Moving towards sustainable coasts: A critical evaluation of a stakeholder engagement group in successfully delivering the mechanism of adaptive management

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Abstract

It is widely recognised that there is a need for direct engagement between stakeholders to establish locally accepted strategies for sustainable coastal management solutions. Adaptive management approaches have emerged as one of the preferred mechanisms in coastal zone management. Central to the application of adaptive management implementation is the effective engagement of stakeholders to encourage a participatory decision-making process. There are relatively few studies which have analysed the effectiveness and dynamics of stakeholder groups to establish sustainable adaptive management in practice and what opportunities and challenges can arise from such collaborative approaches. This research critically evaluates stakeholder engagement in the adoption of adaptive management at East Head, Chichester Harbour, England. The study has identified significant issues and opportunities that have arisen throughout the decision-making process. It has found that a major challenge has been to achieve acceptance of the mechanism of adaptive management, particularly in relation to aspects of uncertainty. It is of critical note that the advisory group in question (EHCIAG) has become a valuable vehicle in bringing together key stakeholders throughout all stages of the adoption of the adaptive management approach. It is suggested that this collaborative approach, has gradually reduced conflict through building knowledge, gaining trust and ultimately achieving acceptance. A management model and recommendations for best practice are presented derived from the views of the advisory group itself which can be applied across a range of scales, situations and environments.

1. Introduction

The severity of coastal flooding and erosion in many countries has led to growing concerns about societal vulnerability, particularly in the context of floodplain development, insurance practices and climate change (Connor, 2016). It is now widely recognized that the uncertainty of future climate change must be incorporated within flood and coastal erosion risk management (FCERM) approaches to develop sustainable, long-term strategies (Environment Agency, 2009; Defra, 2010). Consequently, coastal management in England has undergone a major paradigm shift as it transitions from 'keeping flood water out' to one which 'makes space for water' (Department of Environment, Food & Rural Affairs [Defra], 2004). It is now widely recognized that the uncertainty within coastal systems including that of climate change, needs to be accounted for within long-term strategies to ensure not only a continuous level of protection, but also economic longevity (Lempert *et al*., 1996; Evans *et al*., 2004; Environment Agency, 2009; Defra, 2010; Merz *et al*., 2010). As a result, there has been a realignment towards more integrative risk management paradigms over the past two decades, and it has been suggested that coastal zone management plans should be updated more regularly to provide adaptive approaches better suited to a changing dynamic environment, considering alternative solutions and reducing future risks (Hall *et al*., 2003; Penning-Rowsell *et al*., 2006; Heintz *et al*., 2012; Challies *et al*., 2016).

The development of the broader philosophy of Integrated Coastal Zone Management (ICZM) and the approach of FCERM alongside the development of the policy framework through Shoreline Management Plans (SMP), has encouraged more holistic, adaptive and integrated approaches where feedback and revision of the process is iterative (Figure 1) (Potts, 1999). Although both integration and sustainable development are core concepts of ICZM, it is integration which is seen as imperative for the success of ICZM (Cicin-Sain & Belfiore, 2005; Hastings & Potts, 2013). One of the key mechanisms of delivery for sustainable ICZM has been the refinement of the concept and practice of adaptive management which has received more attention in recent years (Challies *et al*., 2016). Adaption is the "process of becoming adjusted to new conditions, in a way that makes individuals, communities or systems better suited to their environment" (Defra, 2008, p. 4). Central to adaptive management is the effective engagement of stakeholders in encouraging a participatory decision-making process.

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Wider public participation can be seen as a fundamental component of successful ICZM (Cicin-Sain & Belfiore, 2005; Chaniotis & Stead, 2007; Hastings & Potts, 2013; Potts *et al.*, 2016). The concept of public participation often appears a simple solution (Morgan, 1998), but the success of integrating wider opinion into coastal policy and management is difficult to assess (Shipley & Utz, 2012). Over the last twenty to thirty years, there has been an increasing emphasis placed on the concept of building local coastal partnerships. These relationships are based upon shared responsibility and trust, and are widely regarded as beneficial in linking local authorities to non-departmental bodies to effectively manage the coast (Fletcher, 2003; Milligan & O'Riordan, 2007; Stojanovic & Ballinger 2009). Many authors have advocated the need for locally accepted FCERM interventions and more scientific research on the role of participation in FCERM, particularly in adaptive approaches (Johnson & Priest, 2008; Butler & Pidgeon, 2011; Challies *et al.*, 2016). As Thaler and Levin-Keitel (2016) acknowledged, there has been an increasing number of papers in which stakeholder engagement was found to be important in FCERM, and several studies have analyzed integrated and participatory-based management approaches (Hall *et al.*, 2003; Penning-Rowsell *et al.,* 2006; Johnson & Priest, 2008; Heintz *et al.*, 2012). However, although a number of studies have been undertaken at regional, national and global scales (Hall *et al.*, 2003; Penning-Rowsell *et al.,* 2006; Johnson & Priest, 2008; Heintz *et al.,* 2012; Benson *et al.*, 2016), there is a paucity of studies which focus on integrative, participatory approaches within FCERM on a local scale. Moreover, as suggested by Challies *et al.* (2016), many authors have examined adaptive and integrative management strategies which advocate stakeholder engagement to varying degrees (e.g. Walker *et al.*, 2014; Penning-Rowsell and Johnson, 2015; Becker *et al.,* 2015), but there is a need for a greater degree of critical analysis in how and under what conditions participatory approaches either work or do not work in FCERM.
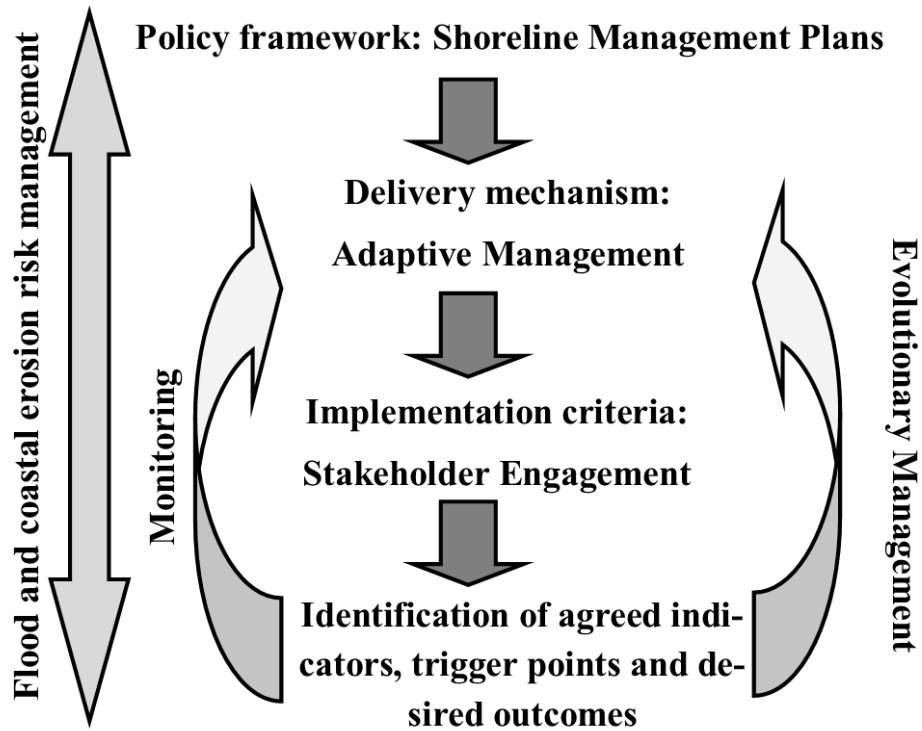
Figure 1. Schematic diagram showing the relationship between the various levels of coastal management.

