

2012

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Publication details

Hammerton, Z, Dimmock, K, Hahn, C, Dalton, SJ & Smith, SDA 2012, 'Scuba diving and marine conservation: collaboration at two Australian subtropical destinations', *Tourism in Marine Environments: Special Issue*, vol. 8, no. 1-2, pp. 77-90.

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Publisher's version also available at:

<http://dx.doi.org/10.3727/154427312X13262430524180>

SCUBA DIVING AND MARINE CONSERVATION: COLLABORATION AT TWO AUSTRALIAN SUBTROPICAL DESTINATIONS

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Divers are increasingly becoming involved in marine conservation, often doing so as part of their recreational activities. Two New South Wales (NSW) volunteer underwater conservation groups [Solitary Islands Underwater Research Group Inc. (SURG) and Byron Underwater Research Groups (BURG)] were studied to characterize members' motivations to assist with conservation in subtropical/temperate marine environments. The collaboration between private and government organizations at two dive destinations was explored to reveal implications towards marine conservation outcomes. Primary motivations to engage in marine conservation programs were a desire to contribute to environmental conservation and to increase personal knowledge and diving skill-base. The volunteer work of these two underwater research groups builds on existing monitoring programs within local marine protected areas with benefits possible through collaboration at each diving destination.

Key words: Scuba diving; Marine tourism; Conservation; NSW volunteer organizations

Introduction

Destinations are a fundamental element of tourism systems (Leiper, 2004) and the quality of the diving experience, and dive site, are of fundamental importance to dive tourism destinations (Garrod, 2008). Dive tourism can be important for coastal areas if it is managed in a way that minimizes negative impacts, including damage to marine ecosystems (Townsend, 2003). The collaborative involvement of organizations from different sectors

at a destination can be beneficial by mitigating potential impacts (Bramwell & Lane, 2000).

Marine conservation projects offer valuable opportunities for collaboration between destination stakeholders including: tourism operators, who provide access to offshore diving locations; resource managers and research scientists, who benefit from data collected; and local and visiting conservation volunteers, who increase their diving experience, skill base, and knowledge of the marine environment. Partnerships between marine resource stakeholders

are desirable, given the high value placed on marine biodiversity for recreation and leisure. In this way, marine conservation practices become an incentive for destinations and host communities (Dearden, Topelko, & Ziegler, 2008).

In Australia, approximately 50% of reef systems are within subtropical or temperate waters (Zann, Kailola, & Sutton, 1996). This includes the state of New South Wales (NSW) with a coastline measuring 1973 km, which contains six recently declared marine protected areas (MPAs). Julian Rocks (JR) in Cape Byron Marine Park (CBMP) and the Solitary Islands Marine Park (SIMP), Coffs Harbor, are two of these and both are situated in northern NSW (Fig. 1). Both marine locations are well known within the national and international diving community. Biodiversity is high at both locations with each providing critical habitat for a range of threatened and protected species. Up to 35,000 scuba divers visit CBMP annually, while visitation to the SIMP has exceeded 11,000 in recent years

(personal communication). Scuba divers are primarily drawn to these locations to experience many iconic species, such as the critically endangered grey nurse shark (*Carcharias taurus*) and the vulnerable black cod (*Epinephelus daemeli*), and to witness first-hand the diversity of marine life that result from the overlap of tropical, temperate, and endemic species (Harriott, Smith, & Harrison, 1994; Malcolm, Smith, & Jordan, 2010). A volunteer underwater research group (URG) is also active at each location.

An important partnership between scuba diving industries, marine research specialists, and volunteer groups can be formed through marine conservation at diving destinations. Divers' efforts as volunteers can be a vital resource for marine conservation. In seeking to know more about Australian-based conservation diving groups, this article will identify factors that influence involvement by marine conservation divers in subtropical/temperate environments in NSW. The discussion draws on

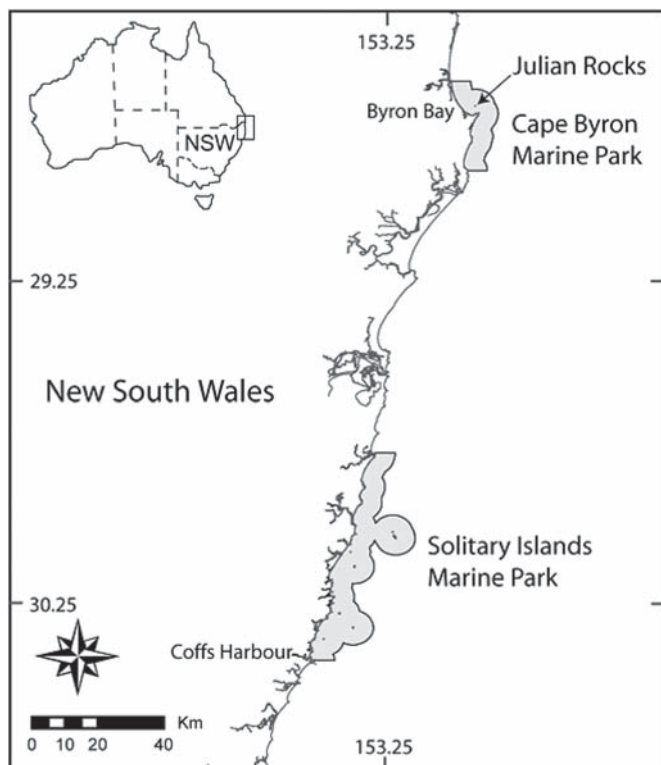


Figure 1. Julian Rocks (CBMP) and Solitary Islands (SIMP) marine protected areas.

the importance of volunteer marine conservation at two diving destinations and acknowledges the implications for marine protected area management which can result at the destination.

