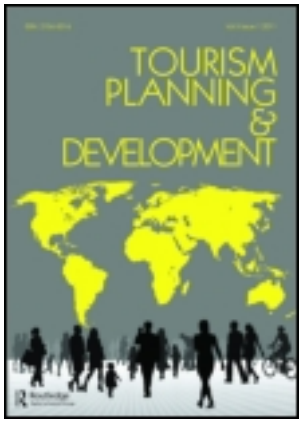

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Steven Andrew Martin[a] & Ilian Assenov[b]
[a] Faculty of International Studies, Prince of Songkla University, Phuket, Thailand
[b] Faculty of Hospitality and Tourism, Prince of Songkla University, Phuket, Thailand
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Investigating the Importance of Surf Resource Sustainability Indicators: Stakeholder Perspectives for Surf Tourism Planning and Development

STEVEN ANDREW MARTIN* AND ILIAN ASSENOV**
*Faculty of International Studies, Prince of Songkla University, Phuket, Thailand and **Faculty of Hospitality and Tourism, Prince of Songkla University, Phuket, Thailand

ABSTRACT *The sustainability and conservation of coastal surfing resources have gained considerable attention in the twenty-first century. Scholars, graduate students, not-for-profit organizations, and commercial and governmental sectors have entered the surf tourism research field in order to better understand and manage surf sites. This research investigates the significance of 27 social, economic, environmental, and governance indicators outlined in the* Surf Resource Sustainability Index*, a contemporary methodology for measuring the conservation aptitude of surf sites. Twenty-one highly experienced surfers from diverse backgrounds were chosen for in-depth interviews based on their position as key stakeholders and for their practical experience, knowledge, and interaction with the resource. The study finds that surfers placed the highest importance for conservation aptitude on beach quality, water quality, legislative status, biodiversity, and history. Overall, environmental and governance indicators were slightly more significant than social indicators, and economic indicators were the least significant. Stakeholders' comments and corresponding ratings are listed for each indicator and provide insight to their perspectives and evaluations. The research contributes to surf tourism planning and development though the clarification of sustainability indicators and the discernment of indicator importance by surfers. A surf resource conservation action matrix is developed for future policy design and management.*

Introduction

Surf sites increasingly face concerns over the protection and sustainable management of limited resources and habitat, particularly the socioeconomic and environmental impacts and increased interests by surfers, tourists, and other stakeholders of the coastal zone (Buckley, 2002a, 2002b; Butt, 2010; Farmer & Short, 2007; FFLA, 2010; Lazarow, Miller, & Blackwell, 2007, 2008; Martin, 2013a, 2013b; Martin & Assenov, 2011, 2012a, 2013a, 2013b, 2013c; Mead, 2009; Nelsen, Pendleton, & Vaughn, 2007; Ponting 2009a; Ponting & O'Brien, 2013; Ponting, McDonald, & Wearing, 2005; Ryan, 2007;

Correspondence Address: Steven Andrew Martin, Faculty of International Studies, Prince of Songkla University, Phuket, Thailand. Email: surftourism@gmail.com

Scarfe, Healy, Rennie, & Mead, 2009a, 2009b; Short & Farmer, 2012; Shuman & Hodgeson, 2009; Tourism New South Wales, 2009; Wearing & Ponting, 2009).

In order to create a concise and global model for the improved assessment and sustainable management of coastal surfing resources and surf tourism, a system of 27 social, economic, environmental, and governance indicators was developed by Martin and Assenov (2012b, 2013a). When placed into four indices, these indicators comprise the *Surf Resource Sustainability Index* (SRSI). Built upon Martin and Assenov's (2013a) existing SRSI methodology and a scoping study by Martin and Assenov (2013b), this research investigates the importance of surf resource sustainability indicators among surfer-stakeholders. Surfers from diverse backgrounds were chosen for this study given their inherent personal experience as key stakeholders in the resource. Based on SRSI indicators, their perspectives are sought on various attributes of site conservation. Qualitative and quantitative data are generated and discussed in the contexts of planning, development and future research.

Rationale

The rationale for the study is placed in three contexts: (1) to generate quantitative data on indicator importance for immediate analysis and use in future SRSI design and research; (2) to facilitate in-depth discussion on existing SRSI indicators and generate qualitative data in order to better understand the holistic nature of indicator importance and improve the index; and (3) to make a contribution to knowledge useful in the socioeconomic and environmental planning, development, and management of coastal surfing resources.

Literature

Coastal Surfing Resources

Surf sites around the world are under ever-increasing pressures from tourism, coastal development, pollution, and other anthropogenic factors, and strategies to protect these resources first came forward from the diverse surfing communities in Australia, New Zealand, and the USA. Of particular interest is the development of *Surfing Capital*, an approach to recognizing a range of ecological features of surfing areas as both intrinsic and valued assets (Lazarow, 2010; Lazarow et al., 2007, 2008). In making an apparent connection between the ecological health of marine systems and surfing, Shuman and Hodgeson (2009) note that coral reef areas are among the best locations in the world for surfing and stress the significance of increasing knowledge and awareness of the health of coral reefs on a global scale in an effort to actively assist in the conservation of these ecosystems. Strategies to manage and protect coastal surfing resources include the promulgation of *Surfing Reserves* based on the practical and political recognition and conservation of surf sites. Surfing reserves identify surfers as integral stakeholders and custodians of sites and current policies range from symbolic recognition to comprehensive legislation and protection (ASBPA, 2011; Butt, 2010; Farmer & Short, 2007; FFLA, 2010, Short & Farmer, 2012; Tourism New South Wales, 2009).

In an investigation of surf resource sustainability and tourism, Martin and Assenov (2012a, 2013a) identify a growing number of practical and theoretical issues in the developed and developing world. For example, there are the negative effects that surf tourism activities are having in developing nations, where carrying capacities are quickly reached and the lack of appropriate management at sites are key problems alongside the social, economic, and cultural impacts on rural host communities. Positive aspects include economic development and opportunities for traditional resource custodians (Buckley, 2002a,

2002b, 2007; O'Brien & Ponting, 2013; Ponting, 2009a, 2009b; Ponting et al., 2005; Wearing & Ponting, 2009). In developed countries, such as Australia, the UK, and the USA, urban surf sites witness high-use and high-impact visitation from local surfers seeking recreational space. Here, threats and impacts of urbanization, including coastal development and pollution, have negative implications for surfing resources, while small business and communities benefit from economic opportunity and infrastructure (Lazarow et al., 2007, 2008; Marchant & Mottiar, 2011; Nelsen et al., 2007; Shaw & Williams, 2004; Shipway, 2007; Phillips & House, 2009).

Surfers as Resource Stakeholders

Surfers are a special subset of recreational beach users with strong cultural passion and sense of ownership of their surf spot as a "natural cultural resource" (ASBPA, 2011). As a key stakeholder group, Scarfe et al. (2009a) suggest that as the social, economic, and environmental benefits of surfing breaks are realized, surfers are increasingly integral in coastal resource management. Counter to the common stereotype, experienced surfers often have at least a college degree and are in the upper middle-class income bracket (Nelsen et al., 2007). ASBPA (2011) identify that surfing is an important recreational and cultural use of the coastal zone and that surfers are a viable coastal stakeholder group. They note that the role of surfers is essential when considering the identification, preservation, or mitigation of surfing resources into coastal planning and project development. Thus, by engaging surfers, inputs or concerns can be addressed early in the design process. Butt (2010) suggests that surfers can pinpoint areas of special interest that developers should avoid and they have a role to play in promoting the following basic principles: conserving and enhancing natural and cultural heritage; sustainable use of natural resources; understanding and enjoyment of the environment through recreation; and sustainable social and economic development of local communities.

