2001) of the national systems of the US and Canada. They are most often part of a zoning scheme within larger multiple-use MPAs.

Much research has been conducted on the design and creation of marine reserve networks and now that a number of networks, in places like the Channel Islands, Florida Keys, and particularly the Great Barrier Reef, have been established and implemented,

more research is being targeted at reserve effectiveness. (e.g. CDFG et al. 2008, Cox and Hunt 2005, Fernandes et al. 2005, Grorud-Colvert and Sponaugle 2009). Hundreds of publications address reserve design [an interesting meta-analysis is provided by Halpern and Warner (2002) reviewing more than a hundred papers addressing reserve effects]. An illustrative sub-sample of this rich literature, focused only on reserve and network design, includes Airame et al. (2003), Apostolaki et al. (2002), Baskett et al. (2007), Bohnsack (1999), Botsford et al. (2003), Cabeza (2003), Cabeza and Moilanen (2006), Gaines et al. (2003), Halpern et al. (2006a, b), Halpern and Warner (2003), Leslie et al. (2003), Ley (2005), and Mangel (2006). Considerations for the design of marine reserves, illustrative of the many works addressing this topic (after Roberts et al. 2002) include: biogeographic representation; habitat representation; magnitude of and vulnerability to disturbance (particularly human threats and natural catastrophes); size required to meet conservation goals; ecosystem connectivity; presence of vulnerable habitats, exploitable species, and species of particular concern; importance of the area for vulnerable habitats, life stages, or populations; and how the area contributes to ecological services for humans. More succinctly, synthesized from this body of work, one could encapsulate the criteria for sound reserve network design as “The Four “R’s””: 1) Representation – a reserve should contain as many aspects of ecosystem biodiversity as possible; 2) Resiliency – a reserve must be sufficiently large and well managed to maintain all aspects of biodiversity in a healthy condition for foreseeable future; 3) Redundancy – network of reserves must include enough examples of each aspect of biodiversity to ensure the long-term existence of the unit in the face of uncertainty; and, 4) Reality – there must be sufficient funds and political will to acquire and subsequently manage protected areas. Many, if not all, of these marine reserve design criteria (and benefits that can accrue from reserves, see below) are also directly applicable to the design of all MPAs, whether fully-protected or multiple-use. In both cases, it is also essential that the process of design and management of reserves and MPAs is transparent and inclusive, using all available avenues for effective and extensive public engagement. No MPA or marine reserve – nor for that matter any protected area – can be fully successful if the public does not “buy-in”

to its creation and management. While most of these design parameters are challenging to evaluate, as is reaching consensus on their concordance with the criteria in the public policy arena, such criteria have been successfully applied, and robust reserve networks created in their application.

A large percentage of this body of work on marine reserves clearly documents the positive ecological effects of marine reserves (after COMPASS 2001):

- Within the reserve, they result in increases in abundance, diversity, body-size and productivity of organisms resulting from decreased mortality, reduced habitat destruction, and indirect ecosystem effects; they reduce the probability of localized extinctions of species; larger reserves lead to larger benefits.
- Outside the reserve, size and abundance of exploited species increase (sometimes called “spill-over”), and larvae from reserves replenish areas beyond the boundary.

Marine reserve networks buffer the effect of environmental change and provide greater benefits than a single reserve (again, the “greater than the sum of its parts” argument). Effective networks also need to encompass large geographic areas to increase system resilience. Admittedly, not all reserves accrue all these benefits, and some poorly designed – or originally designed robustly but through the public engagement process altered in a way that decreased their design efficiency – may not be as beneficial to preserving ecosystem structure and function. However, as the Scientific Consensus Statement (COMPASS 2001) posited, they are wholly justified based simply on the best available science.

Yet, our ability to implement reserve networks is limited. Those opposed to marine reserves, largely ocean users whose activities will be constrained by their establishment, have routinely mobilized the political power sufficient to defeat many proposals. However, CDFG et al. (2008) in their review of the Channel Islands marine reserve network, found that displaced fishermen found other places to fish, the numbers of fishermen did not decline in the first five years of implementation, and their catches

increased. Similar results have been reported in the Florida Keys (Cox and Hunt 2005, Grorud-Colvert and Sponaugle 2009). Therefore, the greatest challenge for marine reserves and marine reserve networks is not a lack of knowledge about their benefits or how to design them effectively; the science does not lack robustness. Rather, the most significant challenge is that we cannot get beyond the opposition to creating them, so that it can be clearly demonstrated that they are working, that we can adapt our management actions to make them work better, and that this can be done in a transparent and inclusive way.

Enforcement is necessary once a site or network has been established. There is a growing and compelling body of literature (Guidetti et al. 2008, Samoily et al. 2007, Shimshack and Ward 2008, Walmsley and White 2003, and a recent, thought-provoking paper by King and Sutinen 2009 on “rational noncompliance” regarding fisheries management regulations) that strongly suggests that MPAs are most effective in meeting conservation goals when they are enforced. This highlights the realities of likely non-compliance, particularly if there is little public “buy-in,” and the futility of watching a well-designed MPA fail because of lack of attention to critical management functions. Because of the costs associated with achieving effective enforcement, this will continue to be another significant challenge.

With regard to the question as to whether fully-protected marine reserves are different from ocean wilderness, the answer may be “somewhat.” While marine reserves can offer protection to wilderness qualities and attributes, in that commercial and extractive human activities are generally prohibited in these areas, these qualities and attributes are not being preserved for their wilderness value. This intent in establishing ocean wilderness is important. It conveys the central purpose for which the area has been set aside and protected, and should be clearly stated as a goal when either a marine reserve (Airame et al. 2003, PISCO 2007) or ocean wilderness is established. This central goal is one of the defining elements of the management plan developed for the area. Unless wilderness values are explicitly considered in management planning, it is unlikely that management actions developed in that plan will promote and foster

wilderness preservation. Further, areas of the ocean perceived as wilderness are generally remote, tending toward places where the presence of man and human development will be minimized. In contrast, while marine reserves may be in such places, they can also be just offshore major metropolitan areas and in high vessel traffic areas. Motorized access to marine reserves is rarely addressed as a management issue, whereas in ocean wilderness it would be prohibited or restricted. While they may be similar, marine reserves are a different tool established with somewhat different management goals in mind.

5.6 Ocean Wilderness as Part of the “Marine Conservation Toolbox”

Times of great change can also be times of great opportunity. While the frameworks for the National MPA Systems in the US and Canada have been developed and are being implemented, they are far from nearing completion, and given the current level of agency participation, full implementation will require considerable additional effort and investment by these agencies. Even the idea of “National MPA Systems” is still a recent concept, and the process of integration of this idea into the deeply entrenched agency cultures is just beginning. Notwithstanding the “alphabet soup” of MPA terminology (Barr 2010), the idea of adding something new that enhances and expands existing preservation programs is not incomprehensible. Ocean wilderness is something that can address qualities, values and resources valued by the public that no existing category of MPA currently can. It is a tool that has a long and robust history of effective resource conservation and preservation. It is also a tool generally familiar to many of the implementing agencies, particularly in the US where wilderness stewardship is a valued part of resource conservation. However, the addition of this new tool would need to be viewed by the implementing agencies as an opportunity to enhance and strengthen their existing conservation programs. It must be supported with a robust and defensible definition as well as effective and operationally reasonable management framework. The implementing agencies would also need to have some confidence that

there is sufficient public support, with sound engagement and outreach, to effectively establish and manage ocean wilderness areas.

It would be naïve to suggest that there are no significant challenges. A number of the key MPA implementing agencies do not currently include wilderness in their statutory authorities, nor are they recognized in existing wilderness laws as wilderness management agencies. Neither the National Marine Conservation Areas program in Canada nor the National Marine Sanctuary System in the US include wilderness preservation as a part of their mission and mandate. This is particularly problematic for waters of national EEZs where these programs have the primary MPA establishment mandate.

The programs that are currently “wilderness management agencies” under law and policy, as discussed in Chapter 4, have either not recognized the opportunities for enhancing wilderness stewardship presented by ocean wilderness that they already have within their jurisdiction, or are have not, to this point, considered designating ocean and coastal waters as wilderness. Ocean wilderness may represent another significant threat to stakeholder groups who have opposed marine reserves and other MPAs that directly affect their access and use of ocean and coastal waters.

Additionally, while the National MPA Systems remain in their early stages of implementation, the frameworks for their establishment were developed with extensive public engagement, and changes to these system plans may face considerable opposition. One great challenge that comes with public engagement is the perception by those who participate that, once a plan is developed, it will not change as new situations are encountered during the implementation of that plan. Most agencies that have attained a level of sophistication regarding public engagement from hard-won experience are very careful to remind their constituencies that the plans they develop are “organic.” They will change adaptively as implementation proceeds, as the environment and human uses change over time. However, this message rarely is heard and understood. One example of such an adaptive change is the establishment of the marine reserve network at the Channel Islands National Marine Sanctuary, where this reserve network was designed

and implemented to address continuing degradation of important resources that were not being conserved under the existing management plan (Airamc et al. 2003). These are clearly significant challenges, but perhaps not insurmountable with time and compelling arguments.

As the Arctic provides a regional focus for analysis and case-studies in this dissertation, it is important to examine Arctic governance, protected areas and their potential relevance to ocean wilderness.

5.7 The North American Arctic: Governance and Protected Areas

The Arctic is a place of great fascination and allure for many people (Doubleday 1999) who see it as remote, cold, and mysterious, harsh and unforgiving, a place that embodies the romance of exploration. It is valued culturally as our iconic wilderness. It is the land of polar bears, walrus, narwhals, tundra and ice. We are captivated by it.

In a less romantic way, we are drawn to the Arctic more recently by the promise of opportunities to exploit resources, as well as issues surrounding marine transportation and national sovereignty. Recent estimates are that approximately 30% of the world's undiscovered natural gas and 13% of oil are likely to be in the offshore areas of the Arctic Ocean (CRS 2010, Gautier et al. 2009), and very recently exploratory drilling has been conditionally approved for areas off Alaska's Arctic coast (Schmidt 2011). There are large commercial fisheries in the eastern Arctic, and growing interest in the offshore waters of the western Arctic off Alaska (CRS 2010). With the gradual retreat of sea ice in the Arctic as a result of global climate change, the routine use of the Northwest Passage (NWP) is becoming a reality, as is the development of a number of deep-water ports along the Arctic coast to support this increased maritime transportation activity (CRS 2010, Arctic Council 2009). The issue of sovereignty is also much in play with governments preparing and submitting documentation in support of the extension of territorial waters in the Arctic to the UN Commission on the Limits of the Continental Shelf (CLCS), an element of the implementation of the UN's Convention on the Law of the Sea (Dodds 2010). The Government of Canada has made the Arctic a key element of

its policies (Dodds 2011), asserting sovereignty over the Arctic Archipelago and surrounding waters, including the NWP. Others, particularly the US (CRS 2010), have claimed the Passage to be an “international strait” and not the territorial waters of Canada. The US has made the Arctic a similar priority, though perhaps less stridently than Canada, issuing National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (NSPD 66/HSPD 25), which, among other provisions, reasserts the claims of the US regarding the NWP, and its sovereignty over waters off Alaska. Some of the MPA implementing agencies in the US are primarily focusing on conducting research in the US Arctic (DOI 2010, Holland-Bartels and Pierce 2011, NOAA 2009), but elements of those plans relate to conservation and, potentially, establishment of protected areas. There is little doubt that the Arctic’s vast and untapped resources have captured the attention of North America and the world, not the least as a result of observed changes in the Arctic due to global warming (ACIA 2004).

5.7.1 Social and Ecological Context and Implications of Climate Change

Clark and Harris (2003) conclude that: “...the greatest concern for the Arctic is probably the ecological implications of climate change, particularly insofar as sea ice extent and duration are likely to be affected... the capacity of marine ecosystems to withstand the cumulative impact of a number of pressures, including climate change, pollution and overexploitation, acting synergistically...” will be the primary question. Added to this list of concerns are the likely impacts to the humans who live there and the significant adaptation they will have to make to these new conditions (Alessa et al. 2008, Berkes and Jolly 2001, Berman and Kofinas 2004, Bluhm and Gradinger 2008, Ford et al. 2006, Gearheard et al. 2006, Hovelstrud et al. 2008, Leduc 2006)

Polyak et al. (2010) posited that “The most defining feature of the surface of the Arctic Ocean and adjacent seas is its ice cover...which waxes and wanes with the seasons, and changes in extent and thickness on inter-annual and longer time scales. These changes, while driven by climate, themselves affect atmospheric and hydrographic conditions in high latitudes on various time scales.” The current rate of climate change in

this region is similar to the fastest natural change that has occurred in the past, “but future changes may have no natural analog” (White et al. 2010). Ice is retreating faster during summer – some have postulated an “ice-free summer” in the Arctic by about 2037 (Wang and Overland 2009) – and there is a thinning and loss of multi-year ice. Ice-free area in the Arctic Ocean is likely to increase observed temperatures as a result of the “albedo effect” (Perovich et al. 2002, Wassman et al. 2011), exacerbating the direct loss of ice cover and ice thickness resulting from climate changes. As alluded to in the ACIA (2004) policy report, this sea-ice loss will provide opportunities for greater access for human activities (shipping, fishing, tourism...which may be viewed as positive or negative, depending on your perspective), but will also cause clear negative effects, such as greater erosion and damage to coastal infrastructure because ice-free coastal areas will be exposed for prolonged periods to storms. As CBD (2009) concluded: “Life and livelihoods in the Arctic need to be recognized, their value acknowledged and their preservation made a priority.”

Climate change will affect the marine ecosystem of the Arctic. As summarized from an excellent recent meta-analysis by Wassman et al. (2011), changes may include: increased freshwater discharge, changing salinity regime; changes in the temperature regime with depth; northward range expansion of all marine taxa, changes in species composition and population size across all taxa, changes in the locations and timing of primary and secondary production; changes in habitat use by mobile species (and potentially changes in structure of more sessile benthic communities). However, the authors pointed out that analysis of such ecosystem changes will be significantly hindered by a lack of adequate baseline data.

As discussed in Chapter 6, one way of overcoming this paucity of baseline data may be to enlist the assistance of Native communities, who often possess deep knowledge of these places in the Arctic. Great challenges are likely coming for Arctic inhabitants. Berkes and Jolly (2001) offered some insights into the likely adaptations, as well as the observed resilience of Native communities of the North, particularly the Inuvialuit of the Western Canadian Arctic, in adapting to change. The authors reported

that some of the impacts related to subsistence activities include: changes in access availability to hunting and fishing territories; exposure to unsafe conditions, particularly in sea-ice areas; the unpredictability of weather and climate on the subsistence cycle; and changing availability of species for hunting and fishing. The authors further observed that, “although these changes are affecting subsistence activities, many of the impacts have been absorbed thanks to the flexibility of the seasonal cycle and the Inuvialuit way of life. For the most part, Inuvialuit coping strategies relate to adjusting or modifying subsistence activity patterns (i.e. changing when, where, or how hunting and fishing occur). They also harvest a mix of different species and try to minimize risk and uncertainty.” While these are termed, “coping responses,” longer-term adaptive strategies are reported as follows: “...cultural practices that are considered to be adaptive responses to the arctic environment and include: (1) mobility and flexibility in terms of group size, (2) flexibility with regard to seasonal cycles of harvest and resource use backed up by oral traditions to provide group memory, (3) detailed local environmental knowledge and related skill sets, (4) sharing mechanisms and social networks to provide mutual support and minimize risks, and (5) intercommunity trade. While change to the environment from climate change has the potential to challenge the capacity of Native communities to keep their traditional knowledge “current,” updating and revising traditional ecological knowledge with changing environmental conditions is another element of northern cultures’ flexibility and adaptability (Leduc 2006). Whatever the scope and intensity of the challenges, active engagement of the communities of the north will be essential in finding appropriate solutions and has already led to the implementation of Indigenous community observation networks (e.g. the Bering Sea Sub-Network; Smith et al. 2011).

5.7.2 Arctic Governance

The Arctic is a complex region, encompassing the sovereign maritime territories of five countries (United States, Canada, Russia, Denmark (Greenland), Norway. Iceland is often added as a sixth country, as a small portion of its EEZ extends beyond the Arctic

Circle. As Jensen and Rottem (2010) observed: “The Arctic region does not suffer under a state of virtual anarchy, despite outward appearances.”

Each of these countries has created its own laws and policies for governing its Arctic waters (Brosnan 2011). Also, a number of international governance frameworks provide mechanisms for collaboration and collective governance in the region (CAFF 2000, Corell 2007, de La Fayette 2008, Dodds 2010, Harders 1987, Holland 2002, Young 2009). There appears to be some agreement from these reviews of Arctic governance that “...in general, representatives of the Arctic countries have observed that there is sufficient legislation available to them to protect the marine environment and conserve its biodiversity and habitats” (CAFF 2000). However, this legislation is not always implemented nor its provisions adequately enforced (CAFF 2000). Some have suggested the need for a treaty similar to that which governs the Antarctic region, because it would create some legally binding agreements – sometimes called “hard-law” governance mechanisms – for the Arctic (Borgerson 2008, Corell 2007, de La Fayette 2008, Nowlan 2001, Rayfuse 2007). Arguments calling into question the need for such a strategy were offered by Stokke (2007) and Young (2009, 2011). Suggesting that “soft-law” institutions like the Arctic Council have expanded the knowledge base on issues of importance and provide a forum for collaboration on seeking resolutions to these issues, Stokke (2007) posited that efforts to create a more formal treaty-based agreement for the Arctic would not add much to what is already in place, and could potentially undermine the past collaborative work of the Council. Young (2009, 2011) suggested that the existing soft-law governance structure currently in place in the Arctic has accomplished much without threatening the circumpolar national sovereignty, and the potential to achieve any lasting and effective treaty is quite remote, given the national interests of the Arctic nations. Young (2009) also speculated that, given the rapidly changing environment of the Arctic and our just emerging understanding of the complexity of the governance issues that will need to be addressed, a soft-law approach is likely to be better able to adapt and respond to these rapid changes more effectively. Both Stokke (2007) and Young (2011) recommended, in part, that an expanded and enhanced Arctic Council

could offer the greatest potential to effectively address the challenges of governance in the Arctic.

CAFF (2000) provided a succinct overview of the international governance framework in the Arctic (summarized in Table 5-3, below), providing the most relevant elements of that framework. These elements represent significant international conventions and agreements that have application in Arctic waters, and potentially address issues of considerable importance in this region. The Arctic Council, arguably the most important international collaborative body in the Arctic, is not included in this summary; it is discussed in some detail below.

It is important to understand that international conventions, agreements and other collaborative mechanisms, in the Arctic and elsewhere, are voluntary, in the sense that they are really only effective if all affected parties agree to be bound by the agreements made under these conventions as to how they will be implemented. In some cases, countries may not be signatories to a convention, but agree informally to abide by their terms and conditions. However, they do matter in the larger picture of international governance insofar as they represent customary management for areas outside national jurisdiction, and the expectations of appropriate conduct and behavior by the world community beyond sovereign boundaries.

The Arctic is a place where collaboration is essential. It is an ocean surrounded by nations who see the emerging economic potential of the Arctic in this time of great and rapid change. It is also a place deeply connected to the Indigenous people who live there, who rely on these places for subsistence and sustaining cultural traditions, and who have recognized rights of access and use. These conventions and the collaborations that they foster could be of considerable importance in helping Arctic nations and Indigenous communities develop and achieve a common vision for the future of this region. They can offer opportunities to establish management frameworks for the resources of this region all Arctic nations can embrace, that respect and honor the Indigenous rights of access and use, and can assist in making the rest of the world aware of and support their

Table 5-3: Key International Framework Elements of Arctic Governance

Framework Element	Administrative Body	General Purpose	Includes Provision for Place-Based Protection
United Nations Law of the Sea Convention (UNCLOS)	United Nations (administers but has no operational role)	“Umbrella agreement...embodies in one instrument customary rules of international law governing uses of the ocean...establishes definitive legal classification system for ocean space.” ¹ Established International Sea Bed Authority, which controls activities in “seabed, ocean floor, and subsoil thereof” beyond limits of national jurisdiction, and International Tribunal for the Law of the Sea for settlement of disputes.	Encourages, but does not provide unique mechanism.
Global Program of Action for the Protection of the Marine Environment from Land-Based Activities (GPA)	United Nations Environment Program (UNEP)	The GPA focuses on protection of the marine environment from land-based activities. It principally addresses pollution abatement, but also contains provisions for the protection of coastal and marine habitats and activities which degrade the marine environment.	No
International Convention for the Prevention of Pollution from Ships (MARPOL)	International Maritime Organization (IMO)	Addresses nearly all potential sources of pollution of the marine environment from shipping: vessel discharges of oil, noxious liquid, substances in bulk, and potentially harmful substances in containers, sewage and garbage.	Through IMO, can establish “Special Areas,” “Areas to be Avoided,” “Particularly Sensitive Sea Areas” “declared significant for ecological, socio-economic, scientific, non-renewable natural, cultural or historical reasons.”
Convention on Biological Diversity (CBD)	CBD Secretariat hosted by UNEP	comprehensive environmental agreement “to protect the totality of the planet’s biological resources.” Goals are “the conservation of biological diversity; the sustainable use of biodiversity’s components; and the equitable sharing of benefits derived from genetic resources”	Mandates establishment of MPAs and networks. Does not provide unique mechanism, but implements through national authorities of signatories (which include all Arctic countries except US).
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, CMS)	CMS Secretariat/UNEP	intended to protect migratory species and their habitats. Objectives are to prohibit takings, conserve restore habitats, remove obstacles to migration, threatening endangered migratory spp.	The CMS has no independent authority to designate protected areas...may be relevant where other protected areas established involve migratory species.

Table 5-3 (continued)

Framework Element	Administrative Body	General Purpose	Includes Provision for Place-Based Protection
International Convention on the Regulation of Whaling	International Whaling Commission (IWC)	provides for the conservation of whaling stocks, and more recently is focusing more attention on whale conservation and management (beyond just regulating whaling). The IWC, which has indigenous participation, establishes aboriginal whaling quotas as part of their work, which has some considerable significance in the Arctic.	The IWC has established whaling sanctuaries in the Southern and Indian Ocean, and has the authority to extend this protection to other areas.
United Nations Fisheries Agreement (UNFA)	United Nations	Addresses "straddling stocks" and highly migratory species, the establishment of regional fisheries management organizations (RMFO) to more effectively manage these high seas fisheries, promotes biodiversity conservation and ecosystem approaches to management.	No authority to establish MPAs currently, but recent meetings at UN regarding the UNFA have raised the issue. ⁴
The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	Ramsar Secretariat	Convention focuses on the protection of habitat of migratory waterfowl. Can include marine water, coastal lands and islands, and particularly coastal wetland areas.	Ramsar designation does not provide any protective legal status, and sites so designated do not require any legal protection through national legislation.
Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)	UNESCO	Identifies and designates natural areas and cultural sites of "outstanding universal value." Restricted to territory and territorial sea (out to 12 nmi.) of signatory countries.	World Heritage Site designation does not provide any protective legal status, but does convey some meaning in being determined to be a site of "outstanding universal value." There are a number of WHS designations for marine waters in the Arctic, including Greenland, Iceland.

Notes: 1. CAFF(2000)

2. http://www.ospar.org/content/content.asp?menu=00180302000011_000000_000000

3. Notable, however, that US and Canada collaborated with Russian Federation on "NPA-Arctic," "National Programme of Action for the Protection of the Arctic Marine Environment," a project funded by the Global Environment Facility (GEF), which is just concluding work.

4. <http://www.un.org/News/Press/docs/2010/sea1934.doc.htm>

collaborative action. Of particular significance are those conventions that address human uses that are likely to increase in the Arctic as a result of the effects of climate change. Shipping, commercial fishing, extraction of non-renewable resources from the seabed (e.g. oil and gas exploration and development, mining) all represent challenges ahead.

One particular challenge facing the Arctic already generating considerable controversy is redefining sovereignty under UNCLOS as it applies to the Arctic waters (Table 5-3). The epicenter of current activity with regard to claims of Arctic waters is the Commission on the Limits of the Continental Shelf (CLCS), which is establishing new EEZ boundaries in the Arctic (Dodds 2010, Powell 2010). At stake is the potentially rich petroleum that lies below the seabed (Gautier et al. 2009), as well as fishing resources and shipping opportunities likely to be present in these waters. The CLCS issues recommendations for revising continental shelf boundaries based on proposals from these coastal states, which must make significant investments to collect extensive, detailed, high-resolution hydrographic data and other supporting technical and scientific information. Some believe that this submerged lands allocation (i.e. extending EEZs under the definitions being used by the CLCS) is not in the best interest of fostering collaboration in the Arctic and that it is better to reach some agreement to manage these submerged lands and waters under a collaborative agreement (Young 2009). But as Dodds (2010) observed regarding the CLCS, “distinguishing between geopolitics, law and science is far from unproblematic.”

Another issue of particular concern is the potential opening of Arctic waters to increased shipping activity as sea ice retreats. Both the Northern Route (through the waters of the Russian Federation) and the fabled Northwest Passage (through the Canadian Arctic archipelago) are both likely to be more heavily used by global shipping companies when they become ice-free for at least a portion of the year. The Marine Environment Protection Committee of the International Maritime Organization (IMO), identifies specially protected areas (e.g. “Special Areas,” “Areas to be Avoided,” and “Particularly Sensitive Sea Areas”), “which can be declared significant for ecological, socio-economic, scientific, non-renewable natural, cultural or historical reasons” (CAFF

2000) and where strong protection measures can be put in place to manage shipping impacts. The IMO is likely to play a critical role in preparing for this seeming eventuality, helping to insure that whatever shipping takes place in this region is conducted in a manner that preserves the Arctic environment. The protected areas designations within the scope of their authority, as well as their work addressing discharges of pollutants from ships and establishing standards for ships that operate in “ice-covered waters,” are essential to achieve appropriate protection of the environment of the Arctic.

A final noteworthy convention with regard to Arctic waters is the United Nations Fisheries Agreement (UNFA). Commercial fishing has been minimal and largely limited to the lower latitudes of the eastern Arctic, as a result of the sea ice cover. In 2009 in the Western Arctic, the North Pacific Fishery Management Council, through the National Marine Fisheries Service, has closed the waters under jurisdiction off Arctic Alaska (<http://www.fakr.noaa.gov/npfmc/fishery-management-plans/arctic.html>). With the retreating ice cover, there will likely be considerable interest in potentially exploiting fishery resources of the Arctic. There are currently no regional fisheries management organizations in the Arctic (i.e. international collaborative management frameworks established to address fisheries resources that straddle international boundaries) yet there are, and with warming will likely be more, stocks of commercially-important species that are “straddling stocks.” UNFA has the potential to offer some tested solutions to the fishery conflicts likely to be encountered in the Arctic of the (not too distant) future.

The laws and policies for the Arctic nations are also important in addressing the full scope of Arctic Governance, particularly with areas of EEZs of these countries likely to significantly expand through the CLSC process, but any comprehensive description and analysis of this element of Arctic governance would be too lengthy to include here. A recent paper by Brosnan (2011) provided a detailed overview of this governance by the five principal Arctic nations, and concluded that they share common interests, addressing: environmental concerns, resource development, sovereignty and security,

governance, scientific research, and shipping. Each of these is potential focus areas for collaboration, and potential conflict, in the circumpolar north.

5.7.3 Collaboration and Conflict in Arctic Governance

As Berkman and Young (2009) warned: “The Arctic could slide into a new era featuring jurisdictional conflicts, increasingly severe clashes over the extraction of natural resources, and the emergence of a new 'great game' among the global powers.” However, de La Fayette (2008) offered a different perspective:

Relations between states in the Arctic are by no means as negative as many people believe. Journalists and political scientists like to see conflict, as it is their job to report it, analyze it and comment on it. Conflict is news; cooperation is boring and ignored.

These two statements represent ends of the spectrum of the literature reviewed. Corell (2009), focusing on the opportunities that this potential for conflict provides, concluded:

The Arctic actually offers an opportunity for states concerned – in particular the Arctic coastal states – to demonstrate that they are able to cooperate actively in a constructive manner...an opportunity to set an example by demonstrating how responsible actors on the international arena should interact.

The Arctic Council provides a key mechanism for collaboration in the Arctic (<http://arctic-council.org/article/about>). Formed in 1996, the Arctic Council was established as:

...a high level forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic indigenous communities and other Arctic inhabitants on common arctic issues, in particular issues of sustainable development and environmental protection in the Arctic ... [and to] adopt terms of reference for and oversee and coordinate a sustainable development program” (Arctic Council 1996).

There are eight permanent member states of the Arctic Council, including the five countries that border the Arctic Ocean (US, Canada, Norway, Russia Denmark/Greenland) as well as Iceland, Sweden, Finland. There are also a number of “permanent members” (which are aboriginal organizations): Aleut International Association, Arctic Athabaskan Council, Gwich’in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and the Saami Council. The Council seems well regarded for its success in engaging these indigenous groups in their structure and deliberation (Shadian 2006, Young 2009). The Council has six Working Groups including the Protection of the Arctic Marine Environment (PAME). These Working Groups have produced a number of important plans and analyses, including comprehensive reviews of two of the more significant expanding human activities in the Arctic, the Arctic Marine Shipping Assessment Report and the Arctic Offshore Oil and Gas Guidelines, both published in 2009. They have also developed the Arctic Environmental Protection Strategy (AEPS) that has guided the work of the Council and its members since it was published in 1991, and, as mentioned previously, was responsible for the development of the Arctic Climate Impact Assessment in 1994.

The Arctic Council is viewed as an important institution regarding the future of the region, whose work should be supported and enhanced (Brosnan 2011, Corell 2009, de La Fayette 2008, Holland 2002, Stenlund 2002, Young 2009), but may have to evolve. Jeffers (2010) mentioned that the Arctic Council has no current role with regard to fisheries, and suggested, among other relevant recommendations, that a new Working Group be formed within the Council structure to address this topic. Young (2009) recommended a number of ways how the Council could play a larger role, particularly outside the Arctic (asserting that “a governance system that focuses only on regional concerns cannot succeed in achieving environmental protection, much less sustainable development in the Arctic”) and suggested that, the Council play the role as:

...a higher level policy forum that can address the relevant issues in comprehensive terms and without any crippling bias that undermines its

ability to resolve such problems in a constructive fashion...(being) a facilitator rather than a regulator.

While the Arctic Council will continue to be an important component of emerging collaboration in the Arctic, how effective it will ultimately be depends greatly on if and how this evolution occurs.

Increasingly, Arctic governance is circumpolar in scope, is engaging many parties including representatives of Native and indigenous organizations, and actively addresses, through the Arctic Council, many of the management issues facing the north, especially oil and gas development and marine transportation. The increasing emphasis on sovereignty, driven largely by the work of the UN's CLCS and disputes over the status of the NWP, has the potential to decrease the current level of collaboration. There are many opportunities for conflict in the Arctic. Expanding human uses, including shipping, oil and gas development, commercial fishing, maintenance of subsistence life ways, all facilitated by the shrinking Arctic ice, are rife with possibilities for conflict. But, as Brosnan (2011) concluded: "...in a dynamic, uncertain environment such as the Arctic, it is perhaps more useful to explore and illuminate the avenues for cooperation than to attempt to predict conflict."

5.7.4 Protected Areas in the Circumpolar Arctic

It is not surprising that there are relatively few protected areas in the Arctic relative to other regions of the world. This is a remote area, sparsely populated, and until recently, was largely protected by permanent sea ice, limiting the potential for human activities that could harm the fragile ecosystem of the Arctic. The retreating and thinning sea ice is removing this natural barrier to human activities, and more regulatory controls may be required to afford Arctic resources some protection. Part of the management framework that will be imposed will almost certainly involve the establishment of protected areas, both on land and in the sea. The Protection of the Arctic Environment (PAME) Working Group of the Arctic Council has, in its portfolio, the topic of protected areas. According to PAME (<http://www.arcticdata.is>) as of 2010, the total land area in

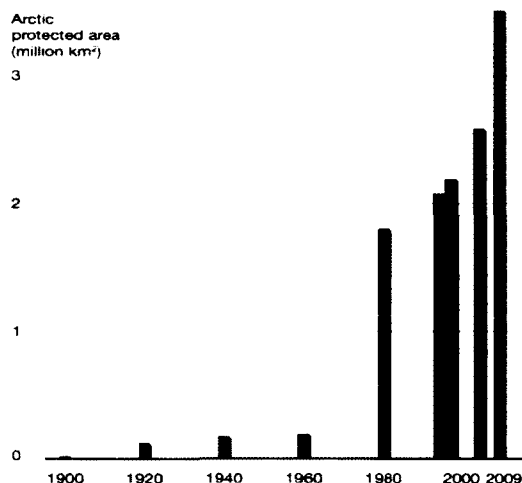
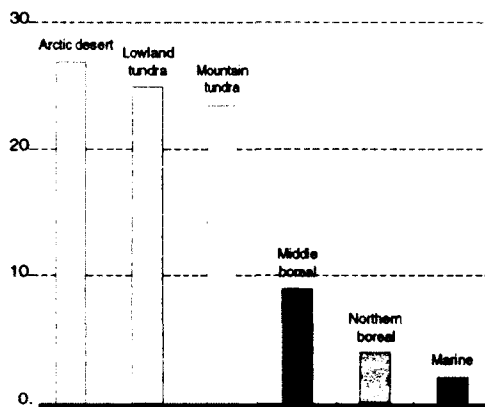
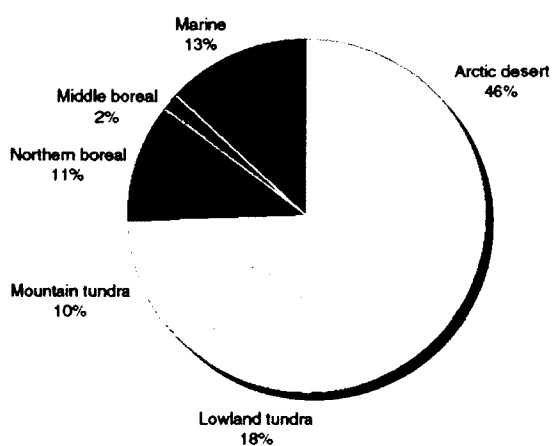


Figure 5-1: Trend in Arctic Protected Areas (PAME 2011).

the Arctic under some form of protection has been increasing over the last decade (Figure 5-1). However, UNEP/GRID-Arendal (2005) suggested that there is a deficit in the protection for coastal and ocean areas. Only 13% of the area protected includes marine waters (Figure 5-2), and “while large land area in some regions have been set aside, the marine component – so critical to Arctic food chains and coastal ecosystems – remains vastly unprotected” (UNEP/GRID-Arendal 2005). These ecosystems also represent

those at the highest risk as access increases for fisheries, industrial exploration of minerals and petroleum along the coasts and as new receding sea ice open up areas for exploitation.



Source: CAFF. 2001. Arctic Flora and Fauna: Status and Conservation.

Figure 5-2: Breakdown of Arctic Protected Areas by Biome Type (Fig. 25 from UNEP/GRID-Arendal 2005).

Unprotected areas of ocean and coastal waters have also been identified (Figure 5-3). Priorities have been identified for additional protection based on proximity to existing protected areas in coastal land areas (UNEP/GRID-Arendal 2005).



Figure 5-3: Unprotected Coastal Areas Adjacent to Existing Protected Areas (Fig. 26 from UNEP/GRID-Arendal 2005).

Interestingly, these priority areas include nearly all of the shoreline of the Arctic Ocean, with the exception of nearshore areas (e.g. along the Alaska coast of the Beaufort and Chukchi Seas, within the Canadian Arctic archipelago) where there are no land-based

coastal protected areas nearby. These areas of the Arctic coast may also be worthy of additional protection, but did not meet the “proximity to existing protected area” criterion used in this analysis.

It is also important to note, with particular reference to Chapters 6 of this thesis, that:

Coastal areas are not only vital to indigenous peoples and ecosystems, they also represent the world’s remaining intact ecosystems including land, coast and the sea. In many protected areas, indigenous peoples can retain their traditional rights of subsistence hunting. In order to implement these intentions, it is of major importance that the appropriate resources are allocated to relevant agencies and organizations to ensure that an actual implementation of a marine protected areas network is developed together with co-management systems. Hence, an opportunity exists to help strengthen the resilience of Arctic ecosystems to climate change by minimizing the extent of other pressures. This can, in turn, help indigenous peoples buy the time they need to help shape and define their own future and manage the resources, upon which many still depend, in a sustainable manner (UNEP/GRID-Arendal 2005).

An ongoing activity related to protected areas and the Arctic, through the PAME Working Group of the Arctic Council, is to implement the recommendations of the Arctic Marine Shipping Assessment (Arctic Council 2009) with regard to identifying and protecting areas that may be especially sensitive to the impacts of shipping. In the PAME 2011-2013 Work Plan, Annex 2 directs this identification of “areas of heightened ecological and cultural significance” and potential “specially designated Arctic marine areas” that may be particularly threatened by shipping and related infrastructure development in the Arctic. PAME is charged with identifying these areas and preparing documentation for submission to the International Maritime Organization (IMO) by relevant member governments. Such areas might be proposed as “Particularly Sensitive Sea Areas,” or what are called “associated protective measures” under the IMO authority

(examples include “mandatory ship reporting systems,” “no anchoring areas,” “areas to be avoided,” “mandatory ship routing,” vessel traffic separation schemes”). These areas might also be proposed for establishment as “Special Areas” and “Emission Control Areas” under the International Convention for the Prevention of Pollution from Ships (MARPOL). A final report, including recommendations for areas to be proposed to the IMO for protection, is scheduled to be completed in 2012.

5.7.5 Marine Protected Areas in the Arctic Waters of the US/Alaska

Depending on the definition one uses, there are either a relatively large number or very few MPAs in the US Arctic. According to the US National MPA Center (<http://www.mpa.gov>), there are approximately 32 potential MPAs in Alaska (i.e. Aleutian Islands, Bering Sea, Chukchi Sea and Beaufort Sea) that meet the broad criteria for inclusion in the National MPA System. Three of these, Yukon Delta NWR, Alaska Maritime NWR, and Arctic NWR, are currently inscribed in the National System. Of particular note (see Chapter 5), all three of the national wildlife refuges protected areas in the Arctic include designated wilderness waters although it is unclear whether these areas are actively managed as wilderness. Of the remaining eligible MPAs, nearly all are fishing areas, in which only fishing is regulated in one form or another and not directly addressing other potential human impacts. The US National MPA System recognizes such areas as MPAs, but not all do (see “*The Controversy over Fishery Management Areas*” above, this Chapter). The 2009 Arctic Fishery Management Plan, which closed all Arctic waters of the US from the Bering Strait to the Canadian border and out to the limit of the EEZ, will preserve options for future fisheries in this region, and while it remains closed will provide considerable protection for the Arctic ecosystem from impacts that could have resulted from fishing that might have been conducted there had the closure not been established. This closure was established through the Magnuson-Stevens Fishery Conservation and Management Act, the primary statutory authority for fisheries management in the US. This Act has broad jurisdiction over fisheries management, but lacks the potential reach of MPA statutes (e.g. National Marine

Sanctuaries Act, National Park Service Organic Act) to broadly regulate and manage any human activity that may be proposed for these areas that has the potential to degrade biodiversity and ecosystem structure and function. The Magnuson-Stevens Act contains a few required consultation provisions for non-fishing activities that have the potential to degrade important fishery habitat areas, but otherwise lacks regulatory jurisdiction to provide full authority for ecosystem protection – except for fishing and its impacts. Actions under the Magnuson-Stevens Act are not intended to provide lasting protection for the biodiversity of the area, nor to preserve ecosystem structure and function, and has little real impact on the future ecosystem management of the region beyond those interests related to impacts on and impacts to the fisheries that may be developed there once the closure is lifted.

