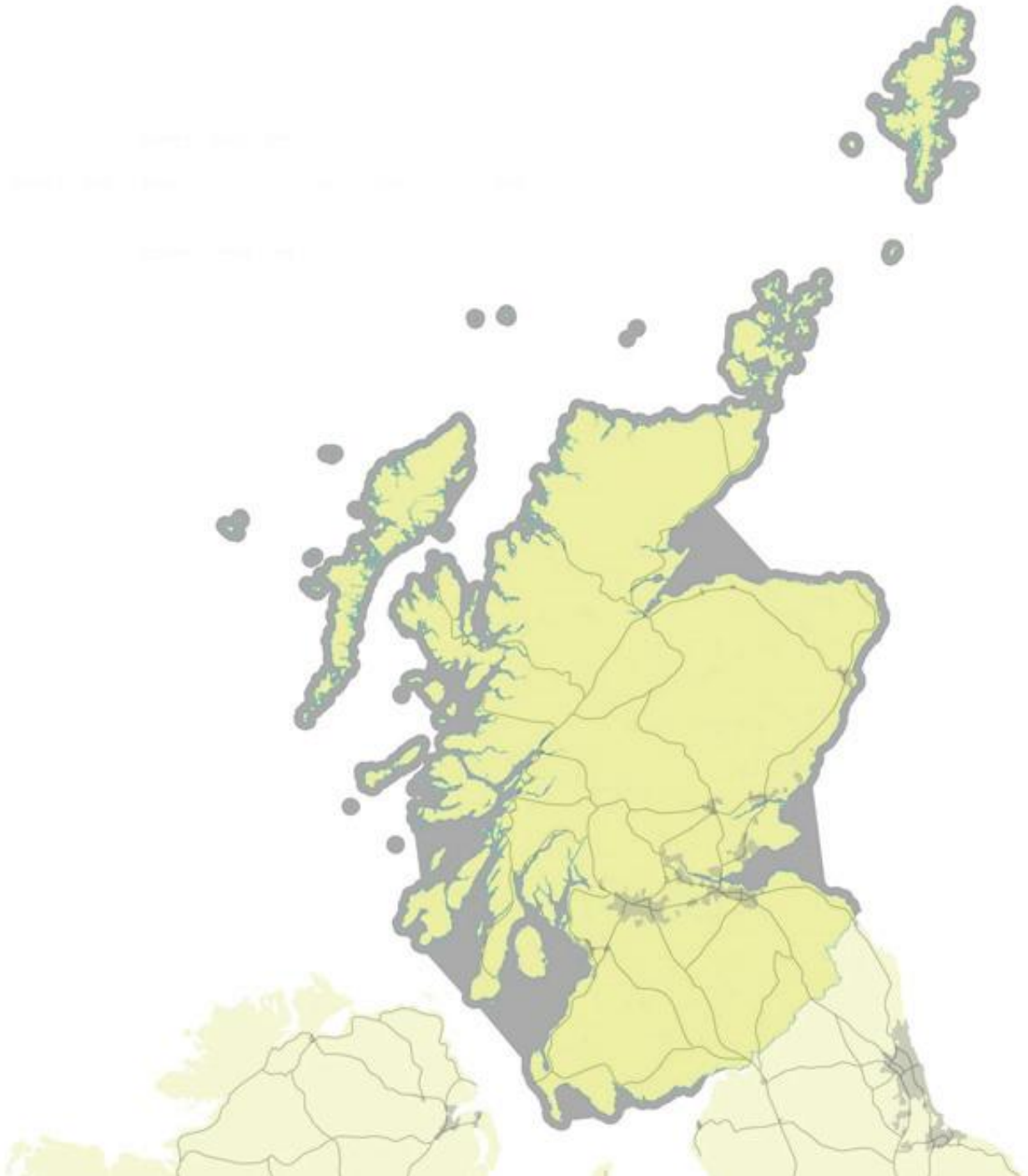
THE 3 MILE LIMIT

THE CASE FOR A SUSTAINABLE FISHERY

SCFF

SCOTTISH CREEL FISHERMEN'S FEDERATION



The three mile limit.

This document is an attempt to inform and promote to fishermen and fisheries managers the fact that reinstatement of the three mile limit is not just possible or plausible, but is presently the best chance we have of preserving and allowing some recovery of our inshore fisheries for the future. Furthermore it is entirely affordable.

The three mile limit was in place for the bulk of the 100 years preceding 1984. Since its removal, almost all the remaining demersal/ finfish species, previously commercially exploited within inshore waters, have been reduced to commercial extinction, the bulk of the inshore fleet are now mainly reliant on nephrops and scallop fisheries.

The decline in the inshore fishing fleets working from Scottish west coast ports has been quite dramatic, with many ports now only serving a small fraction of the fishing vessels of just a decade or two ago. The ecosystem, the fisheries and employment opportunities in the inshore waters within 3 miles of land have deteriorated considerably since the opening of those waters to trawling.

The east of Scotland has a significantly different geography and distinct fisheries from those on the west. Much of the east coast static sector is based around crab and lobster fisheries and a more significant percentage of those static fisheries are based further offshore than three miles. It is for those reasons that this document aims to focus on the west coast and many of the options considered herein will not be applicable or appropriate to the east coast inshore fleet.

Introduction

It is the sincere belief of the authors that it is possible to substantially improve the health of our inshore ecosystem and our inshore fishing industry in a relatively short space of time and with relatively little effort. The improvement could be so substantial as to double the amount of fishermen employed inshore, double the amount of vessels operating inshore and double the revenues generated from the area. Remarkably we think it is possible to do all this without increasing the present catch, and do so with substantially less environmental footprint. Further still the implementation of this proposal would simultaneously reduce the bethnic disturbance, discard and by-catch ratios for those fisheries to practically zero.

The mechanism that may be able to realise those remarkable achievements is the reinstatement of the former three mile limit (or a close variation of it).

Other significant benefits from reinstating the 3 mile limit include the ability to address, solve or mitigate gear conflict between the static and mobile sectors, accommodate the expansion of the creel sector, remodel fishers relationship and interactions with MPA's, create protection of inshore nursery grounds for vulnerable finfish (amongst other species) and disrupt less of the ecosystem services provided by benthic habitats. It will also become possible to successfully implement other fisheries management measures that cannot be realised in mixed gear Nephrops fisheries (e.g. increasing the MLS of nephrops, returning berried prawns etc.). Most importantly for fishermen it can achieve this whilst maintaining and promoting vibrant diverse and healthy fishing communities.

Applicability

The primary focus of this document is the inshore west coast Nephrops trawl and creel fisheries, however those fishing grounds and the communities that depend on them are also shared by scallop, dredge and dive fisheries as well as significant crab and lobster fisheries and other smaller scale fisheries interests like commercial angling, whelk and razor fishers.

Left: Fraserburgh Harbour in the 1880s

Furthermore there is significant historical evidence that there were once substantial demersal fin fish fisheries along the entirety of the Scottish west coast, it is our belief that they will also be positively affected by the proposal.

The Evidence

There are some who dispute the impacts of mobile trawl and dredge fisheries, and many who consider bottom contact mobile gears as analogous to ploughs on land. Regardless of your position on the nature and impacts of mobile gears, the evidence for some of their long term effects is clearly demonstrated in the historical record.

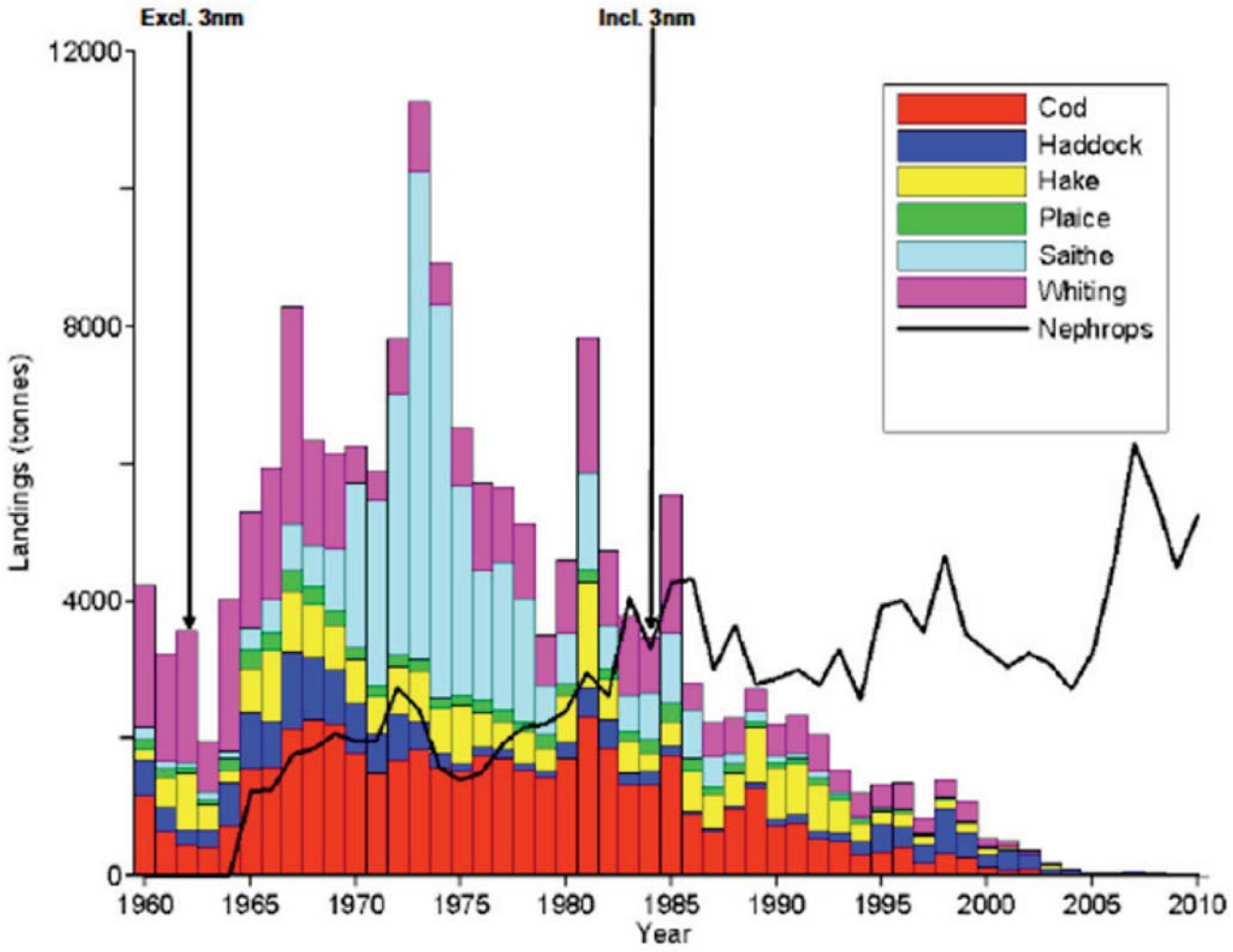
Again there are some who argue creel fishing could also become unsustainable, we demonstrate that there is sufficient evidence to show that, with a well regulated static gear fishery, both the fishermen and the environment would benefit from a transition from mobile to static gears within the 3 mile inshore zone.

