Angling Trust Dossier on Inshore Netting Reform

Inshore Netting and Estuarine Protection - A New Approach to Inshore Fisheries for the 21st Century

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2. EXECUTIVE SUMMARY

This dossier details the dramatic increase in the impact of netting on inshore fish stocks and recreational angling as a result of the introduction of cheap, monofilament nets, and makes recommendations for modernisation of the out-dated, complex and poorly-enforced legislation regulating the use of nets in home waters. The current review of byelaws by the Inshore Fishery and Conservation Authorities (IFCAs) presents an ideal opportunity to reform these regulations.

The Problem

- Many inshore and migratory fish stocks have suffered severe declines since the proliferation of monofilament nets. More than 70 percent of sea anglers surveyed stated that the biggest factor stopping them going fishing was poor fish stocks. Sea angling activity results in a total overall spend of over £2bn to the English economy. Reform of netting regulations should result in better management of inshore fisheries based on the social, economic and environmental criteria of interested stakeholders.

- Inshore netting depletes threatened stocks of salmon and sea trout returning to rivers to spawn and contributes to poor marine survival, which is the biggest factor affecting stocks of these highly prized game fish that support thousands of rural businesses.

- Lost monofilament nets can continue catching and killing fish, seabirds and marine mammals for many years – so called 'ghost nets'.

- A great deal of netting activity takes place in areas that are used by fish for spawning or migration, or in juvenile nursery areas. This has a much greater impact on fish stocks than more selective (i.e. rod and line) fishing methods.

- The UK's complex and piecemeal mix of controls on the use of nets reflects both the local nature of inshore fisheries management and the varying degrees to which individual regulators and interests across England have interacted over past decades.

- Since the introduction of monofilament nets in the 1970s, the efficiency, availability, ease of use, low cost and versatility has seen their use explode over the decades and there are now unprecedented amounts of monofilament netting – both legal and illegal – deployed around the inshore waters and estuaries of the UK.

- The regulations covering netting are outdated, undermined by loopholes and exemptions and no longer fit for purpose leading to problems with meaningful enforcement and conservation objectives being compromised.

- As well as being used by registered, licensed vessels, monofilament nets are often used both illegally and legally by unlicensed, unregistered, fishermen. This creates a very significant problem for enforcement as well as contributing to the problem of IUU fishing.

- Control, monitoring and enforcement of monofilament net fisheries requires significant improvements in order to combat illegal fishing and assess the real impacts of licensed, or unlicensed, legal fishing.

- Various legal issues have presented challenges in implementing and enforcing netting regulations since the introduction of the Marine & Coastal Access Act and the formation of the Inshore Fishery and Conservation Authorities.

The Solution

- The current byelaw review process being carried out by the Inshore Fisheries and Conservation Authorities (IFCAs) provides an important opportunity to take a major step forward reviewing the regulations governing the use of monofilament nets around the coast. This could lead to sustainable and inclusive inshore fisheries management in English waters.

- The regulation and extensive use of enmeshing nets should be reviewed. The proliferation of these since the early 1980s has undoubtedly meant that some species and some areas are now subject to significantly higher fishing pressure. Many of these areas and species are of great interest to Recreational Sea Angling (RSA).

- The grey areas between commercial/non-commercial and licensed/unlicensed fishing need to be removed. All those catching fish for sale should be licensed.

- Net-free zones should be designated to prevent overfishing in localised areas of sensitivity for specific stocks and species – such as estuaries, which act as nursery grounds and migration routes for a number of threatened and protected species.

- Spawning, aggregating and migrating stocks should be protected from netting through temporal or spatial closures.

- The Marine and Coastal Access Act should be reviewed to ensure that local fisheries management and enforcement authorities have the powers to introduce and enforce regulations around the coast for both marine and migratory species.

The Benefits

- The vast majority of netting controls developed to date have been directed at the management of commercial fishing. Some measures have been focused on conservation, but the benefits to RSA have been totally incidental. The current review of IFCA byelaws provides a fundamental opportunity to re-evaluate all of the extant measures and look again in detail at all the impacts incurred and social, economic and environmental benefits provided, intended or otherwise.

- Reviewing and streamlining netting regulations could make control, monitoring and enforcement more efficient and more effective.

- Better control, monitoring and enforcement would mean management decisions could be more evidence-based and implemented more effectively.

- Juvenile and spawning stocks could be afforded better protection allowing them to complete their lifecycles, which would be of benefit to commercial fishermen, RSA and the environment alike.

- Conflict resolution would be one key aim of more sustainable management solutions. There are extant examples of spatial zoning to reduce potting and netting conflicts. Further development of such dialogues should include all commercial and RSA interests.

- Protection of estuaries as recreational angling-only areas would provide a chance to connect with nature and to carry out a healthy, sustainable pastime for millions of people near to where they live; many towns and cities are located adjacent to estuaries.

3. BACKGROUND

Time and time again, when sea anglers are asked what is most damaging to inshore fish stocks the reply is inshore netting. There are now unprecedented amounts of monofilament netting – both legal and illegal – deployed around our inshore waters and estuaries. Bass stocks around Europe have reached their lowest ever recorded levels and many other species of interest to recreational anglers have shown marked declines in average size and abundance since the proliferation of monofilament netting. The regulations covering netting are outdated, undermined by loopholes and no longer fit for purpose. In this dossier we make the case for reform on both economic and conservation grounds.

