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## Capstone Projects

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# Doing swell: a participatory tool for measuring well-being in coastal island communities.

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## **Abstract**

The purpose of this tool is to create a method for understanding the community-level impacts of marine spatial planning through the lens of well-being. Well-being consists of three dimensions, material, relational, and subjective. Assigning measurable indicators to each produces a quantitative and holistic measurement of well-being. Here, household well-being is measured through an 11-question, subjective survey, complemented by an additional set of subjective resilience questions. The household well-being and resilience scores generated from the surveys are aggregated to produce community-level well-being and resilience scores. These scores are useful for guiding marine spatial planners, as they identify vulnerable communities, highlight differences in communities, and track changes in community well-being over time. The insights gained from these scores can inform adaptive management measures, help planners select optimal locations for marine spatial plans, and inform planners' understanding of changes in community well-being associated with marine spatial planning. This tool addresses the need for holistic, practical, and transferrable approaches and promotes mutually beneficial marine spatial plans.

## Executive Summary

The global 30x30 initiative, to protect 30% of land and water by 2030, has inspired a new wave of marine spatial planning (MSP) initiatives. New MSPs present exciting opportunities to increase ocean conservation and improve how they are created. Marine spatial plans should focus as much on impacts on stakeholders as they do their conservation goals. Impacts on stakeholders are frequently measured through externally-defined, economic indicators that cannot capture the complex, reciprocal relationship between the ocean and its users (Woodhouse et al. 2015). This shortcoming is exacerbated in the context of islands, where islanders derive significant cultural, social, psychological, and economic values from their marine environment (Conkling 2007). Including stakeholders in a people-centered approach is necessary for understanding the breadth of possible conservation impacts, and it creates a richer context for ethical and effective conservation outcomes (Milner-Gulland et al. 2014; Stephanson & Mascia 2014).

The purpose of this tool is to evaluate community well-being as it relates to changes in ocean use through the social well-being approach. The social well-being approach is a practical framework used to measure community-level well-being (Gough & McGregor 2007). The Well-being in Developing Countries Research Group (WeD) (2007) defines well-being as the “state of being with others, where human needs are met, where one can act meaningfully to pursue one’s goals, and where one enjoys a satisfactory quality of life.” The framework distills well-being into three equally important dimensions, material, relational, and subjective, that can be quantified and measured via indicators (Gough & McGregor 2007). Material well-being is the observable outcomes of well-being, like income, food, shelter, and employment (Mbaru et al. 2021). Relational well-being describes what people do and how they interact with others to achieve their needs (Mbaru et al. 2021). Lastly, subjective well-being refers to people’s perceptions of themselves and the quality of their lives (Mbaru et al. 2021).

For the purpose of this tool, community resilience will also be assessed. Resilience is “the capacity of a system to absorb disturbance and reorganize while changing to retain essentially the same function, structure, identity, and feedback”(Walker et al. 2004). A resilient community is one that can ensure well-being in the face of adverse changes or shocks Bahadur et al. 2015).

A subjective well-being and resilience survey is used to collect quantitative well-being and resilience data at the household and community level. The survey will target ocean users, a group pre-determined by the Waitt Institute’s, Ocean Use Survey as those who use and value their ocean spaces. Measuring the well-being of ocean users is relevant to MSP because ocean users derive significant social, cultural, economic, and psychological values from the ocean.

Eleven indicators of material, relational, and subjective well-being were adopted from existing frameworks and studies based on their applicability and transferability to island communities. These indicators are measured in a survey of 11 well-being-related questions and generate a household well-being score. Respondents are prompted to

choose the level they disagree or agree with the question based on a 1-10 Likert scale with one being strongly disagree and ten being strongly agree. Jones' (2019) model for measuring household resilience is adopted here to complement the well-being survey. Jones' (2019) model asks respondents to rate their level of agreement with a resilience capacity question on a scale of one to ten. By averaging the responses to the well-being and resilience questions, household-level well-being and resilience scores can be calculated. Averaging household scores generate community-level well-being and resilience scores.

Well-being and resilience scores are useful tools to guide the creation of MSPs. They can elucidate which communities may be primed for more positive or negative impacts; they can draw attention to where further research is needed to understand community structure, or they can be used to compare communities. This information can inform MSP delineation or stimulate other measures to understand and support communities. By measuring well-being and resilience scores pre-, during, and post-MSP implementation, changes over time can be observed. While these changes cannot be directly attributed to MSP, even for ocean users, they can be catalysts for further investigation.

