

EH ALSF PROJECT NO. 5737

**International Marine Aggregates Management Strategic
Review: Main Report**

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ENGLISH HERITAGE

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Executive Summary

This report compares the marine element of the UK Aggregates Levy Sustainability Fund (ALSF) historic environment programme with other international management policies relating to heritage assets, in the context of the international marine aggregates industry.

The report identifies by comparison the distinctive value of marine historic environment involvement in the ALSF alongside other forms of heritage management policy or practice currently applied in other nations that might be successfully applied in the UK in relation to marine heritage sites impacted by aggregate extraction.

The report also identifies issues addressed by ALSF projects that have the potential for delivering 'added value' for other areas of marine planning and development, and promotes the international leadership role of the UK in the innovative management of marine heritage sites.

The report concludes that, when compared to the different types of federal and centralised aggregates-related heritage management in use around the world, the ALSF is an exceptional scheme that has driven proactive, collaborative research of benefit to all stakeholders. The ALSF is a model of innovative heritage management, involving as it does peremptory public and private sector collaboration in the provision of strategic management of, and guidance upon, resources of benefit to all sectors, rather than relying on reactive management and/or burdensome federal and state controls.

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The History of the Aggregates Levy

The introduction of the Aggregates Levy ('the Levy') was first announced in the Chancellor of the Exchequer's March 2000 Budget Statement, although consultation on the Levy had begun as early as 1997 after the Labour Party came to power in May of that year¹. The Levy was formally introduced on the 1st April 2002, initially as a two-year pilot scheme. Following a three-year renewal, a further one-year extension was announced in the pre-Budget Statement of December 2006². A review of the Levy undertaken in 2008 indicated the intention of HM Treasury to extend the Levy until at least 2011³.

The Levy's intended purpose is to address the environmental costs associated with quarrying not already covered by regulation (including noise, dust, visual intrusion, loss of amenity and damage to biodiversity). HM Revenue and Customs run the Levy in partnership with HM Treasury and the Department for Environment, Food and Rural Affairs (Defra). It employs the 'polluter pays' principle⁴, and from the outset the intention was to provide a 'Sustainability Fund' ('the ALSF') drawn from the Levy to finance work relieving the environmental impacts of past, present and future aggregate extraction in both the terrestrial and marine zones.

The ALSF is distributed on behalf of Defra by, amongst other bodies, English Heritage (EH), including a specific 'ring-fenced' allocation for solely marine initiatives distributed by EH and the Centre for Environment, Fisheries and Aquaculture Science (CEFAS)⁵. The total Defra ALSF disbursement was £142.1 million over the financial years 2002 to 2008, and will amount to an additional approximately £72m across the financial years 2008 to 2011 (c. £24 million pa)⁶. A proportion of this Sustainability Fund has consistently been used to support work designed to better understand and protect the historic environment: between 2002 and 2008 the ALSF funded over 250 projects involving the historic environment to a total value of over £23.1m⁷; between 2008 and 2011 EH is anticipated to disburse an additional £4.5m, c. £1.5m pa⁸.

During the ALSF 'pilot scheme' (2002 to 2004) the ALSF had the following objectives set by Defra: [1] minimising the demand for primary aggregates, [2] promoting environmentally friendly extraction and transport, and [3] reducing the local effects of aggregates extraction (becoming in April 2005 'addressing the environmental impacts of past aggregates extraction'). In March 2005 the wording of Defra's third objective was changed and a fourth objective added: [4] to compensate local communities for the impacts of aggregates extraction.

EH supported projects that delivered against Objectives 2 and 3, the goal of the EH ALSF scheme being to reduce the impact of aggregate extraction on the historic environment, both terrestrial and marine. EH was particularly interested in supporting projects designed to develop the knowledge, understanding and appreciation of sites, monuments, buildings and landscapes that have been, or may be in the future, affected by aggregate extraction⁹. EH also provided financial assistance towards the excavation, analysis or dissemination of unforeseen archaeological remains encountered during developer-funded excavation in advance of aggregate extraction (provided that normal planning procedures had been adhered to). ALSF funds were also used by EH to bring about sustainable improvement in practice in the sector¹⁰.

In January 2008 a consultation on the future priorities for and delivery of the ALSF proposed that for the period from April 2008 to March 2011 the ALSF should focus on 'reducing the environmental footprint of aggregates production and delivering benefits in areas of extraction'¹¹. Five overarching themes decided by Defra were to be followed: [1] quarries, [2] marine, [3] resource use, [4] transport and [5] communities. As of April 2008, EH distributes funding specifically against themes 1 and 2, its dedicated research focus within this being to: 'respond to the gaps identified in the benchmark reports (especially those related to improving the 'environmental performance' of the aggregates sector) and 'dissemination... built on the arrangements developed during 2007-08 so that research results are targeted to where real improvements can be made'¹². 'Strategic research' is also funded in order to 'underpin the long-term planning of sustainable aggregates supply', overseen at the strategic level jointly by Defra and CLG and allocated an additional £1m pa¹³.

UK Heritage Practice and Policy

Prior to the introduction of the ALSF in April 2002 there were few large historic environment research projects undertaken in the UK for which funding came from the public sector. European Union (EU) funding, in partnership with agencies like EH, has paid for projects such as Historic Landscape Characterisation¹⁴ (HLC) (undertaken in line with the European Landscape Convention)¹⁵. A patchwork of university and local amateur society research was ongoing, often on single sites and often over many years. As for nationwide or regional-scale research into the historic environment, two of the few strategic assessments of UK heritage were the 'Monuments at Risk'¹⁶ and the 'England's Coastal Heritage'¹⁷ surveys of the mid 1990s, assessing the state of surviving sites and monuments. In terms of public involvement, the Heritage Lottery Fund (HLF) comprised the most significant 'public sector' source of funding¹⁸. As a result, many ongoing historic environment projects began to tailor their aims and objectives to match the funding criteria of the HLF. Beyond EU and HLF funds, projects that were grant-aided by EH dominated in the domestic marine historic environment.

Case Study: the Protocol for the Reporting of Finds of Archaeological Interest

Prior to the introduction of the ALSF there was considerable reliance in the marine zone on voluntary codes of practice, in particular the Joint National Archaeology Policy Committee's (JNAPC) *Code of Practice for Seabed Developers* (1995, revised 2006 by the Crown Estate and the JNAPC)¹⁹.

A major achievement of the ALSF has been the introduction of the joint BMAPA (British Marine Aggregates Producers Association) and EH Guidance note *Marine Aggregates and the Historic Environment*, published in 2003²⁰. This was the marine aggregate industry and EH's proactive response to an identified policy gap, and led on to a comprehensive reporting protocol and implementation service (the *Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest*), in which BMAPA members made a commitment to implement this Code voluntarily across all operations²¹.

The introduction of the Protocol was accompanied by an Awareness Programme, implemented by Wessex Archaeology and funded by the ALSF, to raise awareness and provide guidance on how to identify and deal with artefacts retrieved during the extraction process. The programme included visits by archaeologists to wharves and vessels, regional workshops on finds recognition, a pilot newsletter and a DVD training package. Following the success of the initial 2005-06 Awareness Programme, an extension to the programme was granted in 2007/08.



Photo from an awareness programme workshop (Image © Wessex Archaeology)

A range of archaeological material has been reported so far, including organic remains, such as wood, peat, bone and antler; struck flint, and the remains of World War II aircraft. The reported finds represent a valuable source of information for understanding the nature, date and distribution of prehistoric settlements within the submerged prehistoric landscape, as well as representing a record of subsequent historic and cultural events, and have the potential to inform the results of other research projects.

The introduction of the Protocol has been well received by the industry. The protocol's principal achievements lie in an increased archaeological understanding and awareness within industry and the participation of everyone involved in the aggregate dredging process. The success of the Code, Protocol and the working relationships between industry and heritage operatives have subsequently led to the incorporation of these requirements into dredging permissions by the Crown Estate²².

The BMAPA Protocol project exemplifies the positive and mutual benefits of good collaboration between industry and archaeologists, and in doing so, helps to achieve a more informed and efficient regime for managing the historic environment.

The legislative situation prior to (and to a major extent after) the introduction of the Levy was complicated by the different approach to management, including heritage management, in the marine and terrestrial zones. As discussed below, in the marine zone regulation is based on environmental protection law (not property law like in the terrestrial zone), and there is no system comparable to that on land that would allow the operation of development-led work on the historic environment²³.

The marine management situation was exasperated by problems of securely identifying (and repetitively establishing) historic site locations in the marine zone, together with a lack of knowledge of the total extent and significance of submerged cultural materials. A major success of the ALSF has been in funding survey/mapping

projects that assist in historic site identification, acquisition and re-acquisition, modelling and monitoring, effectively removing this 'data barrier' to successful proactive marine project planning²⁴.

The disparity between terrestrial and marine historic environment management was partly resolved in 2002 when, simultaneous to the introduction of the Levy and ALSF, the National Heritage Act (2002)²⁵ amended the National Heritage Act (1983) and the Ancient Monuments and Archaeological Areas Act (AMAAA) (1979)²⁶ to extend EH's remit into the Territorial Sea (i.e. from mean low water out to the 12 mile limit).

Within the reforms of the National Heritage Act (2002) came further recognition of the need for Government to expand the management of the marine historic resource as a necessary step towards a unified consent process, sustainable development, integrated management, and the application of a precautionary principle in development and stakeholder involvement. This is the principle of Integrated Coastal Zone Management (ICZM)²⁷, an approach that is central to the UK's coastal planning strategy²⁸. Non-ALSF derived funding of coastal surveys in response to the occurrence or prediction of the impact of climate change has assisted heritage involvement in ICZM. A series of EH-sponsored 'Rapid Coastal Zone Assessment Surveys' were initiated along the coasts of Norfolk, Suffolk, Essex and North Kent between 1999 and 2004; the programme has since been extended and is either complete or now underway for all areas of England²⁹. The ICZM programme has in turn fed into a series of EH standards and historic environment guidance documents on coastal change and management produced over the past few years³⁰.

Marine Heritage Management and the Aggregates Industry – United Kingdom

In order to understand the international context of marine historic environment management in relation to aggregates, it is important to appreciate the distinctive circumstances of the UK marine historic environment. The most significant of these circumstances is the fact that the UK is reliant on marine-sourced aggregates to a far higher degree than virtually any other nation in the world. A small and isolated island landmass, a distinctive and highly varied sub-regional geology, early industrialisation and a resultant high population primarily living in intensely developed urban and suburban environments all lead to a significant and ongoing demand for marine-source aggregates in the UK (although this reliance is highly variable between different regions dependent on their geology and infrastructure). In addition, the UK has a long history of both extensive and *intensive* marine zone development, much greater than that of many other nations (even near EU neighbours sharing in some cases adjoining territorial sea-zones). This development takes the form of fishing, mining and other forms of resource extraction, energy development, pipe and cable-laying, port and harbour development (including channel dredging) and defence infrastructure.

CLGs' Minerals Planning Guidance Notes and their replacement Minerals Policy Statements set out the government's policy on minerals and planning issues. These provide advice and guidance to local authorities and the minerals industry on policies and the operation of the planning system with regard to minerals³¹. This includes specific mention of cultural as well as natural heritage. Of particular relevance to this discussion are Marine Mineral Guidance 1 (MMG1): *Extraction by Dredging from the English Seabed* (2002) (which provides a statement of the Government's policies on the extraction of marine sand and gravel and other minerals from the English seabed)³² and Marine Mineral Guidance 2 (MMG2): *the Control of Marine Minerals Dredging from British Seabeds* (2007) (which provides advice on those aspects of the development control system of particular relevance to minerals and on the preparation and determination of applications)³³. CLG's *Final Regulatory Impact Assessment: the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations* (2007) is then the transposition of Directives to, and regulation of, marine minerals dredging in the proposed area³⁴. This document also transposes into UK law the requirements of the European Community Directives on the assessment of the effects of certain public and private projects on the historic natural and cultural environment (the EIA Directives) (see discussion below). Scotland and Wales have introduced equivalent regulations³⁵.

Traditionally, there has not been any statutory control of marine dredging in the UK. The Crown Estate owns most of the seabed and issues commercial licences to dredge for marine minerals³⁶. To obtain a licence, companies who have been successful in a tender round run by The Crown Estate must obtain a 'Dredging Permission' from the Government, a procedure including the submission of an Environmental Impact Assessment (EIA) alongside a range of wider scoping and coastal impact studies. If a favourable Dredging Permission is granted, the Crown Estate issues the applicant with a Production Licence³⁷. This proactive management regime has an 'environment first' setting of regulations. Aggregate companies – indeed, all marine zone developers – have even higher hurdles to jump to gain permission for works than occurs on land. Heritage is one component taken into consideration in this regime.