Netting takes many forms and isn't just one activity – as we have set out below. However, for the purposes of this report, it refers to the use of static (fixed) and drift enmeshing and encircling nets for the capture of marine and migratory fish species at sea and in estuarine or transitional waters.

These netting types, which continue to develop in their technology, can be devastatingly efficient at catching fish and are relatively cheap and easy to deploy and use from small boats and from the shore. As a result, they are predominantly used by the inshore under 10 metre fleet where they often come into conflict with anglers fishing from boats and even from the shore when nets are set, sometimes, within yards of the shore.

The low cost of monofilament gill netting allows fishermen to have within their armoury a range of nets suitable for any opportunity that arises, ready to put aboard and use at short notice. The nature of the modern fishing fleet is one that is geared to respond to wherever the opportunity to earn money arises. Even relatively small 10 to 12 metre boats can carry large amounts of gear, enabling substantial instantaneous effort and catches. The catching power of these nets is well recognised and has resulted in the Manacles and the Runnel Stone byelaws effectively prohibiting the use of nets to catch bass from these areas.

Today almost all fisheries are predominately using monofilament gill/tangle nets; wreck netting for pollack, coal fish, ling and cod; tangle netting for rays, turbot, brill; inshore gill netting for bass, mullet and wrasse; sole netting for plaice and flounder or the red mullet fishery which utilises very small meshes and consequently results in a very high by-catch of immature, non-target, species.

As the use of this gear has reduced the number of fish on any given area of ground, the natural reaction by fishermen attempting to maintain catches is simply to increase the amount of gear being used, which only increases the speed of the downward spiral of over-fishing.

4. HISTORICAL PERSPECTIVE AND TECHNOLOGICAL DEVELOPMENTS

Prior to the 1950s netting materials were made of natural fibres such as cotton and hemp. These materials required considerable maintenance due to the potential to rot and were constructed of relatively coarse, highly visible twine.

The development of synthetic multi-filament nylon netting in a variety of twine thicknesses resulted in netting that was cheaper, easier to handle, and which required little or minimal maintenance. In addition, synthetic twine nets generally caught more fish than natural fibre nets (used in comparable situations) and as a consequence of all these benefits there was a considerable escalation in the use of such nets.

By the mid-1970s netting materials changed again with the arrival of monofilament and multi-monofilament netting. This new material had enormous advantages over the multi-filament netting. It was cheaper, considerably less visible, and lighter (especially after soaking). New opportunities for catching fish became available such as setting gear on ground previously regarded as too rough. This meant that areas that had previously been effectively natural 'no take zones', such as wrecks, rocky outcrops and shallow sand banks, which all attract fish, became heavily targeted. The possibilities of the netting becoming snagged were outweighed by the cheapness of the gear. New and often inexperienced or part time fishermen were attracted to the gill net fishery. The lightness of the gear even when being hauled wet allowed for far longer lengths of netting to be worked by small vessels.

As the use of monofilament and multi-mono netting exploded, experience led to the improvements of setting ratios (the length of sheet netting set into a given head and foot line length) to maximise efficiency – nets could be set to be very selective or as entanglement nets, which are very unselective. Optimal twine thicknesses were also discovered to improve efficiency still further. Alongside this development, special hydraulic haulers were developed specifically for gill netting to improve the rate at which gear could be retrieved, especially from deeper water and during periods of larger tides that have historically been regarded as unworkable. The new material creates less resistance against the tide and therefore stands perpendicular to the sea bed over the slack water period for a longer time thus yet again increasing the catching efficiency.

5. THE CASE FOR REFORM

Inshore netting in sensitive nursery areas and estuarine environments runs the risk of severely depleting marine fish stocks.

A collapse in inshore fish stocks would be disastrous for recreational sea angling, and the declines we have already seen are having an impact on rates of participation. Defra's own Sea Angling 2012 report [2] shows there are 884,000 sea anglers in England who directly pump £1.23 billion p.a. into the economy and upon which 10,400 full time jobs are dependent. If induced and indirect impacts are taken into account, these figures soar to £2.1 billion and 23,600 jobs. The 6,000 commercial fishermen remaining in England land £160 million worth of fish [all species], 80 per cent of which are of no interest to anglers. The remaining 20 per cent, or £32 million worth of fish, comprises the same fishery resources upon which the £1.23 billion sea angling industry is dependent and includes £5 million worth of commercially-landed sea bass. The latest advice from the International Council for the Exploration of the Seas (ICES) is for a complete moratorium on harvesting sea bass, after years of their advice for more stringent conservation measures being ignored by politicians and regulators. Conservation measures to control netting of fish within the inshore area that is targeted by the RSA sector would lead to increased participation by anglers, which would generate more revenue for tackle shops, charter boat skippers and coastal communities.

There is no doubting the economic case for granting greater protection for inshore fisheries that are accessible to sea anglers. There is an altogether different and equally powerful environmental case for doing the same.