A series of recommendations are given for the most effective and efficient use of the tool. First, using objectively defined indicators adopted from other frameworks decreases the time and effort to determine them locally, increases the applicability and transferability of the tool, and increases the legitimacy of the indicators (Milner-Gulland et al. 2014). Second, reverse coding can refocus respondents and combat survey fatigue (Jones 2019). If repeated, the survey should be administered yearly and at the same time of year to reduce variation in well-being induced by seasonal changes such as typhoon or hurricane seasons (Michaelson & Mahony 2012). Finally, if the survey is administered multiple times, panel data should be collected to decrease variability (Jones 2019; Mbaru et al. 2021).

One limitation of this tool is priming and the variation that will be introduced between primed and non-primed respondents (Jones 2019). When the tool is administered after the OUS, respondents will be focused on the value of their ocean resources, whereas when it is given later, they will not. This introduces cognitive bias. A limitation to panel data is the threat of attrition, or losing respondents over time, which may impact the data (Mbaru et al. 2021). Another limitation is attribution; direct conclusions about changes in well-being or resilience as a result of MSP cannot be drawn (Mayoux & Chambers 2005). Instead, observed changes should be highlighted and used to guide further research. Lastly, it is important to note that this tool is not predictive of the scale or modality of impacts from MSP rather it provides a means by which impacts can be observed.

The social well-being approach represents a holistic, people-centered, quantitative approach to understanding communities and how they change over time. Utilizing this approach in concurrence with changes in ocean use for coastal island communities is an effective way to tie the well-being of a community to the state of its ocean, and to include stakeholders in the creation of MSPs.

## Keywords

Social well-being • Marine spatial planning • Resilience • Islands

## Introduction

Despite the frequency of their use, externally defined, economic indicators are insufficient for understanding the impacts of conservation on communities, and they fail to capture the dynamic relationships between people and their environments (Woodhouse et al. 2015). Holistic conservation approaches are centered around people and recognize the reciprocal relationships between resource users and their environment (Stephanson & Mascia 2014). They are ethically sound; as altering how people interact with their environment produces unavoidable impacts on peoples' lives (Milner-Gulland et al. 2014). They utilize valuable socioeconomic data that helps inform where and how to best implement conservation initiatives (Stephanson & Mascia 2014). Furthermore, holistic approaches amplify and include communities or other groups that are often marginalized or silenced by biologically- or economically-focused conservation assessments (Milner-Gulland et al. 2014).

The Waitt Institute (WI), a non-profit that partners with national governments and communities of island nations, utilizes the knowledge and interest of stakeholders alongside the best available science to create and implement sustainable marine spatial plans (MSPs) (Waitt Institute 2023). The WI uses the Ocean Use Survey (OUS), a participatory mapping survey, to connect with stakeholders and establish where they are using their ocean, what they are using it for, and how much they value it (Waitt Institute 2023). The OUS's stakeholder-centric approach to planning optimizes resource use and conservation goals (Waitt Institute 2023).

Holistic, inclusive approaches, like the OUS, are paramount to the success of marine spatial planning in island nations. There is an inextricable link between small island nations and their oceans. To emphasize this, some have renamed themselves as "large ocean states" to highlight their vast oceanic resources rather than their limited terrestrial space (Hume et al. 2021). The concept of "islandness," coined by Conkling in 2007, describes a shared identity that transcends the different cultures and geographies of islanders that is the result of living in relatively small communities, with varying degrees of isolation, and exceptionally close to the marine environment (Conkling 2007). Recognizing the traditional use and stewardship of island communities over their marine resources not only invites invaluable ecological perspectives and knowledge, but it acknowledges that islanders, their continued stewardship, and their support, are essential to successful marine conservation (Polasky 2008). For successful MSPs in island communities, conservation is as much a social process as a biological one.

## Purpose of Toolkit

The purpose of this tool is to create a method for assessing community well-being as it relates to changes in ocean ocean due to marine spatial planning.

## The Social Well-being Approach

The social well-being approach is a practical framework for quantifying and measuring well-being (Gough & Mcgregor 2007). It can further be operationalized to illustrate changes in well-being over time and relate those changes to conservation interventions. To apply well-being scientifically, a generally accepted definition is needed (Milner-Gulland et al. 2014). For this toolkit, the adopted definition of well-being is the “state of being with others, where human needs are met, where one can act meaningfully to pursue one's goals, and where one enjoys a satisfactory quality of life” (WeD 2007). The Wellbeing in Developing Countries (WeD) research group coined this definition after five years of development and poverty alleviation research and designed it to encapsulate the different dimensions of well-being. Multiple frameworks, such as the Organization for Economic Co-operation and Development's (OECD) “How’s Life” and WeD's “3D Approach,” recognize that well-being consists of three equally important dimensions: material, relational, and subjective. Distilling well-being into three dimensions and assigning measurable indicators to each allows researchers to implement it as a medium for measuring change over time.