After discussing the related literature and presenting the aims and methodology, the article presents the results from primary and secondary data collection, including two case studies that introduce the volunteer marine conservation organizations Solitary Islands Underwater Research Group (SURG) and Byron Underwater Research Group (BURG). The article then presents results from primary data, which identify the influences on divers to become involved with marine conservation, followed by a discussion relating the findings with published literature before outlining how these organizations collaborate at the diving destination through marine conservation research.

Literature Review

Ditton, Osborne, Baker, and Thailing (2002) noted a trend taking place in planning and management towards integrated resource management at destinations which incorporates the recreational use of marine locations. For marine destination stakeholders, partnerships and collaborations are seen as an opportunity to support individual and collective interests given the high value placed on marine biodiversity for recreation and leisure (Cater, 2003; Rees, Rodwell, Attrill, Austen, & Mangi, 2010). Environmental resource planners and managers at marine destinations have governance and research responsibilities placed upon them to protect, monitor, or restore marine ecosystems (Cater & Cater, 2007). For leisure seekers like scuba divers, the quality of a marine site will factor substantially in the choice of diving destination (Cater & Cater, 2007; Garrod, 2008; Kubas, Atlas, & Sapci, 2006; Worachananant, Carter, Hockings, & Reopanichkul, 2008).

Sorice, Oh, and Ditton (2007) indicate that little is known of scuba divers' conservation goals, even though environmental quality is important in their choice to dive certain sites (Kubas et al., 2006). Proenvironmental diving behaviors are said to increase with diving experience, as Thapa, Graefe, and Meyer (2006) considered an environmental ethic in divers to include advanced buoyancy control

and in-water confidence during difficult ocean conditions. Environmental sensitivity should be encouraged early in a diver's career—even during basic scuba diver training programs because improved diving skills can reduce diver impacts at a site (Cater & Cater, 2007; Worachananant et al., 2008).

Research into scuba divers' motivations indicates that some divers become interested in developing diving skills and learning more about the underwater marine environments, with the level of environmental concern, or ethos, increasing as diving development improves (Todd, Graefe, & Mann, 2002; Worachananant et al., 2008). There can be a tendency to progress from an initial desire "to see the big stuff" towards more specific and detailed understanding of the marine environment (Cater & Cater, 2007). Further, the observations made by recreational divers during a dive are important to the informal monitoring of the quality and condition of the underwater environment as feedback is constructive for commercial operators, marine resource managers, and the broader diving community.

Divers can play an important role in conserving marine environments by participating in and assisting with marine research. In doing so, they are integral to raising conservation awareness within the wider community (Cuthill, 2000; Darwall & Dulvy 1996; Goffredo, Piccenetti, & Zaccanti, 2004; Harborne, Afzal, Andrews, & Ridley, 2000). The use of recreational scuba divers as volunteers to collect data can effectively overcome a major hurdle. The task of establishing and maintaining programs at a scale large enough to adequately monitor marine habitats has been frequently cited as an impediment to effective and ongoing management within MPAs (Pattengill-Semmens & Semmens, 2003).

Schmeller et al. (2008) reviewed the advantages of volunteer-based biodiversity monitoring in Europe, finding that volunteer-based projects can provide reliable data across a range of species, yielding unbiased results that can be utilized for conservation management outcomes. Pattengill-Semmens and Semmens (2003) also found volunteers to be critically important in data collection for the Reef Environmental Education Foundation (REEF) Fish Survey Project in Florida with evaluation of fish/habitat interactions and species distribution within sanctuary zones incorporated into existing monitoring programs. In research by

Goffredo et al. (2004), volunteers were recruited and trained in biological monitoring. Considerable amounts of data were collected, and in economic terms, volunteer divers proved to be a valuable resource, significantly decreasing project costs.

It seems then, the capacity of volunteer divers for marine conservation is being recognized, yet, there appears no apparent understanding of the influences and motivations on participants to be involved with volunteer marine conservation.

Once a commitment to volunteer is made, Blackman and Benson (2010) suggest a psychological contract exists between participants and host organizations, which supports a reciprocal mutuality that lies at the heart of the arrangement. In the context of tourism organizations, volunteer motivations reflect both a desire to make a difference and a commitment to personal development and competence building. Benson (2005) also cites education and learning as key elements in volunteer motives for involvement with host organizations.

Volunteer organizations are integral to Australian life and, collectively, they make an extraordinary contribution to society. It has been estimated that 34% of Australian adults volunteer their time to organizations in fields as diverse as education, welfare, and sport and recreational support (Australian Bureau of Statistics, 2006).

