A critical evaluation of stakeholder engagement in adaptive management: a case study of East Head, Chichester Harbour, UK

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Statement of Originality

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Abstract

Coastal zones are integrally linked to our way of life. However, in a changing climate, flooding and coastal erosion is becoming a significant issue and it has been increasingly recognised that new long-term sustainable methods are required. As such, adaptable approaches are emerging as a new paradigm in coastal zone management. However, flood and coastal erosion risk management is dissimilar to many other forms of environmental governance, particularly concerning the need for direct engagement between stakeholders to come to agreement in locally accepted strategies. Therefore, central to the adaptive management process is the effective engagement of stakeholders to encourage a participatory decision-making process, thus improving the understanding of change and achieving collaborative consensus and acceptance.

This study has critically evaluated stakeholder engagement in adaptive management at East Head, Chichester Harbour, UK. Specifically, it has examined the perceptions of the East Head Coastal Issues Advisory Group on two key areas; the adaptive management policy and the effectiveness of the advisory group. A web-based questionnaire survey and semi-structured telephone interviews were used to address these two areas.

The study has indicated that concerns remain surrounding the effectiveness of the adaptive management policy and its consequences for the future, although it has been highlighted that the policy is still in its early stages. However, most significantly it has been expressed that the East Head Coastal Issues Advisory Group has been a valuable vehicle in bringing together key stakeholders throughout all stages of the decision-making process. Through this co-management approach, conflict has gradually been reduced through building knowledge, gaining trust and ultimately achieving acceptance. A model for effective stakeholder engagement within a local advisory group has been developed based upon the East Head Coastal Issues Advisory Group experience.

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Contents summary

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List of abbreviations

AM – Adaptive Management

AONB – Area of Outstanding Natural Beauty

ASFPM – Association of State Floodplain Members

CDC – Chichester District Council

CG – Coastal Group

CHC – Chichester Harbour Conservancy

CME – Cakeham Manor Estate

DEFRA – Department for Environment Food and Rural Affairs

EA – Environment Agency

EU – European Union

FCERM – Flood and Coastal Erosion Risk Management

FGWT – F Glenister Woodger Trust

FRM – Flood Risk Management

FWMA – Flood and Water Management Act

ICZM – Integrated Coastal Zone Management

LA – Local Authority

LGA – Local Government Association

MAFF – Ministry of Agriculture, Fisheries and Food

MStAG – Medmerry Stakeholders Advisory Group

NE – Natural England

NPFF – National Planning Policy Framework

NSSMP – North Solent Shoreline Management Plan

NT – National Trust

PPS25 – Planning Policy Statement 25

SLR – Sea Level Rise

SMP – Shoreline Management Plan

SSSI – Site of Special Scientific Interest

UNCED – United Nations Conference on Environment and Development

WFD – Water Framework Directive

WWE – West Wittering Estate

WWPC – West Wittering Parish Council

Contents Detail

Chapter One

Introduction

1.1 Introduction

This research aims to investigate, evaluate and establish a thorough understanding of the effectiveness of stakeholder engagement in the East Head Coastal Issues Advisory Group (EHCIAG) within Adaptive Management (AM) at East Head, Chichester Harbour, United Kingdom (UK).

This chapter starts by introducing the focus of the project and the rationale for the research. The aims and objectives of the research are then introduced and the chapter concludes with an overview of the dissertation structure.

1.2 Focus of the project and rationale

Throughout the Earth's history, natural coastal morphological change has been an ongoing process in response to varying geomorphological and oceanographic factors (Cowell et al., 2003). In the UK, the coastline is predominantly in a transgressive phrase, whereby the shoreline advances landwards in response to sea level rise (SLR), evidenced by coastal erosion (Burgess, Jay, & Nicholls, 2007). Other drivers including offshore bathymetric transformations, changes in tidal, wave and wind patterns and a changing sediment budget, e.g. shorelines switching from drift to swash-aligned due to exhaustion of sediment supply, can all operate and interact at different temporal and spatial scales to produce the overall form of the coastline (Stive et al., 2002; Cowell et al., 2003; Cooper & Navas, 2004; Pirazzoli et al., 2004; Regnauld et al., 2004). According to Linham and Nicholls (2012, p. 95), all of these changes are likely to have "far-reaching consequences for the world's coastal zones".

Human activity can exert additional pressure on coastal zones, often against the natural trends of nature (Pope, 1997; Linham & Nicholls, 2012). Throughout history, man has attempted to control coastal behavior through interferences such as land reclamation, coastal defence and dredging, particularly as coastal developments have increased alongside a growing population (Burgess, Jay, & Nicholls, 2007). However, these interferences are having cumulative effects, consequently disturbing the balance of coastal systems (Coffey & O'Toole, 2012).

It has been recognised that continuing with hard engineering will not be suitable for all areas in the future (Cooper & Mckenna, 2008; Pontee & Parsons, 2012; Challies et al., 2016). Furthermore, limited finance has meant decisions must be made concerning the continued maintenance of coastal defences (Preston, 2015). As such, adaptive approaches should be considered, enabling finance to be utilised in heavily populated areas (Pontee & Parsons,

2012; Preston, 2015). According to the Department for Environment, Food and Rural Affairs (Defra) (2006), withdrawal of coastal defence could also assist in meeting environmental targets and encourage society to make space for nature by working with natural processes.

Over the past two decades, the presence of recurring flood disasters has seen a shift towards more integrative risk management paradigms (Hall et al., 2003; Penning-Rowsell et al., 2006; Heintz et al., 2012; Challies et al., 2016). In particular, the development of Integrated Coastal Zone Management (ICZM) and Shoreline Management Plans (SMP) has encouraged more holistic and integrated approaches (Potts, 1999; Preston, 2015). This has empowered local decision-making and adaptive approaches have received more attention (Cicin-Sain & Knecht, 1998; Potts; 1999; Challies et al., 2016).

Effective stakeholder engagement has been recognised as a central component in coastal planning decisions and management. As Thaler and Levin-Keitel (2016) acknowledged, there have been an increasing number of papers in which stakeholder engagement was found to be more important in Flood Risk Management (FRM). In particular, there have been several studies in Flood and Coastal Erosion Risk Management (FCERM) regarding integrated and participatory-based management approaches (Hall et al., 2003; Penning-Rowsell et al., 2006; Johnson & Priest, 2008; Heintz et al., 2012). A study by Hartmann and Spit (2016) emphasised that communication must be improved between stakeholders throughout the planning and decision-making process. Furthermore, Kuhlicke et al. (2016) found the effectiveness of participatory approaches has been widely challenged.

According to Benson et al. (2016) and Challies et al. (2016), a gap in knowledge was evident, signifying a requirement for further social scientific research on the role of participation in FCERM, particularly in adaptive approaches. Furthermore, although a large number of studies have been undertaken across global, national and regional scales (Hall et al., 2003; Penning-Rowsell et al., 2006; Johnson & Priest, 2008; Heintz et al., 2012; Benson et al., 2016), there are few studies that focus on integrative, participatory approaches within FCERM at a local scale. Many authors advocated the need for locally accepted FCERM interventions (Johnson & Priest, 2008; Butler & Pidgeon, 2011; Challies et al., 2016). Therefore, this study will aim to address the knowledge gap by evaluating the effectiveness of stakeholder engagement in AM within FCERM. The study area, East Head, Chichester Harbour, UK (Figure 1.1 & Figure 1.2) provides an excellent example of a site with an established stakeholder group (EHCIAG), who have together worked through all stages of the AM policy.

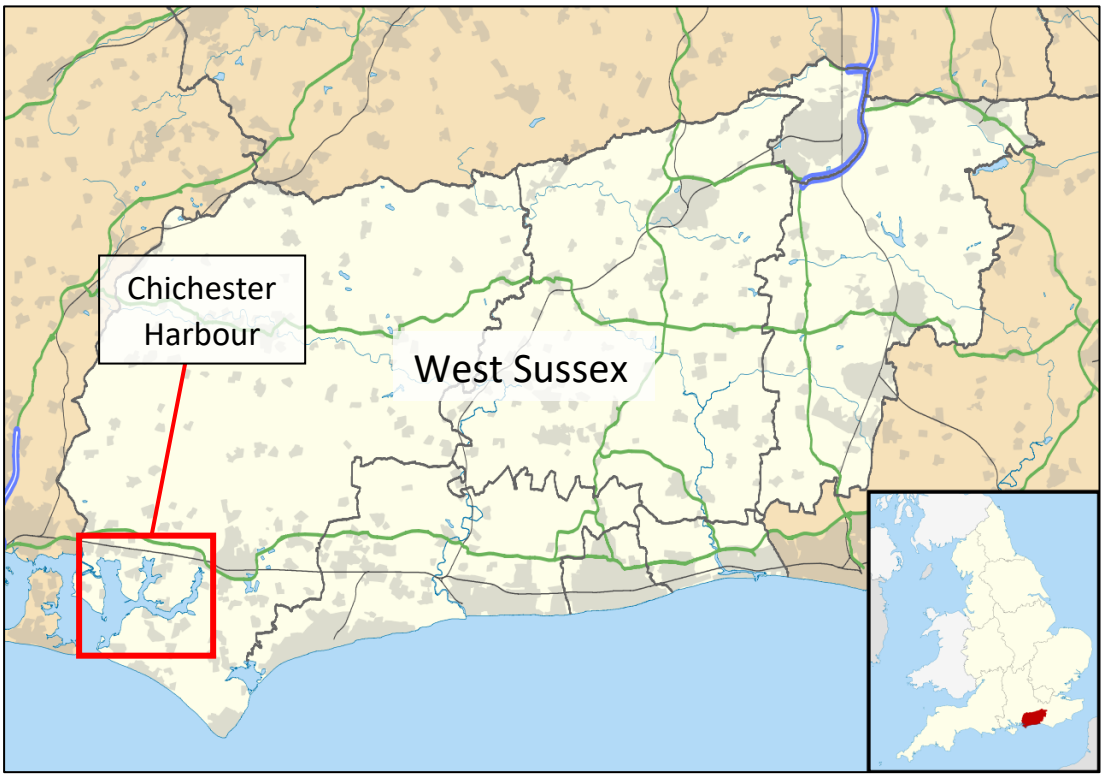

Figure 1.1 Location of Chichester Harbour, West Sussex in relation to regional England (after Ordnance Survey OpenData, 2010).

Figure 1.2 Location of study area, East Head (indicated by the red box), relative to Chichester Harbour (after Ordnance Survey, 2016).

Through conducting this research, the study could potentially contribute to existing literature and improve stakeholder engagement in FCERM. By providing a localised example of an advisory group, the successes and challenges could be explored, enabling a model of best practice to be developed. Additionally, the study provides a unique example of stakeholder engagement in AM, which has rarely been examined in previous literature.

1.3 Aims and objectives

The overall aim is to critically evaluate stakeholder engagement in adaptive management at East Head, Chichester Harbour, UK to develop a model of best practice.

Table 1.1 lists the research objectives which need to be considered in achieving the overall aim.

Table 1.1 Project objectives.

Objective No.	Objective
1	Critically review the literature to explore the frameworks and approaches to shoreline management, including the emergence of adaptive management.
2	Review the literature to examine the benefits and drawbacks of stakeholder engagement using local and international examples.
3	Examine and analyse stakeholder involvement within the adaptive management policy at East Head, including perceptions of the effectiveness of the advisory group.
4	Evaluate the perceptions of the East Head Coastal Issues Advisory Group towards the adaptive management policy and effectiveness of stakeholder engagement at East Head, thus identifying successes and challenges.
5	Put forward a series of recommendations for stakeholder engagement in adaptive management at East Head, to develop a model of best practice for future coastal management.

1.4 Dissertation structure

This research project has been divided into seven chapters, detailed in Table 1.2.

Table 1.2 Dissertation structure.

Chapter	Detailed Explanation
One	Outlined the focus and rationale for the research, as well as the project aims and objectives.
Two	Presents a thorough review of the topical literature and is divided into eight subsections. The first and second sections review the impacts and responses to coastal erosion and flooding. The policies concerning flood and coastal erosion risk management are then explored in section three. Section four focuses on adaptive management and working with natural processes. Stakeholder engagement and stakeholder analysis in flood and coastal erosion risk management is explored in sections six and seven. Section eight outlines a critical review of previous local and international examples with lessons learnt, including an indication of gaps in the research.
Three	Introduces the methodology used to carry out this research. Firstly, the case study area is identified. Following this, a detailed explanation of the chosen research methods is discussed regarding development, administration and analysis of the questionnaire survey and interviews. The chapter will evaluate the chosen methods and draw conclusions, ensuring the most appropriate methods for this research are conducted.
Four	Presents and discusses a detailed analysis of the data collected through the questionnaire survey. The chapter is divided into three subsections. The first section addresses the characteristics of the respondents, with subsequent sections providing a more comprehensive view of key themes. Reference to the literature will facilitate comparisons to this research.
Five	Analyses and discusses the results of the semi-structured interviews which were conducted to gain a more in-depth view and understanding of the survey responses. Before the outcomes of the interviews are explored, analysis methods are discussed.
Six	Summarises, discusses and critiques the major findings of the previous two chapters. Following this, recommendations are made and areas of further research are suggested.
Seven	Presents a summary of key findings and draws final conclusions.

Chapter Two

Literature Review

2.1 Introduction

This chapter aims to critically examine and discuss the existing literature to achieve objectives 1 and 2 in section 1.3. This chapter is divided into six main sections and will provide a foundation for the research, enabling comparisons to be made with this project in the subsequent chapters. The first section discusses the impacts of flooding and coastal erosion. The second section evaluates the historical and current responses to FCERM. Section three identifies the policies concerning FCERM and section four addresses the approach to adaptive management. Section five focuses on stakeholder engagement addressing the benefits and drawbacks, as well as the need for stakeholder analysis. Section six concludes the chapter by critically reviewing other experiences of stakeholder engagement in FCERM and identifying the gaps in the research.

2.2 Flooding and coastal erosion: the impacts

Shorelines are ephemeral and dynamic places where erosion can be a dominant process, often leading to landward retreat of the coastline (Linham and Nicholls, 2012). According to the European Commission (2015), around half of the world's population lives within 60km of the coastline, in Europe alone this equates to 200 million people. This figure is expected to rapidly increase further by the 2080s (Figure 2.1) (Nelleman, Hain, & Alder, 2008). As a result, coastal change has become a hazard with the capacity to cause significant damage and disruption. Flooding is one such hazard, which can have devastating effects and cause catastrophic impacts at local, regional and national scales (Wheater; 2006; Lamond, Proverbs & Antwi, 2007). Impacts include significant damage or loss of property, infrastructure and agricultural land (Jongman et al., 2012). Furthermore, during coastal flooding, the movement of salt-water into freshwater areas (saline intrusion) can impact on the biodiversity of freshwater ecosystems (British Geological Survey, 2012). Additionally, any flooding event can impact negatively on the economy, often costing billions to the insurance sector, businesses, individuals, communities and the government (Dathan, 2015).

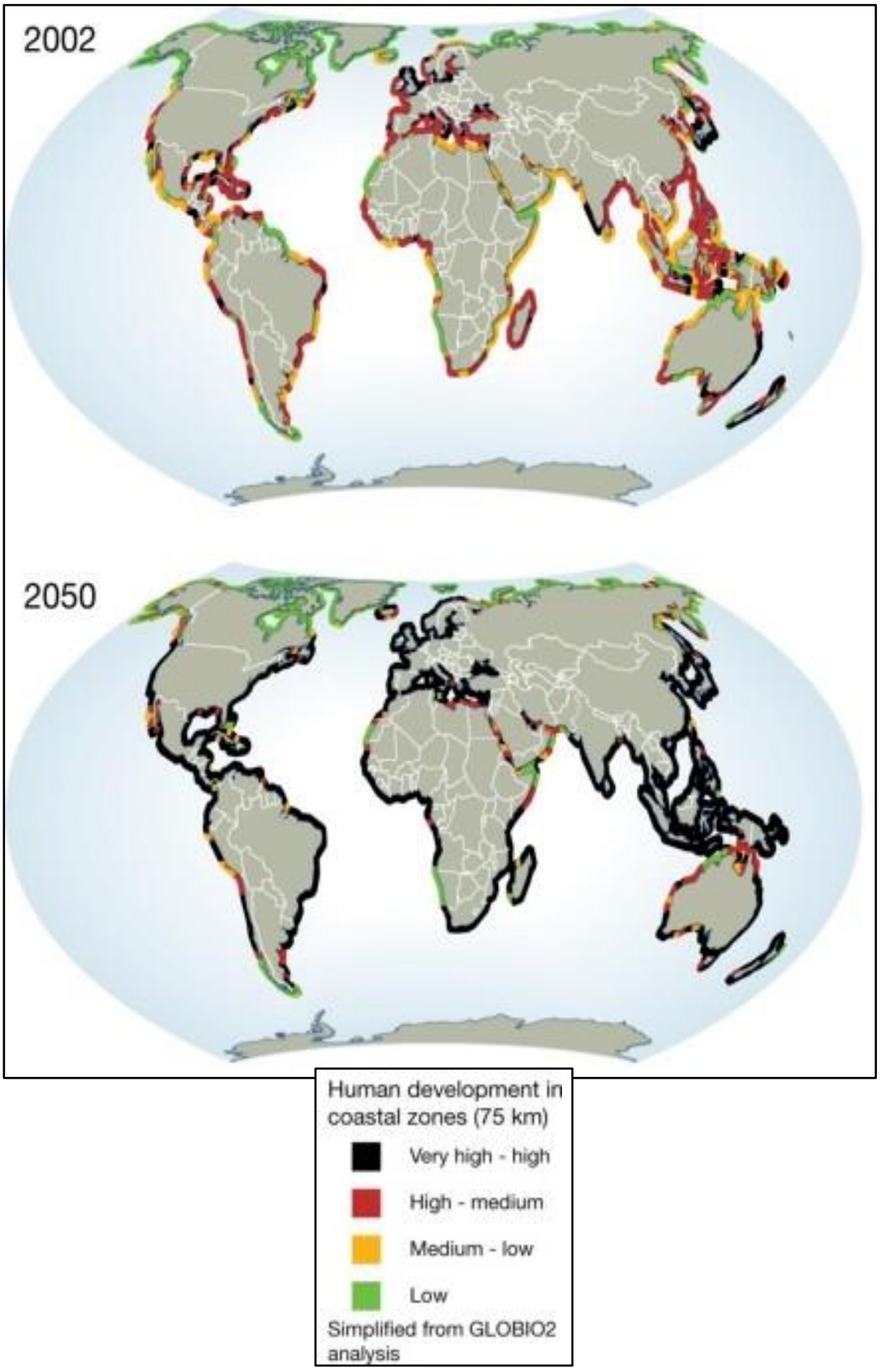

Figure 2.1 Recorded human development in coastal zones in 2002 and future predictions in 2050 (Nellemann et al., 2008).

In the UK, flooding events are becoming increasingly frequent, causing widespread damage to local communities (Connor, 2016). Most recently, extreme flooding occurred in the UK following the devastating effects of Storms Desmond, Eva and Frank, costing the UK economy up to £5.8 billion in the long-term (Connor, 2016). According to Connor (2016), future predictions of SLR and climate change will increase the frequency and intensity of floods further. Furthermore, a study by the National Climate Assessment (2014) anticipated climate-related changes include a SLR of up to 0.6m by 2100, including larger storm surges and extreme waves (Figure 2.2).

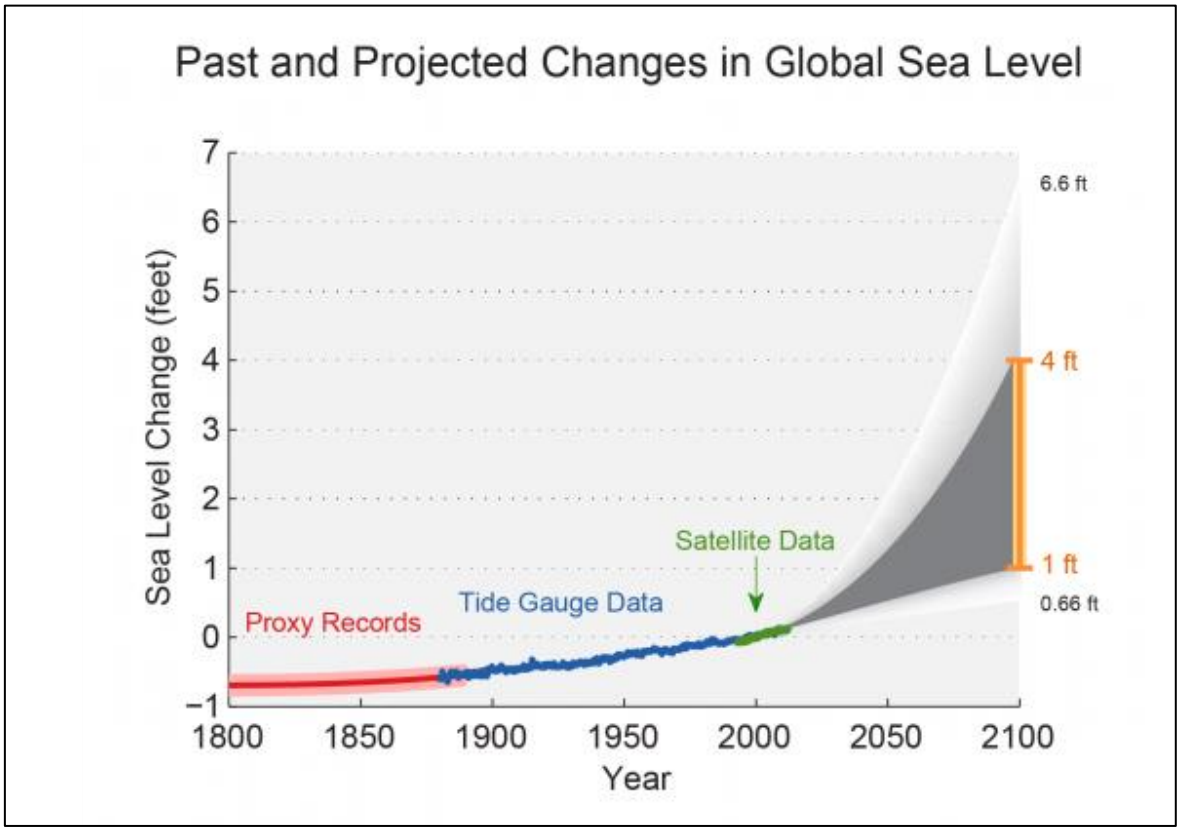

Figure 2.2 Past and projected changes in global SLR (National Climate Assessment, 2014).

The severity of recent flooding in the UK has led to growing concerns about societal vulnerability, particularly in the context of floodplain development, climate change and changing insurance practices (Connor, 2016). It is therefore imperative that since coastal zones are amongst the most densely populated and dynamic natural environments on Earth, that they are managed in the most appropriate way in order to ensure long-term sustainability (Linham and Nicholls, 2012).

2.3 Response to coastal erosion and flooding

2.3.1 Historical response to coastal erosion and flooding

Historically, flooding and coastal erosion has been managed through hard defences, e.g. sea walls, groynes, rock armour etc. (Cooper & McKenna, 2008), due to boundaries between the land and sea being considered as fixed (Coates et al., 2001). Furthermore, the environmental, social, political and economical aspects of coastal management had previously been considered as independent factors in the decision-making process (Kay & Alder, 2005). As coastal zones generate interest to a wide range of stakeholders, such as coastal planners and managers, residents, NGOs, governments, businesses and the public (Duxbury & Dickinson, 2007), conflict has been a common issue in coastal management, particularly when an interest is not accounted for (Cicin-Sain and Knecht, 1998).

More recently, it has become recognised that this historical approach is not sustainable and other strategies would need to be considered, accounting for natural processes as well as stronger integration amongst stakeholders (Pettit, 1999; Humphrey & Burbridge, 2003; Masselink et al., 2011).

2.3.2 Integrated Coastal Zone Management

In 1987, the concept of sustainability was recognised globally within the 'Brundtland Report', and sought to "meet the needs of the present without compromising the ability of future generations to meet their own needs", declared in the United Nations Rio Conference on Environment and Development (UNCED) in 1992 (Report of the World Commission on Environment and Development, 1987, p. 4). The concept was supported by a list of twenty-seven guiding principles and led to Agenda 21, where Chapter 17 specifically related to the protection of the world's coasts and seas (Table 2.1) (UNEP, n.d.).

Table 2.1 The programme areas of Agenda 21, Chapter 17. The reference to integrated management and sustainable development of coastal areas is highlighted in red (Adapted from Agenda 21, n.d.).

	Programme Areas of Agenda 21, Chapter 17
1	**Integrated management and sustainable development of coastal areas, including exclusive economic zones**
2	Marine environmental protection
3	Sustainable use and conservation of marine living resources of the high seas
4	Sustainable use and conservation of marine living resources under national jurisdiction
5	Addressing critical uncertainties for the management of the marine environment and climate change
6	Strengthening international, including regional, cooperation and coordination
7	Sustainable development of small islands

As a result of Agenda 21 (Chapter 17), Integrated Coastal Zone Management (ICZM) became globally recognised as a way of sustainably managing the worlds coastlines. It was also created as a mechanism to collaborate all key aspects in achieveing integration (Kay & Alder, 2005). As suggested by Portman et al. (2012), integration differentiates ICZM from traditional coastal management strategies as it encompasses a range of stakeholders, combining policy-making with the knowledge of science (Figure 2.3).

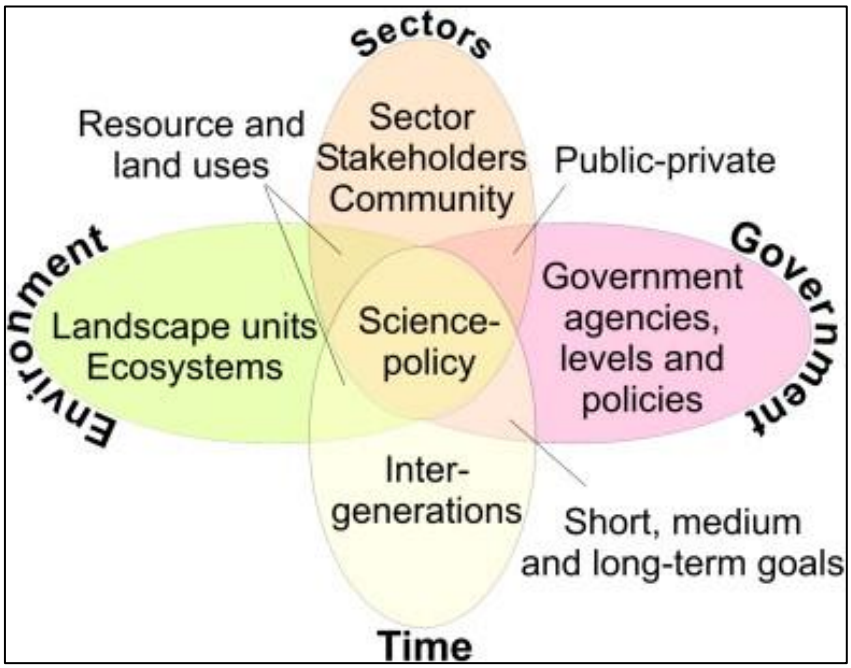

Figure 2.3 Addressing the science-policy interface in integration, considering several dimensions including horizontal (amongst different-use sectors) and vertical (amongst different levels of government) integration (Portman et al., 2012).

