

Developing a participatory approach to the management of fishing activity in UK offshore Marine Protected Areas

Review of the current context of Adaptive Risk Management

Contents

1. Background & Introduction	2
1.1 What is Adaptive Risk Management?.....	2
1.2 Benefits of Adaptive Risk Management.....	4
1.3 How can we implement Adaptive Risk Management?.....	5
2. Legal framework	6
2.1 European legislation	6
2.2 National legislation.....	7
2.3 Legal application of ARM	7
3. Governance structures for fisheries management	7
3.1 Roles and responsibilities	7
4. Current uncertainties and assumptions	10
References	11



1. Background & Introduction

Our seas and oceans are an integral part of our history, economy and way of life. The UK Government and Devolved Administrations have jointly published the UK Marine Policy Statement¹ of a shared UK vision for clean, healthy, productive and biologically diverse seas and oceans.

To secure this vision, Defra's 25 year plan² states that in Secretary of State (SoS) waters³ they will 'Achieve good environmental status of our seas while allowing marine industries to thrive and complete our ecologically coherent network of well-managed marine protected areas (MPAs)'. An ecologically coherent network of well-managed MPAs is one tool which can help achieve Good Environmental Status⁴. Additionally, the plan highlights Defra's ambition for increased collaboration in regard to management by 'joining forces with local stakeholders to find the most appropriate ways of drawing down the riches of the sea in a sustainable way.' The importance of a project such as this to engage with sea users was also a key pillar highlighted in the 2017 Barber review⁵. 'Pillar 3 highlights that there are many areas of public expenditure where the active engagement of the user of a service or resource can make an enormous difference to improving outcomes, and that if this is neglected, then it can do much to frustrate the successful delivery of outcomes'.

In 2013 Defra set out the Revised Approach to the Management of Commercial Fisheries in European Marine Sites (EMS)⁶. This policy was later expanded to include [Marine Conservation Zones](#) (MCZ). This process outlined the overarching policy approach and key implementation steps to ensure that all existing and potential commercial fishing operations are managed to comply with Article 6 of the Habitats Directive and subsequently the Marine and Coastal Access Act 2009 (MCAA). This document provides a review of the current context of Adaptive Risk Management (ARM) in SoS waters in relation to fisheries assessment and management.

1.1 What is Adaptive Risk Management?

Adaptive management can be summarised as 'learning by doing' and adapting based on that learning. Williams & Brown (2018) state that 'Adaptive management addresses uncertainty about the processes influencing resource dynamics, as well as the elements of decision making itself'. The phrase "adaptive resource management" was first used over four decades ago (Walters & Hilborn, 1978), and since then multiple academic papers have considered the term (Holling, 1978; Walters, 1986; Prato, 2000, 2003, 2005; Williams & Brown, 2014), with the premise that adaptive management provides an appropriate framework for managing ecosystems where there are multiple sources of uncertainty.

As we improve our understanding of ecosystem responses to human interventions we have the opportunity to modify management actions accordingly. Adaptive management can increase the rate at which acquired knowledge aids management decisions and create a shared understanding among scientists, policy-makers, stakeholders and managers (Holling 1978; Prato, 2006, 2008).

¹ Available at: <https://www.gov.uk/government/news/uk-marine-policy-statement-published>

² Available at: <https://www.gov.uk/government/publications/25-year-environment-plan>

³ English inshore and offshore waters and Northern Ireland offshore waters

⁴ Information on the Marine Strategy Framework is available here: http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm

⁵ Available at: <https://www.gov.uk/government/publications/delivering-better-outcomes-for-citizens-practical-steps-for-unlocking-public-value>

⁶ Available at: <https://www.gov.uk/government/publications/revised-approach-to-the-management-of-commercial-fisheries-in-european-marine-sites-overarching-policy-and-delivery>

A set of Adaptive Risk Management (ARM) Principles developed and agreed by an informal Task and Finish group of delegates from a multi-disciplinary ARM workshop in January 2017, hosted by Natural England, states the following in relation to the appropriateness of ARM in the MPA management cycle:

