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Public perceptions of marine wilderness as a marine protected area designation



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ABSTRACT

A representative survey of 530 residents of the most heavily populated region in Oregon (USA) showed that most believed the concept and label of wilderness could apply to the ocean. Although a majority thought Oregon's marine reserves could be called wilderness, other areas of the ocean along Oregon's coast and elsewhere in the world were seen as more appropriate for marine wilderness. Respondents also thought wilderness was more applicable to land than the ocean. Over half would not change their attitudes or visitation associated with marine areas if they were designated as wilderness. For those who would be affected by this designation, most would change their attitudes in a positive direction and increase visitation. "Marine protected area," "marine reserve," "marine wilderness," and "wilderness" designations evoked different reactions among respondents with marine protected areas and reserves inferring regulations and limitations, and terrestrial and marine wildernesses eliciting notions of pristineness and purity.

1. Introduction

Recognition of extensive anthropogenic impacts to the world's oceans has led to calls for establishing more marine protected areas (MPAs; Boonzaier and Pauly, 2016; Halpern et al., 2008; Pollnac et al., 2010). As MPAs increase in number, so too do the titles and labels given to such protected areas. In addition to "MPA," there are other designations such as marine sanctuaries, marine reserves, marine parks, and fishery reserves. Researchers have pointed out the confusion generated by these inconsistently defined and applied labels (Ehler, 2008; Fitzsimons, 2011; Shafer and Benzaken, 1998). This confusion can also obscure the importance of MPAs (Al-Abdulrazzak and Trombulak, 2012), impede management (Rodriguez-Rodriguez et al., 2015; Voyer et al., 2015), and hamper policy development and decision-making, especially at large scales (Ehler, 2008; Fitzsimons, 2011). A number of classification schemes have been proposed to address this issue (Agardy, 1997; Al-Abdulrazzak and Trombulak, 2012; Horta e Costa et al., 2016), but none have been widely adopted. The International Union for Conservation of Nature (IUCN) guidelines for applying protected area categories (e.g., Category 1a: strict nature reserve; Category 1b: wilderness area) to marine areas (Day et al., 2012) provide perhaps the best chance for coherent application of management categories and

labels, but even these are often used inconsistently (Boonzaier and Pauly, 2016; Fitzsimons, 2011).

Further exacerbating the confusion of designating MPAs as sanctuaries, reserves, or parks is that some of these terms have also been used in terrestrial areas (e.g., national parks), despite well-documented ecological differences between marine and terrestrial ecosystems (e.g., Carr et al., 2003; Kearney et al., 2013; National Academy of Sciences [NAS], 2001). These differences are an important underlying factor in the calls from some researchers and practitioners urging caution in using terrestrial labels and concepts in the marine context (Al-Abdulrazzak and Trombulak, 2012; Kearney et al., 2013; Sloan, 2002).

Although ecological differences are often invoked to discourage the application of terrestrial labels to marine areas, the literature on MPA designation has rarely empirically examined how people conceive of and react to these different titles and labels. These views are critical, as they can influence attitudes and behaviors toward protected areas, regardless of underlying ecology (Gobster et al., 2007). Given that ecological success of MPAs is often at least partially dependent on their social acceptability (Hoelting et al., 2013; Thomassin et al., 2010; Weible, 2008), public beliefs about MPAs carry particular importance. The labels given to these areas can affect public beliefs by indicating what actions (e.g., fishing, motorized boating) are permissible and how

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MPAs should be managed (e.g., for fishery stock replenishment, conservation, recreation).

“Wilderness” is a prime example of a concept and label used for describing some terrestrial protected areas and a few areas of the ocean, often without consideration of what the term means in a marine context. Societal relationships with areas deemed as wilderness on land have been long, polarizing, and much-discussed (Cronon, 1996; Dawson and Hendee, 2009; Nash, 2014; Watson et al., 2016). The evocative and provocative nature of a term such as wilderness suggests a need to examine its use in new contexts such as MPAs. Although some research on this topic has been conducted (e.g., Barr and Kliskey, 2014a, 2014b; Lindholm and Barr, 2001; Shafer and Benzaken, 1998; Sloan, 2002), gaps remain in understanding how populations outside of traditional stakeholders (e.g., commercial fishers, recreational anglers, managers, scientists) view the application of the wilderness label and concept to the marine environment, and how this might affect attitudes and actions toward the ocean.

Couching MPAs as marine wilderness, for example, may or may not be a way for managers to excite the interest of people who otherwise may not pay much attention to ocean issues (Steel et al., 2005), but whose opinions and actions regarding MPAs may impact these areas. The utility of such an approach partly depends on what wilderness as applied to the ocean means to people, and what attitudes and behaviors this designation might inspire. Basing MPA designations not only on ecological or regulatory criteria, but also on an understanding of the effects of these designations on public cognitions has the potential to ease some of the confusion around the numerous titles and labels given to MPAs. This understanding can facilitate communication with the public about the values and objectives of protecting ocean spaces. This article explored the applicability of the label and concept of wilderness in a marine context, and its implications on public cognitions associated with MPAs.

2. Conceptual foundation

2.1. Wilderness

Wilderness is a complex concept, even outside of a marine context. Research on terrestrial wilderness highlights the contentious nature of the term and suggests there is little consensus on what it constitutes (Cronon, 1996; Nelson and Callicott, 2008). Guidance on what wilderness means can be gleaned from administrative and statutory classifications. The United States of America (USA) 1964 Wilderness Act defined “A wilderness, in contrast with 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.” This act, however, has mainly been applied to terrestrial areas formally designated as wilderness in the USA and a few marine areas immediately adjacent to these land-based wilderness areas. Outside the USA, the IUCN defined wilderness as “large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, which are protected and managed to preserve their natural condition” (Dudley, 2008, p. 14). This conceptualization includes the possibility of some people thinking that marine areas could be called wilderness (Day et al., 2012), but these administrative definitions only apply to areas officially designated as wilderness under the appropriate statute, law, or administrative guideline (Dawson and Hendee, 2009). Wilderness in this paradigm is a definable legal title given to an area.