One phenomenon to emerge from more integrated management approaches is the emergence of coastal action groups (Famuditi, 2017). These groups can take on many forms from a single issue residents based protest group, through to a more formal advisory stakeholders/experts working group. This research is concerned with the latter, which aim to initiate compromise and provide the basis for establishing more "unified and locally accommodative partnerships" (Milligan & O'Riordan, 2007, p. 507). It is argued that this form of advisory group can be a way of moving forward to create consensus and deliver sustainable coasts and management. The emergence of coastal groups can be seen as the development of participatory decision making which is assumed to lead to better decision-making, implementation, compliance and more beneficial social outcomes compared with top down administrative decision making. Nevertheless, Challies *et al.* (2016) suggest that despite the potential benefits of participatory approaches for sustainable FCERM, it is not clear whether this occurs or not. In addition, it is crucial to understand what are the opportunities and challenges of participatory and collaborative approaches in FCERM? This research thus aims to answer these questions by evaluating a localized example of stakeholder engagement. In particular, this research

acknowledges that although many aspects of best practice are accepted within coastal management, there are very few case studies if any, which demonstrate the criteria for success of a local advisory group based on the perceptions of the group itself. As such this research, presents a framework for success which can be replicated in many geographical locations and for a range of stakeholder groups.

2. Study site and the formation of an advisory group

For FCERM to be sustainable it needs to take account of long-term strategies in relation to climate and associated coastal change (Lempert *et al*., 1996; Evans *et al.*, 2004; Merz *et al*., 2010). However, as the drivers of coastal erosion and flooding incorporate a range of interests, a balance and mediation between these competing interests is critical for achieving success (Hall & Solomatine, 2008; Challies *et al.,* 2016). One way to achieve this balance is by the formation of coastal advisory groups comprising a range of different stakeholders.

This research critically examines the actions of the East Head Coastal Issues Advisory Group (EHCIAG) which was established in 2007 (Table 1) (CHC, 2014). The advisory group was formed to incorporate the views of a range of local stakeholders who were charged with identifying the most effective mechanism for delivering integrated management at the site. This advisory group was comprised of a range of members including local authorities, private groups and management organisations statutory bodies.

Organization	Abbreviation	Main role/expertise
Cakeham Manor Estate	CME	Neighbouring stakeholder
Chichester District Council	CDC	Local authority
Chichester Harbour Conservancy	CHC	Harbour authority
Environment Agency	EA	Statutory body - Technical and strategic overview input
F G Woodger Trust	FGWT	Funder
National Trust	NT	Own and manage East Head/Area Rangers
Natural England	NE	Statutory body for environmental legislation
West Wittering Estate	WWE	Land owner
West Wittering Parish Council	WWPC	Representative of the local community

Table 1. Members of the EHCIAG and the main roles of each organisation (EHCIAG, 2008).