'Given that fishing is an ongoing and evolving activity and that any assessment is by definition, a snapshot in time, it is important that a process exists to ensure that fisheries advice and management also continues to evolve in order to continue to contribute effectively to Marine Protected Areas (MPA) achieving/maintaining their conservation objectives. It is therefore important to recognise that ARM is not a substitute for assessment under the various statutory instruments that govern our MPAs, nor is it an experimental gap filling process in lieu of the relevant assessment process. ARM should therefore be predicated upon a robust and comprehensive assessment having taken place, the outcome of which should be management that is proportionate to the risks posed by the fishery and adequately precautionary in the face of uncertainty. ARM then entails a process of monitoring, reviewing and feeding back into ongoing management decisions both to ensure their ongoing suitability and to prevent unacceptable impacts from occurring.'

Managing natural resources in an adaptive manner involving users, scientific advisors and regulators is an established and well-documented process. Adaptive management is a tool which can support the ongoing monitoring and review of MPAs which takes place. The United States Department for the Interior⁷, have described adaptive management as “*exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions. Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable resource systems.*” Williams & Brown (2014, 2018) present Adaptive Management as a cycle with a double-loop (Figure 1), splitting uncertainty into two components, the system response to management (iterative phase) and the effectiveness of the decision-making architecture (deliberative phase). The deliberative phase is a planning phase in which the critical components of adaptive decision-making are formulated, whilst the iterative phase uses these elements in an ongoing cycle of learning.

⁷ [Adaptive Management Applications Guide](#) - April 2012 (US Department of the Interior)

Adaptive Management Cycle

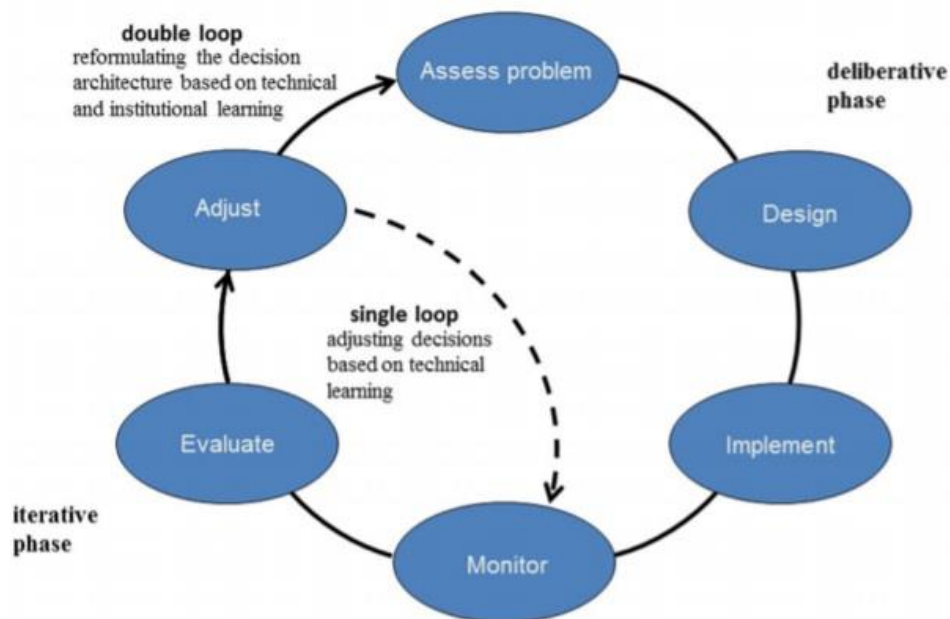


Figure 1: Steps in adaptive resource management (Williams & Brown, 2018)

1.2 Benefits of Adaptive Risk Management

Sedimentary habitats in offshore waters are economically important areas for both licensed and unlicensed activities and have significant ecological value for their ecosystem service provision. Consequently, multiple European and national MPAs have been designated for a range of sedimentary habitats to ensure their protection. However, there are many challenges associated with successful management in a dynamic marine environment. Managing fisheries in a proportionate and non-discriminatory manner and in accordance with the prevailing regulatory framework in an environment where there is uncertainty is particularly challenging. Uncertainty can exist for several reasons, but in offshore sedimentary habitats such as sandbanks, it is often related to an incomplete understanding of the impacts of fishing activity on mobile sedimentary habitats.