The regulations governing inshore netting are outdated and confused and lead to problems with meaningful enforcement. As a result, conservation objectives are compromised. For example, as well as being used by registered, licensed commercial fishermen, the ease of use of monofilament nets also means they are used both illegally and legally by unlicensed, unregistered fishermen either catching fish for personal consumption, selling these fish illegally or selling them legally through a loophole in the regulations that exists in the UK.

For this reason, enforcement of regulations around the use of nets has been notoriously difficult to achieve. Review of the impact of netting and the rules governing its use in the inshore waters of England is therefore overdue in order that:

1) Fish stocks can be managed sustainably

2) The grey areas between commercial/non-commercial and licensed/unlicensed fishing are removed

3) The value of recreational sea angling as an equal stakeholder in our commonly-owned fish stocks can be better integrated into inshore fisheries management

4) Enforcement can be simplified for the decreasing resources of the IFCAs.

Simplifying and streamlining enforcement would achieve multiple benefits for regulators, commercial fishermen, recreational anglers and most importantly, fish stocks. Areas of conflict could be reduced by ensuring illegal and semi-legal fishing, which destroy the fish stocks upon which angling relies and undermines the business opportunities of genuine licensed fishermen, is addressed through reforming rules on netting.

6. NET DESIGN AND USE

Although relatively simple in basic design, enmeshing nets can be rigged and used in a variety of different ways in order to modify their performance. This gives rise to a number of terms for types of nets, dependent on both design and usage.

Sheet netting

Sheet netting can be made of a variety of yarn types. In recent years synthetic fibres have dominated. A number of monofilaments may also be used to form the twine, giving rise to 'mono-ply' usually made of around three monofilaments, and 'multi-strand monofilament' or 'multi-mono' when a larger number of monofilaments is used. Key features of twines that affect performance of enmeshing nets include: transparency, colour, strength, stretch, suppleness and texture (in terms of number and looseness of fibres and their ability to cling to rough surfaces).

Sheet netting is usually specified in terms of mesh size, which can be defined as 'knot to knot' (distance between consecutive knots), 'mesh circumference' (perimeter of each mesh), or most commonly 'stretched mesh' (distance between knots on opposite sides of the mesh when fully pulled apart).

Sheet netting is 'rigged' by attaching it to head and foot ropes according to a hanging ratio, which determines the shape of the diamonds formed by each mesh, the length of the final net resulting from a given length of sheet netting and the amount of slack in the net. The hanging ratio and slackness of the net will influence its ability to enmesh and entangle fish and may also influence its visibility.

The simplest form of enmeshing net often referred to as a gill net consists of a single wall of netting attached to a leaded foot rope and buoyant head rope, such that the net hangs/stands vertically in the water column in slack water.

Gillnets

Gillnets, set correctly, are size selective; the probability of capture of a fish that contacts the net is largely dependent on the fish's size. Fish with maximum girth less than the mesh circumference will be able to swim through the net, while large fish may not be able to get their heads sufficiently into the mesh to become wedged and may escape. However, gill nets may also catch some fish by 'snagging' onto irregular body protuberances such as the lips or spines.

This basic design of net may be modified in a number of ways:

1. 1. One or two additional sheets of large meshed net ('armouring' or 'trencher meshes') may be hung on one or both sides of the smaller meshed net to form a trammel net. Trammel nets have a higher efficiency of capture for larger fish than standard gill nets.
2. Tangle nets are slack set gill nets, which aim to entangle as well as enmesh fish.
3. Drifted nets dispense with the anchor although, dependent on tidal conditions, some bottom drifted nets may still use weights on the buoy rope to maintain close contact with the seabed.

Fixed nets are stationary relative to the seabed and fish encounter them either by actively swimming into them, or they may be brought into proximity by drifting with the current. Drift nets by contrast move with the current and will catch fish which are holding station relative to the seabed.

There are a number of advantages of using enmeshing nets over trawls: they can be worked from smaller and less powerful vessels (which reduces fuel consumption and suits the profile of the UK inshore fleet); they can be set on or over rough ground where trawling may not be possible; and they can be more selective in the size of fish captured.

Encircling nets

Seines are the classical encircling nets. Beach seines are set by using a small boat to pay out a long barrier of net from one point on the beach to form a loop around fish close to the shore. Returning to another point on the beach, the net is then hauled in from the shore. Seines typically consist of relatively small meshes and thick, sometimes braided, twine and are not intended to enmesh or entangle the fish.

Enmeshing and entangling nets can also be used in the method of a beach seine, which complicates gear definition. Floating enmeshing nets may also be used to encircle schools of fish, thereby increasing the likelihood of fish contacting the net and enmeshing. This is known as 'ring netting'. A similar approach known locally as 'splashing' consists of setting drifted surface gill nets close to the shore so that they largely enclose a small cove or bay, then making a disturbance inside the enclosure, by splashing the water or rapidly circling at high speed, to drive fish into the net.

