Pots, Traps & Creels Interactions with Subtidal Mud

1. Introduction

The Assessing Welsh Fishing Activities (AWFA) Project is a structured risk-based approach to determining impacts from current and potential fishing activities (undertaken from licensed and registered commercial fishing vessels), upon the features of European marine sites (EMS) in Wales.

Further details of the AWFA Project, and all completed assessments to date, can be found on the AWFA website.

The methods and process used to classify the risk of interactions between fishing gears and EMS features, as either purple (high), orange (medium) or green (low) risk, can be found in the AWFA Project Phase 1 outputs: Principles and Prioritisation Report and resulting Matrix spreadsheet.

2. Assessment summary

Assessment Summary: **Pots, Traps & Creels Interactions with Subtidal Mud**	**Assessment of impact pathway 1: Physical damage to a designated habitat feature:** No studies were found that directly or indirectly measured or estimated physical impacts of potting on Subtidal Mud or similar habitats. Expert judgement suggests the physical impacts from pots, weights or anchors making contact with Subtidal Mud habitat could cause damage to the substrate. **Assessment of impact pathway 2: Damage to a designated habitat feature via removal of, or other detrimental impact to, associated biological communities:** Direct evidence. expert judgement and indicative MarLIN sensitivity assessments suggest the impacts from pots, weights or anchors making contact with Subtidal Mud habitat could cause damage to some of the biological communities. Confidence in this assessment is **high** (please see section 8).

3. Feature description

Feature Description: **Subtidal Mud**	Sublittoral mud and cohesive sandy mud are found from the shallow areas, below the extreme low water mark (infralittoral) to deep offshore circalittoral habitats. This habitat is predominantly found in sheltered areas where the reduced influence of wave action and/or tidal streams allow fine sediments to settle, such as harbours, sealochs, bays, marine inlets and estuaries and stable deeper/offshore areas (EEA, 2019; JNCC, 2015). The Celtic Deep, located approximately 80km south-west of the Pembrokeshire Coast, has water depths of between 100 and 200m and is a large and important area of Subtidal Mud in Welsh Waters (Defra, 2015). The habitat incorporates a relatively narrow range of sediment types including infralittoral and circalittoral muds and fine mud, sandy muds and muds in variable and low salinity (EEA, 2019; JNCC, 2015). Annex 1 lists Welsh biotopes associated with this feature and the definition of 'biotope'. Subtidal Mud supports a range of animals, both on the sediment surface and burrowing within it. Infralittoral and circalittoral muds typically include polychaetes (*Lagis koreni*, *Melinna palmata*, *Nephtys hombergii, Magelona* spp.) and bivalves (*Thyasira* spp, *Macoma balthica*, *Nuculoma tenuis, Abra nitida, Phaxas pellucidus*). The most common biotopes in Wales are SS.SMu.CSaMu.LkorPpel and SS.SMu.ISaMu.MelMagThy (data from the Marine Recorder Application, 2020). Echinoderms, in particular brittlestars such as *Amphiura filiformis* are also commonly found in more cohesive sandy mud areas particularly associated with the biotope SS.SMu.CsaMu.AfilMysAnit. Sea cucumbers are also present in this habitat, *Ocnus planci* is an abundant component of the biotope SS.SMu.IFiMu.Ocn, present in Wales in Tremadog Bay (EEA, 2019; JNCC, 2015; MarLIN, 2020; Marine Recorder Application, 2020). The relatively stable conditions associated with deep mud habitats often lead to the establishment of distinctive communities of megafaunal species (BRIG, 2011). Seapens are a distinctive component of Subtidal Muds but are relatively uncommon in Welsh waters. In deeper areas with more stable mud, the seapen *Virgularia miriabilis* is associated with biotopes SS.Smu.CfiMu.SpnMeg and is present in the Celtic Deep and North East of Anglesey, just within Welsh Offshore Waters. Burrowing megafauna, including the burrowing crustacean *Nephrops norvegicus,* is also associated with this biotope and burrows of this species have been widely recorded in the Celtic Deep. The echiuran worm *Maxmuellaria lankesteri* is also a characterising example of megafauna from 'Muddy Hollow' in Tremadog Bay, an unusually deep and sheltered area in Wales (NRW, 2018a; Porcupine Natural History Society, 2006). Subtidal Mud habitats in reduced or low and variable salinity are principally characterised by infaunal polychaetes and oligochaetes (EEA, 2019). Some of the characterising species of the low and variable salinity Subtidal Mud habitats are the oligochaete *Tubificoides* spp, polychaetes *Aphelochaeta marioni, Capitella*

	capitata and Nephtys hombergii in the following principal biotopes SS.SMu.SMuVS.AphTubi, SS.SMu.SMuVS.CapTubi, SS.SMu.SMuVS.NhomTubi and SS.SMu.SMuVS.OlVS, found in Wales currently in the Severn Estuary and Milford Haven. Areas of fluid, species poor mud in the biotope SS.SMu.SMuVS.MoMu are found in the Severn Estuary.

