



Oregon Coastal Community Well-Being Assessment

Conducted for and in cooperation with the
Oregon Department of Fish and Wildlife

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All report content was written by the authors and reflects the perspective of the authors based on interpretation of questionnaire responses. Content does not necessarily reflect the perspective of the ODFW, the Forest Service, or their employees.

The questionnaire administered in this project was relatively long, and it included some questions that were difficult and / or personal in nature. We thank the coast residents who devoted their time and energy to sharing their perspectives. We especially thank residents who provided open-ended comments, which we used to revise the questionnaire during the pilot testing process and to interpret responses throughout the process.

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Executive Summary

Oregon's five marine reserves were designated in 2012 for purposes of conservation and scientific research. They are managed by the Oregon Department of Fish and Wildlife (ODFW), which contracted with Oregon State University to conduct a survey of Oregon coast residents as part of ODFW's marine reserve human dimensions research program. The survey covered level of respondent awareness and recreational utilization of reserves, the perceived effects of current reserves and preferences for modification of reserve spatial area (reduce, expand, or leave unchanged), and the potential effect of change in reserve area on respondent well-being.

The survey was conducted in 2017 with a random sample of coast residents, following an extensive questionnaire development process. A total of 1,172 completed questionnaires were received for a response rate of 17%. Data were weighted by geographic area, age, and income to better reflect the coast population.

In addition to content directly related to marine reserves, the questionnaire included content on demographic and employment characteristics, environmental worldview, perceived individual and community resilience, and subjective well-being. Several of these variables provide a baseline for monitoring changes that might affect or be affected by the marine reserves.

Perceived community resilience was assessed across seven statements. Respondent agreement was strongest with respect to the statement that the community would be able to provide key services, such as police and fire protection, during emergencies. Agreement was least strong with respect to the community being able to develop new industries in response to potential decline in current industries. Similarly, agreement was low regarding the ability to sustain the community in the event of a significant earthquake / tsunami.

With respect to perceived individual resilience, the strongest level of agreement was in the broad ability to find a way out of difficult situations. The lowest level of agreement was with the ability to cope with an earthquake and tsunami in the community.

Average (mean) subjective well-being was 80 on a life satisfaction scale of 0 for not at all satisfied to 100 for completely satisfied. Across the evaluated aspects of life, satisfaction was greatest with respect to the natural environment in the region and lowest with respect to the respondent's financial situation.

Turning to recreational engagement within the past 10 years in areas that have been designated as marine reserves, participation varied by activity, with 29 percent of respondents reporting they often engage in viewing-oriented activities (e.g., sightseeing, photography, or wildlife viewing), 27 percent reporting they often engage in beach walking or related activities, 17 percent in exploring tide pools, seven percent in recreational fishing, and five percent in other ocean-oriented activities (e.g., swimming, kayaking, or surfing). A coast-wide map of reserve locations and regulations was provided, but unfamiliarity with precise "on the ground" reserve boundaries may affect the above participation estimates.

Half (49 percent) of respondents reported they were moderately or extremely aware of marine reserves in Oregon, while 51 percent reported they were not or slightly aware of reserves. Awareness was greatest in the Lincoln City / Neotsu / Gleneden region and lowest in the Cannon Beach / Seaside region.

Respondents indicated the perceived effects of the current marine reserves across five categories: commercial / charter fishing, recreational fishing, conservation, community jobs / income, and

community character. Many respondents indicated no effect or neutral effect. Other respondents reported a diversity of effects, ranging from very negative to very positive. Across all respondents, the mean effect was noticeably positive for conservation (5.1 on a scale of 1 for very negative, 4 for neutral, and 7 for very positive). The perceived effect of marine reserves was essentially neutral for jobs / income (3.9) and community character (4.1). It was somewhat negative for commercial / charter fishing (3.8) and recreational fishing (3.6). Across communities, the mean perceived effect was most positive in the Lincoln City / Neotsu / Gleneden region and most negative in the region anchored by Coos Bay.

Respondents then indicated their preference for modification of marine reserve spatial area (spatial preference), on a scale of 1 for significantly reduced, 3 for left unchanged, and 5 for significantly expanded. Coastwide, the mean was 3.6. Across communities, the mean was highest for the Cannon Beach / Seaside region and lowest for the Brookings region.

The goal of this study was not to judge the accuracy or desirability of perceptions or preferences, but rather to understand the diversity of perspectives across respondents – and to understand factors that might explain this diversity, especially regarding spatial preference. One such factor is environmental worldview, which was measured using level of agreement with 10 statements, with five reflecting anthropocentric (human-focused) conservation and the other five reflecting connectedness to nature. Cluster analysis was used to group respondents based on their responses. The Moderate group had mid-range levels of agreement across both sets of statements (anthropocentrism and connectedness to nature). The High A - Low C group was relatively high in anthropocentrism and low in connectedness to nature, while the Low A - High C group had the reverse pattern. The High A - High C group was high in both anthropocentrism and connectedness to nature, while the Low A - Low C group was low in both.

A bivariate analysis indicated that environmental worldview predicts spatial preference, with respondents high in anthropocentrism and low in connectedness to nature being more likely than others to prefer a reduction in marine reserve area. Conversely, respondents low in anthropocentrism and high in connectedness to nature were more likely to prefer an expansion.

Multivariate analyses were used to expand this evaluation to include (a) recreational use of areas that have been designated marine reserves and (b) employment in commercial fishing (regardless of whether that fishing was affected by marine reserves). In the path model of perceived effect and spatial preference, environmental worldview was a statistically significant predictor of spatial preference and of the perceived effects of current marine reserves, which was modeled as a precursor to spatial preference.

Respondents who frequently engaged in coast-oriented recreation (e.g., sightseeing and beach walking) were more likely than others to report positive perceived effects of current marine reserves and were more likely to prefer expansion in marine reserves. Frequent engagement in recreational fishing (including shellfish) was not a statistically significant direct predictor of spatial preference. However, it was negatively correlated with perceived effect, and thus was indirectly negatively correlated with spatial preference. The same pattern was found for employment in the commercial fishing sector. This potentially suggests that those engaged in recreational fishing and those employed in the fishing sector are neutral with respect to the concept of marine reserves, but their spatial preferences are more negative than those of others due to negative perceived effects of reserves. Frequency of engagement in other ocean recreation (e.g., swimming, kayaking, or surfing) was not a statistically significant predictor of either perceived effect or spatial preference.

Lastly, choice experiment and subjective well-being models were estimated. In the choice experiment, respondents indicated their choice across the current situation and two potential “change” options, with the options including possible changes in marine reserve area, forest

reserve area, annual household cost, and change in regional fishing and timber jobs. With respect to preference for marine reserve changes, the perceived effect of current reserves was a statistically significant predictor; respondents who evaluated current reserves as having positive effects were more likely to favor an increase in reserves, while those who evaluated current reserves as having negative effects were more likely to favor a reduction in reserves.

In turn, environmental worldview, recreational use of areas that have been designated as marine reserves, and employment in commercial fishing were statistically significant predictors of perceived effects, with patterns similar to those in the path model. For example, respondents in the high in anthropocentrism and low in connectedness to nature group were more likely to perceive the effect of current marine reserves as negative, as were respondents employed in commercial fishing and respondents who frequently have engaged in recreational fishing in areas that have been designated as marine reserves.

Respondents predicted how their well-being would be affected by each of the two “change” options used in the choice experiment. Patterns were similar to those in the choice experiment model. For example, the effect of a potential expansion (or reduction) in marine reserve area depended on respondent evaluation of the effects of current reserves. In turn, that evaluation depended on environmental worldview, recreational use of areas that have been designated as marine reserves, and employment in the fishing sector.

1. Introduction

1.1. Background

In 2008, the state of Oregon began a process to establish a limited system of marine reserves within state waters.¹ Marine reserves are areas in Oregon coastal waters that have been designated for conservation and scientific research. These areas include sub-areas: marine reserves, in which ocean development and all removal of marine life are prohibited, and marine protected areas (MPAs), in which some fishing activities are allowed. In this report, “marine reserve” is used to refer to reserves as a whole, including areas designated as either marine reserve or marine protected area.

State mandates and guidelines for the Oregon marine reserves are provided in Executive Order 08-07 (2008), House Bill 3013 (2009), Senate Bill 1510 (2012), administrative rules adopted by state agencies (OAR 635-012, OAR 141-142, and OAR 736-029), and in the Oregon Marine Reserve Policy Recommendations adopted by the Oregon Ocean Policy Advisory Council (OPAC) in 2008. The Oregon Department of Fish and Wildlife (ODFW) was designated the lead agency responsible for implementing and managing the Oregon Marine Reserve System.

Based on OPAC policy recommendations, the goals of the marine reserve system are:

- Conservation: Conserve marine habitats and biodiversity.
- Research: Serve as scientific reference sites to investigate marine reserve protections and the Oregon territorial seas, to inform nearshore ocean management.
- Communities: Avoid significant adverse impacts to ocean users and coastal communities.

During an extensive public engagement process, local communities worked with state officials to locate the reserves in areas that would provide ecological benefits and avoid significant negative impacts to ocean users and coastal communities, in accordance with Executive Order 08-07. The reserves were phased in over several years and are, from north to south, Cape Falcon, Cascade Head, Otter Rock, Cape Perpetua, and Redfish Rocks. All are within 3 nautical miles from shore. Figure 1.1 shows reserve location, rules, and variation in sub-areas (marine reserves and marine protected areas).

ODFW’s monitoring includes the Marine Reserves Human Dimensions Monitoring Program, which conducts studies to determine the direct and indirect social, cultural, and economic impacts that result from reserve site implementation.² The information collected through this process should be relevant to other marine and coastal natural resource policy issues in Oregon. As part of this program, ODFW contracted with Oregon State University (OSU) to conduct a survey of Oregon coast residents regarding marine reserves and related topics. This report describes the survey process and results.

¹ This introductory material is based on:

Epperly et al. (2017). 2016 visitor intercept survey: Coastal visitor ocean awareness. Oregon Department of Fish and Wildlife. Available [here](#).

² See the [human dimensions website](#) for more information. This project complements previous evaluations of attitudes toward marine reserves, including:

Needham et al. (2016). Resident perceptions of the Oregon marine reserve system. Oregon State University. Available [here](#).

For example, Needham and colleagues evaluated public support for marine reserves, while this project evaluated public spatial preferences for marine reserves.

The questionnaire was developed to assess various aspects of coast resident interaction with marine reserves, including:

- Level of recreational use.
- Level of awareness.
- Perceived effects (positive and negative) of current reserves.
- Preferences for reserve spatial area, both in general (reduce or expand) and via a choice experiment.
- Evaluation of potential effects of change in reserve spatial area on respondent well-being.

The USDA Forest Service provided supplemental project funding, and some questionnaire content included preference for forest reserve spatial area. “Forest reserve” refers to federal land in the Coast Range that is Congressionally-designated wilderness, areas administratively withdrawn from resource extraction, or late successional reserves designated under the Northwest Forest Plan.³

The questionnaire also included content related to perceived community and individual resilience, well-being, and job satisfaction. This information provides a baseline for understanding current conditions and for assessing change over time in coastal communities. Such understanding is important because marine reserve management occurs within – and may affect – the socio-economic context of coastal communities.

³ Based on:

Garber-Yonts et al. (2004). Public values for biodiversity conservation policies in the Oregon Coast Range. *Forest Science*, volume 50, number 5, pages 589-602.

Figure 1.1. Marine reserve map and rules.



Cape Falcon Marine Reserve		
	Prohibited	Allowed
Marine Reserve	- Taking any fish, seaweed, invertebrates, or wildlife - Deploying fishing gear	- Removing fishing gear that has drifted into area, with Oregon State Police permission - Transit with catch on board
MPA	- Taking any fish, seaweed, invertebrates, or wildlife; exceptions in next column	- Taking crab - Taking salmon by troll

Cascade Head Marine Reserve		
	Prohibited	Allowed
Marine Reserve	- Taking any fish, seaweed, invertebrates, or wildlife - Deploying fishing gear	- Removing fishing gear that has drifted into area, with Oregon State Police permission - Transit with catch on board
North MPA	- Taking any fish, seaweed, invertebrates, or wildlife; exceptions in next column	- Taking crab - Taking salmon by troll - Taking groundfish recreationally using hook & line from private, non-chartered boat
West MPA	- Taking any fish, seaweed, invertebrates, or wildlife; exceptions in next column	- Taking crab - Taking salmon by troll
South MPA	- Using net gear	- All other legal take

Otter Rock Marine Reserve		
	Prohibited	Allowed
Marine Reserve	- Taking animals or seaweed - Ocean development	

Cape Perpetua Marine Reserve		
	Prohibited	Allowed
Marine Reserve	- Taking any fish, seaweed, invertebrates, or wildlife - Deploying fishing gear	- Removing fishing gear that has drifted into area, with Oregon State Police permission - Transit with catch on board
North MPA	- Taking any fish, seaweed, invertebrates, or wildlife; exceptions in next column	- Taking crab - Taking salmon by troll - Recreationally using hook & line from the shore
SE MPA	- Using trawl fishing gear - Taking Pacific herring, Pacific sardine, anchovies, smelt, Pacific sand lance, or market squid	- All other legal take
Seabird PA	- Taking Pacific herring, Pacific sardine, anchovies, smelt, or Pacific sand lance	- All other legal take

Redfish Rocks Marine Reserve		
	Prohibited	Allowed
Marine Reserve	- Taking any fish, seaweed, invertebrates, or wildlife - Deploying fishing gear	- Removing fishing gear that has drifted into area, with Oregon State Police permission - Transit with catch on board
MPA	- Taking any fish, seaweed, invertebrates, or wildlife; exceptions in next column	- Taking crab - Taking salmon by troll

1.2. Data presentation

Unless otherwise noted, all results reported here reflect weighted data. The “by community” analyses presented below include results for each community or region with at least 30 survey respondents (unweighted). Three communities⁴ have between 30 and 50 respondents, and results for those communities should be treated with more caution than results for the remaining communities, which have more than 50 respondents.

For ease of reading, numbers are rounded in this report; some percentages may not sum to expected amounts. Unless otherwise noted, averages in this report are means rather than medians. There were “missing values” for many variables. For example, some people did not answer the income question. Percentages shown in this report are “valid percentages” unless otherwise noted. Valid percentages adjust for missing values.

In presenting results, reference is made to question numbers in the paper version of the questionnaire (e.g., Q7 is question number 7), which is reproduced in Appendix B.

1.3. Survey methodology

This project involved development of new methods, including a new scale of community resilience and a relatively novel approach to assessing the well-being effects of marine reserve designation. Caveats and limitations are noted below. Nonetheless, these new methods were based on extensive development and evaluation, both within this project and during a prior project.

The questionnaire utilized for this project was based in part on a questionnaire developed for a prior project, funded by Oregon Sea Grant with supplemental funding from the Oregon Department of Fish and Wildlife. That project occurred in 2015 and involved 413 completed surveys by residents of the following communities (alphabetically): Arch Cape, Cannon Beach, Depoe Bay, Florence, Garibaldi, Gold Beach, Manzanita, Nehalem, Newport, Port Orford, Rockaway Beach, Warrenton, and Wheeler.

This project was funded by the Oregon Department of Fish and Wildlife with supplemental funding from the USDA Forest Service. Survey administration occurred in 2017 and involved several steps:

- In April, an initial version of the questionnaire was administered in person to a small number of respondents on the central coast. Respondents were asked to “think out loud” in order to identify confusing questions and to understand thought processes when completing the questionnaire.
- In June, a pilot version of the questionnaire was administered using a split of “drop-off pick-up” (DOPU) and mixed-mode approaches. The DOPU approach involved an initial mail letter describing the survey project followed by project assistants encouraging participation by personally delivering questionnaires to recipient households and arranging times to pick up the questionnaires. The mixed-mode approach involved completion of the questionnaire either online or via mailed paper questionnaires, following the correspondence process described below.
- In September, a pilot version was administered using the mixed-mode approach.
- In November, the final version was administered using the mixed-mode approach.

⁴ Bandon, Nehalem/Manzanita/Arch Cape/Wheeler, and Gardiner/Reedsport/Lakeside/Scottsburg.

The questionnaire was revised at each step of the process based on feedback received during previous steps. The September and November versions were sufficiently similar that responses from both administrations were used for the analysis presented here.

At each stage, a sample of coast residents 18 years old or older was selected based on names and addresses associated with DMV (Driver and Motor Vehicle Services) driver license and ID card records. Persons in the mixed-mode samples (recipients) were sent the following correspondence, with some variation in process based on a split-sample design.

- An invitation letter with either 1) a paper copy of the questionnaire or 2) the URL for the online questionnaire with a postage-paid reply postcard for those preferring to complete the questionnaire in paper format. Paper questionnaires were then sent to those returning the postcard.
- A reminder letter, sent to recipients who had not completed the online questionnaire or returned their postcard within approximately one week.
- A reminder letter, with the URL for the online questionnaire, as well as a copy of the paper questionnaire and postage-paid reply envelope, sent to recipients who had not completed the questionnaire within approximately three weeks.

A paper map (Figure 1.1) was included with all paper copies of the questionnaire; an online map was provided in the online questionnaire. Recipients were provided the opportunity to “opt out” of the project to avoid receiving additional mailings. Incentives were used to thank respondents for participating in the survey.

Adjusting for undeliverable questionnaires, 6,913 coast residents received the survey invitation and 1,172 completed sufficient questions to be considered “completes.” This led to a response rate of 17%. More than half the respondents (61%) completed the questionnaire online, with 39% completing it in paper format.

1.4. Maximizing data accuracy

The goal of surveys such as this one is to use a sample (a limited number of respondents) to describe the population (everyone of interest, in this case all adult Oregon coast residents). Because only a portion of the population is sent a questionnaire, and not all recipients complete the questionnaire, this type of data collection is susceptible to various sources of error.

This survey administration addressed the four main sources of error in the following ways:

- Coverage error was addressed through the use of the DMV sampling frame, which appears to be the best available resource for a random sample of resident names and postal addresses.
- Sampling error was addressed through a large sample size.
- Measurement error was addressed through an extensive questionnaire development, review, and pilot administration process.
- Non-response error was addressed by maximizing response rates via multiple mailings, as well as by weighting data based on location, age, and income.

Despite extensive questionnaire development, we recognize that some of the questions were conceptually difficult or simply may have been misinterpreted; thus, there is potential for measurement error.

Non-response error arises when those who complete the questionnaire (respondents) differ from those who do not (non-respondents) on a variable of interest. This potential error jeopardizes conclusions about the population based on responses by the sample.

To address potential non-response error, data were weighted in this sample based on three characteristics. First, the coast was divided into 24 towns / regions, and the sample was weighted to reflect the population of DMV records across those locations. Second, the sample was weighted based on US Census data on age distribution for the coast. Third, the sample was weighted based on US Census data on household income distribution. Survey respondents tend to be older and with higher income than the population as a whole, and this weighting process better aligns the sample with the population. Unless otherwise noted, all results reported here reflect weighted data. Note that not all respondents reported their age or household income, such that weighting reduced the sample to 1,011 respondents. Non-response to individual questions (item non-response) further reduced the sample for some analyses.

2. Respondent characteristics

This section provides background on the coast residents who completed the questionnaire (the respondents).