When all else is considered, reinstatement of the three mile limit is the only plan on the table which addresses the present decline in the inshore sector and offers the likelihood of long term stability and sustainability for the inshore fisherman. The three mile limit manages to address many of the big, otherwise insurmountable, issues presently facing our environment and our industry, like the commercial extinction of most inshore demersal fish species, and the decline in catch per unit of effort within the remaining nephrops and scallop fisheries.

Below: Herring gutters at work, Wick, 1920

A case study, The Firth of Clyde:

The landings of the principal demersal fish, and of Nephrops, from the Clyde since 1960 are shown in the figure below.



Source: http://www.gov.scot/Publications/2012/06/7562/1

History & evidence

The collapse of inshore bottom fish fisheries followed closely upon the removal of the three nautical mile closure to bottom trawling in 1984. (a case study extract from Thurstan & Roberts, 2010)

In the early 19th century, prior to the onset of industrial fishing, the Firth of Clyde supported diverse and productive fisheries for species such as herring, cod, haddock, turbot, and flounder. The 19th century saw increased demand for fish, which encouraged more indiscriminate methods of fishing such as bottom trawling.

During the 1880s, fish landings began to decline and upon the recommendation of local fishers and scientists, the Firth of Clyde was closed to large trawling vessels in 1889. This closure remained in place until 1962 when bottom trawling for Nephrops norvegicus was approved in areas more than three nautical miles from the coast.

The trawl closure within three nautical miles of the coast was repealed in 1984 under pressure from the industry. Thereafter, bottom fish landings went into terminal decline, with all species collapsing to zero or near zero landings by the early 21st century.

The evidence suggests that trawl closures helped maintain productive fisheries through the mid 20th century and their reopening precipitated the collapse of bottom fish stocks.

This once diverse and highly productive environment will only be able to recover if trawl closures or other protected areas are reintroduced.

Fishery management in the Firth of Clyde and other similarly affected marine ecosystems needs to change from the current species-centred approach to one which takes into account the complex ecosystems that are present.

Above: Tucking a seine net, c1900

Long before the current fishery problems in the Clyde emerged, it was clear to late 19th century fisheries scientists that the Clyde ecosystem needed protection from over-exploitation and damage by fishing gear. Their advice is even more relevant today as the Firth of Clyde and other similarly affected marine ecosystems approaches the endpoint of over-fishing, the point where nothing remains that is worth catching.

The region now faces possible irreversible losses of biodiversity, fisheries productivity and other important ecosystem services provided by species whose ecological roles have disappeared as their populations have collapsed.

The closure of the Firth of Clyde to trawling

(extract from Thurstan & Roberts, 2010)

Most fishing for bottom-living species during the 19th century was with static lines, nets and traps. During the second half of the 19th century, bottom trawls began to be used within the Firth of Clyde, dragged by small sailing vessels .

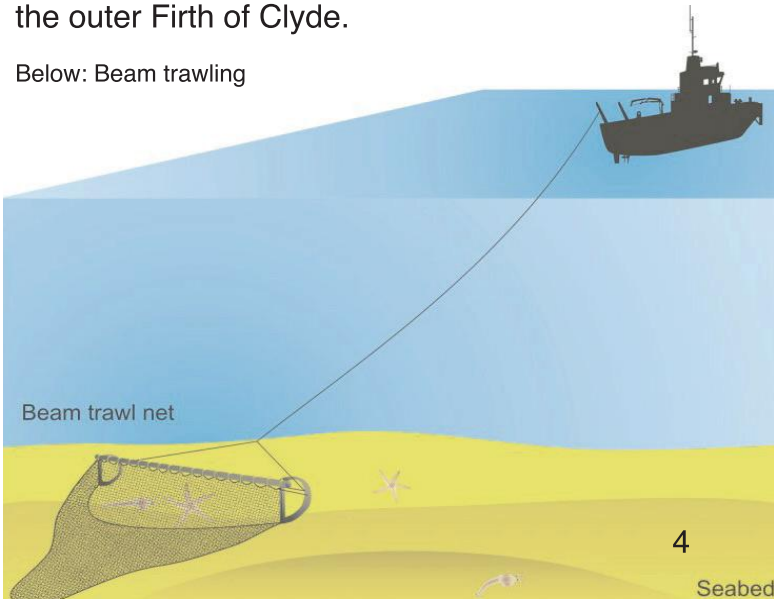
During the 1880s, and as a result of their enquiries, it became clear to a number of fisheries scientists that Firth of Clyde fisheries were becoming depleted. This led to calls for part of the Firth of Clyde to be closed to trawling:

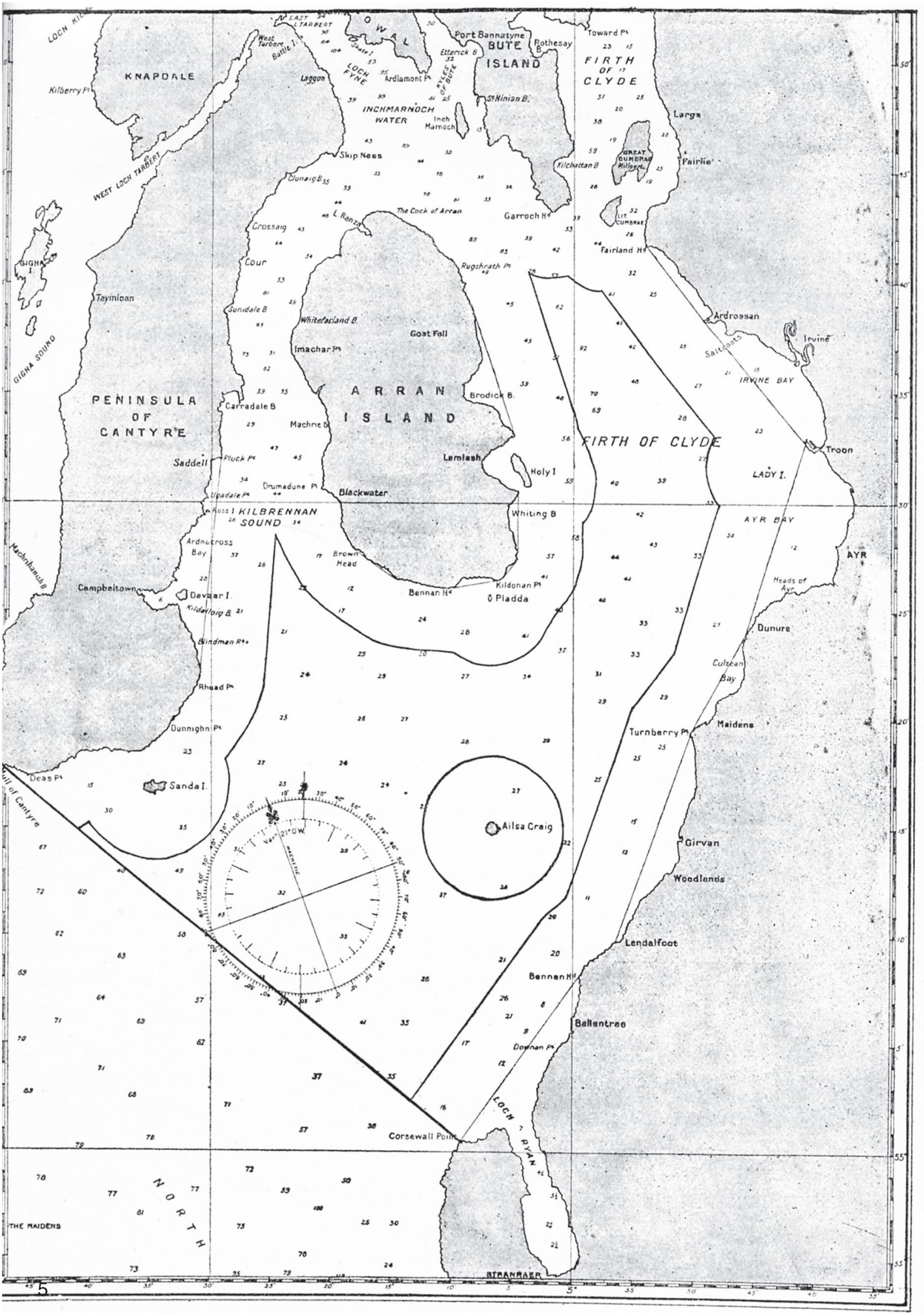
"...From the scientific evidence obtained, and from the testimony given on the spot, it appears that the numbers of these fish have very seriously diminished in recent years; and it is scarcely possible to escape the conviction that this has been mainly due to excessive trawling [...] There is reason to believe that were a period of quiescence bestowed upon some of these waters, opportunity would be given for undisturbed increase, especially of the smaller fish; and this would ultimately largely add to the yield, not only in the waters immediately protected, but in those which are contiguous"

These arguments against trawling were echoed throughout Scotland and, in 1889, it was made unlawful to trawl within three nautical miles of the low-water mark anywhere in Scotland.

In the same year an area within the Firth of Clyde comprised of 380 square miles was also closed to bottom trawling, in a straight line from the Mull of Kintyre, Argyllshire, to Corsewall Point, Wigtownshire, and extending over part of the outer Firth of Clyde.