4. Gear description

Gear Description: Pots, Traps & Creels	Pots, traps and creels (pots) are rigid cage-like structures designed to capture fish or shellfish species living on or near the seabed (FAO, 2001; Seafish, 2020a). They typically comprise one or more funnel-shaped entrances that guide fish or shellfish into one or more easily accessed and usually baited compartments (FAO, 2001; Seafish, 2020a). UK pot designs, sizes and construction materials vary geographically and according to target species, environmental conditions and fisher's preference (Seafish, 2020a). Top-entry inkwell pots (0.28-0.47 m^2 footprint) and side or top-entry parlour pots or 'D-creels' (0.24-0.55 m^2 footprint) weighing 15-20kg are used to catch crab or lobster and are made from wire, rubber, metal and netting (Gravestock, 2018; Cornwall Creels, 2020; Seafish, 2020a). Solid sided 20-30 litre rectangular containers with holes in the sides (0.09-0.14 m^2 footprint), a mesh funnel at the top, a concrete bottom and weighing 6-12kg are used to target whelks (Channel Pots, 2020; Seafish, 2020c). Lightweight plastic tubular pots with small-mesh sides and funnel entries at either end are used to target prawns (Coastal Nets, 2020; Seafish, 2020a). Pots can be fished individually or in strings (fleets), where several pots are attached to a length of rope, laid along the seabed and marked at either end with a rope to the surface and a marker buoy (Seafish, 2020a). The number of pots in a fleet will depend on factors including pot design, target species, habitat fished, fisher's preference, vessel size and the available deck space to store the pots once they have been hauled (Seafish, 2020b). Fishers can have multiple strings of pots deployed at any one time, hauled following a soak time of 24-48 hours (Seafish, 2020a). Multi-compartment 'parlour' pots generally retain catch for longer periods making them more suitable for longer soak times, whereas single-compartment 'inkwell' pots are subject to more escapees during longer soak times (Swarbrick and Arkley, 2002). Strings of lighter traps, such as prawn creels, use anchors or weights at either end to reduce movement in tides (Seafish, 2020a). Other pots are designed to be heavy or utilise concrete-weighted end-pots that replace the need for anchors or weights (Seafish, 2020b). Strings of pots are deployed (or shot) one at a time whilst the

	boat slowly moves over the target fishing ground (Seafish, 2020a). Single pots are generally set in rocky inshore areas and can be bounced along the seabed until they contact rock or reef (FAO, 2001). Baited pots can capture undersized target species, non-target invertebrates and occasionally fish species (Pantin *et al.*, 2015). However, the use of appropriate-sized mesh coverings, or the addition of large-mesh panels or escape-gaps, can ensure smaller individuals and non-target species are able to escape (Seafish, 2020a).

5. Assessment of impact pathways

Assessment of impact pathway 1	**1. Physical damage to a designated habitat feature (Physical Impacts)** No studies were found that directly or indirectly measured or estimated physical impacts of potting on Subtidal Mud. Assessments based on expert knowledge suggest that potting is of limited concern to Subtidal Mud sediments (Roberts *et al.*, 2010; Hall *et al.*, 2008; JNCC and NE, 2011). If potting were to occur across Subtidal Mud, the general physical impacts from static gear including pots, weights or anchors could cause surface disturbance (e.g. scour marks) in the sediment (JNCC and NE, 2011; Walmsley *et al*., 2015; Gall *et al*., 2020). However, it seems unlikely that impacts from potting would prevent feature recovery in the long term. Where pots are fixed in strings, the retrieval of pots, or incidences of rough weather, could lead to ropes, pots and anchors dragging over or entangling seabed structures, potentially causing physical damage or abrasion to the seabed (MacDonald *et al.,* 1996; Roberts *et al.,* 2010; JNCC and NE, 2011). During spring tides, strong wind and large waves may cause unintentional movement of pots and any associated seabed abrasion could be increased (Eno *et al*., 2001; Sørensen *et al*., 2015; Stephenson *et al.,* 2015). Depending on the footprint and the intensity of potting it is possible that the physical impacts from pots, weights or anchors making contact with Subtidal Mud habitat could cause damage to the substrate.
Assessment of impact pathway 2	**2. Damage to a designated habitat feature via removal of, or other detrimental impact to, associated biological species (Impacts on Biological Communities)** Direct studies considering the impact of potting on the biological communities of Subtidal Mud habitats have been conducted in Scotland (Eno *et al.*, 2001). Burrowing megafauna are found in mud habitats in Wales, but seapen communities are not commonplace in Welsh waters (NRW, 2018a), with *Vigularia miriablis* the only