2.1. Geographic and demographic characteristics

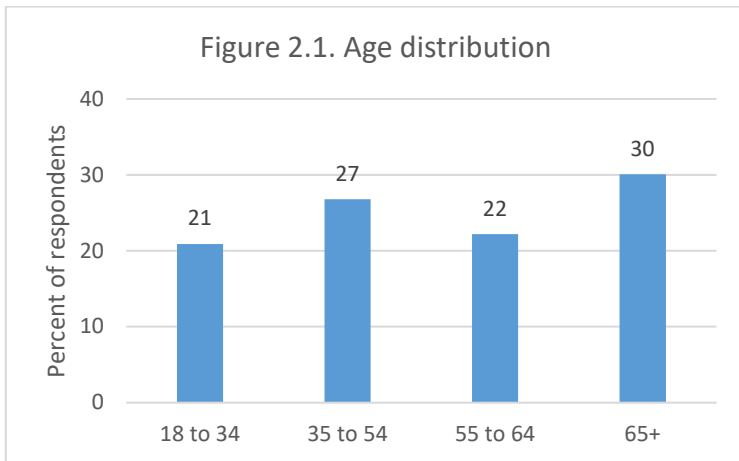
Table 2.1 presents the geographic distribution across coast areas defined by sets of zip codes. The survey sample covered the whole coast region. Smaller communities, including those near marine reserves, did not have enough respondents for their results to be reported separately; they are grouped into the “all other” category.

Table 2.1. Geographic distribution of respondents (zip codes in parentheses)	
Area	Percent
Coos Bay / North Bend / Coquille / Myrtle Point / Powers / Allegany (97420, 97459, 97423, 97458, 97466, 97407)	25.2
Astoria / Warrenton / Hammond (97103, 97146, 97121)	11.6
Newport / South Beach / Toledo (97365, 97366, 97391)	7.6
Brookings (97415)	7.5
Swishhome / Mapleton / Florence (97439, 97453, 97493, 97480)	7.1
Cannon Beach / Seaside (97138, 97110, 97145)	5.7
Tillamook (97141)	5.6
Lincoln City / Neetsu / Gleneden (97367, 97388, 97364)	4.8
Waldport / Seal Rock / Tidewater (97394, 97390, 97376)	4.1
Gardiner / Reedsport / Lakeside / Scottsburg (97467, 97449, 97441, 97473)	3.6
Bandon (97411)	2.6
Gold Beach / Widderburn (97444, 97491)	2.5
All other communities	12.1
Total	100

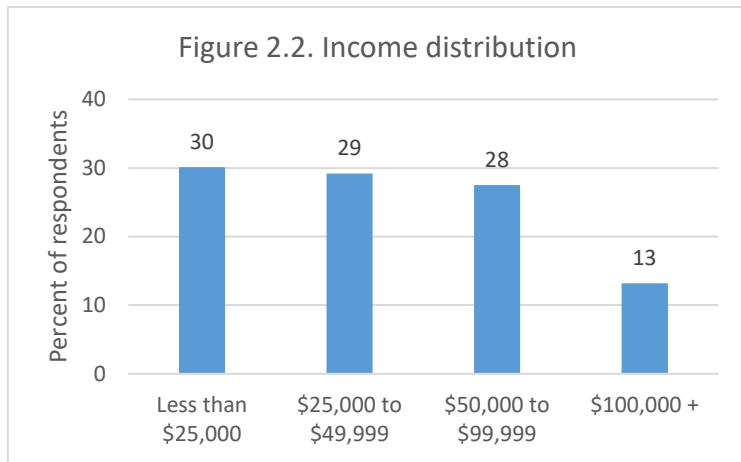
Almost all (96%) respondents live in their community year round (Q1), and many are long-time residents (mean of 18 years in the community, median of 14 years) (Q2).

Slightly more than half (51%) of respondents reported their gender as female, 48% reported as male, and a small number (less than 1%) reported “other” (Q27). With respect to education (Q28), the average number of years completed was 15, with 75% completing some college or technical school and 19% completing some graduate or professional school.

The age (Q26) distribution is shown in Figure 2.1, with roughly half the respondents being between 18 and 54 and the other half being 55 or older.



The annual household income (Q29) distribution is shown in Figure 2.2, with roughly even distribution across the lower three categories and 13% of respondents falling into the highest category.



With respect to household composition (Q30), some respondents did not write the number of children in the household; these respondents were assumed to not have children in the household. On average, there were two adults in the household, with 25% reporting one adult, 60% reporting two adults, and 15% reporting more than two. Most (75%) reported no children in the household, 12% reported one child, and 13% reported two or more children.

2.2. Employment characteristics and job satisfaction

Table 2.2 shows distribution of respondents by self-selected employment category (Q23), separated by respondent’s primary job and other sources of household income (e.g., respondent second job or employment of other members of the household). The total for primary job does not equal 100 because these percentages exclude respondents who did not answer the question or who indicated more than one primary job. The total for other household income does not equal 100 because not all respondents had additional sources of household income.

Employment category	Primary	Other
Not in paid employment – retired, homemaker, family caregiver, student, unemployed, or other	41.1	N/A
Fishing -- commercial, charter, and other fishing-related	1.9	4.2
Farming, forestry, or other natural resource-oriented	3.8	5.6
Construction	3.1	3.7
Manufacturing	2.2	3.9
Professional services – medical, legal, accounting, engineering, financial, insurance, real estate, etc.	12.4	9.0
Retail – supermarket, hardware, clothing, gas, etc.	6.3	4.2
Restaurant, bar, brewpub, fast food	2.7	3.8
Lodging or other tourism business – hotel, motel, vacation rental, tours, etc. (excluding charter fishing)	3.8	4.0

Government, including public schools / teaching	9.4	8.3
Working, but in a different category	8.2	7.3
Total	95	54

Employed respondents also indicated satisfaction with the following aspects of their job (Q25), using a scale of 1 for very dissatisfied to 5 for very satisfied, with 3 being neither dissatisfied nor satisfied.⁵

- Earnings: Actual earnings from the job
- Predictability: Predictability of earnings from the job
- Security: Job security
- Safety: Safety from injury on the job
- Fatigue: Fatigue from the job
- Healthfulness: Healthfulness of the job
- Time away: Time spent away from home
- Adventure: Adventure of the job
- Challenge: Challenge of the job
- Own boss: Opportunity to be own boss
- Suits you: How well the job suits you

As illustrated in Figure 2.3, Respondents were most satisfied with how well their job suited them. They were least satisfied with fatigue from the job, though the mean even for fatigue was above the “neutral” level.



2.3. Place attachment and environmental worldview

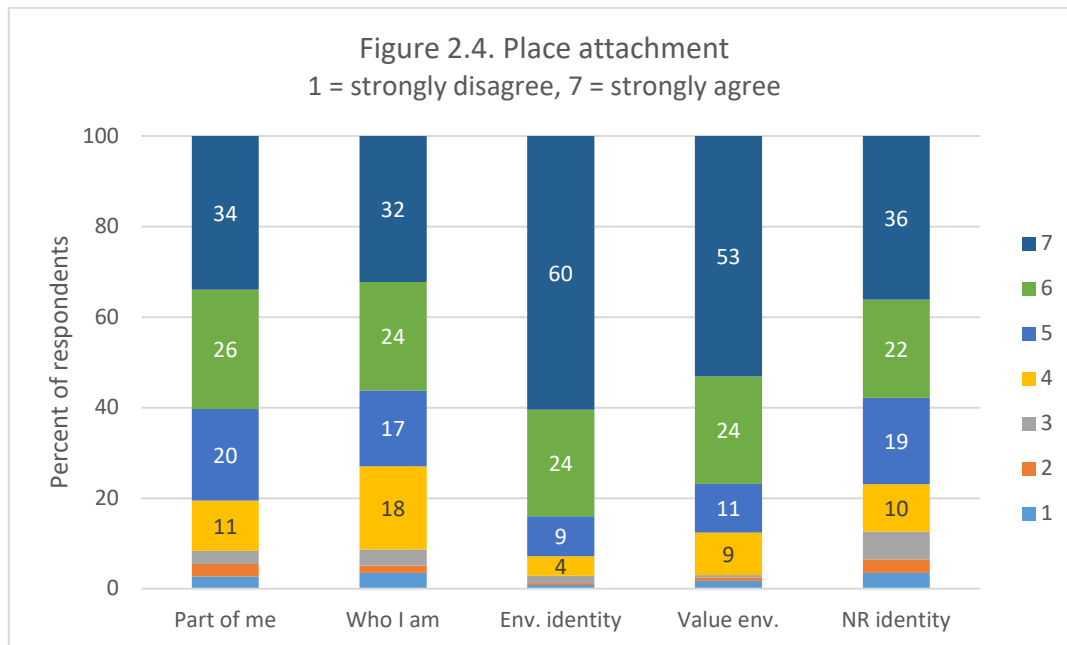
Place attachment was not a focus of this project, but the items in Q20 provide an indication of attachment and regional identity. Respondents were asked their level of agreement with the

⁵ The job satisfaction scale was a modified version of the scale used by Pollnac and colleagues. See: Pollnac et al. (2015). Aspects of fishery management, job satisfaction, and well-being among commercial fishermen in the Northeast region of the United States. *Society & Natural Resources*, volume 28, number 1, pages 75-92.

following statements, using a scale 1 for strongly disagree to 7 for strongly agree, with 4 being neither disagree nor agree.

- Part of me: I feel the place where I live is a part of me
- Who I am: Living on the Oregon coast says a lot about who I am
- Env. identity: The coastal environment, including plants, animals, and ecological processes, is important to our region’s identity and character
- Value env.: I value the coastal environment because it is my home
- NR identity: Continued harvest of natural resources, such as fishing and logging, is important for our region’s identity and character

Figure 2.4 illustrates agreement across the attachment items. Most respondents agreed with each statement, with the greatest degree of strong agreement being for the environmental identity item.



Environmental worldview was based on responses to statements reflecting a mixture of the connectedness to nature (CNS) scale and anthropocentric (human-focused) conservation (Q21, except for the third statement).⁶ The items were as follows, with the first five items reflecting anthropocentrism and the second five items reflecting connectedness to nature. The disagree-agree response options were the same seven-point scale as for place attachment, above.

- Future: The main reason to protect the environment is to conserve fish, timber, and other natural resources for future human benefit

⁶ The connectedness to nature scale was created by Mayer and Frantz: Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, volume 24, pages 503-515. The anthropocentrism scale included items created specifically for this project, as well as items adopted or adapted from the literature. See: Milfont & Duckitt. (2010). The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, volume 30, pages 80-94. Vucetich et al. (2015). Evaluating whether nature’s intrinsic value is an axiom of or anathema to conservation. *Conservation Biology*, volume 29, number 2, pages 321-332.

- Contribute: Nature is important mostly because of what it can contribute to human well-being
- Jobs: The main goal of natural resource management should be to provide a stable flow of resources to sustain jobs and local communities
- Manage: Natural resource management should focus primarily on benefits to humans
- Exist: Plants and animals exist primarily for the benefit of humans
- Life force: I feel that all inhabitants of Earth, human and nonhuman, share a common "life force"
- Community: I think of the natural world as a community to which I belong
- Kinship: I often feel a kinship with animals and plants
- Oneness: I often feel a sense of oneness with the world around me
- Embedded: Like a tree can be part of a forest, I feel embedded within the broader natural world

As presented in Figure 2.5, responses to each environmental worldview item were diverse. In addition, they varied across the items. The majority of respondents agreed with all statements except the "Manage" and "Exist" items, which are similar in their strong anthropocentric orientation.

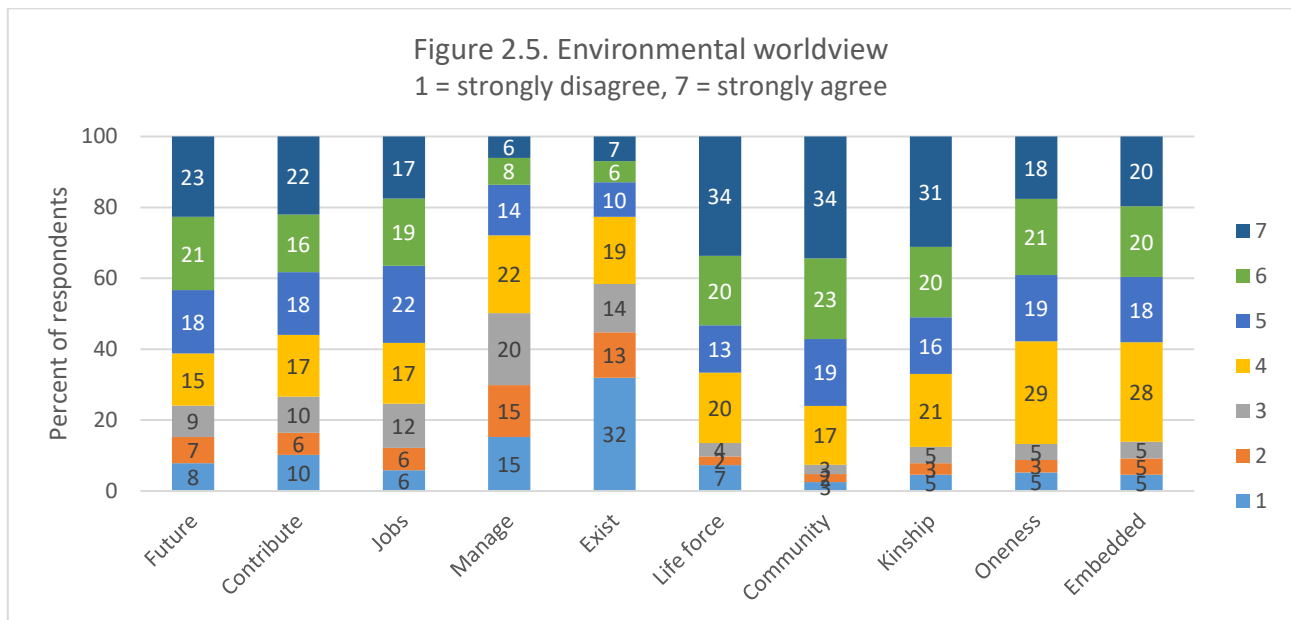
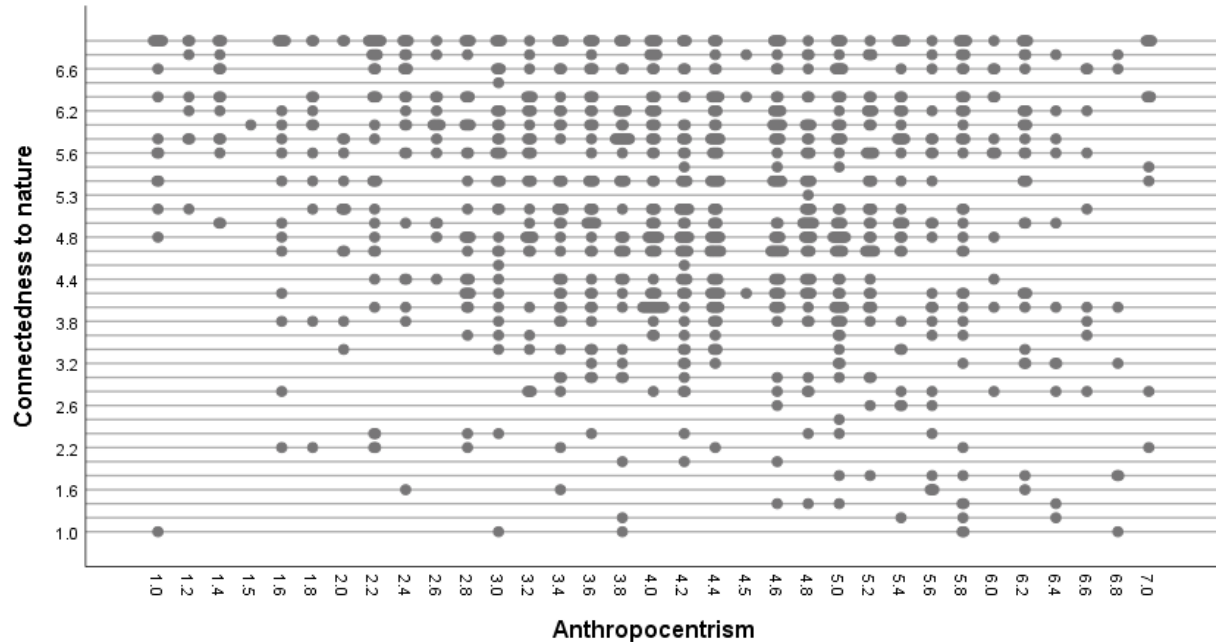


Figure 2.6 is a scatterplot of environmental worldview, reflecting each respondent's anthropocentrism (mean of the first five items in the above bulleted list) and CNS (mean of the second five items). The pattern of dots (one dot per respondent) indicates that anthropocentrism and CNS tend to be independent of each other. A respondent may be high on anthropocentrism and low on CNS, or the reverse. Other respondents may be high on both or low on both. However, relatively few respondents were low on both, as indicated by the modest number of dots in the lower left quadrant of the scatterplot.

Figure 2.6. Scatterplot of anthropocentrism by connectedness to nature. Each dot reflects the mean on each scale for one respondent. Overlapping dots indicate multiple respondents at the same point.



Responses to the environmental worldview items were used to create clusters of respondents, with those clusters used to understand diversity in preferences regarding spatial area of marine and forest reserves (see Section 4). Cluster analysis creates groups of respondents based on the pattern of their responses to survey questions, in this case the connectedness to nature and the anthropocentrism items. Five clusters were created, with the base (reference) cluster for the models being Moderate, reflecting mid-range responses for the ten items (primarily 4 and 5 on the 7-point scale). The other clusters were labeled relative to strength of anthropocentric responses followed by CNS responses. Thus, persons in the High A - Low C cluster responded relatively highly on the anthropocentrism scale and less highly with respect to the CNS scale. This set of items provided the richness of multiple combinations across the eco-anthropocentrism continuum and the connectedness to nature continuum.⁷ For example, one person may be high in anthropocentrism and high in CNS, a second person may be low in anthropocentrism and high in CNS, and a third person may be high in both.

Respondent scores on the anthropocentrism and CNS scales were then correlated with agreement on two of the place attachment items: coastal environment identity (“The coastal environment, including plants, animals, and ecological processes, is important to our region’s identity and character”) and natural resource harvest identity (“Continued harvest of natural resources, such as fishing and logging, is important for our region’s identity and character”). Each of these identity variables was based on a single survey item; therefore, they are not considered as “robust” as the environmental worldview scales. Nonetheless, they potentially provide insight.

As illustrated in Figure 2.4 above, most respondents agreed that both aspects (coastal environment and harvest of natural resources) are important to the region’s identity and character, with 60% of respondents indicating 7 on the 7-point scale for the coastal environment item and

⁷ Our focus was on how environmental worldview predicted variability (diverse responses) in other variables, such as spatial preference for marine reserves. However, it is worth noting that whether one worked in the fishing sector (Q23) did not predict cluster membership or one’s mean score on either the anthropocentrism or the CNS scale in a statistically significant manner.

58% indicating 6 or 7 for the harvest of natural resources item. Within this generally high level of agreement, correlation with environmental worldview may provide additional perspective.

Correlation coefficients are presented in Table 2.3. All the coefficients are statistically significant,⁸ but the correlations between anthropocentrism and coastal environment identity, and between connectedness to nature and natural resource harvest identity, are weak (below .20 in absolute magnitude).

	Anthropocentrism	Connectedness to nature
Coastal environment identity	-.09	.50
Natural resource harvest identity	.42	-.19

The correlations between anthropocentrism and natural resource harvest identity, and between connectedness to nature and coastal environment identity, are moderate (between .40 and .60 in absolute magnitude). This suggests a relationship between one’s environmental worldview and one’s view of the coast region’s identity and character.

3. Resilience and well-being

The questionnaire included questions relating to resilience, both at the community level (Q17) and the individual level (Q18). Respondents were asked their level of agreement with several statements, using a scale 1 for strongly disagree to 7 for strongly agree, with 4 being neither disagree nor agree.