Below: Beam trawling

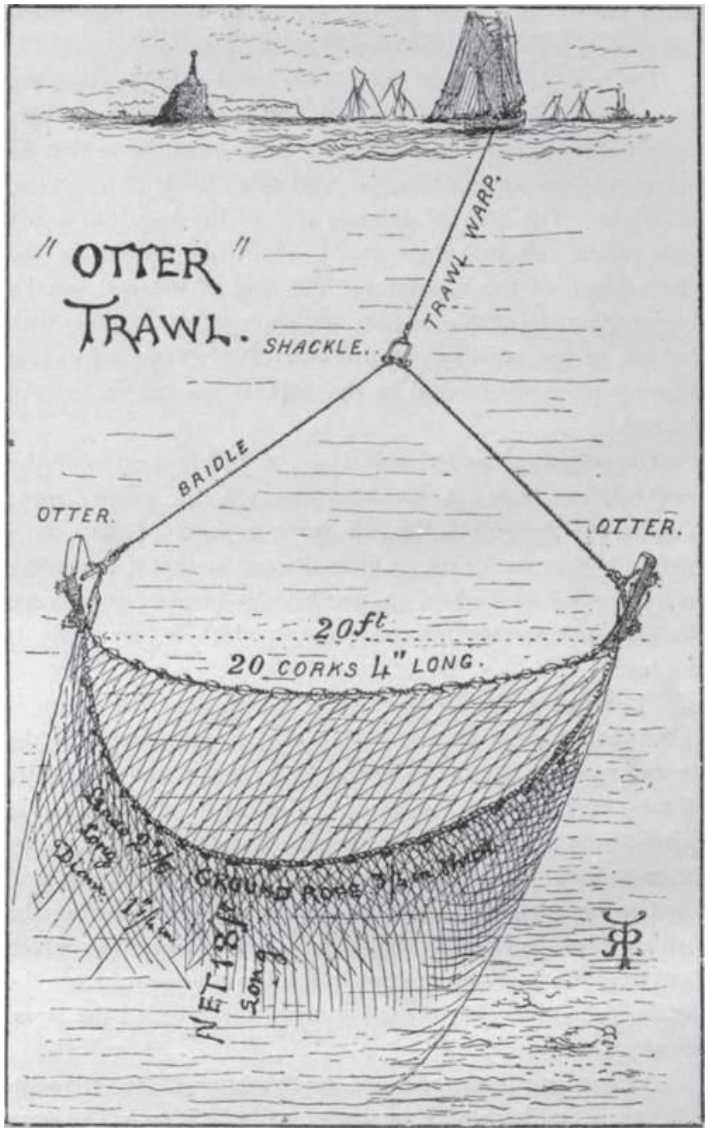



KNAPDALE
Kilberry Pt
LOCH KILBERRY
EAST TARBERT
West Tarbert
Battle I.
Skate I
LOCH FYNE
Ardlamont Pt
OWL
Port Bannatyne
BUTE ISLAND
Rothesay B.
Etterick B.
KYLES OF BUTE
St Ninian B.
Toward Pt
FIRTH OF CLYDE
Largs
Pairlie
INCHMARNOCH WATER
Inch Marnoch
Skip Ness
Kilchattan B
GREAT CUMBRAE
LIT. CUMBRAE
Dunaig B.
WEST LOCH TARBERT
The Cock of Arran
L. Ranza
Garroch Hd
Fairland Hd
Crossaig
Cour
Rugshrath Pt
GIGHA I.
Tayinloan
GIGHA SOUND
Sunidale B.
Whitefarland B.
Goat Fell
Imachar Pt
Ardrossan
Irvine
Saltcoats
IRVINE BAY
PENINSULA OF CANTYRE
ARRAN ISLAND
Carradale B.
Machrie B.
Brodick B.
FIRTH OF CLYDE
Troon
Saddell
Pluck Pt
Lamlash
Holy I
LADY I.
Drumadune Pt
Blackwater
Upadale Pt
Ross I
KILBRENNAN SOUND
Whiting B.
AYR BAY
AYR
Machrihanish B.
Ardnacross Bay
Brown Head
Campbeltown
Davaar I.
Kildalloig B.
Bennan Hd
Kildonan Pt
Pladda
Heads of Ayr
Dunure
Blindman Rks
Rhead Pt
Culzean Bay
Dunnighn Pt
Turnberry Pt
Maidens
Deas Pt
Sanda I.
Ailsa Craig
Girvan
Woodlands
Lendalfoot
Bennan Hd
Ballantrae
Dunnan Pt
LOCH RYAN
Corsewall Point
NORTH
THE MAIDENS
STRANRAER

The opening of the Firth of Clyde to trawling

(extract from Thurstan & Roberts, 2010)

By the end of the 19th century, steam had revolutionised the fishing industry. In 1895 the otter trawl was introduced in which, instead of a beam, the net was kept open by two boards that acted as hydroplanes. Otter trawls had a broader sweep and could capture fish much more efficiently than the beam trawl. Within one year of its introduction, the otter trawl had been adopted by almost all trawlers within the Scottish fleet.



Above: Early otter trawl diagram

As the herring fishery declined pressure mounted to re-open the areas in the Clyde that had been closed to bottom trawling. It was argued that fishers needed to expand and diversify into other stocks, such as demersal fish species, scallops and Nephrops.

A directed fishery for Nephrops began in the 1950s and quickly increased in importance in the Clyde area and the rest of Scotland.

Seine nets were used in the Clyde until a Bye-law came into effect in 1962 which allowed trawling for Nephrops within the Clyde sea area that had been closed to trawlers since 1889, except within the three-mile limit.

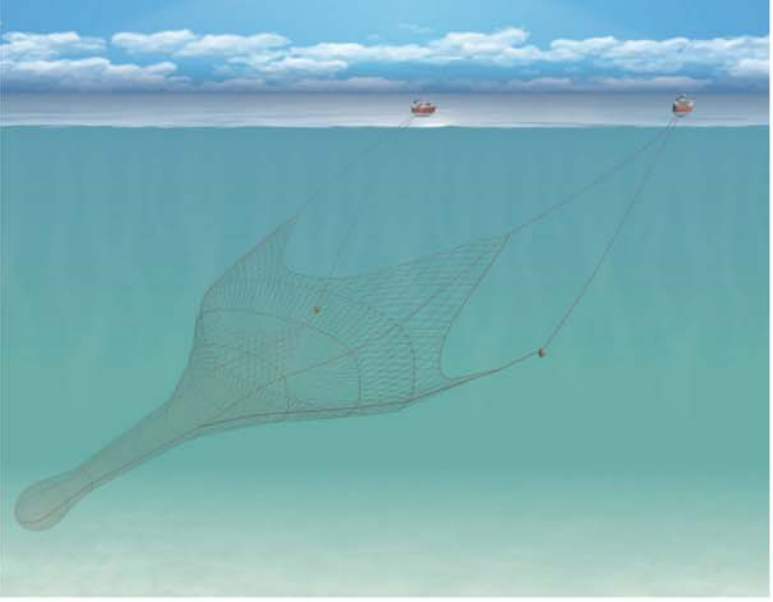
The increase in Nephrops trawling also enhanced fish catches as any valuable species caught would be retained for market.

The re-opening of the outer closed area to trawlers and the success of the demersal fisheries during the 1960s encouraged most of the Clyde fleet to switch to full-time demersal trawling . As trawlers increased in power and adopted rock-hopper gear (rollers attached to the ground rope of the net) they began to operate in grounds that had previously been too rugged for trawl fishing .

Above: Otter trawl hopper net

Catches of species such as cod and haddock swelled during the 1960s, whilst the invention of the faster mid-water pair trawl in the 1970s meant that large specimens of cod, hake, and saithe were also caught in great quantities.

Left: Firth of Clyde closures including the 3 mile limit (Thurstan & RobertsW)



Above: Pair trawling diagram

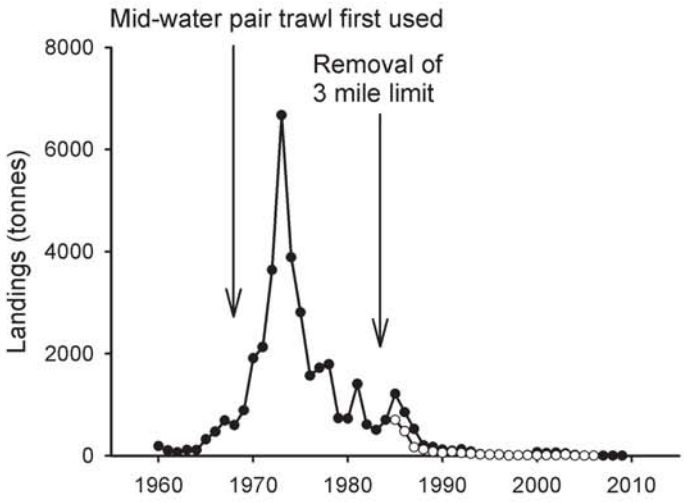


Figure 4: Landings of Saithe

Closed circles indicate landings from the Wider Firth of Clyde, ICES statistical rectangles 39E4, 39E5, 40E4 and 40E5 1960–2009 (these encompass the Firth of Clyde, part of the North Channel and part of the Sound of Jura). Data sourced from Hislop (1986) (1960–1984), the Scottish Government (1985–1999) and Marine Fisheries Agency (2000–2009).

Figure 4 shows a boom and bust in the saithe fishery that corresponds to the introduction of this gear, which allowed mid-water shoals of the species to be caught with great efficiency.

The complete collapse of the Clyde's demersal fin-fisheries.

Landings of saithe peaked at over 6500 tonnes in 1973 following the introduction of mid-water trawls and accounted for over 50% of demersal landings in the Clyde that year. However, this was a boom-and-bust fishery and the catch quickly collapsed.

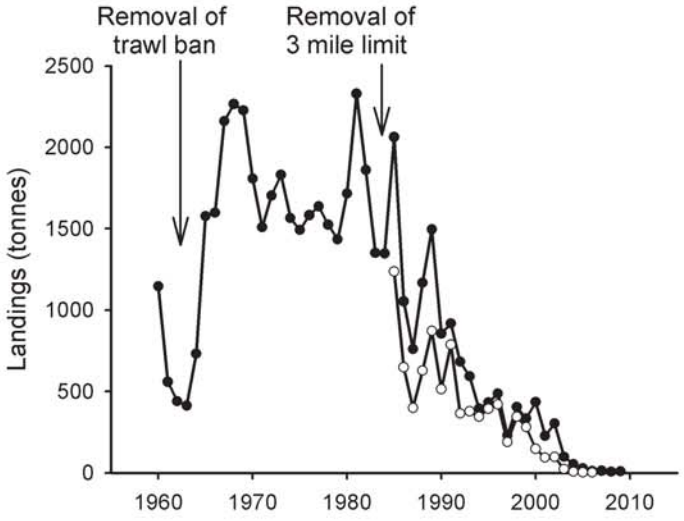


Figure 5: Landings of Cod

Landings of cod increased rapidly during the 1960s following the reopening of the outer trawl closure area, remaining in a state of dynamic stability consistent with total effort until 1984 when declines began. However, the reopening of the three mile limit to trawling that year did little to raise landings, and between 1984 and 2009, landings decreased by over 99%.

