



Archaeology within Marine Aggregate Environmental Statements

Aggregate Levy Sustainability Fund Marine Aggregates & the Historic Environment

English Heritage Project 4740

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Non Technical Summary

The Hampshire and Wight Trust for Maritime Archaeology has undertaken a review how archaeology is considered in the Environmental Statements (ESs) which accompany marine aggregate dredging licence applications. The project has been commissioned by English Heritage and funded by the Aggregate Levy Sustainability Fund.

Marine extracted sand and gravel are a key resource for construction and coastal defence schemes and 21% used in England and Wales is from marine sources. To ensure these benefits are sustainable marine aggregate extraction is licensed. Licence applications are accompanied by an ES which outlines the potential impact of extraction and aims to reduce potential damage to the environment. Maritime heritage and archaeology issues are considered in an ES.

Twenty-nine ESs were collated for the review with ten selected for in depth analysis of their source use. The review investigates archaeological work in support of ESs: research, advice, recommendations and implementation of mitigation measures. This review has sought the opinions of both the aggregate industry and heritage professionals.

Four key sources were identified; relevant legal designations; the Joint Nautical Archaeological Policy Committee (JNAPC) Code of Practice for Seabed Developers, National Monument Record (NMR) Maritime Section and the United Kingdom Hydrographic Office (UKHO) Wreck Index. The assessment of the range of sources used found these key sources were used in the vast majority of cases; other sources were not subject to such widespread use. The use of geophysical data and historic chart are important and their use is on the increase but many ESs did not utilise this data. Geophysical data and historic charts were usually only collected from one organisation with no attempt to investigate the potential of other organisations. Local museums and collections were used infrequently in ESs. Furthermore, the use of secondary and non-standard sources was inconsistent. Future schemes should try to rectify this situation.

How sources were used in an ES varied. This is due in part to the individual researchers training and experience. There is also correlation between poor source use and not using an Archaeological Technical Report in support of an ES. Clearly, a supplementary report is important to encourage full investigation of sources.

Very few alternative sources of data have been highlighted during this review. Two national sources offer cost effective potential to researchers; the British Geological Society and the National Maritime Museum. Neither appear to have been used, they were not explicitly mentioned in ESs. Local sources also offer researchers a potentially useful data. Researchers should make an effort to identify local sources and at least make initial enquiries into their potential benefit.

Archaeological advice on shipwrecks is comprehensive. Advice on submerged landscapes has improved, although this advice is more poorly developed than that provided for shipwrecks. There is a potential for unknown sites to be present in dredging areas, yet often no attempt is made to identify this resource. Offshore installations and infrastructure were not covered in advice and coastal and intertidal sites were very poorly represented. This is largely due to there being no perceived threat to these site types.

Overall mitigation recommendations were good although it is apparent that this was due to quality groundwork in the earlier stages of the ES. Therefore it is very important that ESs use a wide range of sources and offer comprehensive advice. Recommendations were followed through and implemented once the licence had been granted. Mitigation strategies are currently working with current schemes provided a large potential for development in the future.

Of the ESs which specify practical mitigation strategies, fifteen are currently active. Further investigation of these strategies was undertaken by questioning the relevant aggregate companies. Individual strategies were identified; this included exclusion zones for shipwrecks and anomalies, archaeological interpretation of monitoring surveys, grab samples and pre-dredge surveys.

Overall opinion on mitigation implementation was sought from relevant individuals. This included representatives from aggregate companies which have active strategies in place, English Heritage (EH) and the NMR (National Monument Record) for the role in administering the Protocol for Finds. The responses targeted four areas; advice on mitigation implementation, the British Marine Aggregate Producers Association (BMAPA)/EH Protocol for Finds, Aggregates Levy Sustainability Fund (ALSF) Projects and the range of mitigation strategies. The results were very positive suggesting a strong foundation has been built between the respective parties. A number of future challenges have been highlighted; it is hoped that this review will lead to these problems being solved.

The projects results were judged against current best practice to identify areas that require attention. Thirteen areas were highlighted relating to source use, archaeological advice and the subsequent mitigation strategies. Under each area three potential actions were identified. These actions are listed in order of simplicity and cost effectiveness and could be used to help influence future developments of best practice.

As this is the first detailed review of archaeological considerations in ESs a number of challenges were faced when undertaking the project, these have been included in this report. Marine archaeology, the aggregate industry, the legal framework of licensing applications and relevant best practice guidelines have been, and continue to, undergo fast paced changes. Due to this changing landscape it is important that future reviews are undertaken to ensure standards are maintained.

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Gavin Stone undertook the research and assessment for this review. Julie Satchell managed the project. Report writing by Gavin Stone and Julie Satchell.

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1 Introduction

The development of best practice in relation to the inclusion of marine cultural heritage within the environmental assessment process is an area that is under scrutiny. The definition and development of 'best practice' requires frequent review against the regulatory framework, advances in knowledge of the extent and nature of the resource and new and developing techniques and methods.

This project investigates how archaeology is considered within Environmental Statements (ESs) submitted for marine aggregate dredging licences. The study considered a selection of ESs dating from across the period for which their production has been required in support of licence applications before focussing on ESs submitted since 1998, when the application procedure underwent major changes. The review uses key legislation and guidance from the last two decades as measures for best practice.

A total of twenty-nine ESs were assessed for their source use, provision for archaeological advice and subsequent mitigation recommendations. Ten ESs were selected as case studies for detailed investigation of how sources were used. Where applicable, the implementation measures that resulted from the ESs were assessed using a combination of raw data and opinion from those involved in the process. The results of this review were compared to current best practice and recommendations for revision have been forwarded.

This report has four main sections which assesses each project objective individually. Section 5 assesses the range of desk based sources consulted in ESs and how they have been used. Section 6 reviews the archaeological advice and mitigation recommendations provided in ESs. Section 7 investigates how archaeological mitigation strategies are implemented after a licence has been granted. Section 8 assesses current Best Practice guidelines in light of the results from this review.

This project was commissioned by EH and funded through the ALSF. It has also received support from the marine aggregate dredging industry.

2 Project Background

2.1 Marine Aggregate Extraction

Marine extracted sand and gravel are a key resource for construction and coastal defence schemes. Around 21% of sand and gravel used in England and Wales is from marine sources. The use of this material reduces the demand for land based quarrying, which impacts the environment, agriculture and development value of an area.

Marine aggregates have clear benefits in coastal defence and beach replenishment schemes. They closely resemble existing coastal materials and reduce the need of terrestrial transport as they can be deposited close to the final destination. This has huge environmental benefits, which the Government is keen to support. The Government also recognises that these benefits should be sustainable and do not adversely impact on the marine environment. Procedures are in place to monitor extraction; consent from the Government and a licence from The Crown Estate (the landowner) is required prior to dredging.

A variety of legal designations and non-statutory guidance has been produced on the issue in the past twenty years. There has also been significant legislation and documentation concerning archaeology, which relates to marine aggregate extraction both directly and indirectly. A chronology of these developments is listed in Table 1 (see section 2.5).

2.2 The Environmental Impact Assessment Regime

2.2.1 Marine aggregate extraction licensing

The licensing procedures for marine aggregate extraction have changed considerably over the last 30 years. Since 1968, applications have been assessed using the Government View (GV) process. The Government assesses extraction for its impact on the marine environment, fisheries and the fishing industry. This system continued until the 1980's with the introduction of the Environmental Impact Assessment (EIA).

2.2.2 EIA Directive

The requirement for the assessment of potential impacts on the environment was outlined within the European Council EIA Directive (85/337/EEC) in 1985. The procedure covers a broad range of activities, which require an environmental impact statement and consultation with the public and environmental authorities. In 1989 the EIA requirements were incorporated into the GV process. The marine aggregate industry and The Crown Estate undertook the new requirements voluntarily. As a result, all licence applications since 1989 have included an EIA. The EIA Directive was amended in 1997 (97/11/EC).

2.2.3 Changes in legislation

New proposals were drafted in 1998 to increase the transparency of the process and reduce the timescale of GV. The draft "Environmental Impact

Assessment and Habitats (Extraction of Minerals by Marine Dredging) Regulations” will provide a statutory system that complies with the EIA Directive (97/11/EC amending 85/337/EEC). It is yet to be passed into the legislature. In the interim, the regulations have generated new guidelines for the GV process. Marine aggregate companies must submit an Environmental Statement (ES) with all new licence applications. The ES should include a Scoping Study, an EIA and a Coastal Impact Study. The onus is on the company to undertake studies, identify concerns, undertake consultation and resolve issues (Gubbay 2005). Furthermore, there should be various phases of public consultation, which should include Non-Governmental Organisations and other interested parties.

2.2.4 Marine Minerals Guidance Note 1

The Marine Minerals Guidance Note 1: MMG1 (Office of the Deputy Prime Minister [ODPM] 2002) was published to clearly set out Government policies and procedures on marine aggregate extraction. It states:

“14. The Government will pursue a precautionary approach in the consideration of applications for marine minerals dredging. The Secretary of State will only issue a favourable GV or grant permission for new areas for marine minerals extraction where he is satisfied that all environmental issues, including coastal impacts, have been satisfactorily resolved.”

MMG1 increases the environmental information required to support applications. It has also expanded the consideration of impacts to include cultural heritage and tourism alongside biological and physical issues with consultation from relevant interest groups.

2.2.5 Review of Environmental Statements

The 'Marine Aggregate Extraction: A review of selected environmental statements' (The Wildlife Trusts and World Wildlife Fund [WWF] UK 2003) project assessed the quality of a sample of ESs from licence applications. The review addressed gaps and areas of weakness in ESs, which led to recommendations for future improvements.

The project was undertaken from a marine wildlife and habitat perspective, assessing five ESs completed during 1999-2002. The ESs were all undertaken prior to the publication of MMG1. It was comprehensive in its coverage of issues relating to the marine biological and physical environment. It recognised that ESs are “...the cornerstone of the GV as it is principal source of information used by OPDM and other stakeholders to assess impacts. “

2.2.6 Draft Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Dredging) Regulations

The regulations seek to formally transpose the GV procedure into the legislature. Consultation took place during June and August 2006 and the summary of responses was released in November 2006. The regulations should be in place by early 2007. Procedural guidance will be provided on the regulations in the Marine Minerals Guidance Note 2 (MMG2). The guidance

note sets out the procedures that will be followed in the decision making process and will be used in conjunction with MMG1.

2.3 Archaeology Within Marine Aggregate

2.3.1 The significance of the resource

The British Isles and its continental neighbours have been greatly influenced by its surrounding seas. The sea has served as a gateway to migration, stimulated ideological and technological innovation, fuelled growth in trade and industry and provided a variety of resources. During periods of lower sea levels, the current seabed and foreshore provided a landscape inhabited and exploited by ancient peoples for half million years. This landscape has since been drowned, preserving archaeological and palaeo-environmental evidence.

These traces of the past litter the seabed; including shipwrecks, war graves, ancient watercraft, drowned landscapes, occupation sites and stone tools. These sites provide insight into how we developed into who we are today and are valuable tools in education, leisure and tourism. Archaeological sites contain irreplaceable information and should be appropriately managed, preserved and/or recorded.

2.3.2 Potential impact of dredging

Without adequate assessment and mitigation marine aggregate dredging may have a negative impact on archaeological sites and palaeo-environmental evidence. Damage to a site could lead to a loss of irreplaceable information, destabilisation of the protective environment and/or destruction of components. Artefacts and relationships between site elements may be lost or disturbed. Furthermore, changes in coastal processes and local sediment patterns could directly or indirectly lead to erosion, instability and the destruction of a site.

2.3.3 Archaeological considerations in EIAs

Cultural heritage is an environmental factor, which must be assessed for direct or indirect effects under the EIA Directive. Information relating to such effects should include “a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects”. It should also include the data required to identify and assess the main effects.

The European Union (EU) adopted the Strategic Environmental Assessment (SEA) Directive in 2004. It states that environmental consequences of developments must be identified and assessed prior to their adoption. Environmental effects are not purely considered in ecological effects; it also includes the impact on cultural heritage. Environmental organisations and the public should be fully consulted on these effects.

The government has adopted the EIA and SEA Directives. Recent developments in the GV procedure reflect this. Therefore, archaeological advice and potential mitigations should be included in ESs, which accompany marine aggregate dredging licences.

2.3.4 IFA Standards and Guidance (1994)

The Institute of Field Archaeologists (IFA) published 'Standards and Guidance for Desk Based Assessment' in 1994. The document defined best practice for archaeologists undertaking DBAs and included sites in the intertidal zone and underwater. It provided procedures for project designs, sources, data collection, reporting and other considerations.

Source types and locations were detailed in an annex, including archaeological databases, historical documents, cartography, pictorial documents, geotechnical information and secondary sources. While it did not explicitly highlight sources for work in the offshore zone, many relevant sources were included. It was revised in 1999 and 2001.

2.3.5 JNAPC Code of Practice for Seabed Developers (1995)

The Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Developers sets out non-statutory procedures for consultation and cooperation between seabed developers and archaeologists. Its main objective is to encourage developers to seek archaeological advice as early as possible to allow potential implications to be considered. Developers are encouraged to report discoveries, take account of need for cooperation and undertake archaeological survey and investigation where development is unavoidable.

The Code also includes a voluntary undertaking by the British Marine Aggregate Producers Association (BMAPA). This states, "...members of the BMAPA will co-operate with the JNAPC in pursuit of aims to preserve archaeological remains." Furthermore, geophysical surveys will be made available to archaeologists and when possible archaeologists will undertake a watching brief during dredging operations.

The JNAPC Code of Practice was, for quite some time, one of the few pieces of specific guidance for developers in the offshore zone. The Code has recently been amended (see 2.4.3) although all ESs considered for this project were submitted under the previous version.

2.3.5 Marine Minerals Guidance Note 1

The potential adverse impact on war graves, wrecks and other remains of archaeological interest requires careful consideration under MMG1. Dredging should be undertaken in areas and in ways that do not have "unacceptable impacts" on archaeology (among other factors). It also states that the dredging industry should continue to use the JNAPC Code of Practice for Seabed Developers, as it is consistent with the Government's policy on archaeology.

It contains suggestions for archaeological mitigation measures:

"A21. The ES should include consideration of the practical steps that might be taken to mitigate the effects of the proposed mineral extraction. These should be site specific and closely linked to particular potential environmental effects identified

during the EIA process. Mitigation measures may include: safety buffer zones around war graves, important wrecks or other marine archaeological sites, pipelines and cables.”

2.4 Recent Initiatives

2.4.1 Marine Aggregate Dredging and the Historic Environment

In 2003, BMAPA and English Heritage produced the “Marine Aggregate Dredging and the Historic Environment: guidance note”. The guidance elaborates on the JNAPC Code of Practice and MMG1 by providing practical advice on assessing and mitigating the archaeological impacts of dredging. It is aimed at all parties involved in the GV procedure; the aggregate companies, archaeological consultants, curators and regulators.

The guidance details various issues relating to the marine historic environment including its importance, existing statutory controls and the possible effects of aggregate extraction. Archaeological best practice is described to illustrate the process of investigation from initial advice through to mitigation and monitoring.

2.4.2 Protocol for reporting finds of archaeological interest

The implementation of a protocol to report and deal with finds was detailed in the BMAPA and English Heritage guidance note. Both organisations felt that a single industry standard protocol, which applied to all areas, would be preferable. As a result they published the “Protocol for reporting finds of archaeological interest” in 2005.

It aims to reduce the impact of dredging on the marine historic environment by addressing finds made at sea, onboard and at wharves. Aggregate companies provide a reporting structure and awareness programmes for staff. English Heritage are designated as the archaeological contact for the companies, offering advice on identification, conservation, further proposals and mitigation measures. It will also liaise between the companies and the Receiver of Wreck, the Crown Estate and other archaeological bodies.

2.4.3 New JNAPC Code of Practice for Seabed Development (2006)

The Code has recently been redrafted to reflect the changes in legislation and the use of the marine environment. Furthermore, it highlights changes in archaeological practice and techniques relating to the marine historic environment over the last decade. There is also an increased awareness of the need to protect and manage this resource.

The Code builds on the original, increasing guidance to developers on obtaining archaeological advice, risk management and legislative implications. Best practice archaeological advice is detailed with information relating to the assessment of heritage and the subsequent fieldwork, mitigation measures and monitoring. It provides a comprehensive list of expert contacts for further advice. As the new Code was under consultation during 2006, all ESs considered for this project fall under the original Code.

2.4.4 Marine Aggregate Extraction: A review of selected environmental statements

The review by the Wildlife Trust and WWF-UK was undertaken from a wildlife and habitat perspective. It did not undertake any detailed analysis of archaeological issues and only two of the five ESs reviewed included archaeology. The other three were not applicable as "...the EIA had failed to reveal marine archaeological features of potential concern."

The two applicable ESs were awarded a 'good' score, as the generic guidance was successfully undertaken. Yet the non-applicable ESs also received a 'good' score, which resulted in archaeology being the only section in the review, which scored good overall. This may have given an unrepresentative view of archaeology within ESs.

The review recognised that future ESs will have to meet additional archaeological requirements. It also noted that submerged landscapes were increasingly recognised alongside the traditional subjects of shipwrecks and war graves. This process of review, assessment and analysis proved to be particularly fruitful for the interrogation of the development of responses to EIA requirements. It also enabled a comparison of different approaches taken. Through such a review it is possible to assess the effectiveness of new regulations, guidance and methods. As a result this project was formulated to investigate archaeological considerations in ESs.

2.4.5 Aggregate Levy Sustainability Fund

The Aggregate Levy Sustainability Fund (ALSF) aims to offset the environmental impacts of aggregate extraction by funding a range of projects. English Heritage distributes funds on behalf of the Department for Environment, Food and Rural Affairs (DEFRA) to develop initiatives which will benefit the understanding and protection of the historic environment. A two-year pilot scheme began in 2002 and was followed by a second round of funding for 2004-2007. The transfer of responsibility for England's marine historic environment to English Heritage resulted in the funding of a range of maritime projects.

The projects cover a variety of archaeological issues; guidance on the assessment of the marine historic environment, mapping the potential of the seabed and improving the baseline information available for effective management of the resource. The results of these projects are directly relevant to marine aggregate dredging and directly increasing understanding of archaeological considerations in ESs.

2.5 Chronology of Legal and Non-statutory Developments

Title	LD	1985			1990			1995			2000			2005
EEC EIA Directive 1985		■												
Protection of Military Remains Act			■											
EIA incorporated into GV process				■										
Valletta Convention						■								
IFA Standards & Guidance for DBAs							■							
JNAPC Code of Practice							■							
Merchant Shipping Act 1995	■						■							
EU EIA Directive 1997	■							■						
UNESCO Convention on the Protection of the Underwater Cultural Heritage										■				
Revised IFA Standards & Guidance for DBAs										■				
Marine Minerals Guidance Note 1											■			
ALSF Round 1 Projects												■	■	
BMAPA/EH Marine Aggregate Dredging and the Historic Environment: guidance note													■	
Marine Aggregate Extraction: A review of selected environmental statements													■	
EU SEA Directive	■													■
ALSF Round 2 Projects														■
BMAPA/EH Protocol for reporting finds of archaeological interest														■
CEFAS: The role of seabed mapping techniques														■
Revised JNAPC Code of Practice														■
Draft EIA and Natural Habitats (Extraction of Minerals by Dredging) Regulations	■													■
Draft MMG Note 2														■

Table 1: Chronology of Key Documents
(LD = Legal Designation)

3 Aims and Objectives

3.1 Project Aim

The project aims to investigate aspects of archaeology within marine aggregate Environmental Statements by:

- Assessing the need for cost-effective good practice guidelines in relation to aspects of archaeological desk-based assessment
- Reviewing the development of the provision of archaeological advice and mitigation implementation to inform current and future best practice

3.2 Project Objectives

3.2.1 Objective one

To assess the current use of sources for desk-based assessments and investigate the availability of further resources to enhance our ability to predict potential archaeological impacts in a cost-effective manner.

