



Commercial Trial of Fishtek “Banana Pinger” Cetacean Deterrent

Dr Andrew Woolmer, April 2015

Background

The commercial fishing industry is subject to increasing levels of scrutiny from the public, environmental NGOs and the media. Amongst these groups cetaceans such as whales, dolphins and porpoises often have the highest profile and are subject to a great deal of conservation focus. Concerns have been raised over the incidental bycatch of protected species, particularly cetaceans, over the past 20 years. As a consequence the accidental bycatch of cetacean species has become an increasingly important part of fisheries management.

Cetacean bycatch is addressed by EU Council Regulation 812/2004, which mandates the use of acoustic deterrent devices (pingers) for all >12 metre (m) vessels using static nets in ICES Divisions VII d,e,f,g,h,j (Celtic Sea and the English Channel), as well as in some more specific fisheries in the North Sea (Subarea

IV)¹. The Marine Strategy Framework Directive (MSFD) requires member states to ensure that the marine ecosystem is maintained in ‘Good Environmental Status’ (GES). Bycatch and abundance levels of sensitive species are an important component of such assessments.

The Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (Ascobans) requests that Parties and Range States develop and implement national plans of action or similar measures to reduce the bycatch of small cetaceans. In the UK this is implemented in the UK Small Cetacean Bycatch Reduction Plan, and the UK’s Biodiversity Action Plans for various marine species.

At the time of writing proposals for a UK wide series of Harbour Porpoise Special Areas of Conservation have been released. In Wales these are large areas of sea extending from the shore to the median line.

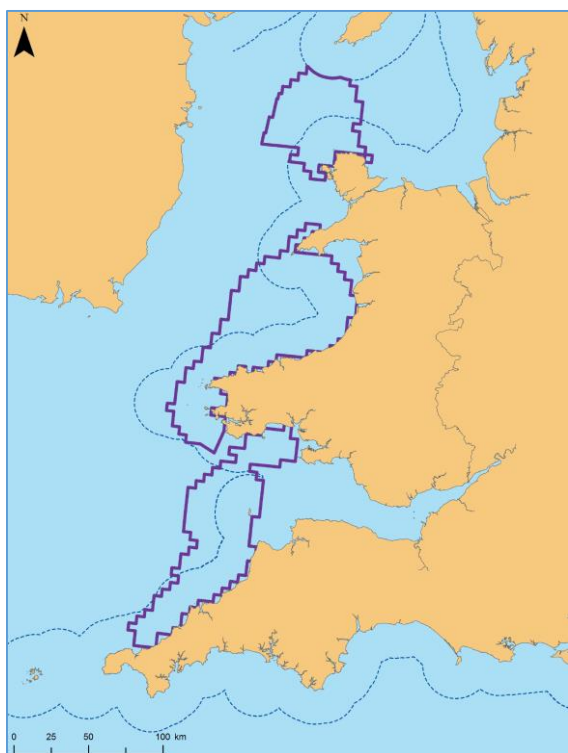


Figure 1. Areas under consideration as Harbour Porpoise SACs around Wales

The situation in Wales

Eighteen species of cetacean have been recorded in Welsh seas over the last 30 years². Five species are amongst the most commonly reported; harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), short-beaked common dolphin (*Delphinus delphis*), Risso’s dolphin (*Grampus griseus*) and minke whale (*Balaenoptera acutorostrata*).

The harbour porpoise is the most common and widely distributed species around Wales and present all year round in some areas. Harbour porpoise sightings are known to occur in ‘hot spots’ around Wales including North and West Anglesey (around Point Lynas & South Stack, Holyhead), the southwest coast of

¹ <https://www.gov.uk/reduce-dolphin-and-porpoise-by-catch-comply-with-regulations>

² Baines, M.E. and Evans, P.G.H. (2012). Atlas of the Marine Mammals of Wales. CCW Monitoring Report No. 68. 2nd edition. 139pp.

the Llyn Peninsula, southern Cardigan Bay, off Strumble Head and Skomer & Ramsey islands, and in the Bristol Channel off the Gower Peninsula and in Swansea Bay.

Among the marine mammals, harbour porpoises and common dolphins are most frequently bycaught in certain static net fisheries in British waters, while common dolphins are also bycaught in some pelagic trawl fisheries. The Welsh fishing fleet are characterised by under 10 m vessels, the majority of which employ static gears. Although static nets are generally considered to represent the main risk to cetacean species, these are mainly the larger nets used in offshore fisheries that can extend 1000s of metres. The static nets used by Welsh fishermen are smaller and this may be reflected in the current low estimates of harbour porpoise bycatch in Wales (4 in 2014).

