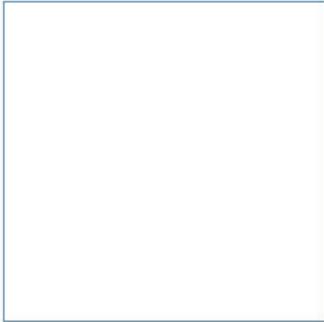
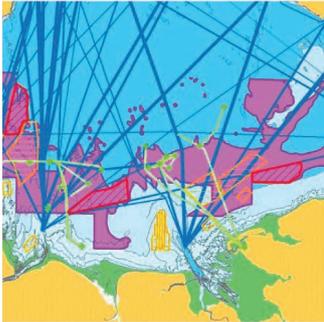
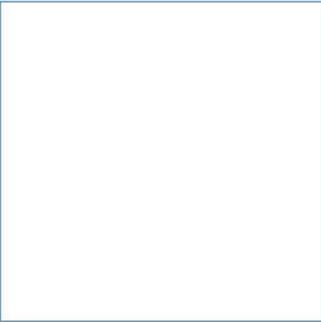
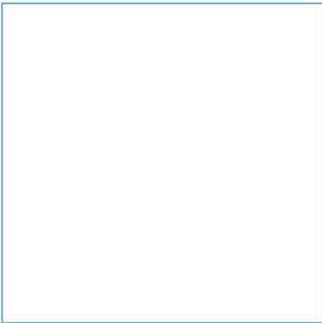


# Natural Resources Wales

## Derelict Vessels

The management of derelict vessels within Milford Haven

March 2021



Innovative Thinking - Sustainable Solutions



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# Executive Summary

This report has assessed the impact of derelict vessels, how this affects Milford Haven, the legislation available, its practical application and identified the process available for removal. The assessment from each of these sections has been provided as key points with a summary analysis given in the conclusion. The report found that derelict vessels within Milford Haven are monitored and removed when required, however, due to the lack of a funding mechanism and a national strategy, the removal of derelict vessels is reliant on the resources of local authorities. The conclusions of the report are given below.

A derelict vessel is defined within this report as a vessel (any ship or craft or any structure capable of navigation) that has been abandoned and become a nuisance, specifically those that do not fall into the lifecycle management regime of larger vessels. Smaller non-commercial craft are not subject to 'life-cycle' design where the construction of a vessel also considers its disposal. Due to the lack of regulation for End of Life (EOL) management, the process of disposal and the costs involved often lead to abandonment. This may result from owners lacking the financial means to responsibly dispose of their vessel. It is for that reason that a financial mechanism, such as a central or regional vessel disposal fund, paid into by owners at purchase, or as part of a periodic charge, would provide for EOL management. This would also raise owner and operator awareness of their social responsibility towards the disposal and recycling of obsolete vessels. Manufacturing and operator companies may also address their Corporate Social Responsibility (CSR) through direct recycling schemes or payment into a central fund for vessel disposal.

The environmental and public health impact from derelict vessels is specific to each case, where the construction of a vessel, hazardous substances onboard, the nature of its surroundings and accessibility, influence the hazards. As a derelict vessel does not have an owner, monitoring the state of the vessel may not be routinely carried out. Therefore, its condition may not be directly assessed, and further deterioration may not be prevented, leading to eventual decomposition. As a derelict vessel decomposes the contents of the vessel may spill, the hull and equipment break apart, and the vessels material erode releasing hazardous substances into the environment. With a lack of direct monitoring, the effect on the environment, risk to public health and the safety of navigation may not be perceived until an effect has become noticeable.

Disposal of derelict vessels or marine waste should be conducted under the waste framework directive. This requires that where possible the materials, components and equipment recovered should be reused or recycled with as little as possible sent for incineration or landfill.

The current process for the removal of derelict vessels in Milford Haven depends on the collaborative approach of authorities wishing to take action. When the effect of a derelict vessel becomes noticeable, such as drifting debris in a navigational channel or a vessel breaking apart on the foreshore, action is prompted. The principal factor determining the controlling authority, is the location of derelict vessel or debris. Each authority monitors its jurisdictional area for risks including the impacts from derelict vessels, however, to meet the conditions of the legislation, action cannot be taken under the powers available until the effects of these impacts are considered. The cost of removal often requires that initial expenditure is covered by the acting authority. This and subsequent costs may be recoverable depending on the powers selected for use, although the lack of ownership and limited intrinsic value of derelict vessel and marine waste is unlikely to cover the expenditure required.