There are currently no multiple-use MPAs or marine reserves (beyond those area-based fishery management zones) in the Arctic waters of the US. Based on personal knowledge, there have been a small number of attempts to establish national marine sanctuaries in Alaskan waters, but none have yet been successful.

5.7.6 Marine Protected Areas in the Canadian Arctic

Canada has few MPAs in the Arctic (see Table 1) designated under their primary Federal MPA authorities. DFO has designated one site under its Oceans Act authority, the Tarium Niryutait Marine Protected Area located off the Mackenzie Delta in the Beaufort Sea, which was established in 2010. Its management framework is focused on sustaining the local populations of beluga whales and their habitat, although it includes other resources of importance to the region, and is comprised of three separate areas. There is another proposed area, called an “area of interest,” in the nearby waters of Darnley Bay, which is proposed to protect a larger suite of resources, including fish, polar bears, seals, seabirds, and beluga whales. DFO has no other “areas of interest” in Arctic waters (<http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/index-eng.htm>).

The National Marine Conservation Areas (NMCA) Program does not currently have any NMCAs established in the Arctic, and only four sites across Canada, two fully designated (under special legislation) and two “established,” but in a transitional period of five years when a full management plan is developed for that site. As a “representative areas” MPA program, the NMCAs are established within marine bioregions (as mentioned previously, not the same bioregions DFO is using as a basis for their MPA planning), and nine have been identified in their system plan for the Arctic. Specific “representative areas” have only been identified in five of the nine bioregions, totaling thirteen potential sites, but others will be identified as system planning proceeds. Of particular note, the NMCA program is actively developing a feasibility assessment for Lancaster Sound and in 2010 announced a potential boundary delineation for that area. Lancaster Sound is the Eastern entrance to the Northwest Passage, possesses high biodiversity, and is particularly critical as habitat for whales, seals and seabirds.

With regard to the other Canadian MPA program, the Canadian Wildlife Service’s “Marine Wildlife Areas,” there are currently no sites designated in the Arctic. Indeed, there are no such sites currently designated anywhere in Canada, with only one, the Scott Islands on the most Northerly tip of Vancouver Island, under review. There are, however, a number of large “migratory bird sanctuaries” established in the Arctic by CWS near the coast, but not directly adjacent.

5.8 Prospects for Integrating Ocean Wilderness in the North American Arctic

As a relatively new idea, and one that challenges the orthodox and accepted wisdom of the current paradigm of wilderness, any possibility of “selling” this idea will require deeper analysis and deliberation. What is ocean wilderness, in theory and practice? How can ocean wilderness enhance opportunities for ocean conservation and contribute to the effectiveness of MPA networks and systems in the Arctic. What type of stewardship framework is necessary and appropriate to preserve relevant wilderness values and qualities? Where in this vast region can efforts be most effectively invested

to potentially establish these areas? These questions identify the key issues that this research attempts to address.

With regard to an appropriate geographical and institutional context, the North American Arctic has much to offer. On the institutional side of the equation, the US and Canada are just embarking on the establishment of their national MPA systems, being driven in part by the global emphasis on developing such systems. While there are differences in the approach being taken, it is likely that defining and proposing a new category for the MPAs being inscribed into these systems would not be opposed simply on the grounds that the conventions and principles underpinning these national MPA systems are too entrenched to accommodate a new idea. All but a few of the governmental agencies responsible for the constituent MPA programs within the US and Canada already recognize wilderness stewardship as part of their mission and mandate. Given the number and variety of MPA programs currently in operation in North America, there would seem to be many opportunities to include wilderness designations in their respective ocean and coastal conservation “toolboxes.” Finally, as will be discussed in greater detail in Chapter 7, North American countries are actively embarking on a comprehensive and coordinated international “marine wilderness” initiative. Given the global leadership that North American protected areas programs seem to exert, the likelihood of the potential extrapolation of what could be accomplished through these programs to other regions of the world where wilderness can be found, sometimes in abundance, has great potential if past history is any indication.

From the context of geography, the North American Arctic is a place currently subject to great change, and with change comes opportunity. When a “crisis” is perceived, decision makers are generally more open to innovation and creativity as they seek solutions, being a culture rooted in the idea that “if we just put our minds to it,” no problem is insurmountable.

When we hear that there is a crisis in the Arctic (e.g. that it is being irreparably harmed by climate change) we feel compelled to action. We do all this at a distance, and largely without a clear understanding of the implications of our actions, as we lack deeper

knowledge of place. Bravo (2009) suggested that, knowingly or not, well-meaning advocates may create a “crisis narrative” of climate change and the Arctic, in part, and “sustain (that) narrative that defines communities ‘at risk’ in order to justify expert interventions.” Indeed it is very likely a “crisis,” and the Arctic is changing, but our intervention, as a world community, should recognize Dodds’ warning that there “is usually a high price to be paid” for forging ahead with “grand plans designed at a distance.” As the Arctic is a place where people live and are sustained by its resources, there is much to gain from active engagement of Indigenous communities in the Arctic (Bravo 2009, Dodds 2010, 2011), as the Arctic Council has championed. This represents another dimension of context, what might be called the “cultural” context for ocean wilderness. The very important “cultural” dimension is addressed in greater detail in Chapter 6, and referenced extensively throughout this analysis.

There are currently few MPAs in the Arctic. This region is vast, distant, and until recently, perceived as “naturally” protected by ice cover and harsh climate, constraining opportunities for human development and resource exploitation. While the national MPA systems in the US and Canada are in “start-up” mode, the implementation of these systems in the Arctic is even less advanced. However, interest in establishing protected areas in this region is significant, and efforts are already underway, both nationally and internationally through the work of the Arctic Council, to begin to address the identified “deficit” in protection for Arctic coastal and ocean waters. The rising tide of interest in asserting sovereignty in the North is potentially a “double-edged sword” in that growing nationalism may impede or degrade some of the enthusiasm and support for regional governance through established institutions like the Arctic Council. However, it can also be a powerful vehicle to increase the visibility of Arctic issues, particularly in concert with the climate change “crisis,” and offer a forum for potentially resolving issues which would otherwise be diverted into the “agree to disagree” category, such as the longstanding disputed national boundaries in this region. The adage, “agree to disagree,” is still a disagreement. Finally, and perhaps most importantly with regard to this particular topic, the Arctic is an iconic wilderness. There are few who seriously

challenge this perception. If one is seeking mechanisms to preserve wilderness, it is useful to target a place that is already perceived as wilderness, as our “last frontier.” It is not surprising that, of the dozen or so wilderness waters areas in the United States, all three of the Federal protected areas that occur in this region have designated ocean wilderness already within their boundaries (see Chapter 5). Considering the many “dimensions of context” that affect this region, it would seem difficult to refute the conclusion that one would be hard pressed to find any place that is potentially a better fit as a “test bed” for ocean wilderness than the North American Arctic.

Chapter 6 What It Might Be...

"There is no Indian word for wilderness because there was no wilderness."

Dennis Martinez (2003)

6.1 Introduction

As discussed in Chapter 1, the lens through which we view the world around us can have a profound influence on how we define it, interact with it, and how we view our place and role in the ecosystems in which we live. With regard to places we call "wilderness," Hende and Dawson (2002) offered a great deal of latitude in their suggestion that "wilderness is what we think it is." Who "we" are is a determinant of what lens we use to define the term "wilderness."

Whether on land or in the sea, some perceive wilderness as places of quiet solitude, of self-examination, of adventure and potential danger, of awe-inspiring vistas, places of challenge and renewal for body and spirit. They can be places of refuge for plants and animals from the ever-encroaching frontier of human development, places for ecosystems to function "naturally" outside of man's direct influence. They can be thought of as places that remind us of our culture's history and heritage, and what the natural world may have been like before humans arrived and established settlements. They can also remind us of what we have to lose if we do not set such areas aside, saving intact, wild areas from "civilization." They are places that we may visit to enjoy and appreciate, but they are not often where we live.

For others, however, they may be "home." They are places that provide sustenance for body and spirit, places they live in co-existence with nature, places to which they are deeply connected as a result of their ancestral heritage, places these cultures have continuously inhabited for sometimes thousands of years. This lens by which we view the environment around us is an important consideration in how we conceive the idea of wilderness, and ultimately how such areas are identified, established, and managed.

Ocean wilderness can be a useful tool in the marine conservation “toolbox.” It can provide a vehicle to protect special areas with wilderness qualities and values, responding to the public’s desire for such areas to be preserved. Setting aside areas that can be representative of how ecosystems operate largely outside the influence of man provides science with “control” areas (i.e. areas where, because of the relative lack of human influence, comparative studies can be conducted that offer the opportunity to better identify natural changes in environmental conditions apart from the impacts of human activities). Wilderness provides opportunities for appropriate recreational activities, and through this visitation offers opportunities for education and interpretation not only about wilderness, but larger marine conservation issues and challenges. It also can protect biodiversity and ecological integrity, perhaps offering, on a global scale, some hedge against the effects of climate change.

For those of the dominant culture, who are most often legitimately “just visitors,” additional ocean wilderness can supply many benefits and opportunities. But, for those who call wilderness “home,” their goals and aspirations for what ocean wilderness can provide is likely to be different, particularly as regards the use of wilderness resources for subsistence (Dear and Myers 2005). For Indigenous communities, what we call “wilderness” is a source of food and a way of maintaining long-standing cultural practices related to hunting, fishing, collecting medicinal herbs and other plants essential to the conduct of cultural ceremonies (e.g., Kliskey et al. 2003). For these people, preserving what we call “wilderness” is part of sustaining a way of life, an existence very much tied to that place and its natural and cultural resources.

The purpose of this chapter is to examine the different “lenses” through which ocean wilderness may be perceived, particularly as regards to Arctic Indigenous cultures. The chapter will begin with a critique of the wilderness idea from an Indigenous perspective and a discussion of the larger context of culture, race, gender, and class with respect to understanding perceptions of wilderness. It will discuss the history of conflict between Indigenous people and the dominant culture that came to their shores to colonize their homelands, bringing with them their own lens very much shaped by the biblical

concept of “dominion” (Nash 2001), and how this history is relevant today with regard to identifying and establishing ocean wilderness. The discussion will highlight the Indigenous experiences with marine resource stewardship, the potential implications of past Aboriginal tenure over ocean and coastal waters, the loss of these rights in the post-colonial world, and examples of how that experience has contributed to the successful, and not so successful, contemporary Indigenous co-management of marine areas. The role of traditional ecological knowledge (TEK) and what it can potentially contribute to effective conservation and management of ocean and coastal resources will also be addressed. A speculative scenario is provided offering insight into collaborative processes that might be used to establish wilderness waters in the Arctic within Indigenous “homelands and waters.” Finally, it will identify opportunities that may be provided by ocean wilderness for Indigenous communities, and how this legacy of conflict can be potentially overcome through active engagement of Indigenous communities in co-management of these areas.

6.2 “The Trouble with Wilderness”

The idea of wilderness is not without its critics. Cronon (1996), in his critique of how the idea of wilderness has evolved to become valued for its separation of humans and nature, spoke of the seeming paradox of wilderness as “other.”

Wilderness is not quite what it seems. Far from being the one place on Earth that stands apart from humanity, it is quite profoundly a human creation – indeed, the very creation of particular human cultures at very particular moments in human history. It is not a pristine sanctuary where the last remnant of an untouched, endangered but still transcendent nature can for at least a while longer be encountered without the contaminating taint of civilization. Instead, it is the product of that civilization and could hardly be contaminated by the very stuff of which it is made. Wilderness hides its unnaturalness behind a mask that is all the more beguiling because it seems so natural. As we gaze into the mirror it holds up for us,

we too easily imagine that what we behold is Nature when in fact we see the reflection of our own unexamined longings and desires. For this reason we mistake ourselves when we suppose that wilderness can be the solution to our culture's problematic relationships with the non-human world, for wilderness is itself no small part of the problem.

Cronon does not diverge from the idea espoused by Hendee and Dawson (2002) that "wilderness is what we think it is," but suggested that what many have come to think it is can only be achieved by this separation of man and nature, places we value because we are not despoiling them with our presence. His criticism is one seeking some middle ground, where man and nature are reintegrated, where our presence in wilderness is not viewed as a "problem," but as an essential part of what makes these places wilderness.

In suggesting that wilderness is "the very creation of particular human cultures at very particular moments in human history." Cronon (1996) identified an elemental part of the criticism of wilderness. The history of the evolution of the wilderness idea was constructed and nurtured largely by white men of wealth and power. These were scholars, scientists, writers and conservationists from the eastern US who saw the western frontier closing, the large tracts of undeveloped lands of the West beginning to lose their wild character. They sought to preserve some of the remaining areas still relatively untouched by civilization in their "natural state." These white men of power and influence represented the "particular human cultures" to which Cronon (1996) was referring, and the mid- to late-19th Century the "particular moments in human history." But what of the aspirations of other cultures, classes, genders and races that also had some stake in the evolving identity of wilderness?

This prevailing concept of the duality of wilderness, where man is not considered a part of nature, where wilderness is "other," could be considered the foundational element of the criticisms with regard cultural perceptions of wilderness. Many Indigenous cultures view the relationship of man and nature holistically rather than as man apart from nature (Colchester 1997). Kliskey et al. (2003), in their discussion of Maori perceptions of wilderness and nature, offered that:

These viewpoints see society as inseparable from the natural world, and indeed many of the wilderness areas that people from Western cultures consider to be “empty of civilization” are considered by indigenous people as part of their everyday life—both physically and spiritually. In Australia the post-colonial view of wilderness areas as *terra nullius*, or an empty land, is considered a fantasy by Aboriginal people for whom the concept has the effect of denying their cultural relationship with those landscapes (Langton 1998). These are homelands that are “known and loved, sung and recounted, owned and cared for to promote life” (Rose 1996).

This notion of the dualism underlying the prevailing concept of wilderness also has also received criticism from the feminist viewpoint. Vance (1997) stated that:

A basic tenet of ecofeminism holds that the patriarchal domination of women runs parallel to the patriarchal domination of nature (Warren 1994). Both women and nature have been controlled and manipulated to satisfy masculinist desires, we say; both have been denied autonomous expression and self-determination.

She further observed that “the idea of wilderness is “...an extreme manifestation of the general Western conceptual rift between culture and nature.” This dualistic concept of the human-nature relationship is:

a construction of patriarchal thinking that defines an Other in ways that serve patriarchal interests while marginalizing all manifestations of that Other which exist outside the desired norm” (Vance 1997).

An additional element of this feminist critique of the perception of wilderness as “other” is not simply the problem with duality itself, but the hierarchy that is imposed by it (Vance 1997). Tied to the idea of “dominion,” separating humans and nature in our conception of wilderness has the effect of subordinating nature. From the eco-feminist viewpoint, this implies the concomitant subordination of women within the dualistic perception of wilderness.

Fortunately, there is a growing acceptance of the idea that nature is comprised of linked “socio-ecological systems” (Berkes and Folke 2000). These systems are defined in a way that better integrates man as a part of, rather than apart from, ecosystems. This reconceptualization of the way we define the human-nature relationship may help to change the prevailing view of wilderness to one more consistent with these different cultural and gender perspectives (Kliskey et al. 2003).

DeLuca and Demo (2001), in their analysis of the implications of race, class, gender and culture on the evolution of the environmental movement in the US and its embrace of wilderness preservation as a central tenet, suggested that what these early advocates of the wilderness movement created was “white wilderness.” The “white” here refers to a “learned ‘knowledge system’ rather than a neutral physiological referent to skin color” (DeLuca and Demo 2001). Arising from a Eurocentric bias, the authors posited that these white, male founders of the environmental movement – with wilderness preservation at its focus – possessed perceptions and beliefs regarding the relationship between humans and their environment that were quite divergent from those who were less economically advantaged, and were of different races, cultures and genders. The resulting idea of wilderness, therefore, held little relevance to these other groups and created obstacles to “forge coalitions” across these race, class, gender and cultural divides necessary to implement effective solutions to environmental challenges.

During its first one hundred years, the environmental movement has been concerned, almost exclusively, with preserving pristine places. This narrow, class- and race-based perspective of what counts as nature leads the environmental movement to neglect people and the places they inhabit... (DeLuca and Demo 2001).

“What we think it is” has developed over time with implicit race, gender and class connotations (Cronon 1996); the “we” may be a significant element of society, but perhaps not as inclusive as it could or should be. DeLuca and Demo (2001) suggested:

The deconstruction of wilderness as a founding concept (of the environmental movement), the revealing of wilderness to be unnatural, is

not an argument for the abandonment of wilderness and preservation politics. It is to realize that an unquestioning embrace of pristine wilderness has political and social costs as well as benefits.

If wilderness preservation, including ocean wilderness, requires broad constituencies of support, the issue of relevance is of critical importance.

The matter of gender and wilderness has been a particular subject of discussion and analysis. At a fundamental level, the dominant culture's gender identification of wilderness has contributed to disenfranchising women from wilderness. Earlier in human history, wilderness was believed to be under the influence of female forces. "In ancient Greece, untamed nature was perceived as the domain of wild, irrational, female forces that contrasted with the rational culture ordered by males" (Colchester 1997).

Perceptions of the wild changed with the rise of the movement to preserve wilderness, becoming the domain of men; places men tamed nature, demonstrated their survival skills, hunted wild beasts, and to take from it what was needed to sustain them and their families (Olsen and Backes 2001). The "female" voice in wilderness was gradually lost, further disconnecting women from the wilderness that was once perceived as their domain.

Hessing (2004), addressed the issues of gender and wilderness preservation in Canada – but likely equally applicable to the US – and offered that:

Gender is a primary factor in the under-protection of Canadian wilderness. Conventional efforts to protect wilderness fail to resonate with the economic dynamics and cultural mosaic of contemporary Canadian society, especially as they are mediated by gender. The rhetoric, appeal, and implementation of wilderness protection do not acknowledge how social differences, especially gender, construct our perspectives of landscape. Gender remains unexplored as a potentially significant factor in the protection of the Canadian wilderness.

Further articulating the issue of gender and wilderness, the author suggests:

The notion of wilderness is not gender neutral. Wilderness areas have been traditionally portrayed as an arena of male activity, whether through exploration, combat, or subjugation. As wilderness has "historically been construed as a man's world, a woman entering into that domain may feel that she is trespassing beyond the boundaries of her gender" (Glotfelty 1996). Women are underrepresented and unacknowledged in the context of wilderness.

According to Hessing (2004), gender-based criticisms of the prevailing idea of wilderness are grounded in both the conceptual and the practical. The current paradigm of wilderness has been interpreted by some feminists critics as an outgrowth of the Western culture's perception of dualism or separation of nature and culture, and the larger political structure of domination of nature (Vance 1997), who offers:

Idealizing wilderness as 'pure' or 'perfect' nature ensures two things: first, that a privileged few will always be able to shake off the yoke of civilization ... and revert to a temporary state of primal purity where they can be appropriately humbled in the presence of God's creation, then return restored and refreshed to the challenges of the human world; and second, that the inferiority of all other expressions of nature will be reinforced, thereby justifying continuing domination of them.

“Wilderness protection in this sense becomes a means of appropriating wild spaces for the use of the privileged and a means of subordinating the wild to human ends” (Hessing 2004).

Economically, women are vastly underrepresented in the job market related to resource exploitation (e.g. logging, fishing, mining, oil and gas extraction), which are often conducted in places we perceive as wilderness (Hessing 2004). This tends to enhance the disassociation of women with wilderness and offers no alternative to traditional domestic roles women play in society. Even in other elements of the employment, or these traditional domestic roles, women are involved with work related to “the transformation of ecosystem products into socially consumable goods through the

basic provision of food, shelter and clothing” (Hessing 2004). In such work, such as fish processing or manufacturing involving wood products, the transformation of the resources of wilderness ecosystems into commodities further distances women from appreciation of the intrinsic values of wilderness (Hessing 2004). As Hessing concluded:

Women's traditional underrepresentation in the wild indicates the potential for identifying more complex and diverse understandings of a wilderness experience, derived from the experience of a variety of social locations - immigrants, First Nations, and other minorities. This social variation in wilderness experience already exists but remains unacknowledged, beneath the surface of a normative wilderness experience...Gender provides a lens to understand the alienation from wilderness experienced by many women as a product of social subordination, patriarchal control, and cultural domesticity.

Specific issues regarding race have been addressed in Chapter 3. Clearly, many of the criticisms related to the need for inclusiveness in establishment and management of wilderness are all important and relevant. Seeking out and listening to all citizens, notwithstanding their race, class, gender or cultural affiliation is not only essential, but can make wilderness more meaningful to the all who value these areas. In a democratic society, no voice should be left unheard, or fail to give all perspectives given due consideration.

DeLuca and Demo (2001) provided a lengthy analysis of John Muir's writings and strong advocacy on behalf of wilderness preservation, and of the wilderness photography of Carleton Watkins. The essence of these authors' criticism is that both Muir and Watkins established the foundations for the conceptualization of ideal wilderness as being a place where man is nowhere in sight. They “sold” this idea to other “white men” who would use their power and influence to preserve this sort of wilderness. Muir was the son of a minister, and a devout man himself, so it is unsurprising that he spoke of the wilderness as sacred places (Nash 2001). Watkins was a preeminent nature photographer of the period, sought to capture the grandeur and awe of the wilderness

areas he visited to share these visions of wilderness with others. Clearly, both these wilderness pioneers were men of their time, and they pursued, and were sought out by, the people who had power and influence to achieve their goals. From a practitioner's perspective, this is little different than the effective advocacy of today, targeting key messages to those who have the power and influence to implement a vision. Perhaps, as men of their time in history, they were not attuned to issues like cultural, racial, class or gender inclusion. Their goal was solely to make a compelling case that wilderness was disappearing and some of it should be preserved. Through the lens of today, their pursuit of this goal may have been somewhat myopic in terms of race, gender, culture, and class, and important perspectives regarding wilderness may not have been heard at the time. While contemporary critics may be justified saying that what we have preserved is flawed and potentially irrelevant to many in modern society, vast areas of wild lands were preserved as a result of the work of these wilderness pioneers, and the efforts of many others, and more are being added. The wilderness areas that have been preserved offer a form of "option value" for becoming more relevant to these important constituencies.

If there is one key finding in this research, it is that the US Wilderness Act – and other similar wilderness statutes – has been and continues to evolve. Perhaps greater inclusion will occur as the laws and practice of wilderness preservation evolves and adapts. Wilderness managers, scientists and advocates of today, who are more diverse at least in gender based on the demographic results of the Ocean Wilderness Survey reported in Chapter 3, and the idea of relevance of wilderness and issues of gender, class, race and ethnicity is much more at the forefront than it was when the wilderness movement was beginning. It is the duty of those that currently implement these wilderness preservation programs to actively seek out these originally overlooked voices and perspectives to insure that what wilderness being preserved becomes more relevant and meaningful to all citizens.

The world has changed since Muir wandered the wilderness and wrote so passionately about what he observed, and since Watkins captured the natural beauty of

Yosemite in his images to share with the world, and our laws change with it. If what is being preserved as wilderness is not relevant to today's society, managers of wilderness programs will, being deeply committed to continuing the work of wilderness preservation, will listen and adapt to make wilderness more relevant. Civil society has vested the responsibility to establish and manage wilderness areas with these program managers, and they take this responsibility seriously. Potential enhancements of the wilderness systems like ocean wilderness may be a useful and appropriate vehicle to facilitate this evolution. As we collectively expand our concept of what we believe "wilderness" is, we might also take the opportunity to better define and articulate in a more open, transparent, and inclusive way, how we incorporate this broader cultural perspective.

More effectively including consideration of race, class, gender and culture in our deliberations regarding wilderness identification, establishment and management is essential. To make wilderness meaningful to these different cultures and people, all perspectives must be acknowledged and integrated into the processes that identify what we preserve as wilderness, and how what we have collectively chosen to preserve is afforded effective stewardship.

For the geography of particular interest in this research, the North American Arctic, it is Indigenous cultures and communities, how they perceive and value wilderness, and what role they might play with regard to identification, establishment and management of ocean wilderness that is of particular interest. Indigenous communities have a long history of stewardship of ocean and coastal waters, but also of conflict arising from colonialism, dispossession, and deprivation. It is a history that has left a legacy of challenges, mistrust, and skepticism.

6.3 Overcoming a Difficult History

Nash (2001) provided a detailed and comprehensive discussion of the origins of the idea of wilderness from the earliest conceptions to the current status. Particularly in North America, the early wilderness movement was, as mentioned above, driven largely

by intellectuals, writers, politicians, and conservationists who, seeing what human development can do to “tame” the wilderness that once existed in the Eastern US, sought to protect largely wild areas of the western frontier from a similar fate. In their enthusiasm to provide what has come to be known as “an enduring resource of wilderness,” they stipulated – given the prevailing perception of wilderness at that time – that the appropriate place for man in the wilderness was as “only a visitor.” While we collectively gained much in the systematic preservation of wilderness in the US, through the passage of the Wilderness Act of 1964 and the establishment of the National Wilderness Preservation System, this did not come without a cost. As chronicled by Catton (1997) and Spence (1999), the establishment of formally designated wilderness was accomplished in many if not most cases through the dispossession of Indigenous groups who had called this wilderness “home” for hundreds and sometimes thousands of years. While much was achieved in setting aside and preserving wilderness as viewed through the historical lens of the dominant culture, for the Indigenous communities that were expelled from their homelands, the wounds were deep and devastating, leaving scars that remain today. These cultures were not just subjected to physical dispossession from their homelands and resources. There was a deeper cultural impact, described as “symbolic obliteration from the landscape – their removal from its history, memory, and representation” (Schama 1996, cf Brockington and Igoe 2006). Compounding the cultural, economic, and social impacts of dispossessions, Indigenous groups generally faced significant discrimination and deprivations at the hands of the dominant culture, were often prohibited from speaking their native languages and practicing their traditional ceremonies and customs, and generally experienced what some in the Indigenous community have described as the “Native American Holocaust” (Brave Heart and DeBruyn 1998). Seeking meaningful collaboration and fostering an atmosphere of trust with such communities represents a formidable challenge.

The idea of wilderness has begun to evolve in a way that may help to heal these wounds, to redress the grievances of those who lost their homes and homelands, who suffered “collateral damage” in the battle to preserve wilderness. Outside the US many

countries, including Australia, New Zealand, and Finland particularly, have established the preservation of Indigenous cultures as one of the core principles of their wilderness programs (see Chapter 2). In the US and Canada, greater recognition of subsistence uses of wilderness has been, to some degree and in some places, formally integrated into wilderness laws. Co-management of natural and cultural resources in wilderness and other protected areas is emerging as a way to engage the Indigenous communities in preserving these areas, to honor and recognize the deep connection of these people to the places they call “home.” Given this long history of stewardship and deep connection to place many in Indigenous cultures possess, wilderness established in ocean and coastal waters may provide an opportunity to promote this healing and to improve and enhance our effective preservation of these areas for the benefit of all as part of the “enduring resource of wilderness.”

6.4 Traditional Indigenous Marine Resource Management

There is strong historical evidence to suggest that management of ocean and coastal resources did not begin with the arrival of western colonists (Cinner 2007). Indigenous communities managed the marine and coastal places they have inhabited and used (Cinner 2007, Dwyer 1994, Johannes 2002) for sustenance and subsistence since when they arrived (although also likely went through the same cycle of “survival-overexploitation-conservation” after they arrived). In many cases, this management was highly organized and effectively implemented. It was based on deep knowledge of these places from, in some cases, thousands of years of presence in that place and long experience with the cycles of life that support and sustain the lives of these people. There are many examples of such “customary management”: temporary closures, fallow rotation, gear restricted areas, and permanently closed areas (Cinner 2007). Customary management systems could be dynamic and adaptive to changes in both social and ecological conditions (Berkes et al. 2000, Cinner et al. 2007). Cinner (2007) observed that:

Customary management systems have been effective at meeting both conservation goals...and community goals...while achieving high levels of compliance without active enforcement patrols...they frequently possess...effective governance institutions that induce compliance, including the demarcation of boundaries of resources and user groups, mechanisms for conflict resolution, sanctions for violators, adaptability to social and ecological conditions.

Berkes (1999) [summarized and adapted from Johannes (1978)] identified a wide variety of traditional marine conservation measures implemented by Pacific islanders, including permanently closed fishing areas, seasonal closures, allowing a portion of the catch to escape, holding excess catch in fish ponds, bans on taking small fish and invertebrates, limiting some fishing to emergencies, restricting harvesting of seabirds and eggs, gear limits, and bans on disturbing or taking nesting sea turtles. There is little doubt that sophisticated and complex management systems were being implemented by many Indigenous communities before first contact. Many of these management systems encompassed both land and sea. The Native Hawaiian *ahupua* (described in Kliskey et al. 2009), which provided protection and management of areas from the mountaintops to the seaward edge of the fringing reefs, is an excellent example of what is currently called “integrated coastal management.” The similarity of this Native Hawaiian integrated management to one of the key findings of the Ocean Wilderness Survey (Chapter 4), the concept of “wilderness-adjacent waters,” is worthy of special emphasis here. Expanding protection of the land to the adjacent coastal waters is not without historic precedent.

The “high levels of compliance without enforcement” mentioned by Cinner (2007) is also particularly notable given the considerable resources applied to enforcement in marine protected areas today, but perhaps not unduly surprising. Prior to colonial occupation, such coastal and ocean waters were considered to be under a form of village, family or other kinship ownership, what is defined as “customary sea tenure.” The bonds created by these kinship, family and village relationships were strong in comparison to those in evidence among the current transient “mobile society” of the

dominant culture in most coastal areas, and compliance with rules established by families or villages was simply presumed. When survival is at stake, breaking the rules can have dire consequences.

6.5 The Rise, Demise, and Resurgence of Customary Sea Tenure

“Customary sea tenure” (CST) has been defined (Ruddle 1996, cf Aswani 2005) as where “particular groups of people (e.g., individuals, clans, tribes, etc.) have informal or formal rights to coastal areas and in which their historical rights to use and access marine resources are, in principle, exclusionary, transferable, and enforceable either on a conditional or permanent basis.” Aswani (2005) further explained: “entitlements to sea space are not only characterized by rights to geographical space but can also encompass rights to specific habitats, technologies, and species, or a combination of these.” CST was not widely recognized by arriving colonists because it conflicting with the dominant culture’s perception of the “commons” status of these waters. Private ownership by an individual, family or village was, and remains, very uncommon in Western culture. Additionally, CST was conferred to these groups orally by tradition or sovereign grant and these “transactions” were usually not written down or documented (Cordell 1989).

As summarized by Cordell (1989), formulation of the concept of common ownership of the sea is attributed to the work of Dutch legal scholar Hugo Grotius. In 1604 in his treatise *Mare Liberum*, Grotius proposed that the sea was too vast for countries to effectively retain and enforce any sovereign rights over their coastal waters – beyond the effective range of a cannon shot, approximately 3 miles (Prescott 1978 cf Cordell 1989) – and that ocean resources were, at that time, believed to be inexhaustible. Therefore, all people should have the right of access. A contemporary of Grotius, British barrister John Selden, countered with another perspective, which was published in 1635 as *Mare Clausum*. In this work, Selden maintained – quite presciently given the situation today – that coastal waters (beyond three miles) should be retained under sovereign ownership because the fisheries resources there would be exposed to overexploitation. While this debate may have been a “tipping point” for the issue of “freedom of the seas,”

Cordell maintained that this argument was largely determined. Common ownership of the seas was already a part of accepted law and practice in the “developed countries” of the period. As most of the people who possessed CST were in remote places and many had not yet experienced first contact, they were oblivious to this idea of common ownership, at least of the type in force in Western societies. Once colonial powers came to their shores, however, CST was almost entirely ignored. The marine resources in these areas were too valuable for exploitation to be exclusive to the local Native community. Notable here is that this colonization may have resulted in degrading the natural resources of many areas previously subject to CST (Johannes 1978). When new settlements were established, the primary concern of the new inhabitants was necessarily focused on the immediate need of survival in what was an unfamiliar environment. Finding and taking as much fish, game, and wild edible plants as possible to provide sustenance for the new inhabitants was essential. Considering that the existing Indigenous community would have continued to fish and collect food from the same area, this collective level of resource extraction was, ultimately, not sustainable. It is highly likely that longer-term conservation of these resources was not even considered until settlements were well established, and the consequence of this overexploitation was unsustainability.

Today, CST can be an important consideration in deliberations over Indigenous land and sea claims. Governments, and particularly the courts, in countries such as Australia, New Zealand, and Canada, are recognizing CST in both new legislation and settlements of sea claims (Robinson and Mercer 2000). Many Aboriginal communities have been and are currently engaged in extensive historical and anthropological research to identify suitable documentation of these CST arrangements to offer as evidence of this past ownership and management of ocean areas subject to claims. Laws have been passed and are being implemented in these countries, largely driven by court decisions regarding Aboriginal claims, that recognize limited sovereign rights largely related to harvest allocation but also to participation in resource management (Robinson and Mercer 2000). Claims of ownership rights and self-determination regarding coastal lands

and waters have great potential in driving the engagement of Indigenous communities in identifying and preserving the values and qualities of these areas they consider important. This may offer opportunities for identifying and establishing wilderness as part of that engagement.

6.6 Traditional Ecological Knowledge

Indigenous cultures often possess deep knowledge and wisdom which potentially represents an extremely important source of place information. This knowledge system has been described as “traditional ecological knowledge” or “TEK” (Kliskey et al. 2009), and sometimes referred to as “Indigenous knowledge” or “IK” (Slikkerveer et al. 1995, cf Berkes 1999, Wohling 2009). The ocean and coastal resource management frameworks arising from CST were largely based on this knowledge gained through long experience of sustaining these communities on the resources available to them in that place.

Berkes (1999) defined TEK as “a cumulative of knowledge, practice, and belief system.” It evolved by adaptive processes and was handed down through generations by cultural transmission. TEK focuses on the relationships of living beings (including humans) with each another and their environment.” TEK can include, but is not limited to, important information regarding the location and ecological importance of habitat areas and species, phenology of resident and migratory species, population estimates, exploitation patterns and historical trends, but also the belief systems that surround these relationships between humans and the ecosystems in which they live and subsist (Berkes et al. 2000, Turner et al. 2000).

There is growing interest regarding TEK in marine conservation (Drew 2005, Tibby et al. 2008), However, the widespread use of these knowledge systems has been limited by a number of factors. These include the reluctance of Indigenous groups to share parts or all this knowledge (Drew 2005, Huntington 2000), and unfamiliarity and discomfort many researchers and managers have with engaging in an effective cross-cultural dialogue required to obtain such knowledge (Huntington 2000). Huntington further observed that “...issues of ownership and control over use of TEK sometimes

arise,” and that the time it may take to develop sufficient relationships based on mutual trust and respect with Indigenous communities to effectively integrate TEK is always significant. There is also some reluctance on the part of the scientific and management community to accept TEK as valid and useful given that it is based on a knowledge system quite different from that routinely relied upon to support science and management.

As Huntington (2000) importantly cautioned, “TEK, like other forms of knowledge (including science), is sometimes wrong. Such errors may be due to misinterpretations made both by observers (e.g., informants) and by collectors of information (e.g., managers and researchers),” and concludes:

Unquestioning acceptance of TEK is as foolish as its unquestioning rejection... TEK should be promoted on its merits, scrutinized as other information is scrutinized, and applied in those instances where it makes a difference in the quality of research, the effectiveness of management, and the involvement of resource users in decisions that affect them.

As discussed above, the challenges to effectively integrating TEK into MPA and wilderness waters designation and management are some of the same challenges faced with integrating TEK into natural resource management generally, discussed in considerable detail in Kliskey et al. (2009). In a recent literature review by Bohensky and Maru (2011), regarding efforts to integrate TEK over the last 40 years, the authors provide some recommendations relevant to this discussion. To improve the integration of TEK, they offered four key findings:

- 1) New “frames for integration” need to be developed, where both knowledge systems should to be valued for what they contribute and not diluted when combined;
- 2) “Social context, including politics and power,” need to be carefully considered;
- 3) Evaluation should go beyond scientific processes of validation; and,

4) Inter-cultural “knowledge bridgers,” those who possess deeper knowledge of both systems, should be actively engaged in these processes.

TEK is an entirely different knowledge system from Western scientific knowledge and, while there are many obstacles in attempting to find common ground with the modern scientific and management community in its integration, it has the potential to offer, at a minimum, an excellent observation-based, long-term, place-specific database to support effective management.

While recognizing the potential importance of TEK, particularly to enhance knowledge of “place” for protected areas, Wohling (2009) offered some caveats. Expanding on Huntington’s (2000) caution that all forms of knowledge should be critically evaluated and scrutinized, Wohling posited that it is not the knowledge itself, but the interpretation of it that creates the greatest challenges:

Nonindigenous interpretations of indigenous knowledge have propelled us toward reified meanings, abstracted concepts, and an information-based taxonomy of place. The result can be the diminishing and ossifying of a dynamic living practice and the failure to recognize expressions of indigeneity in contemporary forms.

As with the myth of the “noble savage,” Wohling argued that some have become overly enthusiastic regarding TEK and its potential contributions to natural resource management. Like any other group, Indigenous people may or may not make good natural resources management (NRM) decisions:

Nonindigenous people, anxious to assign some form of useful role to indigenous people, have refused to acknowledge that indigenous people also express agency through disinterest and nonparticipation. I argue that part of accepting the role of IK in NRM is also accepting that not all indigenous people possess IK, not all IK is valid, and not all indigenous people are interested in IK or in becoming natural resource managers.

Wohling’s key point was that IK is not adapted to the scales and kinds of disturbances that contemporary society is exerting on natural systems.” It is acquired and passed on to

subsequent generations for places usually with limited geographies.

It is this very localness, boundedness, and fine-scale focus that makes IK highly intuitive and thus often lacking in the counter-intuition that is the cornerstone of modern ecological science and necessary for operability at the large scale.

Increasingly, the impacts that must be addressed in natural resource management are exerted over large geographic scales (e.g. global climate change). Many of the species that require the most attention are those that have regional and continental-scale migrations. What is happening in a particular place can be important, even critical, and can offer some insight into this larger picture, but it may be a very small and localized expression of that impact. Wohling cited the example of Green sea turtles in Northern Australia, where:

Coastal indigenous people have a sometimes profound knowledge at the estate level, for example the natural history of the Green turtle (*Chelonia mydas*)...they have limited understanding of the broader life histories of this species such as the long-range migration routes and the genetic relationships between international populations.

