Pots, Traps & Creels Interactions with Coarse Sediment (High Energy)

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 Coarse Sediment (High Energy)**	<u>**Assessment of impact pathway 1: Physical damage to a designated habitat feature:**</u> No studies were found that directly or indirectly measured or estimated impacts of potting on Coarse Sediment (High Energy) or similar habitats. As potting is a subtidal activity it is unlikely to interact with intertidal parts of this habitat. Expert judgement suggests the impacts from pots, weights or anchors making contact with Coarse Sediment (High Energy) habitat could cause damage to the substrate. <u>**Assessment of impact pathway 2: Damage to a designated habitat feature via removal of, or other detrimental impact to, associated biological communities:**</u> No studies were found that directly or indirectly measured or estimated impacts of potting on Coarse Sediment (High Energy) or similar habitats. As potting is a subtidal activity it is unlikely to interact with intertidal parts of this habitat. Expert judgement and indicative MarLIN sensitivity assessments suggest the impacts from pots, weights or anchors making contact with Coarse Sediment (High Energy) habitat could cause damage to some of the subtidal biological communities. Confidence in this assessment is **low** (please see section 8).

3. Feature description

Feature Description: Coarse Sediment (High Energy)	High Energy Coarse Sediment is made up of mobile pebbles, cobbles and gravel with a variable amount of coarse sand. Habitats along the open coastline or within tide-swept channels containing Coarse Sediment (High Energy) are often disturbed by regular wave action or strong tidal currents (EEA, 2019). Due to the highly mobile surroundings, silt and finer sediments do not accumulate in these habitats and flora and fauna that need stable conditions, such as seaweeds, do not settle here. Annex 1 lists the main biotopes associated with the Coarse Sediment (High Energy) feature in Wales and provides the definition of 'biotope'. Gravelly or shelly sand is common within Coarse Sediment (High Energy) habitats and found in Caernarfon Bay, Cardigan Bay and off the west of Anglesey (Robinson *et al*., 2009). The high energy element of this feature promotes robust and fast-growing species which are able to colonise mobile pebbles and cobbles [SS.SCS.ICS]. Tolerant species found here include calcareous tube worms such as *Spirobranchus triqueter (previously Pomatoceros triqueter)* barnacles including *Balanus crenatus* and *Balanus balanus* and bryozoan and coralline algal crusts [SS.SCS.CCS.PomB]. This biotope is commonly found around the Welsh coastline and particularly on the Western approaches, many examples have been found across the entire Pembrokeshire Marine SAC and Lleyn Peninsula and the Sarnau SAC sites. The fauna of these habitats is dominated by polychaetes, such as *Protodorvillea kefersteini,* found typically in the Cardigan Bay SAC [SS.SCS.CCS.Pkef]. High-energy environments also promote transitional communities such as the impoverished biotope of mixed gravel sands where the polychaete *Glycera lapidum* is found [SS.SCS.ICS.Glap]. This transitional community tends to be seasonal and is not commonly found in Wales with a couple of examples seen in the Lleyn Peninsula and the Sarnau SAC and the Severn Estuary SAC. Sandwaves and sandbanks may also develop under high energy conditions. The waves and banks are made of loose grains of sand with gravel and silt components collecting in the troughs. In the spaces between the grains of sand, communities of small polychaetes may be supported such as *Hesionura elongata* and *Microphthalmus similis*, along with protodrilid polychaetes such as *Protodrilus spp*. and *Protodriloides spp* [SS.SCS.ICS.HeloMsim]. This biotope is primarily found outside SAC boundaries, with most examples occurring along the south coast of Wales, but some examples can be found in the Carmarthen Bay and Estuaries SAC, Pembrokeshire Marine SAC and Severn Estuary SAC. Coarse Sediment (High Energy) also includes larger grain sizes, such as shingle and pebble. In areas of unstable rounded pebbles and shingle, the strong wave action does not allow many organisms to settle and grow, resulting in low biodiversity and reduced species assemblages (BRIG, 2011; MarLIN, 2020). A seasonal turnover of fauna may also be noticed here, as changes over time promote variations in stability within the habitat. Some species found in this biotope include a small range of robust polychaetes and bivalves with

	occasional crustaceans and echinoderms [SS.SCS.ICS.SSh]. This biotope is relatively scarce in Welsh waters but predominantly found at the Western tip of the Lleyn Peninsula and the Sarnau SAC. Clean gravels may also be found at the upper reaches of marine inlets in a few sparse locations, at the interface between estuary and sea where water movement is strong, and all the silt is removed from the sediment, e.g. in the Severn Estuary and Carmarthen Bay and Estuaries SACs (BRIG, 2011, JNCC, 2015). In this highly turbulent environment, a small number of robust and brackish-tolerant species are found [SS.SCS.SCSVS].

