Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT 2014

Finfish

S. Thompson

Much research activity associated with finfish in 2014 has been in the form of targeted pieces of work, generating reports throughout the year, rather than as one monolithic piece of work reporting at the year end. Many of these reports have been connected with developing understanding of and management measures for the Bass fishery.

These reports, together with the Contents, where appropriate, are –

All of these pieces of work can be found as individual reports within this general folder.

Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT

2014

Composition of commercial finfish catch

S. Thompson

Composition of commercial finfish catch

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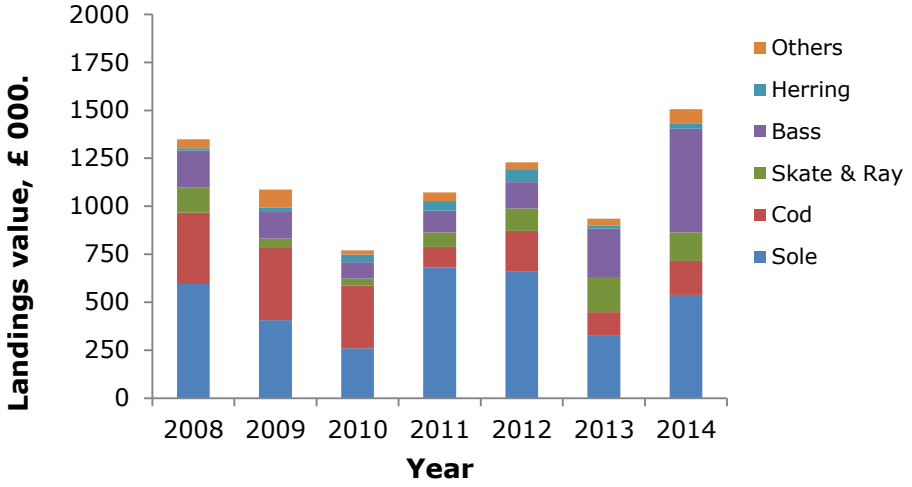
Introduction

A background of the general description of factors impacting on finfish within our area, and an outline of the fishing industry, are presented in the EIFCA Research Report 2013 (sections 5.2 & 5.3). There has been no substantive change in those factors since preparation of that report, and the details are therefore not repeated here.

This section should be read as a continuation of section 5.4 of the EIFCA Research Report 2013.

Overview & Major Species

The same five species of finfish dominated EIFCA data on commercial landings within our district in 2014 as in 2013, with these species making up at least 90% of both the value and volume of landings (Figure 1). Our records indicate increased landings by weight for each of these species to a greater or lesser extent (Figure 2), but with no major change to the trends of those landings.



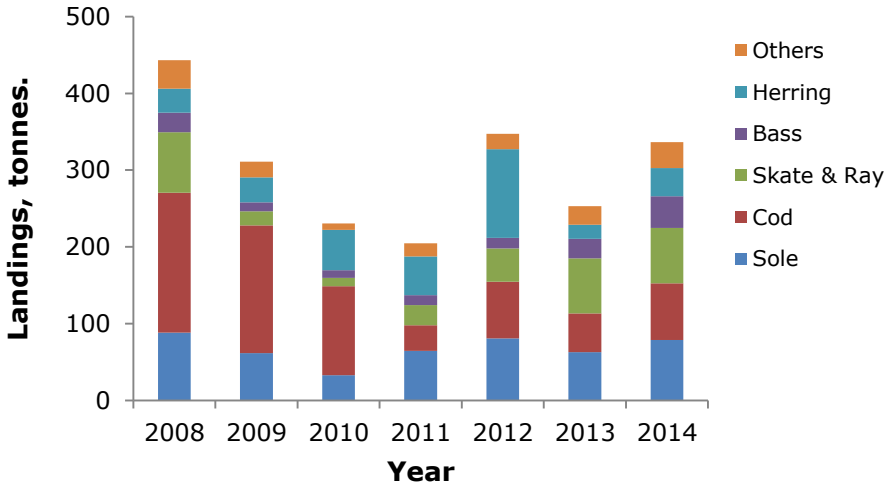


Figure 1 Annual landings of main species of finfish by value (top) and weight (bottom) within the EIFCA district 2008 – 2014 inc. EIFCA Area Officers data.

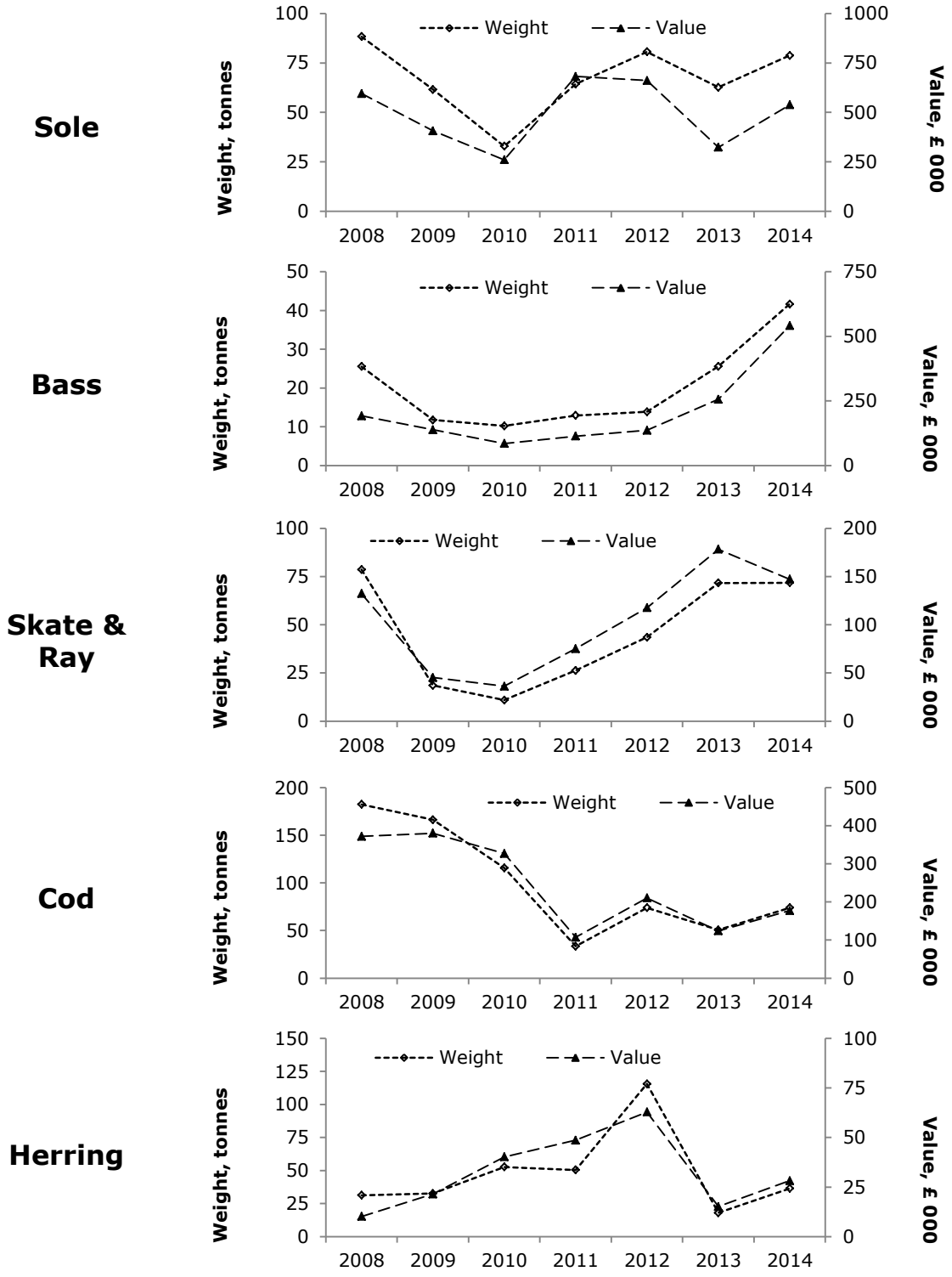


Figure 2 Annual landings by weight and first sale value of Sole, Bass, Skates and Rays, Cod and Herring within the EIFCA district 2008 – 2014 inc. EIFCA Area Officers data.

There has been no change in the relative ranking of value / kg of these species; however the upward trend in the value of bass has continued (Figure 3).

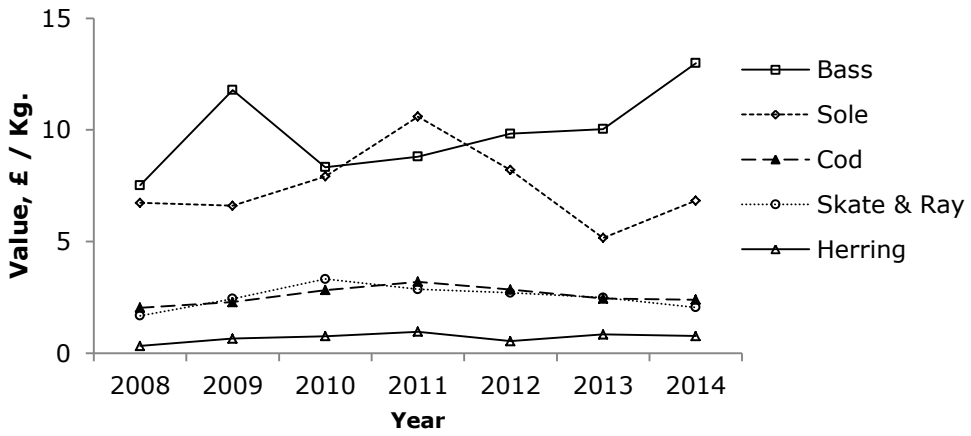


Figure 3 Annual average first sale values of top five finfish species within the EIFCA district 2008 – 2014 inc. EIFCA Area Officers data.

Reconciliation of EIFCA and MMO landings data

There remains the concern over the difficulty of reconciling landings figures from EIFCA area officers with the data collected by the Marine Management Organisation (MMO), as demonstrated in Figure 4. Potential reasons for this were explored in section 5.4 of the EIFCA Research Report 2013, with the fact that MMO figures do not record individual landings below 25 kg (in 2013 – now raised to 30 kg) identified as a potential major reason. Evidence in support of this has been gained in association with a project collecting detailed landing data voluntarily supplied by some Suffolk fishermen, which demonstrates that the majority of individual landings are below the 30 kg threshold (Figure 5). Not all species are equally affected by this effect; from the data available to us, most of the landings of cod exceeded 30 kg, but very few of any other species.

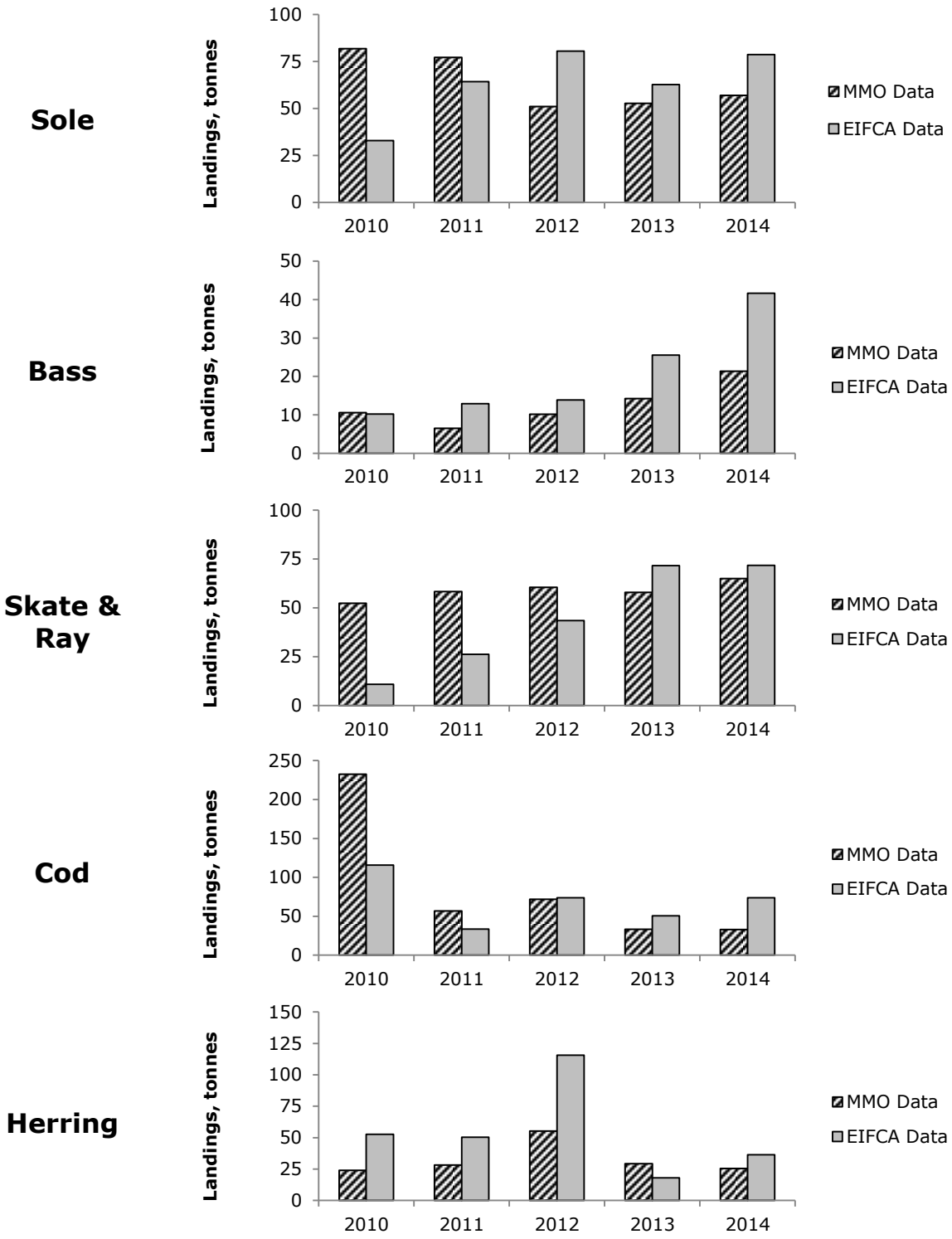


Figure 4 Comparisons of landings weight from MMO data and EIFCA data for the major finfish species within the EIFCA district.

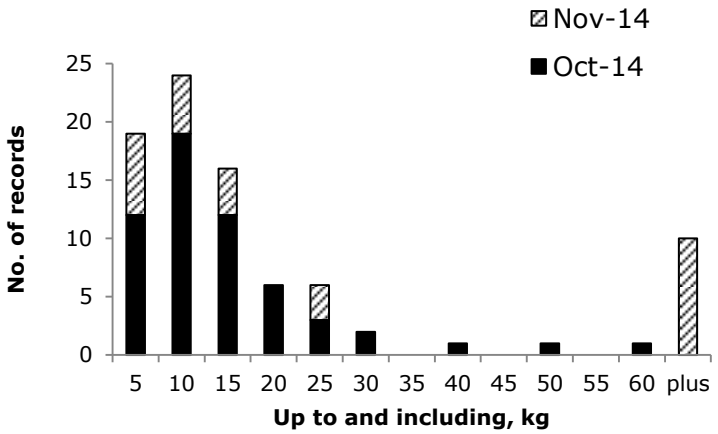


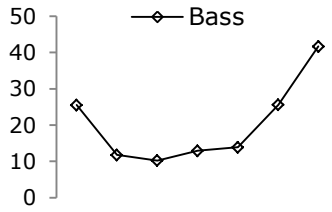
Figure 5 Number of individual landings of various weights for all commercial species landed off Suffolk. Data generated from figures voluntarily supplied by commercial fishermen.

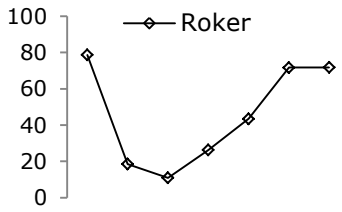
All Species overview

Data on landings of all species (Figure 6) indicates several points of note –

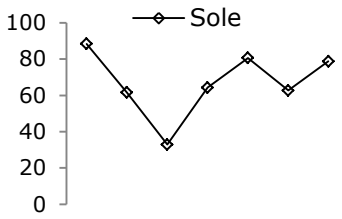
- Bass landings continue to rise. This issue is considered in more depth elsewhere in this report and other documents within the package of reports.
- Skate and Ray ("Roker" in Figure 6) landings have risen, and now constitute a major part of the business plan of our inshore fleet.
- Sole continue to be a major economic factor for our inshore fleet.
- Herring landings are low. Herring are seemingly abundant in the area, and the ICES report on the stock status is good, with potential for increased exploitation. Prices for herring are low, possibly at least in part driven by unrecorded landings (and probably sales) from unlicensed vessels.
- Mullet landings have shown a large increase in percentage terms, albeit from a low base. Mullet are a species which – in our waters – will not support high levels of fishing mortality, due to slow growth and late maturation. It is possible that the increased landings of mullet are as a result of them being bycatch from the bass fishery. In many instances, measures which afford protection to bass will also protect mullet. Mullet are a species with the potential for conflict between commercial and recreational exploitation, although there are fewer specialised mullet anglers than there are bass anglers.
- Smoothound landings seem to be on an increasing trajectory. This species will not support high fishing mortality, due to low rates of reproduction. It is a species for which it is possible to envisage conflict between commercial and recreational exploitation.
- Flounder landings are trending upwards. Concerns have been raised as to possible conflict between commercial and recreational exploitation of flounder. Within the precision and coverage of the data available, it is not possible to detect a threat to flounder stocks in our district. Measures to protect estuaries and inshore waters will substantially protect flounder, which spends the majority of its life in those areas.
- Of the minor species, turbot and brill are fish with high values per kilo and therefore a valuable catch, but of limited abundance due to previous overfishing.

