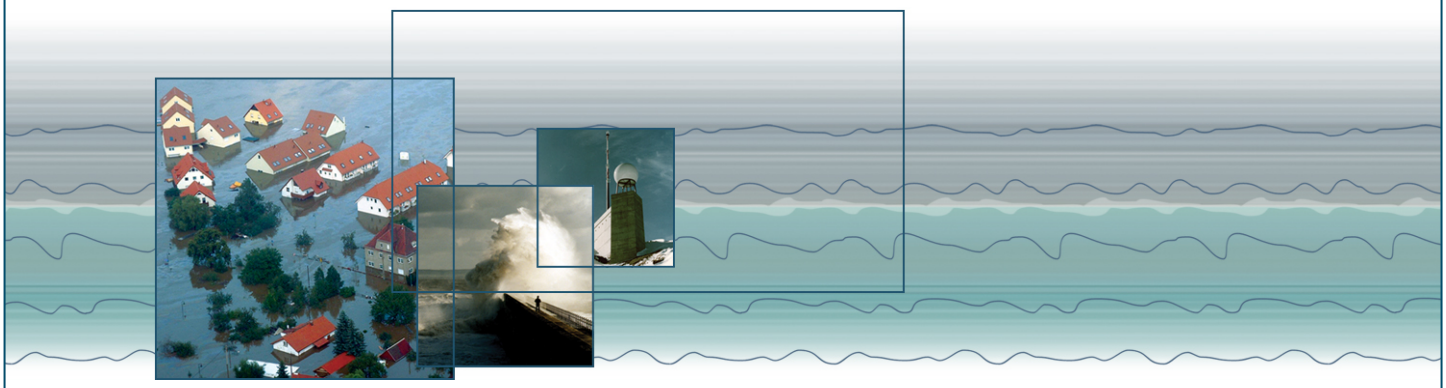
Integrated Flood Risk Analysis
and Management Methodologies



Strategic planning for flood risk management in London

CHALLENGES AND OPPORTUNITIES FOR AN ADAPTIVE STRATEGY PROCESS IN URBAN AREAS

Date 25th June 2007

Report Number T13-07-06
Revision Number 2_1_P10

Task Leader Gerard Hutter

FLOODsite is co-funded by the European Community
Sixth Framework Programme for European Research and Technological Development (2002-2006)
FLOODsite is an Integrated Project in the Global Change and Eco-systems Sub-Priority
Start date March 2004, duration 5 Years

Document Dissemination Level
PU Public

SIXTH FRAMEWORK PROGRAMME

DOCUMENT INFORMATION

Title	**Strategic planning for flood risk management in London**
Lead Author	**Loraine Mc Fadden**
Contributors	**Sue Tapsell, Edmund Penning-Rowsell**
Distribution	**Members of task 13**
Document Reference	**T13-07-06**

DOCUMENT HISTORY

Date	Revision	Prepared by	Organisation	Approved by	Notes
25/04/07	2_0_P10	L. Mc Fadden	FHRC	S.Tapsell	
25/06/07	2_1_P10	S.Tapsell	FHRC	L.Mc Fadden	

ACKNOWLEDGEMENT

The work described in this publication was supported by the European Community's Sixth Framework Programme through the grant to the budget of the Integrated Project FLOODsite, Contract GOCE-CT-2004-505420.

DISCLAIMER

SUMMARY

This case-study explored complexities involved in managing flood risk, within a major city faced with increased coastal flooding. The importance of moving from defensive strategies towards pro-active anticipating strategies, which involve thinking and acting ahead of the build up of risk, is becoming widely recognised in flood management. However, the opportunities and the challenges faced by decision-makers involved in strategic management, in moving towards this ideal have not largely been examined. This report highlights a series of key challenges and opportunities towards developing integrated strategies for flood risk management for the London and Thames Estuary region.

The report suggests that the predominant feature of Integrated Flood Risk Management (IFRM), adaptive co-management and strategic planning is the emphasis on a holistic and continuous process of management. Essentially, all three concepts focus on systems thinking: considering the human and physical environment to be a complex entity, comprised of dynamic sub-systems reflecting coupled social, economic and geo-biological behaviour through time. In line with this systems-orientated approach, four primary characteristics were considered within the case-study as indicative of a successful adaptive management process: 1) nurturing diversity in decision-making, 2) combining the range of existing knowledge systems into the decision-making process, 3) embracing uncertainty and change and 4) creating opportunity for self-organisation. The study focused on two key questions: what is the evidence of adaptive flood risk management within the Thames Estuary? and what are the challenges/key limitations in moving towards strategic management of flood risk in the London and Thames Estuary region? The research was comprised of an extensive desktop review of the current IFRM project within the Thames Estuary (UK Environment Agency Thames Estuary 2100 Project) and in-depth interviews with key regional stakeholders with interest and input to the strategy development process.

This work highlights a series of important steps that have been taken towards integrated management in the London and Thames Estuary region. However, the fact remains that in reality, an integrated and adaptive approach to managing the flooding system remains difficult to achieve. Ensuring all stakeholders are engaged in a decision-making process is critical to understanding the range of conflicts and choices for a management process. Yet, a transparent, accountable and just decision-making process demands a radically different approach to the traditional models of planning and implementation that exist. Truly integrated strategies are still relatively few in number. Integration cannot be assumed to simply emerge from a process that has included a range of scientific interests. As such, it must be pursued with mechanisms to facilitate an integrating perspective on the environment included early within the strategy development process. One of the most difficult tasks in formulating an adaptive strategic planning process may be the challenge of developing relationships, both within and between, the social, physical and institutional environments that allow a region to manage uncertain futures and relatively uncertain drivers of change. A final challenge is the feasibility of developing a long-term adaptive strategy process, in which there is a continuous cycle of learning and testing among stakeholders in the decision-making process. Learning from previous flooding events and the ability to self-organise is often constrained within stakeholder organisations: resources, perceptions and politics being three primary limiting factors.

CONTENTS

Error! No table of figures entries found.

Appendices

1. Error! No table of figures entries found.Introduction

The importance of moving from defensive strategies towards pro-active anticipating strategies, which involve thinking and acting ahead of the build up of risk, is becoming widely recognised in flood management. This evolving policy context for flood risk management has given increased credence, for example, to the contribution of effective flood warning systems and to taking account of flood risk when planning development in areas at risk (Thorne *et al.*, 2006). Moves within flood risk management are paralleled in the wider environmental literature by increasing emphasis on enhancing adaptive capacity of communities to climate change and varying socio-economic scenarios, and by emerging interests in the adaptive co-management of complex environmental-social and institutional systems **(**Turner *et al.*, 2003; Walker *et al.*, 2004; Adger *et al*, 2005**)**. Developing a combination of long-term goals, aims and measures, as well as process patterns of decision-making, that are continuously aligned with the changing physical and societal context is a central theme in environmental management. Strategic planning, as a tool for conceptualising and implementing this process, is also increasingly recognised as having an important role in reducing the vulnerability of flood-prone areas.

The aim of this task is to explore adaptive strategy planning for flood risk management in London and the associated Thames Estuary floodplain, highlighting issues involved in translating the philosophy of flood risk management into a sustainable and practical plan for an important estuarine environment. Significant research interests surround the need for adaptive responses to environmental and social risk and the limitations towards enhancing adaptive capacity. This study seeks to examine the specific opportunities and challenges faced by decision-makers involved in strategic planning in a highly complex physical and social environment, subject to increasing pressures from both climatic and social change. The focus of the case study is on highlighting issues involved in managing flood risk in a large urban area where there is pre-existing flood defence infrastructure but a new philosophy that moves towards flood risk management rather than flood defence.

In this first instance, this report sets the theoretical context of the research, examining the concepts of IFRM and adaptive co-management in the context of strategic planning. Following this review is a discussion of the context of flood risk management in London, highlighting complexities involved in managing flood risk, within a major city faced with increased coastal flooding. The report then explores the impact of external and internal dimensions of the process of decision-making on the effectiveness of formulating and implementing strategic alternatives for flood risk management. Finally, it concludes by suggesting a series of lessons and challenges emerging from the London case-study, which have wider application in the process for flood risk management.

2. Integrated Flood Risk Management and Adaptive Management in the context of strategic planning

Integrated Flood Risk Management (IFRM) is a systems approach to flood risk management, focusing on interdependencies and inter-relations between water and land management and the dynamic behaviours of the systems. IFRM takes a 'need-to-manage' approach, which considers floods as a natural occurrence with risks but also certain benefits. This is as opposed to a need-to-control and reflects a paradigm shift from defence to pro-active management of flood risks (Green, 2004). IFRM is therefore based on a good understanding of process drivers and not only sustains an appropriate standard of protection but also ensures that all options for managing flood risk, such as managed re-alignment and zoning development are maximised. An integrated approach involves cooperation and coordination across institutional and disciplinary boundaries, focusing on participatory and transparent approaches to decision-making and managing water and land across the catchment as a whole (APFM, 2004).

Largely in parallel with the concept of IFRM is that of the adaptive co-management of social and physical systems. The theme of adaptation has become a strong element of managing vulnerable environments, particularly within the global change community (e.g. Yohe and Tol, 2002; Turner *et al.*, 2003; Walker *et al.*, 2004; Adger *et al.*, 2005). Adaptive co-management has been defined as a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, on-going, self-organised process of learning by-doing (Folke *et al.*, 2002). The ecological dimension should be expanded to incorporate knowledge of the wider behaviour of the physical system as reflected in the morphological and sediment dynamics of the system (i.e. geomorphology). Adaptive co-management seeks to enhance the capacity of communities and environmental systems to modify or change their characteristics or behaviour so as to cope better with existing or anticipated external stress i.e. improve the adaptive capacity or resilience of the system. The concept of adaptive capacity is frequently cited in the context of human systems, as a societal-based concept describing active management of coastal systems (Yohe and Tol, 2002; Adger *et al.*, 2004). On the other hand, the concept of resilience emerges from physical-based science and largely maintains its association with the ability of the ecological system to self-organise, though this is often linked with societal response (Walker *et al.*, 2004). The concept has evolved considerably since Hollings (1973,) seminal paper, however is retains much of its basic emphasis as the capacity of a system to absorb disturbance and reorganise while undergoing change so as to retain essentially the same function, structure and identity. Both concepts (i.e. resilience and adaptive capacity) are used in different scientific communities, with different conceptual and empirical backgrounds. However, despite these differences, the basic principle underpinning both concepts is essentially the same and reflects the dynamic response of the system when subject to disturbance (McFadden, 2006).