In 2002, the European Union established a list of key principles to apply a strategic and integrated approch to ICZM in Europe (Table 2.2). The principles have subsequently become the main standard by which European ICZM progess is measured (McKenna et al., 2008).

Table 2.2. The eight EU principles, set out in Chapter Two of the Recommendation of the European Parliament in 2002, for achieving ICZM (European Commission, 2015).

Principle	Aim of the principle
A broad overall perspective	Thematic and geographic – takes into account the interdepedence and disparity of natural systems as well as human activites impacting the coast.
A long-term perspective	Takes into account the precautionary principle and the needs of present and future generations.
Adaptive management	Gradual process which will facilitate adjustment a problems and knowledge develop, requiring a sound scientific basis.
Local specificity	Makes it possible to response to practivcal needs with specific solutions and flexible measures due to the diversity of coastal zones.
Working with natural processes	Respecting the carrying capacity of ecosystems, making human activities more environmentally friendly, socially responsible and economically sound in the long-term.
Involving all the parties concerned	Involving economic and social partners, orgainsations representing residents, non-governmental organisations and the business sector in the management process by means of agreement and shared responsibility.
Support and involvement of relevant administrative bodies	At national, regional and local levels between which appropriate links should be established with the aim of improving coordination of the various exisiting policies.
Use of a combination of instruments	To facilitate coherence between sectoral policy objectives and coherence between planning and management.

2.3.3 Shoreline Management Plans and coastal defence

In the early 1990's, a study carried out by HR Wallingford established that coastal sediment movements occur within distinct boundaries, known as sediment cells (Motyka & Brampton, 1993; Bray, Carter & Hooke, 1995). A sediment budget can be calculated accounting for any inputs (sources) or outputs (sinks or stores) along a coastline, thus providing essential information about probable rates of change at specific locations (Figure 2.4) (Bray, Carter & Hooke, 1995; Komar, 1996).

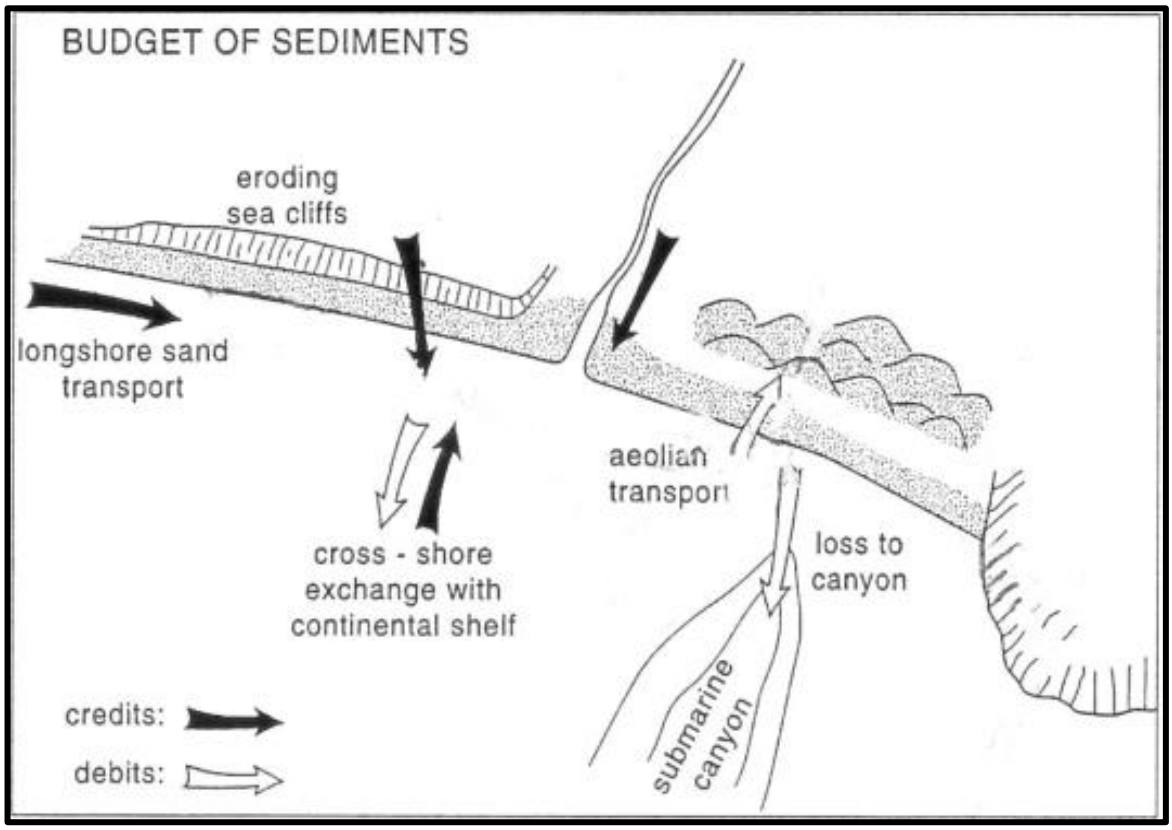

Figure 2.4 The main components involved in the formulation of a sediment budget. Credits represent inputs and debits represent outputs to the system (Komar, 1996).

Acknowledging this, in 1995 the former Ministry of Agriculture, Fisheries and Food (MAFF)[1], (introduced an integrated coastal defence strategy, known as a Shoreline Management Plan (SMP) in England and Wales. According to Defra (2001, p. 1), an SMP is a non-statutory high-level document which aims to provide:

"A large-scale assessment of the risks associated with coastal processes and presents a policy framework to reduce these risks to people and the developed, historic and natural environment in a sustainable manner."

[1] Disbanded in 2001, responsibilities transferred to Defra and the Welsh office.

SMPs were intended as a way of enabling proactive, long-term and large-scale planning of the risks of coastal erosion and flooding, wherein all the conflicting needs and constraints on the coastline are identified and considered (Cooper et al., 2002). They were created to provide advice to operating authorities and private landowners on the management of their defences, incorporating all aspects concerning the conservation of geologically and ecologically important sites (Defra, 2001). Furthermore, they enabled operating authorities, such as the EA, maritime local authorities and internal drainage boards to work with neighbouring authorities, to produce an SMP which covered a number of administrative boundaries (Cooper et al., 2002). To ensure the process between preparation and revision of existing plans is continued, Coastal Groups (CGs) are established in recognition of the need for a more integrated approach to SMP development (Potts, 1999). This sought to facilitate a discussion between parties with differing interests, such as consultancies, authorities and the policy developers (Potts, 1999).

There have been two generations of SMPs, the most recent created in 2006. The second generation were developed with a much stronger focus on creating polices that worked with natural processes (Preston, 2015). The generic coastal defence options are presented in Table 2.3.

Table 2.3. SMP coastal defence options (Defra, 2006).

Policy	Action
Hold the existing defence line (HTL)	Maintaining or changing the standard of protection.
Advance the existing defence line (ATL)	Constructing new defences seaward of the original defences.
Managed Realignment (MR)	Identifying a new line of defence to landward and, where appropriate, constructing new defences landward of the original defences.
No Active Intervention (NAI)	Where there is no investment in coastal defence assets or operations, i.e. no shoreline management activity.

2.4 Policies concerning Flood and Coastal Erosion Risk Management

Flood risk management in England has experienced significant changes from strategies which are dominated by specific flood defence to those which focus on flood probabilities and consequences (Table 2.4) (Johnson et al., 2005; Johnson, Penning-Rowsell & Parker, 2007). The transition from high-level strategy and decision-making processes, e.g. 'Making space for water' (Defra, 2005), to regional level processes, e.g. the EA 'Strategy for flood risk management 2003-2008', has been evident over recent years.

Table 2.4 Post-war flood policy in England emphasising the changes in strategies over the past 40+ years (Johnson et al., 2005).

Belief system	Land drainage (WWII – 1970s)	Flood defence (1980s – 1990s)	Flood risk management (2000s+)
Nature of humans	Humans have dominion over nature. Land is there for human use	Humans have dominion over nature (power and right to exercise it)	Humans are part of nature, not superior to it. Nature has intrinsic value
Priority of values	Priority on agricultural productivity and food security within the national economic context	Priority on economic growth, national security and welfare standards	Ecological and environmental values should be viewed on par with economic growth, national security and welfare standards
Fundamental policy position	To improve and protect agricultural land from flooding	To defend people and property from flooding	To manage flood risks equitably and in accordance with the principles of ecologically sustainable development
Basic policy mechanism	Investment in land drainage and rural flood defence	Investment in urban flood defence and flood alleviation schemes according to national priority criteria and economic appraisal processes	A focus on decisions that satisfy social and economic needs whilst maintaining the ecosystem enhancement

National policy on FCERM was previously set out in the Planning Policy Statement 25 (PPS25) in England (Local Government Association [LGA], 2015). However, after several reforms the government published the National Planning Policy Framework (NPPF) to promote local decision-making and maintain strong planning policy on managing risks of flooding based upon the central roles of local planning authorities (Defra, 2009) (Figure 2.5). Plans are to be supported by Strategic Flood Risk Assessments (SFRA) with a view to applying a sequential, risk-based approach to development in order to minimise flood risk to people and property (LGA, 2015).

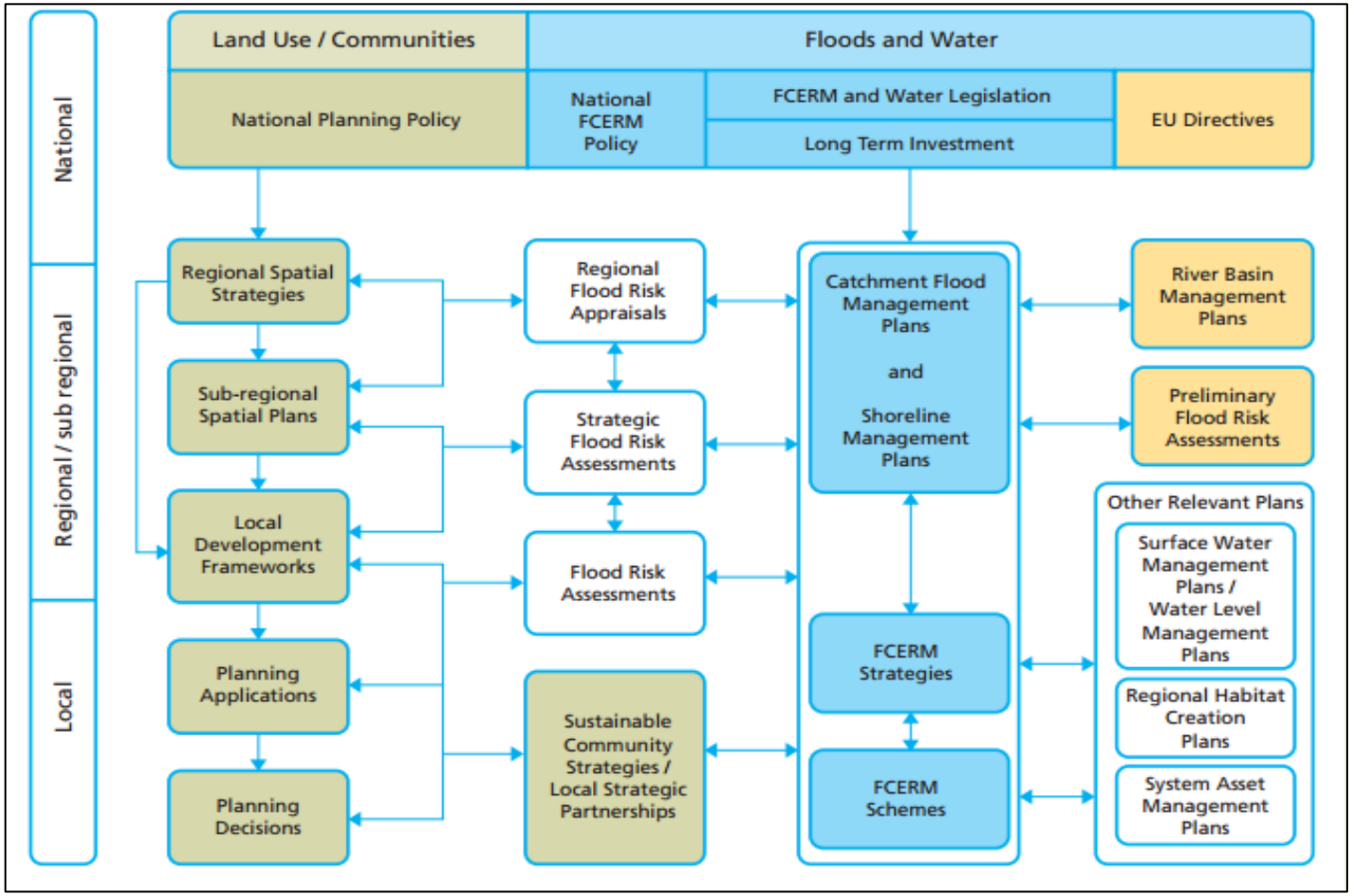

Figure 2.5 An overview of the roles and relationships between high level plans, strategies, schemes and other planning initiatives in FCERM (Defra 2009).

2.4.1 Pitt Review 2007

In 2007, after catastrophic flooding claimed several lives and devastated parts of England, Sir Michael Pitt was requested to review the country's flood defences (Defra, 2012). Pitt noted that flood and coastal risk could no longer be easily managed through construction of bigger harder defences and suggested that the country must try to adapt and work with natural processes in order to adhere to a more sustainable approach (Defra, 2011). The review was extremely comprehensive and brought forward 92 recommendations, of which ten related directly to local government (LGA, 2015).

2.4.2. Flood and Water Management Act 2010

The Pitt Review significantly shaped the Flood and Water Management Act (FWMA) 2010, which required that FCERM authorities were to contribute towards achieving sustainable development (LGA, 2015). The FWMA enables legislation to be updated to guarantee better protection from flooding and helps to reduce risk by clarifying those who are responsible for management (Defra, 2011). According to Defra (2011), there are now greater powers and defined responsibilities for tackling local sources of flood risk and new roles have enabled local flood authorities to effectively collaborate with other stakeholder groups.

Other strategies including 'Future Water', developed in 2008 following severe flooding, sets out the governments long-term vision for water management (LGA, 2015). It puts forward policies to encourage sustainable and effective management of flood risk and includes more holistic management approaches and planning for development, emergency, response and resilience to flooding (LGA, 2015).

2.4.3 European Legislation

The EU Floods Directive aims to provide a consistent approach to FRM across all of Europe. The directive applies to all types of floods (river, urban, coastal, storm surges etc.) and uses a three stage process approach to FRM (Figure 2.6) (European Commission, 2015). The Flood Risk Regulations transpose the EU Floods Directive into law in England (LGA, 2015).

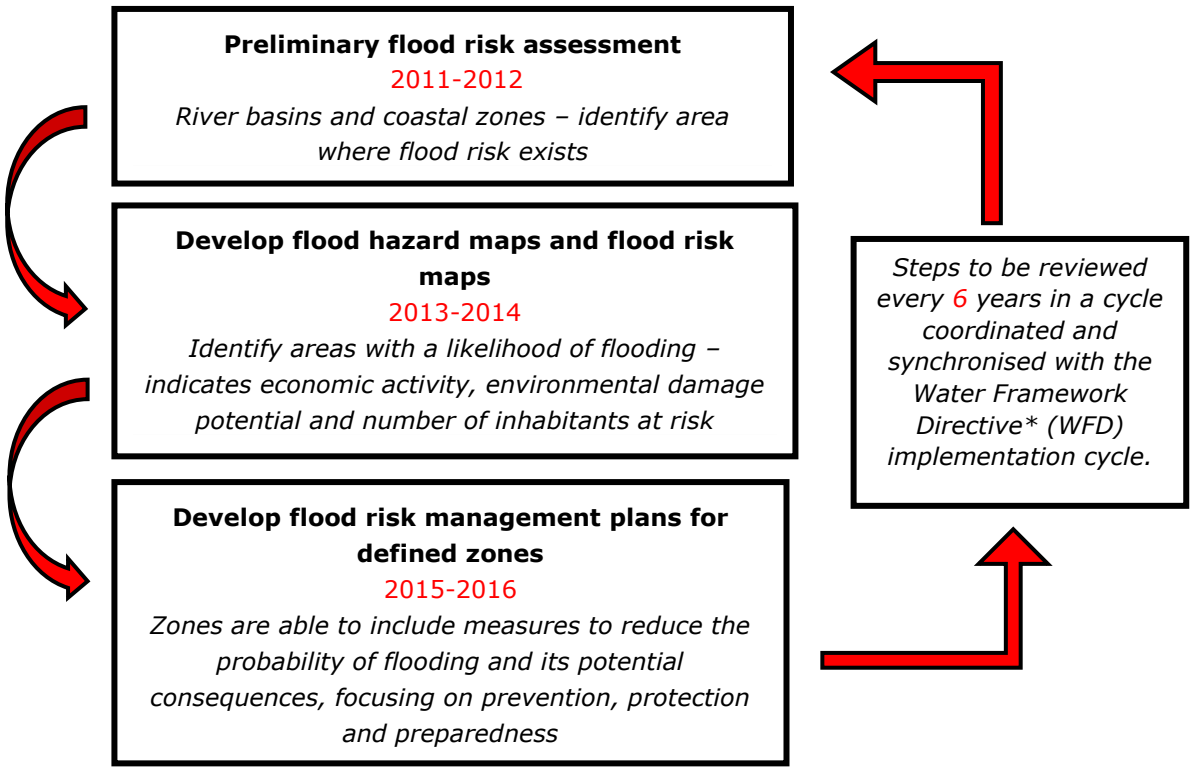

Figure 2.6 The three stage process for the EU Floods Directive which all member states have to complete. The years indicate expected completion for each stage. *WFD – EU member states must achieve good qualitative and quantitative status of all water bodies (including marine waters up to one nautical mile from shore) by 2015 (European Commission, 2015).

2.5 Working with natural processes in adaptive management

Coastal management in England is undergoing a major paradigm shift as it transitions from 'keeping flood water out' to one which 'makes space for water' (Defra, 2004). According to Defra (2008, p. 4), "adaptation is the process of becoming adjusted to new conditions, in a way that makes individuals, communities or systems better suited to their environment". Working with natural processes involves taking action to manage the risks of flood and coastal erosion by protecting and restoring the natural function of coasts (Environment Agency [EA], 2010). Due to limited funding, it has been acknowledged that unless there is a risk to significant assets or life, then natural processes should continue undisturbed (Ledoux et al., 2005). Furthermore, the Association of State Floodplain Members (ASFPM) (2013) suggested coastal zone management plans should be updated more regularly in order to provide adaptive approaches better suited to a changing dynamic environment, which considers alternative solutions and reduces future risks (Figure 2.7).

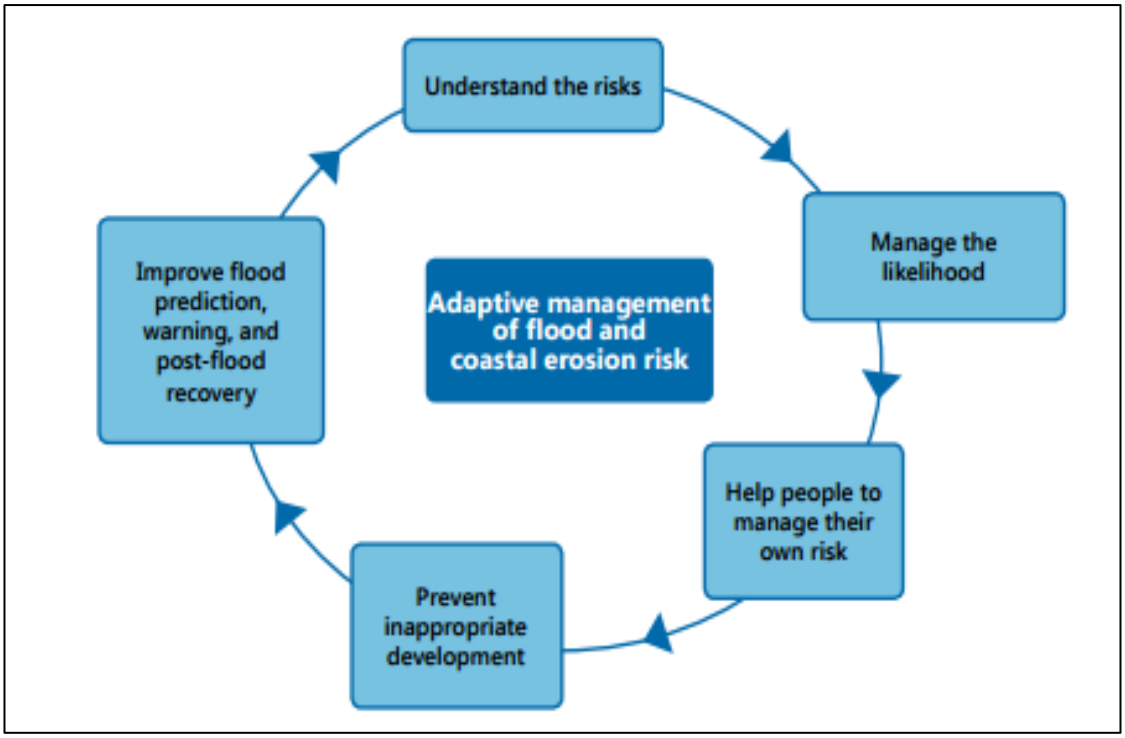

Figure 2.7 AM in FCERM. Although the steps are not necessarily sequential, the impacts of climate change coupled with an increasing population demand that there is reliable, accurate data in order to make sound decisions for future considerations (ASFPM, 2013).

Natural processes can operate across a continuum from mitigated engineering to complete naturalisation (Figure 2.8) (EA, 2012). As suggested by the EA (2012), Adaptive Management (AM) approaches do not necessarily have to replace traditional defences but can instead accompany them, thus increasing the capacity to cope with climate change. Sustainable combined techniques have the potential to not only regulate flooding and erosion but may also provide additional benefits such as enhanced biodiversity, improved water quality and carbon storage (EA, 2012). It is now widely recognised that the uncertainty of future 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; EA, 2009; Defra, 2010; Merz et al., 2010).

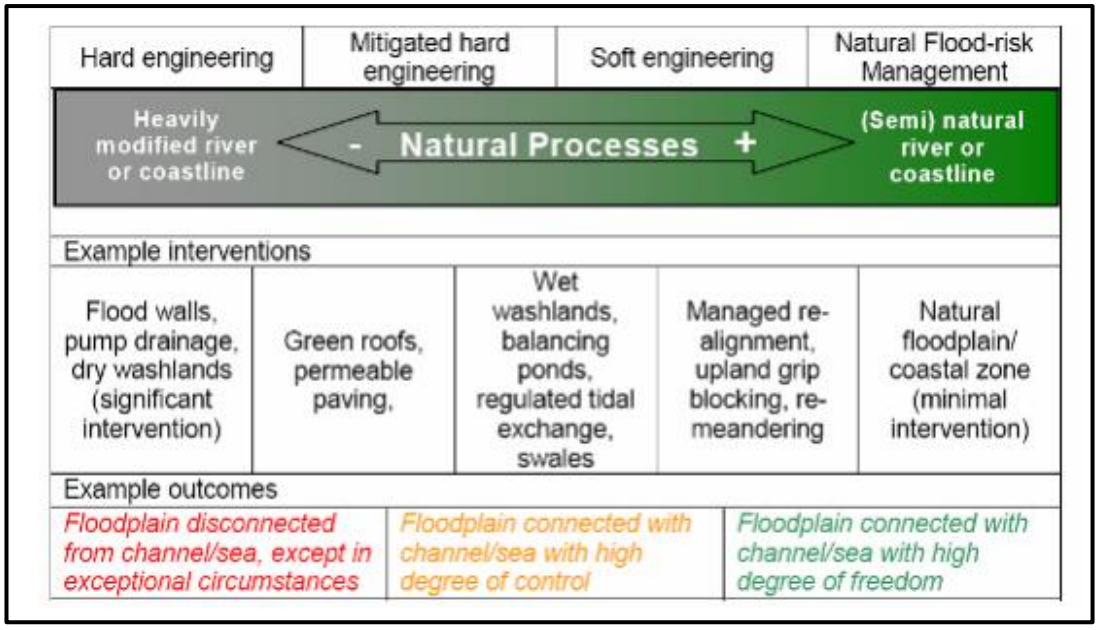

Figure 2.8 The continuum by which natural processes work from heavily modified to natural coastlines (EA, 2012).

2.6 Stakeholder engagement in Flood and Coastal Erosion Risk Management

The FCERM system in England contains a wide range of stakeholders at national and local levels (Defra, 2015). Defra have overall responsibility for defining policy direction and provide the funding scheme from the national government (Defra, 2015). The EA governs the strategic overview of all sources of flooding and coastal erosion and leads negotiations with third parties as the operational authority (Defra, 2015). At the local level, key stakeholders include Lead Authorities (LAs) and anyone with an interest in the site (Defra, 2015).

According to Green and Penning-Rowsell (2010), stakeholder engagement can be defined as a social process, where different groups work together to find a joint solution for a specific problem. Stakeholder engagement is a fundamental aspect of effective integrated FCERM, and consensus amongst stakeholders is often a key prerequisite in making a flood risk management strategy successful, e.g. 'Making space for water' (Renn, 2008). However, due to differing interests, a key problem often lies in the views of each stakeholder group on FCERM policy (Levin-Keitel, 2014). The complexity of the interactions between the ecological, physical and social processes in FCERM poses a significant challenge in understanding and managing floods (Wheater, 2002). Consequently, FCERM touches on an extensive range of sectors, thus requiring balance and mediation between the competing interests (Hall & Solomatine, 2008; Challies et al., 2016).