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# 1 Derelict Vessels

## 1.1 Definition and scope

This report has been prepared by ABPmer for Natural Resources Wales (NRW) under the Marine Licensing and Specialist Advice Framework. The scope of the study seeks to address the topic of derelict vessels within Milford Haven. The report defines what a derelict vessel is, their impact on public safety, safety of navigation and potential effects on the environment. The process for removal of derelict vessels is examined with regard to relevant authorities, their responsibilities and legislation. In summary, future control mechanisms are suggested in accordance with available guidance.

A derelict vessel is considered by this report to be a vessel (any ship or craft or any structure capable of navigation<sup>1</sup>) that has been abandoned and become a nuisance. An abandoned vessel may be considered a nuisance through either neglect of maintenance (decomposition), mooring arrangement (submerged or partly submerged), drifting (not under command) or aground (unintentionally or as a means of voluntary pollution<sup>2</sup>). In determining if a vessel is abandoned the following should be considered:

- Period of neglect, if a vessel has not been attended to within a time defined by a relevant authority, this may be a few weeks or months;
- Loss of ownership, this may be by lack of financial capacity, following a maritime casualty, storm or theft;
- If the vessel has been confiscated due to illegal activity;
- If the vessel has become a wreck; and
- If the vessel is subject to salvage.

The status of a vessel should not be considered 'abandoned' unless all reasonable efforts have been made to establish the owner or those responsible. Following these attempts and only after public notification may a vessel be given abandoned status. The requirements of this process are not explicit although the information contained in the Torts (Interference with Goods) Act 1977 (UKGov, 1977) may be used for guidance.

This report is concerned with the management of derelict vessels under 500 Gross Tonnes (GT) which do not come under the 'Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships' 2009 (HKC, 2009). The management of derelict vessels outside of this convention is not currently provided for by any specific International, Regional (European Union) or National legislation. The handling of such vessels is dependent on the responsibilities of the authority or authorities where the vessel is located and is primarily driven by local requirements. Several related studies have been conducted at a regional scale with conclusions and guidance providing recommendations for a unified pan-European approach to developing control mechanisms and addressing the management of marine waste.

Vessels that have been subject to a 'Marine Casualty'<sup>3</sup> and are subsequently defined as wrecks in accordance with the Nairobi International Convention on the Removal of Wrecks (WRC, 2007) are considered derelict vessels providing they meet the requirements listed above.

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<sup>1</sup> International Maritime Organisation (IMO) definition of 'vessel'.

<sup>2</sup> Voluntary pollution means the intentional discarding of waste in an unauthorised location.

<sup>3</sup> "Maritime casualty" means a collision of ships, stranding or other incident of navigation, or other occurrence on board a ship or external to it, resulting in material damage or imminent threat of material damage to a ship or its cargo (WRC 2007).

## 1.2 The impact of derelict vessels

As derelict vessels are not owned, if an authority responsible for their monitoring, maintenance or repair does not take ownership then eventual decomposition will lead to the vessel becoming submerged, adrift and broken up as marine litter. Vessels abandoned by owners due to loss may already be in this condition, and therefore become a nuisance in a much shorter time frame.

The primary concern over derelict vessels is a lack of ownership and therefore control, governing movements and preventing them becoming obsolete<sup>4</sup>. Where a vessel is not controlled its location may not be known until reported by another party. In this instance, derelict vessels in general present a hazard as their locations are not monitored and they may become adrift or submerged in a navigationally important, public or environmentally sensitive area.

Derelict vessels are not subject to maintenance or repair resulting in a process of decomposition that reduces the vessel's intrinsic value and the recyclable value of its components. The process of decomposition varies depending on the materials the vessel is constructed from, what is held on board, the nature of its construction and the environmental conditions it is subjected to. Decomposition includes the breaking apart of the vessel, the breakdown of manufactured components and the leaching of products held onboard. The marine waste produced may in turn continue to decompose and break apart further, increasing the impact the derelict vessel has. The waste produced from the decomposition process, as with the vessel itself, is likely to drift unmonitored and have a similar impact.