	known seapen species recorded (NRW, 2018a). Eno *et al.* found that the impacts from potting ranged from low impact to no long-term impact on seapen communities because *V. miriablis* species withdrew into a tube within the sediment to protect itself from damage (Eno *et al.*, 2001). Another study found that it is possible for pots to remove individuals of *V. mirabilis*, however, the impact of this would be community specific i.e. related to density of individuals (Adey, 2007). A further study on mud-specific epifauna suggests 50% of the sensitive and erect epifauna was damaged by entanglement after moderate potting activity, although the sample size is small and may be site specific (Troffe *et al.*, 2005). If potting were to occur across Subtidal Mud, the general physical impacts from static gear, including pots, weights or anchors, making contact with the seabed during gear deployment could cause surface disturbance and abrasion to biological communities (Roberts *et al.*, 2010; JNCC and NE, 2011; Walmsley *et al.*, 2015; Gall *et al.,* 2020). Where pots are fixed in strings, the retrieval of pots, or incidences of rough weather, could lead to ropes, pots and anchors dragging over or entangling seabed structures, potentially causing physical damage or abrasion to the biological communities (MacDonald *et al.*, 1996; Roberts *et al.*, 2010; JNCC and NE, 2011; Gall *et al*., 2020). During spring tides, strong wind and large waves may cause unintentional movement of pots and any associated seabed abrasion could be increased (Eno *et al.*, 2001; Sørensen *et al.*, 2015; Stephenson *et al.*, 2015). If there is a sensitive species present further assessment of the potting activity is recommended (Walmsley *et al.*, 2015). Subtidal Mud biotopes have been assessed to a range of pressures by MarLIN (Tillin and Rayment, 2016). Relevant pressures for the assessment of potting impacts are primarily abrasion and penetration of the sediment. MarLIN abrasion and penetration sensitivity assessments for Subtidal Mud biotopes shown in Annex 1 conclude: the majority of biotopes have a medium sensitivity to abrasion and penetration with some biotopes exhibiting a high sensitivity to penetration. Please refer to the MarLIN website which provides further information about the assessment methodology and the supporting evidence (www.marlin.ac.uk/). Depending on the footprint and the intensity of potting it is possible that the impacts from pots, weights or anchors making contact with Subtidal Mud habitat could cause damage to some of the biological communities.

6. SACs where the habitat occurs as a component of a designated feature

Dee Estuary SAC	The Dee Estuary SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018b). Please see the latest SAC feature condition assessment for information on the location and condition of features.

	The following features contain Subtidal Mud habitat within the Dee Estuary SAC: 1. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 2. Estuaries
Menai Strait and Conwy Bay SAC	The Menai Strait and Conwy Bay SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018c). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Subtidal Mud habitat within the Menai Strait and Conwy Bay SAC: 1. Large Shallow Inlets and Bays 2. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 3. Sandbanks which are slightly covered by seawater all the time
Carmarthen Bay and Estuaries SAC	The Carmarthen Bay and Estuaries SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018d). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Subtidal Mud habitat within the Carmarthen Bay and Estuaries SAC: 1. Large Shallow Inlets and Bays 2. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 3. Estuaries 4. Sandbanks which are slightly covered by sea water all the time
Pembrokeshire Marine SAC	The Pembrokeshire Marine SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018a). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Subtidal Mud habitat within the Pembrokeshire Marine SAC: 1. Estuaries 2. Coastal lagoons 3. Large Shallow Inlets and Bays 4. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 5. Sandbanks which are slightly covered by seawater Allthe time

Lleyn Peninsula and the Sarnau SAC	The Lleyn Peninsula and the Sarnau SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018a). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Subtidal Mud habitat within the Lleyn Peninsula and the Sarnau SAC: 1. Coastal Lagoons 2. Estuaries 3. Large Shallow Inlets and Bays 4. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 5. Sandbanks which are slightly covered by seawater all the time
Severn Estuary SAC	The Severn Estuary SAC contains examples of the Subtidal Mud habitat, as evidenced by data and relevant literature (NRW, 2018e). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Subtidal Mud habitat within the Severn Estuary SAC: 1. Sandbanks which are slightly covered by sea water all the time 2. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 3. Estuaries

7. Evidence Gaps

- Direct studies to measure the impacts from potting on Subtidal Mud habitat.
- A study comparing the impacts from different types of pots and methods of potting.