7. REGULATIONS GOVERNING THE USE OF NETS

Legal status – a complex picture

The fixed netting regulations originally introduced under the Salmon Act, 1986 (as amended under the 2009 Marine and Coastal Access Act) and additional fixed and drift netting restrictions intended to protect salmonids also provide some protection for other sea fish, in particular bass and grey mullet, which frequent inshore areas and estuaries and spend a significant proportion of time relatively high in the water column. However, in areas with no salmonids, which is about half of the English coastline, there are no regulations restricting the use of fixed nets. Regulation of drift nets and encircling nets is generally even less extensive and the use of attended drift nets and ring nets in close proximity to the shore is still permissible in many areas around the coast. In some cases, these fisheries are targeted at bass, and/or deployed in bass nursery areas under the guise of fishing for another species.

Drift nets are usually (and may be required to be) attended and this tends to reduce both the total amount of nets deployed and soak time, and this may improve survival rates for any fish that require release (e.g. salmonids or bass in bass nursery areas), although direct evidence quantifying survival rates is limited. Studies of release success from rod and line fishing for salmonids indicate that survival rates are greatly increased by limiting damage to scales, and gills and keeping the fish out of the water for as little time as possible. These objectives would seem to be difficult to achieve with monofilament netting.

The Cornish *mesh of nets* regulation on the Manacles and Runnel Stone reefs provides protection for a range of species in a small area. The legislation was targeted to protect traditional commercial trolling fisheries for bass in an area where bass abundance is sometimes high, but other finfish species benefiting from the general absence of netting include pollack, red mullet, grey mullet and wrasse. In addition to bass, several of these are important RSA target species and this legislation does therefore provide highly localised protection for, and benefit to, recreational sea angling. It therefore provides a good case study that could be employed in thousands of other locations around the coast, with great economic, social, and environmental benefits.

Unlicensed to Kill – The UK anomaly

It is legal to fish 'recreationally' with nets and legal to sell fish caught with nets without a license from the shore and unpowered vessels.

In many areas around the UK there is nothing stopping the use of nets for 'recreational' use – fish that are not sold but for personal consumption. In addition, fish can be legally sold without a license if they were caught in nets set from the shore or from unpowered vessels where no license is currently available. However, these sales cannot be made through the registered Buyers and Sellers Scheme[3] and there is no way for them to be recorded. This undermines effective fisheries management and is potentially contributing significantly to many tonnes of unrecorded catches of threatened stocks such as bass. The provision of licenses for these fisheries would legitimise them and allow sales to be recorded – thereby increasing the accuracy of data on which fishing opportunities are allocated, and enabling regulation to protect stocks for conservation or the benefit of RSA.

The 30kg exemption for private consumption.

In addition, existing legislation (Registration of Buyers & Sellers scheme) allows individual transactions of fish of up to 30kg to go unrecorded, providing these sales are for "private use". The extent of unrecorded landings from the net fisheries exploiting this opportunity remains unknown but is estimated to be contributing significantly to overall fishing mortality in some fisheries – particularly bass, where the profile of the fishery lends itself to low volume, high margin sales.

In the UK, nets used by small scale under 10-metre fishing vessels are often perceived as being low impact. However, the cumulative fishing effort from these fisheries is often very much more significant at a national scale than it is given credit for, as well as having a major impact on local inshore fish stocks.

Summary of spatial controls relating to fixed nets

Under the historic arrangements (as modified by the changes brought under the 2009 Act [1]), fixed netting is supposed to be prohibited all year round in most estuaries, unless specifically licensed/authorised by the EA for taking salmon, sea trout or eels. In shallow inshore waters (out to 1 nm in Devon and Cornwall), unless the headline lies at a minimum depth (usually 3 m or more) below the sea surface at all stages of the tide, fixed netting is prohibited. This legislation implemented for the protection of salmonids, provides, as an incidental by-product, very limited protection for sea fish in close-to-shore waters of approximately 7 m depth or less. However, it is poorly-enforced and the technical specifics prohibit anglers and other concerned parties being able to report transgressions.

Areas where fixed netting is constrained include the English North Sea coastline North of the Humber, the Sussex coast, the South coasts of Devon and most of the South Cornwall coast East of the Lizard, parts of the North coasts of Devon and Cornwall and parts of the Cumbrian coastline. In all, only around half of the English coastline currently has regulations restricting the use of fixed nets close to shore. The other half of the coastline, where fixed netting is authorised without restriction, is in Lincolnshire and East Anglia, and along parts of the Dorset, Cornwall and Lancashire coasts.

Summary of spatial controls relating to drift nets and/or encircling nets

Spatial controls relating to drift nets are numerous and diverse, because they have predominantly been introduced locally through byelaws rather than with an over-arching legislative base such as the Salmon Act (1986) as was the case with fixed nets prior to the Marine and Coastal Access Act (2009). However, their geographic distribution suggests that the main driver for many of these regulations has been the protection of salmonids.