Taking this example a step further, Wohling suggested:

It is through the work of combined science and IK projects that indigenous people now have a broader understanding of the complexities of the life history of *C. mydas* and the threatening processes that confront it. IK alone is unable to operate at the enormous scale required to conserve and manage such a migratory species.

The true promise of TEK, Wohling suggested, is in its effective integration with contemporary science and scientific inquiry, and to recognize the real value of the evolving nature of Indigenous knowledge as part of this integration. He concluded:

Indigenous societies adapt and evolve in response to colonization. As indigenous people continue to evolve and adapt their knowledge of postcolonial landscapes, hybrid knowledge, derived from a mix of

indigenous and nonindigenous knowledge is created. I argue that the preoccupation with the search for authentic IK has been something of a yellow brick road. What can be transferred between generations is the summary codified information about a particular plant or animal but the ecology of the plant or animal species in question must be learnt experientially by each generation in situ over time. Consequently, I would argue that 30-yr knowledge is not the same as 2000-yr knowledge. The older knowledge, codified as information in a summary form is passed to the next generation who then interpret it based on current conditions. What requires recognition is the way indigenous people adapt to change by absorbing new understandings of their estate. These new forms remain a valid expression of contemporary indigeneity. It is frequently nonindigenous people who insist on framing indigeneity and IK through the lens of the past and then attempt to extrapolate this authentic knowledge out as universal axioms or truths.

What Wohling seems to be suggesting here is closely analogous to the “shifting baselines syndrome” concept originated by Pauly (1995). Our observation of the current state of an ecosystem can profoundly affect our interpretation of its structure and function. Indigenous observers are likely to be equally subject to this phenomenon, and their interpretation of TEK may be influenced, perhaps significantly, by what they observe now in comparison to how that system has changed over time.

While Wohling’s cautionary tale about TEK and its use are certainly valid and worthy of serious consideration, the potential importance of TEK for “place-based” protected areas, like ocean wilderness, is precisely the “localness, boundedness, and fine-scale focus” of TEK that potentially makes it valuable. Information specific to that place is usually the missing element in the protected area manager’s knowledge base. Careful extrapolation of data and information from other areas can offer insights into ecosystem structure and function, but it relies on inference rather than relevant site-specific knowledge. The collaborative integration of TEK with contemporary scientific research,

monitoring and characterization, much in the manner in which Wohling has suggested TEK itself evolves, seems an appropriate model for optimal use of TEK for place-based management.

This issue of colonialism is another important lens through which the interaction between dominant cultures and Indigenous groups should be viewed. A recent review by Cameron (2012) discussed and critiqued the legacy of colonialism on research and policy development in the Arctic, with particular focus on research regarding vulnerability and adaptation of Arctic Indigenous communities in response to climate change. Cameron warned of “perpetuating the delimitation of Indigenous peoples to the ‘local’”. By limiting the legibility of the Indigenous geographies to the realm of the ‘traditional’” is a frame of reference that arises out of the dominant culture’s colonial past. In adopting this lens, “the very act of aiming to diagnose and mitigate Inuit vulnerability to climate change” causes researchers and policymakers to fail “to account for the most significant and pressing dimensions of climate change in the region,” including oil and gas exploration and extraction, mining and shipping.” She offered the conclusion that:

Even scholars who conceive of themselves and their work as a response to colonialism must reckon with the tradition within which they operate, and with potential continuities between recent interest in Indigenous peoples, knowledges, and experiences, and past exploitation and domination... (such research) risks perpetuating colonial assumptions, knowledges, and practices...as it aims to improve the lives of Indigenous northerners. It does so by perpetuating a longstanding delimitation of Indigeneity to the local and traditional, by rendering climatic change a field of technical intervention, and by excluding from its frame of reference the broader colonial and political-economic context within which northern Indigenous peoples struggle to respond to climate change...Such a move, however unwitting, is profoundly consequential.

To help overcome this challenge, Cameron recommended, as one potential (“very complex and contested”) solution, engaging in partnerships between Indigenous and non-

Indigenous researchers when addressing such questions as adaptation and vulnerability, keeping in mind that “such partnerships do not necessarily release non-Inuit researchers from their positions as inheritors of colonial systems of knowledge and practice.”

Despite the considerable challenges to effectively integrating TEK, there have been a number of successful collaborations that demonstrate the value of such efforts. One of these involves the establishment and early work of the Alaska Eskimo Whaling Commission (AEWC; Freeman 1992, Freeman 1989, Huntington 2000).

As detailed in Huntington (2000), when the International Whaling Commission (IWC) proposed a ban on the harvest of bowhead whales, the Inupiat hunters from the villages of the Arctic Alaska coast came together to form the AEWC to preserve their subsistence use of this resource. A critical element of the debate regarding the proposed ban related to the status of the bowhead population, which had been determined, through scientific census methodologies, to be around 2000-3000 individuals. Based on their experience, the hunters believed that this population estimate was low, that the actual population was around 7000 individuals, and this difference was a result of the methodologies employed by scientists to arrive at the population estimate. This methodology involved shore-based observations, and the hunters believed that the assumptions used by the scientists in this census (i.e. that all migrating bowheads were observable from the onshore observation areas, and that if there were no open leads in the ice, that the whales would stop migrating) were invalid. They based this opinion on their long experience travelling far out on the pack ice during the whale migrations, and routinely seeing whales in these offshore areas where there were leads in the ice, but too distant from coast to be seen using the existing shore-based methodology.

The AEWC recommended that they supplement the census with both aerial surveys, to extend the observations to offshore areas, and to use acoustic monitoring, to document continued migration of whales under the ice when no leads were observable from shore. This expanded methodology was implemented when the census data was collected to update the population estimates, in the early 1980s, and the findings of this survey confirmed the whalers' knowledge as accurate. The updated census data for

bowhead whales was estimated at between 6000-8000. Armed with this new information, the AEWG was able to convince the IWC to establish a quota rather than an outright ban on taking bowheads. Clearly, the integration of the TEK possessed by the Inupiat whalers was instrumental in not only making the population estimates more robust, but in preserving the subsistence harvesting opportunities for the communities of the Arctic coast of Alaska.

A second example of what might be considered successful integration of TEK also relates to the Arctic and the subsistence harvest of beluga whales, as discussed by Huntington (2000) and Fernandez-Gimenez et al. (2006). Recognizing the crisis situation created by the IWC's proposed ban on bowhead whale harvest, beluga hunters in this region hoped to avoid a similar situation through the creation, in 1988, of the Alaska Beluga Whaling Committee (ABWC). The ABWC is comprised of:

Alaska Native hunters, scientists and agency managers...with the goals of maintaining healthy beluga whale populations, providing for adequate subsistence harvest of beluga whales and protecting hunting practices of Alaskan subsistence hunters.” (Adams et al. 1993; Alaska Beluga Whale Committee 1995, cf Fernandez-Gimenez et al. 2006).

The major focus of the ABWC has been the effective integration of Native beluga whalers into the research that supports the management of this species. According to Fernandez-Gimenez et al. (2006), the Committee addressed five areas of research: population estimates and trends, harvest levels, migratory behavior, stock identity and TEK studies. In each of these areas, the whalers have actively participated in the conception, conduct, analysis and reporting of the findings of this research, and throughout has contributed their TEK to guide and inform the work of the Committee. For example, given the importance of stock estimates and quota allocation, this was one of the first areas of collaborative research pursued by the Committee.

After the research plan had been developed by the Committee, the whalers played an important role in the conduct of the research. As summarized by Fernandez-Gimenez et al. (2006):

Starting with the limited data available from earlier studies, ABWC scientists worked with native villagers to learn from them when and where belugas usually appeared in their areas and when they were hunted. A rotating series of aerial surveys was conducted to cover each provisional management stock of belugas. Hunters often accompanied the survey team and provided advice on when and where to fly in order to locate belugas. Some hunters interviewed felt that their advice had not been heeded, in part because the logistics of scheduling the aircraft or the maintenance of a statistically valid research design constrained the flexibility of the surveyors.

While clearly not without challenges, the research was conducted with active participation of the whalers, scientists and managers. Once the results were obtained, the ABWC reviewed the data and further commented, and sometimes challenged, the findings but ultimately determined that “it was useful information and that the estimates to date largely supported their contention that beluga stocks in northern and western Alaska were healthy” (Fernandez-Gimenez et al. 2006). The authors further reported that “The population estimates were used by the National Marine Fisheries Service (NMFS) to develop stock assessment reports, on which management decisions were based, and in which ABWC was credited with providing essential information.” Similar contributions of TEK were documented by Fernandez-Gimenez and co-workers with regard to other research conducted by the committee, including genetic analysis of populations, satellite telemetry, and other highly sophisticated scientific research methodologies.

Fernandez-Gimenez et al. (2006) included a lengthy discussion of the challenges and dissatisfaction expressed by Committee members on process, organization, and how valued they perceived their contributions to the work of the Committee were to other participants. It could be argued that this case study may not represent a fully successful example of TEK integration, but it appears that the traditional knowledge of the Native participants was being actively, if sometimes indirectly, included and had a significant effect on the research and management of beluga whale populations in Alaska. The

authors concluded that:

The ABWC appears to be a strong example of the way in which a co-management organization can provide opportunities for relationship-building and joint action, particularly joint inquiry about beluga populations. These joint research activities in turn have reinforced communication and trust among participants leading to increased commitment to and involvement in research by hunters, and increased appreciation for and use of TEK by scientists and managers.

Both of these examples address integration of TEK within the context of co-management. They offer “lessons learned” both regarding the potential value of TEK in these collaborative management frameworks and the challenges faced and opportunities presented in seeking effective integration of these very different but potentially complementary “knowledge-practice-belief systems”.

Indigenous co-management may represent one potential mechanism for incorporating such knowledge into marine protected area and wilderness waters management. These ancient rights of ownership, and the long history of effective Indigenous community-based resource management are becoming more widely recognized by countries around the world, particularly those in Oceania and Australasia (Aswani 2005, Aswani and Hamilton 2004, Bess 2011, Capistrano 2010, Carter and Hill 2007, Cinner 2007, Cinner et al. 2007, Foale et al. 2011, Gorman et al. 2008, Grant and Miller 2004, Robinson and Mercer 2000, Turner et al. 2007, Vierros et al. 2010, Yandle 2007). To ignore or dismiss this different but potentially valuable deep knowledge of ecosystem structure and function would be not only illogical but impractical, where the effectiveness of natural resource management is so inextricably tied to our knowledge of such systems. As Sun Tzu observed in “The Art of War,” “Unless you use local guides, you cannot get the advantages of the land.” (<http://suntzusaid.com/>). For the purposes of this discussion, the focus will be on the US and Canada, where treaty rights, territory settlement agreements, and broader government recognition of Indigenous rights with

respect to access through co-management to ocean resources is increasingly being addressed.

6.7 Current Indigenous Co-Management in US and Canada

To be fully successful in expanding wilderness preservation in the Arctic to include wilderness waters, co-management is likely to be an important element of the necessary engagement with Indigenous communities of the North. Given the strong desire for Indigenous self-determination and ownership claims for vast land and sea areas in this region, it is unlikely that any effective place-based preservation will be effective without some shared decision making authority over these areas.

There is broad recognition of the value of public engagement in increasing the effectiveness of environmental management generally (Reed 2008), particularly with regard to the designation and management of protected areas (Dalton 2006). While this engagement can take many forms and involve various levels of shared decision making, when the major players involved have been vested with special rights and access to the areas and resources of these protected areas, some co-management arrangement is likely to be given serious consideration. Where Indigenous communities are involved, where such communities possess particular sovereign rights related to access to the area and some institutional role proscribed in legislation or government-to-government agreements, co-management is likely the governance mechanism of choice.

“Co-management is defined here as a formal or informal arrangement through which natural resource decision making authority is shared by resource users and government management agencies” (Pinkerton 1989). While co-management can be embodied in more informal relationships, it should engage all parties involved in a meaningful way in shared decision making. Summarizing Fernandez-Gimenez et al. (2006), essential functions of co-management include:

- 1) effective natural resource management
- 2) preserving and fostering cultural integrity and harvest efficiency
- 3) offering process and equity

- 4) data gathering and analysis for understanding the state of the resource
- 5) knowledge building and understanding of resource and ecosystem dynamics

In essence, co-management involves shared decision making, meaningful engagement, and each party bringing to the table their best knowledge, whether TEK or scientific, and a willingness to achieve consensus on management actions. Like all collaborative efforts, co-management succeeds or fails as a result of the trust and mutual respect that the people participating develops over time (Gilmour et al. 2011, Stern 2008).

In some of these places, the Indigenous community is the dominant culture and their “homeland” is a place they may have inhabited for millennia. The issues of concern to that community may be principally linked to their perception and continued use of that area largely within the context of their culture and heritage. Other places may have a more “mixed culture” of Indigenous and non-Indigenous people who do not possess the same depth of shared history and heritage. This makes the scope and complexity of any co-management framework established significantly broader and potentially more controversial as the Indigenous community may possess certain rights and privileges by law or tradition that others in the community may not. For purposes of this discussion, the focus will be where the Indigenous community is the “dominant culture” in the sense that nearly all the people of that community possess Indigenous ethnicity, that community leaders are largely from this population, and they share a common Indigenous cultural heritage. The participants in co-management governance mechanisms implemented will more likely be focused on Indigenous perceptions, values and uses particular to their rights, interests and culture. Many of the issues, challenges and opportunities discussed, however, may be applicable to the broader “mixed” communities.

While the US and Canada have established a number of Indigenous co-management arrangements for areas of the ocean and coast, few could be considered fully successful in terms of providing meaningful shared decision making. While this may be a function of the relatively short history of co-management in North America – perhaps

only a few decades (based on the information and published literature reviewed for this discussion) – it is also likely to be a consequence of the reluctance of either the Canadian or the US governments to convey sovereign maritime rights to Indigenous people (Valencia and VanderZwaag 1989). Such reluctance may imply to the Aboriginal community a sense that these governments are not committed to true co-management, which can undermine the relationship of trust and mutual respect co-management must possess in order to be fully successful. While it lags behind Canada’s greater, albeit still limited, achievements in this arena, there are also examples of Indigenous co-management in the US.

The US recognizes “Indian Tribes” as “sovereign governments” but also defines them as “domestic dependent nations under its protection” (both contained in EO 13157) which seems internally contradictory but perhaps hints at one of the underlying inconsistencies that makes tribal coordination in the US a challenge. Executive Order 13175 of November 6, 2000 states that, as a matter of policy of the US Government, “the United States recognizes the right of Indian tribes to self-government and supports tribal sovereignty and self-determination.” Both this Executive Order, and a subsequent Presidential Memorandum of November 5, 2009, establish and reinforce the policy that the relationship between the US Government and Tribes is “government to government,” and Federal agencies must formally and effectively consult in a “meaningful and timely” manner with tribal governments when “policies with tribal implications” are proposed.” Whether the tribes believe they are being consulted in a “meaningful and timely,” “government to government” manner is unknown. The Presidential Memorandum of 2009 directed Federal agencies to develop consultation policies, and many of those have only recently been adopted, but perhaps the fact that the President would specifically direct the agencies to take this step speaks to the issue of past effectiveness.

A number of case studies from the US and Canada have been assembled, discussed below, that help to demonstrate the potential effectiveness, and shortcomings, of the co-management process as it being implemented with Indigenous communities. Information regarding these particular examples was collected from published sources,

including descriptions and evaluations provided in the primary literature, analyses and descriptions available on the Internet, and agency publications. Many of the observations regarding the effectiveness of these arrangements are from the author's personal experience, collegial interactions with the managers of these sites, and from having spent time at a number of these protected areas learning about the way in which these co-management agreements function in practice.

6.7.1 Olympic Coast and Northwest Hawaiian Islands

There are no formal Indigenous co-management relationships for MPAs, or ocean wilderness, in the US. Kliskey et al. (2009) identified two collaborative programs that represent limited and incremental steps possibly toward co-management. NOAA's National Marine Sanctuary System has established an Intergovernmental Policy Council for the Olympic Coast National Marine Sanctuary involving four treaty tribes, the State of Washington and NOAA to foster greater collaboration among these governments. The Sanctuary System has also created mechanisms within the management framework for Papahānauōkū Marine National Monument (PMNM) to foster greater collaboration with Native Hawaiians at that site, which was designated in large part because of the great cultural significance of this place to Native Hawaiians. This is considered "significant and meaningful engagement" in PMNM management by the National Marine Sanctuary System and some, although not all, Native Hawaiians. Neither of these arrangements is true co-management as the decision making authority is held by the government agency partners, but they do represent a possible path toward this goal.

6.7.2 Alaska

There are twelve formal co-management arrangements in Alaska that address subsistence harvesting of marine resources (Marine Mammal Commission 1998) including bowhead whales, walrus, sea otters, and beluga whales. While this report of the Marine Mammal Commission does not discuss the effectiveness of these co-management initiatives, Metcalf and Robards (2008) offered some insights into this in

their discussion of the challenges faced by the US Eskimo Walrus Commission. They reported that there remain some fundamental differences in goals between the Commission and its Federal co-manager, but provide few details. Fernandez-Gimenez et al. (2006) conducted an analysis of the integration of TEK into the work of the Alaska Beluga Whale Committee and found that while some integration is being achieved, Native hunters involved believed that the science being used constituted “a tool of state control.” Clearly, the US has made a number of attempts to implement Indigenous co-management, but tangible success continues to be elusive.

6.7.3 Inuvialuit and Nunavut

There are more examples of successful Indigenous co-management in Canada than in the US in terms of recognizing the rights of Indigenous people and fostering a sense of collaboration with land and ocean protected areas management agencies. Some of these may involve coastal and ocean waters that have been designated as wilderness, but it is unclear if this is the case (see Chapter 5). However, as most of these lands and waters are in the Arctic, they can be presumed to possess wilderness qualities and attributes.

There have been a number of very important legal decisions, summarized by Houde (2007), that have led to this greater number of apparent successful Indigenous co-management arrangements. Based on personal experience of having worked with Indigenous groups and protected areas programs both in the US and Canada, it is my assessment that there is a considerable difference in perspective between these two countries regarding the perception of the potential viability of establishing and successfully implementing co-management approaches. Perhaps actually achieving success (or believing one has achieved success) promotes a more positive view of this management tool.

Certainly, there are some very significant examples in Canada regarding Indigenous territorial claim agreements. According to the Government of Canada’s Indian and Northern Affairs (INAC) website (<http://www.ainc-inac.gc.ca/index-eng.asp>),

there are approximately 26 comprehensive (new) treaties that have been completed (how many remain unresolved is not reported), 503 specific claims (disputes over existing treaties) in process, 924 settled, and 76 in litigation. These numbers of active and settled claims strongly suggest that Indigenous communities have a keen interest in self-determination and the Government of Canada is committed to meaningfully evaluating all claims to traditional lands and waters.

As Valencia and VanderZwaag (1989) observed: “The Canadian Inuit have been one of the most successful of all Indigenous peoples in furthering claims and management rights to offshore resources.” Two examples provide some sense of what these settlement agreements might mean in terms of marine and coastal protected areas. Both the Inuvialuit (in the Western Arctic) and Nunavut (in the Eastern Arctic) Lands Claims settlements involve significant areas of marine waters, but the Indigenous communities’ role in the planning for and management of these offshore areas is oversight rather than regulatory. Both Valencia and VanderZwaag (1989) and Craig (2002) provided comprehensive overviews of both these agreements.

The Inuvialuit Settlement Agreement (ISA) enacted by the Canadian Parliament in 1984 (http://www.daair.gov.nt.ca/_live/pages/wpPages/InuvialuitLandClaim.aspx), provides a map of the settlement region (ISR) that shows a considerable portion of the ISR is located in the coastal and offshore waters of the Beaufort Sea (to 80° N). While this map includes this vast area of the Arctic Ocean, the Inuvialuit have limited jurisdiction over how the area is managed and used. However, a number of institutions have been created under the ISA (Craig 2002) that offer oversight over subsistence activities, including the harvest of marine mammals and fisheries in these waters. The agreement established a “comprehensive system of regional environmental planning and development” that requires review by the Environmental Impact Screening Board (EISB) and Environmental Impact Review Board (EIRB) of all development activities of “consequence to the ISR” that are likely to have “an adverse environmental impact on the ISR” (Craig 2002). For example, this provides some oversight of oil and gas proposals. If the project was found to have unacceptable impacts, the EIRB would recommend to

the permitting agency that the project should not be approved. In cases of disagreement, the permitting agency would bear the burden of responding to the Board with the reasons why they believe the project should be allowed to proceed. There is a review board to resolve situations such as this with the power to issue a binding decision (Valencia and VanderZwaag 1989).

The Nunavut Settlement Agreement (NSA, <http://caid.ca/NunLan1993.pdf>), passed by Parliament in 1996, is sometimes referred to (somewhat ironically) as a “sea-claim” because it also contains a considerable area of the Arctic Ocean within and adjacent to the portion of the Canadian archipelago region within the Territory. However, it provides, as with the ISA, little direct jurisdiction over these waters. There is language in the NSA regarding review of proposals for the establishment of areas for marine conservation (“Marine Areas,” c. 15), but the oversight structure for coastal and offshore areas is similar to the Inuvialuit agreement, focusing on maintaining control over subsistence activities. The NSA also included an agreement to create the Territory of Nunavut, which was established in 1999, and presumably this new Territorial government will offer greater opportunities for self-determination to the Inuit of Nunavut. The Settlement Area is vast, and undoubtedly the Territory will play a significant role in the development of Arctic Resources in the future.

6.7.4 Haida Gwaii

With regard to co-management in Canada, each of the treaties and land claims has co-management components, so there are many more than can possibly be discussed here. However, one co-management example is worthy of special mention. In Northern British Columbia, the Gwaii Haanas National Park Reserve (NPR), Haida Heritage Site (HHS), and National Marine Conservation Area Reserve (NMCAR) are well respected models of Indigenous co-management (<http://www.pc.gc.ca/pnnp/bc/gwaiihaanas/-index.aspx>). The Reserves are co-managed by Parks Canada and the Council of the Haida Nation through a body called the Archipelago Management Board, comprised of two members of the Haida Nation, two Parks Canada Representatives, and the

Superintendent, who works for Parks Canada, but is Haida. The Haida have, in litigation, one of the comprehensive land claims still yet to be settled (hence, the use of the “reserve” title for the NPR and NMCAR). Their proposed boundary of the settlement region includes a significant area of ocean waters around Haida Gwaii (formerly called the Queen Charlotte Islands) and encompasses the entirety of the NMCAR and Bowie Seamount MPA (<http://www.haidanation.ca/Pages/CHN/History.html>), administered by the Department of Fisheries and Oceans. There are formal agreements for co-management of the Reserves between the Government of Canada and the Council of the Haida Nation (<http://www.haidanation.ca/Pages/Agreements/Agreements.html>). Based on extensive personal experience, having spent six-weeks on Haida Gwaii working with Parks Canada on the NMCAR establishment, this is an exemplar of how a marine protected area can be effectively co-managed with an Indigenous community. Jones et al. (2010) provided the Haida perspective on their planning and co-management.

The relative effectiveness of Parks Canada and Department of Fisheries and Oceans (DFO) co-management efforts with the Haida offers an interesting comparative case study. As mentioned previously, the proposed Haida land claim settlement area includes a significant area of ocean waters around Haida Gwaii that encompasses the entirety of the NMCAR and Bowie Seamount MPA administered by DFO. While a co-management agreement between the Haida and the Government of Canada has been established for collaboration on the management of Bowie Seamount MPA, the coordination under this agreement has been far less successful than the co-management involving Parks Canada and the Haida. As an example, it was not until after Bowie Seamount was well into the designation process that DFO officially recognized that this area was culturally significant to the Haida. This seamount, named *Sgaan Kinghlas* by the Haida ("Supernatural Being Looking Outward"), plays a significant role in Haida heritage as part of their creation story (<http://www.pac.dfo-mpo.gc.ca/oceans/protection/-mpa-zpm/bowie/index-eng.htm>). The Haida name is now used in materials DFO has published on the MPA, but it was not so from the beginning of the process.

While many factors could contribute to this comparatively less successful

collaboration, it would appear that DFO lacks Parks Canada's experience and skill in implementing Indigenous co-management. They have not demonstrated the deep commitment to addressing Indigenous collaboration that Parks Canada has shown in establishing high-level institutions within their organizational structure to provide a voice for Aboriginal partners, and in offering protected areas education and training opportunities to Aboriginal employees and other individuals within these communities.

Other issues may include:

- MPAs are only a small part of DFO's mission and mandate, which is predominantly focused fishery management.
- DFO appears to exhibit an agency culture that is more "top-down" oriented than Parks Canada in its management approach.
- Perhaps most importantly, they have not established an on-site management presence to work directly, on a day-to-day basis, with the Haida for the Bowie Seamount MPA.

From this personal experience and observation, the collaborative management of the NPR and NMCAR represent an exemplary example of how a marine protected area can be effectively co-managed with an Indigenous community. The Bowie Seamount MPA example, in contrast, demonstrates many of the challenges.

A considerable number of co-management mechanisms are in place in the US and Canada. Few offer Indigenous governments significant control over the submerged lands and waters of their reserves. With the exception of the co-management arrangement in operation on Haida Gwaii, true shared decision making, an essential element of effective co-management, remains elusive. The required level of trust among co-management participants also seems lacking in most of these examples, and communication generally does not seem to be particularly effective. While the institutional co-management structures have been developed and established, the fundamental recognition of sovereignty of participating Indigenous groups seems to be only partially embraced by National governments. This appears to be particularly the case for ocean and coastal waters of the Arctic (see discussion below, Valencia and VanderZwaag 1989), where

federal agencies, and the National governments they represent, are reluctant to fully convey rights and shared management authority to Indigenous governments. Perhaps this seeming reluctance is a result of the considerable economic value of the natural resources present in these areas. Regardless, ultimate successful implementation of co-management will require governments to provide a context for co-management in which Indigenous partners are given a shared decision making role, foster deeper trust among the parties to these agreements, and recognize the considerable contributions that can be made by Indigenous communities to the process.

6.8 A New Paradigm for Indigenous Co-Management in Ocean Wilderness

Jacques Cousteau once famously said that “people protect what they love” (<http://www.cousteau.org/about-us/justice>). Who better than those who call a place “home” and have done so for millennia, who love and are deeply bound to that place in body and spirit, should be entrusted with the stewardship of that place? Who has the deep knowledge of that place required to effectively preserve it as “an enduring resource of wilderness?” Who has the most to lose if that place is not effectively preserved?

With regard to some Indigenous communities, it would seem that the existing framework for wilderness stewardship is “upside-down.” With greater knowledge and experience, with a long history of ocean and coastal management spanning many generations, and with so much to lose, it could be argued that these Indigenous communities should have a greater, if not a primary role, in the management of the resources and qualities of areas we all value and want to see preserved. However, there are different types and levels of “place attachment,” as discussed in Chapter 1, that have relevance to this discussion.

Dasmann (1988) contrasted what he calls “ecosystem people” and “biosphere people.” “Ecosystem people” are those largely Indigenous communities who are bound to places by tradition, living in that place for many centuries, and do not abandon that place in the face of hardships or unexpected changes in the ecosystem which supports them culturally and spiritually. Failure to effectively preserve the resources they depend

on to sustain them is not an option. Given their deep connection to that place, moving to another place when resources become unsustainable is unlikely to be considered. In contrast, “biosphere people” are those who rely more on global resources and markets, and are not as greatly affected if a single ecosystem is degraded. Clearly, “ecosystem people” have a greater stake in more effective conservation and management of the resources on which they must depend. Undoubtedly, these communities also have a stake in what happens in these places, arguably a significant one, but the consequences of failure are not as potentially significant.

Agencies that manage and implement wilderness designations and other protected areas could play a supporting role in supplying more conventional (i.e. dominant culture science-based) resource management expertise, act as a liaison to the larger regional, national and global resource management community, and represent the interests of others who have a stake in management decision making (i.e. citizens outside the local communities for whom such areas, as part of national protected areas systems, are preserved and managed). As discussed above, this is the framework in place for the protected areas of Haida Gwaii; it is working very effectively, and can serve as a model for this ocean wilderness management framework being proposed. Both the Council of the Haida Nation, as an equal partner in the Archipelago Management Board, and the Government of Canada are deeply invested in the partnership. Among other significant contributions to this partnership, the Council’s excellent planning office (see Jones et al. 2010) has data resources and planning expertise at least equal to the sophistication, expertise and capability of Parks Canada staff. Most importantly, the Council can play an advocacy role with the Government of Canada that the Parks agency cannot, helping to secure resources necessary to provide the staff and services required to effectively manage these remote, complex, and relatively large National Park and National Marine Conservation Area Reserves. A well-executed co-management arrangement led by the Indigenous community and supported by the protected area management agency could not only be more effective in preserving wilderness values and qualities for Indigenous wilderness homelands, but has the potential to expand and enhance the resource

management capacity of the agency managers who are serving in this supporting role by encouraging creativity, new ways of thinking, and novel approaches to the work they do.

The more holistic view of many Indigenous people regarding their environment would fit well into this new paradigm. Such designations would potentially include both the land and sea areas comprising their homelands, and they could be managed in an integrated and seamless way. The “invisible wall” that exists between land and sea is much less evident in the Indigenous way of thinking. CST arrangements of Indigenous maritime cultures were mostly if not always constructed this way, affecting both their activities on the land and their stewardship of the adjacent areas of coastal waters. Certainly, the *Ahupua'a* management system of the Native Hawaiians (Kliskey et al. 2009) is one illustrative example. As discussed above, many of the co-management systems implemented in Canada, including the examples of the Inuvialuit and Nunavut Settlement Agreements, include sometimes large expanses of adjacent waters. Given the many wilderness areas in the US, as discussed in Chapter 5, that terminate abruptly at the water's edge, the dominant culture's approach to identifying wilderness is significantly more limited than many Aboriginal cultures, based on what we know of their conception of the environment. Surmounting this “wall” between land and sea would likely be far less at issue for such Indigenous homeland wilderness areas.

Clearly, not only will resource management agencies be required to take a step back and rethink what their most effective role might be in such collaborations, but some investments are likely to be required. To overcome the “cross-cultural dialogue” conundrum, additional training may be required for both Indigenous and Western science-based managers to help bridge this cultural divide.

Currently, for example, there are few formal education programs specifically targeted at Indigenous individuals who aspire to marine protected areas management careers. Similarly, existing training programs for non-Indigenous natural resource managers regarding working with and better understanding Indigenous cultures are (from personal experience) woefully inadequate. A cooperative education program at the university, and perhaps eventually graduate, level, sponsored by and with significant

involvement of federal marine protected areas management agencies would offer many opportunities to begin to develop a common language and better understanding of the cultural perspectives of both groups. Effectively integrating classroom and practical education opportunities for students at existing protected areas, could, with time, produce a cadre of managers that could operate effectively in both worlds, see through the eyes of the other, and begin to find creative and innovative ways to cross the divide. Parks Canada has done this for particular Indigenous individuals who show promise as potential protected areas managers (the current Superintendent at Gwaii Haanas is one such individual).

Parks Canada is exemplary, as a federal protected area agency, in its deep commitment to establishing an effective partnership with Indigenous communities (Langdon et al. 2010). The current CEO of Parks Canada has established an Indigenous advisory group, the Aboriginal Consultative Committee, to advise Parks Canada leadership, through the CEO, regarding Aboriginal issues. Parks Canada has also created an Aboriginal Affairs Secretariat within the agency to foster and guide this evolving relationship. Arguably, there have been some similar efforts in the US, but nothing to the extent that Parks Canada has implemented. With such commitment and investment, it is not surprising that the one exemplar of effective co-management in North America is at a Parks Canada site, and more are being developed, particularly in the North (Langdon et al. 2010).

While many changes would need to be made to current management practice to effectively implement such a new paradigm, the most challenging would be the need for agencies to evolve beyond the perceived need to be “in charge.” Most existing resource management agencies, with the possible exception of Parks Canada, are not currently so evolved that this could be achieved without fundamental changes in how the role of the agency is conceived, and developing new skills to support, rather than oversee, co-managed protected areas. It is indeed challenging to contemplate such a fundamental shift in power and authority, but clearly, given the Parks Canada example, this sort of evolution would not be impossible.

6.9 Challenges to Implementing Indigenous Co-Management of Wilderness Waters

Many of the places described here where co-management is already a part of the fabric of interaction between Indigenous communities and Federal governments would easily fall into the category of wilderness, particularly those in the North. However, there is a significant cultural divide between the dominant culture perception of wilderness and that of Indigenous groups (Klein 1994, Klein 2002, Lyons 1989, Martinez 2003). In the broadest terms, a large number of Indigenous communities view nature as a unified system and the notion of separating out a portion and giving it a special status is thought of as unnecessary and unwise. The North American dominant culture view of wilderness (Klein 1994, Klein 2002) “where man is just a visitor,” conflicts deeply with beliefs of Indigenous cultures who view these areas not as “wild” but as “home” (Lyons 1989), a place that sustains them physically and spiritually (Klein 1994, Klein 2002).

The potential success or failure of collaborative processes depends on the stakes, the stakeholders, and their perception of the status of the environment in that place. Perception of resource conditions can be important. Gilmour et al. (2011) suggested that where the potential for a “lose-lose” outcome is great, participants may be more motivated to seek collaborative solutions. High levels of trust may enhance, through more effective communication, the resilience of socio-ecological systems when that system is faced with a “surprise” or significant, potentially state-changing disturbance (Longstaff and Yang 2008). Payton et al. (2005) observed that “place attachment” (i.e. shared attachment and regard to a valued place) may also significantly enhance the opportunities for successful collaborative management approaches, which could be particularly important in co-management of protected areas, where place attachment is usually quite strong.

Building trust in Indigenous co-management arrangements involves special challenges resulting from a history dominated by conflict rather than collaboration, disagreements over sovereignty and self-determination, and divergent world views. Establishing effective cross-cultural dialogue is particularly problematic, and the

“knowledge bridgers” suggested by Bohensky and Maru (2011) may offer some assistance in this regard. The importance of personal contact is undoubtedly one of the other required elements in building trust. Working side-by-side on a daily basis, being a part of the same community, affords protected areas managers the opportunity to transcend being “just a faceless bureaucrat” who arrives for meetings and takes the next flight out. Personal relationships can help overcome challenging situations, disagreements that could otherwise result in the process breaking down. Trust takes work, time, and commitment, but is clearly worth the investment.

With specific regard to MPAs and ocean wilderness, sovereignty over coastal waters and submerged lands also represents a significant challenge. In *Amoco Production Co. v. Village of Gambell, Alaska*, (107 S. Ct. 1396, 1987), as described in Valencia and VanderZwaag (1989), the court rejected a claim of the Indigenous community on St. Lawrence Island in the Northern Bering Sea for sovereignty over the waters surrounding the island out to 25 nautical miles, setting an important precedent opposing Indigenous control of traditional waters. The State, which has primary jurisdiction over these submerged lands and waters, to three nautical miles, is likely not to be particularly supportive of the idea of wilderness in its coastal waters, notwithstanding who is seeking this new wilderness area. Both Catton (1997) and Allin (1982) described the consistent opposition of the State of Alaska to wilderness designations, particularly during the battle over the Alaska National Interest Lands Conservation Act of 1980 (ANILCA; P.L. 96-48). The State fought bitterly and lost in the Supreme Court over control of submerged lands within the Glacier Bay National Park and Preserve (Magnuson 2006). Another relevant landmark case, discussed in Symmons (1999), involves Dinkum Sands shoal, off Prudhoe Bay. The State of Alaska contended that the shoal was emergent land, and claimed the waters surrounding the shoal as “submerged state land,” but the Court, again, ruled in favor of the US Government. While the courts have sided with the Federal government in these cases, they were hard fought, bitter battles and it is unlikely the State of Alaska will be amenable to cede any of its submerged lands for establishing wilderness waters. Absent some significant change

in the court's perspective on Indigenous sovereignty of submerged lands and waters, some sort of partnership that includes the State of Alaska and the Indigenous community in a co-management arrangement might be the only viable solution, but it remains another formidable challenge given the history involved.

There is also a history of the US Government rejecting the idea of co-management of wilderness and protected areas in Alaska. Catton (1997) described the proposal for the creation of a co-managed wilderness protected area proposed during the establishment of the Gates of the Arctic National Park in the region of Anaktuvuk Pass. The Nunamiut, working with the National Park Service (NPS), forged an agreement to establish "the Numamiut National Wildlands," which would have been a wilderness area co-managed by the NPS, the State of Alaska, and various Indigenous organizations. At the last minute, this proposal was removed from the draft ANILCA bill by the Office of Management and Budget who felt that the NPS should not be encumbered with a new management structure based in co-management. This last minute removal of the proposal was a deep disappointment to all involved with its formulation, particularly the Nunamiut. Such experiences are long remembered.

The notion that subsistence is a fundamental right in wilderness areas in Alaska has been clarified and embraced by the courts, public land managers, and the public, so an idea like the Numamuit National Wildlands might likely receive a different response were it proposed today. As Klein (2002) insightfully observed:

Uses of Arctic lands for traditional subsistence purposes and wilderness recreation can be compatible, while serving both the interests of cultures Indigenous to the Arctic and those from outside of the Arctic... Providing for designated long-term uses of lands in the Arctic cannot be done without an understanding of their values and importance to residents of the Arctic, as well as those living outside of the Arctic... We do not need to abandon the Wilderness Act to protect the "wild" lands of the Arctic... But in the Arctic, where humans continue to live in their homelands as integral components of the natural systems present there, new terminology is

needed for designation of protected areas if Arctic residents are to be supportive players in the selection and protection of lands we “southerners” view as wilderness.

Collectively, these challenges are substantial, but again, perhaps not insurmountable. Most will require creativity and innovation; if solutions were obvious, there would be more examples of successful co-management. All will require greater investments of time, and a deeper commitment, by all parties involved, to the value of co-management.

6.10 Establishing Ocean Wilderness in the Arctic: A Potential Scenario

To give some tangible sense of what a process might look like for identifying and establishing wilderness waters in the Arctic, a speculative scenario is proposed. For the purposes of this scenario, it is presumed that a national park in the Alaskan Arctic is initiating a review and update of its management plan. The park in question already has wilderness designated within its boundary, but only on coastal lands with the seaward boundary of that wilderness, and the park, at mean high water. The areas of potential wilderness waters are known to be within what are considered traditional lands and waters of an Indigenous community adjacent to the park, and are actively used for subsistence of that community.

Under existing procedures for such a management plan update, the process would be guided by the National Environmental Policy Act of 1969 (NEPA, P.L. 91-190, 42 U.S.C. 4321-4347). Any significant changes to a management plan for any protected area requires that the NEPA process be followed so that the public be offered opportunities to offer their views about these potential changes.

The National Park Service would initiate this process with what are called “scoping sessions,” where the public is invited to provide input into what changes should be made in that management plan, what issues or concerns they have related to the management of the park and the protection of the resources therein. These scoping sessions, as is the case with all elements of public consultation throughout the process,

require that ample notice of the public meetings be provided to affected communities, other state and Federal agencies, and the public. In that notice, basic background information about the park, the current management plan, and any contemplated changes they have identified at that point be provided. The scoping sessions would be held, public comment received and documented, and from this information, the elements of the plan that will be addressed in the review are identified. The concerns and issues about potential changes received at the scoping sessions would provide additional guidance to those preparing the planning documents.