Grassroots Surf Organizations

ASBPA (2011) identifies surfers as key stakeholders which are becoming increasingly organized to protect existing surf spots and support coastal management that takes into consideration surfing issues. At the not-for-profit level, notable organizations include Save the Waves, Surfers Against Sewage, Surfrider Foundation, and Surfers Environmental Alliance. Surfers may also form local and regional boardriders and lifesaving clubs, and these organizations are usually centered on surf sites and form stakeholder groups. Augustin (1998) notes that when united, these clubs can comprise national federations and play an essential role in the local promotion of surfing through synergies inspired among surfing sponsors, the media, and the local communities. Surf lifesaving clubs may form independently or under the auspice of local or regional governments, and can become grassroots stakeholder groups directly related to site integrity in terms of community, education, and safety (AECOM, 2010).

The Surfing Community

Butt (2010) writes extensively on the role of the surfing community as an important stakeholder group directly affected by the integrity of surf site sustainability. He notes that if a surf site is destroyed, polluted, or degraded for some reason, the surfers in the town will not only suffer because they will not be able to surf it, but they might also suffer because their jobs depend on that wave bringing money-spending tourists into town, including surf shops, surfboard manufacturers, or surfing schools. Case in point, the AEC Group (2009)

identifies that surf businesses on the Gold Coast, Australia, create local employment for a number of high-skill occupations tangentially connected to the resource, including graphic designers, filmmakers, journalists, web designers, legal and finance professionals as well as the more obviously related areas of surfboard shaping, clothing and hardware design, surf schools, educators, and surf media. Individual surfers also bring money to local businesses and the wider coastal economy with they go surfing, including fuel and food.

Surf Tourism Stakeholders

In terms of surf tourism, Buckley (2002a) offers four interrelated and intersecting groups of stakeholders which influence the role of surf tourism in sustainable development. They include individual surfers, the commercial and competitive tour operators, local residents and government officials. He notes that the ethics is among surfers form a complex fabric of stakeholder responsibility along with the desires and codes among tour operators, the traditional and modern perspectives of host communities, and the requirements of governments. To address these concerns, SDSU (San Diego State University)'s Center for Surf Research (2013) aims to foster stakeholder engagement in the social, economic, and environmental sustainability and development of destination communities. Thus, they recommend stakeholder leadership in the struggle for sustainability, such as creating and disseminating specialist knowledge to governments, the surf industry, tourism developers, destination communities, not-for-profits, and tourists.

Beach and Tourism Sustainability Indicators

Sustainability has emerged as a critical planning and development issue across the world—and organizations are increasingly required to explain their performance on a range of natural resource management challenges with reference to quantitative metrics (Emerson et al., 2010). Thus, sustainable tourism indicators can be used to monitor the desirability of future tourism planning and developments and benchmark against which different sites or destinations can be evaluated (Basu, 2003). However, tourism sustainability is a complex concept due to its latent, multi-dimensional, and relative nature (Pulido-Fernandez & Sanchez-Rivero, 2009) and therefore quantifying it and measuring it with indicators is intrinsically difficult. As a result, although many attempts have been made to develop sustainability indicators, there is no single set of indicators that can be universally applied to allow cross-sectional comparisons of tourism destinations. Nonetheless, Ariza et al. (2010) designed an integral quality index for urban and urbanized beaches comprising 13 sub-indices which assist with the environmental management and monitoring of beaches and in the planning process. Their research identified that the index, as a "hierarchical management scorecard" made planning more proactive, especially by synthesizing the state of the most important beach processes.

Pijoan (2008) is perhaps the first to conceptualize a set of indicators specifically for the assessment surf sites in physical and social contexts. Her research offers an *Integrated Aptitude Index* for surf beaches in Ensenada, Mexico, which is based on the sum of indicators rated in terms of quality, particularly beach and water quality; seasonality, types, and quality of waves (break singularity); local and international users (contribution); and infrastructure (access, facilities, and parking).

The Surf Resource Sustainability Index

Due in part to the globally expanding surf tourism industry, surf breaks have been illuminated as valuable and vulnerable natural resources by surfers and other stakeholders. To

address these concerns and the protection and management of coastal surfing resources, the SRSI was developed. The SRSI provides a framework of sustainability indicators used in the assessment of a surf site's aptitude for conservation management based on the premise that the sustainability and conservation of resources can be fostered through a metric-orientated planning and development methodology (Martin & Assenov, 2012b, 2013a, 2013c). As a modular approach to surf site field assessment, SRSI provides a set of building blocks which include qualitative and quantitative metrics. Twenty-seven indicators are based on conservation aptitude and these indicators are integrated into four indices (social, economic, environmental, and governance). Martin (2013b) defines conservation aptitude as a theoretical compass which points toward sustainability. It represents the summation of assessable qualities or attributes a site possesses which can make a positive contribution to sustainability. Conservation aptitude is employed as a relative and qualitative assessment measure of the extent to which a site has in place those attributes considered favorable to its sustainable management (as a site and as a natural resource) over both the short and long term. An abridged version of the original SRSI indicator descriptions is provided in Table 1. Indicator assessment criteria are not provided but are available from Martin and Assenov (2013a).

Multi-dimensional Framework

The multi-dimensional SRSI framework offers the benefit of description and referencing of conceptual and analytical values and appears in two layers, qualitative/quantitative for indicators and purely quantitative for the indices. Thus, the micro-level forms the qualitative layer which is based on field observations and descriptions, and subsequently a numerical value is attached whereby high ratings represent high aptitude for conservation. The generation of qualitative data gathered from field work serves to increase reliability and validity and is foundational to the SRSI modular design. For example, third parties can cross-check findings and retesting at sites can be compared with earlier descriptions. An example of the SRSI modular design is provided for three of the governance indicators (25, 26, and 27) in Table 2.

Previous Applications

Case studies were carried out in Phuket, Thailand (Martin, 2013a, 2013b; Martin & Assenov, 2012b, 2013a, 2013c). The trials found that considerable time and experience is required to attach quantitative values to qualitative attributes, yet the process served to catalogue and measure sustainability factors with two significant implications. The first was in the standardized framework to study surf tourism sites within different contexts (e.g. social, economic, environmental, and governance); the second was focusing the attention on the diverse interests fundamental in the argument for surf site conservation (e.g. stakeholder values and perceptions), particularly at the indicator level. The outcome of the studies placed the applicability of the index into five contexts: (1) comparing the quality of different surf beaches in the same area or region (through cross-sectional analysis); (2) identifying changes over time at a given surf beach (trend analysis); (3) conducting beach and water safety assessments; (4) providing the framework for a consultative process whereby different stakeholder groups can offer their own weights to the clusters of factors; and (5) prioritizing surf sites in the legislative aspect, particularly as regional or national surfing reserves (Martin & Assenov, 2013a). The current study is particularly focused on the fourth context, the investigation of stakeholder importance and the weights they place on each indicator.

Table 1. SRSI indicator descriptions

Social indicators

1. **Clubs – Boardriders:** Boardriders clubs can provide a level of organized communication and collaboration among surfers. In some cases, they are not-for-profit organizations which may provide custodianship of the site
2. **Clubs – Lifesavers:** Lifesaving clubs promote public water safety and site awareness, particularly for local youth. Clubs may be a sign of the benefit of surfers as surf lifesavers and indicate custodianship of the site
3. **History:** History provides context to the surf site background and culture and serves as a key factor in the argument for site recognition and protection, particularly when aiming for surfing reserve status
4. **Public safety:** A safe and secure atmosphere contributes to site integrity and attracts or detracts community use and participation accordingly
5. **Social experience:** As surf sites provide benefits in terms of health, well-being, destination awareness, and community spirit, these difficult-to-measure attributes are increasingly relevant (i.e. the human experience)
6. **Socio-psychological carrying capacity:** Use and satisfaction are strongly influenced by the number of surfers as well as the local ethics of surfers at the site. A high social carrying capacity may increase the argument for surf site conservation
7. **Surf community:** A strong surfing community can provide a social base and structure for surf site custodianship
8. **Surf events:** Surf events generate awareness of the surf site and the significance of surfing. Events may help to identify surfers and the surfing community as stakeholders of the resource and to facilitate communication.