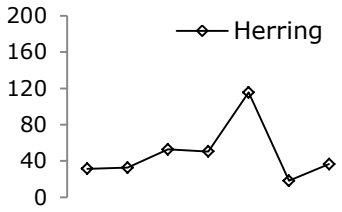
Major species, Increasing trend



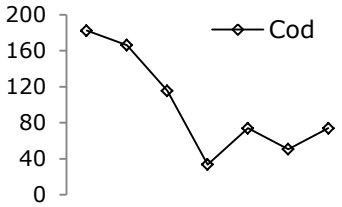


Major species, No clear trend

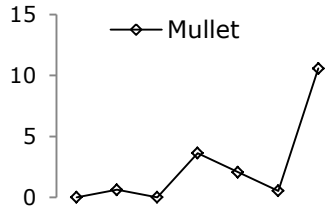


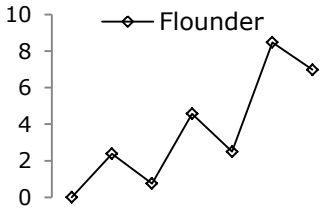


Major species, Declining trend

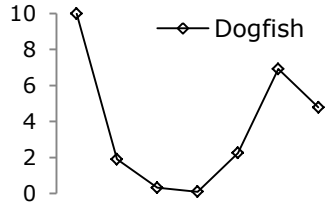


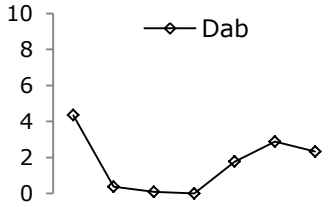
Second tier species, Increasing trend





Second tier species, No clear trend





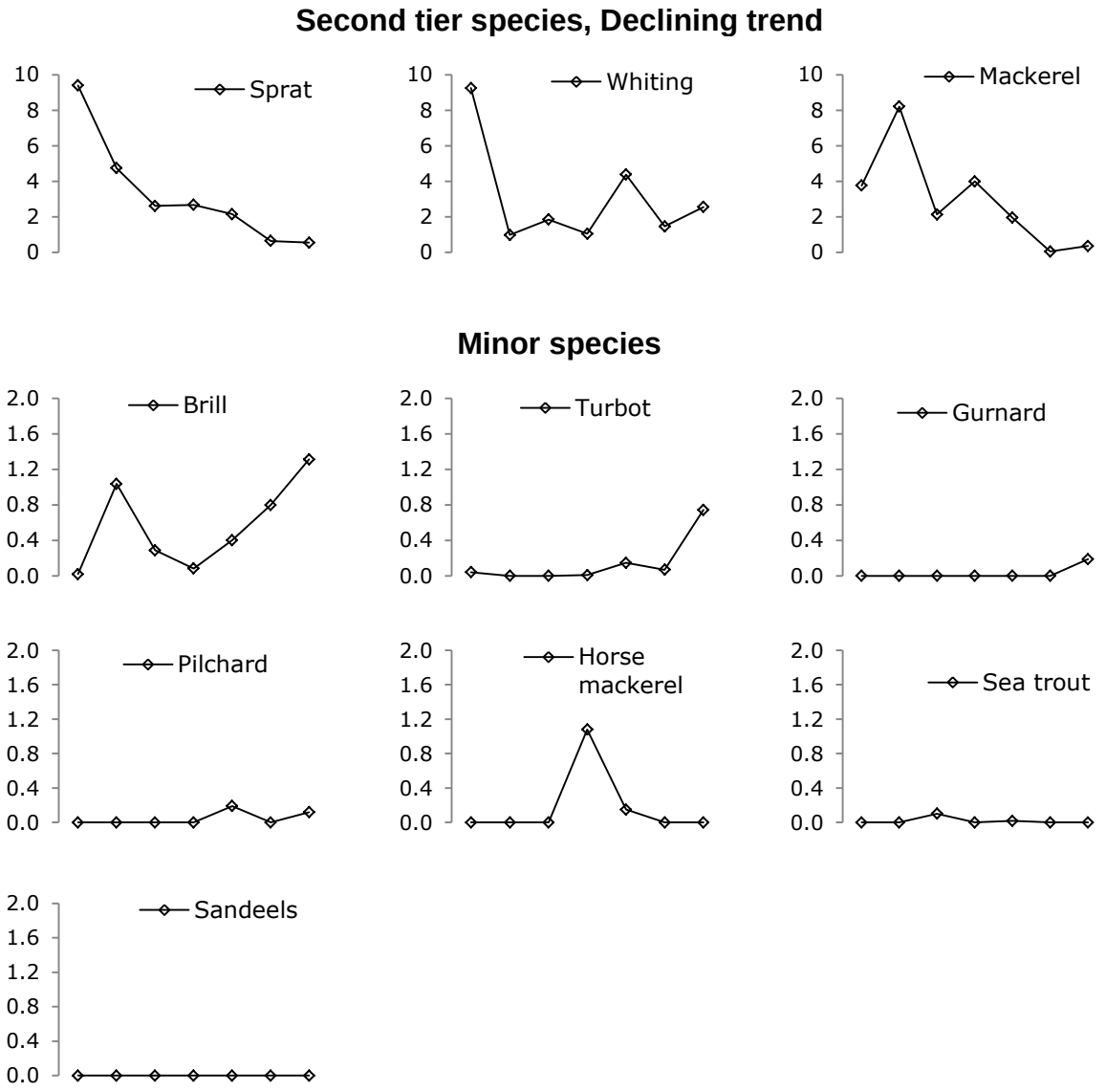


Figure 6 Annual landings data by weight (y-axis, tonnes) for years 2008 – 2014 inc. (x-axis) from EIFCA Area Officers data.

Bass

Much recent interest and concern has centred around the Bass fishery, as evinced by other papers within this overall package of reports. Recorded catches, whether based on EIFCA data (Figure 7) or MMO data (Figure 4), have shown a sustained upward trend.

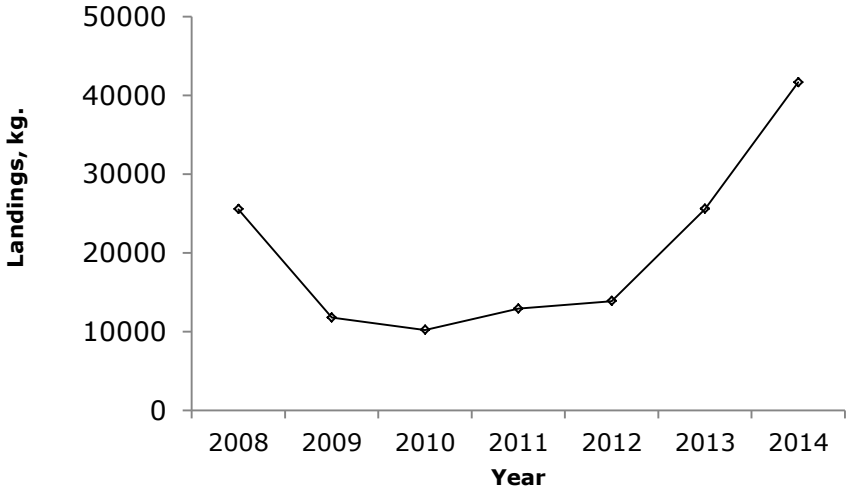


Figure 7 Landings by weight of bass from within the EIFCA district 2008 – 2014 inc. EIFCA Area Officer data.

This trend is largely being driven by increased landings in ports in the south of our district (Figure 8).

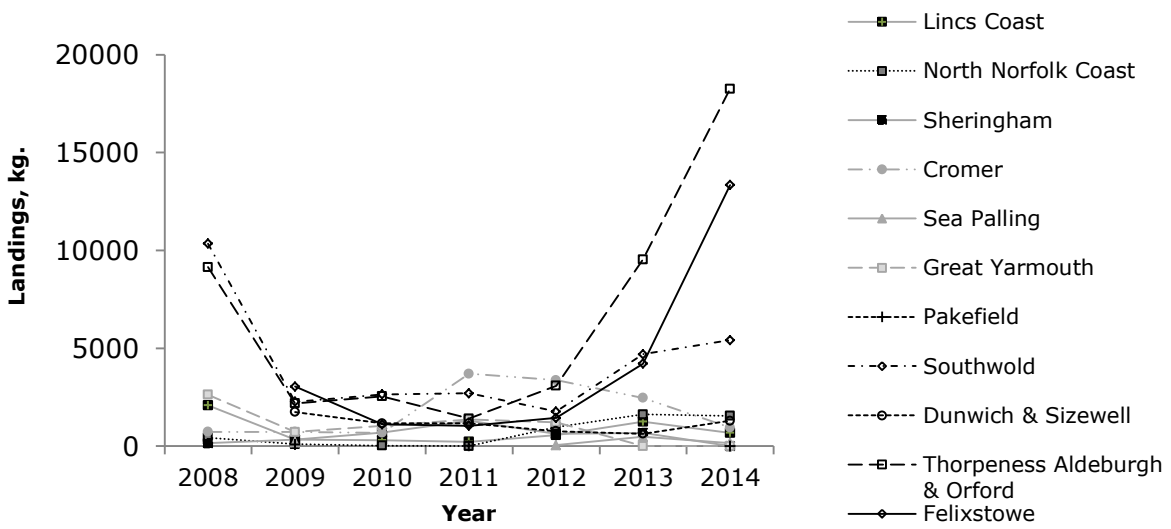


Figure 8 Landings by weight of bass at various ports within the EIFCA district 2008 – 2014 inc. EIFCA Area Officers data.

There is now clear evidence that – at least in some years – bass spawn within the North Sea (van Damme et al 2011), with early stage eggs being recorded in April and May. Bass aggregate and move together to defined spawning areas. There is evidence of fishing at times of year indicative of targeting spawning aggregations (Figure 9), with 2014 landings in those two months approaching 50% of the total annual landings (Figure 10).

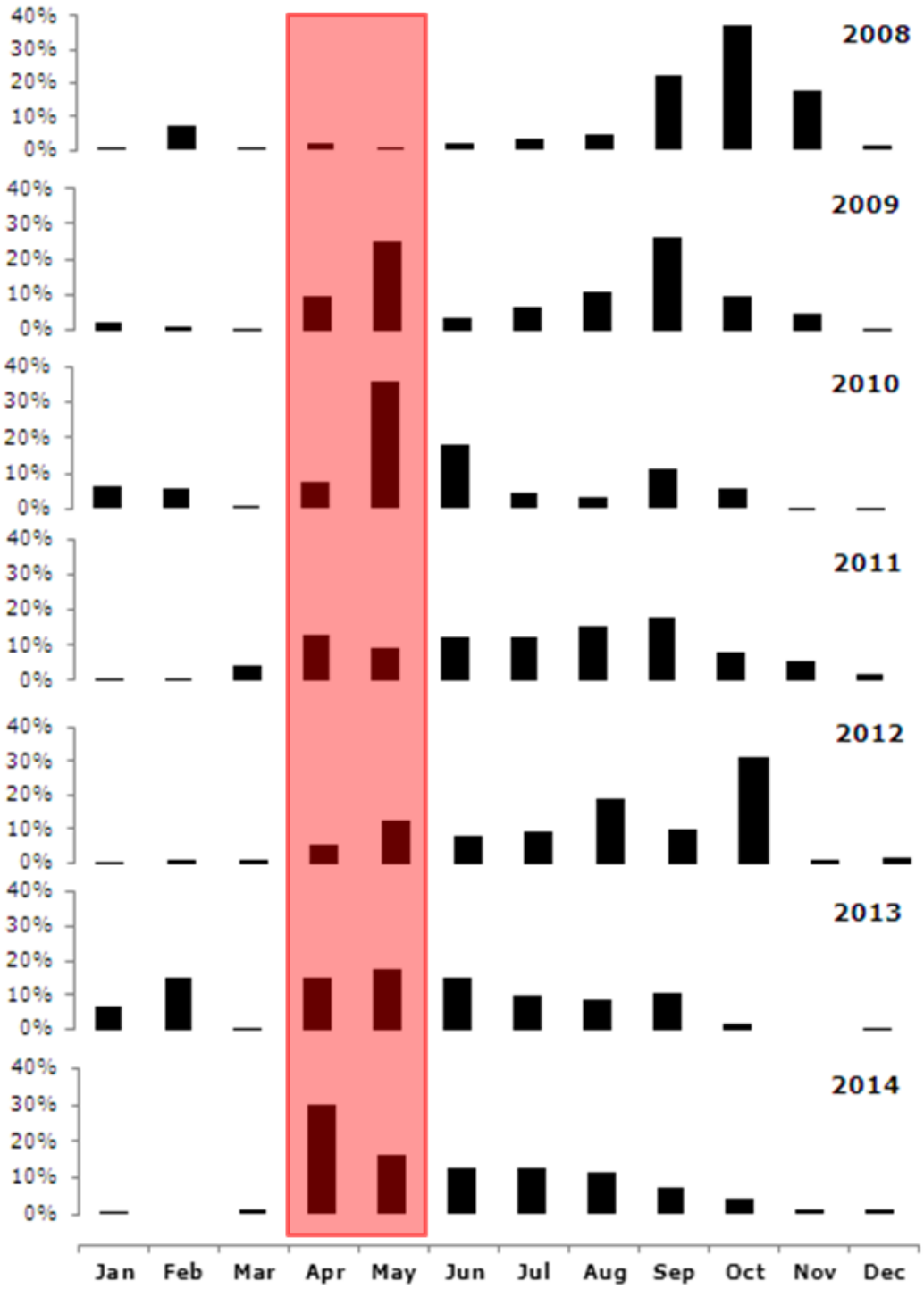


Figure 9 Percentage of total annual bass landings in EIFCA district recorded each month for years 2008 – 2014 inc. EIFCA data. Peak spawning months indicated by red area.

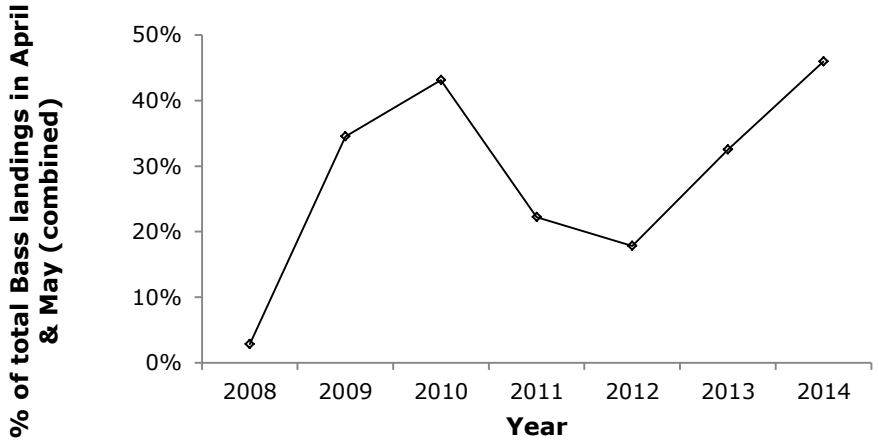


Figure 10 Proportion of the total annual catch of bass for that year caught in April & May for each year 2008 – 2014 inc. within the EIFCA district. EIFCA Area Officers data.

Bass is a species currently of major concern to ICES, the EU and the UK government at the moment, as well as attracting appreciable interest and comment from the recreational sea angling sector. Several specific reports and papers have been prepared in connection with understanding and managing the bass population and fisheries within our district. These are included elsewhere within this package of reports.

References

van Damme, C. J. G., Hoek, R., Beare, D. J., Bolle, L. J., Bakker, C., Barneveld, E. V., ... & Tribuhl, S. V. (2011). Shortlist Master plan Wind Monitoring fish eggs and larvae in the southern North Sea: final report Part A en B.

Eastern IFCA

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2014

Brief summary of Environment Agency Water Framework Directive sampling results.

S. Thompson

Brief summary of Environment Agency

Water Framework Directive sampling results.

Introduction

The Environment Agency (EA) undertakes repeated surveys of fish in transitional waters (estuaries and nearshore coastal waters) in connection with the Water Framework Directive (WFD).
Section 5.5 of the Eastern IFCA 2013 Research Report describes the methods and locations for these surveys. There have been no substantive changes to those details since preparation of that report, and they are not repeated here.

Results

The Environment Agency have kindly continued to supply eastern IFCA with the results from their ongoing WFD sampling programme. Data for surveys within the period 8th October 2013 to 22nd September 2014 is the latest such data received, and this has been added to the database of data previously received from the EA (which now covers the years 2006 – 2014 inclusive).

The stations sampled, methods deployed and number of surveys using each method are presented as Figure 1.

From this, it is evident that sampling over this period has been concentrated on sites at either extremity of our district – the Humber estuary (many of the sample sites within the Humber Estuary are not actually within our district, but examination of this data does give us information about what is happening in a very important habitat and fish nursery area adjacent to our district) and the southern Suffolk estuaries of the Alde and Ore, Orwell and Stour.

Examination of the results of these surveys does not yield any surprising or new insights into the distribution and sizes of fish within those areas – the pattern of geographical and size distribution of species is as in the longer time series dataset analysed for the 2013 Research Report. Accordingly, the analysis and results as contained within the 2013 Eastern IFCA research report can be taken as valid, and the extensive analysis and presentation of information has not been repeated discretely for the most recently obtained data.

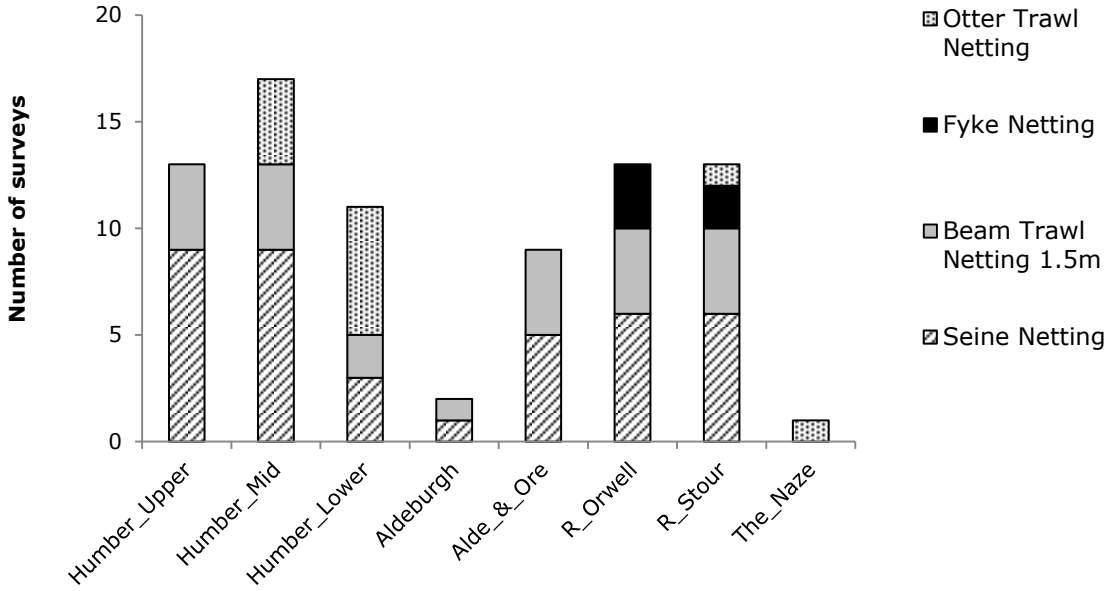

Figure 1 Numbers of surveys by various methods at WFD monitoring sites - EA surveys 8 Oct 2013 - 22 Sep 2014 inc.

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2014

Considerations in connection with bass stocks and management

S. Thompson

Considerations in connection with bass stocks and management

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Introduction

ICES (International Council for the Exploration of the Sea) have been suggesting reducing catches for bass for some years (Figure 1). However, landings have been above these suggested levels (Figure 2).

Year	ICES Advice	Predicted catch correspond to advice, tonnes
2012	No increase in catch	
2013	20% reduction in catches (last 3 years' average)	< 6000 (b)
2014	36% reduction in commercial landings (20% reduction, followed by 20% precautionary reduction)	< 2707 (b)
2015	MSY approach	< 1155 (c)
	(b) Commercial landings.	
	(c) Total landings. (Comm. & Rec.)	