Many have argued, however, that substantial wilderness exists that has not been formally named or officially designated as such through these legal or political means (e.g., Barnes, 2003; Higham et al., 2000). In some instances, this undesignated wilderness has been identified through the presence or absence of physical characteristics. Conditions such as roadlessness, remoteness, minimal human structures or

alterations, and large size are cited as defining characteristics of wilderness areas, whether or not they have been formally designated as such (Higham et al., 2000; Nash, 2014; Wall-Reinius, 2012). People from various locations and backgrounds, however, can perceive the same conditions as possessing widely varying degrees of wildness or a complete absence thereof (Durrant and Shumway, 2004; Lupp et al., 2011; Lutz et al., 1999; Nelson and Callicott, 2008).

Wilderness, therefore, might be regarded not simply as a legal designation and collection of physical attributes, but rather as a social construct (Cronon, 1996; Nelson and Callicott, 2008). From this perspective, wilderness is in the eye of the beholder; it is “the terra incognita of people’s minds” (Dawson and Hendee, 2009, p. 4) or, at least, a human creation (Cronon, 1996). In this sense, wilderness may or may not actually be present in formally designated wilderness areas, and a given set of physical characteristics may or may not constitute de-facto wilderness, depending on who makes the assessment (Lupp et al., 2011; Wall-Reinius, 2012).

Whatever its definition, wilderness is a powerfully evocative term. Nash (2014) and Oelschlaeger (1991) have written extensively on the roots of wilderness, including the various and changing perceptions that Americans have of lands that are considered wild. Studies have shown broad and growing popularity for wilderness across the American public since the mid-1990s (Cordell et al., 2003; Cordell et al., 1998; Lutz et al., 1999). This support, however, is far from ubiquitous with a noteworthy minority who can be apprehensive, distrustful, or outright hostile to the idea of wilderness and other protected lands (Durrant and Shumway, 2004; Yung et al., 2008). It has been debated whether wilderness even exists given pervasive human alteration of the biosphere (Cole and Yung, 2010; McKibben, 2006) and whether wilderness remains relevant in modern society (McCool and Freimund, 2016; Smith and Kirby, 2015).

Wilderness is a multi-faceted concept deserving of careful consideration when applied to new areas and contexts. This is particularly the case given whether wilderness or other labels used to connote protected areas can make a difference in how those areas are perceived and valued (Brailovskaya, 1998; Yung et al., 2008). As more MPAs are designated, including as marine wildernesses, it is increasingly important to investigate what this concept and label means in a marine context, and whether views regarding terrestrial wilderness apply in this context.

2.2. Marine wilderness

Although the wilderness concept is well-developed in terrestrial areas, application to the ocean was not widely discussed until the late 1980s and there has been little conformity in its conceptualization and implementation (Barr, 2008; Sloan, 2002). Early discussions were mostly conducted in academic and practitioner forums, and produced various definitions of what constitutes marine wilderness (Bohnsack et al., 1989; Kelleher and Kenchington, 1991). The fourth World Wilderness Conference in 1987 defined marine wilderness as “marine areas where little or no evidence of human intrusion is present or permitted, so that natural processes will take place unaffected by human intervention” (Kelleher and Kenchington, 1991, p. 44). The IUCN stated that marine wilderness areas “should be sites of relatively undisturbed seascape, significantly free of human disturbance, [...] works, or facilities, and capable of remaining so through effective management” (Day et al., 2012, p. 20). The North American Intergovernmental Committee on Cooperation for Wilderness and Protected Areas Conservation (NAWPA) offered a definition consistent with those for terrestrial wilderness: “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” (NAWPA, 2011, p. 1). The emphasis for marine wilderness tends to be on perpetuating natural conditions and

processes, and restricting human activities. Marine wilderness definitions have substantial overlap with those of marine reserves (MRs), as a defining characteristic of MRs involves prohibiting development and extractive uses (Lubchenko et al., 2003; NAS, 2001). These terms have been used synonymously (Brailovskaya, 1998; Rockefeller, 2008).

Informed primarily by biophysical and policy considerations, these definitions and early discussions involved limited examination of what marine wilderness means to the public, and whether application of wilderness to marine areas is perceived as legitimate. Shafer and Benzaken (1998) were among the first to investigate whether people outside of academia and management thought the wilderness label was applicable to the ocean. Their work at Australia's Great Barrier Reef: (a) found most respondents (80%) agreed that wilderness existed in this marine area, and (b) identified attributes thought to affect the wilderness character of a marine area (e.g., number of people, noise, boat traffic, distance from coastal access). Barr and Kliskey (2014a, 2014b) replicated elements of this study and also found that most respondents (nearly 76%) thought areas of the ocean could be considered wilderness and said similar marine wilderness attributes were important. In these studies, the term wilderness transcended differences between terrestrial and marine environments. These studies did not, however, address whether applying this concept or label to the ocean imbues this term with new meanings, or how applying wilderness to marine areas might change cognitions or behaviors related to these areas.

These studies also focused on invested stakeholders such as reef users and marine, wilderness, and science professionals. Views of the general public were not examined. Although the general public typically lacks detailed knowledge about the ocean (Steel et al., 2005), this population often has opinions about wilderness on land (Cordell et al., 2003; Dawson and Hendee, 2009; Yung et al., 2008) that may affect their willingness to extend terrestrial ideas of wilderness to marine areas. This population also constitutes people on whose behalf public resources such as MPAs are supposed to be managed, and who make up most tax and voting bases that ensure the viability of MPAs (Barr and Lindholm, 2000). Given that populations other than traditional stakeholders (e.g., managers, fishers) have less direct experience with MPAs (Voyer et al., 2012), the label given to these areas is also a crucial, perhaps singular, means by which they encounter protected ocean space (King, 2005). Research on cognitions associated with marine wilderness has also not untangled relationships between terrestrial and marine applications of wilderness, which may be an important distinction if marine wilderness is used as a label for communicating with citizens.

2.3. Social science perspectives

If wilderness is a social construct and a "state of mind" (Nash, 2014, p. 5), there should be no complications applying this concept to the ocean. This assumption, however, remains largely unexamined due to the limited explorations of marine wilderness from a social science perspective. Place-based research offers one lens through which to examine the applicability of wilderness to marine areas. Place-based research has historically focused on the social concept of sense of place, downplaying the role of physical environments in human-place relationships (Lewicka, 2011; Tuan, 1974; Williams and Patterson, 1996). Stedman (2003) challenged this focus, asserting that the physical nature of a place (marine or terrestrial) impacts how that place is interpreted and what meanings are ascribed. Some researchers have not gone as far as Stedman (2003) in asserting the primary importance of physical environments, but have found that the meaning of a place is intertwined with its physical characteristics (Brehm, 2007; Kyle and Chick, 2007; Windsong, 2014). In a marine setting, physical attributes unique to the ocean are important. Wynveen, Kyle, and Sutton (2010) found that characteristics of the Great Barrier Reef Marine Park's environment contributed to the formation of place meanings, setting this marine area apart from terrestrial places.

