Broad Character: Fishing
Character Type: Aquaculture
National Perspective

INTRODUCTION: DEFINING/DISTINGUISHING ATTRIBUTES

The Character Type Aquaculture includes the following Sub-Character Types:

- Fish farming
- Shellfish farming

The 'Aquaculture' Character Type relates to the commercial cultivation of fish and shellfish populations under controlled conditions which are often, but not always or wholly, enclosed from wild stocks. It includes the raising of saltwater and/or freshwater species and may occur in locations inland, in rivers (freshwater or estuarine), tidal areas or in fully marine situations. Under 'Aquaculture', the main Sub-types, 'Fish farming' and 'Shellfish farming' generally involve different methods, locations and material features.

Fish farming refers to areas characterised by the commercial cultivation of fish populations under controlled conditions. Fish farms may be sited inland or coastally located artificial ponds, or in rivers, estuaries or the open sea, and they may be enclosed to varying degrees from wild fish stocks in tanks, cages or nets. The Sub-type includes closely and functionally associated management, storage and distribution facilities.

Shellfish farming refers to areas characterised by the commercial cultivation of shellfish populations under controlled conditions which are sometimes, but not always, enclosed from wild stocks. Shellfish farming includes oyster beds, mussel beds and cockle beds, which are 'seeded' and managed over several seasons until they are big enough to harvest. Structures used at such farms to provide additional surface area for shellfish attachment include arrays of trestles, racks and poles. The Sub-type includes closely and functionally associated management, storage and distribution facilities.

The commercial cultivation of fish and shellfish populations under controlled conditions (cockles in particular) is popular to supply a broad range of cooking traditions now popular in England. Cockles still collected, as they have been since time immemorial, by raking them from the sands at low tide. Many of the cockles sold in England are from the Thames estuary. In some parts of England, cockles are sold freshly-cooked as a snack (e.g. Essex).

HISTORICAL PROCESSES; COMPONENTS, FEATURES AND VARIABILITY

Typical components of this Character Type include:

- Shellfish farms
- Fish farms
- Oyster beds
- Fish quays and wharfs

The exploitation of oysters has a long history in England. Prehistoric shell middens containing oysters are known around the country, the oysters collected with other shellfish by groups of hunter gatherers exploiting the rich coastal resources. Gathering oysters was probably quite common in coastal areas at this early period but prehistoric evidence of oyster 'farming' is lacking and the evidence for oyster consumption is limited to shell midden contents, such as those dating to the Mesolithic period at West Voe, Shetland (Melton and Nicholson 2004). They were probably a subsistence food. Coastal areas would have been the most productive in Mesolithic England due to their relative abundance of food, which would almost certainly have included oysters (Hunter and Ralston 1999). Historical reference to the exploitation of existing natural oyster beds in England occurs during the Roman occupation (Eyton 1858). Oyster shells have been found in many of the English Roman villas, including Fishbourne and Barton Court Farm (Potter and Johns 1992). Oyster beds on the Kentish Flats that have been used since

Roman times and the town of Whitstable (Kent) is still particularly noted for its oyster farming. By the 18th century, oyster fishery was certainly flourishing in England (Whitfield 2005).

Physical remains of oyster beds are notoriously difficult to date, although it is likely that most archaeologically recorded English examples are medieval or post medieval (Hegarty and Newsome 2005, 86). A peak in oyster consumption was observed in the mid 19th century when oysters were a common food for the poor.

Fish farming as a distinctly maritime-related activity relevant to HSC is relatively limited in extent nationally. For example there are currently an estimated 55 aquaculture businesses in south west England, but most of these are freshwater fish farms. Parts of Langstone and Chichester Harbours which are designated as a sea bass nursery area and important spawning ground for demersal fish (Hampshire County Council, 2010).

VALUES AND PERCEPTIONS

Modern aquaculture is increasingly coming to the attention of the wider general public in various ways. For some, fish farming is seen as a potential answer to unsustainable fishing of the wild resource, while for others there are significant outweighing concerns over man's ability to control chemical and nutrient pollution from fish farms and the potential for genetic mixing of farmed fish with wild stocks.