Figure 1 Advice from ICES and corresponding proposed catches for bass 2012 – 2015 inc. Source = WWW1

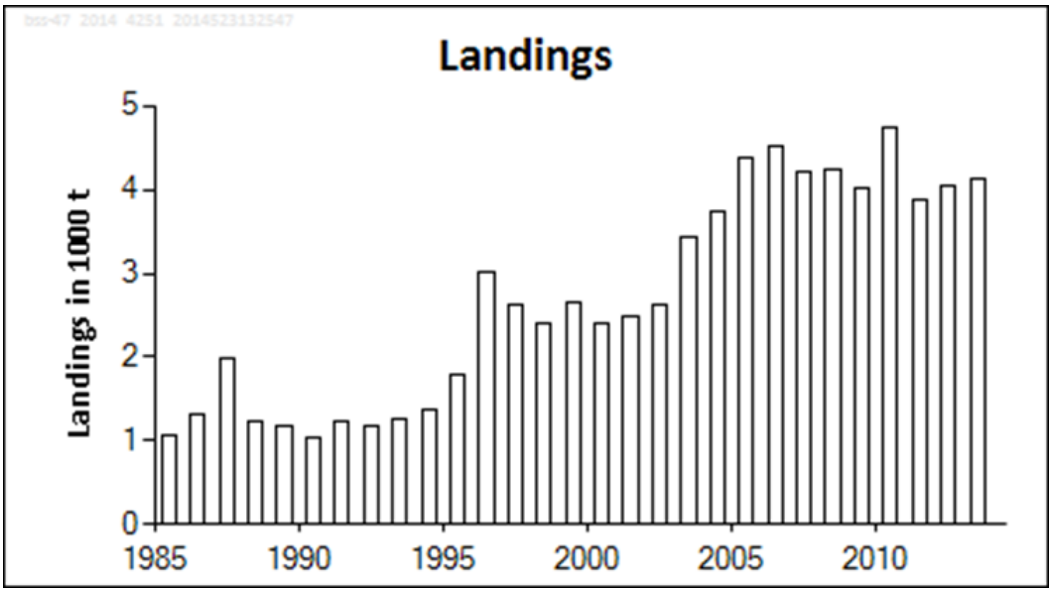

Figure 2 ICES figures for bass landings in Divisions IVbc, VIIa, and VIId–h. Source = WWW1

This has resulted in ICES advice in June 2014 that the bass stock is being fished at levels above those which would lead to exploitation of the stock at MSY (Maximum Sustainable Yield), which is a requirement under the CFP (Figure 3).

Stock status

Fishing pressure				
	2011	2012	**2013**	
MSY (F_{MSY})	✗	✗	✗	Above target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

Stock size				
	2012	2013	**2014**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Above B_{lim}

Figure 3 ICES advice on bass June 2014, Source = WWW1

The issue of management of bass stocks has come strongly to the fore recently, with direct attention from both the UK Government (see Appendix 1, "Extracts from transcript of UK Parliament debate 3 Dec 2014") and the European Commission. The EU has brought in emergency measures to limit the fishing mortality of major spawning aggregations (see Appendix 2, "EU Emergency measures 26 January 2015"), and in addition made clear to member states that there is an expectation that the member states would bring in measures to limit mortality from other fishing activities (see Appendix 3, "Press Release from EU Newsroom 26 January 2015").

Bass are a very important species to commercial fishermen, leisure anglers, and as a component of inshore ecosystems in their own right within the Eastern IFCA district. This, coupled with increasing pressure on stocks, has led to an appreciation that it is very important for us to understand the issues relating to the management of bass stocks and the pressures on them. Parliamentary recognition of the fact that the IFCAs have a major role to play in this management is shown by the comment from George Eustice on 3rd December 2014 that "*we should recognise the role that IFCAs can play*" (Appendix 1).

This report synthesises information which has been used in developing that understanding.

Relevant facts of Bass biology

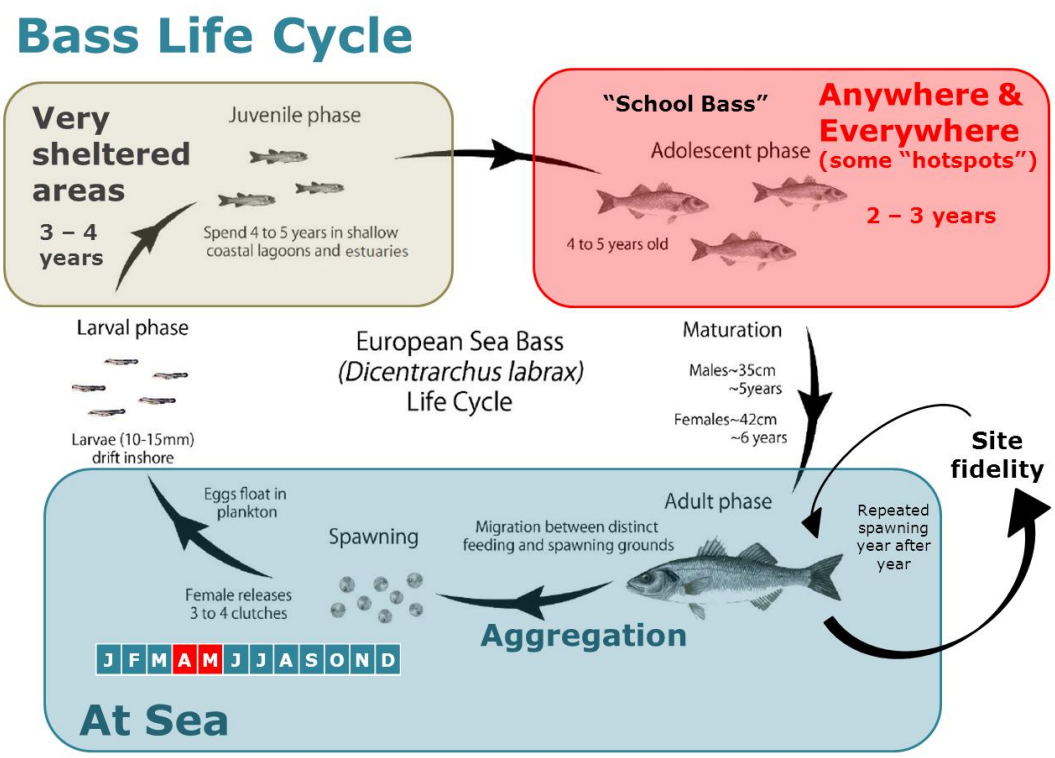

Figure 4 Bass life cycle, with indications of habitat at various stages. After Carrol 2014, (WWW2)

Bass spawn in the open sea in (in our area) April and May. Time of spawning is controlled by temperature, with the 9°C isotherm being an important indicator of when and where spawning will occur. Bass spawn in the Western English Channel earlier in the year, and the peak of spawning moves up the English Channel. These spawning aggregations are currently subjected to high fishing pressures.

There is conclusive evidence that bass do spawn – at least in some years – in the North Sea (see section below – "Spawning Aggregations")

The planktonic eggs hatch within a few days. Bass larvae then drift into sheltered inshore and estuarine areas, such as salt marshes. The juveniles spend some years in these habitats, which are very important to the overall wellbeing of the stocks. The estuaries used, and the extent to which bass remain in the estuaries all year, depends on the water temperature. When that is low, the juvenile bass move out to deeper water, or die.

Once they reach the size of about 15 cm, "school bass" range widely in shoals and can turn up just about anywhere. This behaviour continues until the fish approach maturity at about 40 cm, some 5 – 6 years old. The current minimum landing size of 36 cm permits exploitation of school bass, and this exploitation can be heavy at certain times and places.

On maturation, bass aggregate to form breeding shoals. These aggregations can occur close to shore, but the fish tend to move out from the shore to spawn. During this time they are targeted by recreational and commercial fishing. Once they have spawned, bass have a tendency to return to a home range.

Current Situation in EIFCA area

Bass have become a very important fish to the commercial fishing fleet. The landings have been rising (Figure 5), and the value of landings has now risen to such a level that bass is actually or close to the most valuable finfish species landed in our district (Figure 6).

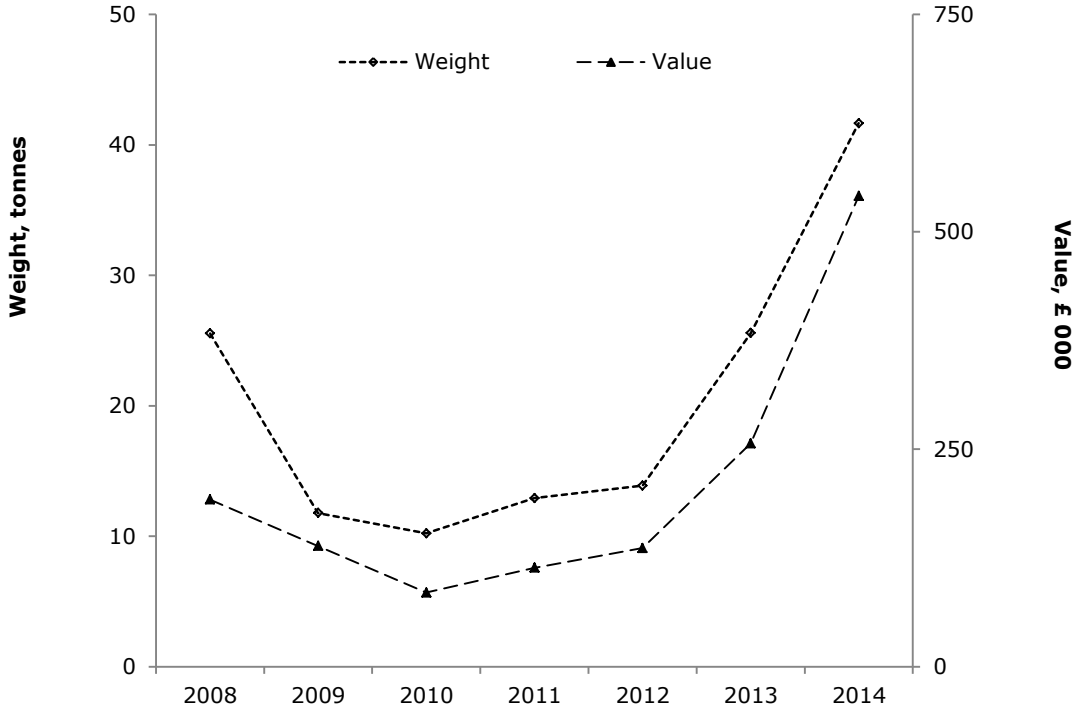

Figure 5 Landings weight and value of Bass 2008 – 2014, based on EIFCA data

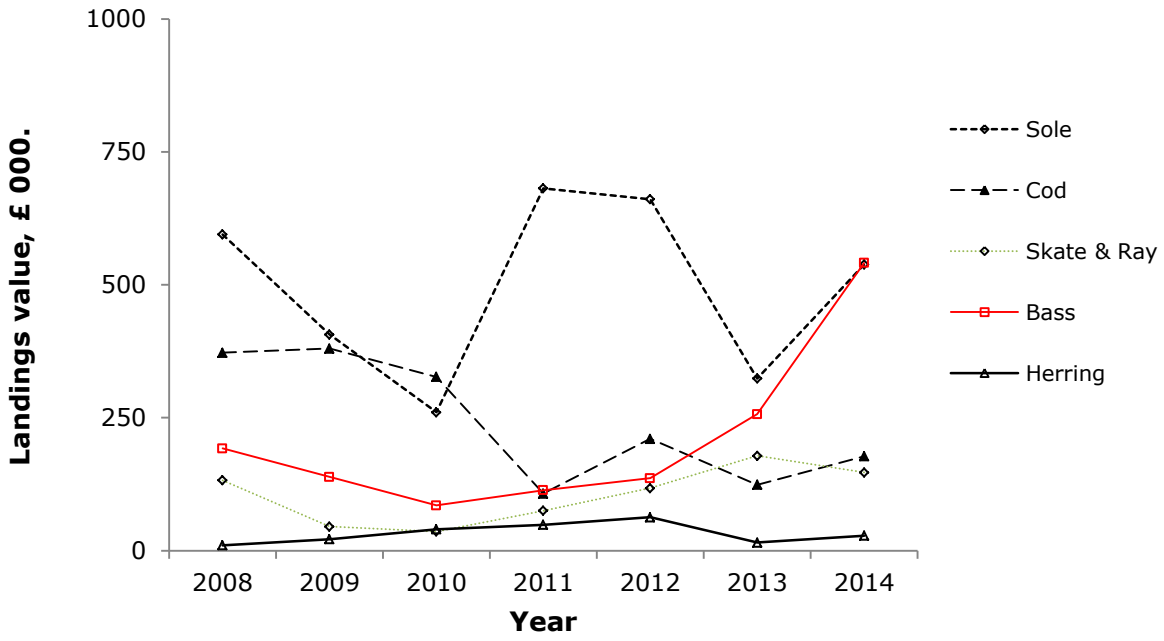

Figure 6 Landings value of most valuable finfish species within EIFCA district 2008 - 2014. EIFCA data

(NB It is acknowledged that there are discrepancies between the data obtained from EIFCA Area Officers returns and that obtained from Marine Management Organisation (MMO). The reasons behind this are explored more fully in the section "Reconciliation of EIFCA and MMO landings data" within the report "Composition of commercial finfish catch", which forms part of the package of Research Reports for 2014. That notwithstanding, data obtained from EIFCA Area Officers can be considered to give an indication of relative trends of landings.)

Bass are also an extremely important and emotive species for the recreational sea angling sector. The size and value of this sector within our district is considerable (Figure 7) and in fact exceeds the total value of the entire commercial sector, even when the relevant multipliers to account for total economic benefit of commercial sea fish are applied (Figure 8).

Key facts from "Sea Angling 2012"

England as a whole	EIFCA ("best estimates")
884 000 Sea Anglers	Abt 80 000 Sea Anglers
£ 831 Million Direct Spend	£ 75 Million Direct Spend (= abt £940 / angler)
10 400 FTE Jobs	940 FTE Jobs
	Commercial Fleet
	Abt 350 CREW, plus multiplier (Total abt. 710)

Figure 7 (above) Key figures from "Sea Angling 2012" for the whole of England and for the EIFCA area (Armstrong & Hyder 2013)

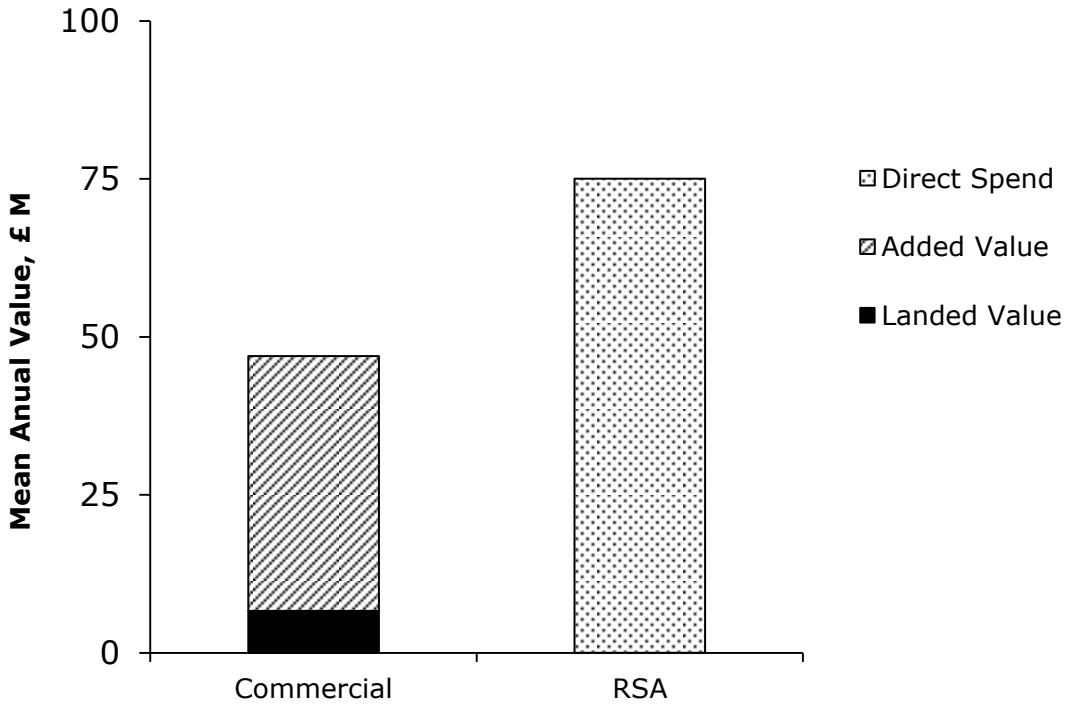

Figure 8 (above) Comparison of total value to UK economy of commercial fishing (annual average of total landings 2008 – 2013) (landed value from EIFCA data, multipliers from Curtiss 2008) with direct spend on recreational sea angling (from Armstrong & Hyder 2013) for EIFCA district.

The bigger picture

ICES summary and advice for bass from June 2014 (WWW1) demonstrates a generally rising trend in landings, which seems to have plateaued in recent years (Figure 2). The fishing mortality has also been trending up, and still is so. The level of fishing mortality has been above that which ICES consider to be compatible with fishing at MSY (Maximum Sustainable Yield) for at least thirty years (Figure 9). The recruitment of young bass – an indication of the potential future health of stocks some years into the future – was at a particularly low level in the years around 2010. Although the level is now higher than that, it is still low in comparison with levels seen around the turn of the century (Figure 10). This is of particular concern in a long lived slow growing fish such as bass, where low recruitment can have an effect on population levels for a protracted period. Although the total biomass of potentially breeding bass has held up for some years, this is now declining, and approaching the limiting level at which ICES consider the stock to be in critical condition (Figure 11).