The concept of strategic planning compliments efforts towards integrated and adaptive flood risk management and is an important component of a sustainable management process. Strategic planning has been defined as 'a disciplined effort to produce fundamental decisions and actions that shape and guide what an organisation (or other entity) is, what it does and why it does it' (Bryson, 2004). It has been characterised on the basis of a number of core features, including: 1) recurrent cognitive processes of aligning the content of a strategy with the context within which it is being developed and applied, 2) creating new categories for catching emerging and uncertain context features, 3) through actively searching for and welcoming new information and 4) paying as much attention to the quality of the process as to the contents and outcomes (Bryson, 2004).

Building on these ideas, an adaptive strategic process for flood risk management is focused on dynamic learning. It is concerned about the development of flexible resources and capabilities for adjusting the formulation and implementation of management strategies. This is in terms of swift response to unexpected events and trends (Volberda, 1998) but also in an effort to anticipate and prepare for opportunities and challenges emerging from longer term change (e.g. climate change)

(Yohe and Tol, 2002). The predominant feature of IFRM, adaptive co-management and strategic planning is the emphasis on a holistic and continuous process of management. Essentially, all three concepts focus on systems thinking: considering the human and physical environment to be a complex entity, comprised of dynamic sub-systems reflecting coupled social, economic and geo-biological behaviour through time. In line with this systems-orientated approach and with literature on environmental management – particularly the work of Folke *et al.* (e.g. Folke *et al.*, 2002 [7], Hughes *et al*., 2005) on resilience of socio-ecological systems – four primary characteristics can be considered as indicative of a successful adaptive management process:

- **Nurturing diversity in decision-making: governance**

The management process encompasses practices that build resilience and a social network with trust and respect in the decision-making process. Nurturing diversity also includes sharing of management power and responsibility, involving multiple institutional linkages. Decision-making should be facilitated at multiple levels with some degree of autonomy completed by modest overlaps in authority and capacity: this allows for testing of rules at different scales.

- **Combining the range of existing knowledge systems into the decision-making process (e.g. engineering, physical modelling, social science).**

An adaptive process should not dilute, homogenise or diminish the diversity of experimental knowledge systems for management. It allows the integration of a wide range of system behaviours and functionalities into the strategy development process.

- **Embracing uncertainty and change.**

The management process depends on institutional learning incorporating previous crises. Management strategies resemble risk spreading and insurance building within society, diversity and redundancy of institutions and their overlapping functions (absorbing disturbance). The management process may actively behave like disturbance.

- **Creating opportunity for self-organisation.**

Adaptive management and planning continuously tests, learns and modifies its activities and understanding for coping with change and uncertainty. Learning processes include operational monitoring and evaluation mechanisms. With an adaptive management process is the emergence of an experimental approach based on iterative cycles.

The case-study seeks to explore the strategy development process reflected in current flood management within the Thames Estuary, using the four characteristics outlined above as benchmarks on progress towards IFRM. The report focuses on: 1) evidences of an adaptive strategy development process and 2) key limitations in developing an adaptive management framework for the region. Based on the challenges and opportunities for pre-flood risk management, a series of guidelines for strategy development will be developed.

3. London and the Thames Estuary: complexities and context for adaptive planning

The River Thames (see figure 1) is multi-faceted, functioning on many essential levels: the river and its corridor act, for example, as an artery for communication, and a resource for commerce, industry, commodities, housing, biodiversity, recreation, drainage and water supply. It is a functional tidal system and continuing improvements in water quality, together with the intrinsically rich diversity and continuity of habitat, has meant that the Thames now supports one of the widest varieties of fish, wildfowl and invertebrates of any Estuary in Europe. The lands adjoining the Thames comprise a number of valuable habitats including: fresh and salt water marsh, grazing marsh, mud-flats, shingle

beach and inter-tidal vegetation. The hinterland includes areas of open marshland and extensive brownfield areas.

Figure 1 The River Thames and London

Along the Thames Estuary there are a number of important environmental sites designated under the EC Habitats and Birds Directives. There are also Sites of Special Scientific Interest within the floodplain area, many of which are water dependent and situated both riverward and landward of the flood defences. As well as the environmental designations, there are also three world heritage sites, Scheduled Ancient Monuments, Areas of Archaeological Importance, Conservation Areas and buildings of national importance within the flood risk area. In addition, there are also a number of hazardous industrial sites (COMAH sites) and waste disposal sites that may need to be protected from flooding to prevent pollution problems. Strategic planning for flood risk management occurs within the context of a wide range of EU directives, national Planning Policy Guidelines (PPGs), Planning Policy Statements (PPSs) and sub-regional polices and plans. The policy context which surrounds planning in London and the Thames Estuary region is outlined in Appendix 1.

The Thames Estuary floodplain is extensively developed. London produces 17% of the UK's GDP and the City of London is one of the world's major financial centres: it is the banking centre of the world, and Europe's main business centre. The London foreign exchange market is the largest in the world, with an average daily turnover of $504 billion, more than the New York and Tokyo exchanges combined and the economy generates $365 billion annually. London is the largest city in the European Union with an estimated population on 1 January 2005 of 7,421,328 and a metropolitan area population of over 1.25 million. Future planned development to the east of London as part of the Government's 'Thames Gateway' regeneration scheme will add 120,000 homes to the region.

Major floods, both from the Thames and its tributaries, have long been a part of London life. The construction of the tidal defences along the Thames Estuary can be dated to the 12th century. The 'law of the marsh', established in Essex in 1280, required every man to contribute to the upkeep of defences in proportion to his benefits and land rights. A parliamentary authority was established in 1427 and reinforcement of the Act in the 16th century established the principles of land drainage and tidal defences for the next 300 years (Peter Brett Associates, 2002).

A series of increasingly damaging high tides between 1874 and 1877 resulted in the passing of the Metropolis Management (Thames River Prevention of Floods) Amendment Act in 1879, which led to the raising and maintenance of defences to prescribed levels above Ordnance Datum. The Act was further amended to raise these statutory levels in subsequent years when high tides exceeded the defence levels. In January 1928, a surge tide combined with high freshwater flowing into the Thames caused flooding in which 14 people drowned in central London. Further rising of the defences followed and these 1930 defence levels remain today upstream of the Thames Barrier. These 1930

levels protected London during the catastrophic tidal surge tide of 1953, but over 300 people died on the East coast of England, as many as 24,000 houses were flooded, up to 400 destroyed and over 32,000 people were evacuated from their homes (Johnson *et al.*, 2004). On Canvey Island alone, 59 people died. Research into the causes of tidal surges and a method for controlling surge tides in London ultimately led to the passing of the Thames Barrier Act in 1972 and the construction of the Thames Barrier and associated defences (Gilbert and Horner, 1984).

The Thames Barrier was operated for the first time in 1983, and between 1983 and May 2003 it was closed 87 times to protect London from flooding. The tidal defence systems comprises the Thames Barrier, seven other major flood barriers owned and operated by the Environment Agency, over 400 moveable defences and 487km of tidal walls and embankments. The current standard of protection provided is generally 1:1000 and the current design standard has an allowance for sea level rise to the year 2030. However beyond this time, if no improvements are undertaken the standards of defence will begin to fall below the design standard with increasingly serious consequences for the Thames Estuary and London.

A series of strategic options and associated policy considerations exist for flood risk management in the Thames Estuary region, with varying implications for resources within the floodplain (Environment Agency, 2004a). These options can be summarised as:

- *Do nothing: i.e. "walk away".*

The risk of flooding will increase rapidly over the next 30-40 years with the flood risk area becoming more frequently inundated.

- *Continue present practice i.e. " do minimal"*

This results in a gradual reduction in standard of flood protection, with potential for damages as above but over a longer time frame. Reactive management carried out in an uncoordinated manner will also give increased risk of flooding to the protected areas.

- *Integrated Flood Defence Management*

An integrated approach to managing the defences will be maintained to a high standard of protection. This approach is reactive to changes in the estuary and only addresses the defences, which will need to be more substantial in time to address the environmental/social impacts. Two sub-options exist within this strategy approach: (1) Enhancement of flood risk management standards within the existing option structure: reconfigure the barrier and enhance the downstream embankments to provide a higher standard of protection within the existing flood defence philosophy and the type of assets that this has created and (2) Enhancement of flood risk management standards within a new option structure: provide and maintain the same standard of flood protection in some other way ("throttle" in the Estuary; downstream barrier to complement the existing one etc).

- *Integrated Flood Risk Management*

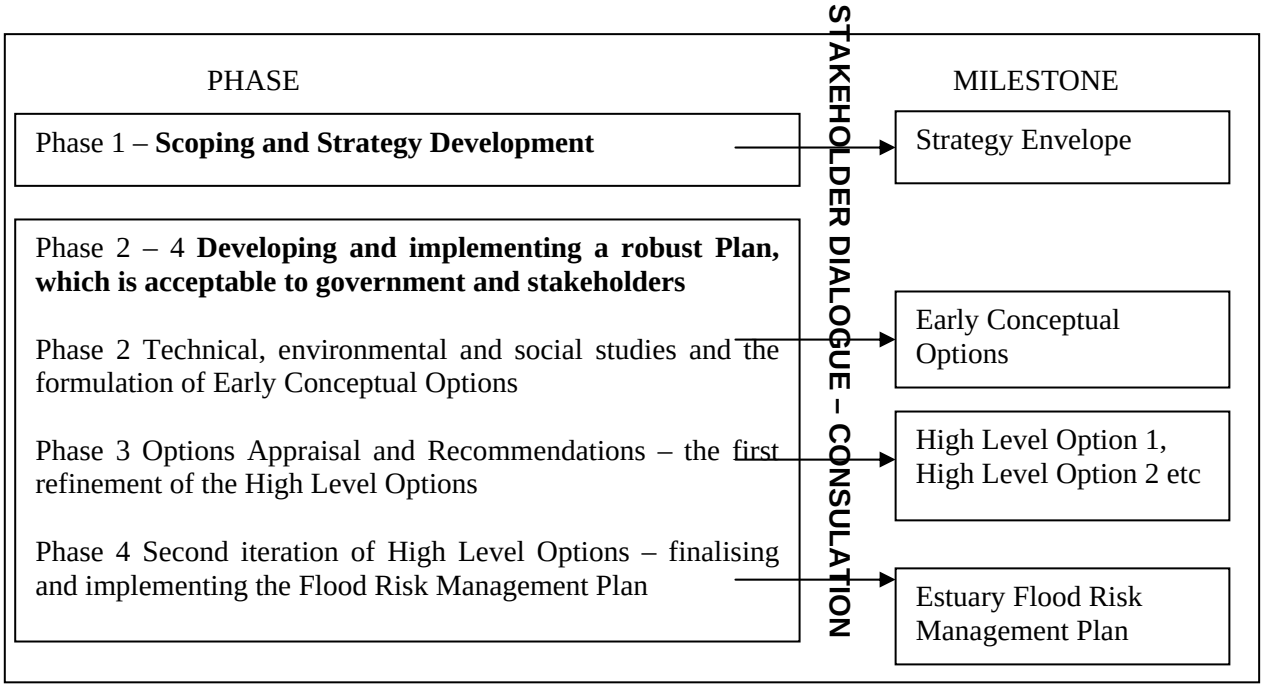
Proactive approach based on a good understanding of the process drivers would not only sustain an appropriate standard of protection but also ensure that all options for managing flood risk i.e. engineering and non-structural measures, such as spatial planning, are maximized. This approach will include integrated but robust development control, which will reduce risk but also have the potential to lower costs. All stakeholders are actively involved in the decision-making process which raises awareness and gives workable solutions.