In Northumberland, prohibitions apply to purse seines and ring nets, while in the North Eastern IFCA district Danish seines are prohibited and in Cornish IFCA waters the use of encircling nets is restricted to vessels below a certain size. There is provision for local short-term prohibition of fixed and drift netting in St Ives Bay in response to seabird kills. Devon has prohibitions for nets in general in a number of estuaries, for trammel nets in particular in a wider range of estuaries and prohibition of netting and trawling in the Lundy area. In the North West, the legislation focuses on seasonal prohibitions of seine and drift nets. North Western IFCA prohibits mobile nets other than trawls, but including drift and seine nets in a series of estuaries from May to November, unless licensed for salmonid fishing by the EA in the former North western SFC district, and prohibits drift and beach seine nets in four defined areas from December to March in the former Cumbria SFC district. Kent & Essex IFCA has legislation relating to drift net fisheries for herring.

However, enforcement of the regulations has always proved to be a challenge and will continue to be so as IFCA resources become increasingly stretched over coming years.

In addition, the status of both legal and illegal unlicensed netting continues to muddy the water as far as regulation goes and this must be addressed if we are to move towards an effective regime of fisheries management and control.

8. CONSERVATION COMPROMISED

The effectiveness of meshing nets relies on fish trying to pass through the netting. If they see the netting or become aware of vibrations of netting (a common problem with pre-monofilament nets) the fish will turn and circumnavigate the net. Gill netting with the old multi-filament nylon nets was found to be most effective at night but the almost invisible mono netting, especially in coloured water, effectively doubles the period during which the netting will effectively catch fish; this has caused conflict with conservationists because the invisibility of the gear also leads to an increased by-catch of diving birds and marine mammals.

Development of multi-sheet trammel drift net bass fishery

The development of mid-water, multi-sheet trammel netting is a technological development in net fishing that has proved to be devastatingly efficient at catching some species – particularly for bass in the Southern North Sea where the practice targets larger, spawning adult bass. Catches of bass from East Anglia increased dramatically in recent years – not because of an increased abundance of bass but because of the development and deployment of this new fishing method targeting previously unfished cohorts of fish. Fisheries officers from East Anglia have reported huge numbers of bass being caught between 8lb-12lb[1]. Given the state of bass stocks across the EU it is critical that the impact of mid-water trammel netting on spawning and adult bass stocks is recognised as a serious contributing factor to the depletion of bass stocks at both an EU and local level.

The Lyme Bay closure [4]

In 2008, 60 km^2 of Lyme Bay were closed to scallop dredging and bottom trawling in order to protect the rich reef habitats found on this part of the South Coast. The area was subsequently designated as a Special area of Conservation (SAC). Whilst the ban has protected the seabed features and habitats from these highly destructive fishing methods, an unintended consequence has been a near doubling of the use of static gear, pots and nets, which has led to fish stocks within the area being fished at unsustainably high levels. The Lyme Bay Fisheries & Conservation project was set up to address this and the Lyme Bay Working Group aims to manage the area properly through a memorandum of understanding and voluntary codes which will benefit, the environment, fisheries and coastal communities in the area. Addressing the regulations surrounding the use of monofilament fixed and drift nets would avoid the scenario occurring again along other areas of the coast.

Bass Nursery Areas

Thirty-seven areas where fishing for bass is restricted (bass nursery areas) were implemented in the 1990s in order to protect bass in areas where a high proportion of the population is below the size limit and they are particularly vulnerable to exploitation. This legislation prohibits fishing for bass from a boat, with seasonal variations and additional restrictions on using sand eels for bait. However, netting still takes place in some bass nursery areas, generally with the stated aim of fishing for grey mullet, and it is widely-known that catches of bass are illegally retained. Spatial controls on netting in bass nursery areas would complement the existing legislation in protecting bass and facilitate more effective enforcement. Such measures would also provide additional protection for other estuarine species such as migratory salmonids, grey mullet and local populations of gilthead bream in South West England. Additional protection from netting for grey mullet and other species of sea fish would represent a small cost to the commercial sector, but it would provide a much higher socio-economic return to local coastal communities where recreational angling is important, as well as result in improved stocks of bass of larger and more valuable sizes for the benefit of recreational anglers and commercial fishermen alike. Defra is currently reviewing the Bass Nursery Area legislation with a view to strengthening and extending the regulations in light of the decline in UK and EU bass stocks.

The Sennen Cove mullet beach seine netting

Photograph by Phil Monkton: The Cornishman, 11 March 2015.

Conservation concerns and conflict [5] exist around practices such as the beach seine netting for pre-spawning aggregating grey mullet in South Western Cornwall. Many tonnes of spawning fish can be caught in a single haul of the nets. Anglers maintain that grey mullet, a high value recreational species, should not be netted during its spawning phase and that this practice is unsustainable.

Cornwall seabird kills in 2012

Gillnet by-catch has been described at the "sleeping giant of seabird threats", with a global estimate of at least 400,000 birds killed each year in gillnet fisheries [6]. Monofilament gillnets are virtually invisible to diving seabirds, which become entangled and drown whilst fishing. In 2012 two incidents were reported [7] where hundreds of birds drowned in nets set to catch bass in St Ives Bay, Cornwall. These incidents resulted in a three-week fishing exclusion zone for gill nets being imposed in the bay, backed by fines of up to £50,000. Many more such incidents continue to go unreported. But seabirds are not the only victims; gillnets also pose a major by-catch threat to dolphins, whales, seals and turtles.