Consideration of risk and uncertainty are often key factors in management decision making. It has been stated that when critical uncertainty exists in conservation management, adaptive management offers a rigorous and intensive process to develop, trial or test multiple effective management options (Walters & Hilborn, 1978; Cook *et al.*, 2016).⁷ Uncertainty is a key challenge due to the difficulty in accurately determining ecosystem states and predicting the outcomes of management actions (Prato, 2006).

In SoS waters, based on current knowledge regarding the potential impacts of activities and in light of uncertainty and evidence gaps, under the common fisheries policy, managers have proposed a zonal approach to managing sedimentary features in offshore MPAs to reflect the overall uncertainty surrounding extent of risk. In delineating the zones, attempts are made to strike a balance between minimising risk to achieving the site's conservation objectives whilst not disproportionately impacting the fishing industry where the evidence of impacts is uncertain.

The process of adaptive management aims to utilise the fact that levels of uncertainty can change over time. As we reduce uncertainty, measures could be *adapted* in the future to achieve better conservation outcomes and to maximise sustainable use. Uncertainty can be present in both the deliberative phase and the interactive phase. There are various reasons why management in MPAs might need to be adapted due to a change in uncertainty, including (but not limited to) the following:

- New information on feature extent/distribution;
- New information on level/type of activity occurring;
- New information on feature condition evidence (e.g. from site monitoring surveys) or wider evidence relating to fisheries impacts (e.g. scientific literature)

Adaptive management is therefore an appropriate mechanism to ensure that any changes in our understanding can be fed back into the decision-making process.

1.3 How can we implement Adaptive Risk Management?

As stated by Armitages *et al.*, (2007) there is often a learning paradox. Whilst emphasis is placed on the importance of learning, there are ongoing struggles to learn from experience and respond to complex social-ecological conditions. To address this, the project aims to explore a participatory process for establishing, evaluating and adapting fisheries management measures in offshore MPAs. Through active stakeholder participation, the project aims to consider when and how a change in uncertainty should feed into ongoing management decisions.

As the MPA management cycle includes decisions at each stage requiring information, there is the opportunity to *adapt* the management of activities depending on progress towards the features attaining their conservation objectives. With the ongoing monitoring of status and monitoring of effective management within the MPA cycle, the potential exists to introduce information at any of the key points in the ARM cycle (Figure 1). Although regulators, scientific advisors and stakeholders all have a role in the MPA management process, the exact role each plays in informing decisions is not always clear. This project proposes to address a number of outstanding questions to enable the implementation of an effective approach to adaptive management.

1. Who needs to participate in decision-making, what is their role/remit, and what steps are important to wider stakeholder participation?
2. What information is required and in what format, to make decisions regarding management?
3. How do the parties bring their information to the decision-process?
4. Where does uncertainty impact and/or impede the process, and is there any mitigation available?
5. How do we embed a truly collaborative approach/mind set between stakeholders?

Answering these question forms part of the deliberative phase for developing a framework and associated guidance for adaptive management.

Example of Adaptive Risk Management in a native oyster fishery

The MCAA places a clear duty on Inshore Fisheries and Conservation Authorities (IFCA) to sustainably manage sea fisheries resources in their Districts to the 6nm limit and to protect marine ecosystems from the impact of fishing. They are required to ensure effective management of marine habitats in the inshore area. This includes amongst other things activities such as recreational sea angling, bait digging and seaweed gathering which were previously not regulated by Sea Fisheries Commission. IFCA's have a duty, under Section 154 of the Act, to further the conservation objectives of MCZs and will be expected to introduce byelaws regulating fishing activity where necessary. In order to sustainably manage sea fisheries resources, IFCA's will need to gather evidence, evaluate options, propose management solutions and, where necessary, develop and agree byelaws. They will also need to evaluate outcomes and review the effectiveness of any action taken.