Economic indicators

9. **Surf amenity and infrastructure:** Surf site amenities may provide convenience and safety and create awareness of the site, allowing communities improved interaction with the site; this may be particularly relevant to families with children
10. **Surf events:** Surf events create a focal point for economic impact assessment and stakeholder presence. The results of surf event economic impact studies are progressively of interest to stakeholders
11. **Surf industry and commercial activity:** Surf sites are increasing exploited in terms of surf-related enterprise, including surf-entrepreneurs and corporate interests. The surf industries and other commercial activities at the area form an economic hub which may provide an impetus for the protection of the site
12. **Surf-related nonmarket values:** Nonmarket values are not easily measurable in monetary terms (e.g. the value of surfers' beach visits, those who come to view the waves, or loss of recreational opportunities due to anthropogenic or natural environmental disasters, etc.), yet they are significant in terms of the broad economic implications of surf sites. Non-market values are increasingly relevant in the argument for conservation and protection
13. **Surf tourism:** Given the limited literature on the economic benefits and impacts surrounding domestic and international surf tourism in rural and urban environments, research in this area is foundational and significant for understanding the sustainable use of surf sites. Surf tourism is a key issue in surf site development and conservation planning

Environmental indicators

14. **Biodiversity:** The overall existence and health of flora and fauna are relative to the pressures from external forces and the estimated site resilience. While measuring biodiversity is scientific in nature, careful observation can prove to be an indication of the broad issues
15. **Coastal engineering:** Coastal engineering projects are a significant factor affecting the resource base with high potential to change the natural dynamics of the surfing area. While in some cases surf sites have been created as a result of various projects, there are a surf sites which have been permanently altered or entirely destroyed. Pristine sites (altogether free from engineering projects) receive a high score
16. **Eco-physical carrying capacity:** Impacts on local flora and fauna, such as foot traffic over sand dunes, encroachment on bird nesting areas, surfers stepping on coral reefs, damage from boat anchorage, etc., are indicators of the site's aptitude to sustain human interaction and conservation
17. **Hazards–Marine life:** Marine life hazards are highly relevant to the human interaction with the resource and are inherent to conservation planning. While marine hazards may pose threats to site users, they are also a component to biodiversity
18. **Hazards–Physical:** Physical hazards at surf sites, such as dangerous rip currents or submerged rocks, are a public safety issue which, if identified, can be managed. Implications for addressing hazards may include intervention, such as signage or constructing fences above unstable cliff areas to protect visitors

(*Continued*)

Table 1. Continued

19. **Quality–Beach:** The quality and integrity of the site are key indicators for the value, concern and custodianship at time of assessment. In terms of natural quality and conservation, visible human impacts and development are significant factors to be weighed along with other aspects of degradation, such as coastal erosion
20. **Quality–Water:** Water quality is a highly significant factor in the integrity and sustainability of surf sites. Issues may stem from surrounding watersheds, urban runoff and sewage, construction sites, agriculture, aquaculture, golf courses, industrial discharge, and the general levels of nutrients or bacteria including *Escherichia coli*
21. **Surf type and quality:** Wave types and overall wave quality include a number of aspects and considerations, including the diverse skill levels of surfers and interests of stakeholders. Therefore, the importance of this indicator may be influenced by subjective opinion. For example, easy-to-ride point breaks, fun beach breaks or dangerous barreling waves are of "quality" to distinct groups

Governance indicators

22. **Beach & water safety:** Beach and water safety are highly relevant to the sustainable use of the area. Beaches with lifeguard presence may have a higher degree of safety management, particularly in developed countries
23. **Education & interpretation:** The successful petition for conservation of natural sites is enhanced through the development and availability of information to stakeholders, including the public. The participation of the general public and various stakeholders in the education process is an indication of the conservation aptitude of the site. Edification may indicate the host community's psyche and sense of place
24. **Legislative status:** The implications of legislative status are wide ranging and may be anchored to the indicator for "management". Determining the conservation status is a key starting point and strong impetus for site conservation. Examples of legislation status for surf sites include national park, marine protected area, national surfing reserve, and world surfing reserve
25. **Management:** The implications of management include aspects of multi- and mixed-use areas alongside beach and ocean safety. Research literature indicates that conservation management is tied to planning, enforcement, and stakeholder engagement
26. **Not-for-profit organizations:** Not-for-profit organizations may help to identify, monitor, report, and support issues related to the integrity of the site and its usage. These organizations are an indicator of conservation aptitude as they signify stakeholder engagement (e.g. Surfrider Foundation). However, successes and failures must be determined jointly and in context
27. **Public access:** As conservation normally considers the interaction of stakeholders with the resource as a component to sustainability, the presence of entities or infrastructure inhibiting access (public, private, or governmental) is an indication of reduced conservation aptitude. In unique cases, limited or restrict access may perform a conservation role by limiting over-use of the site

Source: Adapted from Martin and Assenov (2013a).

Methods

The research method centers on the 27 SRSI indicators and aims to gage their level of importance based on interviews with surfer-stakeholders. The measurement scale is based on a 1–5 number *Likert Scale* such that high values reflect a high importance for conservation planning and development. Interviewees were asked to choose one of five potential values (i.e. 1 = very low; 2 = low; 3 = moderate; 4 = high; and 5 = very high). Thus, the mean indicator values fall into the following five categories: very low (1.00–1.80); low (1.81–2.60); moderate (2.61–3.40); high (3.41–4.20); and very high (4.21–5.00). Respondents were also asked to provide qualitative comments where appropriate.

Data Collection and Interviewee Profile

Twenty-one personal interviews were conducted from September to November 2012 during the 2012 annual Phuket Surfing Contest at Patong Beach, Thailand, or via *Skype*. Respondents were chosen based on their position as key stakeholders and for

Table 2. Example of the SRSI modular design

Indicator	Assessment criteria	Qualitative site assessment	Quantitative site assessment
(25) Management	Identify the existence of guidelines or standards for activities at the site and assess, as best as possible, the effectiveness of enforcement (i.e. gage the active policy measures in context and practice)	Descriptive field assessment	1–5 Likert Scale
(26) Not-for-profit organizations	Determine the number or type of not-for-profit or related activity affecting authority and activity at the site (if any). Identify past and present successes and failures. Consider project support and potentialities	Descriptive field assessment	1–5 Likert Scale
(27) Public access	Identify the level of accessibility alongside laws or other issues surrounding public right of entry, such as laws, hotels or infrastructure which inhibit or prohibit entry to sites. Consider if access restrictions at rural sites or islands are in an agreement with traditional resource owners and provide any conservation function	Descriptive field assessment	1–5 Likert Scale

Source: Adapted from Martin and Assenov (2013a).

their practical experience and knowledge of the resource. They were of diverse backgrounds and experience and included key surf tourism scholars, surf industry professionals, veteran lifeguards, and professional and international surfers and surf tourists from Africa, Asia, Australia, Europe, and California and Hawaii, USA. Their combined years of surfing experience were 655 (an average of 31 years each) and they had surfed an average of eight countries each. The interview time was between 90 and 120 minutes for each respondent.