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 & 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 Coarse Sediment (High Energy) or similar habitats. As potting is a subtidal activity it is unlikely to interact with intertidal parts of this habitat. Assessments based on expert knowledge suggest that potting is of limited concern to Coarse Sediments (Roberts *et al.*, 2010; Hall *et al.*, 2008; JNCC and NE, 2011). If potting were to occur across Coarse Sediments (High Energy), the general physical impacts from static gear, including pots, weights or anchors, making contact with the seabed during gear deployment could cause surface disturbance (e.g., scour marks) and abrasion (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, as these habitats are subject to sediment movement due to wave and/or tidal action (Hall *et al*., 2008; Walmsley *et al*., 2015). 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 Coarse Sediment (High Energy) habitat could cause damage to the substrate (Walmsley *et al*., 2015).

Assessment of impact pathway 2	**2. Damage to a designated habitat feature via removal of, or other detrimental impact to, associated biological communities (Impacts on Biological Communities)** No studies were found that directly or indirectly measured biological impacts of potting on Coarse Sediment (High Energy) or similar habitats. As potting is a subtidal activity it is unlikely to interact with intertidal parts of this habitat. If potting were to occur across Coarse Sediments (High Energy), 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). Coarse Sediment biotopes have been assessed to a range of pressures by MarLIN (Tillin and Tyler-Walters, 2016). Relevant pressures for the assessment of potting impacts are primarily abrasion and penetration of the sediment. MarLIN abrasion and penetration sensitivity assessments for Coarse Sediment biotopes shown in Annex 1 conclude: the majority of biotopes have a low sensitivity to abrasion (4 biotopes) and penetration (3 biotopes) with 3 biotopes not sensitive to abrasion, 2 biotopes not sensitive to penetration and 1 biotope of medium 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 Coarse Sediment habitat could cause damage to some of the subtidal biological communities.

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

Menai Strait and Conwy Bay SAC	The Menai Strait and Conwy Bay SAC contains examples of the Coarse Sediment (High Energy) 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 Coarse Sediment (High Energy) habitat within the Menai Strait and Conwy Bay SAC: 1. Reefs
Cardigan bay SAC	The Cardigan bay SAC contains examples of the Coarse Sediment (High Energy) 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 Coarse Sediment (High Energy) habitat within the Cardigan bay SAC: 1. Sandbanks which are slightly covered by sea water all the time 2. Reefs
Carmarthen Bay and Estuaries SAC	The Carmarthen Bay and Estuaries SAC contains examples of the Coarse Sediment (High Energy) 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 Coarse Sediment (High Energy) habitat within the Carmarthen Bay and Estuaries SAC: 1. Large shallow inlets and bays 2. Estuaries 3. Sandbanks which are slightly covered by sea water all the time
Pembrokeshire Marine SAC	The Pembrokeshire Marine SAC contains examples of the Coarse Sediment (High Energy) 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 Coarse Sediment (High Energy) habitat within the Pembrokeshire Marine SAC: 1. Estuaries 2. Large shallow inlets and bays 3. Sandbanks which are slightly covered by seawater at low tide 4. Reefs
Lleyn Peninsula and the Sarnau SAC	The Lleyn Peninsula and the Sarnau SAC contains examples of the Coarse Sediment (High Energy) 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 Coarse Sediment (High Energy) habitat within the Lleyn Peninsula and the Sarnau SAC: 1. Large shallow inlets and bays 2. Sandbanks which are slightly covered by seawater all the time 3. Reefs
Severn Estuary SAC	The Severn Estuary SAC contains examples of the Coarse Sediment (High Energy) habitat, as evidenced by data and relevant literature (NRW, 2018f). Please see the latest SAC feature condition assessment for information on the location and condition of features. The following features contain Coarse Sediment (High Energy) habitat within the Severn Estuary SAC: 1. Estuaries 2. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge)

8. Evidence Gaps

- Direct studies to measure the impacts from potting on Coarse Sediment (High Energy).
- 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 4, representing low 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.	Based on the fishing gear acting on the feature in the UK.	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.** **Score 1.**	**Based on similar fishing gears acting on the feature in other areas, or the fishing gear acting upon a similar feature in the UK.** **Score 1.**	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

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Annex 1: Welsh biotopes included in the AWFA potting and Coarse Sediment (High Energy) 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 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 and penetration 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.SCS.CCS.Pkef	Low	Low
SS.SCS.CCS.PomB	Low	Low
SS.SCS.ICS.Glap	Low	Low
SS.SCS.ICS.HeloMsim	Low	Medium
SS.SCS.ICS.SSh	Not sensitive	Not Sensitive
SS.SCS.SCSVS	Not sensitive	Not sensitive