East Head is located within The Solent, the body of water separating the Isle of Wight from mainland England, and forms an important sand and shingle spit on the east side of the entrance to Chichester Harbour, West Sussex (Figure 2 and Figure 3) (Chichester Harbour Conservancy [CHC], 2014). The site exemplifies a nationally rare, fragile and dynamic sand-dune habitat valuable to the wider Chichester Harbour Area of Outstanding Natural Beauty (AONB). East Head is also a designated Site of Special Scientific Interest (SSSI) and a Ramsar Site for its importance as a habitat for coastal birds (West Wittering Estate, 2016). The spit and dunes have many important values and are of significant interest to environmentalists, recreationalists and tourists. Additionally, the spit plays an important role in the harbour system, providing protection to a significant number of boats that use the lower part of Chichester Harbour and its narrow entrance into the Solent (CHC, n.d.). Although formed naturally by the process of longshore drift, its shape and direction have been affected by sea defences, which have been interrupting natural coastal processes (CHC, n.d.). Of particular significance is 'The Hinge', which has been continuously changing direction and has caused great concern between organisations and the general public interested in the future of East Head (CHC, n.d.) (Figure 3).
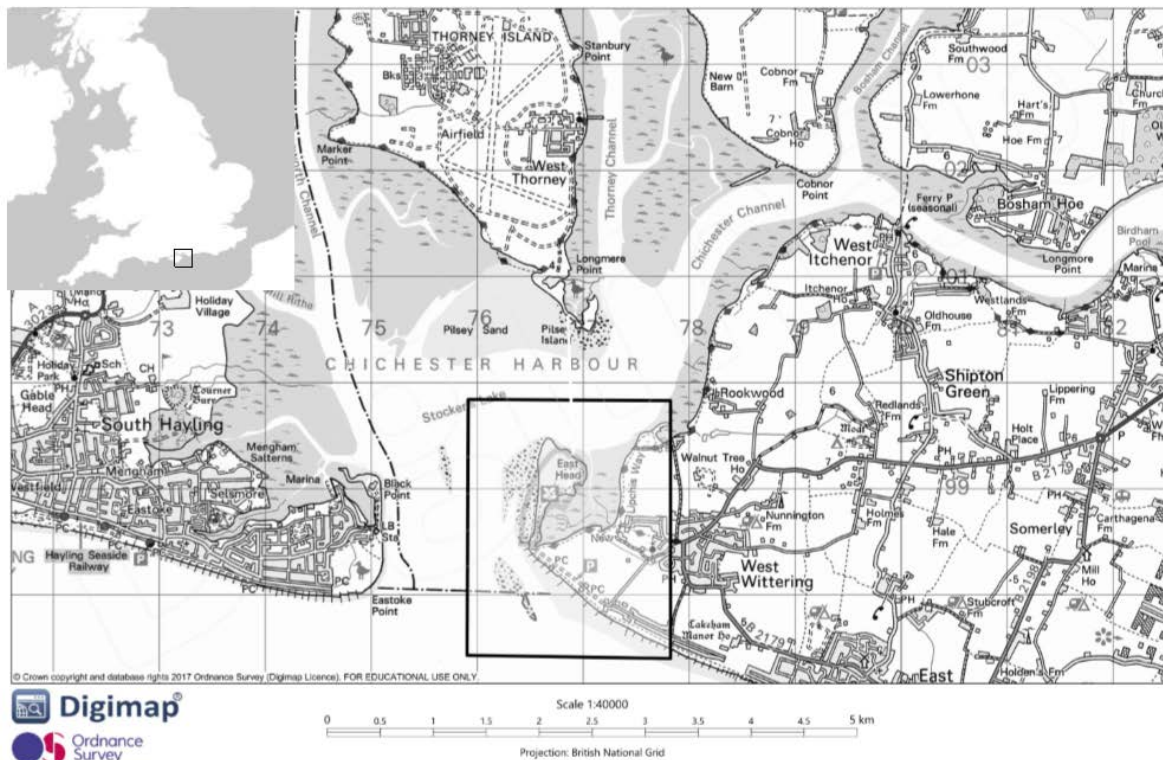
Figure 2. Location of Chichester Harbour, West Sussex and of the study area, East Head (indicated by the black box)(© Crown Copyright and Database Right [2017]. Ordnance Survey (Digimap Licence)).
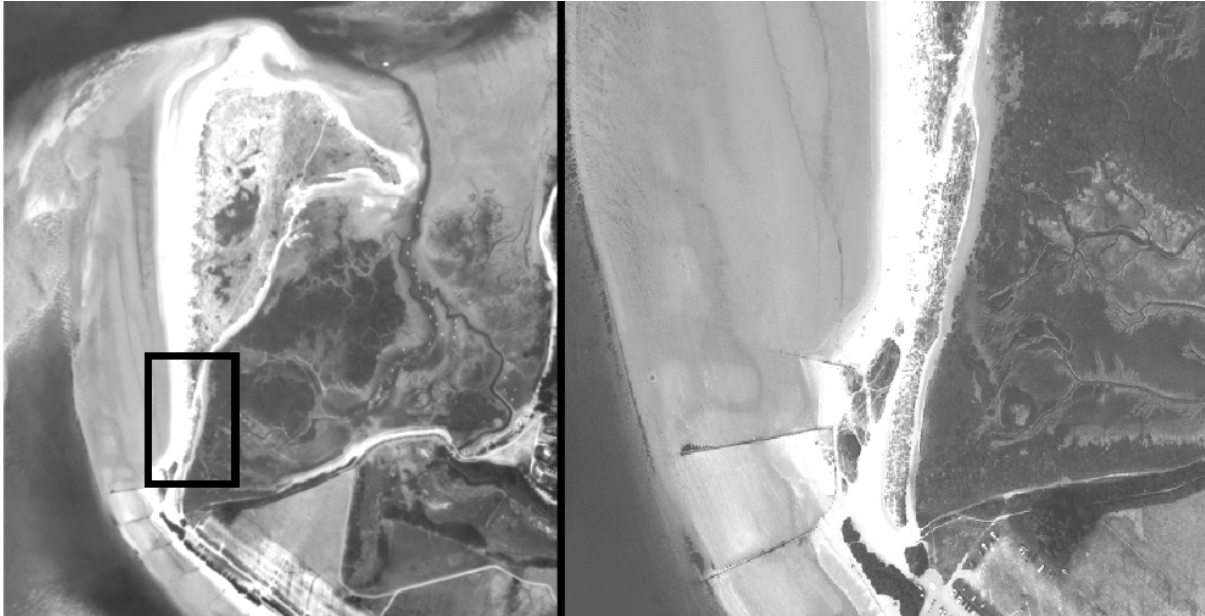

Figure 3. Aerial photographs of East Head spit. Left, view of the whole spit in August 2016, box indicates area of the spit previously overwashed in 2004. Right, a view of the area of the spit known as the 'Hinge'. (Images from the Channel Coast Observatory, 2016).

East Head spit is a dynamic coastal feature which has experienced periods of accretion and erosion throughout its existence. Following significant accretion during the 1980s and 1990s (partly due to human intervention), East Head then began to erode significantly on the seaward side from the late 1990s onwards culminating with the 'the Hinge' becoming significantly eroded (Baily *et al.,* 2003). As a result, the part of the spit connected to the mainland was overwashed in 2004, leaving it narrow, low and flattened (Figure 3, Channel Coast Observatory, 2016). The dynamism of East Head and unpredictable nature of the geomorphological processes, made it difficult to decide on an agreed management strategy. Many stakeholders were opposed to hard engineering structures at the site, however most were opposed to no active intervention. Initial repair works included the renourishment of the Hinge area in 2004/5. In the next few years, rather than continuing to erode, East Head appeared to stabilize and indeed sediment accretion occurred in several previously eroded areas. Differing opinions were put forward as what to do next in the face of geomorphological complexity and

uncertainty. The solutions suggested ranged from hard engineering approaches to allowing a breach to occur. The challenge for coastal managers was to protect the landform whilst still allowing it to remain a dynamic feature. It therefore became apparent that a new approach was required that not only effectively managed the coastal zone, but also considered the varying interests of groups concerned with East Head's future, hence the formation of the advisory group.

In 2008, the EHCIAG identified adaptive management as the most appropriate and viable mechanism for East Head (EHCIAG, 2008) and by 2010 this strategy had been accepted as a policy unit in the North Solent SMP (NSSMP, 2010). According to the NSSMP (2010), adaptive management aims to promote flexible decision making, address uncertainties and work with the coastal processes to provide a proactive management approach. EHCIAG state that "The aim of Adaptive Management will be to preserve the social, economic, environmental, navigation and amenity value of East Head to the community for the life of the Strategy. The emphasis will not be on trying to lock the feature in its present size, shape and location, nor should it be encouraging orientation in a pre-determined direction" (EHCIAG, 2008, p .1). At East Head, adaptive management has resulted in a flexible management strategy. The adaptive management approach involves field data collection and analysis allowing management decisions to be reviewed, checked and if necessary amended. The geomorphological changes which have occurred at East head have been episodic and nonlinear which makes prediction of future scenarios difficult. Adaptive management gives the coastal management team the flexibility to react in a way tailored to suit the changes which may occur. Measures which exemplify the adaptive management approach include; regular data collection and analysis, implementation of sediment recycling when required; reduction of some hard sea defences (e.g. groyne lowering) in response to the changing geomorphological conditions at the site. In can also be argued that the implementation of adaptive management also involves estimates of future coastal behaviour and land uses and identification of appropriate indicators (of potentially impending adverse impacts) that might trigger future management interventions. These "triggers" and the respective courses of action are agreed within the stakeholder engagement processes. This is challenging with regards to estimating future behaviour, to the identification of indicators and to obtain agreement in relation to long-term goals. In addition, close monitoring of the indicators is required and efficient intervention needed if acceptable thresholds of change are ever triggered.