Under sections 155 and 156 of the MCAA 2009, the Sussex IFCA has introduced the Oyster Permit Byelaw which establishes a permit-based system for the commercial exploitation of native oyster stocks by dredging ([Oyster-permit-byelaw.pdf](#)). The Byelaw provides a responsive adaptive management for oyster fisheries and supports the development of sustainable fisheries through catch restrictions and gear configuration through permit conditions. Section 20 of the byelaw sets out the flexible permit conditions. New conditions are reviewed at least once every 12 months from the date of introduction, and all permit conditions no less than once every four years. The authority is required to consult with stakeholders, organisations and persons whose interests are likely to be affected by any change in the flexible permit conditions. Decision on the flexible permit conditions are based upon the consultation responses and consider information such as data collected from permit holders, scientific and survey data gathered, impact assessments of proposed changes and advice from SNCBs such as Natural England.

2. Legal framework

The legal mechanism for Government(s) to designated MPAs are:

2.1 European legislation

Directives are statutory instruments adopted by the European Union that bind all Member States. They are binding as to the results to be achieved but give flexibility to Member States over the means used to achieve those results. In relation to wildlife and nature conservation, the key directive which provides for the protection of animal and plant species of European importance and the habitats which support them, applicable to UK Offshore waters, is Directive 92/43/EEC⁸ of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. This Directive is transposed into UK law as the '[Habitats Regulations](#)' and enables the establishment of a network of protected sites, called [Natura 2000 network](#). [Special Areas of Conservation \(SACs\)](#) and [Special Protection Areas \(SPAs\)](#) are designated under the transposed EC Habitats Directive for habitats and species listed in Annex I and II of the Directive. SACs with marine components are sites that contain [qualifying marine habitats or species](#).

⁸ Available at:

http://ec.europa.eu/environment/nature/info/pubs/docs/others/ECJ_rulings%20Art_%206%20-%20Final%20Sept%202014-2.pdf

2.2 National legislation

The [Marine and Coastal Access Act 2009⁹ \(MCAA\)](#) gained Royal Assent on 12th November 2009 and provides the legal mechanism to help ensure clean, healthy, safe, productive and biologically diverse oceans and seas by putting in place a new system for improved management and protection of the marine and coastal environment. The Marine Act, which mainly applies to England and Wales (with equivalent legislation in place for Scotland and Northern Ireland), comprises eight key elements, including powers which enable the designation of MCZs in the territorial waters adjacent to England and Wales and UK offshore waters. The Act created both the Marine Management Organisation (MMO) and Inshore Fisheries and Conservation Authorities (IFCAs), granting powers to these organisations in relation to the implementation of, and compliance with, any fisheries management measures.

2.3 Legal application of ARM

Government and Fishery Regulators in England (the MMO and IFCAs) are the competent authorities responsible for managing fishing in Marine Protected Areas. This includes existing fishing activities. The MMO and IFCA's are obliged to ensure that activities which could adversely affect the conservation objectives for the MPAs are managed in a manner that ensures compliance with the requirements of Article 6 of the EU Habitats Directive or under Section 154 of the MCAA.

3. **Governance structures for fisheries management**

The approach and responsibility for conservation and management in English/SoS waters varies depending upon location. As of 2018, Marine Protected Areas which fall outside the UK's 12 nautical mile limit are exclusively managed under the EU Common Fisheries Policy (CFP). In accordance with [Articles 11 and 18](#), requests for management have been developed jointly between the UK Government and any Member States with a direct management interest in the area affected. The MMO are the lead authority regarding the implementation of, and compliance with, any fisheries management measures. Within 6nm, the MCAA places a clear duty on IFCAs to sustainably manage sea fisheries resources in their Districts and to protect marine ecosystems from the impact of fishing under Section 153. Statutory nature conservation bodies provide advice to government and regulators on Conservation Objectives and activities that may impact the achievement of these¹⁰.

3.1 Roles and responsibilities

Marine Management Organisation (MMO)

- The MMO is an executive non-departmental public body, sponsored by DEFRA, created by the Marine and Coastal Access Act. The MMO acts as the competent marine planning authority on behalf of UK Government, delivering marine functions in English territorial waters and UK offshore waters (for matters that are not devolved) such as marine licensing and enforcement of marine legislation. The MMO is responsible for regulating most activities and enforcing sea fisheries, nature conservation measures and licensing legislation.

