

## ***6. Synthesis and Summary***

### **6.1 Overview of Themes 1 to 4**

A great deal of potentially useful archaeological material exists on the continental shelves of the world. However, it is being threatened by the recent expansion of industrial concerns onto the shelf. It is therefore important, from both academic and cultural resource management perspectives, to locate and investigate this archaeological resource before it is irretrievably lost.

In an ideal world, all investigations of submerged landscapes and their potential archaeology would be based around small scale localized studies. Particular areas would be subject to high resolution surveys using bathymetric and sub-bottom seismics, core sampling and diver survey. This would enable very detailed palaeo-environmental and palaeo-geographic reconstructions to be constructed. Models (on local and regional scales) could then potentially be developed for the location of particular types of site (e.g. fishing sites), periods of site (e.g. the Mesolithic) or preservational contexts (e.g. primary contexts).

In reality, time and expense considerations render this approach highly unlikely in the near future. At present, detailed geological snapshots of certain areas do exist (e.g. the palaeo-Arun valley), as do glimpses of submerged archaeology (e.g. Bouldnor Cliff) but nothing like the intense detail that the ideal approach demands. Consequently we have to accept that a more 'top-down' strategy may have to be adopted. To this end, this project has performed a wide ranging review and assessment of the existing information regarding continental shelves in an effort to determine what archaeologists and other Quaternary researchers are capable of achieving at present and over the next few years.

This information was divided into 4 broad Themes, and the results of the assessment are as follows.

#### *Theme 1: The reconstruction of submerged landscapes*

- Significant flaws exist in our perception of submerged landscapes, the role they played in prehistory and the way in which they are reconstructed.
- In archaeology at least, a better understanding of sea level change and its effect on palaeo-geographic reconstruction is required. Rather than simply taking existing reconstructions at face value, their validity and applicability to the particular questions being asked must be assessed before use.
- Errors exist in all forms of sea level data, and thus result in spatial errors in the position of reconstructed palaeo-shorelines.
- The magnitude of spatial differences in shoreline position depends on the source of sea level data and the topographic time horizon, used in the reconstruction. However, in all cases, spatial errors are minimized in areas of steep topography.
- The most accurate and applicable palaeo-shoreline reconstructions require relative sea level based on local data. These reconstructions are applicable for predictive modelling or survey on a scale of kilometres or less.

- The techniques of constructing sea level curves are well established. However, in many cases the evidence required to construct them no longer exists. In these occasions coarser reconstructions may have to suffice.
- The error limits associated with the reconstruction of shelf scale landscapes have been quantified and assessed for a range of sea level curves and stratigraphic time horizons, using the North-west European continental shelf as an example.
- These regional reconstructions are suitable for providing a large scale background to archaeological research and for the initial planning stages of more localised surveys. Such reconstructions will have implications for both academic research and offshore environmental impact assessment. They are not applicable for predictive modelling or survey on a scale of kilometres or less.

*Theme 2: The nature of the pre-submerged archaeological deposits*

- A spatial and temporal diversity of archaeological material potentially exists in the presently submerged areas of the continental shelf.
- Large scale patterns of land use are evident in the terrestrial record which are likely to be applicable to the submerged regions.
- The submerged material will probably exist in one of three states of preservation: Primary, secondary or tertiary context.
- The research potential of secondary contexts for the Upper Palaeolithic and Mesolithic and tertiary contexts for all periods needs to be examined to a greater degree than at present.
- The potential of the submerged material lies in more than just identifying areas as 'landbridges' or migration corridors.
- Areas identified for further research include the antiquity and importance of coastal exploitation, and human response to sea level change. Each period and region may also have specific research questions that could be addressed by data from submerged contexts.