While the study was aimed at measuring indicator importance it also sought to generate new knowledge and understanding of individual indicators and their implications. Informants were given a survey sheet to review during the interview and the researchers made all markings and notes on an original survey sheet for each participant. For interviews conducted via *Skype*, documents (survey sheet and a copy of the SRSI) were emailed prior to the appointment. Individual indicators were discussed with each informant to ensure the clarity and context of their decision (i.e. the importance of the indicator in terms of conservation aptitude). Subsequently, interviewees were asked to provide the level of importance for the conservation aptitude of each indicator. The interviewer managed the context of discussion for each indicator relative to the corresponding index to which it belongs (e.g. surfing events in terms of their economic importance or surfing events in terms of their social importance). Discussion was required in all cases to ensure that informants gave objective answers (rather than merely offering their subjective opinion on the indicator). Detailed notes were taken during the discussion of each indicator and comments and suggestions were encouraged throughout interviews. Additionally, once respondents had arrived at their 1–5 rating decision for each indicator, they were formally asked if they would like to make an on-the-record comment for that particular indicator to appear in the research. Each respondent commented on approximately five indicators and these comments are featured in the next section.

Limitation, Bias, and Reliability

Issues of bias include the subjective nature of interpreting and measuring indicator importance for both researchers and respondents. In order to reduce bias and increase validity, interviews were structured to adhere to the indicator criteria and the context of conservation aptitude. Although this was done to reduce the subjectivity of respondents, issues of consistency remain and are difficult to clarify as reliability testing was not possible in most cases. While perceptive field surveys based primarily on any stakeholder group carry a potential for bias, surfers are a pivotal group because of their familiarity with surf resources and the background of indicators. Thus, even if respondents are biased in some aspect, it does not mean their observations are invalidated by that bias. To address these issues, the research design was cognoscible of characteristics associated with stakeholder perspectives that might offend or unfairly affect the rating or distort a given score. The research encompassed a wide range of individuals from diverse backgrounds which reached beyond the reference to their acknowledgement of having experience with surfing. Consequently, surfers need not be stereotyped as a single stakeholder group as they come from all walks of life, backgrounds, skill levels, and associations with the resource.

Quantitative Results

Although all four indices received a "high" importance ratings, the average importance of environmental (4.04) and governance (3.90) indicators as slightly higher than that of social (3.81) and economic (3.45) ones. Three of the top four indicators (of "very high" importance) were environmental: water quality (4.71), beach quality (4.48), and biodiversity (4.29); followed by the social indicator for history (4.29). Overall, 19 of the 27 indicators were rated as highly important and the top five are coastal engineering (4.19); education and interpretation (4.05); surf community (4.14); socio-psychological carrying capacity (4.0); and surf tourism (4.0). Although no indicators received low or very low mean values, four indicators were only of moderate significance: marine life hazards and physical hazards (both at 3.38), and surf amenity and infrastructure and surf-related nonmarket value (both at 3.05). The importance rating of each indicator has been calculated and provided in Figure 1.

Qualitative Results

Stakeholder comments on the 27 SRSI indicators are placed in their respective social, economic, environmental, and governance contexts. The levels of importance assigned by respondents to particular indicators have been provided in parentheses following each statement. Comments of respondents who assigned lower importance values are listed first, followed by comments reflecting higher values. Respondents were most likely to make statements relative to indicators for which they felt strongest about or had vested interests in. A critical summary of stakeholder viewpoints is provided for each indicator group. The on-the-record comments by respondents are presented in Tables 3–6.

Social Indicators

Interviewee comments on social indicators identify the significance and potential to generate much needed communication and collaboration between stakeholders—among surfers as well as with other stakeholders. In addition, high social aptitude for site protection is viewed as an essential component for policy development. Respondents mostly agree

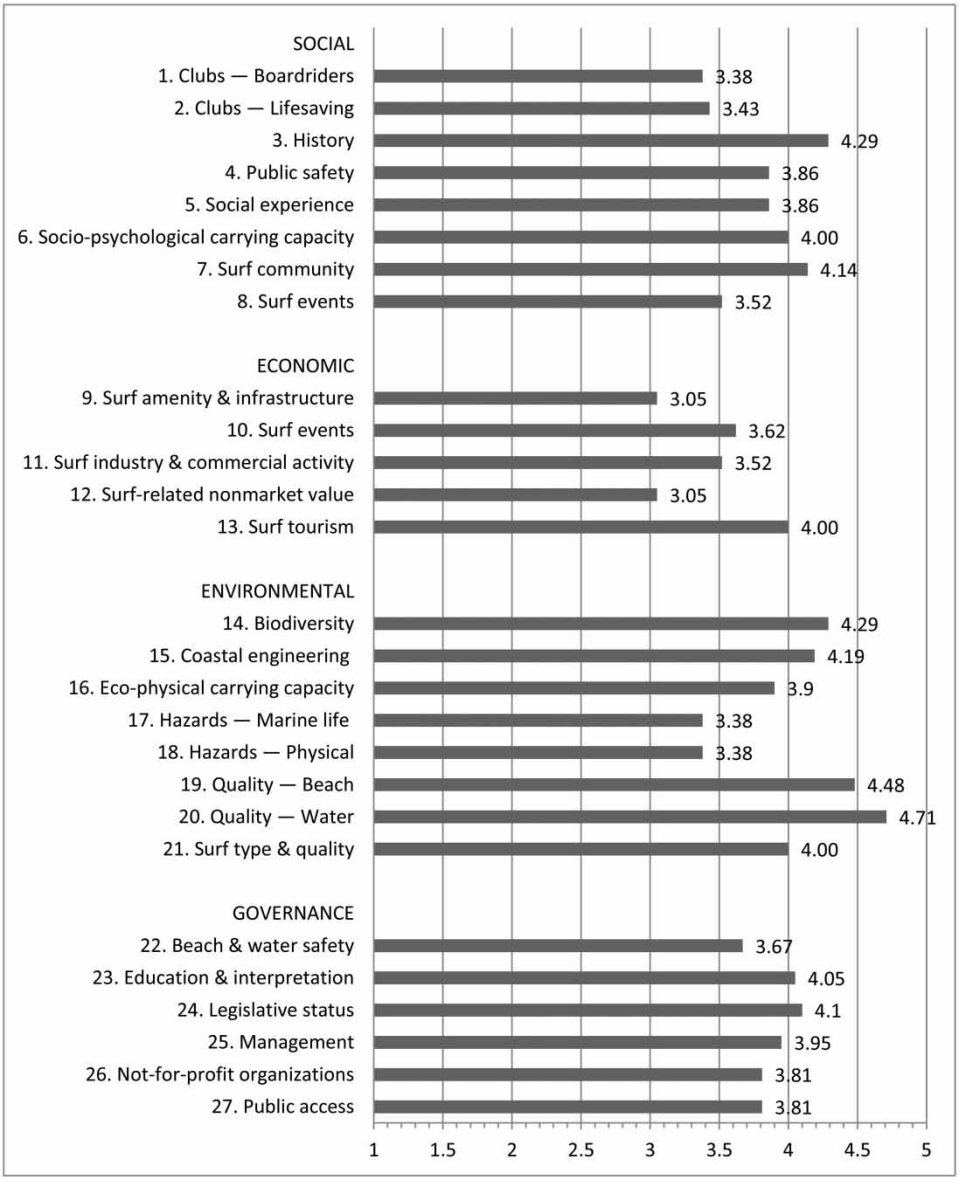

Figure 1. SRSI indicator importance.
Note: Measurement scale: very low (1.00–1.80); low (1.81–2.60); moderate (2.61–3.40); high (3.41–4.20); and very high (4.21–5.00).

that boardriders clubs, which may include social networks and entire families, are significant in encouraging the management and protection of the resource, practically at the specific sites where they are based. Lifesaving clubs were slightly more controversial, yet there is general agreement that they offer much needed education and safety services not provided by other institutions or local government. Surf site history as an attribute of conservation aptitude was the highest-ranking social indicator and is viewed as foundational to the contemporary relevance of site protection in areas where surfing activities have matured, such as in Australia and California and Hawaii, USA. Interviewees expressed

