

European Sea Bass (*Dicentrarchus labrax*) in the Inner Severn Estuary (including South Gloucestershire and Gloucestershire)

Importance of the Inner Severn Estuary for European sea bass *Dicentrarchus labrax*

Nursery function

Data collected from the Inner Severn Estuary (South Gloucestershire and Gloucestershire) over the last 40 years irrefutably highlights the importance of the area to juvenile European sea bass (*Dicentrarchus labrax*, hereafter referred to as bass). This is unsurprising given the known habitat preferences of juvenile bass. 'The obligate habitats for juvenile bass (< 4 yrs) are intertidal areas such as estuaries, with 0+ fish penetrating deep into low salinity areas such as saltmarshes. (Kelley, 1988; Laffaille *et al*, 2001; Elliott & Hemingway, 2002; Colclough *et al*, 2002 & 2005; Pickett *et al*, 2004)' (in IFM 2015a). The extensive intertidal areas and saltmarshes in the Inner Severn Estuary (see Figures 4.5.5, 4.5.6, 4.5.7, 4.5.8, 4.5.9, & 4.5.10, Thomson Ecology 2014) combined with new research which shows that 0+ bass show strong site fidelity to specific saltmarsh nurseries (Green *et al*, 2012) in their first summer confirms the presence of significant habitat for juvenile bass provided in Inner Severn.

The most detailed scientific evidence comes from Power Station sampling at Oldbury and Berkeley. Whilst Oldbury sits just outside the Gloucestershire border in South Gloucestershire, Thomson Ecology, citing Claridge and Potter (1983), conclude that 'the species composition and relative numbers of individuals in samples taken from shallow waters at Oldbury were essentially the same as those at Berkeley and this is considered to be 'a reasonable reflection of the fish community in the inner estuary' (Thomson Ecology 2014). This view is confirmed by the Defra Chief Fisheries Science Advisor, Dr O'Brien in his response to an FOI by Gloucestershire County Council, in which he states that the studies at Oldbury, whilst from an adjacent area to Gloucestershire 'should reflect the types of fish expected to occur within Gloucestershire County Council's boundary' (Thomson Ecology 2014).

Claridge and Potter (1983) studied samples from Oldbury Power Station and concluded that 'this study has demonstrated that the Severn Estuary and inner Bristol Channel is an important nursery area for juvenile bass'. In 1976/7 almost 9000 bass were obtained from the once-weekly 24 hour samples taken at Oldbury, most of which were taken between September and December –indicating the existence of very large schools of bass entering the estuary (Claridge and Potter 1983). Additionally they noted that findings closely parallel those recorded in similar environments such as the North and South Devon estuaries and inshore Irish coastal waters (Claridge and Potter 1986). The sampling at Oldbury was repeated 20 years after the first dataset was studied (1996-1999) and found that there were marked increases in the numbers of certain species, including bass (Potter *et al*. 2001) suggesting the importance of the Inner Severn Estuary as a bass nursery area has increased over time.

Data from Environment Agency WFD sampling has improved our spatial knowledge of bass use of the Inner Estuary with bass clearly extending into Gloucestershire: 'Young of year bass can penetrate into low salinity areas. This is well illustrated with the strong 0+ group found each year at Arlingham Passage. Given the salinities obtained here in the late summer and autumn months, it is probable

that this represents the maximal penetration of the whiting, **but the juvenile bass nursery may well extend further still'** (Colclough 2009).

Adult distribution

It is much harder to estimate the numbers of adult seabass in the upper Severn Estuary, due in part to the extreme tidal range of the estuary. As stated in Thomson Ecology (2014) there is a lack of information on pelagic species in the Bristol Channel and Severn Estuary – this also applies to adults of the species whose juveniles are caught by intertidal sampling by the Environment Agency WFD surveys. Large bass have been taken by WFD sampling in South Gloucestershire in the spring at both Aust and Whirls End. Claridge and Potter (1983) found that whilst abundance of 0+ bass was greatest, 2, 3, 4 and 5 year old bass were also present. They give an average length of 5 year old bass as 290mm, of which EA WFD data from Arlingham show very few bass larger than this. Interestingly, EA WFD data show that despite limited numbers of bass being caught (unknown survey effort) at two sites further upstream of Arlingham (Cotts point and Lower Rea Hempstead, both Gloucestershire), all bass caught were greater than 290mm, ranging from 352-550mm suggesting more research needs to be carried out and current utilisation of the Upper Estuary by adult bass may be underestimated.

Bass management in the Inner Severn estuary

A recent review of bass management by Devon and Severn IFCA has highlighted that the most important areas of work for the IFCA are assessing the designation and management of bass nursery areas and inshore aggregation areas of bass (D&S IFCA 2015). This is in accordance with best practice published by the Institute of Fisheries Management whose position on estuarine management calls for 'greater recognition in management regimes of the high importance of intertidal areas as key nursery grounds for the early life stages of a range of economically significant species' (IFM 2015b).

The IFM also states that 'juvenile bass are present in many more locations today as their distribution has expanded since 1990. Much larger areas need protection today. In a number of cases (e.g. Blackwater & Thames estuaries) the current distribution of young bass extends far beyond the original BNA' (IFM 2015). Furthermore the IFM states that 'The Institute is actively engaged at present in advising individual IFCAs on how to identify, manage and promote new bass nurseries in some of these areas, based upon this data background.' (IFM 2015a). D&S IFCA are currently in the process of developing a PhD which will look at the provision of suitable habitat and protection given to juvenile & adult bass in the district within & outside BNAs. It is envisaged that this will include work looking at whether areas in the Severn Estuary require Bass Nursery Area status, including the Inner Estuary, based on the scientific findings cited above.

Other fish species in the Inner Estuary

The Inner Severn Estuary is also an important nursery for several other marine fish species, evidenced by peer-reviewed literature and Environment Agency sampling. As stated in Thomson Ecology (2014) the Severn Estuary ranks as one of the top ten estuaries in the UK for the number of estuarine-opportunistic species it supports. As this report specifically relates to bass no more information on these species is provided in this report but will be the subject of future Literature

Reviews by D&S IFCA. However the IFM position on the importance of estuaries to fish & fisheries management is clear:

‘Estuaries provide some of the most productive and dynamic aquatic environments available. They provide important spawning and nursery grounds for a broad range of freshwater, estuarine and marine fish species, some of which need to migrate through the estuary in order to complete their lifecycles. They also act as vital corridors of migration for a number of species which must migrate through into freshwaters to complete their life cycles in freshwaters upstream. In the past, fisheries management in most estuaries has been somewhat fragmentary. Migratory fisheries have tended to be managed by the Environment Agency (EA and other equivalents) with little direct contact with marine fisheries interests and regulators, other than to protect migratory salmonids in specific locations. To date, marine regulators have not appreciated the importance of the estuaries as critical marine nursery grounds. Clearer information on this critical value has only arisen in the past decade, based largely upon new sampling regimes for the Water Framework Directive (WFD).’ (IFM 2015b)

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