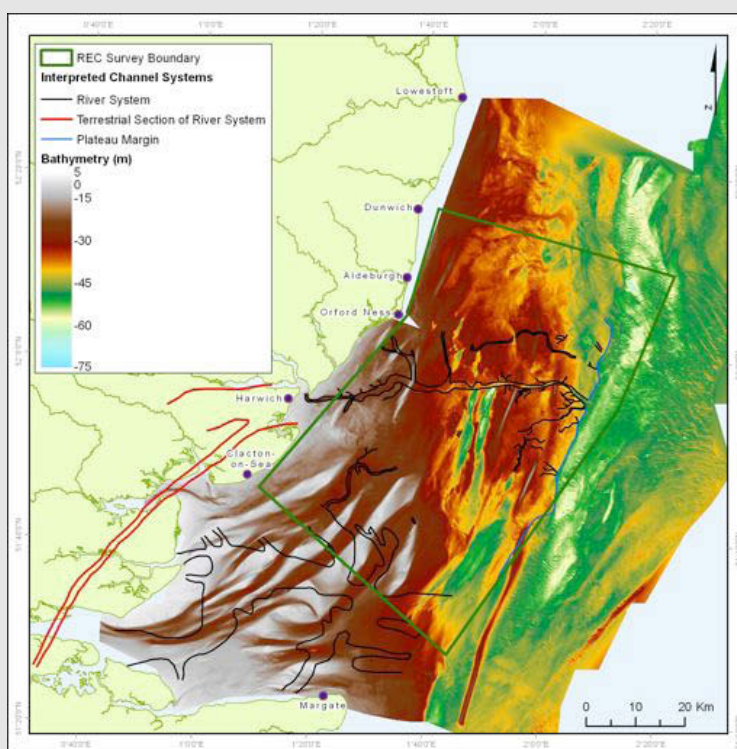
EH (as an Executive Non-Departmental Public Body and the Government's statutory adviser on the historic environment, advising the Department of Culture, Media and Sport (DCMS)), has been collaborating more and more closely with other Department's Non-Departmental Public Bodies (e.g. CLG, Defra, the Environment Agency) in the combined management of terrestrial/marine natural/cultural heritage. For example, EH sits on the Marine Aggregate Regulatory Advisory Group with Natural England, the Joint Nature Conservation Committee and CEFAS. The group regularly provide information and collaborative responses to 'industry' on a range of

environmental issues, sharing information and collaborating to ensure the protection of both the natural and historic marine environment during the licensing of aggregate extraction. Similar types of collaborative working are also undertaken at the local government level in the integrated management of cultural/natural resources.

Case Study: the Regional Environmental Characterisation Programme

The wider (i.e. non heritage-specific) marine ALSF programme in which EH have been involved as a partner has been moving since the outset of the ALSF towards a more interdisciplinary approach to research, in order to make best use of resources and deliver added-value not just to marine aggregates research, but to wider research outcomes.

An interdisciplinary approach to research is visible in many ALSF funded projects, but most of all in the 'Regional Environmental Characterisation' (REC) programmes, where some £10m of ALSF funds have been used to support broad-scale regional marine mapping. The aim of the REC surveys is to acquire data of the highest quality and detail possible. This enables broad scale characterization of seabed habitats within the regions, both their biological communities and potential historic environment assets. REC's were conducted along the South Coast, the Outer Thames, the East Coast and the Humber between 2007-2009³⁸.



Interpreted channel systems of the Outer Thames Estuary³⁹ (Image © Emu Ltd.; SeaZone bathymetry data © British Crown and SeaZone Solutions Ltd. Product Licence 052008.012. All rights reserved)

Through such programmes, the natural and historic environment communities draw ever more closely together, biologists and geologists on the one-hand thinking about links and project crossover with heritage interests, and the heritage community thinking likewise. In most cases the sites and primary data requirements are the same; it is just a matter of how such data can be processed at the secondary level to achieve research-specific outputs.

The Outer Thames Estuary REC, for example, published in July 2009, identifies both prehistoric submerged landscape data as well as evidence of historic shipwrecks that can be cross-referenced with the UK Hydrographic Office wreck records, as well as both site and region-specific natural environment data, models and outcomes⁴⁰. The project identified a large palaeo-land surface (1,500 km²) and channel system dating to 720,000 BP onwards, in close proximity to the earliest known occupation sites in Britain. These are finds of the highest significance to the understanding of the early occupation of the British Isles. Such land surfaces and channels have the potential to inform marine zone users and managers about the nature and rate of environmental change as well as potentially preserving actual archaeological material and sites.

The Outer Thames Estuary REC report concludes that 'a new approach to the submerged heritage be developed in this area and monitoring plans should now reflect the significance of the findings of this study'⁴¹.

At the time of writing in late 2009 one large revision to the legislative and framework under discussion is currently underway, the Marine and Coastal Access Act (MCAA) (2009)⁴². This passed into Statute in late 2009 and has a number of proposals that impact on the management of both marine aggregates and the historic environment⁴³. These proposals include the creation of a strategic marine planning system overseen by a new Marine Management Organisation (MMO)⁴⁴, the revision of the existing marine licensing system⁴⁵, and the establishment of a network of marine protected areas in UK waters. In particular, a consultation running across late 2009 and early 2010 reviews proposed plan areas within the English Inshore and English Offshore zones, assisting the MMO in deciding which zones it should take into account when deciding the order in which to develop marine plans for each area⁴⁶. Working alongside the ALSF, the Act will further intermesh the management of the marine historic and natural environments within its new regulatory regime.

Marine Heritage Management and the Aggregates Industry – Centralised Governments

Nations with centralised heritage management systems akin to those of the UK are generally more proscriptive than federal states like the US and Australia. In the UK, heritage management effectively functions in support of, rather than opposition to, the planning development system; in comparison, several other EU member states effectively proscribe against all development through the blanket protection of (and thus assertion of State ownership of) all types of cultural heritage, both portable and monumental. This is the case in for example Greece, Italy, Sweden and Denmark, as well as non-EU European nations such as Norway and Switzerland.

The example of Denmark compares neatly with the UK. A plan for a quarry, either on land or in the marine zone, is subject to an Environmental Impact Statement (EIS), including impacts on the historic environment alongside the natural environment. Proactive work akin to that funded by the ALSF is only derived from the ongoing internal funding of the Heritage Agency of Denmark (the equivalent to EH and part of the Danish Ministry of Culture, the equivalent of DCMS), and has mainly focused on identifying parameters for zones with a high potential impact upon the historic environment of both the terrestrial and marine zones. Only in 2006 did the types of innovative, collaborative projects commonly funded by the ALSF begin to be developed, when the University of Southern Denmark joined forces with the Heritage Agency of Denmark, a regional museum and a large construction contractor to write an application for research funds addressing the potential, the risks and pressure and innovative approaches for mitigation on the West coast and the North Sea.

The example of the Netherlands offers another interesting case study where levies on aggregates extraction are due, but the political preference has always been to treat that money as general tax income, rather than providing an environment-specific project fund akin to the ALSF. Over the past decades the Dutch State Service for Archaeological Heritage Management (ROB) occasionally conferred with the organization of dredging operators (VBKO) to formulate heritage management policy in the marine zone. However, even though such consultation occasionally led to the sponsorship of some specific activities, this purely voluntary line was not very successful. However, it did contribute to an increase in general public awareness of the impact of aggregates extraction upon heritage resources. Most aggregates management continues to be undertaken on a case-by-case basis at the local government level, mostly those with responsibility for large areas of aggregate extraction like the Westerschelde, the Rotterdam area and the regional offices of the national water, roads and security authority (Rijkswaterstaat). Together, these organisations have sponsored larger projects such as the 'Innovative Measurements of Sunken Objects' (IMAGO) project of 2001-03⁴⁷. On the basis of such predictive research they have entered into extensive negotiations with industry on integrated planning and mitigation of activity at aggregate extraction sites, resulting in Memorandums of Understanding.

The European Union

The EU primarily protects cultural heritage as a part of wider trans-national marine planning. In part, this is to do with the EU preferring to defer to member states' own practices as regards the management of cultural heritage due to the extent of trans-national variation in this respect⁴⁸. The EU's Marine Strategy Framework Directive (2008/56/EC) (2008) (MSFD) establishes a framework for community action in the field of marine environmental policy. Point (3) of the directive states that 'the marine environment is a precious **heritage** that must be protected, preserved and, where practicable, restored with the ultimate aim of maintaining biodiversity and providing diverse and dynamic oceans and seas' (author's own emphasis)⁴⁹. At the time of writing in late 2009, Defra has an ongoing consultation document (closing in January 2010) on draft regulations to transpose the MSFD into UK law in 2010, leading to proactive work by 2012⁵⁰, a coordinated monitoring programme for the on-going assessment of 'Good Environmental Status'⁵¹ by 2014, and a programme of measures to achieve that status by 2015-16⁵². Neither the MSFD nor UK specific draft regulations make direct reference to natural/cultural heritage and/or aggregates. However, once the MSDF is in force in UK seas it will undoubtedly impact upon these aspects of the marine zone.

EU Directive 85/337/EEC (as amended by Directives 97/11/EC and 2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment also integrates environmental considerations into the preparation and adoption of plans and programmes liable to have significant effects on the environment, by subjecting them to an Environmental Impact Assessment (EIA)⁵³. As noted above, EIA's has formed part of UK

mineral licence procedures since 1989, and Environmental Statements have been submitted with every application owing to the cooperation and goodwill of the dredging industry. The EIA Directive has been transposed into UK legislation through various 'EIA Regulations', generally in the form of secondary legislation associated with existing consent provisions, most notably under the terms of the *Town and Country Planning (Environmental Impact Assessment) (Amendment) (England) Regulations (2008)*⁵⁴ and the *Marine Works (Environmental Impact Assessment) Regulations (2007)*⁵⁵ (and comparable regulations in Scotland, Wales and Northern Ireland). Point 22 (iii) of the latter includes specific reference to 'the direct and indirect effects of the project on... cultural heritage'⁵⁶. Related to this are then the UK's obligations under the terms of European Directive 2001/42/EC (the SEA Directive) 'on the assessment of the effects of certain plans and programmes on the environment', a process which requires a formal environmental assessment of certain plans and programmes which are likely to have significant effects on the environment⁵⁷. This has led to a series of detailed surveys of SEA zones being undertaken in UK Territorial Seas and also Exclusive Economic Zone (EEZ) waters, a process which included detailed archaeological assessments, resulting in a comprehensive corpus of legislation, plans and policies concerned with the protection of the submerged maritime archaeological resource within each SEA study area⁵⁸.

The European Landscape Convention has been in force in the UK since March 2007. 'Landscape' is defined in the Convention (Article 1) as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. The Convention insists (Article 2) that landscape exists in urban and marine as well as in rural areas, and that it is everywhere (the everyday and the degraded as well as the outstanding)⁵⁹. EH has an Action Plan to assist the implementation of the Convention⁶⁰, covering the period 2008-2013 and coordinating their existing landscape work with the wider aims of the Convention in relation to Defra's *Framework for Implementation of the European Landscape Convention*⁶¹. Through these documents the UK blends its existing and future landscape management strategies into the overarching aims of the European Landscape Convention, in particular through the types of closer inter-disciplinary and inter-sector collaboration discussed elsewhere in this report. In this respect the ALSF is instrumental in the UK being a European leader in the implementation of the European Landscape Convention, since the ALSF has led to many of the innovations in integrated management (including management of the interlinked terrestrial and marine, natural and cultural environments) that the Convention proposes.

The EU's Integrated Maritime Policy seeks to raise the visibility of 'Maritime Europe', including Europe's maritime heritage and communities. Procedures to assist this promotion have included a European Atlas of the Seas as an educational tool and as a means of highlighting our common maritime heritage, as well as the celebration of an annual 'European Maritime Day' to raise the visibility of maritime affairs and promoting links between maritime stakeholders⁶². The European Commission has also sought to establish networks of best practices between maritime stakeholders, including between Member States in relation to marine spatial planning, which has helped to link maritime heritage communities with other stakeholders as well as other nations through cross-fertilization between networks and the broad participation of interested stakeholders in each of them⁶³. There is considerable potential for the UK to play an enlarged leadership role in the promotion of ALSF-type best practice in the EU in this respect.