The methodology, results and analysis of this objective is covered in “Section 5: Assessment of Desk Based Sources.”

3.2.2 Objective two

To undertake a comparative review of archaeological advice and mitigation recommendations put forward within environmental statements.

The methodology, results and analysis of this objective is covered in “Section 6: Review of Archaeological Advice and Mitigation Recommendations.”

3.2.3 Objective three

To investigate how mitigation recommendations have been implemented.

The methodology, results and analysis of this objective is covered in “Section 7: Investigation of Mitigation Implementation.”

3.2.4 Objective four

Assess the need for revised good practice guidelines and/or recommendations for the inclusion of archaeology with ESs.

The methodology, results and analysis of this objective is covered in “Section 8: Review of Results against Best Practice.”

4 Data Gathering

4.1 Key Documents

It was important to place the project within the current context of marine mineral extraction regulation, Environmental Impact Assessments and archaeological practice. Relevant documents covering legal obligations and non-statutory guidance were consulted and assessed. Sources from abroad and on prediction/monitoring in ESs were also considered. A full list of these documents is included in the appendix (see section 11.1). Assessment of the results of the project alongside these documents helps to establish the positives and potential areas for improvement within the current framework.

4.2 Environmental Statements

4.2.1 Collating ESs

Over ninety aggregate dredging licensing applications have been filed through the Government View procedure with the Department for Communities and Local Government (DCLG, formerly the ODPM) up to May 2006. Sixty of these applications have been lodged since 1998. Due to the quantity of applications most were viewed at the offices of the aggregate companies, although a minority were viewed at the DCLG in London.

At the outset of the project it was decided that only a selection of pre-1998 applications would be assessed. Due to changes in legislation in 1998 these applications do not reflect recent standards although the selection would provide context to the changing regulatory regime. The pre-1998 ESs were selected at random.

From the initial list of applications provided by the DCLG twenty-nine ESs were viewed. This reduced number was due to several reasons:

- An ES could cover multiple licence areas
- Some applications have not yet reached the stage of requiring an ES
- Some applications are currently on hold
- Only five pre-1998 applications were selected

It should be noted that the reference to 'All ESs' in this report reflects data from ESs collated and included in this review. It does not refer to all ESs undertaken for the purposes of marine aggregate dredging licences. Furthermore, the ESs viewed may be for a licence that has been granted or be part of an ongoing application.

Research was desk based and involved gathering data relating to the use of baseline sources, archaeological advice and mitigation recommendations. All ESs were given a reference number and their originators have been kept anonymous for the purposes of project reporting.

4.2.2 Period grouping of ESs

ESs were grouped into three periods according to their year of publication. The periods were chosen to reflect significant changes in the GV procedure. This method enabled the analysis of ESs in light of contemporary best practice. It also highlighted the possibility of changes in trends between periods.

Period	Description	Total ESs Reviewed
1	Applications prior to 1997 inclusive	5
2	Applications between 1998 – 2002	16
3	Applications since 2003 inclusive	8

Table 2: Period grouping of ESs

4.2.3 Selection of Study Area

A study area of the South Coast was selected, as this is the region of expertise of the Hampshire and Wight Trust for Maritime Archaeology. This includes Hampshire, the Isle of Wight and the adjacent areas off the coast of West Sussex. There were nine ESs in the study area of the twenty-nine ESs collated for this review. One ES was undertaken during Period 1; the other eight were undertaken in Period 2. These were selected as case studies and scrutinised in more depth. One ES from Period 3, outside the study area, was also selected at random. This was important to provide chronological context to the detailed assessment of source use.

5 Assessment of Desk Based Sources

5.1 Methodology

5.1.1 Assessing the range of sources within ESs

All ESs were assessed for the range of sources that were consulted. For the purposes of this review a source was defined as providing information directly (specific archaeological data) or indirectly (legislation/guidance to practice in a particular fashion). Three source types were identified:

1. Key sources
 - Relevant legal designations
 - JNAPC Code of Practice for Seabed Developers
 - NMR Maritime Section
 - United Kingdom Hydrographic Office (UKHO) Wreck Index
2. Standard Sources
 - NMR (Palaeolithic or Mesolithic finds)
 - UKHO Historic Charts and archives
 - Relevant Sites and Monuments Records
 - Records held by the Receiver of Wreck
 - Historic charts held by other sources (e.g. local record offices)
 - Non-statutory procedures (e.g. BMAPA/EH guidance, IFA guidelines)
 - Geophysical data
 - Local museums and collections
 - Larn Shipwreck Index
3. Non-standard and secondary sources
 - Non-standard sources were those used in addition to key/standard sources. They may only be relevant to a particular locality.
 - The use of secondary sources was scored from 1 to 3, where 1=Poor, 2=Average and 3=Good. The score was based quantity of secondary sources used and the consideration of wider material (e.g. geology, oceanography, regional/national/international context).

The distinction between a source being identified as key or standard was based on whether it was consistently important throughout all Periods. Contemporary opinion may regard certain standard sources as important and thus should be identified as key. It was decided though that growth in importance over time should be balanced with its contemporary importance to provide a fairer assessment.

Each ES was checked against the list of key and standard sources. A score was given based on the use of secondary sources. All non-standard sources were noted and considered for their use as alternative sources (see section 4.1.4).

ESs received an overall score for the range of source use. Scores given ranged from 1 to 3, where 1=Poor, 2=Average and 3=Good. The use of all key sources was classed as the most important factor. The guidelines for scoring are as follows:

Rating	Score	Description
Poor	1	Key sources were ignored and/or few standard sources were consulted with poor secondary/alternative source use
Average	2	All key sources and a range of standard sources were consulted with limited/average secondary source use
Good	3	All key sources and most standard sources were consulted with average/good secondary source and non-standard source use

Table 3: Scoring the range of sources used in ESs

5.1.2 Detailed assessment of case studies

The ten case studies selected for detailed analysis were assessed using seven criteria. The selection of the criteria reflects best practice guidelines. ESs received a score in each criteria from 1 to 3, where 1=Poor, 2=Average and 3=Good. The guidelines for scoring are as follows:

1. Extent of study area in relation to dredging zone

Was the study area limited to or extended beyond the dredging zone and if so, to what extent? Is the coastal/terrestrial context considered and if so, to what extent?

2. Level of detail from source

What is the level of reference to sources in the text, images and/or appendices? The varied coverage of each source within an ES was taken into account.

3. Assessment of the quality or reliability of the data

Was the quality or reliability of the data questioned in the ES? Were conflicts between the data highlighted and if so, were they satisfactorily resolved? Did any assessment effect the conclusions drawn from the sources?

4. Use of information within ES

How was the information used? Was it represented purely in the text or used to create images, maps, tables, appendices or other formats?

5. Assembly, summary and organisation of data within ES

Does the structure of the ES suitably represent the data? Is the impact of the data lost due to the ESs assembly/organisation? Is there a summary of the relevance of the data?

6. Summary of data in relation to local/regional context

Is there a summary of the data in relation to the local or regional context? Is this context used to form conclusions?

7. Referencing of sources

Were the sources correctly referenced in the text, footnotes and/or bibliography? Was a bibliography included? The varied referencing of each source within an ES was taken into account.

5.1.3 Identification of organisations with potential resources

A selection of organisations and institutions with data relating to the marine zone were identified as potentially holding collections that were archaeologically significant. They were approached to quantify the potential for accessing their data in relation to marine aggregate assessments and the possible cost implications of this. A number of organisations known to and used by archaeological consultants were also approached to quantify the extent of their collection.

The organisations were split into two groups: national/international and south coast region. The South Coast area was defined as Hampshire and the Isle of Wight. A full list of the organisations approached is in the appendix (see section 11.2).

A questionnaire was emailed to all relevant contacts within each organisation. Questionnaires were sent to multiple departments of some organisations to quantify the various collections held. The questionnaire focused on establishing:

- Scope of the collection
- Access to the collection
- Data relevant to the study area
- Curator's opinion as to whether collection is potentially significant to archaeological consultants

Further web-based research was undertaken on organisations that did not return the questionnaire. Information concerning the scope/access of the collection and whether data may be relevant was collated from the official website. All websites accessed are listed in the bibliography.

The responses were analysed to assess the potential of each resource for use in future ESs. This provided evidence of how the use of an extended range of base line sources could affect the archaeological DBA process.

5.2 Assessing the Range of Sources within ESs

A full list of the raw data from the assessment is included in section 11.4.1.

5.2.1 Key sources

The use of the four key sources was very comprehensive in all 29 ESs. The relevant legal designations, the JNAPC Code of Practice for Seabed Developers and the National Monument Record Maritime Section were all consulted in every case. The UK Hydrographic Office Wreck Index was consulted in 97% of cases. Only one ES did not utilise this source; the ES is from Period 2.

These results are not surprising as the members of BMAPA signed up to the JNAPC Code of Practice in 1995. The Code highlights the necessary legal designations and the NMRM. Therefore, it is expected that all three sources would be utilised. The high usage rate of the UKHO Wreck Index shows that it is an established source for ESs. As for the one ES that did not use this

source it is possible that it was overlooked in the text rather than in the data collection stage. However, this one stray case does not detract from the fact that best practice guidelines are being followed and key sources are the ‘first port of call’ in research.

5.2.2 Standard sources used per ES

Nine sources were identified as standard sources (see section 5.1.1). Overall, standard source use was considerably reduced in relation to key source use. The probability that a standard source was used in an ES was 36% whereas use of key sources was 99%. One source was only used in 10% of cases; if this source is ignored the probability of use of the other eight sources still remains below average at 39%. Use of some sources was very common although frequency of use was still far inferior to key source use.

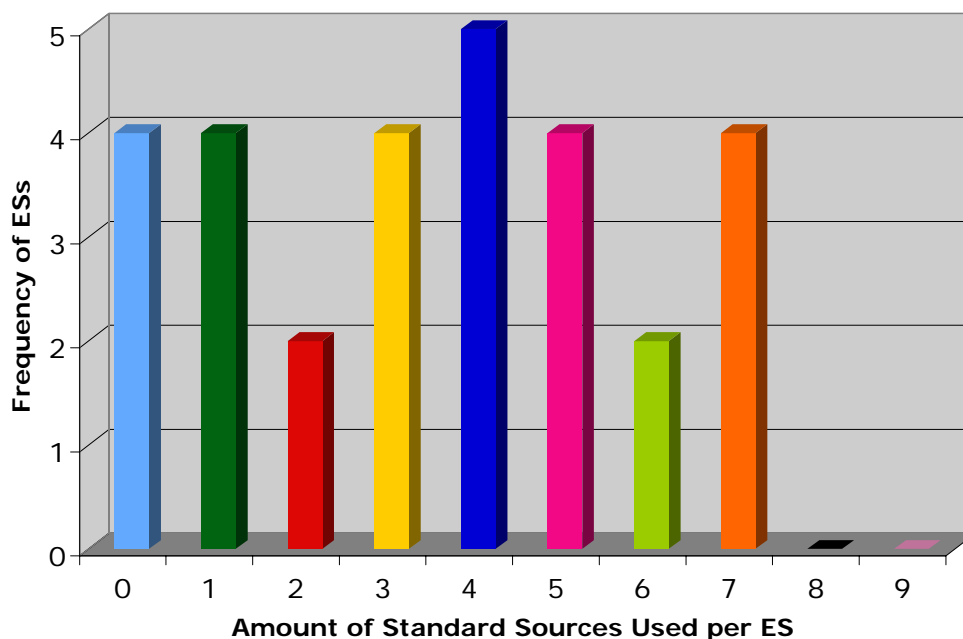


Chart 1: Frequency of ESs using a particular amount of standard sources

None of the ESs used eight or nine standard sources (see section 5.1.1 for list of standard sources). It is reasonable to expect that this would be the case as the standard source list was identified as part of this review. While it is a list of the most common sources used in archaeological desk based assessments it is not a collectively recognised or definitive list. The list is more comprehensive than the list in the BMAPA/EH guidance note. Furthermore, guidance from the 1990's did not include a definite list of sources for work in the offshore zone. Some parties may even disagree with the inclusion of some sources on the list or argue for others overlooked. Therefore, contractors would have selected sources using experience and/or advice, which would vary dependent on time and place.

Four ESs did not use any standard sources; two of these were from Period 1 and two were from Period 2. Four ESs only used one standard source; three of which are from Period 2. It is worrying that nearly a third of ESs undertaken in Period 2 used one or less standard sources, this could be interpreted as

being below minimum standard practice. While there was no specific guidance available on maritime sources there was advice from other sources available at the time. The IFA 'Standards and Guidance for Desk Based Assessments' includes a list of sources available including local authorities, local museums/collections, local record office, geotechnical data and historic charts. This could have serious implications for the archaeological advice and subsequent mitigation recommendations, as they would be based upon data, which may be incomplete. The historic environment may not have been adequately quantified in these cases. It is worth noting that all ESs that performed poorly on standard source use did not draw their information from a supplementary Archaeological Technical Report. It is possible that a suitably qualified marine archaeologist was not used, which may have resulted in unfamiliarity with the available guidance and sources.

The use of seven or more sources was associated with good source use. The results were encouraging with 14% of ESs in this category. 17% of ESs used five or six sources which distinguished above average source use. The combination of above average and good source use is proportionately polarised with poor source use. These are buffered by a majority of 40% which recorded average use of standard source use.

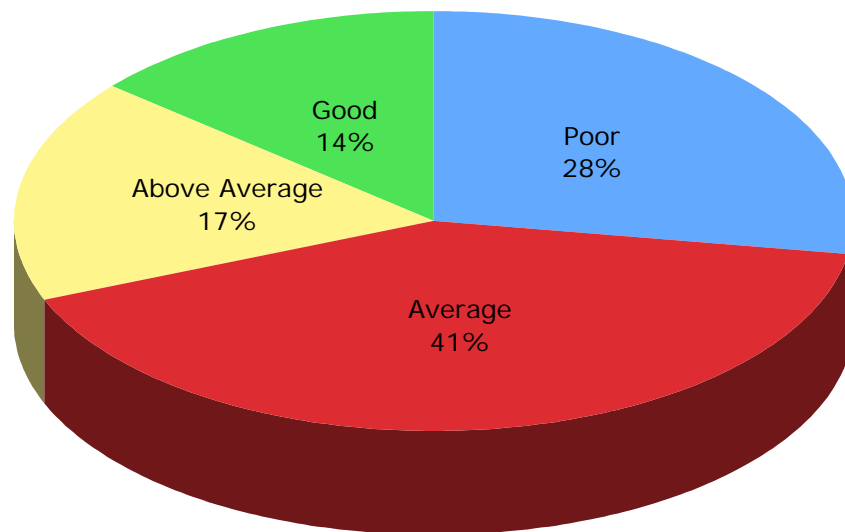


Chart 2: Percentage of ESs receiving a particular score rating

These results should be considered in light of the date they were undertaken. Reviewing the average total of standard source use per ES across the periods shows that the data is chronologically skewed. The situation has clearly improved over time:

Period	Total per ES
All	3.5
2 & 3	3.9
1	1.4
2	3.3
3	5.1

Table 4: Average total of standard sources used per ES

ESs submitted since 2002 use an above average amount of standard sources. When compared to earlier periods it shows a vast increase in the use of sources. This is due in part to increased guidance in the period. It is also likely to be a product of the growth in archaeological understanding, experience and practice that took place in preceding years.

5.2.3 Specific standard sources used in ESs

The percentage of ESs using a specific standard source was investigated. The results are presented in Chart 3 and Chart 4 (see below). Chart 3 assesses which sources were used most frequently across all ESs and ESs from Periods 2 and 3. It also offers a comparison between the two types of data. Chart 4 shows specific source use in each Period, reflecting changes in source use over time.

The two most commonly used sources were local SMRs and geophysical data. SMRs were used in 69% of ESs, rising to 75% when results from Period 1 are excluded. Geophysical data was used in 66% of ESs, rising to 67% when results from Period 1 are excluded. The rise in use of these sources was a reflection of the overall trend that source use is higher in Periods 2 and 3 than across all ESs. Only local museums and collections bucked the trend.

5.2.3.1 Sites and Monuments Records

SMRs are listed as a source of data in the BMAPA/EH guidance and for advice and information in the JNAPC Code of Practice. Every ES from Period 3 used them. Many would argue that SMRs are in fact a key source, not a standard source, and the high usage rate is evidence of this. It was selected as a standard source for the purpose of this review because while their relevance to maritime archaeology has increased considerably over the last decade, earlier ESs may not have placed the same importance on them. The amount of maritime sites in SMRs continues to grow. It is also true of the importance of submerged landscapes; Palaeolithic and Mesolithic sites in SMRs provide local and regional context of sea level changes. This review required that such factors were taken into account. The increase is clearly illustrated in the results (see Chart 4).

5.2.3.2 Geophysical Data

Geophysical data was provided by two sources; the dredging company as a product of pre-dredge surveys or the licence application and environmental consultants for the purposes of the ES. Therefore, many of these surveys have not been undertaken specifically for archaeological purposes. While they do provide valuable data for archaeologists, in many cases mitigation recommendations call for further surveys under the guidance of archaeologists. Furthermore, five ESs that used geophysical data did not have an archaeological technical report. It is possible that a suitably qualified archaeologist did not undertake these assessments; therefore any subsequent conclusions may be scrutinised. Geophysical data use is high in ESs but how the data is accumulated and analysed is not necessarily a true reflection of its quality for archaeological purposes. Finally, attention should be

drawn to the apparent correlation between the use of geophysical data and the overall quality of source use.

Overall Score	ESs using data	ESs not using data
Poor	3	7
Average	6	2
Good	10	1

Table 5: Comparison of overall scores for ESs and use of geophysical data

Clearly, ESs which used geophysical data scored far better than those did not and there is a polarisation of the results. During the scoring process the use of geophysical data was not specifically considered so this has not had an effect on the results. However, the strength of these results indicates that review of geophysical survey data underpins high quality archaeological assessment.

5.2.3.3 Historic Charts

The use of historic charts was varied across ESs. There are primarily three sources for historic charts; the UK Hydrographic Office (UKHO), the National Maritime Museum (NMM) and local sources (e.g. libraries, record offices). In ESs the UKHO was frequently referred to as a source for historic charts, whereas the NMM was not. Local sources were also used. Historic charts are important sources as they provide information on shoreline change, bathymetry, wrecks, navigation, shore side features and communication routes (Maritime Archaeology, 2005).

The overall use of historic charts from the UKHO is not very impressive, only 34% of ESs. There is a clear improvement over time and usage rates are up from zero in Period 1 to 75% in Period 3. Yet this still needs further improvement as the UKHO is the world's foremost centre for hydrographic data, enabling the creation of a unique research resource. Furthermore, it is included in the BMAPA/EH guidelines and therefore should be used in every case.

The National Maritime Museum (NMM) collection is never specifically mentioned in any ES so we must assume that it is not consulted. Its absence is probably due to researchers concentrating time and resources on charts from one source. Another consideration for only using UKHO charts may be that they provide enough data for the purposes of the ES. Is it cost effective for researchers to access the NMM collection? It contains more than 100,000 charts and maps, with a large proportion from the UK. Duplication of data may be a problem yet a recent study investigating the potential of charts to inform on sites or areas of archaeological interest showed that the NMM does hold a significant amount of unique data. Nearly 30% of charts reviewed in "Chichester Harbour: Historic Chart Assessment" (Maritime Archaeology, 2005) came from the NMM; the rest were from the UKHO. Furthermore, these maps did provide information not found in the UKHO charts. This study was localised and it would be difficult without wider research to identify national trends yet it is a good example that a relevant source is being overlooked.