The Thames Estuary 2100 (TE2100) Project has been set up by the UK Environment Agency to examine the latter of these options and develop a plan for an integrated approach to flood risk management. The strategic aim of the project is to develop a Flood Management Plan for London and the Thames Estuary that is risk based, takes into account existing and future assets, is sustainable, includes all stakeholders, and addresses the issues in the context of a changing climate and varying socio-economic scenarios that may develop over the next 100 years. The project is to be implemented by an Environment Agency led team who will plan, manage, co-ordinate and lead the programme of

studies. However, the participation and support of key organisations and the general public is essential to the long-term success of the project. The project benefits from the support of DEFRA and partnership with a range of Thames Estuary stakeholders including the Greater London Authority, the Thames Gateway Partnerships and the Port of London Authority.

Because of the complexity of the study and consultation programme required to develop the Plan, a phased approach was developed to guide the progress of strategy development, figure 2. Within Phase 1, the TE2100 team have investigated a series of policy approaches: Do-nothing, Continue Present Practice, Integrated Flood Defence Management and Integrated Flood Risk Management. Integrated Flood Risk Management is the preferred option - strategic and proactive flood management based on a good understanding of process drivers and active involvement of all stakeholders. Within the Context of Integrated Flood Risk Management, a range of conceptual high level options have been developed within Phase 2, drawing on the best understanding of flood risk management as could, potentially, be applied to the Thames Estuary. These options will be tested using a 'Decision-Testing Framework' against social, economic and climate scenarios for the next 100 years to assess their appropriateness and sustainability. Through refinement and iteration, this process will move within Phase 3 to a more detailed understanding of the estuary to assess the *likely* high level options to address the management of flood risk. The scoping to date suggests that a second iteration of testing within Phase 4 and accompanying stakeholder engagement should provide a sufficiently robust Flood Risk Management Plan.

Figure 2 Flood Risk Management Plan Development and Review Process



This report examines phase 1 and the recently completed phase 2 of the strategy processs: the development of early conceptual options for flood risk management. It is important to note that the project is on-going and evolving. The project aim is to have a completed flood risk management plan by 2010.

4. Managing flood risk: opportunities and challenges for an adaptive approach

This analysis has been based on both a comprehensive review of TE2100 reports and supporting literature, and a series of in-depth, semi-structured interviews with regional stakeholders. The literature analysis identified areas of particular interest and relevance to the current strategy development process. The primary role of the interviews was to explore details of these key areas: particularly challenges, constraints and opportunities as experienced and perceived by the stakeholders. A short outline of the regional and sub-regional organisations from which representatives were interviewed is given in Appendix 2. Six interviews were conducted in total, all were tape-recorded and fully transcribed. The length of the interviews ranged from 60-75 minutes. A generic topic guide for the interviews can be found in Appendix 3. The generic guide was revised for each interview, aligning questions to the type and structure of the organisation.

For each of the four characteristics of an adaptive approach to strategy development previously identified, this section reviews current progress as identified from the literature basis of the project and then adds to this framework key prespectives which have emerged from the stakeholder interviews. Finally, this section concludes with a discussion of common themes emerging from the interview analysis

4.1 Nurturing diversity in decision-making: governance

4.1.1 Evidence from the literature basis of TE2100

Evidence from the management process suggests that key opportunities have been created to facilitate stakeholder input within the decision-making process. A stakeholder engagement strategy has been developed with the aim of managing the communication process and to ensure that information gathering and consultation with all interested parties are undertaken and integrated within the overall project programme. The stakeholder engagement strategy has resulted in collaboration with the Thames Estuary Partnership: a forum for local authorities, national agencies, voluntary bodies and local communities. An information document has been launched (Environment Agency, 2006) which serves as an introduction to the project and its context, allowing stakeholders to register their interest in the FRM plan. The Strategic Environmental Assessment (SEA) Scoping Report has been sent for consultation to the statutory stakeholders and 'other key organisations in the estuary'. Dialogue has been established with Government and other policy and decision-makers to establish the legislative context and policy requirements for a strategic approach to the development of sustainable flood management solutions.

A key question in evaluating the strategy process from the context of adaptive management focuses on building resilience into the strategy through practices which encourage active participation, conflict resolution and other mechanisms which ensure collaboration in the decision-making process. Stakeholder engagement can range from such participatory practices to consultation, with a gradation between these two end forms. An adaptive approach focuses on participation. The plan certainly recognises a need for stakeholder engagement; however is there evidence of 'good governance' within the current strategy development process?

An immediate challenge to an adaptive strategy is the difficulty of managing a fully participatory process within a major conurbation such as London. The numbers and range of stakeholders involved in the Thames Estuary make such a process largely untenable from a resource perspective (see appendix 4). As a consequence, TE2100 has aimed to tailor its approach to engagement to a range of different identified audiences. With a manageable group of stakeholders, engagement can become a more effective dimension of the decision-making process. However, despite this focus on a targeted

group of stakeholders, to date there has been no provision for participation in the development of the FRM plan: engagement has been restricted to consultation. There has been no requirement within the strategy development process for engagement at any level on the technical assessment of flood risk management responses and a further criticism of the project has been the lack of clear communication strategy and information flows.

4.1.2 Evidence from stakeholder perspectives on FRM

Each of the stakeholders interviewed have a broad network within which they communicate and/or collaborate on issues related to flood risk management. The Environment Agency clearly emerges as a primary focus: cited in each interview as a key link in communication. However the network range varies widely, including for example, the World Wildlife Fund, Local Authorities, the Council of Mortgage Lenders, the Royal Society for the Protection of Birds and the Audit Office. There is very little cited communication across the specific groups interviewed, despite the fact that each organization has significant vested interest in managing floods. The Thames Estuary Partnership was the only group to express working links with another involved in the interview process. One interviewee expressed some concern at the difficultly in developing relations with another within the group.

The perspective of the interviewees on relationships between the primary decision-makers and statutory consultees on flood risk management issues (e.g. Environment Agency; Department for Environment, Food and Rural Affairs (DEFRA); Office of Deputy Prime Minister (ODPM); Department of Communities and Local Government (DCLG)) was generally consistent: '*they are working much better now than they were*'. Reasons for this varied, but essentially reflected the impact of some external force in galvanizing moves towards flood risk management. The Association of British Insurers, for example, highlighted the role of the 2012 London Olympics and the high-profile position of climate change. Climate change studies were also suggested by the regional planner as an important driver, as was re-drafting of a policy strategy on flood risk and development (PPS25). Two of the interviewees, however, expressed a clear negative response when asked of the effectiveness of working relationships between decision-makers: the member of the Greater London Authority and the Strategic Flood Risk Assement (SFRA) Project Manager representing a Sub-Regional Development Partnership. The latter raised a challenge regarding internal consistency and sustainability of decision-making within one of the key organisations in the flood risk management process:

'*the EA has guidelines thrust upon them from DEFRA, ODPM thrust development on the (Thames Gateway) area. The travesty is that on one hand OPDM allocate property across the flood plain, and on the other hand produces PPS25'*

The discussions on the current status of wider stakeholder engagement, including interested but non-statutory consultees, produced a range of responses from the interviewees. Responses varied from clearly negative, through citing improvements but highlighting significant remaining problems, to a positive statement on engagement. A further perspective was that stakeholder engagement at this early stage of the project was largely premature:

'….no decision-making is happening at the minute. Until we move towards a final strategy and final decision-making, communication across different organisations is expected to be limited'

This differentiation of responses related considerably well with the level of public engagement that each organisation is generally committed to. The public-facing bodies, emerged on the more negative ends of the spectrum in their views of the effectiveness of current governance. Largely government-facing institutions were more likely to be positive regarding the existence of wider-engagement. Two extremes of responses also emerged on the general importance of broad-based engagement during the strategy development process. A clear view expressed by the SFRA Project Manager was that a fully

participatory (or perhaps even limited participatory) process is not a high prority in the strategy development process:

'*it is not an issue that local authorities don't know what the (environment) agency will do in the next year – the lack of direction is not a problem….the fact is that housing development will be replaced within 50 years and business over 10 years, so long-term planning is not an issue'*

'*communication is not an issue with the general public. If they are not flooded very often, they will simply always be lost in the process. If you are flooded more often you become an intelligent client and through experience and need have sourced all the relevant information'.*

This expression constrasts significantly with that of the TEP, which stresses the importance of clear and effective communication, and highlights the importance of participation to local groups and the public:

'*everybody thinks everyone moves around nowadays, a lot of people don't….the longer-term does matter because they're worried what's being left for their children and so on….'.*

'*everyone in our groups is concerned that they have some say from their local expertise….that local knowledge might get left out'.*

The importance in a strategy development process of a shared vision across stakeholders of the future of London and the Thames Estuary was also explored within some of the interviews. There was an agreement across respondents that there is not a particularly clear vision for the future of the region and in particular the Thames Gateway area: rather there were significant competing pressures pulling in different directions. A practical reason for working towards at least different aspects of a shared vision of the future was highlighted by one respondent:

'*there is so much money flying around with very short timescales to change areas of London, big regeneration projects,…and a lot of change of staff… its easy for someone to come in knowing nothing about what's gone on before'.*

The ability to obtain a unified view of 'the future' was questioned by the respondent from the Port of London on the basis that interest groups have their own perceptions and priorities for the estuary and surrounding area. This fact was demonstrated by the interviewee, when in the context of discussing lines of commication, a very particular view of the aims of interest groups across the region was given:

'*bearing in mind we're all here, we're all supposed to work for the good of the river….'.*

A warning was raised of the danger of being driven by one particular vision for London, a point which will be re-visited at a later stage within the report.