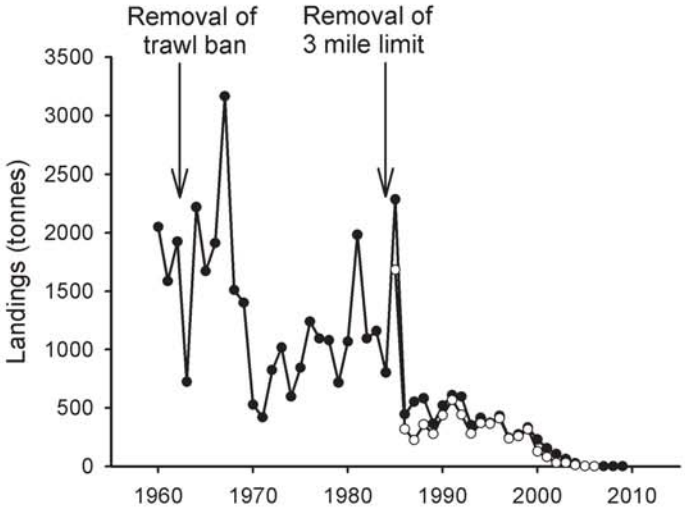


Figure 6: Landings of Whiting

Landings of whiting follow a similar trajectory of collapse to cod, with a decline of over 99% since 1984.

Haddock again follows a similar pattern, with short-term boosts in landings following the repeal of both trawl closures. However, landings have since collapsed and there has been an overall decline of 92%.

Along with cod, *hake* was one of the most important species in terms of value up to the 1980s, with up to 57% of the total Scottish landings of hake taken from the Clyde in the

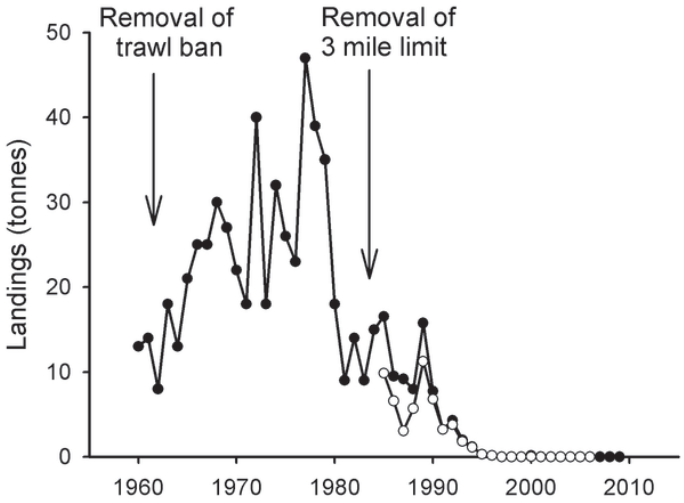


Figure 7: Landings of Flounder

early 1980s . Since the reopening of the trawl closure, landings have declined to virtually zero.

Flatfish landings such as *flounder and plaice* have also declined . The low abundance of plaice in the Firth of Clyde was questioned more than a century ago, when a substantial difference in the number of flatfish between the Clyde and the Firth of Forth was noticed. These investigations speeded the closure of the Clyde grounds to trawling, which as noted earlier, lasted first until 1962 (up to 3 miles) and then 1984 (full area).

Landings data suggest that many bottomfish populations are now at an all time low, a view upheld by the personal testimonies of many experienced Clyde fishers.

The conclusion seems inescapable that trawling closures provided important partial refuges for many commercially important whitefish species from the late 19th century up until 1962 and 1984 when they were re-opened.

The protected effects of trawl closures were most likely achieved through a combination of habitat protection and reduced fishing pressure. The high fishing effort and damage to seabed habitats which immediately followed the re-opening of areas closed to trawling appears to have precipitated the complete collapse of the Clyde's demersal fin-fisheries.

In 2008, fin-fish such as cod, plaice and herring constituted less than 2% of landings by weight. Eighty-four percent of landings by weight were Nephrops, representing nearly 87% of the value of Clyde fisheries. The remainder was composed of other invertebrates such as scallops, crabs and lobsters.

Landings of species' groups from the Firth of Clyde from 1985 to 2008 - Overall landings peaked at over 10,000 tonnes in 1985 but have since decreased. (a) Flatfish and round-fish landings have declined to almost zero.

Data from the Scottish Government. doi:10.1371/journal.pone.0011767.g013

Conclusion

As well as removing bottomfish species, bottom trawling and scallop dredging have reduced habitat complexity in the Clyde and other similarly affected marine ecosystems resulting in an environment that supports low macrofaunal diversity , making it less resilient to environmental fluctuations. In combination, the habitat altering properties of Nephrops and scallop trawl fisheries and high by-catch of juvenile fish associated with Nephrops trawls will prevent the recovery of bottom-fish populations.

In our view, the complexity and productivity of the Firth of Clyde ecosystem will only be restored with the (re)introduction of significant spatial protection from fishing. Areas must at least be closed to mobile fishing gears .

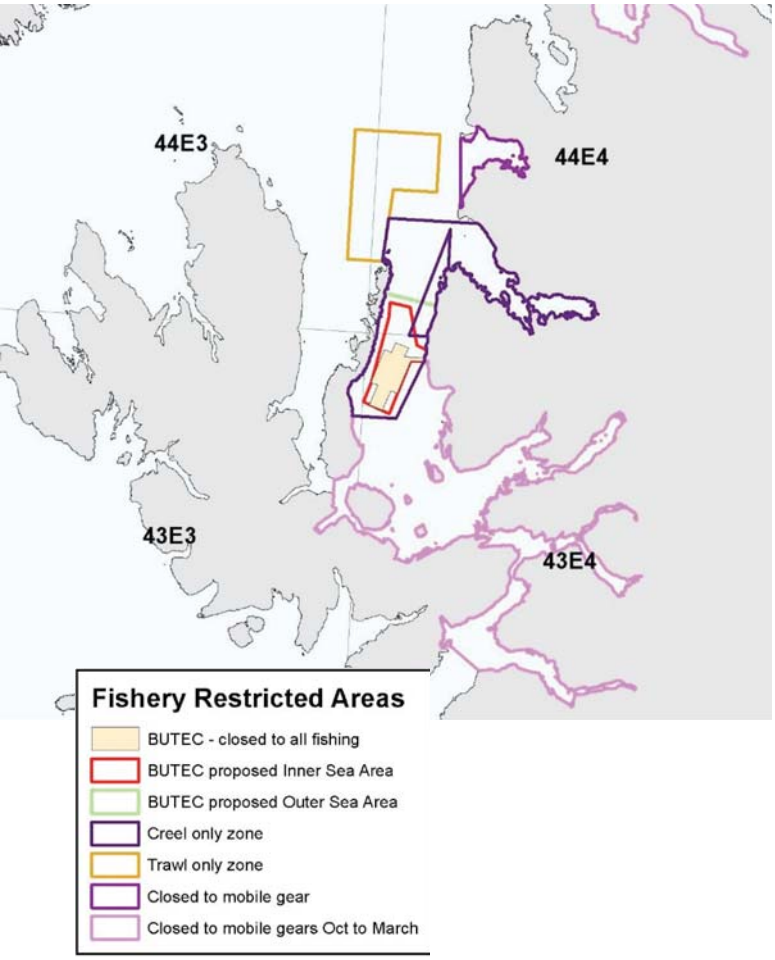
[...] case study from Thurstan and Roberts (2010)

It is clear from the above that large areas inshore, where there is no trawl and dredge activity, are required in-order to promote recovery of finfish in inshore waters and allow bethnic habitats to recover.

There is a very compelling case for extensive spatial management of inshore fisheries.

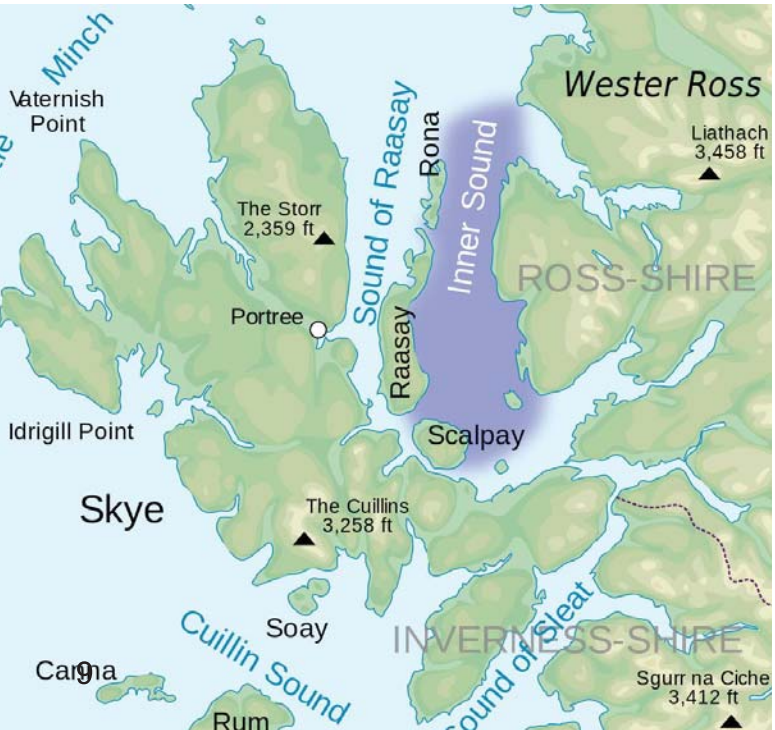
Spatial management

Spatial management is a contentious issue within the fishing industry and it is especially so when the perception is that one sector is to pay the price and another sector derive the benefit. However replacing high impact, low value fisheries methods with low impact, high value methods is not the same as one sector simply displacing another!