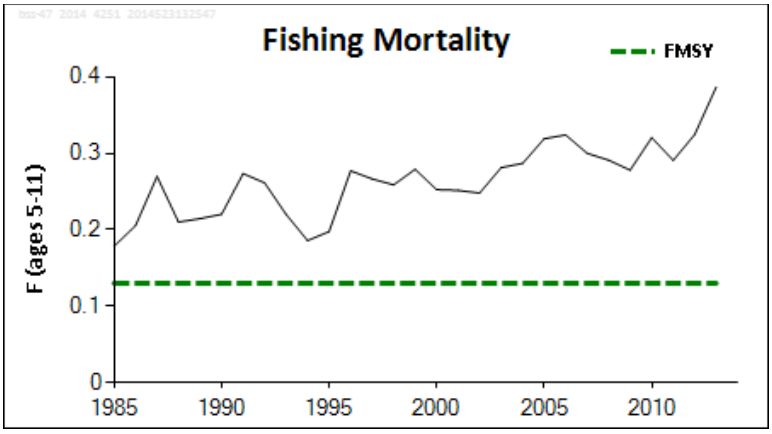

Figure 9 (above) Fishing Mortality of bass in ICES divisions IVbc, VIIa, and VIId–h (Irish Sea, Celtic Sea, English Channel, and southern North Sea), ICES data. WWW1

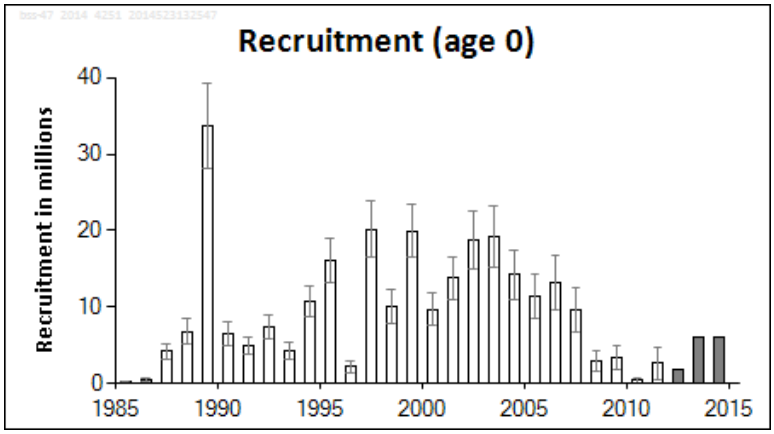

Figure 10 (above) Recruitment of bass, measured at age = 0, in ICES divisions IVbc, VIIa, and VIId–h (Irish Sea, Celtic Sea, English Channel, and southern North Sea), ICES data. WWW1

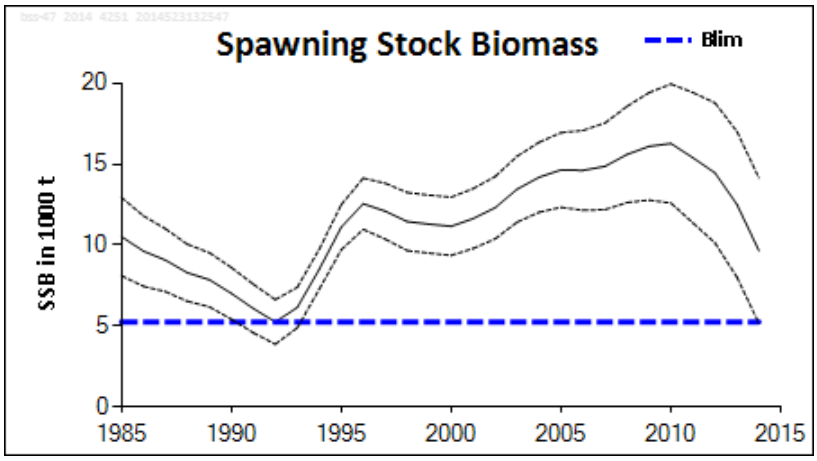

Figure 11 (above) Spawning Stock Biomass of bass, measured at age = 0, in ICES divisions IVbc, VIIa, and VIId–h (Irish Sea, Celtic Sea, English Channel, and southern North Sea), ICES data. WWW1

ICES most recent advice for the management of the bass stocks in the Irish, Celtic & North Seas, and the English Channel is for a total fishing mortality (commercial and recreational combined) in 2015 of less than 1155 tonnes. In 2013, ICES recorded a combined fishing mortality (commercial and recreational) of some 5400 tonnes.

The relatively poor recent recruitment of bass is borne out on a more local level by CEFAS long term studies of bass recruitment in The Solent (Figure 12), and for the rivers Stour & Orwell by interpretation of data supplied to EIFCA by the Environment Agency (Figure 13).

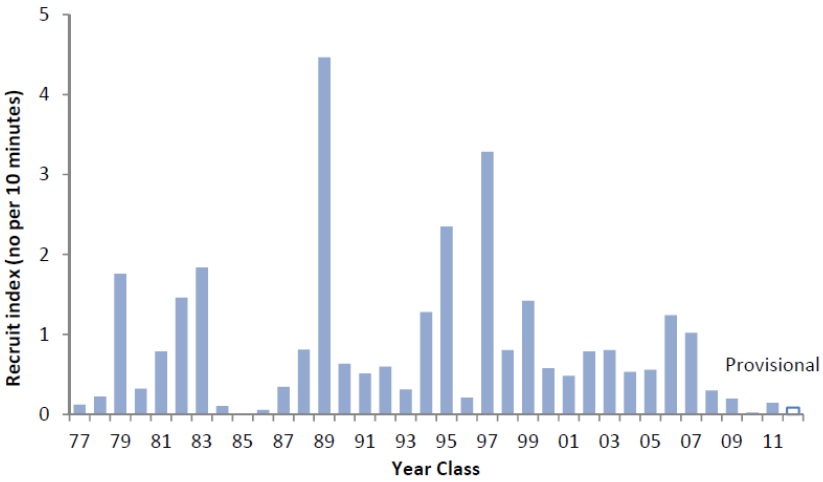

Figure 12 (above) Recruitment Indices for the bass population in The Solent, CEFAS data (Brown & Armstrong 2014)

Figure 13 (above) Abundance of small bass in rivers Stour (Diamond markers, solid line) & Orwell (square markers, dotted line). Data supplied from EA (WFD data), interpreted by EIFCA staff.

It is highly likely that the population of bass will decline in the coming years, due to recent relatively poor recruitment. It is probable that this will happen irrespective of any management measures which may be taken. If adequate management measures are not taken, it is likely that this decline will be even worse.

The picture of a fish stock exhibiting increasing landings, whilst at the same time the underlying dynamics of the stock are on a downward trajectory, are unfortunately all too common. This pattern of landings has often been the precursor to catastrophic stock collapse. As an example from history, the Gulf of Maine cod fishery showed a very similar "shape" of landings over a period of some 45 years to that of bass landings in our district within the past seven years. After a period of seemingly inexorable rise in landings, the Gulf of Maine cod fishery effectively collapsed, and has not yet recovered (Figure 14).

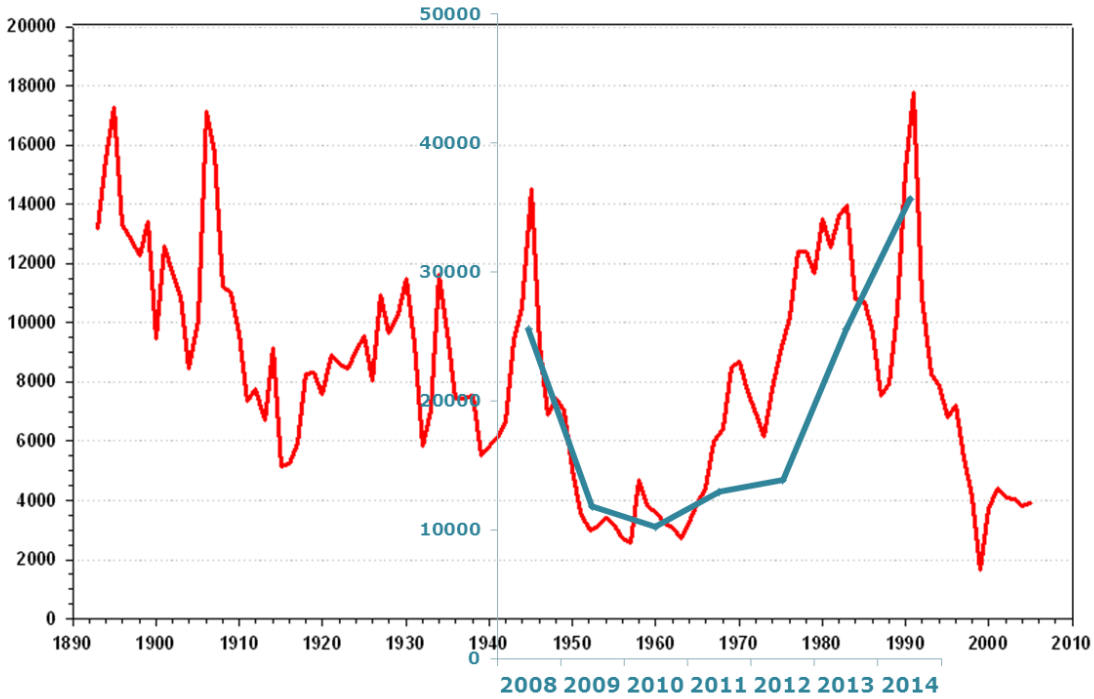

Figure 14 Pattern of landings from the Gulf of Maine cod fishery (red line, y-axis in tonnes per year in black) compared with bass landings within the EIFCA district (blue line, y-axis kg / year in blue). X-axis = year. Source cod data = WWW3; bass data = EIFCA Area Officers reports.

Management Factors & Options

Spatial & Temporal Closures

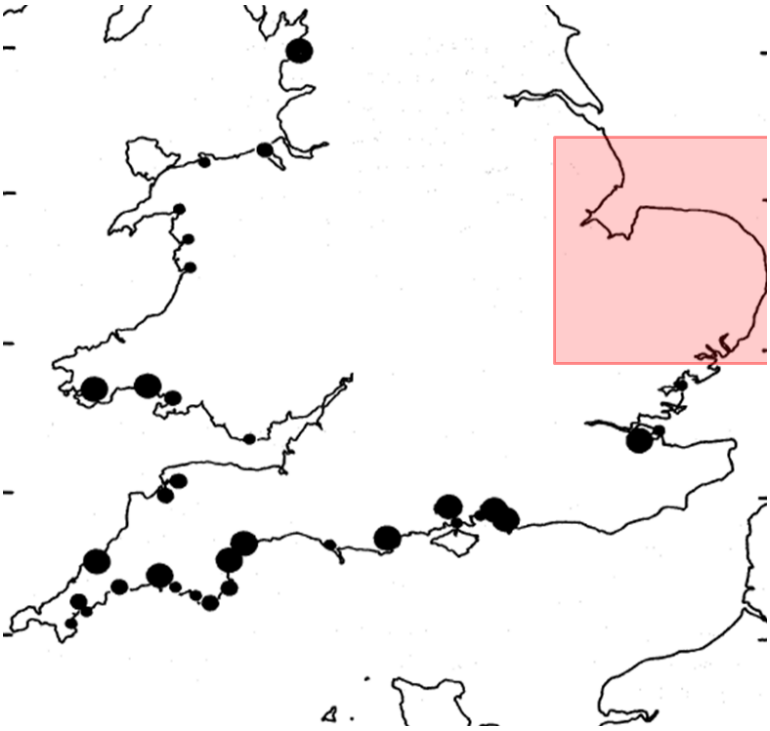

Figure 15 Location of Bass Nursery Areas in England and Wales (black circles), with Eastern IFCA region indicated by red square.

The "Bass (Specified Sea Areas) (Prohibition of Fishing) Order 1990. SI1990 No 1156" (BNA SI) provides for the creation and regulation of Bass Nursery Areas, with the intent that those areas provide protection for bass below minimum landing size. A range of measures including prohibition on fishing for bass from a boat, and the use of live sandeel as bait, are the measures intended to achieve that aim. There are currently no bass nursery areas designated under this legislation within the Eastern IFCA district, although there are areas where it is possible to identify that such protection could be justified.

Distribution of Bass in our district

Bass are approaching the northern limit of their range within our district. Seawater temperature has an important effect on their distribution, especially in the juvenile stages.

Within our district, a plume of water entering the southern North Sea from the English Channel serves to maintain elevated water temperatures in part of our district over the winter, in contrast to the notably cooler water further north (Figure 16).

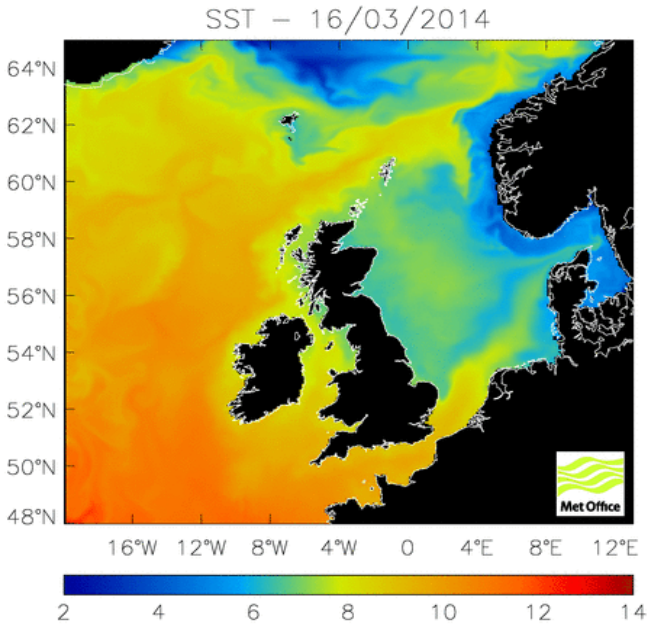

Figure 16 Surface sea water temperature (indicative), 26 March 2014

There is a close association between the abundance of, predominantly, juvenile bass in various estuaries and the location of the estuary in relation to the water inflowing from the English Channel (Figure 17).

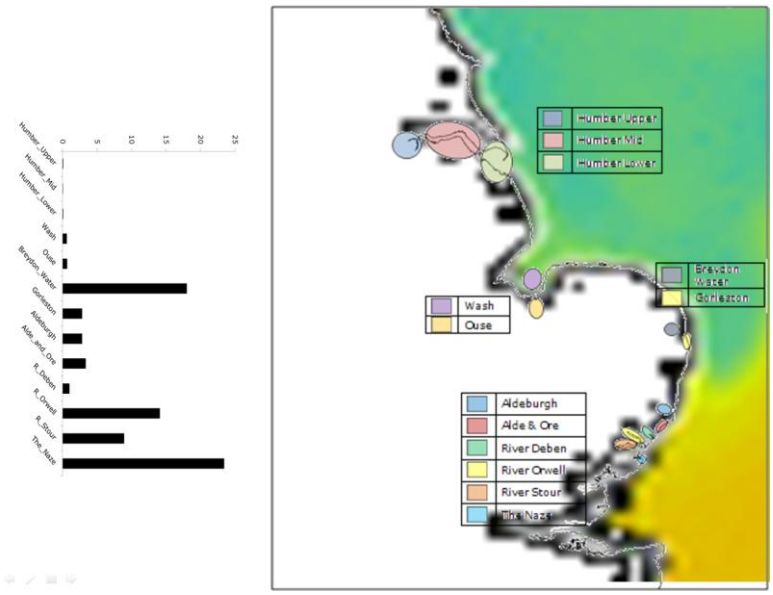

Figure 17 Abundance of bass, as indicated by average number per sample from Environment Agency water Framework Directive sampling, at various sites within the Eastern IFCA district

Within the estuaries, there is some indication of a slight tendency for smaller bass to be found higher up the estuary, larger lower down – but this is far from determinative. Overall, any size of bass can be found at any point within the estuary at some time (Figure 18).

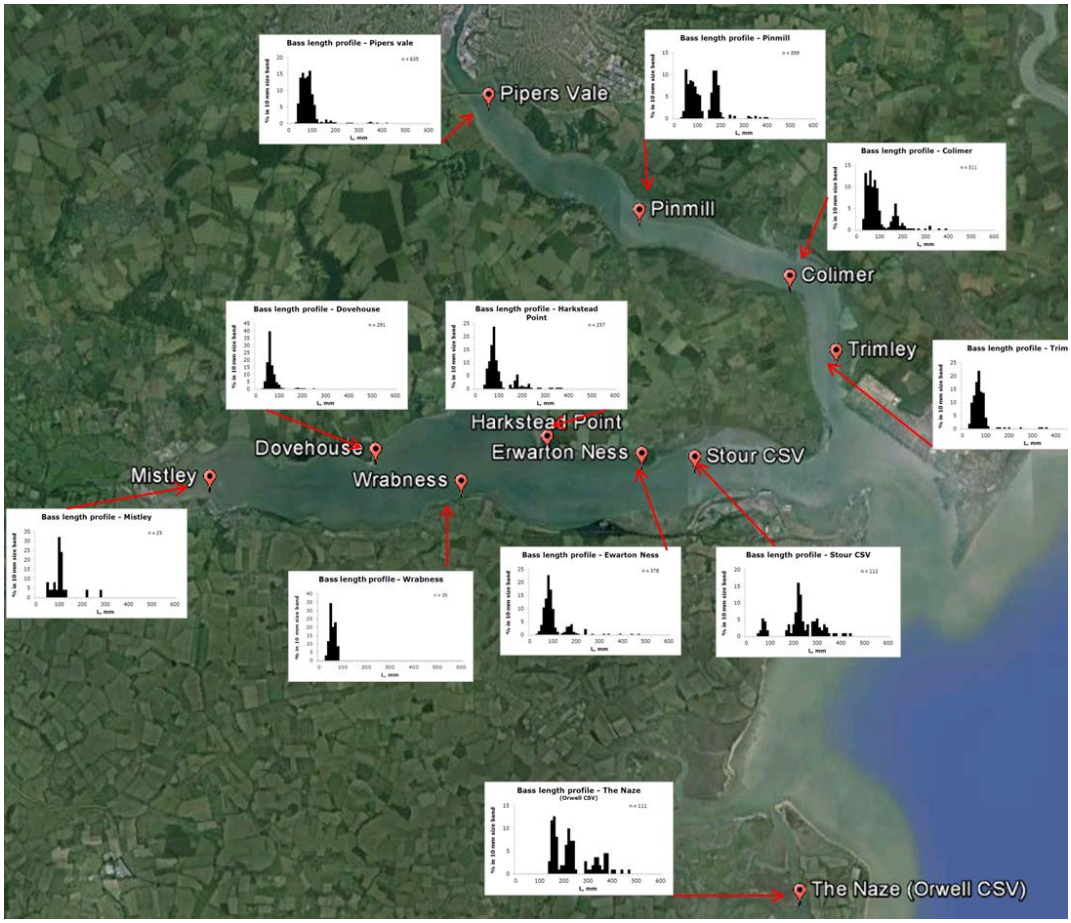

Figure 18 Size Profile of bass at various sample stations within the Stour & Orwell estuaries. Data from EA WFD monitoring.

Breydon Water stands out from the general trend, exhibiting disproportionately high abundance of bass (Figure 17), with a tendency towards a greater abundance of larger (but still below MLS) bass. This water body represents a good candidate for consideration as a nursery area.

Sizewell nuclear power station stands at roughly the point on the Suffolk coastline where the incoming plume peels away from the coastline (Figure 19).

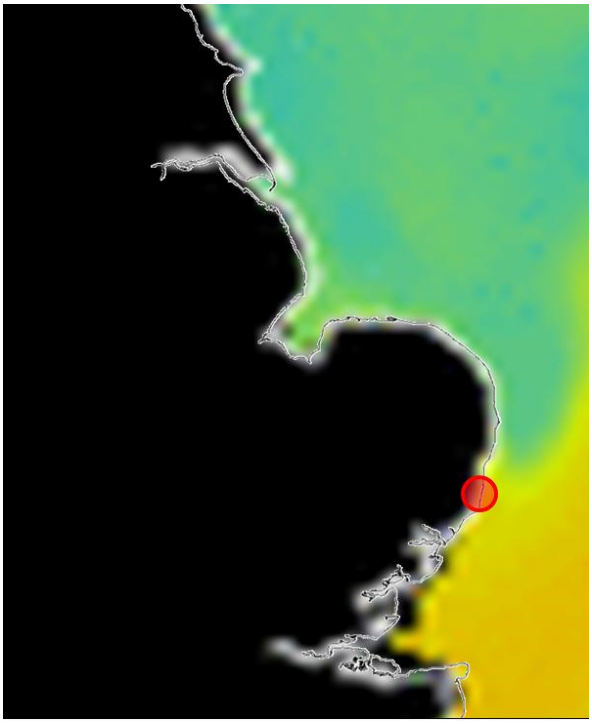

Figure 19 Location of Sizewell nuclear power station in relation to March sea surface temperature.

The warm water discharge from the power station attracts a range of marine life, including bass. This is especially marked over the winter, when it is probable that the fact of having an area remaining warm on the edge of the colder sea locations acts as a literal "hotspot". In addition to the direct attractive effect of the discharged water, there is a groundbaiting effect from a variety of species of fish and other marine life which has been killed or injured by passage through the power station water system.

