

Pots, Traps & Creels Interactions with Subtidal Mixed Sediments

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

<p>Feature Description:</p> <p>Subtidal Mixed Sediments</p>	<p>Subtidal Mixed Sediments are found from shallow areas, below the extreme low water mark (infralittoral), to deep offshore circalittoral habitats and areas of variable salinity. They incorporate a range of sediments including muddy gravels and sands with shells and shell debris and mosaics of cobbles and pebbles (and occasionally boulders) embedded in or lying upon sand, gravel or mud (EEA, 2019; JNCC, 2015).</p> <p>As Subtidal Mixed Sediments are so varied, they support a wide range of animals, both on the sediment (epibiota) and within it (infauna) (JNCC, 2015). Some component biotopes (see Annex 1 for definition) of this habitat can be particularly diverse, e.g. SS.SMx.IMx.SpavSpAn (JNCC, 2015), found in Wales in the Menai Strait. Tremadog Bay also has areas of high diversity in poorly sorted sandy and muddy gravel sediments with cobbles and pebbles within the biotope SS.SMx.CMx.MysThMx (NRW, 2018c). Annex 1 lists Welsh biotopes associated with this feature.</p> <p>Characterising fauna of subtidal mixed sediment include polychaetes (e.g. <i>Sabella pavonina</i>), bivalves (e.g. <i>Cerastoderma glaucum</i>, <i>Mysella bidentata</i>, <i>Modiolus modiolus</i>), echinoderms (e.g. <i>Asterias rubens</i>, <i>Crossaster papposus</i>) and anemones (e.g. burrowing anemone <i>Cerianthus lloydii</i>, rock dweller <i>Urticina felina</i>). Hydroids (e.g. <i>Hydrallmania falcata</i>, <i>Nemertesia anennina</i>) and bryozoans (e.g. <i>Flustra foliacea</i>, <i>Escharella immersa</i>) are commonly found in areas with higher tidal currents (such as off Anglesey) and in Wales typically occur associated with the common biotope SS.SMx.CMx.FluHyd (EEA, 2019; JNCC, 2015, MarLIN, 2020). This biotope is noted to represent part of a transition between sand scoured circalittoral rock where the epifauna is conspicuous enough to be considered as a biotope and a sediment biotope where an infaunal sample is required to characterise it and is possibly best considered an epibiotic overlay (JNCC, 2015).</p> <p>Brittlestars can also be found on this habitat type, particularly associated with the common, widespread biotope SS.SMx.CMx.OphMx and less common SS.SMx.IMx.VsenAsquAps forming dense beds varying in size (JNCC, 2015). Sponges, such as <i>Halichondria panicea</i>, barnacles and encrusting polychaetes, such as <i>Pomatoceros triqueter</i>, can also be found on embedded large cobbles or boulders and in adjacent connective transitions between sand-scoured rock and subtidal mixed sediment habitat types (EEA, 2019; JNCC, 2015; MarLIN, 2020).</p> <p>A turf of seaweeds may also be present in some shallower areas on shell, shell debris and stones in biotopes such as SS.SMx.CMx.FluHyd (JNCC, 2015).</p> <p>Mixed sediments in the Welsh offshore area, including the Celtic Deep and outer Cardigan Bay, include communities assigned as SS.SMx.OMx.PoVen (Robinson <i>et. al</i>, 2009). This biotope represents a diverse community particularly rich in polychaetes with a significant venerid bivalve component.</p> <p>Additional species that feature in biotopes associated with this sediment type also include the invasive non-native <i>Crepidula fornicata</i> (slipper limpet), in the variable salinity biotope SS.SMx.SMxVS.CreMed and full</p>
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	salinity SS.SMx.IMx.CreAsAn, and oysters in biotope SS.SMx.IMx.Ost (JNCC, 2015); these biotopes are not common in Wales and are only recorded in Milford Haven Waterway.
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4. Gear description

Gear: Description: Pots, Traps & Creels	<p>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).</p> <p>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 m² footprint) and side or top-entry parlour pots or 'D-creels' (0.24-0.55 m² 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 m² 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).</p> <p>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).</p> <p>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).</p> <p>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</p>
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	<p>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).</p> <p>Baited pots can capture undersized target species, non-target invertebrates and occasionally fish species (Pantin <i>et al.</i>, 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).</p>
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5. Assessment of impact pathways

<p>Assessment of impact pathway 1</p>	<p>1. Physical damage to a designated habitat feature (Physical Impacts)</p> <p>No studies were found that directly or indirectly measured or estimated impacts of potting on Subtidal Mixed Sediments or similar habitats.</p> <p>Assessments based on expert knowledge suggest that potting is of limited concern to Subtidal Mixed Sediments (Roberts <i>et al.</i>, 2010; Hall <i>et al.</i>, 2008; JNCC and NE, 2011).</p> <p>If potting were to occur across Subtidal Mixed Sediments, the general 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) in the sediment (JNCC and NE, 2011; Walmsley <i>et al.</i>, 2015; Gall <i>et al.</i>, 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 <i>et al.</i>, 1996; Roberts <i>et al.</i>, 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 <i>et al.</i>, 2001; Sørensen <i>et al.</i>, 2015; Stephenson <i>et al.</i>, 2015).</p> <p>Depending on the footprint and the intensity of potting it is possible that the impacts from pots, weights or anchors making contact with Subtidal Mixed Sediments habitat could cause damage to the substrate (Walmsley <i>et al.</i>, 2015).</p>
<p>Assessment of impact pathway 2</p>	<p>2. Damage to a designated habitat feature via removal of, or other detrimental impact to, associated biological communities (Impacts on Biological Communities)</p>