Marine Heritage Management and the Aggregates Industry – Federalised Governments

The USA and Australia, which have similar long histories of heritage management to the UK, have significantly differing approaches to the conjoined management of their marine cultural and natural heritage. In such federal government systems, responsibility for heritage management is usually devolved to a sub-national level, although including forms of at least semi-centralised heritage management policies in conjunction with State-level legislation; this makes the management relatively more complex and expensive to those industries that are impacted on. Under such circumstances an overarching centralised strategy such as the ALSF would be neither possible nor legally desirable – as much as anything because of the logistical difficulties in operating such a centralised system in much larger federalised countries. However, many themes as well as project-specific components of the ALSF could be usefully applied in such nations, as discussed in the conclusion of this report.

In the US the federal Minerals Management Service (MMS) (part of the Department of the Interior) manages aggregate extraction (terrestrial and marine) in a broadly similar fashion to the UK⁶⁴ (although the federal government both pays for and manages applications – not the developer), with control undertaken on a case-by-case basis as applications for extraction are submitted, and Environmental Impact Assessments undertaken by consultants⁶⁵. In a similar way to the Crown Estate in the UK, the MMS indicates to aggregate lease owners how surveys for shallow hazard or historic resource identification are to be undertaken. The MMS adheres to the National Historic Preservation Act (NHPA) (1966), and Secretary of the Interior's Standards for assessing 'historical significance', as well as site-specific federal heritage legislation⁶⁶. In the case of oil, gas, and sulphur leases in particular, the MMS has established regulations⁶⁷, and issues guidance to lessees⁶⁸ to ensure compliance with Section 106 of the NHPA (1966) and its implementing regulations⁶⁹.

'Notices to Lessee's (NTLs) provide guidance on the regulations regarding historic environment discoveries and the conduct of cultural resource surveys. NTLs also identify specific Outer Continental Shelf (OCS) lease blocks with a high potential for containing cultural resources on the basis of previous studies⁷⁰. In addition, federal law requires that agencies such as the MMS consider the effects of any undertaking on significant historic

environment resources⁷¹. Such regulations grant specific authority to each MMS regional director to require archaeological resource surveys and reports (based primarily upon remote sensing surveys, followed up where deemed necessary more detailed investigations on the basis of submitted reports by MMS archaeologists) where deemed necessary⁷². These investigations are normally proposed in areas where historic sites are likely to be found by the oil and gas industry, and are undertaken on the basis of the MMS's own specific guidelines for conducting remote-sensing surveys and writing reports for archaeological sites on the OCS⁷³. As is common in polluter-pays legislation of this type: such surveys are entirely reactive, the guidelines only apply to specific, pre-identified high-probability areas, and the requirements of the survey work differ depend on whether the block has been determined to have a probability for historic shipwrecks or for submerged prehistoric sites⁷⁴.

The MMS often funds different studies designed to revise or update the guidelines published in the 'Notices to Lessees and Operators' (NLT) documents. They do this using money paid by the energy and aggregates industries in order to obtain lease rights. PhD and post-doctoral research studies are also occasionally funded through this manner, usually in collaboration with industry. The MMS also undertakes proactive, ALSF-type work, under auspices of its own historic environment teams. This is usually in collaboration with State heritage organisations, industry and academia; it is aimed towards 'public heritage' agendas, and in some cases results in the production of teaching resources⁷⁵. Examples of recently funded projects with cross-comparison to the ALSF type include:

- Proactive desk-based resource assessments of areas of 'high archaeological potential' undertaken on the basis of reactive report data submitted by industry – e.g. evaluations of submerged sites on the Gulf of Mexico Outer Continental Shelf⁷⁶. Such projects are comparable in scope and agenda to ALSF projects 3783/4728/4729/4731/5254 *England's Historic Seascapes*⁷⁷.
- Non-invasive fieldwork utilising remote-sensing and also divers / ROVs on specific identified single or multiple archaeological sites at risk – e.g. collaborative research into the historic and natural environmental stability and significance of World War II era shipwrecks⁷⁸, on the Viosca Knoll 19th century wreck⁷⁹ and on the 'Mardi Gras' shipwreck⁸⁰. Such projects are comparable in scope and agenda to ALSF projects 3324 *Assessing, Evaluating and Recording Wrecks on the Seabed*⁸¹; 3364 *High Resolution Sonar for the Archaeological Investigation of Marine Aggregate Deposits*⁸²; 3594 *Multi Beam Sonar on Wrecks*⁸³; 3877 *Wrecks on the Seabed*⁸⁴ and 5402 *Wrecks Ecology*⁸⁵.
- Non-invasive analyses of the impact of specific invasive human activities on historic sites – e.g. analyses of the damage to historic sites of offshore dredging⁸⁶. Such projects are comparable in scope and agenda to ALSF projects 3837 *Rapid Archaeological Site Surveying and Evaluation in the Marine Environment*⁸⁷ and 5401 *Seabed Grab Sampling*⁸⁸.
- Desk-based and remote-sensing modelling of site location probabilities – e.g. work on high-probability models for historic shipwrecks⁸⁹. Such projects are comparable in scope and agenda to ALSF projects 3365 *Modelling Exclusion Zones for Marine Aggregate Dredging*⁹⁰; 3876 *Seabed Prehistory*⁹¹ and 3968 *Severn Estuary Assessment of Sources for Appraisal of impact of Maritime Aggregate Extraction*⁹².
- Creation of a teacher's resource on the historic shipwrecks of the Gulf of Mexico⁹³. Such projects are comparable in scope and agenda to ALSF projects 3963/5204 *Aggregates to Outreach*⁹⁴ and 4840 *Maritime Archaeology Access and Learning Workshops*⁹⁵.
- Examination and testing of potential prehistoric features on the offshore continental shelf⁹⁶. Such projects are comparable in scope and agenda to ALSF projects 3277 and 3543/3545 *Submerged Palaeo-Arun*, 3362 *Re-Assessment of the Archaeological Potential of Continental Shelves*⁹⁷ and 4632 *Transition Zone Mapping for Marine-Terrestrial Archaeological Continuity*⁹⁸.
- Inventory and analysis of historic site occurrence on the Atlantic Outer Continental Shelf⁹⁹. Such projects are comparable in scope and agenda to ALSF projects 3322 *Artefacts from the Sea*¹⁰⁰; 4000 *Beach Replenishment and Derived Archaeological Material*¹⁰¹ and 3917 *Enhancing our Understanding: Navigational Hazards*¹⁰².

Although organisations such as the MMS undertake directly aggregates-related heritage management broadly comparable to the historic environment component of the ALSF, it remains fair to generalise that US aggregates related heritage funding is far less extensive (in terms of funding proportion by tonnage of aggregate extracted) than in the UK. This is in most part because while the tonnages of aggregates extracted in the US are in all ways significantly greater than the UK: [a] the majority of these aggregates are derived from terrestrial sources; [b] the majority of historic environment mitigation work in response to extraction comes through reactive, polluter-pays, responses under State environment and planning law rather than proactive ALSF-type funding, with only limited strategically-directed funding by the MMS comparable to the ALSF. By virtue of the federal government system of the US, such funding is also far more regionally targeted at the State level than in the UK, even where such funding ultimately derives from Federal rather than State government. The significant levels of Federal ownership of land, both terrestrial and marine, also mean that Federal heritage requirements can be enforced over significant areas of the US.

Other federal organisations with (limited) control powers over marine development then include the National Park Service (NPS) (like the MMS part of the Department of the Interior) and National Oceanic and Atmospheric Administration (NOAA)¹⁰³. Various activities of the NPS and NOAA have at least a passing impact on the management of aggregates and the historic environment, if only through a leadership role (as outlined in the NPS

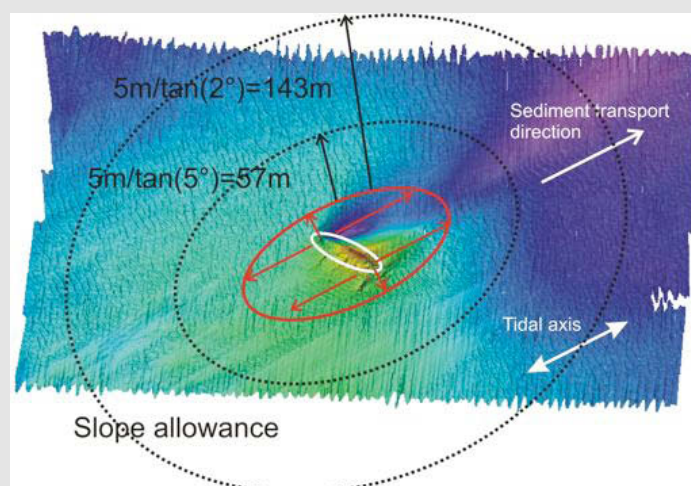
Director's Order #28a: Archaeology (2004))¹⁰⁴. The manner by which NOAA in particular, on behalf of the US, protects and enhances historic resources through the use of wide-reaching marine sanctuaries protection or both natural and cultural heritage features is particularly interesting in relation to the UK management of both marine resources and protected sites. NOAA's management structure and regime offer a useful model for future such management of the UK Territorial Sea via the MCAA (2009) and its new MMO, which is likely to have similarities in form, function and remit to NOAA¹⁰⁵.

The management of historic resources in the context of development and extraction is further complicated in countries such as the US and in particular Australia through the requirements of Native Title and other Indigenous ownership/management rights. In the US the primary legislation is the North American Graves Protection and Repatriation Act (1990)¹⁰⁶; in Australia, this is the Aboriginal Heritage Act (2006), under which mining is considered a high impact activity¹⁰⁷. At a State level in the US, additional environmental protection and heritage laws also apply.

Case Study: Modelling Exclusion Zones for Marine Aggregate Dredging

The 'Modelling Exclusion Zones' project funded by the ALSF aimed to achieve a more 'robust, methodical and practical' approach to the design of exclusion zones whilst achieving a balance between the requirements of heritage protection and the interests of the marine aggregate industry¹⁰⁸.

Through the analysis of large quantities of data, including the results of laboratory tests and field investigations on two wreck sites, the study greatly enhanced the understanding of the relationship between flow and sediment dynamics. Data derived from a series of Acoustic Doppler Current Profilers (ADCPs) were used to measure the flow field around each wreck, from which it was possible to reconstruct patterns of flow modification around the obstacle. The results can help to predict the rates and patterns of sediment accretion around a wreck site and also sediment erosion, with clear implications for predicting changes in a site's stability.



Proposed exclusion zone, with inner buffer zone, defined by system dynamic¹⁰⁹
(Image © Justin Dix, National Oceanography Centre)

On the basis of these results, the project proposed an alternative to the current circular exclusion zone: the suggested design consists of a tidally aligned ellipse. Surrounding the wreck and encompassing the seabed directly affected by its presence is an inner 'dynamic buffer'; this is then surrounded by a 'slope buffer', the outer edge of which forms the perimeter of the exclusion zone. In combination, these attempt to ensure the long-term stability of in situ sediments and sediment input from upstream of the site, whilst also protecting the potential distribution of artefacts downstream.

A further project has since developed models of sediment mobility at the regional scale, in order to predict rates of sediment transport and to identify areas likely to experience accumulation or erosion over time, with potential implications for the long-term preservation of sites. An extension of this project using Acoustic Doppler Current Profiler (ADCP) deployment to record current sediment transport pathways within the English Channel is also being considered.

The results of the project were of direct and practical use to the marine aggregate industry, as well as other marine industries, and demonstrate the positive outcome of regular, close communication between the dredging industry and other key stakeholders. Indeed the scientific results of this project are currently being edited to form a guidance note for both the industry and the regulators.

In comparison to the UK and US it is notable that there is effectively no aggregate-related marine heritage management undertaken in Australia, for the simple reason that the size of the landmass, relatively low density of human occupation and wealth of easily accessible terrestrial minerals currently makes such exploitation unnecessary¹¹⁰. Australia's marine cultural heritage is, as a consequence, some of the least understood of any developed nation in the world. Significant sections of the Australian coast, both terrestrial and marine, have never been subjected to even partial survey, meaning that the extent and cultural significance of remains is virtually impossible to calculate¹¹¹. It is worth, however, briefly considering the present situation in Australia in order to help identify ALSF projects that could be usefully applied in Australia in the future. For example, in comparison to the BMAPA/EH Guidance note 'Marine Aggregates and the Historic Environment'¹¹² and the related 'Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest'¹¹³, many Australian mining companies have established individual or communal codes of conduct for mineral exploration¹¹⁴. This is particularly significant given the scale of extraction in some regions of Australia by major multinational organizations – e.g. Rio Tinto, which currently spends around nine million US dollars a year on its Australian exploration programme and which has negotiated over 65 Native Title Agreements for access over the period 1995-2005¹¹⁵. There is no reason why that these BMAPA/EH documents and procedures – indeed, virtually all of the ALSF marine zone mapping and management initiatives – could not be used as a model for future Australian marine zone aggregates management, involving the same types of industry/government cooperation.