3.1. Perceived community resilience

The following statements are at the community level (Q17), with the last statement reflecting social cohesion, which may contribute to resilience.

- Emergencies: During emergencies, my community will be able to provide key services, such as police and fire protection
- Climate: If climate does change over time, with effects such as rising sea levels, we’ll be able to adapt and sustain our community
- Flooding: We’ll be able to recover and sustain our community if there’s extensive flooding here
- Earthquake / tsunami: We’ll be able to recover and sustain our community if there’s a significant earthquake and / or tsunami here
- Deal with problems: When a problem occurs, community members are able to deal with it
- Bounce back: My community is able to “bounce back” from downturns in the local economy
- New industries: If there is a decline in our current industries, we’ll be able to develop businesses in new industries
- Work together: People in our community work together even when they disagree

Means are shown in Figure 3.1. Respondents most strongly agreed that their community will be able to provide key services during emergencies, followed by the general statement that

⁸ A p-value of .05 or smaller is used here as the cutoff for statistical significance. When a correlation coefficient or other measure of a relationship is statistically significant, one can be confident that there is a relationship between the variables in the population (in this case, the population of coast residents) and not simply a relationship in the sample due to sampling error.

community members could deal with problems that arise. Respondents least strongly agreed that their community will be able to develop new industries, followed by the ability to sustain the community in the event of a significant earthquake / tsunami.

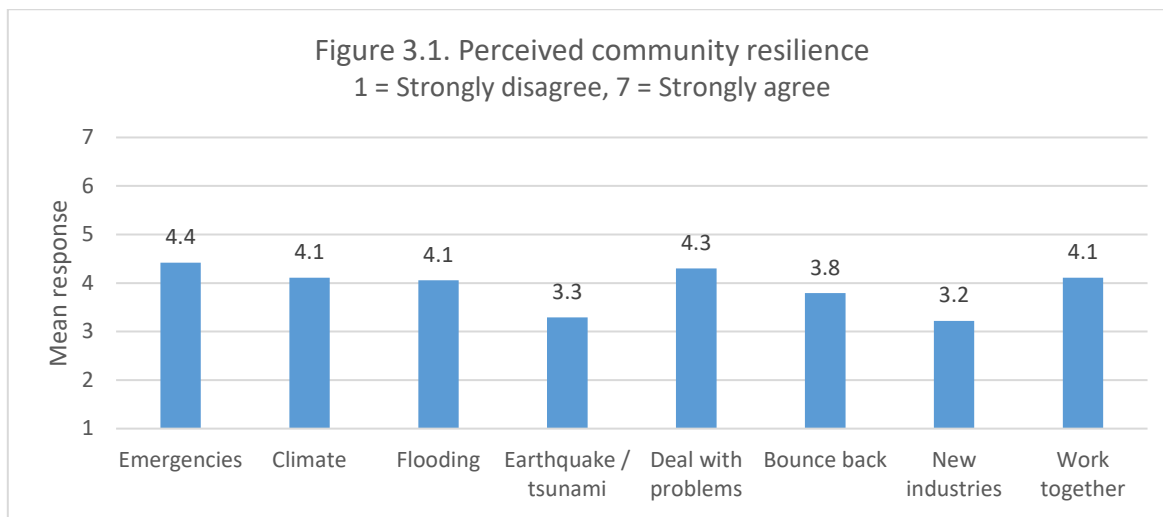
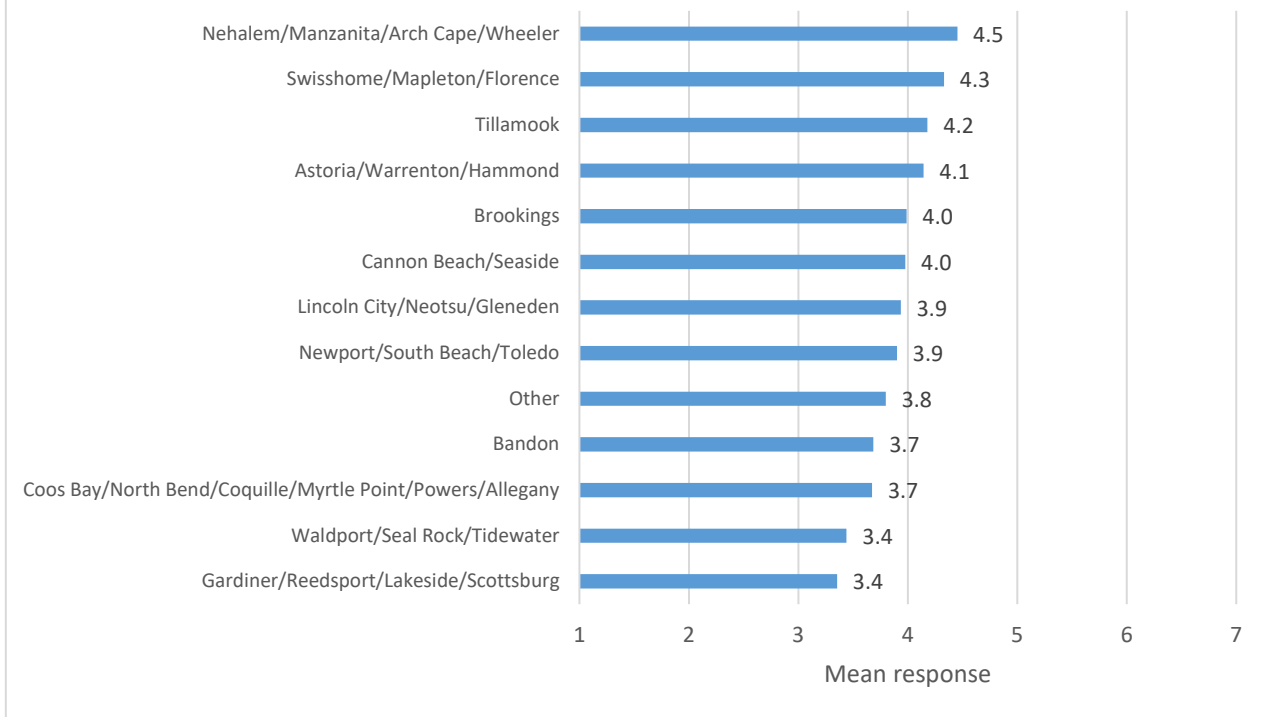


Figure 3.2 presents perceived community resilience across communities. As noted above, smaller communities, including those near marine reserves, did not have enough respondents for their results to be reported separately. The communities / regions of Bandon, Nehalem/Manzanita/Arch Cape/Wheeler, and Gardiner/Reedsport/Lakeside/Scottsburg had enough respondents for results to be reported separately, but they had fewer respondents than other communities in Figure 3.2 and subsequent figures; results for those communities should be interpreted with caution.

The average (mean) for each respondent was calculated across the first seven statements shown in Figure 3.1; “work together” was excluded because it is a more a contributor to community resilience than an indicator of community resilience. The mean of that mean, across all respondents in the community, is presented in Figure 3.2.

Figure 3.2. Perceived community resilience by community
 1 = Strongly disagree, 7 = Strongly agree

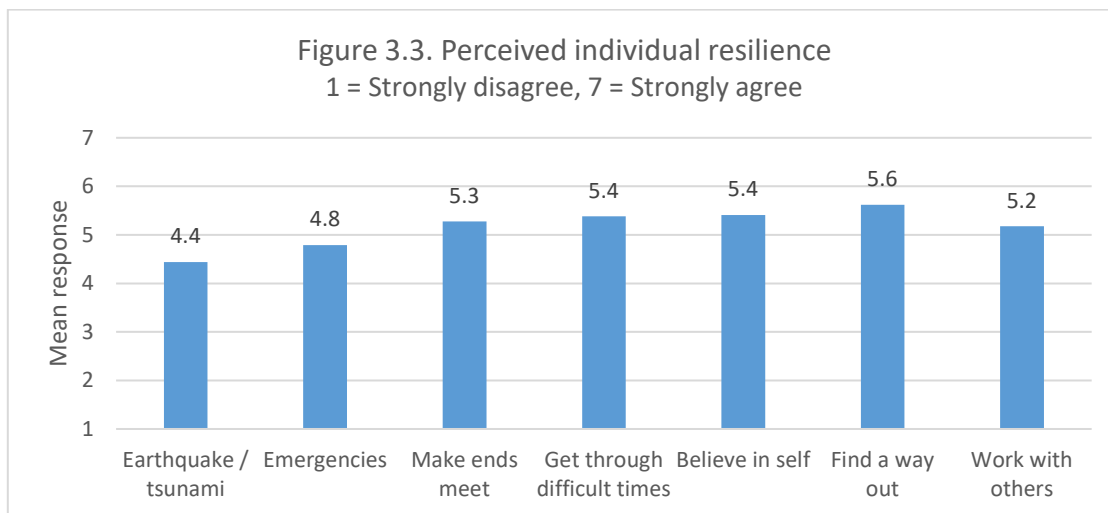


3.2. Perceived individual resilience

The following statements were at the individual level (Q18), with the last statement focusing on social cohesion.

- Earthquake / tsunami: I could cope with an earthquake and tsunami in my community
- Emergencies: I can deal with any emergencies that might occur
- Make ends meet: I was able to make ends meet during the "great recession" of 2008 and 2009
- Get through difficult times: I can get through difficult times because I've experienced them before
- Believe in self: My belief in myself gets me through hard times
- Find a way out: When I'm in a difficult situation, I can usually find a way out of it
- Work with others: I work with others in the community even when I disagree with them

Means are shown in Figure 3.3. On average, they are higher than the means for community-level resilience. The statements differ, which precludes strong conclusions, but the pattern suggests respondents have greater confidence in their own individual resilience than in the resilience of their communities.



The highest level of agreement at the individual level was the broad ability to find a way out of difficult situations. The lowest level of agreement was with the ability to cope with an earthquake and tsunami in the community.

Consistent with research elsewhere,⁹ there was a positive and statistically significant correlation between perceived community and individual resilience, though it was only moderate in magnitude (0.42).

3.3. Subjective well-being

There is significant policy and research interest in the concept and measurement of ecosystem services, which are defined broadly as the benefits that flow from nature to people. These benefits typically are measured using various metrics of human well-being.¹⁰

A common metric is willingness-to-pay, which is monetary in nature. It is illustrated in the discussion of the choice experiment in Section 4.3.2. An alternative metric is subjective well-being (SWB), which reflects how people experience and evaluate their lives both generally and in specific domains of life, with domains representing life components such as social relationships or financial

⁹ See:

Lyons et al. (2016). Assessing the well-being benefits of belonging to resilient groups and communities: Development and testing of the Fletcher-Lyons Collective Resilience Scale (FLCRS). *Group Dynamics: Theory, Research, and Practice*, volume 20, pages 65-77.

¹⁰ Interested readers are referred to the following for additional information:

Ban et al. (2019). Well-being outcomes of marine protected areas. *Nature Sustainability*, volume 2, pages 524–532.

Breslow et al. (2016). Conceptualizing and operationalizing human wellbeing for ecosystem assessment and management. *Environmental Science and Policy*, volume 66, pages 250–259.

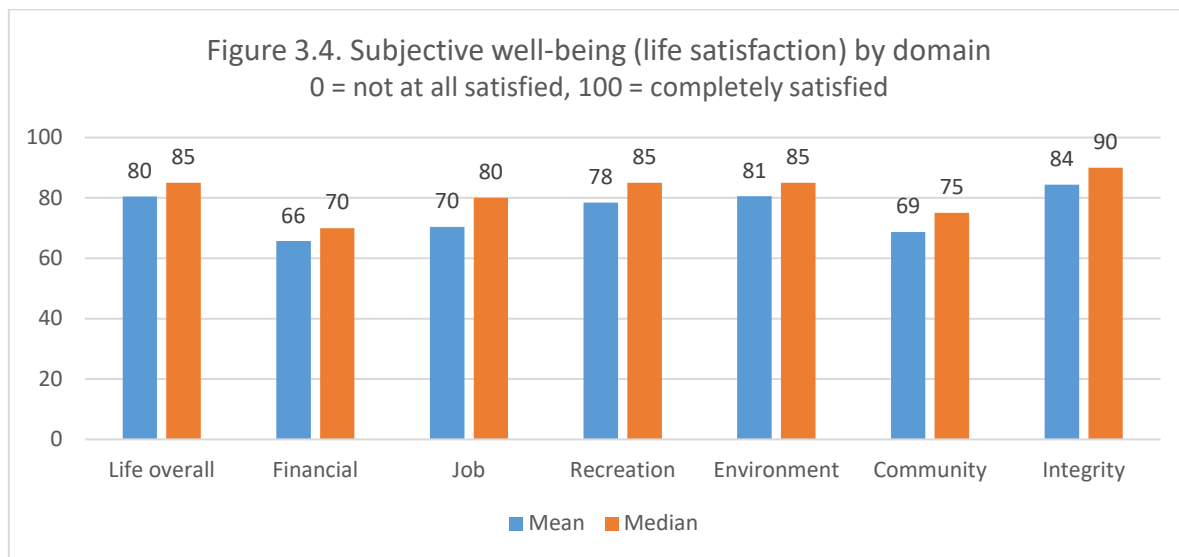
King et al. (2014). The concept, dimensions and methods of assessment of human well-being within a socioecological context: A literature review. *Social Indicators Research*, volume 116, pages 681-698.

status.¹¹ SWB approaches are newer but may represent a useful complement to monetary and other well-being approaches in understanding ecosystem services.¹²

Evaluative SWB was first measured on a baseline basis (not specifically tied to reserves) by asking respondents to indicate how satisfied they have been with their life overall and with the following specific aspects (domains) over the past year, using a scale of 0 for not at all satisfied to 100 for completely satisfied (Q11).

- Life overall: Your life overall, considering all aspects
- Financial: Your financial situation
- Job: Your job situation, if currently employed
- Recreation: Recreation opportunities in the region
- Environment: Quality of the natural environment in the region
- Community: The community and its culture
- Integrity: Your ability to live with integrity, in a way that reflects your moral values

Figure 3.4 shows means and medians for life overall and by domain.



Medians are presented because low values among some respondents can “pull down” the mean. A median reflects the “middle respondent” and is an alternate way to consider the average. Looking across domains, respondents were most satisfied with the natural environment and their

¹¹ The [OECD guidelines for measuring subjective well-being](#) provide an overview and review. Annex A of the document presents “standardized” measures of SWB across three categories. The measure used here falls into the “evaluative” category.

¹² Interested readers are referred to the following for additional information, with the Bryce et al. and the Kenter et al. articles illustrating application of broad conceptions of SWB in the marine context.

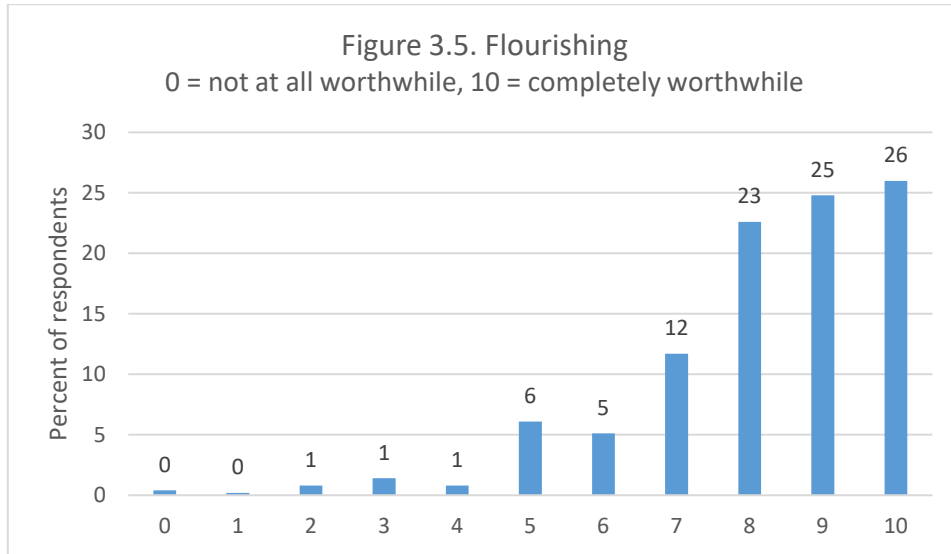
Bryce et al. (2016). Subjective well-being indicators for large-scale assessment of cultural ecosystem services. *Ecosystem Services*, volume 21, pages 258-269.

Kenter et al. (2016). The impact of information, value-deliberation and group-based decision-making on values for ecosystem services: Integrating deliberative monetary valuation and storytelling. *Ecosystem Services*, volume 21, pages 270-290.

Stone & Mackie. (Eds.). (2013). *Subjective well-being: Measuring happiness, suffering, and other dimensions of experience*. Washington, DC: The National Academies Press.

ability to live with integrity. They were least satisfied with their financial situation, their community, and (if currently employed) with their job.

Another measure of subjective well-being reflects “flourishing” and was assessed by respondents indicating the extent to which they feel the things they do in life are worthwhile (Q19). Results shown in Figure 3.5 indicate respondents tend to view their lives as being on the higher end of the scale; the mean is 8.2.



The potential well-being effects of reserve spatial area are evaluated as described in Section 4.3.3 below.

4. Marine reserve engagement, perceived effects, and spatial preferences

4.1. Recreation engagement and awareness

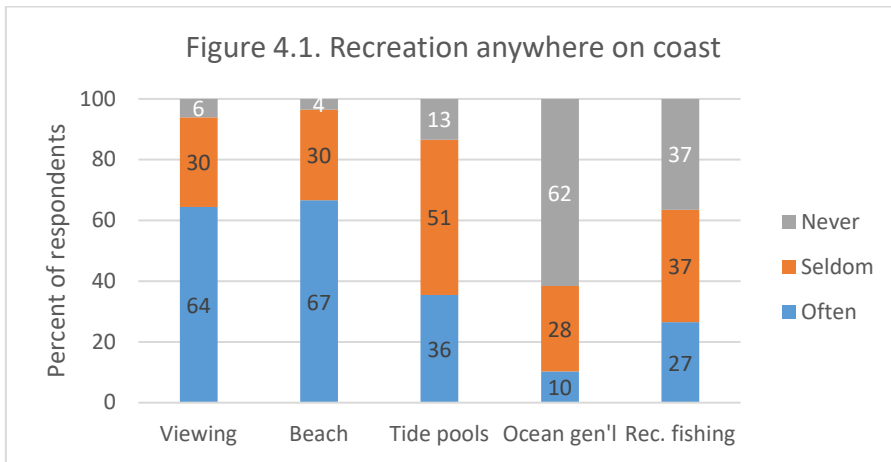
Respondents reported how often they have engaged in various recreational activities within the past 10 years, both in general along the coast (Figure 4.1, from Q3a) and specifically in areas that have been designated as marine reserves (Figure 3.2, from Q3b), using the following categories:

- Viewing: Ocean-oriented sightseeing, photography, or wildlife viewing (birds, whales, etc.)
- Beach: Beach walking, running, shell collecting, or rockhounding
- Tide pools: Exploring tide pools
- Ocean gen'l: Ocean swimming, kayaking, surfing, boogie boarding, snorkeling, or diving
- Rec. fishing: Ocean recreational fishing (including charter) or collecting shellfish (e.g., crabs or clams)

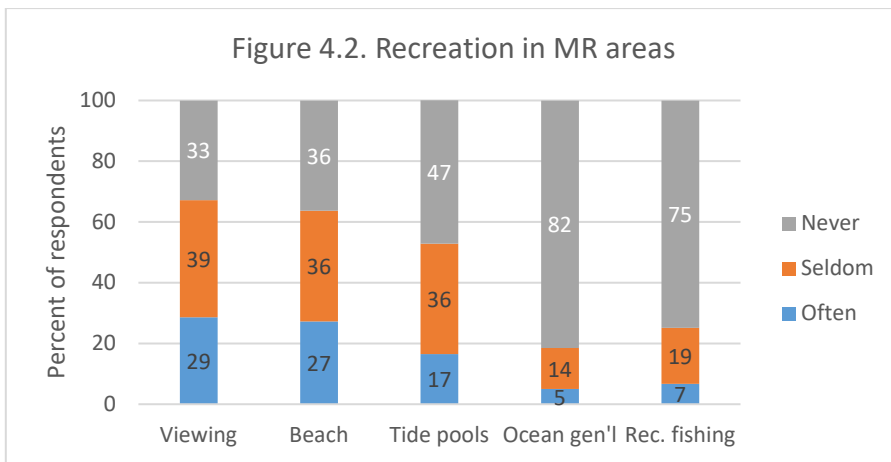
Note that the 10-year period includes years prior to marine reserve designation and years since designation. Prior to designation, respondents may have engaged in recreation activities in current marine reserve areas that are no longer allowed in those areas due to designation.