Work would begin on the draft management plan by agency staff, largely out of sight of the public. This draft plan must include a description of the existing ecological, social, and economic conditions present in the park, and would propose a number of alternatives addressing potential revisions to the plan. It would include various alternatives that usually escalate in scope and effect from a “no action” alternative to the most extensive changes that might be proposed. With regard to potential ocean wilderness areas that might be identified in the plan, a wilderness suitability determination would be conducted that evaluates the wilderness qualities of the area and its suitability under the Wilderness Act for possible designation, and the potential impacts of that designation on park visitors.

Once the draft management plan is completed, another public notice is published, formal consultation is re-engaged, and a hearing is held to receive comment on the plan and the various management alternatives proposed. The plan is widely distributed prior to the hearing, and usually published in its entirety on the Web and paper copies made available upon request. Comment on the draft management plan is received and documented, and the agency considers and evaluates the comments during the development of a final management plan. Other meetings may be held to discuss the plan with key constituencies, and any additional comments received are also carefully considered.

When the final plan is completed, it is published and distributed, with an extensive section responding to the comments received on the draft plan and how they

were considered and integrated – or not – in the final plan. The public and any affected agencies would have a proscribed amount of time to offer comments on the final management plan and the management strategies proposed. At the close of that public comment period, the agency would evaluate those comments, make any final changes they felt were needed in the plan, and publish the final version of the revised management plan. This would include responses to any comments received and any changes made in response to those comments, and identify the effective date of new management plan would come into force and effect.

With regard to any changes proposed to the wilderness boundaries, should the areas proposed be determined to be suitable for designation, these changes would be identified and a proposal would be sent to Congress seeking their consent to include these expanded areas in the wilderness within the park. In the case of proposals to include ocean areas a wilderness that are not within the existing park boundary, Congress must also approve the expansion to the boundary of the park in order to accommodate the designation of the proposed wilderness waters. Until Congress passes the bill that contains the formal designation, the park would manage the area as “proposed wilderness,” subject to the same requirements and restrictions on use as designated wilderness, preserving the wilderness qualities, values, and attributes of the area until Congress can act on the proposal.

If Congress ultimately passes the wilderness designation, the area would formally become part of the NWPS. If, however, Congress disagrees with the recommendation of the NPS, the areas would revert to normal parklands, and be managed under existing regulations for such areas. There is no expressed limit as to how long an area can be managed as “proposed wilderness” by the agency if Congress fails to act on the recommendation. In such a circumstance, the agency would likely reevaluate the proposal when the management plan is again revised. At that time, they would either reassert the recommendation or withdraw it, and perhaps propose implementing some appropriate management regulations that offer special protection to the area that would

preserve as much of the wilderness quality of the area as they can within the scope of their jurisdiction and administrative discretion.

Under the current process, the public, including the Indigenous community, Federal and state agencies, and other interested parties are extensively consulted at key phases in the process. However, the development of the draft and final plan are done “in-house” by the agency with little transparency. While the agency is required to address all comments received during the review process, they are not compelled to change the plan to integrate these comments if they do not agree with them or they feel they conflict with their statutory mission and mandate as they have interpreted it. In practice, there is considerably more ongoing communication with the communities and interested parties, and there is “give and take” on proposed revisions to the plan arising from this collaboration, but there is no requirement that this additional outreach and coordination take place. In many cases, what is done, as described in this process, is considered sufficient to allow the park to effectively manage the resources for which the park was established to protect. However, when the disagreements are significant, it is left to the courts to compel, or political intervention to influence, the park to implement alternative management measures that they may feel are insufficient or inadequate to protect the park consistent with their mission and mandate.

The speculative scenario proposed here would trigger a collaborative process of engagement with the Indigenous community, and other essential partners, much earlier, prior to any proposed revisions to any management plan or the conduct of wilderness suitability determinations. It is widely held by protected areas practitioners that when lines are drawn on a map, battle lines are drawn, as well.

Another presumption made for this scenario is that the managers of the park have taken the opportunity to build a longstanding relationship of trust with leaders of the Indigenous community, and there is a working relationship between the park staff and the community. It could be argued that, in most cases, this is an unreasonable presumption, but increasingly, protected areas managers are spending more time outside the park boundaries in “gateway communities,” building relationships and effective lines of

communication. There is a growing realization within the protected areas community that laying this sort of foundation with local communities can help to make the management of the park more efficient and effective, and less of a “lightning rod” for controversy. If indeed this presumption is unmet, building such a relationship would require an even greater investment of time before any discussion of potential wilderness waters could be introduced into the discussions.

This initial phase of collaboration would focus on coming to agreement on definitions, process, and decision making roles. What do we mean by “wilderness?” What activities of importance to the community might we agree are permitted, and which would not be? How would we construct a process for decision making that would be equitable? Who are the other key players and what role do they have in guiding the management of the areas we call “wilderness?” What are the likely limitations and requirements imposed by their agency through law or policy with which the park must comply that potentially affect the community-park partnership? These would undoubtedly be challenging discussions, and may take a great deal of time to reach consensus, but if that is achieved, the community and the park would articulate the consensus positions in writing, formulate an agreement which would guide the partnership, and seek the formal consent of both parties.

Given that such a partnership is uncommon – although becoming less so today – it would also be essential for the park managers to seek the support of their agency in embarking on this process. While the idea may only be a vision for the future, the park managers should be able to clearly articulate an endpoint for what they are trying to achieve (e.g. a co-management arrangement with the local Indigenous community regarding the establishment and management of the wilderness waters designated within the park). They should also be able to clearly articulate the parties involved, the level of decision making authority with which each party would be vested, what the role of the park is likely to be in the day-to-day management of the area and in the development of management strategies and regulations affecting that area. How might disagreements over management be resolved within the co-management arrangement? If the agency is

reluctant to fully support this sort of unconventional management arrangement, the park managers should freely share this with community partners, as they may be in a position to exert political pressure on the agency to more seriously consider the proposal for co-management, or simply withdraw from further discussions, and potentially seek another path forward.

In addition to these two key participants in these early discussions, it is likely to be important to engage the state in deliberations, as well. Perhaps this is best done after the community and the park have agreed in principle on some of the underlying questions regarding the partnership, discussed above. As the state has ownership rights over the coastal waters (out to 3 nautical miles) adjacent to where wilderness waters are identified, their role is an important one.

During this early phase of the coordination, it would be useful to bring together representatives of the Indigenous community with the Haida of British Columbia to learn first hand from their experiences regarding co-management with Parks Canada. The Haida have learned many lessons along the way, both positive and negative, about how to successfully attain effective co-management, and what they could share has potentially great value (discussed previously in section 6.7.4). Similarly, coordination between the park managers and the managers of the NMCAR and NPR would be potentially most beneficial. While the statutory authorities under which Parks Canada and NPS are different, they are not so much so that Parks Canada's "lessons learned" would lack relevance. As discuss above, the Gwaii Haanas model would be a good one to follow, given the success of the co-management arrangement there.

Congress will have an important role in all of this when any recommendation for wilderness waters is put forward, and so it is essential to keep the state Congressional delegation informed about what is being discussed. The first formal contact with members of Congress would likely be best after the key participants have agreed to a process and the foundation principles that would guide the partnership. Thereafter, it would be important to provide routine updates to key staff, and perhaps even invite Congressional staff participation in the local deliberations.

At this point, broader coordination would be desirable, including any Federal and state agencies with interests in the area, and the public. This could be done through the press and internet. With regard to the public, it would be useful to offer jointly-conducted briefings by the partners to environmental non-governmental organizations, fisheries organizations, and others who have an interest in any initiative involving the establishment of marine protected areas. While sometimes cumbersome and often operationally complex, all public statements and outreach materials should be jointly developed and issued by the principal parties and all briefings and meetings conducted jointly. There are powerful messages conveyed by the presence of partners standing “shoulder to shoulder” when interacting with the public.

The development of the management plan revisions and the wilderness suitability determination would still be guided by the National Environmental Policy Act (NEPA) process, as this is required by law. While NEPA establishes the minimum requirements for public engagement, agencies can do more than what is required. The difference in this scenario relates to a provision under NEPA that allows other entities to be actively involved in the development of the management plans and other required documents. Called “cooperating agencies,” partners can formally assume an active role in the process, and can participate in all phases of the public review as full partners. Establishing some entity within the Indigenous community, and the state, as a “cooperating agency,” they become part of the “in-house” staff that write the plans, respond to public comments, and deliberate over alternatives to be presented in the NEPA documents. This makes the process of plan development completely transparent to the key partners, offers a forum for required deliberations within the required process, and promotes a sense of “ownership” of the plan by the Community and state collaborators. The process of draft and final management plan development, and the wilderness suitability determination, would proceed much as described above, except that the “in-house” plan development team now includes the key partners, and should include considerably more coordination with other interested parties during the process than in

the existing process, to begin to build and foster constituencies of support for the wilderness waters designation.

A large part of the deliberations will be to agree on an appropriate stewardship framework for the wilderness waters, and a process for implementing such a framework. Under this scenario, at least two alternatives might be considered. The first would be an “equitable” framework, where the community, the park, and the state would have an equal voice in management decision making, much like the model provided by Gwaii Haanas. Each party would be represented on some coordinating body, and each would have an equal voice in decision making. Another potential framework would position the Indigenous community to have a lead role in the stewardship framework, with the park and state playing more of a supporting role, and representing the interests of their respective governments in the collaborative management body. It would be seemingly inappropriate, based on the lack of success of current co-management arrangements discussed above, for either the state or the park to step into this lead role, given the minimum requirement for effective co-management being at least “equal voices” in decision making. Again, lessons from successful co-management arrangements, like Gwaii Haanas, would be very important in guiding the development of an agreement for a consensus framework.

Presuming that there is a positive outcome (i.e. the wilderness waters are found suitable and worthy of designation and a stewardship framework for this area is successfully developed) the next step would be to present the recommendation to Congress for their consideration. If the coordination with the state Congressional delegation has been done well, these will be the proposal’s “champions.” Having this support will also be critical when agency budgets are being deliberated. Such a novel management framework for these wilderness waters will not come without a cost. The community will need funds to support their active participation, and the park will need additional funds to staff and implement the collaborative management body. Additional funding will be needed, at a minimum, to support resource inventory and monitoring, surveillance and enforcement, training, and other expenses related to management of the

area. Part of the coordination with the Congressional delegation will be to make them aware of these needs, and seek their support in meeting them.

Clearly, this scenario would be considerably more complicated in practice. Attaining consensus among the partners on perhaps even small issues will not be simple nor straightforward. Time would be needed to work out these details, but so long as the partners are committed to the process, and to finding a path forward, this scenario is more than merely speculation. The keys are the investment in building relationships of trust, recognition of the potential for effective collaboration and the value each party brings to the table, learning from the success (and failures) of others, a commitment to achieving the vision, and getting others to share that vision. As protected areas managers have been heard to say from time to time, “it’s not rocket science...it’s much more difficult than that.”

6.11 Conclusion

This chapter began by suggesting that the lens through which we view the world around us has significant implications for how we interact with it and how we behave as stewards of the ecosystems in which we live and visit. Who we are, our background, experience and cultural ethnicity are some of the factors in determining the lens we use. As a multi-cultural society, where issues of gender, class, and race are also important considerations, there are many lenses to consider. In order to effectively engage as many of those who wish to be involved in the identification and establishment of ocean wilderness as possible, we need to see what others are seeing. Clearly, this is not easily accomplished. Some have considerably divergent perspectives from one’s own, and even within groups with similar cultural backgrounds there are differences. However, as regards ocean wilderness, the attempt must be made in order to arrive at some meaningful consensus as to “what we think it is.”

There is little doubt that Indigenous peoples may view wilderness with different lenses. Some have suggested that they have no concept of wilderness at all; that these places, to them, are simply “home.” There is a long history in North America of physical

and cultural dispossession of Indigenous peoples in the dominant culture's quest for "the enduring resource of wilderness." There seems to be great skepticism among Indigenous people regarding the motives of those who propose protected areas, including wilderness, and perhaps there is good reason for this. The history of co-management has not been particularly positive. Saying this, however, there are examples, offered above, where inroads toward effective collaborations have been made, so the situation is not hopeless. Perhaps we just need to more actively listen, to understand, and to adapt where we can.

Particularly as regards the Arctic, we have a lot of listening to do. The reality is that the places we call "wilderness" in the North American Arctic are inhabited, albeit sparsely, and the people who live there are seeking a greater role in the management of these areas. In the Canadian North, Indigenous groups are successfully settling land claims, attaining at least some of the sovereignty over their homelands and waters they are pursuing. In both Canada and Alaska, Indigenous governments are looking for opportunities to participate more actively in the management of human activities that are increasing in the Arctic as the sea ice retreats, including commercial fishing, shipping, and oil and gas development. It would seem that co-management would be one of the more appropriate mechanisms to provide these opportunities for the Aboriginal governments to be full participants in guiding the Arctic to a sustainable future.

However, based on this review and analysis, the collective experience with co-management in this region, and elsewhere in North America, has not been very positive and will require some adjustment. National governments seem less than willing to share management authority over offshore areas of the Arctic, and most often the Indigenous communities have to resort to public hearings and, occasionally the courts, to be heard with regard to management of human activities that pose threats to their ocean and coastal waters. The co-management that is in place in this region does not seem to be working as effectively as it could, and there appears to be considerable distrust by the Indigenous participants in the co-management processes in which they are engaged. Few of these arrangements involved shared decision making, except for the Gwaii Haanas

process, which can provide “lessons learned” that can help improve the effectiveness of Indigenous co-management.

More fundamentally, attention needs to be directed at changing how wilderness in the North is conceived to make our collective idea of wilderness more appropriately reflect the Indigenous perceptions of these areas. This principle, firmly embedded in the US Wilderness Act, embracing the idea that wilderness is a place “where man is just a visitor” needs to be reevaluated within the Arctic context. As discussed in Chapter 3, Eidsvik (1989) observed that “whether man remains (in a designated wilderness) or not is irrelevant as long as the time, space, and species' relationships are retained.” While the Wilderness Act in the US created a magnificent system of wilderness areas, it has come at some considerable cost, largely as a result of the adherence to this notion of the appropriate role of man in these wildernesses as being “just a visitor.” If Eidsvik’s criteria are appropriate, and can be effectively achieved, perhaps we are closing the door on something that potentially has great value to preserving wilderness in the North American Arctic by continuing along this path. To make wilderness designations more consistent with Indigenous communities’ cultural perspectives, they need to be accorded the respect of being engaged as a partner in the process with concomitant power.

Sadly, except for a few brief, shining moments we are collectively victims of our own inertia and fear of change. As a result, new ideas take a long time to implement as they need to be weighed, measured, deconstructed, evaluated, and debated. It is almost always an uphill battle against deeply and widely held orthodoxy when the change is fundamental, a Kuhn-ian “paradigm shift” (Kuhn 1962). The changes proposed here would take many years to fully implement, if indeed they rise above the fear and inertia. When resource agencies began to consider the idea of public engagement in management decision making, in itself a “paradigm shift,” it was not an immediate embrace, but a long and difficult, kabuki-like courtship. What drove the change, at least in part, was the desire of constituencies who were affected by these management actions to be more involved, to have their voices heard. It was equally the realization by the agencies that the outcomes from such collaborative approaches were more robust, nearly always

improvements from their original conception. Perhaps as significant an outcome, the constituencies that were actively involved acquired some sense of “ownership” of the resulting management actions, making compliance with the rules imposed far less of an issue. Agencies are accepting, albeit perhaps grudgingly at times, of the idea that changing management frameworks takes a much longer time when the public is fully engaged. A significant investment of effort is required, but the results arising from these community-based management initiatives appears to be worth the investment. Public engagement has helped to bring back and foster some of the community cohesion that contributed to the success of many of the CST arrangements. Building on the “place attachment” many, from all cultures, races, genders and classes possess for their adjacent ocean and coastal waters, and in response to dwindling resources and the adverse effects on those who rely on those resources for their livelihoods and sustenance, many community-based management approaches are finding greater success. The dominant culture is rebuilding the “villages” the Indigenous communities never abandoned.

Resolving the question of “what we think it is” may also involve some rethinking as to what “it” is, especially with regard to the “inhabited wilderness” of the North. Recently Cole (2011) resurrected an idea that dates back to the early years of the wilderness movement in the US. He suggested that the notion of “types” or categories of wilderness designations be revisited, arguing that a single conceptualization of wilderness is both impractical and inefficient. If the notion of Hende and Dawson that “wilderness is what we think it is” is valid, it is more likely consensus could be reached on “what we think it is” if more options are part of the bargain. Cole stated:

“Wilderness serves many different needs, having multiple and varied values and purposes. Although many assume that these values and purposes are congruent and that all can be provided in optimal measure in one type of wilderness, this is not the case.”

Cole pointed out that the framers of the Wilderness Act had a typology in mind in the early discussions of what the Act should contain, flowing from similar thinking articulated by Leopold (1925), Marshall (1933), during the early policy development

discussion within the Wilderness Society, an organization in which both Marshall and Leopold were founding members. Cole and Yung (2010), in their excellent recent book “Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change,” cited climate change among the primary drivers of the need to think more broadly about how we designate wilderness. To this point, Cole (2011) offered that:

Climate change has increased the lack of congruence among the multiple meanings of naturalness and the diverse values of wilderness. Conserving biological diversity will require more heroic efforts than imagined, more intrusive and widespread manipulation in wilderness.

In other words, we need to be more flexible in the way we identify and manage wilderness in order to accommodate appropriate management actions in different types of wilderness to achieve effective stewardship. The implementation of such a strategy would not be trivial by any means, as the institution of wilderness within the construct of the National Wilderness Preservation System in the US is firmly entrenched in many ways. However, as Cole speculated, it could be implemented either through modifying the Wilderness Act itself, or through some administrative actions by the wilderness stewardship agencies through the assignment to present and future designated areas differing management frameworks for various categories of wilderness. Alternatively, it might be pursued through some more evolved implementation of zoning of existing and future wildernesses. None of these authors would have been specifically thinking about the Arctic, ocean wilderness, or Indigenous “homelands wilderness,” but the accommodation in our thinking about and managing wilderness is equally valid and relevant.

The timing of implementing such a change would have to be carefully evaluated. Change is equal parts “chaos” and “opportunity,” and the potential to lose ground in the battle for wilderness preservation could be considerable during such a transition. But, if one believes the theoretical underpinnings of resilience theory (Holling and Gunderson 2002) that diversity in socio-ecological systems increases resilience and sustainability, and the possible extension of this theoretical construct by Young (2010) to governance

systems, creating greater diversity in wilderness stewardship is likely to be a good thing in the long view. It might also be a way to find common ground with Indigenous communities of the North to effectively preserve what we see through our lens as wilderness, and what they see as “home.”

Chapter 7 “Toward an Ocean Wilderness Future” – Conclusions and Recommendations

7.1 Introduction

What is the future of ocean wilderness? This research confirms that formally designated ocean wilderness does indeed exist, established under current authorities and, to a limited degree, managed as wilderness. This work also identifies the types of areas that would be most compatible with the currently established sites and with the perceptions of those who manage and conduct research in these areas. Should some process be pursued to evaluate these potential candidate sites, and if so, what issues would need to be addressed, what further steps taken, to expand the part of the NWPS that includes ocean wilderness? This is either a challenge worth pursuing, or simply an interesting idea that has been evaluated and found neither particularly useful nor appropriate. While arguably a daunting task, would designating more ocean wilderness offer benefits to ocean resource conservation that exceed the potential costs? Informed and guided by the results of this and other relevant research, is it time for action rather than more talk and deliberation? Is this truly “an idea whose time has come?”

This research, guided by the goals discussed in Chapter 1, addressed developing a robust definition for ocean wilderness (Chapter 2), and sought and evaluated the perceptions of resource managers and scientists regarding various important elements of what ocean wilderness is and how it should appropriately be managed (Chapter 3). This work also offered an inventory of existing wilderness waters and began to identify existing management frameworks for these areas (Chapter 4), and identified the possible context of ocean wilderness within MPA networks and systems in operation and under development in North America (Chapter 5). Finally, the research delved into the potential for expanding ocean wilderness in the Arctic in collaboration with the Indigenous communities that populate this region (Chapter 6). These elements of the research offer a considerable amount of existing and new knowledge and information regarding the goals set when the work was initiated.

The measure of success in achieving these goals, and recommendations for the work that lies ahead, is the subject of this final chapter. Each chapter will be summarized in the following section with key findings of the research relevant to the stated goals and suggestions about how this work might be utilized to support future actions. Following the discussion of insights and findings regarding the five key elements of this research, some observations are offered about building the constituencies of support required for expanding ocean wilderness. The chapter concludes with eight recommendations for future action that would address necessary steps to effectively implement future ocean wilderness designations.

7.2 Defining Ocean Wilderness (Chapter 2)

Chapter 2 offers an inventory and analysis of existing definitions of wilderness from around the world, how the key terms of those definitions are interpreted, and the implications of this body of knowledge on defining wilderness waters. The work presented provides a firm foundation for how wilderness is conceptualized by many different countries and cultures, identifies which principles are common to most definitions, some unique elements that have been adopted, and highlights a number of interpretations of those laws and policies with special relevance to defining ocean wilderness.

There has been significant progress in identifying what people think ocean wilderness is and a consensus is forming around the elements of a common definition. The “Ocean Wilderness Experts Group” convened at the 2004 International Wilderness Law and Policy Roundtable began the process by developing a potential definition that has been widely discussed and deliberated over the past eight years. Chapter 2 summarizes the work of the Expert Panel and its recommendations (see Barr 2008) that was used as a source document for discussions of the “Marine Wilderness Collaborative” at the 9th WWC (“WILD9”) in Merida, Mexico in 2009. The Marine Wilderness Collaborative (MWC) (<http://www.wild.org/main/how-wild-works/policy-research/marine-wilderness-collaborative>) is a group established by the WILD

Foundation to advance the implementation of ocean wilderness worldwide, and has four stated objectives to:

- Define wilderness and wilderness management in marine environments through a public consensus-based process.
- Work with the U.S. Fish & Wildlife Service and other government agencies through the Intergovernmental Working Group on Marine Wilderness.
- Gain input through MWC workshops at WILD9 and in other locations.
- Circulate drafts of “Conserving Marine Wilderness,” the definition and management objectives for marine wilderness and reference, to inform a consensus document for policymakers.

The MWC achieved two significant steps forward. The first is the development of an agreement among the governments of the US, Canada, and Mexico to more closely coordinate and cooperate on wilderness conservation. This agreement was signed at the WILD9 Congress in 2009 and a copy of that agreement is provided in Appendix 6.

This agreement recognized that marine and coastal areas are part of our collective concept of wilderness in North America, and established the commitment by these governments to promote and enhance wilderness “on land and in marine and coastal areas.” The agreement further stipulates that a coordinating body be formed to assist in implementing the agreement. The North American Committee on Cooperation for Wilderness and Protected Area Conservation (NAWPAC) was established for this purpose.

As a result of this commitment, a Marine Wilderness Working Group (MWWG) was convened by the NAWPAC in 2010 to address the issue of ocean wilderness (what they have termed “marine wilderness”) and was charged with two specific tasks: (1) “to pursue a common definition and management objectives for marine wilderness,” and (2) “to examine potential candidate areas for marine wilderness designations in the United States, Mexico, and Canada” (MWWG 2011). In late 2011, the MWWG released a “working draft” of a document called “Conserving Marine Wilderness” (MWWG 2011) which offered a proposed consensus definition for marine wilderness and objectives for a

management framework. This “working document” is provided in Appendix 6.

The “Conserving Marine Wilderness” working document offered the following as their consensus definition:

Marine wilderness areas are primarily intact, self-sustaining, and undeveloped, with no modern infrastructure, industrial activity, or permanent or significant human habitation, including also areas capable of being returned to a wild state. They retain their intrinsically wild appearance and character and are protected and managed to preserve their ecological integrity, biological diversity, and environmental health. In marine wilderness, where the earth and its community of life are uncontrolled by humans and natural processes dominate, humans use and enjoy the areas in ways that are consistent with their wild character and that leave the areas unimpaired for future generations.

Marine wilderness also should be of sufficient size to: perpetuate its protection and use in a relatively unimpaired condition; continue opportunities for compatible subsistence uses and indigenous cultural practices; allow low-impact, minimally invasive educational and scientific research activities that further the administrative or educational objectives or scientific knowledge of the wilderness area; and if degraded, be capable of being restored or rehabilitated to a wilderness state.

As a management entity, (1) marine wilderness areas in MPAs can be stand-alone sites where the entire MPA is considered a wilderness area, or (2) marine wilderness can be a certain geographic portion, or subset, of a larger MPA. Some MPAs have areas within their boundaries that are considered wilderness areas, preserving and protecting a wild character. MPAs can be managed in such a way that the management authorities have the flexibility to work within their existing mandates to make marine wilderness a part of their conservation strategy.

For comparative purposes, the definition developed by the “Experts Group” at the

2004 Ocean Wilderness Workshop is:

Arcas of the marine environment that are untrammled and generally undisturbed by human activities and dedicated to the preservation of ecological integrity, biological diversity, and environmental health. An area of ocean wilderness may provide:

- opportunities for quiet appreciation and enjoyment in such a manner that will leave these areas unimpaired for future generations as ocean wilderness;
- continued opportunities for subsistence uses and indigenous cultural practices.

Clearly, the similarity with the definition put forward by the 2004 Roundtable “Experts Group” and the MWWG definition is striking. While the 2004 definition was more succinct, it embraces almost precisely the same key elements as those proposed by the MWWG.

The MWWG proposed a management goal for marine wilderness:
Protect and, maintain and restore the wilderness character of defined marine areas by protecting their ecological integrity, wild and natural appearance, biodiversity, ecosystem processes, and undeveloped quality and provide for the human use and enjoyment of these areas in ways that leaves them unimpaired.

They also put forward management objectives supporting this goal, which include:

- Maintain or restore the ecological integrity, wild and natural appearance, biodiversity, ecosystem processes of marine wilderness areas.
- Maintain and restore the undeveloped quality of marine wilderness areas. Under this objective, prohibiting permanent structures, human habitation (except as provided in a treaty with Indigenous community), and restricting use of motorized access are all mentioned as recommended management actions.
- Maintain the outstanding opportunities for solitude and recreation, and

opportunities for education and aesthetic enjoyment in marine wilderness areas.

- Respect cultural and religious practices of local indigenous people within the confines of the definition and management objectives and consistent with wilderness character and values.
- Manage marine wilderness following a publicly transparent process.

This proposed goal and framework, offered as a consensus position and developed by representatives of six wilderness management agencies in the US, Canada, and Mexico, is a significant achievement. This international consensus statement clearly defines what ocean wilderness is and how ocean wilderness should be managed, providing sufficient detail to offer practical guidance to wilderness managers. While this statement of policy has not been formally adopted by the agencies involved or the countries they represent, the fact that the working group was able to put forward a consensus statement, with the level of detail it contained, on this difficult and controversial topic was an impressive accomplishment.

What direct effect or influence this research has had on the success of the work of the MWWG is uncertain. If there is one element of the work of the MWWG that this research effort was most likely to have influenced, it would be spurring progress toward the consensus definition of ocean wilderness. The various publications, presentations, and, perhaps most importantly, ongoing and personal interactions by the author with many of the key participants in this important effort are likely to have had some underlying and supporting role in raising awareness as well as offering insight and recommendations regarding the various issues addressed by the Committee. There are more constituencies to be effectively engaged, particularly the traditional terrestrial wilderness advocacy community, a broader constituency of ocean users in North America, and ocean conservation agencies (that are not currently engaged in wilderness management) in order to arrive at a true consensus definition, but this is clearly a major step forward.

Implementation of this consensus definition by the MWWG will provide opportunities for the application of this research. Because many of the elements of the

consensus definition will require refinement and interpretation, the more detailed information and documentation provided in Chapters 2, 3, 4 and 5 will offer a firmer foundation for implementation.

The review of international wilderness law and policy reported in Chapter 2 offers benchmarks against which the MWWG policy can be evaluated (i.e. is it consistent with international norms and standards regarding how wilderness is defined?). It also suggests elements that may be added or enhanced as the definition is evaluated and refined.

The results of the ocean wilderness perceptions survey, presented in Chapter 3, provides some encouragement and affirmation of the support for the idea that ocean wilderness has merit and is valued by a key constituency of the wilderness community and perhaps the larger user community. Given the similarity of results between this and the previous ocean wilderness survey in the Great Barrier Reef Marine Park in Australia, there is some indication that this support may extend to broader constituencies.

The results of this survey clearly indicate strong support for the idea that wilderness is a concept that can be appropriately applied in the marine context, starting with the extension of wilderness designations into waters directly adjacent to established wilderness areas. This finding was highlighted in the survey findings from the assessment of wilderness quality of images of putative wilderness. The presence of land in these images and the suggestion that those lands might be designated wilderness both strongly influenced the perception of the adjacent waters as possessing wilderness qualities.

The strong emphasis on the importance of non-use values of ocean wilderness, a finding both in response to a direct question about this and in the responses to the “perceptions of ocean wilderness” sections of the survey, suggests opportunities for building a broader consensus with those who do not use wilderness simply for recreation. Again, such a finding expands the potential base of support for ocean wilderness designations to those who value these areas, but may never visit them.

The findings of the section of the survey related to identifying compatible uses of

ocean wilderness lends support to the management objectives identified by the MWWG in their policy, and provides important information for further developing the detailed guidance on activities that should be permitted or prohibited. The management survey (Chapter 4) offers insights into how managers of ocean wilderness perceive these areas, how they are currently managing them, and what they might need and desire to build capacity to do the job more effectively. The insights regarding essential attributes of wilderness provided in the survey both offers greater support for the MWWG definition, as well as greater clarity with regard to any attributes that should receive particular emphasis in selecting potential candidate areas and how they are managed.

The wilderness waters inventory in Chapter 4 also offers essential information for expanding wilderness areas into ocean and coastal waters. This inventory provides a comprehensive and well-documented description of the current scope and status of ocean wilderness in the US National Wilderness Preservation System (NWPS), containing information that can assist the MWWG in setting priorities and allocating resources to support the identification and stewardship of wilderness waters.

Similarly, the description and analysis provided in Chapter 5, addressing the MPA system context for wilderness waters, offers important information regarding which MPA networks, systems, and constituent programs currently include wilderness stewardship within the scope of their respective authorities. This information will be useful in guiding and informing the MWWG as to how ocean wilderness designations may be more effectively integrated into the evolving national MPA systems in North America, and the challenges that are likely to be faced in effectively achieving such integration.

The collaborative work of the MWWG established an important institutional foundation and appropriate mechanism for applying and utilizing much of the information and insight offered in this research. Its work is far from completed, but, given the progress thus far and the relatively short time in which the ocean wilderness definition and management objectives were completed, it is likely that additional steps toward fulfilling their mandate will be taken just as expeditiously.

7.3 Perceptions of Ocean Wilderness (Chapter 3)

Beginning from the now often referenced observation by Hendee and Dawson (2002) that “wilderness is what people think it is,” obtaining some sense of what “we think it is” constitutes a fundamental element of this research. With only one previous published survey that addressed perceptions of ocean wilderness (Shafer and Benzakin 1998), this work makes a significant contribution to our understanding of this arguably essential knowledge.

Based on the survey findings, the relatively strong support has been demonstrated within the target audience for the idea that ocean and coastal waters can be wilderness. Lending support to the findings of the previous study related to the spatial dimensions of ocean wilderness, these areas are perceived as multi-dimensional, encompassing the seabed, water column, surface and the airspace above. The findings also increase our understanding of the values identified as most important, human uses that may be compatible and incompatible, and the non-use values believed to be significant to such areas. Based on the striking similarity of the results of this study and the previous work conducted in Australia and involving frequent users of the Great Barrier Reef Marine Park, there may be justification for extrapolation of the findings to perceptions of other constituencies beyond the targeted participants of the studies. The results of the evaluation of the images of potential wilderness waters offered insights into what attributes an area of ocean wilderness is likely to possess and those it should not. As mentioned above, one of the most significant findings was that waters adjacent to land and designated wilderness along the coastline seemed to be most often perceived as having wilderness qualities, which could be important in identifying priority areas for future designation. There is much to learn from this survey, which is reflected in the many ways the findings could be used in future work on ocean wilderness mentioned throughout this chapter.

The survey was not without its limitations, however. The target audience was a potentially important constituency for future implementation of ocean wilderness, but was not by any means reflective of the broader public. The respondents were nearly all

white, well educated professionals, evenly split between men and women, a sex ratio that seemed to reflect the larger community of managers and scientists targeted, but gave no insight into the significant issue of how cultural background or ethnicity affects perceptions of ocean wilderness. Some of the questions posed in the survey could have been developed more strategically to provide insights into more subtle issues of interpretation. For example, the questions related to appropriate human uses in ocean wilderness failed to clearly stipulate which activities are routinely conducted from motorboats, and so the respondents may not have taken this into account if they were not familiar with these activities. The use of photographs to identify attributes of wilderness is a methodology subject to potentially significant bias (as discussed in detail in Chapter 3). Notwithstanding these limitations, the results of the analysis of the survey seemed to suggest that the findings were sufficiently robust to overcome these issues.

As was mentioned above, the results of the survey have potentially broad application, particularly in support of the work of the MWWG. If nothing else, the findings, taken as a whole, seem to make a compelling case that “what we think it is” includes ocean and coastal waters.

7.4 Existing Wilderness Waters and Management Framework (Chapter 4)

On any journey, finding the most favorable path to take requires knowing not only where you are headed, but also knowing where you are. If the goal is to expand and enhance the footprint of wilderness waters areas in North America, knowing what already exists is a necessary prerequisite. The comprehensive wilderness waters inventory, reported in Chapter 4, is that point of embarkation.

The results of this inventory clearly identified around 1.1 million acres (4,466 square kilometers) of ocean and coastal waters that have been designated as wilderness and are currently part of the NWPS. Based on the documentation provided in the “master” wilderness files of the wilderness management agencies, most of these areas of ocean and coastal waters were intentionally included in the designated wilderness boundaries, presumably to enhance opportunities for preserving the wilderness values and qualities of

these areas. While this is only 1% of the approximately 110 million acres of wilderness in the NWPS, this finding is significant. It indicates that, within the scope of the US Wilderness Act, ocean and coastal waters can be legitimately designated as wilderness. While the official record is often only barely sufficient to definitively determine what the framers of those wilderness designations actually intended by including “wilderness-adjacent waters” within formal boundaries of these areas, the fact remains that they exist and have been preserved under law.

The results of the management survey (summarized in Chapter 4) suggest that the effectiveness of the preservation of these areas may not be directly linked to current management practices. Findings of the wilderness waters inventory and management survey documented that some of the areas that appear to include wilderness waters are not being recognized as such by site managers. This seems particularly prevalent in situations where jurisdiction over the waters within the designated wilderness boundary are not within the full authority and control of the wilderness management agency. In such sites, some presumptive statutory prohibitions, such as those regarding motorized access, are not being actively enforced by site managers (what has been described here “administrative special provisions”). Where the wilderness status of these waters is acknowledged, the management survey found that managers believed that basic information and relevant expertise are insufficient at those sites to enable effective management. As the analysis of the survey concluded, it should not be too surprising that the wilderness stewardship of these areas would appear to be, in many cases, less robust than perhaps it could be. The management framework established for the wilderness waters of Glacier Bay NP&P (mentioned in Chapter 4) could provide a model for how this stewardship could be improved, but the management survey found that communication among managers of wilderness waters was not very common, so important guidance such as this was not often shared.

Insights into the question of what might be an appropriate management framework for ocean wilderness can be found in the Ocean Wilderness Perceptions Survey, presented in Chapter 3. Respondents to the survey were very consistent in their

belief that wilderness values and qualities were present in ocean and coastal waters, and that those qualities and values could be found on the water's surface, in the air above the water, on the seabed, and in the water column. Six attributes of wilderness were found to be most important to respondents, including: the amount of boat traffic, presence of human-made structures, amount of noise, opportunities for solitude, naturalness of the area, and opportunities to preserve biodiversity and ecosystem integrity in these areas.

Perceptions of the photographic images of putative wilderness areas seemed to strongly reinforce the importance of these attributes. Thresholds for degrading wilderness quality appeared to be very low. For example, the presence of *any* human-made structure in an image (or even where the perception existed that some structure or development was just outside the field of the photograph) appeared to be sufficient to cause respondents to reject the area depicted in the image as having wilderness qualities.

Clearly, the types and extent of appropriate human use was a central finding of the survey. Consistent with customary terrestrial wilderness management, motorized access and commercial uses (e.g. commercial fishing, shipping) were found to be antithetical to wilderness in ocean and coastal waters, while most recreational pursuits and Indigenous cultural heritage-related activities were perceived as considerably more compatible. This survey provides a great deal of detailed guidance for developing an effective management framework for ocean wilderness, and can offer much as management strategies are developed for these areas.

With regard to potential benefits that accrue from expanding wilderness designations into adjacent waters, while there are no empirical data or case studies to address this with complete objectivity, some sense of this can be extracted from the perceptions survey responses (Chapter 3). The perception of potential benefits is evident in the response to the questions in the survey regarding “wilderness-adjacent waters” as demonstrated by the overwhelming emphasis respondents placed on the proximity of designated wilderness on land affecting the perception of the wilderness qualities of the waters nearby. As discussed in Chapter 5, it was considered reasonable to suggest that if a visitor to wilderness is standing on the shore of a designated wilderness, and looking

out over jet skis and motorboats operating nearby, one could conclude that the solitude that visitor is seeking in this wilderness would be elusive. Additionally by inference, if the waters of a designated wilderness include seabird nesting areas or seal haul-out sites, it would again be reasonable to presume that the resources in the wilderness waters upon which these creatures rely for sustenance would be more effectively protected than if the waters were not within the designated wilderness. Identifying additional evidence of any benefits related to extending designations into “wilderness-adjacent waters” will have to wait until such an action is taken, and the results of this action evaluated, but intuitively, a reasonable case can be made that such benefits are likely.

7.5 Ocean Wilderness in the Context of MPA Networks and Systems (Chapter 5)

MPA networks and systems are growing and evolving throughout the world largely as a consequence of international agreements that have committed governments to expand their marine conservation efforts through the establishment of MPAs. In North America, both the US and Canada have ongoing efforts to establish national MPA systems, which offer opportunities to more effectively integrate and coordinate the constituent MPA programs in these countries. This research found that progress is being made, but challenges are being encountered in this effort related to agency inertia, “turf-battles,” and having sufficient resources to fully accomplish this considerable task.

Based on the analysis conducted for this research, of the eight protected area programs in the US and Canada with MPA stewardship responsibilities, four have wilderness programs currently within their statutory authority. The US wilderness programs (FWS and NPS) have existing designated wilderness waters within their respective systems (see Chapter 4), and Parks Canada appears to have some wilderness areas within the boundaries of their national parks, particularly in the Arctic. Based on available information from the management agencies and the results of the management survey, few of these designated wilderness areas are being actively managed as wilderness.