Community awareness, education, and marine conservation have been a high priority for organizations, including volunteer organizations, over the past 20–30 years. The attention to marine conservation led to the establishment of voluntary marine organizations along the NSW coast. The objectives of these groups include building greater understanding of the local marine environment and raising awareness and stewardship of marine environments within the wider community. In 1953, the Underwater Research Group of NSW was established in Sydney and became incorporated in 1958. During the early years, this group was involved in research projects such as; surveys of benthic assemblages, restocking and transplanting abalone, and a year-long biodiversity study. During the 1980s, awareness of marine conservation gained momentum and other volunteer groups became involved in the acquisition of knowledge about marine communities along the NSW coast. Since then, volunteer

groups have been established along the NSW coastline with a total of 14 active groups (in early 2011). With financial support from state and federal government agencies, these groups undertake a range of marine research and conservation activities.

For marine conservation to be successful, collaboration between stakeholders, including working with volunteer organizations, is fundamental. Partnerships also have the potential to establish pathways between stakeholders which assist information sharing and support the value of high-quality marine resources (Bramwell & Lane, 2000; Cater & Cater, 2007; Pattengill-Semmens & Semmens, 2003; Rees et al., 2010).

Indeed, many different types of volunteer marine conservation organizations exist and each will have its own focus and objective. This article takes the position that there are distinct differences evident between marine conservation organizations, such as those at the heart of this article (SURG and BURG), and larger international underwater marine conservation organizations (i.e., REEF and Reef Check), which are well respected and known for opportunities they offer individuals to be involved with marine conservation volunteering. The article identifies some of these differences, purely to explain how two Australian Underwater Research Groups have become important contributors in a process of data collection, information generation, and monitoring at their respective destination, which in turn allows for a cooperative and integrated approach to marine resource management involving multiple stakeholder groups. With this in mind, integrated coastal zone management activities such as reef monitoring, rehabilitation, and marine protected areas are legitimate components for marine resource management in preserving biodiversity and ecological processes (Cicin-Sain & Belfiore, 2005).

Wood and Zeppel (2008) are of the view that international conservation groups, such as Earthwatch Institute, The Oceanic Society, and The Tethys Institute, all function according to a model adapted from Ellis (2003), whereby they operate on a commercial basis in which tourist volunteers pay to work for the organization (possibly on a once only occasion) as volunteers and researchers. In contrast, NSW volunteer marine conservation

groups are not structured or established to function as international commercial businesses. Instead, groups such as those described in this article must seek competitive Australian government funding to carry out their work. Any funding obtained is absorbed in operational costs associated with training volunteer divers, carrying out underwater surveys and data collection. Additionally, international marine conservation organizations have as their focus projects based on tropical reefs at warm water diving destinations. Yet, subtropical and temperate waters support many species of marine flora and fauna, including threatened and iconic species not found in tropical waters, and thus hold much appeal to dive tourists and marine scientists alike. Further still, international marine conservation organizations employ project coordinators, while members of SURG and BURG volunteer their time to complete the work of the organization, in order to facilitate marine conservation outcomes.

Differences between organizations' imperatives are raised by Wood and Zeppel (2008), who state that not all marine research tourism organizations have a focus on collecting quality data that can be utilized for management outcomes. Instead, many international marine conservation organizations emphasize the marine adventure or marine wildlife tourism experience for participants. In contrast, a primary focus for SURG and BURG is collecting quality data to be used for information generation and management outcomes. Due to this, data collected by these URG groups have been validated and are useful for marine resource managers.

Aims and Objectives

Yin (2003) recognizes the value of case studies to contribute to knowledge because they help investigate contemporary phenomenon within a real-life context, particularly when the organizational boundaries are not evident. To learn about issues surrounding volunteer marine conservation organizations in Australia, including reasons for involvement, this study sought to link particular aspects related to volunteer involvement with marine conservation. Secondary data provided information on the background of each URG. Primary data were required to identify motivations

for divers' involvement in marine conservation in NSW. To frame the primary data within a broader context requires discussing how the work of these organizations link with other destination stakeholders, through marine conservation and research. Herein we provide an explanation of how collaboration among these community organizations, government agencies, and tour operators contributes to achieving organizational goals and wider conservation outcomes. In doing so, these relationships can be seen for their capacity to generate knowledge of the quality of the diving sites, site-specific marine conservation issues, and promoting the dive sites to the wider destination community.

The objectives of this article are to:

1. Introduce two successful Australian volunteer marine conservation–underwater research groups (URGs),
2. Describe the characteristics and motivations of marine conservation divers in NSW as members of the two URGs,
3. Discuss how the partnership between stakeholders benefits these two diving destinations and contributes to marine conservation.

Methodology

Data Collection and Sample

Data were obtained from primary and secondary sources. Necessary secondary data were obtained from work published by Dalton and Smith (2009) and contained in a report on Underwater Research Groups in NSW. Primary data were obtained via a questionnaire distributed to the membership of the two marine conservation organizations. Membership to BURG and SURG was a key criterion for this study. Veal (2006) indicates that criterion sampling is used when specific characteristics are sought from a sample group. The current combined membership of SURG and BURG stands at 68 individuals. Of this total, 50 members are considered "active," in that they attend regular meetings and participate in marine conservation research.