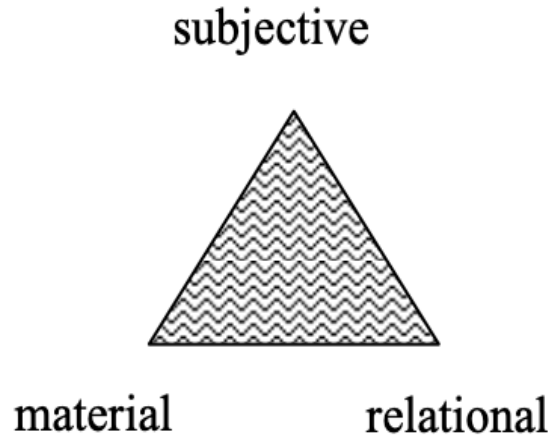
### The three dimensions of well-being

The three dimensions of well-being are defined as follows:

1. **Material well-being** is the objective observable outcome of well-being; it includes material resources such as food, income and assets, shelter, employment, access to services and natural resources, and environmental quality (Mbaru et al. 2021).
2. **Relational well-being** describes what people do, and how they interact with others to achieve their needs and a good quality of life (Mbaru et al. 2021).
3. **Subjective well-being** refers to people’s perceptions and how they feel about their situation and quality of life and pays attention to the values and beliefs that people have which shape those perceptions (Mbaru et al. 2021).

All three dimensions are interconnected, interdependent, and of equal importance which is best represented through White’s (2009) “triangle of well-being”.





**Figure 1. White's (2009) Triangle of Well-being.**

White notes that the subjective dimension is intentionally placed at the apex of the triangle because “the meanings of the other dimensions (material and relational wellbeing) are ultimately derived through the values and interpretations of the subjects” (White 2010).

The well-being approach is useful in understanding resource-dependent communities because of their connection to and reliance on environmental resources (Stephanson & Mascia 2014). The utility of well-being is highlighted in the context of islands and islanders (Coulthard et al. 2017). Aside from islanders being closely connected to their marine environment, key social, cultural, and perceptions are intrinsic to island life and often overlooked by economically-focused conservation impact assessments (Coulthard et al. 2017). The social well-being approach has also been used to successfully identify important traditional, cultural, and heritage facets within communities and their relationships to them (Gollan et al. 2019).

A subjective well-being survey will be used to collect quantitative well-being data at the household and community level. The utility of this tool rests on the notion that:

1. Islanders are inherently linked socially, culturally, economically, and psychologically to the marine environment;
2. That those connections influence their well-being.

## **How the social well-being approach can be used to understand community-level impacts of MSP**

The social well-being approach outlines a framework for researchers to compare well-being between communities and over time in a statistically robust way.

### Highlighting and measuring differences in well-being between communities

Well-being scores from each sampled household can be averaged to generate a community-level well-being score. This score can provide meaningful insight into potentially vulnerable communities during the conservation planning process and can guide adaptive management measures (Stephanson & Mascia 2014).

Additionally, community-level well-being scores can be used to compare communities. This is most useful in the early conservation planning stages and can be applied to a prioritization modeling process. These scores, along with levels of resource dependence data gleaned from the OUS, can help avoid or minimize negative impacts on communities. For example, if planners are choosing MSP locations between two subsistence fishing communities, comparing their well-being scores may be helpful to determine where no-take zones should go to be least harmful.

### Measuring change in well-being over time

By measuring well-being pre-, during, and post-MSP, changes in well-being can be noted and studied.

This is best illustrated in a 2021 study conducted by Mbaru et al. in Kenya which is summarized below:

To better understand the impacts of fisheries bycatch management, Mbaru et al. developed a multidimensional approach to measure well-being changes over time. The authors explored the effects of the adoption or non-adoption of an escape slot trap on the material, relational, and subjective well-being of fishers.

Material well-being was defined as the resources that individuals can rely on to meet their needs like food, employment, and the environment. Relational well-being describes the importance of social relationships like friendship, kinship, and love and was measured in this study by relational balance. Relational balance is used to represent social embeddedness by measuring giving and receiving within a community. This concept illustrates social connectedness and reveals how people access other human needs and benefits in society. Subjective well-being is how people feel about their lives and the resources that they have.