Although wilderness can be considered a social construction and the physical landscape, whether marine or terrestrial, "sets bounds and gives form to" the meanings supporting that construction (Stedman, 2003, p. 671), the label wilderness may have its own effects on how an MPA is viewed. Research using a symbolic interactionist framework indicates that symbols (e.g., words, names, labels) influence how social and physical environments are interpreted (Blumer, 1969), and these symbols can carry more meaning than social or physical characteristics alone (Colton, 1987). Wynveen et al. (2010), for example, found consensus among respondents on the intrinsic value of unique natural resources protected in the Great Barrier Reef Marine Park, and suggested this consensus was partly shaped by the symbolism of the marine park designation. Wilderness is often interpreted as a symbol for various aspirations and values (Cole, 2005; Schroeder, 2007), and designating places such as MPAs as wilderness ostensibly confers those values and aspirations to that place. Little research has examined whether this occurs with the designation of marine wilderness areas, or whether this wilderness designation would alter attitudes (i.e., positive or negative evaluations; Fishbein and Ajzen, 2010) toward an MPA. In addition, because symbols such as wilderness can affect attitudes and behaviors (Colton, 1987; Fishbein and Ajzen, 2010), the sustainable management of MPAs demands an understanding of what wilderness in the ocean may mean to a broad representation of the public.

This article explored five research questions relative to the social implications of applying the concept and label of wilderness to marine areas. First, to what extent does the public think the concept of wilderness applies to areas of the ocean in general and to MRs in the state of Oregon (USA) in particular? Second, does this differ from the extent that this concept is thought to apply to areas of land? Third, what are the similarities and differences among public views of "marine protected area," "marine reserve," "wilderness," and "marine wilderness?" Fourth, how would application of wilderness to Oregon's MRs alter attitudes about these areas? Fifth, how would wilderness rather than MR designation affect intended visitation?

3. Methods

3.1. Study context

Oregon recently had its first MRs designated at Cape Falcon, Cascade Head, Otter Rock, Cape Perpetua, and Redfish Rocks. These MRs are defined as "an area within Oregon's Territorial Sea or adjacent rocky intertidal area that is protected from all extractive activities, including the removal or disturbance of living and non-living marine resources, except as necessary for monitoring or research to evaluate reserve condition, effectiveness, or impact of stressors" (Oregon Ocean Policy Advisory Council [OPAC], 2008, p. 1). Four of these MRs (all except Otter Rock) also have some of their area designated as MPAs with slightly less restrictive regulations. In Oregon, an MPA is "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" (OPAC, 2008, pp. 5–6). Although none of these MRs are termed as wilderness, the emphasis on protection from extraction and limits on human impact is similar to some definitions of marine wilderness (Bohnsack et al., 1989; Day et al., 2012).

With a few exceptions (e.g., Perry et al., 2017; Perry et al., 2014), most studies of Oregon's MRs have focused on the most directly invested stakeholders (e.g., commercial fishers, recreational anglers, scientists). Even Perry et al. (2014, 2017) oversampled coastal residents in communities of place nearest these MRs. Although these stakeholders and adjacent communities are likely to be most directly affected by these reserves, data from these populations are not necessarily reflective of dynamics in other regions of the state or of broader societal relationships with the ocean, which is a common limitation of social science research on MPAs (Barr and Lindholm, 2000). This article

investigated the views and cognitions of residents in the most heavily populated region of Oregon (i.e., Portland to Ashland between the Coast and Cascade Mountain Ranges). This non-coastal population is significant in that it constitutes the majority of Oregon's voting population and is more culturally and socio-economically diverse in comparison to the rest of the state. Although this population is arguably not as invested in or affected by marine issues as more traditional stakeholder groups (e.g., commercial fishers, residents living nearest the MRs), studying this population provides managers of Oregon's MRs with insights into views held by residents of the most populous region of the state, which adds a needed facet to the understanding of human-ocean relationships in this state.

3.2. Data collection

Data were obtained from a mixed-mode survey (internet, mail) of residents in this region in 2016. The sample was drawn randomly from postal records delineated by census blocks. Questionnaires were administered using four mailings (Dillman et al., 2014). The first mailing was a postcard notification with an option to complete the questionnaire on the internet using individual access codes. Those who did not complete the questionnaire on the internet received the second mailing, which consisted of a letter, questionnaire, and postage-paid return envelope. This was followed by a postcard reminder (with the option to complete on the internet) and then a second full mailing (letter, questionnaire, envelope) to those who had not responded. Of the 2,800 residents contacted, 530 completed questionnaires (77 completed on the internet, 453 completed by mail) for a response rate of 20% after accounting for undeliverables (e.g., incorrect address, moved). A telephone non-response bias check was conducted with 75 residents who did not complete the questionnaire and they were asked a subset of questions. No substantive differences were found between those who completed the full questionnaire versus this non-response bias check. Demographics (e.g., age, sex [male/female]) of all respondents were compared with the most recent census information and the data were weighted by these demographic variables to ensure representativeness of the sample.

3.3. Analysis variables

Respondents were asked in open-ended questions early in the questionnaire to list three words or short phrases they associated with "marine protected area," "marine reserve," "wilderness," and "marine wilderness." This early placement minimized potential order effects from exposure to terms and definitions later in the questionnaire.

Table 1

Reliability analyses assessing applicability of wilderness to ocean and terrestrial areas, and attitude change with wilderness designation of Oregon's marine reserves.

	Mean	% agree ^a	Item total correlation	Alpha if deleted	Cronbach alpha
Applicability of wilderness to the ocean ^b					.86
Areas of the ocean in the world	4.10	80	.69	.84	
Areas of the ocean along Oregon's coast	3.88	72	.82	.71	
Oregon's marine reserves	3.62	60	.69	.84	
Applicability of wilderness to land ^b					.91
Areas of land in the world	4.52	95	.82	.89	
Protected areas of land in Oregon	4.40	91	.87	.84	
Other areas of land in Oregon	4.29	87	.82	.89	
Attitude change with wilderness designation					.91
Opinion would be more positive ^c	3.25	28	.83	-	
Would like Oregon's marine reserves more ^d	3.21	28	.83	-	

^a Percent of respondents indicating that they either "agree" or "strongly agree" with the statement.