⁹ Available at: <https://www.legislation.gov.uk/ukpga/2009/23/contents>

¹⁰ Roles and responsibilities available under Resources at <https://jncc.gov.uk/our-work/mpa-adaptive-management-outputs/>

Inshore Fisheries and Conservation Authorities (IFCAs)

- Created under the Marine and Coastal Access Act, reflecting a greater responsibility for conservation of the marine environment in conjunction with fisheries management and enforcement duties in England. Their purpose is to lead, champion and manage a sustainable marine environment and inshore fisheries, by successfully securing the right balance between social, environmental and economic benefits to ensure healthy seas, sustainable fisheries and a viable industry. IFCAs are either committees or joint committees of the local authorities that fall within an IFC district, there are a total of 10 IFCAs. They are tasked with the sustainable management of inshore sea fisheries resources in their local area. They are made up of representatives from the constituent local authorities (who provide funding for the IFCA) along with people from across the different sectors that use or are knowledgeable about the inshore marine area, such as commercial and recreational fishermen, environmental groups and marine researchers, who offer their time voluntarily.
- Sections 155 of the MCAA gives Inshore Fishing Conservation Authorities the provisions for the creation of byelaws. Section 156 of the 2009 Act sets out a non-exhaustive list of the types of activities for which IFCAs may make byelaws (including emergency byelaws) to manage sea fisheries resources in their district. Provisions that may be made by a byelaw include prohibiting or restricting the exploitation of sea fisheries: (a) in specified areas or during specified periods; (b) limiting the amount of sea fisheries resources a person or vessel may take in a specified period.

Department for Environment, Food and Rural Affairs (Defra)

- Defra is the government department responsible for marine environmental protection, and fisheries in the UK. The Secretary of State is responsible for confirming and revoking byelaws and initiating hearings.¹¹

Natural England (NE)

- Natural England was vested through the [Natural Environment and Rural Communities \(NERC\) Act 2006](#) and is the government's statutory adviser on nature conservation out to 12nm in English waters. Both the Habitat regulations and the Marine and Coastal Access Act requires regulators to consult the advice of Natural England regarding how any conservation objectives stated for an MPA may be furthered, or how the achievement of any such objectives may be least hindered, and how any impacts may be mitigated.

Joint Nature Conservation Committee (JNCC)

- JNCC has responsibility for the provision of nature conservation advice in the offshore¹² area. JNCC is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation. JNCC is also legally constituted through the [Natural Environment and Rural Communities \(NERC\) Act 2006](#). In relation to MPA management, JNCC's specific responsibilities for offshore marine nature conservation are set out in the [Conservation of Offshore Marine Habitats and Species Regulations 2017](#), [Offshore Marine Conservation \(Natural Habitats, &c.\) Regulations 2007](#), and the [Marine and Coastal Access Act 2009](#).

¹¹ Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/182343/ifca-byelaw-guidance.pdf

¹² 'Offshore' is defined as beyond 12 nautical miles (nm) from the coastline to the extent of the United Kingdom Continental Shelf (UKCS).

Table 1. Roles and responsibilities for the project governance

Body	Roles	ARM Responsibilities	Role in project
Marine Management Organisation (MMO)	Regulator	Decision maker – design and enforcement of measures	Project partner
Joint Nature Conservation Committee (JNCC)	Scientific Adviser	Advise on impacts of fishing and condition of features	Project partner
Natural England (NE)	Scientific Adviser	Advise on impacts of fishing and condition of features	Project partner
Bangor University	Scientific institution	Development of scientific models to assess the effectiveness of measures	Project partner
NFFO	Stakeholder - Fishing representative	Represent fishing interests in decision making. Co-ordinate input of fisheries information to support decisions	Project partner/Regional Stakeholder Groups
Department for Environment, Food and Rural Affairs (Defra)	Government	Policy makers	Project Advisory Group
Inshore Fisheries and Conservation Authorities (IFCAs)	Regulator	Decision maker – design and enforcement of measures	Project Advisory Group
Environmental NGOs	Stakeholder	Represent environmental interests in decision making.	Regional Stakeholder Groups
International Fishing Industry	Stakeholder – International fishing representative	Represent fishing interests in decision making. Co-ordinate input of non-UK fisheries information to support decisions	Project Advisory Group/ Regional Stakeholder Groups
National Fishing Industry	Stakeholder - Fishing representative	Represent fishing interests in decision making. Co-ordinate input of fisheries information to support decisions	Project Advisory Group/ Regional Stakeholder Groups
Local Fishing Industry	Stakeholder - Fishing representative	Represent local fishing interests – data providers	Regional Stakeholder Groups
Producer Organisations	Stakeholder - Fishing representative	Represent fishing interests in decision making. Co-ordinate input of fisheries information to support decisions	Regional Stakeholder Groups
SeaFish	Non-Departmental Public Body	Represent fishing industry through promotion of a sustainable catching sector	Project Advisory Group