2.6.1 Definition of a 'Stakeholder' in the context of Flood and Coastal Erosion Risk Management

There are several definitions and differences of opinion as to what or who a 'stakeholder' is (Reed et al., 2009). Many definitions have built on the work of Freeman (1984), who conducted comprehensive work on stakeholder theory. As Carina and Keskitalo (2004) suggested, 'stakeholder' is a much used term which can be used in a narrow sense of the word or with a much broader understanding. The World Bank (2001) have a broad understanding of stakeholders, suggesting a stakeholder is everybody that is affected or interested by a project. For the purposes of this project it is necessary to define the boundary between those within the definition and those outside it (Mcglashan & Williams, 2003). In this context a stakeholder is thus defined as:

> *"individuals and groups, which may affect or be affected by the coastal decision"* (Mcglashan & Williams, 2003, p. 87).

2.6.2 The benefits and drawbacks of achieving stakeholder engagement in Flood and Coastal Erosion Risk Management

In recent years, stakeholder engagement has become recognised as an essential component in FCERM, alongside integrative management (Huitema et al., 2009; Challies et al., 2016). Particularly, with reference to AM, stakeholder participation is regarded as being central to the process (Figure 2.9) (Rist et al., 2013). Stakeholder engagement has become embodied in most policy statements and management frameworks, e.g. EU Floods Directive, and has been acknowledged as an effective way to reach consensus in policy and management decisions (Newig et al., 2014). According to Challies et al. (2016), the rationale for achieving stakeholder engagement in FCERM relates to shifts in environmental governance over the past half-century, whereby participatory decision-making has often lead to better plans, improved implementation and more beneficial outcomes. Participatory management can foster trust and strengthen support for decisions, whilst ensuring equal representation for all those involved (Rowe & Frewer, 2000). Furthermore, Newig and Fritsch (2009) suggested that environmental impacts are often lessened within effective participatory management in comparison to top-down, administrative decision-making.

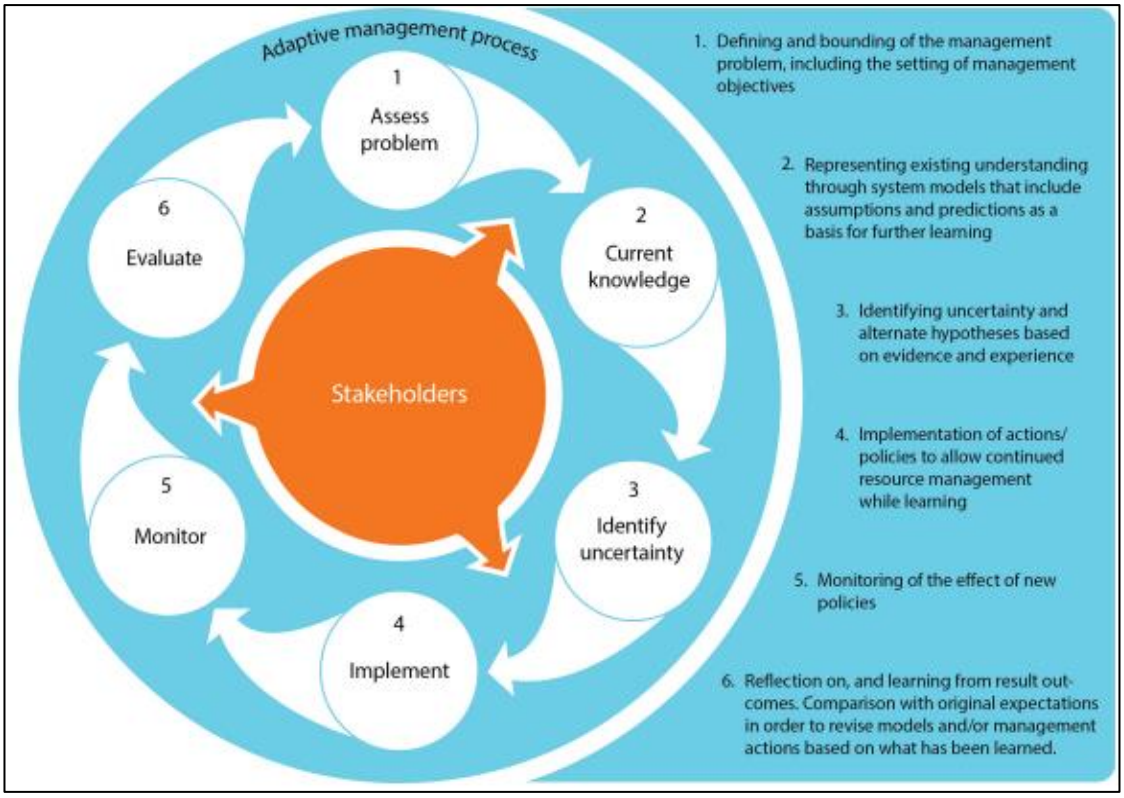

Figure 2.9 The adaptive management process, where stakeholder participation is considered central to the process (Based on Holling, 1978; Walters, 1986. Source: Rist et al., 2013).

Despite the many benefits of stakeholder engagement, potential drawbacks are also evident. According to Maguire (2010), consultation fatigue can occur, whereby stakeholders may be asked to participate in time-consuming processes but end up with little or no influence over decisions. There is also a risk of marginalising smaller stakeholder groups if there is minimal opportunity for them to express their views (Maguire, 2010). Therefore, stakeholder involvement can increase the likelihood of conflict, highlighting the importance of establishing an integrative decision-making process (Brody, 2003).

According to Levin-Keitel (2014), opportunities can often be lost due to disconnection between different tiers of the stakeholder hierarchy. As a result, there has been a shift from top-down decision-making to a more diverse and inclusive governance process, whereby multiple stakeholders are involved in decisions and implementation (Challies et al., 2016). As flooding and coastal erosion poses a threat to property, economic activity and human life at a community level, responsibilities are required to be redistributed away from centralised authorities (Thaler & Priest, 2014). This therefore implies the need for a concerted engagement with different stakeholders to arrive at locally accepted FCERM strategies (Thaler & Priest, 2014; Challies et al., 2016). Krick et al. (2005) identified five essential stages in effective stakeholder engagement (Figure 2.10).

Figure 2.10. The five stage stakeholder engagement framework (after Krick et al., 2005. Source: 'Getting to Sustainability', 2012).

2.6.3 Coastal advisory groups

The idea of forming coastal groups has been incorporated by many users concerned with coastal planning (Fletcher, 2003). According to Milligan and O'Riordan (2007), the idea of building local coastal partnerships based upon shared responsibility and trust is worth exploring. Coastal advisory groups can play a critical role in the management of the coast and it has become evident that more partnerships are needed that link local authorities to non-departmental bodies managing the coast (Fletcher, 2003; Milligan & O'Riordan, 2007; Stojanovic & Ballinger 2009). However, it must be noted that this could vary for different parts of the coast to reflect local geographies, political arrangements and histories, to adjust to the local specificity and management needs (Milligan & O'Riordan, 2007).

Coastal advisory groups could initiate compromise and provide the basis for establishing more "unified and locally accommodative partnerships", linking several organisations such

as Defra, EA, English Nature, tourism, landowners, resident's associations and parish councils (Milligan & O'Riordan, 2007, p. 507). This could be one way of moving forward to create consensus and truly sustainable coasts (Milligan & O'Riordan, 2007).

2.7 Stakeholder analysis

Stakeholder analysis is essential in developing an inclusive approach to management (Nicholls, 2014). According to Ramirez (2000, p. 102), "stakeholder analysis refers to a range of tools for the identification and description of stakeholders on the basis of their attributes, interrelationships and interests related to a given issue or resource". It has become popular in many fields within a wide range of organisations including governmental and non-governmental bodies, regulators, policy-makers, businesses and the media (Friedman & Miles, 2006). Reed et al. (2009, p. 1933) suggested stakeholder analysis is a process which:

- Defines aspects of a social and natural phenomenon affected by a decision or action.
- Identifies individuals, groups and organisations who are affected by or can affect those parts of the phenomenon.
- Prioritises these individuals and groups for involvement in the decision-making process.

Nicholls (2014), advocates an alternative framework within stakeholder analysis (Figure 2.11), which provides an insight into current and future relationships, within the social, economic and environmental system.

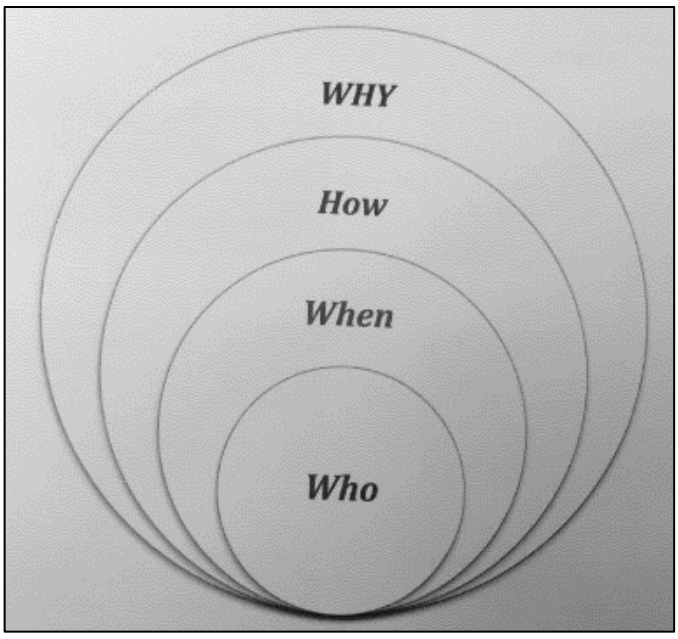

Figure 2.11 Components of stakeholder analysis (Nicholls, 2014).

2.7.1 The need for stakeholder analysis in Flood and Coastal Erosion Risk Management

According to Reed et al. (2009), it is well recognised by decision-makers that there is a requirement to understand who is affected by decisions and actions, and who has the power to influence their outcome i.e. the stakeholders. As stakeholders have varying levels of interest in the coastal environment, analysis is used to understand the diverse range of conflicting interests (Friedman & Miles, 2006). According to MacArthur (1997), The World Bank has been using this type of analysis within participation methodology since 1993. However, stakeholders are often selected on an ad hoc basis, thus marginalising important groups, introducing bias results and jeopardising long-term viability (Reed et al., 2009). Therefore, interest has been increasing in a range of methods that can be useful for analysing stakeholders (Figure 2.12) (Grimble & Wellard, 1997; Reed et al., 2009; De Nooy, 2013).

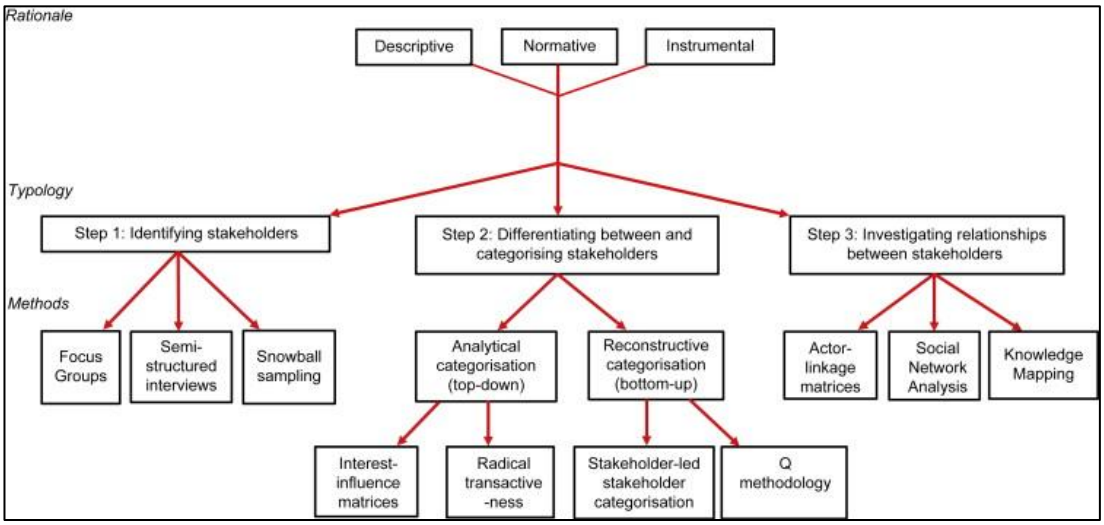

Figure 2.12 A schematic representation of rationale, typology and methods for stakeholder analysis (Reed et al., 2009).

Stakeholder analysis is regarded as being essential to social learning and improves the evaluation of management outcomes (Tompkins & Adger, 2004; Andersson, 2006; Crona & Hubacek, 2010). Furthermore, Dreyer and Renn (2011) advocated stakeholder analysis as a method which enables a holistic view and provides further insight into how stakeholders can learn from each other's actions. Therefore, in the context of co-management systems, stakeholders are more likely to adapt their knowledge and opinions to their partners (De Nooy, 2013). This type of analysis can also be used as an instrument for mitigating conflicts and managing resources (Grimble & Wellard, 1997), and could prove an essential tool in ensuring long-term policy (De Nooy, 2013).

2.8 A review of best practice and lessons learnt from local and international experience

This section will provide examples of topical research with relevance to this project, including an example of a similar advisory group in FCERM (2.8.1) and a case study of partnership and engagement in FCERM, Austria (2.8.2). Identification of the gaps in existing research will then be identified (2.8.3), thus emphasising the rationale for this project.

2.8.1 Medmerry Stakeholders Advisory Group (MStAG)

Medmerry is located in West Sussex, South East England (Figure 2.13) and is home to the largest managed realignment scheme of the open coast in Europe, on a stretch of coast threatened by coastal flooding (University College London, 2014). Following a revision by the government to change the proposed 'Hold the Line' option at Medmerry, to 'Managed Realignment', continued input from residents, locals and interested parties became recognised as a significant issue (EA, 2007). Subsequently, the Medmerry Stakeholder Advisory Group (MStAG) was established in 2009 to provide local residents with an opportunity to learn more about FRM and to discuss ideas on how it could benefit their community (Table 2.5) (Thomas, 2014). MStAG was led by the EA to promote, manage and support the community, thus facilitating policy and action (Famuditi, 2016). As a result, any issues could be resolved before the strategy was fully implemented (Famuditi, 2016).

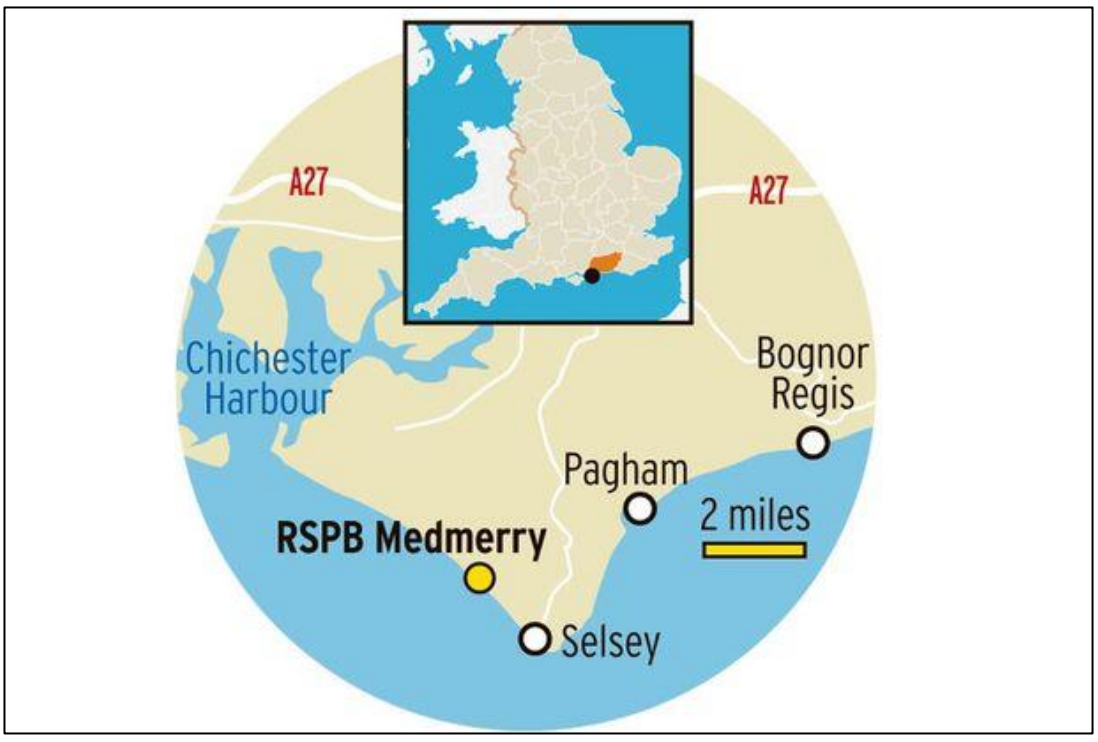

Figure 2.13 Location of Medmerry in West Sussex, UK (Smith, 2015).

Table 2.5. Members of the MStAG (EA, 2014).

Members of MStAG
Agricultural farmers/growers
Birdham Parish Council
Bracklesham and East Wittering Parish Council
Chichester District Council
Countryside access forum for West Sussex
Earnley Parish Council
Earnley residents group
Fisheries
Ham residents group
Leisure and recreation
Manhood cycle network
Manhood Peninsula Partnership
Manhood Peninsula Steering Group
Manhood Wildlife Group
Medmerry residents group
RSPB
Save our Selsey
Sesley Coastal Trust
Selsey Town Council
Sidlesham Parish Council
Sussex Beach Holiday Village
West Beach Selsey resident's association
Wildfowlers

In a study by Crispin (2015), surveys and interview methods identified that the formation of the group was integral for transferring information between local organisation groups and national, and regional levels. The group was recognised as a significant mediator between statutory organisations and local communities in establishing trust, and increased the extent of obtaining a balanced view and eliminating individual issues (Crispin, 2015). Potts (1999) and Hines et al. (2012) advised that local CGs are essential in successful completion of SMPs and action plans. This is evident within the MStAG group, which received positive community feedback due to the ability of individual views reaching the community via an advisory group, thereby representing people on a local scale (Crispin, 2015). However, Crispin (2015) advised that this type of approach would not be suitable for all management schemes, and the inception of a stakeholder advisory group should only be used if deemed appropriate.

According to McAlinden (2015, para 10), managed realignment projects often require effective engagement with all local stakeholders as the return of the land to sea can often "elicit fear in local people". This was the case for Medmerry, where locals believed the scheme would fail and damage the economy (McAlinden, 2015). However, through effective engagement via the MStAG, the scheme has now been labelled as "one of the most sustainable projects the EA has ever delivered" (Figure 2.14) (McAlinden, 2015, para 1).

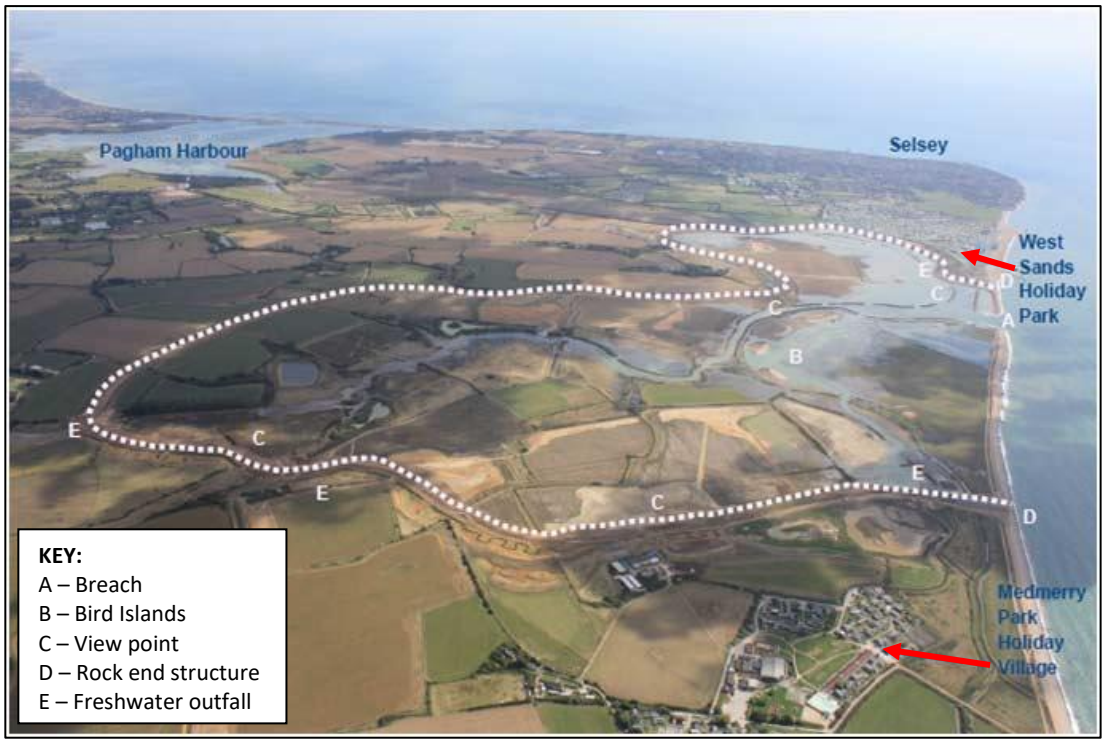

Figure 2.14 Managed Realignment Scheme at Medmerry (McAlinden, 2015).

2.8.2 Stakeholder engagement and partnership in Flood Risk Management, Austria

In a study by Thaler, Priest and Fuchs (2016), partnership at the local level has been recognised as a key approach towards FRM. Berkes (2010, p. 492) advised that consensus between different groups of stakeholders is essential and should involve "inclusion, power-sharing, joint decision-making and an interaction of equals". Partnership and performance can be described as complimentary and heavily influential on the quality of engagement and interaction between stakeholders (Lundquist & Trippl, 2013).

Interview methods used by Thaler et al. (2016) illustrated that three coastal groups studied in Austria represented a wide range of interests and objectives, thus reflecting the multitude of stakeholders in planning and decision-making processes (Figure 2.15). A significant issue arose in the lack of institutional and social proximity, resulting in

insufficient cooperation, thereby lengthening and complicating the negotiation process due to the need to consider all interests (Balland, 2012). Furthermore, interviews identified strong barriers and conflicts based on a lack of technology, expertise and common management approaches (Figure 2.16) Thaler et al., 2016). Significant problems also arose in 'smaller members with less power' feeling as though they had less input in the final decision, highlighting a major issue relating to fair sharing of power between the different levels of stakeholders (Thaler et al., 2016). According to Thaler et al. (2016), the influence of stakeholders very much depends on key aspects such as trust and openness between all members.

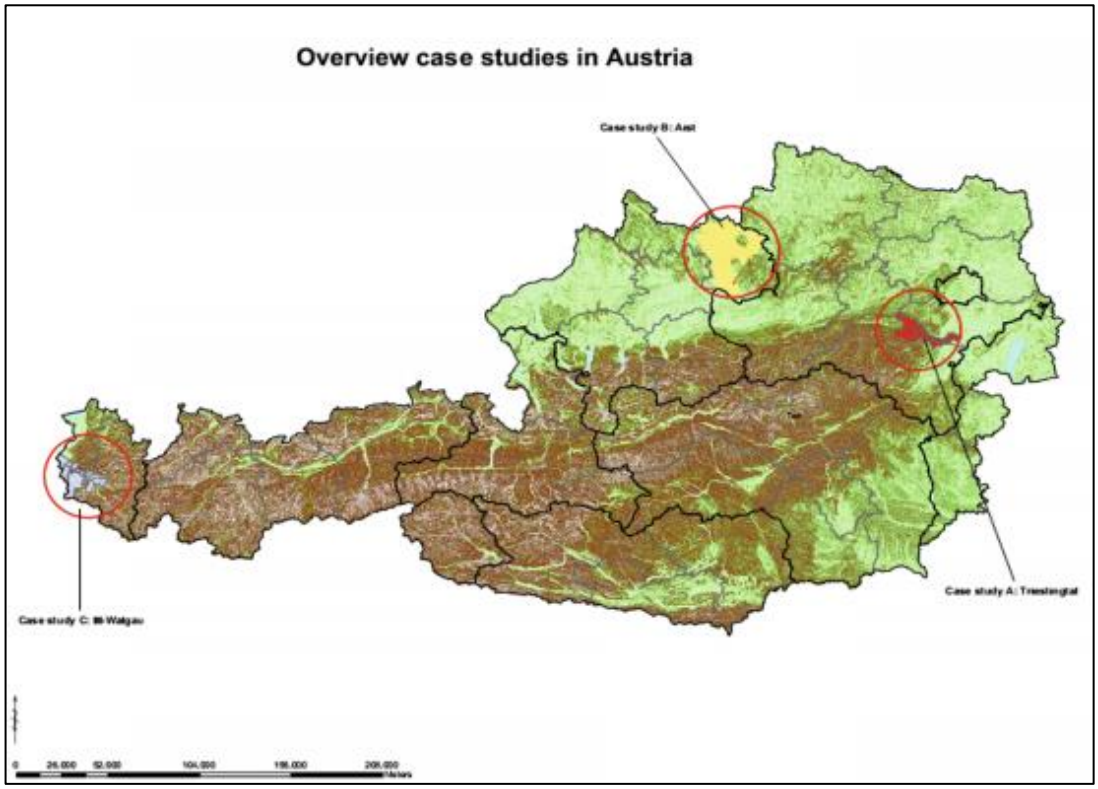

Figure 2.15 Case studies chosen by Thaler et al. (2016) in addressing local partnerships (Thaler et al., 2016).

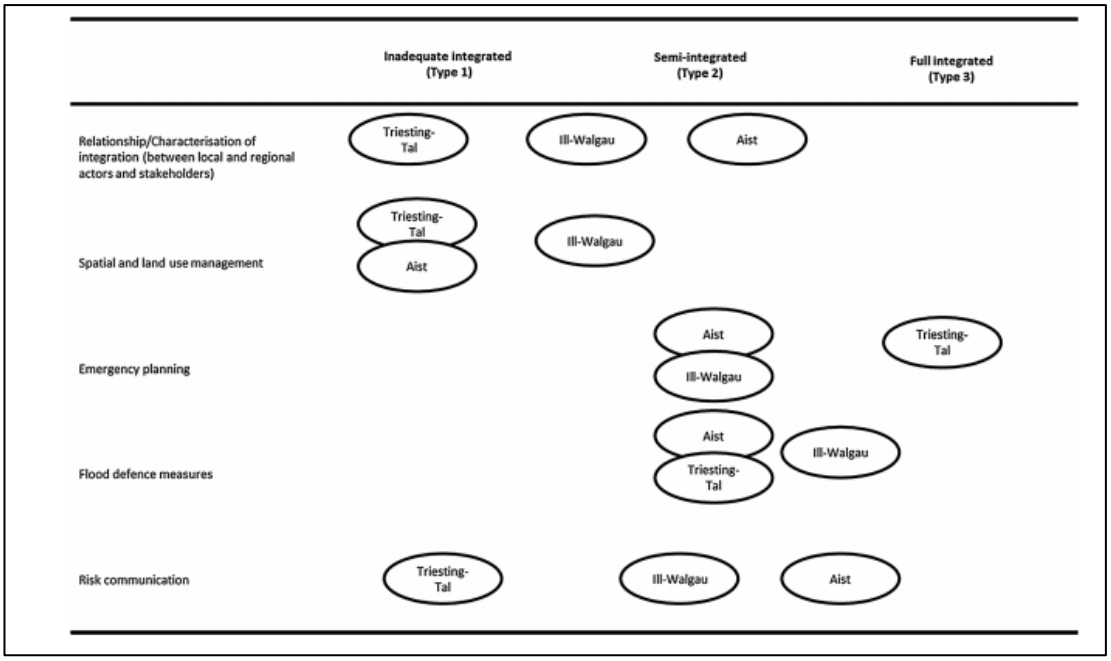

Figure 2.16 Overview of the results highlighting that none of the three case studies had fully achieved a full level of co-operation (type 3) between the different members (Thaler et al., 2016).