Above: Current Inner Sound spacial management

Below: Inner Sound geographic area



Case study, The Inner Sound:

The Inner Sound is a body of water situated between the Isle of Raasay and mainland Scotland. It is unusual in that it contains a significant no take zone (BUTEC submarine range), a significant creel only zone, equally sized trawl only zone and a mixed fishery zone that is open to trawl under 12 meter vessels for 6 months of the year.

What is most interesting about the Inner Sound is not so much its legislative complexity but the characteristics of its fishing community.

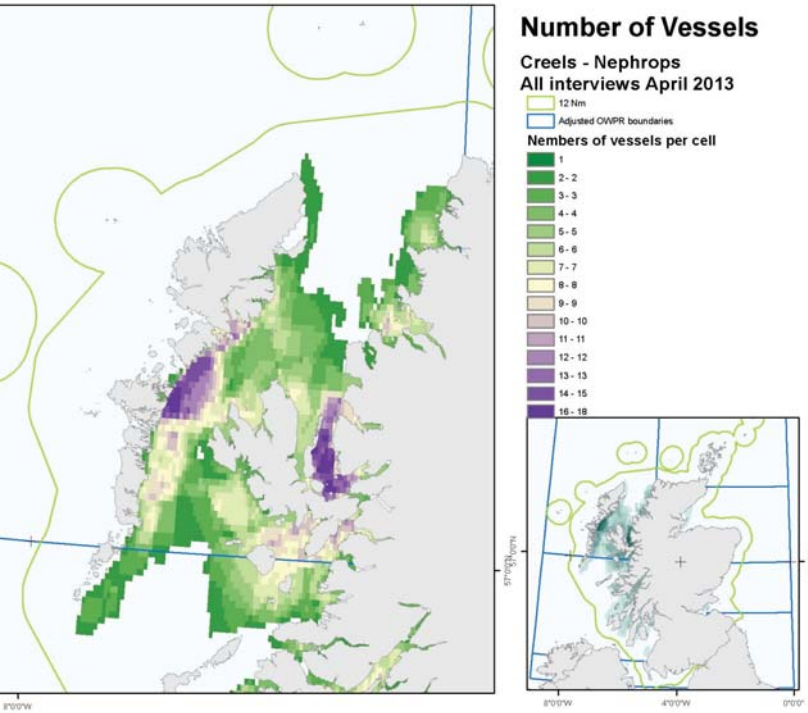
The inner sound employs more fishermen per sq km than any where else in Scotland, it also supports more boats per sq km than any where else in Scotland and generates more revenue and most unusually all whilst landing less prawns than other equivalent areas!

The principal reason that the Inner Sound can support such a significant density of boats and fishermen and still generate significant revenues is because the vast majority of the vessels that fish there are static gear vessels utilising creels.

By working in areas that are either closed to trawling or where trawling is restricted to only half the year the creel vessels are able to work unhindered by the “gear conflict” that often plagues those creel fishers whom operate in “mixed fishery areas”.

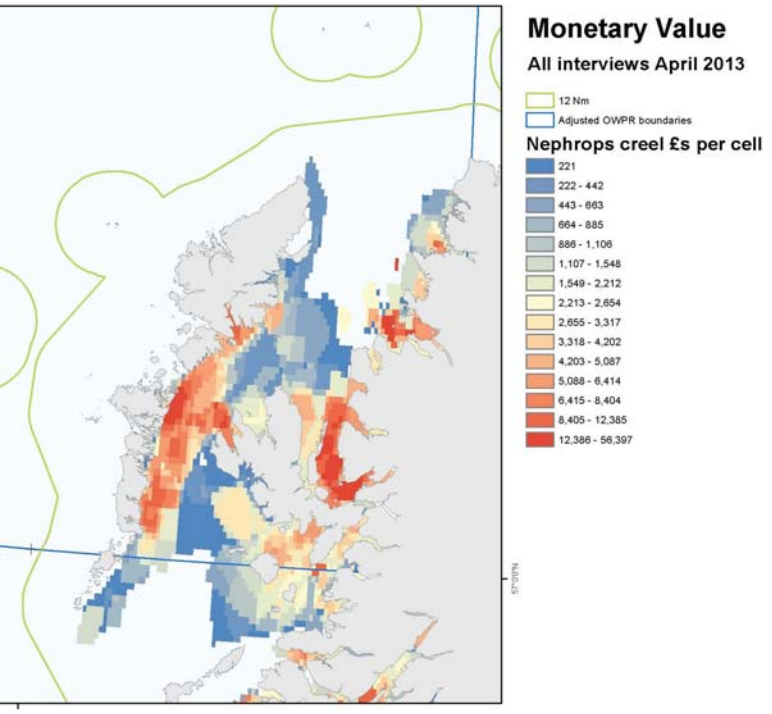
The average value for live whole prawn exceeds the value for the equivalent trawl caught prawn often by several times. This coupled with the costs associated with a days operation of a creel vessel being significantly less than that of a trawl, means that a creel vessel can employ two men and pay the same wage as an equivalent trawler whilst catching one quarter to one half the prawns!

The profitability of the seabed in the Inner Sound is not because they are better prawn fishing grounds than outside the Sound, or because more prawns live or even more prawns get caught there, the profitability of the Inner Sound fisheries and the amount of fishermen per sq km that are employed here is solely the result of the catch method.



Above: Map showing the concentration of vessels by area

This is primarily the result of the difference in value between creel and trawl caught prawns and the fact that the majority of the prawns are creel caught.



Above: Map showing monetary value of catch by area

Emulating this success throughout the west coast might not be easy, however it is entirely possible.

In the 1970s report on the potential removal of the three mile limit the Fisheries Board for Scotland stated *"We are extremely dubious of the inference that a prosperous fishing industry can be encouraged by providing protected enclaves for static gear fisheries!"*.

Accordingly when the three mile limit was removed in 1984 there were no *enclaves* for static gears and for the most part the greater catching capacity of trawl and the inability of creels to compete on the same grounds led to a short period of exceptional *gear conflict.* After a short time the trawl boats dominated and became responsible for catching the vast majority (85%) of all the prawns caught within the former trawl free area.

In the 1990s the exceptional annual cycle of gear conflict within the Inner Sound led to the creation of the trawl and creel only zones, this created the first and only substantial protected area for static gears on the Scottish west coast.

This area has proved the fisheries board of Scotland were seriously mistaken in their inference that *"a prosperous fishing industry could not be encouraged by providing protected enclaves for static gear fisheries".* The Scot Map data clearly shows that protected areas for static gears can't just be prosperous but that their levels of prosperity can far exceed any other fishery presently practised in inshore waters around the Scottish coastline.

If the three mile limit was reinstated (and it included dredge and pair trawl as well as any other previous mobile gear exception). Then the prospect of gear conflict from mobile/static interaction would be removed. The prawn creel could then be worked on all the prawn ground that it previously operated on prior to the lifting of the the 3 mile limit. There is significant evidence that this could then be the foundation required to emulate the success of the static sector within the Inner Sound fishery.

The biggest single factor that might curtail the doubling, tripling or even quadrupling of the static sector within three miles of land is the availability of the markets to absorb the increased capacity within the niche premium live creel caught sector. It is for this reason that any transition from mobile to static gears within the three mile limit area would have to be paced to correspond with growth in the market capacity. Further development of the markets would most likely be required prior to a

complete realisation of the potential of the three mile inshore zone.

The proposals here-in attempt to mitigate the possible costs, by both proposing funded fleet restructuring, including elements of fleet decommissioning and a proposal to accommodate effort transfer from mobile to static sectors via licence and funded vessel conversion schemes.

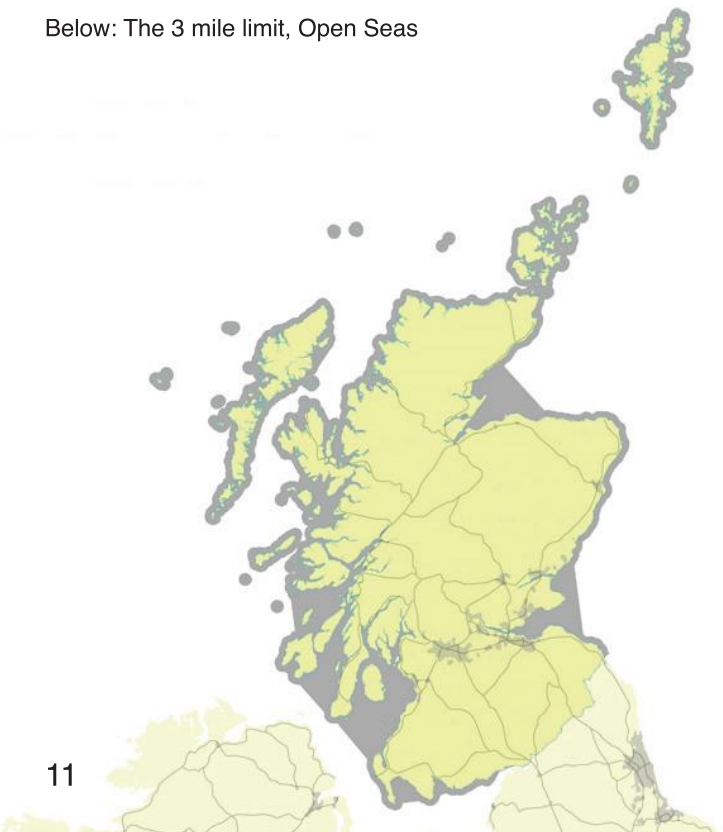
Why the three mile limit?

Any spatial management that seeks to achieve a meaningful recovery of inshore finfish, required for good environmental status, will have to be on a scale capable of at the very least producing, in the long term, commercially catchable quantities of fish.

Although exactly what a *meaningful recovery* is can be debated. It would be unreasonable to assume that any less than sustainable commercially catchable quantities of fish could be considered a meaningful recovery to the commercial fishing industry.

There is historical precedent and evidence for the productivity, perfusion and variety of species that can be supported within three miles. The vast majority of all creeling still takes place within 3 miles of land and there is historical precedent that an extensive inshore mobile fleet can be supported without the requirement of fishing within three miles.

