



Perceived risks and benefits of recreational visits to the marine environment: Integrating impacts on the environment and impacts on the visitor[☆]



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ABSTRACT

Marine environments provide a range of important ecosystem goods and services. To ensure the sustainability of this environment, we require an integrated understanding of the activities taking place in coastal environments that takes into account the benefits to human visitors but also the risks to the environment. This paper presents two studies on the perceived risks and benefits associated with recreational visits to rocky shores in the UK and internationally. Marine experts and recreational users of the coast responded to questionnaires that explored the marine awareness and wellbeing effects of different activities on the visitor and, in turn, the perceived harmfulness of these activities to the environment. Two studies found that a visit to a rocky shore was seen to improve visitors' awareness regarding the marine environment as well as their wellbeing (with some activities being calming such as sunbathing and relaxing, and others exciting such as rock pooling). However, this was perceived to be at a cost to the environment, as some activities were noted to have detrimental effects on the habitat. Marine experts and coastal users gave very similar answers, as did British (Study 1) and international respondents (Study 2). Using an integrative approach, the perceived impacts on both the environment and visitor were then explored together. Walking and rock pooling were seen to provide considerable wellbeing benefits but had high negative impacts on the environment. In contrast, resource focussed activities such as fishing, bait collecting and crabbing were perceived as less important for visitor wellbeing yet also had negative environmental impacts. Using this integrative approach, this analysis begins to suggest priorities for management that benefits both the environment and the recreational users.

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1. Introduction

Coastal marine environments provide important industrial, recreational and biological services. The UK alone has 20 000 km of coastline, with over 320 million visits annually (Natural England, 2010) and over 300 000 jobs associated with the tourism industry (EU, 2011). The majority of Britain's coastline consists of rocky shores, the intertidal coastal area where solid rock predominates (Oakley, 2010). This specific environment is a valuable asset with high biodiversity. It also offers a number of important

services, including food, natural sea defences and recreation (Branch et al., 2008). However, rocky shores experience numerous threats, and to preserve the benefits of this environment, we need to encourage sustainable use and management. Considering the activities that take place is crucial for a consensual approach and for developing policies that regulate these activities effectively. In particular, perceptions of both risks and benefits associated with using the environment need to be considered together, and impacts on both the environment and the user need to be taken into account in management strategies. This paper firstly reviews the literature regarding the typically negative impacts visits have on the environment, and the literature regarding typically positive impacts on the visitor themselves. Two studies are then reported that examine perceptions of risks and benefits for both the environment and the user simultaneously. Samples of marine experts and recreational users of rocky shores were surveyed, focussing on recreational visits to rocky shores in the UK (Study 1) and more globally (Study 2).

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1.1. Literature review

1.1.1. Impacts on the environment

Marine scientists have examined the effects recreational visitors have on rocky shores by examining activities (e.g. Addison et al., 2008; Natural England, 2010; Porter and Wescott, 2004; Smallwood, Beckley and Moore, 2012) and relating them to potential impacts on the habitat (e.g. Beauchamp and Gowing, 1982; Fitzpatrick and Bouchez, 1998; Fletcher and Frid, 1996). For example, Pinn and Rodgers (2005) compared areas frequented by visitors with areas less commonly visited and found that the former had lower levels of biodiversity. Fletcher and Frid (1996) systematically manipulated the amount of walking on different communities (often referred to as “trampling” in the literature) and found that the abundance of some species increased whilst others declined as a consequence. There is a vast amount of literature examining recreational ecology, the study of the ecological relationships in recreational contexts between human and nature; however many of the empirical studies focus on one particular activity (e.g. trampling; Beauchamp and Gowing, 1982; Brosnan and Crumrine, 1994; or four-wheel driving; Priskin, 2003a) and/or on one particular species (e.g. mussels; Smith et al., 2008). Consequently, apart from descriptive review articles (e.g. Branch et al., 2008; UK CEED, 2000), there appears to be little research simultaneously examining the impacts caused by a range of activities on this particular environment (rocky shores), or focussing on the benefits such activities may have on the visitor.