The authors used a before-after-control-intervention (BACI) design to measure how well-being changed over time in adopter versus non-adopter fisher groups. Well-being data were collected primarily from household questionnaires given in face-to-face interviews for at least two rounds. The first round was a baseline survey with follow-up surveys given eight and 16 months after the intervention. The use of panel data (interviewing the same individual over time) eliminated some variation over time. Material well-being was measured via wealth and based on the material style of life (MSL) which evaluates household possessions and structure. Relational well-being was captured by asking respondents to list others with whom they fished or shared information. Responses that tied fishers together by both revealing that they fish

together or by sharing information were used to indicate relational balance. Lastly, subjective well-being was measured by individuals' feelings about the quality of their livelihoods, social relationships, and job satisfaction. Responses were rated one through five on the Likert scale.

The analysis by Mbaru et al. revealed that adopters of the conservation initiative had no observed negative impacts on the three dimensions of well-being over time. The authors noted an important limitation; if stakeholders' expected outcomes of the conservation intervention were not realistic and thus not met, it can lead to disillusionment and distrust over time. The discrepancies observed between the objective and subjective measurements of well-being emphasize the importance of multiple indicators to achieve the most holistic view.

Rather than being a recommendation, monitoring, and evaluation of intervention outcomes is at the core of this study. As stated by these authors and many others, it is the moral responsibility of conservation professionals to ensure that interventions have at least neutral if not positive impacts on the surrounding communities.

## **Subjective Resilience**

Another relevant indicator of how MSP may impact communities is household resilience. Walker et al. (2004) define resilience as “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedback.” Therefore, a resilient community is one that can ensure well-being in the face of adversity, shock, or change (Bahadur et al. 2015).

### SERS Model

Jones (2019) has created a framework for subjectively measuring resilience through a series of nine questions called the Subjective self-Evaluated Resilience Score (SERS) approach. Nine survey questions assess the different aspects of household resilience: absorptive, adaptive, transformative, social capital, financial capital, political capital, learning, anticipatory capacity, and early warning (see **Appendix A** for a list of example statements) (Jones 2019). Responses to the nine questions are answered on a Likert scale based on the respondent's level of agreement or disagreement; the responses are then averaged to compute a household-level resilience score (Jones 2019).

### SERS AAT-Variant

Béné et al. (2012) have proposed a more concise framework for assessing resilience that utilizes only three capacities: absorptive, adaptive, and transformative capacity. Béné et al. (2012) argue that these three capacities are the core elements of resilience as they represent the ability to cope, adjust, or modify behavior in the face of change (Béné et al. 2012). Jones (2019) adapted this to the SERS Model by only measuring the absorptive, adaptive, and transformative capacities through three statements assessed

along the Likert scale. See **Appendix A** for the AAT-variant highlighted in the SERS Model.

## **How measuring subjective resilience can be used to understand community-level impacts of MSP**

If resilience is the ability of a system or community to cope with change, then a lack of resilience will decrease the community's ability to cope with change (Walker et al. 2004).

### Highlighting communities vulnerable to change

Collecting community-level baseline data can further support the decision-making process of marine spatial planners and communities by highlighting communities that may be less resilient to changes in their ocean use.

Jones and D'Errico (2019) compared the 9-question SERS and 3-question AAT-variant approaches to the widely-used, objectively measured resilience approach, Resilience Index Measurement Analysis (RIMA). The results of their study are summarized below.

Jones and D'Errico developed the Subjective self-Evaluated Resilience Score (SERS) approach to measure resilience to environmental shocks and risks from a subjective perspective. This approach is grounded in the notion that individuals or communities can appropriately identify possible risks and their capacities to deal with them. The authors define resilience as the capacity to maintain well-being outcomes in the face of diverse hazards or risks. The authors also note that despite the subjective approach of the SERS model, by selecting the nine capacity-related questions, true objectivity is impossible.

To compare the results of the SERS model, the authors use a like-for-like comparison against the objectively evaluated resilience model, the Resilience Index Measurement Analysis Index (RIMA). RIMA was developed by the United Nations Food and Agriculture Organization (FAO) as an econometric model to measure household resilience to food security. A household survey was deployed over 2,380 households in Karamoja, Uganda, to gather socio-economic data for the RIMA index as well as responses to the SERS questions. The authors found that the RIMA and SERS results were statistically correlated, the association between the scores was positive, and the SERS model was associated with many of the socioeconomic drivers indicated in the RIMA model. The authors also tested the similarity of the AAT-variant against a hybrid RIMA. The results showed that the AAT-variant produced statistically similar results to the hybrid RIMA. Depending on the goals, time, and capacity of the surveyors, the nine or three-dimensional approaches can be used to obtain statistically significant outcomes.