Data from a CEFAS monitoring programme to assess the numbers and size profile of fish entrained on the intake screens at Sizewell Nuclear Power Station was analysed and presented within the Eastern IFCA Annual Research Report for 2013 (section 5.6), and is not repeated here.

The area around Sizewell is known within the recreational sea angling community as a good site for catching bass. The size distribution of these fish indicates that many must be considered as "school bass", slightly below or slightly above the MLS. This area therefore represents a good candidate for designation as a bass nursery area.

In general, it is felt that the bass nursery area legislation under the BNA SI has not been a success. The limitations imposed on activity allow too many loopholes, which in effect mean that the legislation is rarely fully enforced. North Western IFCA have recently considered the situation in the vicinity of Heysham nuclear power station, and have decided that rather than implementing or enforcing legislation via the BNA SI, they would bring in their own byelaw prohibiting all fishing activity and carriage of equipment which could be used in fishing activity at sea, on the shore and within 10 m. of the high water mark. This has the great benefit of clarity.

Spawning Aggregations

There is clear evidence that bass spawn in the southern North Sea. Stage 1 eggs have been found at numerous locations (Figure 20). These eggs are so young that they can be considered as indicators that the location of spawning must be nearby (Thompson & Harrop, 1987). The magnitude and direction of the residual current indicate that these eggs could not have drifted in from spawnings in the English Channel, but must have been spawned in the North Sea.

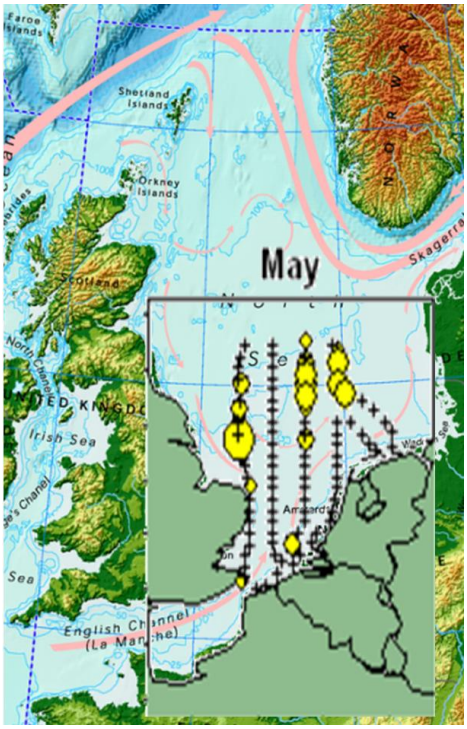

Figure 20 Location and indicative abundance of Stage 1 bass eggs in the southern North Sea, May 2010. Overlaid on chart of residual water currents within the North Sea. (egg data from van Damme et al 2011)

Bass have a tendency to form aggregations before and during spawning. Aggregations of large bass have been reported by Eastern IFCA area officers during the months of February, April & May in several years.

Eastern IFCA landings data indicates that there are in some years appreciable fractions of the total annual catch of bass landed in the spawning season (Figure 21).

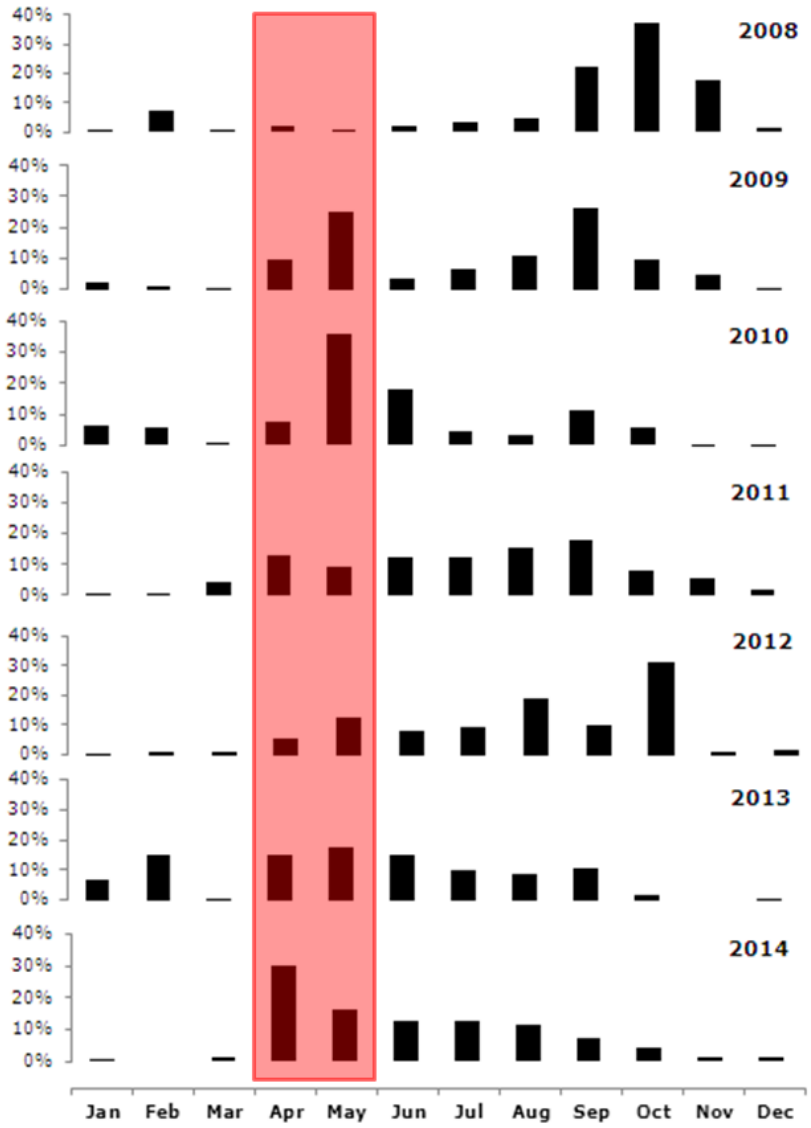

Figure 21 Proportion of the total annual landings of bass recorded in each month, by year. (EIFCA data). Red overlay indicative of likely spawning season.

The value to overall stock management of conserving large fish is well recognised (e.g. Hixon et al 2013), and the negative impact which disturbance to spawning fish can cause is also documented (van Overzee & Rijnsdorp, 2014). Even fish caught and released by angling routinely experience mortalities of the order of 20% (for similar species - Danylchuk et al 2007, Cooke et al 2003).

There would be merit to consider a close season for the landing of or fishing / angling for bass, of March, April & May. This would – in most years, depending on the temperature regime – afford protection to the aggregating fish before and during spawning.

Method Control

There is anecdotal – but not fully documented – evidence of appreciable unlicensed, unregulated and unreported fishing activity within our district. Gill netting from the shore for bass is often quoted as being a major component of this. In addition, at some locations the fleet of small boats conducting inshore fishing are very largely unlicensed – for instance, Figure 22 shows boats at Sizewell Beach in December 2014. These boats are equipped to fish a variety of methods – gill nets, pots and beam trawls were all observed adjacent to the boats. Of the 14 small boats drawn up on the beach that day, only one was a licensed fishing vessel.

Figure 22 Evidence of fishing activity photographed at Sizewell Beach 15 December 2014

Expert opinion from EIFCA Area Officers and enforcement staff indicates that at least part – in some cases, an appreciable fraction – of landings from such activities are sold, through a variety of outlets. There is a tendency for those involved in such activities – having already gone beyond the law in selling fish – to have scant regard for the full suite of legislation.

Taking action to limit / stop such activity would have genuine positive stock management benefits, and would also have the major advantage of garnering support from both legitimate commercial fishermen and true recreational sea anglers.

MLS (Minimum Landing Size) / Mesh Size

There have long been calls, and abandoned plans, for increases in the minimum landing size for bass, in order that the fish could spawn at least once before becoming a commercial target.

A specific report has been prepared to examine issues surrounding MLS for bass ("Bass – Minimum Landing Size considerations") and the details of that report are not repeated here beyond highlighting some major points.

If the LANDING size is increased, but the size at CAPTURE remains the same, then the likely effect of such measures is that increased numbers of fish will be discarded (or landed undersize). Bass caught in gill nets are very unlikely to survive being released from the nets. (NB As regulations stand at the moment, and announced into the future, bass – not being a species subject to TAC – will not be the subject of forthcoming discard bans).

An alternative is to attempt to limit the catching of fish below a desired size in the first place. Currently, there is a minimum mesh size of 90 mm for gill nets for bass. At this size, some 90% of bass greater than or equal to 42 cm length coming into contact with the gill net will be caught (Pickett et al 1995). A mesh size of 100 mm would retain some 60% of such fish.

The industry report that they already largely use 100 mm nets, to aid selectivity of larger bass (P Haslam, pers comm). Formalising that size in regulations would be a positive step, and it may be that we would wish to increase that size in future. Commercial fishers have made significant investments in certain types of fishing gear, so a sudden change to a larger mesh size would impose financial hardship. However, if the measure were announced well in advance, fishers could take account of this when re-equipping between seasons.

Direct Control of Fishing Mortality

At the moment, bass is not a quota species. Although there are limits on the amount which can be taken by boats locally, these are so high that they do not constitute a limitation on fishing mortality.

There are currently no limits on the amount of bass which can be taken by leisure anglers and non-commercial fishers such as netsman.

Bag limits for non-commercial utilisation now seem to be firmly on the agenda. Initial EU proposals (in December 2014) were for a bag limit of one bass per day, but more recent statements (Appendix 3) have indicated a wish for a three bass bag limit. The Parliamentary Under-Secretary of State for Environment, Food and Rural Affairs (George Eustice) stated in a parliamentary debate on 3 December 2014 that the UK government would seek a two bass / day limit (although this may well be superseded by the EU measures). There is a question

mark as to whether EU regulations would apply to non-motorised craft and shore fishing – it is important that any bag limit on non-commercial fishers does apply across the board, as there are times and places when large catches of bass can be made from the shore.

An EU statement of 26 January 2015 (Appendix 3) indicates a desire for member states to propose and implement limitations on catches by commercial vessels.

Protection of vulnerable stages

Potential obstructions to the free movement of bass and other species into and out of the important feeding grounds of salt marsh have been identified. In some instances, these have been deliberately placed as an attempt to slow down water flow, enhance the deposition of sediment in certain places, and thus build up salt marsh area (Figure 23). A note has been prepared and circulated to the Eastern IFCA environment team to appraise them of the potential impacts of such developments when considering projects which we become aware of. This is available as a part of the package of reports ("Points of concern on Saltmarsh "Enhancement" schemes").

Figure 23 Structure with the potential to impede the movement of bass to and from saltmarsh areas. From "Suffolk Flood and Coastal News – July 2014"

There are within our district several installations which abstract large quantities of sea water for various purposes. Although the regulation and documentation of such abstractions are an Environment Agency function, we should satisfy ourselves that the best possible design, equipment and operational protocols are being used to minimise the impacts of such activities on bass and other marine life. For instance, a device using a combination of sound and light generators in conjunction with the seawater intake system of a Belgian nuclear power station achieved an 89% reduction in the number of bass entrained on the intake screens. (WWW4).

Bycatch from Shrimp fishing – especially in estuaries.

Shrimp fishing can catch a large amount of other marine life – including juvenile fish – as a bycatch. Although most shrimp fishing employs some form of bycatch minimisation technology (such as veil nets), if the fish are sufficiently small they will pass through the veil net and be caught.

Catchpole et al (2008) found that small bass were indeed caught by shrimp boats fishing off the North Norfolk coast, although the numbers were not high – typically about 5 / hour, with no significant difference between those using veil nets and those not. This work confirmed that a greater proportion of small fish than large will pass through the veil nets (although with whiting rather than bass).

The area where the Catchpole study was conducted does not have a high density of small bass. It would be beneficial to quantify the amount of bass caught as bycatch in the shrimp fishery –especially for any such activity which occurs in those estuaries known to support populations of juvenile bass, such as the southern Suffolk estuaries.

Bycatch in other fisheries.

Within the Eastern IFCA district, there is a licensed fishery for salmon and sea trout under the Anglian Coast Net Limitation Order, administered by the Environment Agency. An assessment of the potential impact of that fishery is available as a separate report ("Assessment of the Anglian Coast Net Limitation Order"), concluding that there is a possibility that there is significant bycatch of bass from that fishery. However, if the fishery is effectively controlled by bag limits for non-commercial fishermen, it seems unlikely that this fishery will represent a major source of fishing mortality to the bass stocks.

Bass - Fast Facts

An attempt has been made to encapsulate the most important and pertinent points in connection with bass as a series of easy to remember bullet points – the "Fast Facts" listed below.

- Bass is very important to commercial and recreational fishers.
- There is a considerable groundswell of opinion in the public, Parliament and the EU to "DO SOMETHING".
- There is a pressing need for a very substantial reduction in fishing mortality.
- Bass form pre-spawning aggregations in our area, and (at least in some years) spawn in the North Sea.
- Within the Eastern IFCA district, there are identifiable areas important for bass at several stages in their life cycle.
- Recent low recruitment indicates that there will be a reduction in bass stocks in coming years, irrespective of management measures. Lack of adequate measures will make this reduction worse.

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Appendix 1- Extracts from transcript of UK Parliament debate 3 Dec 2014

Richard Benyon (Newbury) (Con): (former fisheries minister)

- "However, if we just left matters to the sclerotic processes of the EU, this stock would crash before we could do anything about it. There is a lot that we can do unilaterally,…"
- "We need action on minimum landing sizes; we need spatial and temporal closures; and we need better protection of nursery areas. "

The Parliamentary Under-Secretary of State for Environment, Food and Rural Affairs (George Eustice):

- "…..the decline of bass is not new news…"
- "We have consistently argued, for instance, that there should at the very least be restrictions on targeting bass from January to April and that those should apply in the key offshore spawning aggregation areas. "
- "Finally, we have suggested further work on the identification and protection of bass nursery areas in all member states, which will build on the progress we have made in the UK."
- "(*in connection with forthcoming EU debate on the issue*)… UK priority for this Council to extend and strengthen the proposals to limit commercial fishing. We will also seek a two-fish bag limit for recreational anglers, rather than the one-fish limit that has been proposed. "
- "What I am sceptical of, though, is having an outright ban on commercial fishing sectors, as has been trialled in Ireland. "
- "Ireland has found that, in the absence of a wider European agreement, just having a total ban on commercial fishing has not been effective."
- "In the 10 seconds I have left, let me say that we should recognise the role that IFCAs can play. Many already implement their own measures to protect bass. Finally, I will be going to Europe and to the Fisheries Council to get the best deal we can."

Appendix 2 - EU Emergency measures 26 January 2015

COMMISSION IMPLEMENTING REGULATION (EU) 2015/111 of 26 January 2015 establishing measures to alleviate a serious threat to the conservation of the sea bass (Dicentrarchus labrax) stock in the Celtic Sea, Channel, Irish Sea and southern North Sea.

Article 2 Measures

- During the period of application of this Regulation, it shall be prohibited to fish for sea bass (*Dicentrarchus labrax*) in ICES divisions IVb,c, VIIa,d-k using pelagic trawls (referred to as OTM — midwater otter trawls, PTM — midwater pair trawls) with a cod end mesh size of 70 mm or greater. For vessels using those gears, it shall also be prohibited to retain on board, relocate, tranship or land sea bass caught during the period of application of this Regulation in the same area. Member States shall report catches of sea bass by pelagic (OTM or PTM) gears to the Commission 14 days after the end of each month.

Article 3

- Entry into force This Regulation shall enter into force on the day following that of its publication in the Official Journal of the European Union. It shall apply until 30 April 2015. This Regulation shall be binding in its entirety and directly applicable in all Member States.

Appendix 3 - Press Release from EU Newsroom 26 January 2015

- In order to help the stock of sea bass recover, more action is needed to address the impact of all other commercial and recreational fishing activities.
- For recreational fishing which accounts for 25% of sea bass catches, this would include a limit of three fish per day per angler.
- Member States would also need to set a minimum size of 42 cm so that fish are not caught, or are released, before they have reproduced.
- For other commercial fisheries than pelagic trawling, this would also include limiting catches. The Commission is working with the Member States involved to prepare a proposal to the Council of Ministers as soon as possible.

Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT

2014

Bass – Minimum Landing Size considerations

S. Thompson

Bass – Minimum Landing Size (MLS) considerations

In order to more fully understand the aspects to be considered for and potential impacts of changes to the minimum landing size (MLS) for bass I was asked to compile a brief report on this matter.

This report was prepared and circulated in January 2015; the content of the report is attached as pages 3 – 10.

Bass – MLS considerations

Summary

- The current MLS of 36 cm affords poor protection to breeding bass, especially females.
- There are several considerations when attempting to identify a suitable MLS, and this paper considers these.
- An MLS at or close to 45 cm would appear to offer a combination of greatly enhanced protection for spawning and potentially spawning fish and a closer approach to the optimum yield from the fish stocks.
- There are considerations in connection with mesh sizes of gill nets should the MLS be increased.

Stephen Thompson **January 2015**

The imposition of a Minimum Landing Sizes (MLS) has long been a tool within the management of fisheries. MLSs are easily understood, and generally perceived to be a fair management measure, as they apply equally to all users. There is wide acceptance that, whilst a valuable component of the toolbox, MLSs can not achieve good stock management on their own (Harrison 1986), and selection of a minimum landing size to impose requires that fisheries managers have a clear understanding of the objectives of the measure (Hill 1992).

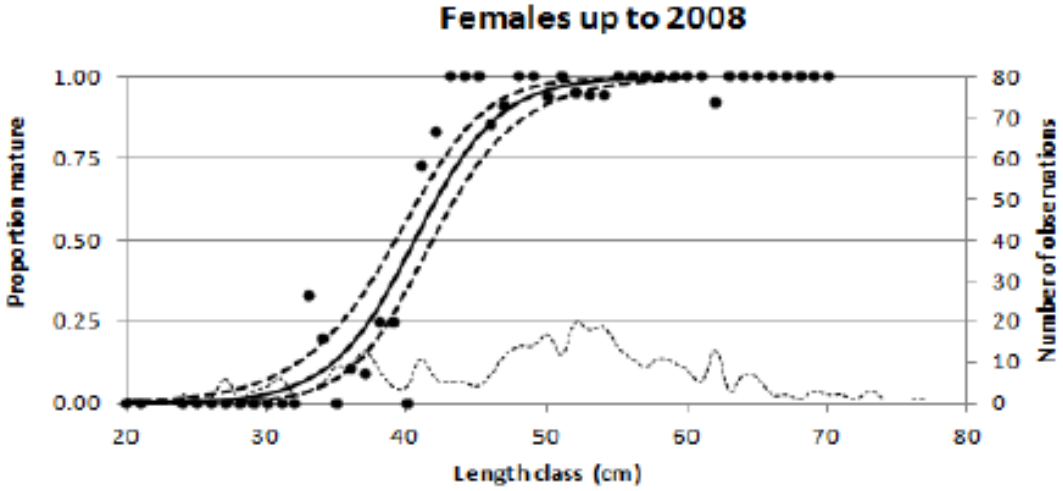
Selection of the minimum landing size (MLS) to manage a fishery depends on the criteria used to make the decision. Common criteria applied include –

- The size at sexual maturity of a defined proportion of the fish
- The size to ensure that a defined proportion of fish have had the opportunity to spawn at least once
- The size which delivers the maximum economic benefit for the fishery

The current minimum landing size for bass in Eastern IFCA waters is 36 cm total length (tip of snout to tip of tail). Whilst many male fish will – at the appropriate time of year – be sexually mature at this size, studies indicate that most female bass will not be.