Table 3. Interviewee comments on social indicators[a]

1. **Clubs – Boardriders:** These clubs are so tribal that they can be deleterious (2); Boardriders clubs bring people together (3); Boardriders clubs get things rolling, such as the Kirra [Australia] Boardriders Club—they are also not-for-profit and bring some benefit (3); It's good to have them but not if there are too many (3); Particularly important in the context of a surfing reserve (3); This indicator is likely more relevant in developed areas (4); Boardriders clubs get the word out (5)
2. **Clubs – Lifesavers:** Lifesaving clubs are comprised of volunteers and we do not think so much of them—there are feuds between surfers and lifesavers as some lifesavers come from inland and are not part of the surfing culture (1); The lifesaver volunteers appear very social to me, however, paid lifeguards are more significant (3); Lifesaving clubs are good for kids and community (4); Lifesaving clubs may provide some backing for the conservation argument (4); I am a member and teach water safety, and clubs are mainly good, but there are also many idiots in the clubs (5); Lifesaving clubs are where people gather and educate about the benefits, dangers and beauty of sites (5); Governments are often absent, and lifesaving clubs are the ocean-awareness substitutes—done out of love (5)
3. **History:** If history has some benefit for conservation then it has importance (3); Hawaii may have surf spots with much longer history than other places around the world, but has this helped in surf site conservation? (3); Should history include pre-European, pre-surfing history? For example Burleigh point [Australia] was a popular meeting point for local aboriginal peoples (4); The importance of history may be country-specific, for example, in Australia surf site history is very important, but in other countries perhaps less so (5)
4. **Public safety:** I don't surf some places because of crime (3); The public safety issue may cross a number of social lines (3); Issues are increasing these days with drugs, etc. (4); I don't really go to sites if there are a lot of social problems (4); The site should be preserved either way, but public safety is very important from a management perspective (4); Fights or getting robbed at a site make you not want to go (5)
5. **Social experience:** This may have to do with individual behavior—a jerk may generate negative social attitudes at a site, adding or taking away the "psychic kitty" of the place (3); If it is not a friendly area I won't hang around, but I may still go surfing (3)
6. **Socio-psychological carrying capacity:** A crowded beach is a good beach—it indicates that people are happy (3); Carrying capacity really depends on the day and the spot, especially with regard to wave frequency—also, today SUP [Stand-up Paddling] is a consideration (3); High carrying capacity is good because it means that the site is successful (4); Crowdedness is good—individuals may agree it is crowded yet they benefit in some way (4); Crowdedness is one of the things that drove me to travel and look for new alternative sites (4); In terms of capacity management, we may need to consider the quality of the wave, particularly in terms of the use-value, which may actually be an economic argument (4); The safety issue is relevant in carrying capacity (5); We must consider if low social carrying capacity is related to surf rage and localism (5)
7. **Surf community:** The surfing community are the "default" lifesavers at surf sites (3); It really depends on who and how many people make up the surf community (3); The Gold Coast [Australia] has a strong community movement and the surfers' families get involved too (4); The surfing community encompasses everything—not in terms of numbers, but more in terms of the like-mindedness at the site and the sport (4); The surfing community is very important because they will care about the site (5); I consider the SUP [Stand-up Paddling] versus regular surfers conflicts which have led to heated public debates in Hawaii and showed the involvement of the community in East Hawaii [Big Island of Hawaii], also the community stopped the surf lessons which had become a point of contention at the site (5); The surfing community is very important, for example there was a huge outcry regarding the *Thyspunt* nuclear plant near Jeffery's Bay, South Africa (5)
8. **Surf events:** Corporate sponsors are more focused on their bottom line [advertising] than the site (3); It can mean different things—I don't see it as a negative—it may depend on the type of event, we do small events that teach safety and value so if the event is aimed at educating the community (the teaching approach), then I see this as very important (3); Once you have a successful surf contest at a site, you will want to continue it annually and keep the site integrity (4); Good for the public and good for kids (4); This indicator also has implications for social experience and carrying capacity, for example, the regulars at the Duranbah [Gold Coast, Australia] are fed-up with the number of surf contest held there (4); Surf events bring economy and moral fellowship, and open up a network for surfing—among many aspects—including "relationships" (5); They create an awareness of the site and the activity (5)

[a]The numbers in parentheses following each statement indicate the level of importance assigned by the interviewee to the particular indicator. Lower importance values are listed first.

Table 4. Interviewee comments on economic indicators[a]

9. Surf amenity and infrastructure: The Gold Coast [Australia] has showers, and that's good, especially when you have kids, it's a place to wash the sand off, etc., however, parking can go either way, it can bring crowds and other issues (2); The need for amenity (showers, etc.) may be higher for families (3); Most spots in Hawaii now have amenities, and this may mean more use and more community (5); With the amenity people will come (5); Especially when you have kids! For example, we need good roads [in Malaysia] (5); Artificial Surfing Reefs (ASRs) bring economic benefits (5)

10. Surf events: I disagree with corporate leveraging of surf events (2); Events have indirect benefits and increase public awareness of the site (3); Hmmm, are there any real economic benefits? (3); Surf events lift the economic spirit of the community, but it depends on how international they are (3); Surf events bring an international economic aspect (4); It really depends on how much is actually going back to the community or the site (4); Surf companies are in it to sell clothes and economics speaks louder than words (4); Economics is very important today, it is a full circle, boosting economy and awareness, and the surfers get to see new products—there is so much more to say—it's an avenue (5); People will know there is a surf competition and will want to share in the experience (including non-surfers), so from the contest the word and participation grow year after year in annual events—for example, the Charating, Desaru and Tiomen [Malaysia] contests brought economic benefits to the area (5); It is a means to build your way and your dream, a linkage to a better life through surfing, including the corporate aspect—we have done this with surfing in Desaru [Malaysia] (5)

11. Surf industry and commercial activity: Outlet shops near beaches are okay for families (3); We must consider the issues that come with commercial activity, such as more people and overcrowding (4); The more money people spend, the higher the chance for conserving the spot (4); Surf industry and commercial activity will increase the level of support for the spot (4); We would like to think that the economic hub around the site can bring some conservation benefits (5)

12. Surf-related nonmarket values: For community growth, surfing is a foot in the door—surfers are cool and people follow, so there are intrinsic benefits (4); It depends on the area, for example, the non-market implications in Hawaii may be large given the history and culture, but maybe in Thailand it is less significant (4); In an economic way the visitors bring unique benefits, and benefit themselves (such as through a better lifestyle), but they might also bring crime and corruption (4); This indicator may have broad implications which are not well understood by the non-surfing community (4); Surfing is good for everyone around the area, not just for the surfers (5); We must consider how this indicator is vested in the coastal region (5)

13. Surf tourism: Although I gave a low importance score, surf lessons put bread on the table; and the community contribution aspect is also very important, so this takes precedence (2); Of course surfers' spending is good for the tourism industry, such as on the Gold Coast [Australia] and I think of domestic surf tourism at Angourie [Australia], but perhaps limited commercialism or no commercialism is even better for the actual site (2); Some support for conservation may come from tourism, but it may not be local support (3); Personally, I don't like the crowds which surf tourism brings, but we can't deny that others benefit from surf tourism which is good for their livelihoods (4); It depends on the area, for example surf tourism may be important for Indonesia (4); Economically it brings a lot of benefits, but personally I don't like all the surf schools and students (4); Tourists are the supporting base to the area, and tourism may bring some government support (5); We travel to surf, and it brings other surfers and creates a global social network (5); Tourism is key—if it is a good group of tourists (5); Surf tourism is growing—it is not waning—yet after 50 years of surfers' travelling explicitly for surfing it is only now that it has come under the microscope (5)

[a]The numbers in parentheses following each statement indicate the level of importance assigned by the interviewee to the particular indicator. Lower importance values are listed first.