	<p>No studies were found that directly or indirectly measured impacts of potting on Subtidal Mixed Sediments or similar habitats.</p> <p>If potting were to occur across Subtidal Mixed Sediments, 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 <i>et al.</i>, 2010; JNCC and NE, 2011; Walmsley <i>et al.</i>, 2015; Gall <i>et al.</i>, 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 <i>et al.</i>, 1996; Roberts <i>et al.</i>, 2010; JNCC and NE, 2011, Gall <i>et al.</i>, 2020). During spring tides, strong wind and large waves may cause unintentional movement of pots and any associated seabed abrasion could be increased (Eno <i>et al.</i>, 2001; Sørensen <i>et al.</i>, 2015; Stephenson <i>et al.</i>, 2015). If there is a sensitive species, further assessment of the intensity of potting activity is recommended (Walmsley <i>et al.</i>, 2015).</p> <p>Subtidal Mixed Sediments 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 Mixed Sediment biotopes shown in Annex 1 conclude: the majority of biotopes have low to medium sensitivity to abrasion and penetration with one biotope [SS.SMx.IMx.Ost - <i>Ostrea edulis</i> (oyster) beds on shallow sublittoral muddy mixed sediment] having high sensitivity to penetration and abrasion.</p> <p>Please refer to the MarLIN website which provides further information about the assessment methodology and supporting evidence (www.marlin.ac.uk/).</p> <p>Depending on the footprint and the intensity of potting it is possible that the impacts from pots, weights or anchors making contact with Subtidal Mixed Sediments habitat could cause damage to some of the biological communities.</p>
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6. SACs where the habitat occurs as a component of a designated feature

<p>Menai Strait and Conwy Bay SAC</p>	<p>The Menai Strait and Conwy Bay SAC contains examples of the Subtidal Mixed Sediments 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.</p> <p>The following features contain Subtidal Mixed Sediments habitat within the Menai Strait and Conwy Bay SAC:</p> <ol style="list-style-type: none"> 1. Large Shallow Inlets and Bays
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	<ol style="list-style-type: none"> 2. Sandbanks which are slightly covered by seawater at low tide 3. Reefs
Pembrokeshire Marine SAC	<p>The Pembrokeshire Marine SAC contains examples of the Subtidal Mixed Sediments 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.</p> <p>The following features contain Subtidal Mixed Sediments habitat within the Pembrokeshire Marine SAC:</p> <ol style="list-style-type: none"> 1. Estuaries 2. Large shallow inlets and bays 3. Mudflats and sandflats not covered by seawater at low tide (at the lower (seaward) edge) 4. Reefs <p>The Pembrokeshire Marine SAC also contains the “<i>Ostrea edulis</i> (oyster) beds on shallow sublittoral muddy mixed sediment” biotope [SS.SMx.IMx.Ost] which was assessed as having high sensitivity to abrasion and penetration (see Annex 1).</p>
Lleyn Peninsula and the Sarnau SAC	<p>The Lleyn Peninsula and the Sarnau SAC contains examples of the Subtidal Mixed Sediments 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.</p> <p>The following features contain Subtidal Mixed Sediments habitat within the Lleyn Peninsula and the Sarnau SAC:</p> <ol style="list-style-type: none"> 1. Coastal Lagoons 2. Estuaries 3. Large shallow inlets and bays 4. Sandbanks which are slightly covered by seawater all the time 5. Reefs
Cardigan Bay SAC	<p>The Cardigan Bay SAC contains examples of the Subtidal Mixed Sediments 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.</p> <p>The following features contain Subtidal Mixed Sediments habitat within the Cardigan Bay SAC:</p> <ol style="list-style-type: none"> 1. Reefs

Severn Estuary SAC	<p>The Severn Estuary SAC contains examples of the Subtidal Mixed Sediments 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.</p> <p>The following features contain Subtidal Mixed Sediments habitat within the Severn Estuary SAC:</p> <ol style="list-style-type: none">1. Estuary
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7. Evidence Gaps

- Direct studies to measure the impacts from potting on Subtidal Mixed Sediments.
- 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 5, 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. Score 2.	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. 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 Subtidal Mixed Sediments 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.SMx.CMx.CIloMx	Medium	Medium
SS.SMx.CMx.CIloMx.Nem	Medium	Medium
SS.SMx.CMx.FluHyd	Medium	Medium
SS.SMx.CMx.MysThyMx	Low	Low
SS.SMx.IMx.CreAsAn	Low	Low
SS.SMx.IMx.Ost	High	High
SS.SMx.IMx.SpavSpAn	Medium	Medium
SS.SMx.IMx.VsenAsquAps	Low	Low
SS.SMx.OMx.PoVen	Low	Low
SS.SMx.SMxLS	Low	Medium
SS.SMx.SMxVS.AphPol	Low	Low
SS.SMx.SMxVS.CreMed	Low	Low