Conclusions: Lessons Learned

A comparison of the different types of federal and centralised aggregates-related heritage management in use around the world highlights in particular how innovative the ALSF is in driving proactive, collaborative research of benefit to all stakeholders. The ALSF is a model of innovative heritage management, involving as it does peremptory public and private sector collaboration in the provision of strategic management of, and guidance upon, resources of benefit to all sectors, rather than relying on reactive management and/or burdensome federal and state controls.

Above all, ALSF heritage funding represents an extremely cost-effective form of *strategic* funding in comparison to other sources of heritage funding. The ALSF assists the development process through strategies such as mapping the distribution of unknown/unmapped heritage resources (particularly in the marine zone), the development of management strategies for such heritage (e.g. exclusion zones), and the provision of industry guidance and standards. All of these activities assist the aggregates and other industries in identifying, planning for, and mitigating risk (including unexpected cost and delays) in the medium and long-term. Writing in early 2010, the benefits of the development of the long-term partnerships involving industry, government and academia that have been actively worked towards from the earliest days of the ALSF are also becoming ever more visible, as long-running projects come to fruition. Such partnerships – especially in the marine zone – help fulfil the wider aims of the ALSF, where truly inter-disciplinary approaches to research involving all stakeholders and both the natural and cultural heritage are increasingly evident. Such approaches make best use of resources and deliver added value to not just marine aggregate research but to wider research outcomes, a case point being the REC programmes discussed above.

The UK heritage community, when offered the opportunity of access to a new funding stream, wholeheartedly embraced the ALSF, and as a consequence rapidly undertook an extraordinarily diverse array of work that was good in every way – good in practice, being cost-effective and collaborative (particularly with industry), good on outreach, and good on dissemination. The result was an enhanced data set, tools-set and understanding-set of use to academia, government, industry and the general public alike. No other comparable international industries are so well provided with data on the location, impact and possible avoidance or mitigation strategies for the historic resource in relation to their activities, and no other specialist community (drawn either from the historic or natural environment communities) so well furnished with new data, techniques and above all working relationships with industry.

The marine historic environment component of the ALSF in particular has been recognised by the heritage community, industry and government as being one of the most successful components of the broader ALSF programme. The ALSF has led to a significant improvement of relationships between all stakeholders, and has had a considerable additional PR benefit promoting the understanding of the marine historic environment to the general public. It is notable, however, how unaware of the ALSF most international communities' remain: industry, heritage managers, politicians and the general public alike. This is a shortcoming of the ALSF in terms of the UK's reputation on the international stage and in particular its well-established international leadership role in heritage management. More needs to be done to promote the successes of this component of the ALSF to the international community. This promotion should follow the precedents set in the 'main' ALSF, being business-facing, cost-effective and collaborative (particularly with industry and running across the marine historic natural/cultural research community), focused on responding to, and mitigating, identified shared risks. There are, as outlined below, many projects funded by the ALSF that have an immediate applicability in other international situations. These projects can be used as models by the international community, and could potentially involve UK industrial and heritage organisations in the provision of a variety of outreach and training opportunities, 'master classes' and suchlike.

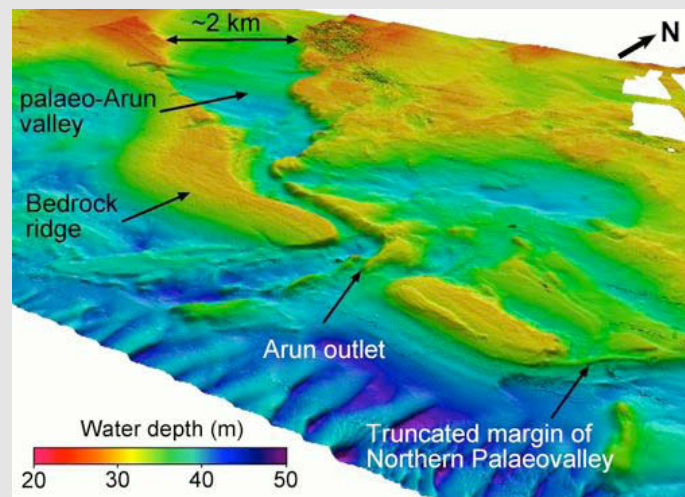
Case Study: 3D Seismics for Mitigation Mapping

During periods of exposure in the Late Quaternary glacial periods, much of the UK continental shelf became a terrestrial landmass, crossed by a network of river valleys. These fluvial systems, with their array of natural resources, would have provided attractive environments for humans to occupy and exploit, and this is demonstrated by the wealth of archaeological evidence derived from the onshore river terraces of England's South Coast¹¹⁶.

The same sediment bodies of offshore fluvial systems are of considerable interest to the aggregate industry and are coming under increasing pressure from other offshore activities (extraction and construction). Despite a long-standing awareness of this submerged terrestrial landscape, its archaeological potential has only been realised in recent decades¹¹⁷, and the lack of detailed knowledge of this palaeo-environment was became clear. It was in the long-term interests of both minerals operators and managers of the historic environment, to encourage a better understanding of submerged palaeo-landscapes so that informed decisions can be made about the future management of finite mineral and archaeological resources¹¹⁸.

In response to this data imperative, and following recognition of the archaeological importance of the UK continental shelf, the ALSF funded several projects that considerably enhance our understanding of the offshore resource and our ability to predict potential areas of archaeological preservation. These projects demonstrate the support given by the marine aggregate industry, which recognises the importance of developing a sound knowledge base as a way of reducing risk.

Using existing 3D seismic datasets donated by Petroleum Geo-Services, the University of Birmingham mapped an extensive area of the southern North Sea as part of their ALSF funded 3D Seismics for Mitigation Mapping of the Southern North Sea Project¹¹⁹. The maps of buried landscapes produced from this data have revealed the location of former coastlines and a complex system of palaeochannels, with areas of potential wetland that may be conducive to the preservation of archaeological remains.



View of the Arun palaeovalley, looking northeast, reconstructed from multibeam bathymetry data¹²⁰ (Image © Sanjeev Gupta, Imperial College London)

The River Arun belongs to another fluvial system that joins a substantial palaeo-valley located within the English Channel. Extensive seismic and core datasets were made available to Imperial College London by Hanson Aggregate Marine Ltd., United Marine Aggregates Ltd. and RMC Marine Ltd. for mapping the Arun's present offshore component. These existing seismics has been used to identify and characterise fluvial features, such as terraces and peat horizons, which have a potential for containing evidence of early prehistoric activity¹²¹.

Recommendations arising from this data survey process include the application of high resolution seismics and targeted sampling strategies to further investigate areas of high and low preservation potential. The integration of information derived from other sources (e.g. vibrocore and grab-sample data and artefacts) may help to establish the presence or *absence* of archaeological material as well as the chronology of associated marine deposits.

These projects demonstrate the innovative ways in which marine geophysics and geology can be used to enhance our understanding of the topography and morphology of submerged palaeo-landscapes, and it is widely acknowledged that large-scale and costly projects such as these would not have occurred without the support of the ALSF.

Conclusions: Next Steps

Nations wishing to learn lessons from the development and operation of Aggregates Levy and ALSF-type resource and heritage management should, therefore, consider projects significance on basis of the following criteria. Priorities for fieldwork can then be identified using models based on the most successful ALSF projects¹²²:

Business Facing

Marine ALSF projects have been *strategic*, timely and well managed, responding to currently pressing needs to identify, and help mitigate, shared risks. Numerous marine-zone ALSF projects had immediate functionality/use to industry as well as to Government, modelling locations of sites or aggregate dynamics around particular locations, responding to currently pressing needs in industry to identify, and help mitigate, risks. For example, the ALSF has significantly helped to advance ways of assessing and evaluating wreck sites to assist with understanding the effects of marine aggregate dredging on shipwrecks, using a variety of methods of hydrographic survey, remote sensing and diving survey in order to provide industry, regulators and contractors with guidance on the assessment, evaluation and recording of historic wreck sites¹²³. The ALSF has also been instrumental in the assessment, and creation of, models for the sediment deposit distribution and palaeogeographic evolution of the continental shelf as part of the process of enhanced historic site and landscape mapping and distribution and consequently industry risk-avoidance¹²⁴. This is part of the wider development and deployment of methodologies for mapping the historic character of the coastal and marine environment as part of the process of enhanced site and landscape mapping and distribution and consequently industry risk-avoidance¹²⁵.

Proactive

Marine ALSF projects have been good at showing immediate *functionality* of use to all partners, such as modelling the locations of sites or seabed/water column dynamics around particular locations. For example, the ALSF has helped industry and the heritage community to work closely on modelling exclusion zones for marine aggregate dredging through an enhanced understanding of the physical processes of site formation, used in turn to define exclusion zones around such sites both within and adjacent to licensed aggregate dredging areas, as well as any proximal inter-tidal sites¹²⁶. Related to this has been the testing and development of rapid, quantitative, remote (geophysical) sensing techniques for the enhanced investigation of marine historic sites in sensitive aggregate extraction areas in order to provide industry, regulators and contractors with guidance on the historic and natural environmental assessment, evaluation and recording of wreck sites¹²⁷.

The efficiency of stakeholder partnership projects was instrumental to this functionality and cost-effectiveness, such as through the use of legacy data or industry platforms, and frequently involved industry provision of in-kind support via the loan of equipment. A major early success of the ALSF was the series of projects that utilised existing industry data sets to produce contiguous palaeo-landscape reconstructions across the marine to terrestrial boundary. These projects enhanced data continuity across space and through time within an area of landscape previously examined through a series of stand-alone investigations, enabling marine sites that are of present and future concern to aggregate dredging to be fully interpreted with their historic context¹²⁸.

Communicative

Marine ALSF projects have seen effective local-level, long-term communication and collaboration between individual industry employees, researchers and curators. Positive lessons can be learnt from researchers who have succeeded in establishing good communication with marine dredging companies. For example, the development of the BMAPA/EH protocol for reporting finds of historic or natural interest involves members of staff employed by the aggregate dredging companies reporting finds being made on the seabed, on board dredging vessels, and at wharves, by staff reporting to a local 'Site Champion' who compiles a preliminary report¹²⁹.

Partnership Based

Marine ALSF projects have undertaken from the outset *partnership*, with all partners being including in project development and design, data sharing and collection, and/or processing. For example, ALSF projects involving close collaboration have included a project identifying current gaps in data and understanding relating to aircraft crash sites at sea in response to the high potential for aircraft crash sites on the seabed, allowing for better risk management and avoidance by industry¹³⁰. Similarly, the ALSF has helped address strategic gaps identified in the course of preparing Environmental Statements for marine aggregate extraction licence applications in addition to developing methodologies for assessing the presence or absence of prehistoric archaeology within marine aggregate dredging areas. These methodologies provide clearer guidance to industry by applying industry-standard geophysical and geotechnical tools for the assessment and evaluation in offshore areas, in order to provide industry, regulators and contractors with guidance on the assessment, evaluation and recording of historic wreck sites and landscapes¹³¹.

Media Friendly

Marine ALSF projects have been keen to undertake *outreach*, including significant PR potential for all partners through internal industry media and conferences (including lots of possibilities for PR-friendly photos with company logos), and the provision of accessible, user-friendly *resources*. For example, the ALSF has placed a major emphasis on the creation and provision of education programmes to increase awareness and knowledge of the historic importance of the maritime environment and its aggregate resources¹³².

Mutually Beneficial

Marine ALSF projects have assisted industry and the planning sector in the acquisition of new datasets (allowing for better pre-planning and risk-avoidance); have provided historic environment professionals with new investment (supporting management-based research into the historic environment as well as the development of analytical techniques); and all sectors with collaborative data acquisition, analysis and management, together with the additional public relations benefit through media friendly enterprises, data-sharing and sponsorship. For example, the enhancement of curatorial records of materials recovered from the sea that has derived from ALSF projects provides industry with greater resolution in Environmental Assessments (EAs) to accompany marine aggregate licence applications¹³³. So too have enhanced ways of mapping evidence of historic shipping¹³⁴. Such projects also significantly increase the range and detail of data available to not only the specialist heritage community but also the wider community, including everyone from sports divers to family historians.

