Welsh Governments call for evidence on shore-based netting in Wales

The purpose of Welsh Government's Shore Based Netting Review was to open discussions about the need for additional regional or national protections to prevent migratory fish bycatch by shore set nets in Wales. Natural Resources Wales (NRW) provided advice on salmonids in January 2023 to inform the Welsh Government's Review.

Shore set nets have the potential to bycatch other protected species. The following sections provides you with NRW's risk-based advice and references to some relevant evidence sources with respect to potential migratory fish, elasmobranchs, seabird, and marine mammal bycatch in shore set nets in line with Goal 8.1 of the Sea Bass FMP published in December 2023.

Migratory fish

The bycatch of twaite shad, allis shad, river lamprey and sea lamprey, Habitats Directive Annex II fish species, in shore set nets is possible, as bycatch has been reported in these (or similar) nets in the UK. For example, Maitland and Lyle (2005) reported bycatch of numerous allis shad and twaite shad in salmon stake nets on the Solway Firth (mesh size presumed 90mm as per Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003). Hillman (2003) reported salmon nets men and other commercial fishing operations routinely capturing shad as bycatch in the Tamar Estuary. Ellis et al. (2008) reported capture of a twaite shad in a set net with mesh size of 263mm, and Northridge et al. (2015) reported bycatch of shad in gill nets and wreck nets. The ICES Working Group on Bycatch of Protected Species (WGBYC) has reported numerous incidents of bycatch of shads in many fishing gears, including in static net gears, and Elliott et al. (2023) reports bycatch of both shads and lampreys in net fishing gears. Finally, Aprahamian (1982) obtained twaite shad in the Severn Estuary bycaught in salmon drift nets (144 shad) and the historic salmon putcher ranks (309 shad) .

The ongoing Bangor University Fisheries Industry Science Partnership (FISP) Project on bycatch in nets by has recently recorded the bycatch of shad species.

For netting with smaller mesh sizes (<65mm) associated with fishing for shrimps, prawns, mackerel, herring, sprats, whitebait and sandeels etc., bycatch of shads and lampreys is considered to be more likely depending on the time of year and location. For netting with larger 89mm or 100mm mesh sizes, bycatch of shads and lampreys is considered to be less likely by virtue of more fish being able to pass through or escape from the net should they encounter it, but still possible in some instances. Bycatch risk in nets >89mm will be higher

if conducted during key time periods and locations, and low-medium risk if conducted outside these key time periods and locations.

Recent tracking data from Swansea University has shown that adult shad spend considerable time feeding inshore in shallow bays. River lamprey mainly feed in estuaries, while sea lamprey have been shown to migrate farther from the coast/offshore. However, as all species migrate into freshwater to spawn, a key sensitive time periods for these species in terms of bycatch risk in shore set nets would be their spawning migration, when adults move to freshwater to spawn. They will be found in much larger densities in the marine environment during their spawning migration as they congregate in inshore coastal and estuarine waters, than during the remainder of their marine residency phase where they are more widely distributed. Adult individuals, during their spawning migration, will also be of a size where becoming caught in the nets is more likely, compared to during their juvenile migrations or sub-adult marine residency/feeding phases. Ensuring adults return to freshwater to spawn is essential for maintaining the population.

Adult spawning migration periods in inshore coastal and estuarine waters are as follows:

- Twaite shad and allis shad – mid-April to mid-June
- River lamprey – October to December
- Sea lamprey – April and May

Key sensitive locations for these species at these times will be the estuaries and nearby inshore coastal waters of the rivers where there are spawning populations, some of which are Special Areas of Conservation (SACs) for the species. There is a risk of bycatch of these species in other areas around the Welsh coast, but this advice highlights what we consider to be the highest risk areas for bycatch.

Key adult spawning migration areas are as follows:

- **Twaite shad and allis shad –** Severn Estuary (inc. Wye Estuary and Usk Estuary); Three Rivers Estuaries (Taf, Tywi and Gwendraeth) and Carmarthen Bay; Dyfi Estuary; Mawddach Estuary; Dwyfor Estuary.
- **River lamprey and sea lamprey** – Severn Estuary (inc. Wye Estuary, Usk Estuary, Ebbw Estuary and Rhymney Estuary); Swansea Bay (inc. Tawe Estuary, Afan Estuary and Neath Estuary); Burry Inlet (inc. Loughor Estuary); Three Rivers Estuaries (Taf, Tywi and Gwendraeth Estuaries); Eastern and Western Cleddau Estuaries and Milford Haven Waterway; Teifi Estuary; Aeron Estuary; Dyfi Estuary; Mawddach Estuary; Y Foryd (inc. Gwyrfai Estuary); Seiont Estuary; Conwy Estuary; Clwyd Estuary; Dee Estuary.