As shown in Figure 4.1, most respondents engage in some form of recreation along the coast in general, with engagement most common for beach walking, sightseeing, and related activities.

The most common responses in the “other” category in Q3 were dog walking / hiking, camping, and bonfires.

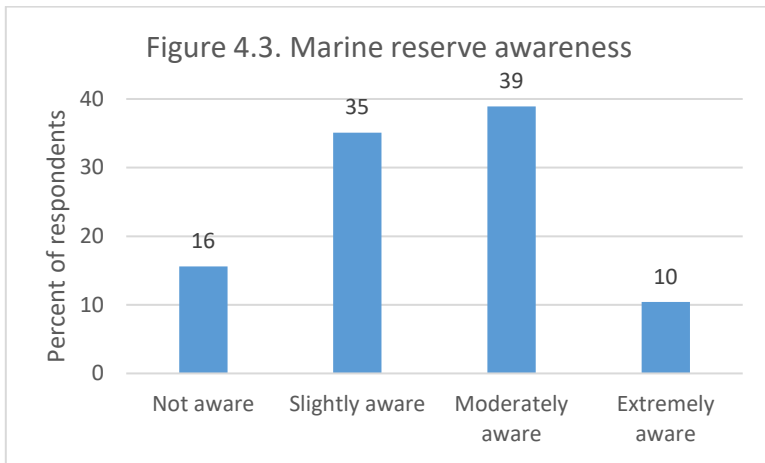


As expected, participation specifically in marine reserve areas was less frequent (Figure 4.2 relative to Figure 4.1). The map shown in Figure 1.1 above was provided in the questionnaire, but it is possible that some respondents were unfamiliar with the precise “on the ground” locations of the reserves, especially given variable levels of awareness regarding the marine reserves (Figure 4.3 below).

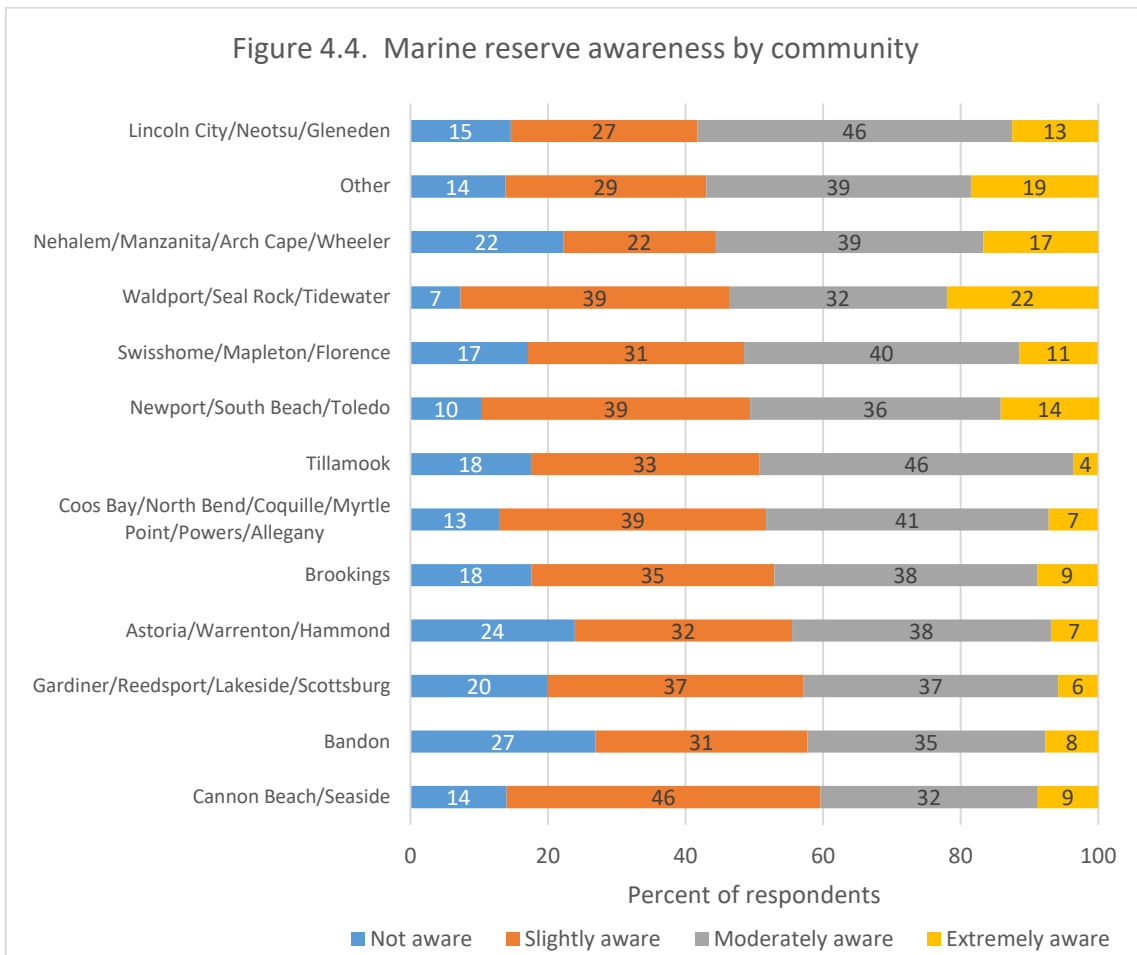


When asked their level of awareness regarding the reserves (Q4), most respondents reported slight or moderate awareness (Figure 4.3).¹³

¹³ Low levels of awareness and engagement in marine reserves is not uncommon. See: Aanesen & Armstrong. (2019). Trading off co-produced marine ecosystem services: Natural resource industries versus other use and non-use ecosystem service values. *Frontiers in Marine Science*, volume 6, article 102.



Awareness varied by community, as illustrated in Figure 4.4, with communities sorted from largest to smallest percentage in the higher two categories combined. As noted above, smaller communities, including those near marine reserves, did not have enough respondents for their results to be reported separately. The communities / regions of Bandon, Nehalem/Manzanita/Arch Cape/Wheeler, and Gardiner/Reedsport/Lakeside/Scottsburg had enough respondents for results to be reported separately, but they had fewer respondents than other communities in Figure 4.4; results for those communities should be interpreted with caution.



4.2. Perceived effects and spatial preferences

This section presents perceived effects and spatial preferences regarding marine reserves. The goal of this project was to assess resident perspectives. It is recognized that these perspectives and preferences may be diverse and depend on various factors.¹⁴ *No judgment is made regarding the accuracy or desirability of these diverse perspectives.* For example, perceived negative and perceived positive effects are considered equally valid. Likewise, preferences for spatial area reduction and expansion are considered equally valid.

Respondents were asked how they felt about potential changes associated with the marine reserves (Q5), on a scale of 1 for very negative to 7 for very positive, with 4 being neutral or no effect. These perceived effects were reported in each of the following categories:

- Commercial / charter: Reduced opportunities for commercial or charter fishing (including shellfish)
- Recreational: Reduced opportunities for recreational fishing (including shellfish)
- Conservation: Increased conservation of the marine environment
- Jobs / income: Change in community jobs / income
- Character: Change in character of the community

As shown in Figure 4.5, many respondents reported no effect for them and their households. For those reporting effects, the direction and magnitude of the effects were diverse, with some respondents reporting very negative effects and others reporting very positive effects.

¹⁴ In the marine protected area context, previous research has documented diversity in perspectives, preferences, and well-being effects. Examples include:
Ban et al. (2019). Well-being outcomes of marine protected areas. *Nature Sustainability*, volume 2, pages 524–532.

McNeill et al. (2018). Attitudes to a marine protected area are associated with perceived social impacts. *Marine Policy*, volume 94, pages 106-118.

Wallmo & Edwards. (2008). Estimating nonmarket values for marine protected areas: A latent class modeling approach. *Marine Resource Economics*, volume 23, pages 301-323.

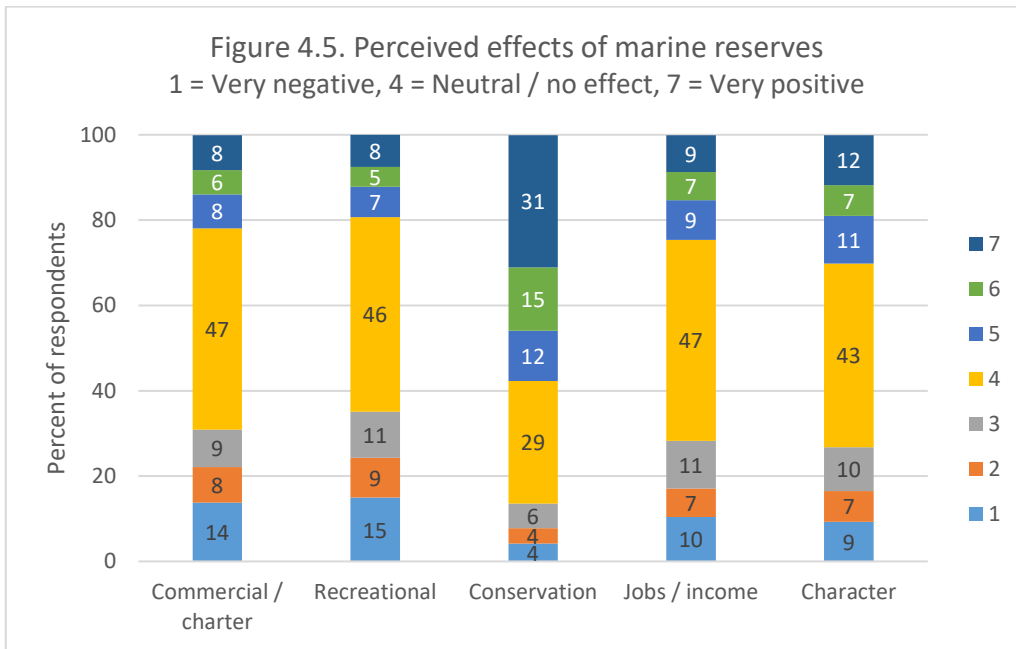


Figure 4.6 is based on the same data, but it shows mean values across each of the categories. The mean was noticeably positive for conservation. It was essentially neutral for jobs / income and community character. It was somewhat negative for commercial / charter and recreational fishing.

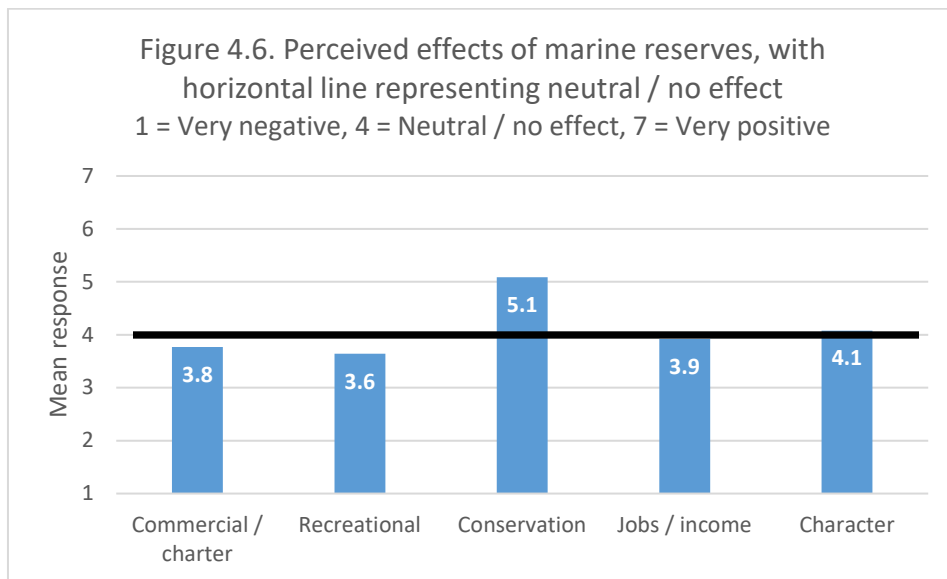
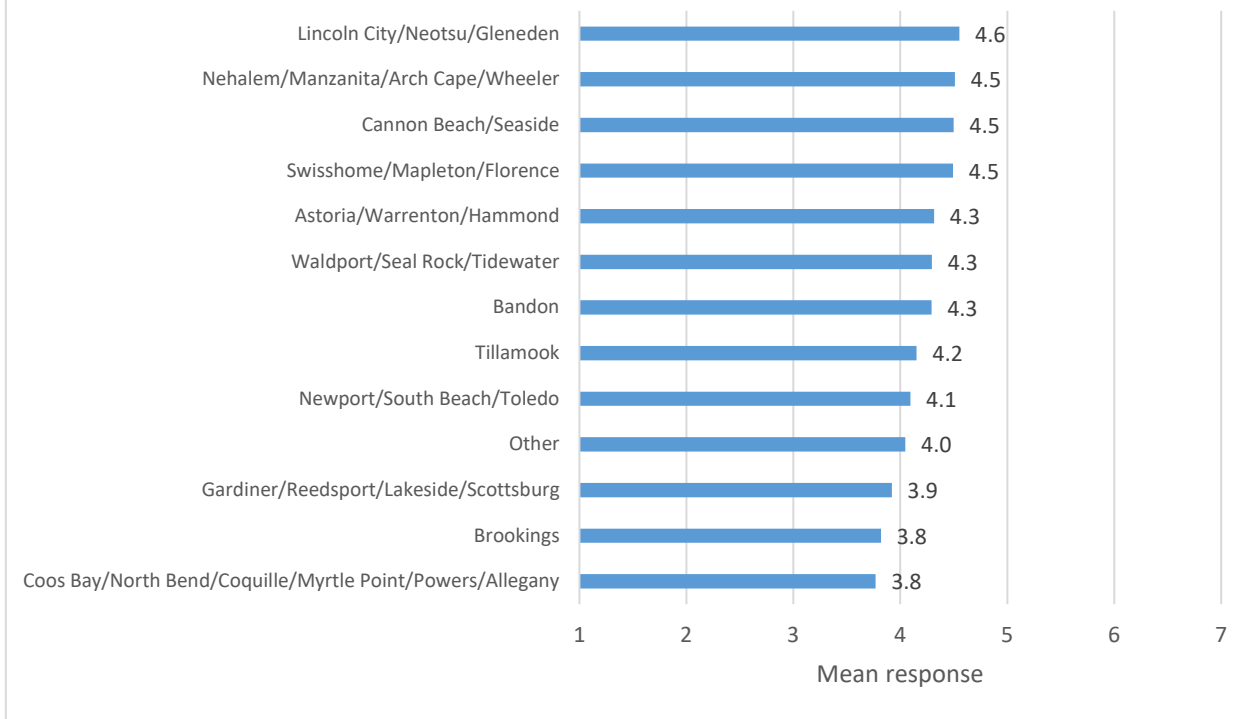


Figure 4.7 shows how perceived effects vary across communities. In this case, the average (mean) for each respondent was calculated across the five categories shown in figures 4.5 and 4.6. The mean of that mean, across all respondents in the community, is presented in Figure 4.7.

Figure 4.7. Perceived effects of marine reserves by community

1 = Very negative, 4 = Neutral / no effect, 7 = Very positive



Respondents were then asked whether the area dedicated to marine and forest reserves should be reduced or expanded, on a scale of 1 for significantly reduced to 5 for significantly expanded, with 3 being left unchanged (Q7). Figure 4.8 shows these spatial preferences. As with the perceived effect of marine reserves, preferences for area dedicated to reserves are diverse. Roughly half the respondents would like to see expansion, but more than a third would like reserve area to be unchanged, and noticeable percentages would like to see reductions. The mean rating for marine reserves was 3.6, while the mean rating for forest reserves was 3.5.

Figure 4.8. Preference for area dedicated to reserves

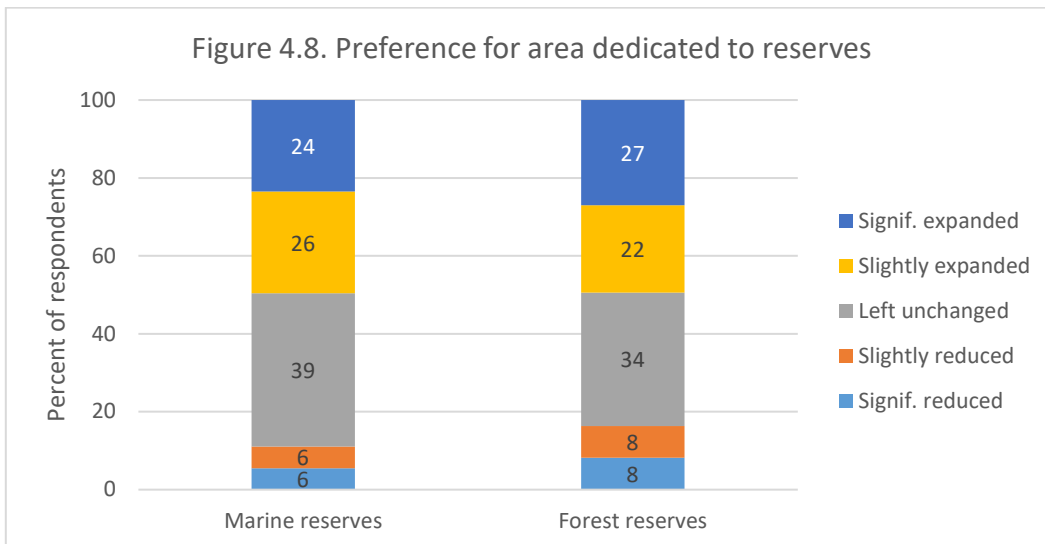
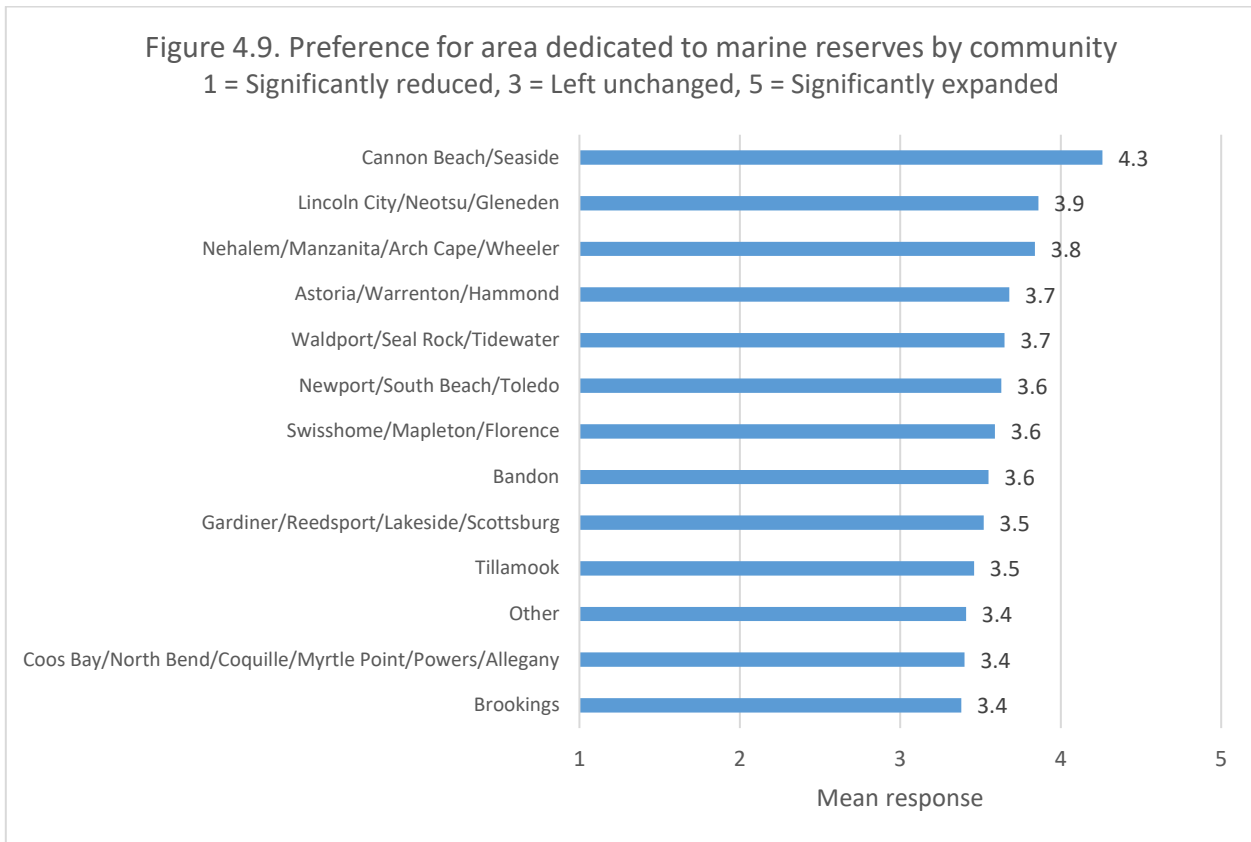


Figure 4.9 shows how marine reserve spatial preferences vary across communities.