Discussion on the existence of overlaps in authority and capacity, and the impact on flood risk management, brought a further perspective to the analysis. Again, views expressed by the respondants ranged from one standpoint that overlaps are being managed more efficiently and with greater consistency (SFRA Project Manager), to the opposite view expressing that many existing overlaps within decision-making processes are exerting a significant negative impact on the strategic development process for flood risk management (London Assembly member).

Ensuring that effective mechanisms and processes exist to identify areas of decision-making which require more knowledge or expertise, and integrating these into the strategy development, was highlighted by the Association of British Insurers as the more important task in the strategy process rather than focusing on overlaps in functionality etc. This may reflect the needs of a commerical organisation where redunancny is minimised for the most effective use of resources.

An interesting perspective on the usefulness of 'overlapping' within strategy development was given by the TEP interviewee, associating the concept with the consultation process:

'if you're working on a topic you have months to digest…if you think that in one evening meeting or one session of two hours you can wave a lot of documents around and people will say oh that's fine…that's actually insulting, yet its what we do and call it consultation….several people saying the same thing, the overlap and continual talking about it in different forums so that people get the same chance we get to understand'.

4.2 Combining the range of existing knowledge systems into the decision-making process

4.2.1 Evidence from the literature basis of TE2100

To date, there has been no real progress towards combining the distinct knowledge systems which exist on the functioning of the London and Thames Estuary region to develop an integrated approach to flood risk management. Such knowledge systems encompass in broad terms the physical functioning of the system (e.g. engineering and physical sciences - structural approaches to management) and the socio-economic behavioural trends within the region (social science - non-structural methods). In the second place, decision-making structures within the planning process (i.e. the governance framework) do not reflect the spatial or temporal dimensions of the physical and socio-economic functioning of the estuary system. This dual coupling is essential: firstly in respect of the complex sub-systems that define the functioning of the estuary, and secondly of the scales of functionality within the structures for decision-making. Without such coupling, the ability to anticipate change across the region, and so influence the strategy process in appropriate and effective ways, is limited.

The importance of incorporating a broad-knowledge base into decision-making was identified at an early stage of the strategy development process (Environment Agency, 2004c). However, at the first critical output stage of the strategy process (the preliminarily flood risk management options – or 'early conceptual options'), the example suites of responses to flood risk were all structurally-derived. Given this fact, the planning process has not seemed to more beyond a traditional defence approach. A simple question may be raised: given the IFRM emphasis of the strategy development, why has the process failed in this initial phase to move towards delivering integrated responses for managing flood risk in the estuary region?

The development of the preliminary flood risk management options has been underpinned by a Phase 1 Studies Programme, which seeks to increase understanding of estuary processes and links between form and function in the estuary and so develop a better understanding of flood risk. It has also built a critical knowledge base of the current condition and standard of protection provided by existing defence standards. Indeed, in many respects the Phase 1 Programme is comprehensive (Environment Agency, 2004c [14]). However the studies have a distinct focus on the physical environment: there are limited (or no) early studies on the social dynamics of the London and Thames Estuary region. This is a primary limitation of current progress towards flood risk management of the Thames Estuary region. This lack of socio-economic dimensions in the initial planning and research stage seems to be precipitated by an understanding of the role of social science as mainly a 'public relations' exercise e.g.

'….the economic and social context of the estuary will have a major impact on the political acceptability of the options' (Environment Agency, 2004a p96)

'A social framework will be developed to enable public attitudes and institution perception to be accurately gauged' (Environment Agency, 2004a, p145).

Societal and economic issues will impact the final direction of strategy recommendations for flood risk management at a 'high-level' decision-testing phase. The flood risk management options will be tested using a specified decision-testing framework against social, economic and climate scenarios for the next 100 years to assess their likely appropriateness and sustainability, iteration allowing the options to be refined. This will be an important dimension of the decision-making process. However, the social framework of the Thames Estuary does not influence the early planning process - the process whereby various options for intervention to reduce flood risk are reached. As a result, the current strategy development process cannot deliver examples of suites of integrated physical (engineering and other structural interventions) and social (non-structural) responses.

The commonly adopted Source-Pathway-Receptor-Consequence (SPRC) model will form a basis for integration as the programme moves toward the delivery of flood risk management options. Such an analysis recognises multiple source events (e.g. high rainfall), receptors (e.g. properties within the flood plain and people) and pathways between the source and the receptor (e.g. flood routes such as defences and overland flow) and examines the linkages between these elements in leading to a particular consequence in the system. This means it will contribute towards enabling a whole flooding-system based approach to decision-making: a critical dimension of IFRM. However, there are complex feedbacks in the flooding system and to use the SPRC model as an integrating mechanism for strategy development requires an understanding of the range of processes affecting flood risk: including interactions between the natural environment and socio-economic processes. The model cannot be used as a 'quick fix' for a complex system approach when primary knowledge on societal behaviour is either not available or not being utilised.

4.2.2 Evidence from stakeholder perspectives on FRM

The issue of knowledge integration within the strategy development process was closely linked by the interviewees to governance and stakeholder engagement, so feedback on this specific theme was more limited. The need to take an integrated approach was expressed by the respondents:

'*it has to be integrated properly with the overall social economic picture…otherwise it will always be a shock horror event…that we only think about in terms of crisis'*. London Assembly Member.

However, the feasibility and effectiveness of adopting an integrated approach in a complex environment such as that of London and the Thames Estuary was challenged by the Port of London interviewee:

'*whether one can ever take a fully integrated view is perhaps questionable…and whether if one was to take such an integrated view decisions would ever be taken is also questionable…whether it gets so overloaded that you're just to paralysed to make a decision…'*.

The issue of over-loading was also referred to by the Association of British Insurers, though in the context of a different question:

'*we're on quite a lot of consultant lists now, but we get so many of them that you then have to decide which one you are going to do something about, so there is also a communication over-load in some respects'*.

Such responses would seem to suggest that stakeholders value the adoption of an integrated approach unless it generates significantly increased volumes of knowledge that the decision-making process cannot assimilate or if the approach commits stakeholder organisations to additional actions or

responses to the process. The Association of British Insurers is a national organisation with a wide range of specific insurance interests: the Port of London Authority is a regional body whose primary responsibility and interest is in navigation. The reality is that such organisations often have very small teams dealing with flood risk management as well as a range of 'natural events' issues. This means that many organisations cannot commit to contributing beyond the level of their current (and stretched) resources.

Despite citing the limitations on integrating decision-making, the interviewees stressed that their respective organisations have already contributed to wider policy development and current knowledge through participating in the consultation process:

'*we do an awful lot of comments on an awful lot of consultations'.*

This assertion suggests that the interviewees consider some basic level of cross-fertilisation of ideas and approaches to FRM already exists within the region.

Whilst there was limited feedback on integrating knowledge from the perspective of developing the *regional* flood risk management strategy, each of the interviewees did reflect on integrating scientific knowledge within their respective *organisational* decisions or guidelines regarding flood risk. Policy guidelines from DEFRA and technical information from the EA were cited most frequently as contributing to knowledge-building and strategy development. Other information sources included the MET office, UKCIP (UK Climate Impacts Programme), university research groups and consultants.

When reflecting on moves towards greater integration, the interviewees considered DEFRA's 'Making Space for Water' (DEFRA, 2005) – a strategy document outlining a new UK Government approach for flood and coastal erosion management in England - an important and useful step towards integrated flood risk management:

'*after 'Making space for water' there's more of an awareness of the wider approach to managing flood risk'* London Assembly Member.

Whilst this strategy document was regarded by all respondents as an important step in flood risk management, perception as to the contribution of 'Making space for water' to new policy directions varied across different organisations. There were two basic end-points in the degree to which the strategy had been assimilated across the group. At one end, the ideas in 'Making space for water' are already integrated within the organisation's strategy, for example, the ideas are already part of planning understanding at the level of the Regional assembly. However, the SFRA Project Manager brought attention to the other end of the spectrum highlighting that whilst Local Authorities are aware of the policy, they are too occupied with complying with statutory local planning frameworks to consider the implications of a national policy on their local areas.

4.3 Embracing uncertainty and change

4.3.1 Evidence from the literature basis of TE2100

The emerging Thames Estuary strategy will outline FRM options for London and the Thames Estuary corridor for the next 100 years. In achieving this aim the research basis of the strategy will identify both climate change and socio-economic futures for the London region. In these respects the current strategy process is clearly focused on developing a plan that factors in different future scenarios, so that decisions are influenced by the changing environment. This dimension builds resilience into the flood risk management plan. It is also anticipated that a process of review and revision will continue after the plan has been produced, maintaining a strategy which is in some way responsive to uncertain

futures. In addition to embracing anticipated future change, the strategy development process is also focused on obtaining a greater understanding of current uncertainities and change within the environment. The project states that it's aim is to learn from existing primary research and an Horizon Study has scoped a strategy for liaising with the UK DEFRA research programme, faciliating links with UK based research. In parallel with the preparation of the Thames Estuary strategy, a number of adjoining or interrelated strategies are being developed by the Environment Agency and other Operating Authorities. It is anticipated that the outputs of these strategies will be integrated into developing propsoals for the estuary: thus, a diveristy of plans will inform flood risk management decisions. Finally, dialogue has been established between the project managers and the UK Office of the Deptuy Prime Minister, as well as with the Association of British Insurers. This discussion focuses on insurance for developers and risk minisation, and key points have been agreed. However risk spreading strategies such as fiscal levers and changes to the planning process have not been considered within the early conceptual flood risk management options, which can be considered a significant limitation of the current process.

4.3.2 Evidence from stakeholder perspectives on FRM

The relative impact of the existence of uncertainties and their role in decision-making was explored in each of the interviews. For some of the stakeholders uncertainty has a very significant impact on decisions with respect to flood risk, particularly for example, the insurance industry:

'*if there is a lot uncertainty, they (insurance companies) have to take a very cautious view, and in effect they price that in'.*

However, there was a clear difference across the stakeholders with regard to their attitudes to this theme. An interesting perspective emerged from the Thames Estuary Partnership regarding public acceptance of uncertainties:

'*they're most reassured by the chance to know what the alternatives being considered are, even though no-one can guarantee what is going to happen in the future'.*

Building on this, the interviewee highlighted the importance of communicating a range of futures and options to stakeholders from an early stage of a project. Commenting from the context of Local Authority decision-making, the SFRA Project Manager argues that scientific uncertainties are not important to members of the partnership, with decisions being made on current legislation appropriate to the issues being considered, indeed:

'*at the member level, the only uncertainty of importance is whether they (members of local authority) will be re-elected in four years'.*

The view from a regional planning context contrasts significantly with the local context. Regional planning is a relatively long-term process and from this perspective uncertainty is an issue that needs to be understood and managed more effectively.