Below: The 3 mile limit, Open Seas



Sector profiles

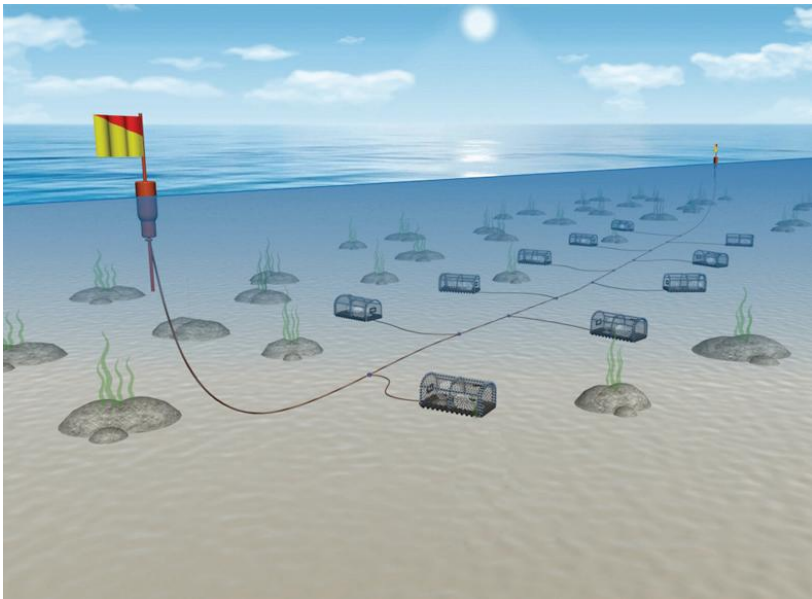
Inshore static fisheries *account for approx 85% of the Scottish fleet by boat numbers 70% of the fleet by direct employment, 20% of the fleet by revenue and 8% by weight of prawns harvested. They have almost no fish by catch and discard survival is approx 95%. Static vessels can selectively grade nephrops and return undersized animals live, and can also return berried animals.*

Source: http://www.gov.scot/Resource/0046/00467217.pdf

It is suggested that from the perspective of sustainability, using a combination of vessel and gear limits along with minimum landing size and a policy of returning berried prawns, static fisheries would be if anything under exploited by the present fleet within 3 miles and the fishery be capable of absorbing anticipated transfer of effort from the nephrops mobile sector.

Above: Typical inshore creel vessel

Below: Diagram showing a typical creel fleet on the seabed



***Trawl fisheries** have essentially the opposite profile to static fisheries in that they account for approx 15% of the inshore prawn fleet by vessel numbers, 30% by direct employment, 80% by revenue generated, 90% by weight landed.*

The mobile sector can have significant by-catch and discards, with significant mortalities (as much as 4.5~9 Kg discards to 1Kg of landed prawns). Due to high mortalities (65+%) the option for returning undersized or berried animals is not credible with the trawl caught fishery.

http://www.seas-at-risk.org/1mages/Ziegler%20_%2 Valentinsson.pdf

Above: A typical 10-12m trawl vessel

Gear conflict

The removal of the three mile limit in 1984, has (on the west coast of Scotland) created a generation of fishers whom have had to compete with each other for the same species on the same ground using different gear types, gear types which are completely incompatible when used within the same space at the same time.

Competition has further been exacerbated by advances in electronic technologies as well as net design (specifically the more advanced hopper nets) which have allowed the mobile trawl sector to tow gear and fish in areas that were not possible to be fished just a decade ago.

The effect of this competition and its negative consequences are known as *gear conflict*.

This gear conflict has divided fishing communities and been a financial penalty to both static and mobile operators. It has in effect dictated fishing patterns and practices in many coastal fishing areas. If there was an absence of sectoral competition the requirement to monopolise or 'defend access' to ground would be significantly reduced.

85% of all gear conflict takes place within 3 miles of land.

By reinstating the three mile limit and spatially separating the vast majority of the west coast mobile and static sectors nephrops boats, gear conflict, ghost fishing of "lost" gear, and many of the other undesirable consequences, associated with differing fisheries sectors competing for access to the same species on the same fishing grounds, will be substantially mitigated.

Spatial management is a mechanism where the majority of gear conflict can be addressed and also where the underlying issues and associated problems can also be addressed to the benefit to both mobile and static sectors of the fishing industry.

http://www.gov.scot/Topics/marine/Sea-Fisheries /InshoreFisheries/GearConflict

The EU Common Fisheries Policy specifically states:

*"Existing rules restricting access to resources within the 12 nautical mile zones of Member States have operated satisfactorily, benefiting conservation by restricting fishing effort in the most sensitive part of Union waters. Those rules have also preserved the traditional fishing activities on which the social and economic development of certain coastal communities is highly dependent. Those rules should therefore continue to apply. **Member States should endeavour to give preferential access for small-scale, artisanal or coastal fishermen**".*

Optimising the Prawn fishery from a revenue perspective

Significantly more revenue can be generated by static fisheries methods for each Kg of prawn caught, when compared to the same prawns being caught by mobile vessels.
The revenue generated is based on the fact that creel caught prawns command a premium price of 2 to 4 times that of trawl caught prawns and almost all prawns captured by a creel vessel are landed at this premium price, whilst up to 50% of trawl caught prawns are landed as tails, which have a price relative to whole live creel caught prawns of less than 20%.

Also it costs a mobile vessel more revenue in fuel and expenses to generate any given income, thus proportionally more revenue generated by the mobile sector is absorbed in expenses as opposed to generating wages.

It has been shown by the *Assessing the Options for Change* document, commissioned by the Scottish Government, that 90% of the existing west coast creel sector are already accommodated within the historical three mile boundary. And that there is enough room within the three mile zone to accommodate some transfer of effort from the inshore trawl sector.

The *assessing the options for change* document evaluated a conservative transfer ratio of mobile to static vessels operating within the three mile zone of 1:1.8, meaning that for each inshore trawler no longer operating within three miles you could safely support Approx. 2 creel vessels.

The assessing the options for change document itself admitted that this was a very conservative figure and it has been argued that in reality this figure would be more like 1:4, meaning that there could be four creel vessels for every trawler.

Even with the documents conservative figure of 1:1.8 there could be two creel vessels replacing each equivalent 2 man trawler, without requiring catching any more prawns and without the by-catch, discards and bethnic disturbance associated with mobile gears.

Below: Prawn creel with nephrops catch

Optimising The inshore prawn fishery from an ecological perspective

Over and above the obvious economic benefits of fleet restructuring and transitioning to a static fishery highlighted above, other potential dividends could be realised by way of significantly reduced ecological disturbance of seabed and non target species.

Above: Prawn trawl net with by-catch

The economic figures and other studies, relating to fuel consumed, by-catch, discard survival ratios and seabed disturbance associated with each fishery, clearly demonstrate that if the same prawn fishery was prosecuted by static vessels as opposed to mobile, up to 4 times more fishers could be directly employed in the fishery.

4 times more static vessels, whilst still catching less prawns would reduce by-catch, seabed disturbance and discards to practically zero.

The environmental impact of creeling on benthic communities is minimal, practically benign compared to trawling, an aspect relevant for conservation of habitats and biodiversity. It is widely documented that trawling adversely affects sea pens, burrow structures, soft corals, sea fans and many other fragile structures on and below the sea bed. And although creels also interact with those structures the minimal effect and resilience of those environments to creel activities is in stark contrast to the effect of mobile gear.

http://www.researchgate.net/profile/Daniel_Valentinsson/publication/259678322_Environmental_life_cycle_assessment_of_Norway_lobster_%28Nephrops_norvegicus

The difference in swept area (or interaction area) of a Kg of nephrops caught with towed net vs a Kg caught with creels is very pronounced. Although creels interact with a larger area than just that area of the seabed in contact with the creel and fish 24/7 - even allowing for this - the fact that the trawl net is being towed over the seabed means that it interacts with significantly more seabed to produce any given Kg of prawns.

The above referenced study calculated this area is over 10 times that required to catch the same kg of prawns with creels. Thus the benefits of transitioning from mobile to static gears could produce a significant environmental as well as economic dividend.

Both undersized and berried (egg laden) nephrops that are returned from creel fisheries have a survival rate of over 94% compared to less than 45% for the majority of trawl caught discards. This means that minimum landing size is a very effective management tool within a creel fishery and almost a futile management tool within a trawl fishery.

The creel sector already lands the vast majority of its whole prawn significantly above minimum landing size and would invite a increase in minimum landing size as a management tool to achieve a sustainable fishery within a creel only fishery.

This document proposes a phased minimum landing size increase and invites consideration of a returning berried prawn policy, subject to ongoing assessment, to ensure a sustainable low impact fishery within the three mile limit area.

Below: Flame shell, Loch Carron

Regulating creel numbers

The amount of creels deployed by each vessel and the amount of vessels participating in the creel fishery are both issues which require to be managed in any sustainable creel only fishery.

The amount of creels deployed by each vessel varies quite considerably as does the amount of creels deployed in any area. Often this is dictated by prevalence of suitable fishing opportunity (both prevalence of prawns and competitors).

Trawl and creel operators generally compete for access to fishing grounds, this has led to many creel vessels deploying gear to mark territory both from competing creel vessels as well as from competing trawlers.

Most creel operators agree that it would be beneficial to cap the amount of gear any vessel can deploy, and that can be deployed in any given area. Many agree on the principal that within the bounds of economic viability, less gear overall would be beneficial.

However it has never been possible to get voluntary agreements on capping gear per vessel due to the fact that it has never been possible to cap the amount of vessels in the creel sector as the existing licensing regime allows any registered fishing vessel to deploy creels. Also many creel operators argue that removal of gear will facilitate and encourage more trawling in those areas previously only fished by creel vessels. This situation would change in the presence of a three mile limit.

This document proposes changes to the licensing regime to cap then regulate the size of the creel sector. The introduction of a creel register with a creel tagging system to cap gear operated per vessel, with a phased introduction of individual vessel allocations consistent with ongoing assessment of the sustainability of the sector.

Fin fish recovery

It has been widely documented that the collapse in the inshore fish stocks has been directly correlated with corresponding developments in the practices of nephrops trawl fisheries.

It is only reasonable to expect that fleet restructuring and a transition to a creel only fishery within three miles would promote some fin-fish species recovery, and in time it may be possible for there to be commercial fin-fish fisheries exploited within three miles and possibly some spillover to adjacent inshore waters.