3. Methodology

This research is essentially an assessment of the views of the stakeholders of the coastal advisory group for East Head in relation to their experiences in assessing and implementing adaptive management. The overall research design used a mixed-methods based approach to collate data in relation to the views of the members of the group. The mixed methods approach advocates the use of mixed methods research and allows the analysis of a combination of quantitative and qualitative data within the same study (van Griensven, Moore & Hall, 2014). It can be argued that a mixed-methods approach provides greater flexibility and allows deeper and more complete understanding of the issues involved (Johnson *et al*., 2007). More specifically, data for this research was collected via web-based questionnaires and semi-structured telephone interviews which were identified as the most appropriate methods of data collection in this study. Internet surveys compile a broad representation of respondents' views about specific topics to generate sound and systematic information (Lee, 2006), whilst providing a relatively quick approach within a limited timeframe at minimal cost. Although questionnaires are a useful tool, it is unlikely they will reveal the depth of the views given (Popper, 2004). Therefore, as part of the mixed-methods approach, further data collection was undertaken to gain the level of detail required (Clough & Nutbrown, 2002; McQueen & Knussen, 2002). As such, semi-structured interviews were chosen as a supplementary qualitative tool in building upon the survey responses and subsequent initial analysis.

A critical goal of survey administration is to increase the credibility of the results by achieving high response rates (Burkell, 2003). Therefore, pre-notification of the survey was sent to all respondents via a known stakeholder to establish initial trust. Following this, a cover letter with the attached questionnaire was distributed outlining the project details and upon completion of the survey a summary of the results was provided as a final incentive. The initial questionnaire contained both open and closed format questions (Oppenheim, 1992). Open questions, or free response questions, do not offer the respondent a series of pre-defined choices (Walsh, 2001; Shackleton *et al.,* 2011 & Fink, 2017). Closed questions in contrast provide a limited scope of answers (Bernard, 1998; Oppenheim, 1992 & Fink, 2017). By utilisng this approach, it was anticipated that a comprehensive understanding would be achieved in completing a more detailed analysis. Before distributing the survey, a pilot study was carried out, pre-testing the questionnaire on a group of individuals, with a view to improving the response rate. This identified whether questions were relevant to the research, enabling a justification process of

the entire survey. In some cases, questions were deemed inappropriate and were thus removed. The questionnaire was constructed into four sections, dividing topics accordingly. Each section was carefully ordered to ensure questions become more focused towards the end of the survey, with the intent to gradually gain more detailed insight over the course of completion.

As this project focused on a specific group (EHCIAG), the surveys were distributed to all organisations affiliated to the group. A list of specific individuals, known to have an established track record within the EHCIAG, were chosen through communication with various stakeholders. There was opportunity for more than one individual from an organization to complete the questionnaire depending on their time spent within the group, varying degrees of knowledge or differing opinions within each organisation. The individuals who completed the web-survey were subsequently asked to participate in the telephone interviews.

4. Results

The research design was successful in achieving good response rates for research requiring descriptive analysis. Nine stakeholder groups were given the opportunity to complete a detailed questionnaire. In total, twelve completed surveys were received which included organisations who chose to complete two surveys due to a differing level of knowledge or opinion within the organization. All the stakeholder groups responded to the survey. In several questions, respondents have been asked to select a number of factors they consider to be applicable. The respondent was then asked to rank these factors in order of importance. Therefore, in some cases, although one option may be chosen by a high number of respondents, it may not necessarily rank as the factor of most importance. Ranking questions calculate the average ranking for each answer choice, therefore determining which answer choice was preferred overall (Survey Monkey, 2016).

This is based on a weighting average where:

w = weight of ranked position

x = response count for answer choice

$$\frac{x_1w_1 + x_2w_2 + x_3w_3 \ldots x_nw_n}{\text{Total}}$$

(Survey Monkey, 2016).

Weights are applied in reverse so the most preferred choice has the largest weighting. In doing this, the data is clear in highlighting which answer choice is most preferred amongst all respondents (Survey Monkey, 2016). It should be noted that the 'other' option frequently ranked highest in the results charts. However, this was deemed as an inaccurate representation as not all respondents were given or perhaps considered the choices of those who provided further answers under the 'other' category. i.e. if an answer given by one respondent under the 'other' category was listed in the initial question choices, it may have received a greater representation and thus a different ranking score. However, despite causing anomalies regarding the ranking score, this information was still relevant to the research which has been reduced to specific sections to aid understanding.

4.1 Acceptance of the adaptive management policy

The survey data collected for this research suggest that 83% of respondents agreed that adaptive management is the correct policy choice for East Head and although no respondents suggested it was the wrong choice, 17% stated they remained unsure. The primary reasons for it being an appropriate choice included suggestions that it would no longer be '*realistic*' to predict changes, in this case the position of the spit, and therefore an adaptive management approach would allow for flexible decision-making for long-term sustainable outcomes. Several respondents highlighted how adaptive management would encourage natural processes to prevail, and can be particularly applicable in sites where people or property are not immediately at risk. As one respondent suggested "*adaptive management strikes the right balance between nature taking its course and engineering*". Of the 17% that remained unsure about the policy, it was stated that although there was trust in the experts' view, precaution should also be taken in case of a breach (i.e. the Hinge) or cumulative effects on other parts of the coast, such as the

West Wittering shoreline. Uncertainty is inextricably linked to adaptive management and many still regard adaptive management as an idea as opposed to a practical means (Lee, 1993; Buck *et al.*, 2001; Stankey *et al.*, 2005). According to Buck *et al.* (2001), such concerns underlie the social, political and collaborative nature of the challenges facing adaptive management.

Respondents were also asked whether they believed there were any barriers preventing the successful adoption of adaptive management. A lack of agreement within the group (80%) was the largest barrier followed by public support (70%) and constraints from legislation (30%). A report by Williams and Brown (2012) similarly suggested a lack of agreement as a major barrier in adaptive management due to uncertainty regarding management impacts, often being expressed as disagreement amongst stakeholders with differing views. Some responses indicated that a change in personnel can contribute to disagreement creating sudden changes in their approach, e.g. from "*nothing needed doing*" to suddenly "*something needs doing*". Nyberg (n.d.) proposed that changes in personnel can lead to policy drift due to a change in understanding or application of adaptive management methods. Half of respondents had no reservations with one respondent specifically stating "*it is absolutely the right approach given our current understanding of coastal processes and the likely effects of climate change*". However, the remaining 50% had reservations relating to several aspects:

- *Interpretation of the policy*

- *Continued cooperation from the group*

- *Availability of resources and funds*

- *Monitoring to a high standard*

- *Environmental legislation preventing future actions*

- *Limited area of study and effects on the shoreline to the east*

- *Uncertainty with the final outcome as no one knows exactly what will happen*

Continued cooperation from the group is a common concern in adaptive management stakeholder groups. Friedmann (1987) suggested learning and action are the hallmarks for social learning planning models. It is clear that successful acceptance and continued support for adaptive management requires consistency in funding, approach, monitoring and consultation. Williams and Brown (2012) advocate that adaptive management focuses on learning through fundamental partnerships of stakeholders to create and maintain a sustainable

resource system. Monitoring is well-recognized as a crucial concern in adaptive management, as supported by Stankey *et al.* (2005), who acknowledged the critical role of ongoing monitoring and evaluation as the basis from which learning can inform action. East Head has been subject to intensive monitoring modelling and analysis, all of which show a complicated system liable to sudden change. The survey results suggest that continued support from the stakeholders will be aligned to the continuation of this monitoring at East Head and the interconnected areas. One interviewee advocated the need for a "*larger, structured communication plan*" and to interpret the policy into "*layman's terms*". This reinforces the need for coastal managers to demonstrate effective and continued communication with regards of the use of adaptive management as a technique. It is also suggests that as well as issuing public explanation there should be an attempt to ensure that this is understood by those less familiar with coastal management issues. Despite these concerns, several respondents seemed content with the policy and according to one respondent, "*adaptive management offers a long-term and cost-effective way whilst working within the limitation of the Site of Special Scientific Interest status and the movability to put high defences in*". Adaptive management is a policy which is not "*set in stone*" but several interviewees have agreed that due to the dynamic nature of East Head, there would be insufficient certainty to set any other policy. Many interviewees also agreed evidence is now showing that the theory is working. Although some interviewees stated that there are "*action and trigger points*", there were concerns about what would happen during a major storm, such as the one that occurred in 2004 causing the breach. A significant problem could lie in the different perspectives on what a timely action may be. Adaptive management requires "*a need to react rather than predict*" and although this has been communicated in the past, looking forward it must be recognized that this communication needs to continue.

Adaptive management can be interpreted as a leap into the unknown and perhaps a key factor in moving forwards with stakeholder support lies in a more effective clarification of the approach. During the associated interviews, all respondents recognized that there remains a problem concerning uncertainty with the approach of adaptive management. A lack of understanding seems to be a predominant factor, as well as the requirement for a more certain outcome. According to one interviewee, most uncertainty goes "*back to the deep-seated need for people to have certainty and a clear-cut answer*". Adaptive management cannot offer certainty but according to one respondent "*is the sensible and pragmatic approach*". It is suggested that although the Terms of Reference state what adaptive management means, it is

still "*a matter of interpretation*" and although adaptive management has brought consensus, it remains an ambiguous term. One of the interesting points to emerge from the surveys was the uncertainty that some respondents had towards the adaptive management policy.

The North Solent Shoreline Management Plan (NSSP, 2010) stated that the adaptive management policy is designed to promote flexible decision-making and address the uncertainties by working with natural coastal processes. However, in both the survey and interviews, respondents indicated there existed still a degree of concern surrounding the effectiveness of the policy and its likely future effects. As Viles and Spencer (1995, p. 293) highlighted, it is "impossible to solve all coastal problems and part of any sustainable use plan must recognize the environment cannot be controlled as such". In the face of a changing climate where surprise is likely, there are many sources of uncertainty and drivers of future change that decision makers and communities could be better prepared for (Brisley *et al*., 2012). Adopting more adaptable plans could be the answer to sustainably and pragmatically managing flood and erosion risks (Brisley *et al*., 2012). Therefore, although the adaptive management policy at East Head has yet to be "*fully tested*" (interviewee response), the site provides a great example and test case of managing for resilience, particularly in an area where "*no people or properties are significantly at risk*" (interviewee response).

4.2 Effectiveness of the coastal advisory group-self evaluation

One key aspect of importance within the study is the perceived effectiveness of the advisory group. This is important as the continued support and involvement of the stakeholders will arguably be enhanced if they see that their role is a key part of the management process. All the respondents in the survey agreed the advisory group has been effective. Two respondents stated that although the group took a long time to come to consensus, it eventually worked and considered multiple interests. Respondents were asked to choose which factors they considered important in advisory groups and asked to rank these factors in order of importance (Figure 4). All respondents agreed that transparency was important, followed by regular meetings/communication (83%), openness (83%) and focus on outcomes (83%). The issue of transparency is crucial as noted by O'Riordan and Ward (1997) and Crispin (2015) who indicated transparency was essential in effective coastal management. A range of other factors were also considered crucial to the successful nature of an advisory group. It is clear that knowledge across the broad range of coastal management issues is important with 75% of

respondent stating that specific expertise was very important to the group's success and 67% believing that the diverse nature of the group was most important. Milligan and O'Riordan (2007), argued that coastal advisory groups can initiate compromise and aid in establishing more unified partnerships by linking organizations of varying interests. Individual groups of differing perspectives may have initially created conflicts at the start of the process but the process of working together within the group has been used as a means of reducing conflict through reaching consensus (Milligan and O'Riordan, 2007). In order to assess conflict within the group, respondents were asked to rate the level of conflict at the start of the process, during the process and at the time of study (Figure 5). All respondents agreed strong conflict was evident at the start of the process. 17% of respondents agreed this strong conflict continued during the process in comparison to 83% stating the conflict level dropped to moderate. At the time of study, 42% of respondents implied that conflict is moderate compared with 58% suggesting there is no conflict.
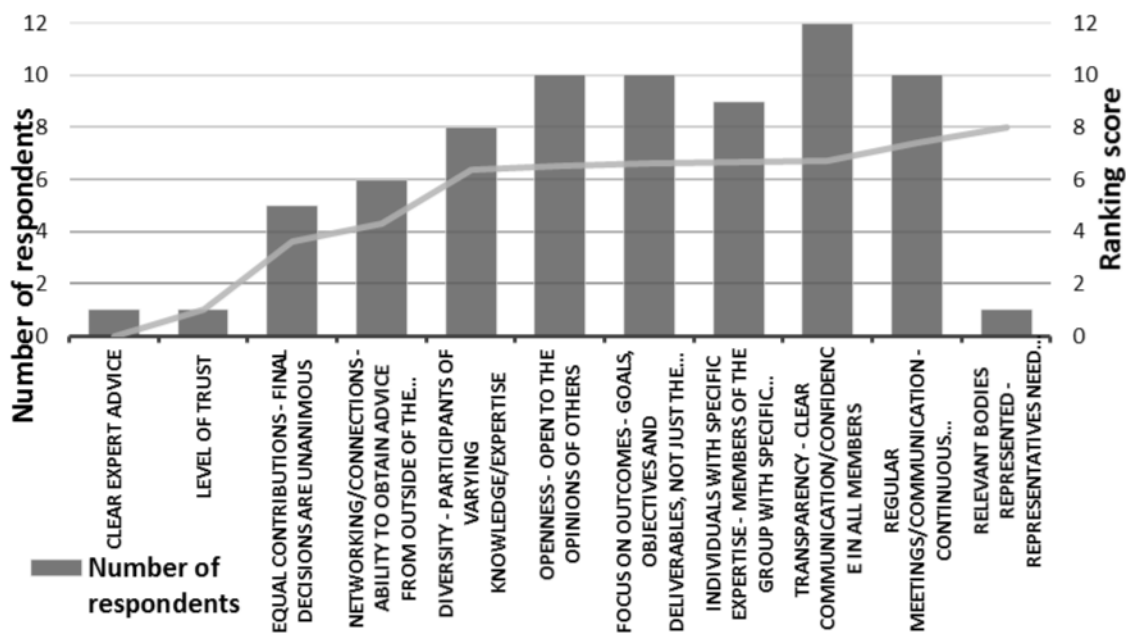