Pawson & Pickett (1996) did not find any female bass less than 42 cm long with mature gonads, and Pawson et al (1987) reported that of the 700 bass from the English Channel examined, fish between 32 and 42 cm were found with maturing gonads, but very few with mature gonads, or spent fish.

A CEFAS study using samples collected from around the coast of England and Wales during December to April in the years 1982 to 2008 produced the maturity curves and values as shown in Figure 1 and Table 1. (ICES 2012). (It should be noted that the collection of samples continued into 2009, when a large number of relatively small fish were sampled. If these fish were included in the analysis, the resultant curve shifts to the left – greater proportion of fish maturing at a smaller size – for both females and males. The papers authors considered that consideration of data from 1982 – 2008 only gave a truer reflection of the real picture. I concur with that view, but we should be aware that anyone familiar with this work may present an alternative view of the conclusions. ST.)



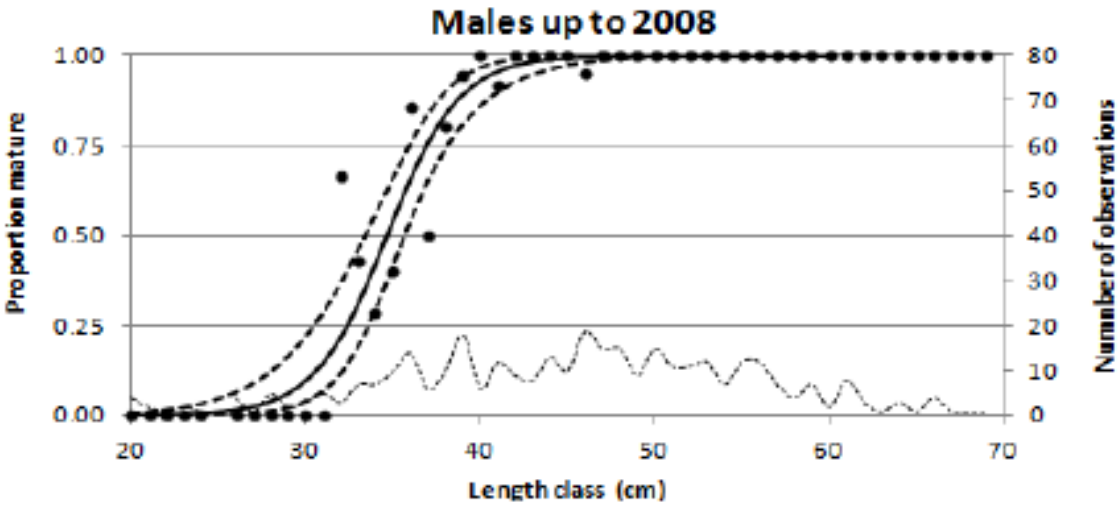


Figure 1 Maturity ogives (with 95% confidence intervals) fitted to individual records for bass sampled during December – April in 1982 to 2008. Females (top) and males (below), numbers of observations / length class as dotted line below. From ICES 2012

Table 1 Length in cm. (rounded to nearest whole cm.) at which 25%, 50% & 75% of female and male bass are sexually mature. Data from ICES 2012

Length cm. at % sexually mature	Females	Males
25%	37 cm.	32 cm.
50%	41 cm.	35 cm.
75%	44 cm.	37 cm.

A more recent study in Welsh waters (Carrol 2014) found a small proportion of female bass exhibiting clear signs of sexual maturity at less than 42 cm length, but none at 36 cm (Figure 2).

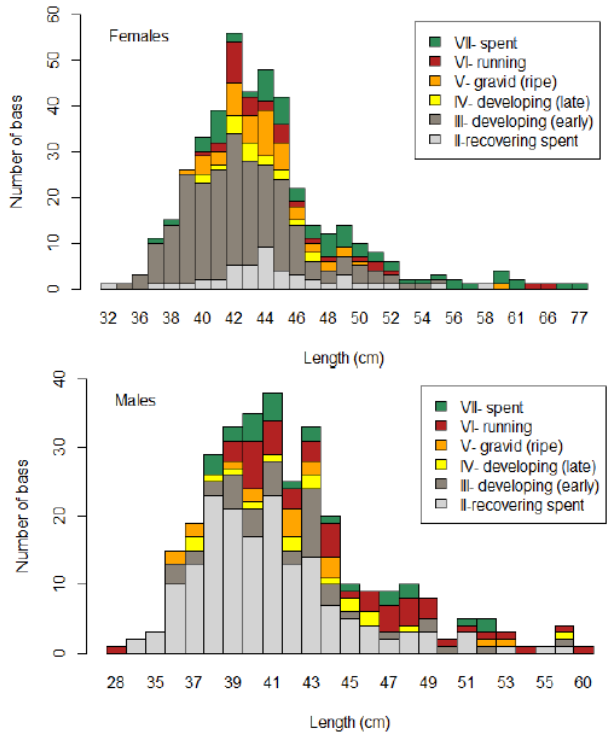


Figure 2 Frequency distribution of maturity stage per 1 cm length categories for female (top) and male (below) bass for all of Wales. (From Carrol 2014)

It is recognised that fishing mortality can cause the size at which fish become sexually mature to decrease, due to the strong selective pressure for genes for early maturation – genes coding for fish to spawn at a small size produce disproportionately more offspring than those for fish which are not sexually mature until a larger size, as many of the "larger spawner" fish are caught before they can reproduce. (Law 2000, Law 2007). It may be the case that we are seeing this effect in bass populations, although I have not been able to find any specific studies on this. That notwithstanding, sustained high fishing mortality is very likely to have either caused or to cause in future a reduction in the size at which bass first become sexually mature.

The above considerations give an understanding of the size at which bass first become sexually mature. If the desire is to protect bass so that a defined proportion have the opportunity to spawn at least once, then it is necessary to factor in the growth until the next spawning season comes around. Consider the example of a hypothetical MLS of 43 cm – if a bass is genetically programmed to become sexually mature at 43 cm length, and it achieves that length in July, it then becomes a legitimate target for the fishery. The fish would not, however, have the opportunity to spawn for the first time until the next spawning season came around the following April / May. In order to provide protection for this fish until it had the opportunity to spawn at least once, the MLS would have to be 43 cm + the increase in length the fish would achieve between July and April / May.

Using the parameters calculated in ICES 2012 as inputs for the von Bertalanffy growth equation it is possible to calculate the annual growth increment for a range of lengths of bass at the start of the year (Table 2).

Table 2 Annual growth increment for a range of lengths of bass at the start of the year. Data from ICES 2012

L, cm. at year start	Annual increment, cm
36	4.9
38	4.7
40	4.5
42	4.3
44	4.1
46	3.9
48	3.7
50	3.4

A further potential consideration on which to base the selection of which MLS to apply is that of achieving the maximum yield from a fishery. A yield / recruit model based on data for bass population size structure as in the 1980s indicates that for the Thames bass fishery (the nearest to our area, both geographically and in terms of population and exploitation characteristics) the optimum yield in terms of total weight of bass potentially landed would be achieved if exploitation of the fish started once they had achieved a length of some 46 cm (Figure 3) (Pawson & Pickett 1987). (Note that this refers to the weight of fish landed, rather than monetary value – it does not reflect the fact that larger bass attract a higher price / kg. Were such consideration to be incorporated into the calculation, the curve would move to the right and the optimum financial return would be achieved at a higher value of length at first exploitation).

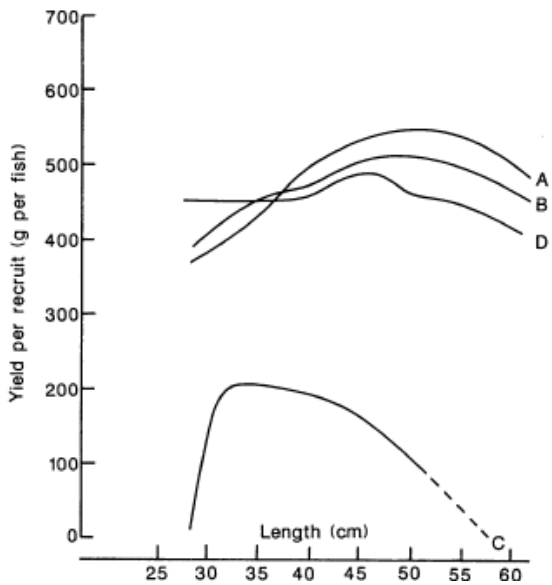


Figure 3 The effect of increasing length at which bass are first caught on the biomass yield of the fisheries with the exploitation patterns of (A) the total UK fishery (B) the Devon & Cornwall fishery (C) the West Coast fishery and (D) the Thames Estuary fishery. From Pawson & Pickett (1987).

Taking the above factors into consideration, it is possible to summarise the options for the specification of a minimum landing size to achieve desired aims as per Figure 4.

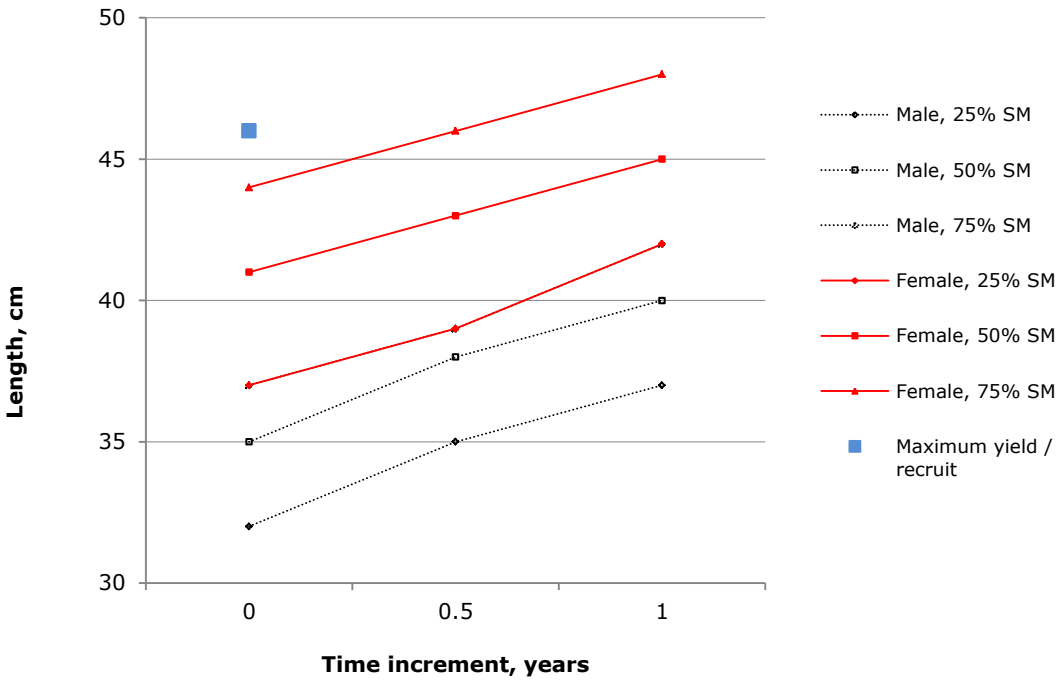


Figure 4 Length of Bass meeting criteria of % of the stock at that length having achieved a defined proportion of fish sexually mature, combined with a defined time increment since achieving that % of sexual maturity. NB the line for "Male, 75% SM" is largely overwritten by that for "Female, 25% SM". Using data from ICES 2012.

In order to determine the length of bass / MLS meeting certain criteria –

- Identify the relevant line (male / female, and % of the stock to have achieved sexual maturity)
- On that line, identify the relevant amount of time before the spawning period for which fish achieving that proportion of sexual maturity are to be protected by the MLS
- Read off the appropriate length.

ie, if the desire is to protect 50% of spawning female bass for six months prior to them spawning, select the relevant line (red line, solid red squares as markers) and follow along to the 0.5 year time increment. This intersection gives a required MLS of some 43 cm.

Consideration should also be given to the relationship of the size required for optimisation of the yield per recruit to any MLS under consideration (see section above).

Additional considerations

The imposition of MLS alone does not offer optimum fisheries management. A major consideration is that the regulation is for minimum LANDING size – if fish are caught below the MLS and then released, and a substantial proportion die during this process, there is little conservation benefit. Much of the bass fishing within EIFCA area is by gill netting, which does not lend itself to the benign release of captured fish.

Gill nets are to some extent size selective, in that it is possible to identify a range of fish sizes which will be retained by gill nets of certain mesh sizes (always assuming the gill net is set fairly tightly, rather than effectively operating as a tangle net). The legal minimum mesh size for gill nets for bass in EIFCA waters is 90 mm stretched mesh, but anecdotal evidence (expert opinion from EIFCA area officers and enforcement officers) suggests that the commercial fleet routinely use 100 mm mesh nets, with the intent to avoid catching small bass. As shown in Figure 5, choice of this mesh size will indeed tend to avoid retention of almost all bass below the current MLS of 36 cm, and a large proportion of those below about 41 cm, but there is high retention of fish of all sizes larger than that (Pickett et al 1995).

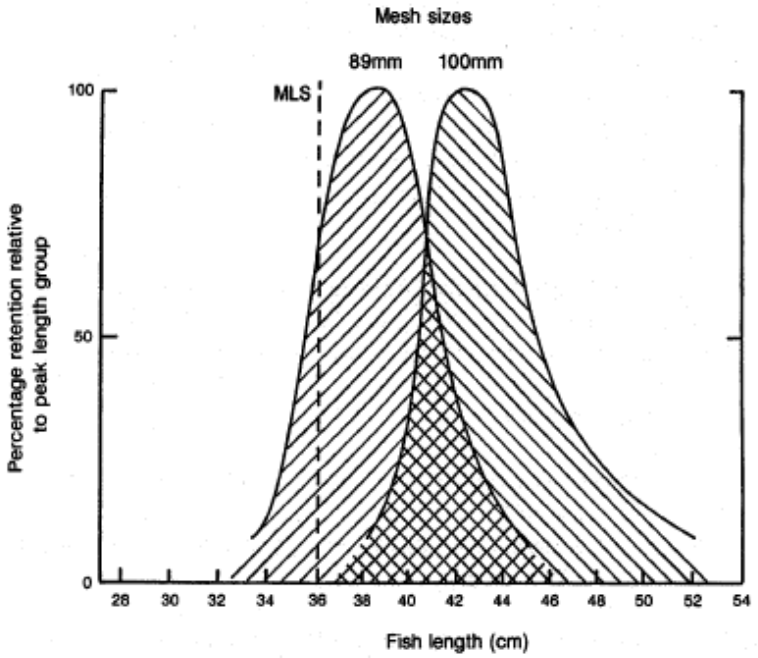


Figure 5 Theoretical gill net retention curves for bass in gill nets of mesh size 89 & 100 mm. (From Pickett et al 1995)

The same study produced a curve to identify the proportion of bass of various lengths likely to be retained by various gill net mesh sizes (Figure 6). Although in theory this could be used to determine what size mesh a gill net should have to retain specified sizes of bass, great care must be exercised doing this, as the mesh sizes considered covers a narrow range, and extrapolation outside of this range is undesirable.

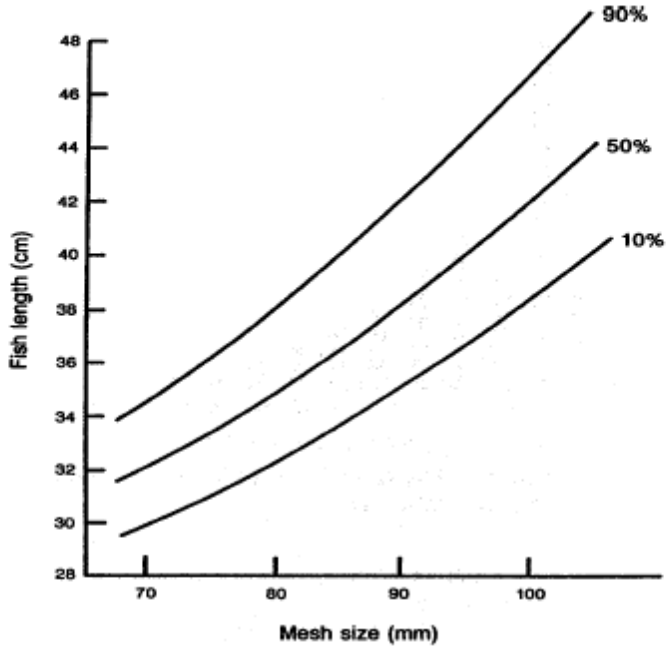


Figure 6 The proportions of bass at different lengths retained by various gill net mesh sizes

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Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT

2014

Points of concern on Saltmarsh "Enhancement" schemes

S. Thompson

Points of concern on Saltmarsh "Enhancement" schemes

Whilst reading a publication "Suffolk Flood and Coastal News" of July 2014, it was noticed that schemes had seemingly been instigated intended to capture drifting sediment and enhance the rate of accretion of saltmarsh areas, presumably to alleviate flood risk.

From the images associated with the article, it appeared that the structures used could also have an impact on fish and other aquatic species attempting to use the network of creeks to access the very important intertidal feeding areas of saltmarsh.

A brief note was therefore prepared and circulated to the research and environment teams on 10 December 2014 to highlight these concerns and inform consideration of such schemes as they come to light in future. It is hoped that these concerns can also be disseminated to groups who may be considering such schemes for the future.

The content of that note is presented here as pages 3 & 4.

Points on Saltmarsh "Enhancement" schemes, especially in connection with the Deben estuary (also has application in other estuaries)

There is evidence of schemes intended to encourage the accumulation of sediment in salt marsh areas – for instance, the "Suffolk Flood and Coastal News" July 2014 contained these images of schemes involving the placing of barriers.

From these images, it seems that these structures are also likely to impede the free movement of fish and other animals into and out of the creeks with the tide. This can result in areas of saltmarsh being unavailable to the fish to feed in at high tide, and / or trapping of fish as the tide drops, which could result in them being subject to increased predation from, especially, birds.

There is a considerable body of evidence to indicate that saltmarsh and intertidal areas are very important feeding grounds for a range of fish species (eg Kelly (1988), Laffaille et al (2000), Laffaille et al (2001), McIvor & Odum (1988), Colclough et al (2005).

There is also evidence that fish exhibit site fidelity, such that loss of access to a particular area of marsh may well have a major impact on the fish populations associated with that marsh – they can't simply go somewhere else. (Green et al (2012)).

The potential impact of structures such as in the images above (and any others which impose restrictions on the free movement of fish and other animals), combined with the ready availability of other means of achieving the same end (for example, the positioning of withies and sticks as "tufts", to replicate the effect of pioneering salt marsh plants) indicates that the use of such structures must be very carefully considered, and the full impacts appraised.

Stephen Thompson **December 2014**

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Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT

2014

Assessment of the Anglian Coast Net Limitation Order

S. Thompson

Assessment of the Anglian Coast Net Limitation Order (ACNLO)

In order to more fully understand the unlicensed unregulated fishery within our district I was asked to compile a brief report on the Anglian Coast Net Limitation Order.