The importance of planning for uncertain futures in decision-making for London was emphasised by the London Assembly Member. Again, this contrasts with the view of the significance of uncertainty in Local Authority decision-making. Relating to the earlier point on the danger of a fixed vision for London, the interviewee highlighted that reviewing scenarios as a means of gaining an understanding of potentially different futures for London, is one of the roles of the London Assembly. This was considered particularly important as:

'*current Mayor policy-making is very much driven by a particular vision for London: particular economic projections based on particular projections in terms of population growth…one*

of the roles that the Assembly can do is to take a…step back and look at the different scenarios and be aware of the different factors'.

Scenario analysis was also discussed by the regional spatial planner as a method for managing uncertainties for decision-making at the regional scale, as an aid to develop what can be considered as 'no regrets policies'.

The proposition that uncertainty exerts limitations on the effectiveness of decision-making was also discussed within the group. The interviewee for the Association of British Insurers raised a point concerning differences that exist between clients and insurance providers:

'*greater uncertainty means more likelihood of withdrawing from certain areas. We've tried to articulate this argument to re-assure people who think that more flood mapping means they're less likely to get insurance, when actually we're saying that you're more likely to get it'.*

This point may raise a different perspective on public perceptions of uncertainty to that expressed through the Thames Estuary Partnership: one which may suggest a form of preference for the unknown as a means of avoiding potential outcomes from a better understanding of the current risk or future change in flooding. The London Assembly Member referred to this same issue:

'*in fact it* (i.e. uncertainty) *can be used as a cloak to hide behind'.*

Uncertainty with regards to investment within flood risk management was a limitation identified by both the London Assembly Member and SFRA Project Manager as having a highly significant impact on decision-making. Both interviewees felt that the lack of actual funding mechanisms for the implementation of strategic alternatives emerging from developing the flood risk management plan was currently the most significant constraint on FRM.

'*one area of importance is the continual change of investment that the government are putting in. They are claiming specific values on one hand but the reality is that the investment isn't there. There is a huge uncertainty as to the ability of public bodies to deliver goals due to investment restrictions'.*

Responses to a question regarding the potential for uncertainty to be considered as having a positive role in decision-making brought the general response that it was intellectually attractive and that uncertainty had a positive influence on the process. However, the reality of decision-making often is that:

'unless there is a good reason that I can articulate, I cannot make that decision'.

4.4 Creating opportunities for self-organisation

4.4.1 The literature basis

A clear iterative approach exists for decision-testing within the flood risk management plan development and review process, which allows the planning process to test, learn and modify its activities. The decision testing process will be used to assess how levels of uncertainty affect the robustness and sustainability of future decisions. This will be an iterative process used to arrive at the optimum set of solutions for the London and Thames Estuary region. The project aims to formalise this review process against a set of criteria, recognising its importance in informing policy and operational decisions that are currently being made and defining where additional information and further analysis is needed.

The environmental responsibilities and statutory and Environment Agency obligations of the project will be delivered through the application of Strategic Environmental Assessment (SEA) and this provides another vehicle for self-organisation within the policy process. Complex social and environmental impacts can be anticipated through the SEA and will be assessed through this process. Based on this assessment, appropriate protection and mitigation measures can be incorporated into the strategy to ensure sustainable and accountable decision-making. At this earlier stage in the strategy development process, potential flood risk management options have not been tested against the range of risk management scales i.e. local opportunities and constraints were not considered in the development of the early conceptual flood risk management options. However, as the strategy development plan proceeds, decision-testing is expected to occur across the range of levels of decision-making.

4.4.2 Stakeholder perspectives

Learning from previous flooding events is recognised as an important attribute of an adaptive strategy process and this issue was explored within the interviews. The Association of British Insurers emerged as an organisation which had evolved through, and with, developments in managing flood risk. The interviewee highlighted the floods of autumn 2000 in the UK as a key catalyst in changing approaches within the organisation to flood risk management:

'*we started out by saying that we've actually got to have a long-term campaign over getting the right amount of investment into flood management….we were very critical of the way that the system was organised and that it wasn't being as effective and efficient as it should be. We took a long hard look at the planning system…it really did make us much more hard line on issues than we had previously been with a view to actually managing national flood risk in a rather more effective way, and that continues to this day'*.

However, the general perspective emerging through the remaining interviewees was that on a whole, previous floods and responses to these events has had limited impact on stakeholders. This covered a wide spectrum of stakeholders across the area, from the general public, to local authorities and through to the regional assembly level. The Regional Planner mentioned whilst there were likely lessons to be learned, the only real impact that can be distinguished on policy-making is recognition of the need to emphasise flood risk management at the local level.

Reasons were suggested within the interview for the absence of a learning process among stakeholders at the local scale. These included historical links to a highly politicalised flooding event and a lack of awareness of the nature of the flood risk:

'*There are sites where due to historical links this change is not occurring* (i.e. open to alternative solutions for flood risk management), *for example, Canvey Island. The elderly residents remember 1953* (flooding event) *and all the promises by politicians that it would never happen again'*.

'*at the member level* (of the local partnership) *we have a 'head in the sands approach', the opinion is that we have large defences, therefore we don't have flood risk and if we have no flood risk we should be encouraging as much development as possible'*.

The impacts of Hurricane Katrina in Louisiana, Mississippi and Alabama, and especially in New Orleans, were mentioned by the Thames Estuary Partnership, the Thames Gateway South Essex Partnership and the London Assembly Member as having some flood-risk focusing influence on the minds of local residents and other local stakeholders.

Discussion surrounding the influence of both short and long-term change on decisions regarding flood-risk management provided some indication of the existence of measures to monitor and evaluate the strategy development process. A general theme across the interviewees was the pressures of

limited resources, and the restrictions which this imposes on the ability of an organisation to take a pro-active approach to incorporating change within its strategy focus. For some of the interviewees projecting short-term change was an integral or important component of decision making. The aim of the Regional Spatial Strategies, for example, is to outline planning policies for 20/25 years ahead: the Association of British Insurers have looked at growth areas and climate change impacts to identify major new sources of risk. For other interviewees, short-term strategy is based on current guidance from policy-makers:

'*The role of the Thames Gateway South Essex (TGSE) Partnership is to gather information, to guide people….all that we can do is take on board the information that is there….the Strategic Flood Risk Assessment looks at climate change and makes an assessment of change of risk as a consequence of climate change…but it is not the role of TGSE to challenge existing guidance...'*.

The significance of longer-term change to decision-making was emphasised by all interviewees, with interesting responses to this theme emerging from the discussions. However, whilst the importance of decision-making on the long-term was recognised, the general opinion was that the potential for a strategy process to include decisions based on low-term change was still relatively low, for example:

'*I don't think we as an* (Regional) *Assembly, or indeed the planning process in the country as a whole, has really got to grips with the longer term'*.

Perceptions of a need for individual organisations to be involved in longer-term strategy development process varied: reflecting to a large extent the scale of an organisation and its role or relationship to flood risk management. The Association of British Insurers - a national organisation focusing on articulating insurers' needs - highlighted the responsibility which is incumbent on the organisation to get involved in the debate on long-term change and management of flood risk. The view from the SFRA Project Manager – representing a sub-regional partnership whose aim is to encourage and enable future development of the Thames Gateway South Essex area – was that long-term planning is essentially of limited importance at the local level, and was rather the remit of the Environment Agency:

'*an insurer offering cover tomorrow will not be necessarily thinking about long-term trends but we are very conscious that decisions we make about the infrastructure now will be with us for a long time and we feel that it's all too easy for the finger to be pointed at insurers when it goes wrong…so we feel that it's incumbent on us to get involved in the debate now.'* (Association of British Insurers)

'*it* (the significance of long term trends on flood risk management) *is significant in terms of the Environment Agency's role from the 2100 project…so it's input ultimately is going to be key in terms of how the region as a whole looks at flood risk management from a defence point of view or not'*. (SFRA Project Manager)

Finally, a perspective was given on the potential challenges of adopting a strategy development process which seeks to monitor and manage change in the long-term. Local authorities and other bodies which are focused on the day-to-day management of the Estuary and surrounding area, and which require information and decision-making over the short term, are limited in the degree to which they can derive value from the long-term strategy development process:

'*Clearly we have interaction with the TE2100 project, but to be honest, this is difficult because they have taken so long to get where they are'*.

4.5 Additional themes emerging from the interviews

A series of other interesting and important themes emerged during the course of the interviews conducted within this research and the range of these themes are outlined in Table 1. A recurrent theme across the interviews was the need for more focus on the building industry. Encouraging more adaptable housing was highlighted as a means for achieving relatively simple but effective reduction in the vulnerability within the Thames Estuary floodplain. The challenge represented by the lack of compensation mechanisms for home owners in high risk flood areas was also raised in discussion within the interviews. The interviewee from the Association of British Insurers, highlighted experiences from colleagues in the insurance industry within New Zealand:

'*they 'retire' properties that are in high flood risk areas and where they consider it just not feasible to put in place defences, so, in effect, the Earthquake Commission* (a semi-government body) *buys up a plot of land which gives people the wherewithal to then buy an alternative plot. Now they're in a different situation in New Zealand in that there's a lot of land and not that many people…. it's not directly transferable…to the UK but there may be some things that we can take out of that'*.