Figure 4. Factors considered important in successful advisory groups.
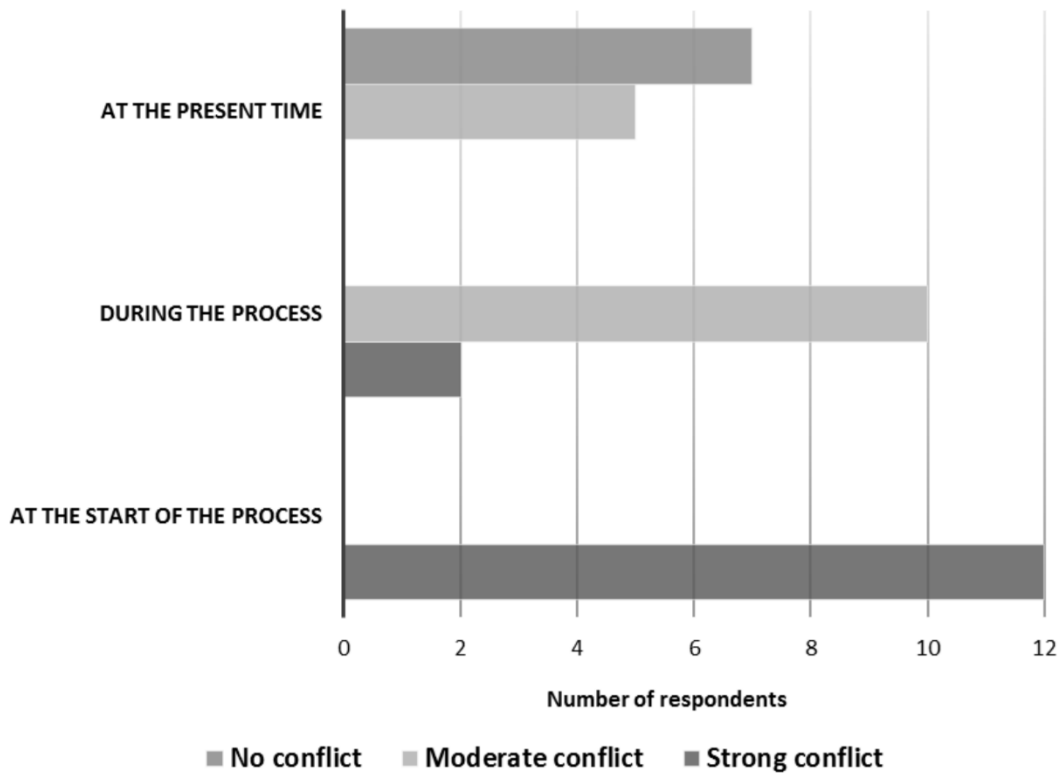
Figure 5. The intensity of conflicting interests between the stakeholder groups at different stages of the process.

Two open-ended questions were presented in order to gain more detailed insight into what needs to be improved (five responses) and how the group will now move forwards (ten responses). Improvements included:

-   *Clearer and consistent communication to the wider community*

-   *Greater research and interpretation*

-   *A greater acceptance that consensus will not always be met*

-   *Improved secretarial services e.g. an external minute taker*

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In terms of moving forwards, the following was suggested:

-   *Continue to work towards creating a group identity, as opposed to single organizations, so it is shown that the group is collaboratively committed to any decisions made*

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- *Continue working to prove adaptive management can effectively happen in order to provide the community with more security in the perceived risks*

- *Maintain regular monitoring and be ready to respond to changes as they occur at short notice*

- *Continue meeting 3-4 times per year*

- *Maintain relationships and the aims of policy*

- *Address the possibility of the group formation existing for other benefits on the coastline*

The interviews with the various stakeholders espoused the benefits of having external expertise, such as links to academia, to gain more information if and when it was required. However, one interviewee raised a concern that although there is substantial information concerning East Head, "*wider knowledge*" is lacking and could be beneficial in the future. It was mentioned that although all members were aware of the information, East Head is a dynamic, ever evolving and difficult site to predict. Therefore, although there is access to the information, the information should be interpreted appropriately in order to contribute to more effective decision-making. One interviewee advised that if required, information could be *"converted into something that all members understand"*. Despite this, several comments indicated that access to information should remain sufficient and as suggested by one respondent *"as long as the group exists, the right people are around the table and links into expertise are there if needed, we can make the best decisions"*. All interviewees agreed that the decision-making process has been effective and all members have been able to participate within efficiently conducted meetings. Several members stated that there were always attempts to consider all views and decisions have been "*fairly equal*", despite a lot of "*variable opinions*". In particular, one respondent suggested there has been significant improvement in the last three years due to improved communication and although it had been "*a long iterative process*", the group has "*successfully kept everyone onboard*". Only one interviewee felt they had "a weaker voice in the debate" although advised "full opportunity to participate" was given. Several interviewees expressed the importance of voting on major decisions and how consensus was achieved before any final decisions were made. An important part of the process was obtaining advice from the experts, allowing members to realize and understand concerns, thus enabling the group to gradually and slowly come to mutual agreements. Of particular significance, two interviewees

advocated that although the process may not be perfect, the group demonstrate a great "*model for other examples*".

Conflict resolution is a key component of any successful stakeholder engagement. Table 2 summarizes some of the main points interviewees highlighted regarding conflicts and how they believe it has been resolved. Many interviewees agreed the primary conflict has been in deciding whether to allow defences to fail or to be repaired at East Head. One interviewee suggested that although conflicts have arisen, "*this would be the case with any working group, and you have to work through the issues in order to progress from that*". It is recognized that conflicts have considerably reduced within the group, particularly in the past three years, and the group now appears to come to much more amicable agreements.