^b Variables measured on 5-point scales of 1 "strongly disagree" to 5 "strongly agree."

^c Variable measured on a 5-point scale of 1 "my opinion of Oregon's marine reserves would be more negative if they were designated as wilderness" to 5 "my opinion of Oregon's marine reserves would be more positive if they were designated as wilderness."

^d Variable measured on a 5-point scale of 1 "I would like Oregon's marine reserves less if they were designated as wilderness" to 5 "I would like Oregon's marine reserves more if they were designated as wilderness."

Respondents were then provided with a map of Oregon's MRs and the following information later in the questionnaire: "Although Oregon's marine reserves are not officially designated as 'wilderness,' some people believe wilderness exists on not only land, but also in the ocean. However, other people believe wilderness only exists on land and does not include the ocean. Wilderness has many possible definitions, but for the purposes of the rest of this survey, it can generally be considered as places where natural processes dominate and intentional human modification of the environment is minimal." Appropriateness of applying wilderness to the ocean and land was then assessed by asking respondents whether they disagreed or agreed that six areas could be called wilderness: (a) areas of ocean in the world, (b) areas of ocean along Oregon's coast, (c) Oregon's MRs, (d) areas of land in the world, (e) protected areas of land in Oregon, and (f) other areas of land in Oregon. Items were measured on five-point scales of 1 "strongly disagree" to 5 "strongly agree."

Attitude change in response to potential designation of Oregon's MRs as marine wilderness was measured with two items, each on five-point scales. The first asked if opinions of these areas would be more negative (1 on scale), not change (3), or be more positive (5). The second asked if respondents would like Oregon's MRs less (1 on scale), not change their opinion (3), or like these reserves more (5) if they were designated as marine wilderness. An open-ended question then asked respondents who indicated their attitudes would change to describe the nature of that change. Potential behavioral changes in visitation to Oregon's MRs were measured by asking on a five-point scale whether respondents would want to visit these areas less often (1 on scale), the same amount as now (3), or more often (5) if they were ever designated as marine wilderness. For comparison, another question on the same scale asked how often respondents would visit Oregon's marine areas if they were designated as MRs. To minimize bias against those who had never visited before or did not have the ability to visit Oregon's coast, both questions addressing changes in visitation asked if respondents would *want* to change visitation.

4. Results

4.1. Applicability of wilderness to marine areas

Respondents generally agreed with applying the concept of wilderness to marine areas (Table 1, Fig. 1). Most respondents agreed or strongly agreed that areas of ocean in the world (80%, $M = 4.10$), areas of ocean along Oregon's coast (72%, $M = 3.88$), and Oregon's MRs (60%, $M = 3.62$) could be called wilderness. Only 16% of respondents disagreed that Oregon's MRs could be called wilderness, but this was

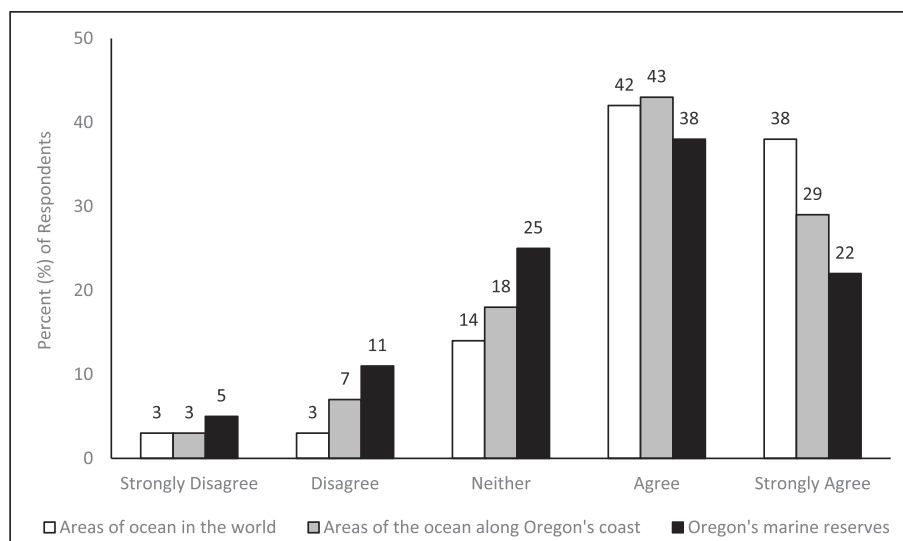


Fig. 1. Percentage of respondents who disagreed or agreed that areas of the ocean at different geographic extents could be called wilderness.

greater than those who disagreed that wilderness could apply to other areas along Oregon's coast (10%) or other areas of ocean in the world (6%).

4.2. Applicability of wilderness to marine versus terrestrial areas

Almost all respondents agreed or strongly agreed that wilderness applies to areas of land in the world (95%, $M = 4.52$), protected areas of land in Oregon (91%, $M = 4.40$), and other areas of land in Oregon (87%, $M = 4.29$; Table 1). Although respondents agreed with applying the concept of wilderness to the ocean, they were significantly more willing to apply this concept to land than the ocean across all geographic contexts (i.e., areas in the world, areas in Oregon, protected areas in Oregon), paired-sample $t = 8.31$ to 14.63 , $p < .001$ (Table 2). Cohen's d effect sizes indicated that the strength of these differences in wilderness applicability between areas of land versus the ocean in Oregon and around the world were "typical" or "medium" ($d = .45$ and 0.50), and there was a "substantial" or "large" difference in wilderness applicability between protected areas of land in Oregon versus Oregon's MRs ($d = .84$; Cohen, 1988; Vaske, 2008).

Cronbach alpha reliability analysis indicated that the items assessing applicability of wilderness to the ocean ($\alpha = .86$) and land ($\alpha = .91$) could be aggregated into two separate scales, one for ocean areas (3 items) and one for land areas (3 items; Table 1). Deletion of any variable from its respective scale did not improve reliability. Alphas $\geq .65$ suggest that variables are measuring the same concept and justify combining them in an index (Vaske, 2008). Comparison of the aggregated ocean ($M = 3.86$) and land ($M = 4.41$) indices showed that

respondents agreed wilderness was more applicable to terrestrial (i.e., land) areas than marine environments, paired-sample $t = 12.69$, $p < .001$ (Table 2). The effect size ($d = .67$) indicated that this difference was between "typical" or "medium" and "substantial" or "large" (Cohen, 1988; Vaske, 2008).