As to what the potential role might be for ocean wilderness within the context of MPA networks and systems again can only be inferred from the information collected in this analysis. Given that wilderness is already an element of half of the existing MPA programs, the leap to including oceans in their wilderness holdings would perhaps be a small one. With the exception of the sites currently within the US NWPS, none of the programs have formally recognized “wilderness waters” as a type of MPA, so the addition of ocean wilderness provides these programs with another tool to use in their efforts to effectively conserve ocean and coastal resources.

North American MPA programs, particularly in the Arctic region, are re-evaluating their approaches to conservation as a consequence of climate change, seeking new ways to help preserve fragile ecosystems in the North. Human activities in the Arctic are expanding and increasing (as discussed in Chapter 6), and MPAs are often put forward as a potential mechanism to address the likely adverse ecological impacts of climate change as well as the threats to the Indigenous communities and their way of life. Change brings both challenge and opportunity, and therefore the results of this research suggest that the timing for establishing ocean wilderness in this region may be fortuitous. Given the collaborative work of the MWWG, discussed above, the prognosis for establishing, and effectively managing, additional ocean wilderness in North America in the next several years could be favorable.

7.6 Co-Management of Ocean Wilderness with Indigenous Communities of the Arctic (Chapter 6)

The Arctic, a regional focus for this research, is a place both generally considered to be wilderness and where people live. The people who live there are largely Indigenous, including, but not limited to, the Aleut and Inupiat of Alaska, the Inuvialuit of Western Canada, the Sami of Scandinavia and Western Russia, and the Chukchi and Koryaks of Far-Eastern Russia. This region, encompassing some 40 million square kilometers, supports only about four million people (<http://arcticportal.org/people>), sparsely

populated in comparison with other regions around the world. No matter how sparse the population may be, this is “inhabited wilderness.”

Chapter 6 of this document addressed historical and contemporary relationships that these Arctic inhabitants and other Indigenous peoples from around the world have with the sea. Also, it describes and evaluates how they have interacted with the dominant culture with regard to preserving their ways of life and cultures, particularly in formalized agreements regarding the co-management of resources upon which they rely for physical and cultural sustenance. Chapter 6 also addresses what has been written about Aboriginal peoples’ perceptions of the dominant culture’s concept of “wilderness,” and the possible implications of these perceptions on the potential for expanded designation of wilderness waters in this region.

With regard to Indigenous perceptions of “wilderness,” the prevailing insight was that this is concept quite alien to most Aboriginal people, particularly in the Arctic (Klein 1994). What the dominant culture thinks of as wilderness, most Indigenous people think of as “home.” Most of their languages do not even have a commensurate word for “wilderness” (Martinez 2003). Despite this apparent cultural divide, it is reasonable to suggest that they clearly understand the concept as they have a long history of being dispossessed, physically, culturally, and spiritually, as a consequence of the dominant culture’s pursuit of wilderness preservation. Arguably, as discussed in Chapter 6, this is not a particularly firm foundation for expanding wilderness in Arctic Aboriginal homelands and waters, especially when compounded by the general discrimination and deprivations experienced by most Aboriginal people around the world in their dealings with the dominant culture.

Indigenous cultures were found to possess considerable historical and contemporary experience with stewardship of ocean and coastal waters. Chapter 6 describes the “customary management” of marine waters and resources by Aboriginal cultures, management which was both sophisticated and, in many cases, highly successful in achieving sustainable resource use. Further, in many instances, these waters were owned by the communities, under “marine tenure” arrangements, which persisted until

colonization. The evidence presented in this chapter suggests that more contemporary experience with resource management, largely through co-management agreements in North America, was far less successful.

Many examples and case studies of co-management were discussed and evaluated. With the exception of the highly successful co-management arrangement between the Council of the Haida Nation and Parks Canada regarding the management of the Gwaii Haanas National Park and National Marine Conservation Area Reserves in Northern British Columbia, few of these agreements could be described as “fully successful.” There was a high degree of skepticism and mistrust reported among the Aboriginal participants in these co-management processes. While there could be many reasons contributing to the observed lack of success, the analysis conducted for this work identified important factors contributing to the less than successful history of Indigenous co-management included:

- the lack of true, shared decision making
- the reluctance of national governments to fully recognize the sovereign rights of Indigenous peoples, particularly as regards ocean resources and uses beyond traditional subsistence activities
- the national governments’ perceived lack of appropriate respect for and commitment to these processes, recognizing the inherent value of co-management and what contributions Indigenous participants can offer in such processes
- the participants’ lack of sufficient attention to the essential trust-building required for effective collaboration

Another potentially important element of the success or failure of collaboration was identified as the integration of traditional ecological knowledge (TEK). The “knowledge-practice-belief complex” (Berkes 1999) of TEK was identified as having great potential to contribute the deep knowledge and wisdom of Indigenous people to enhance and expand our understanding of ecosystems, particularly where our customary science-based knowledge may be robust but perhaps insufficient. There is a considerable

body of literature addressing TEK and the challenges of effectively integrating this important knowledge into resource management efforts. The relevant research described and analyzed in Chapter 6 suggested that some of these challenges include:

- reluctance of Indigenous groups to share all or part of their knowledge, as well as issues of ownership and control over the use of TEK
- inability of researchers and managers to effectively engage in the required cross-cultural dialogue
- again, the lack of attention to building essential trust among the collaborators
- reluctance of the science and management community to accept the validity and relevance of this knowledge
- the legacy of colonialism impinging on the capacity of the non-indigenous researchers' to view TEK more objectively
- TEK is generally focused on knowledge of place, and may be insufficient in understanding ecosystem processes that operate at a larger geographic scale

Notwithstanding the significant challenges identified in this literature, this study concluded that these challenges had the potential be overcome utilizing the many recommendations offered by the researchers who have studied and analyzed this history of attempts at integration, as well employing the findings of the larger body of research that has been conducted on effective public engagement. The analysis further suggested that potential value of TEK to expand our knowledge and understanding of ecosystems, and the resources they support, more than exceeded the likely investment required in continuing to thoughtfully and respectfully engage willing Indigenous partners in this pursuit of effective integration.

One reason why this investment is warranted is climate change and its implications with regard to achieving some acceptable level of sustainability in places valued by both Indigenous and non-Indigenous people. Some relevant observations and conclusions were offered in this Chapter.

As a result of the review and analysis of the relevant literature, a key observation is that the impact of climate change is an immediate concern. Significant changes in Arctic ecosystems, and the resources sustained by that system, are currently being documented, analyzed, and management responses are being developed. The lives and cultures of the people of the Arctic are changing at a rate where adaptation cannot keep pace with this accelerating rate of change. The permanent sea ice cover of the Arctic Ocean is retreating to an extent where seemingly each year a new record is established.

The research being conducted suggests that not only are species ranges expanding northward, as water temperatures rise, but ice-dependent species like polar bears and “ice-obligate” seal species, are exhibiting population declines associated with behavioral changes that adversely affect their survival. Many of these ecosystem changes are translating into major concerns for the Arctic people who rely on these resources for their physical and cultural sustenance and subsistence. Chapter 6 provides a summary of the available research that is identifying these changes and the challenges they present to Arctic communities.

As has been proposed a number of times in this discussion, change brings both challenges and opportunities. While there is little likelihood that the trajectory of these changes can be altered sufficiently to slow or reverse the trends being reported, the establishment of protected areas in the Arctic can provide more active opportunities for preserving what can be preserved and can help raise public awareness and support for addressing these challenges to the extent possible. Ocean wilderness designations may be another important tool in the “marine conservation toolbox” to specifically address preserving the wilderness values of this region. The literature suggests that trade-offs will have to be made, as many of the human uses of Arctic waters will greatly intensify in the coming years. However, protected areas and ocean wilderness can offer the opportunity to help achieve some balance between use and preservation. The Arctic has been described as our “last great wilderness,” and it is reasonable to suggest that some of it should be preserved for future generations. This can be done only with the effective

engagement, and perhaps the leadership, of the Indigenous people of the Arctic who have the deep knowledge of place, and arguably the most to lose.

Any concerted effort to establish additional ocean wilderness in places like the Arctic will require greater public awareness and support for preserving the wilderness values of this region. Building essential constituencies of support for this monumental task represents another significant challenge which was mentioned many times in this document. While discussion and analysis of this issue was not driven by any *a priori* objective or research questions, it is an essential element of the work that lies ahead.

7.7 Opportunities for Building Constituencies of Support

There is a need to build and expand support for ocean wilderness among a broad spectrum of users, advocates, and the public if additional wilderness waters have any chance of being established. Effective engagement requires a strategic approach, as it involves considerable time and effort, and identifying the key players is a necessary first step toward formulating an appropriate strategy. Unquestionably, the support of the traditional wilderness community is critical to future implementation of ocean wilderness. Ocean user groups, particularly those involved with extractive uses, are another key constituency to engage. A third constituency that will require more engagement is the ocean and coastal management community, especially the agencies that are not currently involved in wilderness stewardship. Chapter 6 highlights two other important issues regarding engagement. The first concerns the Indigenous community, whose current views of wilderness are perhaps best characterized as “skeptical.” The other is to more effectively address race, class, gender and other cultural groups in this engagement. In order to secure support from the broadest sweep of potential constituencies, ocean wilderness must be relevant to their lives, livelihoods and aspirations. To move forward, attention will have to be given to this necessary engagement.

With regard to the traditional wilderness community, the fact that the North American wilderness management agencies have arrived at a consensus definition will be quite helpful. There is some deference to the wilderness management agencies in this

arena and their acceptance will have some positive influence. The MWWG consensus definition is reasonably detailed, broad in scope, and addresses many of the key issues involved in implementation in a way that is consistent with the US Wilderness Act and other relevant wilderness stewardship statutes in North America. This should provide some level of assurance that what is being proposed would not unnecessarily dilute the underlying strength of the protections afforded to wilderness under existing law and policy. Attention will have to be focused on reaching out to this community, but many of their potential objections should have been addressed in the careful wording of the consensus definition.

Another outstanding issue identified in this research is the potential for expanding the already controversial atmosphere surrounding wilderness designations generally as a result of attempts to identify and establish more ocean and coastal areas as wilderness. How this ultimately plays out will depend to some degree on how receptive the ocean users and ocean and coastal management agencies, and their supporting constituencies, might be with regard to the idea. The US Congress and Canadian Parliament will likely respond to potential ocean wilderness designations taking their cues from the level of opposition or support seen in their constituencies. This is being written at a time when the US Congress, and to a somewhat lesser extent, the Canadian Parliament are being confronted with a fiscal crisis of arguably historic proportions, and the economic and political implications of wilderness designations may rise and fall on the tide of the economy. It may take a while for the “dust to settle” before these governments can objectively and constructively evaluate wilderness designations without the dominant concern being potential adverse impacts to economic recovery.

With regard to the ocean user community and the (non-wilderness management) regulatory agencies that manage their activities, this engagement will require some strategic outreach and education, perhaps better undertaken before a major controversy develops over some particular area being considered for ocean wilderness designation. It is widely accepted among those skilled and experienced in public engagement related to resource conservation that simply drawing lines on a map can generate controversy

(Delaney 2003) and make it considerably more difficult to address the issues involved, overcome positions that become entrenched, or attempt to rationally and systematically find common ground among participants in the process. Again, having a clearly articulated and detailed definition and management framework as provided in the consensus definition will help to frame this engagement. Many times, drawn from years of experience, a particular constituency may not like or agree with some action taken as part of the establishment of a protected area, but they may be more likely to acquiesce if the designation offers greater consistency and predictability. If they know that a certain area is “off limits” to their activity, this predictability has some value to them as a kind of “trade-off” for agreeing not to escalate their opposition.

There are those in the ocean user community that may be inclined to support the designation of ocean wilderness, particularly those who are involved with recreational pursuits. The MWWG consensus definition unambiguously includes an exception to the prohibition on commercial uses that applies to “compatible recreational uses.” Clearly, having supportive ocean users at the table can be invaluable in both being sure they are fully engaged and as a balancing force in the group dynamics at work during consultation sessions. “Buy-in” by ocean users is critical, not only in the establishment process, but also afterward, to help ensure compliance with the regulations imposed. In reality, likely candidates for ocean wilderness areas will be remote and isolated places and actual users may be limited. In the approximately 100,000 sq. mile area of the Papahānaumokuākea Marine National Monument, only around eight commercial fishermen were displaced by the Monument proclamation, yet commercial fishing organizations in the Western Pacific, and indeed throughout the US, were strong opponents nonetheless. It is the “slippery slope” perception that drives this opposition. If it is proposed for this remote and isolated area, it is only a matter of time, opponents believe, before it comes to their fishing ground, oil and gas field, or shipping lane. This is where consistency is important, where areas unworthy of wilderness designation, but being considered for political reasons, need to be rejected as possible candidates. It is impractical to suggest that all conflicts with users can or should be avoided in seeking out potential candidates for ocean wilderness

designations, but succumbing to political pressure to consider areas that may possess only marginal wilderness values and qualities is never a wise thing to do. Linking potential ocean wilderness to existing designated terrestrial wilderness areas may be a strategy, at least in the beginning, which can offer a stronger case to be made for establishing such areas. It would provide an opportunity to enhance existing wilderness stewardship, which is likely to resonate with traditional wilderness advocates, creating “the tide that lifts all boats.” As regards most things, the caution of Hippocrates to “first, do no harm” is sage advice indeed.

Unfortunately, this caution is likely moot in the case of Indigenous communities. As was discussed in Chapter 6, native communities have a long history of conflict with the dominant culture’s establishment of wilderness areas. Here, effective engagement will almost certainly require empowerment through co-management. Both in the US and Canada, Indigenous communities are seeking more autonomy and self-governance. Changing the attitudes and perceptions of these communities will require more than a transparent and inclusive process for establishment of wilderness, no matter how well executed and well-meaning it might be. Managers of ocean wilderness programs should look upon this as an opportunity to establish new and innovative management structures for these sites. They should embrace these opportunities to learn and expand their way of thinking about these special places from people who have lived there for, in many cases, centuries, and who possess traditional knowledge that can offer new insights into the ecological complexity of those places and how sustainability of resource use can be achieved. Managers will have to develop new skill sets and devote sufficient time to build trust. They will also need to learn how to effectively support rather than lead, how to give up the power of being the ultimate decision maker as has been done so successfully by Parks Canada at Gwaii Haanas National Park Reserve and National Marine Conservation Area Reserve. Particularly in the North, the future prospects for ocean wilderness greatly depend on how effectively the empowerment ocean wilderness designation may provide is communicated, and ultimately, successfully implemented.

This work has begun the process of identifying those that most need to be

engaged when the idea of ocean wilderness is implemented, but has also succeeded in engaging a number of key players. Certainly, the wilderness management community has been successfully engaged, if the work of the MWWG is any indication, through publications, presentations, and ocean wilderness-focused sessions at the Roundtable and the World Wilderness Congresses. The simple fact that a consensus definition of ocean wilderness has been developed by these North American agencies and specifically called out as a priority in the international agreement is a clear signal, amid the noise, that the awareness of ocean wilderness, and the potential benefits of expanding ocean wilderness to more ocean and coastal waters, is a message being received. The engagement of the more than 250 scientists and managers, most from wilderness management agencies in the US and Canada, by their responding to the ocean wilderness survey for this research helped to reach a key constituency with this message. Just offering the opportunity to participate in this survey to more than 1000 participants at the George Wright Biennial Conference, undoubtedly raised awareness of the idea of ocean wilderness whether these participants responded or not. The wilderness management survey, discussed in Chapter 4, targeting managers of existing wilderness waters areas, also very effectively engaged this important constituency, managers who are already in a position to effect change in the way we view and manage ocean wilderness today. While much more will need to be done, and the contribution of this work may be increasingly important as the idea is implemented, it could be modestly suggested that the research conducted here has catalyzed the progress made to this point.

7.8 Recommendations: Contributing to “the Enduring Resource of Wilderness”

Ocean wilderness has great potential to contribute to sustaining and expanding “the enduring resource of wilderness” in North America. More clearly articulating this potential has to be part of the strategy for moving forward, as a new idea seeking acceptance. Implementing ocean wilderness must enhance our wilderness programs, provide the public with a clear message that these ocean and coastal areas are also an essential part of our history and heritage, and would contribute to preserving highly-

valued wilderness areas we want and need. At least in the beginning, it will be necessary to unambiguously demonstrate this “value-added.”

7.8.1 Validate the Existing Wilderness Waters Inventory

The Inventory of existing wilderness waters offered in this work is comprehensive and based on information contained in the wilderness “master files” of the NPS and FWS. Careful consideration was given to all the information assembled, and a conservative approach was adopted for identifying existing ocean wilderness designations. However carefully evaluated, this inventory is one person’s interpretation of the collected information. In many cases, the available information was incomplete, and the identification was based on “official maps” of the areas that were generally drawn by hand and may have not reflected the true boundaries at a scale where the finer details could be accurately discerned. Where published descriptions of key boundary coordinates were included in the file, this information was also utilized in addition to the maps and any relevant supplementary documents. The inventory represents the best information available and as consistent an interpretation of the documents discovered, but it has not been verified by the agencies with jurisdiction over these wilderness areas.

Recommendation 1: *The National Park Service and Fish and Wildlife Service should conduct a formal evaluation of the wilderness waters inventory developed in this research to appropriately determine the location and extent of existing ocean wilderness areas.*

Once this evaluation has been completed, it should be made available to agency managers and the public to clarify the formally accepted boundaries of these wilderness waters. This evaluation should also clearly articulate any “special provisions” provided in the laws designating these areas that address any activities that might be permitted that would otherwise be prohibited under the Wilderness Act.

7.8.2 Expand and Enhance Stewardship of Existing Wilderness Waters

An obvious first step in demonstrating the important “value-added” would be to begin to provide appropriate stewardship of existing ocean wilderness. Chapter 4 offers, for the first time, a comprehensive inventory of areas where current wilderness designations include ocean and coastal waters. The publically available information for these sites consistently offers the statement that these wilderness areas are being managed in accordance with existing wilderness laws and policies. While this statement may be true insofar as it represents a broad statement of intent, the results of the management survey for these areas (as provided in Chapter 4), suggests that few of the currently designated wilderness waters areas are actually being managed as wilderness.

There are a number of reasons offered by those managers as to why this is the case, but three seem to be most commonly put forward. The first is that the authority to regulate human activities in waters and submerged lands within state territorial waters (i.e. within 3 nautical miles of the coastline) rests with the states as conveyed by the Submerged Lands Act of 1953 (43 U.S.C. § 1301 et seq.). There are some exceptions, such as Glacier Bay, where, in 2005, the U.S. Supreme Court (*Alaska v. United States*, 125 S. Ct. 2137) ruled that the submerged lands within the Park were owned by the Federal government because the park was established prior to Alaska statehood and the original National Monument proclamation included the submerged lands. However, states have primary jurisdiction where the courts have not ruled otherwise, and in a few cases where the states have voluntarily acceded jurisdiction for other reasons, usually related to implementing collaborative management arrangements.

In some instances, managers of areas identified in the wilderness waters inventory (Chapter 5) responded that they did not consider these waters to be part of the designated wilderness, despite the fact that they were included in the map of the area referenced in the statutory designation. While this jurisdictional issue presents an obstacle to recognizing and protecting these areas as wilderness, it is not insurmountable. As discussed in Chapter 5, the US Fish and Wildlife Service (FWS), in 1992, forged an agreement with the State of Florida giving the FWS “the right to manage for public

purposes” all islands, tidal lands, and submerged lands throughout the Refuges (State of Florida and FWS 1992). While not yielding their entire jurisdiction over the submerged lands, the State of Florida made an accommodation, through this agreement with FWS, to share its authority for these submerged lands and overlying waters. Ocean and coastal waters are a “commons,” “owned by none” but perhaps paradoxically “owned by all.” The issue here is not ownership, in a strict sense of the word, but the authority to manage these areas in a manner consistent with statutory requirements established under the Wilderness Act.

Recommendation 2: *a) A comprehensive and detailed analysis of legal jurisdiction in wilderness waters should be conducted. b) Case studies of where partnerships (such as that developed in the Florida Keys Refuges) have been adopted to create innovative mechanisms to empower collaborative management should be described and assessed in terms of their “on the ground” effectiveness and practicality. c) Appropriate training should be developed and made available to wilderness waters managers regarding this topic (see further discussion of “training,” below). d) Managers of protected areas that include wilderness waters should be encouraged to engage relevant state agencies in discussions of potential collaborative mechanisms for implementing appropriate stewardship for these designated wilderness waters areas.*

The second reason put forward by wilderness waters managers as to why they are not managing these areas as wilderness is that, unlike the land areas within the designated wilderness boundary, there is a lack of knowledge regarding the resources and qualities of these areas, and of the values that should be preserved as a part of effective wilderness stewardship. Few of the areas in the inventory have ongoing characterization and monitoring programs beyond the shoreline, and managers in these predominantly “land management agencies” are less familiar with managing coastal and ocean waters than they are with managing coastal lands and islands. The “invisible wall” is much in evidence here. Sufficient knowledge of the resources present, the spatial and temporal

patterns of human uses that can have adverse impacts on these resources, and a working knowledge by managers - whose training and experience is largely focused on terrestrial protected areas - of coastal and marine conservation science are unquestionably lacking for most of these designated areas. It is understandable that so few areas of wilderness waters are receiving appropriate protection. As one eminent NPS scientist once observed, such places need to be more than just “blue areas on our maps.”

There are a number of excellent existing programs in the NPS and FWS that systematically address inventory and monitoring at their parks and refuges. These basic functions necessary to support effective management could be expanded and enhanced at sites with wilderness waters to offer a better knowledge base upon which effective stewardship of these areas could be achieved.

Recommendation 3: *a) Wilderness management agencies should develop appropriate protocols for inventory and monitoring of designated wilderness waters. b) These protocols should be effectively and efficiently integrated into their established inventory and monitoring programs.*

The third common response to why wilderness waters are not receiving stewardship attention is a lack of trained personnel familiar with the management of ocean and coastal waters as wilderness. While the management survey suggested that additional training and communication among those with similar responsibilities for management of ocean wilderness areas would be welcomed and utilized, such opportunities do not currently exist. As discussed in Chapter 5, while this discipline is emerging, a training program based on what is already known, and what can be shared among practitioners during the conduct of such training would be a good start.

Recommendation 4: *a) Wilderness management agencies, in cooperation with the international Marine Wilderness Working Group, should collaborate with the Arthur Carhart National Wilderness Training Center staff to develop a training curriculum and*

program addressing ocean wilderness stewardship. b) As a part of that training program, mechanisms should be identified to establish a forum for wilderness waters managers to facilitate the sharing of ideas, issues and strategies for effective ocean wilderness stewardship. c) Wilderness management agencies, and sites with wilderness waters (or ocean resources generally) within their jurisdiction should seek out opportunities for communication and collaboration with marine protected areas (MPAs) managers, particularly for sites that have MPAs nearby or with which they already have some coordination. Staff exchanges, special sessions at professional meetings, and other means of encouraging communication and collaboration should be identified and utilized.

Funding was identified as a fourth impediment to effective ocean wilderness stewardship, but it is a topic beyond the scope of this research. Managers (especially including the author) have often focused on a lack of financial support as reasons for not being able to implement new and expanded programs and initiatives. This perspective is largely justified, as managers of most protected areas, both on the land and in the sea, are provided with insufficient resources to do the full extent of the job for which they have been given responsibility. No recommendation provided in this or any other document will change this situation. However, it is hoped that as interest in wilderness waters grows, and this elusive but important “value-added” is demonstrated, more financial support for ocean wilderness stewardship will be forthcoming.

One strategy that may be helpful in this regard is to encourage academic and government resource economists to conduct research on establishing the economic value of ocean wilderness, encompassing both “use” and “non-use” values. A single published paper appears to exist on this topic (Doeleman 1990). Barr et al. (2003) provided an overview of the topic of non-use values of marine protected areas and offers recommended methodologies to conduct such studies. Recently, resource economists from NOAA have conducted a number of economic valuation studies of national marine sanctuaries, and marine reserves within those sites, that include both market and non-market valuation methodologies (<http://sanctuaries.noaa.gov/science/socioeconomic/>

pdfs/valuation.pdf). Not only could this research serve as a model for robustly assessing the value of wilderness waters, but also offer information potentially applicable to this topic. Being able to point to an actual calculated value for such areas sometimes has political impact, and could offer opportunities for enhancing financial resources appropriated to wilderness management agencies for wilderness waters stewardship.

While not without challenges, some perhaps significant, providing stronger stewardship for existing wilderness waters is perhaps “low-hanging fruit.” The marine conservation community has been addressing many of these management issues for decades, principally in the development and implementation of fully protected marine reserves and reserve networks, and much of this knowledge is directly transferrable. What will be required, however, will be for the wilderness management agencies to more fully embrace the idea of ocean wilderness, beyond the recent progress made through the MWWG in the international arena. Our collective way of thinking about wilderness will have to change, to broaden and expand to include ocean and coastal waters, but this may not be the formidable task it may seem, given the results of the ocean wilderness perceptions survey reported in Chapter 3. As research on wilderness is conducted and analyzed, as policy is crafted and implemented, as education and outreach documents are developed, as we discuss with one another this truly exceptional “enduring resource of wilderness,” our vision of wilderness must penetrate this “invisible wall.”

7.8.3 Expanding the “Footprint”: Identify and Establish Ocean Wilderness

The MWWG has undertaken another important task, “examining potential candidate marine wilderness sites” throughout North America. While the challenge of developing a consensus definition was considerable, this task represents a far greater challenge. This is where it is strategically essential to keep in mind the guiding principle that progress on ocean wilderness is likely to be most effective when it is done in a way that enhances our collective goal of preserving wilderness generally. To the extent practicable, it should integrate with our existing wilderness preservation efforts, programs, and institutions rather than be conceived as something new, unique, and apart. It is an

opportunity to demonstrate, in a tangible way, the “value-added” of expanding our wilderness system into the sea.

One of the surprising results of the perceptions survey, reported in Chapter 4, was the clear preference for ocean wilderness in coastal areas over those in the open ocean. When respondents were questioned about their perception of “ocean wilderness” while viewing the images provided, the outcome was striking. The analysis suggested that coastal areas (i.e. images that included both land and sea) were far more likely to be rated as possessing “perceived high ocean wilderness quality” than images of open ocean areas. When this line of questioning was extended further to ask whether knowing that the land was designated wilderness would that affect the perception of the water area as ocean wilderness, the preference was even stronger. This stated preference was too overwhelming to be misinterpreted. There was a definite correlation between the presence of designated wilderness on land and the perception of wilderness qualities in the adjacent waters. Clearly, this lends support to the idea that if one were seeking “candidate sites for marine wilderness” and demonstrating “value-added” to wilderness stewardship generally through new ocean wilderness designations, one should start this process by locating and evaluating coastal and ocean waters that are adjacent to currently designated land wilderness areas. In Chapter 4, such areas were termed “wilderness-adjacent waters.”

Generally with regard to coastal wilderness, where boundaries end at the shoreline, there are obvious potential benefits to extending the wilderness boundary seaward, as discussed above. These nearshore waters are generally areas where human activity is concentrated, and where the impacts of that activity are observed most routinely. As suggested by Vincent (2011), we should consider “saving the shallows...focusing marine conservation where people might care.” It is the places people care about that truly define what wilderness should be.

There are many potential candidates for “wilderness-adjacent waters” in the preliminary inventory along the Arctic coastal areas of Alaska, as reported in Chapter 5. The vast majority of the designated wilderness areas there extend only to mean high

water (MHW) for their seaward boundaries. While a more comprehensive analysis of “MHW boundary wilderness” has not been conducted, it would be safe to speculate that this region is not unusual in this regard. While the Bureau of Land Management and the US Forest Service are both wilderness management agencies in the US, and both have stewardship responsibility for coastal wilderness areas, none of the wildernesses under their jurisdiction extend beyond MHW. The NPS and FWS also have many of the “MHW boundary wilderness” areas along all coasts of the US, including the Great Lakes, and a number of them have boundaries of refuges, National Parks and National Seashores that extend into coastal and ocean waters (examples include Fire Island National Seashore, and Apostle Islands National Lakeshore, and both include coastal wilderness designations). However, few of these nearshore areas have been designated as wilderness. Given the likely large number of candidates for potential designations, this offers many different and varied opportunities to enhance the protection of wilderness values for these established wilderness designations.

Recommendation 5: *Initiatives to identify and evaluate potential ocean wilderness should focus on existing “MHW boundary” wilderness areas. This would provide opportunities to show how ocean wilderness can synergistically enhance wilderness stewardship for both marine and terrestrial wilderness.*

This recommendation is particularly targeted at the MWWG, who will likely be engaged in such an initiative in the near term. Such a strategy would more likely help to garner support for ocean wilderness in the traditional wilderness community and wilderness management agencies by demonstrating the potential “value-added” that ocean wilderness has to offer.

Another rationale for focusing on “wilderness-adjacent waters” is a practical one. The cost of operating a place-based marine protected area is considerable. Personnel, vessels, vehicles, constructing and maintaining facilities, both administrative and visitor centers, research, monitoring, education, outreach, enforcement, coordination with

partners near and far, and a host of other operational requirements require significant resources to do the job effectively. The farther the seaward boundary of that MPA is from land, the greater the operational costs. Based on long personal experience and observation, MPAs managed out of some central headquarters facility in an area far from the site are rarely effective. Place-based protected areas can only become more than “paper parks” if they have a presence in the community, are known and earn the trust of that community, and are focused on that place, its resources, and its challenges. Nearshore areas adjacent to designated wilderness can be more effectively and efficiently managed using the existing staff, facilities and programs already in operation to oversee the protected area within which the terrestrial wilderness is located. Clearly, there would be an increase in the cost of doing business if “wilderness-adjacent waters” were added to the boundary of the existing wilderness, but this cost would be far less than having to create a management infrastructure “from the ground up.”

The final justification for advocating a priority for evaluating “wilderness-adjacent waters” is institutional. The current wilderness management agencies in North America rarely are given, or seek, jurisdiction over waters adjacent to their protected areas very far from the shore. Nearly all the seaward boundaries of National Parks and National Wildlife Refuges are confined to the waters within three nautical miles of the land, and none of these Parks or Refuges include only coastal and ocean waters. All are firmly grounded on the land. There are other MPA programs that have been established to conserve and protect these open-ocean areas within the Exclusive Economic Zones. In the US, this is principally the National Oceanic and Atmospheric Administration’s National Marine Sanctuary System, and in Canada, both the National Marine Conservation Areas (NMCA) Program at Parks Canada, and the “Ocean Act MPAs” in the Department of Fisheries and Oceans fill this role (as discussed in Chapter 2). None of these programs currently manages wilderness, nor are they empowered to do so under their statutory authorities, at least formally under the US Wilderness Act and the Canadian laws and policies that are relevant to designating wilderness. This could change. There is precedent for adding additional wilderness management agencies in the

US. The Federal Land Policy and Management Act of 1972 (P.L. 94-579) vested the Bureau of Land Management (BLM) with the authority to manage wilderness areas, to make recommendations to Congress regarding BLM lands suitable for designation as wilderness, and to include these BLM-managed wildernesses as part of the National Wilderness Preservation System. The likelihood that Congress would convey a similar authority to the National Marine Sanctuary System is an open question, but the agency would likely have to actively seek that authority. NOAA has expressed no interest to take this step. While the National Marine Conservation Areas Program in Canada is part of the Parks Canada Agency, which is empowered to designate and manage wilderness zones in the National Parks, they have chosen not to include wilderness areas in their current zoning scheme for NMCAs, and it does not seem likely they would embrace this, given past discussions with leadership of the NMCA Program regarding ocean wilderness. Therefore, as the situation currently stands, only the existing wilderness management programs have the authority to recommend designation of wilderness, and it would be more efficient to seek ocean wilderness designations only for areas within their jurisdictional authority, or areas that are potentially within that authority. While open-ocean areas may indeed be “wilderness,” formal designations are not really practical, or perhaps even possible, at the present time.

Another existing, routine mechanism that would greatly assist in identifying and potentially establishing ocean wilderness areas is the updating of management plans for sites with existing wilderness areas. Wilderness management agencies in both the US and Canada are currently required under their authorities to address wilderness suitability as part of the management planning process. While there are some exceptions, ocean and coastal waters adjacent to wilderness, and adjacent to coastal lands within the protected area determined to be suitable for wilderness, seem to be largely ignored in this process. Apostle Islands National Lakeshore is one exception, where, in their last management plan update, waters surrounding portions of the park were considered, but ultimately not included. The ongoing management planning process at the Arctic NWR (<http://arctic.fws.gov/ccp.htm>) has also included a review of their “MPA areas”

encompassing some 100,000 acres of coastal and ocean waters. In this process, they have preliminarily concluded that the adjacent waters areas already designated and managed as wilderness, and those in the MPA areas being managed under the “minimal management” category, are sufficient to protect the ecological integrity of the Refuge. While neither of these examples ultimately resulted in the designation of additional wilderness waters, the fact that these reviews were conducted should serve as a model for future management planning.

Recommendation 6: *a) An analysis of past management plan reviews should be conducted by wilderness management agencies to identify and evaluate how they were conducted, and recommend “best practices” concerning procedures and policies for conducting future wilderness reviews involving adjacent waters. b) As a part of the conduct of management planning activities for all coastal protected areas, wilderness management agencies should evaluate potential wilderness suitability for waters adjacent to existing designated wilderness areas, utilizing the procedures and policies developed in Recommendation 5(a). Where these areas are found suitable, they should be reserved as “potential wilderness,” and included in wilderness recommendations made to Congress arising from that evaluation.*

Notwithstanding whether recommendations for wilderness designation are made in these reviews, or Congress (or the wilderness management agency in Canada) actually acts on those recommendations, these evaluations should be conducted more routinely, particularly where the boundary of the protected area already extends beyond the shoreline. This would be especially important in areas within MPA boundaries where the authority over submerged lands within these boundaries was retained in Federal ownership (i.e. where the protected area was established prior to statehood; Glacier Bay National Park and Preserve, the Arctic National Wildlife Refuge, and certain National Wildlife Refuges in the Hawaiian Islands and Western Pacific, are examples).

Stepping back a bit to look at the bigger picture, a number of methodologies have

been proposed to identify potential ocean wilderness areas based on the physical attributes of the area. Certainly, the Halpern et al. (2008) “map of human impact on marine ecosystems” is an example of this on a global scale. Utilizing 17 “anthropogenic drivers of ecological change,” from shipping and fishing to pollution and climate change effects, the map generated offers a truly big picture perspective of where the “imprint of man” may be least evident. More recent work by Andrew et al. (2012) on mapping *de facto* wilderness in the boreal forest of Canada, focusing on landscape structure, also offers a robust methodology for identifying the geographic extent of areas of a particular biome, on a continental scale, that possess the physical attributes of wilderness.

More of these exercises identifying potential ocean wilderness have been regional in scale. Henry and Husby (1995) mapped the Barents Sea region of the Arctic using four physical attributes related to “remoteness” and “naturalness.” Carver et al. (2002), Fritz and Carver (1998), Fritz et al. (1999), Fritz et al. (2000), from the Wildlands Research Institute at the University of Leeds in the UK, have been engaged in wilderness mapping using a number of physical attributes potentially indicative of wilderness quality, also focusing largely on remoteness and naturalness, and have advanced this approach considerably. Undoubtedly, the current global emphasis on marine spatial planning (Ehler 2008, Ehler and Douvère 2009) will offer considerably more data and information that can be utilized to identify potential ocean wilderness based on physical attributes and patterns and extent of human uses of ocean and coastal waters. An interesting example of how marine spatial planning may be useful in this regard is provided in a recent paper by Stelzenmuller et al. (2010).

Although these mapping exercises are useful and perhaps even necessary, they are not sufficient. It is the intangible qualities of wilderness that give it value, that resonates with us emotionally and spiritually, that makes us want to preserve wilderness as an “enduring resource.” If Hendee and Dawson’s (2002) definition of wilderness, that “is what people think it is,” is valid, then people must be part of the equation in its identification, not simply GIS coverages representing what adverse impacts their presence in potential wilderness leave behind.

It is interesting to note that some wilderness areas are named for champions of wilderness. The Mollie Beattie Wilderness in the Arctic Refuge, the Philip Burton Wilderness at Point Reyes National Seashore, and the Bob Marshall “Wilderness of No Return” (known within the wilderness community simply as “The Bob”) are all examples of this phenomenon. We celebrate wilderness as places, places people have struggled to preserve, places we love and through which we are enriched and sustained. This attachment is a critical element of how we go about identifying wilderness and it should be part of the foundation of any proposed process to identify and evaluate potential ocean wilderness. The wilderness mapping approach of Kliskey and Kearsley (1993), which assesses the value of potential wilderness using, in part, the perceptions of people who visit these places, embodies this essential element.

Recommendation 7: *The identification of ocean wilderness should include some measure of the intangible values of wilderness, should not be based simply on physical attributes and human impacts. These are intended to be places people value and appreciate, where place-attachment is a critical element of the equation. Therefore, some measure of the potential value people attribute to places identified should be an important consideration in the identification process.*

Jacques Cousteau, echoing the words of Senegalese poet and naturalist Baba Dioum, once said “we protect what we love” (<http://www.cousteau.org/about-us/justice>). If we only identify areas of coastal and ocean waters that fit some preconceived set of physical parameters as ocean wilderness, this is only half the battle, and perhaps the easiest part as such areas also tend to be those that contain few resources of any economic value for exploitation. Consistent with the “worthless lands hypothesis” of Runte (1973), wilderness may be remote, may be inaccessible, and may be devoid of the visual “imprint of man’s work,” but it may also not be valued by anyone, not considered one of the special places society expects our wilderness areas to be. Selecting areas that no one cares about may make the establishment process less rancorous, but what have we

protected in the end? This may be another reason to more aggressively promote the idea, suggested above, of research into the non-market (“non-use”) valuation of ocean wilderness areas. Clearly, developing some sense of the intangible values of ocean wilderness would be most helpful in fulfilling this recommendation.

Another less romantic, more practical reason to rely heavily on place-attachment as part of the ocean wilderness identification process is that the more people want to preserve an area, the more likely it will be that there will be voluntary compliance with the rules established to preserve that area. If there is little “buy-in” to a designation of wilderness, or any protected area, the regulatory compliance will almost certainly be inadequate, and greater resources would have to be allocated to active enforcement. If wilderness are places people visit and appreciate because they find freedom from the influence of civilization, cops with badges and guns are not the sort of thing one would hope to encounter there. As wilderness is generally remote and isolated, enforcement is a costly and demanding part of the operation of protected areas, requiring considerable financial resources to deployment of enforcement officers. The challenges of doing this in a “wilderness-appropriate” way (such as the use of horses and even dogsleds for transportation of enforcement rangers in terrestrial wilderness) make voluntary compliance an important goal.