The most recent Article 17 reports on harbour porpoise and other cetacean species status have been favourable at a UK level³. Natural Resources Wales believe that bycatch levels in Welsh waters are minimal although a thorough review of this assessment is planned. Management of harbour porpoise and other cetaceans is undertaken to Management Unit (MU) level. In Wales this is at the scale of the Celtic and Irish Seas (MUs), and therefore NRW has to consider bycatch in the wider area, especially in the SW Approaches where bycatch is considerable. This wider consideration will influence official view on the status of harbour porpoises in Welsh waters and the Management Unit.

Although the current assessment of bycatch of cetaceans and particularly harbour porpoises is not considered by NRW to be significant in Wales (pers com, Tom Stringer NRW), in the context of the designation of new large SACs, there is concern that WFA members could be faced with precautionary management measures, such as area closures, should suitable mitigation measures be unavailable.

WFA position

No fisherman wants to catch a porpoise or dolphin in his nets and will do their best to avoid doing so. The Welsh Fishermen's Association (WFA) supports any practical solution to reduce residual risk of entanglement of cetacean species. Irrespective of the current assessment that there is a low risk of entanglement in Wales and that those that do occur are not affecting the wider population, WFA members wish to investigate the use of low-cost but effective acoustic deterrents such as those manufactured by Fishtek.

The current proposals for Harbour Porpoise SACs presents an additional driver for WFA to identify and adopt, where appropriate, practical mitigation measures to reduce the residual risk of entanglement.

Acoustic Deterrents

Pingers are acoustic deterrents that warn cetacean species of the presence of fishing nets in order to reduce the risk of entanglement. Deployment of these devices has been credited with successfully reducing bycatch in offshore static net fisheries and pelagic trawl fisheries around Europe following their statutory introduction in 2004^{4,5}.

Small cetaceans including harbour porpoises, common dolphins and bottlenose dolphins, all common around Wales, have the ability to acoustically detect nets at short distances from the gear. The mechanism through which pingers work is not clearly understood but it is thought that pingers may act to alert approaching cetaceans and induce them to echolocate and detect the nets, conversely pingers may act as a deterrent causing cetaceans to turn away from the source of the pings.

³ http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1351_UK.pdf

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:150:0012:0031:EN:PDF>

⁵ http://www.ascobans.org/sites/default/files/document/NSG4_Inf_3.1.1.b_UK_812report2013.pdf

Fishtek Banana Pinger

The Banana Pinger meets the criteria set by the European Union Council Regulation 812/2004 for pingers that can be used at 200m spacing on nets (Set1). It produces pings with randomised intervals between pings of 4 to 12 seconds. Each ping last 0.3 seconds and contains a series of frequencies in a random order, with each lasting 20ms or more. The frequencies range from 50 to 120 kHz and are above the level of seal hearing. The sound output is distributed radially evenly and overall meets the 145dB re 1uPa @ 1m level set in the regulation.



Figure 2. Fishtek Banana Pinger fitted to the footrope of a static net.

Banana Pinger field trials Cornwall

In 2013 a detailed field trial of the Fishtek Banana Pinger was carried out in a collaborative research study involving fishermen and Cornwall Wildlife Trust⁶. This study assessed whether a newly available cost-effective design of acoustic deterrent, the Banana Pinger, would be effective and practical for use on smaller vessels which represent the majority of the UK fleet.

The trial took place from 4 vessels operating around Cornwall and the efficacy of the pingers was measured using acoustic instruments known as 'C-PODS' which are able to detect the presence of cetaceans nearby.

The trial showed that the detection rate of porpoises in the vicinity of nets fitted with pingers was reduced by 82%. This reduction is considered to indicate a large reduction in risk of entanglement for in porpoises and exceeds previously reported results for other commonly used pinger designs.

The trial also investigated behavioural effects of the pinger on porpoise and dolphins, such as long-term displacement, habituation, or attraction (the 'dinner bell' effect). There was no decrease in pinger effect over the 8 month period of the trial, proving that habituation was not an issue. In addition there was no form of attraction to the pingers and the deterrent effect was maintained throughout the trial.

Conclusions drawn from the Cornwall Wild Life Trust study:

"The study gives strong evidence that the Banana Pinger is a practical and effective way of reducing porpoise bycatch in set nets, and provides the strongest evidence of any study that habituation of porpoises to pingers is unlikely to be a significant issue."

⁶ http://www.ascobans.org/sites/default/files/document/NSG4_Inf_4.3_BananaPinger.pdf

Aims of the Current Trial

Avoiding duplication of the Cornwall WLT trials the current trial was not to determine the efficacy of the pingers as deterrent or warning device but to establish any issues with their use under commercial fishing conditions. As a collaborative project there were aims specific to both partners:

Fishtek

- Identify any issues with operational use on board Welsh inshore vessels and investigate how the experience on Welsh boats compares with other trials.

