21. Barrel jellyfish *(Rhizostoma octopus)*

Irish name: Smugairle róin béalrufach

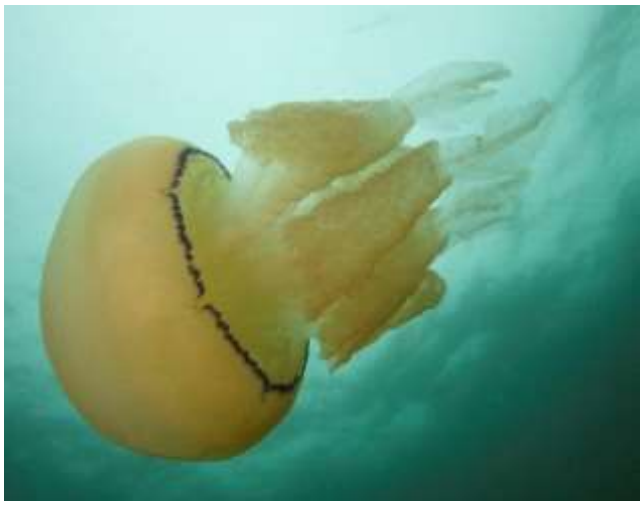

Figure 1. Barrel jellyfish, *Rhizostoma octopus* (Gmelin, 1791) © Ciaran O'Murchú

Background

Rhizostoma octopus (Gmelin, 1791) or the barrel jellyfish (also known as dustbin lid jellyfish) is one of the largest rhizostome jellyfishes, and can attain a bell diameter of ca. 90 cm and a wet weight of over 30 kg (Houghton et al. 2007; Doyle et al. 2012). It is the most northerly distributed rhizostome with a population located as far north as Solway Firth and Clyde Sea area in Scotland and as south as Arcachon and St. Jean de Luz in the Bay of Biscay (Houghton et al. 2006; Doyle, Georges and Houghton 2012). Populations are also known from the southern North Sea off the Belgium, Dutch and German coasts such as the Elbe estuary (Russell 1970; Holst et al. 2007; Thiel 1966). Within this broad geographical area, barrel jellyfish are mainly found in shallow bays (with riverine input) and as such have a punctuated distribution, with only a handful of areas known where populations regularly occur (Houghton et al. 2006; Lee et al. 2013; Van Walraven et al. 2015). Occasional records of individuals are known from many other localities but these may represent 'sinks' where individuals are transported and stranded on beaches from 'source' populations (Lee et al. 2013). Within the western Irish Sea, a large population of barrel jellyfish was identified off the Rosslare Harbour (and north along the coast of Curracloe beach) using aerial surveys (Houghton et al. 2006). 10,000s of individuals were observed over consecutive surveys during 2003 and 2004. Additional observations were made from ferry surveys out of Rosslare (Doyle et al. 2007) and juvenile barrel jellyfish were observed north of Rosslare ferry port in November 2004. In February to April 2023, large numbers of barrel jellyfish were recorded stranded on beaches in County Dublin and Meath. Aerial surveys in Carmarthen Bay revealed that there can be large interannual variation in the abundance of barrel jellyfish, from almost zero in 2005 to >590 tonnes in 2009 (Elliot, Hobson and Tang 2017). No aerial surveys of populations in the western Irish Sea have been carried out since Houghton et al. (2006).

Rationale for spatial protection in the western Irish Sea

Barrel jellyfish were nominated for inclusion because they are an ecologically important species in the pelagic environment. With 10,000s of individuals forming large blooms

(aggregations), they represent an important food source for the migratory leatherback sea turtle (*Dermochelys coriacea*) which are known to feed on barrel jellyfish in the Wexford area. A retrospective analysis of a turtle sightings database (>100 years of sightings) revealed that leatherbacks are more likely to be sighted in bays where you have barrel jellyfish blooms than anywhere else (Houghton et al. 2006). As leatherbacks are an Annex IV species, it is important that these pelagic foraging areas are protected to ensure their favourable conservation status. Barrel jellyfish are also known to act as refugia or nurseries for many fish species including the Atlantic horse mackerel (*Trachurus trachurus*). Such refugia may play an important role in the protection of juvenile fish. Barrel jellyfish are not afforded any protection as they are not listed as a protected species under any legislation or red list.

The **western Irish Sea is considered a significant part of its range**. Within the entire Irish Sea only 3 other locations (Carmarthen Bay and Tremadoc Bay in Wales, and Solway Firth on the Scotland/England border) are known to have large populations of barrel jellyfish (Houghton et al. 2006). Strandings are known to occur along the Wicklow, Dublin, Meath and Louth coastlines but no significant population was identified in these areas which are more likely sinks for vagrant individuals (Lee et al. 2008).

Based on current knowledge barrel jellyfish are amenable to spatial protection as they only occur in very specific shallow bays, with only one known location identified in all Irish waters. As such the waters off Rosslare and north along the beaches of Curracloe provide a very unique habitat for this species. As there already exists a fishery for this species in Welsh waters, it is important to consider the ecological impacts that a fishery for barrel jellyfish in the western Irish Sea would have on the jellyfish population but also on other species that depend on it.