This report was prepared and circulated in January 2015; the content of the report is attached as pages 3 – 6.

Anglian Coast Net Limitation Order (ACNLO)

Assessment

Attempts should be made to assess the level of bycatch of bass by those operating under ACNLO licenses, and to inform holders of these licenses of changes to minimum landing size for bass, and bag limits, as and when these become applicable.

Assuming the level of compliance with existing and forthcoming legislation is good, there is at the moment no need to regard legitimate activity under the Anglian Coast Net Limitation Order (ACNLO) as a high priority threat to fish stocks, or management measures, provided that steps are taken to limit the Bass bycatch. This is due to the following factors –

- Removal of the option to sell a high value bycatch will reduce the incentive to take part in this fishery. (See comments below in final paragraph in connection with consideration of bycatch).
- The number of license holders is relatively low.
- It is inevitable that this number will reduce as time goes by.
- Providing that license holders adhere to the conditions of their licenses connected with the requirement of the holder to be conducting the fishing operation, it is likely that the level of fishing is actually quite low.
- Challenging legitimate ACNLO license holders is unlikely to be an efficient use of resources.

Should activity be occurring related to licenses held under the ACNLO which are not fully meeting the conditions of the licenses, or there be appreciable ongoing large bycatch (especially bass), then there is the possibility of damage being caused by activity licensed by the ACNLO.

Much of the information within this document was kindly supplied by Dr. Roger Handford, Senior Advisor (Partnerships), Fisheries, Biodiversity and Geomorphology Team, Environment Agency (EA), to who thanks are due for his assistance.

Since 1996, the Environment Agency (and predecessors) have promulgated and administer the Anglian Coast Net Limitation Order (ACNLO) which annually licenses several named individuals to use nets (specified as either drift or non-drift nets) for the purposes of fishing for salmon and sea trout within the Anglian region (between Spurn Point and Walton on the Naze, Essex, therefore including all the EIFCA region). These persons are not required to use a registered fishing vessel for their activities. The order itself, and an explanatory document relating to proposed changes (August 2014, to be implemented by 1 January 2016) to the Order, can be found within EIFCA resources (Here - the Order is – "AN - Anglian Coast 2005", and the explanatory document– "Anglian NLO FAQ aug14"). There is an annual charge (currently £79) for these licenses.

The fishery is concentrated around the North Norfolk coast, and also around Lowestoft. It is likely that the fish targeted are returning to spawn in either local

rivers (where the populations of salmon and sea trout are low) or the North East of England, where the populations are higher.

There are relatively few licenses currently in existence (Table 1), and the number will decline to zero in coming years as current participants are no longer capable of using their licenses for one reason or another. At the inception of the ACNLO, the anticipation was that the fishery would be extinct by 2024, and more recent assessments are still in line with this.

A person may only acquire an annual license if they have held a corresponding license in the previous year. There are conditions in which licenses may be transferred to another person, but these are strictly controlled –

- On the death of a license holder, that particular license can be transferred to a person meeting certain criteria. However, this license is only valid for the remainder of the year in question (in practise, only until the end of the fishing season at the end of September). The transferee will not be eligible for a license in subsequent years. (Article 5 (1)).
- There is a provision for the one-time-only transfer of a license to another person under certain conditions, as outlined in Article 6 of the ANCLO. Correspondence with Dr Handford indicates that this Article has only rarely been used, if at all, due to the lack of people meeting the specified conditions. The EA are considering removal of this Article in their current review of the ACNLO.

Table 1 ACNLO annual catches and numbers of licenses held for recent years

Year	Annual Catch (numbers)		Licences in existence		
	Salmon	Sea Trout	Drift net	Non-drift net	Total
2004 – 2013 average	12	808			
2009 – 2013 average	4	487			
2013	2	387			
2004					40
2013			19	5	24
2014			17	5	22

The current age profile of license holders indicates that the number will decline in coming years (Figure 1) - this is the intent of the EA, and the Order is sometimes referred to as a Reducing Net Limitation Order.

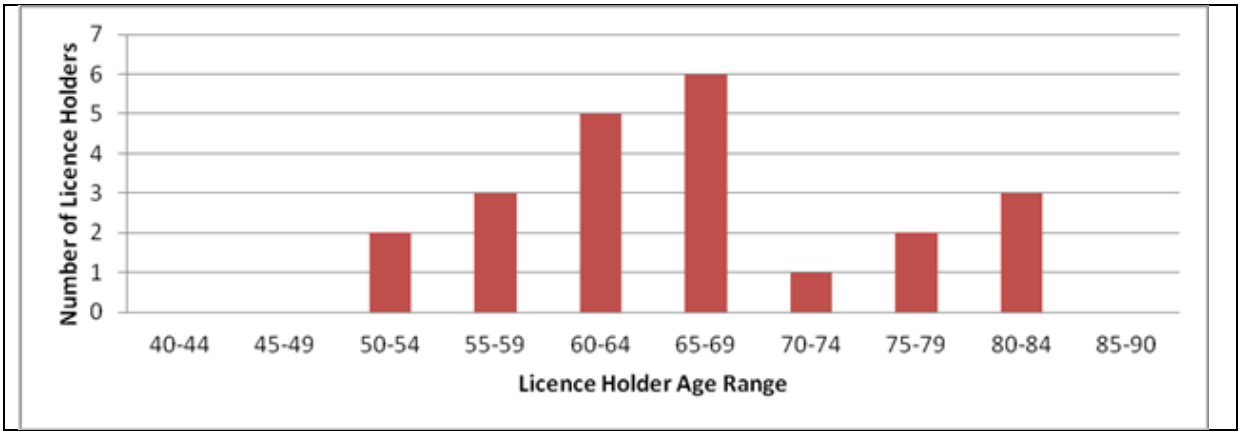

Figure 1 Age Profile of holders of license under the ACNLO, 2014 season (data supplied by EA)

The nets used in this fishery tend to be some 200 – 300 metres long (but not limited under the Order). There is a specification within the EA byelaw 9iii that the mesh size must be "*not less than 3 centimetres in extension from knot to knot (the measurement to be made on each side thereof) or 12cm measured round each mesh, the measurements to be made when the net is wet*." This is equivalent to a stretched mesh of 60 mm. Fished close inshore, these nets will take bass and mullet when those species are in the area. Such a net will retain bass below the current MLS of 36 cm – as an estimated example, a 60 mm gill net would retain some 90% of the 33 cm long bass which came into contact with it.

Catches of salmon and sea trout by ACNLO license holders which we are aware of (Table 1) indicate that these catches can not be the basis for a sound commercial business for the totality of the license holders. A study (EA Nov 2014) assessed the entire first sale value of this fish sold from the fishery (some are used for personal consumption only) as less than £5000 per year. The distribution of catch amongst participants is very disparate, with the five highest catching netsmen accounting for approximately half of the catch. The inevitable conclusion is either that at least some of the participants are treating this activity as a "paying hobby", or that they make their money from the inevitable bycatch of these nets (probably principally bass and mullet), or that recorded catches represent a substantial under -declaration of actual catches . Some of those fishing under ACNLO licenses acknowledge catching "*whitefish and bass*", but declined to provide specifics (EA Nov 2014). Many regard their participation in the fishery as a part of their cultural heritage, to keep alive the traditions of their ancestors.

If license holders are considered the same as "recreational" fishers in terms of management of bass stocks, this would lead to them being subject to the same bag limit as recreational sea anglers. If enforced, this would remove the incentive to conduct the activity in the expectation of a valuable saleable bycatch. I see no reason not to consider holders of only an ACNLO licence in the same way as recreational anglers (the ACNLO specifically refers to licenses "*to fish ….for salmon and migratory trout*" (Article 2 (1)), without reference to conferring rights to fish for other species). If holders of ACNLO licenses are permitted to take bass as a bycatch, this represents an unquantified fishing mortality with potential implications for management of the stocks. **This is probably the single most important consideration in connection with the ACNLO at the moment.**

Stephen Thompson **January 2015 (amended February 2015)**

Data Sources

Dr. Roger Handford, Senior Advisor (Partnerships), Fisheries, Biodiversity and Geomorphology Team, Environment Agency, *pers comm* (extensive).

EA Nov 2014 - Environment Agency - "Economic and Social Value of the Anglian Coastal Salmon and Sea Trout Fishery" Report v2, November 2014

EA Aug 2014 - Anglian Coast Net Limitation Order Questions & Answers.

EA 2005 - Environment Agency (Anglian Coast) (Limitation of Net Licences) Order 2005

Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT

2014

Unlicensed Herring fishing in Eastern IFCA waters.

S. Thompson

Unlicensed Herring fishing in Eastern IFCA waters

In order to more fully understand the unlicensed unregulated fishery within our district I was asked to compile a brief report on the fishery for herring within our waters undertaken by unlicensed vessels.

This report was prepared and circulated in January 2015; the content of the report is attached as pages 3 – 5.

Much of the information within this document was kindly supplied by Alan Garnham, Ady Woods and Jason Byrne, EIFCA Area Officers, to who thanks are due for their assistance.

Unlicensed Herring fishing in Eastern IFCA waters

Fast Facts

- The North Sea herring stocks are in good status.
- Extensive activity by a large number of unlicensed operators, including sales of fish.
- Low value, leading to lack of commercial exploitation.
- A feature of the southern part of the EIFCA district, from Wells southwards.
- Dependant on calm conditions to make catches, and even in good conditions catch rates vary from effectively zero to extremely high.

The inshore sea areas in the southern part (roughly from Wells-next-the-Sea southwards) of the Eastern IFCA district support an appreciable fishery for herring by unlicensed vessels. It is considered that the fish may be present further North than this, but there is effectively no fishing for them. There is a shift throughout the EIFCA district from the South (where there are very large numbers of unlicensed herring fishers and few licensed boats fishing for herring) to further north, where there are more commercial vessels and fewer non-licensed boats fishing herring.

The fishery occurs all year round (apart from a period from late July to the end of August) when conditions are suitable. Fishing only occurs when the wind is very slight (not above force 2), and never in Easterly winds. The movement of the fish shoals are unpredictable, turning up in a location in numbers and staying there for a few days or weeks.

This fishing occurs mainly from small boats, relatively close to the shore (a few metres to half a mile), and also in estuaries. The method of choice is gillnets, with a few using fixed gear and some people use any net they have available. Fishing usually occurs around slack water (day or night).

Catch rates can be high, with on occasions a net being sufficiently loaded to endanger the boat before the whole of the net has been shot. On average nets are set for some twenty minutes. On the other hand, there will be days when boats will catch nothing all day, as the fish are not in that location. It is considered that the total catch from the unlicensed fishery certainly exceeds that from the commercial fleet in the southern part of the EIFCA district, but this is not the case further north around North Norfolk where there are more licensed vessels fishing herring.

As well as personal consumption / given to friends, the caught herring is used as bait (pot/ long-line). Expert opinion is that many of the unlicensed vessels are selling their catch.

In total, more than 1000 boats take part in the unlicensed fishery, although some may not fish at all in any particular year. Some boats are kept locally - on moorings, in marinas and on land. In addition, boats are trailered to the area to participate in the fishery, from at least as far away as the Home Counties.

ICES advice is that the North Sea herring stocks are in reasonable condition, with fishing mortality below that indicated for MSY, and spawning stock biomass above the precautionary approach level (Figure 1).

Stock status

Fishing pressure	2011	2012	**2013**	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa})	?	?	?	**Undefined**
Management plan (F_{MP})	✓	✓	✓	Below limit

Stock size (at spawning time in autumn)	2011	2012	**2013**	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MP})	✓	✓	✓	Above trigger

Figure 1 Extract from ICES advice on Herring for 2014

In years past there have been numbers of large commercial vessels fishing out of local ports. At present, the low price of herring (consistently appreciably less than £1 / kg on average) mitigates against the exploitation of the stocks by commercial vessels. The low price is driven by herring currently being unfashionable, coupled with the wide availability of herring at very low prices from unlicensed fishers bearing none of the overheads of commercial operators. A small scale commercial fisherman has reportedly said that were there to be no sales of fish by unlicensed fishers, then it would be viable to catch the species commercially.

Stephen Thompson **January 2015**

Information sources

- Extensive expert opinion from Alan Garnham, Ady Woods & Jason Byrne, Eastern IFCA Area Officers.
- EIFCA Area Officers reports.
- ICES Advice May 2014 North Sea Herring in Subarea IV and Divisions IIIa and VIId (North Sea autumn spawners) (accessible via http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/2014/her-47d3.pdf)

Eastern IFCA

Inshore Fisheries and Conservation Authority

RESEARCH REPORT 2014

Fish Survey River Deben July 2014

S. Thompson

Fish Survey River Deben July 2014

Contents

Figures

Introduction

Survey team –

- Ron Jessop
- Simon Howard
- Lee Torrice
- Stephen Thompson

A survey was undertaken on 21st July 2014 in the estuary of the River Deben, Suffolk, with the aim to assess and quantify the fish population. We used a Water Framework Directive compatible beach seine net, deployed from "Pisces" and hand hauled onto the beach. This method is the Environment Agency standard, and therefore allows comparison with EA surveys conducted in adjacent estuaries. It is the same method as EIFCA used in October 2013, thus allowing us to build a time series of results.

Location, conditions and method

Sites are identified in the image below (Figure 1). "Opposite Waldringfield Golf Course" was used in both October 2013 and July 2014, and is identified as the "Highest" site in tables and graphs etc. "Ramsholt Arms" was used in both October 2013 and July 2014, and is identified as the "Mid" site in tables and graphs etc. "Bawdsey Manor saltmarsh edge" was used in October 2013, but was not accessible due to tidal level in July 2014, when "Shingle Beach opposite Felixstowe Ferry", some 750 m downstream, was used instead. These sites are identified as "Mouth". The change proved fortuitous, as the alternative site yielded interesting results.

Tides on at Felixstowe on the survey dates were –

21st July 2014	Time (BST)	07:28	13:32
	Height (m.)	3.37	1.09
1st October 2103	Time (BST)	09:43	16:02
	Height (m.)	3.24	0.85

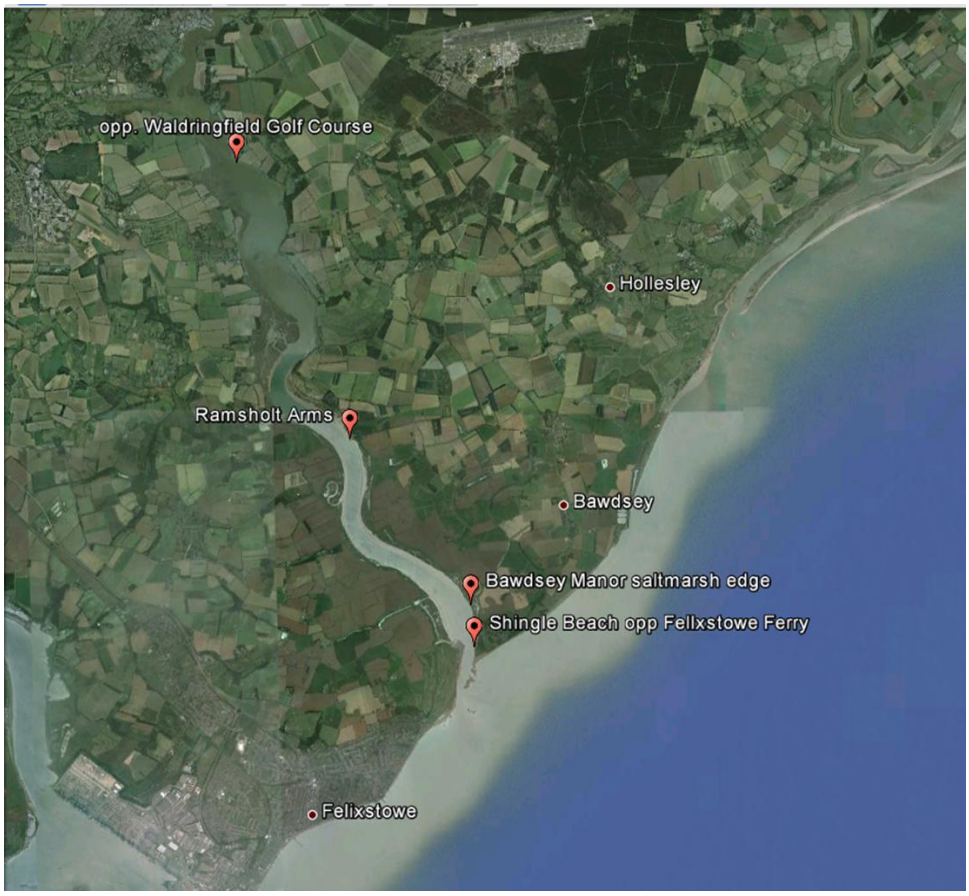

Figure 1 Locations of sample sites River Deben (image from Google Earth)

One valid tow was completed at each site, with one end of the net held by one person on the beach, the net paid out and towed round in a semicircle by "Pisces", the other end of the net then being passed to another person on the beach. The two ends of the net were then drawn up the beach and together, to result in a bag containing the catch. Two tows (one at the "Mouth" site, one at the "Highest " site) were not counted as part of the dataset, as the net had not deployed correctly (the footrope rolled up at "Highest", and the net was not deployed sufficiently far out from the beach at "Mouth"). On these occasions, the tow was repeated, and the resultant valid results used in the dataset.

Results of the measuring of the fish captured are given as Appendix 1.

Results

Sufficient numbers of four species were captured to allow meaningful comparisons to be drawn, and these are presented below for Sprat (Figure 2), Sand Smelt (Figure 3), Goby (*Pomatoschistus* sp) (Figure 4) and Bass (Figure 5).