Areas not included in the Welsh Government's Byelaw and Bass Nursery Area maps are:

- **Twaite shad and allis shad** – some parts of the Severn Estuary; the inner parts of the Three Rivers Estuaries (Taf, Tywi and Gwendraeth); some parts of Carmarthen Bay.
- **River lamprey and sea lamprey** – some parts of the Severn Estuary; western Swansea Bay; the inner parts of the Loughor Estuary; the inner parts of the Three Rivers Estuaries (Taf, Tywi and Gwendraeth); the inner parts of the Eastern and Western Cleddau Estuaries; the Milford Haven Waterway; the outer Conwy Estuary; the outer Dee Estuary.

NRW have provided Welsh Government with a number of high level generic AWFA assessments on Habitats Directive Annex II protected fish species interactions with nets which summarise potential impact pathways and available evidence:

2024.07.25 Drift Nets on River and Sea Lamprey FINAL.docx
2024.07.24 Fixed Nets on River and Sea Lamprey FINAL.docx
2024.07.25 Drift Nets on Twaite and Allis Shad FINAL.docx
2024.07.24 Fixed Nets on Twaite and Allis Shad FINAL.docx
2024.07.25 Drift Nets on Salmon FINAL.docx
2024.07.24 Fixed Nets on Salmon FINAL.docx

Fish species will have varying resilience to the impacts of bycatch which may differ depending on population status. Additionally, shore set nets may not be the biggest contributing factor to the bycatch of Annex II fish species e.g. inshore nets set by boats or entrainment in power stations water intakes will also have the potential to remove these species.

There are other fish species of conservation importance at credible risk of bycatch in shore set nets, which are not protected under Annex II of the Habitats Directive, that Welsh Government should consider. These include species on the Environment Wales Act 2016 interim Section 7 list and the Wildlife and Countryside Act 1981 Schedule 5.

A number of fish species, including bass, which can be targeted and bycaught in shore set nets are also prey species of protected marine mammal and bird MPA features, such as sandeel, herring, plaice, sole, mackerel etc.

Fish dimensions

Twaite shad and allis shad
- Fineness ratio – minimum body depth=4.75* standard length (used sprat and herring fineness ratio from Turnpenny, 1981)
- Adult length – 25-37cm twaite shad; 37-58cm allis shad (Population models developed for Hinkley Point C; Maitland and Hatton-Ellis, 2003)
- Adult width – up to 7.79cm twaite shad, up to 12.21cm allis shad

River lamprey and sea lamprey
- Fineness ratio – minimum body depth=16*standard length (used eel fineness ratio from Turnpenny, 1981)
- Adult length – 8-41cm river lamprey, 40-100cm sea lamprey (Maitland, 2003; Claridge et al., 1986)
- Adult width – up to 2.6cm river lamprey, up to 6.25cm sea lamprey

ICES Working Group on Bycatch of Protected Species (WGBYC) reports:
- Working Group on Bycatch of Protected Species (dtu.dk) 2017
- Working Group on Bycatch of Protected Species (WGBYC) (figshare.com) 2022
- Working Group on Bycatch of Protected Species (WGBYC) (figshare.com) 2023
- Working Group on Bycatch of Protected Species (WGBYC) 2024

References

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- Claridge, P. N., Potter, I. C., and Hardisty, M. W. (1986) Seasonal changes in movements, abundance, size composition and diversity of the fish fauna of the Severn

Estuary. Journal of the Marine Biological Association of the United Kingdom 66: 229-258.
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- Northridge, S., Kingston, A. and Thomas, L. (2015) Annual report on the implementation of Council Regulation (EC) No 812/2004 during 2014
- Turnpenny, A. W. H. (1981) An Analysis of Mesh Sizes Required for Screening Fishes at Water Intakes. Estuaries 4: 363-368.