Questionnaire Design

The primary data instrument (questionnaire) specifically sought information about members which

was not available from secondary sources. This information related to the members' motivation to be involved with the volunteer work of the BURG and SURG. Both open and closed questions were included in the questionnaire design.

Questions that focused on participants marine conservation motivations and influences were informed by published literature into scuba diving (Thapa et al., 2006; Todd et al., 2002) and volunteering (Benson, 2005; Clifton & Benson, 2006), and specifically asked divers to provide the influences on their choice to volunteer in marine conservation. Questions were open ended so as to capture the breadth of individual choice for this section (Veal, 2006).

The study also sought demographic data (gender, age range), details of members' scuba diving qualifications, years of diving experience and number of recorded dives, as well as seeking to identify whether participants are involved with other conservation organizations. These data were best obtained using closed questions which provide categorical responses (Veal, 2006).

Data Analysis

From the combined membership of 68 individuals, a total of 44 completed questionnaires were received leading to a participant response from the SURG membership of 61%. The response rate from BURG members was 73%.

On receipt of completed questionnaires, several steps were taken to translate information into data. Each questionnaire was numbered and data from closed questions (gender, age range, number of years diving, highest diving qualification) coded. Coded data were then entered in an Excel spreadsheet. Also, respondents were asked to give three reasons why they became involved with volunteer marine conservation. These open-ended responses were entered into the spreadsheet, after which the total responses across the sample were reviewed for emergent themes and subthemes. Thematic analysis is often undertaken to help organize and reduce the bulk of open-ended and qualitative responses (Veal, 2006). Once all data were entered and the dataset prepared, it was possible to compare and analyze data for reporting. The results provided useful insights into the membership of the two volunteer URG organizations, and are discussed below.

Results and Discussion

The results and discussion will be presented according to the objectives of the study.

Objective 1: Introduce Two Successful Australian Volunteer Marine Conservation Underwater Research Groups (URGs)

The Solitary Islands Underwater Research Group (SURG). SURG was established in 1985 by enthusiastic underwater naturalists, videographers, photographers, and scuba divers who had a unified interest in understanding and protecting the marine environment of the mid-north coast of NSW. Many had been active in a successful campaign to protect diverse habitats at North Solitary Island, within the Solitary Islands group.

Initial activities focused on dives at different local locations, sharing underwater images during regular slide nights, and compiling species lists for taxa of interest to members, which were self-published as checklists [e.g., marine shells, and nudibranchs (sea slugs)]. As members included passionate underwater photographers, an obvious step was to commence a photographic inventory as a resource for researchers and other marine users. Published as a series of identification cards depicting more than 100 species, these cards were created over a 5-year period from 1988 to 1993. With the advent of digital photography, the collection migrated to a custom-designed web page which is updated and visited by a large cross-section of marine resource users.

Within a few years, SURG attracted trained marine scientists who, recognizing the potential of dedicated members, advocated the development of formal research skills. This was resourced through successful applications to the federal government (Australian Nature Conservation Agency) for funding to map marine habitats and assess community structure in and around the Solitary Islands. Summarized in the first technical report by SURG (Smith & Edgar, 1999), the data became instrumental in informing the zoning plan for the Solitary Islands Marine Park (SIMP) in 2002.

SURG's contribution to management of the SIMP forged stronger links with the managers who proposed future projects to address specific management issues/information gaps and facilitated

applications for external funding. These associations with agencies and research-active academics increased SURG's research capacity with subsequent successful applications for over \$115,000 from external sources (since 2002). Thus, with financial support from agencies, SURG have completed eight projects with direct management outcomes. These include: monitoring coral bleaching and coral disease; monitoring the spread of an invasive cnidarian (corallimorpharian); quantitative assessment of marine debris; and surveys of Threatened and Protected marine species. The two latter projects contributed, respectively, to a regional review of marine debris in the coastal waters of northern NSW (Smith, 2010), and the first regional-scale attempt to document the distribution and habitat use of Threatened and Protected species (Smith, Dalton, & Purcell, 2010).

As an established underwater research group in NSW, and given their success in marine research endeavors, the expertise and advice of SURG members is sought for the purposes of broader marine conservation. A SURG member sits on the Solitary Islands Marine Park Advisory Committee (NSW Government Ministerial appointment), which comprises representatives from a range of user-groups, and another sits on the Marine Park Advisory Council, which provides advice to government at the scale of the entire NSW coast. SURG members also share their experiences with other volunteer groups and had input into the formation of BURG.

The Byron Underwater Research Group (BURG). BURG was established in 2005. The group's primary objectives are to: involve the wider community in marine conservation; foster greater awareness of the marine environment; and train recreational scuba divers in scientific methods of data collection. This occurs through practical and educational marine projects. In 5 years BURG secured over \$74,000 in government funding (2006 and 2009) to conduct marine conservation activities. The focus of these grants was marine restoration, education and protection in Cape Byron Marine Park (CBMP).