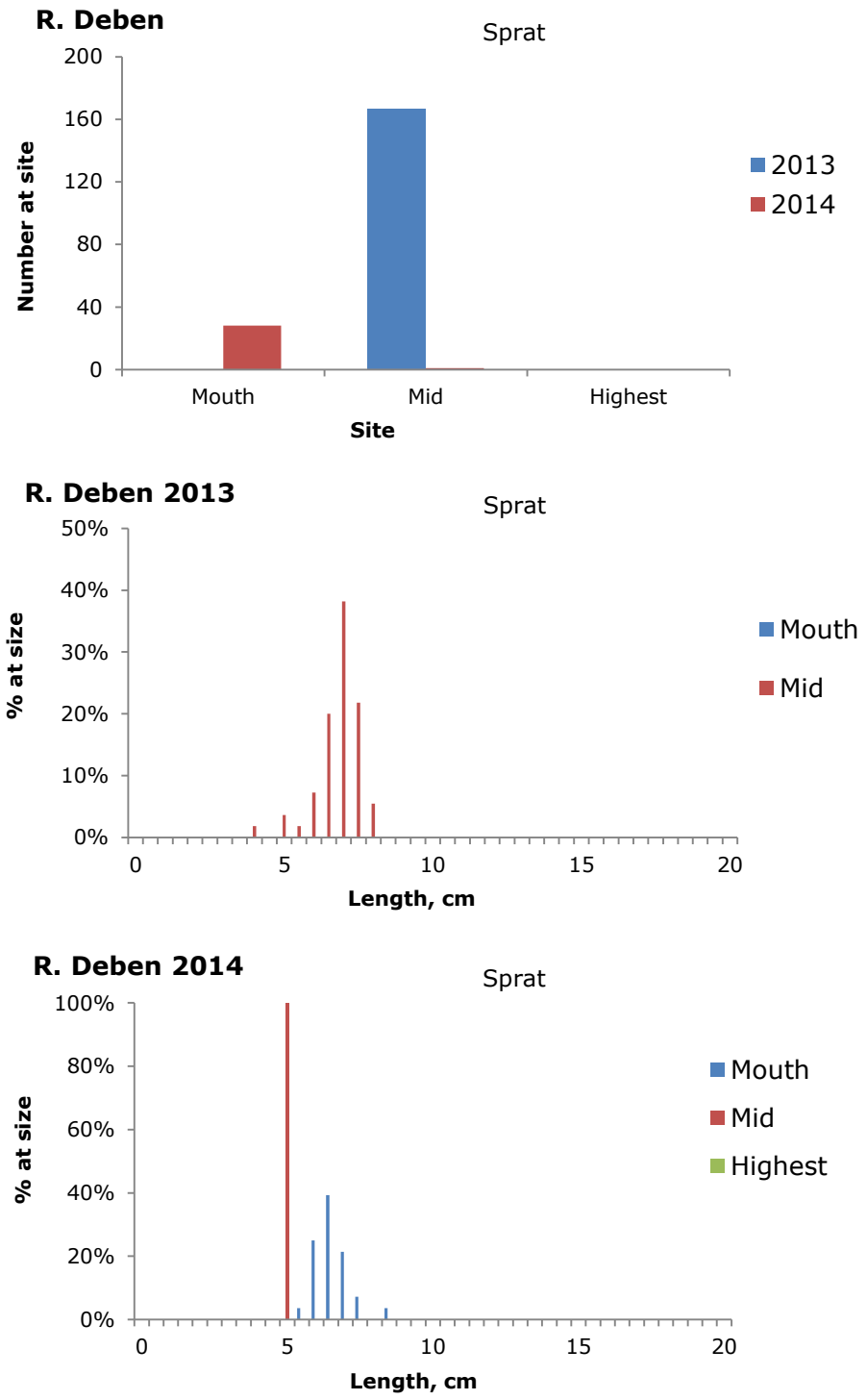

Figure 2 Comparisons between numbers of Sprat captured at each station (top graph) and length profile (lower two graphs) for 2013 & 2014

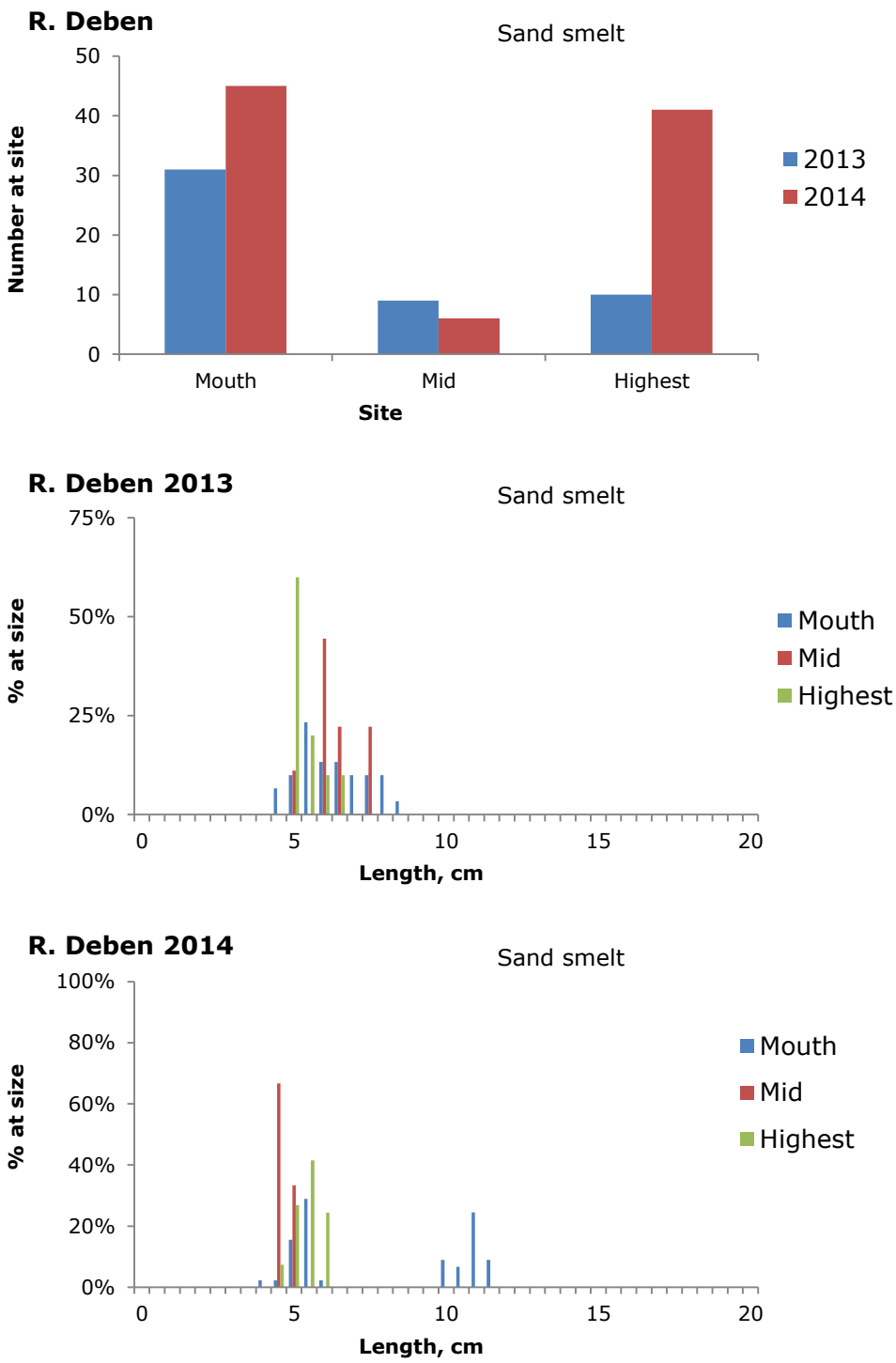

Figure 3 Comparisons between numbers of Sand Smelt captured at each station (top graph) and length profile (lower two graphs) for 2013 & 2014

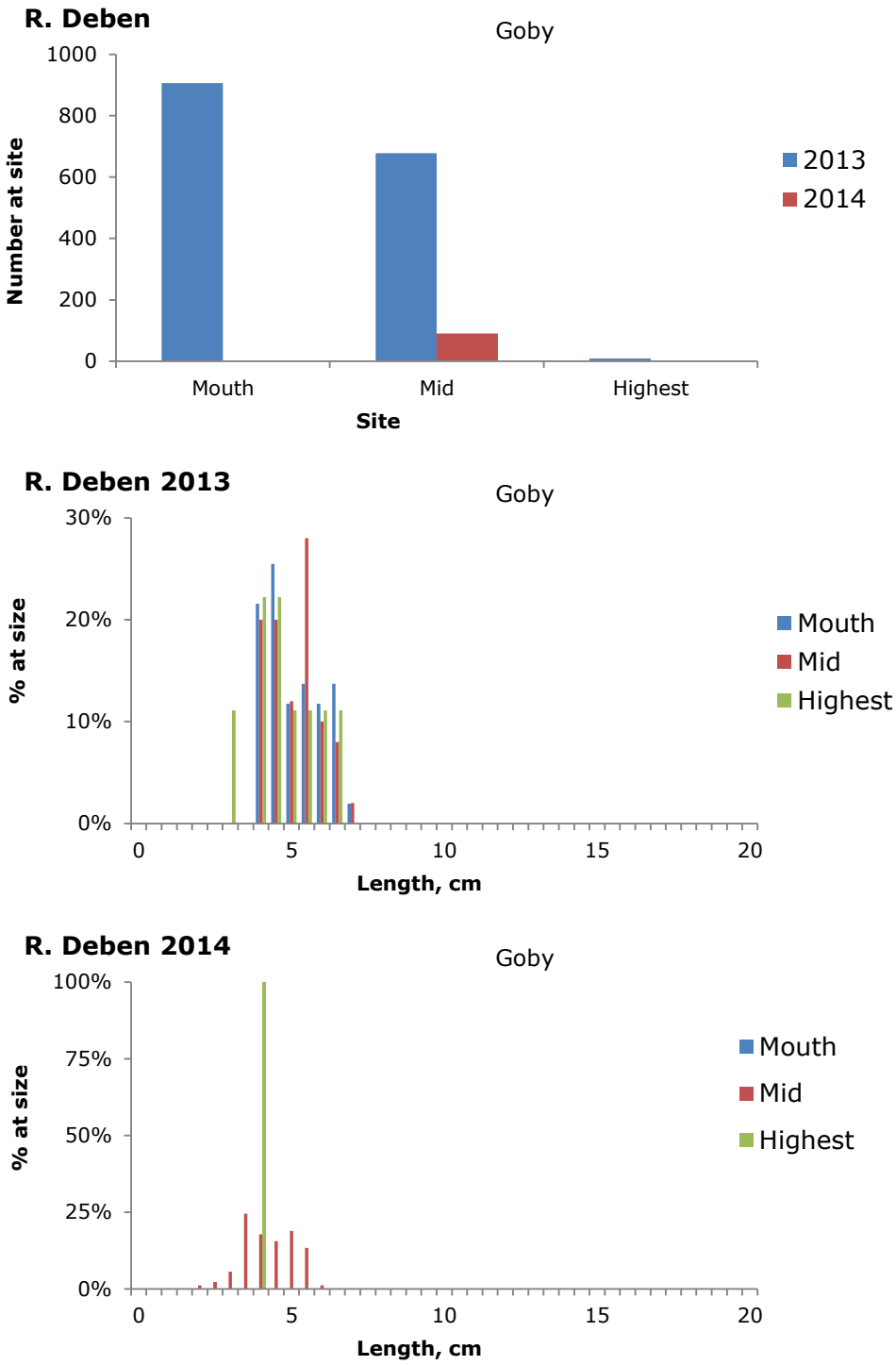

Figure 4 Comparisons between numbers of Goby (*Pomatoschistus sp*) captured at each station (top graph) and length profile (lower two graphs) for 2013 & 2014

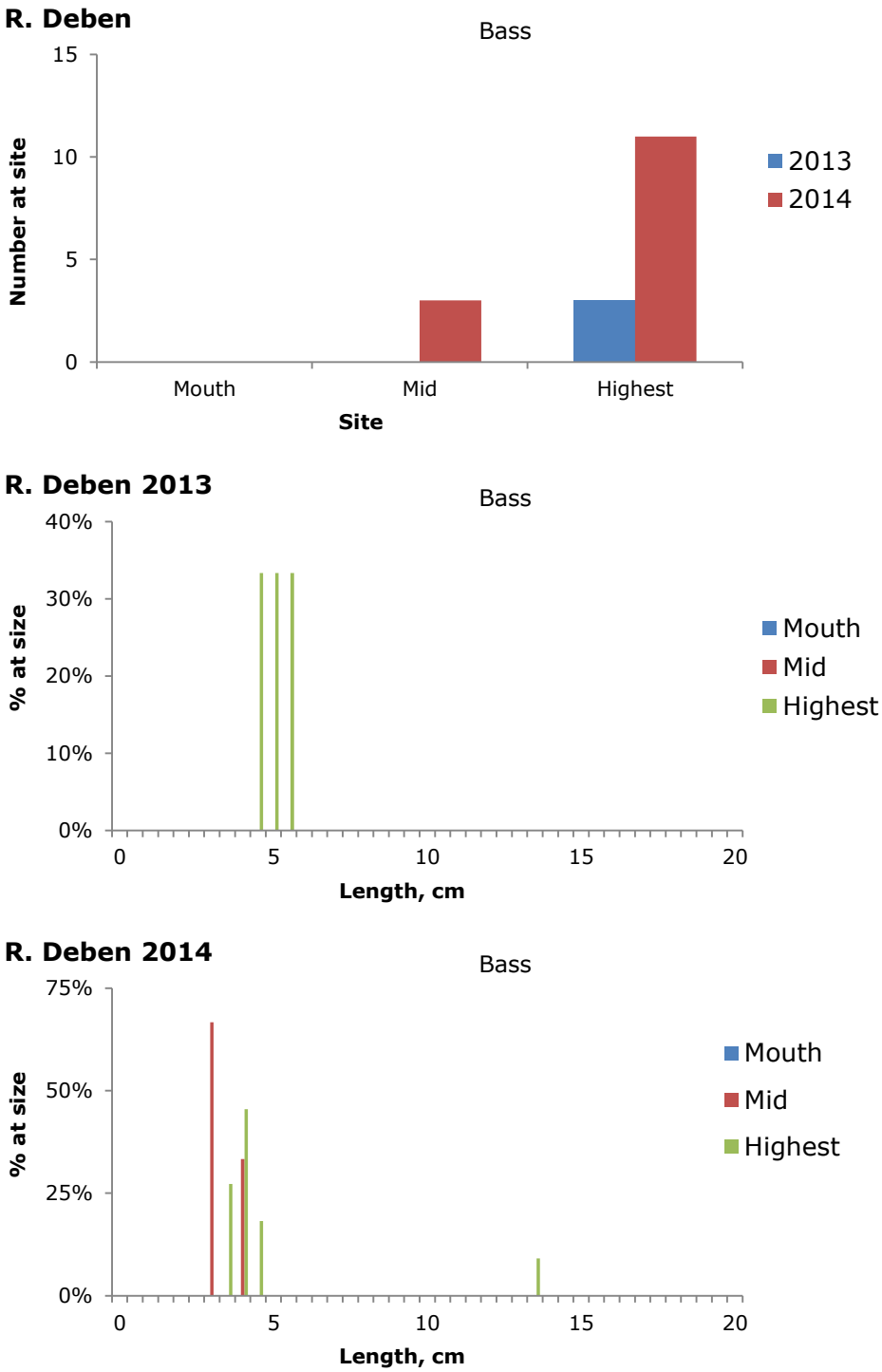

Figure 5 Comparisons between numbers of Bass captured at each station (top graph) and length profile (lower two graphs) for 2013 & 2014

Discussion

Initial observation suggests that the following conclusions may reasonably be drawn from this data –

- There is detectable growth in fish between July (sampled in 2014) and October (sampled in 2013). Whilst this is of course to be expected, it does validate the capture and measuring techniques, as the results correspond with what would be anticipated.
- For some species (Sand Smelt and Bass) it may now be possible to detect two year classes, or spawning cohorts, rather than the one as shown in October 2013 results.
- The distribution – in terms of location within the profile along the estuary – for species has been broadly similar on each sampling occasion.
- This data suggests that Sand Smelt use much of the estuary as juveniles, but tend to be in the vicinity of the lower estuary as they approach adult size.
- Goby (*Pomatoschistus sp*) were found in abundance at the salt marsh edge specific site of the "Mouth" station in 2013, but not at all off the shingle beach specific site of the "Mouth" station in 2014. This accords with what is known of the distribution of this species.
- There are differences in numbers of fish captured between the two surveys. More sprats and gobies (*Pomatoschistus sp*) were caught in October 2013, and more bass and sand smelt in July 2014.
- Sprats are nomadic, and it can be expected that their abundance will vary year to year.
- Gobies (*Pomatoschistus sp*) were much more abundant in 2013 than in 2014. The overall reduction in numbers can be partially explained by the change in the specific location of the survey site at "Mouth" (see above). It may also be that at this time of year most gobies are so small that they simply pass through the meshes of the sample net.
- The number of small bass captured is encouraging. Warm summers such as 2014 are beneficial for bass stocks, but a cold winter could very easily wipe out any increased population of small bass.

Other points of interest –

- It will be useful to incorporate the site identified in July 2014 "Shingle Beach opposite Felixstowe Ferry" into further surveys as a replacement for the site "Bawdsey Manor saltmarsh edge". The "Shingle" site adds an additional habitat, and is accessible at any stage of the tide. It may also be of interest that the "Shingle" site would be a very good one at which to video the activity. (if it is desired to do this, there would be a need for an additional person specifically to operate the video camera).

Appendix 1. Results of R. Deben Fish Survey July 2014

Date	21-Jul-14	21-Jul-14
Time (BST)	14:30	14:30
Location	River Deben	River Deben
Site	Shingle Beach opposite Felixstowe Ferry	
Lat, N	51.989	51.989
Long, E	1.394	1.394
Wind direction	SW	SW
Wind force	3	3
Sea state	0 - 1	0 - 1
Seabed	Shingle	Shingle
Notes	Steep shingle beach giving onto deep water	
Species	Sprat	Sand smelt
Binomial	*Sprattus sprattus*	*Atherina presbyter*
Total No.	28	45
Length, cm		
0		
0.5		
1		
1.5		
2		
2.5		
3		
3.5		
4		1
4.5		1
5		7
5.5	1	13
6	7	1
6.5	11	
7	6	
7.5	2	
8		
8.5	1	
9		
9.5		
10		4
10.5		3
11		11
11.5		4
12		
12.5		
13		
13.5		
14		
14.5		
15		

In addition to these, one Grey Mullet (*Mugil cephalus*) at 54.5 cm and one Three spined stickleback (*Gasterosteus aculeatus*) at 3.0 cm were recorded

Date	21-Jul-14	21-Jul-14	21-Jul-14
Time (BST)	13:15	13:15	13:15
Location	River Deben	River Deben	River Deben
Site	Ramsholt Arms		
Lat, N	52.023	52.023	52.023
Long, E	1.361	1.361	1.361
Wind direction	SW	SW	SW
Wind force	3	3	3
Sea state	0 - 1	0 - 1	0 - 1
Seabed	Muddy	Muddy	Muddy
Notes	Soft mud - getting softer as go further down the shore		
Species	Bass	Goby	Sand smelt
Binomial	*Dicentrarchus labrax*	*Pomatoschistus sp.*	*Atherina presbyter*
Total No.	3	90	6
Length, cm			
0			
0.5			
1			
1.5			
2		1	
2.5		2	
3	2	5	
3.5		22	
4	1	16	
4.5		14	4
5		17	2
5.5		12	
6		1	
6.5			
7			
7.5			
8			
8.5			
9			
9.5			
10			

In addition to these, one Sprat (*Sprattus sprattus*) at 5.0 cm and one Brill (*Scophthalmus rhombus*) at 2.5 cm were recorded

Date	21-Jul-14	21-Jul-14
Time (BST)	11:00	11:00
Location	River Deben	River Deben
Site	Opposite Waldringfield Golf Course	
Lat, N	52.068	52.068
Long, E	1.331	1.331
Wind direction	SW	SW
Wind force	3	3
Sea state	0 - 1	0 - 1
Seabed	Muddy	Muddy
Notes	Mud with some gravel	
Species	Bass	Sand smelt
Binomial	*Dicentrarchus labrax*	*Atherina presbyter*
Total No	11	41
Length, cm		
0		
0.5		
1		
1.5		
2		
2.5		
3		
3.5	3	
4	5	
4.5	2	3
5		11
5.5		17
6		10
6.5		
7		
7.5		
8		
8.5		
9		
9.5		
10		
10.5		
11		
11.5		
12		
12.5		
13		
13.5	1	
14		
14.5		
15		

In addition to these, one Goby (*Pomatoschistus sp.)* at 4.0 cm was recorded