The selectivity myth – exploding the myth that gill nets are always selective

The most regularly promoted argument for gill nets is that of selectivity. A given mesh size (providing the setting ratio is not over slack) will catch and retain a fairly narrow band size of fish. Fish with maximum girth less than the mesh circumference will be able to swim through the net, while large fish may not be able to get their heads sufficiently into the mesh to become wedged and may escape. Elasticity of the netting yarn and compressibility of fish bodies may mean that even fish with a girth slightly larger than the mesh circumference may be able to squeeze through and escape (Potter & Pawson, 1991) [8]. The selectivity graph for gill nets is therefore typically bell shaped with capture likelihood for a given mesh size optimal for a particular fish size and declining for both smaller and larger fish. However, gill nets may also catch some fish by 'snagging' onto irregular body protuberances and this may broaden the range of sizes of fish captured, depending on the species concerned and design features of the net.

It is therefore argued that the selectivity of gill nets is superior to many other forms of fishing that potentially capture small immature fish. However, the high selectivity of gill nets is highly dependent on the hanging ratio. Hanging ratios resulting in slack nets prevent selectivity and effectively become entanglement nets and catch fish of all sizes and all species.

9. ESTUARIES – WHY THEY ARE PARTICULARLY IMPORTANT.

Estuaries are some of the most dynamic and productive ecosystems. The ecosystem services provided by estuaries produce highly significant socio-economic benefits to society. Our growing understanding of these systems now suggests that we need more specialised management and greater protection measures for these uniquely important habitats.

The Marine and Coastal Access Act has tended to treat estuaries as arms of the sea, rather than recognising their truly unique nature. They provide spawning grounds for species of conservation significance such as the smelt and act as nursery grounds for a broad range of economically important marine species such as bass, sole and plaice. In some cases, the scale of estuaries can have strategic regional importance – estuaries and the saltmarshes they support provide the optimal nursery grounds for the early life stages of bass. Wider protection of these areas is crucial to bass recovery. Future national and European bass measures will need to include the provision for greater protection for estuaries.

Furthermore, estuaries are home to valuable recreational species and the recreational angling potential of these environments is huge, particularly in the large recovering urbanised estuaries, which provide an opportunity for people from cities to have contact with and develop an understanding of nature on their doorstep. Although not without their significant dangers, they also provide opportunities for safe and easily-accessible fishing for young people, and those with disabilities.

Estuaries are vital migratory corridors for a range of threatened diadromous species (salmon, sea trout, eel, smelt, shads, lampreys) as well as providing important habitats for over-wintering birds as well as seals, dolphins and porpoises. The intertidal margins of estuaries also provide important benefits in terms of carbon sequestration, nutrient stripping, defence against rising sea levels and climate change.

10. BENEFIT OF REFORM

Why now? – Policy Context

As part of the requirements of the Marine and Coastal Access Act, the ten regional IFCAs managing inshore fisheries out to six miles around the English coast are required to carry out a review of their byelaws. This presents an opportunity to ensure that historic byelaws are brought up to date in order to reflect the requirements of managing fisheries in the 21st century.

Unlike their predecessors the Sea Fisheries Committees, the IFCAs have a requirement to manage sea fisheries resources sustainably and take into account the requirements of all stakeholders, with recreational anglers being the largest single group affected by their decisions.

The Government is currently carrying out a review of bass nursery area legislation in England and Wales and reviewing the byelaws around netting in relation to bass which, particularly given the steep decline in the status of the stock across the EU, should afford greater protection to UK bass stocks.

In addition, there is a legal requirement under the Water Framework Directive to achieve good ecological status in our transitional and coastal (TraC) waters. The focus has shifted to addressing TraC waters through the catchment-based approach, but a national review of netting would provide an invaluable framework to help ensure good ecological status is achieved in TraC waters at a catchment based level.

Illegal, Unrecorded and Unregulated (IUU) fishing is recognised as an international problem that threatens fish stocks and undermines local fishing fleets. At an EU and UK level, IUU fishing – such as the use of nets for legal and 'semi-professional' fishing – may be operating at a scale that is having a very significant impact on important recreational and commercial fish stocks. In addition, the resulting catches and fishing mortality go unrecorded, fatally undermining the ability of scientist and fishery managers to manage stocks sustainably or have accurate knowledge of catches in order to successfully fish at levels achieving maximum sustainable yield – the central pillar of the Common Fisheries Policy.

Following the vote to leave the EU on 23 June 2016, the importance of domestic measures to conserve fish stocks cannot be over-emphasised. Negotiations over quotas and international fishing rights are likely to reduce the fishing opportunities for the UK's fishing industry and may increase pressure on inshore waters. Urgent measures are therefore required to ensure that there are sustainable stocks of fish for commercial fishermen and recreational anglers alike in the decades to come. Such measures can take many years to yield benefits because of the slow recovery of long-lived species such as bass and the need for habitats to recover their productivity after protection.

11. RECOMMENDATIONS

The existing complex mix of netting controls reflects both the local nature of inshore fisheries management and the varying degrees to which different regulators and interests across England have interacted with each other over past decades. The current byelaw review process underway in the newly established IFCAs provides an important opportunity to take a major step forward in sustainable and inclusive inshore fisheries management in English waters. Inshore fisheries management will continue to be driven locally, but needs to be set in a national framework to provide a degree of consistency and to improve understanding and enforcement of regulations. In the wake of the 2009 Act, there is much more evidence than ever before of closer working relationships.