Table 1 Additional themes emerging from the interviews

Association of British Insurers (ABI)	• emphasis on the relationship between the planning process and the insurance industry • limits of current understanding • issue of responsibility i.e. ABI stepping up • problems of limited resources • significant progress has been made towards better risk management • issue of compensation in flood risk management • current lack of focus on the building industry
Thames Estuary Partnership	• trust in the decision-making process • significant progress has been made in flood risk management • responsibility in decision-making: stakeholders taking some responsibilities • issue of raised expectations: funding and resources • building regulations: example of not working towards common vision
East England Regional Assembly	• scale is raised as an important issue in priorities for flood risk management • local focus for flood risk • lack of evidence or tools – early in the process • issue of compensation in flood risk management • role of building industry … need to be building more adaptable housing • positive view on flood risk management and working together offers inverse argument: packing stuff in behind defences • still uncertainties over how planning deals with such issues – many of which are below horizon of planning system
Greater London Authority	• land use planning and regeneration plans • progress on managing flood risk but still problems • lead-time required for flood defences and managing flood risk: importance of long-term • issue of resources, funding (investment) and uncertainty • developers and building industry: need for clear information
Port of London Authority	• interesting take on defining the problem – ports need to be beside water – development doesn't • taking responsibility in decision-making: stepping up • significance of local authorities in making final decisions on development and flood risk • perceptions of local residents

	• long time-lag involved in current FRM project – 'world moving on' • differences in organisation and effectiveness of stakeholder lobby groups across the river
Thames Gateway South Essex Partnership	• flood risk is only 'relevant' in terms of development and expansion but is integral • members of local authorities: limited understanding of flood risk or need for management • problem of resources: taking on issues such as MSWater, doing strategic FRA • idea of being too late specifically for regional SFRA, also limited value of strategic • high value of TE2100: reference point, doesn't need to communicate at present: data • guidance in areas of lower standards of defence • increasing expectations of what can be delivered, very dangerous

Building on this discussion, a suggestion for potential land-swapping to reduce the amount of development sites in higher flood risk areas was raised by the interviewee:

'*what has determined those (*intended development sites*) is where English Partnerships happen to own a site because it's now derelict and brown field. Now it may well have been a very good use of a riverside site industrial use, etc. That does not mean it's a good site for housing ….we understand that concerns about the green field and preventing urban sprawl … but we question whether it is always most sensible to use high risk brown field and in a place like London where actually improving the amount of access to green open space in the inner city areas would also be a significant benefit, perhaps we need to look at doing some land swaps in those situations'*.

Another point relating to compensation raised within an interview was the complexity surrounding deciding when to stop regeneration of high-risk areas:

'at what point, you know, do you start saying to the owner of that land, when you next come forward for redevelopment you can't put housing on there, you'll get a lower value … I mean how do you compensate?'.

The danger surrounding raising expectations to a level beyond which decision-makers are able to deliver was a further interesting discussion point that emerged from the interviews. In reflecting on the reasons for failure of a previous estuary management plan within the Thames Estuary, an interviewee stated:

'they raised huge expectations about we will do this, and that's what the management guidance says, there's this huge list of we ought to do this, we ought to do that … and then there wasn't the staff or the money to do it or to check it'.

On a positive note, a general theme emerged of 'stepping up', or more stakeholders – including key regional organisations and local communities – seeking to take responsibility in a decision-making process. However, these positive comments were combined with some concern that members of the public were being discouraged from adopting a more pro-active role in managing individual flood risk. One example given by an interviewee was the negative impact that key decision-making organisations had in public meetings when they stated that the public '*had no need to worry'* because flood warning systems would insure that they were informed of risk events. A second positive reflection emerging from the interviews was that despite the continued existence of primary challenges to achieving integrated FRM, significant steps have been taken in moving FRM forward. These steps have been particularly valuable in the context of the complexities which define the physical and human environment of the study area.

5. Discussion: emerging lessons and challenges

Many interesting points have emerged from this review of FRM strategy development in London and the Thames Estuary region. From these points a number of key lessons can be identified. These lessons are applicable not only to the specific case-study in question, but introduce key questions and challenges which either need to be addressed theoretically or which are important from a practical perspective at more generic levels.

5.1 Governance

The flood risk management development plan as highlighted in Figure 2, clearly recognises the role of stakeholder participation in the process of idenfying options for managing flood risk. However, the reality is that, to date, this aspect has been very limited in its scope within the London case-study. The importance of clear communication and consistent goals in the strategy process across the decision-makers emerged as a key issue from the interviews, and questions were raised across the group which challenged the current effectiveness of this process. However, this wide-spread recognition of the importance of a shared vision did not translate to an equally wide-spread value of stakeholder engagement in the strategy development process. Rather, there was a mixed response within the interview group to the lack of public participation. From the opinions expressed by the respondents, it would seem that there are key organisations with input to FRM that do not consider the reality of public participation a necessity or, at the very least, one which should relate across the range of content within a strategy framework. This constrasts with the view of members of the public, as articulated for example through the Thames Estuary Partnership, which is one of interest and desire to be involved in the wider strategic planning process. This dichotomy reflects a key challenge to the development of an effective governing framework for the strategy process within the study area.

Key steps have been taken by the current London FRM project in defining the needs and opportunities towards implementing policy, so that the decision-making process has moved towards ‘good’ governance. However, the current project, like many management programmes and projects do not (or cannot?) go beyond the basic consultation level and therefore the decision-making processes are limited in their ability to address the wide ranging conflicts of interest which define the vulnerability of the environment. The fact is that a transparent, accountable and just decision-making process demands a radically different approach to the traditional dirigiste model of planning and implementation that has existed. It raises questions concerning governance that have only been partly addressed to date, including by Green (2003). An example of such a question is the relationship of communities and individuals with interest and concern regarding FRM, to the organisations with the power and the resources to determine the nature of the strategy process. Another question may relate to the mechanisms that can be used to promote the engagement and commitment of both groups of stakeholders to the decision-making process, as well as to the incentives available to reach and implement a shared vision. The fact is that many strategy development processes fall short of the engagement necessary for adaptive planning.

Ensuring all stakeholders are engaged in a decision-making process is critical to understanding the range of conflicts and choices for a management process: as well as promoting the commitment of individuals or groups of stakeholders to any management plans which emerge from the process of decision-making. Improving the current FRM strategy process in this direction would promote our understanding of the nature of vulnerability with the area and would equip decision-makers to develop better options for these needs.

5.2 Knowledge Integration

An interesting point emerging from the interviews is that the respondents gave a distinct internal-organisational context to knowledge integration: only reflecting how current scientific knowledge impacted the decisions made by their respective organisation. With a complete lack of comment on integration at the scale of the London and Thames Estuary system, influencing or commenting on regional-scale integration of the range of knowledge on flood risk was not seen to be considered by individual stakeholders to be within their organisation's remit.

It would seem there is an assumption among stakeholders that different aspects of 'the science' under-pinning the strategy development process are being effectively integrated by the Environment Agency as scientific-leaders of the flood risk management strategy. The literature evidence from the first two phrases of the project suggests that this has not yet been happening to any significant level. Increasing our knowledge of the integrated system i.e. relationships and linkages between the spatial and temporal responses of the physical and socio-economic environment is fundamental to understanding the true impact of external forcing on the system and so to effective management. This research suggests that more effective moves towards integration must be made within the current strategy process for the London region. More generically, integration within strategy development cannot be assumed to simply emerge from a process that has included a range of scientific interests. As such, integration in a management process has to be pursued, with mechanisms to facilitate an integrating perspective on the environment included early within the strategy development process. The responses of the interviewees may also suggest a dissociation of stakeholders with the existing knowledge basis of the project. In this specific case study, the managers of the TE2100 project coordinate and provide all scientific expertise to the strategy development process and as such other stakeholders may be less apt to be engaged with the scientific analysis. However, potential challenges emerging from an absence of clear associations, at the very least feedback links in knowledge, reflects a broader-scale lesson for achieving adaptive management. In particular, the lack of local expertise input to the knowledge basis and subsequent lack of ownership of the decision-making process can raise significant difficulties in developing a successful management strategy.

The findings within the case-study reflect a wider issue within integrated environmental management: progress in interdisciplinary research is largely limited to understanding the process of communicating and informing science to reach the 'best' solution. However, effective adaptive management requires that strategies are developed from an agreement building process which is defined by the range of stakeholders with interest in the management process, but also underpinned by knowledge on the integrated behaviour of the system (McFadden, in press). Linking integrated scientific knowledge with an integrating approach to stakeholder engagement is critical to understanding the differences in the functional scales at which the science of the system and at which the decision-making power operates, and ensuring effective communication and decision-making links across these scales. This is important to creating an adaptive strategy process.

5.3 Embracing uncertainty and change

The current FRM plan development process has moved towards facilitating uncertainty, including mechanisms in the decision-making process through which strategic alternatives for management can be tested against a range of potential physical and socio-economic futures for London and the Thames Estuary region. However, whilst this positive reflection can be made of Environment Agency leadership of the *management planning process*, there is concern among stakeholders that primary decision-makers *setting the context* of flood risk management are not giving sufficient regard to the range of possible futures for the region. Such discussions on uncertainty were related by interviewees to the UK Government development proposal 'The Thames Gateway', with the concern that the Government approach to proceeding with a very fixed socio-economic future in mind for the region, is constraining the effectiveness of the strategic planning process.

The research indicates a distinction between local-scale and broader-scaled organisations on ability, or in the perceived need, to incorporate uncertainty into decision-making. At the local level incorporating uncertainty into decision-making, would seem to be considered by some stakeholders as irrelevant or impossible. At the regional scale, and particularly for organisations with objectives which relate to a relatively longer-term, uncertainty is recognised as an issue that needs to be understood and managed more effectively. Another point emerging from the interviews is that greater clarity of both the impacts of uncertainty (particularly at the general public level) and the limitations on current decision-making (particularly at the policy level) is required to prevent uncertainty being used as an issue to block 'unfavourable' alternatives for flood risk management.

This distinction between local and broad-scale organisations highlights the key challenge of dealing with issues of scale: geographical scale, the scale of problems and the multi-scale nature of actors and interventions. Dealing with scale implies that closer attention needs to be paid to links and to differences between processes and actors at different spaces and time, recognising the interconnectivity of scales and the constraints, interactions and feedbacks associated with changes in scales.

One of the most difficult tasks in formulating an adaptive strategic planning process may be the challenge of developing relationships, both within and between, the social, physical and institutional environments that allow a region to manage uncertain futures and adapt in an integrated manner to drivers of change. In addition to managing and reducing uncertainity to manage negative impacts on the physical and/or human environment, however, is the additional aim fostering an adaptive system that can re-organise to exploit emerging opportunities. Accomodating current and predicted environmental and social pressures and uncertainity surrounding these pressures is certainly an important step for integrated and sustainable management of the coast. However, using management to enlarge the benefits of change and not just diminish the costs (Yohe and Tol, 2002) defines a different and more adaptive approach to managing vulnerable environments.