4. Current uncertainties and assumptions

It is important to identify and clearly articulate the project scope and therefore its expectations. The objective of the project is to establish a potential process for future adaptation of management. It is not designed to influence any existing processes to develop management measures or to amend measures already in place. In particular, it is important to ensure there is no confusion regarding the case study sites. While the outputs from the current project may facilitate better informed and supported decision making in any future review of management within the case study sites, it will not influence the outcome of existing proposals for management.

In UK waters, the following are the most common causes of uncertainties in relating to management:

1. Information pertaining to the protected features: Information on features extent and distribution can be limited as offshore surveys and habitat mapping is resource intensive. Modelled & predictive maps are key resources, however as the marine environment is dynamic and features extent can be mobile, this means that mapping products are not static and often need to be updated to reflect changes in knowledge/information of feature extent and distribution and are refined as survey data becomes available.
2. Information regarding activities occurring within, or in vicinity of protected features: limited or lack of information on the spatial distribution and level of activity is a large contributor to uncertainty.
3. Information and understanding of the interaction between features and gear types and the resulting effects can vary.
4. Gaps in data and other evidence can also hinder the decision-making process. Identifying if features are attaining or progressing towards attaining their conservation objectives can be a large cause of uncertainty which is depending upon information on feature sensitivities and condition from monitoring.
5. There remains several uncertainties and assumptions in relation to EU Exit. Legislation¹³ was introduced to Parliament in October 2018 laying out how fisheries will be managed after the UK leaves the EU, covering negotiating access to UK waters for foreign vessels, setting of fishing opportunities, and protection of the marine environment. On the latter, the Bill proposes to extend byelaw making powers to the MMO and Devolved Administrations, meaning fisheries management measures for conservation purposes (e.g. MPAs) in offshore waters would be introduced through byelaws rather than through the EU Common Fisheries Policy. However, there is still uncertainty surrounding how long the UK will remain under CFP in relation to a transition period and regarding access for non-UK fisheries with potential implications for the current process to agree joint recommendations for MPA management with other Member States.

¹³ Available at: <https://services.parliament.uk/Bills/2017-19/fisheries.html>

References

Armitage, D., Marschke, M. & Plummer, R., (2007). Adaptive co-management and the paradox of learning. *Global Environmental Change* 18:86-98

Cook, C. N., de Bie, K., Keith, D. A., & Addison, P. F. E., (2016). Decision triggers are a critical part of evidence based conservation. *Biological conservation* 195:46-51

Holling, C. S. (ed), (1978). *Adaptive environmental assessment and management*. Wiley, Chichester, UK

Prato T (2000) Multiple attributes Bayesian analysis of adaptive ecosystem management. *Ecological Modelling* 133:181–193

Prato, T. 2003. Adaptive management of large rivers with special reference to the Missouri River. *Journal of the American Water Resources Association* 39(4):935–946.

Prato, T., (2006). Adaptive management of national park ecosystems. *George Wright Forum* 23:72–86.

Prato, T., (2008). Adaptive management for natural parks: Considerations for an experimental approach. *PARKScience* 25:1

Walters, C. J., (1986). *Adaptive management of renewable resources*. Blackburn, Caldwell, NJ

Walters, C. J., Hilborn, R., (1978). Ecological optimization and adaptive management. *Annu Rev Ecol Syst* 9:157–188

Williams, B.K. & Brown, E. D., (2014). Adaptive management: From more talk to real action. *Environ Manag* 53:465–479

Williams, B. K. & Brown, E. D., (2018). Double-Loop Learning in Adaptive Management: The Need, the Challenge, and the Opportunity. *Environ Manag*, p1-12