Despite the barriers noted, Thaler et al. (2016, p. 851) recommend group cooperation at the local level as an "ideal instrument for stakeholder engagement in FRM" and suggested this was the only realistic possibility of realising appropriate flood defence measures. Additionally, it could allow for indirect benefits such as harmonisation of spatial marine-terrestrial environments as well as increase the potential for implementation of policy, e.g. the EU Floods Directive. (Thaler et al., 2016).

2.8.3 Identifying the gaps in the research

Adaptive management is a concept that has been used in research for several years. For example, Johnson (1999) found 65 papers that used 'adaptive management' in their title, keywords or abstract. However, many of these papers focused on terrestrial management, e.g. rivers and wetlands, with very few focusing on coastal restoration (Johnson, 1999). Within coastal and marine management, AM is frequently assessed as a decision framework within marine fisheries management and there has been little focus on the coastal zone, more specifically coastal defence (Walters, 2007). Moreover, Challies et al. (2016), suggested there has been empirical evidence on the effectiveness of participation in many neighbouring environmental fields.

In more recent years, there has been an increasing number of papers published concerning stakeholder engagement in FCERM, but there are few examples of how adaptive management was explicitly used to enhance the success of coastal restoration (Thaler et al., 2016). Challies et al. (2016) noted there has been little research explicitly examining the roles and implications of participatory decision-making in FCERM (Fordham et al., 1991; Daniell et al., 2010; Newig et al., 2014). However, Challies et al. (2016) indicated that many contributions have examined AM advocating participatory engagement to varying degrees (Walker et al., 2014; Becker et al., 2015; Penning-Rowsell & Johnson, 2015), but there is a requirement for a greater critical analysis of how participatory and collaborative approaches work.

AM has attracted attention for its emphasis on management experiences as a source of learning (Thaler et al., 2016). Studies have found that the successful implementation of AM requires a high level of awareness regarding the constraints and issues surrounding those involved combined with effective communication (Ledoux et al., 2005). Therefore, to develop this awareness and establish the most effective mechanisms for communication in FCERM, further research is required to fill the acknowledged gap (Goeldner-Gianella, 2007; Challies et al., 2016).

This study will contribute to the emerging research agenda by providing a critical analysis of stakeholder engagement within a unique example of an advisory group working together to implement AM.

2.9 Conclusion

This chapter has reviewed and evaluated the existing literature. The impacts of flooding and coastal erosion have been addressed as well as the historical and current frameworks, policies and strategies in place for shoreline management. Reasons behind working with natural processes and moving towards adaptive management approaches were also evaluated. Stakeholder engagement was discussed in detail, including a particular focus on advisory groups. The chapter concluded by providing examples of best practice and lessons learnt within a case study of Medmerry and Austria. Finally, the gaps in existing research were identified enforcing the need for this project to be conducted. In writing this chapter, objectives 1 and 2 (Section 1.3) have been successfully achieved.

Chapter Three

Methodology

3.1 Introduction

This chapter will present the research methods undertaken in order to reach the study aims and objectives. The case study selection is first described (Section 3.2), followed by a rationale of research methods (Section 3.3). An explanation regarding the use of questionnaires as a data collection method is provided including techniques for analysis (Section 3.4). Finally, the qualitative data is described, justifying and discussing the incorporation of semi-structured interviews (Section 3.5). The chapter will review and evaluate the chosen methods, ensuring ensure the data collected will be of value (Fairclough, 1977).

3.2 Selection of case study

The south coast of England is highly vulnerable to flooding, which is likely to increase with SLR in the future (Veiga-Leinert & Nicholls, 2008). Specifically, the Solent has a long history of coastal flooding events, which have become increasingly common over the past 70 years, often arising in conjunction with highest sea levels (Ruocco et al., 2011). East Head is located within the Solent and forms an important sand and shingle spit on the east side of the entrance to Chichester Harbour (Figure 3.1) (Chichester Harbour Conservancy [CHC], 2014). The site provides an example of a nationally rare, fragile and dynamic sand-dune habitat (National Trust, n.d.), valuable to the 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 environmentalists, recreationalists and tourists (National Trust, n.d.). Additionally, the spit plays an important role in the harbour system, providing protection to a large number of boats that use the lower part of Chichester Harbour and its narrow entrance into the Solent (CHC, n.d.).

Figure 3.1. Location of study area, East Head (after Ordnance Survey, 2016).

3.2.1 History of management at East Head

East Head has been built up by sediment, transported north-westwards by waves between Selsey and West Wittering (National Trust, n.d.). However, although formed naturally by the process of longshore drift, its shape and direction have been affected by sea defences, which have been interrupting the process for nearly 200 years (Figure 3.2) (CHC, n.d.). A long-term presence of beach groynes has resulted in a loss of sediment supply to the southeast and as a result the spit and dunes have been starved of sediment (CHC, n.d.). Of particular significance is 'The Hinge', which has been continuously changing direction and has caused great concern between organisations and people interested in the future of East Head (CHC, n.d.). Although historical records are not entirely clear, it is believed that the first breach at East Head occurred in 1721 (CHC, n.d.). Following this, several events (Table 3.1) led to the requirement for a new long-term and strategic management approach from 2005 (CHC, n.d.).

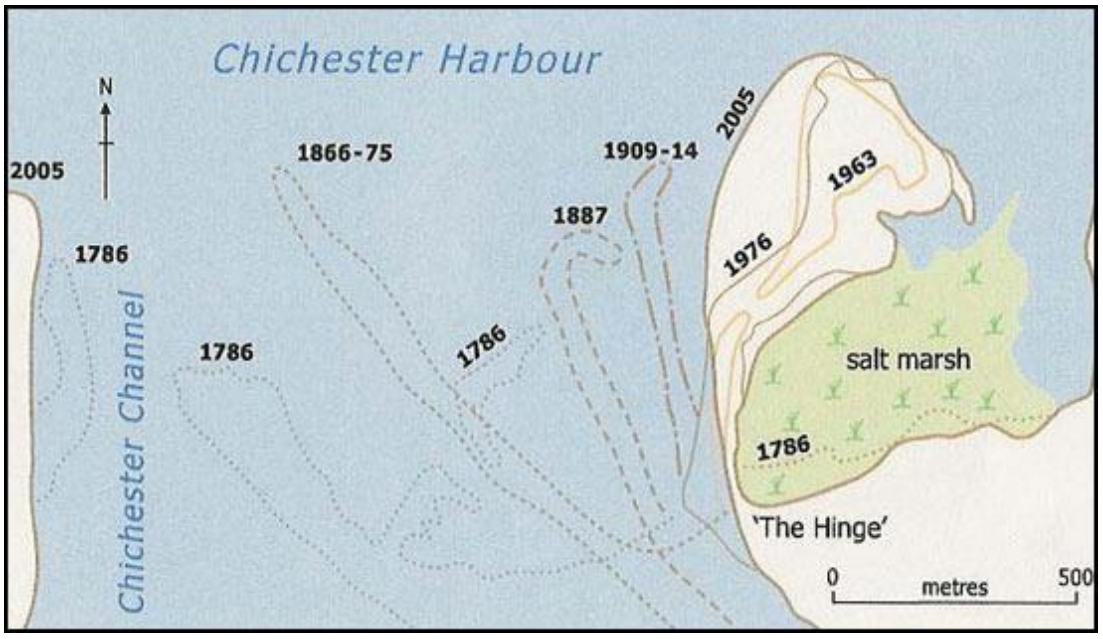

Figure 3.2 East Head retreat and rotation, 1986-2005 (Created by the University of Portsmouth, sourced from CHC, n.d.).

Table 3.1 Timeline of events at East Head leading to the requirement for a new management approach (Chichester Harbour Conservancy (YEAR).

Year	Event
1587	Earliest map showing a spit at the harbour mouth
1721	First breach presumed although not confirmed
1860	East Head begins to rotate clockwise with The Hinge staying stationary
1840s to 1930	Groynes built along the Selsey to West Wittering coastline
1930	The western shoreline of East Head has south to north orientation
1963 – November	A breach is caused by storm conditions
1964	Dune stabilisation and building work begins
1966	National Trust take over ownership
1957-58	Breakdown in the trapping efficiency of the groynes, 7000m3 of sand and shingle move on the hinge
1980s	National Trust discontinue the dune building work
1995	The rate of erosion at The Hinge begins to rapidly increase
1998	The recession rate is more than 1m per month
2000	Rock berm is constructed creating a hardened 'spine' for The Hinge
2004 - October	The Hinge is over-washed, leaving it narrow, low and flattened
2005 – June	13,000m3 of sand and shingle are moved from the distal end to the Hinge

3.2.2 East Head Coastal Issues Advisory Group (EHCIAG)

As issues and concerns intensified, it became apparent that a new approach was required which not only effectively managed the spit but also considered the many differing interests of groups concerned with East Head's future. Subsequently, in 2007 the East Head Coastal Issues Advisory Group (EHCIAG) was formed and included a collection of local stakeholders charged with implementing a new strategy (CHC, 2014). The membership of the group consists of landowners, democratic representatives, key funders and relevant statutory agencies (Table 3.2) (EHCIAG, 2008).

Table 3.2. Members of the EHCIAG and the main roles of each organisation (EHCIAG, 2008).

Organisation	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

3.2.3 The current management of East Head

Although East Head is owned by the NT, the EHCIAG work closely together to ensure it is actively managed appropriately and in accordance with differing interests (CHC, 2014). As such, in 2008 the EHCIAG identified that Adaptive Management (AM) would be the most appropriate and viable approach for East Head (EHCIAG,2008).

The aim of the approach:

"…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, see Appendix F).

In 2010, the strategy was accepted as a policy unit in the North Solent SMP (NSSMP) (Figure 3.3) (NSSMP, 2010). Although the policy of AM is not a SMP policy, it was taken from the approved Pagham to East Head Coastal Defence Strategy for the East Head frontage (NSSMP, 2010). After almost a decade of discussions and consultations at East Head, AM has become a locally, politically acceptable policy, aiming to promote flexible decision making, address uncertainties and work with the coastal processes to provide a proactive management approach (NSSMP, 2010). A key element lies within its monitoring regime to examine and react to the effects of management approaches (NSSMP, 2010).

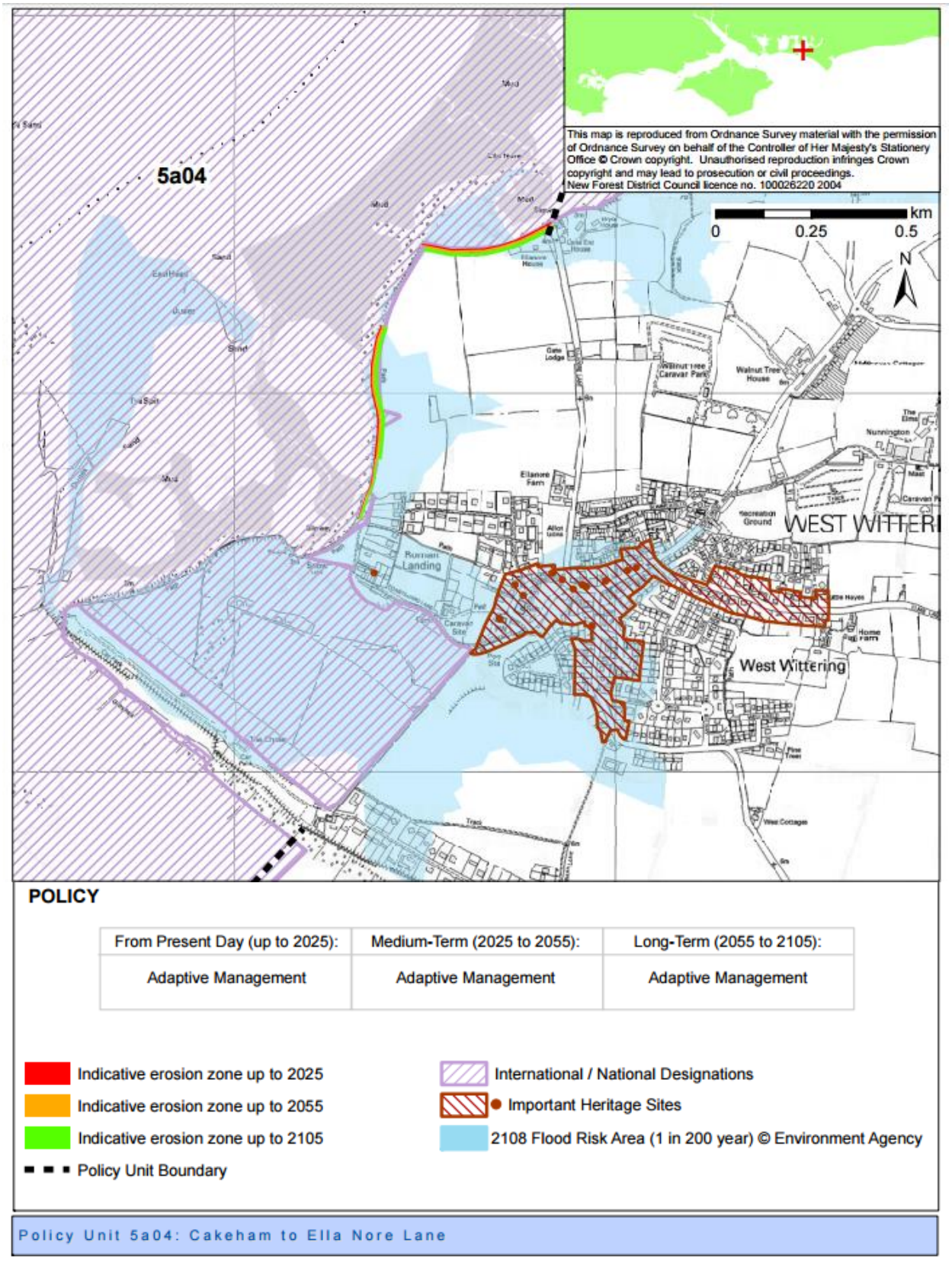

Figure 3.3 AM policy unit for East Head (NSSMP, 2010).

3.3 Research methods

This section provides justification for the choice of research methods and outlines the techniques behind development of the questionnaires and interviews.

3.3.1 Rationale

Conducting research is a process that requires a series of stages in which one essential step involves planning for the collection of data through an appropriate research method (Oppenheim, 1966; Bryman, 2008). For the purpose of this research, questionnaires and interviews were considered to be the most appropriate methods of data collection. According to Bradley (2013, p. 191), a questionnaire is a "formalised set of questions for obtaining information from respondents". There are several advantages to utilising questionnaires as a research technique. For example, questionnaires enable respondents to think about their responses and if properly administered, they can offer anonymity or confidentiality (Bradley, 2013). Furthermore, questionnaires can be administered inexpensively whilst returning a wealth of information in a short period of time and are particularly useful when the researcher already has a knowledge of the research topic (Young, 1940; Babbie, 1990; Smith, 1990; Witkin & Altschuld, 1995; Lee, 2006). According to Lee (2006), questionnaires can be used as an appropriate tool when estimating feelings and preferences about specific topics in order to generate sound and systematic information. However, Ackroyd and Hughes (1981) and Popper (2004) also indicated disadvantages to using questionnaires as a research method, including a difficulty in obtaining valid responses. Table 3.3 demonstrates some of the advantages and disadvantages of employing questionnaires as a research method.

Popper (2004) suggested that questionnaires are a useful tool in compiling a broad representation of the views of respondents, however it is unlikely they will reveal the depth of those views. Therefore, further interrogation is required using other methods to gain the in-depth detail that may be required (Clough & Nutbrown, 2002; McQueen & Knussen, 2002). As such, semi-structured interviews have been chosen as an appropriate supplementary qualitative tool in building upon the survey responses and analysis.

Table 3.3 The advantages and disadvantages of using questionnaires as a research method (Created using information from Ackroyd & Hughes, 1981; Popper, 2004; Gillham, 2008).

Advantages	Disadvantages
The research produces data based on real-world observations (empirical data)	Securing a high response rate to a survey can be hard to control
Respondents can complete the questionnaire when it suits them	The data produced may lack details or depth on the topic being investigated
Potential to accumulate a large number of responses in a short amount of time	There is no way to tell how truthful a respondent is being
Very practical	Can be inadequate to understand some forms of information - i.e. changes of emotions, behaviour, feelings etc.
The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package	People may read differently into each question and therefore reply based on their own interpretation of the question - i.e. what is 'good' to someone may be 'poor' to someone else, therefore there is a level of subjectivity that is not acknowledged. Questions must be clear and unambiguous to avoid confusion
Can be carried out by the researcher or by any number of people with limited affect to its validity and reliability	There is a level of researcher imposition, meaning that when developing the questionnaire, the researcher is making their own decisions and assumptions as to what is and is not important. The wording and structure of questionnaire can have significant influence on answers
Positivists believe that quantitative data can be used to create new theories and / or test existing hypotheses Relatively cost effective	There is no way of telling how much thought a respondent has put in. Furthermore, the respondent may be forgetful or not thinking within the full context of the situation
Can be analysed more 'scientifically' and objectively than other forms of research. Closed question response is relatively straightforward to analyse	Phenomenologists state that quantitative research is simply an artificial creation by the researcher, as it is asking only a limited amount of information without explanation
When data has been quantified, it can be used to compare and contrast other research and may be used to measure change	Lacks validity - data quality can be questionable if the surveys are not complete or accurate
Relatively cost effective	Little control over the way respondent completes questionnaire
Responses can remain anonymous	Respondents may have concerns with regards to what will happen to the data
Reduces interviewer bias	Respondent literacy issues
Enables questions to be standardised	

3.4 Quantitative data – Methods behind questionnaire development

Questionnaire construction can be a delicate process in which several attributes are required to contribute to a well-made survey (Lee, 2006). Such attributes include clear organisation and wording, well-drawn and exhaustive response options as well as a natural flow or order to the questions (Lee, 2006). All these attributes are the result of effective development which, according to Peterson (2000), requires a list of distinct tasks (Figure 3.4).

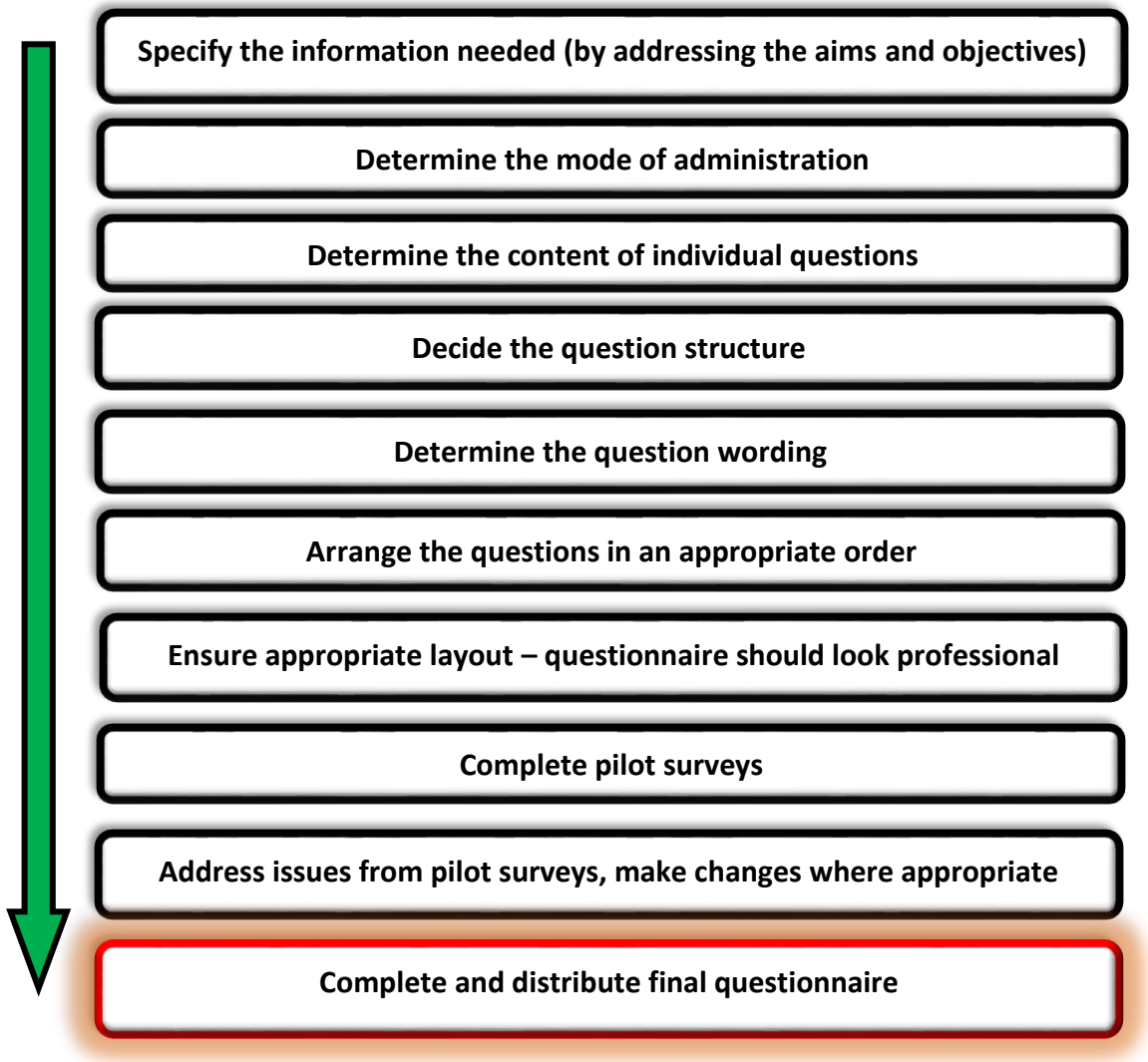

Figure 3.4 The systematic approach to developing a questionnaire whereby each task of the process must be completed before subsequent ones are undertaken (adapted from Peterson, 2000).

3.4.1 Design and mode of administration

Survey design can depend upon the aims and objectives of the research as different approaches will suit different situations (Table 3.4) (Walker & Burdick, 1977; Yu & Cooper, 1983). For example, Fleming and Bowden (2009) suggested that web-surveying and postal surveys enable the collection of large sample sizes, however postal surveys can incur higher costs through postal expenses.

Initially, an electronic survey, created within Microsoft Word was chosen as the method due to the discreet sample size. However, technical issues posed a fundamental issue in this technique, which was exposed in the pilot study (see section 3.4.6). Therefore, for practicality and ease of administration, an internet survey (Survey Monkey) was employed as the final method. According to Couper (2000), the internet is often viewed as the most efficient tool in distributing surveys. Watt et al. (2002, p. 327) suggested that "using web-based evaluation questionnaires can bypass many of the bottlenecks in the evaluation system, such as data entry and administration."

Table 3.4 The advantages and disadvantages of using different methods for conducting questionnaires (using information sourced from Synodinos, 2003; Kaplowitz, Hadlock & Levine, 2004; Lee, 2006; Neuman, 2006; Veal, 2006; Bradley, 2013; Bryman; 2016).

Method	Advantages	Disadvantages
In person (face to face)	• Less burdensome to the respondent who does not have to write out responses. • Higher response rate, also immediate • Opportunity to observe respondents • Researcher controls sequence of questions • Can ask complex questions • Personal contact can result in meaningful answers	• Interaction between researcher and respondent may bias response • Not good if respondents are dispersed over a wide geographical area • Loss of anonymity • Time consuming • Potential to be costly e.g. travel • May require a team to help – may add to costs and also difficult to determine correct administration of survey
By telephone	• Beneficial for consequential questions • Immediate response • Greater anonymity than personal interviews • Less costly than personal and by postal • Easily able to contact irrelevant of their geographic location	• Negative perception of telephone interviews • Not suitable for longer questions • Potential for respondent bias • Unable to use visual aids e.g. check/rank lists • Potential to be costly
By post	• Easy to administer – does not require personal interview • Practical if respondents are widespread • Control over visual quality of the instrument, which can be made to look professional • Greater degree of anonymity • Can reach a large number of people over short time	• Inability to control whether or not the individual will return or complete the questionnaire – possibly low response rates • Inability to control whether the individual will fill in the questions in the right order – questions must be clear as no opportunity for explanation • Greater level of literacy required • Inappropriate for studies of rapidly changing opinions • May have difficulty reading different handwriting
By email (electronic survey created in Microsoft Word)	• Can be easy to administer and less costly than other types • Response rates generally higher • Easier to analyse responses	• Not easy to guarantee anonymity • Possible access/compatibility issues with individual's computer settings • Accurate and valid answers can be questionable
By internet (web-based survey)	• Good if the population sample is highly specific i.e. from an organisation • Easy to show visual material • Not very costly (depending on programme/site used) • Can reach a large number of people in short time • Practical if respondents are widespread • Quick and easy analysis – most sites analyse the questionnaire automatically	• Requires IT literacy from respondent • Difficult for more complex questions • Possible issues with individual's internet security • Potential for low response rates • Must have internet access • Accurate and valid answers can be questionable
Drop and pick-up	• Beneficial if all respondents are in one area • Quick and easy way to obtain several responses in short period of time • Potential for low cost	• May seem rushed for respondent – poor and inaccurate completion • Can create bias response – opportunity for discussion between several participants • Time-pressure for collection

3.4.2 Questionnaire response rate

A critical goal of questionnaire administration is to increase the credibility of the results by achieving high response rates (Burkell, 2003). There are various techniques which can be used to improve response rate. Bradley (2013) suggested eliminating difficulties from the research task, which could be in the form of an incentive. An incentive is "any device which can be used to encourage respondents to answer or comply with a researcher's requests" (Bradley, 2013, p. 194). Examples may include monetary incentives such as money, gift vouchers or gifts (Bosnjak and Tuten, 2003). However, some researchers disagree with the use of monetary incentives as it could relate to biased cooperation and incorrect ethics (Perkins, 2011; Burkell, 2003). Furthermore, there may not be enough money in the research budget to cover the extra costs (Perkins, 2011; Bradley, 2013).