Jones and D'Errico (2019) note that limitations to the subjective evaluation approach include the possibility of cognitive biases influencing respondents' answers and that it is

an indirect approach to measuring resilience with no way of validating the results without continued measurement over time. However, the SERS approach is cost and time-effective, reduces the use of proxy indicators, and allows respondents to include perceptions of resilience in their communities that could not be included in objective approaches.

## Methodology

### Selection of indicators and their justifications

Indicators were primarily adopted from the Organization for Economic Cooperation and Development (OECD). The OECD is an intergovernmental organization made up of 38 member countries that seeks to stimulate economic progress. In 2020, they published their 5th edition of the “How's Life” framework which measures well-being in different countries via 80 indicators (OECD 2020). Additional indicators were chosen from the Millennium Ecosystem Assessment’s (MA) “Ecosystems and human well-being” framework, and two peer-reviewed studies.

There were three main drivers for selecting well-being indicators:

- 1) **Legitimacy:** By adopting indicators for well-being from existing, global frameworks, their legitimacy as metrics for well-being was ensured.
- 2) **Transferability:** This survey is intended to be used across different communities and cultures, where lives may vary significantly, and still be an effective measurement tool. Indicators selected from the OECD and MA have already been demonstrated to measure well-being across different countries.
- 3) **Applicability:** After discussions with the Waitt Institute’s, Blue Economy Team, and a thorough investigation of the well-being literature, additional indicators were chosen from peer-reviewed studies for their relevance to MSP and their utility alongside the OUS.

The resulting list of 11 indicators is meant to produce a concise yet robust understanding of well-being.

To measure resilience, Jones’ (2019) model was adopted. This model is already in an operational format and is designed to be altered and applied to different resilience-related scenarios (Jones 2019).

For the list of indicators selected to measure well-being and their justification see **Appendix B**. Jones’ resilience capacities are available in **Appendix A**.

### Survey Design

Assessing well-being will be operationalized using a survey. Respondents will be given a list of 11 well-being questions to respond to based on how strongly they agree or disagree with them. The responses will be collected using a Likert scale from one being *strongly disagree*, to ten *strongly agree*. The 11 well-being questions will be followed by

nine or three resilience questions, depending on the desired robustness of the survey data. The three or nine resilience questions will also be assessed against a 10-point Likert scale where individuals will be asked to note how strongly they agree or disagree with the statement.

Jones (2019) recommends using a 10-point Likert scale because it increases the number of response options, i.e., 1-10 versus 1-5, makes it easier to separate individual responses, and allows for finer, more ordinal judgments (Gurney et al. 2014; Jones 2019).

To ensure that the survey results can be extrapolated to understand the impacts of marine spatial planning, it will be given to the same sample (or a subset) population as the OUS. The OUS targets those most closely linked to the marine environment and therefore may be influenced most by restrictions on ocean use.

The survey will ask respondents to indicate which community they primarily reside in so that each response can be used to calculate community-level scores.

The first survey will be administered alongside the OUS by either embedding at the end of the questionnaire or in a separate follow-up questionnaire given in the same sitting. In either case, the respondent will be asked for permission to collect their email address and to be contacted in the future to re-take the survey. Follow-up surveys will be conducted online and sent using the email address given in the first assessment.

### Evaluation method

The simplest, most transparent method for evaluating survey results is an equally weighted average of the Likert scale responses (Jones 2019).

Each household will receive a well-being score by averaging the Likert response to each question ( $Q$ ) by 11 (the number of questions).

$$\textit{Household score} = \frac{Q_1 + Q_2 + Q_3 \dots + Q_{11}}{11}$$

Each household will receive a SERS resilience score by averaging the Likert response to each question ( $Q$ ) by 9 (the number of questions).

$$\textit{SERS score} = \frac{Q_1 + Q_2 + Q_3 \dots + Q_9}{9}$$

The AAT-variant resilience score will be calculated by averaging the Likert response to each statement ( $Q$ ) by three (the number of questions).

$$AAT - \text{variant score} = \frac{Q_1 + Q_2 + Q_3}{3}$$

Community-level well-being and resilience scores will be generated by averaging the household scores from the sampled community where  $H$  is each household's score and  $N$  is the total number of households sampled.

$$\text{Community score} = \frac{H_1 + H_2 + H_3 + \dots + H_n}{N}$$

The community resilience score can be calculated using the same formula. Calculating the mean, mode, and standard deviation of the community scores can aid in determining the average well-being and resilience of an area and can statistically highlight outlying communities.

The sample sizes for this survey will be determined in the design of the OUS. The OUS determines representative sample sizes for each island based on the populations of each inhabitant island, and based on populations of key stakeholder sectors (Waitt Institute 2023). Generally, smaller populations require larger sampling ratios to ensure representativeness (St. Olaf College n.d.). For populations less than 1,000, a sample ratio of 30% is advised (St. Olaf College n.d.).