The UKHO is effectively a monopoly for sourcing charts in ESs. Usage of other sources for historic charts is very poor and in fact is reduced from 38% of ESs in Period 2 to only 25% in Period 3. The potential benefit of charts from local sources is comparable to that from the UKHO and the NMM. They are also highlighted in the BMAPA/EH guidance note. Accessing charts from local sources may be more difficult though and therefore not as cost effective. The questionnaire reply from the Isle of Wight Record Office admits "...the scale of documentation which could be of use means that there is a danger of being swamped by information." It is also difficult to ascertain whether local sources would have charts not duplicated from the national sources. For example, the Isle of Wight Record Office holds around 50 charts of the area; many are printed rather than original manuscripts and therefore may be available elsewhere (pers comm. Smout, 2006). Further research is required to ascertain the true benefit of charts from local sources.

5.2.3.4 Local museums and collections

Local museums and collections were used the least by all ESs, consulted in only 10% cases. They can contain relevant artefacts and/or archives that may shed light on undiscovered archaeological sites. There are several reasons why they are not utilised more frequently. Some areas may not have a local museum that contains relevant data. It is also possible that unless highlighted during the desk based assessment, the existence of a museum/collection may remain unknown and therefore overlooked.

The cost effectiveness of this source is also an issue, particularly private collections. If the collection is not well organised it may be difficult for a researcher to extract relevant material efficiently which would increase costs of data collection. A researcher's time and costs may also be increased due to travelling to collection/museum. As such, this source might be ignored by researchers. This use is reduced when Period 1 results are excluded to 8%, with no ESs from Period 3 using the source. The reduction could be due to past experience; investigation of local museums and collections may not have proved cost effective. It could also be due in part to the introduction of guidelines and a checklist approach whereby certain recommended sources are covered and alternatives are ignored.

5.2.3.5 Overall trends

The data reveals other trends in standard source use:

- Most sources were used more frequently over time, with use peaking in Period 3
- The exceptions to this were local museums/collections and historic charts from other sources
- Seven of the standard sources were used in 50% or more of Period 3 ESs
- Certain sources have always been favoured over others

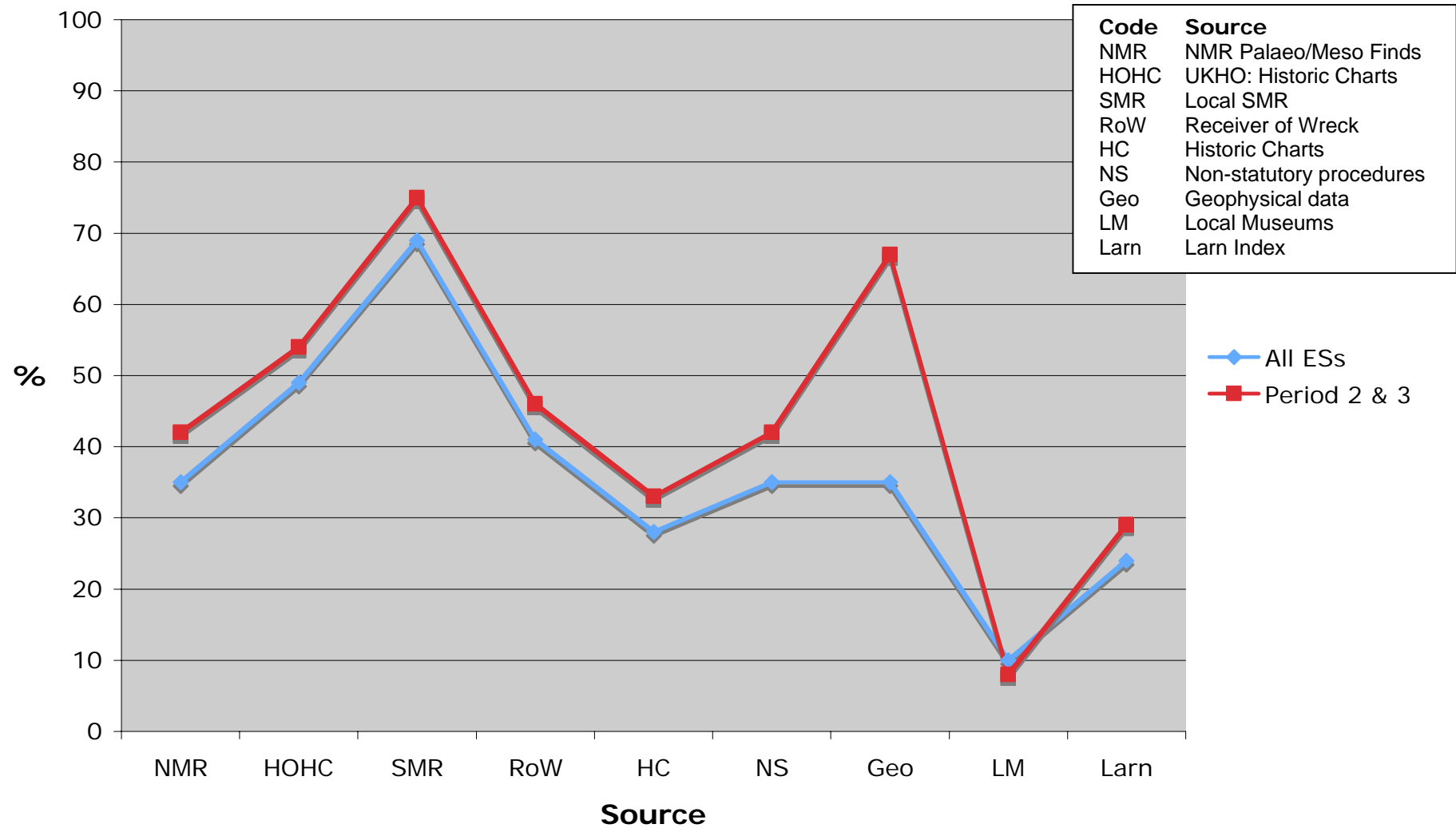


Chart 3: Percentage of ESs using a specific standard source: comparison of all ESs & from Period 2 & 3

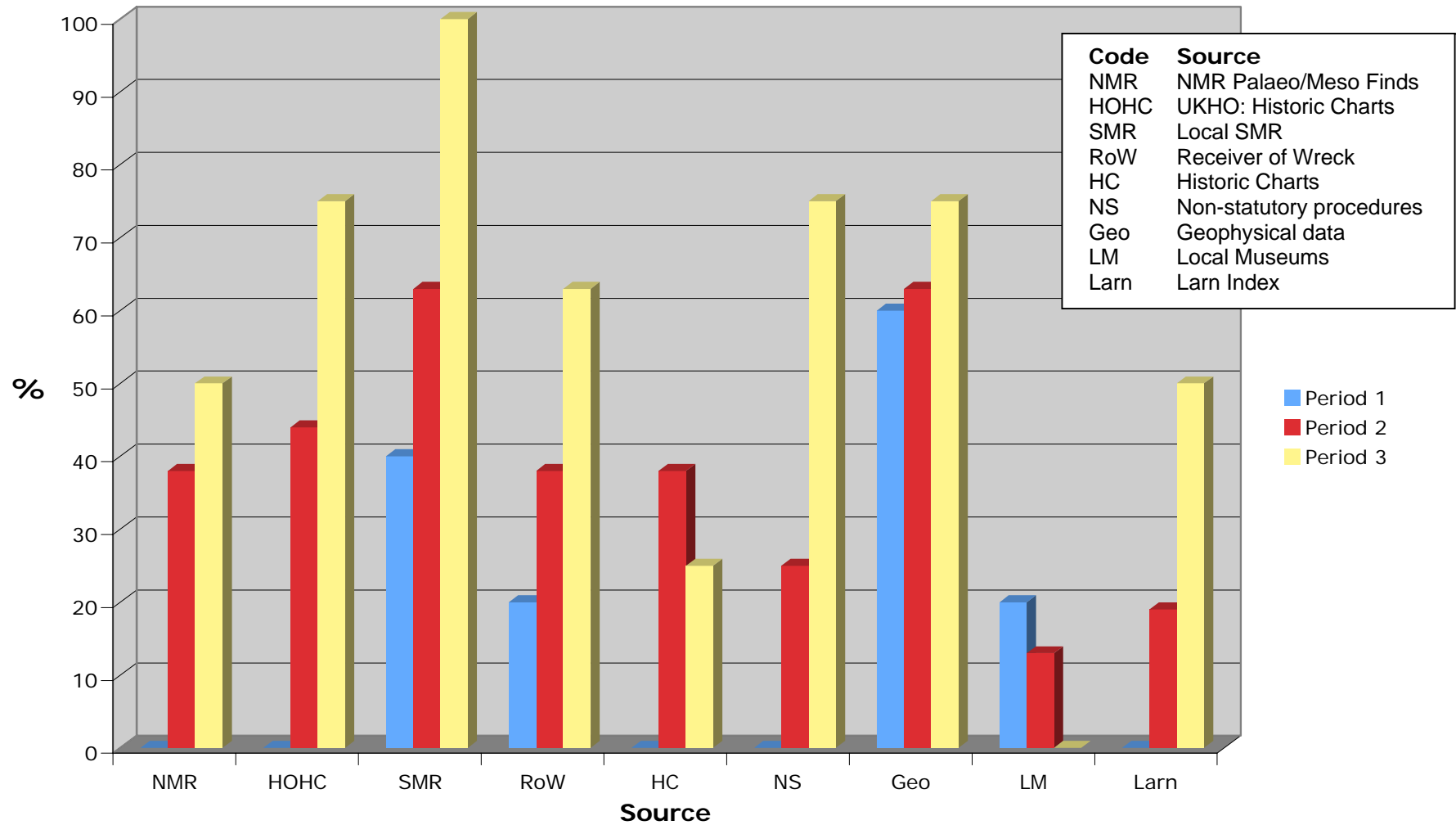


Chart 4: Percentage of ESs using a specific standard source: breakdown by period

5.2.4 Secondary sources

Overall secondary source use in ESs was poor (see *Chart 3*). This was due to the amount of poor scores given to ESs in Period 2. There were more ESs from this Period and as such Period 2 trends tend to affect the overall picture. Secondary source use was very poor in Period 1 with no ESs scoring well. The situation does improve in Period 2 although half of the ESs scored poorly. Period 3 is a great improvement, with good scores far outweighing poor and average scores. Again it is noticeable that there is an improvement over time.

Only one Period 1 ES and half of the Period 2 ESs had an archaeological technical report. It could be assumed that a suitably qualified archaeologist did not undertake the other assessments. If this is the case, poor secondary source use may be because a researcher from a non-archaeological background is not be familiar with relevant secondary sources.

The improvement of use is due to increased awareness, experience and availability of secondary sources. As new studies are undertaken, particularly in the area of submerged landscapes, secondary source use will continue to improve. Results from ALSF projects are also beginning to filter into ESs. There are implications for the subsequent archaeological advice provided in ESs with poor secondary source use. These ESs could not benefit from many of the sources available to current assessments. Yet, to make use of contemporary research would require undertaking a new desk based assessment which is neither cost effective nor practical. Recent initiatives and guidelines, such as the Protocol for Reporting Finds, aim to mitigate against damaging the unknown resource. Whether they provide sufficient mitigation for potential gaps in archaeological knowledge is discussed later.

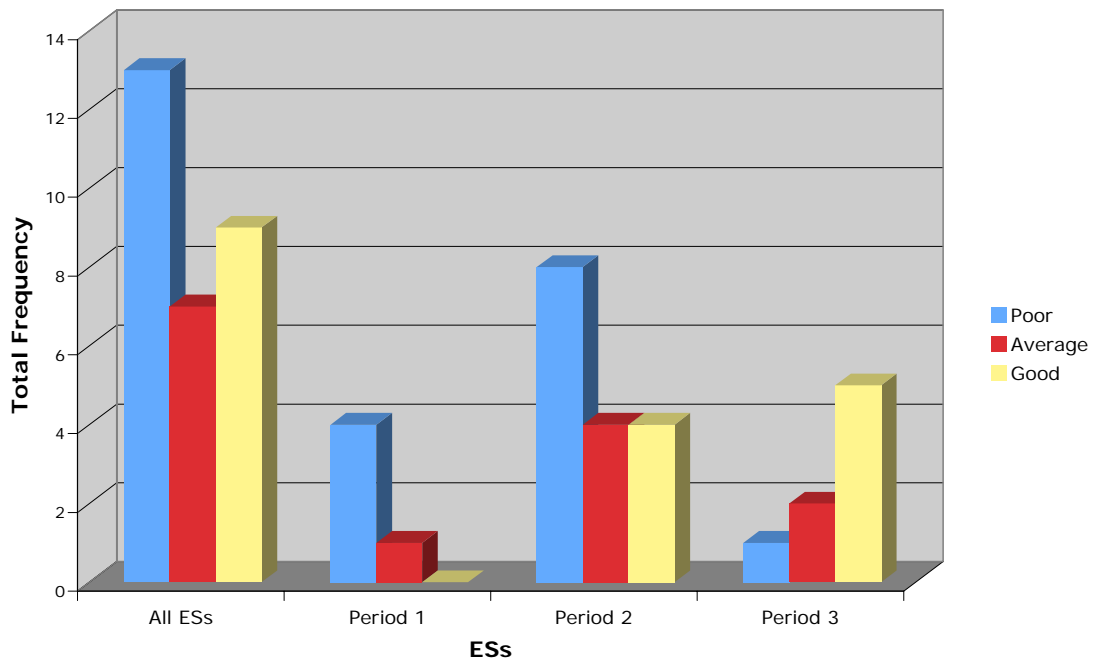


Chart 5: Frequency of scores for secondary source use

This review has highlighted the scope of the secondary sources used in ESs. It is recognised that during this time archaeological assessment practice in the marine zone has been developing and as such earlier examples are unlikely to be as comprehensive. However, further productive avenues of research, outside the scope of this project, would include questioning in more detail how the secondary sources were used and interpreted in respect of the proposed extraction. This may demonstrate whether re-use of sources over time, without reflection on their suitability, coverage, updating, or the exploration of alternatives, results in a 'check-list' approach that promotes the standardisation of ESs.

5.2.5 Non-standard sources

A total of ten ESs used non-standard sources. Several ESs used multiple non-standard sources; four ESs used two different sources, one ES used three sources and one ES used four sources. Twelve different sources were used, some were used in multiple ESs.

The non-standard sources used were:

- Archaeological Diving Unit
- 'Dive Wight' by Pritchard and McDonald
- DRACAR: Northern France database of Palaeolithic & Mesolithic records (used in 2 ESs)
- HM Coastguard
- HWTMA Archive (used in 3 ESs)
- Inspector of Ancient Monuments: EH IOW
- IOW Centre for Coastal Environment
- Lloyds Register (used in 2 ESs)
- RNLI: Local Branch
- National & Local Planning Policies and Management Plans
- Southern Rivers Palaeolithic Project (used in 2 ESs)
- Suffolk Underwater Studies Centre

The vast majority of ESs which used non-standard sources were from Period 2, nine in total. The other ES was from Period 1; no ESs from Period 3 used non-standard sources. As there are twice as many ESs from Period 2 than Period 3 this may have led to the discrepancy. This does not explain the relative difference though, with over 50% of ESs in Period 2 using non-standard sources while there is no use in Period 3. The usage spike in Period 2 is probably due to increased maritime archaeological awareness and activity. The subsequent drop in Period 3 may have been due to several reasons.

There is the possibility that through experience and past investigation these sources are known to be unsuitable either in their content or due to their locality. In fact, the majority of the sources are 'local' sources, based mainly around the south coast, and are therefore unlikely to be relevant to other areas. Is this a product of increased maritime archaeological activity or knowledge of this area? It may be simply that most of the ESs from the south coast were undertaken in Period 2 when alternative source use was at its

highest. This still leaves unanswered questions. Are there not similar sources in other dredging areas? If so, why are they not used?

Increased non-statutory guidance containing lists of recommended sources might be responsible. A checklist approach may have been adopted whereby key and standard sources are covered as recommended but alternatives are not investigated. Furthermore, the investigation of such sources may not be cost effective to developer or consultant. The likelihood is that the cost of investigating these sources does not equal the perceived benefit. In the last five years competition for commercial contracts in maritime archaeology has grown as more companies enter the market place. A product of increased competition is the reduction of costs in a bid to win customers. Undertaking activities outside the standard list would increase costs and may be the difference between winning or losing a contract.

There is no definitive guide to non-standard sources that may be useful in the preparation of ESs and other DBAs, only experience. Due to the commercial nature of ESs this experience is a premium.

5.2.6 Overall score

The scores for overall source use were fairly evenly split across all ESs (see *Chart 4*). In fact good scores were more frequent than poor or average. Scores are polarised between Period 1 and 3. No Period 1 ESs received a good score with most receiving poor scores. The opposite is true of Period 3; Period 2 ESs are relatively constant.

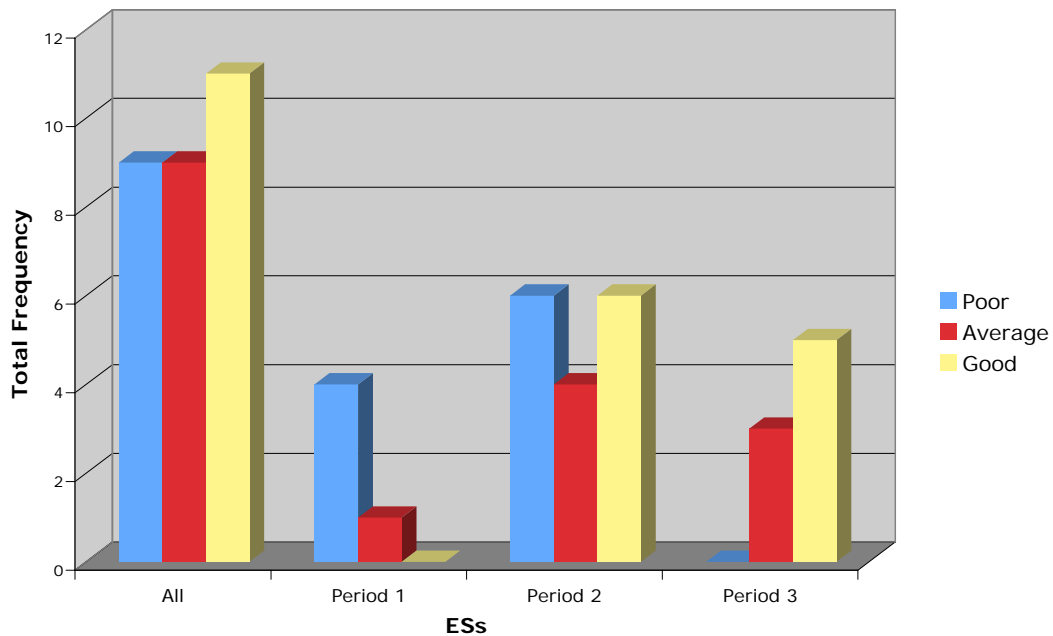


Chart 6: Frequency of scores for overall source use

It is encouraging that no Period 3 ESs scored poorly. There is a definite improvement over time and recent results suggest source use is at a good level. The mixed results in Period 2 suggest a time when changes in legislation and guidance with increased knowledge and best practice were

beginning to change a flawed system. The overall results reflect the results in other areas; key, standard, secondary and non-standard source use.

The picture of source use shows mixed results that are improving over time. Only eight ESs are from Period 3, half as many as Period 2. Any direct comparison is therefore skewed. Yet future ESs would probably confirm the trends that appear here. It should be also noted that there are some flaws with Period 3 source use although this could be down to a cost effective approach. This will be discussed further in section 5.5.

There is also correlation between the overall score and whether an ESs drew its archaeological information from a supplementary Archaeological Technical Report (see table 6). All of the ESs which received a poor score did not have a supplementary report. In comparison, every ES which received a good score did have a supplementary report.