Cross-Disciplinary

Marine ALSF projects have had at their heart cross-management of projects by both natural and historic environment professionals, intermeshing cultural and natural environment research specialisms and data. For example, the ALSF has helped to develop an enhanced understanding of the environmental interactions of wreck sites and the (potentially cumulative) impacts on wreck sites from aggregate extraction, including the role, if any, of wrecks in deep water acting as artificial reefs/habitats¹³⁵. ALSF funding has also supported work developing a framework and methodology for evaluating the importance of the physical remains of wrecks on the seabed and then assessing their significance. Such projects involved from the outset marine natural environment partnership in the assessment of the significance of such wreck sites as habitats, and the *overall* project provides industry, regulators and contractors with guidance on the assessment, evaluation and recording of wreck sites¹³⁶.

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Acronyms

ALSF – Aggregates Levy Sustainability Fund (UK)
AMAAA – Ancient Monuments and Archaeological Areas Act (1979) (UK)
BMAPA – British Marine Aggregates Producers Association
Cefas – Centre for Environment, Fisheries and Aquaculture Science (UK)
CLG – Department for Communities and Local Government (UK)
DCMS – Department for Culture, Media and Sport (UK)
Defra – Department for Environment, Food and Rural Affairs (UK)
EH – English Heritage
EEZ – Exclusive Economic Zone
EIA – Environmental Impact Assessment
EU – European Union
HLC – Historic Landscape Characterisation
HLF – Heritage Lottery Fund
ICZM – Integrated Coastal Zone Management
JNAPC – Joint Nautical Archaeology Policy Committee (UK)
MCAA – Marine and Coastal Access Act (2009) (UK)
MMO – Marine Management Organisation (UK)
MMS – Minerals Management Service (US)
MSDF – Marine Strategy Framework Directive (2008/56/EC) (2008) (EU)
NHPA – National Historic Preservation Act (1966) (US)
NOAA – National Oceanic and Atmospheric Administration (US)
NPS – National Park Service (US)
NTL – Notice to Lessee (US)
REC – Regional Environmental Characterisation (UK)

Endnotes

¹ For the purposes of the Levy, 'aggregate' was deemed in the 1997 budget statement to be sand, gravel and rock, with some exceptions, including quarried or mined products (such as coal, metal ores, industrial minerals etc.), materials used in the production of lime and cement, blocks of stone (including dimension stone, building stone, flagstones and slates), and aggregates used in prescribed industrial or agricultural processes. See <http://archive.treasury.gov.uk/pub/html/budget97/chxstat.html>, paragraph 143.

² See <http://www.english-heritage.org.uk/server/show/nav.1315>

³ See Defra (2008) *Pre-Budget Statement to the House of Commons*, http://www.hm-treasury.gov.uk/prebud_pbr08_speech.htm

⁴ Any organisation responsible for commercially exploiting aggregate in the UK is required to register their business with the government and pay the Levy. Under normal circumstances this constitutes the operator, owner or occupier of any site where a quantity of taxable aggregate is won from the land, stored, mixed with anything other than water or processed. In some circumstances this can also be the owner of the aggregate, the person using aggregate for construction purposes, or the person who agrees to supply aggregate to another person. Anyone importing aggregate from outside the UK and agreeing to supply it or using it for construction purposes or mixing the aggregate with any other substance other than water also needs to register and account for the Levy. See <http://www.hmrc.gov.uk/aggregates-levy/index.htm>

⁵ Other ALSF distributors on behalf of Defra are Natural England, the Mineral Industry Research Organisation (MIRO), the Waste and Resources Action Programme (WRAP), the Department for Business, Innovation and Skills (BIZ), the Department for Transport (DfT), the Department of Communities and Local Government (CLG) and selected Local Planning Authorities.

⁶ See Defra (2008) Consultation on the Future Priorities for and Delivery of the ALSF – April 2008 to March 2011, 3.

⁷ See Flatman, J., Short, J., Doeser, J and Lee, E. (eds.) (2008) *ALSF Dissemination Project 2002-07 Benchmark Report: Sustainable Heritage – Aggregates Extraction and the Historic Environment*. London: UCL Centre for Applied Archaeology, on behalf of English Heritage, http://www.sustainableaggregates.com/docs/revs/t4_susheritage.pdf, 9.

⁸ See <http://www.defra.gov.uk/corporate/consult/alsf-08/index.htm>

⁹ See English Heritage (2003) *Coastal Defence and the Historic Environment*, <http://www.english-heritage.org.uk/upload/pdf/CoastalDefenceEH.pdf>, 3.

- ¹⁰ These included: [a] the development and publication of written guidelines and codes of practice to assist decision-making, and to capture, document and communicate good practice both as a source of reference for the practitioner and a learning tool for professional development; [b] support for formal academic publication of the results of using new methodologies; [c] support for seminars and conferences to review and share results and good practices, and [d] resources to allow archaeologists and minerals planners and operators to work together and develop professional networks and mutual understanding.
- ¹¹ See Defra (2008) *Consultation on the Future Priorities for and Delivery of the ALSF – April 2008 to March 2011*, 4.
- ¹² See Defra (2008) *Consultation on the Future Priorities for and Delivery of the ALSF – April 2008 to March 2011*, 7.
- ¹³ See Defra (2008) *Consultation on the Future Priorities for and Delivery of the ALSF – April 2008 to March 2011*, 8.
- ¹⁴ See <http://www.english-heritage.org.uk/server/show/nav.001002003008001>
- ¹⁵ See <http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm>
- ¹⁶ See Darvill, T. and Fulton, A. (1998) *MARS: the Monuments at Risk Survey: Main Report*. London: Boumemouth University and English Heritage.
- ¹⁷ See Fulford, M. G., Champion, T. C. and Long, A. J. (1997) *England's Coastal Heritage*. London: English Heritage.
- ¹⁸ The HLF has massively affected the practice of historic environment management, and especially public involvement: since 1994 it has injected some £120m into over 600 projects that support broadly 'heritage' themed projects in the UK, and has, in particular reference to archaeology, provided a huge incentive for all excavations to have a public heritage included in their projects. See HLF (2007) Heritage Lottery Fund National Heritage Memorial Fund: Lottery Distribution Account for the Year Ended 31 March 2007, http://www.hlf.org.uk/HLF/Docs/AnnualReports/HLF_AR_2007.pdf, 1.
- ¹⁹ See http://www.thecrownestate.co.uk/jnpsc_code_of_practice.pdf
- ²⁰ See http://www.english-heritage.org.uk/upload/pdf/Marine_aggregate_dredging.pdf
- ²¹ See <http://www.wessexarch.co.uk/projects/marine/bmapa/index.html>
- ²² See http://www.thecrownestate.co.uk/mrf_aggregates, http://www.thecrownestate.co.uk/marine_aggregates and <http://www.thecrownestate.co.uk/dredging-permission>
- ²³ See Planning and Policy Guidance Note 16: Archaeology and Planning (1990) <http://www.communities.gov.uk/publications/planningandbuilding/ppg16> and Planning and Policy Guidance Note 15: Planning and the Historic Environment (1994) <http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/historicenvironment/ppg15/>. The requirements of PPG 16 in particular are broadly equivalent to 'Section 106' type requirements in the US as laid out under the National Historic Preservation Act (NHPA) (1966), see <http://www.achp.gov/106summary.html>
- ²⁴ UK marine heritage protection law in particular is also distinctive in its reliance on relatively old and often only indirect legislation. The Protection of Wrecks Act (1973) is the primary piece of heritage legislation and was designed merely to be a temporary protection act for such sites, is under-applied and by its own narrow terms can only be applied to wreck sites rather than generic historic sites (see http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1973/cukpga_19730033_en_1). Similarly, the Merchant Shipping Act (1995) (see http://www.England-legislation.hmso.gov.uk/acts/acts1995/ukpga_19950021_en_1) is merely an amended version of the Merchant Shipping Act (1894) that indirectly impacts on cultural heritage and was never designed to have the impact that it does now. The AMAAA (1979) has only been applied to a very small number of marine (even coastal) sites despite the possibilities that exist to schedule sites and monuments under this regime (http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1979/cukpga_19790046_en_1). As noted above, PPGs 15 and 16 cannot be applied in the marine zone.
- ²⁵ See http://www.opsi.gov.uk/acts/acts2002/ukpga_20020014_en_1
- ²⁶ See http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1979/cukpga_19790046_en_1
- ²⁷ See <http://www.defra.gov.uk/environment/quality/marine/iczm.htm>
- ²⁸ This strategy was outlined in Defra (2002) *Safeguarding Our Seas: A Strategy for the Conservation and Sustainable Development of our Marine Environment*, http://www.defra.gov.uk/environment/marine/documents/marine_stewardship.pdf; see also Roberts, P. and Trow, S. (2002) *Taking to the Water: English Heritage's Initial Policy for the Management of Maritime Archaeology in England*, http://www.english-heritage.org.uk/upload/pdf/maritime_arch_policy.pdf, 12, section 7.2).
- ²⁹ See <http://www.english-heritage.org.uk/server/show/nav.18389>
- ³⁰ Including EH (2003) *Coastal Defence and the Historic Environment*, <http://www.english-heritage.org.uk/upload/pdf/CoastalDefenceEH.pdf>, EH (2006) *Climate Change and the Historic Environment*, http://www.english-heritage.org.uk/upload/pdf/Climate_Change_and_the_Historic_Environment_2008.pdf and EH (2007) *Coastal Defence: Caring for our Coastal Heritage*, http://www.english-heritage.org.uk/upload/pdf/coastal_defence.pdf?1252066885, as well as the two reviews of the National Trust estate, (2005) *Shifting Shores*, http://www.nationaltrust.org.uk/main/w-shifting_shores.pdf and (2006) *Forecast Changeable*, http://www.nationaltrust.org.uk/main/w-climate_change-forecast_changeable.pdf, together with the UCL Centre for Sustainable Heritage's strategic review (Cassar, 2004) *Climate Change and the Historic Environment*, <http://eprints.ucl.ac.uk/2082/1/2082.pdf>
- ³¹ See <http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/mineralsandwaste/mineralpolicystatements/mineralsplanningguidance/> for a full list of these and supporting documentation.
- ³² See <http://www.communities.gov.uk/documents/planningandbuilding/pdf/156357.pdf>. See also National and regional guidelines for aggregates provision in England 2005-2020, see <http://www.communities.gov.uk/documents/planningandbuilding/pdf/aggregatesprovision2020.pdf>
- ³³ See <http://www.mfa.gov.uk/pdf/mmg-2.pdf>
- ³⁴ See <http://www.communities.gov.uk/documents/planningandbuilding/pdf/325090.pdf>
- ³⁵ For example, in Wales the Interim Marine Aggregates Dredging Policy (IMADP) seeks to ensure sustainable, objective and transparent decision-making to meet society's needs for aggregates dredged from the Bristol Channel, Severn Estuary and River Severn (see <http://cymru.gov.uk/topics/planning/policy/minerals/interimmarine?lang=en&ts=4>). In September 2007 the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (Wales) Regulations (2007) also came into force, providing a statutory basis for the control of the dredging of marine minerals in Welsh waters (see http://www.opsi.gov.uk/legislation/wales/wsi2007/wsi_20072610_en_1). The regulations include the European Community Directive requirements to assess the environmental effects of certain projects under the Environmental Impact Assessment (EIA) Directive and conserve the habitats of wild plants and animals under the Habitats Directive.
- ³⁶ Although it should be noted that dredging for aggregates above the mean low water mark on areas contiguous with the foreshore and some other areas is covered by the Town and Country Planning Act (1990), see http://www.opsi.gov.uk/acts/acts1990/UKpga_19900008_en_1.htm
- ³⁷ There are currently 79 production licenses producing approximately 21 million tonnes of material pa. The licenses only cover

