



Saltmarshes, ecosystem services, and an evolving policy landscape: A case study of Wales, UK

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ABSTRACT

Coastal areas are facing increasing pressures, resulting in unprecedented levels of change that require an adaptive and flexible governance system. Through its devolved powers, governance in Wales has undergone significant change, with new legislation providing ‘world-leading’ and ‘innovative’ approaches to a range of social, economic and environmental challenges. This provides an opportunity to examine the extent to which ecosystem services have been translated into national policy, providing a useful case study for global coastal governance. This paper reviews five recent Welsh acts, focusing specifically on the case study system of saltmarshes and their ecosystem services, benefits and processes. A number of themes are identified, highlighting opportunities and challenges for global coastal governance. One key observation found that the language used within these 5 Acts is more clearly linked to ecosystem benefits, rather than language traditionally associated with ecosystem services. This evaluation of these Acts highlighted a limited inclusion of ecosystem services – perhaps, if ecosystem services are to be the lynchpin of coastal governance, a more explicit consideration of the concept is required at the highest of policy scales. Finally, recommendations are presented calling for greater inclusion of ecosystem services within high-level policy, and for an integrated and adaptive approach to coastal governance. In addition, it should be noted that although the study is based in a Welsh context, the outcomes are framed within a global scale, providing transferable insights. This paper contributes to the ongoing dialogue surrounding the concept of ecosystem services and its application within coastal governance.

1. Introduction

Globally, coastal environments support a diverse range of ecosystem services (ES) and benefits (MEA, [45,26]). However, as coastal ecosystems around the world experience unprecedented levels of pressure and stress as a result of human activity and ongoing climate change impacts [26,35,57,58], their natural capacity to provide ongoing support for the diverse range of services and benefits is called into question. Environmental governance and how best to manage our natural resources, and their associated ES, remains central to the debate amongst global decision-makers and policy practitioners. In a marine and coastal context, there has been a long-standing move towards a more integrated approach to coastal management [2]. More recently, adopting an ecosystem-based approach to managing natural resources is becoming the globally accepted norm [29,37,6]. Despite efforts to move towards more holistic, integrated approaches to marine and coastal governance, the policy landscape remains complex [10,11], making effective management of ecosystems difficult. Governance varies considerably across coastal and marine ecosystems. As such,

there is no one-size-fits-all approach [38]. However, given the importance of effective governance in supporting healthy, resilient, marine and coastal ecosystems and the successful delivery of a range of ES [21], it is vital that we understand the governance instruments influencing management, as well as how and why different approaches do or do not work.

Welsh coastal areas represent an area of significant importance, with 60% of the Welsh population living on, and benefiting from, the coast [59]. As one of the key coastal fringe ecosystems, saltmarsh environments are at the forefront of coastal change and represent an estimated 6950 ha [23,32]. They are most commonly found in the low energy areas of coastal estuarine environments and act as a connector between fresh and marine water systems. As a coastal system, saltmarshes are dynamic and vulnerable to change, yet are increasingly recognised for their role in coastal protection and defence. Recent years have seen a growing emphasis on conservation and restoration of saltmarsh environments as a result of this capacity [58,8]. With this recognition of their role in vital ecosystem service provision (e.g. coastal defences, flood regulation and prevention, and increasingly,

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carbon capture), saltmarshes are set to play an ever greater role in society's adaptation and mitigation of future change and ecosystem regime shifts [57,58]. As a result, they were selected as an ideal case study system; however, it is anticipated that that the results will be transferrable to the broader coastal environment. This paper provides a starting point by developing an understanding of the role of ES within key policy rather than a review of the entire Welsh saltmarsh governance regime. This paper presents an overview of the methodological approach undertaken to evaluate these 5 key pieces of Welsh national legislation, followed by a discussion of the findings. Finally, the paper highlights potential synergies and opportunities relating to the application of Ecosystem Approach, and the wider ES concept, to global coastal management and governance.

2. Ecosystem services and a changing policy landscape in Wales

This section presents a brief overview of the current governance landscape for natural resource management in Wales and introduces the Welsh national legislation that will be the focus of the paper.