Table 5. Interviewee comments on environmental indicators[a]

14. Biodiversity: The aspect of living or dead may be significant in the argument, however, there are surf spots that are "dead" but they are still good surf spots (3); River mouths may kill a spot due to silt (3); We should consider the effects of global warming on biodiversity (3); The environment needs vitality for tourism and integrity (5); We must consider the chain reaction of effects to the ecosystem at surf sites (5)

15. Coastal engineering: We simply don't understand coastal engineering that well, our knowledge is like a cup which is only "half full" (4); It depends very much on the type of the structure and the type of work or reason—and who are the stakeholders and supporters for the work (4); How we view coastal engineering may change as our attitudes change, for example "Super Bank" verse Kirra [Australia] (4); Hmm, is there a clear record of just how many sites have been made or destroyed around the world as a result of engineering projects? (4); There are good and bad aspects to such projects, sometimes they are a blessing in disguise for surfers, such as "Ala Moana Bowls" and "Point Panic" at Kewalo Basin [Hawaii] where incredible waves were unexpectedly created at harbor entrances (4); The less the better! (5); Jetties may create surf spots, while seawalls can destroy them—so we must weigh the positive and negative effects, and this is difficult as it can go either way (5); Some sites have been positively impacted, such as South Strandbroke Island [Gold Coast, Australia], as a result of sand stabilization through the construction of seawalls on the Gold Coast Seaway (5)

16. Eco-physical carrying capacity: The significance of a surf site's eco-physical capacity is tricky to assess; for example, although most surfers claim to care about the environment, truth is that many just want to surf—they may not think twice about dropping anchor on the reef (2); At the end of the day most surfers don't care, so the eco-physical aspect may not change the value or aptitude of the site (2); High physical capacity may be good for the argument (3); Carrying capacities should be determined through research (5); The key here is the need to implement a management plan (5)

17. Hazards–Marine life: Marine life hazards may discourage the use of the area and there are also political implications (3); If there are issues such as sharks at the site it will affect the decision-making process, meaning that shark attacks or other hazards may make it difficult to argue for the safe usage of the site (4); This indicator is important, my friend died of a shark attack in South Africa (4)

18. Hazards–Physical: It doesn't matter to surfers so much—it's the "surf risk" (1); Even if the site is dodgy [dangerous] it can still be protected (3); There are consequences to everything, and surfers are natural-born risk-takers (3)

19. Quality–Beach: I give this a moderate rating considering the "temporal variance" meaning that the site can likely be cleaned up easily (3); The first impression is how it looks, it can tell a lot about an area (5); A spot's value is its cleanliness (5); It is so important to keep things as best we can (5).

20. Quality–Water: It can be viewed in two ways—the need to improve an area with a problem or the need to preserve what is already clean (4); No one wants to risk catching something from the water, however, if the wave is very good you may take the risk (5); Water quality may not stop me from surfing, but I lose the "wow" factor and I may not stay so long (5); It depends—even if the water quality is poor we still may go surfing … in Malaysia, we often have poor water quality due to rivers and runoff at surf sites (5); Water quality is very important, for example, we don't go surfing when the klong [canal] at Kata Beach [Thailand] periodically releases its terrible black oily scum (5); Unfortunately, water quality doesn't become a critical issue until it is bad (5)

21. Surf type and quality: For many surfers it's just about being in the water (1); Although surfers may want big waves, this is of low importance because we may still go surfing with our friends and families despite the conditions (2); The better the wave, the more important the spot—there are sites that everyone wants to surf or to visit in other capacities (5); This may be very important in terms of the significance of the site, especially for the younger surfers, but for older surfers it may be less important (5); We can consider sites which serve all levels of surfing—the most versatile ones, as such spots attract a wider-range of surfers and a larger degree of skill levels, including beginners (5)

[a]The numbers in parentheses following each statement indicate the level of importance assigned by the interviewee to the particular indicator. Lower importance values are listed first.

Table 6. Interviewee comments on governance indicators[a]

22. Beach and water safety: Beach and water safety are important, but not a "deal-breaker" (3); A lifeguard presence on the beach is good, but the construction of towers and infrastructure is not so important—it is more about the human aspects (4); It depends on the location [type of beach/conditions] as a factor, for example, Yokohama [Oahu, Hawaii] had no lifeguards before, so there were serious accidents and drowning, also it is far away so there was a long response time for the EMS [Emergency Medical Services] (5); Lifeguards create awareness and serve as an advisory, it's a full circle, you never know when conditions change, also lifeguarding provides employment (5); Lifeguards watch the surfers and this adds sustainability to the site, I think of Kahaluu and Honolii beach parks on the Big Island of Hawaii (5); Lifeguarding is very important, at Desaru [Malaysia] there were 10 drownings last surf season—the new highway has brought more tourists—there is a real need for lifeguards, but the local government in the "pre-developed" area has no idea of beach safety (5)

23. Education and interpretation: Education is foundationally important to site integrity (4); Education keeps impacts down (4); It makes everyone to be more aware (4); Education is an indication of the place which the site holds in the host community's psyche and sense of place (4); At the Newcastle Council [Australia], surf-related liability issues are key to ourselves and the public—we're massive on occupational health and safety education (5); If people know more, they might make a difference (5); It may indicate that things are moving in the right direction (5)

24. Legislative status: It can go either way—once you start creating laws and policy you limit opportunity, however, protection is good (3); In Europe, understanding the significance of surf sites is very young and here in Italy it is just 35 years old, so governance and surf site conservation are totally absent from the legislative process, save for single initiatives of small and local not-for-profit organizations (3); One needs the other—legislation needs management (4); The site should be shared, but if it is not shared by other [non-surfer] groups, then legislative status is less important (5); If you have existing legislation, this is obviously important, but legislation without enforcement negates it (5); In the Mentawai Islands [Indonesia] there have been three rounds of legislative planning, yet nothing seems to work—so there are many things to consider, including legal status, the actual set of practices, and of course, corruption—there may be a need to develop a SRSI "governance indicator" (5).

25. Management: From the lifeguard managerial perspective we have seen that regulating anything at surf spots is very hard to do … how can we regulate surfing activities (schools, stand-up paddling, as well as kayakers, boogie-boarders, etc.) at surf sites such as "Point Panic" at Kewalo Basin, Oahu [Hawaii], where bodysurfing and surfing are regulated (in theory), yet (in practice) individuals still do what they want? … So this is of medium importance because of the difficulties involved, it is simply not the nature of the sport—it's like "herding cats"—regulating surfing is hard to do, surfers want to be "self-governing" (3); It is not highly important, but there needs to be some level of management (3); Management may be more significant than legislation (5)

26. Not-for-profit organizations: Given how many people depend on the sea, I think that the impacts of not-for-profit organizations are relatively low (2); Not-for-profits have a pretty good impact, and it is great to see organization among surfers (4); If they are actually doing anything, then it is of high importance (4); They are more positive than negative (4)

27. Public access: Surfers will find a way to access a site (2); Limited access may be okay, but if it's a hotel that is blocking, that is not good (3); Private ownership of beaches is odious (4); We need public access, I am very concerned about wheelchair access to the beach park for my son (5); Development can cut off our access and relationship to the sites, our kids and grandkids should get to experience them (5); If you can't access a surf site then that is a real bummer (5); From the Hawaii point of view, access is very important—access would solicit support for conservation, we have this right—"Hawaiians have their rights" (5); You need infrastructure to have access to a site (5); This is a tricky one—accommodation providers restricting access sounds like a negative, but if the accommodation provider is in an arrangement with traditional resource owners, who they compensate in an agreed upon manner for access to the site, then they may actually be performing a conservation function by limiting over-use of the site, such as during the pre-surfing decree era in Fiji (5)