There have been suggestions that wilderness is everywhere in the ocean, particularly the vast open ocean which is indeed remote and wild by any definition. The idea of wilderness has even been recently evoked in reference to the deep-sea areas (Ramirez-Llodra et al. 2011), which are undoubtedly remote, nearly inaccessible, and perhaps worthy of preservation in some cases. However, based on the results of the ocean wilderness survey, discussed above and in Chapter 4, the idea of open sea as wilderness does not seem to resonate with at least this target audience. While at some point in the future, after ocean wilderness has attained a bit more of a foothold in the wilderness community, when we can objectively and knowledgeably assess the wilderness value of these areas, and determine whether these areas, too, are deserving of formal wilderness designation, this may be something to pursue. However, at this point

in time, it would seem advisable to save this discussion for some other day. As a practical matter, as discussed above, there are significant institutional barriers to designating open-ocean areas in any case. When we have a better sense of what we really mean when we take the formal step of designating wilderness, and resolve many of the operational, and jurisdictional, issues of protecting such vast and remote areas of the sea, it will be time to strike a course to the sea beyond the horizon.

7.8.4 Explore Opportunities for Indigenous Ocean Wilderness Co-Management

As discussed in Chapter 6, one strategy for building constituencies of support for ocean wilderness would be to seek out and forge effective co-management arrangements for such areas with native and Indigenous communities. While this could be done in many regions, as has been in the case of the highly effective co-management accord between the Council of the Haida Nation and Parks Canada at Gwaii Haanas, an argument has been made here that the most advantageous place to explore this idea may be in the North American Arctic. Many of the points made in support of this idea have been articulated in Chapter 6, but there is one more worthy of mention and emphasis. The political power of the Native Alaskans and Aboriginal groups in Canada is growing. The Canadian Government is beginning to pay closer attention to Aboriginal governments when they are seeking something that relates to autonomy and self-government. The situation in Alaska in this regard is considerably less deferential, but the US government is increasingly showing greater interest in Arctic issues, and has begun to listen a little more intently to the Native Alaskan perspectives being offered on a wide range of issues. Indigenous groups in the Arctic are becoming highly skilled in strategically positioning themselves politically in matters that can have an affect on their progress toward greater autonomy. There is a clear sense that when they want something to happen, it will happen, perhaps not tomorrow or next year, but it will come to pass. Aligning with these groups not only will improve the chances that some area of ocean and coastal waters that is important to them would ultimately achieve designation, but there would be much to learn from them in the process of achieving that goal. This is not

to suggest, in any way, that seeking strategic alliances with native and indigenous communities would be solely for the purpose of achieving ocean wilderness designations. There is much to gain, and to learn, from establishing effective co-management arrangements with people who know the land and sea, people who have lived on that land and sustained themselves from that land and sea for centuries, and who trust enough to enter into such a collaboration. But, choosing partners wisely is a critical element of any successful initiative.

Much effort would have to be exerted to forge such an agreement, given the history between the dominant culture and Native and Indigenous groups. Building trust is particularly important. Areas that possess the potential for co-management will have to be identified, and it is likely that a considerable investment of time will be required to build that trust sufficiently to even get to the point of tabling an idea for a proposal. The “speculative process” for approaching co-management of ocean wilderness summarized in Chapter 6 offers at least one way forward within the existing public process framework. Clearly, this is not something that can be implemented as a “first step,” but will require that many small steps be taken to clear the path where that first step will be planted.

Recommendation 8: *Native and Indigenous communities should be actively engaged in identifying and evaluating potential ocean wilderness areas, particularly in the Arctic. Their counsel should be sought and honored. When opportunities are presented to begin discussions on potential co-management, wilderness management agencies should be prepared to invest the time and attention required to nurture and foster these important relationships, acting in a way that builds the trust needed for successful collaboration. Wilderness managers should seek out the advice of those involved in successful co-management arrangements, such as the one between Parks Canada and the Council of the Haida Nation, to become more familiar with what they have learned along the way.*

The agenda for action proposed here is not intended to be exhaustive. However, it

represents some of the highest priority steps that now need to be taken if further progress on the implementation of ocean wilderness is the desired outcome. They are offered as the actions that have the greatest “return on investment” and should be priorities with regard to potentially advancing the ocean wilderness idea. Other opportunities may arise that are unanticipated and should be given serious consideration, notwithstanding whether they fit neatly into this agenda for action. The ultimate goal is to see if the idea of ocean wilderness should be broadly embraced, if more ocean wilderness should be designated, and how to improve effective stewardship of these areas. The course you take to get there is less important than successfully arriving at the destination. As Napoleon Bonaparte once said, *On s'engage et puis on voit!* (“One jumps into the fray, then figures out what to do next.”) (<http://www.corporate-partnering.com/info/strategic-alliances-and-partnerings-quotes2.htm>)

7.9 Concluding Remarks

Although much progress has been made regarding ocean wilderness since this work was initiated more than six years ago, there is a great deal more to do. Ocean wilderness could become something more than an interesting idea that gets bandied about every few years by the next generation of ocean conservationists and wilderness managers, inspirational speakers at wilderness conferences, and aspiring academics that need a dissertation topic. This work has not answered all the questions that need to be answered nor even asked all the questions that need to be asked, but it is a beginning. We now have some idea of what ocean wilderness is, and what we know is robust enough to contribute to a North American consensus on what that definition should be. We have a better sense of how wilderness is defined globally, and have some new ideas for how that information can potentially help to move us forward. There is a reasonably definitive, comprehensive inventory of wilderness waters that exist in the United States that identifies where we are now. Our perceptions, those of a key constituency of ocean wilderness including resource managers and scientists, now have been analyzed and deconstructed, and what has been learned is quite illuminating and instructive. Managers

of some of the existing wilderness waters areas have contributed their perspective and recommendations, and these, too, are most helpful in guiding and prioritizing future actions. We better understand the institutions and agencies that are engaged in marine conservation and ocean management, and how their work potentially relates to ocean wilderness. A potential target region for implementation has been identified and some hopefully compelling arguments have been made to help to justify this selection. Additionally, the clear preference for highly-valued ocean and coastal waters adjacent to existing designated wilderness, identified in the Wilderness Waters Survey, may offer useful guidance in establishing priorities for how to move forward with a greater chance of success. However, while our navigation is better informed and it seems that we have been already underway for a long time, it is likely that we have not yet even left the safety of the harbor.

One can only hope that the work he or she does will help to guide and inform, and in the best possible world, inspire others to action. In this case, it would appear that this outcome is being realized, if the work of the MWWG is any indication. There is much to do, more research to be conducted, more policy discussions in which to engage, more consensus to be built, more successes to achieve and failures from which much more can be learned. However, enough is known now to enable moving forward into implementation, to learn by doing, to formulate questions and solve the problems encountered while doing the hard work. If anything important was illuminated by the Ocean Wilderness Survey, it was that this is an idea that has considerable support from those who will ultimately be the ones to do that hard work. Not all the “i’s” have been dotted, nor the “t’s” crossed perhaps, but enough words have been written to get the meaning; to get the sense of what is being said. Ocean wilderness can fill a void in both marine conservation and wilderness stewardship that has been empty, or nearly so, for too long a time. Perhaps the only way to see if this is an idea worth pursuing is to pursue it.

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Appendices

Appendix 1: Institutional Review Board (IRB) Documents. Ocean Wilderness Perceptions Survey

Appendix 1A: IRB Approval for Ocean Wilderness Survey, 9 March 2011.

From: Kelly McLain <no-reply@irbnet.org>
Subject: IRBNet Board Action
Date: March 9, 2011 3:14:54 PM EST
To: Bradley Barr <bwbarr@alaska.edu>
Reply-To: Kelly McLain <kamclain@uaa.alaska.edu>

Please note that University of Alaska Anchorage IRB has taken the following action on IRBNet:

Project Title: [222783-3] Ocean Wilderness Perceptions Survey
Principal Investigator: Bradley Barr

Submission Type: Revision
Date Submitted: March 1, 2011

Action: APPROVED
Effective Date: March 9, 2011
Review Type: Exempt Review

Should you have any questions you may contact Kelly McLain at kamclain@uaa.alaska.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org

Appendix 1B: IRB Closure for Ocean Wilderness Survey, 8 February 2012.

From: Kelly McLain <no-reply@irbnet.org>
Subject: IRBNet Board Action
Date: February 8, 2012 5:11:13 PM EST
To: Bradley Barr <bwbarr@alaska.edu>, Andrew Kliskey <afadk@uaa.alaska.edu>
Reply-To: Kelly McLain <kamclain@uaa.alaska.edu>

Please note that University of Alaska Anchorage IRB has taken the following action on IRBNet:

Project Title: [222783-4] Ocean Wilderness Perceptions Survey
Principal Investigator: Bradley Barr

Submission Type: Closure/Final Report
Date Submitted: February 7, 2012

Action: APPROVED
Effective Date: February 8, 2012
Review Type: Administrative Review

Should you have any questions you may contact Kelly McLain at kamclain@uaa.alaska.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org

Appendix 2: Description and Analysis of Images Used in Ocean Wilderness Perceptions Survey

Figure A2-1: Image 1 (Survey Questions 7-10)



Glacier Bay Wilderness, Alaska

Description: Aerial photograph (no elevation available) of park waters, which includes snow-capped mountains and glaciers in the distance and lower topographic relief point of land in the foreground, separated by water. Colors are very vibrant, and the image resolution is very clear. Sky has low-hanging clouds around some of the mountains, and the picture is framed on the top and left side by light clouds through which the aircraft was flying when the picture was taken. The horizon is level. There are no visible signs of any human presence. This is a picture of designated wilderness of a site that does include wilderness waters. Picture source: <http://www.wilderness.net>.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	103227	45	2936
Sky	93546	41	1525
Water	32327	14	1583
Total Area	229100		

Table A2-1: Response Summaries/Supplemental Analysis for Questions 7-10

Q7: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters."

Answer Options	Response Percent	Response Count
STRONGLY AGREE	68.8%	148
AGREE	23.7%	51
NEUTRAL	4.2%	9
DISAGREE	0.5%	1
STRONGLY DISAGREE	0.0%	0
NOT SURE	2.8%	6
	<i>answered question</i>	215
	<i>skipped question</i>	37

Q8: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	68	92
ELEMENT/ATTRIBUTE THAT DIMINISHED	16	21
IMAGE ISSUES OF SCALE/CONTENT	12	15
ISSUES WITH USE OF IMAGES TO ID WW	2	3
ISSUES WITH WW HAVING WILDERNESS QUALITIES	3	4
	<i>answered question</i>	135
	<i>skipped question</i>	90

Image Index = 7*

Q9: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

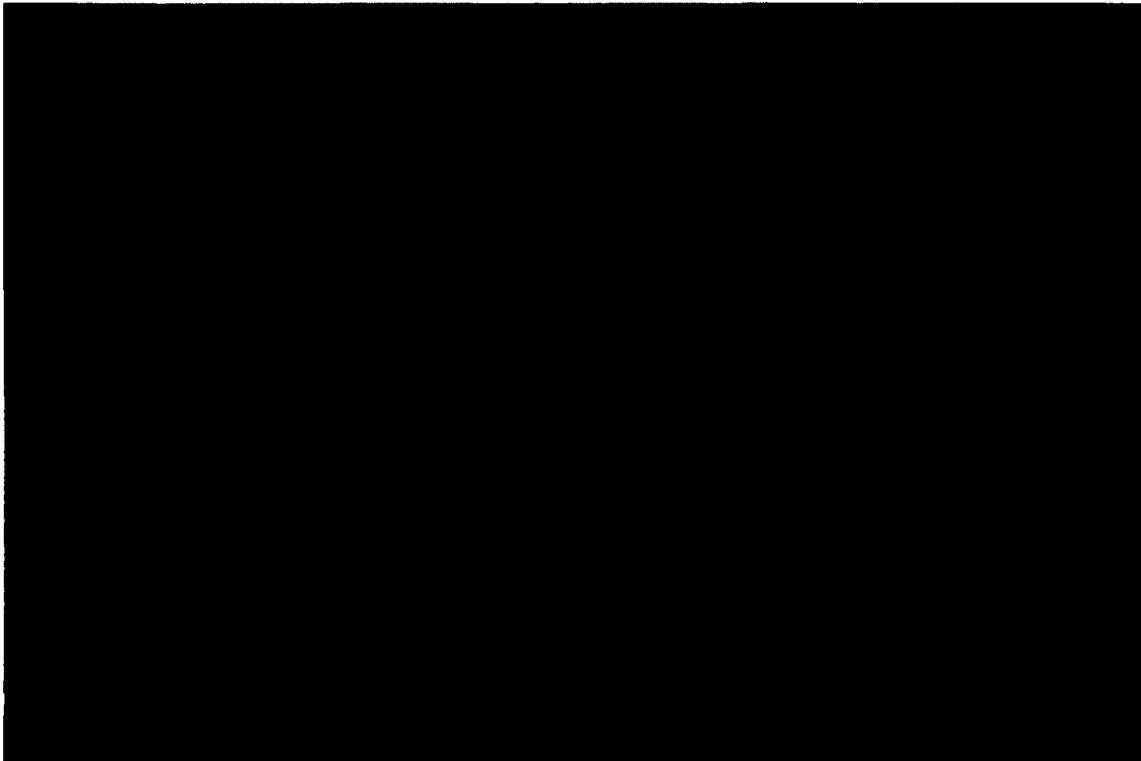
Answer Options	Response Percent	Response Count
YES	45.1%	96
NO	47.9%	102
NOT SURE	7.0%	15
	<i>answered question</i>	213
	<i>skipped question</i>	39

Q10: If you were told that these adjacent land areas are designated wilderness, would this affect

Answer Options	Response Percent	Response Count
YES	66.0%	142
NO	26.0%	56
NOT SURE	7.9%	17
	<i>answered question</i>	215
	<i>skipped question</i>	37

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-2: Image 2 (Survey Questions 11-13)



Northwestern Hawaiian Islands Deep Reef and Galapagos Shark

Description: This is an underwater image from Maro Reef in the Northwestern Hawaiian Islands that includes a coral reef with a Galapagos shark swimming nearby. The reef is made up of very low topography corals, and the colors of the coral are muted by the very blue water through which the picture was taken, but characteristic of many of the deeper reefs in this region. The waters beyond the share are a very deep and vivid blue, and the water clarity is excellent. The shark is the only fish in the frame of the photo, which is also typical of the reefs of the NWHI, which is a "predator-dominated ecosystem." There are no signs of human-induced impacts to this reef area, as the waters of the NWHI are thought to be relatively free of anthropogenic physical perturbation. Picture source: NOAA/Robert Schwemmer, 2005.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Reef	119796	52	1572
Shark	8069	4	721
Water	101804	44	1769
Total Area	229100		

Table A2-2: Response Summaries/Supplemental Analysis for Questions 11-13

Q11: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	14.9%	32
AGREE	25.1%	54
NEUTRAL	32.1%	69
DISAGREE	8.8%	19
STRONGLY DISAGREE	1.4%	3
NOT SURE	17.7%	38
	<i>answered question</i>	215
	<i>skipped question</i>	37

Q12: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	15	24
ELEMENT/ATTRIBUTE THAT DIMINISHED	45	74
IMAGE ISSUES OF SCALE/CONTENT	39	64
ISSUES WITH USE OF IMAGES TO ID WW	1	2
ISSUES WITH WW HAVING WILDERNESS QUALITIES	1	1
	<i>answered question</i>	165
	<i>skipped question</i>	60

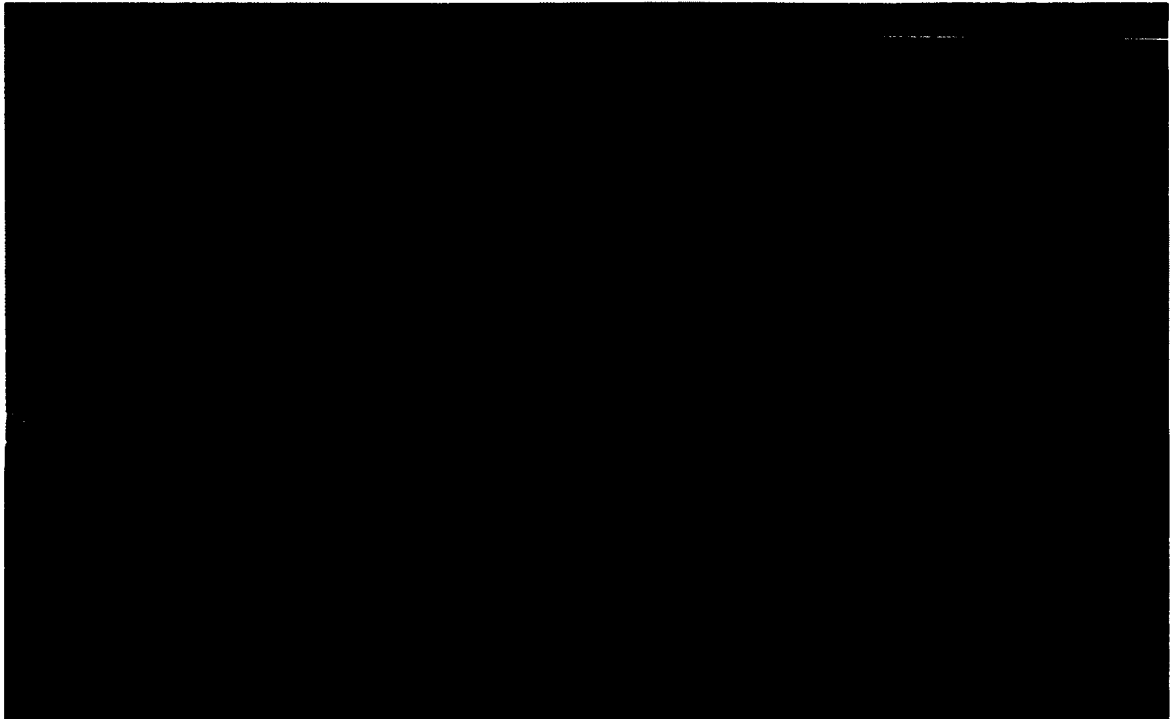
Image Index = 33*

Q13: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Answer Options	Response Percent	Response Count
YES		60.7%	130
NO		25.2%	54
NOT SURE		14.0%	30
		<i>answered question</i>	214
		<i>skipped question</i>	38

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-3: Image 3 (Survey Questions 14-17)



Barren (Nord) Island, Alaska

Description: Nord Island, within the Barren Islands archipelago, is located in the Gulf of Alaska at the entrance to Cook Inlet, and is part of the Alaska Maritime NWR (but are not designated wilderness). These islands are one of the most biologically diverse and productive in the region, supporting half a million breeding seabirds representing 18 species, as well as sea lions, seals, sea otters, and humpback whales, among other marine mammals. The picture is specifically of Nord Island, one of seven in this archipelago, which is the second most prolific in terms of seabird breeding colonies. The island has low profile, green vegetation, exposed sheer rock cliffs, and generally high topographic relief. The waters surrounding the island are deep blue, and the sky is lighter blue with high, thin clouds, which highlights the green vegetation of this rocky island. The island shows no trace of any human presence or history of use, and there is no wildlife visible in the image. The photo was taken from a ship a few miles from the island, and shows the entirety of the island, and a portion of another in the background. Photo Source: Brad Barr, 2001.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	22919	10	1328
Sky	128224	56	1782
Water	78519	34	1452
Total Area	229100		

Table A2-3: Response Summaries/Supplemental Analysis for Questions 14-17

Q14: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	47.0%	101
AGREE	43.7%	94
NEUTRAL	5.6%	12
DISAGREE	0.9%	2
STRONGLY DISAGREE	0.0%	0
NOT SURE	2.8%	6
	<i>answered question</i>	215
	<i>skipped question</i>	37

Q15: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	56	78
ELEMENT/ATTRIBUTE THAT DIMINISHED	9	13
IMAGE ISSUES OF SCALE/CONTENT	32	45
ISSUES WITH USE OF IMAGES TO ID WW	2	2
ISSUES WITH WW HAVING WILDERNESS QUALITIES	1	1
	<i>answered question</i>	139
	<i>skipped question</i>	86

Image Index = 21*

Q16: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

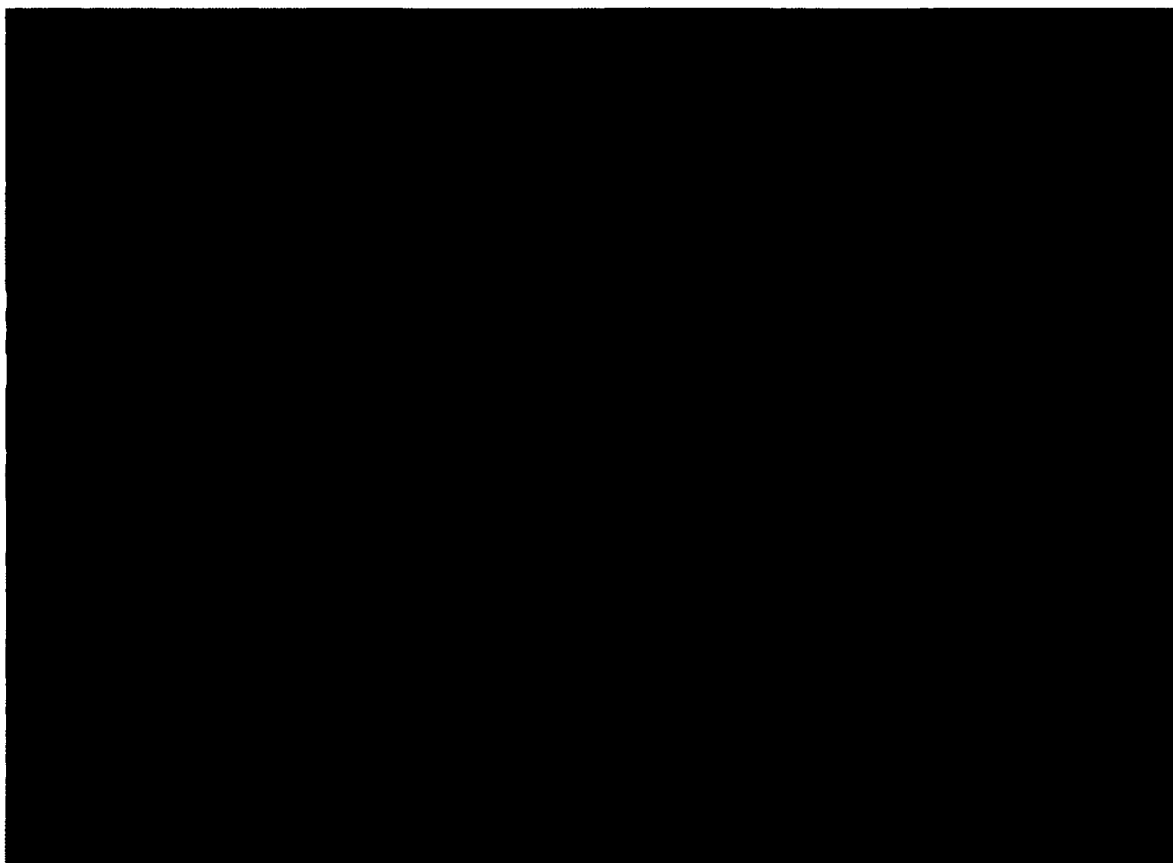
Answer Options	Response Percent	Response Count
YES	51.9%	111
NO	44.4%	95
NOT SURE	3.7%	8
	<i>answered question</i>	214
	<i>skipped question</i>	38

Q17: "If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	69.3%	147
NO	23.6%	50
NOT SURE	7.1%	15
	<i>answered question</i>	212
	<i>skipped question</i>	40

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-4: Image 4 (Survey Questions 18-20)



Summer Sea Ice off Barrow, Alaska

Description: This is a picture of sea ice taken from the beach in Barrow, AK, in August of 2009. The picture is largely dominated by grey tones, except for the light blue tint of some of the larger pieces of sea-ice. Because the ice is close to the beach, and has incorporated sediment from rafting on the shore, some of the ice has a "dirty" appearance, and has rafted together and up-turned as new ice has blown ashore, giving some roughness to the sea-ice surface. The sea-ice is both in the foreground of the picture, and further offshore. There is no wildlife present in the picture, nor is there any indication of human presence. The portion of the beach from which the photo was taken is seaward of the coastal road leading toward Point Barrow between the village and the Inupiat summer fishing camps, separated from the road by a small sand dune and the area is largely free of development or habitation, but houses can be seen in the distance from this location, landward of the road to the East and West. Photo Source: Brad Barr, 2009.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Ice	128901	56	5783
Sky	46400	20	1330
Water	53417	24	5628
Total Area	229100		

Table A2-4: Response Summary/Supplemental Analysis for Questions 18-20

Q18: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	39.9%	85
AGREE	36.2%	77
NEUTRAL	14.1%	30
DISAGREE	2.8%	6
STRONGLY DISAGREE	0.5%	1
NOT SURE	6.6%	14
	<i>answered question</i>	213
	<i>skipped question</i>	39

Q19: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	56	78
ELEMENT/ATTRIBUTE THAT DIMINISHED	9	13
IMAGE ISSUES OF SCALE/CONTENT	32	45
ISSUES WITH USE OF IMAGES TO ID WW	2	2
ISSUES WITH WW HAVING WILDERNESS QUALITIES	1	1
	<i>answered question</i>	139
	<i>skipped question</i>	86

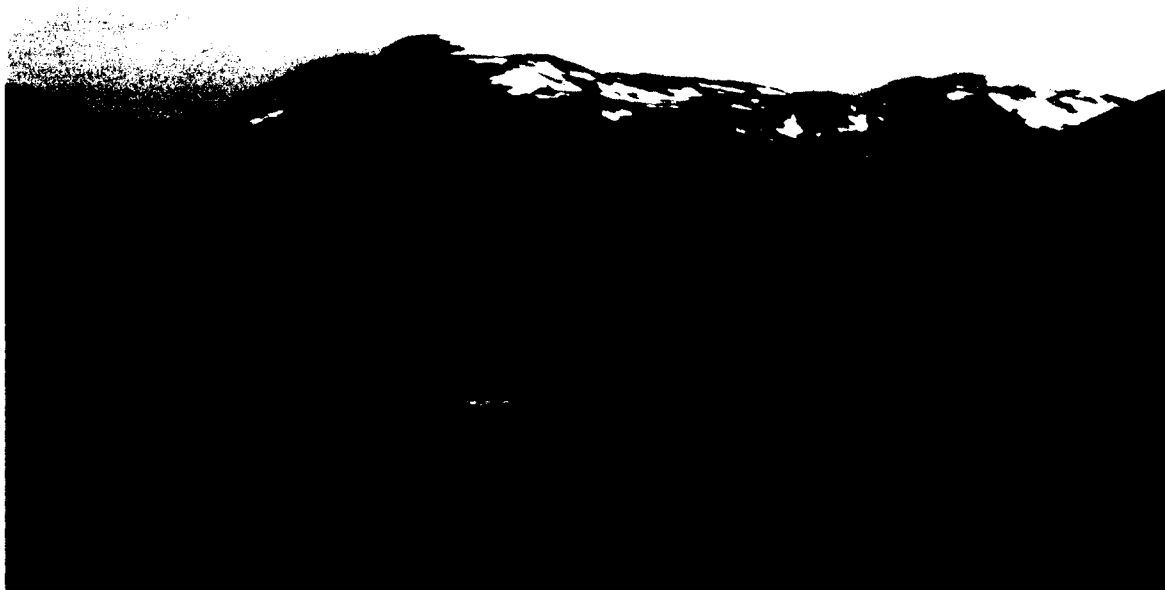
Image Index = 21*

Q20: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Response Percent	Response Count
YES	65.2%	137
NO	26.7%	56
NOT SURE	8.1%	17
	<i>answered question</i>	210
	<i>skipped question</i>	42

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-5: Image 5 (Survey Questions 21-24)



Francisco Coloane Marine Park, Chile

Description: This is a photograph of an area within the Francisco Coloane Marine Park located in the waters adjacent to the Strait of Magellan in Southern Chile, a formally designated marine protected area managed by the Chilean Ministry of the Environment. It is a biologically rich area with many seabirds and marine mammals, particularly humpback whales and a number of smaller porpoises and dolphins. It is approximately 180 km Southwest of Punta Arenas, and has only two tourism operations on the land adjacent to the park with limited facilities, so there is very little development in the region, although the park is located near the main shipping channel for the Strait, which averages three ship-transits per day. The picture shows the typical mountainous terrain of the area, with alpine glaciers on the mountaintops. The photo was taken from a ship, and shows, in the distance two zodiacs headed for the shore, one about two km from the ship and another farther away. The image is largely gray, from overcast skies, but also shows a deep green forest vegetation at the lower elevations. A picture of this same area, taken from a slightly different angle (Q44-47) without the zodiacs, was also used in the survey. Photo Source: Brad Barr, 2011

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	83410	36	1475
Sky	58086	25	1422
Water	87988	39	1474
Total Area	229100		

Table A2-5: Response Summary/Supplemental Analysis for Questions 21-24

Q21: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	27.2%	58
AGREE	49.3%	105
NEUTRAL	9.9%	21
DISAGREE	8.5%	18
STRONGLY DISAGREE	1.4%	3
NOT SURE	3.8%	8
	<i>answered question</i>	213
	<i>skipped question</i>	39

Q22: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	18	28
ELEMENT/ATTRIBUTE THAT DIMINISHED IMAGE ISSUES OF SCALE/CONTENT	73	112
ISSUES WITH USE OF IMAGES TO ID WW	8	12
ISSUES WITH WW HAVING WILDERNESS QUALITIES	1	1
	0	0
	<i>answered question</i>	153
	<i>skipped question</i>	72

Image Index = 5*

Q23: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

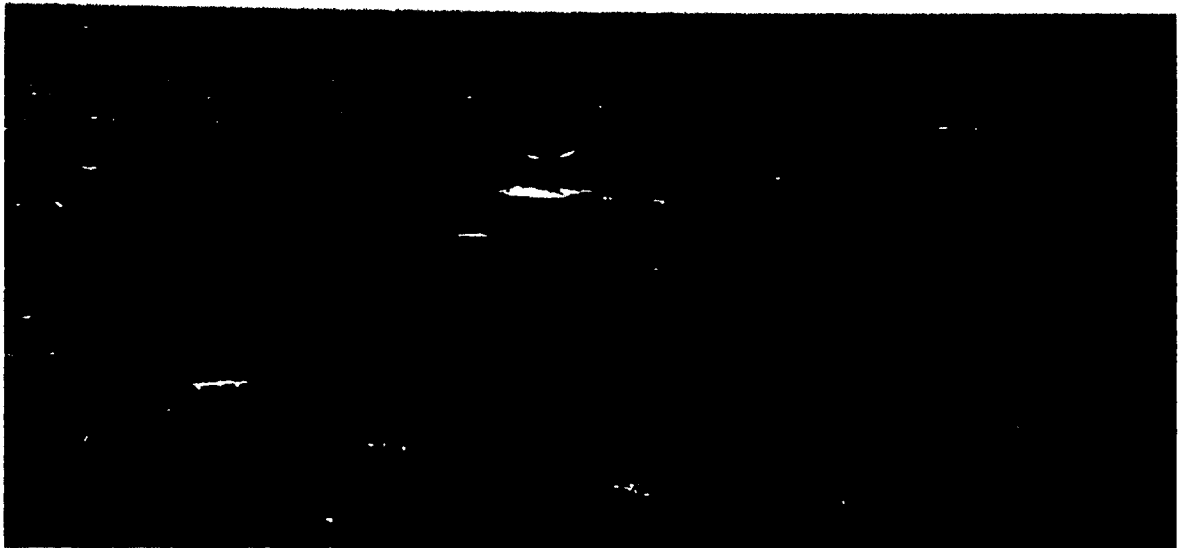
Answer Options	Response Percent	Response Count
YES	50.5%	106
NO	44.8%	94
NOT SURE	4.8%	10
	<i>answered question</i>	210
	<i>skipped question</i>	42

Q24: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	65.7%	138
NO	23.8%	50
NOT SURE	10.5%	22
	<i>answered question</i>	210
	<i>skipped question</i>	42

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-6: Image 6 (Survey Questions 25-27)



Bering Sea, Alaska

Description: This photograph was taken in the Northern Bering Sea in 2001 from a ship transiting North toward the Bering Strait, and includes the flukes of a sounding juvenile Humpback whale about a km to the Southeast. The precise location of the area captured in the image is unknown. It is relatively far offshore, but mountains, or islands with steep topography, can barely be seen in the distance in the upper left corner of the image. No other wildlife is visible in the picture. The sky is a light blue, the water a darker blue. The image is slightly overexposed, but the resolution is relatively good. It appears to have been a day when there was moisture in the air, creating some haze. There were no other vessels present, except the ship from which the photo was taken, anywhere in the vicinity, nor are there any signs of human activity in the image, as this is a relatively remote area with little human presence. Photo source: Brad Barr, 2001.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Sky	73020	32	1414
Water	156017	68	1702
Total Area	229100		

Table A2-6: Response Summary/Supplemental Analysis for Questions 25-27

Q25: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	35.5%	75
AGREE	37.0%	78
NEUTRAL	18.0%	38
DISAGREE	0.9%	2
STRONGLY DISAGREE	0.0%	0
NOT SURE	8.5%	18
	<i>answered question</i>	211
	<i>skipped question</i>	41

Q26: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	51	66
ELEMENT/ATTRIBUTE THAT DIMINISHED	13	17
IMAGE ISSUES OF SCALE/CONTENT	35	46
ISSUES WITH USE OF IMAGES TO ID WW	1	1
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	130
	<i>skipped question</i>	95

Image Index = 22*

Q27: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Response Percent	Response Count
YES	59.2%	125
NO	32.2%	68
NOT SURE	8.5%	18
	<i>answered question</i>	211
	<i>skipped question</i>	41

* "Image Index" = [{"Image Issues of Scale/Content"} / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-7: Image 7 (Survey Questions 28-31)



Seahorse Island, Chukchi Sea, Alaska

Description: This is an aerial photograph taken at low altitude (around 500-600 feet) of the Seahorse Islands, located near Wainwright, AK, near Point Franklin along the coast of the Chukchi Sea. It is part of a barrier island complex and is characterized by low topography and no vegetation. It is in an area where more frequent coastal storms (due to climate change and longer periods of sea-ice) are causing significant erosion of the shoreline. It is also an area where a number of significant historical events occurred related to losses of many whaling ships in the 1870's, as the area behind the island was a harbor of refuge from ice and storms, and a considerable amount of whaling was conducted in this area (until about 1914). While some wreckage from these events is still present in the area, none is evident in this photo. There is otherwise little visitation to this area, and no indication of human activity or signs of human-related alteration of the environment. It is an area that supports many migratory bird species seasonally, as well as whales, seals, walrus, polar bears, and other marine mammals, but for much of the year it is ice-covered. The resolution of the picture is excellent, and water clear enough to see the bottom in many places. Photo source: NOAA/Robert Schwemmer, 2008.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	16406	7	2519
Sky	43564	19	1305
Water	168858	74	4327
Total Area	229100		

Table A2-7: Response Summary/Supplemental Analysis for Questions 28-31

Q28: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	39.3%	83
AGREE	42.7%	90
NEUTRAL	10.4%	22
DISAGREE	0.9%	2
STRONGLY DISAGREE	0.5%	1
NOT SURE	6.2%	13
	<i>answered question</i>	211
	<i>skipped question</i>	41

Q29: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	61	70
ELEMENT/ATTRIBUTE THAT DIMINISHED	9	11
IMAGE ISSUES OF SCALE/CONTENT	29	33
ISSUES WITH USE OF IMAGES TO ID WW	1	1
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	115
	<i>skipped question</i>	110

Image Index = 16

Q30: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

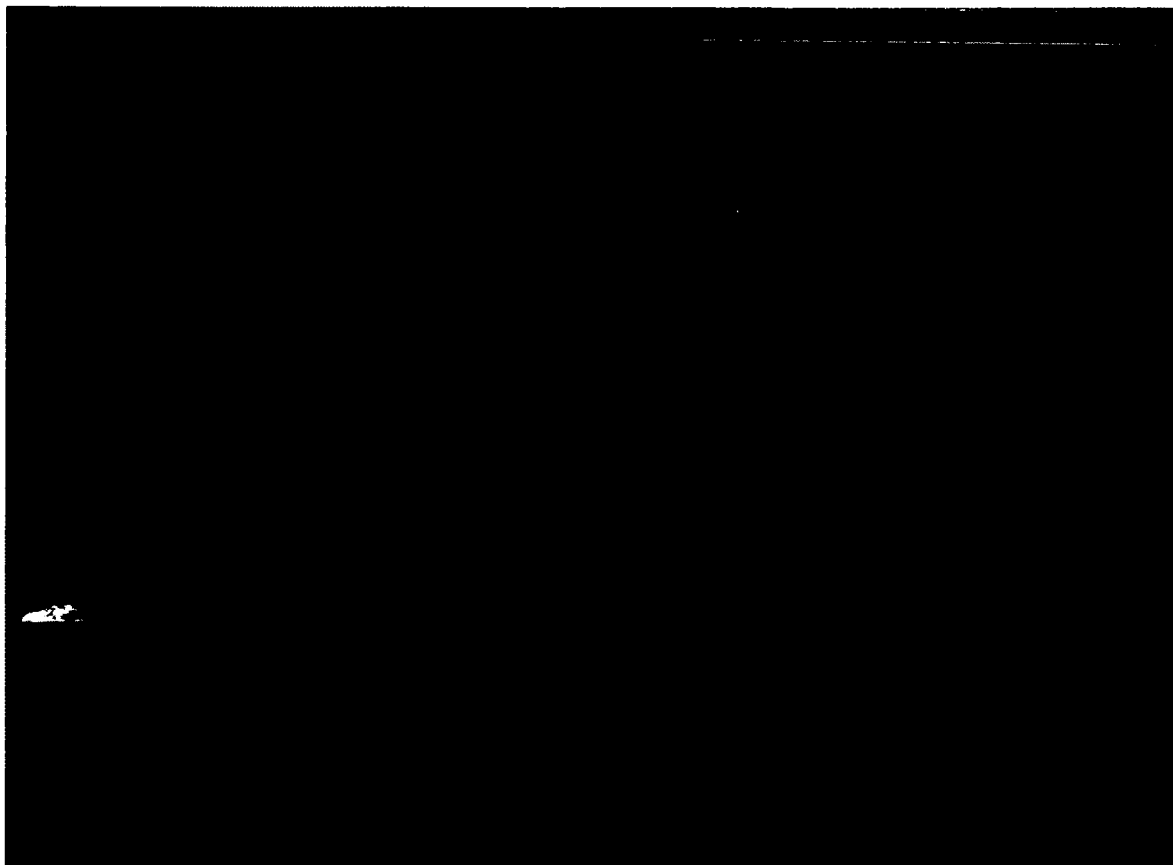
Answer Options	Response Percent	Response Count
YES	50.2%	105
NO	42.6%	89
NOT SURE	7.2%	15
	<i>answered question</i>	209
	<i>skipped question</i>	43

Q31: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	67.6%	138
NO	25.5%	52
NOT SURE	6.9%	14
	<i>answered question</i>	204
	<i>skipped question</i>	48

* "Image Index" = [{"Image Issues of Scale/Content"} / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-8: Image 8 (Survey Questions 32-35)



Hall Island, Alaska

Description: This picture is of a Stellar sea lion haul-out site on Hall Island, part of the 170,000 acre Bering Sea Wilderness within the Alaska Maritime NWR. Hall Island is located 6 km to the Northwest of St. Matthew Island, and is in the remote Northern Bering Sea (this wilderness area is said to be the most isolated area within the NWPS). The island and surrounding waters are highly productive and biologically rich, supports many sea lion and walrus rookeries, and is also an important seabird nesting area. In the image, there are present both a number of sea lions and many nesting Northern Gannets. The island has steep and rugged topography, and the rock faces are green with vegetation. The image was taken when there was light fog, so the clarity is slightly compromised. The adjacent water looks grayish-blue, despite the fact that it is relatively deep. There are no signs of human activity or history of use. Photo source: Brad Barr, 2001.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	163561	71	1730
Water	64960	29	1388
Total Area	229100		

Table A2-8: Response Summary/Supplemental Analysis for Questions 32-35

Q32: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters".