Issue	Solution
Some members concerned if a breach would occur then access would be affected	Change in personnel removed objection, group then compromised and agreed to put a backstop in for some group members rather than letting assets fail if and when.
Repairing or allowing natural processes to take hold of the failed breastworks	Through conversation, acceptance was achieved. Through removal of other defences, predictions of beach stabilization have been realized and acceptance has been agreed in moving forwards. Shingle bun was constructed to assure some members. Now the group work out how to effectively *manage* the failure and not what to do *when* it fails.
Different values	Building trust, particularly over the last three years. Removing barriers concerning funding issues and creating mutual trust and respect. Getting confidence from all members and gaining an understanding of the different perspectives.
"*A stitch in time versus a major change*" – allowing	"*Not fully resolved*", according to one interviewee, as there has not yet been a major storm to put the site to the test. However, another

defences to fail or be repaired.	interviewee suggests there is a strategy in place which will maintain the beach with sand and shingle should concerns arise following a major storm.
How East Head should be managed.	Having the evidence in various formats and being able to freely discuss this within the group. Establishing trust over time (years) and allowing everyone to have a say thereby building relationships. Face to face meetings and discussion have been useful as well as community involvement to find out thoughts and come to negotiations.

Table 2. Summary of interviewee's thoughts on main conflicts and how they have resolved.

Many interviewees outlined the EHCIAG as an exemplar of what can be achieved. Such major successes included communication between national groups, which did not exist before the group was formed. Another interviewee also recognized the group as an "*effective vehicle in managing well-being*" and providing people with assurance through proven competency within an established group. The EHCIAG benefits from a narrow focus both in terms of location and what can be done. All interviewees advised that "*transparency, people with specific expertise and regular meetings and communication*" were key to creating a successful coastal advisory group. According to one interviewee, "*The absolute right people with the right expertise are on the group, it is a very open forum and seems to be working very well.*" However, one interviewee suggested it is possible for specific expertise to be brought in, although it can be useful if it already exists within the group. Regular meetings are project dependent and can vary, but according to most interviewees, the key factor is "*communication*" in creating a successful group. Another interviewee highlighted gaining trust from the local population through education and communication to ensure effective engagement, but advised that the group must be "*prescriptive*". Building up trust and relationships is also "*integral to be able to reach a consensus*".

Generally, the consensus is that the EHCIAG has been a success and all interviewees raised some key points for similar coastal groups to consider:

- Main bodies have transparency of opinions; everyone knows who is standing where.
- Having people who understand the issues in order to make a rationale decision.
- Getting the right people around the table, considering location and who is affected.
- Remain focused on what you want to achieve.

- Share a similar vision which can take "*time*" and "*patience*". This means listening to all the arguments and realizing what can and cannot be done concerning regulations.
- Consider what funding is available early on.
- Be consistent, make sure members understand all changes.
- Have meetings regularly or when required.
- Not having any "*hidden agendas*", as trust and honesty is very important.
- Having a website for providing news and updates, receiving opinion and creating an open, free and working discussion is a good vehicle for communication.

Despite concerns surrounding the policy, all the respondents generally regarded the EHCIAG as a valuable tool in stakeholder engagement which can be adapted elsewhere. The EHCAIG has provided an exemplary example of effective stakeholder engagement through the creation of a site-specific coastal advisory group and has the potential to become a model of best practice. Several interviewees signified the effectiveness of the EHCIAG in comparison to other groups they had previously worked in. Several comments recognized this:

*"We are the test case and raised as the **best example** of working with local communities around the country".*

*"It's been an **incremental and evolutionary process** to gain that knowledge, understanding and confidence of all the players involved, including the community".*

*"We now understand more processes and **working together** in coastal groups has been a **fantastic achievement** and a sound base to go forwards from here".*

Whilst many aspects of best practice within stakeholder engagement can arguably be considered to be established (Figure 6), Table 3 has identified some guidelines for future best practice for similar organisations as defined by the stakeholders themselves. It is of course important to note that different sites will have differing factors to consider and therefore these recommendations are deliberately broad.
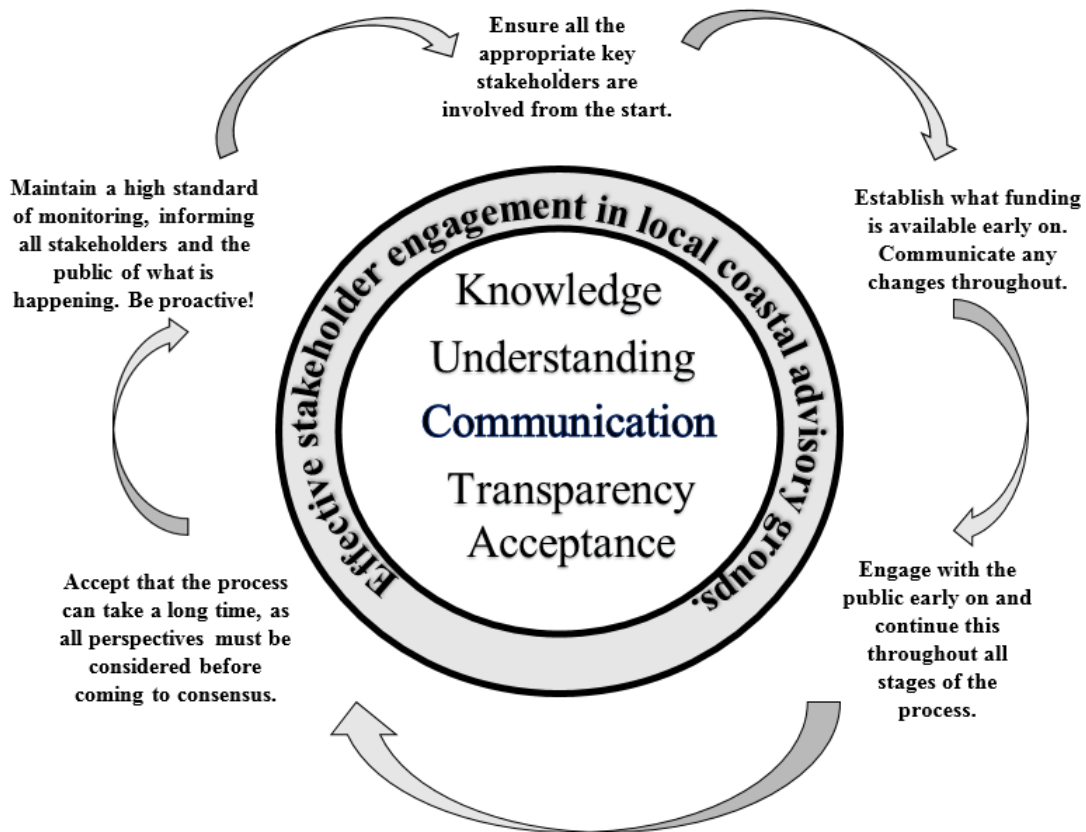
Figure 6. Model of best practice in effective stakeholder engagement within a coastal advisory group, based on the EHCIAG example. The stages are not necessarily sequential, rather indicative of the key steps to be considered.