[a]The numbers in parentheses following each statement indicate the level of importance assigned by the interviewee to the particular indicator. Lower importance values are listed first.

that negative issues surrounding public safety at sites are increasing and this may have implications in terms of planning and development, such as decreased support for new infrastructure. Similarly, an uninviting or unsafe social atmosphere has a psychological effect on conservation aptitude as it may inhibit stakeholder engagement if individuals do not feel welcome at a particular break or stop visiting a beach altogether. Whereas the respondents in their capacity as surfers strongly dislike crowded areas, many of them agreed that in the context of conservation aptitude crowdedness is good as it indicates higher participation and interest in the site. The surfing community, ranked as the second most-important social indicator, was seen as a significant stakeholder at sites in many countries, providing the core impetus to site awareness, custodianship and unity to conserve surf breaks in the wake of environmental degradation and coastal development. Interviewees suggest that the social implications of surf events include providing awareness of the site to the wider non-surfing public and opening a bridge to local government and other stakeholders was important. However, there is widespread distrust of corporate sponsors due to the general perception that their primary motivation is profit, rather than long-term sustainability or community support. Table 3 provides a list of stakeholder comments on the conservation aptitude of social indicators.

Economic Indicators

Economic indicators were viewed in many cases as a trade off and an inevitability of contemporary times. For example, surf amenity and site infrastructure was generally perceived as positive to the conservation aptitude and site integrity by surfer-stakeholders who pinpointed convenience, community use (including families), added value; however, issues of crime and crowding were acknowledged as going hand-in-hand with development. In an economic context, respondents agree that surf events invite a wide-reaching (regional, national, and international) economic element which is of increasing importance in today's economy, but dislike the corporate leveraging of events and are sometimes doubtful of the direct benefits to the local community. They recognized the economic linkages of surf contests with other tourism businesses, such as transport, accommodations, and restaurants. In developing countries, competitions were viewed as a direct way to increase site awareness as an economic attribute, particularly with non-surfer stakeholder groups. Although interviewees expressed reservations regarding the presence of the surf industry and commercial activity at sites, it was considered a positive aptitude in raising support for protecting the site. Similarly, stakeholders see non-market values as important but note that such attributes may be difficult to connect directly to site conservation and are viewed as subordinate to the wider value of the coastal zone. Surf tourism was the highest-ranked economic indicator, but stands out as particularly controversial. While surf tourism provides awareness and directly attributed economic support to a site, respondents note concerns over environmental impacts and social tensions over crowding. Furthermore, although surfers may be involved in surf tourism-related businesses and profit from them, they mainly stand against commercialism, noting that while visitors may bring money to the community, surf tourism may also bring crowding, crime and corruption. Overall, surf tourism is viewed as an inevitable trend of the times and should in any case be leveraged for surf site sustainability (Table 4).

Environmental Indicators

Environmental indicators were ranked on average as the most important indicators in the SRSI in a conservation context, although many respondents admitted that these indicators

were not always crucial for their selection of surfing sites. The significance of biodiversity was well understood by respondents who realize that it is an important aim in conservation, recognizing it as signal of site integrity and an indicator of the wider ecological system. While rated of similar importance, the implications of coastal engineering were more ambiguous as stakeholders acknowledged that these works can create as well as destroy sites. However, emphasis was placed on avoiding these projects and protecting the natural integrity of existing sites. In contrast, hazards were ranked of moderate importance, and this may be unique to the surfer-stakeholder group as surfing has inherent risks and surfers are noted risk-takers. However, policy implications were noted, as it may be more difficult to argue for conservation strategies for sites known for particularly dangerous rip currents, rocks or shark attacks. Beach quality rated very high as this indicator was viewed as crucial to site aesthetics, integrity, and in catching the attention of stakeholders. Similarly, water quality is singled out as the most important of all indicators in the research, although surfers admit that if the wave is very good they may still go surfing even at the risk of getting sick. Poor water quality has spawned activism in the not-for-profit sector with the growth of surfer-based organizations such as The Surfrider Foundation and Surfers Against Sewage (Ryan, 2007). Wave quality was ranked as important, but attracted mixed comments. While experienced surfers prefer sites with high wave quality, this indicator is less significant for novice surfers and the accompanying families and friends. Versatile sites serving all levels of surfing may be more attractive for conservation due to the fact that they draw a larger range of visitors interested in their preservation. Table 5 provides a list of stakeholder comments on the conservation aptitude of environmental indicators.

Governance Indicators

Governance indicators were found to be second highest in importance and provoked a wide range of opinions, with respondents admitting the importance of good governance and education but noting the negatives of over-regulation of a site (see Table 6). Beach and water safety was cited as most relevant to urban settings where the presence of lifeguards is seen as key to site integrity, providing a professional and managerial component relevant to conservation aptitude. In contrast, the lack of safety services in rural areas was viewed as a liability in some cases, given that newly developed surf beaches may experience increasing drowning rates among visitors thus possibly weakening the argument for conservation. Education was ranked as the most important governance indicator, and was identified as vital in fostering stakeholder engagement. Respondents believed that knowledge empowers the public with a sense of understanding of relevant issues and its proactive use helps in reducing impacts at sites. Grassroots not-for-profit organizations were described as sometime ineffective but generally useful when visible and active; they may fill the void in government activity in building conservation policy and developing best practices. Public access was found to be important as support for conservation is related to first-hand experience with sites. At rural surf sites, the role of traditional resource custodians in the context of public access and sustainability is increasingly relevant. Legislation was noted as important in theory but ambivalent in practice, and less crucial for site sustainability than apposite management. Legislation development may be time-consuming without immediate impacts on the concerned sites. Stakeholders identify management as a complex issue given the infancy of management at surf sites as an institutional practice. Knowledge and best practices for surf site conservation are a recent construct and engagement with surfers in the management process was considered as challenging given the individualistic nature of the sport.

Discussion

It is not surprising that nearly all indicators were identified as highly important by the respondents given that the indicators were selected in the first place based on their presumed significance as essential conservation markers. However, we should bear in mind that all respondents, including the scholars, were also surfers, which may have biased the weighting of the indicators. Nonetheless, surfers are grassroots stakeholders and tend to come from diverse backgrounds.

This study indicates that interviews with 21 experienced surfers generated considerable data and insight on surfing resources in the context of conservation aptitude. Given the current and growing attention to the protection of surf sites (Butt, 2010; Farmer & Short, 2007; FFLA, 2010; Martin & Assenov, 2012a; Mead, 2009; Nelsen et al., 2007; Scarfe et al., 2009a, 2009b; Short & Farmer, 2012; Shuman & Hodgeson, 2009; Surfers Against Sewage, 2009; Tourism New South Wales, 2009; Wake, Stuart, Hunt, & McGrath, 2008), surfer-stakeholders offer a direct source of local knowledge, and this may be multiplied by the wider global knowledge surfers accumulate through travel, communication, and observation at surf sites in their own countries and abroad.

Participant Bias

The interview process revealed a difficulty in the discernment of the subjective and objective nature of measuring indicators by informants. Interviewees preferred to give answers based on personal preference rather than judging the implications and importance of each indicator in terms of conservation aptitude and surf site integrity. For example, the social indicator "history" was often perceived as being of very low personal importance but of very high importance when participants were more objective and considered the implications of surf site history in the context of creating surfing reserves (as suggested by Farmer & Short, 2007, Short & Farmer, 2012).

Given the issue of stakeholder subjectivity, the social, economic, environmental, and governance context of the indicators had to be consistently delineated by the researcher during interviews. Therefore, research interviews became unexpectedly structured in order to generate accurate results, and the average length of individual interviews increased to between 90 and 120 minutes. However, this is a finding in its own right in terms of the development of the SRSI methodology; it also generated unexpected results in terms of the extensive discussion notes presented earlier. For example, some of the more controversial indicators (i.e. those which received a wide range of scores), such as the economic indicators for surf tourism and surf events, drew more extensive comments than others, reflecting strong opinions.