The impact of derelict vessels to the environment has a wide scope, presenting a range of hazards of varying severity. The factors affecting impact include the location or area the vessel is in, with associated habitats and systems, the pollutants that may be carried in either packaged form or in tanks and chemicals/materials released during the decomposition process.

The management of a derelict vessel is often dependent on its location and the impact it has to the area. As no owner is responsible either financially or for the risk the vessel poses during the decomposition process, an authority affected by the vessel acts when the level of risk is perceived to be too great. This is a reactive process where risk is not often perceived until it has an effect. The acting authority may vary, due to the location of the vessel, the area of its impact and the effect or risk towards the authority's responsibilities.

Effective management of derelict vessels relies on the authority's risk perception in the area of impact. Through identification and monitoring of vessels with the potential to become abandoned or those that recently have been, the severity of the effect may be objectively assessed in terms of public health, safety of navigation and protection of the environment. Authorities with responsibilities in these areas may then determine if action is required to mitigate the risk, either through determining ownership/responsibility, issuing notices, securing or disposal. Often an early indicator that a vessel may become abandoned is the non-payment of harbour dues, difficulty to contact the owner or a lack of clarity over ownership. Cooperation between relevant authorities allows for a unified understanding of the risks posed by derelict vessels, the responsibility of authorities against these risks and an agreed method of acting upon them, based on the powers available. An agreed standard and method for the management and handling of derelict vessels between authorities provides for an effective approach to determining financial outlay and recovery of costs based on risk and responsibility. Cost/benefit analysis may be produced centrally or by individual authorities depending on local agreements with costs incurred taken from a managed financial framework or specific authority. In the context of authorities, this may extend to owners of Boatyards, Marinas, mooring associations and provide berthing areas located within a larger harbour or council managed area.

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<sup>4</sup> Obsolete, no longer considered seaworthy or having intrinsic worth as a vessel.

## 1.2.1 Disposal of vessels

Derelict vessels are not subject to maintenance and will eventually cease to be seaworthy<sup>5</sup>, if not claimed by a new owner they are considered 'obsolete' and therefore 'waste' (EU 2011). The waste produced during the decomposition process may include the breaking apart of the structure into components, the leaching of stored chemicals, the release of packaged/stored products or the degradation of materials. The process of decomposition is unique to each vessel and location, as is the risk associated with the material used in construction, stored on-board or contained within materials.

Historically, derelict vessels have been allowed to decompose *in situ* with resultant hazards to the safety of navigation, the marine environment and public health. Vessels constructed from natural materials such as wood, metal, plant-based fabrics and cordage have less of an impact on the surrounding environment during decomposition than vessels made of modern synthetic materials.

From the late 1960s onwards the hulls of smaller vessels were predominantly made from Fibre Reinforced Polymers (FRP) with a continued increase in the use of other synthetic materials throughout the 1960s onwards. The average lifespan of these vessels varies, however a UK working group has conservatively suggested around 40-60 years as a reasonable estimate (EU, 2011). This timeline of 40-60 years suggests that there is likely to be an increase in these vessels reaching the end of their serviceable life and potentially becoming derelict from 2020 onwards.

From 2009 onwards, larger commercial shipping has been subject to the Hong Kong Convention (HKC, 2009), relating to the full life cycle of vessels from construction through to recycling and disposal. The introduction of this Convention was in response to the growing acceptance of vessel owners and governments that the environmental and ethical disposal of vessels was required within a financially responsible framework. Due to this Convention few commercial vessels become derelict, although they may become wrecked or salvaged under the Nairobi convention (WRC, 2007), as the intrinsic cost in the vessel remains as valuable as the recycling cost.

Smaller private vessels are not subject to End of Life (EOL) management, therefore the materials and construction methods used are not sympathetic to the requirements of disposal or recycling. These vessels lose their intrinsic value once no longer seaworthy, with the expense of disposal unlikely to recoup costs through recycle value. Once obsolete, vessel waste (the derelict vessel and its contents) should be disposed of in accordance with the requirements of the Waste Framework Directive<sup>6</sup>. Modern synthetic materials such as FRP are not widely recycled and disposal costs are high, resulting in a large expense on the part of the owner or authority.