5.4 Opportunities for self-organisation

As with the theme of uncertainty, there is some difference in the Environment Agency's anticipated approach to self-organisation through a re-iterative development and review process, and the reality among other stakeholders of modifying behavioural responses and preferences on management options given change in the drivers of flood risk within the system. The research suggests that there is generally an absence of a learning process among stakeholders at the local scale and that the ability of regional organisations to adopt an iterative approach to strategy development is very much constrained by limited resources. Perceptions of the need to be involved in a longer-term strategy process also varied across the stakeholders interviewed, reflecting to some extent the scale of organisation and its role or relationship to FRM.

Given that the current strategy process is managed by the Environment Agency, it may be argued that this leadership is sufficient to ensure that management options in an emerging plan have reflected a process of testing and learning. However, this lack of self-organisation ability across the wide stakeholder basis of the region would have implications beyond the life of the TE2100. This would relate in particular to the ability to develop a long-term adaptive strategy process, in which there is a continuous cycle of learning and testing.

6. Conclusions

The London case-study shows challenges that are involved in managing flood risk in a large urban area, where there is a pre-existing flood defence infrastructure but a new philosophy that moves toward flood risk management rather than flood defence. The necessity of adopting an integrated

approach to managing the flooding system is widely recognised, but the reality is that this remains difficult to achieve. Governance, for example, is often used as a buzz word in a rather empty and meaningless fashion. Yet to make true moves towards nurturing diversity in decision-making, difficult questions concerning the distribution of power and funds need to be addressed. In a large urban area such as London, the political nature of decision-making is greatly magnified. The challenges presented by institutions operating within clear boundaries and distinct interest-bases are also clearly raised within this case-study. Developing clear outlines of overlaps in responsibility, funding and motivations, as well as differences in these characteristics, is important to move in the direction of sharing responsibility and power and thereby increasing resilience in the decision-making process. Similarly, integrating knowledge is also easily identified as critical to a successful adaptive strategy process. Yet the reality is that truly integrated studies, which focus on emerging 'total system' behaviour, are still very few in number. As identified in the discussion section, clear practical mechanisms for enabling interaction and integration – as well as improved theoretical models - need to be identified and incorporated into environmental management. There is wide recognition of the centrality of adaptive co-management and the need for a pro-active approach to strategy development. However, the case-study has shown that there is often considerable inertia within the system towards defence due to existing physical structures, models of planning and implementation of flood risk management strategies.

However, in addition to identifying particular challenges in adopting a more systems perspective on FRM, this work also highlights a series of important steps that have been taken towards integrated management in the London and Thames Estuary region. The complexity that characterises the physical and human environment of the case-study area, means that the collaborations and discussions that have begun to be forged in the strategy development process are to be valued. Moving beyond integrating management to encompass the ideal of an adaptive or co-evolving strategy process is an important goal for the management of 22nd century coastal and estuarine environments. Translating this vision into the reality of flood risk management requires a thorough understanding of physical, economic and social processes and responses - and the flood defence assets - which characterise the estuarine system: and an institutional and organisation landscape which facilitates self-organisation, learning and careful planning.

References

1. ADGER, W. N., ARNELL, N. W. and TOMPKINS, E. L. (2005). Successful adaptation to climate change across the scales. *Global Environmental Change - Human and Policy Dimensions* 15, 2, 77-86.
2. ADGER, W. N., BROOKS, N., KELLY, M., BENTHAM, G., AGNEW, M., & ERIKSEN, S. (2004). *New indicators of vulnerability and adaptive capacity*. Final Project Report. Tyndall Project IT1.11. Norwich: Tyndall Centre for Climate Change Research, University of East Anglia.
3. APFM TECHNICAL SUPPORT UNIT (2004) *Integrated Flood Management - concept paper* APFM Technical Document No.1 second edition, The Associated Programme on Flood Management, Geneva .
4. BRYSON, J. (2004) *Strategic Planning for Public and Nonprofit Organsations. A Guide to Strengthening and Sustaining Organisational Achievement.* Jossey-Bass, San Franciso.
5. DEFRA (2005) *Making Space for water: Taking forward a new Government Strategy for flood and coastal erosion risk management in England.* Department for Environment, Food and Rural Affairs.
6. GREEN, C. H. 2003 *Handbook of Water Economics.* Chichester: John Wiley
7. GREEN, C. H. 2004 Flood risk management in the context of Integrated Water Resource Management. Keynote paper, *Workshop on Flood Prevention and Control on the Yangtze Paper,* Wuhan.
8. ENVIRONMENT AGENCY (2004a) Thames Estuary 2100 Phase 1 Report.
9. ENVIRONMENT AGENCY (2004b) Thames Estuary Flood Risk Management Plan: Phases 2-4. Project Appraisal Report.
10. ENVIRONMENT AGENCY (2004c) TE2100 Phase 1 Studies Programme Summary Update Report (March 2004).
11. ENVIRONMENT AGENCY (2006) Thames Estuary 2100 Protecting your Future – A consultation.
12. FOLKE, C., CARPENTER, S., ELMQVIST, T., GUNDERSON, L, HOLLING, C.S. and WALKER, B. (2002) Resilience and sustainable development: building adaptive capacity in a world of transformations. *Ambio* 31, 437-440.
13. GILBERT, S. and HORNER, R. (1984). *The Thames Barrier.* London: Thomas Telford.
14. HOLLING, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecological Systems* 4, 1-23.
15. HUGHES, T. P., D. R. BELLWOOD, C. FOLKE, R. S. STENECK, AND J. WILSON (2005) New paradigms for supporting the resilience of marine ecosystems. *Trends in Ecology and Evolution* 20, 7, 380-386.
16. JOHNSON, C., TUNSTALL, S and PENNING-ROWSELL, E. (2004) Crisis as catalysts for adaptation: human response to major floods. Research Report. ESRC Environment and Human Behaviour New Opportunities Programme. Award No.: RES-221-25-0037. Flood Hazard Research Centre, Publication No.511.
17. MCFADDEN, L. (In press). Governing Coastal Spaces: the case of disappearing science in Integrated Coastal Zone Management. *Coastal Management.*
18. MCFADDEN, L. (2006) Vulnerability Analysis: A Useful Concept for Coastal Management? In: McFadden, L., Nicholls, R.J. and Penning-Rowsell, E. (eds.) (2006) *Managing Coastal Vulnerability: An Integrated Approach.* Elsevier Science. pp282.
19. PETER BRETT ASSOCIATES (2002) Thames Tidal Defences: A Brief Historical Overview of the Administration, draft report prepared for the Environment Agency.
20. THORNE, C., EVANS, E. and PENNING-ROWSELL, E. (2006) *Future Flooding and Coastal Erosion Risks.* Thomas Telford Ltd.
21. TURNER, B. L., KASPERSON, R. E., MATSON, P., MCCARTHY, J. J., CORELL, R. W., CHRISTENSEN, L., ECKLEY, N., KASPERSON, J. X., LUERS, A., MARTELLO, M. L., POLSKY, C., PULSIPHER, A. and SCHILLER, A. (2003). A framework for vulnerability analysis in sustainability science. *PNAS 100* 14, 8074-8079.

22. VOLBERDA, H. (1998) *Building the Flexible Firm. How to Remain Competitive*. Oxford University Press.
23. WALKER, B., HOLLING, C. S., CARPENTER, S. R. and KINZIG, A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society* 9, 2, 5. Available online- http://www.ecologyandsociety.org/vol9/iss2/art5 (last accessed 2nd March 2006).
24. YOHE, G. W. and TOL, R. S. J. (2002). Indicators for social and economic coping capacity - Moving towards a working definition of adaptive capacity. *Global Environmental Change-Human and Policy Dimensions* 12, 1, 25-40.

Appendix 1: EU to Regional Plans and Policies

Scale	Planning Document
EU Directives	
	Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002
	Communication on a European Community Biodiversity Strategy
	Directive 79/409/EEC on the Conservation of Wild Birds
	Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
	Water Framework Directive (2000/60/EC)
	Directive 85/337/EEC on Environmental Impact Assessment
	Directive 2001/42/EC on Strategic Environmental Assessment
	Commuincation Com(2004)472 Flood risk management Flood prevention, protection and mitigation
National Planning Policy Guidelines (PPGs) and Planning Policy Statements (PPSs)	
	PPS1 Delivering Sustainable Development (replaces Planning Policy Guidance Note 1, General Policies and Principles, published in February 1997)
	PPG2 Green Belts (1995)
	PPG9 Natural Conservation (1994)
	PPS9 Biodiversity and Geological Conservation (in consultation) (1994)
	PPG13 Transport (1994)
	PPG15 Planning and the Historic Environment (2002 – original release 1994)
	PPG16 Archaeology (2001 – original release 1990)
	PPG25 Development and Flood Risk (2001) – review of PPG 25
Other National Policies	
	Working with the grain of nature: A biodiveristy strategy for England (2002)
	Working for the Essential of Life (2002)
	Sustainable Communities – Building for the Future (2003)
	Delivering the Essentials of Life (2004)
	Securing the Future – Delivering UK Sustainable Development Strategy (2005)
	Making Space for Water (2005)
UK Legislation	
	Wildlife and Countryside Act 1981 and Ammendment Regulations 1995
	The Conservation (Natural Habitats, &c.) and Regulations 1995 and Ammendment Regulations 11997
	Countryside and Rights of Way Act 2000
	Water Resources Act
	Environment Act 1995
	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 3242)
	Town and Country Planning Act 1990
	The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 293)

	The Environmental Assessment of Plans and Programmes Regulations 2004
Satutory Regional Development Planning	
	The London Plan replaces, RPG 3: Stategic Guidance for London Planning Authorities (1996) RPG 3B/9B: Strategic Planning Guidance for the Thames (1997) RPG 9: Regional Planning Guidance for the South East
	The South East Plan
	The East of England Plan
Regional Sustainable Development Frameworks	
	Integrated Regional Framework for the South East
	East of England SDF
	An SDF for London

Appendix 2: Stakeholders Interviewed: background of organisations

1. Thames Estuary Partnership (TEP)

The Thames Estuary Partnership (TEP) provides is a neutral forum for local authorities, national agencies, industry, voluntary bodies and local communities to work together for the good of the Thames Estuary.

The Partnership:

- Is a charity providing a framework for the management of the estuary
- Co-ordinates a programme of projects
- Facilitates new projects and forums for joint working
- Holds regular events and workshops
- Seeks to further the interests of local communities, local economy and the environment.

2. London Assembly (LA)

The London Assembly is a scrutinising body with 25 members. All 25 are elected by voters in London, at the same time as they vote for the Mayor.