4.3. Marine protected area, marine reserve, wilderness, and marine wilderness meanings

Content analysis extracted themes from the open-ended words or phrases associated with "marine protected area," "marine reserve," "wilderness," and "marine wilderness." A second researcher coded a subset of these responses, and interrater reliability was 92%. This interrater reliability was determined by the degree of overlap between researchers in the number, type, composition, and relative intensities of themes that emerged. It is possible that this high interrater reliability was due to the relatively simplistic nature of these data (i.e., single words, short phrases) compared to more lengthy forms of qualitative data (e.g., interviews, focus groups).

In total, 77% of respondents gave at least one response to these open-ended questions, and several broadly shared themes emerged. These themes are capitalized below and listed in Table 3. References to Environmental Attributes, including biological and physical components of the environment, were particularly common with little difference among these four protected area designations. Words such as "wildlife," "habitat," and "ecosystem" were associated with each designation to a similar extent. Wildlife and animals were a particular focus within this theme. Similarly, each designation evoked the theme

Table 2 Comparison of the applicability of wilderness to land and ocean areas in general, and in different geographic contexts.

	Mean wilderness applicability ^a		Paired-sample t -test value	p -value	Cohen's d effect size
	Ocean areas	Land areas			
Areas in the world ^b	4.10	4.52	9.31	< .001	.50
Protected areas in Oregon ^c	3.62	4.40	14.63	< .001	.84
Other areas in Oregon ^d	3.88	4.29	8.31	< .001	.45
Composite index	3.86	4.41	12.69	< .001	.67

^a Variables measured on 5-point scales of 1 "strongly disagree" to 5 "strongly agree."
^b Ocean areas = "areas of the ocean in the world," Land areas = "areas of land in the world."
^c Ocean areas = "Oregon's marine reserves," Land areas = "protected areas of land in Oregon."
^d Ocean areas = "areas of the ocean along Oregon's coast," Land areas = "other areas of land in Oregon."

Table 3

Prominent qualitative themes associated with protected area designations. Ratings of high, moderate, and low are relative to other themes associated with the same designation (vertically down columns). A rating in one designation does not imply the same importance as that rating within another designation (horizontally across columns).

Themes ^a	Marine Protected Area	Marine Reserve	Marine Wilderness	Wilderness
Prohibitions and Regulations (e.g., no fishing, limited access)	High	High	High	Moderate
Protection (e.g., protected, conservation)	High	High	Moderate	Moderate
Environmental Attributes (e.g., wildlife, ocean, habitat)	High	Moderate	High	High
Restoration (e.g., habitat restoration, recovery)	Moderate	High	Moderate	N/A
Human Activities (e.g., recreation, research)	Low	High	Low	Moderate
Concerns and Threats (e.g., vulnerable, endangered)	Moderate	Low	Low	Low
Importance (e.g., necessary, critical, good idea)	Low	Moderate	Low	Low
Pristineness (e.g., untouched, pure, unspoiled)	Low	Low	High	High
Emotive Connections (e.g., inspiring, serene, interesting)	Low	Low	High	High
Governance and Management (e.g., controlled, managed)	Moderate	Moderate	Low	Low
Health and Cleanliness (e.g., clean, healthy, unpolluted)	Low	Low	Moderate	Low
Complaints and Confusion (e.g. not necessary, ambiguous)	Low	Low	Low	Low

^a These themes are capitalized in the text of the article.

of Protection with words such as “protected,” “conservation,” and “preserved” appearing across all designations. The theme Prohibitions and Regulations also arose for each designation, with mentions of restrictions, regulations, and limitations often appearing. However, there was substantial variation in the overall tone and language used for describing these regulations.

Additional themes appeared across all designations, but were not particularly strong for any of them. These themes included Importance (e.g., “needed,” “good idea”), Governance and Management (e.g., “enforcement,” “well controlled”), Health and Cleanliness (e.g., “clean water,” “healthy”), and Complaints and Confusion (e.g., “too many,” “what is reserved?”). Although the Prohibition and Regulations, Protection, and Environmental Attributes themes were shared and had some importance across designations, they were not always the most prominent for each designation, and distinctions existed in how themes were expressed in relation to each designation. Differences in words and phrases attributed to each designation are discussed below.

4.3.1. Marine protected area

Respondents strongly associated “marine protected area” with restrictions, regulations, and prohibitions. Restrictions on access and fishing were of particular importance, with phrases such as “no access,” “no public entry,” and “off limits” among the most frequently mentioned. Many respondents expressed the theme of Prohibition and Regulations using imperative, commanding language such as “don't fish,” “stay out,” and “don't disturb wildlife.” Some other apparent commands, such as “exercise care,” “do not impact,” “tread lightly,” and “leave as found” appeared to express a stewardship ethic for MPAs.

Among the four designations, “marine protected area” evoked the strongest sense of stewardship, with references including “do it before it's too late,” “defend,” and “guard.” This emphasis within the theme of Concerns and Threats may have emerged because of a perception that these areas require protection. In fact, respondents associated “marine protected area” with potential threats, providing responses such as “endangered area” or “area needs help.” Despite the emergence of Concerns and Threats and the subtheme of stewardship associated with these areas, the Importance (i.e., worth) of these areas was not emphasized as much as it was for the other designations. Rather, there were responses that reflected Complaints and Confusion, indicating uncertainty or even resistance to the idea of an MPA (e.g., “more area controlled by needless organizations and government,” “really vague designation,” “confusing”).

4.3.2. Marine reserve

Similar to associations with “marine protected area,” responses to “marine reserve” also focused heavily on Prohibitions and Regulations, particularly limitations on access and permissible activities. Some

respondents believed that “marine reserve” implied an area that is completely off-limits to people, associating this designation with phrases such as “closed to the public,” “no human activity,” and “oceanic no-use area.” Although respondents emphasized these restrictions and regulations, not all indicated that MRs are entirely off-limits. A number of respondents, more than for any other designation, mentioned Human Activities such as research and recreation when thinking about MRs. This apparent contradiction between an emphasis on prohibitions and a concurrent sense of recreation and other activities was echoed by respondents associating “marine reserve” with the theme Complaints and Confusion such as “what?,” “honestly don't know what a marine reserve is,” and “are the US Marines involved?”