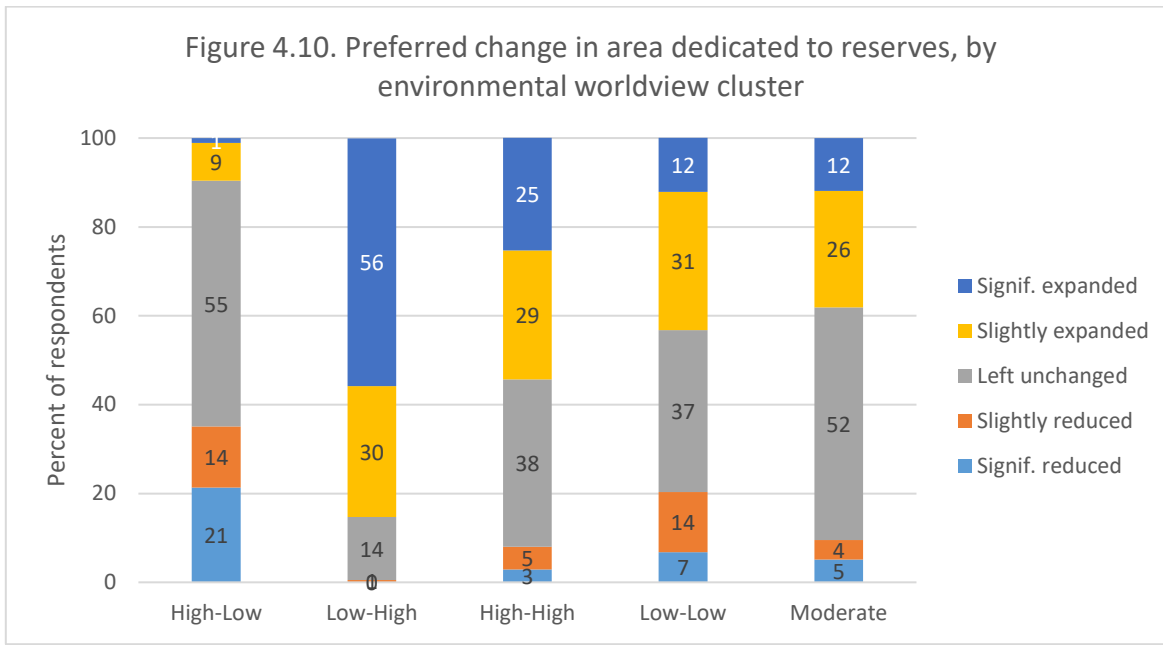


Variables that may explain diversity in spatial preferences are further evaluated in the models presented in Section 4.3. Figure 4.10 illustrates how environmental worldview (see Section 2.3) may affect spatial preferences. The categories include respondents with the following characteristics:

- High A - Low C: relatively high in anthropocentrism and low in connectedness to nature (CNS), 10% of respondents.
- Low A - High C: relatively low in anthropocentrism and high in CNS, 21%.
- High A - High C: relatively high in both, 29%.
- Low A - Low C: relatively low in both, 8%.
- Moderate: mid-range in both, 32%.

Some respondents in the High A - Low C category (left column) favored expansion, and most favored leaving reserve area unchanged. However, relative to the base Moderate category (right column), respondents in the High A - Low C category were more likely to support future reduction. The reverse pattern exists for respondents in the Low A - High C category, with almost none preferring a reduction and most favoring significant expansion.¹⁵

¹⁵ The relationship between environmental worldview cluster and preferred change in marine reserve area is statistically significant (ANOVA, $p < .001$).



Respondents were asked to indicate their priorities across broad issues on the coast, including priority relating to reducing or expanding marine and forest reserves (Q8), on a scale of 1 for not a priority to 7 for high priority. The highest priorities were improving transportation infrastructure, maintaining and expanding the availability of jobs, and reducing crime. Maintaining the traditional character of communities was the next highest priority. Expanding marine and forest reserves was a lower priority than the above issues, with reducing marine and forest reserves being the lowest priority of the presented issues.

4.3. Models of spatial preferences and effects

Section 4.2 presented spatial preferences for marine reserves and the role of environmental worldview as a predictor of those preferences. This section presents additional models of spatial preferences and subjective well-being (SWB) effects. These models provide insight into more complex relationships regarding spatial preferences and effects.

4.3.1. Path model of spatial preference

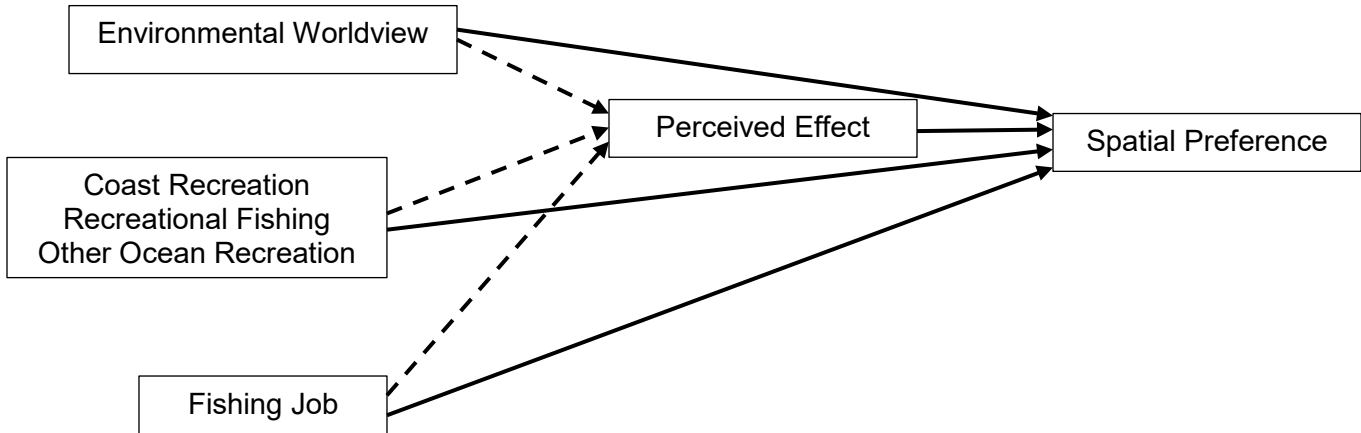
The first model focuses on predicting diverse spatial preferences (Q7) using path analysis, which allows several “layers” of relationships. Respondent preferences for area reduction or expansion were evaluated as a function of the perceived effect of current reserves (mean of responses across the five categories in Q5),¹⁶ environmental worldview (Q21), participation in recreation in areas designated as marine reserves¹⁷ (Q3b), and whether employed in fishing (Q23a). In turn, perceived effect was assessed as a function of worldview, recreation participation, and fishing employment.

¹⁶ The five variables in Q5 represent a coherent scale. They loaded on a single factor using principal component factor analysis with oblimin rotation. They had a Cronbach’s alpha of .85.

¹⁷ As a reminder, the reference time period for this recreation was the past 10 years, which included years prior to designation as marine reserves. Thus, respondents might indicate frequent participation in recreational fishing in the areas based on participation prior to reserve designation, even if they have not participated in recreational fishing in the areas since designation.

The basic relationships in this model are shown in Figure 4.11. Direct relationships with spatial preference are shown with solid arrows, while indirect relationships (via perceived effect) are shown with dashed arrows. For example, perceived effect is modeled as having a direct effect on spatial preference. Environmental worldview is modeled as having both a direct effect on spatial preference (solid line) and an indirect effect via perceived effect (dashed line). Statistical analysis is used to assess whether environmental worldview is directly correlated with spatial preference, indirectly correlated via perceived effect, or both.

Figure 4.11. Path model of marine reserve spatial preference, basic relationships

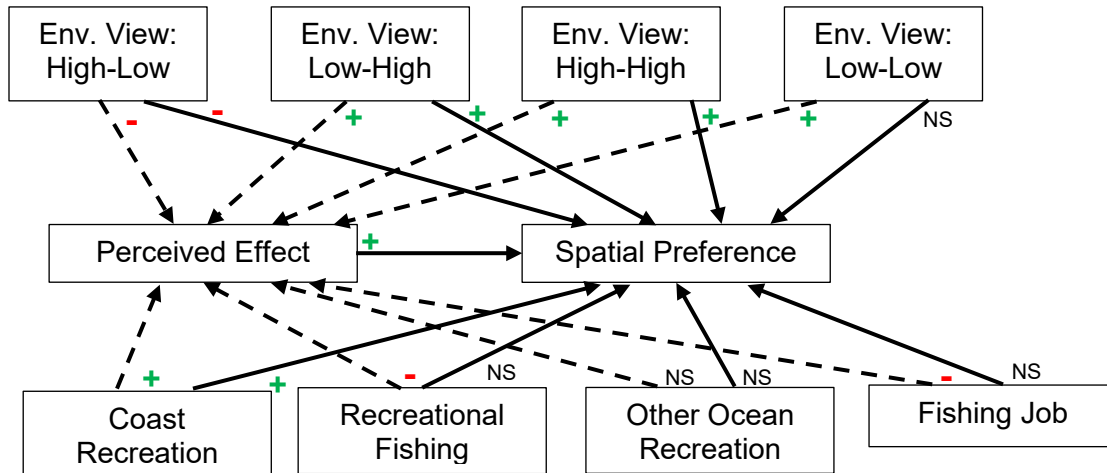


The coast recreation variable is the mean of the Viewing, Beach, and Tide pools categories described in Section 4.1. The recreational fishing variable is the Rec. fishing category, and the other ocean recreation variable is the Ocean gen'l category. The fishing employment variable takes the value of 1 if the respondent is employed in fishing (Q23a primary employment in commercial or charter fishing, or in other fishing-related employment) and the value of 0 otherwise.

Full model results are presented in Appendix A; Figure 4.12 below shows directional results – whether the relationships between variables are positive (+), negative (-), or not statistically significant (NS). On average, respondents who evaluated the current marine reserves positively (positive perceived effects) were more likely to support future expansion of the reserves, while those who evaluated reserves negatively were more likely to support future reduction.¹⁸ This is shown by the “+” above the solid line from perceived effect to spatial preference, which indicates a positive correlation between perceived effect and preference; perceived effect and preference tend to move in the same direction.

Figure 4.12. Path model of marine reserve spatial preference, directional results

¹⁸ Stated differently, on average, lower responses for Q5 on the 1 to 7 scale were associated with lower responses for Q7 on the 1 to 5 scale.



Respondents high in anthropocentrism and low in connectedness to nature (High A - Low C) were more likely than those in the Moderate base category to support future reduction, indicated by the “-” to the right of the solid line from High A - Low C to Spatial Preference. Those low in anthropocentrism and high in connectedness to nature (Low A - High C) were more likely to support future expansion. Respondents high in both were more likely to prefer expansion. Those low in both were not statistically different from the Moderate base category.

Respondents who engage in coast recreation (e.g., sightseeing or beach walking) relatively often were more likely than other respondents to support expansion (“+” to the right of the solid line from Coast Recreation to Spatial Preference). There was not a statistically significant direct relationship between spatial preference and frequency of engaging in either Recreational Fishing or Other ocean recreation. Likewise, there was not a statistically significant direct relationship between spatial preference and employment in fishing.

The above interpretation is for direct effects on spatial preference, shown by the solid lines. There also are potential indirect relationships, via Perceived Effect. In most cases, the relationship between a predictor, on the one hand, and perceived effect and spatial preference, on the other, is the same and thus reinforce each other. For example, respondents high in anthropocentrism and low in connectedness to nature (High A - Low C) are more likely than the Moderate base category of respondents to prefer a reduction in marine reserve size, due both to the direct relationship with spatial preference (“-” to the right of the solid line to Spatial Preference) and to the indirect relationship with Spatial Preference via Perceived Effect (“-” to the right of the dashed line to Perceived effect combined with “+” above the solid line from Perceived Effect to Spatial Preference).

The exceptions to this pattern are the variables Fishing Job, Recreational Fishing, and Low A - Low C environmental worldview. Employment in fishing was not a statistically significant predictor of Spatial Preference, but it was negatively related to Perceived Effect, which, in turn, is positively related to Spatial Preference. Thus, respondents employed in the fishing sector were more likely to perceive the effects of current reserves as more negative (or less positive). In turn, these “more negative” perceived effects were associated with greater likelihood of preferring that marine reserve area be reduced. The same pattern exists with respect to engagement in recreational fishing.

As a reminder, the goal of this project was not to judge the accuracy or desirability of respondents' perceived effects or spatial preferences, but rather to understand them and the factors that affect them. The model shown in Figure 3.8, with details in Table A1, provides insights into which factors do and do not correlate with perceived effects and spatial preferences. Keeping in mind that a given respondent may fall into multiple categories (e.g., employed in fishing and frequently engages in coast recreation), results also provide insights into the reasons for spatial preferences. For example, results potentially suggest that commercial and recreational fishers are neutral with respect to the *concept* of marine reserves (nonsignificant direct relationship with spatial preferences), with their spatial preferences being based on their perceptions of the *effects* of the reserves. Survey responses, and associated analyses, provide one source of information, and conclusions such as this should be "ground truthed" with additional sources of information.

4.3.2. Choice experiment model

The path model in the previous section focused on understanding responses to Question 7, in which respondents indicated the direction (reduction or expansion) and magnitude (slight or significant) of their spatial preferences for marine reserves. The choice experiment model in this section also provides insight regarding spatial preferences, but it does so using scenarios (Question 9) that include features beyond marine reserve area.

Choice experiments allow calculation of trade-offs, including between monetary (e.g., cost) and non-monetary (e.g., reserve area) features, referred to as attributes. Choice experiments are widely used to value ecosystem services and other goods and services that do not pass through traditional markets.¹⁹ The attributes used in this study were (a) area in marine reserves, (b) area in forest reserves, (c) household costs associated with reserve management, and (d) natural resource (fishing and forestry) employment. Each respondent was presented with a scenario that included two options with levels of each attribute generated by computer software from a set of possible changes. In the case of the marine reserve attribute, possible changes included a 50% decrease, no change, or a 50% increase in area.

The presentation of options is illustrated by Q9 in Appendix C. There were 12 different versions of the questionnaire, with one scenario in each version. The levels of each attribute varied across the 12 versions. Thus, some respondents received the scenario with the changes shown in Q9 in Appendix C, while other respondents received scenarios with different changes.

Respondents were asked to choose across the current situation and the two options. Respondent choices allow statistical estimation of the direction and magnitude of preferences for each of the attributes.

Model coefficients allow estimation of willingness-to-pay (WTP) for ecosystem services, in this case those associated with the area designated as marine reserves. Specifically, the ratio between model coefficients for the marine reserve and cost attributes was used to calculate WTP, and illustrative WTP examples are provided below. However, there are important limitations

¹⁹ An introduction to choice experiments is provided by:

Holmes et al. (2017). Choice experiments. In Champ et al. (Eds.), *A primer on nonmarket valuation* 2nd ed. Dordrecht, The Netherlands: Springer.

Applications in the marine protected area context include:

Wallmo & Edwards. (2008). Estimating nonmarket values for marine protected areas: A latent class modeling approach. *Marine Resource Economics*, volume 23, pages 301-323.

Wallmo & Kosaka. (2017). Using choice models to inform large marine protected area design. *Marine Policy*, volume 83, pages 111-117.

regarding the WTP examples from this study, which did not have a primary focus on generating WTP estimates. First, the reserve area attributes were broad given the novelty of the reserves and the absence at present of clear relationships between reserve size or policies (e.g., nature of allowable access and resource utilization) and predictable and detailed outcomes, such as the viability of individual species. This approach is not uncommon (see, for example, the Wallmo and Kosaka study referenced in the above footnote), but the object being valued ideally would reflect detailed expected outcomes.

