Preliminary DRAFT

Working Paper 1 - Summary

Integrated Environmental Management:

A Review of the Concept (February 2015)

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THE IMMERSE PROJECT

Integrated Management and Monitoring of Estuarine and Coastal Ecosystems (IMMERSE), is a research project aimed at informing an Integrated Environmental Management and Monitoring system (EMMS) for Irish estuarine and coastal ecosystems. It is funded by the Irish Environmental Protection Agency's Research Programme (grant no. 2013-B-PhD-11). The methodology for the EMMS will be applicable on a national scale, and will aim to align with the requirements of the Water Framework, Marine Strategy Framework, Habitats, Birds and Floods Directives.

Working Paper I: Integrated Environmental Management: A Review of the Concept

This is the first in a series of six working papers which will be generated by the project. Each paper will reflect on the research findings to date and key milestones. The objectives of Working Paper I are to: define and critically review 'integration' as an environmental planning concept; establish the need for, and benefits of, integration within estuarine and coastal management; appraise the dimensions and aspects of integration relevant for environmental management; evaluate the protocols guiding IEM; and develop and analyse a set of principles of IEM which could be applicable in Irish estuarine and coastal environments.

Defining Integration

The term 'integration' implies a type of 'synergetic linkage and interconnection' which can only be understood 'in terms of what is to be linked and merged' (Healey, 2006). The term integration is related to a suite of words such as 'joined up', 'holistic', 'co-ordinated', 'interrelated', 'balanced' as well as 'comprehensive' and 'integrative' with a focus on 'connectiveness' and 'relations' (Healey, 2006; Mitchell, 2005).

Integration as a concept is considered as a functional activity whereby it brings together 'multiple elements such that the resulting assemblage has some value that did not exist before' (Holden, 2012, p.305). Therefore the term 'integration' used in this working paper infers a holistic approach which embraces a range of actors, levels, scales and processes and has the potential to create a framework through which the complexity of issues influencing effective environmental management can be addressed.

The need for Integration

Multiple human activities affect both the land and coastal environment, yet current management primarily considers activities in isolation such as fishing, conservation, renewable energy, port and harbour development, land infrastructure etc. (Cornu et al., 2014; Crowder, 2006; Foley et al., 2013; Halpern et al., 2008; Visbeck et al., 2014). In the past the marine environment was used principally for two purposes: fishing and navigation (Cicin-Sain and Knecht, 1998). In more recent times however population growth, food and energy requirements, increased economic activity and improved standards of living are resulting in unprecedented levels of demand for coastal and marine resources, furthering the complexity of ecosystem functioning and of the close interaction between humans and the coastal and marine environment.

Additionally with increased resource use, conflicts generally arise amongst estuarine and coastal users in terms of: a) the possibility of having adverse impacts of one use on another use; and b)

competition for space, or sometimes both. Similarly, different activities can be complimentary or co-located with each other. For example seaweed cultivation has the potential to co-exist with marine renewable developments, offering synergies between these sectors (Scottish Government, 2013).

Current governance frameworks, wherein management is fragmented among sectors and institutions with little attention to conflicts or complementarities among social, economic and environmental objectives, are insufficient to address the issues described above (Holden, 2012; Mitchell, 2005). Fragmented institutional arrangements complicate effective environmental management by: narrowing criteria in decision-making; encouraging competing and contradictory objectives; increasing duplication of effort; and introducing disconnects between national, regional and local-level activities (Edelenbos and van Meerkerk, 2015; Kidd and Shaw, 2007).

More integrated approaches therefore are required not only to reflect the critical inter-relations between user-user and user-environment but also to encourage greater synergy between different areas of activity and to ultimately be more effective in addressing spatial development activities (Healey, 2006; Kidd and Shaw, 2007; Tewdwr-Jones and Allmendinger, 2006). Therefore in order to have a healthy and productive ecosystem in which human uses and users may be synchronised there is a need to move from the current sectoral approach to a more holistic one of management (McLusky and Elliott, 2004). Simultaneously, a number of benefits can be gained such as: i) the long term protection of the marine resource; ii) enhanced potential for sustainable multiple use of the marine resource; iii) cost savings and improved economic competitiveness; iv) efficient and cost effective compliance with existing environmental legislation; v) enhanced environmental awareness; vi) improved ecosystem status; and vii) cost effectiveness within institutional and governance structures.

Dimensions of Integration

In the discipline of water management, Kidd and Shaw (2007) categorise integration issues within two classes which can be adapted here for integrated environmental management: i) those related to the **natural system** which determine the availability and quality of natural resources and ii) those related to the **human system** which shape resource use.