Elasmobranchs

Shore set netting is rarely, if ever, used to target elasmobranch species in Welsh inshore waters. However, the bycatch of elasmobranchs in shore set nets is possible given the mesh size of the nets and the intertidal foraging behaviours shown by many species in this group.

Many elasmobranch species in Welsh waters are of conservation importance:

- Basking shark and angelshark are listed on Schedule 5 of the Wildlife and Countryside Act 1981.
- Basking shark, common skate, tope shark, porbeagle shark, blue shark, blonde ray, thornback ray, undulate ray, white/bottlenosed skate, spiny dogfish and angelshark listed on Section 7 of the Environment (Wales) Act 2016.
- Basking shark, angelshark, common blue skate, tope, gulper shark, leafscale gulper shark, white skate, flapper skate, sandy skate, and common smoothhound listed as OSPAR Threatened and/or Declining species.
- Basking shark, angelshark, common blue skate, tope, gulper shark, leafscale gulper shark, white skate, flapper skate, sandy skate, common smoothhound are listed as endangered or critically endangered on the IUCN Red List.

Principally, the species at risk of bycatch with shore set nets would be juvenile ray species using inshore and intertidal areas as their nursery grounds.

In particular, we highlight the ongoing work via Angelshark Project: Wales (Welsh - Angel Shark Conservation Network) and Project SIARC (SIARC | Sharks Inspiring Action and Research with Communities) on the angelshark, common stingray, spurdog, tope, flapper skate and blue skate.

It is not possible to identify specific areas where shore set netting could be conducted without the risk of elasmobranch bycatch. However, key known areas where there are high abundances of elasmobranch species are Carmarthen Bay, Tremadog Bay and Red Wharf Bay/Conwy Bay. Ellis et al. (2012) indicates nursery areas for spotted ray, thornback ray and tope in these areas, and Barker et al. (2022) has modelled angelshark habitat suitability in Welsh waters, with Tremadog Bay highlighted as a key area.

The ongoing Bangor University Fisheries Industry Science Partnership (FISP) Project on bycatch in nets by has recently recorded the bycatch of elasmobranch species, including a juvenile angelshark. Other recent evidence of elasmobranch bycatch in wider subtidal netting is available in Silva and Ellis (2019) and Clarke et al. (2024).

The ICES Working Group on Bycatch of Protected Species (WGBYC) has reported numerous incidents of bycatch of elasmobranchs in many fishing gears, including in static net gears.

ICES Working Group on Bycatch of Protected Species (WGBYC) reports:

- Working Group on Bycatch of Protected Species (dtu.dk) 2017
- Working Group on Bycatch of Protected Species (WGBYC) (figshare.com) 2022
- Working Group on Bycatch of Protected Species (WGBYC) (figshare.com) 2023
- Working Group on Bycatch of Protected Species (WGBYC) 2024

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- Silva, J. and Ellis, J. R. (2019) Bycatch and discarding patterns of dogfish and sharks taken in English and Welsh commercial fisheries. Journal of Fish Biology 94: 966-980 https://doi.org/10.1111/jfb.13899

Seabirds

There are a large number of marine bird species found around the coast of Wales that could be vulnerable to bycatch in shore set nets where netting is permitted.

Numerous species gather in colonies during the spring and summer months to breed, with other species migrating to Wales during the autumn and winter months to overwinter in our inshore waters and estuaries. Some of the areas where birds breed and overwinter are designated as Special Protection Areas (SPAs) and Sites of Special Scientific Interest

(SSSI). The bird features of these sites are protected both within and outside of their sites and may have large foraging ranges.

In 19 August 2024, three Cormorants were recorded as bycatch in a shore set net near Conwy. These birds could have been features of a number of SPA and or SSSIs, including, Puffin Island SPA and Liverpool Bay SPA.

Bangor Universities current FISP Project on bycatch in nets has recently recorded numbers of birds as bycatch.

We have not identified any further specific evidence of bycatch of seabirds in shore set nets in Wales, but that is likely due to the limited amount of bycatch monitoring and reporting conducted, rather than evidence of the absence of bycatch occurring.

Diving seabirds are considered to have the highest risk of an interaction with shore set nets, they include:

- Cormorant, Shag, Puffin, Guillemot, Razorbill, Black guillemot, Red-throated diver, Red-breasted merganser, Common scoter, Common eider, Great crested grebe, Gannet and Manx shearwater

Herring gulls, Lesser black-backed gulls and Northern fulmar could also be at risk of bycatch in shore set nets if they are pursing ensnared fish.