Other options include non-monetary alternatives such as pre-notification of survey distribution as well as delivery of a cover letter with the attached questionnaire (Solomon, 2001). Perkins (2011) advocated establishing trust is crucial to response rate and this could be accomplished by affiliating the questionnaire with a name or organisation in which the respondent is likely to recognise e.g. university logo. In the case of web-based surveys, a study by Perkins (2011) found that highest response rates were associated with user-friendly surveys that contained salient questions, easy navigation and those which did not greatly impose on the respondent's time. However, a study by Heberlein and Baumgartner (1978) found no correlation between length of survey and response rates.

For this research, monetary incentives were not used due to budget constraints. However, pre-notification of the survey was sent to all respondents via a known stakeholder in order to initially establish trust (Appendix A). Following this, a cover letter with the attached questionnaire was distributed outlining the project details (Appendix B and C). The university logo was used on the questionnaire and an indication of completion time was detailed in the covering letter. Following completion of the survey, Bradley (2013) recommended providing a summary of the results as a final incentive. Therefore, a tick box was added to the questionnaire to indicate whether the respondent wished to receive a summary.

3.4.3 Questionnaire bias

According to Furnham (1986), bias is most prevalent in research that involves participant self-report, such as a survey. Bias can be introduced or caused by a variety of factors (Kalton & Schuman, 1982; Dilman, 1991). A major factor relates to low response rates (Dilman, 1991). Furnham (1986) suggested response bias can have a large impact on the validity of

questionnaires, however Kalton and Schuman (1982) advised that there is no trend between bias and response rate. Bias can also be introduced through the phasing of the questions, style of the questionnaire and completion time allowed for the respondent to answer (Goyder, 1985; Furnham, 1986). It is therefore important that the researcher is aware of bias and the effects it can have (Furnham, 1986). For this research, measures were taken to reduce bias and low response rates as previously discussed throughout this section.

3.4.4 Question content and style

The wording of questions is a critical factor concerning the respondent's interpretation of questions (Lee, 2006). According to Neuman (1997, p. 233), there are two main principles that should be considered in development including "avoiding confusing" and "keeping the respondent's perspective in mind". Table 3.5 provides an extensive review of research on the most appropriate methods in developing questions.

Table 3.5 A review of research on the general guidelines for questionnaire development (Adapted from Lee, 2006 using information from Spitzer, 1979; Labaw, 1980; Lees-Haley, 1980; Maher & Kur, 1983; Babbie, 1990; Dixon, 1990; Moran, 1990; Newby, 1992; Oppenheim, 1992; Biner, 1993; Kent, 1993; Richardson, 1994; Weisberg, Krosnik, & Bowen, 1996; Neuman, 1997; Peterson, 2000; Brace, 2004; Thomas, 2004).

Guideline for question development	Reason for guideline
Write simple, clear, and short questions	Ambiguity, confusion, and vagueness frustrate some respondents. The longer the question, the more difficult the task of answering, shorter questions produce higher response rates.
Make specific and precise questions	Specific questions generate more accurate responses due to similar interpretation by all respondents. Questions must be worded with a particular audience in mind. The more general the question, the wider the range of interpretations whereas specific questions are more likely to communicate the same meaning to all respondents.
Use appropriate language	Questions should be worded at the appropriate level for respondents. Technical terms and abbreviations can carry different meanings to respondents who vary in life, work experiences, and education. If the questionnaire is designed for a specialized group, it is acceptable to use specific terms provided all respondents are familiar with them.
Ensure respondents' ability to answer	Asking the respondents to recall past details, answer specific factual information, and make choices about something they know little or nothing about may result in meaningless answers.
Include only one topic or idea per item	Each question should be related to only one topic or idea. Items that contain two separate ideas or try to combine two questions into one are called "double barreled" questions which can confuse respondents. It is better to break the item up and list each part as separate items.
Use appropriate emphasis for key words in the question	Use emphasis tools such as boldfaced, italicized, capitalized, or underlined words or phrases where appropriate to clarify potential confusion within the questionnaire. This can add clarity to questions.
Take care with sensitive questions	Asking sensitive questions has always been a difficult issue as respondents vary in the amount and type of information they are willing to disclose e.g. salary, race. Consider avoiding questions that use words or phrases of regional terminology, or occupational or social class differences.
Avoid negative questions or double negatives	This can lead to easy misinterpretation. Double negatives in ordinary language are grammatically incorrect, confusing and can be difficult to answer. This situation can result in "an awkward statement and a potential source of considerable error" (Sheatsley, 1983, p. 217).
Avoid biased or loaded questions and terms.	Biased questions should be avoided in question development. There are many ways to bias a question, such as identification of a well-known person or agency and social desirability. Words with strong emotional connotations and stands on issues linked to people with high social status can change how respondents answer questions.
Avoid questions with false premises or future intentions	Respondents who disagree with the premises will be frustrated when attempting to answer a question. Answers to a hypothetical circumstance or future intentions are not very reliable, but being explicit will reduce respondents' frustration. Questions for analysis and evaluation should be specific and concrete, and should relate to the respondents' experiences.

Question style generally falls into two categories: (1) closed-ended, structured, fixed-response questions or (2) open-ended unstructured free-response questions (Lee, 2006). Closed-ended questions commonly have a fixed set of multiple choice answers and are useful for analyses due to their uniformity, however a major drawback can be in the structuring of responses (Babbie, 1990; Weisberg et al., 1996). Open-ended questions require more in-depth answers, which use the respondents own words as opposed to pre-determined answers (Lee, 2006). This gives the respondent more freedom to provide an opinion, but a major issue is that some answers may be irrelevant to the purposes of the analysis (Weisberg et al., 1996). Sometimes questionnaire developers combine both types of question style using a "semi-structured" approach in order to maintain easy analysis through closed-ended questions whilst also gaining more in-depth answers through open-ended questions when required (Lee, 2006). Table 3.6 provides a summary for the advantages and limitations to both types of question style.

Table 3.6 Characteristics of closed-ended and open-ended questions (Lee, 2006).

Question type	Advantages	Limitations
Closed-ended	Easier and quicker to answers	Frustration without desired answer
	More likely to get answers about sensitive topics	Confusing if many response choices are offered
	Easier to code and statistically analyse	Misinterpretation of a question without notice
	Easier to compare different respondents' answers	Simplistic responses to complex issues
	Easier to replicate	Blurred distinctions between respondents' answers
Open-ended	Opportunity for respondents to give their opinion	Different degrees of detail and irrelevance in answers
	Unanticipated findings to be discovered	Difficulty with response coding
	Adequate for complex issues	Difficulty with comparison and statistical analysis
	Creativity, self-expression, and richness of detail are permitted	A greater amount of respondent time, though and effort is necessary
	Respondents logic, thinking processes, and frames of reference are revealed	Requires space for answers

For this research, the questions will be semi-structured to allow for easier analysis in closed questions and further explanation in open questions where appropriate (Bernard, 1988). By using this approach, it is anticipated that a comprehensive understanding will be achieved in order to complete a more detailed analysis.

3.4.5 Question order

According to Babbie (1990), question order and layout should be considered just as important as the wording and content of the questions. Additionally, Moran (1990) suggests that a participant will often decide whether or not to respond depending upon the layout of the questionnaire. Various studies have shown that a professional layout can improve accuracy, help the questionnaire flow and gain higher response rates (Spitzer, 1979; Kent, 1993; Neuman, 1997).

In determining question order, the researcher must be attentive to how earlier questions may have unintended effects on subsequent answers (Pew Research Centre, 2016). Oppenheim (2005) suggests positioning more general questions at the beginning of the survey, and gradually narrowing the scope to gain more in-depth answers towards the end of the survey. The questionnaire should also be grouped into topics and unfold into a logical order (Pew Research Centre, 2016). Ultimately, an efficiently constructed questionnaire should facilitate the processing, tabulation, and analysis of the data (Harty, 1979).

The questionnaire for this research has been constructed into four appropriate sections to divide topics accordingly. Each section has been carefully ordered to ensure questions become focused at the end of the survey, with the intent to gradually gain more detailed insight over the course of completion.

3.4.6 Pilot study

Pilot studies are essential in research in order to determine any ambiguities concerning the wording, question order and style of the questionnaire (Bryman, 2016). Any issues with the ease of completing the survey can also be addressed (Bryman, 2016).

A pilot study was carried out on four individuals to pre-test the questionnaire. The original questionnaire was developed electronically using Microsoft Developer and sent via email attachment. It became apparent during the pilot study that this was not the most appropriate mode of administration, due to compatibility issues with differing computers. With this in consideration, the questionnaire was changed to an online web-survey with better possibilities of access for all participants. Furthermore, the results of the pilot survey

were fundamental concerning the question style thus facilitating some essential changes in the wording and validity of some of the questions. It also identified whether questions were relevant to the research enabling a justification process of the entire survey. In some cases, questions were deemed not appropriate and thus removed from the survey.

This pilot study was completed with a view to improving the questionnaires response rate. The changes made should enable more reliable and accurate information to be obtained in order to achieve the overall aims and objectives of the project.

3.4.7 Selecting the participants

As this project focuses on a specific group of people (EHCIAG), the surveys will be distributed to all organisations appropriate to the group as mentioned in section 3.2.2 (Table 3.2). A list of specific individuals, known to have participated within the group, was chosen through communications with various stakeholders. There was opportunity for more than one individual from an organisation to complete a form depending on time spent within the group, varying degrees of knowledge or differing opinions within each organisation.

3.4.8 Data analysis

Data will be manually inputted into Microsoft Excel in order to calculate percentages and display the data visually in tables, graphs and charts. Where appropriate, cross tabulations will be conducted in order to identify any trends and aid in a more comprehensive discussion. As most of the data is exploratory and involves percentage calculations, it would not be appropriate to go beyond descriptive statistics due to the nature of the categorical and non-continuous data (Johnson, 1999; Potts, 1999).

Additionally, online software will be used to generate word clouds. Word clouds can be used as a supplementary tool in analysis to highlight the main differences and points of interest in social research, thus further interpreting and confirming findings (McNaught & Lam, 2010).

3.5 Qualitative data

3.5.1 Semi-structured interviews

Interviews are one of the most commonly used qualitative research methods (Kitchin & Tate, 2000, Longhurst, 2003) and are particularly valuable when used in conjunction with other methods, such as surveys (Longhurst, 2003; Gillham, 2005). However, conducting an interview requires the interviewer to clearly structure questions, listen attentively, pause, probe or prompt when appropriate and encourage the interviewee to speak freely (Clough

& Nutbrown, 2002; Cohen et al., 2007). The structure of an interview can be placed in a continuum somewhere between unstructured (open questions and observation) and structured (closed questions) (Newton, 2010). Table 3.7 shows the advantages and disadvantages associated with each.

Table 3.7 Advantages and disadvantages of different interview techniques (Dobson, 2014).

Types of Interview	Advantages	Disadvantages
Unstructured interviews	• Allows for more information and opinions • Going off on tangents may lead to you getting vital information you didn't consider asking.	• Less valid • Not all information you may have needed to be answered is. • Hard to compare if different questions are asked.
Semi-structured interviews	• Important questions wont be forgotten. • You may come across more question to ask in further interviews.	• Irrelevant data.
Structured interviews	• You collect only the information you require. • The risk of the interviewee, or even the interviewer is minimised.	• More quantitative • Not as valid

For the purposes of this research, a semi-structured interview approach will be used. A semi-structured interview combines a pre-determined set of open questions which often prompts discussion and provides an opportunity to explore responses further (Kitchin & Tate, 2000). In addition, it allows the respondent to discuss and raise issues that may have not been previously considered (Longhurst, 2003).

3.5.2 Selecting the interviewees

As previously discussed (section 3.3.7), this project focuses on a specific group of individuals, and therefore the same individuals who responded on the survey will be asked for interview. It is hoped that by interviewing these participants, more detailed response can be obtained which focuses on specific aspects of the survey responses in order to gain further insight and more detailed analysis.

3.5.3 Interview administration

Face-to-face interviews have long been regarded as the dominant interview technique, although in the last two decades' telephone interviewing has become more common (Opdenakker, 2006). As Cachia and Millward (2011) suggest, the telephone is a widely

accepted means of communication that is integral to everyday life, and should be acknowledged as an effective and viable tool in qualitative research methods. Other new communication forms such as e-mail, skype and other chat boxes have also been introduced in qualitative research (Longhurst, 2003; Opdenakker, 2006).

Due to constraints with time and the varying geographical locations of stakeholders, telephone interviews were selected as the most appropriate method of conducting the interviews. It was also hoped response rate would be higher with telephone interviews. As Cachia and Milligan (2011) noted, telephone interviews are perceived as less demanding than face-to-face interviews. Additionally, Fenig et al. (1993) suggests telephone interviews provide access to participants who are otherwise hard to make contact with and is more convenient in relation to participant's hectic timetables.

To encourage participation, an initial email was sent to all participants detailing why the interview was to be carried out and what it involved (Appendix D). De Leeuw et al. (2007) advised that advance briefing of interviews can increase response rates by 11%.

3.5.4 Ethics

This research was reviewed for ethical consent before any information was gathered (Appendix G). The review addressed and discussed any issues likely to arise and found solutions to deal with them. Consent was received via email from each respondent and respondents have remained anonymous. Additionally, respondents were asked if it was ok to record the interview and reassured that the recording would be for transcribing and data processing purposes only. Due to the nature of this research, it would appear respondents seemed more willing to openly share information.

3.6 Conclusion

This chapter has introduced the selected case study identifying previous and current management strategies. This information provides a solid background and basis for discussion that will occur in subsequent chapters.

The research methods and data analysis techniques to be used have been discussed. Analysis of the interviews is discussed in Chapter Five. An online survey and a semi-structured interview, via telephone, were identified as the most appropriate tools due to the nature of the study whilst also providing a relatively quick approach within a limited time period.

Chapter Four

Data Presentation and Analysis of Questionnaire Responses

4.1 Introduction

This chapter presents the analysis and interpretation of the data obtained from the questionnaire survey. This chapter will first explain the ranking charts used in this analysis. It is then divided appropriately into sections according to the structure of the questionnaire:

- Characteristics of respondents (Section 4.2)

- Adaptive Management Policy Unit (Section 4.3)

- East Head Coastal Issues Advisory Group (Section 4.4)

This allows for detailed analysis of each appropriate section. All questions were answered in the survey and therefore will all be included in this chapter. This analysis will include a brief discussion of the results but a more comprehensive discussion will follow in Chapter 6 after the interview analysis is presented. Due to the exploratory nature of questionnaires, this analysis has not gone beyond descriptive statistics (Potts, 1999).

4.1.2 Explanation of ranking charts

As several charts in this analysis incorporated ranking scores, it was deemed appropriate to explain them at the beginning of this chapter. 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. In results graphs, answers given under this category have therefore been highlighted in green in order to identify these factors as a potential anomaly within the ranking score. However, despite causing anomalies regarding the ranking score, this information was still relevant to the research and will be discussed in this chapter.

4.2 Characteristics of respondents

4.2.1 Response rate of respondents

The response rate to the questionnaire was 100%, thus increasing the credibility of the survey results (Burkell, 2003). Nine stakeholder groups were given the opportunity to complete a questionnaire and twelve completed surveys were received, in which some organisations chose to complete two surveys due to a differing level of knowledge or opinion within the organisation. This high response rate indicated that the questionnaires were appropriately administered and developed. Additionally, all responses were received within a short period of time (two weeks) emphasising the ease of completion (Perkins, 2011; Bradley, 2013). Table 4.1 shows the number of responses received from each organisation.

Table 4.1 Number of responses received from each organisation completing the survey.

Organisation	Number of responses
Cakeham Manor Estate	1
Chichester District Council	2
Chichester Harbour Conservancy	1
Environment Agency	2
F G Woodger Trust	1
National Trust	2
Natural England	1
West Wittering Estate	1
West Wittering Parish Council	1
Total	**12**

4.2.2. Respondents time spent in their current position and on the East Head Coastal Issues Advisory Group.

Figure 4.1 compares the time respondents have spent in their current position. The majority of members have been in their position 6 – 10 years with other members varying from 1 to 15+ years. Only 1 member has been in their position less than 1 year.

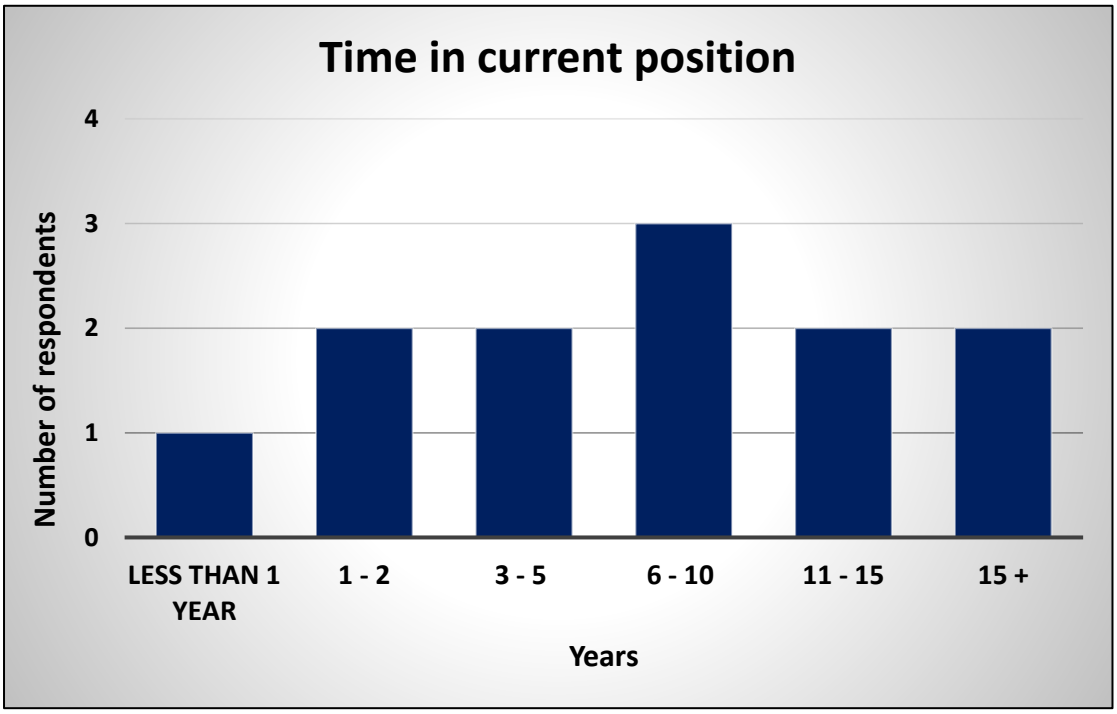

Figure 4.1. Respondents time in their current professional role.

Figure 4.2 displays the time respondents have been involved in the EHCIAG. A third of respondents stated they had been on the group since formation (9 years) and a further third had spent 3 – 4 years sitting on the group. Two respondents fell between 5 – 6 years and 7 – 8 years. Only two respondents stated they had spent 1 – 2 years on the group although one respondent specified they had been involved in the formation previously and subsequently rejoined. The other respondent completed a survey but recommended a second respondent from their organisation to participate who had more experience in the group. The recommended person subsequently completed a survey.

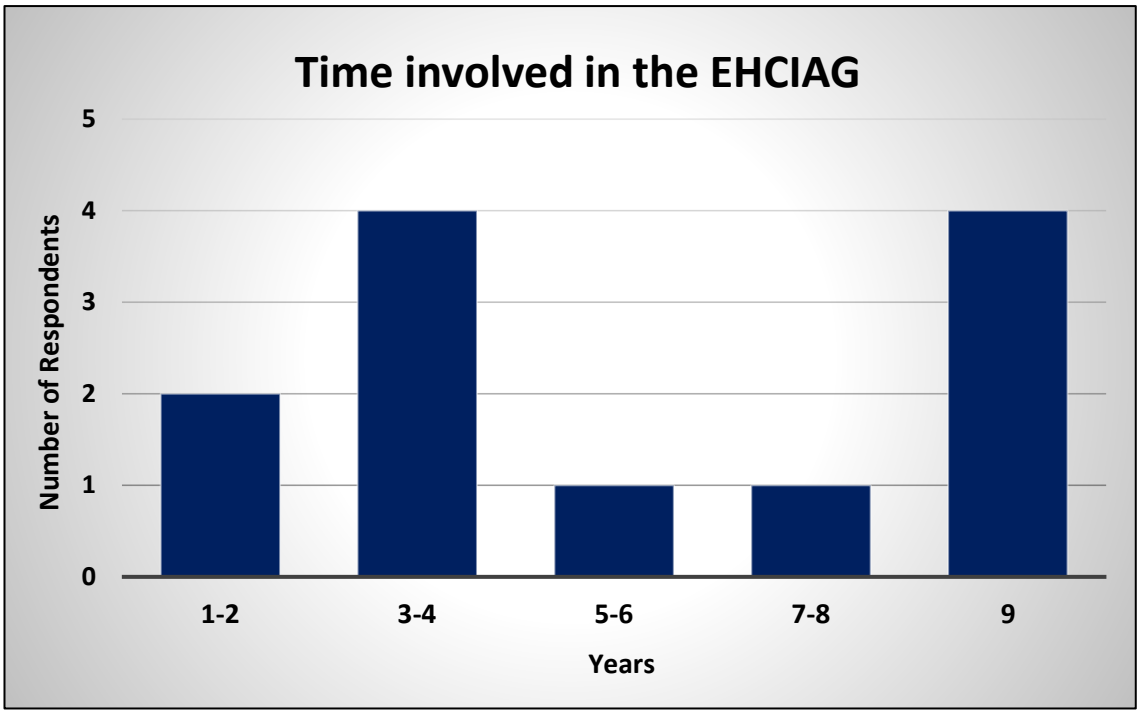

Figure 4.2 Respondents time involved in the EHCIAG.

4.3 Adaptive Management policy unit

Figure 4.3 shows 83% of respondents agreed that Adaptive Management is the correct policy choice for East Head. Although no respondents suggested it was the wrong choice, 17% stated they remained unsure.

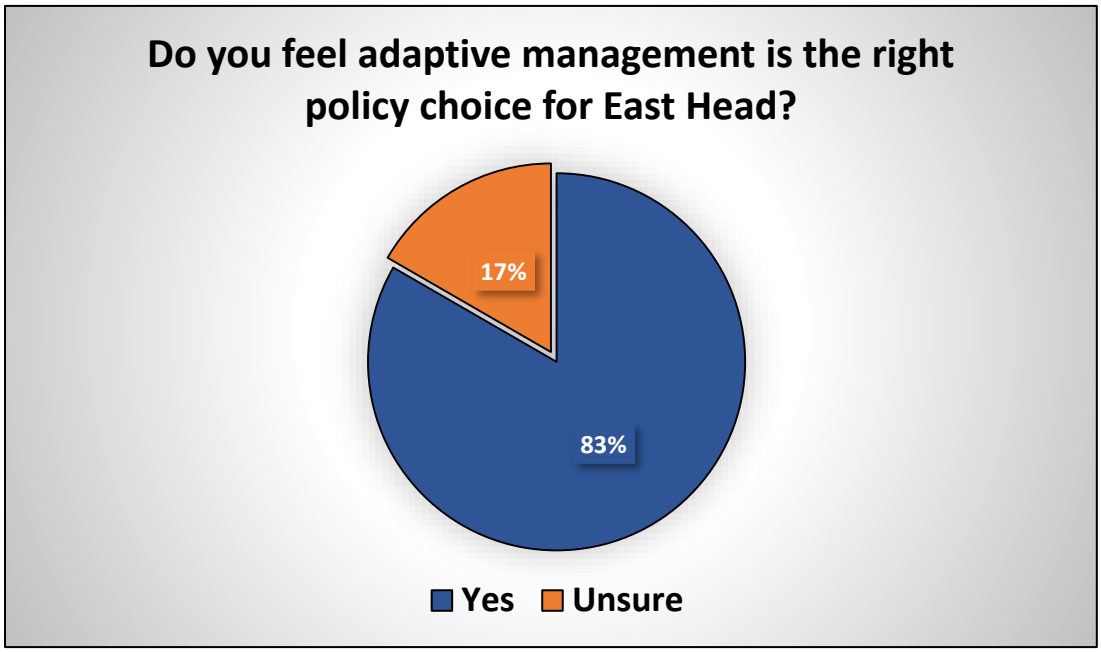

Figure 4.3 Decision of Adaptive Management for East Head.

Respondents were asked to comment on their decision. Similar to a study by Ledoux et al. (2005), many respondents agreed that in the current climate of SLR, it would no longer be 'realistic' to predict changes, in this case the position of the spit, and therefore an AM approach would allow for flexible decision-making for long-term sustainable outcomes. Several respondents highlighted how AM 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;

"AM strikes the right balance between nature taking its course and engineering"

Additionally, many respondents agreed the policy was "a compromise" ensuring all users were represented. One respondent suggested AM has become a recognised strategy which is not "irreversible", and several respondents agreed it allows for monitoring in order to observe the effects of actions and carry out works when required.

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 AM and many still regard AM 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 AM.

4.3.1 Types and sources of information considered useful in Flood and Coastal Erosion Risk Management at East Head

The value of information is recognised as an essential component in aiding decisions in the face of uncertainty (Willows et al., 2003). Table 4.2 and Figure 4.4 show coastal and marine physical processes, recreational use and habitat distribution were considered to be the types of information that 100% of respondents agreed were considered useful at East Head. 91.7% further agreed that the number of properties at risk and sustainability were considered useful types of information. Only 58% of respondents considered land ownership and 50% of respondents suggested other types of information including National Trust coastal policies, public opinion, benefit/cost, acceptable and implementable solution and special designations.

Respondents were asked to rank the information in order of importance and five respondents agreed their 'other' choice was most important (NT coastal policies and special designations). Coastal and marine processes ranked highest (8.33), followed closely by sustainability (7.45) and habitat distribution (6.58). As emphasised by Salm, Clark and Siirlia (2000), the success of effective management often depends on adequate information relating to delineation of areas ensuring boundaries are clear, thus providing knowledge of processes within self-contained units. Moreover, the Scottish Natural Heritage (n.d.), advocated that only when coastal processes are known, can plans be formulated, thereby emphasising the importance of this type of information. Land ownership ranked the lowest (4) with all the other options falling in between, including historical/cultural aspects (4.25) and local and regional legislation obligations (6.3).

Table 4.2 Weighting averages table of types of information considered useful in FCERM, applicable to East Head, with their order of importance.