With regards to the natural system Jonch-Clusen and Fugl (2001) refer to five dimensions of integration in integrated water resource management (IWRM)[1], one of these has direct relevance to estuarine and coastal management: integration of freshwater and coastal zone management, although all five apply when considering the Water Framework Directive (WFD) and its impact on estuary environments. The integration of freshwater and coastal zone management crystallises two very important aspects of IEM related to estuaries. This highlights that the natural estuarine system consists of a variety of complex ecosystems, each needing careful and often different management approaches. One considered approach is ecosystem based management (EBM) which considers the entire ecosystem including human beings. The objective of EBM is to maintain an ecosystem in a healthy, productive and resilient condition, providing the goods and services humans want and need (Ehler and Douvere, 2009).

[1] This includes Integration of land and water management; Integration of surface water and groundwater management; Integration of quantity and quality in water resource management; integration of upstream and downstream water related interests; and Integration of freshwater and coastal zone management.

In terms of the human system, Kidd and Shaw (2007) group the dimensions of human systems into three categories: territorial integration, sectoral integration and organisational integration. 'Territorial integration' for the purposes of estuarine and coastal management refers to land-sea integration (Kidd and Shaw, 2013). This is to reflect the increase in human development pressures on the marine environment and the belief that terrestrial spatial planning can be applied to its sea-based cousin (Kidd and Ellis, 2012). 'Sectoral integration' is the integration of management with other spheres of public policy and their associated actors within a territorial area and across public, private and voluntary divisions (Kidd and Shaw, 2007; Lau, 2014). The emphasis is mainly on the institutions, processes and policies of governments as opposed to the actual interactions and consequences of governance in the sectors themselves. This is usually referred to as 'horizontal' integration i.e. across and between various sectors and stakeholder groups (Boyes and Elliott, 2015; Elliott, 2013). 'Organisational/ institutional integration' is the coordination among international, regional and national levels of organisations and administrative bodies responsible for implementing legal instruments and recommendations (Elliott, 2013). Current governance and institutional arrangements for implementing legislative and regulatory requirements is discussed in more detail in Working Paper II.

Devising Principles of IEM

As there are no set of agreed principles for IEM in Ireland, existing principles, established within international agreements which advance the notion of integration, were reviewed. The international agreements and environmental protocols selected to help formulate a set of IEM principles for estuarine and coastal ecosystems in Ireland include: the UN Conference on Human Environment 1972; the UN Conference on Environment and Development (Rio 1992); the Convention on Climate Change 1992; the Convention on Biological Diversity, 1992; Agenda 21; Aarhus Convention 1998; Recommendation on Integrated Coastal Zone Management, 2002; the Ramsar, Bonn and Bern Conventions; and the OSPAR Convention, 1992.

A set of common principles emanated from this suite of agreements which helped us to devise a list of preliminary principles of IEM which have been taken forward and discussed in the next section.

Evaluating the preliminary principles of IEM

In order to determine if this preliminary set of principles is likely to result in successful and sustainable estuarine and coastal management, it was deemed necessary to establish a set of criteria or set of questions to test these principles. Elliott (2013) developed a set of ten interlinked 'tenets' to achieve successful and sustainable marine management as included in Table 1 which were useful in helping us to devise a list of questions, which were applied to test our preliminary principles of IEM.

Table 1: Tenets for Integrated, Successful and Sustainable Marine Management (Elliott, 2013)

10-Tenets for Integrated, Successful and Sustainable Marine Management
1. Ecologically sustainable 2. Economically viable 3. Technologically feasible 4. Socially desirable/tolerable 5. Legally permissible 6. Administratively achievable 7. Politically expedient 8. Ethically defensible (morally correct) 9. Culturally inclusive 10. Effectively communicable

The results highlighted minor gaps in the characteristics of the preliminary principles where specific environmental aspects were overlooked or were not explicitly or specifically referenced in the wording which could present management challenges in the future. Accordingly, the principles were revised to address these shortfalls and should result in a more robust set of guiding principles of IEM. These principles were subject to scrutiny by the project Steering Group and further refined. The criteria questions and the revised set of 15 principles are included in Table 2.