Since 2006, a major project for BURG has been seasonal monitoring of fish populations at popular dives sites within the CBMP. The program commenced when zoning restrictions were implemented

(2006) at CBMP and provides an accumulated data set demonstrating spatial and temporal changes in fish species in sanctuary zones. The results have emphasized the importance of these habitats for fish communities in general and threatened species in particular.

BURG relies almost exclusively on the support and participation of volunteer divers to carry out scientific research. However, a small group of core members has a high level of diving skill (professional and scientific diving qualifications) on which new members can draw. This feature has facilitated a high level of capacity building, with flow-on effects to the wider diving and nondiving communities. BURG has made substantial outreach to newly certified divers, specifically high school and university students. This effort has achieved high retention rates for volunteer research activities and is training the next generation of volunteer research divers. BURG volunteer divers are coordinated and supervised in-water by commercial divers and marine scientists, thus ensuring consistency in data collected. After initial recruitment, in-water training begins where new members join the fish survey team as an observer, to become acquainted with survey methods and build rapport with other volunteer divers. Following this, new members complete the PADI Fish Identification specialty course, which was tailored specifically for fish survey research within CBMP. BURG members come from various backgrounds and have different levels of diving skill and experience, thus Low-Impact Diving (LID) techniques have become an important part of diver development. Low-impact diving trains the diver to leave zero impact on the marine environment and is achieved by the improvement of underwater buoyancy control, trim equipment configuration, and diver body position relative to the reef.

BURG works closely with the managers of CBMP, by reporting survey results, which complement and augment research conducted by marine park staff and external consultants. Results provide additional data to marine park management on species of interest that would otherwise not be available, due to constraints with funding and personnel (Andrew Page, CBMP manager, personal communication, 2010). Threatened species are a key focus for conservation projects undertaken by both SURG

and BURG, and data collected are directly utilized by MPA managers.

While these volunteer conservation groups were established 20 years apart, they have proved to be productive in contributing to marine conservation. Interestingly, while the activities of SURG and BURG are known, there has been no empirical identification of the membership of the groups. A questionnaire was therefore designed and emailed to the membership of SURG and BURG to obtain information on motivations to be involved with marine conservation.

Objective 2: Describe the Characteristics and Motivations of Marine Conservation Divers in NSW as Members of the Two URGs

BURG and SURG Member Characteristics. The demographic characteristics collected were related to gender, age range, scuba diving experience, and skill level.

Gender and Age. Distinct demographic profiles were evident between each volunteer group. From the sample of respondents, the most common gender and age group were males (60%), between 35 and 44 or 55 and 64 years of age. Female participation was 40%, and age ranges spanned the 25–34 and 45–54 age brackets (Fig. 2).

Scuba Diving Experience. Respondents listed their highest level of diving qualification, number of years they have been diving, and number of

recorded scuba dives undertaken. Divers' experience and training was heavily weighted at the intermediate level, followed by beginning and advanced level divers in the study group (Fig. 3). The level of experience within the sample group is further apparent, in that the most frequently occurring result (mode) given in response to the number of years of diving experience was a score of 10 years of experience.

Other Volunteer Groups. The URG members were asked to identify their conservation involvement with other organizations by listing the number of conservation groups in which they volunteer. Fifty-two percent of the sample identified themselves as only volunteering with one organization, being SURG or BURG, whereas 36% indicated they are actively involved with at least one other conservation organization. Overall, the average member profile for BURG and SURG reveals a high level of commitment to diving, marine conservation, community engagement, and recognition that involvement with a volunteer organization presents opportunities for real and ongoing marine stewardship. Members do not participate simply to be a "volunteer" within a group.

The study found that responses addressed three broad motivational themes: Environment, Personal and Social motivations. When responses for each theme are totaled, a majority of reasons relate to environmental conservation and making an environmental contribution. Next, motivations relate

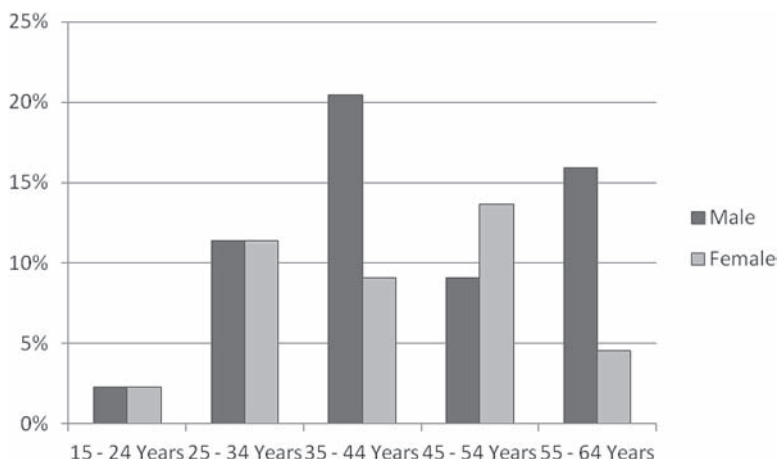


Figure 2. Gender and ages ranges of BURG and SURG membership.