- about 0.12 per cent of the UK continental shelf, and of this only about 11 per cent was actively dredged during 2008, equating to 138 sq km. For more information, see http://www.thecrownestate.co.uk/marine_aggregates
- ³⁸ See <http://www.alsf-mepf.org.uk/projects/rec-projects.aspx> and www.marinealsf.org.uk.
- ³⁹ Source: Emu Ltd., 2009 *Outer Thames Estuary Regional Environmental Characterisation*. London: Marine Aggregate Levy Sustainability Fund, <http://www.alsf-mepf.org.uk/media/13567/outer%20thames%20estuary%20rec%20final%20report.pdf>
- ⁴⁰ See <http://www.alsf-mepf.org.uk/projects/2008/rec-0801/final-report.aspx>
- ⁴¹ Emu Ltd., 2009 *Outer Thames Estuary Regional Environmental Characterisation*. London: Marine Aggregate Levy Sustainability Fund, <http://www.alsf-mepf.org.uk/media/13567/outer%20thames%20estuary%20rec%20final%20report.pdf>
- ⁴² See <http://www.defra.gov.uk/news/latest/2009/marine-1112.htm>
- ⁴³ See <http://www.defra.gov.uk/marine/legislation/key-areas.htm#2>
- ⁴⁴ The MMO will have to work with EH (as the Government's statutory adviser on the historic environment), taking into account of the marine historic environment when developing marine plans and determining licences. It is likely that a Memorandum of Understanding will be developed to formalise the relationship between the two bodies to cover issues such as data sharing and the relationship between MCAA (2009) licences and the system of licensing under the PWA (1973).
- ⁴⁵ Discussions of the reform of the marine licensing regime in the Act's Impact Assessment are the most worrying component of the MCAA (2009) from a heritage perspective. These discussions are made in relation to efficiency savings, and would seem to contradict and/or conflict directly with the broad aims of the UK's now 'hibernated' Heritage Bill to protect both more and a wider range of marine heritage assets (see Heritage Bill, Part I, Chapter 4, Articles 46-77). Although point 139 of the MCAA (2009) Impact Assessment specifically states that only 'activities with little or no adverse effect on the marine environment, heritage, or other legitimate uses of the sea, will be subject to a lighter administrative burden, the overall agenda of this section of the Marine Bill is clearly to 'lighten the administrative burden'. Under such circumstances, from long experience in the terrestrial zone, heritage sites are always under threat.
- ⁴⁶ See <http://www.defra.gov.uk/corporate/consult/marine-plan/index.htm>
- ⁴⁷ See <http://www.periplus.nl/home/content/view/6/35/>
- ⁴⁸ See http://ec.europa.eu/culture/portal/activities/heritage/cultural_heritage_en.htm, also <http://www.european-heritage.net/sdx/herein/index.jsp>. The key heritage-specific EU directive is Article 151 of the 1974 Treaty (ex Article 128) (see <http://eur-lex.europa.eu/LexUriServ/site/en/oj/2002/ce072/ce07220020321en01420146.pdf>), which makes no specific recommendations as regards historic environment site management policies and practices in either the terrestrial or marine zones, and which does not include direct reference to mineral/aggregate extraction. Similarly, the European Convention on the Protection of the Archaeological Heritage (the 'Valetta Convention') (1992) (see <http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm>) makes only limited reference specifically to marine cultural heritage (Article 1 making reference to the definition of items 'of the archaeological heritage situated on land or under water' (Pickard 2002: 53). The Valetta Convention (the European Convention on the Protection of the Archaeological Heritage) makes no reference to aggregates and cultural heritage (see <http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm>). However, the convention seeks to ensure that any development project must safeguard or mitigate against any damage to the archaeological heritage (in particular Article 5), and in the context of 'development' by marine mineral dredging the Marine Mineral Guidance 2 (MMG2) and the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland) Regulations (2007) provide the mechanism by which the UK discharges its international obligations under the Valetta Convention. There has also been one EU Parliamentary Recommendation on this issue: 1486 (2000) 'on maritime and fluvial cultural heritage' (Council of Europe (2002) *European Cultural Heritage: A Review of Policies and Practice* (Volume I). Paris: Council of Europe, 355-59). Pickard (2002: 53) also notes that: 'a draft convention on the underwater cultural heritage was drawn up by the Council of Europe in 1985 but ultimately could not be opened for signature' (Pickard, B. (2002) *European Cultural Heritage: A Review of Policies and Practice* (Volume II). Paris: Council of Europe). There is similarly no EU-level mineral management activity in any way akin to the ALSF in either the marine or terrestrial spheres (see http://www.european-dredging.info/pdf/05-0271_Dredged_Mat_and_Env_reg_EU.pdf); the closest comparisons are with EU regulations regarding waste from extractive operations (i.e. waste from extraction and processing of mineral resources), recognised to be one of the largest waste streams in the EU (See <http://ec.europa.eu/environment/waste/mining/index.htm>).
- ⁴⁹ See http://ec.europa.eu/environment/water/marine/index_en.htm, and <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:EN:NOT> specifically for the text of the Directive.
- ⁵⁰ See <http://www.defra.gov.uk/corporate/consult/msfd-legal-framework/index.htm>
- ⁵¹ See criteria at <http://www.defra.gov.uk/environment/marine/documents/msfd-descriptors.pdf>
- ⁵² See <http://www.defra.gov.uk/environment/marine/msfd.htm>
- ⁵³ The Directive requires an EIA to be carried out in support of an application for development consent for categories of project listed in the Directive at Annexes I and II. Major port schemes are included within Annex I (these being examples of projects for which an EIA is mandatory); other harbour works, marinas, land reclamation and certain coastal defence works fall within Annex II. Similarly, offshore wind farm developments are listed in Annex II as 'installations for the harnessing of wind power for energy production (wind farms)'.
⁵⁴ See http://www.opsi.gov.uk/si/si2008/uksi_20082093_en_1
- ⁵⁵ See http://www.opsi.gov.uk/si/si2007/uksi_20071518_en_1
- ⁵⁶ See http://www.opsi.gov.uk/si/si2007/uksi_20071518_en_4#pt3
- ⁵⁷ The SEA Directive is transposed into UK law by the Environmental Assessment of Plans and Programmes Regulations (2004) and comparable regulations in Scotland, Wales and Northern Ireland, see <http://www.communities.gov.uk/planningandbuilding/planning/sustainabilityenvironmental/strategicenvironmentalassessment/>
- ⁵⁸ See http://www.offshore-sea.org.uk/site/scripts/category_info.php?categoryID=37
- ⁵⁹ See http://www.coe.int/t/dg4/cultureheritage/heritage/Landscape/default_en.asp and <http://www.helm.org.uk/server/show/nav.20574>.
- ⁶⁰ See <http://www.helm.org.uk/upload/pdf/ELConv.pdf?1259564731>
- ⁶¹ See <http://www.landscapecharacter.org.uk/elc/framework> - written for Defra by Natural England and English Heritage.
- ⁶² See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0575:FIN:EN:PDF>
- ⁶³ See item 6 'Reclaiming Europe's Maritime Heritage and Reaffirming Europe's Maritime Identity' of the 2006 Green Paper: *Towards a Future Maritime Policy for the Union: A European Vision for the Oceans and Seas*, http://ec.europa.eu/maritimeaffairs/pdf/com_2006_0275_en_part2.pdf. This issue is discussed in particular in section 2.3.13 'Wrecks and other historic features' of the 2008 Report: *Legal Aspects of Maritime Spatial Planning*, http://ec.europa.eu/maritimeaffairs/pdf/legal_aspects_msp_report_en.pdf, although notably the 'Sectoral Policy' section of the EC's

- 'Maritime Affairs' Commission does not have a specific dedicated minerals/aggregates sub-section (see http://ec.europa.eu/maritimeaffairs/sectoral_en.html).
- ⁶⁴ See <http://www.mms.gov/>
- ⁶⁵ This power is ultimately derived from the Minerals Leasing Act (1920) (see http://www.mrm.mms.gov/laws_r_d/FRNotices/PDFDocs/ICR0122LeasingAct.pdf) and applied through various laws, including at the federal level the National Environmental Policy Act (1969) (see <http://www.epa.gov/Compliance/nepa/>) and its amendment, the National Environmental Quality Act (1992) (see http://www.pcd.go.th/info_serv/en_reg_envi.html), as well as the NHPA (1966) (see <http://www.achp.gov/nhpa.html>).
- ⁶⁶ Such as the Archaeological Resources Protection Act (1979) (see http://www.cr.nps.gov/local-law/fhpl_ArchRsrcsProt.pdf) and Abandoned Shipwreck Act (1987) (roughly equivalent to the AMAAA (1979) and PWA (1973) and in the UK) (see <http://www.nps.gov/history/archeology/submerged/intro.htm>).
- ⁶⁷ 30 CFR 250.194, see http://www.access.gpo.gov/nara/cfr/waisidx_01/30cfr250_01.html
- ⁶⁸ Notice to Lessees (NTL) Numbers 2005-G07 and G10, 2006-G07, 2005-A03 and 2006-P03, see http://www.access.gpo.gov/nara/cfr/waisidx_01/30cfr250_01.html
- ⁶⁹ 36 CFR Part 800, see <http://www.achp.gov/regs-rev04.pdf>
- ⁷⁰ It should be noted that: [a] the MMS can only consider the effects on cultural resources of projects over which it has permitting authority; the MMS does not have the legal authority to manage cultural resources on the outer continental shelf outside of its lease areas; [b] the only impacts that the MMS can consider beyond the outer continental shelf are the indirect visual impacts to historic properties on land (the MMS has announced its intention to develop additional guidance on the issue of indirect visual impacts through consultation with the Advisory Council on Historic Preservation and other interested parties), and [c] once a project's footprint enters State waters (within 3 miles of a State's coastline), the project is no longer under MMS control but is subject to the requirements identified by the State – although these are usually the same NHPA Section 106 requirements as mandated on Federal property, simply being administered by the State Archaeologist, alongside other specific State's laws. In the marine zone in particular, the MMS is also required to ensure that activities it funds and activities it permits do not adversely affect significant historic sites on the outer continental shelf (see <http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/introduction.html>). The MMS's specific 'Archaeological Resource Stipulation' is then outlined in the organisation's operational regulations under 30 CFR 250.194 ('what archaeological reports and surveys must I submit?') and 30 CFR 250.1010(c) ('applications for a pipeline right-of-way grant'), see http://edocket.access.gpo.gov/cfr_2001/julqtr/pdf/30cfr250.194.pdf and http://edocket.access.gpo.gov/cfr_2001/julqtr/pdf/30cfr250.1010.pdf
- ⁷¹ i.e. those resources that meet the criteria of significance for eligibility to the National Register of Historic Places as defined in 36 CFR 60.4 ('Criteria for Evaluation'), see <http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/questions.html>, <http://www.nps.gov/nr/regulations.htm#604> and <http://www.nps.gov/history/nr/publications/bulletins/pdfs/nrb22.pdf>
- ⁷² See <http://www.gomr.mms.gov/homepg/regulate/regs/laws/postsale.html#arl>
- ⁷³ Outlined in NTL 2005-G07, see <http://www.gomr.mms.gov/homepg/regulate/regs/ntls/2005%20NTLs/05-g07.html>
- ⁷⁴ See details of the archaeology survey requirements for specific blocks on <http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/surveyblocks.pdf>
- ⁷⁵ Such work is funded under the long-running Environmental Studies Program (see <http://www.mms.gov/eppd/sciences/esp/index.htm>), initiated in 1973 in order to gather and synthesize information to support decision-making concerning the offshore oil and gas program under the terms of the Outer Continental Shelf Lands Act and Submerged Lands Act (both of 1953) (see <http://www.mms.gov/aboutmms/pdffiles/ocsla.pdf> and <http://www.mms.gov/aboutmms/pdffiles/submerged.pdf>), which set the federal government's title and ownership of submerged lands at three miles from a state's coastline. Section 20 of the Outer Continental Shelf Lands Act (1953) authorised the Environmental Studies Program and establishes three general goals: [1] to establish the information needed for assessment and management of environmental impacts on the human, marine, and coastal environments of the outer continental shelf and the potentially affected coastal areas; [2] to predict impacts on the marine biota which may result from chronic, low level pollution or large spills associated with outer continental shelf production, from drilling fluids and cuttings discharges, pipeline emplacement, or onshore facilities, and [3] to monitor human, marine, and coastal environments to provide time series and data trend information for identification of significant changes in the quality and productivity of these environments, and to identify the causes of these changes.
- ⁷⁶ See MMS Report 2006-036 *Study to Conduct National Register of Historic Places Evaluations of Submerged Sites on the Gulf of Mexico Outer Continental Shelf*, <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3596.pdf>
- ⁷⁷ See <http://www.english-heritage.org.uk/server/show/nav.001002003008006> and ALSF Projects 3783 *England's Historic Seascapes: Liverpool Bay Pilot Area* (http://ads.ahds.ac.uk/catalogue/archive/ehsliverpool_eh_2007/), 4728 *England's Historic Seascapes: Solent and Isle of Wight* (http://ads.ahds.ac.uk/catalogue/archive/ehssolent_eh_2007/), 4729 *England's Historic Seascapes: Southwold to Clacton* (http://ads.ahds.ac.uk/catalogue/archive/ehsclacton_eh_2007/), and 4731 *England's Historic Seascapes: Scarborough to Hartlepool* (http://ads.ahds.ac.uk/catalogue/archive/ehssc Scarborough_eh_2007/)
- ⁷⁸ See MMS Report 2007-015 *Archaeological and Biological Analysis of World War II Shipwrecks in the Gulf of Mexico Artificial Reef Effect in Deep Water*, <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4239.pdf>
- ⁷⁹ See MMS Report 2008-018 *Viosca Knoll Wreck: Discovery and Investigation of an Early Nineteenth-Century Wooden Sailing Vessel in 2,000 Feet of Water*, <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4315.pdf>
- ⁸⁰ See MMS Report 2008-037 *Archaeological Excavation of the Mardi Gras Shipwreck (16GM01), Gulf of Mexico Continental Slope*, <https://www.gomr.mms.gov/PDFs/2008/2008-037.pdf>
- ⁸¹ See ALSF Projects 3324, 3594 and 3877 *Wrecks on the Seabed / Multibeam Sonar*, http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/
- ⁸² See ALSF Project 3364 *High Resolution Sonar for the Archaeological Investigation of Marine Aggregate Deposits*, http://ads.ahds.ac.uk/catalogue/archive/highsonar_eh_2008/
- ⁸³ See ALSF Projects 3324, 3594 and 3877 *Wrecks on the Seabed / Multibeam Sonar*, http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/
- ⁸⁴ See ALSF Projects 3324, 3594 and 3877 *Wrecks on the Seabed / Multibeam Sonar*, http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/
- ⁸⁵ See ALSF Project 5402 *Wrecks Ecology* http://ads.ahds.ac.uk/catalogue/archive/wrecksecology_eh_2008/
- ⁸⁶ See MMS Report 2004-005 *Archaeological Damage from Offshore Dredging: Recommendations for Pre-operational Surveys and Mitigation During Dredging to Avoid Adverse Impacts*, <https://www.gomr.mms.gov/PDFs/2004/2004-005.pdf>