*Theme 3: The modification of archaeological deposits by trans- and regression*

- The present seabed is not an exact analogue of the lowstand landsurface
- Effective interrogation and exploitation of the submerged archaeological resource will require secure and accurate landscape reconstructions.
- The ability and techniques to achieve this are well established. The main difficulty is the time and expense required.
- A significant quantity of archaeological material will be reworked by marine processes. Understanding the processes behind this is important. Future work should attempt to examine these processes in detail. At present some tentative hypotheses and statements can be advanced on the basis of fluvial work and general studies of coarse clastic sediment dynamics.
- A more secure understanding of marine taphonomic processes may aid our understanding of the potential and location of marine secondary and tertiary contexts

*Theme 4: Predictive modelling of submerged archaeological deposits*

- Predictive modelling of submerged archaeological deposits is possible provided the problems described in Themes 1, 2 and 3 are addressed, especially those concerning landscape reconstruction and post-depositional taphonomic processes.

- At present, it is only really feasible where we have detailed reconstructions or knowledge of the past landscape, or a certainty that a landscape is ‘relict’ (in the sense of being unaffected by syn- and post-transgressive processes).

- Essential elements of the model to consider include past human choice in situating sites within the landscape and the post-depositional modification of this pattern.

- Approaches could therefore be based around investigating areas amenable to past human settlement, or areas of likely preservation or erosion. This latter approach places a premium on understanding the transgressive reworking and modification of archaeological deposits.

- Although there are gaps in the information pertaining to submerged landscapes, there is no reason why the filling of these gaps and the development of predictive models cannot be undertaken at the same time. Limited predictive modelling can, and should, be undertaken in areas where the problems described above can be addressed or overcome to a certain extent in order to gain information that will aid in filling the knowledge gaps while the models can be updated as these gaps are filled.

## 6.2 Dissemination

- Papers based on the information and results of this project have been presented at the following meetings, seminars and conferences:

1<sup>st</sup> Aggregates Levy Workshop. April 4<sup>th</sup>, 2003. Southampton Oceanography Centre.  
UK Archaeological Science Conference. April 2<sup>nd</sup> to 5<sup>th</sup>, 2003. St. Anne’s College, Oxford.

*“Integrating Terrestrial and Marine Related Archaeology”*. English Heritage Aggregates Levy Sustainability Fund meeting. April 29<sup>th</sup>, 2003. Museum of London Archaeology Service.

*“Black Boxes”*. May 3<sup>rd</sup> and 4<sup>th</sup>, 2003. Computer Applications and Quantitative Methods in Archaeology, UK. Department of Archaeology, University of Southampton.

*“The evolutionary legacy of the Ice Ages”*. May 21<sup>st</sup> and 22<sup>nd</sup>, 2003. The Royal Society. (Poster Presentation).

*“A re-assessment of the archaeological potential of continental shelves”*. ALSF day-meeting, Museum of London, 16<sup>th</sup> September 2003.

*“A re-assessment of the archaeological potential of continental shelves”*. EH Milestone Event – invited speaker. Museum of London, October 16<sup>th</sup> 2003.

*Underwater Treasures: Archaeology and Aggregates – An Academic Perspective*. Presentation to the All Part Parliamentary Group for the Earth Sciences and the All Party Parliamentary for Archaeology, November 16<sup>th</sup> 2003.

*“Land & Sea: Integrating Archaeologies”*. November 1<sup>st</sup> and 2<sup>nd</sup>, 2003. Department of Archaeology, University of Southampton.

- Papers have been drafted on “the reconstruction of regional scale palaeo-landscapes” (for submission to Proceedings of the Prehistoric Society) and on “Dynamic controls on the archaeological potential of continental shelves” (for submission to Archaeological Science).
- The project also has a website hosted at the University of Southampton (<http://www.arch.soton.ac.uk/Research/Aggregates/shelves-intro.htm>) onto which an outline of the project, and a digital version of this document have been uploaded.
- Finally, dissemination of this work via the internet has already resulted in contact with an industrial organisation (METOC) which undertakes environmental impact assessments for major offshore construction projects. Negotiations are currently being undertaken to utilise the regional scale methods and techniques described here to identify and mitigate the potential threat of offshore construction to shelf archaeology.