8. Confidence assessment

The confidence score is the sum of scores from three evidence components: quality, applicability and agreement. These are qualitatively assessed as high, medium or low using the most appropriate statements in the table below, and these are numerically represented as scores of 3, 2, or 1 respectively.

A total confidence score of 3 – 5 represents low confidence, 6 or 7 shows medium confidence and 8 or 9 demonstrates high confidence in the evidence used in the assessment.

This assessment scores 8, representing high confidence in the evidence.

Confidence	Evidence quality	Evidence applicability	Evidence agreement
High	**Based on more than 3 recent and relevant peer reviewed papers or grey literature from established agencies. Score 3.**	**Based on the fishing gear acting on the feature in the UK. Score 3.**	Strong agreement between multiple (>3) evidence sources.
Medium	Based on either relevant but older peer reviewed papers or grey literature from less established agencies; or based on only 2-3 recent and relevant peer reviewed evidence sources.	Based on similar fishing gears, or other activities with a similar impact, acting on the feature in the UK.	**Some disagreement but majority of evidence agrees. Or fewer than 3 evidence sources used. Score 2.**
Low	Based on either less relevant or older grey literature from less established agencies; or based on only 1 recent and relevant peer reviewed evidence source.	Based on similar fishing gears acting on the feature in other areas, or the fishing gear acting upon a similar feature in the UK.	Little agreement between evidence.

N.B. When evidence is indirect the evidence quality and applicability will be capped to medium, to ensure that direct evidence gaps are captured in this approach.

9. References

Adey, J.M. (2007). Aspects of the sustainability of creel fishing for Norway lobster, Nephrops norvegicus (L.), on the west coast of Scotland (Doctoral dissertation, University of Glasgow).

BRIG, 2011. UK Biodiversity Action; Plan Priority Habitat Descriptions. Mud Habitats in Deep Water. JNCC. Updated 2011. Viewed 16/09/2020. https://data.jncc.gov.uk/data/2728792c-c8c6-4b8c-9ccd-a908cb0f1432/UKBAP-PriorityHabitatDescriptions-Rev-2011.pdf.

Channel Pots. (2020). Suppliers of whelk pots since 2015. [Accessed 10th August 2020]. https://www.channelpots.co.uk.

Coastal nets. (2020). Crab, Lobster, Crayfish, Cuttlefish, Whelk Pots & Potting Components. [Accessed 10th August 2020]. https://www.coastalnets.co.uk.

Cornwall Creels. (2020). Plastic coated pot frames. [Accessed 28th July 2020]. https://www.cornwallcreels.co.uk.

Defra. (2015). Celtic Deep Marine Conservation Zone not proposed for designation in the second tranche. Consultation on sites proposed for designation in the second tranche on marine conservation zones. Viewed 29/09/2020. https://consult.defra.gov.uk/marine/tranche2mczs/supporting_documents/Celtic%20Deep%20cMCZ%20site%20summary.pdf.

EEA. (2019). EUNIS habitat classification (Revised descriptions 2019). European Environment Agency (EEA), Denmark. https://eunis.eea.europa.eu/habitats/2502.

Eno, N.C., MacDonald, D.S., Kinnear, J.A.M., Amos, C.S., Chapman, C.J., Clark, R.A., Bunker, F. StP.D. & Munro, C. (2001). Effects of crustacean traps on benthic fauna. ICES Journal of Marine Science, 58: 11–20.

FAO. (2001). Fishing Gear types. Pots. Technology Fact Sheets. In: FAO Fisheries and Aquaculture Department [online]. Rome. Updated 13 September 2001. [Accessed 04th February 2020]. www.fao.org/fishery/geartype/225/en.

Gall, S.C., Rodwell, L.D., Clark, S., Robbins, T., Attrill, M.J., Holmes, L.A., & Sheehan, E.V. (2020). The impact of potting for crustaceans on temperate rocky reef habitats: Implications for management. Marine Environmental Research, 105134.