In spite of some confusion, Protection clearly emerged as the strongest theme for “marine reserve.” Respondents thought MRs are protected areas of the ocean, whether they are protected by regulations or protected for recreation and research. More so than with any other designation, “marine reserve” also brought forth notions of protection with an emphasis on Restoration for the future. Examples such as “species regeneration,” “reestablish marine ecosystem,” and “saving for the future” were more commonly associated with “marine reserve” than other designations.

4.3.3. Marine wilderness

Prohibitions and Regulations again figured prominently in association with “marine wilderness.” However, there were virtually no uses of the commanding, imperative language commonly used in association with “marine protected area” and “marine reserve.” Limitations, especially on access, were still important for “marine wilderness.” Restrictions that were most salient involved issues similar to wilderness regulations in the terrestrial context, such as limitations on development (e.g., “no man-made structures”), motorized equipment (e.g., “motor-less”), and human footprint or habitation (e.g., “few/no signs of human presence”).

This emphasis on restricting human influence and development is related to the strongest theme that emerged for “marine wilderness,” which is Pristineness. “Pristine,” “undisturbed or altered,” and “untouched” were emphasized by respondents. Although similar phrases appeared for “marine protected area” and “marine reserve,” they were not as common. Some phrases used in association with “marine wilderness” suggested a freedom from human impurity or incursion, which is language that did not appear for the other designations; examples included “protected from human contamination,” “uninfected by man,” and “minimal invasion of man.”

A further distinction for “marine wilderness” was the preponderance of descriptive, even emotional language used by some respondents, exemplified in the theme Emotive Connections. Each of the four designations brought forth some degree of descriptive responses,

with a particularly broad distribution of references to scenic beauty. Despite this, descriptions such as “beautiful” or “isolated” appeared more often for “marine wilderness.” An important subset of these Emotive Connections focused on vibrancy, diversity, and abundance of life in marine wilderness. Phrases such as “lush,” “flourishing,” and “full of life” appeared more frequently here than for any other designation. “Marine wilderness” also evoked emotive language (e.g., “fascinating,” “magical,” “undiscovered,” “inspiring,” “joy”) that was nearly absent from associations with “marine protected area” and “marine reserve.”

Not all respondents, however, had positive or emotional associations with “marine wilderness.” Although each designation had a portion of respondents report negative or confused reactions, “marine wilderness” had more of these Complaints and Confusion and negative associations than the other designations. Those with negative reactions to “marine wilderness” used phrases such as “government takeover,” “tied up,” “red tape,” and “no common sense.”

4.3.4. Wilderness

The most prominent theme to emerge from associations with “wilderness” was Pristine, with numerous references to the untouched or pristine nature of these areas. Notions of Pristine were more strongly associated with “wilderness” than any other theme was for any of the other designations. There appeared to be considerable consensus among respondents that “wilderness” indicates “untouched by man,” “unspoiled,” and “pure.”

Similar to connotations with “marine wilderness,” respondents also used a variety of Emotive Connections and descriptive terms for “wilderness” (e.g., “uninhibited,” “happiness,” “enchanting,” “uplifting”). By comparison, there were few, if any, similar words used in relation to either “marine protected area” or “marine reserve.”

A further difference between responses for “wilderness” and those for “marine protected area” and “marine reserve” was the limited presence of imperative, commanding language related to rules and regulations. Although Prohibitions and Regulations such as “restricted entry” were used with respect to “wilderness,” few responses took the form of commands. There were also few references to recreation in association with “wilderness” compared to the strength of some other themes affiliated with the designation. When recreation was mentioned, it was almost always in connection with terrestrial activities such as “hiking” and “camping.” “Wilderness” also prompted many respondents to think of terrestrial aspects such as “forest,” “deep in the woods,” and “mountains.” Some rules and regulations associated with “wilderness,” such as “no logging” and “no cars,” also focused on regulations typical for terrestrial wilderness areas.

4.4. Changes in attitudes and intended visitation with marine wilderness designation

For both questions measuring attitude change with potential wilderness designation of Oregon's MRs, more than half of the respondents (61–63%) indicated this would not change their attitudes toward the MRs. Cronbach alpha reliabilities suggested these items could be combined into a single index measuring attitude change from designation of Oregon's MRs as wilderness ($\alpha = .91$, Table 1). Using this index, more respondents (32%) indicated their attitudes would change positively (e.g., like, positive) compared to negatively (13%), but more than half still thought wilderness designation would not change their attitudes toward these MRs (55%, $M = 3.23$).

Qualitative responses to the open-ended question asking how opinions would change with wilderness designation of Oregon's MRs also suggested that among those whose opinions would change, most would change positively. These positive responses centered on several themes. The first and most prominent theme was the idea that wilderness designation would afford the MRs with increased protection beyond the level at which they are currently protected. Many respondents had

opinions such as “wilderness designations usually carry extra protections of which I am in favor,” “I would assume there were more protections in place for the marine ecosystem,” and “I hope a stronger designation would help with protection of the oceans.”

Respondents also suggested their positive reactions to potential wilderness designation of Oregon's MRs stemmed from beliefs that such a designation would imply protection of a pristine area, or that the intent of this designation is to reduce human influence on the natural ecosystem. One respondent, for example, stated “my opinion would change in a positive sense. I would have more respect for these reserves and understanding their purpose is to retain a pristine ecological ecosystem.” Several others responded with sentiments similar to “I would think these areas would be untouched” and “it makes them sound more wild with less human footprint.” Similarly, the last theme to emerge from those who said their opinions would change positively with wilderness designation is this designation would confer more respect, value, and appreciation of the MRs (e.g., “they might get more of the attention they deserve,” “I would expect people to respect these areas more,” and “I feel that more respect and concern were being shown”).

Although respondents indicated their opinions would change positively, there were also some who had negative reactions to the idea of wilderness designation of Oregon's MRs. These negative reactions focused on the belief that wilderness designation would carry additional restrictions, particularly the exclusion of people to an excessive degree. Concerns were expressed in statements such as “I would hate for no one to be allowed in or only very few” and “I would feel I wouldn't be able to use it because it would be restricted.” In addition to fear of exclusion from areas designated as marine wilderness, many respondents with negative reactions to the possible designation cited government and regulatory overreach as an important factor. Respondents stated, for example, “government would have too much control and they do a terrible job at everything,” and “more government control and land grabs.”