Table 2: Criteria questions and proposed principles of IEM

Questions to determine suitability of the preliminary principles of IEM (based on Elliott's 10-tenets)	***Principles of Integrated Environmental Management***
Is there a principle which seeks to raise awareness of the societal benefits of a clean and managed marine environment? Is there a principle which acknowledges the ability of the sea to assimilate or support its demands, what might be termed the societal carrying capacity? Will this principle or another support cost-effective approaches and consult and engage with the public, NGOs and all stakeholders?	1. Sustainability (balance between, and integration of, conservation and use of natural resources for provision of ecosystem goods and services i.e. clean, safe and healthy estuarine and coastal ecosystems will be productive)
Is there a principle to help management align with international treaties, agreements, regional seas approaches, directives, national laws and regulations which provide the enabling legislation for adopting wider legal control?	2. Sovereign Right to develop (pursuant to national environmental and developmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.
Is there a principle to ensure that marine/ coastal and estuarine management actions are accepted or tolerated by society and there is an increasing stakeholder input in decision-making? For example, historical rights of local population	3. Environmental justice (i.e. fair distribution of benefits, climate change impacts)
Is there a principle to ensure that the ethics and morals of any sustainable solutions are considered?	4. Equitable access to environmental resources (conflicts and compatibilities)
Is there a principle which seeks to maintain the natural system by protecting the ecological carrying capacity and ecosystem structure and functioning?	5. Conservation of ecosystem structure, functioning and resilience, in order to maintain ecosystem services
	6. Inter-relationship and integration (natural and human systems and prioritise management of ecosystems within the limits of their functioning)
Is there a principle ensuring that statutory bodies are interlinked at international/regional/national levels i.e. 'vertical' integration, and across and between the various sectors and stakeholder groups i.e. 'horizontal' coordination and integration?	7. Holistic decision-making (multi-level, multi-sectoral)
Is there a principle supporting access to the right science and technologies to prevent environmental damage or remediate it once it has occurred i.e. best available	8. Informed decision-making (use of science, best available technologies, local

Questions to determine suitability of the preliminary principles of IEM (based on Elliott's 10-tenets)	***Principles of Integrated Environmental Management***
technologies?	knowledge)
Is there a principle to support the provision of adequate funding to prevent environmental damage and, when it happens, to recover or restore areas i.e. the 'polluter-pays-principle? Will this principle help the marine system to deliver economic needs?	9 Environmental safeguards (incl. adequate funding for remedial and restoration works & environmental regulations)
Is there a principle to help achieve the internationally recognised principles - ecologically sustainable development and the principle of inter-generational equity; the precautionary principle; the conservation of biological diversity and ecological integrity; the economic valuation of environmental factors and the polluter pays principle; waste minimisation, and public participation?	10. Precautionary approach
	11. Polluter pays
Is there a principle supporting communication between all the stakeholders and, in particular, helping to achieve 'vertical' and 'horizontal' integration? Will the principle help to communicate science and projected management outcomes to allow better decision-making?	12. Stakeholder engagement
	13. Communication (education and awareness)
Is there a principle to distinguish if politics is leading or following society and/ or determine if there are differences in fundamental philosophy usually between the centre left/centre right political spectrum and/ or between society and business dominated systems? **Response:** Politics should both lead and follow society e.g. governments need to lead the way in endorsing a climate change agenda based on scientific evidence. On the other hand, society may influence local politics in terms of conservation and/ or protection of non-internationally designated sites. Therefore we do not see the benefit or need to have a specific principle examining the philosophy of politics. However, if one is required in the future to assist with IEM, then Principles 13 & 14 allow for flexibility.	14. Adaptive approach
	15. Continual Improvement

With regards to the implementation of these principles, it is acknowledged that there will be many challenges to overcome. In particular, the idea of 'integration' being all encompassing is a very broad description and one should be mindful that in trying to be everything, it may end up being nothing. Furthermore while the objective may be to bring people together it does not necessarily help them to agree goals. Therefore inconsistent definitions can cause problems when they are used to inform policy, impact organisational operations, and create frameworks for decision-making. When concepts are not clearly defined, too theoretical or lack specific detail they are open to divergent interpretation. This is a key challenge in endorsing the concept of IEM.

The 15 principles of IEM described above have been evaluated against a set of criteria questions based on Elliott's 10-tenets for integrated, successful and sustainable marine management. These principles also underwent further scrutiny in consultation with the project Steering Group and will assist in the progression of a proposed framework of EMMS which has the potential to guide an integrated approach to estuarine and coastal management which is equitable and fair; cross-sectoral and interdependent; holistic and informed, precautionary and safeguarding; fully consulted and communicated; adaptive and flexible; and based around the ethos of delivering sustainable development.

Conclusions

Integration is an ambitious concept in terms of delivering sustainable environmental management and monitoring in Irish estuarine and coastal ecosystems where currently a sectoral approach is the normal process. Nonetheless, principles which have been tested for management rigour, based on sound environmental philosophies, ensuring adaptability and continual improvement have the potential to guide the development of a proposed framework of EMMS. This will be expanded upon in Working Paper II where legislative and regulatory requirements for estuarine and coastal management are reviewed and current governance arrangements in Ireland are appraised against the set of proposed principles of IEM developed within this paper.

References

Please refer to the main report on the IMMERSE website for references cited in text.