However the shellfish-farming side of aquaculture is recognised as having a very long tradition in some areas and that form of aquaculture is still deeply engrained in the perceptions and economy of many communities, as in the case of Whitstable oysters noted above. As such, it is valued for the distinctiveness it affords these areas and as an important element in the local economy.

RESEARCH, AMENITY AND EDUCATION

Overall, the lack of systematic investigation into the archaeology of coastal shellfish fisheries has been identified in the past as a serious omission and a weakness in archaeology (Fulford *et al* 1997). This is being addressed to some extent by the Rapid Coastal Zone Assessment Surveys (RCZAS) and the National Mapping Programme (NMP) which have begun to identify such features. There is considerable potential for further research into the history of aquaculture, in particular its early development and the various techniques employed from catching to processing.

Further research, being undertaken by the Common Fisheries Policy (CFP), is also taking place on the current fishing industry addressing socio-economic impacts (http://ec.europa.eu/fisheries/cfp_en.htm).

From an educational perspective, issues of over-exploitation of fish stocks are helping raise public awareness of sustainability issues surrounding this Character Type.

How we meet society's demands for protein and in particular from fish and shellfish resources, couple with the practicalities, logistics and issues associated with the different types of aquaculture and its conflicts and compromises with estuarine and marine conservation and development, provides an interesting cross-curricular educational case study.

Ppaintings and historic photographs relating to this Character Type also have a valuable role to play both in research and in producing attractive educational resources to raise public awareness about the history and development of aquaculture.

CONDITION AND FORCES FOR CHANGE

Shellfish remains a popular foodstuff And much shellfish collection is still undertaken utilising traditional methods (i.e. by hand) and/or by being sucked up by a machine similar to a large vacuum cleaner, the latter having a more intrusive impact on the seascape. However pressures on the naturally occurring resource may produce an increase in more controlled shellfish farming to meet demand. Recent research has shown that global warming is likely to uncouple and alter the phase relationship between temperature and photoperiod (the period of time per day that an organism is exposed to daylight) and this is likely to have significant consequences for the reproduction of shellfish. Although this is unlikely to lead to extinction, it may cause species to disappear completely from particular areas. However, this will depend on speed of adaptation in relation to climate change and the degree of mixing between populations across the range of species (Lawrence and Soame 2004).

Other economic and environmental pressures on the present fishing and aquaculture industry addressing issues of sustainability also need to be taken into account. Although it concerned naturally occurring shellfish resources, health and safety aspects of the shellfish industry came to the fore after over 20 Chinese cockle-pickers were drowned in Morecambe Bay on 2004. Shellfish farming is also vulnerable to economic pressures on its export trade from increasing continental shellfish stocks and poor export prices. Fish farming also raises environmental concerns over abilities to control pollution from nutrients and disease-control chemicals from fish farms and the potential for genetic mixing between farmed fish and wild stocks.

Aquaculture has had large-scale character impacts on coastal and estuarine settlement patterns and forms as well as presenting visible material remains on the foreshores and estuaries of some areas. It provides an strong and thriving aspect of the locally distinctive historic character of such places.

The industry is also set to undergo regulatory change as, under the Marine and Coastal Access Act 2009, the Sea Fisheries Committees are replaced by Inshore Fishery Conservation Authorities (IFCAs), with a differing membership and differing objectives.

RARITY AND VULNERABILITY

Traditional and long-established shellfish farming methods (i.e. by hand) and/or by the use of a suction machine are still being used today.

Continued control over exploitation of fish stocks is necessary to enable their sustainability, with European Union (EU) reforms and measures progressing towards that end. This has implications for the people whose livelihoods depend on marine food resources and on the character of places that accommodate those livelihoods. Regulation aimed at the sustainable harvesting and greater conservation of wild fish stocks maty well alter the future balance between fishing and aquaculture in providing fish and shellfish protein, and the methods and species used in aquaculture. Understanding historic aqauaculture practices and their long-term sustainability may offer a valuable inputs to these future trends.

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