Overall Score	No Report Used	Used a Report
Poor	10	0
Average	3	5
Good	0	11

Table 6: Comparison of overall scores and use of supplementary report

There is a clear suggestion that the range of source use in an ES benefited from the use of a supplementary Archaeological Technical Report. This probably is due to two factors. Suitably qualified archaeologists undertook the supplementary reports whereas archaeological summaries in ESs not using a report do not appear to use an archaeologist. Furthermore, the reports provide the opportunity for a larger, more in depth desk based assessment of the archaeological issues. Therefore, the undertaking of an archaeological report by a suitable qualified archaeologist is a vital factor in the success of identifying the relevant issues.

5.3 Detailed Assessment of Source Use in Case Studies

A full list of the raw data from the detailed assessment is included in section 11.4.2.

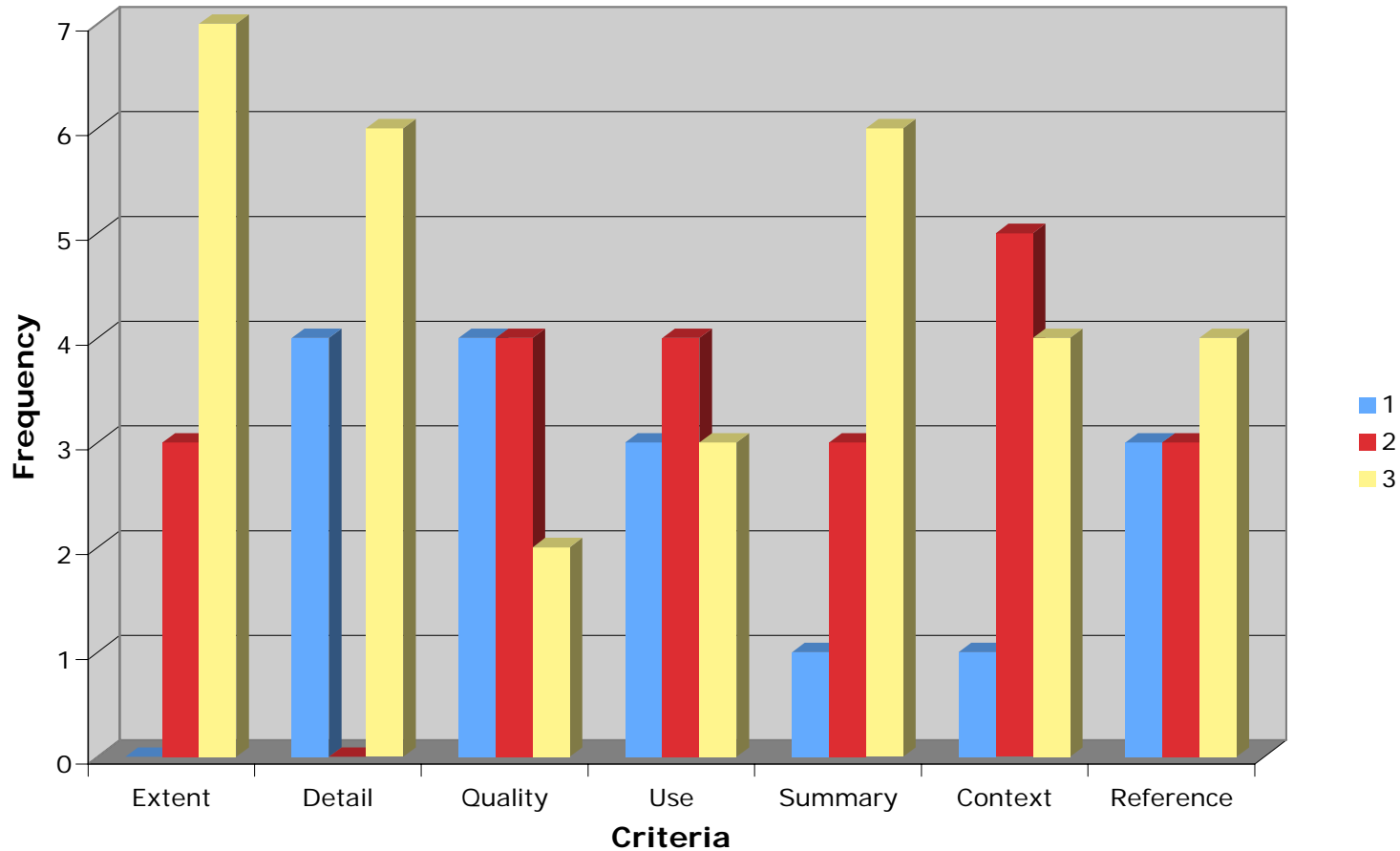


Chart 7: Frequency of ratings for each criteria used in the detailed assessment of source use

5.3.1 Extent of study area in relation to dredging zone

Overall this issue was very well covered; it received seven good scores, the most of any of the criteria. There were no poor scores in the ten ESs and the study area was always beyond the dredging area. Furthermore, many investigated Palaeolithic and Mesolithic sites on the adjacent coastline. There was little coverage of other coastal sites and whether dredging would impact specific sites. Some ESs contained a description of the wider maritime context that coastal sites provide.

5.3.2 Level of detail from source

Scores were polarised fairly evenly between good and poor. The lack of average scores may be due to methodological problems rather than the issue being 'black and white'. It was difficult to quantify the level of detail. This received the poorest scores along with "Assessment of the quality or reliability of the data". A lack of detail may be due to shortage of relevant information in the source and not simply an oversight of the researcher. It is difficult to ascertain this without investigating each source.

5.3.3 Assessment of the quality or reliability of the data

There was little attempt made to question the data. Of the two ESs that scored well they did highlight and resolve conflict in the data. This issue received the joint most amount of poor scores. The lack of assessment by a researcher could be a cost issue. Contractors on tight budgets and time scales may be unable to spend time questioning their sources. This would be particularly true with secondary sources but is a desk-based assessment the correct forum for dissecting the work of others? The IFA Standards and Guidance for DBAs highlights the Association of County Archaeological Officers (1993), which states best practice for DBAs is to comment on the reliability and quality of the data. Therefore, more emphasis should be placed upon this. A further issue is the potential lack of available data; fewer sources are less likely to present conflicts.

5.3.4 Use of information within ES

The use of information was mixed within ESs with the majority using other formats. Some supplemented the text with a mixture of images, maps, tables and appendices; others relied purely on the text. The use of other formats is very important in ESs as non-archaeologists are likely to be presented with the report. It provides them with an overview of the data, which can aid visualisation of the archaeological issues of a site. Furthermore, providing the raw data in appendices enables future researchers to draw their own conclusions. It was disappointing that more ESs did not score better.

5.3.5 Assembly, summary and organisation of data within ES

The data was very well presented in ESs. It was generally clearly ordered and the case for archaeological implications is built in a logical, structured manner. The majority had a summary of the relevance of the data, which provided a quick reference point to relevant issues. Six ESs received a score of good. These results were very encouraging as this information provides the backbone to subsequent mitigation recommendations and licence conditions.

5.3.6 Summary of data in relation to local/regional context

ESs did provide local and regional context; only one ES did not and scored poorly. In most cases this related to the potential for Palaeolithic and/or Mesolithic sites and cited evidence from coastal sites and geomorphological studies. Local shipping routes, potential quantity of seaborne traffic and coastal sites were also assessed in some ESs. This summary was taken further in several ESs and used to form conclusions.

5.3.7 Referencing of sources

There was a very even distribution of the scores for referencing in ESs. Slightly more ESs received a good score and were technically correct. Yet some ESs made obvious errors which would make further investigations into particular statements or evidence difficult. It is somewhat worrying that a basic principle of report writing was not carried out in 30% of cases.

5.3.8 Total scores of case studies

The scores received in all seven criteria were totalled to provide an overall score, ranging from 7 to 21, and a subsequent rating.

Overall Score	Rating
7-8	Unacceptable
9-10	Poor
11-12	Below Average
13-15	Average
16-17	Above Average
18-19	Good
20-21	Excellent

Table 7: Ratings in relation to overall score of case studies

The overall results are detailed in Chart 6. The ESs are colour coded to show which Period they are from. ES01 is from Period 1; ES06 is from Period 3; the other eight are from Period 2.

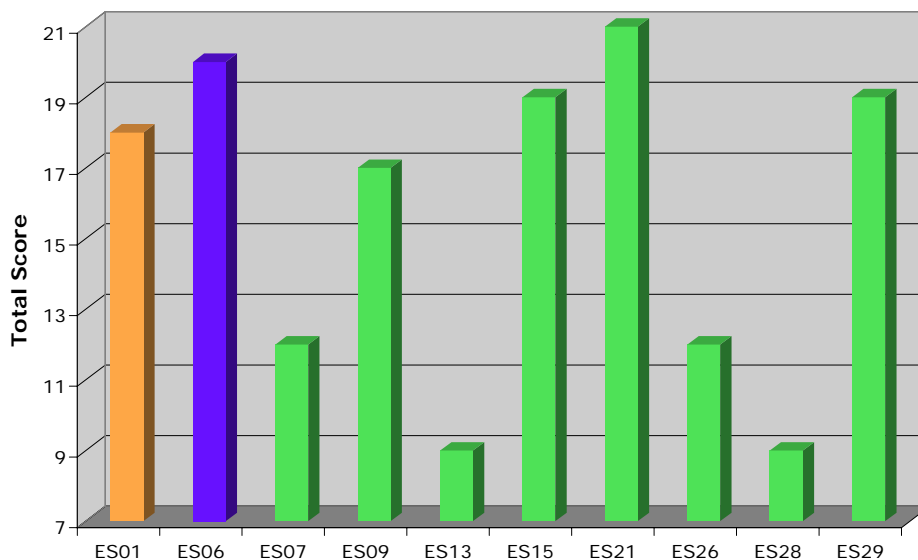


Chart 8: Total scores of case studies

The overall quality of ESs selected for detailed analysis was good. 60% scored above average or better with 20% scoring excellent. One ES also received a maximum score of 21. The ES from Period 1 was good, including it did not negatively affect the conclusions drawn under each criteria. In fact it had a positive effect on the assessment as it did not receive one poor score. The ES from Period 3 was excellent.

Although there are many positive results from the detailed assessment this is overshadowed by four below average ESs. Two of these scored poorly with an overall score of 9, which is only just above the minimum score. This is a disappointment as this detailed assessment dealt with how sources are used within an ES. Quality source use relies on the archaeological understanding, knowledge and experience of the researcher to sufficiently address the issues involved. Therefore, it is not possible to simply attribute poor scores to a lack of guidance or legislation.

Interestingly, all four ESs did not draw their assessment of archaeological issues from a supplementary Archaeological Technical Report and quite possibly did not employ a suitably qualified archaeologist. This is in contrast to the ESs that scored above average or better. All these ESs did draw their assessment from an Archaeological Technical Report. There is a strong indication that a suitably qualified archaeologist is required to interpret the sources to a level, which is acceptable in archaeological desk based assessments.

There is also clear correlation between the range of sources used and how they are used. Chart 7 shows the score that each case study received for:

- Standard source use
- Secondary source use
- Assessment of range of all sources used
- Assessment of how sources are used

ESs that scored poorly on the range of sources used also scored poorly on how the source was used. As source use improves, how they are used also improves.

There is some bias in these results as the vast majority of ESs reviewed for detailed assessment were from Period 2. As such, it may not be an accurate reflection of current practice. This bias does have positive implications though. Only 12.5% of Period 3 ESs did not use an Archaeological Technical Report compared to 50% of Period 2 ESs. The correlation between poor source use and an ES not using a suitably qualified archaeologist may not have been identified if more Period 3 ESs had been used.

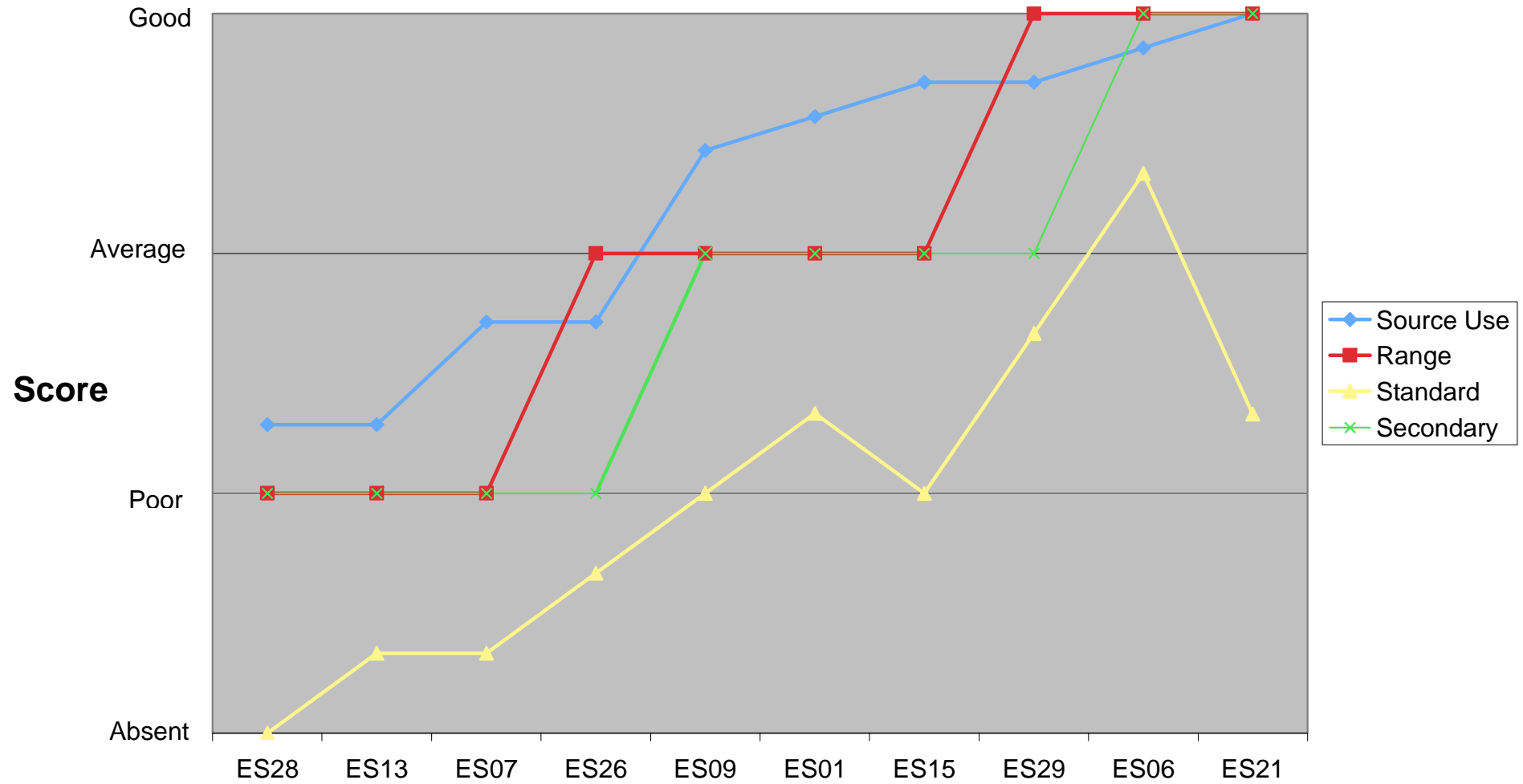


Chart 9: Comparison of scores for range of source use and how sources are used

5.4 Investigation of Alternative Resources

5.4.1 Collection of data

Twenty-nine organisations and institutions with data relating to the marine zone were identified as potentially holding collections that were archaeologically significant. This included some organisations who are consulted for DBAs. A questionnaire was emailed to each organisation to establish the scope of the collection, access to the collection, data relevant to the study area and the curator's opinion as to whether collection is potentially significant to archaeological consultants.

Less than half of the organisations that were approached responded to the questionnaire. Follow up enquiries to those who did not respond were also unanswered. Many of those who did not respond were from non-traditional sources of archaeological investigation. It is also possible that they felt their organisation was not relevant to the investigation. Following further research it was apparent that in many cases this is true. The websites of those who did not respond were researched to assess their potential benefit to archaeologists.

5.4.2 Questionnaire responses

Twenty-nine organisations were sent questionnaires; of which only eleven replied. Two organisations did not complete the questionnaire but returned comments via email. The responses from the questionnaire have been built into a table of responses (see section 11.3). Seven of these organisations are sources that are commonly used in ESs:

- Local SMRs: Isle of Wight, Portsmouth and Southampton
- National Monuments Record: Maritime Section
- UK Hydrographic Office: Archives and Wreck Index
- Local Record Office: Isle of Wight

As the use and merits of these sources are detailed in section 5.2 no further investigation was undertaken.

5.4.2.1 British Oceanographic Data Centre (BODC)

The BODC was one of only two non-heritage organisations that responded to the questionnaire. It has good coverage of wave data and sea level data for the UK offshore zone. The data would be useful in some archaeological studies by providing a broad assessment of the preservation potential of a particular area. Highly dynamic oceanographic conditions may affect erosion of seabed deposits, especially when considered with sediment and bedform data. This could also be important when considering the affect of these conditions on the wrecking process of ships. This source would be particularly useful when undertaking mitigation fieldwork and monitoring programs.

5.4.2.2 Hampshire & Wight Trust for Maritime Archaeology (HWTMA)

The HWTMA is a local organisation with information directly relevant to the study area. It was used by a third of ESs in the study area which suggests that its relevance has already been established. While it does maintain an

electronic record of maritime sites in its region, these sites also appear on the Hampshire and Isle of Wight SMRs as the HWTMA supplies their data to Hampshire and therefore may not be able to provide information on additional sites. It may, however, be able to provide additional information on particular sites that it has worked on or has knowledge of. It holds a range of published and unpublished reports on the area and vast experience of the region's maritime environment that can be used directly as a source or to provide a local/regional context.

5.4.2.3 National Maritime Museum

There are over 100,00 charts and maps in the National Maritime Museum collection, dating from medieval period to the present day. The collection has charts and maps that cover most of the globe with particularly good coverage of Britain. The merit of the NMM collection is discussed in section 5.2.3.3.

5.4.2.5 GSC (Atlantic) Sample Inventory Database

The questionnaire was completed in full but all of their records are geomaterials from the east coast of Canada and High Arctic. As such the results of the questionnaire are not directly relevant to this project and not included in the table of replies. In the final comment it was stated that the collection had been used for archaeological purposes in Halifax Harbour, Saguenay Fjord Quebec and other areas. This shows that such archives are archaeologically significant and equivalent sources should be interrogated for UK based projects.

5.4.2.6 Gosport Discovery Centre and the Hampshire Naval Collection

Two other organisations replied via email but did not complete the questionnaire. The Gosport Discovery Centre (GDC) was identified as a resource relevant to the South Coast Region; the Hampshire Naval Collection is part of the GDC. The response from staff covering both of these organisations stated that they felt they did not hold relevant data. Discovery Centres are modernized, local libraries with community focused facilities. Therefore, they may hold relevant publications like any other local library and as such should be considered in line with the recommendations in BMAPA/EH guidance.

5.4.3 Web based research

Organisations that did not respond to the questionnaire were the subject of in depth research to ascertain the scope/access to their data and whether or not it was a relevant and/or viable research tool. All websites consulted are listed in the bibliography under each organisation (see section 10). The result of this research is presented in a table (see section 11.5).

5.4.3.1 British Geological Survey (BGS)

The BGS holds data which is easily accessible and useful to researchers of the offshore zone. Its website provides a portal to its various collections, allowing free searches of available data. The most useful areas are:

- Borehole Ordering: Free search to view locations of nearly one million borehole records. Subsequent ordering does incur a £13 + vat per

borehole with a minimum order of 2 boreholes. This is a useful tool to identify boreholes in or near to dredging areas.