Sensitivity assessment

In terms of the sensitivity analysis, **the barrel jellyfish scored 'Low' for all pressures**. However, **for Resistance, barrel jellyfish scored a Medium for Removal of target species** and Removal of non-target species. Elliot, Hobson and Tang (2017) stated that during a low abundance year, two leatherbacks foraging and the extraction of 4.3 tonnes of jellyfish for the fishery (normal fishing levels) would be enough to completely deplete the population. However, barrel jellyfish have a benthic polyp stage in addition to the pelagic medusa stage. The **benthic polyp stage confers some resistance (and resilience) to the species** as polyps continuously release new medusae year after year. So provided there is a healthy benthic polyp population, the jellyfish phase can probably withstand a certain level of exploitation (removal of target species). However, it is important to remember that barrel jellyfish provide food for leatherbacks and shelter for juvenile fish species, so removal of large numbers will also impact on these species. Barrel jellyfish are not currently targeted by commercial fisheries in the western Irish Sea.

Under **Resistance, barrel jellyfish also scored a 'Medium' for Underwater noise** but because of the acute and localised nature of such noise (e.g. pile driving for ORE), it will not affect the entire jellyfish population which can be spread over many 10s km. Furthermore, the benthic polyps may act as a potential buffer to widespread damage of a population and therefore, the species **scored Low on sensitivity**. A recent study by Solé et al. (2016) found that *Rhizostoma pulmo*, a sister species to *R. octopus*, is sensitive to low frequency sounds. Scanning electron microscopy (SEM) revealed that marginal sense organs bearing statocysts

(responsible for pulsing, swimming and orientation) were injured (significant hair cell extrusion and loss occurred to the sensory cells).

There was no evidence to suggest that jellyfish are sensitive to electromagnetic energy generated from ORE. **Jellyfish may actually benefit from the increase in new substrate** that will be provided by wind turbine platforms.

Further research needs

To establish the interannual variability in the abundance of barrel jellyfish it is important to conduct regular (annual) aerial surveys during the months of July-August. Boat surveys to quantify size distribution of individuals to inform aerial survey biomass estimates and to quantify associated juvenile fish are needed. Research is needed to determine if barrel jellyfish overwinter on the seabed and whether these individuals are responsible for the next recruitment of barrel jellyfish polyps. It is hugely important to identify where barrel jellyfish benthic polyps are located as any harvesting or removal of medusae, or impacts on the medusae from sound or other, are dependent on a healthy population of benthic polyps.

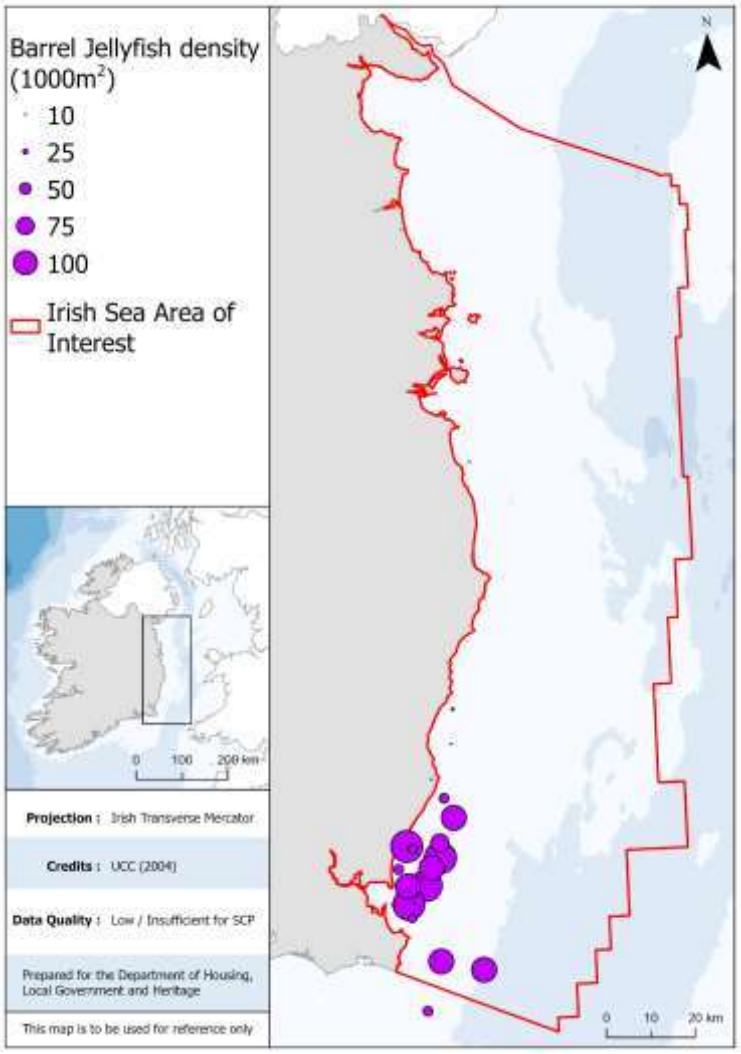

Figure 2. Data available for barrel jellyfish, *Rhizostoma octopus*, in the western Irish Sea.

Data sources and quality

Dataset Name	Data Owning Organisation	Dataset Quality	Metadata URL	Comments
Irish Sea leatherback Turtle Project barrel jellyfish data	University College Cork	Sightings data from aerial surveys carried out in 2003 and 2004. Quality: Good data but older than 10 years		

References

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