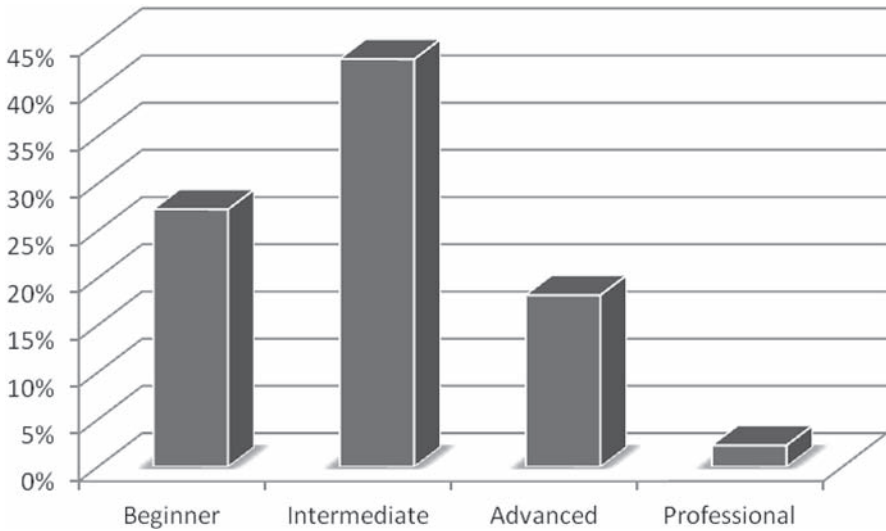


Figure 3. Scuba diving experience and skill level of participants.

to personal development/learning, and personally making a difference. Then, social motivations relate to awareness-raising and being with like-minded people.

Volunteers' Motivations. These open-ended responses from the sample were organized according to three prominent themes (Environmental/Personal/Social), which signaled the main category of influence on members' reasons for involvement. Each of the three themes was then further collapsed into subthemes to denote specific motivating factors. These themes and subthemes are listed in Table 1.

Once themes and subthemes were identified (Table 1), it was possible to compare the subthemes across the sample. This involved totaling the number of entries in each subtheme and creating a histogram to assist reporting and visual representation (Fig. 4).

Data collected indicate that participants' most prominent motivation for being involved in

underwater conservation was influenced by a personal quest for gaining knowledge about the marine environment and developing underwater skills. A common statement given by divers indicated they became involved with marine volunteer conservation "to learn more about marine environments and conservation" and "to improve understanding of marine ecosystems." As well, divers wanted to "improve scuba diving skills while doing something useful," thus reflecting a desire to learn and make a contribution to conservation outcomes.

It was apparent that many participants' motivations centered upon a strong interest in and desire to become involved with the stewardship of local underwater destinations. In this way, divers indicated they were motivated to extend their knowledge of marine ecosystems and "learn more about the other 70% of the planet." As well, comments revealed choices to want to "protect the beauty they saw" because "the ocean is seen as a dumping ground."

Divers' altruism was noted as they "wanted to try to give something back," as well as "to be part of the solution rather than the problem," showing their preparedness to volunteer in marine conservation. For example, one member said:

Diving changed the way I grew to love marine life and realize the way we exploit our oceans is not

Table 1
 Motivations Among Marine Conservation Volunteers:
 Emergent Themes and Subthemes

Environmental—conservation	Environmental—contribution
Personal—knowledge/ learning/development	Personal—make a difference
Social—raise awareness	Social—like-minded people

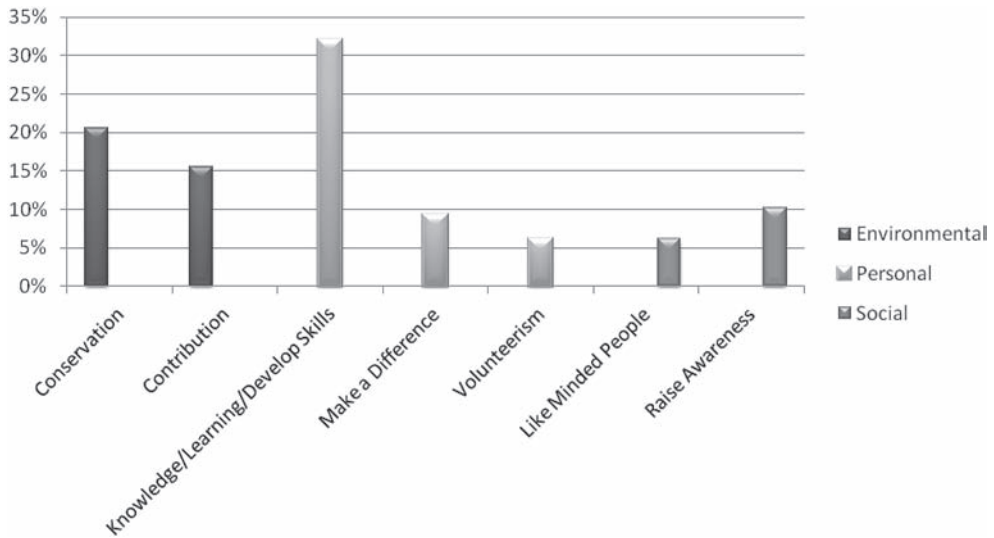


Figure 4. Key motivations and influences for participants' involvement in marine conservation.

sustainable. I hope to play a part in changing the way the next generation thinks and acts.