Gravestock, V. (2018). The Needles MCZ – Part B Fisheries Assessment – Potting.

Hall, K., Paramor, O.A.L., Robinson L.A., Winrow-Giffin, A., Frid C.L.J., Eno, N.C., Dernie, K.M., Sharp, R.A.M., Wyn, G.C.& Ramsay, K. (2008). Mapping the sensitivity of benthic habitats to fishing in Welsh waters- development of a protocol. CCW [Policy Research] Report No: [8/12], 85pp.

JNCC and Natural England. (2011). Advice from the Joint Nature Conservation Committee and Natural England with regards to fisheries impacts on Marine Conservation Zone habitat features. 113 pp.

JNCC. (2015). The Marine Habitat Classification for Britain and Ireland Version 15.03. [Accessed 02/06/2020]. Available from: https://mhc.jncc.gov.uk.

MacDonald, D.S., Little, M., Eno, N.C. & Hiscock, K. (1996). Disturbance of benthic species by fishing activities: a sensitivity index. Aquatic Conservation: Marine and Freshwater Ecosystems, 6(4), 257-268.

MarLIN. (2020). The Marine Life Information Network. Information on the biology of species and the ecology of habitats found around the coasts and seas of the British Isles. (Viewed 15/09/2020). http://www.marlin.ac.uk/.

Marine Recorder Application (2020). Software available at: https://jncc.gov.uk/our-work/marine-recorder/#marine-recorder-application Accessed: September 2020.

NRW. (2018a). Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau Special Area of Conservation Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017. Natural Resources Wales, Bangor pp 143.

NRW. (2018b). Dee Estuary / Aber Dyfrdwy Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 229, 35pp, NRW, Bangor.

NRW (2018c). Y Fenai a Bae Conwy / Menai Strait and Conwy Bay Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 232, 33pp, NRW, Bangor.

NRW (2018d). Carmarthen Bay and Estuaries / Bae Caerfyrddin ac Aberoedd Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 225, 49pp, NRW, Bangor.

NRW. (2018e). Severn Estuary / Môr Hafren Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 235, 41pp, NRW, Bangor.

Pantin, J.R., Murray, L.G., Cambiè, G., Le Vay, L. & Kaiser, M.J. (2015). Escape Gap Study in Cardigan Bay: consequences of using lobster escape gaps. A Preliminary Report. Fisheries & Conservation report No. 44, Bangor University. 43 pp.

Porcupine Natural History Society (2006). Newsletter June 2006. Number 20.

Roberts, C., Smith, C., Tillin, H. Tyler-Walters, H. (2010). Review of existing approaches to evaluate marine habitat vulnerability to commercial fishing activities. November 2010.

Seafish. (2020a). Fishing Gear Database: Pots and traps - general. [Accessed 04th February 2020]. https://seafish.org/gear-database/gear/pots-and-traps/.

Seafish. (2020b). Fishing Gear Database: Pots and traps - lobster. [Accessed 24th February 2020]. https://seafish.org/gear-database/gear/pots-and-traps-lobster/.

Seafish. (2020c). Fishing Gear Database: Pots and trap – nephrops. [Accessed 24th February 2020]. https://seafish.org/gear-database/gear/pots-and-trap-nephrops/.

Sørensen, T.K., Larsen, F. & Bridda, J. (2015). Impacts of bottom-set gillnet anchors on the seafloor and associated flora – potential implications for fisheries management in protected areas. In von Nordheim, H. & Wollny-Goerke, K. (eds) Proceedings of the Conference "Progress in Marine Conservation in Europe 2015" in Stralsund, Germany, 14-18 September 2015. Published 2016 and available online: https://www.bfn.de/fileadmin/BfN/service/Dokumente/skripten/Skript451.pdf.

Stephenson, F., Fitzsimmons, C., Polunin, N.V.C., Mill, A.C., Scott, C.L. (2015). Assessing Long-Term Benthic Impacts of Potting in Northumberland. IN Walmsley, S.F., Bowles, A., Eno, N.C. & West, N. (2015). Evidence for Management of Potting Impacts on Designated Features. MMO1086 Defra Marine Biodiversity Impact Evidence Group (IEG). Final Report pp1 – 111.

Swarbrick, J. & Arkley, K. (2002). The evaluation of ghost fishing preventers for shellfish traps. Seafish Report No SR549. 46 pp.