1. **The vast majority of netting controls developed to date have been directed at the management of commercial fishing. Few measures have been focussed on conservation and the benefits to Recreational Sea Anglers (RSA) have been totally incidental. The current review of IFCA byelaws provides a fundamental opportunity to re-evaluate all of the extant measures and look again in detail at all the impacts incurred and benefits provided, intended or otherwise. The test should be: does the measure provide for the best socio-economic use of the resource consistent with sustainable environmental management, in the modern more inclusive setting?**

2. **The regulation and extensive use of enmeshing nets should be reviewed. The proliferation of these since the early 1980s has undoubtedly meant that some species and some areas are now subject to significantly higher fishing pressure than had existed beforehand. Many of these areas and species are of great interest to RSA.**

3. **Estuaries and near-shore shallow waters are important and productive ecosystems, particularly in the intertidal zones. They act as migratory corridors for a very broad range of fish of many size ranges. They also support extremely important marine nursery grounds. For example, the Thames estuary is now regarded as the largest sole nursery on the East coast and the largest new bass nursery in the southern North Sea (M Pawson & G. Pickett, pers. comms.). Sustainable management of these important systems demands a more sensitive approach. The balance of fixed and drift netting controls and trawling restrictions seen in some estuaries today in some parts of Devon, Cornwall, the North West and the Thames has been developed over time to protect migratory salmonids and juvenile marine fish. They can also be regarded as good practice in terms of sustainable fisheries management and WFD compliance. There is merit in applying these kinds of measures to other estuaries and intertidal zones, albeit in a locally focussed manner. This more sensitive management approach needs to apply to the management of all such environments, given the ecosystem services and socio-economic value they provide, not just to those with formal conservation designations.**

4. **Seasonal aggregations of fish should be reflected more openly in management strategies. For many species of interest to both commercial fishermen and RSA, spawning and nursery grounds are known and the timing of use is predictable. Permanent and seasonal closures are important elements in more sustainable management, but these must be based on sound science and inclusive management.**

5. **Sustainable management solutions will include strong commitment from all parties and consequential low enforcement costs. In some environments the close association of all interested parties provides the possibility of consensual voluntary solutions as well as or in place of statutory controls. These can be monitored actively by all concerned, thereby reducing the enforcement burden on limited numbers of staff trained to the necessary level. A number of successful examples of these arrangements exist today as worthwhile models.**

6. **Conflict resolution would be one key aim of more sustainable management solutions. There are extant examples of spatial zonation to reduce potting and netting conflicts that have been successful.**

7. **The bass nursery arrangements should be re-examined. Complementary spatial netting controls may reduce enforcement requirements and provide additional benefits for other species such as grey mullet which are important species for RSA.**

12. NOTES AND REFERENCES

(i) Facts about netting

http://www.seafish.org/geardb/

(ii) References

[1] The Marine and Coastal Access Act (2009 Act) repealed Section 6 of the Salmon and Freshwater Fisheries Act 1975 and section 37 of the Salmon Act, 1986, thus removing the enabling legislation under which the established fixed engine arrangements detailed in Appendix I were based. Equivalent protection for migratory salmonids would have to be provided by amendment of the existing fixed engine byelaws. Defra instructed the EA to undertake a review and make recommendations accordingly, providing a clear steer that the new arrangements should provide an equivalent level of protection for migratory salmonids. Any evolution of those arrangements thought desirable would have to wait for the projected byelaw review processes that the new IFCAs would have to conduct post establishment.

A review of the fixed engine byelaws was undertaken in 2010. Four scenarios were identified. As a result, the SFC fixed engine byelaws were reworded and remade as necessary to provide a similar level of protection. In addition, all SFC byelaws were transferred to the IFCAs before April 2011.

[2]http://webarchive.nationalarchives.gov.uk/20140108121958/http:/www.marinemanagement.org.uk/seaangling/finalreport.htm

[3] https://www.gov.uk/government/publications/buyers-and-sellers-of-first-sale-fish-and-submission-of-sales-notes

[4] http://www.lymebayreserve.co.uk/

[5] http://www.cornishman.co.uk/mullet-catch-sennen-spawns-online-row-fishermen/story-26155131-detail/story.html

[6] Zydelis R, Small C, French G. The incidental catch of seabirds in gillnet fisheries: A global review. *Biological Conservation*. 2013; 162: 76-88.

[7] http://www.thisiscornwall.co.uk/Second-batch-sea-birds-caught-nets/story-14379851-detail/story.html

[8] https://www.cefas.co.uk/publications/lableaflets/lableaflet69.pdf

13. APPENDICES

Case Studies (overseas)

In many of the more highly developed marine fishery management regimes around the world, the need to properly regulate all forms of inshore netting has already been recognised.

USA

Florida Gill Net Ban
This was introduced in 1994 and heralded as a conservation success but has been hotly contested by the commercial sector. A challenge was thrown out in 1997 (see below) but it is now back in the courts. The Florida Gill Net Ban is cited as one of the most successful in terms of realising the economic potential of an improved recreational fishery.