- Britain beneath our feet: An online atlas which introduces the wealth of digital data, information and knowledge held by the BGS. This is an easily accessible site which is good to use in conjunction with other BGS searches.
- Discovery Metadata: A good, free tool for pinpointing particular datasets within the BGS.
- GeoIndex: Free, map based search facility to identify BGS data collections. It also has an easily accessible 'pop-up' enquiry form making further enquiries simple.

There is no explicit reference to BGS data in ESs for archaeological research. It is possible that this data is part of the wider project geotechnical data and is subsequently used in the archaeological investigations of some ESs. Researchers may have felt the data supplied by the client was sufficient. Yet, there is definite potential of this source. It is very quick and easy to investigate whether or not there is relevant material. The researcher can then make an informed decision on the importance and cost effectiveness of accessing the raw data.

The data would be useful for assessing the preservation potential by identifying areas that are poor for preservation (i.e. exposed bedrock) and thicker sediments which may promote burial and longer term preservation. The offshore core data would be potentially useful in identifying palaeo-landscapes. Furthermore the data could be used in conjunction with oceanographic and geophysical survey data.

There is a potential cost issue of investigating the data. Ordering a large number of boreholes could inflate project costs but as each area is different it is hard to know how many would have to be ordered. Other costs can only be established once data has been identified and ordered. As such, it may not be cost effective to utilise this data. Yet this can only really be established on a case-by-case basis. The BGS search facilities are easily accessible and are not time consuming. Therefore, it would be very simple, cost effective process for future researchers to identify relevant material, obtain a quote and assess the overall benefits against the costs.

5.4.3.2 National Archives

The National Archives did not directly answer the questionnaire; they replied via email highlighting their research guides. The guide for "Ships Wrecked or Sunk" admits that it is "...often not the best source of information" and "Information that would be sufficient to locate a wreck is most unlikely to be found" (National Archives, 2006). It does include a list of useful secondary sources published in the late 20th century that may be useful in some circumstances. This includes the Larn Shipwreck Index and D.J. Hepper's 'British Warship Losses in the Age of Sail 1650-1859'. There are also links to archives which provide some information on both Warship and Merchant Ship losses. This includes the Admiralty Digest, reports of court martial trials, the

Register of Wages & Effects of Dead Seaman 1852-89 and other official ship logs.

The National Archive is not a productive source for broad research into the archaeological potential of an area. Yet it may yield specific information or links to other useful sources if a particular shipwreck was identified from other source investigations. This information could be useful in ascertaining the archaeological importance of a site and help to inform mitigation within a licence area.

5.4.3.3 European organisations with some potential

EUMARSIN, EDMED and GEIXS are all European resources that may have potential benefits for researchers. The UK data that they hold is not relevant as it is supplied by other organisations detailed above; BGS supplies EUMARSIN and GEIXS, BODC supplies EDMED. Yet they hold comparable information from organisations based in Europe. If researchers require data from areas that lie outside of or adjacent to UK waters, i.e. the English Channel or the North Sea, these resources would be very useful search tools. A simple online search would establish whether there is any relevant material and the cost effectiveness of utilising this.

5.4.3.4 Resources with limited potential

The Deal UK website has limited potential as it deals with the gas and oil industry and therefore its coverage unlikely to potential dredging zones. There may be some useful data from well cores and regional geological reports as this data is supplied by organisations other than BGS. Its main purpose would be to provide regional geological context but this information is liable to be derived via other sources.

5.4.3.5 Resources with little relevance to researchers

While it may be a bold statement to totally discount a particular resource, research suggests that BOSCORF, EUROCORE, EuroGeoSurveys, IFM-Geomar and the Lamont-Doherty Deep-Sea Sample Repository are not currently relevant to researchers undertaking ESs. There is potential as source material for research projects into wider offshore archaeological issues (e.g. palaeo-environment, geomorphological processes) that provide results to feed into future ESs.

BOSCORF, EUROCORE and the Lamont-Doherty Deep-Sea Sample Repository do not hold cores to the far north of Scotland and the far west of Ireland. They are not in any proximity to regions which may inform on the environment of a dredging area or its wider environs. Of course this may change in the future but generally they target deep sea areas which would not be subject to aggregate dredging licence applications.

EuroGeoSurveys provides links to various sites but does not itself hold useful data. The majority of links are for terrestrial data and therefore has low relevance to offshore researchers. The only relevant link is to EUSEASED which hosts the EUROCORE and EUMARSIN projects. As these sites have

been identified directly there is no need for researchers to investigate this resource further.

IFM-Geomar holds the Lithotek database which potentially could be useful. Currently, it has no online database so it is difficult to establish whether its data would be relevant. Furthermore, it is based in Germany which makes it an expensive exercise for a researcher just to establish whether or not it holds relevant material before it could even be accessed.

5.4.3.6 South Coast regional sources

The results of web research into Emsworth Museum, the Hampshire Record Office and St Barbe Museum are listed in section 11.5.2. The museums may have relevant material as they have a strong maritime theme due to their proximity to the coast. It is hard to ascertain from their websites how accessible this information is. Researchers working in the South Coast region should contact the curator to identify the potential for useful sources, accessibility of the collection and the cost effectiveness of these resources. The potential of this resource type is outlined in section 5.2.3.4.

The Hampshire Record Office is a potentially useful source. Its online database is free to search and has 90% of all records held. Due to this search facility researchers will find it easier to identify potential sources. A sample search using the key word “maritime” yielded 82 records. Whether this service will be useful in broad searches for ESs is difficult to ascertain but it does make the process less time consuming.

5.5 Development of Best Practice for Source Use

Investigation of the four key sources is well established as part of best practice. Other sources do not have such widespread use and measures to encourage their use would be productive.

While the recent BMAPA/EH guidelines have a section on sources of archaeological data the advice is limited in its information. A useful addition to the guidelines would be an appendix containing contact details of particular sources. This could be taken a step further with a simple online database or list of sources hosted by BMAPA and/or EH. Once established regular updating of such a list would only be necessary if a particular agency changed its details or if subsequent reviews of the guidance highlighted the need for additions or subtractions. After the initial set up costs maintenance costs would be limited and future updates could be addressed as part of larger periodic review projects. There is also the potential for further work into particular localities or secondary sources.

This review has highlighted the importance of geophysical data in ESs. While the use of this source is on the increase it did not happen in every Period 3 ES. It is possible that this data was not available when the ES was undertaken but every effort should be made to interpret the data before the completion of an ES so the wider picture of archaeological material can be completed to best inform the mitigation strategies.

Historic chart use is on the increase yet they are not utilised in every Period 3 ES. Furthermore, there is evidence to suggest that researchers rarely attempt to access charts from sources other than the UKHO. The benefit of charts has been discussed and the potential for the NMM to hold other material shows that researchers should investigate it. Further research is required to ascertain the positives and cost effectiveness of charts held by local sources.

Local museums and collections may not have relevant data but there is little evidence in ESs, particularly recent examples, that any attempt has been made to even enquire to their usefulness. This type of source is listed in the BMAPA/EH guidance and this should have promoted an increase in use during Period 3 rather than the decrease evidenced. Initial enquiries as to the potential of a local museum or collection would not impact greatly on the time and/or cost of research. If relevant material is not forthcoming then a simple statement highlighting this would suffice. The discovery of useful material would benefit the subsequent archaeological advice.

Further investigation of secondary sources relevant to ESs would be beneficial to the understanding of archaeological resource within marine dredging areas. A specific research project aimed at questioning the reuse of particular sources, how they inform advice and mitigation in ES and whether certain sources are being overlooked would be a useful exercise.

The use of particular secondary sources and non-standard sources in ESs is to some extent based on the experience of a researcher or contractor. This is knowledge that is developed over time and does not feature in best practice guidelines. Is it possible to come up with a list of these sources that could be utilised by all researchers who undertake ESs? To do so would require tapping into that knowledge and using it to develop best practice. This could be undertaken by EH as they view all ESs and they would be able to balance commercial sensitivities against the wider issues. Developing this area could reduce time and costs in undertaking future ESs, freeing resources to investigate other areas in greater depth.

How sources are used in an ES is dependent on the individual researchers training and experience. There is some guidance in IFA Standards for DBAs and generally this was followed in the ESs selected for case studies. Some ESs scored poorly overall. It is no coincidence that they did not draw their information from an Archaeological Technical Report. Clearly, a supplementary report is important to encourage full investigation of sources. These reports have become more commonplace in recent years and only one Period 3 ES did not use one. This rise is probably due to the use of archaeological contractors to undertake studies rather than just environmental consultants. Archaeologists are more liable to be aware of and abide to IFA code and which specifies the use of technical reports whereas this is not a specific requirement of the EIA process. The BMAPA/EH guidance states that archaeological issues can be addressed through a separate report yet on this evidence there should be a stronger emphasis on ensuring a technical report

is undertaken. Of course all conclusions should be incorporated into the main ES.

It is apparent that too few Period 3 ESs were selected for detailed assessment of how sources were used; this was based on the study area. The date of an ES could not be established from the preliminary list from the DCLG and it was only once all ESs were investigated that this lack of Period 3 ESs was identified. Future reviews should therefore focus on these later ESs and seek to identify areas which could be improved with training and/or guidance for archaeologists who undertake DBAs.

Few alternative sources of data have been highlighted during this review. The BGS is mentioned in the BMAPA/EH guidelines but is not explicitly mentioned in ESs. Its simple, free online search tools suggest that this is a resource that should be incorporated more frequently in ESs. It is difficult to establish the cost effectiveness of this resource as data is priced on a case-by-case basis. Researchers should attempt to assess the relevance and cost of data as this is a free and quick exercise that may yield major benefits. The use of the NMM for historic charts has been discussed above.

The HWTMA is a good example of a local source that could offer additional information to researchers. It is a unique regional organisation and as such other localities would not have a comparable source. Yet it highlights the importance of local sources of information for ESs. Furthermore, the investigation of other local sources suggests there is at least some possibility of gaining valuable information with minimal initial costs. As such, researchers should make an effort to identify local sources and at least make initial enquiries into their potential benefit to archaeological issues in ESs. This could be undertaken during the Project Design phase enabling the assessment of the cost effectiveness of utilising the source.

6 Review of Archaeological Advice and Mitigation Recommendations

6.1 Methodology

6.1.1 Assessment of archaeological advice

All ESs were assessed for the provision of advice on potential archaeological impacts. To aid interpretation of advice six categories relating to site types in the marine historic environment were identified. During the assessment it became apparent that the majority of archaeological advice concentrated on 'offshore' sites as dredging areas. To aid the assessment process the categories were divided into two groups Offshore and Inshore:

Offshore:

- A. Shipwrecks & aircraft
- B. Submerged landscapes
- C. Offshore installations and infrastructure (forts, gas/oil industry etc)

Inshore (coastal/intertidal):

- D. Coastal/intertidal installations and infrastructure (docks, forts etc)
- E. Eroding coastal/intertidal landscapes
- F. Terrestrial historic assets on or adjacent to coastal/intertidal areas

ESs received a score in each category from 1 to 3, where 1=Poor/Absent, 2=Average and 3=Good. The score reflected the quality of assessment of each category. The following questions were considered during the scoring process for each category:

- Were sites, findspots or other archaeological records derived from the source investigation suitably accounted for?
- If there were no sites, findspots or other archaeological records was there an overview of the archaeological potential?
- If there were no sites, findspots or other archaeological records was there an overview of the local and/or regional archaeological context?
- Was there a summary of the known and potential unknown archaeological resource of an area?
- Was a category ignored because it was not applicable? Was this inferable from the ES?
- What is the level of detail of the advice? Is it supported by evidence from the source investigation?
- Was best practice undertaken in line with contemporary designations and guidelines?

A further assessment of archaeological advice consisted of identifying which ESs drew its advice from a separate archaeological technical report. Whether the report was undertaken prior to the submission of the ES was also noted. This information was used to inform on the importance of a separate archaeological report and its impact on the quality of an ES.

6.1.2 Assessment of mitigation recommendations

All ESs were assessed on their recommendations for practical archaeological mitigation. Providing an effective comparison between ESs for recommendations was a very difficult task. This is due to variations in site types, available evidence, environmental factors and the dredge area. Mitigation recommendations are necessarily tailored to an individual site and scoring against particular criteria does provide a skewed data set. Therefore trends are not easily identifiable and micro scale assessment was not possible.

A macro scale approach was undertaken; this involved scoring the overall mitigation recommendations in an ES and highlighting particular issues by recording comments. As only one score was given to an ES the scoring range was increased. This created clearer distinction between the ESs.

Mitigation recommendation scoring:

0. Absent
1. Poor
2. Below average
3. Average
4. Good
5. Very good

The following questions were considered during the assessment:

- Was all archaeological advice on potential impacts reviewed for mitigation?
- Were all known sites suitably accounted for?
- Was there an attempt to clarify positions and/or existence of unknown sites?
- Were particular site types neglected? Was this due to a lack of evidence?
- Was the appropriate archaeological practice recommended?
 - Survey
 - Field evaluation
 - Recording
 - Excavation
 - In-situ preservation
 - Monitoring
- Is there provision for future discoveries under legal designations and/or non-statutory guidelines?
- What is the level of detail of the recommendations? Is it supported by evidence from the source investigation?
- Is the mitigation proposed a feature of normal dredging practice, part of wider environmental measures or recommended due to archaeological concerns?
- Were recommendations from a supplementary archaeological technical report included in the ES?
- Was best practice undertaken in line with contemporary designations and guidelines?

6.2 Assessment of Archaeological Advice

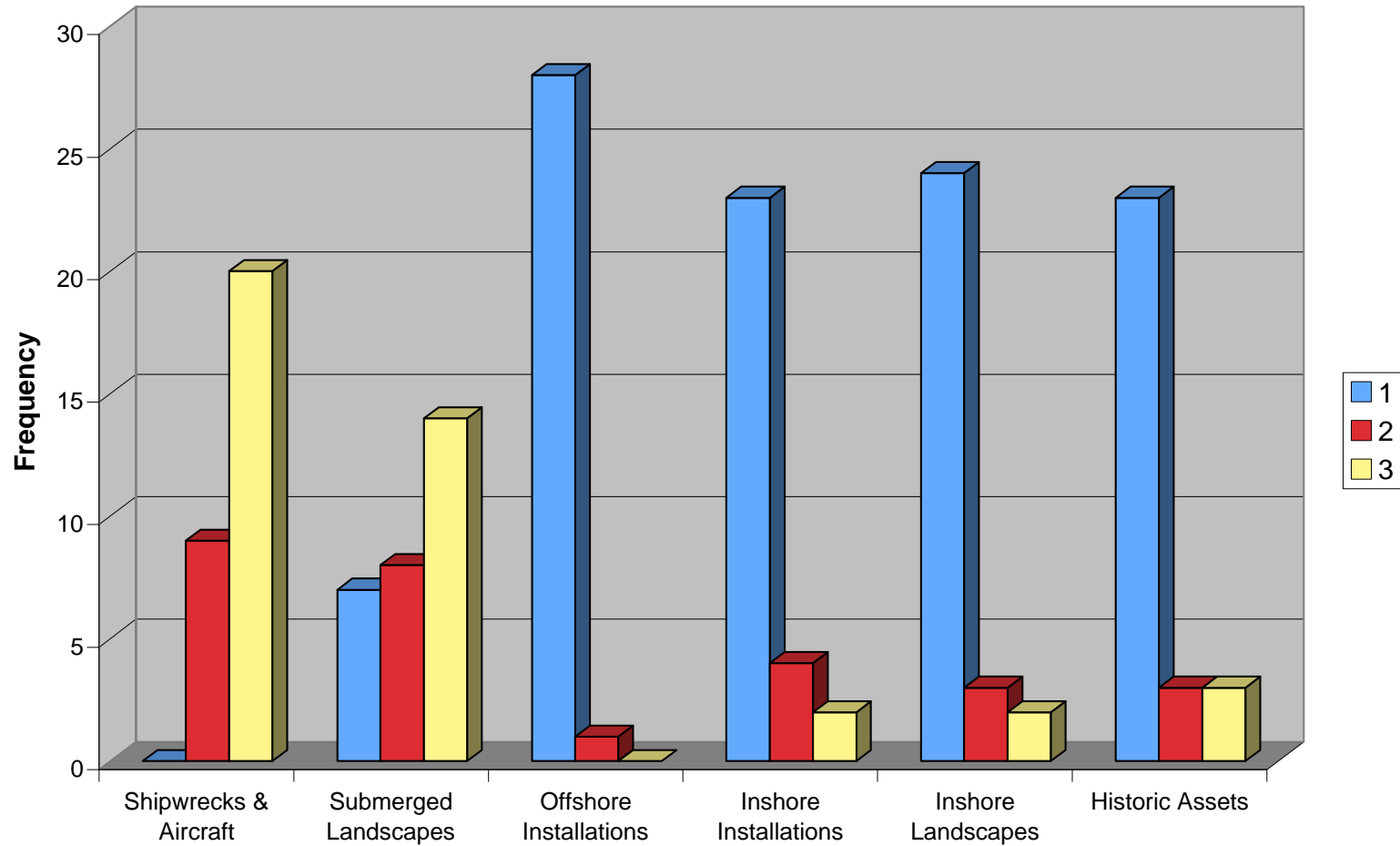


Chart 10: Frequency of scores for categories of archaeological advice

6.2.1 Shipwrecks & aircraft

Unsurprisingly, shipwrecks were very well covered. This category received the most amount of good scores, a total of 20 ESs. Also it was the only category not to receive any poor scores. This is unsurprising as shipwrecks are well represented in maritime archaeological research, available data, experience, understanding and fieldwork. There were few direct references to aircraft as few were highlighted in the research.

A vast majority of ESs highlighted both known, when applicable, and unknown wrecks. Many also discussed the potential for discrete items of shipbourne debris. In some cases the potential historical importance of particular wrecks was highlighted although subsequent discussion was limited. This may be due to the principal reasoning behind the ESs which is identification and definition of important sites or areas of historic importance to aid subsequent mitigation. If a particularly important historic vessel was located then a full discussion of this would be justified.

The majority of ESs listed the relevant legislation covering shipwrecks. In some ESs this was simply a reference to a law. Others included further detail, relating the evidence to a contractor's legal obligations.

The ESs that received average scores do cover known shipwrecks. Yet they lacked on two issues: there is sparse detail and the discussion of the unknown resource is limited. Of the ESs that received average scores, four were from Period 1, two were from Period 2 and three were from Period 3. Interestingly, the spread across all periods does not suggest that there is improvement over time with the introduction of new guidelines or legislation.

6.2.2 Submerged landscapes

Advice on submerged landscapes was mixed but overall was good. Seven ESs scored poorly, one was from Period 3. These ESs made no mention of the subject. This is understandable for known sites as none were highlighted in the research. Yet there was no attempt to quantify the unknown potential for submerged landscapes.

Overall though, ESs did discuss both the known and potential material. Generally, discussion was divided in two periods: Lower to Upper Palaeolithic and Late Upper Palaeolithic to Mesolithic. Many looked at the geomorphological processes of the area to inform on the potential and related this to the known resource and the wider context.

There is an indication that advice on submerged landscapes has improved over time. 66% of ESs from Period 2 and 50% from Period 3 scored well while 60% from Period 1 scored poorly. This improvement in advice is probably linked to an increase in understanding, experience and techniques in the field of submerged landscapes.

6.2.3 Offshore installations and infrastructure

All ESs bar one received a poor/absent score in this category. The ES that received an average score did so purely as it mentioned the broader

archaeological impact and the potential impact. It did not specifically mention offshore installations and infrastructure.