Figure 4 presents the percentage of total responses given for each motivation subtheme and highlights the personal value participants place on developing their knowledge of the marine environment and build SCUBA diving skills.

Findings indicate that individual and mutual benefits are possible from volunteer involvement with conservation, which contributes to improved monitoring and management of environments, as well as personal satisfaction and learning. Notable is the chance to extend awareness and be an advocate on behalf of particular environments (Bell, 2003). The study's findings reflect the type of motivations depicted by niche volunteers in a study by Dolnicar and Randall (2007), which segmented Australian volunteers according to their motivations. Dolnicar and Randall (2007) found niche volunteers have fewer motives than other volunteers, who are motivated for altruistic reasons and are motivated to gain experience. Members of SURG and BURG have identified that their desire for involvement was fueled by their choice to assist marine conservation outcomes. While Sorice et al. (2007) note little is known of divers' conservation goals, the sample of divers in this study identified that their goals are to contribute to ongoing marine conservation, development, and data collection.

In this way the divers' environmental ethic becomes apparent as does their proenvironmental behavior. The study's findings align with views by Thapa et al. (2006), who found that as divers extend their diving experience they may also develop an environmental ethos. Divers' desire to contribute was underpinned by their wish to develop and learn more about marine conservation. Such comments concur with Bell's (2003) recognition that volunteer motivation to support conservation reasons is a valuable tool for advocacy. Cater and Cater (2007) also consider that ongoing involvement with marine environments can lead to detailed and specific understanding.

Objective 3: Discuss How the Partnership Between Stakeholders Benefits These Two Diving Destinations and Contributes to Marine Conservation

The vast Australian coastline, and the relative lack of research investment, provides huge potential for volunteers to contribute to the body of information on marine systems. Though the contribution made by volunteers to organizations is recognized and appreciated, there has previously been reluctance by marine resource managers to use data generated by volunteers, for planning and management: this is primarily because of concerns over the quality of the data. Indeed, where studies of accuracy in

volunteer data have been conducted, a number of issues have been identified necessitating careful data review (Foster-Smith & Stewart, 2003; Smith & Edgar, 1999). However, Smith and Edgar (1999) incorporated ongoing quality control procedures and regular training assessment into marine projects and demonstrated that recording and observational errors could consequently be minimized. More recent programs have also found that non-specialist research divers can successfully collect quality data, provided the scope of the project is realistic, appropriate training is given and data collection is supervised by a marine scientist. These data provide resource managers with information that would not otherwise be available (Brightsmith, Stronza, & Holle, 2008; Dalton & Smith, 2009). Bell (2003) also recognizes that volunteers can help overcome resource constraints faced by conservation managers.

Organizations involved with volunteer marine conservation tourism may be criticized for offering individually rewarding experiences and constructive diving experiences at the expense of valid research (Brightsmith et al., 2008; Darwall & Dulvy, 1996). However, with some standardization in activities, methods, and outputs, there is also strong potential to collect valuable data, to fill existing knowledge gaps, and assist with sustainable management of coastal destinations. Adhering to standardized procedures offers a framework which can improve the reliability of data collected by volunteer groups, which in turn gives resource managers confidence to use volunteer-generated information to make informed conservation decisions (Dalton & Smith 2009).

In Australia, two volunteer conservation groups, SURG and BURG, have been productive and effective in conducting research for marine conservation and management and for retaining an active volunteer membership base. Several factors which contribute to achieving success in marine conservation for these two volunteer conservation groups are:

1. Continuous competitive government funding for research and environmental education projects.
2. Ongoing guidance and support in underwater data collection and design techniques from researchers and academic staff from Southern Cross University.

3. Skilled divers comprise the core membership base and are engaged in sharing expertise and mentoring new divers.
4. Strong stewardship-driven motivation towards maintaining the integrity and high quality of local marine ecosystems.

Collectively, these two volunteer marine organizations are part of valuable marine conservation partnerships in northern NSW which offer constructive outcomes for the destinations. Bramwell and Lane (2000) note that the complexity and fragmented nature of tourism can be enhanced by inter-sectoral collaborations which contribute to a shared perspective through the unique knowledge and resources provided by each partner. Cater (2003) adds that these relationships can lead to integrative capacity building and safeguarding through the interdependence of the collaborative relationship. In the current study, collaboration provides benefits for stakeholders at a number of levels, with implications for marine conservation.