The London Assembly:

- provides a check and a balance on the Mayor
- has powers to amend the Mayor's budget subject to a two-thirds majority decision
- appoints the GLA's Chief Executive, Monitoring Officer, Chief Finance Officer and all other members of the Authority's staff
- investigates issues of Londonwide significance and makes proposals to appropriate stakeholders
- scrutinises the Mayor's performance and makes proposals to the Mayor
- has a power to summon the Mayor, senior staff of the Authority and functional bodies, and bodies or persons in a contractual relationship with, or in receipt of grant from the Authority
- provides members to serve on the Metropolitan Police Authority, the London Fire and Emergency Planning Authority, and the London Development Agency
- provides the Deputy Mayor, who is chosen by the Mayor.

3. Regional Planning Officer, East of England Regional Assembly (EERA)

EERA is the Regional Planning Body for the East of England. Key areas of regional planning work for EERA are the preparation of Regional Planning Guidance for the East of England (broad guidance on the future development of the region, including housing and transportation issues) including a Regional Transport Strategy. It also has an important role in helping with preparation of sub-regional studies.

4. Port of London Authority

The Port of London Authority is a self-financing public sector trust which manages a range of responsibilities along the Tidal Thames. It’s principal responsibility is safety of navigation along the 95 miles of the Tidal Thames, from the Estuary in the East to Teddington in the West. However, it also takes responsibility for protecting the environment of the Thames, promoting its use and doing so within a framework of dialogue with customers and many others interested in the River.

5. Association of British Insurers

The ABI (Association of British Insurers) represents the collective interests of the UK’s insurance industry. The Association speaks out on issues of common interest; helps to inform and participate in

debates on public policy issues; and also acts as an advocate for high standards of customer service in the insurance industry.

The Association has around 400 companies in membership. Between them, they provide 94% of domestic insurance services sold in the UK. ABI member companies account for almost 20 per cent of investments in the London stock market.

6. Spatial Planner - Thames Gateway South Essex Partnership

Thames Gateway South Essex Partnership is a public/private sector partnership that provides strategic leadership for regeneration and growth in Thurrock, Basildon, Southend, Castle Point, and Rochford.

Appendix 3: Generic topic guide

ANALYSING **THE PROCESS DIMENSION** OF STRATEGIC PLANNING FOR FLOOD RISK MANAGEMENT IN THE THAMES ESTUARY

Ask if possible to tape responses as a backup for our own notes. Mention that respondents will not be individually named in the analysis and at any time they may ask for the recorder to be switched off.

Introduction to interview:

- stress process of decision-making rather than specific management responses
- exploring the opportunities and the constraints and challenges towards a strategic approach to flood risk management
- within 3 main themes

This interview is very important to us. We are still exploring the range of relevant issues and developing the most pertinent questions. Today's discussion will be very useful in formulating our subsequent approach to the interviews.

London is subject to a series of sources of flooding including estuarine and surface water and sewerage flooding. I would like to focus this discussion on estuarine flooding: though recognising that flood risk management must take an integrated approach to managing all the sources-pathways and responses.

Theme 1: Is Flood Risk a significant agenda item?

Given your organisation's interest in *Insurance or spatial planning etc*, by definition it is specifically interested in flood risk management.

1. Do you see a clear distinction between flood risk management and flood defence?
2. How would you define this?

3. Is this distinction recognised within the context of your organisation?
4. What are the implications of this distinction on operational approaches and decision-making?

5. Does your organisation have an explicit policy statement on flood risk management?
6. If no, can you reflect on why this is the case?
7. In which other policy context are flood risk and flood management issues examined?

I know that your organisation has a specific policy statement/principles concerning flood risk management

8. What do you see is the relative importance of flood risk management within the wider issues that your organisation deals with?

9. What determines a significant flood risk (in case of ABI is this simply greater than 1.3% annual probability)?

10. In the case of London and the Thames Estuary region, is this standard variable?

Theme: Internal response of the organisation to flood risk

You are a national/regional organization and by focusing on the Thames Estuary, I am asking you to focus on sub-region within your the broad spatial remit.

11. Does the organisational perspective on managing flood risk hold for the Thames Estuary region?
12. If not, how is this region different?
13. What are the links between your organisations response within the Thames Estuary and the national response?

14. Who are the key people within your organisation are involved in flood risk management e.g. special committees?

15. How is current scientific information on flood risk or policy from DEFRA/EA impacting current operational and policy decisions within your organisation?

16. Do previous responses to flooding events impact or inform the current decision-making process?
17. If so, which events and how?

The physical and social context within which you make decisions regarding flood risk management is likely to change e.g. climate change and population pressure:

18. Do you have a strategy unit that responds to a changing context in relation to flood risk management issues in the short-term (i.e. next 12-20 years)?

19. How significant are long-term trends (up to the next 100 years) to decision-making within your organisation?

20. TE2100 is an example of a project that is looking at the long-term. Is your organisation independently working on a long-term scale or will you rely on information from TE2100?

Uncertainty, particular in climate change but also social and economic change is often predominate in discussions on environmental management.

21. Is the issue of uncertainty important to decision-making within your organisation?
22. How is it important and can you give an example of how you deal with uncertainty?

23. Does the existence of uncertainty exert specific limitations on your policy approach?
24. If yes, in what way?

25. In your opinion, could uncertainty have a positive role in strategic planning and decision-making?

Theme: External relationships and impact on managing flood risk

26. What are the main organisations that you communicate and work with on flood risk management?

27. In your opinion, are the central decision-making organisations working together effectively towards strategic flood risk management? (e.g. EA, OPDM, GLA etc)

28. In your view, do they effectively engage with the range of stakeholders/interest groups to reach decisions on management alternatives?

29. If yes to 27,

- Is this giving you the opportunity to enhance your role (non-structural input) in managing the impact and consequences of flooding?

- Can you identify specific developments, structures or relationships which have enabled your effective participation in the decision-making process?

If no to 27,

- In your opinion what are the key limiting factors?

- Are there specific developments that would enhance non-structural input to managing the impact and consequences of flooding?

There are inequalities of power in the decision-making process for flood risk management in the Thames Estuary region e.g. EA ultimate responsibility for defence, range of statutory stakeholders (GLA, OPDM) but also non-statutory or interest groups.

30. In your experience is there a clear and known communication strategy between the key decision-makers?

31. ….between decision-makers and with stakeholders involved in the flood risk management process?

32. Has the lack of communication/or the communication strategy had an impact on the effectiveness of your organisation's response?

33. How important is it to have a shared vision across stakeholders of the (economic, social and physical) future of London? Is this possible? Are we moving towards such a vision?

Literature suggests that overlaps in responsibility and capacity increase the resilience of a system. Yet, overlapping responsibilities is often cited as a restriction to progress and clear lines of authority and responsibility are important.

34. From your experience are there overlaps in the decision-making process for flood risk management in the Thames Estuary? What are they?

35. IF YES, do such overlaps impact the effectiveness of decision-making? In which ways?

36 If communication was improved, could overlaps in function become an asset?

37. Are there other factors involved that could contribute to overlap and redundancy becoming an asset for Flood Risk Management (e.g. better knowledge of the integrated physical and social system)?

38. Are there any other issues or factors that you see as relevant that we haven't touched upon?

If, when working through the interviews, I think of another important question would you mind if I contacted you again, by email or called?

Appendix 4: The range of possible stakeholders for flood risk management of London and the Thames Estuary region

Statutory and Delivery Bodies

DEFRA
ODPM
Treasury
Gov't Office for London
GoEast
GoSE
EERA
GLA
SEERA
Thurrock UDC
East London UDC
Greenwich
Gravesham
Swale
Medway
Bexley
Havering
Barking & Dagenham
Newham
Tower Hamlets
Rochford
Waltham Forest (not tidal fp)
Hackney
Lewisham
Thurrock
Dartford
Castle Point
Southend-on-Sea
Basildon
Kent County Council
London Borough of Southwark
LB Kingston
LB Richmond
LB Wandsworth
Corporation of London
LB Hounslow
LB Hammersmith
LB Wandsworth
LB Lambeth
LB Kensington and Chelsea
LB Westminster
MPs Parliamentarians
East of England Development Agency EEDA
London Development Agency LDA
South East England Development Agency SEEDA
Thames Gateway Strategic Executive
Thames Gateway London Partnership
Thames Gateway South Essex
Thames Gateway Kent Partnership
Gateway to London
Invest Thames Gateway
Cross River Partnership
South London Partnership
Renaissance Southend
Swale Forward
Medway Renaissance Partnership
Kent Thameside Partnership
Environment Agency
English Nature
Countryside Agency
Port of London Authority
English Heritage
Housing Corporation
Thames Regional Flood Defence Committee (RFDC)
Southern RFDC
Anglian Eastern RFDC
Heart of Thames Gateway

Forums and Representative Groups

Assembly
Thames Estuary Partnership
Biodiversity Action Group
Thames Estuary Research Forum
Thames Estuary recreational users group
Lamplighters and Watermen
London Rivers Association
Thames and London Waterways Stakeholder Forum
Thames Landscape Strategy - Hampton - Kew
TLS Kew - Chelsea
Thames Strategy East
River Thames Society
West London Rivers Group
Creekside Forum
Thamesbank
Swale Estuary Partnership
Kent and Essex Sea Fisheries Committee
FWAG (Farming and Wildlife Advisory Group)
CLA (Countryside Landowners Association)
Associated British Ports
Developers Forum (ODPM)
House Builders Federation
ABI
London Thames Gateway Forum
Association of London Government
Local Government Association
London Civic Forum
London First
London Sustainability Exchange
London 21
NFU
Greater London Action on Disability
Pan London advisory Group on Faiths
Age Concern
London Youth Forum
Sustrans
Dickens Preservation Society
Greenwich Environmental Forum

Interest Groups and Organisations

RSPB
CPRE
London Wlidlife Trust
Kent wildlife trust
Essex wildlife trust
Groundwork
Thames 21
WWF
Friends of the Earth
Thames Gateway NHS Trust
London Tourist Board
Kent Tourist Boards
Essex Tourist Board
Emergency Services
Coast Guards
RNLI
Individual Boat Clubs
Thames Water
Southern Water
Anglian Water
Power Utilities
Land Restoration Trust
London Gateway (Shellhaven)
City Airport
Transport for London
Highways Agency
Gravel extractors
Landscape Artists
Ramblers & River WalkersEssex County
Merchant & Commercial Shipping
Individual Developers (property)
BRE
English Partnerships
Residents in Tidal flood plain
Riparian Landowners
Bait Diggers
Fishermen
Dredging / Extraction Co's
Waste Site Operators - Estuary
Research
Media Radio / TV / Print
Consultants