Tillin, H.M. & Rayment, W. (2016). [Fabulina fabula] and [Magelona mirabilis] with venerid bivalves and amphipods in infralittoral compacted fine muddy sand. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [Accessed 15-10-2020]. Available from: https://www.marlin.ac.uk/habitat/detail/142.

Troffe, P.M., Levings, C.D., Piercey, G.B.E. & Keong, V. (2005). Fishing gear effects and ecology of the sea whip (Halipteris willemoesi (Cnidaria: Octocorallia: Pennatulacea)) in British Columbia, Canada: preliminary observations. Aquatic Conservation: Marine and Freshwater Ecosystems, 15(5), 523-533.

Tyler-Walters, H. & Jackson, A. (1999). Assessing seabed species and ecosystems sensitivities. Rationale and user guide, January 2000 edition. Report to English Nature, Scottish Natural Heritage and the Department of the Environment Transport and the Regions from the Marine Life Information Network (MarLIN). Plymouth, Marine Biological Association of the UK. (MarLIN Report No. 4.).

Tyler-Walters, H., Tillin, H.M., d'Avack, E.A.S., Perry, F., Stamp, T. (2018). Marine Evidence-based Sensitivity Assessment (MarESA) – A Guide. Marine Life Information Network (MarLIN). Marine Biological Association of the UK, Plymouth, pp. 91. Available from https://www.marlin.ac.uk/publications.

Walmsley, S.F., Bowles, A., Eno, N.C. & West, N. (2015). Evidence for Management of Potting Impacts on Designated Features. MMO1086 Defra Marine Biodiversity Impact Evidence Group (IEG). Final Report pp1 – 111.

Annex 1: Welsh biotopes included in the AWFA potting and Subtidal Mud assessment

The term 'biotope' refers to both the physical environment (e.g. substrate) and the unique set of species associated with that environment (Tyler-Walters and Jackson, 1999). Biotopes are defined by the JNCC Marine Habitat Classification for Britain and Ireland Version 15.03 (https://mhc.jncc.gov.uk/) and sensitivities to abrasion and penetration are from the Marine Evidence based Sensitivity Assessment (MarESA) (https://www.marlin.ac.uk/sensitivity/sensitivity_rationale). The MarESA approach considers a range of pressures and benchmarks for all biotopes using all available evidence and expertise (Tyler-Walters *et al*., 2018). The MarESA sensitivity to abrasion and penetration assessments highlighted in the table below consider any type of potential abrasion to the surface substratum and associated biology and do not specifically refer to potting activity (Tyler-Walters *et al*., 2018). High sensitivity indicates a significant loss of species combined with a recovery time of more than 10 years. Medium sensitivity indicates either significant mortality combined with medium recovery times (2-10 years) or lower mortality with recovery times varying from 2 to 25+ years. Whilst a low sensitivity indicates a full recovery within 2 years.

Sublittoral sediments	**MarESA sensitivity to abrasion**	**MarESA sensitivity to penetration**
SS.SMu.CFiMu.MegMax	Medium	High
SS.SMu.CFiMu.SpnMeg	Medium	High
SS.SMu.CSaMu.AfilMysAnit	Medium	Medium
SS.SMu.CSaMu.AfilNten	Medium	Medium
SS.SMu.CSaMu.LkorPpel	Medium	Medium
SS.SMu.CSaMu.ThyNten	Medium	Medium
SS.SMu.CSaMu.VirOphPmax	Medium	High
SS.SMu.CSaMu.VirOphPmax.HAs	Medium	High
SS.SMu.IFiMu.Ocn	Medium	Medium
SS.SMu.IFiMu.PhiVir	Medium	Medium
SS.SMu.ISaMu.Cap	Low	Low
SS.SMu.ISaMu.MelMagThy	Low	Low
SS.SMu.ISaMu.NhomMac	Medium	High
SS.SMu.ISaMu.SundAasp	Medium	Medium
SS.SMu.OMu.AfalPova	Medium	Medium
SS.SMu.OMu.CapThy	Low	Low
SS.SMu.OMu.LevHet	Medium	Medium
SS.SMu.SMuLS	Low	Medium
SS.SMu.SMuVS.AphTubi	Low	Low
SS.SMu.SMuVS.CapTubi	Low	Low

SS.SMu.SMuVS.MoMu	Not sensitive	Not sensitive
SS.SMu.SMuVS.NhomTubi	Low	Low
SS.SMu.SMuVS.OlVS	Low	Low
SS.SMu.SMuVS.PolCvol	Low	Medium