Answer Options	Response Percent	Response Count
STRONGLY AGREE	51.2%	108
AGREE	35.1%	74
NEUTRAL	8.1%	17
DISAGREE	0.0%	0
STRONGLY DISAGREE	0.0%	0
NOT SURE	5.7%	12
	<i>answered question</i>	211
	<i>skipped question</i>	41

Q33: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	70	77
ELEMENT/ATTRIBUTE THAT DIMINISHED	2	2
IMAGE ISSUES OF SCALE/CONTENT	27	30
ISSUES WITH USE OF IMAGES TO ID WW	1	1
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	110
	<i>skipped question</i>	115

Image Index = 14*

Q34: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

Answer Options	Response Percent	Response Count
YES	56.7%	118
NO	38.9%	81
NOT SURE	4.3%	9
	<i>answered question</i>	208
	<i>skipped question</i>	44

Q35: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	68.6%	142
NO	25.6%	53
NOT SURE	5.8%	12
	<i>answered question</i>	207
	<i>skipped question</i>	45

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-9: Image 9 (Survey Questions 36-39)



Francisco Coloane Marine Park, Chile

Description: See Q21-24 for general description of FCMP. This image was captured from a ship transiting to the Marine Park through the Strait of Magellan. The picture was chosen for the survey to test the perception of navigation aids (green daymark in the upper right of the picture) on wilderness qualities. The picture includes a forested backdrop, a cobble-sandy beach (where the daymark is located...the area seaward of the daymark may have been altered by creating rip-rap-type protection for the structure) and the adjacent waters. The image was taken about 500 m from the daymark, has a relatively level "horizon" (shoreline), and the water is relatively calm, gray with a greenish tint, and is typical of the shallower nearshore waters in the Strait. Photo source: Brad Barr, 2011.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	91930	40	1486
Water	137170	60	1637
Total Area	229100		

Table A2-9: Response Summary/Supplemental Analysis for Questions 36-39

Q36: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	11.3%	24
AGREE	28.3%	60
NEUTRAL	35.4%	75
DISAGREE	14.6%	31
STRONGLY DISAGREE	1.9%	4
NOT SURE	8.5%	18
	<i>answered question</i>	212
	<i>skipped question</i>	40

Q37: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	8	13
ELEMENT/ATTRIBUTE THAT DIMINISHED	79	129
IMAGE ISSUES OF SCALE/CONTENT	12	20
ISSUES WITH USE OF IMAGES TO ID WW	1	1
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	163
	<i>skipped question</i>	62

Image Index = 8*

Q38: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

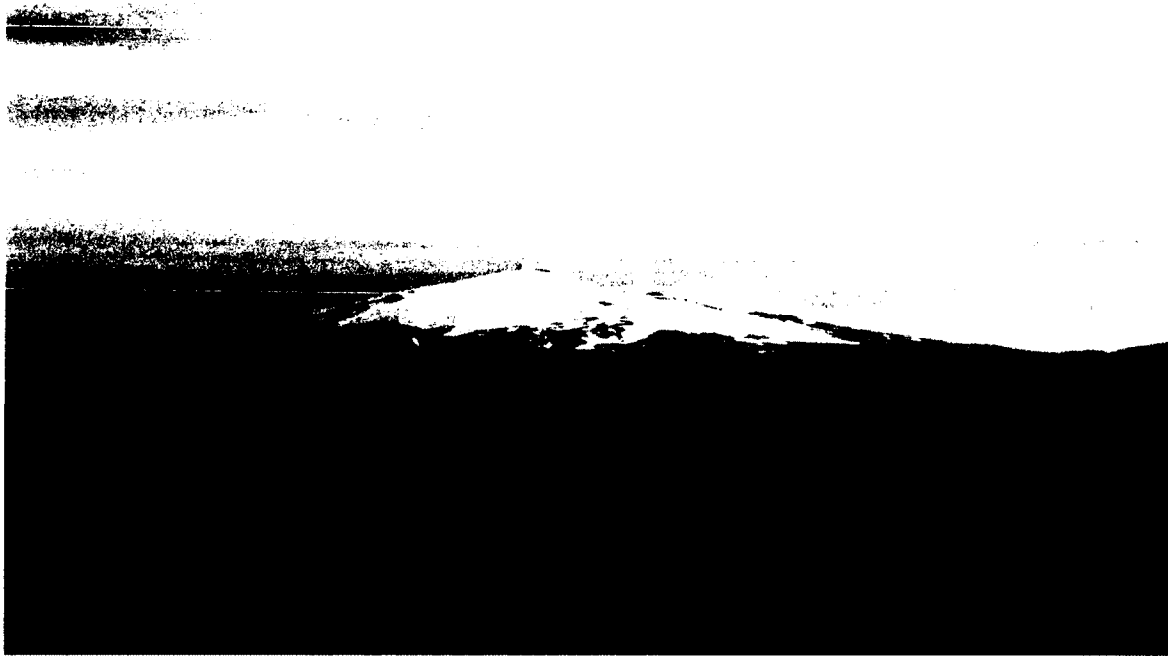
Answer Options	Response Percent	Response Count
YES	44.4%	92
NO	47.3%	98
NOT SURE	8.2%	17
	<i>answered question</i>	207
	<i>skipped question</i>	45

Q39: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	68.1%	141
NO	23.2%	48
NOT SURE	8.7%	18
	<i>answered question</i>	207
	<i>skipped question</i>	45

* "Image Index" = [{"Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100}. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-10: Image 10 (Survey Questions 40-43)



Breidafjörður, Iceland

Description: This picture is from Breidafjörður, the largest marine protected area in Iceland, located on the Northeast coast of Iceland. It is a relatively shallow embayment, 2874 sq. km in size, and contains half of Iceland's intertidal area and a third of its coastline. It contains about 3000 islands, and is biologically productive and diverse, supporting many seabird species, marine mammals (most of Iceland's seal population), marine invertebrates, and many species of marine algae. There is high topographic relief around the fjord, particularly on the Northern side (in the opposite direction from the image) that includes very steep and high cliffs that support many seabird nesting areas. The horizon of the picture is relatively level, it is bluish-gray in coloration, and the Snæfellsnes Volcano (in literature, the entry point for Verne's "Journey to the Center of the Earth") dominates the background of the picture. It contains no observable signs of human activity (although the Snæfellsnes peninsula is sparsely developed), evidence of human use, or wildlife. The photograph was taken a considerable distance from the land (from the middle of the fjord, perhaps 20-25 km). The area has been designated by Iceland as "wilderness", but Iceland's wilderness designations do not seem to offer any special protection to these areas. Photo Source: Brad Barr, 2009.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	30851	14	1264
Sky	110982	48	1581
Water	86999	38	1463
Total Area	229100		

Table A2-10: Response Summary/Supplemental Analysis for Questions 40-43

Q40: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	44.5%	94
AGREE	37.0%	78
NEUTRAL	11.4%	24
DISAGREE	0.9%	2
STRONGLY DISAGREE	0.0%	0
NOT SURE	6.2%	13
	answered question	211
	skipped question	41

Q41: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	56	124
ELEMENT/ATTRIBUTE THAT DIMINISHED	17	38
IMAGE ISSUES OF SCALE/CONTENT	26	57
ISSUES WITH USE OF IMAGES TO ID WW	1	2
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	answered question	221
	skipped question	4

Image Index = 34*

Q42: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

Answer Options	Response Percent	Response Count
YES	42.8%	89
NO	49.0%	102
NOT SURE	8.2%	17
	answered question	208
	skipped question	44

Q43: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	63.5%	132
NO	29.3%	61
NOT SURE	7.2%	15
	answered question	208
	skipped question	44

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-11: Image 11 (Survey Questions 44-47)



Francisco Coloane Marine Park, Chile

Description: Same area as Q21-24, but from a different angle, slightly closer to land, and without any human presence. See Q21-24 for description of FCMP. The image has high topographic relief, mountains in the foreground and background, with alpine glaciers on the tops of the mountains in the background. The lower elevations are forested. The waters are greyish-blue, contrasting the green of the mountains. There is a very slight haze, but the clarity and resolution of the image is excellent. Photo source: Brad Barr, 2011.

Analysis of Composition

	Area (pixels)	%	Perimeter (pixels)
Land	69905	31	1570
Sky	61677	26	1368
Water	98662	43	1501
Total Area	229100		

Table A2-11: Response Summary/Supplemental Analysis for Questions 44-47

Q44: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	51.4%	108
AGREE	39.5%	83
NEUTRAL	3.8%	8
DISAGREE	0.0%	0
STRONGLY DISAGREE	0.0%	0
NOT SURE	5.2%	11
	<i>answered question</i>	210
	<i>skipped question</i>	42

Q45: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	69	74
ELEMENT/ATTRIBUTE THAT DIMINISHED IMAGE ISSUES OF SCALE/CONTENT	2	2
ISSUES WITH USE OF IMAGES TO ID WW	28	30
ISSUES WITH WW HAVING WILDERNESS QUALITIES	1	1
	0	0
	<i>answered question</i>	107
	<i>skipped question</i>	118

Image Index = 15*

Q46: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

Answer Options	Response Percent	Response Count
YES	53.4%	111
NO	40.9%	85
NOT SURE	5.8%	12
	<i>answered question</i>	208
	<i>skipped question</i>	44

Q47: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	66.8%	139
NO	26.4%	55
NOT SURE	6.7%	14
	<i>answered question</i>	208
	<i>skipped question</i>	44

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-12: Image 12 (Survey Questions 48-51)



Aleutian Islands Wilderness, Alaska

Description: This photo is of an area within the 1.3 million acre Aleutian Islands Wilderness, part of the Alaska Maritime NWR. This wilderness, which includes only the islands, supports a rich diversity of native species of seabirds, marine mammals, fish species, and invertebrates, and includes a number of introduced land mammals. It is the homeland of the Aleut people and has a rich indigenous cultural history and maritime heritage. Many of the islands are quite remote and experience little visitation, but a few do have a history of human use. The photo, which is strikingly blue, has excellent clarity and high resolution, includes six active, smoking volcanic islands in the distance, with the high topographic relief of the land from which the picture was taken in the foreground, sloping from the middle of the left margin of the picture to the bottom right corner. The waters are calm (unusual for the Aleutians) and the horizon is level. Photo source: <http://www.wilderness.net>.

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Land	59144	26	1400
Islands	10550	5	1384
L+I	69694	31	2785
Sky	40796	18	1393
Water	117611	51	1789
Total Area	229100		

Table A2-12: Response Summary/Supplemental Analysis for Ques. 48-51

Q48: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	61.0%	128
AGREE	31.9%	67
NEUTRAL	3.3%	7
DISAGREE	1.0%	2
STRONGLY DISAGREE	0.0%	0
NOT SURE	2.9%	6
	<i>answered question</i>	210
	<i>skipped question</i>	42

Q49: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	80	81
ELEMENT/ATTRIBUTE THAT DIMINISHED	3	4
IMAGE ISSUES OF SCALE/CONTENT	15	15
ISSUES WITH USE OF IMAGES TO ID WW	1	1
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	101
	<i>skipped question</i>	124

Image Index = 7*

Q50: Does the presence of islands and/or coastal lands in the picture affect your perception of the surrounding waters as "wilderness?"

Answer Options	Response Percent	Response Count
YES	58.0%	120
NO	38.2%	79
NOT SURE	3.9%	8
	<i>answered question</i>	207
	<i>skipped question</i>	45

Q51: If you were told that these adjacent land areas are designated wilderness, would this affect your opinion about the surrounding waters as being, or not being, "wilderness waters?"

Answer Options	Response Percent	Response Count
YES	66.7%	138
NO	28.5%	59
NOT SURE	4.8%	10
	<i>answered question</i>	207
	<i>skipped question</i>	45

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-13: Image 13 (Survey Questions 52-54)



Papahanoumokuakea Marine National Monument, Hawaii

Description: This is an underwater photo from the Papahanoumokuakea Marine National Monument in the Northwestern Hawaiian Islands, specifically, Rapture Reef, French Frigate Shoals. This is a very remote and pristine area, with little human visitation, within a highly protected MPA. It shows a very productive and intact coral reef, with significant topography, many coral species. There are large numbers of fish, at least four species, swimming over the reef. No marine invertebrates are observed. The image is a strikingly blue color, with a number of corals in the foreground exhibiting other colors, but muted. The "horizon" is level, but the image lacks sharp focus, and is a bit blurry. There is no indication of human-cause disturbance or human presence.

Picture source: <http://papahanoumokuakea.gov> (James Watt).

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Reef	139695	61	1661
Water	89405	39	1479
Total Area	229100		

Table A2-13: Response Summary/Supplemental Analysis for Questions 52-54

Q52: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters".

Answer Options	Response Percent	Response Count
STRONGLY AGREE	40.8%	86
AGREE	35.5%	75
NEUTRAL	12.8%	27
DISAGREE	0.5%	1
STRONGLY DISAGREE	0.0%	0
NOT SURE	10.4%	22
	<i>answered question</i>	211
	<i>skipped question</i>	41

Q53: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	58	67
ELEMENT/ATTRIBUTE THAT DIMINISHED	4	5
IMAGE ISSUES OF SCALE/CONTENT	38	44
ISSUES WITH USE OF IMAGES TO ID WW	0	0
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	116
Image Index = 22*	<i>skipped question</i>	109

Q54: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Response Percent	Response Count
YES	62.5%	130
NO	32.2%	67
NOT SURE	5.3%	11
	<i>answered question</i>	208
	<i>skipped question</i>	44

* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-14: Image 14 (Survey Questions 55-57)



Monterey Bay National Marine Sanctuary, California

Description: This is an underwater photo of a diver in a productive and intact kelp forest in the Monterey Bay NMS, off central CA. The image was chosen for the survey to help identify the perception of a diver in wilderness waters. The image is dominated by lush, green kelp, surrounded by blue water. The image also contains a small area of rocky bottom, with some apparent attached invertebrates, to which some of the kelp is attached. The water clarity is good but not exceptional. The image is relatively level, but the resolution is somewhat low, and seems a bit out of focus. Except for the diver, there is no other evidence of human presence or ecosystem disturbance. Photo source: <http://sanctuaries.noaa.gov> (Kip Evans).

Analysis of Composition

	Area (pixels)	%	Perimeter (pixels)
Diver	5260	2	587
Kelp	172140	75	4136
Water	45839	20	2059
Total Area	229100		

Table A2-14: Response Summary/Supplemental Analysis for Questions 55-57

Q55: Rank the following statement: "The area in this photograph looks like an area i believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	22.9%	48
AGREE	38.1%	80
NEUTRAL	22.4%	47
DISAGREE	2.9%	6
STRONGLY DISAGREE	1.0%	2
NOT SURE	12.9%	27
	<i>answered question</i>	210
	<i>skipped question</i>	42

Q56: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	29	36
ELEMENT/ATTRIBUTE THAT DIMINISHED	40	49
IMAGE ISSUES OF SCALE/CONTENT	31	38
ISSUES WITH USE OF IMAGES TO ID WW	0	0
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	123
Image Index = 18*	<i>skipped question</i>	102

Q57: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Response Percent	Response Count
YES	66.2%	137
NO	26.1%	54
NOT SURE	7.7%	16
	<i>answered question</i>	207
	<i>skipped question</i>	45

* "Image Index" = [{"Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Figure A2-15: Image 15 (Survey Questions 58-60)



Cordell Bank National Marine Sanctuary, California

Description: This photo is an offshore area in Northern California, the Cordell Bank NMS. Cordell Bank, a small underwater seamount, is located approximately 22 miles off the coast, and is highly productive and supports a diverse fauna and flora, with a large number of fish species, marine mammals, and seabirds. The image is a vibrant blue, but the resolution is somewhat limited and the image a bit indistinct. There are a large number of seabirds (shearwaters) rafting in the picture, but no other wildlife. The horizon is slightly askew, but the colors vibrant blue for both sky and water. There are no clear signs of human activity, but there is something in the picture just on the horizon in the upper left of the image (perhaps a vessel). The surface of the water is choppy but relatively calm for these waters, which typically have a large, long swell. Photo source: <http://sanctuaries.noaa.gov> (Jamie Hall)

Analysis of Composition:

	Area (pixels)	%	Perimeter (pixels)
Sky	76250	33	1436
Water	152850	67	1693
Total Area	229100		

Table A2-15: Response Summary/Supplemental Analysis for Questions 58-60

Q58: Rank the following statement: "The area in this photograph looks like an area I believe would contain "wilderness waters"

Answer Options	Response Percent	Response Count
STRONGLY AGREE	29.3%	61
AGREE	36.1%	75
NEUTRAL	22.1%	46
DISAGREE	2.9%	6
STRONGLY DISAGREE	0.5%	1
NOT SURE	9.1%	19
	<i>answered question</i>	208
	<i>skipped question</i>	44

Q59: What aspects or attributes do you see in this picture that you would make you believe this is not "wilderness waters", or detract from the possible wilderness value of the area?

Answer Options (Coded from Open-Ended Q. Responses)	Percent Response	Response Count
DID NOT DIMINISH	49	54
ELEMENT/ATTRIBUTE THAT DIMINISHED	15	17
IMAGE ISSUES OF SCALE/CONTENT	36	40
ISSUES WITH USE OF IMAGES TO ID WW	0	0
ISSUES WITH WW HAVING WILDERNESS QUALITIES	0	0
	<i>answered question</i>	111
	<i>skipped question</i>	114

Image Index = 20*

Q60: If you were told that islands or coastal land areas adjacent to or nearby the area in which this picture was taken are designated wilderness areas, would this affect your opinion about the surrounding waters being, or not being, "wilderness waters"?

Answer Options	Response Percent	Response Count
YES	62.7%	128
NO	27.5%	56
NOT SURE	9.8%	20
	<i>answered question</i>	204
	<i>skipped question</i>	48

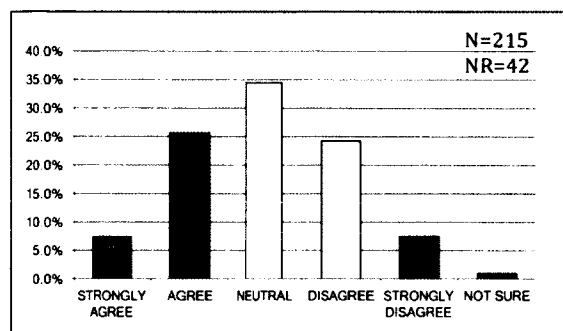
* "Image Index" = ["Image Issues of Scale/Content" / ("Did Not Diminish" + "No Response") + "Element/Attribute that Diminished" X 100]. It is used as a measure of how the quality or content of the photograph helped or hindered a decisive response to the question.

Appendix 3: Ocean Wilderness Survey Preference Question Response Summaries

Figure A3-1: Questions 61-64 Response Summaries

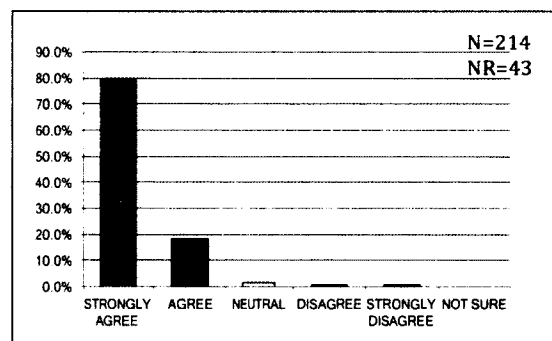
Question 61: Wilderness waters should be managed to encourage visitation and use.

STRONGLY AGREE	7.4%	(16)
AGREE	25.6%	(55)
NEUTRAL	34.4%	(74)
DISAGREE	24.2%	(52)
STRONGLY DISAGREE	7.4%	(16)
NOT SURE	0.9%	(2)



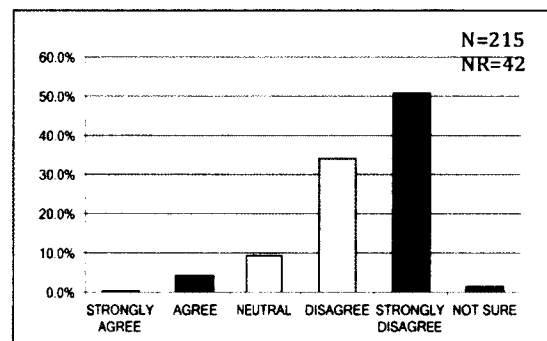
Question 62: Whether or not I visit ocean wilderness, it is important for me to know that such areas exist.

STRONGLY AGREE	79.4%	(170)
AGREE	18.2%	(39)
NEUTRAL	1.4%	(3)
DISAGREE	0.5%	(1)
STRONGLY DISAGREE	0.5%	(1)
NOT SURE	0.0%	(0)



Question 63: The primary function of wilderness waters should be to support products and services important to humans.

STRONGLY AGREE	0.5%	(1)
AGREE	4.2%	(9)
NEUTRAL	9.3%	(20)
DISAGREE	34.0%	(73)
STRONGLY DISAGREE	50.7%	(109)
NOT SURE	1.4%	(3)



Question 64: Ocean and coastal waters areas designated as wilderness not used for the benefit of humans are a waste of natural resources.

STRONGLY AGREE	2.8%	(6)
AGREE	1.9%	(4)
NEUTRAL	2.8%	(6)
DISAGREE	17.2%	(37)
STRONGLY DISAGREE	74.9%	(161)
NOT SURE	0.5%	(1)

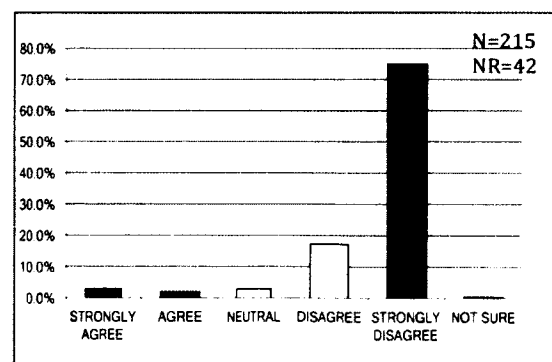
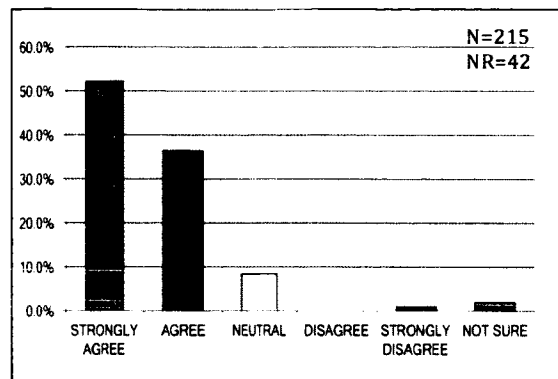


Figure A3-2: Questions 65-68 Response Summaries

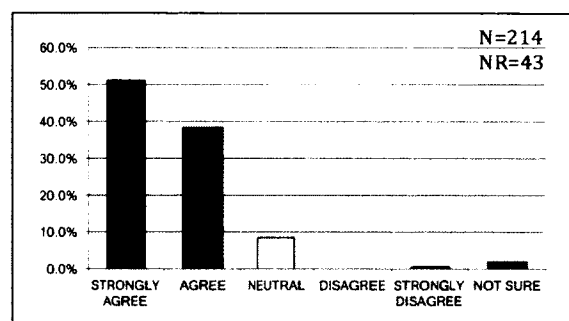
Question 65: Ocean wilderness rejuvenates and sustains the human spirit.

STRONGLY AGREE	52.3%	(112)
AGREE	36.4%	(78)
NEUTRAL	8.4%	(18)
DISAGREE	0.0%	(0)
STRONGLY DISAGREE	0.9%	(2)
NOT SURE	1.9%	(4)



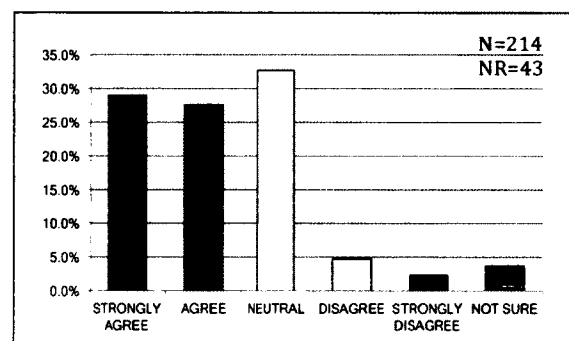
Question 66: Wilderness waters provide us a sense of peace and well-being.

STRONGLY AGREE	50.9%	(109)
AGREE	38.3%	(82)
NEUTRAL	8.4%	(18)
DISAGREE	0.0%	(0)
STRONGLY DISAGREE	0.5%	(1)
NOT SURE	1.9%	(4)



Question 67: Wilderness waters are sacred places.

STRONGLY AGREE	29.0%	(62)
AGREE	27.6%	(59)
NEUTRAL	32.7%	(70)
DISAGREE	4.7%	(10)
STRONGLY DISAGREE	2.3%	(5)
NOT SURE	3.7%	(8)



Question 68: Ocean wilderness lets us feel close to nature.

STRONGLY AGREE	53.5%	(115)
AGREE	39.5%	(85)
NEUTRAL	5.1%	(11)
DISAGREE	0.5%	(1)
STRONGLY DISAGREE	0.0%	(0)
NOT SURE	1.4%	(3)

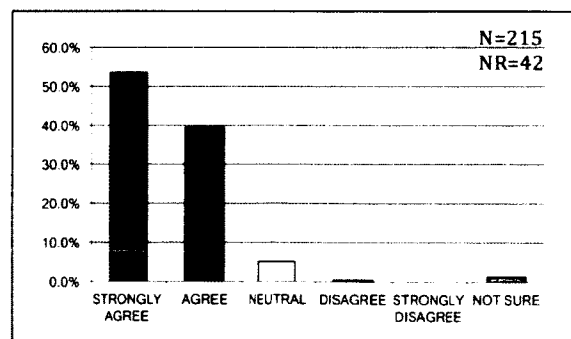
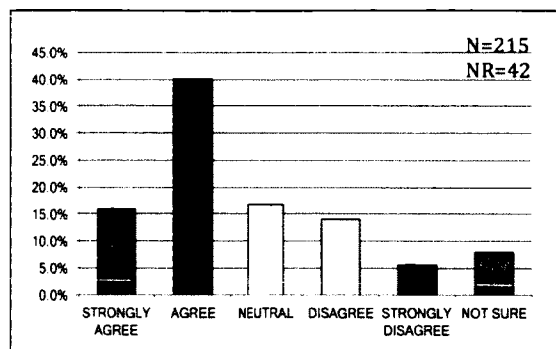


Figure A3-3: Questions 69 - 72 Response Summaries

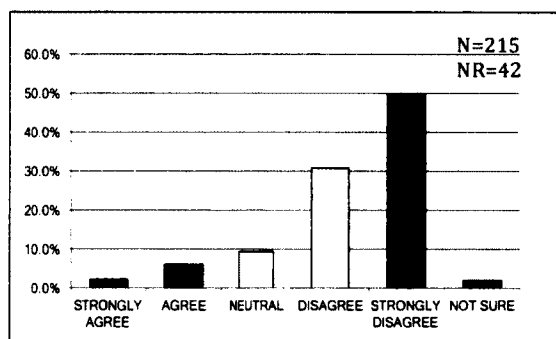
Question 69: If wilderness waters are not threatened by human actions, we should use them to enhance the quality of human life.

STRONGLY AGREE	15.8%	(34)
AGREE	40.0%	(86)
NEUTRAL	16.7%	(36)
DISAGREE	14.0%	(30)
STRONGLY DISAGREE	5.6%	(12)
NOT SURE	7.9%	(17)



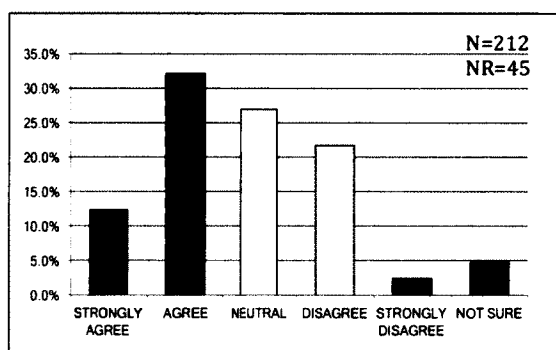
Question 70: Ocean wilderness mainly exists to serve human needs.

STRONGLY AGREE	2.3%	(5)
AGREE	6.0%	(13)
NEUTRAL	9.3%	(20)
DISAGREE	30.7%	(66)
STRONGLY DISAGREE	49.8%	(107)
NOT SURE	1.9%	(4)



Question 71: Wilderness waters should be left to natural processes without being managed by humans.

STRONGLY AGREE	12.3%	(26)
AGREE	32.1%	(68)
NEUTRAL	26.9%	(57)
DISAGREE	21.7%	(46)
STRONGLY DISAGREE	2.4%	(5)
NOT SURE	4.7%	(10)



Question 72: It is important to preserve ocean wilderness for future generations.

STRONGLY AGREE	82.2%	(175)
AGREE	16.9%	(36)
NEUTRAL	0.5%	(1)
DISAGREE	0.5%	(1)
STRONGLY DISAGREE	0.0%	(0)
NOT SURE	0.0%	(0)

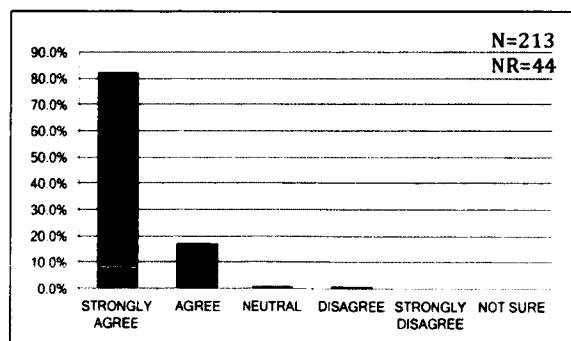
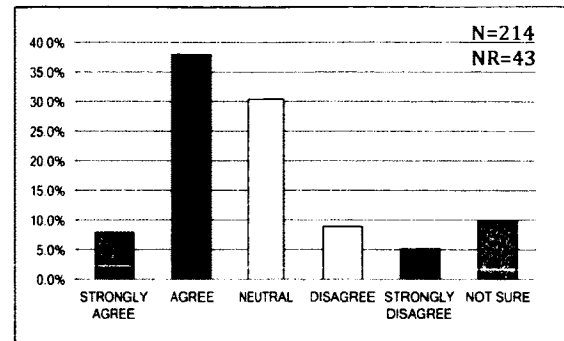


Figure A3-4: Questions 73 - 76 Response Summaries

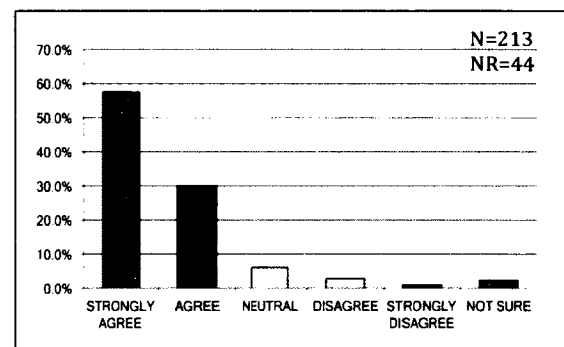
Question 73: Wilderness waters can be improved through management by humans.

STRONGLY AGREE	7.9%	(17)
AGREE	37.9%	(81)
NEUTRAL	30.4%	(65)
DISAGREE	8.9%	(19)
STRONGLY DISAGREE	5.1%	(11)
NOT SURE	9.8%	(21)



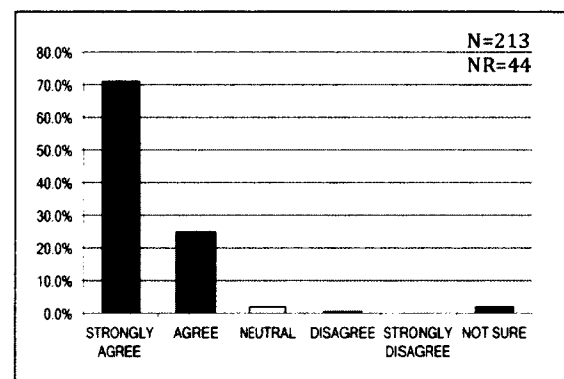
Question 74: Ocean wilderness should have the right to exist for its own sake, regardless of human concerns and use.

STRONGLY AGREE	57.7%	(123)
AGREE	30.0%	(64)
NEUTRAL	6.1%	(13)
DISAGREE	2.8%	(6)
STRONGLY DISAGREE	0.9%	(2)
NOT SURE	2.3%	(5)



Question 75: Humans should have more respect and appreciation for ocean wilderness.

STRONGLY AGREE	70.9%	(151)
AGREE	24.9%	(53)
NEUTRAL	1.9%	(4)
DISAGREE	0.5%	(1)
STRONGLY DISAGREE	0.0%	(0)
NOT SURE	1.9%	(4)



Question 76: If wilderness waters are degraded unintentionally, management actions should be taken to rehabilitate the area.

STRONGLY AGREE	31.6%	(67)
AGREE	51.9%	(110)
NEUTRAL	9.9%	(21)
DISAGREE	1.9%	(4)
STRONGLY DISAGREE	0.0%	(0)
NOT SURE	4.7%	(10)

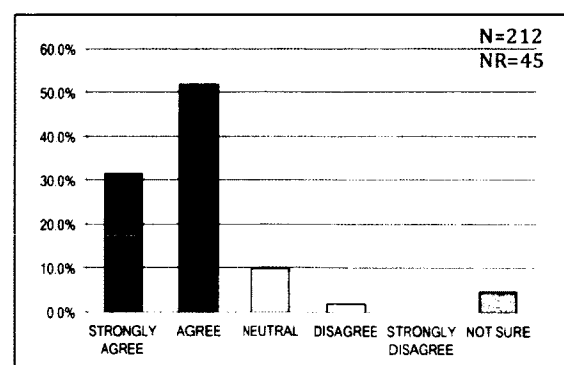
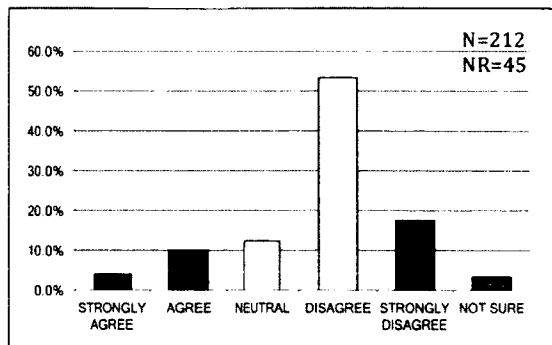


Figure A3-5: Questions 77 - 80 Response Summaries

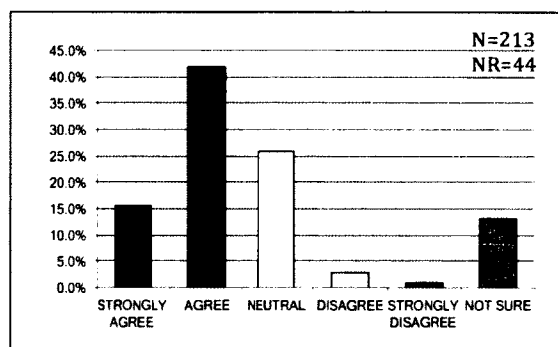
Question 77: Scientific research should be allowed in wilderness waters without restrictions.

STRONGLY AGREE	3.8%	(8)
AGREE	9.9%	(21)
NEUTRAL	12.3%	(26)
DISAGREE	53.3%	(113)
STRONGLY DISAGREE	17.5%	(37)
NOT SURE	3.3%	(7)



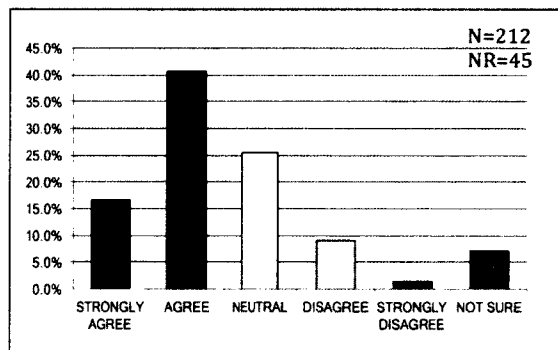
Question 78: Non-native or exotic species introduced into ocean wilderness should be removed.

STRONGLY AGREE	15.5%	(33)
AGREE	41.8%	(89)
NEUTRAL	25.8%	(55)
DISAGREE	2.8%	(6)
STRONGLY DISAGREE	0.9%	(2)
NOT SURE	13.1%	(28)



Question 79: Wilderness waters designations should be used to preserve indigenous cultures.

STRONGLY AGREE	16.5%	(35)
AGREE	40.6%	(86)
NEUTRAL	25.5%	(54)
DISAGREE	9.0%	(19)
STRONGLY DISAGREE	1.4%	(3)
NOT SURE	7.1%	(15)



Question 80: Ocean wilderness may be a useful tool to preserve maritime heritage/historical values.

STRONGLY AGREE	17.5%	(37)
AGREE	50.5%	(107)
NEUTRAL	17.5%	(37)
DISAGREE	8.5%	(18)
STRONGLY DISAGREE	1.9%	(4)
NOT SURE	4.2%	(9)

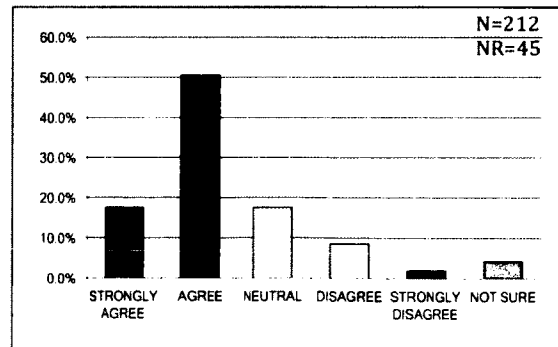
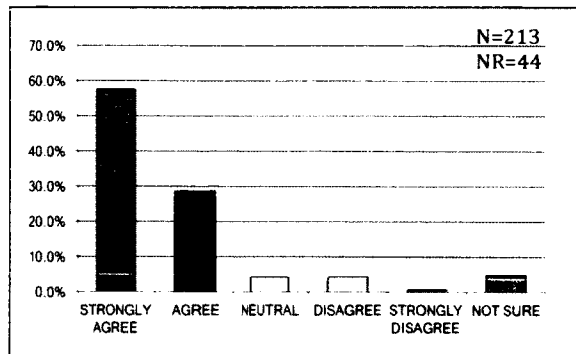


Figure A3-6: Questions 81-83 Response Summaries

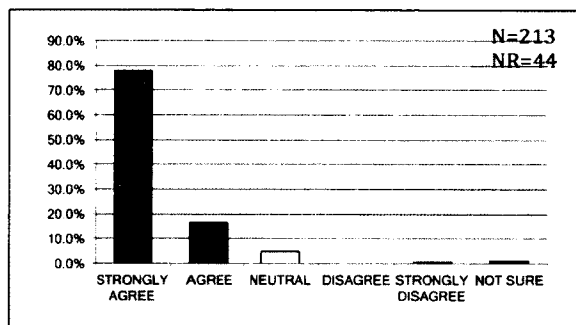
Question 81: The idea of “wilderness” is as relevant in ocean and coastal waters as it is on land.