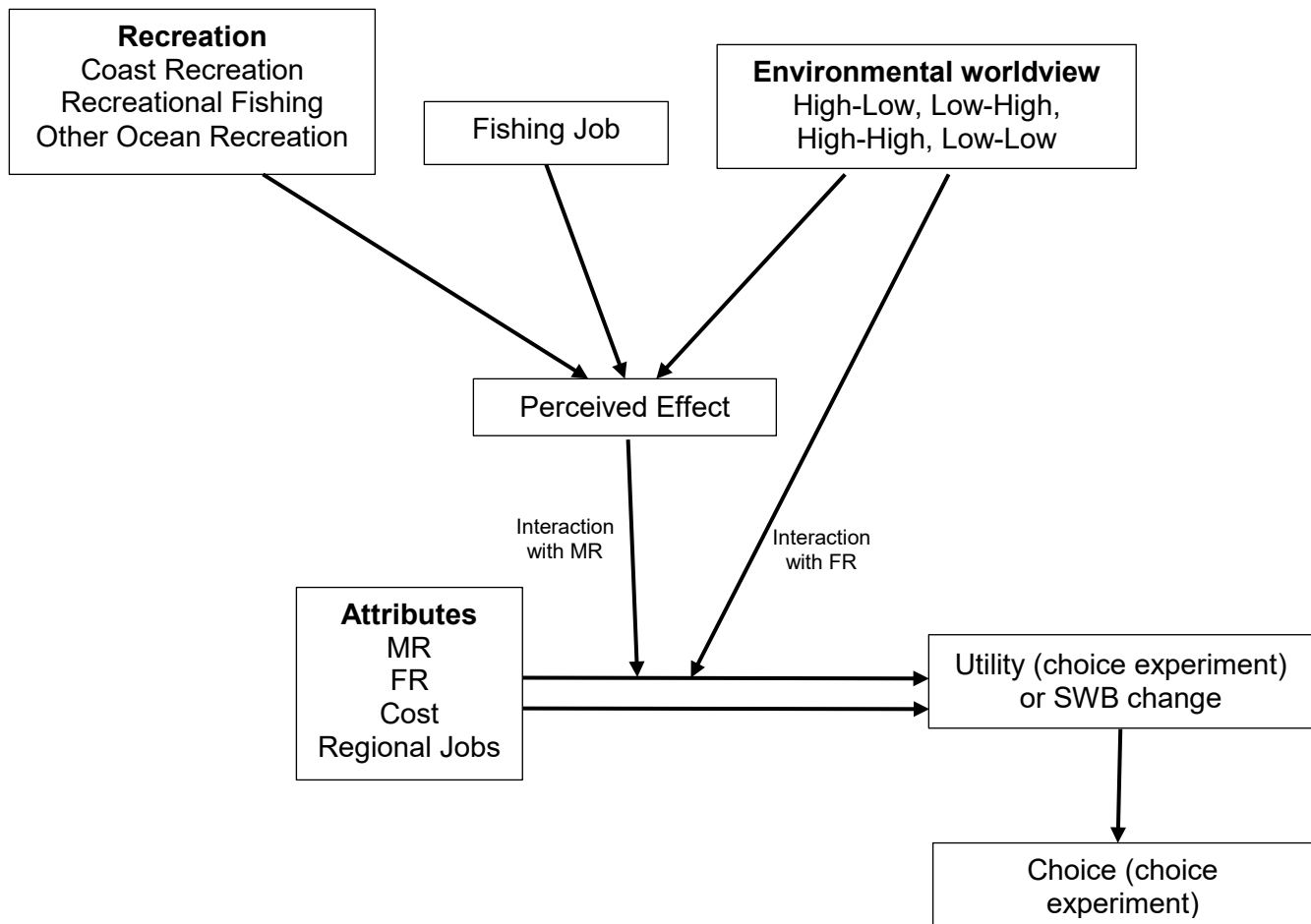
Second, a multi-step survey development process was conducted, and extensive effort was made to increase response rates. Nonetheless, resources were not available for the level of data collection associated with “high-impact” WTP studies, such as those involving natural resource damage assessment.²⁰ Third, we could not realistically state that responses would affect policy, a relationship known as “consequentiality,” such that some respondents may not have been motivated to identify or reveal their true preferences across the choice experiment options.²¹ This choice experiment provides insight into coast resident preferences and the factors that affect them, but the above caveats should be considered when interpreting these WTP estimates.

In this model, choice is evaluated relative to the attributes in the options – marine reserve area (MR), forest reserve area (FR), annual cost to households (Cost), and change in fishing and timber jobs (Regional Jobs). This is illustrated in Figure 4.13, with the subjective well-being model that is described below following the same structure.

²⁰ “High-impact” WTP studies, and the level of resources devoted to them, are illustrated by: Bishop et al. (2017). Putting a value on injuries to natural assets: The BP oil spill. *Science*, volume 356, number 6335, pages 253-254.

²¹ A review of principles relating to consequentiality and other aspects of valuation methods is provided by: Johnston et al. (2017). Contemporary guidance for stated preference studies. *Journal of the Association of Environmental and Resource Economists*, volume 4, number 2, pages 319-405.

Figure 4.13. Choice and SWB models of marine reserve spatial preference and effects



Model results are presented in Appendix A and summarized here. Starting with the non-interacted attributes, both cost and regional jobs significantly predicted choice in expected directions. Options with higher cost and greater job loss (greater negative change in Regional Jobs) were less likely to be chosen.

The coefficient for the forest reserve attribute (FR) was non-significant, suggesting that preference for forest reserve area depended heavily on environmental worldview. The negative sign for FR * High A - Low C indicates that respondents high in anthropocentrism and low in connectedness to nature scores (High A - Low C) were less likely to prefer options as forest reserve area increased. The reverse was true for respondents low in anthropocentrism and high in connectedness to nature (FR * Low A - High C). Respondents high in both or low in both scores were not statistically different from the respondents in the “reference” Moderate category.

The coefficient for the marine reserve attribute (MR) was significant, as was its interaction with Perceived Effect. In turn, Perceived Effect was significantly predicted by the environmental worldview variables, with the same general pattern found above for forest reserves (though with greater statistical significance for the High A - High C and Low A - Low C coefficients). Though the modeled relationship for marine reserves is more complex than for forest reserves, there is a similar conclusion: there is not a single uniform preference for marine reserves; instead, preferences depends on one’s environmental worldview. Respondents high in anthropocentrism and low in connectedness to nature (High A - Low C) were likely to perceive the effects of current

marine reserves as relatively negative. In turn, they tended to prefer options with less area designated as marine reserve. The reverse was true for respondents low in anthropocentrism and high in connectedness to nature (Low A - High C); they tended to perceive the effects of current marine reserves as relatively positive and, in turn, tended to prefer options with more area designated as marine reserve.

Perceived Effect also was significantly predicted by engagement in coast-oriented recreation and in recreational fishing, but not by engagement in other ocean recreation. The positive sign for Coast Recreation in the Perceived Effect component indicates that respondents who engaged in coast-oriented recreation in reserve areas were more likely to report positive evaluations of current marine reserves and, ultimately, prefer options reflecting greater marine reserve area. The reverse was true for respondents who engaged in recreational fishing in reserve areas or whose primary employment was in commercial fishing.

The approach to calculating willingness-to-pay is described in Appendix A, with the following two examples providing illustrative values. Assume Person A is high in anthropocentrism and low in connectedness to nature, never engages in coast recreation or other ocean recreation, often engages in recreational fishing, and works in commercial fishing. The predicted value for Perceived Effect for Person A would be 1.1. Person A's estimated annual household willingness-to-pay for a 1% increase in marine reserve area would be the negative of $(-.01328 + .00537 * 1.1) / -.00192$, which is negative \$3.75.

Assume Person B is low in anthropocentrism and high in connectedness to nature, often engages in coast recreation, never engages in recreational fishing or other ocean recreation, and does not work in commercial fishing. The predicted value for Perceived Effect for Person B would be 5.2, and estimated annual household willingness-to-pay for a 1% increase in marine reserve area would be \$7.58.

Persons A and B illustrate relative extremes, and many coast residents will have characteristics, preferences, and WTP somewhere between these two examples. For example, Person C may work in the commercial fishing sector, may often engage in coast recreation but never in recreational fishing or other ocean recreation, and may have a worldview high in both anthropocentrism and connectedness to nature. Person C's estimated willingness-to-pay for a 1% increase in marine reserve area would be \$2.73.

4.3.3. Model of well-being effects

After completing the choice experiment question, respondents indicated how each of the two options presented in the choice experiment would affect their subjective well-being (Q13 and Q14). This was done after respondents had reported their "current" well-being (Q11, described in Section 3.3 above).

In addition to the caveats noted in Section 4.3.2 for the choice model, it is important to consider that this approach to measuring the SWB effects of marine reserve designation is exploratory. It has been used in other contexts,²² and the application in the context of Oregon marine reserves contributes to methodological development. Nonetheless, results should be treated with caution pending additional methodological evaluation and refinement.

²² The following illustrates a similar application, though differing from the present application in context and methods:

Benjamin et al. (2014). Can marginal rates of substitution be inferred from happiness data? Evidence from residency choices. *American Economic Review*, volume 104, number 11, pages 3498-3528.

As illustrated in Table A2, results for the subjective well-being model are similar to those for the choice experiment model with respect coefficient sign (positive or negative) and significance (indicated by p-values and the presence or absence of asterisks). The results for the Perceived Effect model component (bottom half of Table A2) are very similar across the two models. The results for the main component (top half) are less similar. In part, differences across the choice experiment and SWB models reflect differences in the nature of the models and dependent variables. In part, differences reflect substantive differences in responses. For example, the ratio of the Cost to Regional Jobs coefficients in the choice experiment model differs from the same ratio in the SWB model, suggesting that people respond differently to changes in these attributes, depending on whether they are focused on choice versus subjective well-being.

To summarize, and again starting with the non-interacted attributes, both cost and regional jobs significantly predicted SWB effects in expected directions. Options with higher cost and greater job loss (greater negative change in Regional Jobs) were more likely to lead to losses in SWB.

The coefficient for the forest reserve attribute (FR) was non-significant, suggesting that the effects of forest reserve area depended heavily on environmental worldview. The negative sign for FR * High A - Low C indicates that respondents high in anthropocentrism and low in connectedness to nature scores (High A - Low C) were more likely to report negative SWB change as forest reserve area increased. The reverse was true for respondents low in anthropocentrism and high in connectedness to nature (FR * Low A - High C). Respondents high in both or low in both scores were not statistically different from the reference respondents.

The coefficient for the marine reserve attribute (MR) was significant in both models, as was the interaction with Perceived Effect. In turn, Perceived Effect was significantly predicted by the environmental worldview variables, with the same general pattern found above for forest reserves (though with greater statistical significance for the High A - High C and Low A - Low C coefficients).

Perceived Effect was significantly predicted by engagement in coast-oriented recreation and in recreational fishing, but not by engagement in other ocean recreation. The positive sign for Coast Recreation in the Perceived Effect model component indicates that respondents who engaged in coast-oriented recreation in reserve areas were more likely to report positive evaluations of current marine reserves and, ultimately, report SWB gains from options reflecting greater marine reserve area. The reverse was true for respondents who engaged in recreational fishing in reserve areas or whose primary employment was in commercial fishing.

Appendix A. Model details

Tables A1 and A2 present results of the models for marine reserve spatial preference, choice of options, and predicted SWB changes due to options (described in Section 4.3). Data columns are for variable coefficients, standard errors, and p-values.

All three models were estimated using the same data. Item nonresponse (missing values) on the weighting variables and/or any variable included in any of the three models led to a base sample size for these models of 875. The subjective well-being model (right half of Table A2) has a sample size of 1,750 because each respondent completed two SWB tasks.

The model predicting marine reserve spatial preference (Table A1) takes the form of path ordered logit with the dependent variable being preference for change in marine reserve area (Q7). The model McKelvey and Zavoina R^2 is .49.

Table A1. Path model predicting marine reserve spatial preference

	Coeff.	S.E.	P-value
Spatial preference regressed on			
Perceived Effect	.921**	.097	.000
High A - Low C	-.754**	.259	.004
Low A - High C	1.513**	.246	.000
High A - High C	.599**	.225	.008
Low A - Low C	-.156	.304	.609
Coast Recreation	.607**	.133	.000
Recreational Fishing	-.335	.186	.071
Other Ocean Recreation	.042	.185	.822
Fishing Job	-.508	.682	.457
Perceived Effect regressed on			
Constant	3.801**	.172	.000
High A - Low C	-.823**	.153	.000
Low A - High C	.874**	.146	.000
High A - High C	.294*	.135	.030
Low A - Low C	.326*	.159	.040
Coast Recreation	.266**	.088	.002
Recreational Fishing	-.332**	.112	.003
Other Ocean Recreation	.036	.113	.749
Fishing Job	-1.150**	.410	.005

*, ** Significance level $p < .05$, $p < .01$

The model predicting choice (left half of Table A2) takes the form of path multinomial logit with the dependent variable being choice across options (Q9). The model McFadden R^2 is .07.

The model predicting predicted change in SWB (right half of Table A2) takes the form of path ordered logit with the dependent variable being ordinal change in SWB (Q13a and Q13b). The model McKelvey and Zavoina R^2 is .12.

Note that these are relatively simple models focused on the attributes and specific predictors. Marine reserve awareness, demographic characteristics, and other predictors were not included.

Table A2. Models predicting choice and predicted SWB effects across options

	Choice experiment			Subjective well-being		
	Coeff.	S.E.	P-value	Coeff.	S.E.	P-value
Choice / SWB regressed on						
Constant	-.57100**	.109	.000			
MR	-.01328*	5.438	.015	-.00978**	2.054	.000
MR * Perceived Effect	.00537**	1.315	.000	.00314**	.484	.000
FR	.00336	2.652	.205	.00120	1.385	.385
FR * High A - Low C	-.01459**	4.740	.002	-.00720**	2.483	.004
FR * Low A - High C	.01652**	4.288	.000	.01299**	2.122	.000
FR * High A - High C	.00651	3.752	.083	.00288	1.831	.116
FR * Low A - Low C	.00908	5.572	.103	-.00066	3.168	.835
Cost	-.00192**	.409	.000	-.00067**	.162	.000
Regional Jobs	.00135**	.447	.003	.00076**	.203	.000
Perceived Effect regressed on						
Constant	3.801**	.172	.000	3.706**	.128	.000
High A - Low C	-.823**	.153	.000	-.835**	.119	.000
Low A - High C	.874**	.146	.000	.861**	.104	.000
High A - High C	.294*	.135	.030	.289**	.089	.001
Low A - Low C	.326*	.159	.040	.330*	.147	.025
Coast Recreation	.266**	.088	.002	.272**	.059	.000
Recreational Fishing	-.332**	.112	.003	-.325**	.059	.000
Other Ocean Recreation	.036	.113	.749	.034	.076	.653
Fishing Job	-1.150**	.410	.005	-1.139**	.174	.000

*, ** Significance level $p < .05$, $p < .01$

The following equations were used as the basis for willingness-to-pay calculation.:

$$(1) \quad V = \beta_0 + \beta_1 MR + \beta_2 MR * Perceived\ Effect + \beta_3 FR + \beta_4 FR * High-Low + \beta_5 FR * Low-High + \beta_6 FR * High-High + \beta_7 FR * Low-Low + \beta_8 Cost + \beta_9 Regional\ Jobs + \epsilon$$

Where V is the systematic component of the utility function. In Figure 4.13, the bottom horizontal arrow between attributes and utility reflects the effect of each attribute alone (coefficients β_1 , β_3 , β_8 , and β_9), whereas the top horizontal arrow reflects the effect of the MR and FR attributes in interaction with predictors (coefficients β_2 , β_4 , β_5 , β_6 , and β_7).

Perceived Effect was modeled as an intermediary between recreation, employment, and environmental worldview characteristics, on the one hand (Equation 2, below), and utility via interaction with the MR attribute, on the other hand (Equation 1):

$$(2) \quad \textit{Perceived Effect} = \beta_{10} + \beta_{11}\textit{High-Low} + \beta_{12}\textit{Low-High} + \beta_{13}\textit{High-High} + \beta_{14}\textit{Low-Low} + \beta_{15}\textit{Coast Recreation} + \beta_{16}\textit{Recreational Fishing} + \beta_{17}\textit{Other Ocean Recreation} + \beta_{18}\textit{Fishing Job} + \varepsilon$$

In brief, observed choice depends on unobserved utility, which depends on attribute levels across alternatives (current situation, Option 1, Option 2). Utility also depends on the interaction between the reserve attributes (MR and FR) and non-attribute predictors, such as environmental worldview.

Willingness-to-pay was based on the marginal rate of substitution between the attribute of interest (e.g., marine reserve area) and the cost attribute, and it was calculated as the negative of the ratio of the respective coefficients.²³ This calculation was more complex in the present case due to interaction terms. For example, willingness-to-pay for a one percent increase in the size of marine reserves would be the negative of $(\beta_1 + \beta_2 * \textit{Perceived Effect response category}) / \beta_8$, with the *Perceived Effect response category* values ranging from one to seven.

²³ See Equation 5.18 in: Holmes et al. (2017). Choice experiments. In Champ et al. (Eds.), *A primer on nonmarket valuation* 2nd ed. Dordrecht, The Netherlands: Springer.

Appendix B. Distribution of responses

This appendix provides distributions of responses for survey items, using weighted data. Distributions are not presented for some questions, based on:

- Responses not falling into a small number of categories (e.g., Q2 reflected a wide range of years of residence; Q6 involved “write in” responses).
- Responses being meaningful only when analyzed in combination with other data (e.g., Q9, Q13a, and Q14a responses depended on the attribute levels, which varied across survey versions).
- Questions being novel or difficult (e.g., Q13b and Q14b responses were not analyzed here).

Q1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 months (all year)	969	95.0	95.5	95.5
	9 months	15	1.5	1.5	97.0
	6 months (half)	15	1.5	1.5	98.5
	3 months or less	16	1.5	1.5	100.0
	Total	1015	99.5	100.0	
Missing	System	5	.5		
Total		1020	100.0		

Q3a_1 (Viewing)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	62	6.1	6.1	6.1
	Seldom	300	29.4	29.5	35.6
	Often	653	64.0	64.4	100.0
	Total	1014	99.4	100.0	
Missing	System	6	.6		
Total		1020	100.0		

Q3a_2 (Beach)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	36	3.5	3.5	3.5
	Seldom	303	29.8	29.9	33.4
	Often	676	66.3	66.6	100.0
	Total	1015	99.6	100.0	
Missing	System	4	.4		
Total		1020	100.0		

Q3a_3 (Tide pools)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	133	13.1	13.4	13.4
	Seldom	506	49.6	51.1	64.5
	Often	352	34.5	35.5	100.0
	Total	991	97.2	100.0	
Missing	System	29	2.8		
Total		1020	100.0		

Q3a_4 (Ocean gen'l)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	617	60.5	61.6	61.6
	Seldom	282	27.6	28.1	89.7
	Often	104	10.2	10.3	100.0
	Total	1003	98.3	100.0	
Missing	System	17	1.7		
Total		1020	100.0		

Q3a_5 (Rec. fishing)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	371	36.4	36.5	36.5
	Seldom	376	36.8	37.0	73.5
	Often	269	26.4	26.5	100.0
	Total	1016	99.6	100.0	
Missing	System	4	.4		
Total		1020	100.0		

Q3b_1 (Viewing)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	325	31.9	32.8	32.8
	Seldom	382	37.5	38.6	71.4
	Often	284	27.8	28.6	100.0
	Total	991	97.1	100.0	
Missing	System	29	2.9		
Total		1020	100.0		

Q3b_2 (Beach)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	357	35.0	36.3	36.3
	Seldom	358	35.1	36.4	72.7
	Often	268	26.3	27.3	100.0
	Total	983	96.4	100.0	
Missing	System	37	3.6		
Total		1020	100.0		

Q3b_3 (Tide pools)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	459	45.0	47.2	47.2
	Seldom	354	34.7	36.4	83.5
	Often	160	15.7	16.5	100.0
	Total	973	95.4	100.0	
Missing	System	47	4.6		
Total		1020	100.0		

Q3b_4 (Ocean gen'l)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	794	77.9	81.5	81.5
	Seldom	132	12.9	13.5	95.0
	Often	49	4.8	5.0	100.0
	Total	975	95.6	100.0	
Missing	System	45	4.4		
Total		1020	100.0		

Q3b_5 (Rec. fishing)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	732	71.8	74.8	74.8
	Seldom	181	17.8	18.5	93.3
	Often	66	6.5	6.7	100.0
	Total	979	96.0	100.0	
Missing	System	41	4.0		
Total		1020	100.0		

Q4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not aware	156	15.3	15.6	15.6
	Slightly aware	350	34.3	35.1	50.7
	Moderately aware	387	38.0	38.9	89.6
	Extremely aware	104	10.2	10.4	100.0
	Total	997	97.7	100.0	
Missing	System	23	2.3		
Total		1020	100.0		