- ⁸⁷ See ALSF Project 3837 *Rapid Archaeological Site Surveying and Evaluation in the Marine Environment*, http://ads.ahds.ac.uk/catalogue/archive/rasse_ah_2007/
- ⁸⁸ See ALSF Projects 3876, 4600 and 5401 *Seabed Prehistory*, http://ads.ahds.ac.uk/catalogue/archive/seaprehist_ah_2009/
- ⁸⁹ See MMS Reports 2003-060, 2003-061 and 2003-062 *Refining and Revising the Gulf of Mexico Outer Continental Shelf Region High-Probability Model for Historic Shipwrecks*, <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/3033.pdf>, <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/3034.pdf> and <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/3035.pdf>
- ⁹⁰ See ALSF Project 3365 *Modeling Exclusion Zones for Marine Aggregate Dredging*, http://ads.ahds.ac.uk/catalogue/archive/dredging_ah_2008/
- ⁹¹ See ALSF Projects 3876, 4600 and 5401 *Seabed Prehistory*, http://ads.ahds.ac.uk/catalogue/archive/seaprehist_ah_2009/
- ⁹² See ALSF Project 3968 *Severn Estuary: Assessment of Sources for Appraisal of the Impact of Maritime Aggregate Extraction*, http://ads.ahds.ac.uk/catalogue/archive/severnaggregate_ah_2007/
- ⁹³ See MMS Project 2006-012 *Historic Shipwrecks of the Gulf of Mexico: A Teacher's Resource*, <http://www.gomr.mms.gov/PDFs/2006/2006-012.pdf>
- ⁹⁴ See ALSF Projects 3963 and 5204 *Solent Aggregates to Outreach*, http://ads.ahds.ac.uk/catalogue/archive/solaggs_ah_2008/
- ⁹⁵ See ALSF Project 4840 *Maritime Archaeology Access and Learning Workshops*, http://ads.ahds.ac.uk/catalogue/archive/access_ah_2008/
- ⁹⁶ MMS Project GM-92-42-136 *Examining and Testing Potential Prehistoric Archaeological Features on the Gulf of Mexico Offshore Continental Shelf*, see http://www.gomr.mms.gov/homepg/regulate/enviro/ongoing_studies/gm/GM-92-42-136.html
- ⁹⁷ See ALSF Project 3362 *Reassessment of the Archaeological Potential of Continental Shelves*, http://ads.ahds.ac.uk/catalogue/archive/continentshelves_ah_2008/
- ⁹⁸ See ALSF Project 4632 *Transition Zone Mapping for Marine-Terrestrial Archaeological Continuity (Contiguous Palaeo-Landscape Reconstruction)*, http://ads.ahds.ac.uk/catalogue/archive/cplr_ah_2009/
- ⁹⁹ MMS Project GM-09-10 *Inventory and Analysis of Archaeological Site Occurrence on the Atlantic Outer Continental Shelf*, see http://www.gomr.mms.gov/homepg/regulate/enviro/ongoing_studies/gm/GM-09-10.html
- ¹⁰⁰ See ALSF Project 3322 *Artefacts from the Sea*, http://ads.ahds.ac.uk/catalogue/archive/artefactssea_ah_2007/
- ¹⁰¹ See ALSF Project 4000 *Beach Replenishment and Derived Archaeological Material*, http://ads.ahds.ac.uk/catalogue/archive/beach_ah_2008/
- ¹⁰² See ALSF Project 3917 *Mapping Navigational Hazards as Areas of Maritime Archaeological Potential*, http://ads.ahds.ac.uk/catalogue/archive/navigation_ah_2007/
- ¹⁰³ Such organisations manage historic sites in the marine zone under broadly the same suite of powers (primarily the National Environmental Protection Act (1969)), its amendment, the National Environmental Quality Act (1992) (as amended and regulations at 40 CFR 1500-1508, and NHPA (1966), in particular Section 106 as amended and regulations at 36 CFR 60, 63, 65, 78, 79). The remit of the MMS and NPS covers both the terrestrial and marine environments. As noted above, all are organisations with no real UK counterpart. The major focus of the MMS in particular, including its archaeologists, is on energy extraction sites (primarily oil and gas), not construction aggregates as in the UK.
- ¹⁰⁴ Following on this, if any project – including aggregates extraction – takes place on federal land, uses federal money, or otherwise must comply with federal regulations, and in the case of the MMS discussed above then Section 106 of the NHPA (1966) comes into play. However, it should be noted none of these laws or organisations specifically applies to the management of historic resources in relation to specifically aggregates. See <http://www.nps.gov/policy/DOrders/DOrder28A.html>; also <http://www.nps.gov/archeology/>, including a list of NPS Archaeology Programme publications at <http://www.nps.gov/archeology/aepubs.htm> and NPS Archaeology Programme 'Professional Tools' at <http://www.nps.gov/history/archeology/TOOLS/INDEX.HTM>
- ¹⁰⁵ Thirteen national marine sanctuaries have been established under the National Marine Sanctuaries Act (1972) – these designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, educational, or aesthetic qualities as national marine sanctuaries. The NOAA Maritime Heritage Program responsible for the management of historic resources in relation to this Act, working in partnership with other federal management organisations like the MMS and NPS. Federal law requires proper care and preservation of items of significance to the nation's historical, educational, cultural or artistic endeavours. The program has been particularly successful in the development of its 'public archaeology' remit, undertaking a wide range of high-profile expeditions across the US, including outside of the formal national marine sanctuaries. See http://sanctuaries.noaa.gov/maritime/expeditions/mh_expeditions.html
- ¹⁰⁶ The core Environmental Regulations in the US Offshore Oil and Gas Industry are outlined at: <http://www.oilandgasforum.net/management/regula/USApr.htm>
- ¹⁰⁷ Such laws offer a model for future marine zone management around the coast of Australia. For example, in the Australian State of Victoria, Indigenous Heritage is protected via either a Cultural Heritage Management Plan or a Permit. A Cultural Heritage Management Plan considers the effects of an activity on the known and potential Indigenous sites in any area. It is mandatory if the activity area falls in an area of high cultural sensitivity (an area of known sites or high potential for sites based on predictive modelling) and it is considered a high impact activity. Once/if approved, a Cultural Heritage Management Plan give the proponent the go ahead with the activity under the conditions proposed: this process is outlined in [http://www.aboriginalaffairs.vic.gov.au/web7/rwpgslib.nsf/GraphicFiles/CHMPandPlanningInfoSheet/\\$file/CHMPandPlanningInfoSheet.pdf](http://www.aboriginalaffairs.vic.gov.au/web7/rwpgslib.nsf/GraphicFiles/CHMPandPlanningInfoSheet/$file/CHMPandPlanningInfoSheet.pdf) and [http://www.aboriginalaffairs.vic.gov.au/web7/rwpgslib.nsf/GraphicFiles/CHMP+PDF/\\$file/Guide+to+Preparing+a+Cultural+Heritage+Management+Plan+-+November+08+PDF.pdf](http://www.aboriginalaffairs.vic.gov.au/web7/rwpgslib.nsf/GraphicFiles/CHMP+PDF/$file/Guide+to+Preparing+a+Cultural+Heritage+Management+Plan+-+November+08+PDF.pdf)
- ¹⁰⁸ Dix, J. et al, 2007 *Modelling Exclusion Zones for Marine Aggregate Dredging*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 172-75, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf-9-mb).aspx)
- ¹⁰⁹ **Source:** Dix, J. et al, 2007 *Modelling Exclusion Zones for Marine Aggregate Dredging*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 172-75, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf-9-mb).aspx)
- ¹¹⁰ Such limited marine-zone development that impacts on heritage resources comprises: [a] coastal zone development like port and harbour facilities (including channel dredging and beach replenishment), where heritage is managed under terrestrial Federal and State legislation (a particular concern in the historic waterfronts of major urban centres like Sydney, Melbourne, Adelaide, Darwin, Fremantle, etc.), and; [b] specific shipwrecks identified and protected under dedicated Federal and State marine heritage legislation that are deemed to be of special and specific historic, cultural, environmental or other interest.
- ¹¹¹ See Lennon, J. et al. (2001) *Natural and Cultural Heritage Theme Report: Australia State of the Environment Report 2001*. Canberra: CSIRO on behalf of the Department of the Environment and Heritage,