Due to the substantial market price differences between creel and trawl caught nephrops, the difference between the gear types in ecological impact, on both target and non target species, and with a view to optimising the inshore prawn resource to generate as much revenues and employment as possible. Wherever possible inshore prawn stocks should be exploited by static gear.

Limiting the fisheries ecological impact within sustainable levels should be possible if vessels are implementing an appropriate minimum landing size, and return of berried prawns policy could be introduced to further enhance this.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0011767

Where do MPA's fit in ?

The network of Marine Protected Areas are not meant to be fisheries management tools, nor are they meant to achieve spatial management of the mobile and static sectors. However they have a significant relationship with fishers and displace mobile fishing effort into areas that are already subject to significant effort by both mobile and or static gears.

Apart from the environmental and gear conflict issues associated with displacing effort, there is a very real danger of exacerbating gear conflict in waters adjacent to MPA's .

There is also a real danger that MPA's will cause a *honey-pot effect* (vessels will be attracted to them by virtue of there being better fishing). Also that creel vessels working in adjacent waters will be *herded* into MPA's by virtue of those displaced trawl vessels perceiving MPA's as a spatial management exercise, or simply by virtue of the fact that the MPA can offer a safe place for static gear vessels to fish.

By undertaking a significant fleet restructuring exercise, removing inshore trawl effort in favour of inshore creel effort, the displacement effects on the fishing fleet derived from MPA's will be to a large extent mitigated.

Below: Herring spawn on seaweed

A significant proportion of inshore MPA's are contained within the three mile limit area and especially in areas already occupied with a high density of creels.

The role of IFG's

Tensions between static and mobile sectors are the fundamental reason that the original west coast Inshore Fisheries Groups were not functioning anywhere near their potential.

As consensus based organisations it is very hard for those participating in IFG's to make the decisions necessary to transition inshore fisheries to a sustainable industry.

By spatially separating the bulk of the mobile and static activities on the West coast inshore fleet, it is envisioned that IFG's will be able to fulfill the role of local management groups, facilitating initiatives such as regulating localised creel/vessel numbers, monitoring overall fleet capacity/overcapacity and be a forum where all sectors can meet to address local fisheries challenges, from planning applications, to discussion of renewablea and fish-farming, etc.

With spatial management IFG's can do this in a manner where the two sectors are not essentially pitched against each other and this fact should encourage them to achieve their originally intended function.

Spatial management was one of the issues raised by all fishing sectors and in all IFG management plans, yet to date there has been little meaningful progress in developing a spatial management plan at either a national or local level.

The lack of meaningful progress on spatial management is undermining many of the other objectives contained within the IFG's management plans and is also undermining confidence from the industry as to how useful the IFG's can be in delivering meaningful inshore fisheries management objectives.

Summary of potential benefits

There are significant benefits to be derived from the spatial management of the static and mobile fisheries sectors, those benefits include the ability of the static sector to introduce management measures guaranteeing its sustainability and allowing for its controlled expansion, and allowing for a transfer of effort from the under 12m mobile sector.

The kinds of management measures presently envisioned by the static sector are an ability to regulate effort via creel caps and local vessel limits, increase minimum landing size and a policy of returning berried prawns. All of which have an element of futility within a mixed mobile/static fishery.

Transferring licence and personnel from the mobile to the static sector will reduce effort from the declining mobile sector whilst protecting fishing jobs.

- A well managed inshore static sector can effectively protect the ecosystem services provided by benthic habitats, create an inshore recruitment zone for both shellfish and fin-fish.
- Spatial management will reduce the effects of displacement from the MPA's on the adjacent waters and help stem the effects of both "herding" and the "honey-pot effect".
- The role of IFG's will become enhanced and empowered by removing the adversarial nature of the existing nephrops fleet sectors.
- It is reasonable to expect that a well managed near shore zone will have an overspill effect and contribute to the recruitment of stocks further offshore.
- Another immediate benefit from spatially separating the sectors is the almost immediate removal of the majority of gear-conflict from both the sectors, an issue which has blighted inshore static and mobile fishing communities for 30 years.
- A creel only fishery will allow for creel and vessel caps which are requirements for sustainable management of the inshore fishing fleet.
- In time, sustainable small scale, static, fin fish fisheries would become available to the inshore fleet, offering opportunities for diversification away from single species fisheries.

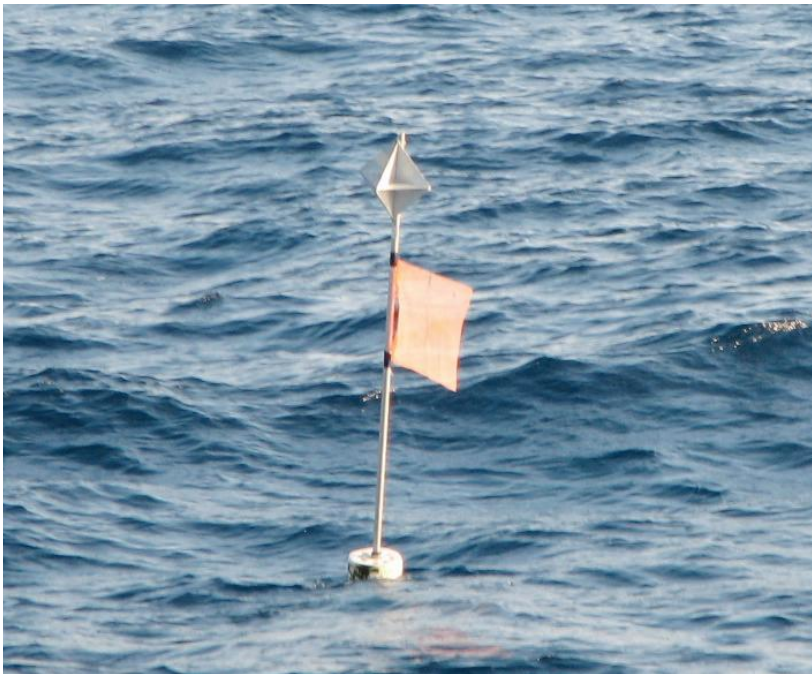
What about creel fisheries outside three miles?

According to the *assessing the options for change* document, commissioned by the Scottish Government, less than 10% of the creel effort on the West coast is deployed outside three miles from land.

There are concerns from mobile operators about competition and the potential for gear conflict and that this sector will require regulating as well as the sector operating within the three mile zone.

With the view to ensuring that the fleet does not undergo unsustainable expansion and encroach on areas traditionally operated in by mobile vessels outside three miles it is proposed that a significantly different and more onerous regime could apply to static vessels wishing to operate outside the three mile limit. Although details will require negotiation between all stakeholders, it is envisaged that those requirements could include elements of gear marking like dan buoys with flags, radar reflectors, lights, transponders, vessel monitoring system, AIS, VMS, published database of gear position etc.

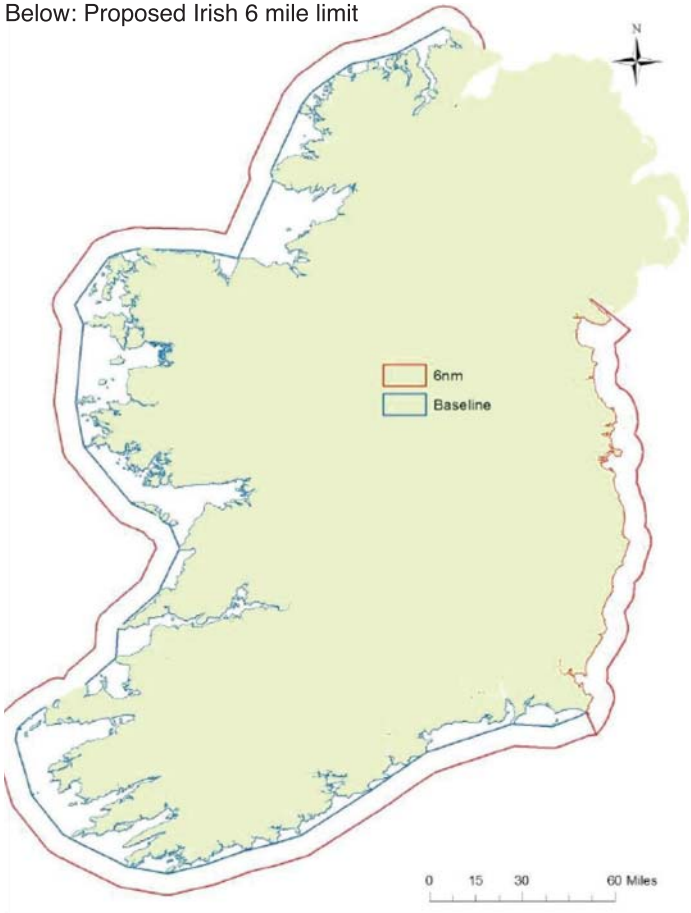
Below: Dan buoy with flag and radar reflector



The Irish Example
Ireland have been consulting on a 6 mile limit for vessels over 12m.

Although this does not distinguish between mobile and static vessels and have the merits/benefits offered by the three mile limit and spacial separation of mobile and static gear types, it does suggest an interesting proposition.

Below: Proposed Irish 6 mile limit



If we were to emulate their proposal then it is possible that an exclusive 3~6 mile zone for vessels under 12m could substantially mitigate the imposition of an exclusive static gear zone within 3 miles.

Managing detrimental effects and mitigating negative consequences

It is assumed that the majority of both the static and mobile sectors will see immediate benefit from reduced gear conflict, however the sector who pays the highest penalty for the proposal would be the smallest of the mobile vessels, therefore mitigation, funding, decommissioning and the availability of new static gear licences would have to focus primarily on creating options and opportunities for those vessels, especially the under 10m mobile sector.