There were some respondents who thought that changing the MR designation to marine wilderness would be unnecessary. One respondent, for example, stated “I feel it's unnecessary to change names to wilderness; what would be the point?” Some others saw wilderness designation as a semantic ruse, stating that it “seems like a gimmick” and “right now, I am very suspicious that changing terminology is a way to take advantage of taxpayers.” Despite these concerns about potential wilderness designation of Oregon's MRs, most respondents would either not change their opinion at all, or if their opinion would change, they described this change as positive.

Most respondents (88%) reported they had visited marine areas in Oregon, and 60% reported visiting at least one of the MR sites in this state. About two-thirds of respondents also indicated that neither MR (67%, $M = 3.12$) nor marine wilderness (64%, $M = 3.02$) designation would alter their desired visitation to these areas. Slightly more respondents wanted to visit more frequently with MR designation (23%) than with marine wilderness designation (21%). Marine wilderness designation would inspire 16% of respondents to visit less often, compared to only 10% of respondents who stated they would visit areas designated as MRs less often because of this designation. Although the difference between means was statistically significant ($p < .001$), the effect size ($d = .12$) was “minimal” (Vaske, 2008) or “small” (Cohen, 1988).

5. Discussion

Most respondents believed the label and concept of wilderness could be applied to the ocean. Although the majority thought Oregon's MRs could be called wilderness, other areas of the ocean along Oregon's coast and elsewhere in the world were seen as more appropriate for marine wilderness designation. Respondents also thought wilderness was more applicable to land than marine areas across geographic contexts. More than half of respondents would not change their

attitudes or visitation if marine areas were designated as wilderness. For respondents who said they would be affected by this marine wilderness designation, most would change their attitudes in a positive direction and increase visitation. Qualitative responses suggested this is because the designation is seen as adding protection, preserving areas, and increasing respect or value of these areas. Responses also indicated that designations of “marine protected area,” “marine reserve,” “marine wilderness,” and “wilderness” evoked distinct reactions with marine protected areas and reserves inferring more rules, regulations, and limitations, whereas terrestrial and marine wilderness areas evoked more notions of purity and pristineness, and descriptions carrying emotional overtones.

Some of these differences in associations among the designations may have stemmed from the longstanding discussion about MPAs and MRs in Oregon. In the decade leading up to creating Oregon's MRs, the consequences, risks, and benefits of MPA and MR designations were discussed statewide with some of this discussion involving restrictions and limitations that MRs and MPAs would require. Marine wilderness, in contrast, has not been widely discussed in Oregon or across the USA, with little public debate about regulations that could accompany this designation (Barr and Kliskey, 2014b). The difference in the extent these designations have been the subject of public dialogue may have influenced some responses. These effects of different levels of public discourse on MRs, MPAs, and marine wilderness may have also been blunted by the overall lack of public knowledge about some of these topics (Perry et al., 2014; Steel et al., 2005). These findings have additional implications for both management and future research.

5.1. Management implications

Although most respondents deemed the label and concept of wilderness to be appropriate for marine areas, it appears that the term “wilderness” brings some of its terrestrial legacy when applied to the ocean. Wilderness was deemed more appropriate for land than marine areas, and many respondents associated this term with terrestrial activities and regulations. Perhaps most important for management of any areas labeled as marine wilderness, both “wilderness” and “marine wilderness” were thought to be untouched, unaltered, and pristine areas, whereas few such expectations existed for MPAs and MRs. It is doubtful these expectations of purity could be met by many marine areas given the ubiquity of anthropogenic impacts on global marine ecosystems (Halpern et al., 2008). It is perhaps this mismatch between the “untouched” ideal of marine wilderness and the lived experience of Oregon's marine areas that prompted some respondents to find wilderness slightly less fitting for Oregon than for other areas of the ocean around the world.

If marine wilderness areas were to be designated, managers would need to prepare to face these expectations of pristineness, which might be unattainable. Dissatisfaction often finds roots in mismatches between expectation and reality (Manning, 2011), and a mismatch might erode acceptability of areas labelled as marine wilderness. Respondents also indicated an expectation that marine wilderness designation would confer added environmental protections, but these areas may or may not provide the additional protection that respondents anticipated. Once again, a mismatch between expectation and reality might prove detrimental to marine wilderness areas.

It is perhaps these expectations of marine wilderness being unspoiled and protective of ecosystems that inspired slightly fewer respondents to want to visit areas designated as marine wilderness compared to those designated as MRs. It is possible that some respondents perceived a marine wilderness as so “unspoiled” and “protected from human contamination” that visiting would counteract the very environmental protections for which the area was set aside. For marine wilderness established with the intent of minimizing human influences, this may be beneficial. However, it is conceivable that a marine wilderness might also be established for other reasons, such as

promoting ecotourism (Shafer and Benzaken, 1998). In this case, the “marine wilderness” label might dissuade the very visitation or ecotourism use that managers might seek. Taken together, it is clear that managing public expectations will be paramount if marine wilderness areas ever begin to be designated on a wider scale.

Most definitions of marine wilderness emphasize general strategies such as perpetuating natural conditions and processes, and restricting human activities (Day et al., 2012; Kelleher and Kenchington, 1991; NAWPA, 2011). Although these attributes were highlighted by most respondents with many feeling positively about the idea of marine wilderness, this label also generated more complaints, confusion, and negative associations than the other designations (e.g., government and regulatory overreach, exclusion of people to an excessive degree, unnecessary additional designation). There is also a lack of consensus on what specific rules and regulations marine wilderness areas might require (Sloan, 2002). This study did not measure public opinions about specific terms and conditions that may be required in marine wilderness areas, but developing a clear vision for rules and regulations pertaining to these areas will be important before formally applying this label and designation. If rules are established that align with public expectations and perceptions, it may be possible to assess whether marine wilderness designation helps to reduce the confusion surrounding the many different MPA titles and labels (Ehler, 2008; Fitzsimons, 2011; Shafer and Benzaken, 1998), or if the additional designation of wilderness, with its long and sometimes contentious history, increases the confusion even more.

The designations “marine protected area” and “marine reserve” have their own attendant expectations, chiefly focused on limitations and restrictions. These expectations of tightly regulated spaces might suit managing agency needs, as many MPAs and MRs (including those in Oregon) are established to minimize negative impacts to ecosystems, mainly with restrictions on access and use. However, Oregon's MRs and many other MPAs around the world are not intended to entirely exclude people or prohibit non-consumptive recreation use. Depending on the reasons for designating an MPA and the extent the public is allowed to access the area, it may or may not be beneficial that restrictions such as “no human activity” and “off limits to everyone” are among the most salient associations that the public in this study had with MPAs and MRs.