In general, populations of breeding diving bird in Wales have been increasing over the last 20 years. Guillemot, Razorbill, Puffin and Manx shearwater have increased by 76%, 82%, 197% and 186% respectively (Burnell et al, 2023). It appears that any bycatch from shore set nets has not adversely affected the populations of these seabirds.

A number of these diving birds migrate away after breeding during the spring and summer and return the next summer to breed again, although Razorbill and Guillemot return earlier around midwinter.

Black guillemot have increased by a level of 15% in the last twenty years. These birds do not migrate and will winter in the same areas as they breed and therefore could be at risk of bycatch in shore set nets all year round.

Gannets have also increased by 12% over the last 20 years but have recently been severely affected by avian flu reducing the population by 55% on Grassholm SPA. (Burnell et al, 2023) (Tremlett et al, 2024)

Shag and Cormorant species are found around the Welsh coast all year round and have reduced in numbers over the last 20 years by 17% and 29%, respectively. Cormorant is a breeding feature of Puffin Island SPA and part of the wintering assemblage of Liverpool Bay SPA and The Dee SPA. Cormorants from Puffin Island can disperse widely but a number of them will probably winter in Liverpool Bay. The Cormorants found dead in the net at Colwyn Bay on the 19 August 2024 could well be part of the Puffin Island SPA population as well as the Liverpool Bay SPA wintering population (Burnell et al, 2023).

Welsh government, NRW, RSPB are currently working on the Welsh Seabird Conservation Strategy which may be produce recommendations to reduce mortality from bycatch for some populations.

Evidence within Regulation 37 packages can be referred to for relevant SPAs Natural Resources Wales / Conservation Advice for European marine sites (Reg 37)

NRW have provided Welsh Government with a number of high level generic AWFA assessments on Bird's Directive species interactions with nets which summarise potential impact pathways and available evidence:

2023.04.07 Drift Nets on Benthic Feeding Seabirds.docx
2023.04.07 Drift Nets on Pursuit and Plunge Diving Birds FINAL.docx
2023.01.04 Fixed Entangling Nets on Benthic Feeding Seabirds FINAL.docx
2023.02.23 Fixed Entangling Nets on Pursuit and Plunge Diving Birds FINAL.docx
2023.01.04 Fixed Gill Nets on Benthic Feeding Seabirds FINAL.docx
2023.02.23 Fixed Gill Nets on Pursuit and Plunge Diving Birds FINAL.docx
2023.01.04 Fixed Trammel Nets on Benthic Feeding Seabirds FINAL.docx
2023.02.23 Fixed Trammel Nets on Pursuit and Plunge Diving Birds FINAL.docx

References

- Burnell, D., Perkins, A.J., Newton, S.F., Bolton, M., Tierney, D.T. & Dunn, T.E. (Eds) 2023. Seabirds Count. A census of breeding seabirds in Britain and Ireland (2015-2021)
- Tremlett,C.J., Cleasby, IR, Bolton, M & Wilson, L.J. 2024 Declines in UK breeding populations of seabird species of conservation concern following the outbreak of high pathogenicity avian influenza (HPAI) in 2021–2022 Bird Study

Marine mammals

The potential 'risk' areas and timings for bycatch of marine mammals in shore set nets will depend on the location and timing of the netting, for which there is little information. This is a significant evidence gap.

Nevertheless, we have good information on the distribution, abundance, and timing of marine mammals around Wales:

NRW recently compiled marine mammal data layers to inform consenting considerations Natural Resources Wales / Mapping environmental considerations for marine planning. The spatial source maps from that Project may be of use.

For cetaceans (and seabirds) the following provides density and sighting maps for a 30-year dataset. However, it is biased to offshore distributions rather than very close to shore. 646: Modelled Distributions and Abundance of Cetaceans and Seabirds of Wales and Surrounding Waters (naturalresources.wales).

For distributions and abundance of seals at sea, the best source is the following Frontiers | Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management (frontiersin.org)

For shore based data on hauled out seals and pupping, DataMapWales Home | DataMapWales (gov.wales) contains a composite map of seal pupping and haul out sites.

We recently commissioned an aerial survey of the whole of Wales to census hauled out seals during summer. This report (Thompson in prep) will be available soon, but in terms of seal site distribution, the data does not differ markedly to that already in DataMapWales.