In reality, this category is ignored in ESs and the scores reflect an absence of advice on these site types. The absence of advice is due to the lack of evidence derived from sources. Is this a result of commonly used sources not containing evidence or guidance on this site type? Or is the information overlooked as it is not seen as important to the archaeological assessment? It should also be remembered that this site type may not be prevalent in many dredging areas and aggregate companies are likely to avoid such material to prevent damage to their equipment.

Some may argue that the remains of gas, oil and other offshore industries are not relevant to archaeological assessments in ESs. They are not highlighted in the BMAPA/EH guidelines. Yet in section A21 of MMG1 pipelines and cables are listed as archaeological sites that may require mitigation, particularly exclusion zones. Furthermore, they are a part of the industrial archaeological resource, providing a picture of a twentieth century activities. Also this category was included in this review on the advice of English Heritage suggesting that this matter may require further discussion and investigation.

6.2.4 Inshore sites and landscapes

During the scoring process it became apparent that advice on these site types was absent or minimal. Although scoring for inshore sites and landscapes was originally divided into three categories (see section 6.1.1) they were assessed together. This is because there are overarching issues with advice for these categories.

Twenty-three ESs scored poor/absent in all three categories. The scores reflect the absence of advice. Five ESs scored average or good in all three categories; the other ES scored average or good in two of the categories. In each of these six cases, inshore archaeology was broadly covered in varying detail with no specific sites identified:

App ID	Period	Comments
ES01	1	Stated that there was no threat to archaeology out of dredging area as there is no seabed mobility
ES02	2	Received average scores as it mentioned the broader archaeological potential
ES07	2	Highlighted sensitive sites on shoreline but no real detail
ES13	2	Explicitly mentions there is no coastal impact
ES14	2	Does mention possible impact on coast but no detail or explanation
ES29	2	Explicitly mentions there is no coastal impact

Table 8: Comments on ESs with positive scores for inshore archaeology advice

These broad statements are useful as they indicate that the matter has been investigated. If there is no evidence of impact on the coast then it is not

necessary to go into great depths to investigate archaeological issues. Yet ES14 states that there is the possibility of coastal impact but does not offer any further detail. There is no discussion of what these impacts might be and no subsequent mitigation recommendations. This is from Period 2 so could not benefit from key guidance and it did not have a supplementary Archaeological Technical Report. Yet it is possible that dredging may be impacting on important coastal sites, it is unclear in the ES.

The high proportion of ESs that made no comment on inshore archaeology could be attributed to many factors:

- Coastal Impact Studies are undertaken to investigate if and how dredging will effect the coastline, if they do not have an effect then there would be no perceived threats to inshore archaeology
- Aggregate companies would give up an application or re-scope it based on reduced tonnage or working practice if there is a impact on the coast, therefore inshore archaeology would not be affected
- Time and cost restraints on the archaeological assessment may lead to inshore issues being overlooked
- Researchers may presume that as areas are a significant distance offshore that inshore sites and landscapes will not be affected
- Contemporary guidance does not highlight inshore issues

It would be unreasonable for an ES to include a full assessment of inshore sites and landscapes if there was not a proven impact on the coastline. What is reasonable though, is for the archaeological advice to clearly state that this has been investigated on a basic level. This would involve investigating the Coastal Impact Study for the area to derive any potential impacts and confirming that there is no impact. If there is the potential for coastal impact and the licence application proceeds then a full assessment of inshore archaeological sites and landscapes should be undertaken.

6.2.5 Analysis of archaeological advice in relation to source use

Period 1 and 2 ESs that received an average score on shipwreck and aircraft advice all scored poorly on the range of sources. These ESs accounted for 60% of all ESs with poor range of source use. This suggests that the advice may have suffered due to limited research. In contrast, the ESs from Period 3 had all received good scores on the range of sources and it is the actual advice which is only average. Of the nine ESs which scored average, only two used a supplementary Archaeological Technical Report.

There is clear correlation between poor advice on submerged landscapes and the quality of source use. Of the seven ESs which received a poor score, six also received a poor score for source use. The other ES received an average score for source use. This trend does continue with ESs which received an average score for submerged landscape advice: only 25% of ESs scored well for source use. Finally there is strong evidence that the use of a supplementary Archaeological Technical Report improved the quality of advice in this category. 80% of the ESs that scored poor or average did not use one. Only 8% of ESs that did not use one received a good score.

There is no evidence that the quality of source use affected whether or not advice was given on inshore archaeological issues. In fact, of the six ESs which commented on the subject, four scored poorly under range of source use.

6.3 Assessment of Mitigation Recommendations

6.3.1 Overall assessment

Generally practical mitigation recommendations were good across all ESs with 62% scoring good or very good. 17% had no mitigation recommendations; no ESs received a poor score and only 7% scored below average. The results improved when ESs from Period 1 were ignored.

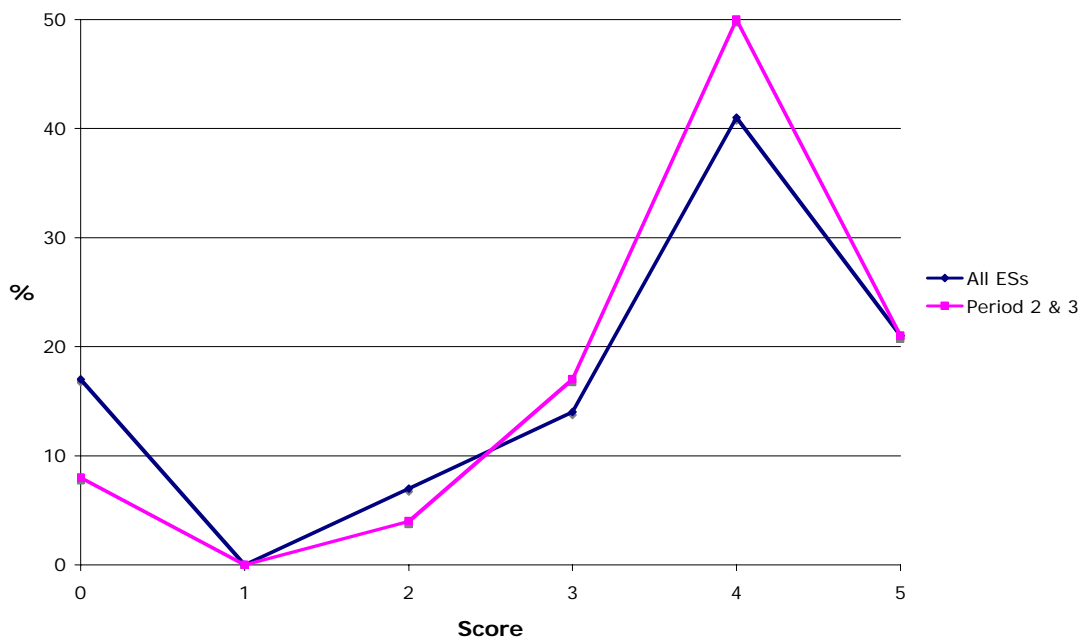


Chart 11: Comparison of percentage of ESs receiving a particular score

Seven ESs had subsequent archaeological reports and/or analysis of geophysical data prior to the completion of the licence procedure. In all of these ESs the initial recommendations were poor or below average but improved with the subsequent work. The score was based on the improvements, as it was using this information that conditions were placed upon the licence. This is evidence of the importance of using a suitably qualified archaeologist at the earliest stage possible to ascertain the true potential of the resource.

6.3.2 Very good mitigation recommendations

The six ESs which received very good scores were based on quality source use. All bar one scored good for range of sources used; ES01 scored average but scored well in the detailed analysis of how sources were used. ES06 was also subject to detailed source analysis and received a score of excellent. They used the analysis of geophysical data as part of the assessment.

All these ESs were based on good archaeological advice. The advice was reviewed for mitigation and if mitigation was not required for a certain aspect then reasons were forthcoming. It is probably no coincidence that all six ESs drew the recommendations from Archaeological Technical Reports.

The known and unknown resource was well accounted for in the recommendations. Where positions were unknown suitable methods to confirm them were forwarded. The appropriate archaeological practice was recommended. The strategies addressed archaeological concerns well.

6.3.3 Good and average mitigation recommendations

The majority of ESs received a good score, a total of 11. These ESs made adequate recommendations to protect the known resource and made provisions for unknown material. Overall, these ESs drew their recommendations from good source work; 78% of these ESs scored good for source use. Surprisingly, two ESs had poor source use but managed to provide good mitigation. They used a combination of good coverage of the known material while highlighting the potential for future discoveries. Furthermore, they did not draw their information from Archaeological Technical Reports.

These two ESs were the exception rather than normal practice. The trend across all ESs is that the quality of mitigation recommendations was a result of quality groundwork in the earlier stages of the DBA. Better mitigation strategies drew from quality source use, a wider range of sources and the use of Archaeological Technical Reports. The four ESs with average recommendations had comparable quality in other aspects that have been reviewed. The trend continues with below average recommendations.

6.3.4 Below average mitigation recommendations

Two ESs had below average mitigation recommendations. ES19 notes the presence of a wreck and that the aggregate company will undertake operational procedures but no detail of the procedures are given. This might suggest that the company is dictating the mitigation rather than the ES providing guidance. Less specific guidance is included in ES13 to avoid the wreck and anomalies in and adjacent to the dredging area.

Both of these ESs scored poorly on source use and neither used an Archaeological Technical Report. Furthermore, ES13 scored poorly on the detailed analysis of how sources were used. There is a clear suggestion that the groundwork for mitigation recommendations has led to a below average result.

6.3.5 ESs without practical mitigation recommendations

Five ESs did not have practical mitigation methods. Three of these were undertaken during Period 1, the other two were from Period 2. In all cases, the investigation of sources other than analysis of geophysical data did not reveal any known archaeological material. Therefore, it is reasonable that mitigation was not proposed. Yet all of these ESs scored poorly in the assessment of source use. In fact, 83% of the ESs that scored poorly did not have any

mitigation recommendations. This may not prove that archaeology was missed but there is clear correlation between poor range of source use and no mitigation recommendations. Furthermore, ES28 scored poorly on how sources were used.

Four of the five ESs did undertake geophysical survey analysis but it is unclear whether or not a suitably qualified archaeologist reviewed this, as they did not draw information from an Archaeological Technical Report. Furthermore, ES14 makes confusing statements suggesting at first that the location of wrecks is unknown but geophysical analysis revealed a wreck and two anomalies. There were no subsequent mitigation recommendations for these, which was confirmed by the aggregate company.

There was little attempt to quantify the unknown resource in these ESs. One ES did draw scant attention to the coastal impact and three made similar cases for submerged landscapes. They all scored average for archaeological advice on shipwreck which was due to limited detail and little discussion of the unknown resource.

The evidence collated in these ESs suggested that no mitigation was necessary but the poor source use suggests that archaeology may have been missed. It is difficult to prove this yet the wreck and anomalies which were unaccounted for in ES14 do show that there are potential flaws in the investigation of archaeology. Three of these ESs were from Period 1 so these flaws can be seen as a product of insufficient guidance. This does apply to the Period 2 ESs to some extent yet it is concerning that licences that are currently being dredged may be impacting archaeology.

6.4 Development of Best Practice

6.4.1 Archaeological advice

Advice on submerged landscapes in ESs has vastly improved in the last decade. It is clear though that there is still room for improvement. This is because understanding and knowledge in the area is continuing to evolve. Due to the nature of this resource there is a potential for unknown sites in dredging areas yet too often no attempt is made to quantify this unknown resource. This was an issue that was highlighted in 'Marine Aggregate Extraction: A review of selected Environmental Statements' (2003). The results from ALSF projects will continue to aid understanding of submerged landscapes and it is important that they are used to inform on advice in future statements.

Offshore installations and infrastructure were not covered in advice. The importance and value of these site types within dredging areas needs to be quantified. From there a strategy for quantifying and potentially protecting these sites can be developed.

Coastal and intertidal sites were very poorly represented. The reasons for this have been discussed and to some extent it is understandable why they are neglected. It is very easy to dismiss any impact though there should be a

basic investigation of the impact on these sites. This would not, in the first instance, require an in depth investigation of sources for this site type. Instead, an investigation of the coastal impact study would reveal if inshore sites would be affected by dredging. If any impact is perceived an investigation of the coastal resource could follow.

6.4.2 Mitigation recommendations

Overall mitigation recommendations were good. As a result of the review it was apparent that the quality of mitigation recommendations was a result of quality groundwork in the earlier stages of the DBA. Therefore it is very important that ES undertake a thorough examination of a wide range of sources. It is also apparent that an Archaeological Technical Report is an important factor in producing recommendations that sufficiently mitigate against any proposed impacts.

7. Investigation of Mitigation Implementation

7.1 Methodology

During the collation phase it was possible to ascertain which ESs specified practical archaeological mitigation recommendations. A further distinction was made as to whether an ES was still in the application phase or had led to the licensing of an area. Fifteen ESs have active mitigation strategies in place. Some ESs cover multiple areas; for the purpose of this section an area is defined as the multiple areas covered by one ES.

Aggregate dredging companies with active mitigation strategies were contacted via email. The strategy for each area, current results and monitoring proposals were noted. These were compared with the recommendations in the relevant ES. They were also asked to complete a questionnaire on their general views of the implementation process. All responses have remained anonymous. The questions posed to the companies are listed in section 7.3 with a summary of all answers.

As the provider of advice to developers and the regulator, EH was approached for its opinion on the implementation of mitigation recommendations. A questionnaire was emailed to a relevant contact in the Maritime Team. The questions posed to EH are listed in section 7.4 with the full responses.

The NMR is the recipient of information from the BMAPA/EH protocol on finds. This project did not intend to undertake a full review of the protocol, only to consider it in the context of the wider issue of mitigation implementation. A questionnaire was emailed to relevant contacts in the NMR who deal with the protocol. The questions posed to the NMR are listed in section 7.5 with a summary of all answers.

7.2 Assessment of Mitigation Implementation

7.2.1 Exclusion zones for shipwrecks

Exclusion zones around wrecks serve to provide protection for sites of cultural significance in addition to promoting safety during dredging activity by preventing large metal shipwrecks impacting dredging equipment.

Eleven areas have utilised exclusion zones for wrecks, these sites were all highlighted in the mitigation recommendations of the relevant ES. One area did identify wrecks in the mitigation recommendations but exclusion zones were not necessary as the wrecks were identified in a pre-dredge survey area that was outside of the working area. Wrecks were not identified in three ESs and therefore exclusion zones were not recommended for those areas.

There are some potential implications for the quality of source use and archaeological advice when considering exclusion zones for wrecks. Of the three that did not recommend this measure, 66% of ESs scored poorly on source use compared with only 17% of ESs which did identify wrecks. Consideration of the advice on shipwrecks reveals that 100% of ESs without

exclusion zones scored average compared with 8% of those which identified wrecks. There is the possibility that due to poor source investigation and subsequent average advice that shipwreck material was not identified. It may be just a coincidence but there is sufficient doubt to confirm that quality investigation of sources and advice provides a solid foundation to all subsequent work.

7.2.2 Exclusion zones for anomalies

Only five areas had exclusion zones for anomalies. All the other areas did not have anomalies identified although two ESs did not utilise geophysical data so it is possible that anomalies were not picked up during the DBA. This shows that interpretation of geophysical data is an important factor in protecting potential archaeology.

On several occasions anomalies have been investigated using visual surveys and have been deemed to hold no archaeological importance. The anomaly was removed, the zones were lifted and dredging was able to continue in that section of the area.

There has been an incident where contractors did not recommend an exclusion zone around a large anomaly as it was either missed or deemed irrelevant. After a later survey, the aggregate company felt the anomaly warranted an exclusion zone and implemented one. It is encouraging to see aggregate companies take the initiative in these circumstances.

7.2.3 Archaeological interpretation of monitoring surveys

Eleven areas are subject to archaeological interpretation of monitoring surveys on a regular basis. The regularity of interpretation varies, annual, bi-annual or every five years. In some circumstances not every survey is interpreted archaeologically.

Two of the areas that don't have archaeological interpretation of surveys are from ESs undertaken in Period 1; the other two are from Period 2. As these are older ESs they were not subject to the same guidelines as recent licence applications are.

7.2.4 Other aspects of strategies

Three ESs were subject to grab samples. Very little material of archaeological interest was discovered. Currently no other grab samples are planned for other areas.

Six areas used pre-dredge surveys to confirm the existence and/or position of wrecks. Subsequent results in one area led to the confirmation that exclusion zones were not necessary. The other surveys were able to pinpoint positions of wrecks.

7.3 Opinion of Aggregate Company Representatives

7.3.1 Advice from contractors

Question A1: Do you feel that you receive adequate advice and support in matters relating to the marine historic environment from contractors? Are there areas that require improvement?

Overall companies believe they receive adequate advice from contractors, in some cases it is very good. The workload of contractors is increasing; from an archaeological point of view this is surely a good thing although this would result in increased costs for the companies. One complaint was that pragmatic advice was sometimes difficult to obtain. This was associated with the companies being “*soft targets for what can only be considered as research projects.*” This was a minority position.

7.3.2 Advice from EH and DCLG

Question A2: Do you feel English Heritage and the DCLG provide adequate advice and support in matters relating to the marine historic environment? Are there areas that require improvement?

Generally the advice given is sound. DCLG rely on their advisors and the subsequent licence conditions reflect advice from EH. The importance of ALSF research was also highlighted; it was seen as a useful guidance tool. The shortage of pragmatic advice was again highlighted by one company which was worried that some of EH’s advice was not commercially sound. This was a minority position.

7.3.3 Insufficient archaeological advice

Question A3: Have there been examples when archaeological advice has not sufficiently covered the marine historic environment? (i.e wrecks/anomalies not picked up from the interpretation of survey data) Has this led to problems with licence applications or during dredging?

In the majority of cases, archaeological advice sufficiently covered aspects relating to the marine historic environment. There are very few examples of archaeological material being missed during the ES. In one case an anomaly was not recommended for protection by a contractor; the company eventually self imposed an exclusion zone. In an older licence area wreckage was covered by mobile sand and was not discovered; modern technology may identify the object if the situation arose again.

Several companies highlighted potential problems with survey data. Poor or mediocre data can hamper interpretation and as such additional pre-dredge surveys may be required. Also, some surveys are “*specifically aimed at identifying economic reserves of sand and gravel and consequently are not best suited to the identification of wrecks.*”

7.3.4 Wreck exclusion zones

Question A4: If an exclusion zone has been placed around a wreck site, is further archaeological fieldwork undertaken to aid understanding of the site as

a matter of policy? Is it dependent on the proximity of the site to dredging activities?

As a matter of policy, wreck sites that are subject to exclusion zones are not subject to further fieldwork. In some circumstances, the proximity of a wreck to dredging activities may warrant further studies to establish the nature of the wreck. The results of these studies may result in an attempt to relax the zone. One company stated that an exclusion zone would not be removed in the first circumstance even if survey results suggest there is no wreck in the area. Further work would be undertaken to confirm this initial assumption. DCLG would only remove a zone on the advice of EH.

7.3.5 Anomaly exclusion zones

Question A5: If an exclusion zone has been placed around an anomaly, is further archaeological fieldwork undertaken to ascertain if the site is of an archaeological nature and whether the exclusion zone should remain? Is it dependent on the proximity of the site to dredging activities?

Anomalies are far more likely to be investigated than wreck sites. This is still dependent on their proximity to dredging activities and their impact on reserves. If it can be demonstrated that the site holds no archaeological significance then the restrictions may be relaxed or even lifted. On one occasion, anomalies in the middle of a dredging area were investigated. They were found to have no archaeological interest, the wreckage was moved and the restriction was lifted.

7.3.6 Negative aspects of mitigation strategies

Question A6: Do you feel that there any negative issues concerning the range of archaeological mitigation strategies? (i.e not cost effective, constrain dredging for minimal benefit of archaeological understanding)

Companies are generally content with mitigation strategies to date. They are seen as necessary and do not preclude dredging and overall companies did not have any negative comments. It was felt that the current ALSF projects would increase understanding of the marine historic environment increasing the success of mitigation strategies.