For an example survey, see **Appendix C**.

## **Recommendations for use**

### Adopting existing indicators

Subjectively measuring indicators that are objectively defined creates the opportunity to capitalize on the strengths of both perspectives (Jones & d'Errico 2019). Using objective well-being indicators identified by existing frameworks or peer-reviewed studies eliminates the time and effort needed to define indicators on a community-by-community basis. Using existing indicators also allows results to be compared across countries and frameworks. The major drawback to externally defined indicators is that they may not be appropriate in different communities. Therefore, selecting the most flexible and appropriate indicators and consulting with the community is paramount.

### Combatting survey fatigue

To combat survey fatigue, the list of survey questions should remain short, and the statements should be direct (Jones 2019). Some statements should be reverse-coded to emphasize a positive or negative perspective. This is useful for minimizing acquiescence bias or the tendency for people to select 'agree' to everything when they are tired of answering (Jones 2019). Reverse-coding refocuses the respondent and prompts them to think more closely about their response (Jones 2019).

### Including an open response box

An open response box at the end of the survey such as “Is there anything else you would like us to know?” or “Did any notable events (surrounding the weather, your friends or family, or your country) occur this year?” allows a respondent to contextualize their response and can serve as a useful reference when characterizing changes in well-being over time. For example, a respondent may have a high well-being score one year noting a successful fishing season, and a relatively low well-being score when surveyed after fishing restrictions are put in place which would seem to indicate that this individual’s well-being has been directly impacted by conservation measures. It should be noted that the correlation between the two cannot be accepted as causation, but can serve as a useful indicator of specific community-level impacts.

### Administration

The frequency of administration determines how effective the data is at showcasing changes in well-being. There is no standard time between surveys (Mbaru et al. 2021 collected data over months whereas Gurney et al. 2014 collected data over decades), but data should be collected at least once a year (Michaelson & Mahony 2012). Surveying at least annually allows for meaningful time series to be created (Michaelson & Mahony 2012). The survey should also be administered at the same time each year to reduce variation (Michaelson & Mahony 2012). This is particularly important in island nations that are susceptible to major weather events that impact well-being. Panel data, or surveying the same individuals over time, should be collected to decrease extra variances and because it can be more accurately compared over time and across groups (Jones 2019; Mbaru et al. 2021). The order of questions should remain consistent each year to reduce variability (Michaelson & Mahony 2012).

### **Option A:**

Number of questions: 20 (11 well-being + the 9-Question SERS Model)

Number of times deployed: 1(baseline) + each year the Waitt Institute works in-country.

Administration method: Administered after the OUS for the baseline but in an independent questionnaire which is repeated annually by the same respondents.

Benefits: This approach captures the most holistic picture of a community’s well-being and level of resilience. Including all nine resilience-capacity questions increases the clarity of the data and provides greater insight into the different facets of resilience that a community may have. This is particularly helpful for comparing resilience across communities and will more accurately reflect variations of resilience capacities, such as a relatively higher absorptive or social capacity. The more descriptive the resilience score, the more helpful it may be in guiding further research into how to encourage adaptive capacities or capacity-building activities or to speculate negative impacts.

Deploying the survey multiple times allows for changes in well-being and resilience to



be viewed over time. The level of change in either can be compared to the baseline assessment and/or across communities. Observed changes in well-being can be used to support theories for observed impacts on a community.

Tradeoffs: This is the longest version of the survey which is the most likely to induce survey fatigue. Furthermore, annual surveys may miss seasonally-related changes in well-being associated with hurricanes or typhoons, El Niño/La Niña years, droughts, or other weather-related events. Additional time and resources will be needed to ensure that the panel respondents have access to the survey each year.

### **Option B:**

Number of questions: 14 (11 well-being + the 3-Question AAT-variant SERS Model)

Number of times deployed: 1 (baseline) + each year the Waitt Institute works in-country.

Administration method: Administered after with the OUS for the baseline but in an independent questionnaire which is repeated annually by the same respondents.

Benefits: This survey is shorter and may ward off respondent fatigue. Statistically similar resilience results can be obtained from fewer questions which saves time and financial resources while administering the survey. The results of this survey can be compared between communities and to the baseline to reveal how they differ from each other and how they have changed over time. Albeit in less detail, this survey still captures data that may be used to inspire strategies for capacity building to improve resilience.

Tradeoffs: This survey cannot capture the variability of community resilience which may be important to comparing communities. Annual surveys may miss seasonally-related changes in well-being associated with hurricanes or typhoons, El Niño/La Niña years, droughts, and other weather events. Additional time and resources will be needed to ensure that the panel respondents have access to the survey each year.