	Rank												
Factor	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**N/A**	**Total**	**Score**
Number of properties at risk	9.09%	9.09%	9.09%	18.18%	0.00%	0.00%	9.09%	0.00%	27.27%	0.00%	18.18%		
	1	1	1	2	0	0	1	0	3	0	2	**11**	**5.67**
Habitat distribution	0.00%	16.67%	25.00%	16.67%	8.33%	16.67%	8.33%	8.33%	0.00%	0.00%	0.00%		
	0	2	3	2	1	2	1	1	0	0	0	**12**	**6.58**
Historical/cultural aspects	0.00%	10.00%	0.00%	0.00%	10.00%	10.00%	10.00%	30.00%	0.00%	10.00%	20.00%		
	0	1	0	0	1	1	1	3	0	1	2	**10**	**4.25**
Geological aspects	0.00%	0.00%	16.67%	8.33%	25.00%	16.67%	0.00%	16.67%	0.00%	8.33%	8.33%		
	0	0	2	1	3	2	0	2	0	1	1	**12**	**5.27**
Coastal/marine physical processes	25.00%	41.67%	0.00%	8.33%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
	3	5	0	1	3	0	0	0	0	0	0	**12**	**8.33**
Recreational use (local residents)	8.33%	0.00%	16.67%	25.00%	8.33%	16.67%	8.33%	0.00%	8.33%	0.00%	8.33%		
	1	0	2	3	1	2	1	0	1	0	1	**12**	**6.27**
Land ownership	0.00%	0.00%	0.00%	0.00%	9.09%	9.09%	36.36%	9.09%	9.09%	0.00%	27.27%		
	0	0	0	0	1	1	4	1	1	0	3	**11**	**4**
Local and regional legislation obligations	16.67%	8.33%	0.00%	0.00%	0.00%	25.00%	8.33%	8.33%	0.00%	0.00%	33.33%		
	2	1	0	0	0	3	1	1	0	0	4	**12**	**6.38**
Sustainability	18.18%	9.09%	27.27%	18.18%	18.18%	0.00%	0.00%	9.09%	0.00%	0.00%	0.00%		
	2	1	3	2	2	0	0	1	0	0	0	**11**	**7.45**
Other	33.33%	11.11%	0.00%	11.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	44.44%		
	3	1	0	1	0	0	0	0	0	0	4	**9**	**9.2**

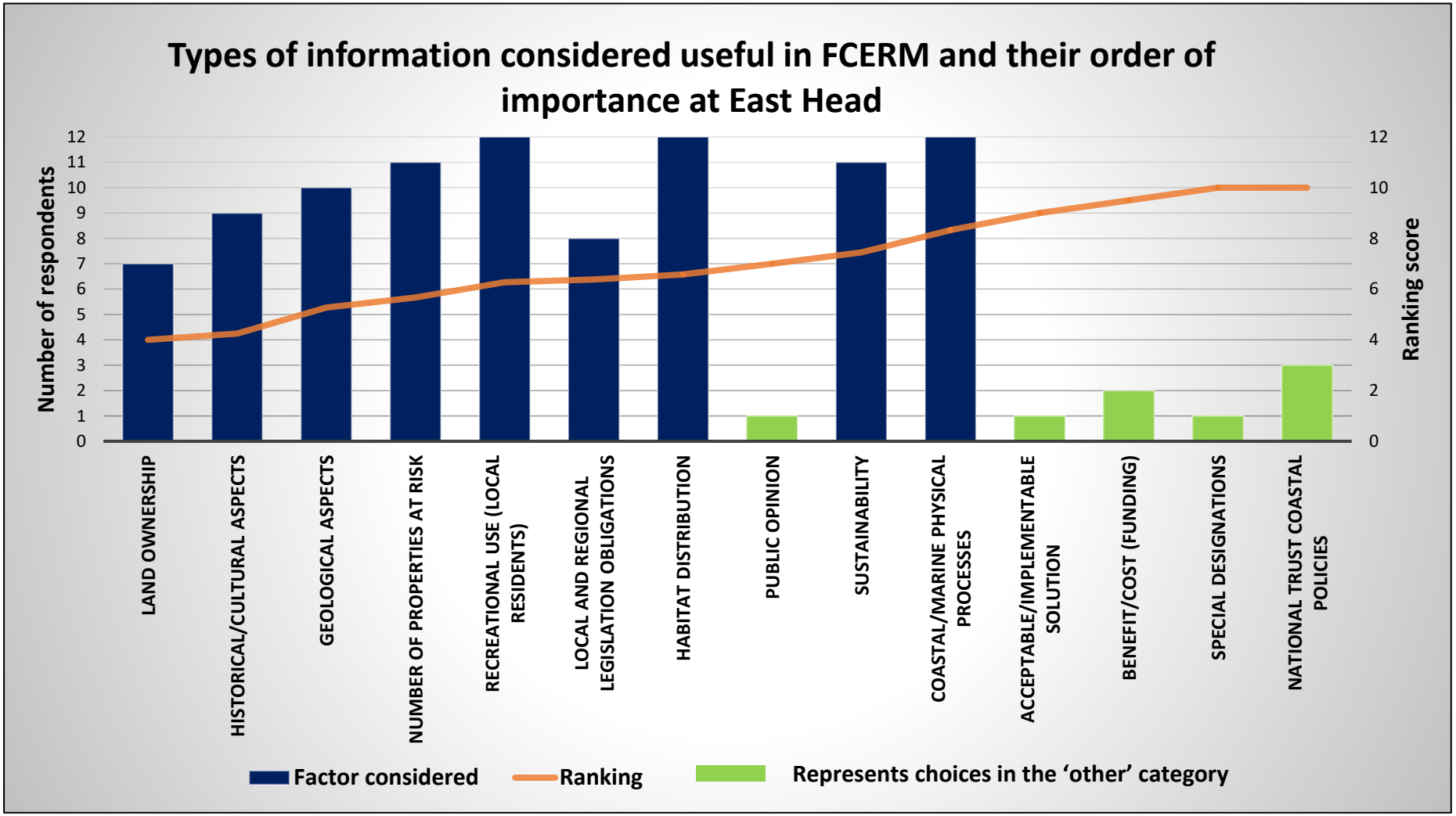

Figure 4.4 Types of information considered useful in FCERM, applicable to East Head, and their order of importance.

Table 4.3 and Figure 4.5 identified which sources of information were considered important at East Head. 100% of respondents agreed coastal monitoring information and information from the EA were the most useful sources. 91.67% of respondents suggested academic reports, followed by 75% agreeing on information obtained from the local community and the LA. This percentage reflected similar responses to a study by Famuditi (2010), in which Coastal Action Groups agreed LA and local community information were significantly useful. Wynne (1991) argued that local information can often be more valid than that from wider expertise, such as the EU, due to its specificity to a local area, thus reducing more generalised information. Although only 25% of respondents indicated that information from Defra was useful, it must be noted that several respondents suggested information was actually obtained from Natural England and not Defra, hence its addition as an extra option. 'Other' additional options included 'land owners' and 'internal specialists'. Social media was not considered by any respondents.

Information from the EA ranked most highly with a score of 10.17, followed by information from external consultancies (10.13) and coastal monitoring information (10). These factors suggested expert advice is essential and as Williams and Brown (2012) found, a lack of information and understanding about the impacts of management, i.e. through coastal monitoring, can increase uncertainty. Least important sources of information were identified as 'other media' (2.5) and EU documentation (5.4). Famuditi (2016) also found EU documentation ranked low although they found 'other media' ranked much higher. This contrast could, however, relate to the differing types of participants within each study. It is suspected that if Natural England had of been an option, more respondents would have considered it, as it ranked highly by those who did, as opposed to information from Defra, which ranked low (4).

It should be noted that social media was given a ranking score despite not being selected as an answer, suggesting a mistake by one respondent. With a rank of least importance this anomaly thus had little significance. However, other authors, e.g. Rayner & Rickert (1988), found social media as a credible source of information.

Table 4.3 Weighting averages table of sources of information and their order of importance at East Head.

Rank															
Factor	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**N/A**	**Total**	**Score**
DEFRA	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	0.00%	12.50%	0.00%	0.00%	75.00%		
	0	0	0	0	0	0	0	1	0	1	0	0	6	**8**	**4**
EA information	33.33%	8.33%	16.67%	25.00%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
	4	1	2	3	2	0	0	0	0	0	0	0	0	**12**	**10.17**
EU documentation	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	12.50%	25.00%	0.00%	0.00%	0.00%	37.50%		
	0	0	0	0	0	2	0	1	2	0	0	0	3	**8**	**5.4**
Local authority documentation	16.67%	0.00%	25.00%	33.33%	8.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.67%		
	2	0	3	4	1	0	0	0	0	0	0	0	2	**12**	**9.8**
Local community	0.00%	10.00%	0.00%	10.00%	20.00%	30.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%		
	0	1	0	1	2	3	1	0	0	0	0	0	2	**10**	**7.88**
Other coastal users	0.00%	0.00%	0.00%	0.00%	12.50%	12.50%	12.50%	12.50%	0.00%	0.00%	0.00%	0.00%	50.00%		
	0	0	0	0	1	1	1	1	0	0	0	0	4	**8**	**6.5**
External consultancies	0.00%	60.00%	0.00%	0.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%		
	0	6	0	0	1	1	0	0	0	0	0	0	2	**10**	**10.13**
Coastal monitoring	25.00%	16.67%	25.00%	8.33%	16.67%	8.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
	3	2	3	1	2	1	0	0	0	0	0	0	0	**12**	**10**
Academic reports	18.18%	9.09%	36.36%	18.18%	0.00%	0.00%	18.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
	2	1	4	2	0	0	2	0	0	0	0	0	0	**11**	**9.55**
Social media	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	0.00%	0.00%	0.00%	0.00%	87.50%		
	0	0	0	0	0	0	0	1	0	0	0	0	7	**8**	**5**
Other media	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	12.50%	0.00%	75.00%		
	0	0	0	0	0	0	0	0	0	1	1	0	6	**8**	**2.5**
Other	16.67%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	66.67%		
	1	1	0	0	0	0	0	0	0	0	0	0	4	**6**	**11.5**

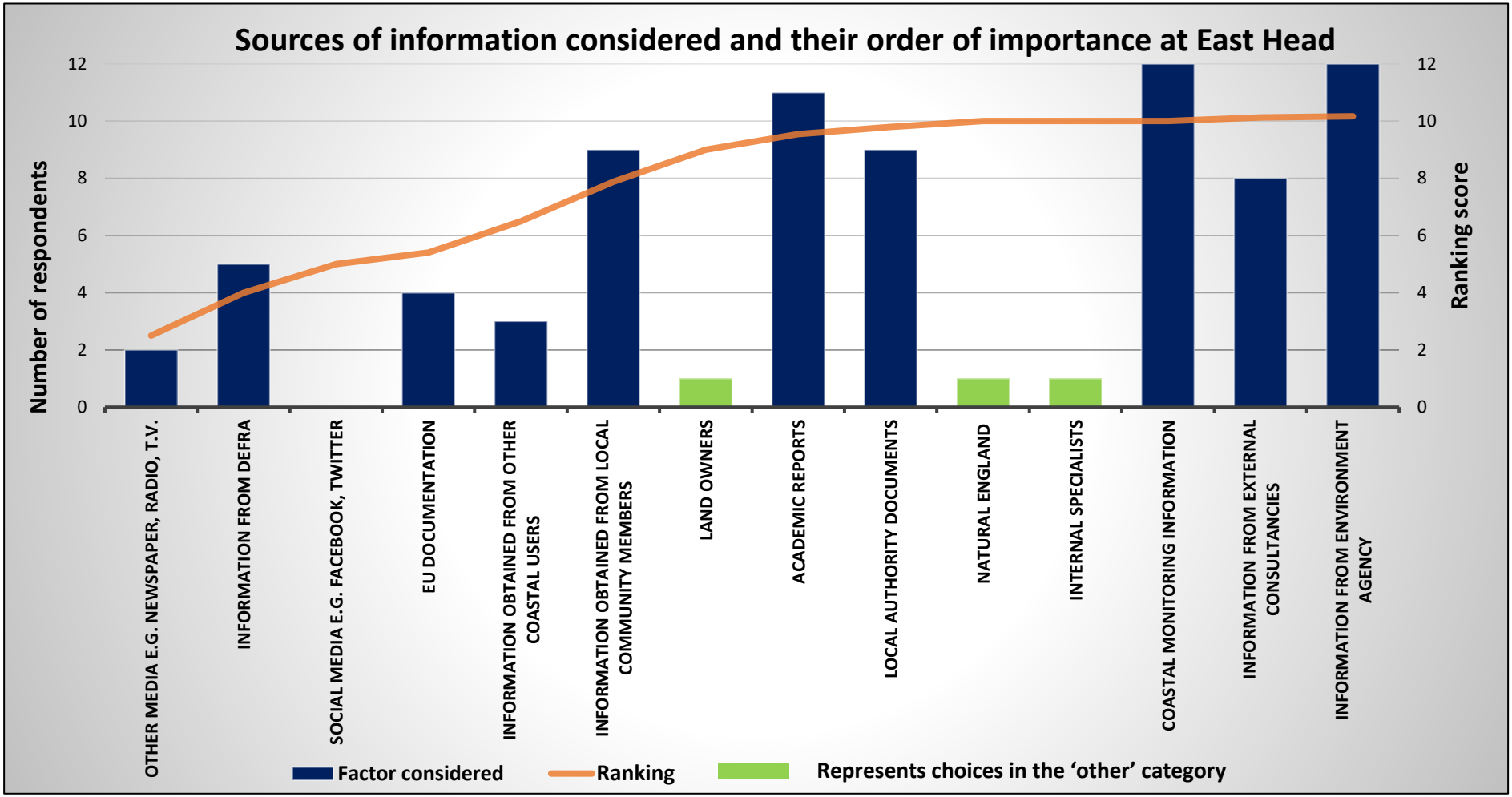

Figure 4.5 Sources of information and their order of importance at East Head.

4.3.2 Adaptive management aims

Most respondents (75%) agreed the aim of AM has so far been achieved, 17% did not agree and 8% of respondents skipped the question (Figure 4.6). To gain more insight, respondents were asked to comment on their reasons and eight responses were received. Respondents agreeing with the aim suggested AM will "safeguard all values" and stated there has so far been "no negative effects on any of these (values)". Nevertheless, many respondents indicated AM is a timely process and is still in the early stages at East Head, perhaps suggesting why 8% skipped the question. Moreover, one respondent highlighted that there has not yet been a "severe storm to test the consequences". This could also indicate why 17% of respondents have not agreed with the statement, due to a degree of uncertainty, similar to those responses in Figure 4.3. However, as Walters (1986) advised, AM gives stakeholders the chance to respond to, and even take advantage of, unanticipated events.

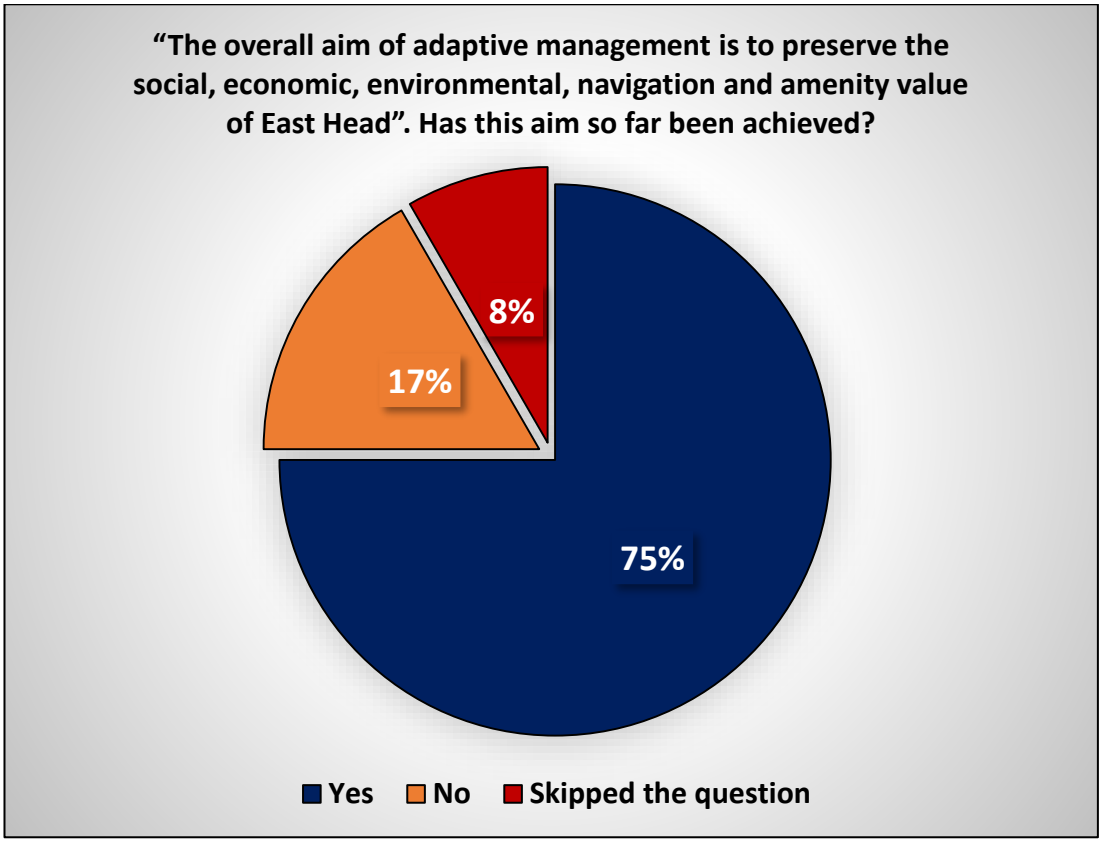

Figure 4.6 Achievement of the overall aim of AM at East Head.

67% of respondents agreed that East Head has so far been allowed to adapt naturally whereas 33% disagreed (Figure 4.7). Ten additional comments were received in which several respondents stated it is too early to tell, a similar response to the previous aim (Figure 4.6). Many respondents suggested that the removal of more structures is necessary before natural processes can dominate. Additionally, one respondent advised this statement was made and "agreed by some members before they fully understood what it meant". As Williams and Brown (2012) outlined, a limited understanding often contributes to uncertainty in strategies.

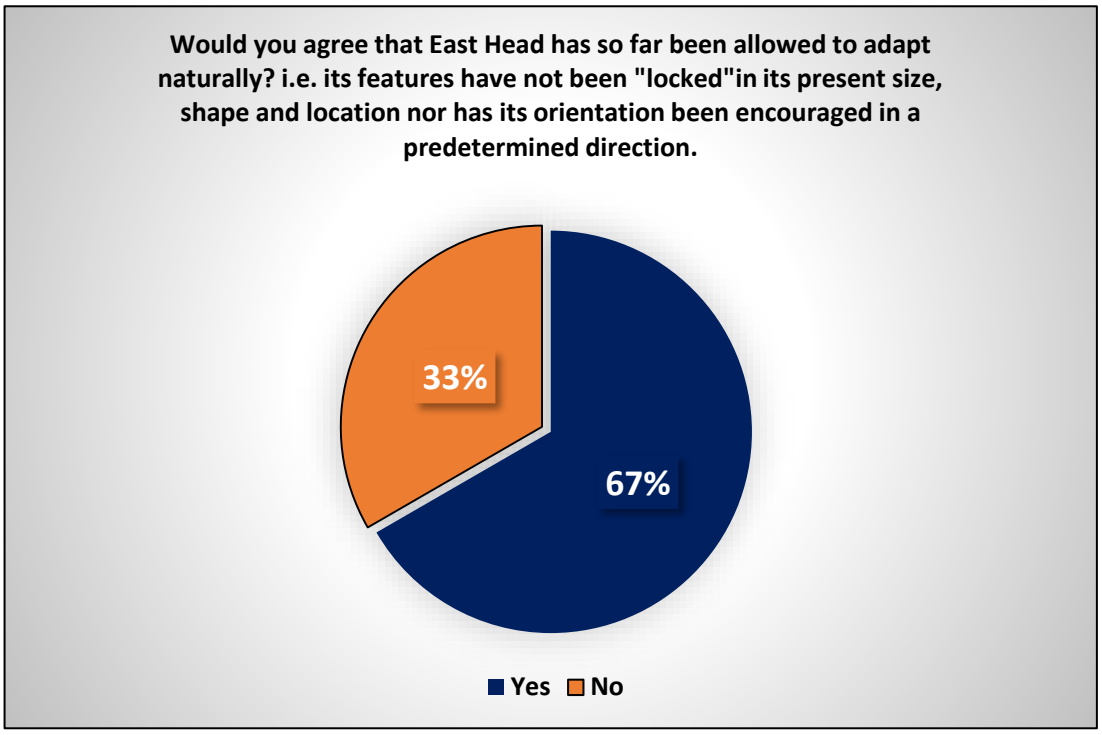

Figure 4.7 Respondents view on whether East Head has been allowed to adapt naturally.

4.3.3 Barriers and reservations for the AM policy at East Head

Figure 4.8 shows whether respondents believed there were any barriers within the policy unit. 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 stated a lack of agreement as a major barrier in AM 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 AM methods.

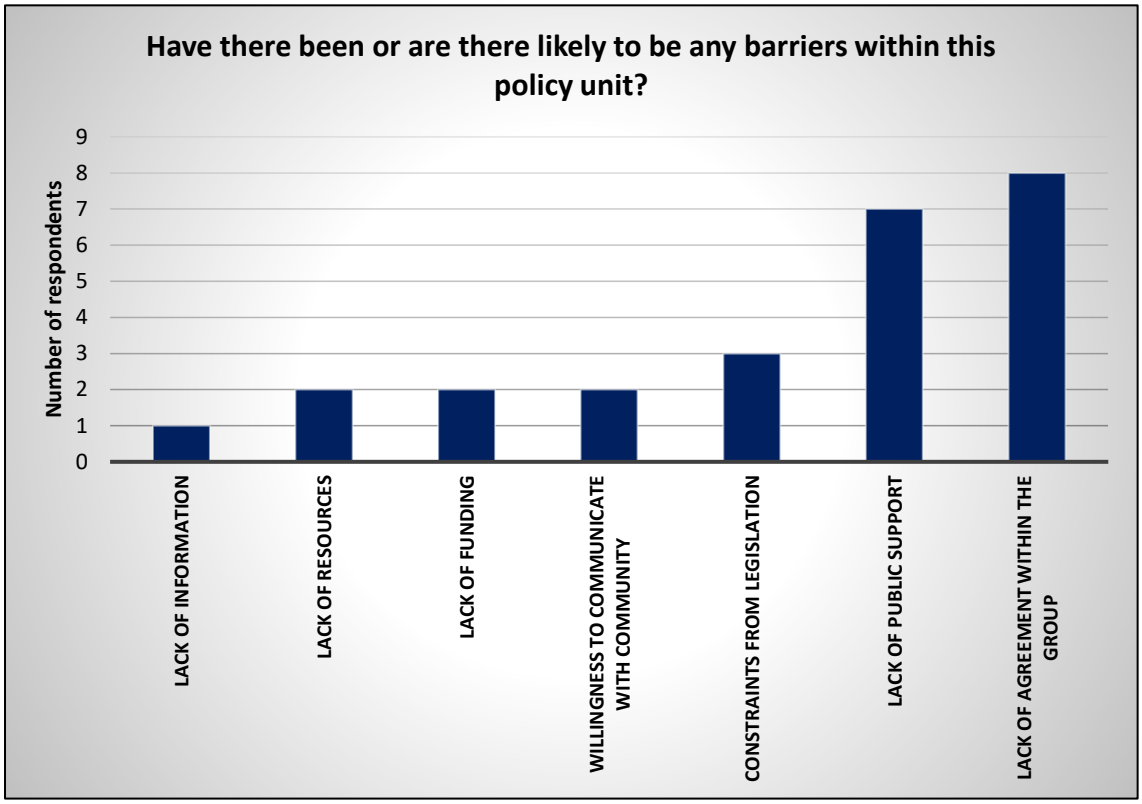

Figure 4.8 Barriers within the policy unit.

A willingness to communicate with the community was added as an extra option (20%) in line with lack of resources (20%) and lack of funding (20%). Gardner (2013) advised that a lack of resources and funding can cause major issues, often greatly restricting the ability to implement AM plans effectively. It is therefore positive that these barriers are viewed as least concerning by the EHCIAG. However, one respondent did suggest that all members must continue to “recognise the importance of the group to ensure they have continued participation” regarding resources and funding. A lack of information (10%) was considered as the least likely barrier as respondents indicated that this is constantly improving.

Additional comments by respondents emphasised that although consensus has been achieved, difficulties in convincing members of the group and the public to remove hard structures was a significant barrier as hard defences are well understood (referring back to Section 2.3.1). Turner et al. (2014) stated that hard defences often provide people with a perceived level of security and therefore a willingness to change can be a substantial barrier.

Furthermore, a respondent added, “public opinion can change, particularly when dramatic changes occur, often resulting in continuously changing levels of support”, thus emphasising the importance of all “parties maintain[ing] an understanding of what is going on”. In a study by Benson and Stone (2013), public support was acknowledged as a constraint on fully implementing AM.

An open-ended question was used to identify any final reservations concerning the policy. 50% 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

Interpretation and uncertainty have been recognised as issues in Sections 4.3 and 4.3.2. Continued cooperation from the group is a common concern in AM as Williams and Brown (2012) advocated AM focuses on learning through fundamental partnerships of stakeholders to create and maintain a sustainable resource system. Monitoring is well-recognised as a crucial concern in AM, 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. Moreover, Friedmann (1987) suggested learning and action are the hallmarks for social learning planning models. Although resources and funding was mentioned as a reservation, the results from Figure 4.8 would indicate this was not noted as a major concern by the majority of respondents, although to maintain this, there is a reliance on continued group participation.

4.3.4 Word cloud on the Adaptive Management policy

Respondents were asked to provide one word to describe the policy at East Head. A word cloud has been created from their responses (Figure 4.9). Of the responses, three words were used by more than one respondent; sustainable, pragmatic and working. All the responses could be described as 'positive', although the words 'conscious' and 'experiment' suggested some members remain cautious and aware of the uncertainty, perhaps relating back to reservations in the previous section (4.3.4.2).

Figure 4.9 Word cloud for the AM policy unit at East Head (created using Word Cloud, 2016).

4.4. East Head Coastal Issues Advisory Group (EHCIAG)

This first section included questions requiring open-ended responses in order to gain an insight into the main expertise within the group, and to examine why respondents believed the group was set up. Several responses were received relating to expertise in the group (Figure 4.10), signifying the wide breadth of respondents, thus reducing bias by including respondents from various backgrounds.