Stakeholder Importance Ratings

When applying stakeholder importance ratings to indices, two approaches are normally taken, one using equal weights for indicators within a given index and the other using weights based on the judgment of a particular group of stakeholders (i.e. indicator importance as outlined in this study). Phillips and House (2009) recognize that different stakeholders attribute different importance to the beach quality indicators they investigate, and three distinct groups of stakeholders—surfers, mothers and conservation workers—assign weightings that vary significantly in line with their priorities, which, respectively, tend to emphasize different physical, human, and biological factors. In fact, within a particular group of surfers with extensive international experience, we found that individuals

from diverse backgrounds placed different levels of importance on SRSI indicators. For example, lifesaving club members placed higher significance on lifesaving clubs relative to other interviewees, lifeguards placed higher significance on water safety, professional and contest-affiliated surfers placed higher significance on the social and economic implications of surf contests, and so forth. Such differences in the respondents' attitudes would be further amplified if stakeholders with more diverse backgrounds were surveyed (as was evident in Phillips & House, 2009). Thus, indicator importance can serve as a practical guide, offering a window to the way in which different people with different interests in surf tourism locations will focus on particular attributes, such as families with children might prefer beaches with higher safety standards and amenities, surfers might care most about the quality or frequency of waves, local landowners might be concerned about impacts related to access, and local governments might value high economic turnover. It is reasonable to conclude that other stakeholder groups could be interviewed to gage the relative differences in importance that they place on the resource and the conservation aptitude of surf sites.

Indicator Temporal Variance

Some respondents identified how the importance of indicators can be anchored to their relative temporal variance (i.e. reversibility or permanence). For example, beach quality or public safety are potentially reversible in the short term (i.e. beaches can be cleaned up and beach parks can be policed) and were therefore determined to be of lower importance when compared with the loss of biodiversity or coastal engineering projects which have long-term implications. For example, interviewee J. Middleton (personal communications, November 7, 2012) notes that he only gave mid-ratings to indicators which were "changeable", such as social indicators like those for the clubs or events. In contrast, he gave higher ratings to indicators which were more permanent, such as those in the environmental index like biodiversity, eco-physical carrying capacity, and coastal engineering.

Ultimately, accounting for the short- and long-term dynamics of indicators is problematic and is inevitably a limitation in terms of the reach and scope of the study. While follow-up studies such as trend analysis can help in addressing these issues, considerable time is required for this type of investigation. In cases where immediate action is essential, such an approach could prove ineffective in terms of action and result. Future research can consider if reversible indicators should carry more or less weight in the planning process.

Interdependence of Indicators

Throughout the interview process, respondents were discursive in regard to the interdependence of indicators and expressed the need for future research to consider any number of interrelationships among sustainability factors. As Pulido-Fernandez and Sanchez-Rivero (2009) indicated, understanding the multi-dimensional and relative nature of sustainability indicators poses intrinsic challenges. Indeed, many entities need to be in harmony to preserve the quality of surf tourism sites and the coastal zone is particularly complex. For example, we must consider the interrelated and intersecting context of indicators in the coastal surfing environment, such as that surf tourists need waves to ride, waves need coral reefs to break, coral reefs are degraded by urban runoff, and runoff is caused by urban development as a result of building hotels for tourists. Although such linkages may be obvious, they do not always have negative implications for sustainability. Interviewees noted that amenities may boost economic growth and awareness of the site and

increase community use and conservation opportunities; jetties may create surf spots; and surfing events may provide needed impetus to launch surf site protection by putting a spotlight on the social and economic implications of surfing activities. Respondents' comments included that legislation in isolation is of little consequence unless there is appropriate management; beach quality or natural carrying capacity are linked with management; carrying capacity may link with surf rage and localism; infrastructure may be related to public access; and surf site history include indigenous and pre-surfing history. Future research can seek to delineate the theoretical and empirical "surf system" boundaries to include the complete and holistic interplay of human and physical characteristics.

SRSI Conservation Action Matrix

In terms of the conservation planning and development of surf tourism sites, an area of concern is that areas with low conservation aptitude may be problematic to protect although their conservation value may be significant. Therefore, the interpretation of indicators and respective indices should consider a number of attributes, including the significance of low aptitude indicators in context. For example, a threat-based approach (TNC, 2007) could be considered, whereby low aptitude identifies a higher need for immediate action. Along this line of thinking, the methodology could be adapted to include conservation values or management priorities as suggested by surf tourism researcher J. Ponting (personal communications, November 9, 2012):

> In terms of index development, we must consider the context of the indicators, for example conservation aptitude versus conservation value or management priority. Although conservation indicators and ratings are a very good idea, we must be cautious that they don't simply lead us to consider the sites that are the easiest or most manageable to protect.

To address this issue, a conservation action matrix has been developed whereby assessments can be weighed against the perceived importance by stakeholders and appropriate actions can be better articulated and addressed (Figure 2). The matrix is divided into quadrants corresponding to the level of indicator importance relative to site assessment score.

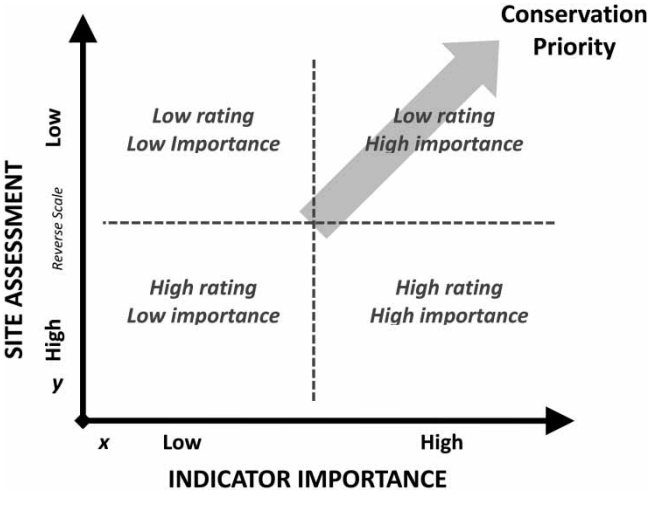

Figure 2. The SRSI conservation matrix.
Note: A reverse scale is applied to the y-axis to better illustrate the conservation priority.

Low rating, high importance: urgent action needed.
Low rating, low importance: action needed but not critical.
High rating, low importance: preserve the site attributes.
High rating, high importance: sustain and closely monitor the site attributes.

If stakeholder perspectives on SRSI indicator importance are to serve and expand the overall planning, development, and ultimately the conservation argument for coastal surfing resources, new research can focus on the legislative and management priorities of surf sites in terms of current and future values. Such investigations should involve surfers as stakeholders in the coastal and environmental planning and development process.

Conclusion

Investigating indicator importance requires a wide view which covers time and circumstance, and unforeseen "sustainability" issues are problematic to measure, leaving us with a somewhat myopic understanding even under the best research conditions. Nonetheless, the current study was instrumental in investigating indicator importance and innovating an indicator ranking process. Given the growth and circumstance of surfing activities and surf tourism around the world, and considering any number of anthropogenic impacts on coastal surfing resources, this study investigated the stakeholder perspectives of international surfers from diverse backgrounds and found that all 27 SRSI indicators were important among respondents, generating useful dialogue for surf tourism planning and development, particularly in terms of sustainability and conservation. The measurement of sustainability indicators through stakeholder interviews shed light on surf locales as integral and valuable resources and a need for future research on the significance and implications of surf tourism sites in social, economic, environmental, and institutional contexts.

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