There were some negative aspects highlighted by one company:

“Some of the mitigation strategies seem to be more research orientated with little bearing to potential revenue streams. Unfortunately, the marine aggregates industry is not in a strong position to negotiate. Because of the lack of GVs granted over the past 15 years the industry is under immense pressure to deliver new licences and in this situation, it will sign up to excessive mitigation and monitoring measures. On reflection, some of the measures (and not necessarily archaeological) seem to be both expensive and questionable in terms of output.”

A specific aspect was exclusion zones which have a 200m radius. These were seen as large considering the positioning accuracy of modern vessels. It was

felt that these zones could be reduced to a 150m radius which would reduce the level of resource sterilisation by about 40%.

7.3.7 BMAPA/EH Protocol

Question A7: What are the positive and/or negative aspects of the EH/BMAPA protocol for finds? Do you feel that changes are required? (please note this review does not intend to fully assess the protocol, only view it in the context of other mitigation strategies)

The protocol is a relatively new mitigation tool and it may be too early to judge its results. Nevertheless, companies have already had positive and negative experiences of the system. The protocol increases the likelihood of finds being made and reported by ships and wharves while involving wharf and ships staff in a worthwhile and well-publicised initiative. It has led to a trusting and constructive relationship between the industry and EH as companies are self-regulating as far as the protocol is concerned. Overall the protocol seems to be working, the training and workshops were useful and many feel no changes are required as yet.

Several negative aspects were also highlighted. The reporting process adds another task to already stretched company management. Also storing sometimes large objects pending decisions on what to do with them is difficult.

This review did not intend to fully assess the protocol, only view it in the context of other mitigation strategies. A full review of the protocol is necessary in the future to allow a full range of experiences, positive and negative, to be assessed.

7.3.8 ALSF Projects

Question A8: Have the results of ALSF projects aided archaeological understanding, advice and mitigation implementation? In your experience, which projects have been particularly useful?

Companies have seen the ALSF projects which relate to the marine historic environment as a success. Projects which resulted in the acquisition and interpretation of further data were particularly useful for increasing understanding. At a recent ALSF conference, some projects were seen as extremely useful in understanding the marine historic environment as they had specific research aims that could be answered. The 'Submerged Palaeo-Arun & Solent Rivers: Reconstruction of Prehistoric Landscapes' project and the ongoing study 'Modelling exclusion zones for marine aggregate dredging' were seen as particularly important. There is some agreement though that more time is needed to determine the true effectiveness for advice and mitigation.

7.3.9 Other comments

Question A9: Please feel free to add any other comments on archaeological issues within dredging areas.

According to one representative, the marine historic environment is one of the most successfully managed issues affecting aggregate dredging. They highlighted the strong relationship with EH, the high standard of site assessment and the good response overall to the reporting protocol from wharves and ships.

7.4 Opinion of English Heritage

7.4.1 Advice sought by dredging companies during application

Question B1: Do you feel that aggregate dredging companies seek sufficient advice from you and/or English Heritage during the licence application? Are there ways that the process could be improved via better communication, understanding or other methods?

“In general, yes. The system for progressing through the Government View procedure is well established and the move to a statutory basis should just reinforce the present system that does seek to ensure adequate communication, understanding of the proposal and the methods by which the historic environment should be examined.”

7.4.2 Advice sought by contractors

Question B2: Do you feel that archaeological contractors who prepare Environmental Statements seek sufficient advice from you and/or English Heritage during the licence application? Are there ways that the process could be improved via better communication, understanding or other methods?

“Again, in general yes, but our main point of contact will be with the overall environmental consultants appointed to deliver the complete environmental assessment (e.g. inclusive of fisheries, recreation, ornithological detail). Therefore an appointed subcontractor to deliver archaeological detail will make enquires directly to relevant data holders such as the National Monuments Record of English Heritage.”

7.4.3 Advice sought by dredging companies during mitigation

Question B3: Do you feel that aggregate dredging companies seek sufficient advice from you and/or English Heritage during archaeological mitigation implementation? Are there ways that the process could be improved via better communication, understanding or other methods?

“The detail about archaeological mitigation will be dealt with by the overall environmental consultants appointed by the dredging company and not necessarily with a dredging company. However, the wording of the licence and associated condition (inclusive of archaeological mitigation), should a favourable Government View be granted, is held directly with the regulator (Department for Communities and Local Government).”

7.4.4 Current mitigation strategies

Question B4: Do you feel the currently available mitigation strategies suitably protect the marine historic environment? Would you like to see further methods developed? Do you feel that any current methods should no longer be used for their lack of archaeological input or cost effectiveness?

“The present strategies do seem appropriate, but effectiveness requires assessment and so we look to subsequent monitoring reports as a key system to enable us to review strategies and their effectiveness. Further methodological development is relevant with particular reference to optimising the use of exclusion zones and further support for such work through Aggregates Levy Sustainability Fund (or other similar mechanism) is necessary. The present suite of methods does seem appropriate and provides a range of methods to be applied subject to the particular conditions and characteristics of the aggregate winning area.”

7.4.5 Negative aspects of strategies

Question B5: A comment raised during this review suggests that some mitigation measures “seem to be both expensive and questionable in terms of output”? Do you feel this is an accurate statement? Do you feel there is sufficient archaeological “output” to make any expensive worthwhile?

“We provide advice to the regulator as to how the historic environment should be subject to analysis to enable evaluation of the relevant interest present on and within the seabed. If the industry considers the methodologies to deliver this evaluation are expensive or “questionable in terms of output” then we welcome further collaborative effort to further refine and improve methods that still deliver the necessary data to inform our advice to the regulator. In our opinion archaeological “output” does provide the detail necessary to inform our advice to the regulator and we can only comment that such output will incur expense as does any other element of the required system for examining the environmental impact of the proposed development.”

7.4.6 EH resources for mitigation implementation

Question B6: With the increasing workload that is accumulating from mitigation fieldwork do you feel that you and/or English Heritage are able to commit sufficient resources to the licensing process and subsequent strategies?

“Our advice will be expected and we will therefore commit resources as we can to enable delivery. We also believe that work to date supported by ALSF research will aid the process of evaluation, but only if sufficient resources and a strategic approach is adopted by the industry to ensure the very best “value” is returned from the effort to develop methodologies and interpretation of the marine historic environment supported by ALSF Round One and Two projects.”

7.4.7 BMAPA/EH Guidance and Protocol

Question B7: Do you feel that the recent BMAPA/EH guidelines and protocol are working? Are there positive or negative issues that have arisen since their implementation?

“Comment is offered that the guidelines do provide the necessary detail required by the industry and we will continue to ensure reference is made to the published document. The protocol is also a valuable tool and one that can be adapted and applied to other marine development interests. A particularly positive aspect of promoting the protocol has been the system of road shows to ensure take up and how it can be made to work effectively. It is therefore important that long term support is given by parties such as BMAPA to both the updating the guidelines and protocol as and when necessary.”

7.4.8 Other comments

Question B8: Please feel free to add any other comments on the licensing procedure, mitigation implementation or any other aspect of marine aggregate dredging.

“The initiative shown by BMAPA to formulate a system of Regional Environmental Assessments (REA) to support license renewal and proposals for new extraction areas is welcomed. We therefore look forward to working with the industry to ensure an appropriate strategic approach is developed to implement a meaningful REA system that links effectively with subsequent EIA for site specific applications and that optimises and puts into practice and tests the ALSF published research.”

7.5 Opinion of NMR on BMAPA/EH Protocol

7.5.1 Number of finds collected

Question C1: To date, how many finds have been collected through the scheme?

From October 2005 to September 2006 eighteen events were reported by the dredging companies to Wessex Archaeology. After further research by Wessex Archaeology staff, twenty monuments/finds for that period were reported.

7.5.2 Common find types

Question C2: Are particular finds types noticeably more common than others?

The most common type of find is bones/fossils from prehistoric periods and later.

7.5.3 Positive and negative aspects

Question C3: Do you feel the scheme is working? Are there any particular positive or negative aspects of the scheme?

The protocol has resulted in the NMR being able to enhance its database with a greater diversity of maritime records, not just shipping finds. This is in line with its commitment to extend the scope of the record beyond shipwrecks to include bone, tusk, antler and similar finds.

Several negative aspects have been highlighted at this early stage. The co-ordinates involved with most finds are necessarily vague as they are from the dredging area or the wharf where the item was discovered. This can make it difficult to provide a precise location and thus context for the record created on the AMIE database.

One respondent felt that the scheme has not been running long enough to fully assess how the scheme is working. However, they were *“surprised that very few events were reported by the dredging companies.”*

7.5.4 NMR's implementation of the scheme

Question C4: Do you have sufficient resources to implement the scheme successfully and efficiently?

The NMR's role in implementation is purely to input the data. Due to the small number of finds to date there is minimal data entry and as such there are no resource implications.

7.5.5 Other Comments

Question C5: Do you have any other comments?

"It might be useful to have a review of the locational information to see if any more precise system can be developed, although I recognise the limitations inherent in the way the information is gathered and reported."

7.6 Development of Best Practice

7.6.1 Advice on mitigation implementation

Overall the advice and communication between the various parties involved in the ES process is very good. Aggregate dredging companies are happy with the support provided by contractors, DCLG and EH. EH feel that the GV procedure is well established and the passing of the process into the legislature will reinforce this strong position.

Understanding of archaeological issues between parties is good. One company was concerned that the advice was not pragmatic or commercially sound. This viewpoint may be based on the visibly increased workload relating to archaeology over recent years, largely because the marine historic environment was afforded the same level of protection as other issues considered in older ESs. Current archaeological advice is likely to be of a comparable level to that given to other environmental issues. This comment does suggest that there is still potential to improve the relationship between the industry and EH. All parties should be encouraged to air any grievances, concerns and comments in an open, positive forum to further the development of the strong relationship of all parties.

7.6.2 BMAPA/EH Protocol

At this stage it is too early to gauge the success of the protocol. The scheme has only been running for a little over a year; the first year yielded twenty monuments/finds. Nevertheless comments on the protocol show that while there are some issues to be addressed, overall the scheme appears to be a useful mitigation measure.

A full review of the scheme is required after it has been running for 3-5 years. This would obtain a reflection of the range of positive and negative experiences and whether changes are necessary. Future reviews of the ES system should undertake a broader investigation of the protocol to place it in the context of mitigation strategies.

7.6.3 ALSF Projects

There is a high potential for ALSF projects to aid the development of archaeological advice and mitigation strategies. The parties interviewed have highlighted particular studies as good examples of work that could have implications on future methodological development.

The results of ALSF projects are beginning to filter into the management of marine historic environment in and around dredging zones. The projects do not purely afford increased protection to the archaeological resource; they also aid refinement of the mitigation strategies which will reduce time and costs for the industry. This will continue over the coming years and the true effectiveness on advice and mitigation will become clearer. The continued flow of ALSF research projects with clear research aims and benefits should be mirrored by the extension of the scheme and the support of all parties.

7.6.4 Range of mitigation strategies

The mitigation recommendations were undertaken in all areas that have been awarded licences. They have either been undertaken, are ongoing or due to commence in line with the licence conditions.

There is correlation between the quality of source use/ archaeological advice and whether or not exclusion zones for wrecks are implemented. It may be a coincidence that areas that did not use wreck exclusion zones had poor source use and/or archaeological advice. Yet there is sufficient doubt to confirm that quality investigation of sources and advice provides a solid foundation to all subsequent work. The recommendations in sections 5.5 and 6.4 should be followed to guarantee that all strategies are based on sound archaeological research.

The investigation of areas with active mitigation strategies was biased in favour of older ESs. This is because many areas with newer ESs are still in the licence application process. The strategies of Period 3 ESs that were assessed did show improvement over older ESs; the archaeological interpretation of monitoring surveys has become more commonplace. Whether this trend will continue is difficult to ascertain until the strategies for newer ESs have been implemented.

One aggregate company felt that some mitigation measures were not cost effective, particularly 200 metre exclusion zones. This was not a common opinion. In response to the comment, EH stated that their advice was in line with EIA requirements which provide adequate protection of the historic environment from development. Even so, they are happy to discuss the strategies with the industry in a bid to maintain their excellent working relationship. The issue of the size of exclusion zones will be better informed in the future with the completion of the ALSF project 'Modelling Exclusion Zones For Marine Aggregate Dredging'. The project aims to provide more detailed information to aid estimation of the shape and size of exclusion zones.

Future mitigation strategies will draw information from a wider range of data other than ESs. The increased use of archaeologically interpreted monitoring

surveys, the continued development of the relationship between EH and the industry, the BMAPA/EH Protocol and ALSF projects will aid the development of future strategies. It is clear that these developments are still at an early stage yet a solid foundation for all parties to work from has been established.

8 Review of Results against Best Practice

8.1 Methodology

A brief consideration of the current best practice guidelines is incorporated in section 2. Throughout this project the results have been judged in light of contemporary best practice. This section aims to highlight necessary changes to best practice, gaps in the guidance and areas that need greater integration. Positive aspects of best practice have not been focused upon.

Within each area that shortfalls have been identified potential actions have been developed. These actions are listed in order of simplicity and cost effectiveness.

8.2 Proposed Improvements for Source Use

8.2.1 Sources of archaeological data in BMAPA/EH guidance

1. Add appendix containing contact details of particular sources
2. Simple online database/list of sources hosted by BMAPA and/or EH
3. Develop list of sources from particular localities or secondary sources

8.2.2 Use of geophysical data

1. Use of source has improved over time, therefore no immediate concern. Future reviews should ensure continued use
2. Ensure that all ESs use available geophysical data
3. Encourage companies to undertake surveys with archaeological input at earliest possible stage

8.2.3 Historic chart use

1. Use of source has improved over time, therefore no immediate concern. Future reviews should ensure continued use
2. Researchers should be encouraged to assess charts from sources other than the UKHO
3. Undertake wider review of positives and cost effectiveness of charts held by local sources

8.2.4 Local museums and collections

1. Source is not time or cost effective therefore no further action required
2. Initial enquiries should be made at Project Design stage into potential
3. Develop research into South coast study area to establish regional lists of potential organisations with details of data

8.2.5 Secondary sources

1. Compile database/list of previously used sources
2. Research into other secondary sources
3. Review of the use of secondary sources questioning the reuse of sources and the potential of others

8.2.6 Non-standard sources

1. Update list of sources of archaeological data to include sources/details identified in this review
2. Initial enquiries should be made at Project Design stage into potential
3. Develop research into South coast study area to establish regional lists of potential organisations with details of data

8.2.7 How sources are used

1. Ensure ESs draw information from Archaeological Technical Report
2. Ensure all contractors adhere to IFA Standards and Guidance
3. Scheme to guide and train in the full investigation of sources

8.3 Proposed Improvements for Archaeological Advice

8.3.1 Submerged landscapes

1. Continue to encourage understanding and research in this area
2. Ensure the potential for unknown sites is highlighted in all ESs
3. Future reviews to ensure sites receive comparable attention to shipwrecks

8.3.2 Offshore installations and infrastructure

1. Offer advice on site types
2. Encourage investigation of sites
3. Review to quantify historical importance and impact of dredging

8.3.3 Coastal & intertidal sites

1. Ensure all researchers utilise Coastal Impact Studies referring to use and perceived impact even if there is none
2. Ensure areas with perceived impact are suitably investigated in ES
3. Archaeological investigation of the results of coastal monitoring surveys to ensure marine historic environment is not threatened

8.4 Mitigation Strategies

8.4.1 Mitigation recommendations

1. Ensure recommendations are based upon quality source investigation
2. Ensure recommendations are based upon quality archaeological advice
3. Encourage communication with industry over perceived negative aspects of recommendations on dredging

8.4.2 BMAPA/EH Protocol

1. Continue to develop and support the scheme
2. Review after 3-5 years to address negative aspects
3. Review scheme in context of other mitigation strategies

8.4.3 ALSF Projects

1. Continue to develop and support the scheme
2. Ensure results filter into future strategies
3. Identify methodological gaps which can be solved by future projects

9. Conclusion

9.1 Project Review

This is the first assessment of archaeological considerations in ESs which accompany aggregate dredging licences. It has been an important exercise. Generally the results have been positive, although some negative concerns have been highlighted. It also confirms that recent changes in guidance and procedure are heading in the right direction as there is a marked improvement in Period 3 ESs. The aggregate industry, contractors and heritage representatives will be able to use this assessment as a baseline for future investigations and to help develop future best practice.

With hindsight it is clear that the detailed assessment of source use did not investigate enough ESs from Period 3. This is because the study area was selected prior to full investigation of ESs and the South Coast study area contained no Period 3 ESs. The use of more Period 3 for this part of the review would have given a clearer indication of the current practice of how sources are used. The initial collation of ESs did have logistical difficulties. The list of ESs supplied by the DCLG had minimal information which made project planning difficult. It may be beneficial for the DCLG to develop a spreadsheet or database of ES metadata. This could include any supplementary reports which were included.

The investigation of sources used was the most comprehensive aspect of this review. One difficulty was that specific sources may not have been listed because they could have been grouped under a source type (e.g. environmental data) or no relevant information was forthcoming. This situation may have affected limited aspects of the scoring process. This cannot be easily rectified though as the reviewer can only base their assessment on the information included in the ES. There were also methodological problems with comparing the archaeological advice, mitigation recommendations and mitigation strategies of a large number of ESs. This is due to variations in site types, available evidence, environmental factors and proposed dredge area.

9.2 Recommendations for Further Work

This project reviewed ESs which were undertaken in a milieu of transformation. In the last five to ten years archaeological practice, management and understanding have evolved at great pace. It is mirrored by the evolving approach to how the marine historic environment is assessed and protected in aggregate dredging zones. There are still many factors which will keep this momentum rolling; the development of the relationship between heritage agencies and the aggregate industry, the results of ALSF projects filtering into methodologies and increasing experience and development of the BMAPA/EH Protocol for Finds. Therefore it is important that this exercise is repeated in the future to inform best practice and ensure ESs are reaching the correct standards. Future reviews could take place every five years. It would be preferable to investigate a sample of future ESs and compare them to the results of previous reviews.