### **Option C:**

Number of questions: 20 (11 well-being + 9-Question SERS Model)

Number of times deployed: 1 (baseline assessment)

Administration method: After the OUS is completed and in the same platform.

Benefits: This approach utilizes the pre-existing survey platform of the OUS and only requires one round of data collection making it the most cost and time-effective method. Adequate resilience and well-being scores can be collected for each community and can be used to highlight areas of strengths or weaknesses in community well-being and resilience, which also can be compared between communities.

Tradeoffs: Without repetition, changes in community well-being and resilience cannot be observed. These are crucial to understanding the impacts of changes in ocean use. The

chance of survey fatigue is highest for this option due to its length and because it will follow the OUS questions without a visual break.

### Benefits and tradeoffs of pairing with the Ocean Use Survey

The main advantage of administering this survey to the same population as the OUS is its increased efficiency. Piggybacking on the OUS decreases the effort to determine new sample populations, hire and train new enumerators, and find space and time for respondents to take the survey. For all three options, the baseline survey can be taken in the same sitting as the OUS, proctored by the same enumerator, and on the same electronic device.

Survey fatigue is a concern for all three options because they will be given after the OUS and given repeatedly (Option A & Option B). Cognitive bias can be expected during the baseline assessment because respondents will be taking the survey after the OUS which will prime them to think about the value of their ocean spaces. This will inevitably introduce variance between the baseline and follow-up responses because the respondents will not be primed the same.

### Recommendation for the Waitt Institute

It is recommended that the Waitt Institute utilizes Option B to efficiently gain the most holistic and comparable insight into the well-being of coastal island communities. The survey should be administered each year that the WI is working in-country so that capacity-building responses can be implemented if negative impacts are discovered.

### Monitoring and evaluation

Conservationists have a responsibility to the communities that they work in to ensure that their work does not harm people, and is carried out responsibly and transparently (Roe et al. 2010; Woodhouse et al. 2015). Furthermore, monitoring the results of a marine spatial plan is the only way to evaluate whether or not it is achieving its goals, both biologically and socially. Mbaru et al. (2021) and Gurney et al. (2014) demonstrate that meaningful results can be interpreted from re-evaluating well-being in short intervals (zero, eight, and 16 months) or over 15 years.

## **Discussion**

### Limitations

Priming and the variation between primed versus non-primed respondents is one limitation of this tool. As discussed previously, by taking this survey after the OUS, respondents will be primed to think about the value of their oceans and how marine spatial planning may impact them. This headspace can introduce cognitive bias. Furthermore, subsequent surveys will not be primed with the OUS which introduces a level of variability to the results. Jones (2019) recommends eliminating the word resilience from the SERS model as a way to reduce priming which can be applied to the

well-being survey by also excluding the term well-being.

A second limitation is the issue of attribution (Mayoux & Chambers 2005). There are many reasons for changes in well-being. External factors such as extreme weather events, social disruptions, governmental policies, and internal changes, such as the loss of a loved one or the birth of a baby may influence household well-being. By surveying only ocean users, the strong connection between well-being, resilience, and the marine environment is assumed, but assigning causality to changes in well-being must be grounded in further research and with the community's help.

Limitations associated with panel data include attrition or loss of panel members over time, and panel selection bias, when the sample doesn't accurately reflect the community (Mbaru et al. 2021).

The use of externally determined indicators aids in transferability between communities and cultures, but is limited by the fact that not all indicators will be locally meaningful (Woodhouse et al. 2015).

Finally, this tool does not elucidate the mechanism for changes in well-being or resilience, and it cannot be used to predict impacts.

#### Implications for further use or research

A point of interest is the possibility of extending this tool to create or support models that are predictive of the impacts of MSP on a community. This would be greatly beneficial to minimizing negative impacts and enhancing positive outcomes before MSP is implemented.

The results of these surveys could be displayed visually on a map. If geopolitical boundaries are available that correlate to the localities indicated on the survey, a visual representation of the community-level well-being and resilience scores can be created. Visual representations can effectively communicate the differences in well-being and resilience between communities. This can also be exceptionally helpful when including stakeholders in the process of choosing where MSP locations.

## **Conclusion**

The social well-being approach is a holistic and people-centered method for marine spatial planners to understand communities. Deploying this approach through a subjective survey generates robust quantitative data that can be used to describe, compare, and track changes in communities over time. By sampling ocean users, conservationists can use these data to inform best practices for implementing effective, mutually beneficial MSPs and to guide research to further the understanding of community-level impacts. There is a cooperative link between islanders and the ocean which necessitates their inclusion in the creation of successful MSPs.