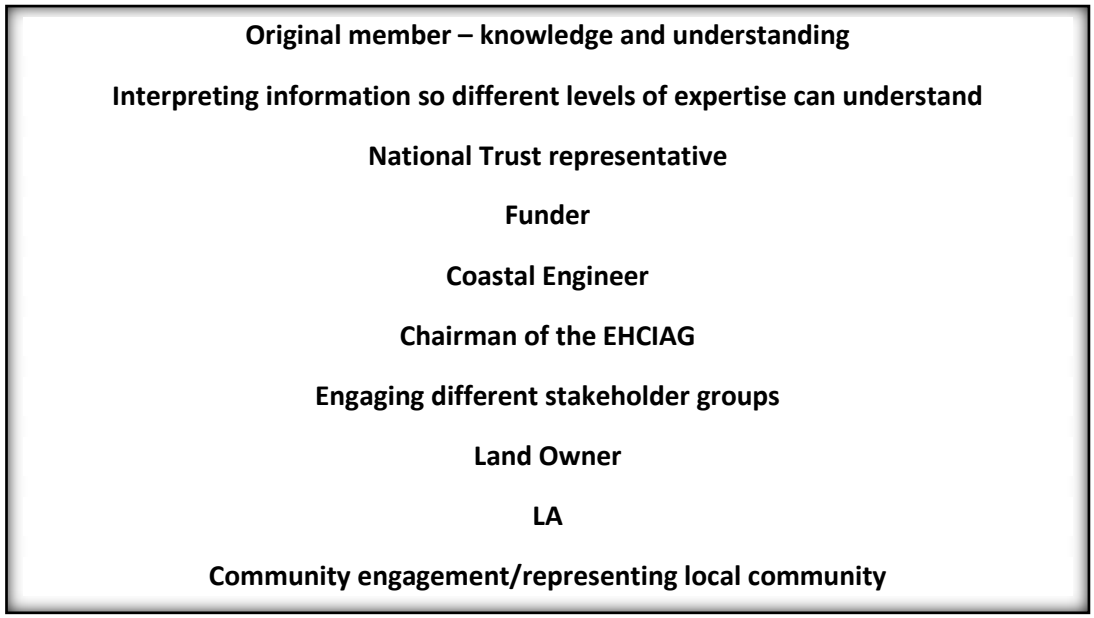

Figure 4.10 Varying expertise within the group.

Table 4.4 shows the varying responses as to why it was believed the EHCIAG was established. The responses indicated that many respondents agreed that major aspects were to integrate all the key stakeholders and engage the local community in order to generate an understanding.

Table 4.4 Respondents' views on why the EHCIAG was established.

To achieve the aims of the AM policy in collaboration with all the key stakeholders/interests.
To help locals understand what's going on and why we make the decisions we do – gaining support!
To merge very disparate views and come up with a consensus approach.
To engage effectively with experts and local people to achieve a common goal.
To preserve East Head and mange coastal erosion and flooding.
To discuss and form views to decide appropriate action given the different views on the management of the area coupled with the existing legal requirements.
To enable frank and open discussion whilst also allowing residents a direct say in how East Head is managed – allowed all parties to air their views and generates trust.

4.4.1 Effectiveness of the East Head Coastal Issues Advisory Group

Figure 4.11 shows 100% of respondents agreed the EHCIAG 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.

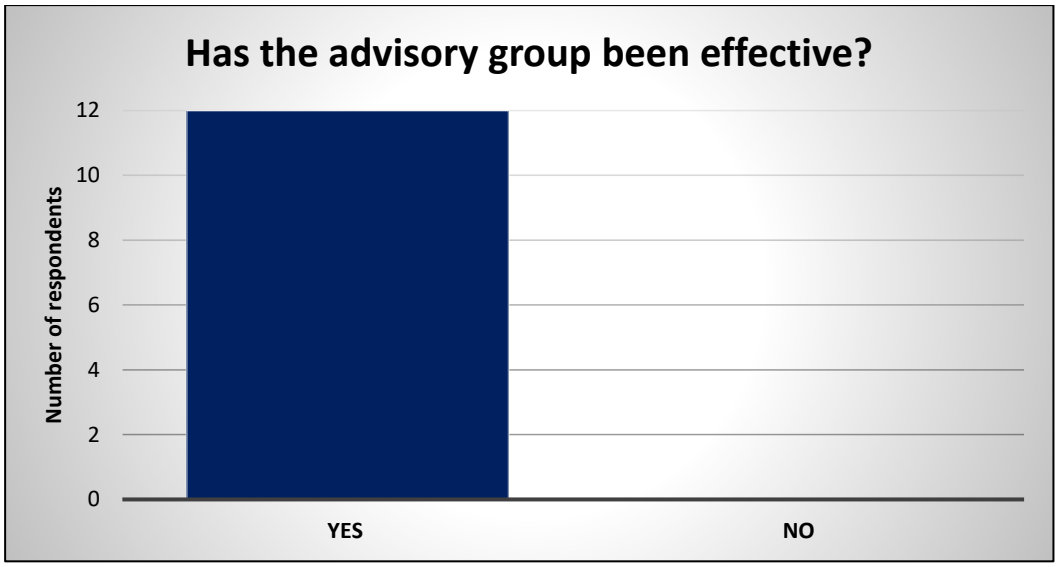

Figure 4.11 Effectiveness of the advisory group.

4.4.2 Important factors in advisory groups

Respondents were asked to choose which factors they considered important in advisory groups (Table 4.5) and asked to rank these factors in order of importance. Figure 4.12 shows that 100% of respondents agreed that transparency was important, followed by regular meetings/communication (83%), openness (83%) and focus on outcomes (83%). Similarly, O'Riordan and Ward (1997) and Crispin (2015) also indicated transparency was essential in effective coastal management. Individuals with specific expertise (75%) was chosen by more respondents than diversity (67%). Least popular options included networking/connections (50%) and equal contributions (42%). Three 'other' choices were added, including clear expert advice, level of trust and relevant bodies represented.

Despite all respondents choosing transparency (6.73), it was ranked second highest behind regular meetings and communication (7.4). Individuals with specific expertise (6.67), focus on outcomes (6.6), diversity (6.38) and openness (6.5) were ranked similarly. Networking (4.33) and equal contributions (3.6) were ranked as least important. Conversely, Berkes (2010) argued that equal contribution is one of the most important factors in coastal advisory groups, often leading to the feeling of "inclusion".

Table 4.5 Weighting averages table of factors considered important in an advisory group and their order of importance.

Rank												
Factor	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**N/A**	**Total**	**Score**
REGULAR MEETINGS/COMMUNICATION	27.27%	18.18%	27.27%	0.00%	18.18%	0.00%	0.00%	0.00%	0.00%	9.09%		
	3	2	3	0	2	0	0	0	0	1	**11**	**7.4**
DIVERSITY	0.00%	11.11%	55.56%	0.00%	11.11%	0.00%	11.11%	0.00%	0.00%	11.11%		
	0	1	5	0	1	0	1	0	0	1	**9**	**6.38**
INDIVIDUALS WITH SPECIFIC EXPERTISE	33.33%	11.11%	11.11%	11.11%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%		
	3	1	1	1	0	3	0	0	0	0	**9**	**6.67**
TRANSPARENCY	16.67%	25.00%	0.00%	33.33%	8.33%	0.00%	8.33%	0.00%	0.00%	8.33%		
	2	3	0	4	1	0	1	0	0	1	**12**	**6.73**
OPENNESS	18.18%	9.09%	9.09%	36.36%	9.09%	0.00%	9.09%	0.00%	0.00%	9.09%		
	2	1	1	4	1	0	1	0	0	1	**11**	**6.5**
FOCUS ON OUTCOMES	18.18%	18.18%	18.18%	18.18%	0.00%	9.09%	0.00%	9.09%	0.00%	9.09%		
	2	2	2	2	0	1	0	1	0	1	**11**	**6.6**
NETWORKING/CONNECTIONS	0.00%	11.11%	0.00%	0.00%	22.22%	11.11%	11.11%	0.00%	11.11%	33.33%		
	0	1	0	0	2	1	1	0	1	3	**9**	**4.33**
EQUAL CONTRIBUTIONS	0.00%	0.00%	0.00%	0.00%	25.00%	12.50%	0.00%	25.00%	0.00%	37.50%		
	0	0	0	0	2	1	0	2	0	3	**8**	**3.6**
OTHER	0.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	20.00%	60.00%		
	0	1	0	0	0	0	0	0	1	3	**5**	**4.5**

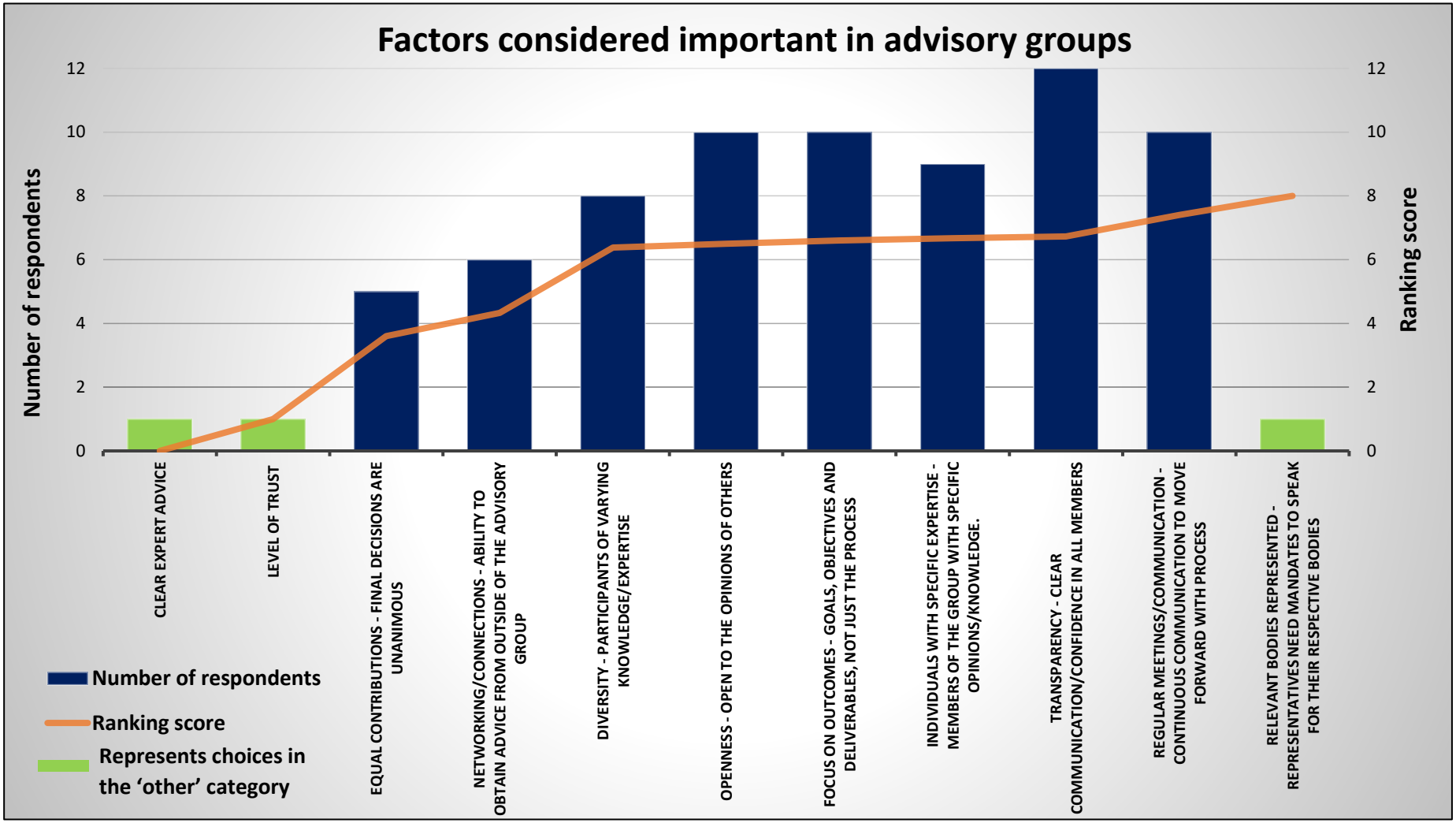

Figure 4.12 Factors considered important in advisory groups and their order of importance.

4.4.3 Drivers for joining the East Head Coastal Issues Advisory Group

Table 4.6 and Figure 4.13 show the main drivers for joining the EHCIAG. Environmental concern (78%) was chosen by the majority of respondents, followed by recreational concern and community service (both 67%), reflecting similar results of a study by Famuditi (2016). No respondents stated they were personally affected by the flood zone, supporting responses presented in section 4.3. Three respondents added 'other' options including 'land owner' and 'part of the job'. Famuditi (2016) also found 'employment' was identified as a driver. Community service (4.67) was ranked most important, followed closely by environmental concern (4.57) and recreational concern (3.17).

Table 4.6 Weighting averages table of drivers for joining the EHCIAG.

	Rank							
Factor	**1**	**2**	**3**	**4**	**5**	**N/A**	**Total**	**Score**
Community service	50.00%	25.00%	0.00%	0.00%	0.00%	25.00%		
	4	2	0	0	0	2	**8**	**4.67**
Environmental concern	40.00%	30.00%	0.00%	0.00%	0.00%	30.00%		
	4	3	0	0	0	3	**10**	**4.57**
Recreational concern	0.00%	11.11%	55.56%	0.00%	0.00%	33.33%		
	0	1	5	0	0	3	**9**	**3.17**
Personally affected by flood zone	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%		
	0	0	0	0	0	7	**7**	**0**
Other	37.50%	0.00%	0.00%	0.00%	0.00%	62.50%		
	3	0	0	0	0	5	**8**	**5.00**

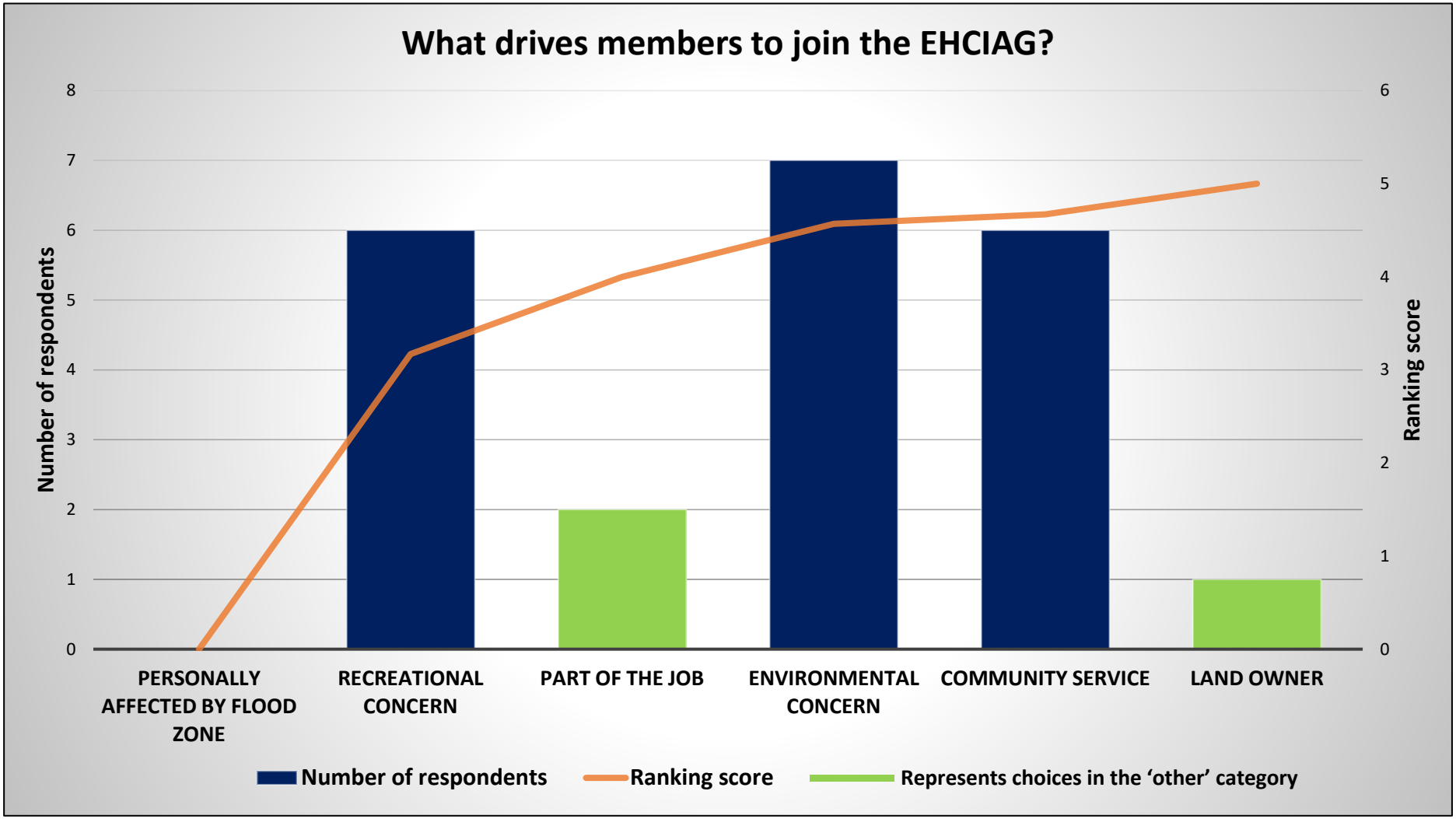

Figure 4.13 Drivers for joining the EHCIAG.

4.4.4 Conflicting interests in the East Head Coastal Issues Advisory Group

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 present time. Figure 4.14 shows 100% of 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 present time, 42% of respondents implied that conflict is moderate compared with 58% suggesting there is no conflict.

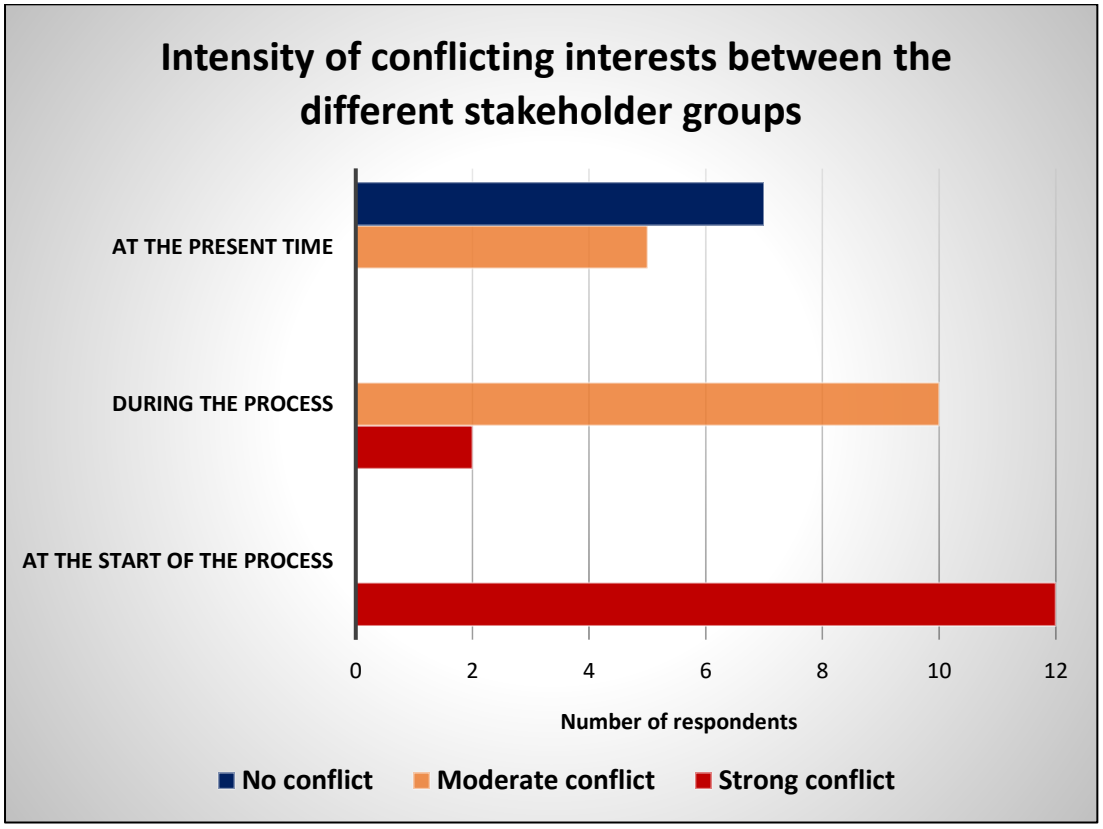

Figure 4.14 The intensity of conflicting interests between the stakeholder groups at different stages of the process.

As suggested by Milligan and O'Riordan (2007), coastal advisory groups can initiate compromise and aid in establishing more unified partnerships by linking organisations of varying interests. As Figure 4.14 demonstrates, individual groups of differing perspectives may have initially created conflicts at the start of the process. However, 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).

4.4.5 Improvements needed and moving forwards with the East Head Coastal Issues Advisory Group

Two open-ended questions were asked 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

In terms of moving forwards, the following was suggested:

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

4.4.6 Word cloud on the East Head Coastal Issues Advisory Group

Respondents were asked to provide one word to summarise the EHCIAG. A word cloud has been created from their responses (Figure 4.15). Of the responses, ‘effective’ stood out as a key word used by several respondents. Similar to Figure 4.9, (Section 4.3.4) all the responses could be described as ‘positive’, illustrating that the formation of the EHCIAG was effective in working together in collectively managing AM at East Head.

Figure 4.15 Word cloud for the EHCIAG (created using Word Cloud, 2016).

On completion of the survey, additional comments highlighted that members felt the EHCIAG was an effective tool in addressing concerns and issues surrounding East Head. Moreover, the inclusion of several key stakeholders was perceived to be instrumental in effective decision-making and compromise. However, major concern seemed not to lie within the effectiveness of the group, but more so within uncertainty in AM, which is yet to be "fully tested by the sea".

4.5 Conclusion

This chapter has met the criteria of objective three and four (Table 1.1) by critically appraising the results, concluding that although respondents were satisfied with the EHCIAG, key concerns lay around uncertainty within the AM policy. In particular, many respondents have agreed it is too early in the process to comment on whether East Head is being allowed to adapt naturally. Despite this, several respondents also suggested recent interventions to remove man-made features has proven that the theory of AM works, but more will have to done before natural processes can dominate.

The results have identified the potential barriers including a lack of agreement within the group as well as a lack of public support. Key issues causing these barriers may relate to reservations including interpretation of the policy and the standard of coastal monitoring.

In terms of the EHCIAG, all respondents agreed the group has been effective, albeit with a degree of conflict during the process. It appeared that transparency, communication, regular meetings and individuals with specific expertise were the main factors considered important in its success.

Chapter Five

Analysis and Discussion of Semi-Structured Interviews

5.1 Introduction

This chapter outlines the information collected from the semi-structured interviews described in Chapter Three. Response rates and analysis techniques are first explained, followed by a discussion of interview outcomes.

5.1.1 Response rate

Interviews were carried out over two weeks. Due to the individual commitments of each interviewee, the length of time in which each respondent could contribute varied. The available time each respondent could provide was established at the beginning of the interview so as to not impose on their time.

As with the questionnaires, response rate was high for the interviews. Of the twelve survey respondents who were approached for an interview, ten participated[2]. This included interviews with eight out of a possible nine organisations. This high response rate reduced bias and provided a fairer representation of all perspectives on the group (Furnham, 1986; Dilman, 1991).

5.1.2 Transcribing and analysing the data

As previously mentioned (section 3.4.3), interviews were recorded to reduce the pressure on taking notes and to enable full engagement with the interviewee (Cope, 2003). After conducting the interviews, transcripts were made to facilitate analyses (Cope, 2003). For ethical reasons, the transcripts will not be included in this project and interviewees will remain anonymous.

5.2. Responses and analysis of interviews

The interview was structured under five main themes:

1. Information for decision-making
2. The decision-making process
3. Adaptive Management Policy
4. Public engagement
5. Coastal advisory groups

It should be noted that all views expressed in the following sections are of the interviewees only.

[2] Two respondents did not respond to invitations to participate in the interviews.

5.2.1 Sufficiency of information for decision-making

There was a general consensus across all interviewees that sufficient information to inform decision-making was obtained. Notably, several respondents suggested the benefits of having external expertise, such as links to academia, to gain more information if and when it was required. It was emphasised that the group will always strive to facilitate more understanding, especially when research opportunities arise. 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. Another interviewee raised the point that,

"…it is expensive collecting and having studies undertaken, there is not always funding for studies. I cannot say I'm 100% confident that we will always have the information in the future".

It was mentioned that although all members were aware of the information, East Head is a dynamic, ever evolving and hard site to predict. Therefore, although there is access to the information, interpretation to ensure an understanding by all is key in 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".

5.2.2 Past and future prospects of coastal monitoring

Several interviewees have mentioned coastal monitoring as a central aspect in how the group will move forwards. However, during the interviews, there were mixed responses on the progression of monitoring. All interviewees agreed that monitoring is being undertaken and several members suggested they were aware of and had been informed about "*surveys*". Furthermore, several interviewees mentioned "*programmes*" such as the "*Coastal Channel Observatory*", "*SCOPAC*[3]" and the "*South East Regional Coastal Monitoring Programme*".

[3] Standing Conference on Problems Associated with the Coastline – influential network of local authorities and other organisations who share an interest in shoreline management of central southern England.

A few interviewees did express concern regarding more local monitoring, wider information and interpretation of the information,

"There needs to be more monitoring on a local basis by the group".

"There's greater reliance on national satellite data/LiDAR[4] data rather than local monitoring".

"It is quite a complex website to get information from".

"What we lack is information about offshore depths".

One interviewee has highlighted that there are plans for local monitoring once more defences are removed, although advised that the group must collectively work on developing this. Conversely, another interviewee advocated that there is a "*comprehensive dataset of coastal monitoring spanning over 13 years*", however as mentioned AM is an extensive process and perhaps such regular monitoring is unnecessary,

"*We know how [East Head] behaves year to year and where the trends are going, let's leave it and do it every two or maybe five years to confirm those series that are developing now"*

Although monitoring appears consistent, the main issue seemed to lie in interpreting the information and making it understandable for all members, thereby providing clarity concerning the status of East Head.

5.2.3 Effectiveness of the decision-making process

All interviewees agreed that the decision-making process has been effective, all members have been able to participate and meetings were conducted efficiently. 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, supported by another interviewee, who stated it has been "*a long iterative process*" but the group has "*successfully kept everyone onboard*".

[4] Light Detection and Ranging technology involves the transmission of infrared pulses of light from a terrestrial or airborne carrier towards a desired feature, creating 3D datasets with high precision and accuracy based on the return time of the pulses divided by two (Campbell & Wynne, 2011).