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See also section 11.1 for 'Key Resource Documents'

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11. Appendices

11.1 Key Research Documents

- Aggregate Levy Sustainability Fund: Relevant Project Reports (see section 10. Bibliography)
- BMAPA/ EH 'Marine Aggregate Dredging and the Historic Environment: Guidance note
- BMAPA/ EH 'Protocol for reporting finds of archaeological interest'
- CEFAS: The role of seabed mapping techniques in environmental monitoring and management (2006)
- Draft Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Dredging) Regulations (DCLG, June 2006)
- European Council EIA Directive 1985 (85/337/EEC)
- European Council EIA Directive 1997 (97/11/EC)
- European Union Strategic Environmental Assessment (SEA) Directive
- IFA Standards and Guidance
- JNAPC Code of Practice for Seabed Developers (1995)
- JNAPC Code of Practice for Seabed Developers (2006)
- Marine Aggregate Extraction: A review of selected environmental statements (The Wildlife Trusts and WWF-UK 2003)
- Marine Minerals Guidance Note 1: MMG1 (ODPM 2002)
- Marine Minerals Guidance Note 2: MMG2 Draft (DCLG, June 2006)
- UNESCO convention on the underwater cultural heritage
- Valletta Convention

11.2 Organisations with Potential Resources

11.2.1 National and International

- BOSCORF
- British Geological Society: Borehole Ordering
- British Geological Society: Geoindex
- British Geological Society: Discovery Metadata
- British Oceanographic Data Centre (BODC)
- DEAL: UK Offshore Oil and Gas
- EUMARSIN Project
- EUROCORE Project
- EuroGeoSurveys
- European Directory of Marine Environmental Data (EDMED)
- GEOMAR: Lithothek Database
- GEIXS
- GSC (Atlantic) Sample Inventory Database (SID)
- Lamont-Doherty Deep Sea Sample Repository
- National Archives
- National Maritime Museum
- National Monuments Record: Maritime Section
- UK Hydrographic Office: Archive (UKHO)
- UK Hydrographic Office: Wrecks Index (UKHOW)

11.2.2 South Coast Region

- Emsworth Museum
- Gosport Discovery Centre
- Hampshire and Wight Trust for Maritime Archaeology
- Hampshire Naval Collection
- Hampshire Record Office
- Isle of Wight County Archaeology and Historic Environment Service
- Isle of Wight County Record Office
- Portsmouth City Museum and Record Office
- Southampton Sites and Monuments Record (SSMR)
- St Barbe Museum

11.3 Questionnaire Responses: Potential Resources

11.3.1 Scope of the collection

Organisation	Areas of UK Offshore Zone	Form of Data	Resolution of Data
British Oceanographic Data Centre	Coastal locations for wave data apart from offshore S Uist, Barrow, Sevenstones. 45 coastal sites for tide gauge (sea level) data. Good coverage of all UK waters for current meter data. Poor coverage/occasional core and dredge samples	Samples (from instruments or cores)	15 minute for tide gauge, current meter and nonspectral wave data. 3 hourly for spectral wave data.
HWTMA	Sea Wight, Solent and adjacent coastline	Paper, artefacts, electronic, photos, video, samples, GIS	Variable
IOW County Archaeology	Isle of Wight/Solent	Paper record, artefacts	Variable
IOW Record Office	Solent and English Channel adjacent to the IOW	Documentary records: paper, parchment, photos and maps	Hard copy
National Maritime Museum	We hold sea charts of all areas of the UK offshore zone. We hold records of a few underwater archaeological investigations.	Paper and some artefacts	Varies
NMR: Maritime	English waters to 12 mile limit	We hold a textual database with locations held in our in-house GIS	N/A – we do not hold survey data
Portsmouth City Museum	Portsmouth Harbour, Langstone Harbour and the Solent	Paper records – reports Electronic data – Sites & Monuments Record Objects – archaeological	The paper reports are usually detailed. However we do not have reports for every site, and most are contained in archaeological journals such the

		archives of material recovered on site	'Proceedings of the Hampshire Field Club and Archaeological Society'. The electronic data is sketchy, and provides basic data about each site (e.g. period, location, and a brief description). The system used for this is HBSMR and does not include GIS. The object site archives consist of boxes of archaeological material.
Southampton SMR	All areas within the City boundary of Southampton - so the River Itchen estuary, half the River Test estuary and a part of Southampton Water. We also hold data for the reclaimed land of the docks.	The database mainly covers archaeological deposits and findspots. We have some records relating to river terrace and peat deposits found during construction work on the docks, stray finds from dredging operations, and the results of archaeological investigations along the foreshores. The database is by no means complete and we have a large backlog. The borehole logs for the city are not yet incorporated (held by our structural engineers).	The GIS data was captured against OS 1:1250 base mapping, but the locational accuracy of the data varies considerably depending on the original source.
UK Hydrographic Office: Archives	All areas - unrivalled record of maritime information for home waters from c.1680 to the present day.	Paper and digital records.	Resolution varies; scale varies. Some (older) records have no defined scale.
UK Hydrographic Office: Wreck Index	All areas	Database records	Data is point data, the accuracy varies as available.

11.3.2 Access to the collection

Organisation	Public Access	Commercial Access	Charge for Use
British Oceanographic Data Centre	Yes, unless it is commercially confidential (then, permission is given by data originators case-by-case)	Yes, but there are charges for some data types.	Yes, (exc VAT) £300 standing charge, £75 per current meter series, £75 per site year for nonspectral wave data
HWTMA	Yes, by appointment	Yes, on request	No
IOW County Archaeology	Yes, by appointment	Yes	There is a charge for SMR officer's time, but not for visits to use collection
IOW Record Office	Yes	Yes	For copies only
Nat. Maritime Museum	Yes	Yes	For commercial contractors
NMR: Maritime	We offer search services based on our maritime data and summary information is available on PastScape www.english-heritage.org.uk/pastscape	Yes - they can use the search services.	We offer a free 'single site/area' search service for maritime information and a charged priority (expedited) search service. Where a search requires more staff time we charge research fees.
Portsmouth City Museum	The public may view items in the collection upon request	Contractors can access the collection on request	No
Southampton SMR	Currently yes, by appointment only. Enquiries are initially answered by sending out digital reports of varying levels of detail, but paper sources can be viewed in the office.	Yes	Currently no
UK Hydrographic Office: Archives	Yes, but by appointment only. A fortnight's notice is the minimum required, but researchers may find that preferred dates are already earmarked for others. The facility can only accommodate a limited number of researchers at any one time.	As a general rule, yes, but by prior arrangement and agreement. In essence it would depend on the use being made of the information being gathered.	This also depends on the use to be made of the information. Our holdings are public records, and copies are Crown Copyright. We do license copyright information for use by others. There is no charge for <i>bona-fide</i> researchers.
UK Hydrographic Office: Wreck Index	No, but data can be supplied on repayment.	Data can be supplied on repayment.	Yes

11.3.3 Other comments

Organisation	Data Relevant to Study Area	Archaeological Potential of Data
British Oceanographic Data Centre	Historical wave data for West Bexington, Budleigh Salterton, Bee Sands, Lyme Bay, Shambles LV, Channel LV. Tide gauge data for Portsmouth, Bournemouth, Weymouth 32 current meter deployments in the area.	Only as background information relating to condition/preservation of archaeological samples, e.g. amount of scour wrecks are subjected to.
HWTMA	All data relevant to study area	All data is of an archaeological nature
IOW County Archaeology	Yes	Yes. However, due to lack of resources the collection is not yet particularly user friendly and is not being actively enhanced.
IOW Record Office	Maps, seacharts, newspaper reports of wrecks, photos and estate papers which have rights to wreck.	Yes – useful background information. But the scale of documentation which could be of use means that there is a danger of being swamped by information.
National Maritime Museum	Yes	Yes
NMR: Maritime	We have similar data for all areas.	The NMR is already used by commercial contractors, researchers and the public.
Portsmouth City Museum	Yes	Yes
Southampton SMR	Yes (see above)	Yes
UK Hydrographic Office: Archives	Yes – numerous surveys from as early as 1686 of the Solent and of the harbours and coastline thereabouts.	Yes and yes. For example, in 2005 the city of Limerick decided to build a tunnel under the Shannon; an archaeologist was sent to UKHO to examine the records we hold of the course and banks of the Shannon to determine whether the tunnel project might impinge on archaeological sites.
UK Hydrographic Office: Wreck Index	No	Not particularly. Shipwrecks of archaeological interest are unlikely to be significant to navigation and hence unlikely to be represented in our records.

11.4 Results: Raw Data

11.4.1 Key, standard, secondary and non-standard source use

The table details:

- Which Period the ES is from
- Whether or not a specific key or standard source was used
- The total number of standard sources used
- The score given for secondary source use
- The amount of other (non-standard) sources used
- The total amount of ESs which used a specific source

AppID	Period	KEY SOURCES				STANDARD SOURCES										2nd	Other
		LD	JNAPC	NMRM	HOWI	NMR	HOHC	SMR	RoW	HC	NS	Geo	LM	Larn	Total		
ES01	1	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	4	2	4
ES02	2	YES	YES	YES	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	1	1	
ES03	2	YES	YES	YES	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO	0	1	
ES04	3	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	NO	YES	6	3	
ES05	3	YES	YES	YES	YES	NO	NO	YES	NO	YES	YES	YES	NO	NO	4	3	
ES06	3	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	7	3	
ES07	2	YES	YES	YES	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	1	1	2
ES08	3	YES	YES	YES	YES	NO	NO	YES	NO	NO	YES	YES	NO	NO	3	1	
ES09	2	YES	YES	YES	YES	YES	NO	NO	YES	NO	NO	YES	NO	NO	3	2	
ES10	2	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES	NO	NO	5	3	
ES11	3	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	YES	6	3	
ES12	3	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	4	2	
ES13	2	YES	YES	YES	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	1	1	2
ES14	2	YES	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES	YES	NO	5	1	2
ES15	2	YES	YES	YES	YES	YES	NO	NO	YES	NO	NO	YES	NO	NO	3	2	
ES16	1	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	1	

ES17	1	YES	YES	YES	YES		NO	NO	YES	NO	NO	NO	YES	NO	NO	2	1	
ES18	2	YES	YES	YES	YES		NO	YES	YES	YES	NO	NO	YES	NO	YES	5	2	1
ES19	1	YES	YES	YES	YES		NO	NO	NO	NO	NO	NO	YES	NO	NO	1	1	
ES20	3	YES	YES	YES	YES		YES	YES	YES	NO	YES	YES	YES	NO	YES	7	3	
ES21	2	YES	YES	YES	YES		NO	YES	YES	YES	NO	NO	YES	NO	NO	4	3	
ES22	2	YES	YES	YES	YES		YES	YES	YES	NO	YES	YES	YES	NO	YES	7	3	1
ES23	2	YES	YES	YES	YES		YES	YES	YES	NO	YES	YES	YES	NO	YES	7	3	1
ES24	1	YES	YES	YES	YES		NO	NO	NO	NO	NO	NO	NO	NO	NO	0	1	
ES25	3	YES	YES	YES	YES		NO	YES	YES	YES	NO	NO	YES	NO	NO	4	2	
ES26	2	YES	YES	YES	YES		NO	NO	YES	NO	NO	YES	NO	NO	NO	2	1	3
ES27	2	YES	YES	YES	YES		NO	YES	NO	NO	YES	NO	YES	NO	NO	3	1	1
ES28	2	YES	YES	YES	YES		NO	NO	NO	NO	NO	NO	NO	NO	NO	0	1	
ES29	2	YES	YES	YES	YES		NO	YES	YES	YES	NO	YES	YES	YES	NO	5	2	1
Total ESs		29	29	29	28		10	13	20	12	8	10	10	3	7			

11.4.2 Overall score for range of sources

- A. Overall score given for range of sources used
 B. Total number of standard sources used
 C. Score for secondary source use

AppID	Period	A	B	C
ES01	1	2	4	2
ES02	2	1	1	1
ES03	2	1	0	1
ES04	3	3	6	3
ES05	3	3	4	3
ES06	3	3	7	3
ES07	2	1	1	1
ES08	3	2	3	1
ES09	2	2	3	2
ES10	2	3	5	3
ES11	3	3	6	3
ES12	3	2	4	2
ES13	2	1	1	1
ES14	2	1	5	1
ES15	2	2	3	2
ES16	1	1	0	1
ES17	1	1	2	1
ES18	2	3	5	2
ES19	1	1	1	1
ES20	3	3	7	3
ES21	2	3	4	3
ES22	2	3	7	3
ES23	2	3	7	3
ES24	1	1	0	1
ES25	3	2	4	2
ES26	2	2	2	1
ES27	2	2	3	1
ES28	2	1	0	1
ES29	2	3	5	2

11.4.3 Detailed assessment of sources

AppID	Period	Extent	Detail	Quality	Use	Summary	Context	Reference	Total
ES01	1	3	3	3	2	3	2	2	18
ES06	3	3	3	2	3	3	3	3	20
ES07	2	3	1	1	2	2	2	1	12
ES09	2	3	3	2	2	3	2	2	17
ES13	2	2	1	1	1	2	1	1	9
ES15	2	3	3	2	2	3	3	3	19
ES21	2	3	3	3	3	3	3	3	21
ES26	2	3	1	1	1	2	2	2	12
ES28	2	2	1	1	1	1	2	1	9
ES29	2	2	3	2	3	3	3	3	19

11.4.3 Archaeological advice & mitigation recommendations

Archaeological Advice:

- A. Shipwrecks & aircraft
- B. Submerged landscapes
- C. Offshore installations and infrastructure (forts, gas/oil industry etc)
- D. Coastal/intertidal installations and infrastructure (docks, forts etc)
- E. Eroding coastal/intertidal landscapes
- F. Terrestrial historic assets on or adjacent to coastal/intertidal areas

Mitigation recommendations

- G. Overall score between 0-5 for quality of recommendations

App ID	Period	A	B	C	D	E	F	Comments on advice	G
ES01	1	3	3	1	2	2	2	No threat to archaeology out of area as no seabed mobility	5
ES02	2	3	2	2	2	2	2	Highlighted broader archaeological potential	4
ES03	2	3	1	1	1	1	1		4
ES04	3	3	3	1	1	1	1		5
ES05	3	2	2	1	1	1	1		5
ES06	3	3	3	1	1	1	1		5
ES07	2	3	1	1	2	1	3	Highlights sensitive sites on shoreline but detail	2
ES08	3	2	2	1	1	1	1		3
ES09	2	3	3	1	1	1	1		4
ES10	2	3	3	1	1	1	1		5
ES11	3	2	2	1	1	1	1		4
ES12	3	3	1	1	1	1	1		4
ES13	2	3	1	1	3	3	3	Explicitly mentions no coastal impact	2
ES14	2	2	2	1	2	2	2	Mentions possible impact on coast but no detail	0
ES15	2	3	3	1	1	1	1		4
ES16	1	2	1	1	1	1	1		0
ES17	1	2	2	1	1	1	1		0
ES18	2	3	3	1	1	1	1		4
ES19	1	2	1	1	1	1	1		2
ES20	3	3	3	1	1	1	1		5
ES21	2	3	3	1	1	1	1		4
ES22	2	3	3	1	1	1	1		4
ES23	2	3	3	1	1	1	1		4
ES24	1	2	1	1	1	1	1		0
ES25	3	3	3	1	1	1	1		3
ES26	2	3	3	1	1	1	1		3
ES27	2	3	2	1	1	1	1		3
ES28	2	2	2	1	1	1	1		0
ES29	2	3	3	1	3	3	3	Explicitly mentions no coastal impact	4

11.5 Web Research of Organisations with Potential Resources

11.5.1 National and International

Organisation	Results from research	Comment on use	Cost
BOSCORF	Deep sea core repository. Holdings (text and cores) are north of Scotland and west of Ireland. No cores close to English coast, and therefore dredging zones.	No relevance to researchers.	n/a
BGS: Borehole Ordering	Allows researchers to identify whether BGS holds records that may be relevant and useful. Facility to request copies of the records online.	Useful tool to ascertain presence of previous boreholes which may or may not be useful to researchers.	Free to search. Fee of £13 + VAT per borehole, min. 2
BGS: Britain beneath our Feet	Online atlas which introduces the wealth of digital data, information and knowledge that the British Geological Survey holds. Offshore and Coastal zone includes maps/data on bathymetry, sea bed sediments, quaternary deposits, bedrock age and geological hazards.	Useful tool to use alongside other BGS search features. Easily accessible site.	Free to search. Digital data available for public and commercial use, price on request.
BGS: Discovery Metadata	Describes BGS datasets held. Either enter a keyword (phrase of interest or region) or select data category. Marine Geology has over 45 datasets on a range of categories including vibrocore samples, seabed surface samples and offshore geophysical surveys.	Useful to pinpoint particular data then need follow up enquiry to BGS to establish whether there is any relevant data.	Free to search, further enquires can be made to supplier of data.
BGS: Geoindex	Provides a map-based index to datasets that have collected or obtained from other sources. It is particularly useful for indicating the availability of data for site specific investigations. It has maps for UK Offshore zone with point data for seabed sample, geophysical survey lines and other material. Searching is free.	Useful tool to use alongside other BGS search features. Contains pop up Data Enquiry form so information can easily be requested.	Free to search. Prices provided on receipt of enquiry form, although some datasets have price information.
DEAL: UK Offshore Oil and Gas	Free web-based service facilitating access to data and information relevant to the exploration and production of hydrocarbons on the United Kingdom Continental Shelf. Source of quality spatial and attribute data for the UKCS and providing a national catalogue of geoscience data, by networking repositories as a single unified data resource.	Limited potential, deals with gas and oil industry and therefore is unlikely to hold data relevant to dredging zones. May be some useful data from Well cores and regional geological reports that are held by	Free to search, signposts data which is liable to costs. Prices on request with holding organisation.

		organisations other than BGS.	
EUMARSIN Project	The meta-database consists of sedimentological, bathymetric and analytical data from EU nations. Users are able to access information concerning the nature and quality of seabed sediments by identifying the sources where the required data are stored. UK data derived from BGS (see above).	As UK data is available via BGS there is limited potential for this source. Useful if researchers are working in an area close to UK Offshore Limit and require data from other nations.	Free to search. Use of data would cost, prices on request from organisation holding data.
EUROCORE Project	A European core meta-directory on the Internet for the tens of thousands of marine sediment cores dispersed in archives throughout Europe. UK data derived from BOSCORF (see above).	No relevance to researchers (see BOSCORF above).	n/a
EuroGeoSurveys	The Members organisations of EuroGeoSurveys are the key metadata and spatial data/ information providers on the subsurface of their individual countries. It provides links to the geoscientific spatial metadata, data and information sets produced by different EuroGeoSurveys members.	Provides links to various sites but does not itself hold useful data. Apart from link to EUSEASED all other links are for terrestrial data and therefore has no relevance.	n/a
EDMED	The European Directory of Marine Environmental Data is an inventory of European marine data and Data Holding Centres. It was initiated by the BODC (see section 5.4.2.1), which holds UK data in the EDMED.	As UK data is held by BODC there is no need to access EDMED unless researchers are working in an area close to UK Offshore Limit and require data from other nations.	Free to search. Use of data would cost, prices on request from organisation holding data.
IFM-GEOMAR	Holds more than 8,700 m of split sediment core samples (over half are from the Red Sea), hard rock samples, corals, sediment traps seawaters and pore waters. Samples are available for current and future research projects for research and education. Based in Germany with no online search facility.	As it is based in Germany and has no online search facility this is not a resource worth investigating for ES.	n/a
GEIXS	A European Geological Data Catalogue which gives a dataset description through the geographic coverage, key words through lexicons and free text. It provides a single point of access, crossing European Nations borders. UK	As UK data is held by BGS there is no need to access GEIXS unless researchers are working in an area close to UK Offshore Limit and	Free to search. Use of data would cost, prices on request from organisation holding

	data is provided by BGS.	require data from other nations.	data.
The Lamont-Doherty Deep-Sea Sample Repository	An archive of sediment and rocks from beneath the ocean floor and of the digital data pertaining to the material. Used for research in climate, environment, and other deep-sea studies. Searchable database for core sites of a given area, for mineralogy, micropaleontology, and other attributes. Global resource but no coverage of areas close to English waters.	No relevance to researchers.	n/a

11.5.2 South Coast Region

Organisation	Results from research	Comment on use	Cost
Emsworth Museum	Archive and display of the history of area with a selection of articles, books, pictures, clothing ships models. There are displays devoted to the old sea-faring families. Close to Chichester Harbour, Portsmouth and the Solent.	Limited use as little potential for information in dredging areas. An initial enquiry would be little cost though which could ascertain overall benefit.	Unknown
Hampshire Record Office	Contains records of minute books, letters, diaries, accounts, title deeds, maps, prints and drawings. Various formats including paper, parchment, film, audio tape and digital files. Online catalogue contains 700,000 descriptions of archives representing around 90% of catalogued records. It also contains digital images of 10,000 Hampshire photographs.	The online search enables researchers to identify relevant material. There is likely to be material that is relevant to the marine historic environment.	Free search, visits and consultation of documents.
St Barbe Museum	Explores the history of Lymington and the New Forest Coast with a catalogue of over 20,000 individual. The collection covers a wide range including geology, hand axes, flint tools medieval pottery and local industries.	Good possibility of relevant material from areas West of Wight. Contact with the curator in the first instance should ascertain available material and access issues.	Unknown