Q5_1 (Commercial / charter)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	138	13.5	13.8	13.8
	2	82	8.1	8.3	22.1
	3	88	8.6	8.8	30.9
	4	471	46.2	47.2	78.1
	5	79	7.8	7.9	86.0
	6	57	5.6	5.7	91.8
	7	82	8.1	8.2	100.0
	Total	998	97.8	100.0	
Missing	System	22	2.2		
Total		1020	100.0		

Q5_2 (Recreational)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	150	14.7	15.0	15.0
	2	93	9.1	9.3	24.3
	3	108	10.6	10.8	35.2
	4	455	44.6	45.6	80.8
	5	71	6.9	7.1	87.8
	6	47	4.6	4.7	92.5
	7	75	7.3	7.5	100.0
	Total	998	97.9	100.0	
Missing	System	21	2.1		
Total		1020	100.0		

Q5_3 (Conservation)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	42	4.1	4.2	4.2
	2	36	3.5	3.6	7.8
	3	58	5.7	5.8	13.7
	4	285	28.0	28.7	42.3
	5	117	11.5	11.8	54.2
	6	148	14.5	14.8	69.0
	7	308	30.2	31.0	100.0
	Total	994	97.4	100.0	
Missing	System	26	2.6		
Total		1020	100.0		

Q5_4 (Jobs / income)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	102	10.0	10.4	10.4
	2	66	6.5	6.7	17.1
	3	111	10.9	11.2	28.4
	4	465	45.6	47.1	75.5
	5	92	9.0	9.3	84.8
	6	65	6.4	6.6	91.4
	7	85	8.3	8.6	100.0
	Total	986	96.7	100.0	
Missing	System	34	3.3		
Total		1020	100.0		

Q5_5 (Character)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	93	9.1	9.3	9.3
	2	72	7.0	7.2	16.6
	3	102	10.0	10.3	26.9
	4	427	41.9	43.0	69.9
	5	111	10.9	11.2	81.1
	6	72	7.0	7.2	88.3
	7	116	11.4	11.7	100.0
	Total	993	97.3	100.0	
Missing	System	27	2.7		
Total		1020	100.0		

Q7_1 (Marine reserves)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significantly reduced	51	5.0	5.5	5.5
	Slightly reduced	52	5.1	5.6	11.0
	Left unchanged	366	35.8	39.3	50.4
	Slightly expanded	243	23.8	26.1	76.5
	Significantly expanded	219	21.4	23.5	100.0
	Total	930	91.2	100.0	
Missing	System	90	8.8		
Total		1020	100.0		

Q7_2 (Forest reserves)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Significantly reduced	76	7.4	8.2	8.2
	Slightly reduced	74	7.3	8.1	16.3
	Left unchanged	315	30.9	34.3	50.6
	Slightly expanded	206	20.2	22.4	73.0
	Significantly expanded	248	24.3	27.0	100.0
	Total	920	90.2	100.0	
Missing	System	100	9.8		
Total		1020	100.0		

Q17_1 (Emergencies)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	61	6.0	6.1	6.1
	2	114	11.2	11.4	17.5
	3	134	13.2	13.3	30.8
	4	167	16.4	16.6	47.4
	5	223	21.9	22.1	69.5
	6	180	17.6	17.8	87.3
	7	128	12.6	12.7	100.0
	Total	1008	98.8	100.0	
Missing	System	12	1.2		
Total		1020	100.0		

Q17_2 (Climate)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	78	7.7	7.8	7.8
	2	106	10.4	10.5	18.3
	3	172	16.9	17.1	35.5
	4	213	20.9	21.3	56.7
	5	222	21.8	22.1	78.9
	6	129	12.7	12.9	91.8
	7	83	8.1	8.2	100.0
	Total	1004	98.4	100.0	
Missing	System	16	1.6		
Total		1020	100.0		

Q17_3 (Flooding)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	71	6.9	7.0	7.0
	2	151	14.8	14.9	21.9
	3	167	16.4	16.5	38.3
	4	162	15.9	16.0	54.4
	5	261	25.6	25.8	80.2
	6	122	12.0	12.1	92.2
	7	79	7.7	7.8	100.0
	Total	1013	99.3	100.0	
Missing	System	7	.7		
Total		1020	100.0		

Q17_4 (Earthquake / tsunami)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	182	17.9	18.0	18.0
	2	211	20.7	20.9	38.9
	3	184	18.0	18.2	57.1
	4	156	15.3	15.4	72.5
	5	160	15.7	15.9	88.3
	6	79	7.7	7.8	96.1
	7	39	3.8	3.9	100.0
	Total	1011	99.1	100.0	
Missing	System	9	.9		
Total		1020	100.0		

Q17_5 (Deal with problems)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	47	4.6	4.7	4.7
	2	85	8.3	8.4	13.1
	3	164	16.1	16.2	29.3
	4	230	22.5	22.8	52.1
	5	256	25.1	25.4	77.4
	6	158	15.5	15.7	93.1
	7	69	6.8	6.9	100.0
	Total	1009	98.9	100.0	
Missing	System	11	1.1		
Total		1020	100.0		

Q17_6 (Bounce back)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	63	6.2	6.3	6.3
	2	166	16.2	16.4	22.6
	3	219	21.5	21.7	44.3
	4	215	21.1	21.3	65.6
	5	213	20.9	21.1	86.7
	6	87	8.5	8.6	95.3
	7	48	4.7	4.7	100.0
	Total	1011	99.1	100.0	
Missing	System	9	.9		
Total		1020	100.0		

Q17_7 (New industries)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	150	14.7	14.8	14.8
	2	208	20.4	20.6	35.5
	3	247	24.2	24.5	59.9
	4	197	19.4	19.5	79.5
	5	119	11.7	11.8	91.2
	6	56	5.5	5.6	96.8
	7	32	3.2	3.2	100.0
	Total	1010	99.1	100.0	
Missing	System	9	.9		
Total		1020	100.0		

Q17_8 (Work together)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	59	5.8	6.8	6.8
	2	80	7.9	9.3	16.2
	3	142	13.9	16.5	32.6
	4	219	21.4	25.4	58.0
	5	195	19.2	22.7	80.7
	6	122	12.0	14.2	94.9
	7	44	4.3	5.1	100.0
	Total	862	84.5	100.0	
Missing	System	158	15.5		
Total		1020	100.0		

Q18_1 (Earthquake / tsunami)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	74	7.2	7.3	7.3
	2	82	8.1	8.1	15.4
	3	118	11.6	11.7	27.1
	4	186	18.2	18.4	45.5
	5	261	25.6	25.8	71.3
	6	183	18.0	18.1	89.4
	7	107	10.5	10.6	100.0
	Total	1010	99.1	100.0	
Missing	System	10	.9		
Total		1020	100.0		

Q18_2 (Emergencies)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	3.5	3.5	3.5
	2	60	5.9	6.0	9.5
	3	103	10.1	10.2	19.6
	4	173	17.0	17.2	36.8
	5	285	27.9	28.2	65.0
	6	216	21.1	21.4	86.4
	7	137	13.4	13.6	100.0
	Total	1009	98.9	100.0	
Missing	System	11	1.1		
Total		1020	100.0		

Q18_3 (Make ends meet)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	36	3.5	3.6	3.6
	2	28	2.7	2.8	6.3
	3	68	6.6	6.7	13.0
	4	155	15.2	15.3	28.4
	5	198	19.4	19.6	47.9
	6	254	25.0	25.2	73.1
	7	271	26.6	26.9	100.0
	Total	1010	99.0	100.0	
Missing	System	10	1.0		
Total		1020	100.0		

Q18_4 (Get through difficult times)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	24	2.4	2.4	2.4
	2	23	2.3	2.3	4.7
	3	36	3.6	3.6	8.3
	4	149	14.7	14.8	23.1
	5	244	23.9	24.2	47.2
	6	297	29.1	29.5	76.7
	7	235	23.0	23.3	100.0
	Total	1009	98.9	100.0	
Missing	System	11	1.1		
Total		1020	100.0		

Q18_5 (Believe in self)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	44	4.3	4.3	4.3
	2	15	1.5	1.5	5.8
	3	30	3.0	3.0	8.8
	4	151	14.8	15.0	23.8
	5	193	18.9	19.1	42.9
	6	304	29.8	30.1	73.0
	7	273	26.7	27.0	100.0
	Total	1010	99.1	100.0	
Missing	System	10	.9		
Total		1020	100.0		

Q18_6 (Find a way out)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	1.5	1.5	1.5
	2	11	1.0	1.0	2.5
	3	15	1.5	1.5	4.0
	4	105	10.3	10.4	14.4
	5	255	25.0	25.3	39.7
	6	366	35.9	36.2	75.9
	7	244	23.9	24.1	100.0
	Total	1010	99.0	100.0	
Missing	System	10	1.0		
Total		1020	100.0		

Q18_7 (Work with others)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	1.5	1.7	1.7
	2	19	1.9	2.2	3.9
	3	37	3.6	4.2	8.2
	4	187	18.3	21.6	29.7
	5	230	22.5	26.5	56.2
	6	226	22.2	26.1	82.3
	7	154	15.1	17.7	100.0
	Total	868	85.1	100.0	
Missing	System	152	14.9		
Total		1020	100.0		

Q19

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	.4	.4	.4
	1	2	.2	.2	.6
	2	8	.8	.8	1.4
	3	14	1.4	1.4	2.9
	4	8	.8	.8	3.6
	5	60	5.9	6.1	9.8
	6	50	4.9	5.1	14.9
	7	115	11.3	11.7	26.6
	8	222	21.8	22.6	49.2
	9	244	23.9	24.8	74.0
	10	256	25.1	26.0	100.0
	Total	983	96.4	100.0	
	Missing	System	37	3.6	
Total		1020	100.0		

Q20_1 (Part of me)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	2.7	2.7	2.7
	2	28	2.7	2.8	5.5
	3	29	2.9	2.9	8.4
	4	111	10.9	11.1	19.5
	5	203	19.9	20.2	39.7
	6	265	26.0	26.4	66.1
	7	340	33.4	33.9	100.0
	Total	1003	98.4	100.0	
Missing	System	16	1.6		
Total		1020	100.0		

Q20_2 (Who I am)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	3.2	3.5	3.5
	2	15	1.5	1.6	5.1
	3	33	3.2	3.6	8.7
	4	170	16.7	18.3	27.0
	5	156	15.3	16.8	43.8
	6	222	21.8	23.9	67.7
	7	300	29.4	32.3	100.0
	Total	929	91.1	100.0	
Missing	System	91	8.9		
Total		1020	100.0		

Q20_3 (Env. identity)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	.8	.8	.8
	2	5	.5	.5	1.2
	3	16	1.6	1.6	2.8
	4	44	4.3	4.3	7.2
	5	89	8.7	8.8	16.0
	6	238	23.3	23.5	39.5
	7	611	59.9	60.5	100.0
	Total	1010	99.0	100.0	
Missing	System	10	1.0		
Total		1020	100.0		

Q20_4 (Value env.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	17	1.7	1.7	1.7
	2	7	.7	.7	2.4
	3	6	.6	.6	3.0
	4	94	9.2	9.4	12.4
	5	108	10.6	10.8	23.2
	6	238	23.3	23.7	46.9
	7	533	52.2	53.1	100.0
	Total	1003	98.3	100.0	
Missing	System	17	1.7		
Total		1020	100.0		

Q20_5 (NR identity)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	3.4	3.5	3.5
	2	30	3.0	3.0	6.5
	3	62	6.1	6.2	12.6
	4	105	10.3	10.5	23.1
	5	192	18.9	19.1	42.2
	6	219	21.4	21.7	63.8
	7	365	35.8	36.2	100.0
	Total	1009	98.9	100.0	
Missing	System	11	1.1		
Total		1020	100.0		

Q21_1 (Life force)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	74	7.2	7.3	7.3
	2	24	2.4	2.4	9.7
	3	38	3.7	3.8	13.5
	4	201	19.7	19.9	33.4
	5	134	13.2	13.3	46.8
	6	198	19.4	19.6	66.4
	7	339	33.2	33.6	100.0
	Total	1007	98.8	100.0	
Missing	System	13	1.2		
Total		1020	100.0		

Q21_2 (Future)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	79	7.7	7.8	7.8
	2	75	7.3	7.4	15.3
	3	89	8.7	8.8	24.1
	4	148	14.5	14.7	38.8
	5	180	17.6	17.9	56.6
	6	208	20.4	20.7	77.4
	7	228	22.3	22.6	100.0
	Total	1006	98.6	100.0	
Missing	System	14	1.4		
Total		1020	100.0		

Q21_3 (Protect natural systems for own sake)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	38	3.8	3.8	3.8
	2	51	5.0	5.1	8.9
	3	52	5.1	5.1	14.0
	4	158	15.5	15.7	29.7
	5	153	15.0	15.2	44.9
	6	227	22.3	22.5	67.4
	7	329	32.3	32.6	100.0
	Total	1009	98.9	100.0	
Missing	System	11	1.1		
Total		1020	100.0		

Q21_4 (Community)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	2.5	2.5	2.5
	2	22	2.2	2.2	4.8
	3	26	2.6	2.6	7.4
	4	166	16.3	16.6	24.0
	5	189	18.5	18.9	42.9
	6	227	22.2	22.7	65.6
	7	344	33.7	34.4	100.0
	Total	1000	98.0	100.0	
Missing	System	20	2.0		
Total		1020	100.0		

Q21_5 (Contribute)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	103	10.1	10.2	10.2
	2	63	6.1	6.2	16.4
	3	102	10.0	10.2	26.6
	4	175	17.2	17.4	44.0
	5	179	17.5	17.7	61.7
	6	163	16.0	16.2	77.9
	7	222	21.8	22.1	100.0
	Total	1007	98.8	100.0	
Missing	System	13	1.2		
Total		1020	100.0		

Q21_6 (Kinship)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	4.6	4.6	4.6
	2	33	3.2	3.3	7.9
	3	46	4.5	4.5	12.4
	4	208	20.4	20.6	33.0
	5	161	15.8	16.0	49.0
	6	200	19.6	19.8	68.9
	7	314	30.8	31.1	100.0
	Total	1008	98.8	100.0	
Missing	System	12	1.2		
Total		1020	100.0		

Q21_7 (Jobs)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	59	5.8	5.9	5.9
	2	64	6.2	6.3	12.2
	3	125	12.3	12.4	24.6
	4	174	17.0	17.2	41.8
	5	220	21.6	21.8	63.6
	6	191	18.7	18.9	82.5
	7	177	17.3	17.5	100.0
	Total	1010	99.1	100.0	
Missing	System	9	.9		
Total		1020	100.0		

Q21_8 (Oneness)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	53	5.2	5.2	5.2
	2	35	3.4	3.5	8.7
	3	46	4.5	4.6	13.3
	4	291	28.5	29.0	42.3
	5	188	18.4	18.7	60.9
	6	216	21.2	21.5	82.4
	7	177	17.4	17.6	100.0
	Total	1005	98.6	100.0	
Missing	System	15	1.4		
Total		1020	100.0		

Q21_9 (Manage)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	154	15.1	15.2	15.2
	2	147	14.4	14.6	29.9
	3	205	20.1	20.3	50.2
	4	221	21.6	21.9	72.1
	5	143	14.0	14.2	86.3
	6	77	7.6	7.7	94.0
	7	61	5.9	6.0	100.0
	Total	1007	98.7	100.0	
Missing	System	13	1.3		
Total		1020	100.0		

Q21_10 (Embedded)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	4.5	4.6	4.6
	2	46	4.5	4.6	9.2
	3	48	4.7	4.8	13.9
	4	281	27.6	28.0	41.9
	5	186	18.2	18.5	60.4
	6	200	19.6	19.9	80.3
	7	198	19.4	19.7	100.0
	Total	1006	98.6	100.0	
Missing	System	14	1.4		
Total		1020	100.0		

Q21_11 (Exist)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	321	31.5	32.0	32.0
	2	129	12.6	12.8	44.8
	3	137	13.5	13.7	58.4
	4	190	18.6	18.9	77.3
	5	99	9.7	9.8	87.1
	6	60	5.9	6.0	93.1
	7	70	6.8	6.9	100.0
	Total	1005	98.6	100.0	
Missing	System	15	1.4		
Total		1020	100.0		

Q25_1 (Earnings)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	41	4.0	7.9	7.9
	2	106	10.4	20.5	28.5
	3	116	11.4	22.6	51.0
	4	177	17.4	34.3	85.4
	5	75	7.4	14.6	100.0
	Total	516	50.6	100.0	
Missing	System	504	49.4		
Total		1020	100.0		

Q25_2 (Predictability)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	38	3.7	7.4	7.4
	2	72	7.0	13.9	21.3
	3	113	11.1	21.9	43.3
	4	157	15.4	30.6	73.9
	5	134	13.2	26.1	100.0
	Total	514	50.4	100.0	
Missing	System	506	49.6		
Total		1020	100.0		

Q25_3 (Security)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	30	3.0	5.9	5.9
	2	63	6.2	12.2	18.0
	3	80	7.9	15.5	33.6
	4	171	16.8	33.2	66.8
	5	171	16.8	33.2	100.0
	Total	516	50.6	100.0	
Missing	System	504	49.4		
Total		1020	100.0		

Q25_4 (Safety)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	32	3.1	6.2	6.2
	2	47	4.6	9.2	15.4
	3	95	9.3	18.5	33.9
	4	144	14.1	28.0	61.9
	5	196	19.2	38.1	100.0
	Total	514	50.4	100.0	
Missing	System	506	49.6		
Total		1020	100.0		

Q25_5 (Fatigue)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	63	6.2	12.3	12.3
	2	109	10.7	21.3	33.7
	3	146	14.3	28.6	62.3
	4	101	9.9	19.7	82.0
	5	92	9.0	18.0	100.0
	Total	511	50.1	100.0	
Missing	System	509	49.9		
Total		1020	100.0		

Q25_6 (Healthfulness)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	3.4	6.8	6.8
	2	67	6.6	13.1	19.9
	3	134	13.1	26.1	46.0
	4	167	16.4	32.5	78.5
	5	110	10.8	21.5	100.0
	Total	513	50.3	100.0	
Missing	System	507	49.7		
Total		1020	100.0		

Q25_7 (Time away)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	31	3.1	6.1	6.1
	2	90	8.9	17.6	23.7
	3	149	14.6	29.0	52.7
	4	128	12.5	24.9	77.6
	5	115	11.3	22.4	100.0
	Total	514	50.4	100.0	
Missing	System	506	49.6		
Total		1020	100.0		

Q25_8 (Adventure)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	47	4.6	9.2	9.2
	2	61	6.0	11.8	21.0
	3	147	14.4	28.6	49.6
	4	136	13.3	26.4	76.0
	5	123	12.1	24.0	100.0
	Total	515	50.5	100.0	
Missing	System	505	49.5		
Total		1020	100.0		

Q25_9 (Challenge)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	2.9	5.7	5.7
	2	46	4.5	9.0	14.7
	3	89	8.7	17.3	32.0
	4	196	19.2	38.0	70.0
	5	154	15.1	30.0	100.0
	Total	515	50.5	100.0	
Missing	System	505	49.5		
Total		1020	100.0		

Q25_10 (Own boss)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	67	6.6	13.1	13.1
	2	52	5.1	10.0	23.1
	3	134	13.1	26.0	49.2
	4	99	9.7	19.3	68.5
	5	162	15.9	31.5	100.0
	Total	513	50.3	100.0	
Missing	System	506	49.7		
Total		1020	100.0		

Q25_11 (Suits you)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	2.6	5.2	5.2
	2	33	3.2	6.3	11.5
	3	73	7.2	14.2	25.7
	4	178	17.5	34.5	60.3
	5	205	20.1	39.7	100.0
	Total	516	50.6	100.0	
Missing	System	504	49.4		
Total		1020	100.0		

Q26

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 34	213	20.9	20.9	20.9
	35 to 54	273	26.8	26.8	47.7
	55 to 64	226	22.2	22.2	69.9
	65+	307	30.1	30.1	100.0
	Total	1020	100.0	100.0	

Q27

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	509	49.9	51.3	51.3
	Male	480	47.1	48.4	99.7
	Other	3	.3	.3	100.0
	Total	992	97.2	100.0	
Missing	System	28	2.8		
Total		1020	100.0		

Q29

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than \$25,000	307	30.1	30.1	30.1
	\$25,000 to \$49,999	298	29.2	29.2	59.3
	\$50,000 to \$99,999	280	27.5	27.5	86.8
	\$100,000 +	135	13.2	13.2	100.0
	Total	1020	100.0	100.0	

Appendix C. Survey instrument

The paper questionnaire is reproduced below. The online version included the same content, but it differed in formatting.