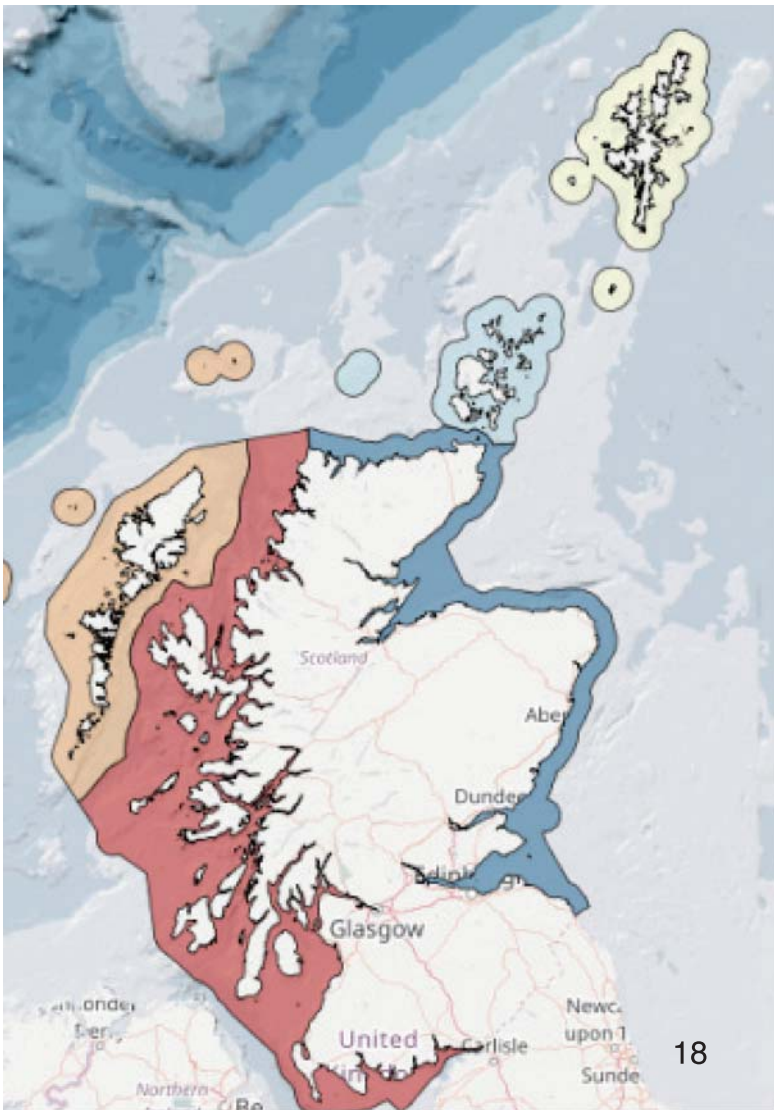
Although there was no compensation or other mitigation given to the incumbent static gear vessels when the three mile limit was abandoned in 1984 - when the traditional creel fishing grounds were opened up to the trawl (essentially decimating the majority of the inshore static sector). It is proposed that this injustice should not be repeated.

In order to protect livelihoods and encourage buy-in and most importantly to avoid forcing small vessel operators into seas where their vessels are not suitable to operate, it is suggested that as many mitigations and new opportunities as possible are offered to those smallest trawl and dredge vessels first.

There are 80 under 10m prawn trawlers that operate within the Scottish fleet and 36 of those are based in the West Coast Mainland IFG. 22 of those in the former SWIFG and 14 in the former NWIFG area. This compares to 202 under 10m creel vessels in the SWIFG and 211 under 10m creel vessels in the NWIFG.

http://www.gov.scot/Resource/0046/00467217.pdf

Below: Amalgamated IFG areas



Possible mitigation/compensation scenario's:
For illustrative purposes only!

With the average value of an under 10m trawler of Approx £100,000, then £3,600,000 would reflect the replacement value of the entire West coast mainland under 10m trawl fleet.

Above: Typical under 10m trawlers for sale, September 2018

Although not every under 10m trawler would opt to decommission or convert to a creel vessel, a suggested reasonable compensation for no longer being able to trawl within 3 miles of land could equal the average value of an under 10m trawl vessel. If we assumed that every under 10m trawl vessel registered on the west coast would have the choice of decommissioning, conversion to creel or subsidised purchase of an existing creel vessel or just continue to work in the 3+nm zone. Then we can estimate the financial cost of facilitating the transition.
As with previous decommissioning. Vessels would bid for access to decommissioning funds with the government accepting the best value for money bids. A budget could be made available to assist in funding the conversion of under 10m trawlers to become creel vessels. And another for diversification away from fishing altogether.

For further illustrative purposes only:
The Grid Economic report estimate the average cost of converting a small trawler to creel fishing would be £35,000, however not all vessels will be suitable for such a conversion. If we take the following scenario:
1/3 of under 10m trawlers were to accept decommissioning @ £100,000
1/3 accept a conversion to creel @£35,000
And 1/3 accept a diversification grant of approx £50,000
There would be 12 new creel vessels at a cost of £420,000
12 new diversification vessels (diving/tourism/ fish farming/renewable or other fishing) at a cost of £600,000
And 12 decommissioned vessels at a cost of £1,200,000
The total for such a scenario would be £2,220,000

The figures quoted are illustrative and are not suggestions of actual amounts that should be spent but attempt to suggest options and bring the possibilities into perspective. Based on the assumptions above it would cost about between three and ten million to compensate those most disadvantaged for what could be one of the most significant positive fisheries overhauls undertaken within Scotland's inshore fishing industry this generation.

That investment would represent an almost immediate guarantee of sustainable fisheries within 3 miles of land and a significant reduction of effort within the remaining inshore zone. Furthermore it would not just secure the employment of the existing inshore fishermen but potentially create 400 new jobs in the low impact high-value creel sector, boosting both Scotland's local economy and our high value premium exports.

What exactly the vessel owner does would be their choice, however the ability of those presently fishing mobile gear inshore to transfer into the static sector could be assisted as much as possible both to minimise unemployment and to ensure as much support from within the industry as possible.

Decommissioning would be the most expensive option. The vessels accepting diversification or conversion grants would still be employed in the marine sector and would not necessarily be unemployed or displaced from their livelihoods

or communities. Communities that would become more sustainable for future generations by this action.

Funding for diversification or conversion could be extended to some of the 10~12m sector, (assuming a forfeiture of trawl fishing licence).

What about the static sector how could it be controlled and kept from unsustainable expansion?

The present licensing regime would have to be amended such that there was specifically a nephrops entitlement associated with vessels who have a track record of landing nephrops. This would be to stop an influx of effort from other fisheries sectors.

There would also have to be the introduction of a prawn creel entitlement and a prawn trawl entitlement, this would be to facilitate controlled and phased transitions between the sectors.

- Cap existing prawn fleet by introducing a prawn permit for vessels with a track record of landing prawns.
- Issue Trawl/Creel licences based on existing track records of declared gear type. There would require to be both a vessel cap on the amount of vessels deploying static gear and a possible overall gear cap.

A phased reduction in overall gear allowances could be introduced year on year and the initial figure be set near the highest threshold so as to minimise impact to the sector and the market. Which in itself would be useless if it was not also accompanied by a cap on the amount of vessels.

The present NWIFG and SWIFG creel fleet is approx 450 vessels and APPROX 35 under 10m trawl could also require to be accommodated.

There would have to be a mechanism to allow transfer of effort from the small trawl sector. And there would have to be a management plan and processes in place to ensure that the sector was sustainable. Those processes could include but not be limited to increases in minimum landing size and controls on landing berried prawns.

Below: Berried prawn (nephop with roe)

Managing detrimental effects and mitigating negative consequences cont.

For illustrative purposes only!

Year 1:

- A register of creels could be created such that all creels presently deployed by the static sector could be counted and overall static effort assessed.

- A maximum amount of creels deployed by any vessel would be set (eg2000).

- Gear deployed outside 3 miles would be subject to extra marking requirements. A larger buoy and or Dan buoys (AIS etc) , which could be phased in, such that static vessels operating outside 3 miles have different requirements to those operated within 3 miles, this could also discourage static operators from moving back and forth between zones.

Year 2:

- An assessment must be made of overall static effort and expansion room and fleet under/ over capacity with a priority given to issuing new licences to operators transferring/converting from mobile sector prioritising those from the under 10m mobile sector first.

- All deployed creels would require to be fitted with a “tag” to prove its registration.

- The maximum number of creels deployable within 3 miles of land per vessel would be reduced to 1800. Gear found not to be registered or tagged would be subject to fine and repeated offences forfeiture of licence.

- Phased increase in minimum landing size would be introduced such that it would become unlawful to land prawns smaller 32mm.

Year 3:

- Maximum gear deployable within 3 mile area would be further reduced to 1600 creels per vessel (approx 50% of that deployed by the largest operators at present). This figure would be dependant upon the outcome of the gear/sustainability assessment

Above: Herring netters, Kyle, c1900

Above: Fishing fleet, Kyle, 1990s

carried out in year 2 as well as the level of conversion uptake from the mobile sector and adjusted accordingly.

- Minimum landing size will be increased such that 3’s will be the smallest grade landable and the grade of 4’s will become obsolete.

Points worth considering are:

- 36 under 10m prawn trawlers may be decommissioned, converted to creel vessels or could diversify and would require to be compensated and or licensed with creel entitlement at a cost of Approx. £3~5,000,000

- A further budget of Approx. £5~7, 000,000 could be made available to assist in restructuring (decommissioning) the inshore mobile 10~12meter fleet on a bidding process, or a 6 mile limit on vessels over 12m imposed. Or both!

Above: Trawl fleet, Kyle, 1980s

Above: The last trawler based in Kyle, sold September 2018

Below: Environmentally low impact creel fisherman,
Alistair (Snoddy) Macleod, Applecross

Conclusion

The removal of the three mile limit has proven to be an unmitigated environmental and economic disaster of epic proportions.

A 98% decline in fin-fish landings from the former three mile limit area, with a degradation and consequent simplification of the inshore ecosystem and a domination of the former three mile limit area by high impact/low value fisheries methods. This is not the only option available to us.

There is the real possibility that we can substantially improve the health of our inshore ecosystem and our inshore fishing industry in a relatively short space of time and with relatively little effort. The improvement could be so substantial as to double the amount of fishermen employed inshore, double the amount of vessels operating inshore and double the revenues generated from the area.

Remarkably it should be possible to do all this without increasing the present catch, and do so with substantially less environmental footprint. Further still the implementation of this proposal would simultaneously reduce the bethnic disturbance, discard and by-catch ratios for those fisheries to practically zero.

Researched and compiled By A.Philp. Document by M.Philp.

SCFF

SCOTTISH CREEL FISHERMEN'S FEDERATION

Cover image: Extent of the historic 3 mile limit (Open Seas)