40. European Flat Oyster (*Ostrea edulis*)

Figure 1. European flat oyster, *Ostrea edulis* ©Dr Keith Hiscock (marlin.ac.uk)

Background

The native oyster *Ostrea edulis* has an oval or pear-shaped shell with a rough, scaly surface. The two halves (valves) of the shell are different shapes. The left valve is concave and fixed to the substratum, the right being flat and sitting inside the left. The shell is off-white, yellowish or cream in colour with light brown or bluish concentric bands on the right valve. The inner surfaces are pearly, white or bluish-grey, often with darker blue areas they grow up to 11 cm long, rarely larger. *Ostrea edulis* is associated with highly productive estuarine and shallow coastal water habitats on firm bottoms of mud, rocks, muddy sand, muddy gravel with shells and hard silt. In exploited areas, suitable habitat is/has been created in the form of 'cultch' - broken shells and other hard substrata. A lifespan of 5-10 years is probably typical as the majority of individuals in populations are 2-6 years old. The native oyster starts life as male, becoming mature at around 3 years of age. After spawning the oyster becomes a functional female. Gamete maturation begins in March or April and is in part temperature dependent. On the west coast of Ireland there is at least one spawning in each sexual phase during the summer. There may be some periodicity in spawning with peaks during full moon periods and fecundity may be as high as 2,000,000 in large individuals (Perry et al., 2017).

Rationale for spatial protection in the western Irish Sea

Ostrea edulis is listed by OSPAR with reference to its severe decline and sensitivity and was therefore nominated for inclusion on the feature list. This species is an ecosystem engineer providing habitat for biodiversity and is of historical significance. *Ostrea edulis* were once very common around the coast of Ireland but have now virtually disappeared due to overexploitation and habitat loss, however there is potential for restoration and reintroduction of the species to suitable areas.

Sensitivity assessment

***Ostrea edulis* are highly sensitive to pressure associated with construction and operation of ORE.** All marine habitats and benthic species are considered to have a resistance of 'None' to physical loss (to land or freshwater habitat) and to be unable to recover from a permanent loss of habitat (resilience is 'Very Low')(high confidence)(Tyler-Walters et al., 2018). *O. edulis* is highly sensitive to habitat structure change (medium confidence). The removal of the substratum would lead to the loss of the biogenic layer created by oysters and its biological community, the oyster cultch (which will remove an important chemical cue used by larvae when settling), and the substratum which provides a point of attachment for larvae. *O. edulis* is also highly sensitive to light and heavy smothering and siltation rate changes (medium sensitivity). As filter feeders that are permanently attached to the substratum, they would be unable to borrow up to the surface. In the low energy environments in which populations of this species develop, the deposited sediment is likely to remain for several tidal cycles, depending on local hydrography (Perry et al., 2017).

***Ostrea edulis* are highly sensitive to pressure associated with the fishing sector.** *Ostrea edulis* is somewhat resistant to some abrasion and is able to recover from some damage to shells. However, damage caused to oyster beds and their habitats by commercial fishing is considered to be of importance to levels of mortality and health of oyster beds and is therefore assessed as highly sensitive (medium confidence). Additionally, the effect of subsurface disturbance will be to displace, damage and remove individuals. Therefore, resistance is assessed as 'Low'. Resilience is assessed as 'Low' and sensitivity is, therefore, assessed as 'High' (medium confidence). *O. edulis* is also highly sensitive to a change in suspended solids (medium confidence). A short-term increase in sedimentation is likely to have an impact on *Ostrea edulis*. *Ostrea edulis* has a coping mechanism to remove increased levels of silt from within the mantle. This behaviour is energetically expensive, and may cause a decrease in growth rate of the organism, but is unlikely to cause mortality. However, at the level of the benchmark, there will be mortality as the level of sediment in the water column will exceed that of what the organism can survive (Perry et al., 2017).

***Ostrea edulis* are assessed as highly sensitive to the introduction or spread of invasive non-indigenous species (medium confidence), a pressure associated with the shipping sector.** Depending on which invasive species is introduced, *Ostrea edulis* may remain. Resistance is assessed as 'Low', a resilience of 'Very low' has been recorded since the successful removal of an invasive species is extremely rare which will mean that the habitat is likely to change. Therefore, sensitivity is assessed as 'High'. Due to the constant risk of new invasive species, the literature for this pressure should be revisited (Perry et al., 2017).

Further research needs

In order for restoration priority areas will need to be identified. In addition, a number of pressures were not assessed for *O. edulis* due to a lack of evidence. These include transition

elements & organo-metal contamination, hydrocarbon & PAH contamination, synthetic compound contamination, introduction of other substances and electromagnetic energy.

Figure 2. Global distribution of *Ostrea edulis*, Source: https://mapper.obis.org/?taxonid=140658

References

Perry, F., Jackson, A. & Garrard, S. L. 2017. *Ostrea edulis* Native oyster. In Tyler-Walters H. and Hiscock K. *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 28-04-2023]. Available from: https://www.marlin.ac.uk/species/detail/1146