Note that there were 12 different versions of the questionnaire, with the changes included in the scenarios (Q9, Q13, and Q14) being systematically varied across the versions. Thus, some respondents received the scenario with the changes shown below, while other respondents received scenarios with different changes. The attributes remained the same – marine reserve area, forest reserve area, cost, and jobs – but the change in each attribute varied across the versions.



Oregon State University
Cascades

WELL-BEING SURVEY

OREGON COASTAL COMMUNITIES



Thank you for participating in this research survey of well-being in Oregon Coast communities, which is funded by the Oregon Department of Fish and Wildlife. Participation is voluntary, and your responses are completely confidential; results will be reported only as part of larger groups.

If you have any questions about the survey, please contact Principal Investigator Kreg Lindberg at 541-322-3126 or by e-mail at kreg.lindberg@osucascades.edu. If you have any questions about your rights as a survey participant, please contact the OSU Institutional Review Board (IRB) Office at 541-737-8008 or by e-mail at IRB@oregonstate.edu

There are no "right" or "wrong" answers in this survey. Please take a moment to provide the answers that best reflect your perspective. If you simply don't know or don't have an opinion on a specific question, please leave it blank.

1. Approximately how much of the year do you live in the community where you received the survey invitation?

- 12 months (all year) 9 months 6 months (half) 3 months or less

2. If this community is your primary residence, where you live most of the time, please write in the number of years that has been the case. If your primary residence is not in this community, please write 0.

I have lived primarily in this community for _____ years

3. In the first column below (column 3a), please indicate how often you've engaged in each ocean-oriented recreational activity anywhere along the Oregon coast within the past 10 years.

In column 3b, please indicate how often you've engaged in each activity within the past 10 years in any of the specific areas shown in red and blue along the coast on the enclosed map – areas that have been designated marine reserves and protected areas, which we'll refer to simply as marine reserves.

Recreation activity	3a. Anywhere on Oregon coast				3b. In marine reserve areas, shown on map		
	Never	Seldom	Often		Never	Seldom	Often
Ocean-oriented sightseeing, photography, or wildlife viewing (birds, whales, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beach walking, running, shell collecting, or rockhounding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exploring tide pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ocean swimming, kayaking, surfing, boogie boarding, snorkeling, or diving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ocean recreational fishing (including charter) or collecting shellfish (e.g., crabs or clams)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other – please describe:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How aware would you say you are about marine reserves in Oregon? Please check one box.

- Not aware Slightly aware Moderately aware Extremely aware



As shown on the enclosed map, approximately 9% of Oregon's territorial sea is designated as marine reserve or marine protected area. These are coastal waters dedicated to conservation and scientific research.

Approximately 10% of Oregon's coast range forest area is forest reserve with designations such as late successional reserves or wilderness areas. Logging, road building, and some recreation activities are limited in these reserves.

5. Designation of marine reserves can affect how people use those places (the map shows locations and rules). That may lead to tangible changes, such as in commercial fishing or marine conservation. Please indicate how you feel about these changes – are they negative, neutral, or positive for you and your household?

Please circle one number for each potential change. If you feel the changes from marine reserve designation are neutral or don't affect you, please circle 4 for each change.

How you feel about potential changes from marine reserve designation	Very negative		Neutral/ No effect			Very Positive	
Reduced opportunities for commercial or charter fishing (including shellfish)	1	2	3	4	5	6	7
Reduced opportunities for recreational fishing (including shellfish)	1	2	3	4	5	6	7
Increased conservation of the marine environment	1	2	3	4	5	6	7
Change in community jobs / income	1	2	3	4	5	6	7
Change in character of the community	1	2	3	4	5	6	7

6. Has designation of marine reserves affected you and your household in ways beyond those mentioned above? If so, please briefly describe them here.

7. It is important for policy makers to understand the perspectives of citizens like you, including perspectives on reserves. Should the area dedicated to marine and coastal forest reserves be reduced, left unchanged, or expanded? Please check one box for each type of reserve.

	Significantly reduced	Slightly reduced	Left unchanged	Slightly expanded	Significantly expanded
Marine reserves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest reserves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Next, please share your broader priorities. When it comes to the Oregon coast, please circle the number to indicate how high a priority each of the following is for you.

	Not a priority						High priority
Improve roads, bridges, and other infrastructure	1	2	3	4	5	6	7
Reduce crime	1	2	3	4	5	6	7
Maintain and expand the availability of jobs	1	2	3	4	5	6	7
Maintain the traditional character of communities	1	2	3	4	5	6	7
Reduce marine and forest reserves	1	2	3	4	5	6	7
Expand marine and forest reserves	1	2	3	4	5	6	7

Below, we ask you to respond to hypothetical options. The following is background information.

State records indicate about 63,400 private sector jobs along the entire coast in 2016, with an average wage of \$33,000 per year. Coast jobs in fishing / seafood and timber / wood products are shown below, based on state records. Jobs in these industries could be affected by the size of marine and forest reserves, or by many other factors. These industries support jobs in other industries and thus contribute to the broader economy.



Marine reserves. Currently, 9% of Oregon's territorial sea is designated as reserve. Assume these areas could be expanded or reduced by policy makers.



Forest reserves. Currently, 10% of Oregon's coastal forest area is in reserves. Assume these areas could be expanded or reduced by policy makers.



Cost to your household. Reserve management funding could come from income taxes, property taxes, or other sources. Assume there may be an additional cost to your household, above current levels.



Fishing and timber, including seafood + wood products. Currently, 7,000 people are directly employed in fishing and timber jobs. Average yearly wages range from \$32,000 to \$62,000.

These options are computer-generated, and the direction and amount of change vary from person to person. Some combinations may not seem logical, but please treat them as realistic. Take your time to consider the options so your response accurately reflects your perspective. Your response provides important insight into the priorities of coast residents.

Current		Option 1		Option 2	
9% of territorial sea is <u>marine reserve</u>	↑	13.5% of territorial sea is <u>marine reserve</u>		↓	4.5% of territorial sea is <u>marine reserve</u>
10% of coastal forests is <u>forest reserve</u>	↑	15% of coastal forests is <u>forest reserve</u>		↓	5% of coastal forests is <u>forest reserve</u>
No additional <u>cost</u> to your household	↑	\$500 per year additional <u>cost</u> to your household		▬	No additional <u>cost</u> to your household
No change in <u>fishing + timber jobs</u>	▬	No change to <u>fishing + timber jobs</u>		▬	No change to <u>fishing + timber jobs</u>

9. If you had to choose between staying with the current situation (no change), Option 1, or Option 2, which would you choose? Please check the box to indicate your choice.

Current situation

Option 1

Option 2

10. How certain are you that your choice reflects your priorities? Please circle the appropriate number on this scale.

Not at all certain											Completely certain
0	10	20	30	40	50	60	70	80	90	100	

11. Please indicate below how satisfied you have been with your life overall and with some specific aspects of your life over the past year (your well-being).

Write in a number from 0 to 100 that reflects your satisfaction with each listed aspect, using a scale from 0 = Not at all satisfied to 100 = Completely satisfied.

Well-being table – your satisfaction with...	
Aspect	Well-being in past year, 0 to 100
Your life overall, considering all aspects	
Your financial situation	
Your job situation, if currently employed	
Recreation opportunities in the region	
Quality of the natural environment in the region	
The community and its culture	
Your ability to live with integrity, in a way that reflects your moral values	

12. Indicating your well-being can be challenging. How certain are you in your report of current well-being?

Not at all certain											Completely certain
0	10	20	30	40	50	60	70	80	90	100	

13. Please imagine that Option 1 is implemented, even if you did not select it in the earlier question. In column 13a on the next page, indicate whether Option 1 would decrease, have no effect on, or increase each aspect of your well-being.

For each aspect that would be decreased or increased by Option 1, please also write a number in column 13b to indicate what your new well-being would be, assuming the changes in Option 1 occur.

Please consider how important the specific changes in Option 1 are to you relative to everything that affects your well-being. Consider the long term, not just the immediate impact of these changes.






14. Next, please imagine that Option 2 is implemented, even if you did not select Option 2. Indicate how Option 2 would change each aspect of your well-being (column 14a) and write in what your new well-being would be for each (column 14b).

Start with 13a + 13b, Option 1

Rate how implementation of Option 1 would affect each aspect of your well-being, which you reported in question 11.

First, check the box for direction of change in column 13a. Second, write what your new well-being number would be in column 13b.






Example: If your life overall well-being currently is 80, and the changes in Option 1 would increase it by 3, check the box for "Increase a little" in the first row of 13a and write "83" in the first row of 13b. Then answer for other aspects.

Current	Option 1
9% of territorial sea is <u>marine reserve</u>	↑ 13.5% of territorial sea is <u>marine reserve</u> 
10% of coastal forests is <u>forest reserve</u>	↑ 15% of coastal forests is <u>forest reserve</u> 
No additional <u>cost</u> to your household	↑ \$500 per year additional <u>cost</u> to your household 
No change in <u>fishing + timber jobs</u>	▬ No change to <u>fishing + timber jobs</u>  

Aspect	13a. Direction of well-being change					13b. New well-being (number)
	Decrease a lot	Decrease a little	No effect	Increase a little	Increase a lot	
Your life overall, considering all aspects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Your financial situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Your job situation, if currently employed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Recreation opportunities in the region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Quality of natural environment in region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
The community and its culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→

Then do 14a + 14b, Option 2

Now rate how implementation of Option 2 would affect each aspect of your well-being, following the same format as in question 13.

Current	Option 2
9% of territorial sea is <u>marine reserve</u>	↓ 4.5% of territorial sea is <u>marine reserve</u> 
10% of coastal forests is <u>forest reserve</u>	↓ 5% of coastal forests is <u>forest reserve</u> 
No additional <u>cost</u> to your household	▬ No additional <u>cost</u> to your household 
No change in <u>fishing + timber jobs</u>	▬ No change to <u>fishing + timber jobs</u>  

Aspect	14a. Direction of well-being change					14b. New well-being (number)
	Decrease a lot	Decrease a little	No effect	Increase a little	Increase a lot	
Your life overall, considering all aspects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Your financial situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Your job situation, if currently employed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Recreation opportunities in the region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
Quality of natural environment in region	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→
The community and its culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→

15. How certain are you in your reports of your new well-being due to Option 1 and Option 2?

Not at all certain											Completely certain
0	10	20	30	40	50	60	70	80	90	100	

16. We'd like to better understand how people think about and report their well-being. In a sentence or two, please tell us what you considered when you reported well-being for your life overall and how it might change due to the options.

17. Please circle one number to indicate the extent to which you disagree or agree with each statement.

Statement	Strongly disagree		Neither disagree nor agree			Strongly agree	
During emergencies, my community will be able to provide key services, such as police and fire protection	1	2	3	4	5	6	7
If climate does change over time, with effects such as rising sea levels, we'll be able to adapt and sustain our community	1	2	3	4	5	6	7
We'll be able to recover and sustain our community if there's extensive flooding here	1	2	3	4	5	6	7
We'll be able to recover and sustain our community if there's a significant earthquake and / or tsunami here	1	2	3	4	5	6	7
When a problem occurs, community members are able to deal with it	1	2	3	4	5	6	7
My community is able to "bounce back" from downturns in the local economy	1	2	3	4	5	6	7
If there is a decline in our current industries, we'll be able to develop businesses in new industries	1	2	3	4	5	6	7
People in our community work together even when they disagree	1	2	3	4	5	6	7

18. Please circle one number to indicate the extent to which you disagree or agree with each statement.

Statement	Strongly disagree		Neither disagree nor agree			Strongly agree	
I could cope with an earthquake and tsunami in my community	1	2	3	4	5	6	7
I can deal with any emergencies that might occur	1	2	3	4	5	6	7
I was able to make ends meet during the "great recession" of 2008 and 2009	1	2	3	4	5	6	7
I can get through difficult times because I've experienced them before	1	2	3	4	5	6	7
My belief in myself gets me through hard times	1	2	3	4	5	6	7
When I'm in a difficult situation, I can usually find a way out of it	1	2	3	4	5	6	7
I work with others in the community even when I disagree with them	1	2	3	4	5	6	7

19. To what extent do you feel the things you do in your life are worthwhile? Please circle one number using the following 0 to 10 scale.

Not at all worthwhile												Completely worthwhile	
0	1	2	3	4	5	6	7	8	9	10			

The next few questions are about our relationship with natural resources and the environment. There are no "right" or "wrong" answers – the goal is to understand the range of perspectives among citizens.

20. Please circle one number to indicate the extent to which you disagree or agree with each statement.

Statement	Strongly disagree		Neither disagree nor agree			Strongly agree	
I feel the place where I live is a part of me	1	2	3	4	5	6	7
Living on the Oregon coast says a lot about who I am	1	2	3	4	5	6	7
The coastal environment, including plants, animals, and ecological processes, is important to our region's identity and character	1	2	3	4	5	6	7
I value the coastal environment because it is my home	1	2	3	4	5	6	7
Continued harvest of natural resources, such as fishing and logging, is important for our region's identity and character	1	2	3	4	5	6	7

21. Please circle one number to indicate the extent to which you disagree or agree with each statement.

Statement	Strongly disagree		Neither disagree nor agree			Strongly agree	
I feel that all inhabitants of Earth, human and nonhuman, share a common "life force"	1	2	3	4	5	6	7
The main reason to protect the environment is to conserve fish, timber, and other natural resources for future human benefit	1	2	3	4	5	6	7
Natural systems should be protected for their own sake, regardless of any benefits they may provide for humans	1	2	3	4	5	6	7
I think of the natural world as a community to which I belong	1	2	3	4	5	6	7
Nature is important mostly because of what it can contribute to human well-being	1	2	3	4	5	6	7
I often feel a kinship with animals and plants	1	2	3	4	5	6	7
The main goal of natural resource management should be to provide a stable flow of resources to sustain jobs and local communities	1	2	3	4	5	6	7
I often feel a sense of oneness with the world around me	1	2	3	4	5	6	7
Natural resource management should focus primarily on benefits to humans	1	2	3	4	5	6	7
Like a tree can be part of a forest, I feel embedded within the broader natural world	1	2	3	4	5	6	7
Plants and animals exist primarily for the benefit of humans	1	2	3	4	5	6	7

22. Please circle one number to indicate the extent to which you disagree or agree that a decision whether or not to harm each of the following types of beings is a moral decision (a decision that makes you think about right and wrong).

	Strongly disagree		Neither disagree nor agree			Strongly agree	
A common species of rockfish	1	2	3	4	5	6	7
An ape	1	2	3	4	5	6	7
A nearshore marine ecosystem	1	2	3	4	5	6	7
A common species of jay (bird)	1	2	3	4	5	6	7
A cow	1	2	3	4	5	6	7
Oak trees	1	2	3	4	5	6	7
A dolphin	1	2	3	4	5	6	7
An old-growth forest ecosystem	1	2	3	4	5	6	7
A tuna	1	2	3	4	5	6	7
Kelp	1	2	3	4	5	6	7
An endangered salmon species	1	2	3	4	5	6	7
A yellow jacket	1	2	3	4	5	6	7
An endangered elephant species	1	2	3	4	5	6	7
A jellyfish	1	2	3	4	5	6	7

23. In the first column of the table below, please check the box for the one category that best describes the work for your current primary job. In the second column, check the boxes for all categories that provide additional household income – if you have a second job and/or if others in your household are employed.

	23a. Check <u>one</u> box for your primary job / work	23b. Check boxes for all other household income
Not in paid employment – retired, homemaker, family caregiver, student, unemployed, or other	<input type="checkbox"/>	
Commercial or charter fishing	<input type="checkbox"/>	<input type="checkbox"/>
Other fishing-related employment	<input type="checkbox"/>	<input type="checkbox"/>
Farming, forestry, or other natural resource-oriented	<input type="checkbox"/>	<input type="checkbox"/>
Construction	<input type="checkbox"/>	<input type="checkbox"/>
Manufacturing	<input type="checkbox"/>	<input type="checkbox"/>
Professional services – medical, legal, accounting, engineering, financial, insurance, real estate, etc.	<input type="checkbox"/>	<input type="checkbox"/>
Retail – supermarket, hardware, clothing, gas, etc.	<input type="checkbox"/>	<input type="checkbox"/>
Restaurant, bar, brewpub, fast food	<input type="checkbox"/>	<input type="checkbox"/>
Lodging or other tourism business – hotel, motel, vacation rental, tours, etc. (excluding charter fishing)	<input type="checkbox"/>	<input type="checkbox"/>
Government, including public schools / teaching	<input type="checkbox"/>	<input type="checkbox"/>
Working, but in a different category – please describe:	<input type="checkbox"/>	<input type="checkbox"/>

24. If you currently are employed, consider your current primary job. Would you still work in the same type of job (industry) if you had your life to live over? If you are not employed, please skip to question 26.

No Maybe / depends Yes

25. Please indicate your level of satisfaction with each of the following aspects of your current primary job.

Aspect	Very dissatisfied		Neither dissatisfied nor satisfied		Very satisfied
Actual earnings from the job	1	2	3	4	5
Predictability of earnings from the job	1	2	3	4	5
Job security	1	2	3	4	5
Safety from injury on the job	1	2	3	4	5
Fatigue from the job	1	2	3	4	5
Healthfulness of the job	1	2	3	4	5
Time spent away from home	1	2	3	4	5
Adventure of the job	1	2	3	4	5
Challenge of the job	1	2	3	4	5
Opportunity to be own boss	1	2	3	4	5
How well the job suits you	1	2	3	4	5

26. How old are you? Please check one box.

- 18 to 24
 30 to 34
 40 to 44
 50 to 54
 60 to 64
 70 to 74
 25 to 29
 35 to 39
 45 to 49
 55 to 59
 65 to 69
 75 or older

27. What is your gender? Please write in. _____

28. What is the highest year of formal education you have completed? Please circle one number. If your highest level is a GED / high school diploma equivalency, please circle "12".

Elementary and high school												College or technical school				Graduate or professional school							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24+

29. What is your household's total annual income before taxes? Include income for yourself and anyone else who regularly lives in your household. Include salary, pensions, interest or dividends, and all other sources of income. Please check one box.

- Less than \$15,000
 \$25,000 to \$34,999
 \$50,000 to \$74,999
 \$100,000 to \$149,999
 \$15,000 to \$24,999
 \$35,000 to \$49,999
 \$75,000 to \$99,999
 \$150,000 or more

30. Including yourself, how many people regularly live in your household? Please write in the number for each (write 0 for children if there are no children in your household).

_____ Adults, including yourself _____ Children, under 18 years old

31. We'll present results by community / region. Please confirm your location by writing your zip code here.

Thank you for completing this survey. If you have any additional thoughts on well-being in your community, please write them here and continue on the back cover, as needed.