Welsh Fishermen's Association

The WFA's central aims for this trial were twofold:

- Establish the practicality of using Banana Pingers as an entanglement mitigation measure in a Welsh context, from typical Welsh fishing vessels and commonly employed gears types.
 - Were there practical limitations to using these devices on static nets?
 - Were there any unforeseen implications of deploying these devices?
- Introduce the concept to fishermen and as means to raise awareness of bycatch issues.

Methodology

In order to ensure that as wide a geographic area and diverse user group of fishermen were included in the trial, 6 vessels were issued with Banana Pingers around Wales (Figure 2). 30 pingers were distributed amongst the fishermen with instructions of how to fit them to their nets.

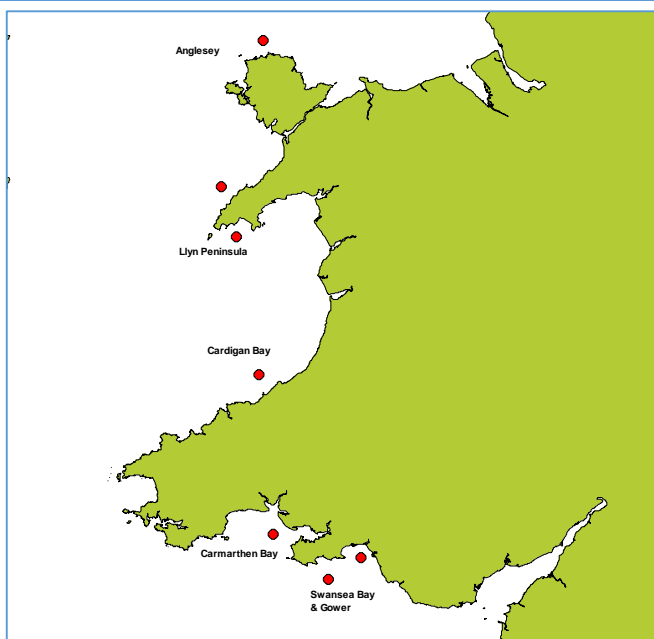
The Banana Pinger has a 200 m effective deterrent range and are either fitted to the footrope or head rope in the centre of short nets or at 200 m intervals on longer nets.

The method of rigging the Banana Pingers was developed by the commercial fishermen involved in an earlier study by Fishtek. The placement of pingers on the footrope rather than the head rope in some cases was thought to reduce the stress on the pinger due to lower tension on the footrope during hauling.

A variety of small inshore vessels were select fishing static gears and targeting variety of species. Methods employed include static gill nets for bass and demersal species, static nets for herring, and bottom-set tangle nets for ray and spider crabs.

The Banana Pingers were deployed in May 2014 to take advantage of the busy summer fishing season.

A structured questionnaire was developed to capture key procedural information and designed to tease out any practical issues with using these devices. These were collected in early spring 2015 after the winter layup period.



Results

The results section presents the responses compiled from the questionnaire.

Size of boat:

Vessels in this study ranged from 5.2m to 10m.

Type of nets:

The main net types used by the Welsh <10 m vessels in this trial were:

- Trammel nets
- Skate/Ray/Turbot tangle nets
- Surface gill nets
- Bottom set gill nets
- Spider crab tangle nets

Length of nets:

The main net lengths (fleet) used by the Welsh <10 m vessels in this trial ranged from nets of 100-150 m to nets of between ~730-900 m (800-1000 yards).

Nets of mesh < 150 mm are limited to 200 m length in Wales.

Tangle nets with mesh >200 mm are commonly used in fleets of between ~730-900 m (800-1000 yards).

Target species:

The main target species for the Welsh <10 m vessels in this trial were:

Finfish	Shellfish
Bass	Spider Crabs
Cod	Crawfish (Very rare)
Mullet	
Pollack	
Skate & Rays	
Monkfish	
Plaice	
Brill	
Turbot	
Sole	

Comments on ease of use of pingers:

A variety of comments were received on the general ease of use of the Banana Pingers all reflecting that once fitted they were essentially forgotten about. This “fit and forget” aspect was seen as positive aspect of their use as any additional tasks for the fishermen were thought to be a potential barrier to their further adoption by participants.

The flashing LED indicator of operation and battery condition was considered to be a useful function as this was easily observed especially in low light conditions.

Do the pingers affect netting operation?

None of the respondees highlighted any significant issues that affected netting operations. Two respondees noted that on occasion the Banana Pinger caught on obstructions during shooting, but a follow up call revealed that this was no more unusual than having occurred with a head rope boy.

This was also thought to be exacerbated by the temporary fitment with zip ties rather than permanent fitment when threaded on the footrope.

There were no issues reported during hauling.

Any porpoise or dolphin activity or bycatch?

No instances of cetacean bycatch were recorded by these 6 vessels during this period.