5.2. Research implications

The result that a large majority of the public in Oregon's most populous region found wilderness to be an appropriate label for areas of the ocean corroborated results from previous research on ocean recreationists (Shafer and Benzaken, 1998) and managers (Barr and Kliskey, 2014a; 2014b). Taken together, these studies indicate that marine wilderness might be a concept with some degree of social acceptability among both traditional stakeholders (e.g., recreationists, managers) and the general public. This does not suggest, however, that the designation of marine wilderness would always be acceptable or without conflict. Rather, results imply that any conflicts associated with the first attempts to establish marine wilderness might not stem from just using the label “wilderness.” It is important to note, however, that studies addressing this issue, including this study, have asked respondents about the hypothetical applicability of the label and concept of wilderness to marine areas without reference to an actual formally designated marine wilderness area. Research post-establishment would help to discern whether social acceptability of marine wilderness as a concept is durable after formal designation.

Results also showed that different designations (e.g., “marine protected area,” “marine wilderness”) inspire differing impressions, meanings, and expectations. Classification schemes for MPAs, such as those proposed by Al-Abdulrazzak and Trombulak (2012), Horta e Costa et al. (2016), and Day et al. (2012), have typically been developed without much regard to social expectations that are provoked by

the labels used. Given that the ecological success of an MPA is tied to its social success (Hoelting et al., 2013; Thomassin et al., 2010; Weible, 2008), classification schemes should take into account the effects of a given designation on public views of the area. Although this study showed different responses to the “marine protected area,” “marine reserve,” and “marine wilderness” labels, there are other marine designations that were not examined here (e.g., sanctuary, park). “Marine parks,” for example, are more common in places such as Australia (e.g., Great Barrier Reef Marine Park, Shark Bay Marine Park) and Asia (e.g., Sisters’ Island Marine Park in Singapore, Tun Mustapha Marine Park in Malaysia), but this designation is quite rare in the USA where this study was conducted and the public could potentially confuse it with aquariums and marine mammal theme parks (e.g., SeaWorld). Research should, however, examine other titles and labels to determine the extent that results are similar or different across contexts.

Researchers have urged caution using terrestrially oriented terms such as wilderness in the marine context, primarily citing differences between marine and terrestrial ecosystems (Al-Abdulrazzak and Trombulak, 2012; Kearney et al., 2013; Sloan, 2002). Although results here did not indicate that wilderness can be applied to the ocean without some complications (e.g., expectations of purity, historical association with terrestrial environments, potential visitation changes), it is a clear demonstration that both social expectations and ecological implications must be taken into account when researching and applying labels (e.g., wilderness) in a new context.

In the relatively new context of marine wilderness, the import of the label and concept of wilderness remains intact, lending support to the symbolic interactionist view of words as potent symbols. “Marine wilderness” shared many associations with those of “wilderness,” especially notions of pristineness, inspiration, and serenity. Although there were some differences in meanings, the core symbolism of wilderness as a place beyond human touch or interference stays with the term, even when it is applied to vastly different environments. This powerful symbolism superseded any “bounds” (Stedman, 2003, p. 671) that may have been given to those meanings by the physical environment of the marine ecosystem. However, most place-based research (e.g., Brehm, 2007; Stedman, 2003) concerns populations who have some familiarity with the physical environment in question. Although speculative and not assessed here, it is possible that some of the symbolism of wilderness carried over to Oregon’s MRs because this study’s respondents may have been less familiar with the physical environment of these marine areas given that they did not live nearby along the coast. Questions about who has rights to resources, whose opinions matter the most, and who should make decisions have been widely discussed in ocean governance (Agardy, 1997; Canessa and Dearden, 2016; NAS, 2001; Voyer et al., 2015). Future research, therefore, should consider comparing perceptions of marine wilderness between groups of people who are and are not intimately familiar with and impacted by marine environments. Groups impacted by decisions involving marine environments include commercial fishers, residents of local communities, and small-scale and subsistence fishers.

Despite the symbolism of “marine wilderness” as a place somewhat distinct from other areas such as MPAs and MRs, application of the wilderness label and concept to marine areas did not have substantial effects on attitudes or visitation for the majority of respondents. This study, however, only examined self-assessed changes in response to a hypothetical marine wilderness designation. An experimental approach, without relying on self-reports, could more precisely identify if the symbolism of wilderness has a direct effect on attitudes and intentions of which respondents might not be consciously aware. It is also possible that cognitions and other mental processes not investigated here might be affected by application of wilderness to an MPA, MR, or other marine area. Emotions, social norms about acceptable behavior in these areas, and beliefs about positive and negative consequences of establishing protected areas might all be affected by the titles or labels ascribed to areas, especially a term as symbolically rich as wilderness.

Although attitudes are undeniably important in understanding the human dimensions of protected areas, these other emotions and cognitions are also worthy of investigation and may reveal even more about effects of applying the label and concept of wilderness to marine areas.

As with most empirical social science research, caution must be used when extrapolating results of this study beyond the population involved. Even within Oregon, there can be regional differences in environmental values, attitudes, and behaviors, with the population in this study known to be generally pro-environment (Morzillo and Needham, 2015; Steel et al., 1994). These results, therefore, may not be reflective of the general public writ large, but rather of a general public, one with major socioeconomic and political importance in Oregon. Research on other populations, including coastal communities and their perceptions of marine wilderness, will help discern whether the results here are more broadly generalizable.

6. Conclusion

Wilderness is a powerful term, capable of influencing the ways humans perceive a place and what expectations are held for an area designated as such. There have been relatively few, but insistent calls over the past several decades for this concept and label to be applied to marine areas such as MPAs. This study identified some of the difficulties, consequences, and benefits that might result from the impact of such a designation on public opinion and behavior. As oceans worldwide are faced with extraordinary pressures, marine researchers, managing agencies, and others concerned about ocean health must not lose sight of the impacts that public views can have on the ability of an MPA to achieve its social and ecological goals. Although marine wilderness designation might not be a panacea to ensure public support of and attention to marine areas, this study demonstrated that the label “marine wilderness” was seen by most respondents as applicable to the ocean, and designating an MPA or MR as marine wilderness would likely have few negative effects on attitudes and visitation, provided that expectations of pristineness and purity attached to wilderness are addressed. Perhaps, then, marine wilderness designation is worthy of more consideration for advancing marine conservation.

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