Annex 8

Ecology and distribution of European Sea Bass in inshore and coastal waters in South West England

Following a review of the causes of recent declines in European sea bass (*Dicentrarchus labrax*) and associated changes in management at a European level, Devon and Severn IFCA stated that it would review possible additional work that the IFCA could undertake which would aid bass conservation efforts (Ross, 2015). A workplan was developed, part of which was to be undertaken following the appointment of a PhD student funded jointly by D&S IFCA and Plymouth University. A student is now in place and the project currently has five focus areas, although as these are still in the developmental stages, they could change. At present these are:

1. Review of existing datasets

Environmental monitoring as part of; statutory monitoring under national or European legislation (e.g. Water Framework Directive), Environmental Impact Assessments (e.g. power station surveys) and as part of scientific or consultancy surveys (e.g. Donovan Kelley) has provided a wealth of freely accessible data on the presence/absence of European sea bass around the UK. Combined with other environmental and anthropogenic data, this data is intended to be used to discern trends in bass movement within the D&S IFCA district over long time series.

2. Tagging studies

To date there have been multiple studies which have used tagged bass to track regional and oceanic movement. These studies have suggested that bass will spend their first 4-5 years within Bass Nursery Areas (BNAs), after which a series of migrations occur which increase in distance from BNAs into coastal waters with age/maturity. Whilst a large number of these studies have identified juvenile bass movement as being largely restricted to within and in close proximity to BNAs, little information is known on the fine scale movement of juvenile bass within BNAs or juvenile habitat use outside BNAs. Radio tags have been used to track fine scale movement of a number of migratory fish (e.g. salmon) and is a technique which can complement stable isotope analyses (see below) to yield fine-scale movement patterns. Fish are marked with a radio tag, and strategically placed radio sensors can then record the presence of the fish. This study will yield much needed information on fine scale juvenile bass movement within BNAs plus coastal areas adjacent to BNAs.

3. Stable isotope analysis

Stable isotopes are naturally occurring chemical signatures which are absorbed from the surrounding environment into bodily tissues. Different isotopes can be used to infer a suite of information about a particular test organism. For example, Strontium isotope ratios are known to vary significantly between watersheds and can therefore be used as a geographic marker. Other isotope signatures can be used to infer diet e.g. Carbon and Nitrogen. Otoliths are calcium based structures used for hearing and/or balance in all teleost fish. Similar to “tree rings” bands are laid down in otoliths in a predictable daily and annual rate, which can be used to infer age. If otoliths are sampled at specific age points the isotopic signatures can then be used to infer the geographic position of that fish at that point in time, to a potential accuracy of 1-10km. Due to the rapid uptake of certain isotopic signatures this method will be used to infer the regional distribution of European

Sea bass across a larger age range (particularly juvenile <42cm) than possible with tags. The major negative of this technique is within fully marine conditions geographic isotope markers are not regionally distinguishable and therefore this technique will be limited to fresh water influenced habitats e.g. estuaries. It is envisaged this element of the research will complement the physical tagging of larger fish (as discussed above).

4. Static net study

Devon and Severn IFCA need to understand the level of the salmon and trout by-catch from fixed net gear within their district. Current by-law proposals include limiting the height of fixed net gear to allow a 3m and 5m gap between the net headline and the water surface at all states of the tide. These byelaws are being proposed to limit salmon and trout by-catch. In an experimental setting we are proposing to use a number of different net setups along the Devon and Severn coast to assess regional patterns in fish communities and trends in bass movement.

5. Steart Peninsula managed re-alignment scheme: habitat utilisation and associations

Managed re-alignment/retreat is a technique where instead of re-enforcing the coastline with concrete sea defences the sea is encouraged to flood low lying land. This process is thought to enhance coastal stability and offer protection to areas further inland by creating new habitats that may absorb marine energy. Managed retreat has also been used as a mitigation method to replace lost habitats caused by coastal development elsewhere. Steart Point is a managed retreat site located in the Severn Estuary. It is of management interest to understand how juvenile bass are using these habitats and how this may compare to natural equivalents i.e. a habitat not created by managed retreat.