Only one interviewee felt they had "*a weaker voice in the debate*" although "*full opportunity to participate*" was given. However, as another interviewee advised:

"Through the terms of reference, it was to be by majority and not unanimous which should be the approach in going forwards. Trying to get agreement around the table 100% is near on impossible."

Several interviewees expressed the importance of voting on major decisions and how consensus was achieved before any final decisions were made. A major part of the process was obtaining advice from the experts, allowing members to realise and understand concerns, thus enabling the group to gradually and slowly come to mutual agreements. Additionally, many interviewees have expressed the benefits of a "*solid chairman*" in enabling all parties to express their perspectives equally.

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

5.2.4 Resolving conflict

Many interviewees agreed the primary conflict has been in deciding whether to allow defences to fail or to be repaired at East Head. Table 5.1 summarises some of the main points interviewees highlighted regarding conflicts and how they believe it has been resolved.

Table 5.1 Summary of interviewees thoughts on main conflicts and how they have resolved.

Conflict	How was it resolved?
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 stabilisation have been realised 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 defences to fail or be repaired.	"*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 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.

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 recognised that conflicts have considerably reduced within the group, particularly in the past three years, and the group now appears to come to much more amiable agreements.

5.2.5 Uncertainty surrounding the Adaptive Management Policy

All interviewees recognised that there remains a problem concerning uncertainty with the policy. 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*". AM is a leap into the unknown and perhaps a key factor in moving forwards lies in more effective clarification of the policy. AM cannot offer certainty but according to one respondent "*is the sensible and pragmatic approach*". Furthermore, one interviewee stated that nothing requires "*100% access… but that is what people focus on*".

It is suggested that although the Terms of Reference (Appendix F) state what AM means, it is still "*a matter of interpretation*" and although AM has brought consensus, it remains an ambiguous term. An interviewee advocated the need for a "*larger, structured communication plan*" and to interpret the policy into "*layman's terms*". However, this would only work if it is interpreted to "*someone who is open-minded enough to listen in the first place*".

Despite this, several respondents seemed content with the policy and according to one respondent,

"AM offers a long-term and cost-effective way whilst working within the limitation of the SSSI status and the movability to put high defences in".

AM 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. A significant problem could lie in the different perspectives on what a timely action may be. AM requires "*a need to react rather than predict*" and although this has been communicated in the past, looking forward it must be recognised that this communication needs to continue.

5.2.5.1 Recent Developments… A Watershed Moment?

Recent developments have included works to remove some man-made features. A new sand and shingle ridge has been constructed along the back of the hinge, designed to reduce the impact of overwashing during severe storms (Figure 5.1). The ridge will also allow for the safe removal of failed sections of timber breastworks, which are currently deteriorating and are intended to allow a naturally sloping beach to form.

Figure 5.1 Sand and shingle ridge constructed along the back of the hinge, designed to reduce the impact of overwashing during severe storms (CHC, 2016).

Many interviewees regarded this as a watershed moment due to visible changes including the formation of a small beach following a storm and big tide. One interviewee stated,

"At the end of the day you can only understand the processes when something happens because of the dynamic system".

Many interviewees suggested this was a turning point, proving the theory works, and should convince and reassure members that AM remains the most appropriate solution. One respondent believed,

"The evolution of it marks the group have accepted this is the way forward".

However, two interviewees disagreed. One interviewee suggested that it was more of a "*breakthrough than a watershed*" and argued that a bigger watershed moment occurred when the "*group gelled*". Another interviewee agreed it "*is certainly a step in the right direction*", but argued that there is "*division in the group as to how you would the fund work anyway*", re-emphasising the uncertainty from Section 5.2.5. According to an interviewee, a broader understanding may arise from "*pro-acting*" as opposed to "*reacting*".

5.2.6 Strengthening public engagement

Although, public support was outlined as a barrier during the surveys, most interviewees expressed their content in engaging the public with the policy. As one interviewee stated, "*public support will never be completely unanimous*", but gaining "*majority support is essential*."

According to one interviewee,

"The community have the blocks to engage with the authorities and challenge them and make sure that they're getting what they think they need out of coastal protection".

Therefore, as another interviewee advised,

"If you can gain the trust from the public, that goes a long way, and a key thing is communication and education, because people are wary of the unknown quantity of natural forces".

Several interviewees advocated the effective use of engagement days, signage, posters, relevant literature, public consultation and exhibitions. It was suggested that coming "*face*

to face" with the public can "*provide an honest answer*", a method which has previously been successful. However, one interviewee advised this can be "*hugely time consuming*". Of particular concern is funding, as mentioned by two interviewees, as well as a group recognition of the importance of getting the community onside. If funding is removed, "*the group will have to listen to the community*". One interviewee suggested there should be stronger emphasis on creating a "*group identity*" (relating back to section 4.4.5) in the future, as the wider community will then recognise "*that this is a group decision rather than someone going it alone and deciding that's how it should be*".

5.2.7 Establishing a successful coastal advisory group based on the East Head Coastal Issues Advisory Group experience

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*".

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 recognised the group as an "*effective vehicle in managing well-being*" and providing people with assurance through proven competency within an established group.

Generally, consensus is that the EHCIAG has been a success and all interviewees raised some key points in what had created this level of success:

- 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 realising what can and cannot be done concerning regulations.
- Consider what funding is available early on.
- Be consistent and if there are changes make sure they are explained to enable all members to understand.
- 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.

5.3 Conclusion

This chapter has built on analyses in Chapter Four, adding supplementary material in meeting the criteria of objectives three and four (Table 1.1). Interviews have helped to gain a deeper and more thorough understanding of the AM policy and the EHCIAG, including some of the successes and challenges to date. The interviews have enabled clarification of some aspects mentioned within the surveys, particularly regarding issues surrounding uncertainty within the AM policy.

It was highlighted that all interviewees believed the EHCIAG group has been generally successful in achieving consensus whilst considering a range of potentially conflicting interests. Conflicts have mostly been resolved through having the right evidence available, effective communication and a process of building relationships and trust.

Some of the most significant issues related to the AM policy. Uncertainty remains an issue due to concerns over interpretation, funding, monitoring and the unknown factor of what should happen in a major storm. However, many interviewees have agreed that recent changes seemed to mark a positive step forwards in gaining acceptance and assurance. It has been recognised that public engagement has previously been effective, although it was noted that a group identity will help to strength public support in the future.

Chapter Six

Overall Discussion, Requirements and Recommendations

6.1 Introduction

This chapter summarises, reviews and discusses the major findings of Chapter Five and Chapter Six. Following an overall discussion and critique (Section 6.2), recommendations are proposed (Section 6.3), areas of further research are suggested (Section 6.3) and Section 6.4 draws final conclusions.

6.2 Discussion and critique

The questionnaires and interviews proved successful in achieving high response rates for a descriptive analysis. The 100% response rate obtained through the web-based survey signified the effectiveness of all aspects; appropriate administration, wording and structure as well as being technically sound, subject to changes from the pilot survey. Additionally, this signified a high level of interest in this project and supported the research rationale (Section 1.2).

Although response rate was high and the telephone-style interview proved effective in working around respondents' personal time constraints, face-to face interviews would have perhaps enabled more in-depth discussion and analysis of body language. However, due to research time constraints and the diverse range of locations, it was not feasible during this study. Conversely, it could also be argued that response rate may have been lower with this method as interviewees seemed keen and content to take part in the telephone-style interview. Additionally, new perspectives may have been introduced by the two respondents who did not participate in the interviews, in particular from one of the respondents in which no interviews were conducted from that organisation.

6.2.1 Dealing with risk and uncertainty in Adaptive Management

One of the key findings of this study was the uncertainty that some respondents had towards the AM policy. The NSSP (2010) stated that the AM 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 recognise 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, 2015).

According to Brisley (2015), adopting more adaptable plans could be the answer to sustainably and pragmatically managing flood and erosion risks. Therefore, although the AM 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).

6.2.2 East Head Coastal Issues Advisory Group: a model of best practice for effective stakeholder engagement

Despite concerns surrounding the policy, all respondents generally regarded the EHCIAG as a valuable tool in stakeholder engagement. 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 recognised 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".*

Based on the EHCIAG and the responses given throughout this project, Table 6.1 has identified some guidelines for future best practice. Figure 6.1 subsequently presents a model of best practice. It is important to note that different sites will have differing factors to consider and therefore these recommendations are reasonably broad.

Table 6.1 Guidelines for future best practice of stakeholder engagement within a coastal advisory group.

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 AM 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".*

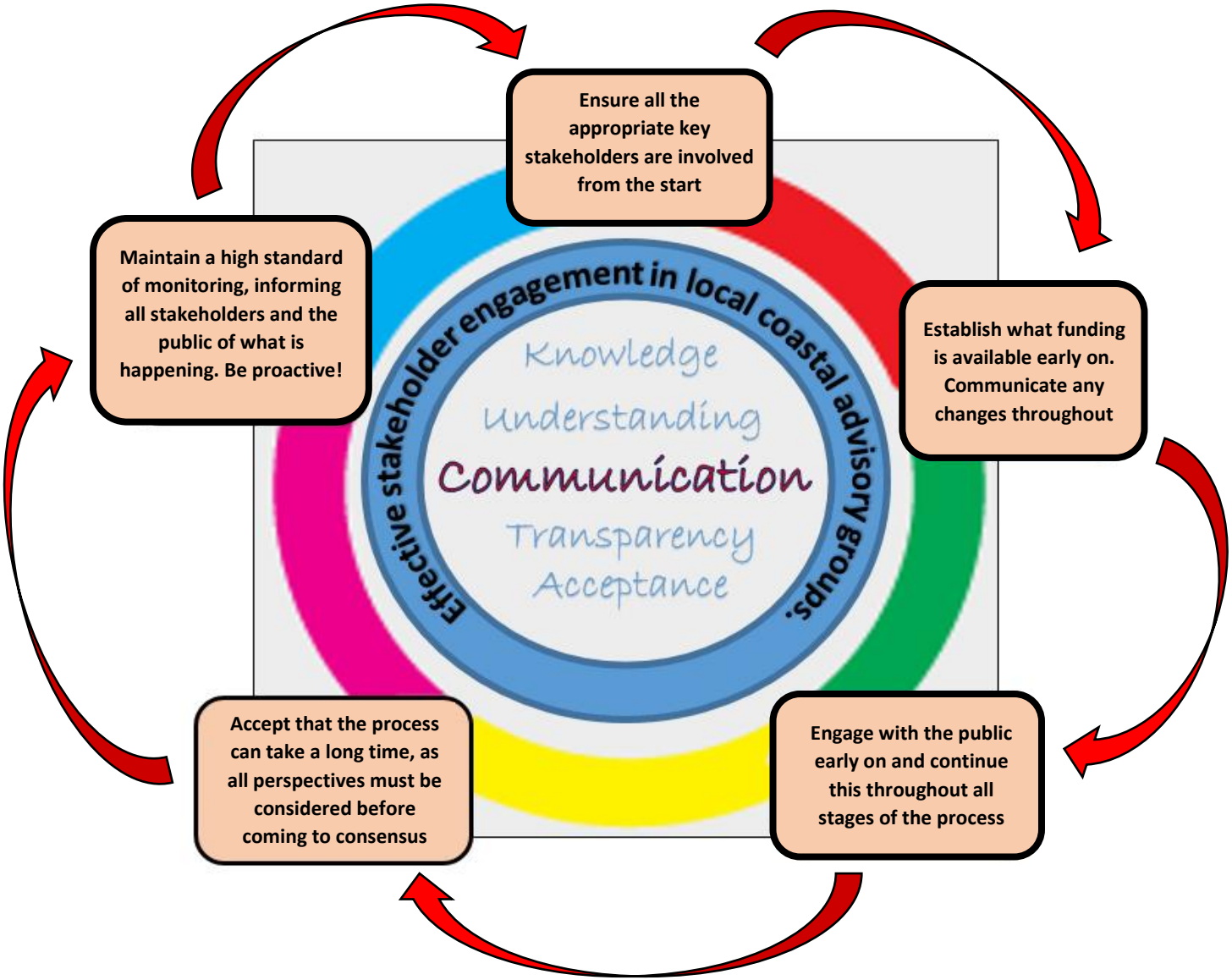

Figure 6.1 Model of best practice in effective stakeholder engagement within a coastal advisory group, based on the EHCIAG example. The stages are not necessarily sequential , rather indicative of the key steps to be considered (Author's Own).

6.2.3 Recommendations for the East Head Coastal Issues Advisory Group in progressing forwards

Although it has been highlighted that the EHCIAG can be used as a model of best practice, Table 6.2 proposes some recommendations, considering any concerns found during this study, thus improving the potential of the group.

Table 6.2 Recommendations for the EHCIAG in progressing forwards.

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 AM policy. It is recommended to clarify and ensure effective interpretation of AM 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 has been mentioned by an interviewee as a way of building confidence in the decisions made by the group. For the wider community it should be recognised 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.

6.3 Areas of further research

This research has explored existing gaps in the research. In particular, it has identified an example of local effective communication in FCERM, where a previously acknowledged gap was evident (Thaler et al., 2016). However, there are still some areas requiring further investigation as listed below:

Research on the perceptions and attitudes of the community surrounding East Head

This project sought to assess the perspectives of stakeholders within the EHCIAG. It would be of further interest to gain a community perspective, using similar methods to outline any concerns and clarify the effectiveness of community engagement.

Wider comparative coastal advisory group studies

The MStAG (Crispin, 2015) was used as a comparative local example in Chapter Two of this project. However, further research is required concerning other localised coastal advisory groups, in order to facilitate comparative studies.

Wider comparative studies on Adaptive Management

The AM 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 AM, 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 et al. (2016) advised, there remains few examples of how AM has been utilised to enhance the success of coastal restoration. There is also extensive scope to conduct further research into the effectiveness of decision-making within AM as there is limited research on this aspect (Challies et al., 2016).

6.4 Conclusion

This chapter has successfully achieved objective five (Table 1.1). The information obtained throughout this project has been considerably valuable in determining the perspectives of stakeholders and evaluating the effectiveness of stakeholder engagement at East Head. Despite the critique surrounding the interviews, the information has helped to build a picture of stakeholder views on AM policy and the EHCIAG. Although there remains some uncertainty with the AM policy, the respondents have signified the EHCIAG as an effective tool in meaningful stakeholder engagement, thus promoting it as model of best practice. Broad guidelines on future best practice within coastal advisory groups have been

established as well as recommendations on effectively progressing within the EHCIAG. Further areas of research should address the community perspectives of East Head and wider research should identify comparative studies of AM and other localised coastal advisory groups.

Chapter Seven

Summary and Final Conclusion

7.1 Introduction

This chapter concludes the project, summarising the research and drawing final conclusions.

7.2 Summary of the research

This study sought to critically evaluate the effectiveness of stakeholder engagement in adaptive management at East Head, Chichester Harbour, UK. East Head provides a unique example of an advisory group (EHCIAG), collectively working together in FCERM. East Head is recognised as a dynamic and unpredictable site and therefore the stakeholder views on the AM policy have also been discussed. AM is likely to be an emerging research agenda, particularly in a changing environment with growing international concerns relating to climate change and sea level rise (Merz et al., 2010).

Through the use of a web-based questionnaire survey and semi-structured telephone interviews, successes and challenges have been identified, analysed and discussed in the following areas:

- Sufficiency of information for decision-making
- Effectiveness of the decision-making process
- Past and future prospects of coastal monitoring
- Conflict resolution
- Uncertainties surrounding the AM policy
- Strengthening public engagement
- Establishing a successful coastal advisory group based upon the EHCIAG

This project has contributed to gaps in the research, particularly concerning effective participation in FCERM. It has also outlined stakeholder perceptions of AM at a localised scale. Through conducting this project, a model of best practice in creating an effective advisory group has been developed based upon the following requirements and recommendations:

- Ensure all the appropriate key stakeholders are involved from the start
- Establish what funding is available early on, communicate any changes
- Engage with the public early on and continue this throughout all stages of the process
- Accept that the process can take a long time, as all perspectives must be considered before coming to consensus
- Maintain a high standard of monitoring, informing all stakeholders and the public of what is happening. Be proactive!

Recommendations have also been proposed for the EHCIAG in progressing forwards:

- Clarification of "Adaptive Management"
- Interpreting coastal monitoring information
- Increase education as a management tool
- Create a more defined group identity

Finally, further areas of research have been recommended:

- Research on the perceptions and attitudes of the community surrounding East Head
- Wider comparative coastal advisory group studies
- Wider comparative studies on Adaptive Management

7.3 Final conclusions

It is now widely recognised that the uncertainty of future climate change must be accounted for within FCERM to develop sustainable, long-term strategies (Lempert et al., 1996; Evans et al., 2004; EA, 2009; Defra, 2010; 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). This study has recognised the importance of effective stakeholder engagement in the context of FCERM, and significantly within the uncertainty of climate change.

AM 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 AM as no people or properties are significantly at risk. This study has indicated that although concerns remain surrounding the effectiveness and consequences of AM, "*it is still very early days in terms of coastal change*" (interviewee response). Therefore, as long as there is an awareness of any changes, acceptance can be achieved and the differing interests can remain to be accounted for. Most significantly, this research highlighted that the EHCIAG has been "*an excellent vehicle*" (interviewee response) in accounting for the differing interests as well as addressing the concerns of the community.

Stakeholder participation is regarded as a central component in the AM process (Rist et al., 2013). As Challies et al. (2016) identified, there is a requirement for concerted engagement with different stakeholders to arrive at locally accepted FCERM strategies. The EHCIAG has demonstrated the importance of effective stakeholder engagement in reducing conflict and

coming to consensus within a local FCERM strategy. An underlying challenge will now be to continue to effectively monitor and inform both members of the EHCIAG and the local community of any progress and changes. It has therefore been recommended for the EHCIAG to clarify what is meant by AM, interpret any coastal monitoring information, increase education as a management tool and create a more defined group identity.

ASFPM (2013) suggested future coastal zone management plans should be updated more regularly in order to provide adaptive approaches better suited to a changing dynamic environment, which considers alternative solutions and reduces future risks. 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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Appendices

Appendix A

Initial email to engage stakeholders in the research

Initial project brief sent to Dr. Uwe Dornbusch and forwarded to the stakeholder group via email:

This project will review and evaluate the roles of stakeholders in adaptive management within flood risk management in East Head, UK. It aims to address the success of this particular type of management and subsequently develop a model of best practice. To conduct this research, questionnaires will be distributed to all stakeholder groups in order to allow opportunity for more than one individual to complete. Following this, short interviews will be carried out to gain more insight from specific individuals within each stakeholder group. I aim to start this data collection process now and complete it by the end of July. I am happy to take any advice and fully appreciate your cooperation in this study.

Appendix B

Cover email for questionnaires

Reviewing the roles of stakeholders in Flood and Coastal Erosion Risk Management: a case study of Adaptive Management in East Head, Chichester Harbour, UK.

Dear all,

I am a postgraduate student at the University of Portsmouth, Department of Geography studying a MSc in Coastal and Marine Resource Management. Following on from Uwe's email, I am currently undertaking research towards my dissertation and conducting questionnaires as part of the process.

This project aims to review the roles of stakeholders in adaptive management at East Head, Chichester Harbour. The study hopes to ascertain how effective the East Head Coastal Issues Advisory Group is in order to develop a model of best practice for effective integration.

As part of the research, I kindly ask for your help in completing the attached questionnaire (link at bottom of this email). This questionnaire hopes to assess your perception of the strategy and of the advisory group. It should take no longer than 15 minutes to complete, depending on whether you wish to make additional comments where appropriate.

Due to deadlines, if you could please send back completed questionnaires by 1st August 2016.

Feedback provided will remain anonymous and individual responses will not appear in the final research. I am happy to provide you with a summary of the results should you wish to receive them. If so, please complete the appropriate section in the survey.

My supervisor is Dr. Jonathan Potts. He can be contacted via
email: [redacted] or Tel: [redacted]

Please feel free to contact me should you have any questions. Your input is integral to this project and I would like to take this opportunity to thank you for your cooperation.

I look forward to hearing from you.

Yours sincerely,

Rebecca Creed
MSc Coastal and Marine Resource Management
University of Portsmouth
[redacted]

The questionnaire link is: https://www.surveymonkey.co.uk/r/Z6358KP

Appendix C

Questionnaire survey

Appendix D

Interview cover email

Dear all,

Firstly, I would like to thank you for taking the time to complete the questionnaires. Your responses have been significantly useful towards my research and I thank you for your cooperation. I will soon provide you with a summary of the results.

Secondly, for the final stage of the study, I would like to conduct short telephone interviews following on from the survey responses. This will enable me to obtain a more in-depth view on certain aspects of the project.

The interviews will last 20-30 mins, depending on any additional comments made, and will follow these key themes:

1. **Information for decision-making**
2. **The decision-making process**
3. **Adaptive Management Policy**
4. **Public engagement**
5. **Coastal advisory groups**

Any information shared with me will be confidential and responses will remain anonymous in the write-up. However, I would like to record the interview, with your permission, for transcribing purposes.

Due to research deadlines, I would like to conduct the interviews over the next 2 weeks. If you are available and would be happy to participate, please provide me with a suitable date and time convenient to you and a telephone number at which I can reach you.

Kind regards,

Rebecca Creed
MSc Coastal and Marine Resource Management
University of Portsmouth

Appendix E

Questions for stakeholder interviews

Questions for stakeholder interviews

Information for decision-making

1. Most members identified information concerning 'coastal and marine physical processes' as the most important *type* of information in FCERM. Has the EHCIAG received sufficient information to inform decision-making and are you confident that this information will continue to be received?

2. Coastal monitoring was identified as one of the most important *sources* of information and further mentioned as a central aspect of how the group will move forwards. Are you regularly informed of any monitoring and if so, are you content with how the monitoring is progressing?

The decision-making process

3. Were you happy with the decision-making process and how the meetings were conducted? i.e. were all decisions fully explained throughout the process and did you feel your organisation had the opportunity to contribute equally?

4. One hundred percent of respondents agreed the EHCIAG has been effective. Although it has been recognised that there has been significant improvement since formation, a lack of agreement was identified as a major barrier within the group. Can you give me an example of a conflict and how it was resolved?

Adaptive Management Policy

5. Some members have uncertainty about the policy, why do you think this is?

6. There have been mixed responses concerning whether East Head has so far been allowed to adapt naturally. Many agree it is too early to tell, however, there have been some recent developments such as the works to remove man made features. Do you see the recent developments as a watershed moment?

Public engagement

7. Lack of public support has been identified as a barrier. How could public support be strengthened?

Coastal advisory groups

8. 'Regular meetings and communication', 'transparency' and 'individuals with specific expertise' have been identified as the top three most important factors in advisory groups. Do you agree with this and are you content all these aspects are applicable to the EHCIAG?

9. What advice would you give to others forming a coastal advisory group?

Final comments

10. Would you like to add any additional comments?

Appendix F

East Head Coastal Issues Advisory GroupTerms of Reference

East Head Coastal Issues Advisory Group

Terms of Reference

Aims

*To implement strategic, long term and sustainable coastal management policy for the Area of **East Head** at the entrance to Chichester Harbour and the adjoining or potentially affected frontages by:*

- Advising on and overseeing the implementation of Adaptive Management Programme for East Head.
- Developing and overseeing the implementation of schemes arising from the strategic programme.
- Obtain funding for schemes
- Monitoring progress of such schemes.
- Participating in reviews and revisions of the strategy.
- Be aware and consider broader issues regarding ICZM

To promote a co-operative and co-ordinated approach to management of this frontage by:

- Utilising shared knowledge and experience to jointly clarify issues, resolve mutual problems and agree outcomes.
- Liaising closely with stakeholders on all coastal issues.
- Ensuring that the DEFRA is fully involved with future proposals.
- Involving other organisations or commissioning extra analysis and reporting where the group agree this could contribute to matters raised.
- Helping to develop coastal monitoring programmes and sharing results.

Background

Adaptive Management was identified as being a viable approach by the East Head Working Group, which met to discuss policy options for managing the coastal frontage at East Head and West Wittering as a result of the 2006 consultation. The aim of this approach can be defined as follows

'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'

The Working Group was constituted by representatives of interested parties in the area. This Group helped define the Adaptive Management approach for inclusion within the draft Pagham to East Head Coastal Defence Strategy (PEHCDS) which will undergo public consultation after Easter 2008.

Objectives, Constraints, Triggers & Actions

(As agreed at Working Group Meeting on 22nd October 2008)

1. Objectives

i. Consider flood risk to West Wittering residents
ii. Sustain economic/environmental/recreational interest of East Head
iii. Avoid adverse impacts on navigation in Chichester Harbour
iv. Support economic/commercial activities in West Wittering and Chichester Harbour
v. Ensure common understanding
vi. Communicate that common understanding to as wide a group as possible

2. Constraints

i. Climate change (sea level rise, increased storminess)
ii. Supply of sediment
iii. Legal and regulatory obligations
iv. Sustainability (working with nature and time frames)
v. Public opinion/acceptance
vi. Money (availability of funding)
vii. Complexity of coastal processes
viii. Uncertainty and risk

3. Triggers for action

i. Significant change to system
ii. Structural degradation
iii. Health and safety concerns (including collapse of structures)
iv. Environmental degradation
v. Adverse impact on navigation
vi. Increased risk of flooding to West Wittering
vii. Changes in legislation

4. Possible actions

i. Do nothing
ii. Further analysis
iii. Dredging
iv. Beach recharge/recycling/management (including sand trapping using relocated marram grass or catch fencing).
v. Repair/removal/re-alignment of beach structures
vi. Erosion protection (e.g. rock, timber, geotextile etc)
vii. Inland flood embankments

Membership

The membership shall adopt the following framework of the Advisory Group.

Working Group:

Chichester District Council (Chair - as Coast Protection Authority)

Chichester Harbour Conservancy

Environment Agency

National Trust

Natural England

West Wittering Estate

West Wittering Parish Council

Cakeham Manor Estate

F G Woodger Trust

The following be invited to attend the Advisory Group meetings as observers:

Havant Borough Council,

West Sussex County Council

The membership of the Advisory Group is representative of landowners, democratic representatives, key funders and relevant statutory agencies.

Meetings

Advisory Group should meet quarterly or at such greater frequency as may be necessary to deal adequately with the business of the group.

Funding

The Advisory Group shall agree and contribute equally to an annual fund for the groups administration and meeting room hire charges.

The funding arrangements for the procurement of group projects and technical studies shall be discussed and agreed by Advisory Group members. This may or may not involve a single party acting as financial "Lead Authority". Initially, national funding will be sought through the Defra Project appraisal system but if unsuccessful, local funding will be fully investigated.

Outcomes

The Advisory Group will deliver an implementation plan, including a timetable for delivery, which will be subject to revision from time to time in response to agreed triggers. Decisions shall be taken by consensus.

Appendix G

Ethics form