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**Appendix A.** Resilience capacities and example statements from Jones’ (2019) “A how-to guide for subjective evaluations of resilience.”

**Table 1: List of nine resilience-related capacity questions used in the SERS model of overall resilience**

RESILIENCE-RELATED CAPACITY	QUESTION
<i>Preamble: 'I am going to read out a series of statements. Please tell me the extent to which you agree or disagree with them.' [Read out each statement and ask] 'Would you say that you strongly agree, agree, disagree, strongly disagree or neither agree nor disagree that:'</i>	
Absorptive capacity	Your household can bounce back from any challenge that life throws at it
Transformative capacity	During times of hardship, your household can change its primary income or source of livelihood if needed
Adaptive capacity	If threats to your household became more frequent and intense, you would still find a way to get by
Financial capital	During times of hardship, your household can access the financial support you need
Social capital	Your household can rely on the support of family and friends when you need help
Political capital	Your household can rely on the support of politicians and government when you need help
Learning	Your household has learned important lessons from past hardships that will help you better prepare for future threats
Anticipatory capacity	Your household is fully prepared for any future natural disasters that may occur in your area
Early warning	Your household receives useful information warning you about future risks in advance

The AAT-Variant capacities are outlined in red.

**Appendix B.** Selected well-being indicators and their justification.

<b>Indicator</b>	<b>Justification</b>
Income (OECD 2020)	Adequate income allows for the acquisition of goods and services necessary for well-being.
Housing quality (OECD 2020)	Housing provides shelter, safety, privacy, and personal space. The area where people live also determines their access to many different services.
Health status (OECD 2020)	Good health is essential to physical well-being and determines whether or not individuals can participate in other activities that support well-being.
Quality of natural environment (Gurney et al. 2014).	The quality of the environment can indicate its ability to provide natural resources and is tied to physical health.
Quality of family relationships (OECD 2020)	Family relationships are essential for emotional support, sharing responsibilities around the home, and caring for each other.
Social Support (OECD 2020)	Social support describes whether or not people feel that they can rely on friends or family during difficult times and can reflect community cohesion.
Time spent in social interactions each week (OECD 2020)	Time spent with others as the focal point of the activity, not when it accompanies another primary activity, can represent how people allocate their daily activities. Spending time connecting with others is important for social relationships.
Trust in others (OECD 2020)	Trust also can indicate social cohesion and is correlated with a willingness to help others.
Life satisfaction (OECD 2020)	Life satisfaction presents an overall understanding of how an individual feels about their life.
Satisfaction with livelihood (Mbaru et al. 2021)	Job satisfaction (regardless of income) represents individuals' feelings towards their industry whether it brings them enjoyment or not. This can help distinguish why people are in different careers (i.e., they want to be or need to be).
Ability to achieve goals (MA 2003)	This reflects both the perceived ability of an individual to set and achieve goals which reflects feelings about self-esteem and if their society can empower them.

Dimension of Well-being: **Material**, **Relational**, **Subjective**

## Appendix C. Example survey

Please consider how you are currently feeling, and respond to these statements based on how strongly you agree or disagree with them.

**1. I have enough income to provide for my household.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**2. My house is a comfortable, safe place to live.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**3. In general, members of my household are in good health and have access to quality food and water regularly.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**4. The areas of the ocean that I rely on are healthy.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**5. I can rely on my family to help around the house and emotionally support me.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**6. I have friends or extended family that I can rely on for help or support.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**7. I spend enough time connecting with friends and family outside of work.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**8. I trust others in my community.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**9. Overall, I am satisfied with the state of my life.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree



**10. Aside from income, I am content with other aspects of my livelihood, like enjoyment or identity.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**11. I am able to achieve my personal goals.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**12. My household can bounce back from any threat life throws at it.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**13. If threats to my household became more frequent and intense, I would still find a way to get by.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**14. During times of hardship, my household can change its primary income or source of livelihood if needed.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**15. My household is fully prepared for any future natural disasters that may occur in the area.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**16. During times of hardship, my household can access the financial support we need.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**17. My household can rely on the support of family and friends when we need help.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**18. My household can rely on the support of politicians and the government when we need help.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**19. My household learned important lessons from past hardships that will help better prepare us for future threats.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**20. My household receives useful information warning us about future risks in advance.**

Strongly disagree [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] Strongly Agree

**21. Is there anything else you would like us to know about your current mental, physical, or emotional state?**

**22. Did any notable events occur in the last year? Like those surrounding friends, family, the weather, or your community? If yes, please explain below.**

(Questions 12–20 are adopted from the 9-Question SERS Model)