The study's findings show collaboration to be beneficial for each destination and for the individual. For the destination, the Underwater Research Groups, SURG and BURG, provide valuable support for marine conservation in northern NSW, which benefits the destination, acting as a bridge between the community and specialists in the marine field. Clifton and Benson (2006) identified positive outcomes occurring at the community level from work by research ecotourists. In this study, SURG and BURG are an interface linking the scientific community with the broader community through marine education and involvement in marine conservation. The work of volunteer conservationists achieved by securing competitive government funding fills gaps in research knowledge and helps to overcome traditional funding constraints and resource limitations in the private and public sectors. Collaborative relations occur, whereby commercial dive operators initially train divers, who subsequently become interested in different aspects of diving and the marine environment—some of these divers progress towards conservation-orientated diving by joining a volunteer group. Researchers noted a diver's level of environmental concern can increase with improved diving skill (Todd et al., 2002; Worachananant et

al., 2008). To conduct their marine conservation, SURG and BURG secure government funding and charter commercial dive operators who also promote the volunteer groups to new and visiting divers. While aboard marine vessels, volunteer divers undertake research in the presence of non-volunteer divers and inform others about conservation issues and volunteer diving. The partnership allows all collaborators to advocate on behalf of marine conservation and generate interest and membership for volunteer marine conservation.

While not a primary income stream, dive tourism operators benefit from externally funded marine conservation projects, as much of the project income is distributed to the commercial dive operators to pay for the use of dive companies' facilities and boats. Dalton and Smith (2009) indicated that a high proportion of funding obtained by volunteer marine conservation organizations is spent on dive-related expenses, which in turn contributes to the income of commercial diving operators, as well as the destination economy.

For members of a volunteer organization, involvement in a marine conservation research group, such as SURG or BURG, provides a quality experience as active involvement allows them to develop and extend their capabilities as scuba divers, underwater researchers, and marine conservationists. At the same time, participants are able to fulfill personal altruistic motivations in their desire to contribute to environmental conservation (Clifton & Benson, 2006).

Conclusion

Two volunteer marine conservation organizations (SURG and BURG) were highlighted in this article to outline their role in collaborative marine conservation outcomes at two dive tourism destinations in NSW, Australia. Members of SURG and BURG identified their motivations to be influenced by a wish to contribute to marine conservation. Respondents indicated they were motivated to pursue marine conservation, extend their diving development and gain further knowledge of marine environments. These views align with motivations of niche volunteers identified elsewhere (Dolnicar & Randall, 2007).

This article recognizes the importance of harnessing recreational divers at the destination

to assist intersectoral partnerships for stakeholders, including dive tourism operators and marine conservation managers. Volunteer marine conservation groups contribute important data that environmental resource managers might not otherwise obtain (Bell, 2003). Commercial dive operators benefit financially by providing access to dive sites and divers become empowered through ongoing education and awareness, which in turn fosters greater stewardship of the marine environment, with flow-on effects to the host community and destination through advocacy and marine conservation activities.

To date, neither of these volunteer URGs has specifically targeted tourist markets to boost involvement in marine conservation activities. International underwater volunteer programs have made contributions to tourism, conservation, and local economies, demonstrating the potential for future tourism markets and research in Australia (Brightsmith et al., 2008; Dalton & Smith, 2009). The future of dive tourism and tourist involvement in underwater conservation projects represents an important resource of economic and environmental value, in which tourist involvement in destination-based volunteer marine conservation organizations may be a logical progression from current research activities.

Biographical Notes

Zan Hammerton is completing a Ph.D. in the School of Environmental Science, Southern Cross University, Lismore, Australia researching the Dynamics of scuba diving on reef ecology. Zan is the dive/research/training Coordinator and a founding member of the Byron Underwater Research Group (BURG), with 20 years of scuba diving experience and holds both Master Scuba diver trainer (Professional Association of Diving Instructors/PADI) and ADAS level 1 Commercial diver qualifications.

Kay Dimmock, Ph.D., is a lecturer within the School of Tourism and Hospitality Management, Southern Cross University, Lismore. She has published in areas including management competencies in tourism education, managing tourism operations, international tourism trends and risk management in outdoor adventure. Kay is a founding member of BURG. Her Ph.D. explores comfort in scuba divers' in-water experiences. Kay's research interests extend to social engagement with water-based tourism and leisure.

Christine Hahn graduated from Southern Cross University in 2002 with a Bachelor of Business in Tourism and

Hospitality Management. Since then, she has been part of the research team for several research centers, including the Center for Gambling Education and Research, the Australian Regional Tourism Research Center, and more recently the Center for Tourism, Leisure and Work. Christine has also been an instrumental member of the research team utilized in the development of Decipher, an online resource of tourism business information.

Steven Dalton was recently awarded his Ph.D. and is currently employed through Southern Cross University as a Research Officer. Steve has 15 years of experience working within the dive industry and has been a member of the SURG for the past 9 years. Steve has worked extensively with marine volunteer groups throughout NSW and has assisted with many successful volunteer funding applications. Currently, Steve is developing an early warning system for coral bleaching at Lord Howe Island, engaging and training local tourist operators and tourists to the island in monitoring coral health.

Steve Smith is an Associate Professor at Southern Cross University. He is a benthic ecologist with a special interest in the assessment and management of marine biodiversity. Steve has a long history of involvement with underwater volunteers, especially in providing training and advice to maximize the scientific value of data collected under a range of programs. He is currently coordinating a project to build the capacity of underwater volunteers across the NSW coastline. Steve is a passionate diver and underwater photographer and consequently enjoys diving destinations recreationally as well as in a research capacity.

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