There have been some improvements to the historically fragmented coastal governance in the UK, and across the devolved governments, through the Marine Strategy Framework Directive (2007), the enactment of the Marine and Coastal Access Act (2009), associated High Level Marine Objectives (HLMOs) and the ongoing marine planning processes [25]. In addition to the ongoing marine planning process and other UK and European policies and initiatives, Wales, unlike the other UK nations, has set additional policy drivers that it must adhere to. Building on initial commitments to sustainable development [67], and a long history of site-based conservation management under national (Westminster) legislation [1], Wales has enacted an innovative and unique suite of legislation. This evolution of Welsh national legislation signals the intention to move towards increasingly interdisciplinary, integrated and holistic approaches to societal challenges [16]. Following the enactment of the Government of Wales Act (2006), Welsh Government has a legal duty to support and promote sustainable

development, with Wales becoming one of the first countries to build this legal mandate into national legislation. This was recognised through the generation of the Welsh Sustainable Development Charter launched in 2009 [65,71], and the intention is further promoted through the five Acts focused on in this paper. On the global scale, integrated approaches to natural resource management are being aspired to across Europe, but there is limited evidence that this is being successfully delivered. This new suite of legislation positions Wales a step ahead of other nations in working towards realising these goals, providing a valuable opportunity for others to learn from the process.

Table 1 provides an overview of the key elements of this suite of new legislation, notably the Active Travel Act (2013), the Well-being of Future Generations Act (2015), the Planning (Wales) Act (2015), Environment (Wales) Act (2016), and the Historic Environment Act (2016). Collectively, this legislative portfolio emphasises the importance of building resilient governance and management systems in order to engender long-term sustainability; aspirations which are supported by the integration and connectivity between the Acts themselves. Further to the new legislation, the recent publication of the Welsh State of Natural Resources Report (SoNaRR) (2016) outlines not only the importance of ecosystem resilience, but also the need for greater focus on the coastal fringe ecosystems of the land-sea interface.

More broadly, the field of ES research has rapidly developed in recent years and is increasingly adopted as the most effective governance approach to managing natural environments and social-ecological interactions ([53,72,18,29]). Although ES as a concept has been widely accepted as the appropriate underpinning for decision-making frameworks for managing complex socio-environmental systems ([41,72]; Ruckelshaus et al., [54]; EC [24]), there are still surprisingly few evaluations of its practical application within a marine or coastal policy context [40], with existing studies commonly linked to terrestrial land use (e.g. [18,3,30,52]). Central to this review is the need to ensure the entire governance landscape is future-proofed, adaptive and flexible [26]. Due to the emphasis currently placed on the ecosystem service-based approach to natural resource management and governance, this

Table 1
Summary of the key points from the five focal pieces of Welsh national legislation [66,68,69,70].

Welsh National Act	Summary of Key Points
Active Travel (Wales) Act 2013	<ul style="list-style-type: none"> – Legal requirement for local authorities in Wales to map and plan for sustainable and active travel. – Creates new duties that consider the needs and provisions required by walkers and cyclists. – Aims to better connect critical infrastructure (e.g. workplaces, hospitals, shopping centres) to reduce reliance on cars. – Requires annual updates from Welsh Government regarding progress made on the implementation of the Act. (Welsh Government [68])
Environment (Wales) Act (2016)	<ul style="list-style-type: none"> – Positions Wales as a low carbon, green economy prepared to adapt to the impacts of climate change. – Encompasses a number of topics including: sustainable management of natural resources, climate change, waste reduction and management, fisheries, marine licensing, flooding and coastal erosion. – Mandates the preparation and implementation of a National Natural Resources Policy (under development). Welsh Government [70]
Historic Environment (Wales) Act (2016)	<ul style="list-style-type: none"> – Amends the pre-existing UK law providing legislative guidance for protecting and managing the historic environment (i.e. the Ancient Monuments and Archaeological Areas Act, 1979, and the Planning (Listed Building and Conservation Areas) Act, 1990. – Provides greater protection to listed buildings and scheduled ancient monuments in Wales. – Aims to improve sustainability of management of historic environments in Wales. – Will create greater transparency and accountability within relevant decision making. Welsh Government [68]
Planning (Wales) Act (2015)	<ul style="list-style-type: none"> – Aims to ensure fair, resilient planning that supports sustainable development. – Modernises the framework for delivering planning services, including allowing applications to be made directly to Welsh ministers. – Improves resilience by advocating collaboration between local planning authorities. – Enables an effective enforcement and appeals process. (Welsh Government [69])
Well-being of Future Generations (Wales) Act (2015)	<ul style="list-style-type: none"> – Aims to improve the social, economic, environmental and cultural wellbeing of Wales through the achievement of 7 national wellbeing goals. – Promotes more joined-up thinking to national wellbeing and decision making through the development of regional Public Service Boards (PSBs). – Establishes the role of a Future Generations Commissioner for Wales who is mandated as a steward for the interests of future generations in Wales. Welsh Government [69]

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