

Sole in 27.7.d – Identification of spawning / juvenile areas and management implications of closing such areas to fishing.

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Closure of spawning and juvenile areas

Spawning areas

As noted in previous advice, closure of spawning areas is not always advisable, and should be considered on a case by case basis. Closure of spawning grounds may redistribute fishing effort to the boundaries of the closed area and/or, in the case of coastal spawning grounds, may have a disproportionate impact on inshore fleets.

Spawning closures assume that the increased production of eggs resulting from reducing adult mortality will enhance the stock by producing more recruits. However, the mortality rate of eggs in the marine environment is one of the most highly uncertain events in the life cycle of the fish. The ICES assessments illustrate this for Sole 27.7.d showing a relatively constant spawning biomass with a highly variable resulting recruitment.

Spawning closures may result in less optimal exploitation of the stock. Effort is not necessarily removed from the fishery, but merely displaced, and this could be redirected to immature fish. Due to the lower weight of immature fish, more are killed per tonne, and the impact is to increase fishing mortality on younger ages and thereby to reduce the stock productivity.

There are exceptions to these scenarios, such as when predictable (in space and time) spawning aggregations are targeted by the industry such that the fleet efficiency at catching fish at spawning time is increased. Moving them away from spawning concentrations (e.g. the 27.7fg cod closure) can reduce adult mortality rates.

Information available from published reports on the spawning of sole in the 27.7.d region, notably Ellis et al. (2012) and Coull et al. (1998), indicate that sole spawning is relatively widespread in the Eastern Channel. This lack of concentrated spawning areas indicates that spawning closures are unlikely to be effective – especially as effort is displaced from them rather than being removed from the annual exploitation of the stock.

Nursery areas

Nursery area closures are known to have far more certain beneficial effects on fish stock productivity. Reducing the mortality on recruits that are already in the stock is better than hoping that you will eventually get more recruits by protecting spawning fish (at least with regards to most species of teleost fish).

Reducing mortality on juveniles allows them to survive and increase in weight, improving the yield obtained from them when subsequently harvested at older ages. The impact is reduced if effort displaced from the closed areas increases fishing mortality on older larger fish, but there is a general

increase in the yield from the stock. The effect of juvenile closures is evident in the medium to long term as the fish grow, it does not solve the short term issues which are required for the older ages.

Information available from published reports on the distribution of juvenile sole in the 27.7.d region (Coull et al., 1998; Koubbi et al. 2006; Ellis et al., 2012) indicate that juvenile sole are located in the south and east of the area along the French coast with more limited areas along the English coast. This information is derived from annual monitoring surveys and from information submitted to ICES which indicate that fisheries in the south and east catch a higher proportion of the young juvenile sole.

Juvenile sole are associated with shallow water, muddy-sand habitats (e.g. the Thames and Liverpool Bay). Within the eastern Channel, sole nursery grounds occur along the French coast (e.g. Baie de Seine) and along parts of the English coast, although there is a more restricted zone of shallow water that would be suitable as sole nursery grounds along the English coast of 27.7.d. Juvenile sole are not found along the more stony sea bed areas associated with stronger currents in the western and eastern ends of the Eastern Channel.

The two MCZ zones that the UK is examining are located in these zones and are therefore expected to have little if any impact on sole recruitment. Fishing activity is limited in the areas on the UK side identified as having higher proportions of juvenile sole, with little trawling and few if any juvenile sole are observed in the catches of any fishing gear.

Summary

The spatial measures suggested may improve stock productivity in the long term but not resolve the current problems for the stock and there are no clear areas in which they could be introduced with beneficial effects in UK waters.

Spawning closures are unlikely to have any beneficial effect on the stock, especially if effort (and TAC) is not removed from the fishery, in which case they can increase the problem. There are currently no data to accurately define any specific sites of concentrated sole spawning activity in the UK waters in area 7.d.

In general, juvenile closures have a medium to long-term beneficial effect by allowing juveniles to grow before harvesting, however the lack of juvenile sole in catches, along with displacement (rather than removal) of effort means that it is highly questionable as to whether such measures would result in improved productivity. Juvenile sole are often in very shallow water, typically shallower than most of the fishing fleets operate, and there are no juvenile concentrations in UK waters of 7.d that would be suitable for closure at the scale required.

References

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