- <http://www.environment.gov.au/soe/2001/publications/theme-reports/heritage/pubs/heritage.pdf>, 10-11. The situation in Australia is complicated by the variety of overlapping Federal and State laws. For example, in Western Australia (a State of considerable mineral working), mineral exploration and mining is primarily administered under the Mining Act (1978), but an extensive array of other Western Australian legislation impacting on the minerals industry¹¹¹. Similarly, in South Australia, another State of significant mineral extraction, prior to commencement of exploration activities organizations must fulfil obligations primarily under the Aboriginal Heritage Act (1988) but also other laws (including the Mining Act (1971), the Heritage Places Act (1993), the Opal Mining Act (1995), the Offshore Minerals Act (2000), the Petroleum Act (2000), and the Petroleum (Submerged Lands) Act (1982)). Commonwealth (e.g. Federal) legislation applies only where Commonwealth decisions are required, for example, matters of national environmental significance, Native Title, World Heritage, foreign investment and uranium export. Relevant Commonwealth legislation includes the Australian Heritage Commission Act (1975), the Historic Shipwrecks Act (1976), the Aboriginal and Torres Strait Islander Heritage Protection Act (1984), the Protection of Movable Cultural Heritage Act (1986), the Native Title Act (1993), the Environment Conservation and Biodiversity Conservation Act (1999), the Environment and Heritage Legislation Amendment Act (No. 1) (2003) (which added heritage preservation to the aforementioned Environment Conservation and Biodiversity Conservation Act), and the Australian Heritage Council Act (2003). In addition, under the terms of the National Reserve System Program initiated by the Natural Heritage Trust in 1996 to improve the representation of the Interim Biogeographic Regionalisation for Australia (IBRA) regions in the National Reserve System, there are 153 marine protected areas, including 13 managed by the Commonwealth Government, some of which include historic/cultural remains (see Lennon, J. et al. (2001) *Natural and Cultural Heritage Theme Report: Australia State of the Environment Report 2001*. Canberra: CSIRO on behalf of the Department of the Environment and Heritage, <http://www.environment.gov.au/soe/2001/publications/theme-reports/heritage/pubs/heritage.pdf>, 27-29). The Commonwealth's Environment Protection and Biodiversity Conservation Act (1999) is particularly significant, defining as it does the 'environment' in an admirably holistic fashion to include: [a] ecosystems and their constituent parts, including people and communities; [b] natural and physical resources; [c] the qualities and characteristics of locations, places and area, and; [d] social, economic and cultural aspects – a broad-based definition and law that has no comparable model in current UK law (see Lennon, J. et al. 2001 *Natural and Cultural Heritage Theme Report: Australia State of the Environment Report 2001*. Canberra: CSIRO on behalf of the Department of the Environment and Heritage, <http://www.environment.gov.au/soe/2001/publications/theme-reports/heritage/pubs/heritage.pdf>, 8-9).
- ¹¹² See *Marine Aggregate Dredging and the Historic Environment: Guidance Note* (2003), http://www.english-heritage.org.uk/upload/pdf/Marine_aggregate_dredging.pdf
- ¹¹³ See *Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest*, <http://www.wessexarch.co.uk/projects/marine/bmapa/index.html>
- ¹¹⁴ For example the Association of Mining and Exploration Companies' (AMEC) *Interim Code of Conduct*, see [http://www.amec.org.au/media/docs/AMEC-CodeOfConduct\(final\).pdf](http://www.amec.org.au/media/docs/AMEC-CodeOfConduct(final).pdf)
- ¹¹⁵ See Lenegan, C. (2005) *Resourcing an Innovative Industry: Minerals Week 2005 Address on 'the Minerals Sector and Indigenous Relations'*. <http://www.atns.net.au/papers/Lenegan.pdf>
- ¹¹⁶ Gupta, S. et al, 2007 *Submerged Palaeo-Arun and Solent Rivers: Reconstruction of Prehistoric Landscapes*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 94-97, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf.-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf.-9-mb).aspx)
- ¹¹⁷ See Flemming, N. 2004 *Submarine Prehistoric Archaeology of the North Sea: Research Priorities and Collaborations with Industry*. York.
- ¹¹⁸ See Westley, K. et al, 2004 *A Reassessment of the Archaeological Potential of Continental Shelves*. Southampton. 1.
- ¹¹⁹ See Gaffney, V. and Thomson, K. 2007 *The North Sea Palaeolandscapes Project*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 114-19, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf.-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf.-9-mb).aspx)
- ¹²⁰ **Source:** See Gupta, S. et al, 2007 *Submerged Palaeo-Arun and Solent Rivers: Reconstruction of Prehistoric Landscapes*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 94-97, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf.-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf.-9-mb).aspx)
- ¹²¹ See Gupta, S. et al, 2007 *Submerged Palaeo-Arun and Solent Rivers: Reconstruction of Prehistoric Landscapes*. In Newell, R. and Garner, D. (eds.) *Marine Aggregate Extraction: Helping to Determine Good Practice*. London. 94-97, [http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-\(july-2007\)-\(pdf.-9-mb\).aspx](http://www.alsf-mepf.org.uk/downloads/documents/marine-aggregate-extraction-helping-to-determine-good-practice-(july-2007)-(pdf.-9-mb).aspx)
- ¹²² For a full list of ALSF marine heritage projects and in most cases project reports available for download, see: http://ads.ahds.ac.uk/catalogue/projArch/alsf/search_maritime.cfm. Similarly, for a full list of MMS marine heritage projects and in most cases project reports available for download, see: <http://www.gomr.mms.gov/homepg/whatsnew/papers/papers.html#ARCHAEOLOGY>, <https://www.gomr.mms.gov/Webstore/gomrcat.asp>, and http://www.gomr.mms.gov/homepg/regulate/enviro/ongoing_studies/gom-se.html. All of the projects listed in the footnotes below are available from these websites.
- ¹²³ For example ALSF projects 3324 *Assessing, Evaluating and Recording Wrecks on the Seabed* (http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/); 3364 *High Resolution Sonar for the Archaeological Investigation of Marine Aggregate Deposits* (http://ads.ahds.ac.uk/catalogue/archive/highsonar_eh_2008/); 3594 *Multi Beam Sonar on Wrecks* (http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/) and 3877 *Wrecks on the Seabed R2* (http://ads.ahds.ac.uk/catalogue/archive/wrecks_eh_2006/).
- ¹²⁴ For example ALSF projects 3277 and 3543 *Submerged Palaeo-Arun* (http://ads.ahds.ac.uk/catalogue/archive/palaeoarun_eh_2007/) and http://ads.ahds.ac.uk/catalogue/archive/palaeoarun_eh_2007/) and 3362 *Re-Assessment of the Archaeological Potential of Continental Shelves* (http://ads.ahds.ac.uk/catalogue/archive/continentshelves_eh_2008/).
- ¹²⁵ For example ALSF projects 3783 *England's Historic Seascapes: Liverpool Bay Pilot Area* (http://ads.ahds.ac.uk/catalogue/archive/ehsliverpool_eh_2007/); 4728 *England's Historic Seascapes: Solent and Isle of Wight* (http://ads.ahds.ac.uk/catalogue/archive/ehssolent_eh_2007/); 4729 *England's Historic Seascapes: Southwold to Clacton* (http://ads.ahds.ac.uk/catalogue/archive/ehsclacton_eh_2007/); 4731 *England's Historic Seascapes: Scarborough to Hartlepool* (http://ads.ahds.ac.uk/catalogue/archive/ehssc Scarborough_eh_2007/) and 5254 *England's Historic Seascapes: HSC Method Consolidation* (http://ads.ahds.ac.uk/catalogue/archive/seascapes_eh_2008/). A US comparison to these projects is MMS project 2006-036 *Study to Conduct National Register of Historic Places Evaluations of Submerged Sites on the Gulf of Mexico Outer Continental Shelf* (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3596.pdf>).
- ¹²⁶ For example ALSF project 3365 *Modelling Exclusion Zones for Marine Aggregate Dredging* (http://ads.ahds.ac.uk/catalogue/archive/dredging_eh_2008/). A US comparison to this project are MMS projects 2004-005 *Archaeological Damage from Offshore Dredging* (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/2945.pdf>); 3036 *Refining and*

- Revising the Gulf of Mexico OCS Region High Probability Model for Historic Shipwrecks (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/2/3033.pdf>); and 99-0014 Seafloor Monitoring Project: First Annual Technical Report (<http://www.gomr.mms.gov/homepg/whatsnew/techann/990014.html>).
- ¹²⁷ For example ALSF project 3837 Rapid Archaeological Site Surveying and Evaluation in the Marine Environment and Transitional Zones (http://ads.ahds.ac.uk/catalogue/archive/rasse_ah_2007/).
- ¹²⁸ For example ALSF project 4632 Transition Zone Mapping for Marine-Terrestrial Archaeological Continuity (http://ads.ahds.ac.uk/catalogue/archive/cplr_ah_2009/) – see also projects 3277 and 3543 Submerged Palaeo-Arun (http://ads.ahds.ac.uk/catalogue/archive/palaeoarun_ah_2007/) and 3362 Re-Assessment of the Archaeological Potential of Continental Shelves (http://ads.ahds.ac.uk/catalogue/archive/continentshelves_ah_2008/).
- ¹²⁹ For example ALSF project 3645 BMAPA Protocol for Reporting Finds of Archaeological Interest – see also 5223 Aircraft Crash Sites at Sea (http://ads.ahds.ac.uk/catalogue/archive/bmapa_ah_2006/).
- ¹³⁰ For example ALSF project 5223 Aircraft Crash Sites at Sea (http://ads.ahds.ac.uk/catalogue/archive/aircraft_ah_2008/). A US comparison to this project are MMS projects 2006-072 Mica Shipwreck Project (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4217.pdf>); 2008-018 Viosca Knoll Wreck (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4316.pdf>); 2008-037 Archaeological Excavation of the Mardi Gras Shipwreck (<http://www.gomr.mms.gov/PDFs/2008/2008-037.pdf>); 89-0092 An Eighteenth-Century Ballast Pile Site, Chandeleur Islands, Louisiana (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3689.pdf>); and 89-0023, MMS 89-0024 and MMS 89-0025 Historic Shipwrecks and Magnetic Anomalies of the Northern Gulf of Mexico (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3678.pdf> and <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3679.pdf> and <http://www.gomr.mms.gov/PI/PDFImages/ESPIS/3/3680.pdf>).
- ¹³¹ For example ALSF projects 3876 Seabed Prehistory R2 (http://ads.ahds.ac.uk/catalogue/archive/seaprehist_ah_2009/); 4600 Habbisburgh/Pakefield Exposures (http://ads.ahds.ac.uk/catalogue/archive/seaprehist_ah_2009/); 5401 Seabed Grab Sampling (http://ads.ahds.ac.uk/catalogue/archive/seaprehist_ah_2009/); and 3968 Severn Estuary: Assessment of Sources for Appraisal of Impact of Maritime Aggregate Extraction (http://ads.ahds.ac.uk/catalogue/archive/sevemaggregate_ah_2007/). A US comparison to these projects are MMS projects GM-92-42-136 Examining and Testing Potential Prehistoric Archaeological Features on the Gulf Of Mexico OCS (http://www.gomr.mms.gov/homepg/regulate/environ/ongoing_studies/gm/GM-92-42-136.html); GM-09-10 Inventory and Analysis of Archaeological Site Occurrence on the Atlantic OCS (http://www.gomr.mms.gov/homepg/regulate/environ/ongoing_studies/gm/GM-09-10.html); and 86-0119 Archaeological Investigations on the OCS: A Study Within the Sabine River Valley, Offshore Louisiana and Texas.
- ¹³² For example ALSF project 3963 Solent Aggregates to Outreach (http://ads.ahds.ac.uk/catalogue/archive/solaggs_ah_2008/); 4840 Maritime Archaeology Access and Learning Workshops (http://ads.ahds.ac.uk/catalogue/archive/access_ah_2008/) and 5204 Aggregates to Outreach: Teaching Pack and Associated Initiatives (http://ads.ahds.ac.uk/catalogue/archive/solaggs_ah_2008/).
- ¹³³ For example ALSF project 3322 Artefacts from the Sea (http://ads.ahds.ac.uk/catalogue/archive/artefactssea_ah_2007/); 4000 Beach Replenishment and Derived Archaeological Material (http://ads.ahds.ac.uk/catalogue/archive/beach_ah_2008/) – see also 3645 BMAPA Protocol for Reporting Finds of Archaeological Interest (http://ads.ahds.ac.uk/catalogue/archive/bmapa_ah_2006/). A US comparison to this project is MMS project 99-0068 Spatial Data Analysis of Artefacts Redeposited by Coastal Erosion (<http://www.mms.gov/itd/hdqrspubs.htm>).
- ¹³⁴ For example ALSF projects 3323 and 3878 England's Shipping (http://ads.ahds.ac.uk/catalogue/archive/englandship_ah_2007/) and http://ads.ahds.ac.uk/catalogue/archive/englandship_ah_2007/) and 3917 Enhancing our Understanding: Navigational Hazards (http://ads.ahds.ac.uk/catalogue/archive/navigation_ah_2007/).
- ¹³⁵ For example ALSF project 5402 Wrecks Ecology (http://ads.ahds.ac.uk/catalogue/archive/wrecksecology_ah_2008/). A US comparison to this project are MMS projects 2007-015 Archaeological and Biological Analysis of World War II Shipwrecks in the Gulf of Mexico: A Pilot Study of the Artificial Reef Effect in Deepwater (<http://www.gomr.mms.gov/PI/PDFImages/ESPIS/4/4240.pdf>); GM-08-09 Investigation for Potential Spanish Shipwrecks in Ultra-Deepwater (http://www.gomr.mms.gov/homepg/regulate/environ/ongoing_studies/gm/GM-08-09.html); and 2008-018 Viosca Knoll Wreck; 2008-037 Archaeological Excavation of the Mardi Gras Shipwreck (<http://www.gomr.mms.gov/Webstore/gomrcat.asp>).
- ¹³⁶ For example ALSF projects 3767 On the Importance of Shipwrecks (http://ads.ahds.ac.uk/catalogue/archive/shipwrecks_ah_2006/) and 3916 Enhancing our Understanding: Shipwreck Importance (http://ads.ahds.ac.uk/catalogue/archive/understanding_ah_2007/).