Priskin's paper (2003b) is one exception that examined the detrimental effects of different activities. Using a survey completed by visitors as they left the shore, Priskin examined tourists' perceptions of twelve activities according to their impact on sandy shores and compared this with her personal knowledge guided by the literature. Some activities were seen as more damaging than others, for instance fishing was seen as *very harmful* whilst swimming was rated as *slightly harmful*. Visitors were generally aware of some of the impacts activities had on the environment but rated these consistently as less harmful than the expert did. Priskin's contribution is important as it compared visitor and expert perceptions, which helps work towards consensual solutions, and it compared a range of activities, which improves our understanding of the relative harm of individual activities. However, several questions remain. First, Priskin found preliminary differences between the public and her own ratings, but conclusions would be more powerful if perceptions from the general public were compared with a larger sample of experts within the coastal field. Second, the ratings in Priskin's study assumed that all activities were similar in frequency; hence it would be useful to see if conclusions differ when commonness is taken into account. Third, it is unknown whether these findings would be similar in other habitats, such as rocky shores. Finally, and perhaps most importantly, Priskin examined the negative impacts associated with a visit to the coast, but what are the *benefits* associated with the different activities, for instance on the visitor's wellbeing? Only considering both together will allow us to properly understand the impacts, which could then potentially help inform management techniques.

1.1.2. Impacts on the visitor

Current psychological research examining impacts on the individual uses a much more general environmental context than the ecological research examining the impacts on the intertidal assemblages. Studies involving both outdoor and computer simulated approaches have shown that natural environments in general have a number of psychological benefits compared to urban settings. They have been shown to improve mood (Barton and Pretty, 2010; Hartig et al., 2003; van den Berg et al., 2003; Ulrich, 1984), increase

the ability to perform cognitive tasks (Berman et al., 2008; Berto, 2005; Hartig et al., 2003; Laumann et al., 2003; van den Berg et al., 2003) and speed up recovery after surgery (e.g. Ulrich, 1984). More specifically, aquatic or “blue” environments were preferred over green environments such as forests (Felsten, 2009; Laumann et al., 2001) and were associated with more positive mood and relaxation (White et al., 2010; White et al., 2013). Recent qualitative research has also explored how families use beach visits in general for improving psychological and physical health (Ashbullby et al., 2013). However, there is little research on the benefits of specific environments, such as rocky shores, rather than of aquatic or natural environments in general.

As well as looking at nature in a very general manner, the psychological approach has tended to overlook the effect of different activities. Many studies in this line of research simply show natural scenes passively on a computer (e.g. Berto, 2005; Felsten, 2009; Laumann et al., 2001, 2003; Staats et al., 2003; van den Berg et al., 2003) or focus on walking (e.g. Berman et al., 2008; [Study 1]; Hartig et al., 2003). The coastal environment has numerous recreational uses, which can include activities from rock pooling (exploring the pools of water and crevices) to playing or sunbathing. Some research has considered the intensity of a particular activity, such as cycling when viewing a video of a natural scene (Barton and Pretty, 2010); yet there appears to be no research on the psychological effects of different activities in natural settings. Consequently, more research is necessary to examine the psychological wellbeing benefits¹ of different activities in natural environments.

In addition to the wellbeing benefits of visiting the environment, there may also be benefits on visitors' marine awareness. Numerous studies have examined the impact of direct and indirect natural experiences using school groups and excursions (Zeppel and Muloin, 2007). For example, Cummins and Snively (2000) examined an educational programme on grade 4 pupils (age 9–10), which involved a classroom session and a field trip to sandy and rocky shores. Children's knowledge and attitudes towards the ocean significantly increased as a consequence of this field trip. Changes in awareness have also been shown in adults, for example after visits to aquariums, marine awareness was found to increase (Adelman et al., 2000; Falk and Adelman, 2003; Wyles et al., 2013). Similarly, Americans who lived close to the coast had higher levels of marine awareness (Steel, 2005). However, little is known on the impacts of a general recreational visit to a natural environment in the absence of any educational input or interpretation.

1.2. Present studies

As reviewed above, previous research suggests that exposure to aquatic environments is beneficial for wellbeing and marine awareness; and at the same time that certain activities have specific detrimental effects on the marine habitat. However, to the authors' knowledge no previous work has examined these effects on the habitat *and* on people together. As a first step, this paper uses two studies to investigate perceptions of risks and benefits for both the visitor and the environment, in an integrated fashion. Such a broad approach would allow us to identify those activities that are most beneficial to humans but of low negative impact to the environment (and encourage people to engage in them). Conversely, it would also tell us which activities have little benefit to human wellbeing yet considerable costs to the environment, which would

¹ Wellbeing encompasses different concepts; our main focus in the present paper is on hedonic wellbeing, which concentrates on pleasure (e.g. happiness/mood; see Ryan and Deci, 2001).

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