STRONGLY AGREE	57.7%	(123)
AGREE	28.6%	(61)
NEUTRAL	4.2%	(9)
DISAGREE	4.2%	(9)
STRONGLY DISAGREE	0.5%	(1)
NOT SURE	4.7%	(10)



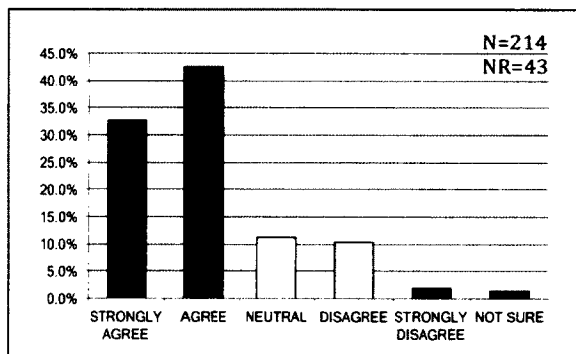
Question 82: I am a strong supporter of preserving wilderness areas.

STRONGLY AGREE	77.5%	(165)
AGREE	16.4%	(35)
NEUTRAL	4.7%	(10)
DISAGREE	0.0%	(0)
STRONGLY DISAGREE	0.5%	(1)
NOT SURE	0.9%	(2)



Question 83: If I feel I am alone in an area I believe is "wilderness", this sense of being alone is more important than the actual distance I am from developed areas.

STRONGLY AGREE	32.7%	(70)
AGREE	42.5%	(91)
NEUTRAL	11.2%	(24)
DISAGREE	10.3%	(22)
STRONGLY DISAGREE	1.9%	(4)
NOT SURE	1.4%	(3)

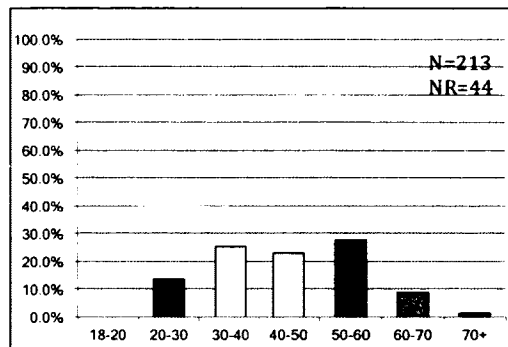


Appendix 4: Ocean Wilderness Perceptions Survey Demographic Response Summaries and Coding

Figure A4: Questions 84-93 Response Summaries

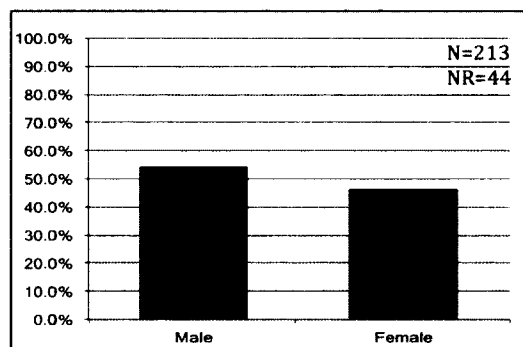
Question 84: What is your age?

18-20	0.0%	(0)
20-30	13.6%	(29)
30-40	25.4%	(54)
40-50	23.0%	(49)
50-60	27.7%	(59)
60-70	8.9%	(19)
70+	1.4%	(3)



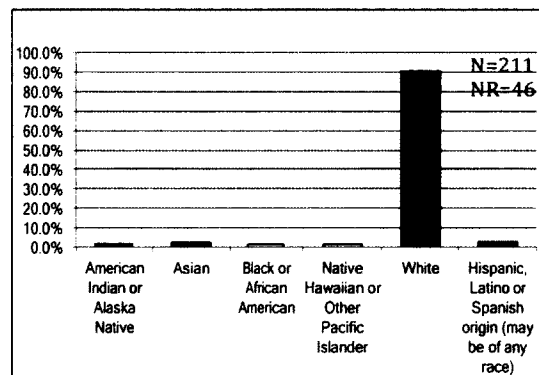
Question 85: What is your gender?

Male	54.0%	(115)
Female	46.0%	(98)



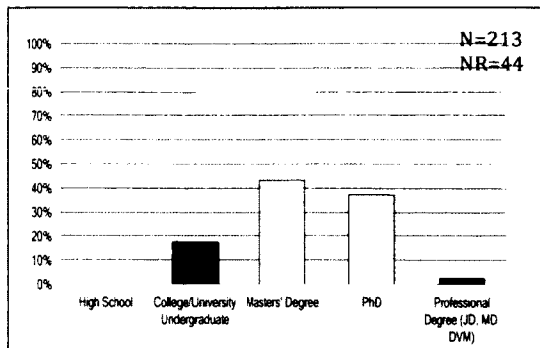
Q86: What is your race/ethnicity?

American Indian/AK Native	1.4%	(3)
Asian	2.4%	(5)
Black or African American	1.4%	(3)
Native Hawaiian or Other Pacific Islander	1.4%	(3)
White	90.5%	(191)
Hispanic, Latino or Spanish origin (may be of any race)	2.8%	(6)



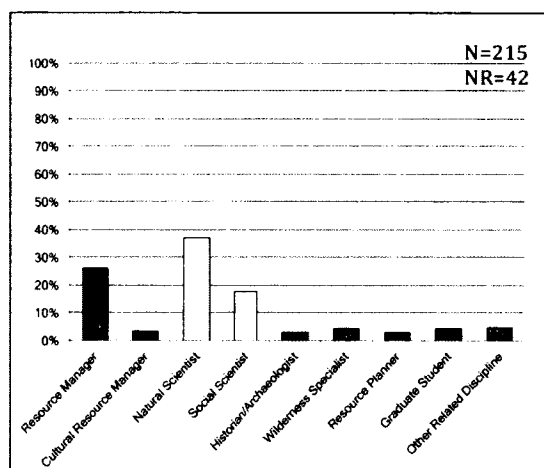
Question 87: Education? Highest grade level completed.

High School	0.0%	(0)
College/Univ. Undergrad.	17.4%	(37)
Masters' Degree	43.2%	(92)
PhD	37.1%	(79)
Professional Degree (J.D. MD DVM)	2.3%	(5)



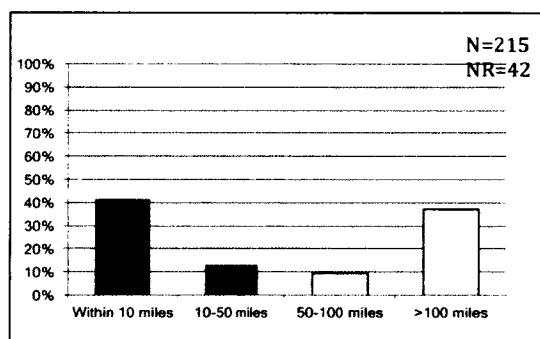
Question 88: Which of the following best describes your occupation?

Resource Manager	26.0%	56
Cultural Resource Manager	3.2%	7
Natural Scientist	37.0%	80
Social Scientist	17.6%	38
Historian/Archaeologist	2.8%	6
Wilderness Specialist	4.2%	9
Resource Planner	2.8%	6
Graduate Student	4.2%	9
Other Related Discipline	4.6%	5



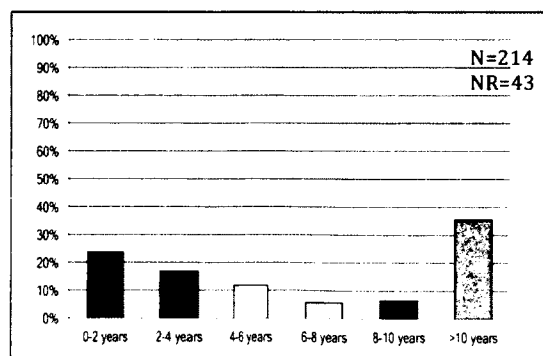
Question 89: How far from the coast (ocean or Great Lakes) do you live?

Within 10 miles	40.9%	(88)
10-50 miles	12.6%	(27)
50-100 miles	9.3%	(20)
>100 miles	37.2%	(80)



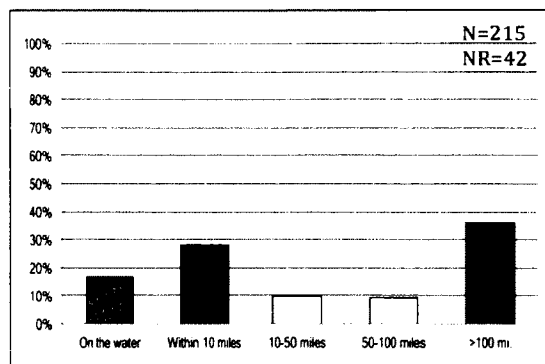
Question 90: How long have you lived at your current residence?

0-2 years	23.8%	(51)
2-4 years	16.8%	(36)
4-6 years	11.7%	(25)
6-8 years	5.6%	(12)
8-10 years	6.5%	(14)
>10 years	35.5%	(76)



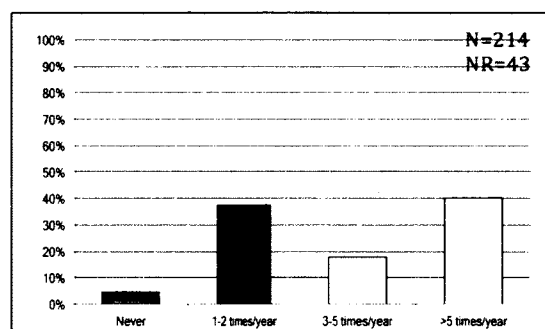
Question 91: How far from the coast do you work?

On the water	16.8% (36)
Within 10 miles	28.0% (60)
10-50 miles	9.8% (21)
50-100 miles	9.3% (20)
>100 mi.	36.0% (77)



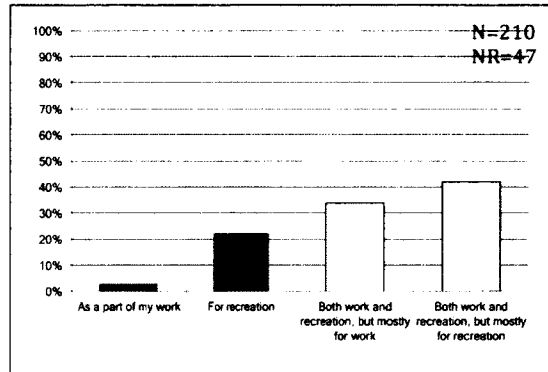
Question 92: How often do you visit wilderness?

Never	4.7% (10)
1-2 times/year	37.4% (80)
3-5 times/year	17.8% (38)
>5 times/year	40.2% (86)



Question 93: If you visit wilderness, for what reason do you go?

As a part of my work	2.4% (5)
For recreation	21.9% (46)
Both work and recreation, but mostly for work	33.8% (71)
Both work and recreation, but mostly for recreation	41.9% (88)



Coding used in the analysis:

AGE:	GENDER:	EDUCATION:	OCCUPATION:
20-30=2	Male=1	Bachelors=1	Resource Manager =1
30-40=3	Female=2	Masters=2	Natural Scientist=2
40-50=4		PhD/Equivalent =3	Social Scientist=3
50-60=5			Resource Educator=4
60-70=6			Resource Planner=5
70+=7			Historian/Archaeologist/ Cultural Resource Manager=6
			Wilderness Specialist=7
			Graduate Student=8
COASTAL RESIDENCE:			
Within 10 mi./10-50 mi.=1			
Beyond 50 mi.=2			
COASTAL EMPLOYMENT:			
On Water/Within 10 mi./10-50 mi.=1			
Beyond 50 mi.=2			
FREQUENCY OF WILDERNESS VISITS:	PURPOSE OF WILDERNESS VISITS:		
>5 visits/Yr.=4	Work/Mostly Work=1		
3-5 visits/yr.=3	Recreation/Mostly Recreation=2		
1-2 visits/yr.=2			
none=1			

Appendix 5: Institutional Review Board (IRB) Documents, Wilderness Waters Management Survey

Appendix 5A: IRB Approval for Wilderness Waters Management Survey, 20 May 2011.

From: Kelly McLain <no-reply@irbnet.org>
Subject: IRBNet Board Action
Date: May 20, 2011 6:22:21 PM EDT
To: Bradley Barr <bwbarr@alaska.edu>
Reply-To: Kelly McLain <kamclain@uaa.alaska.edu>

Please note that University of Alaska Anchorage IRB has taken the following action on IRBNet:

Project Title: [244300-2] Wilderness Waters Management Survey
Principal Investigator: Bradley Barr

Submission Type: Amendment/Modification
Date Submitted: May 20, 2011

Action: APPROVED
Effective Date: May 20, 2011
Review Type: Exempt Review

Should you have any questions you may contact Kelly McLain at kamclain@uaa.alaska.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org

Appendix 5B: IRB Closure/Final Report for Wilderness Waters Management Survey, 8 February 2012.

From: Kelly McLain <no-reply@irbnet.org>
Subject: IRBNet Board Action
Date: February 8, 2012 5:12:44 PM EST
To: Andrew Kliskey <afadk@uaa.alaska.edu>, Bradley Barr <bwbarr@alaska.edu>
Reply-To: Kelly McLain <kamclain@uaa.alaska.edu>

Please note that University of Alaska Anchorage IRB has taken the following action on IRBNet:

Project Title: [244300-3] Wilderness Waters Management Survey
Principal Investigator: Bradley Barr

Submission Type: Closure/Final Report
Date Submitted: February 7, 2012

Action: APPROVED
Effective Date: February 8, 2012
Review Type: Administrative Review

Should you have any questions you may contact Kelly McLain at kamclain@uaa.alaska.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org

Appendix 6: North American Wilderness Collaboration Documents

Appendix 6A: Memorandum of Understanding on Cooperation for Wilderness Conservation, 7 November 2009

**MEMORANDUM OF UNDERSTANDING
On
Cooperation for Wilderness Conservation**

**between the
NATIONAL PARK SERVICE, U.S. FISH & WILDLIFE SERVICE and
BUREAU OF LAND MANAGEMENT of the U.S.
DEPARTMENT OF THE INTERIOR and the U.S. FOREST SERVICE and
OFFICE OF ECOSYSTEM SERVICES AND MARKETS
of the U.S. DEPARTMENT OF AGRICULTURE
of the
UNITED STATES OF AMERICA**

**and the
SECRETARIAT OF THE ENVIRONMENT AND NATURAL RESOURCES
through the
NATIONAL COMMISSION FOR NATURAL PROTECTED AREAS
of the UNITED MEXICAN STATES**

**and the
PARKS CANADA AGENCY
of the
GOVERNMENT OF CANADA**

The National Park Service, U.S. Fish & Wildlife Service, and the Bureau of Land Management of the U.S. Department of the Interior of the United States of America, the U.S. Forest Service and the Office of Ecosystem Services and Markets of the U.S. Department of Agriculture of the United States of America, the Secretariat of the Environment and Natural Resources through the National Commission for Natural Protected Areas of the United Mexican States, and the Parks Canada Agency of the Government of Canada; hereinafter referred to as the Participants:

RECOGNIZING the advanced cooperation that exists between the Participants in the management, planning, preservation and research for the conservation of wilderness areas of the United States, Mexico and Canada;

WHEREAS conservation is generally defined by the Participants as the formulation and implementation of strategies and practices related to the research, monitoring, protection, and restoration of natural resources, ecosystems and their components, while facilitating

opportunities for public outreach, education, visitor experience and enjoyment.

RECOGNIZING that while the concept of wilderness varies among the Participants, it is generally considered to be land, marine and coastal areas that exist in a natural state or are capable of being returned to a natural state, are treasured for their intrinsic value, and offer opportunities to experience natural heritage places through activities that require few, if any, rudimentary facilities or services.

WHEREAS Canada, the United States and Mexico share a continent with vast, interconnected wilderness resources – including forests, mountain ranges, wildlife species, freshwater systems, and oceans and marine life – and whereas this shared resource is best protected through communication, consultation and cooperation;

RECOGNIZING that developing a shared vision of the North American continent’s terrestrial and marine wilderness resources will enhance conservation efforts in each country, as well as cooperation between Participants;

WHEREAS natural and cultural heritage properties and sites on the national territory of each Participant are of significance nationally and, in many cases, internationally through inclusion on the United Nation’s World Heritage List;

WHEREAS wilderness areas in all three countries, Mexico, the United States and Canada, represent irreplaceable elements of the heritage and identity of the people of all three nations;

WHEREAS wilderness areas may assist in the adaptation of flora, fauna and human populations to climate change and other factors that have effects on habitat;

NOTING the Participants’ mutual interest in continuing and strengthening the conservation and management of national parks and wilderness for the purpose of conserving shared ecosystems, in particular in those areas close to or contiguous with national borders;

RECOGNIZING the importance and relevance of ecological and commemorative integrity in the establishment, management and operations of wilderness areas for the purpose of preserving and conserving these areas for the use and enjoyment of present and future generations;

RECOGNIZING the importance of creating a sense of “connection to place” to ensure the continued relevance of wilderness to residents of North America and to enhance public engagement in the protection and conservation of wilderness;

Have reached the following understanding:

This Memorandum has as its objective the creation of a voluntary framework for cooperation and coordination among the Participants concerning the commemoration,

conservation and preservation of wilderness areas. In pursuing such cooperation and coordination, the Participants are fully aware that the modalities available to further the concept of wilderness are different for each Participant, according to their corresponding Laws and authority.

1. (a) The Participants intend to establish an Intergovernmental Committee, to be initially comprised of the Directors of the National Park Service, U.S Fish and Wildlife Service, and Bureau of Land Management, the Chief of the U.S. Forest Service, the Director of the Office of Ecosystem Services and Markets, the National Commissioner of the National Commission for Natural Protected Areas, and the Chief Executive Officer of the Parks Canada Agency or their designated representative, to review, discuss and disseminate information about progress on projects, possible areas for future cooperation, and other related issues.

(b) The Committee should meet periodically, in locations alternating among the three countries. The Committee should make every possible effort to meet in association with the Canada/Mexico/U.S. Trilateral Committee for Wildlife and Ecosystem Conservation and Management in order to avoid replication and ensure integration into on-going initiatives. Other government agencies may be invited to participate in the future, as appropriate.

(c) The members of the Committee may designate appropriate representatives to coordinate and monitor the progress of cooperative activities developed to accomplish the objectives outlined in this Memorandum of Understanding.

(d) The Committee should ensure integration of wilderness activities with other on-going bilateral and trilateral initiatives and avoid duplication of other initiatives.

2. (a) The forms of cooperative activities under this Memorandum of Understanding may include but are not limited to exchanges of technical and professional information; participation in joint seminars, conferences, training courses, and workshops in areas of professional and technical interest; joint planning and research teams; and exchanges of specialists. The type of activities carried out under this voluntary cooperative framework is subject to the availability of funds and personnel of each Participant and subject to the laws and regulations of their respective countries.

(b) Topics of mutual interest and benefit for ongoing or future cooperative activities may include but are not limited to:

- (i) Commitment to promoting and enhancing wilderness on land and in marine and coastal areas;
- (ii) Examination of issues in wilderness conservation and management, with a special concern for the impacts of climate change, fire, and alien invasive species on wilderness areas and their inhabitant species;

- (iii) Research, inventory, documentation, and monitoring of wilderness areas;
- (iv) Valuing human livelihoods dependent on wilderness;
- (v) Consideration of mechanisms of payment for ecosystem services related to wilderness conservation;
- (vi) Public information to increase community support for conservation of wilderness;
- (vii) Joint identification and conservation of transboundary resources as they relate to wilderness areas;
- (viii) Consideration of wilderness areas in the context of a broader landscape approach to conservation management;
- (ix) Establishment of sustained relationships between wilderness managers across the continent for the purpose of mentoring, sharing research and technology, exploring common challenges and solutions, and potentially developing transcontinental goals and plans of action;
- (x) Exploring potential to work with those biosphere reserves with core wilderness areas to advance wilderness conservation;
- (xi) Facilitating visitor experience as a means to enhance relevance of wilderness and foster engagement in wilderness conservation; and
- (xii) Exchange of information and best practices on innovative approaches to governance of wilderness areas.

3. Each Participant should ensure that the information transmitted by one Participant to another Participant under this Memorandum of Understanding is accurate to its best knowledge and belief. The transmitting Participant should not warrant the suitability of the information transmitted for any particular use of or application by the receiving Participant.

4. (a) This Memorandum becomes operative upon its signature by the Participants and its terms apply until discontinued by the Participants.

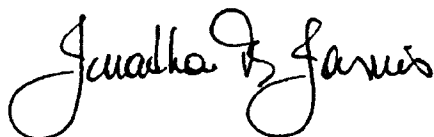
(b) The Participants may modify this Memorandum of Understanding upon their written mutual consent.

(c) Each Participant may discontinue this Memorandum of Understanding at any time upon written notification through diplomatic channels to other Participants. The discontinuation of this Memorandum of Understanding should not affect the validity or duration

of projects under this Memorandum of Understanding, which are initiated prior to such discontinuation, subject to availability of funds.

Signed in triplicate at WILD9, the 9th World Wilderness Congress, Mérida, United Mexican States, on this 7th day of November 2009, in the English, French and Spanish languages.

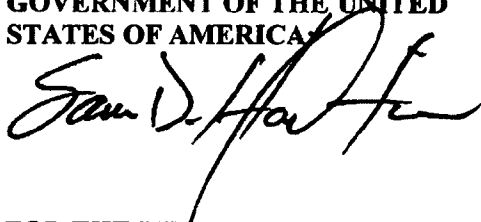
**FOR THE NATIONAL PARK SERVICE
OF THE U.S. DEPARTMENT OF THE
INTERIOR OF THE GOVERNMENT OF
THE UNITED STATES OF AMERICA:**



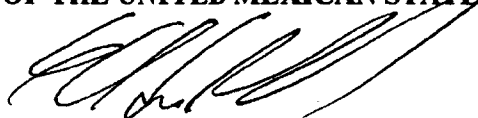
**FOR THE PARKS CANADA AGENCY
OF THE GOVERNMENT OF CANADA:**



**FOR THE U.S. FISH & WILDLIFE
SERVICE OF THE U.S. DEPARTMENT
THE INTERIOR OF THE
GOVERNMENT OF THE UNITED
STATES OF AMERICA:**



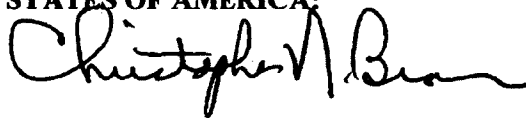
**FOR THE SECRETARIAT OF
ENVIRONMENT AND NATURAL
RESOURCES THROUGH THE
NATIONAL COMMISSION FOR
NATURAL PROTECTED AREAS
OF THE UNITED MEXICAN STATES:**



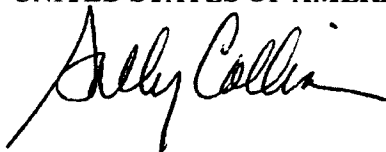
**FOR THE BUREAU OF LAND
MANAGEMENT OF THE U.S.
DEPARTMENT OF THE INTERIOR
OF THE GOVERNMENT OF THE
UNITED STATES OF AMERICA:**



**FOR THE U.S. FOREST SERVICE OF
THE U.S. DEPARTMENT OF
AGRICULTURE OF THE
GOVERNMENT OF THE UNITED
STATES OF AMERICA:**



**FOR THE OFFICE OF ECOSYSTEM
SERVICES AND MARKETS OF THE U.S.
DEPARTMENT OF AGRICULTURE OF
THE GOVERNMENT OF THE
UNITED STATES OF AMERICA:**



Appendix 6B: North American Committee on Cooperation for Wilderness & Protected Areas Conservation, Conserving Marine Wilderness. Consensus Version, Working Document, 10 August 2011.

**NORTH AMERICAN COMMITTEE ON COOPERATION FOR
WILDERNESS & PROTECTED AREAS CONSERVATION**

CONSERVING MARINE WILDERNESS

Consensus Version, Working Document, 10 August 2011

PREAMBLE

Marine wilderness is a topic of interest to the seven government agencies that signed the *North American Memorandum of Understanding (MOU) on Cooperation for Wilderness Conservation* at the 9th World Wilderness Congress (WILD9) in Merida, Mexico in November 2009. Six of the seven agencies manage protected areas. The MOU broadly recognizes that marine and coastal areas are included in any reference to “wilderness” within the document:

RECOGNIZING that while the concept of wilderness varies among the Participants, it is generally considered to be land, marine and coastal areas that exist in a natural state or are capable of being returned to a natural state, are treasured for their intrinsic value, and offer opportunities to experience natural heritage places through activities that require few, if any, rudimentary facilities or services.

WHEREAS Canada, the United States and Mexico share a continent with vast, interconnected wilderness resources – including forests, mountain ranges, wildlife species, freshwater systems, and oceans and marine life – and whereas this shared resource is best protected through communication, consultation and cooperation.

RECOGNIZING that developing a shared vision of the North American continent’s terrestrial and marine wilderness resources will enhance conservation efforts in each country, as well as cooperation between Participants.

In addition, the MOU highlights these “topics of mutual interest and benefit for ongoing or future cooperative activities”:

- Part (2)(b)(i) - *Commitment to promoting and enhancing wilderness on land and in marine and coastal areas.*
- Part (2)(b)(vii) - *Joint identification and conservation of transboundary resources as they relate to wilderness areas.*

The MOU prescribes a North American Committee on Cooperation for Wilderness Protection, renamed the **North American Committee on Cooperation for Wilderness**

and Protected Areas Conservation (NAWPA Committee) per a decision by the agency heads in Banff, Alberta, Canada in May 2011 to expand coverage of the MOU to include protected areas. It is comprised of the heads of the signatory agencies who in turn delegated substantive work to their staff who comprise a Working Committee made up of Working Groups (WGs). The Marine Wilderness Working Group (MWWG) was one of the first WGs to make substantial progress toward producing a tangible output of the NAWPA Committee in the form of this “Conserving Marine Wilderness” (CMW) document.

When the Working Committee first met in person in Halifax, Nova Scotia, Canada in May 2010, it decided that the MWWG will:

1. Pursue a common definition and management objectives for marine wilderness.
2. Examine potential candidate areas for marine wilderness designations in the United States, Mexico and Canada.

As a starting point, the MWWG used a draft marine wilderness concept authored originally by USFWS and The WILD Foundation, coordinator of the Marine Wilderness Collaborative of stakeholders (government agencies, NGOs, scientists, indigenous groups, and others). Over months of regular discussion with the consistent involvement of expert colleagues from five NAWPA Committee agencies, the MWWG developed this consensus version of a new marine wilderness concept paper.

The NAWPA Committee’s concept of marine wilderness as laid out in this CMW document offers insight into what is meant by the term “marine wilderness” and the purpose of setting management objectives for marine conservation. It also clarifies that marine protected areas (MPAs) as management tools can encompass the conservation of marine wilderness without necessarily requiring the designation of a new category of MPA. It is noted that each country, through its own legislative framework and existing MPA categories, can identify which MPAs or sites within MPAs can encompass the conservation of marine wilderness.

The MWWG now seeks to share this “working document” with colleagues outside the MWWG within the NAWPA Committee agencies and among other North American government agencies.

It has established **15 September 2011** as the deadline for receipt of comments. Ultimately, the NAWPA Committee agencies could decide to share the final consensus version of CMW with the North American Marine Protected Areas Network (NAMPAN) and International Union for the Conservation of Nature (IUCN), and encourage use or adaptation of the CMW and appreciation of the importance of conserving marine wilderness.

INTRODUCTION

Healthy, self-sustaining, ecologically intact coastal and ocean ecosystems containing natural assemblages of plants and animals are critical to sustain marine life and the reproduction of species upon which many humans depend. Oceans and associated coastal areas such as estuaries, coral reefs, mangroves and marshes provide many ecosystem services such as providing habitat for biodiversity, functioning as effective and natural carbon sinks, and mitigating storm damage and sea level change. Maintaining their ecological integrity will increase resilience to disturbance and enhance their adaptation to climate change. The need for marine wilderness areas is greater than ever. The global ocean comprises 70% of the Earth's surface, yet currently marine protected areas (MPAs) safeguard only 1% , and only a fraction of MPAs can be considered as including marine wilderness.

“MPA” means: "Any area of intertidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment"¹.

“Marine” refers to the water column, seabed, and the living and nonliving resources contained therein, located in the open ocean, intertidal zones, estuaries, lagoons, certain large lakes, mangroves, kelp forests, sea grass meadows, coral reefs and other living hardbottoms, soft-bottom habitats, and other vegetative and non vegetative resources for shelter and spawning habitat for all aquatic or coastal species, as well as associated coastal areas and portions of continental shelves, polynyas and land-fast ice edges, among other ecological features of oceans.

Threats to the marine environment include but are not limited to: unsustainable harvesting of marine life; built infrastructure; pollution; transportation and commerce; non-native, invasive aquatic organisms; resource extraction; exploration for and extraction of non-renewable mineral and energy resources; energy development; aquaculture; military operations; and bioprospecting. Wider threats are now posed by the impacts of climate change, including warming water, ocean acidification, and ecosystem and biome shift.

The natural and cultural resources of a marine environment may be protected in perpetuity by national, state/provincial, territorial, indigenous peoples', communal or local laws or regulations in MPAs. MPAs in North America vary widely in purpose, legal authority, agency providing oversight, management approaches, level of protection, and restrictions on human uses.

¹ IUCN definition of MPA.

² “Marine wilderness protected area” is suggested as a term to distinguish those MPAs or

Many existing MPAs are unable to offer protection of wilderness values due to how and why they were established and the compromises made to afford their protection in some form of MPA or due to their degradation prior to becoming an MPA. These MPAs may also be too limited in geographic and/or ecological scale to combine the full range of wilderness attributes – ecologically intact, naturally self-sustaining, and undeveloped; providing for the expression of certain spiritual, ethical, and aesthetic values; and allowing for certain compatible traditional, experiential, recreational, and scientific uses. However, there are existing MPAs and sites within MPAs (e.g., core of a biosphere reserve) that do offer protection of wilderness values. These can serve as clear examples of marine areas with ecologically intact ecosystems that have management goals which preserve the wild character and nature of these special places. The need to distinguish those MPAs, or sites therein, which conserve marine wilderness is recognized to further advance marine conservation around the world. Thus, the term “marine wilderness protected areas” (MWPAs) is suggested to encompass those sites, within the current legislation of each country². These MWPAs can ensure the conservation of marine environments that are under increasing human-caused harm to their wild³ and natural character. By valuing marine wilderness characteristics, and applying the wilderness concept (as each nation sees fit), these areas receive special recognition with respect to other, non-wilderness MPAs. MWPAs when combined with watershed-based conservation strategies for adjacent terrestrial areas provide broader protection or restoration potential for intact marine and estuarine ecosystems.

Protecting marine wilderness would foster maintaining biodiversity, ecological integrity, and environmental health by conserving key reproduction areas and habitat critical to maintaining natural age and sex structures of species, key foraging grounds, ecologically important geological and oceanographic habitat features, and critical stopover habitat for migratory species. But beyond this, marine wilderness would protect the other tangible and intangible aspects of wilderness character including providing opportunities for appropriate and compatible recreation that allows physical and mental challenges, adventure, risk, and reward; indigenous cultural and subsistence practices; personal renewal, inspiration, a sense of connection with nature, self-reliance, and solitude; and escape from the pressures of modern society.

Undisturbed wild ocean ecosystems also serve as important natural laboratories and baseline areas for studying global and regional climate change and other human-induced impacts. They provide valuable reference conditions, allowing scientific study of the ecological functions and processes of undisturbed areas and of the socio-economic and cultural importance of such places. This research will inform conservation and

² “Marine wilderness protected area” is suggested as a term to distinguish those MPAs or sites within MPAs which conserve wilderness. Suggesting the term is not meant to imply a new category of MPA would be established necessarily.

³ In the Mexican context, “wild” is understood as natural (holistic concept for environment, habitat, ecosystems, species within, in a natural or well-conserved state).

restoration of endangered ecosystems, including with respect to their importance to society, and provide insights into ways that ocean warming, acidification, and sea-level rise might interact with other threats to marine resources.

Conservation of marine areas for their wilderness character and values will also help offset and address threats posed by historic, current, and developing factors.

Preserving wilderness character and values in a marine environment would allow us to make a bequest of great magnitude for future generations, perpetuating a link to our wild marine heritage.

MARINE WILDERNESS DEFINITION

Marine wilderness areas are primarily intact, self-sustaining, and undeveloped, with no modern infrastructure, industrial activity, or permanent or significant human habitation, including also areas capable of being returned to a wild state. They retain their intrinsically wild appearance and character and are protected and managed to preserve their ecological integrity, biological diversity, and environmental health. In marine wilderness, where the earth and its community of life are uncontrolled by humans and natural processes dominate, humans use and enjoy the areas in ways that are consistent with their wild character and that leave the areas unimpaired for future generations.

Marine wilderness also should be of sufficient size to: perpetuate its protection and use in a relatively unimpaired condition; continue opportunities for compatible subsistence uses and indigenous cultural practices; allow low-impact, minimally invasive educational and scientific research activities that further the administrative or educational objectives or scientific knowledge of the wilderness area; and if degraded, be capable of being restored or rehabilitated to a wilderness state.

As a management entity, (1) marine wilderness areas in MPAs can be stand-alone sites where the entire MPA is considered a wilderness area, or (2) marine wilderness can be a certain geographic portion, or subset, of a larger MPA. Some MPAs have areas within their boundaries that are considered wilderness areas, preserving and protecting a wild character. MPAs can be managed in such a way that the management authorities have the flexibility to work within their existing mandates to make marine wilderness a part of their conservation strategy.

MARINE WILDERNESS MANAGEMENT GOAL AND OBJECTIVES

Each marine wilderness protected area will be managed according to the intent of the Marine Wilderness Definition, Goal and Objectives and by the prescriptions of the applicable MPA Management Plan implemented by each MPA manager according to the conditions of that area and applicable legislation⁴.

⁴ Understood also as customized “marine wilderness stewardship plan” in the US context.

GOAL - Protect and, maintain and restore the wilderness character of defined marine areas by protecting their ecological integrity, wild and natural appearance, biodiversity, ecosystem processes, and undeveloped quality and provide for the human use and enjoyment of these areas in ways that leaves them unimpaired.

OBJECTIVES

(1) Maintain or restore the ecological integrity, wild and natural appearance, biodiversity, ecosystem processes of marine wilderness areas. Marine wilderness should:

- (a) Contribute to the health, biodiversity and abundance of all living marine and coastal resources.
- (b) Conserve or restore the ecological balance of the ecosystem and food chain (predator-prey relationships) in the marine environment.
- (c) Contribute to ecosystem resilience to climate change and human impacts of land- and water-based sources of pollution and sedimentation.
- (d) Avoid the loss of species, in particular species on the IUCN Red List.
- (e) Protect the vital resting, feeding, breeding and nesting areas of resident and migratory species, including invertebrates, fish, amphibians, reptiles, seabirds, and mammals and the anadromous aquatic species that migrate inland.
- (f) Protect the aquatic species upon which some land mammals and birds depend.

(2) Maintain and restore the undeveloped quality of marine wilderness areas by:

- (a) Prohibiting permanent structures or fixtures, with the exception of regulated navigation and mooring structures necessary for human safety or resource protection and existing structures of historical significance.
- (b) Prohibiting permanent human habitation except as provided within the Management Plan of a treaty with a traditional indigenous community(ies).
- (c) Restricting use of motorized equipment, motor vehicles, and motorboats, landing of aircraft, and other forms of mechanical transport to the following as governed by the Management Plan for each particular marine wilderness area:
 - Emergency responses involving the health and safety of persons and wildlife within the area.
 - Public access for appropriate and compatible recreational visits.
 - Temporary measures required by the managing or partner agency that will allow the lowest level of intervention necessary to:
 - Restore ecosystem balance and biodiversity, including the recovery of declined or extirpated species;
 - Control invasive species;

- Mitigate oil spills, remove trash, fishing gear and other debris, and eliminate other human-caused pollution;
 - Conduct scientific research necessary to protect the wilderness character of that area.
 - (d) Allowing appropriate scientific research, monitoring, inventory, and mapping, including of climate change effects, related to the preservation of wilderness character.
 - (e) Protecting against the impacts of necessary commercial shipping lanes or customary commercial boat routes between ports, protecting against the impacts to fishing grounds and protecting against the dumping of sewage and other pollutants from vessels. Area managers will work with the commercial maritime community to protect marine wilderness areas.
- (3) **Maintain the outstanding opportunities for solitude and recreation, and opportunities for education and aesthetic enjoyment in marine wilderness areas, within the context of a Management Plan that:**
 - (a) Protects living marine resources and oceanographic processes and geologic features other natural features, cultural and historical heritage, and habitats from harm, harassment, or damage, from users and watercraft.
 - (b) Provides for the human use and enjoyment of marine wilderness while leaving it unimpaired.
 - (c) Prohibits commercial enterprise except for those services that provide certain compatible recreational uses or fulfill other legislative wilderness purposes of the area.
- (4) **Respect cultural and religious practices of local indigenous people within the confines of the definition and management objectives and consistent with wilderness character and values as conveyed through the Management Plan.**
 - (a) Implement collaborative management between government agencies and those indigenous people for whom all or some of the marine wilderness area is within their verified traditional territories.
 - (b) Respect the relevant cultural and spiritual values of the marine wilderness area, including sacred and ancestral sites and ceremonial and spiritual uses.
 - (c) Incorporate oral experiential/traditional experiential indigenous knowledge of the wilderness area along with social and scientific knowledge in assessing, planning, managing, and educating about marine wilderness areas.
 - (d) Within the construct of the Management Plan, allow for traditional wilderness-based lifestyles and customs, e.g., inhabiting at low density and using resources sustainably.
- (5) **Manage marine wilderness following a publicly transparent process that:**
 - (a) Implements collaborative management between government agencies and communities.

- (b) Permits government agencies to manage the areas taking into consideration the needs of the communities and user groups who use the natural resources within the marine wilderness.
- (c) Clearly demonstrates the necessity of taking management action or allowing other uses in wilderness.
- (d) Evaluates alternatives for accomplishing proposed actions or allowing other uses in the wilderness.
- (e) Results in the application of the alternative that will have the least impact on wilderness character and values.