Bangor Universities current FISP Project on bycatch in nets has recently recorded the bycatch of a single seal pup, which was successfully released alive.

Evidence within Regulation 37 packages can be referred to for relevant marine mammal SACs Natural Resources Wales / Conservation Advice for European marine sites (Reg 37). For the more recent (2019) harbour porpoise SACs around Wales, the following resource links are relevant: Bristol Channel Approaches / Dynesfeydd Môr Hafren MPA – Relevant Documentation & Conservation Advice | JNCC Resource Hub, North Anglesey Marine / Gogledd Môn Forol MPA – Relevant Documentation & Conservation Advice | JNCC Resource Huband West Wales Marine / Gorllewin Cymru Forol MPA – Relevant Documentation & Conservation Advice | JNCC Resource Hub.

Typically, an HRA for marine mammals not only considers impacts within SACs but also those outside of site boundaries (offsite impacts), usually within the respective Marine Mammal Management Units. This is due to the mobile nature of marine mammal features and their functional linkage to habitat outside of the SAC boundaries: Natural Resources Wales / Marine mammal management units in habitat regulations assessments

Together, these species resources provide information on the probable areas and 'seasons' that are potentially more 'risky' for each species. However, given the mobility of these species, no single area can be identified as without risk.

The greatest risk of bycatch from shore set nets, in NRW's opinion, would be to harbour porpoise and grey seal. Bycatch of bottlenose dolphin is not common. Common dolphin bycatch is high in Celtic Seas but typically occurs offshore. And while there is also high bycatch of grey seals in Celtic Seas, this is also largely in offshore fisheries; however, shore set netting is clearly a risk factor for grey seal due to potential proximity to haul out and pupping sites.

For harbour porpoise, the level of bycatch in Celtic/Irish Seas region is high and largely from offshore/inshore boat-based fisheries. Crucially, the amount of bycatch is beyond what modelling suggests the species population can support. NRW has produced information on the risk of removals for Annex II (SAC) marine mammal species: Natural Resources Wales / Marine mammal mortality and adverse effect on site integrity.

OSPAR QSR23 recently assessed bycatch in the OSPAR Regions (e.g. Celtic/Irish Seas) and represents the most up-to date assessment of bycatch risk Marine Mammal By-catch (ospar.org). The MMO in their Stage 4 assessments of fishing on harbour porpoise SACs (Bristol Channel Approaches) should be published in due course with more localised assessment of bycatch in and around Bristol Channel Approaches SAC.

In general, the risk of bycatch to marine mammals can occur year-round. There is a perception that risk of capture during breeding, gestation, calving/pupping, and nursing time, might be greater and would have greater consequences due to the dependencies of young – as was evidenced in the recent harbour porpoise bycatch event (likely mother and juvenile) on 19 August 2024. Timing of risk, however, will be species specific, but capture at other times of the year still remains a risk and is not without consequences (e.g. carry-over effects).

NRW have provided Welsh Government with a number of high level generic AWFA assessments on marine mammal interactions with nets, which summarise potential impact pathways and available evidence:

2022.03.16 Fixed Entangling Nets on Bottlenose Dolphin FINAL.docx
2022.03.16 Fixed Entangling Nets on Grey Seal FINAL.docx
2022.03.16 Fixed Entangling Nets on Harbour Porpoise FINAL.docx
2022.03.16 Fixed Gill Nets on Bottlenose Dolphin FINAL.docx
2022.03.16 Fixed Gill Nets on Grey Seal FINAL.docx
2022.03.16 Fixed Gill Nets on Harbour Porpoise FINAL.docx
2021.05.31 Fixed Trammel Nets on Bottlenose Dolphin FINAL.docx
2022.03.16 Fixed Trammel Nets on Grey Seal FINAL.docx
2022.03.16 Fixed Trammel Nets on Harbour Porpoise FINAL.doc

Otters

There is no evidence NRW can find to suggest shore netting negatively impacts otters. However, just because there is limited evidence of this happening does not mean it cannot or does not happen. NRW would advise a cautious approach to allowing shore netting in coastal locations where otters are known to be present. It would make sense to restrict or manage shore set netting within areas of marine SAC's where otter is a feature, such as Pembrokeshire Marine SAC.

18 February 2025.