Requirement or Recommendation	Reason	Interviewee responses supporting requirement/recommendation
Ensure all the appropriate key stakeholders are involved from the start	Anyone that may be affected by a decision should be entitled to an opinion and the chance to participate in the decision-making process to ensure all interests are accounted for.	*"Consider your location and who is affected".* *"You need all parties represented, choice of local stakeholders needs some thought".* *"Get all the key stakeholders involved – this is critical!"*
Establish what funding is available early on. Communicate any changes	It is important to establish what funding is available early on to rule out what simply cannot economically be done. If funding situation changes, communication is key in maintaining trust between all members.	*"There isn't always funding for studies".* *"Funding is not such a big issue for us but for many that needs to be brought on early on".*
Engage with the public early on and continue this throughout all stages of the process	Public consultation is essential in obtaining support when the community may be affected by decisions. Engagement through flyers, newspapers and posters is useful for regular updates, but engagement days are particularly effective in educating and establishing an understanding – reduces any potential resistance.	*"If you can gain the trust from the public that goes a long way, a key thing is communication and education".* *"Public consultation and exhibitions have been quite successful in getting the village onside".*
Accept that the process can take a long time, as all perspectives must be considered before coming to consensus	Differing opinions can create conflict, a process that must be worked through gradually to ensure everyone feels they have understood and accepted why a management decision has been reached, thus reducing potential for future conflicts.	*"Through conversation, acceptance was achieved".* *"Accept that it's going to take time to reach consensus but also accept you might not reach consensus but you need to remain focused on what you want to achieve".*
Maintain a high standard of monitoring, informing all stakeholders and the public of what is happening. Be proactive!	An incremental part of adaptive management lies in the monitoring regime. Evaluation is critical in order to adapt to any changes. It also promotes a pro-active approach, reassuring the public as well as all stakeholders involved.	*"We're on it when something is going on, keeping up communication, still watching and monitoring".* *"If we keep going all the time we might get that broader understanding".*

Table 3. Guidelines for future best practice of stakeholder engagement with a coastal advisory group.

It has been highlighted that the EHCIAG can be used as a model of best practice, Table 4 proposes some recommendations specifically for the EHCIAG but which also apply more generally to coastal action groups.

Recommendation	Reason
Clarification of "Adaptive Management"	To act without clearly understanding what the problem is, will likely result in a failure to reduce uncertainty. Although the policy is defined in the Terms of Reference, it would be beneficial to re-clarify the adaptive management policy. It is recommended to clarify and ensure effective interpretation of adaptive management in an ambition to reduce those uncertainties and increase confidence.
Interpreting coastal monitoring information	It was noted in this study that not all respondents were confident in the monitoring regime. It is therefore recommended that monitoring is interpreted into something that all members can understand. Even if monitoring shows no drastic changes, regular updates would reassure members who feel unaware of what is happening.
Increase education as a management tool	Public engagement has been perceived as effective, however increasing education, particularly in a changing climate where adaption methods are likely to become more popular, would be beneficial. Through education, understanding can be achieved, and with that acceptance.
Create a more defined group identity	This was mentioned by an interviewee as a way of building confidence in the decisions made by the group. For the wider community it should be recognized that any decisions were made by the group rather than someone going it alone and making independent decisions. It is recommended to have a specific interactive website that is publicly available relating to the EHCIAG, indicating any works that are being carried out. This should include regular updates, perhaps incorporating previous recommendations of continued education and interpretation.

Table 4. Recommendations for the EHCIAG in progressing forwards.

4. Conclusions

This research has provided insight into how and under what conditions participatory efforts contribute to confronting flood hazards and erosion to deliver sustainable coastal management. By evaluating the perceptions of the advisory group EHCIAG, it has been possible to ascertain the opportunities and challenges that can arise from a local advisory participatory group approach. The best practice model and recommendations have been developed as a proven method of what requirements are needed for successful stakeholder engagement at a local level and the case study has demonstrated that a great deal can be learned from the EHCIAG experience, providing an opportunity to create similar locally negotiated strategies in different geographic locations both nationally and internationally. The current research has identified an example of effective local communication in FCERM, where a previously acknowledged gap was evident (Thaler & Levin-Keitel, 2016) and supported evidence for the need of effective communication within the uncertainty of environmental change. The experiences of the EHCIAG clearly show that this type of model can be effective. It is clear from this research that similar schemes require consistency and reliability in terms of funding, monitoring and analysis. It is also clear that effective coastal advisory groups need to be engaged early on in the management process and maintained for continued management and engagement.

Adaptive management was developed primarily as a means of reducing ecological uncertainty and bridging interdisciplinary gaps, but deciding upon its implementation should be carefully considered depending on surrounding factors (Rist *et al*., 2013). East Head provides a sound base for testing adaptive management as few people or properties are significantly at risk. This study has indicated that although concerns remain surrounding the effectiveness and consequences of adaptive management, "*it is still very early days in terms of coastal change*" (interviewee response). By providing an awareness of any changes, acceptance has been achieved and the EHCIAG has been "*an excellent vehicle*" (interviewee response) in accounting for the differing interests as well as addressing the concerns of the community. It is also clear from this research that effective communication at all levels is required for the continued acceptance of adaptive management within coastal areas.

There is clearly scope for further investigation including, research on the perceptions and attitudes of the community surrounding East Head and wider comparative studies on coastal advisory groups and adaptive management. The adaptive management policy at East Head is still in the early stages and therefore its success has yet to be fully evaluated. According to one interviewee, this could take "*decades*". It would therefore be beneficial to undertake studies of

other examples of adaptive management, perhaps in the latter stages (if possible), to address the potential benefits and drawbacks. It would also be of interest to evaluate the variation of views based on the stage of the strategy. As Thaler and Levin-Keitel (2016) advised, there remains few examples of how adaptive management has been utilized to enhance the success of coastal restoration.

It has been suggested that future coastal zone management plans should be updated more regularly to provide adaptive approaches better suited to a changing dynamic environment, which consider alternative solutions and reduces future risks (Association of State Floodplain Members, 2013). Key to this process is a co-management approach and the effective participation of all those involved. Through the creation of local coastal advisory groups, key stakeholders can work together to initiate compromise and provide the basis for establishing more "unified and locally accommodative partnerships" (Milligan & O'Riordan, 2007, p. 507). The EHCIAG provides an excellent example of what can be achieved through effective stakeholder engagement within an advisory group. As one interviewee highlighted, "*it is great to have everyone around the table to be able to make these decisions in partnership....it demonstrates a real commitment from all the partners and the strength of the group as a whole, that we can stand together to achieve this*". This could be one way of moving forward to create and manage truly sustainable coasts.

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