"Florida environmentalists claimed a major victory today when the First District Court of Appeal upheld a rule proposed by the Marine Fisheries Commission ("MFC") that ensures that illegal gill nets cannot be used in Florida waters.

Gill nets are prohibited by article X, section 16, of the Florida Constitution – the net ban amendment. The MFC proposed a rule specifying that gill nets were nets with a mesh size larger than two inches stretched mesh. Three fishermen challenged this proposed rule in December 1996. Earthjustice Legal Defense Fund -- the nation's largest public interest environmental law firm -- intervened in the case on behalf of conservationist groups Florida Wildlife Federation, Florida League of Anglers (the two groups are in the process of merging), and Coastal Conservation Association of Florida on the side of the MFC. An administrative law judge heard the challenge in October 1997 and issued an order upholding the rule in early 1998. Fishermen then appealed the order to First District Court of Appeal."

Australia

New South Wales Recreational Fishing Havens
In the 1990s the New South Wales government began the process of buying out inshore commercial nets in a number of key locations – mainly estuaries and saltwater lakes – and creating a series of recreational fishing havens (RFHs) in net free zones. There are about 15 formal RFHs along the state coast plus a series of marine reserves & zones excluding commercial harvesting. Fish life is good in all these areas and they are highly valued by both anglers and local tourist operators.

Below are three examples of the regulations currently in force:

Pittwater - The whole of the waters of that part of Pittwater, its creeks, tributaries and inlets, enclosed by a line drawn from the western extremity of Barrenjoey Head, to the eastern extremity of West Head, upstream (south) to a line drawn from the western-most extremity of Taylor's Point to the southern-most extremity of Longnose Point.

Species of fish that must not be taken - Any species of fish. Methods of fishing prohibited - Any method involving the use of a meshing net.

Period - The period from January to June (both months inclusive) in each year.

Coila Lake - The whole of the waters of the Coila Lake south of a line drawn from a post on the southern extremity of land portion R.975, in a general westerly direction to a point on the southern shore of the lake being the boundary line between land portions 39 and 43.

Species of fish that must not be taken - Any species of fish.

Methods of fishing prohibited - Any method involving the use of a prawn running net.

Period - All year.

Merimbula Lake - The whole of the waters of Merimbula Lake.

Species of fish that must not be taken - Any species of fish.

Methods of fishing prohibited - Any method involving the use of a net, other than the dip or scoop net (prawns), push or scissors net (prawns), hand-hauled prawn net and landing net.

Period - All year.

There have been a few other total method removal initiatives over the years in NSW which have resulted in dramatic individual species recovery:

- the banning of bottom set gill nets targetting wobbeygongs, which were killing many blue groper (NSW's state fish)
- the banning of floating yellowtail kingfish traps
- the banning of estuary pound nets which targeted yellowfin bream

Queensland net-free zones

Recreational Fishing Groups won a promise from their State politicians to introduce net free zones the new government has moved to declare three net free zones along the coast.

A spokesperson from the Nets Out Qld Campaign said:

"The creation of these new Net Free Zones close to major population and tourist centres was consistent with precedents already set in states such as NSW, Victoria and the Northern Territory. Every industry must constantly be proactive in reforming practices and business models to ensure ongoing social, environmental and economic viability in line with community expectations. The government's Sustainable Fishing Policy is a widely welcomed step on this journey of transformation."

This Policy initiative recognises the huge economic and social benefits derived from recreational fishing and the broader connection with the State's unique marine environment. The policy also recognises the State's role in the Reef 2050 Plan, an essential plan to ensure the health and biodiversity of the Great Barrier Reef including species which interact between inshore and offshore waters. It delivers a way forward to meet government obligations to the environment and the expectations of both recreational fishers and the community.

A $10,000,000 compensation package is to be offered to identified commercial netters who have fished at least one day during the past three years in one or more of the new Net Free Areas.

Victoria Net Bans in Port Phillip Bay

Anglers and Trade bodies worked together to persuade politicians in Victoria to ban netting in the popular Port Phillip Bay snapper fishery near Melbourne. They also have a commitment to achieving a target of 1 million anglers in the state by 2020 and netting restrictions and conservation zones are seen as an important means to this end. See below for local reaction and news.

The Australian Fishing Trade Association (AFTA) has welcomed the actions of Victoria's new government in honouring its election commitment to stop commercial netting in Port Phillip Bay.

"It is clear that the Government recognises the broad ranging benefits of recreational fishing to the Victorian community. Their objective of having 1 million recreational fishers in Victoria by 2020 will increase these benefits significantly. In addition, their plans to establish a statutory authority to manage Victoria's fisheries will ensure genuine and unprecedented representation for Victoria's recreational fishing community, including recreational fishers, the fishing tackle sector and the boating sector.' Said Steve Threlfall, AFTA Director.

The Government's Target One Million plan can be found at: http://www.danielandrews.com.au/wp-content/uploads/2014/11/Labors-Plan-for-One-Million-Recreational-Fishers1.pdf

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