Follow up telephone calls revealed that Harbour Porpoises were commonly seen by participating fishermen around their fishing grounds and that large pods of Common Dolphins had been seen in the Bristol Channel during this period.

No dolphins or porpoises were observed in very close proximity to the nets fitted with pingers (<100 m) despite being seen in the vicinity.

Have you had any problems with dolphin or seal depredation?

One vessel operating in the Bristol Channel reported seal depredation from nets fitted with pingers. A follow up phone call revealed that this occurred on 3 occasions but it was unclear whether this was due to the presence of the Banana Pinger or not, as other non-pinger nets were affected. Seal depredation is considered by local fishermen to be a common issue in some areas of South Wales.

The other vessels in the trial reported no instances of seal or dolphin depredation.

Have you used any other types of pinger in the past and if so which brands?

None of the fishermen in the trial had used other brands of pinger in the past.

As a result of your trials with the Banana Pinger would you consider using pingers in the future?

All of the fishermen who participated in this trial responded that they would use Banana Pingers in the future if it helped to reduce cetacean bycatch.

General Feedback

A common theme from discussions with individual fishermen in the trial was that the potential cost of purchase and maintenance (battery replacement and servicing) could be a barrier to wider adoption. Despite the Banana Pingers being relatively low cost fitting to fleets of nets would still be a burden to small inshore fishermen operating at low profit margins.

Seal depredation was commented upon reflecting the significance of this issue, particularly in South Wales. There was still some concern over possible 'dinner bell' effects and after follow up phone calls there was interest in having depredation trials take place in areas of high seal numbers, where non-pinger fitted nets are commonly affected.

Discussion

The primary aim for WFA was to establish whether the Fishtek Banana Pingers could be safely and practically deployed by Welsh fishing vessels, using commonly employed fishing gears. The responses from the fishermen who participated in the trial were positive and reported no practical issues or limitations that would present a barrier to their wider use.

The WFA were keen for fishermen to trial these devices in order that any unforeseen implications of their use arose. Probably the most significant issue raised during the trial and one that would be a potential barrier for their voluntary introduction, was the question of seal depredation. One participating skipper experienced seal depredation on 3 fleets of nets fitted with Banana Pingers which, although he did not attribute to the Pingers, did give him pause for thought. The follow up discussions with this fisherman highlighted that seal depredation was a common issue experienced by him and his colleagues working along the South Wales coast.

Fishtek advise that the Banana Pinger emits pings in a frequency range from 50 to 120 kHz and are above the level of seal hearing. This being the case it should be impossible for a seal to detect the presence of the net from the operation of a Pinger. In previous trials in Cornwall, Holland and Denmark increased depredation by seals was not an issue (pers. comm Fishtek).

It is suggested that a controlled depredation trial could be conducted in Wales with the aim of robustly determining whether Banana Pingers can increase seal depredation in nets. The local FLAG groups may be a vehicle for funding such trials and collaboration with technical specialists is recommended in order to ensure scientific rigour to trial design and implementation.

On-going costs of maintenance was highlighted as a potential barrier by fishermen. Figures provided by Fishtek suggest that this should not be a barrier to deployment. The pingers have an expected lifetime of over 5 years. Estimated costs (based on a bulk sale price of £40 per unit) work out at around £35/km of net / yr at 200m spacing. This includes purchase price and the cost of the annual battery change. Batteries cost around 50 pence per battery and they last one year of average use (50% of time in water). Apart from the annual battery change there is no servicing. The pinger design with the separate rubber carrier means battery changes are easy and quick. The units can be removed from the net and the battery changed in a dry place, with no need to untie the carrier from the nets.

Also worth noting is the ease with which anyone can check if the pingers are working, which is useful for both skippers and potential observers. The flashing battery indicator tells you it is operational and the number and colour of flashes indicates how much power is left. There is no guess work involved and no acoustic monitoring necessary to check performance. The latter is important for a broadscale deployment as it requires no specialist equipment or technical expertise.

Fishtek are pleased with the outcomes of this small trial as the experiences of the Welsh fishermen reflect those of fishermen in other areas who are using these acoustic deterrents. They are confident that the Banana Pinger has a role in mitigating cetacean entanglement and bycatch, not only offshore where such devices are statutorily required, but inshore under voluntary arrangements.

Next Steps

The current initiative to designate Harbour Porpoise SACs in Wales is of concern to many fishermen who wish to avoid overly precautionary management measures. Cost effective acoustic deterrent devices such as the Fishtek Banana Pinger are viewed as key tools to mitigate the residual risk of entanglement. Many WFA members are willing to voluntarily fit pingers to their nets and the WFA will now develop projects for wider deployment in a phased approach concentrating on cetacean "hotspots" first.

Welsh Fishermen's Association is now going to pursue a number of avenues to secure funding for wider voluntary deployment of these devices, including EU grants and through partnerships with conservation and similar charities.