The percentage of material components used in small vessel construction has been assessed and tabulated in a European study title 'Recovery of obsolete vessels not used in the fishing trade' (EU, 2011), shown in Table 1. Of these components the primary materials are FRP and other polymers.

<sup>5</sup> A ship is deemed to be seaworthy when she is reasonably fit in all respects to encounter the ordinary perils of the seas of the adventure insured. (UKGov 1906).

<sup>6</sup> The UK does not allow FRP to go to landfill and is often burnt.

**Table 1. Percentage of material components used in small vessel construction**

Materials (% of Volume)	Motor Boats	Inflatable Boats	Yachts	Other Boats
Resins reinforced glass fibre	60	2	60	65
Ropes	0	1	2	0
Wood	5	0	5	5
Steel	5	2	3	5
Glass	0.05	0	0.05	2
Plastic	0.3	20	0.3	2
PVC / elastomer	0.5	56	0.5	2
Electrical Wire	0.05	1	0.05	1
Motors	10	10	5	10
Electrical components	3	2	3	2
Bath equipment	5	0	5	0
Furniture	5	2	5	0
Sails	0	0	5	2
Oils	0.05	1	0.05	1
Refrigerators	0.05	1	0.05	1
Batteries	1	2	1	2
Other	5	0	5	0
<b>Material (%) Total in Volume</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

## 1.2.2 Public health

The presence of derelict vessels may be hazardous to public health due to accessibility and lack of monitoring. As derelict vessels are not under any direct responsibility such as that of an owner, authorities with a duty of care, by default carry the risk. As discussed in Section 1.2 the effective management of derelict vessels includes determining the number, location and condition of derelict vessels with the area of responsibility. From this monitoring the level of risk to public health can be assessed and include:

- Accessibility;
- Integrity of the structure;
- Substances carried onboard;
- Arrangement of the vessel (holds, nets, equipment); and
- Consequence of surrounding environment (partly submerged, condition of foreshore etc);

The ease of access afforded to derelict vessels affects the likelihood of risks, with vessels on the foreshore more susceptible to interaction by the public. Without mitigation or monitoring by an owner or authority who has taken responsibility, prevention of access or use of notification deterring the public from interacting with vessels is not provided.

The construction and integrity of derelict vessels affects how they break apart and how easily they may be damaged by interaction with external forces (for example, the general public, the environment or local flora and fauna). Both the hull of vessels and components which have broken off and moved to other locations present a risk to public health, potentially breaking further and causing harm. Derelict vessels may have been abandoned with substances and packaged products left onboard. These may include oils, refrigerants, batteries, cleaning products or other potentially harmful substances. If accessed by the public these chemicals may cause harm, additionally the interaction of chemicals after a period of decomposition may increase the hazard presented to public health.

The condition of a derelict vessel, how it sits in the surrounding environment, the orientation of hull and the arrangement of equipment carried, all contribute to the risk posed. Factors that affect the risk profile include, holds, cabins, machinery, fishing nets, sails or other components. The ease of access by the public to the vessel presents risks of falling from height, slips and trips, becoming caught or hazards associated with enclosed spaces. Components which have become separated also present a hazard to the public if pollutants are presents or if sharp edges and objects injury the unwary.

The location and surrounding environment of a derelict vessel may compound existing hazards. Examples include; the effect of a rising tide on those trapped inside or pinned by the structure, attempting to reach a derelict vessel across a mudflat, submerged gear surrounding a vessel or stranding those onboard. The impact of derelict vessels on public health is primarily affected by monitoring and control, with risks being identified and mitigated against. The most influential factors are accessibility and the surrounding environment, exacerbating inherent risk.

### 1.2.3 Safety of Navigation

Derelict vessels impact directly and indirectly on the safety of navigation, posing both a constant hazard due to their lack of supervision and physical hazard from their decomposition. Without effective monitoring derelict vessels may become adrift, re-float or relocate without notification to the navigational authority. Without an understanding of the number and location of derelict vessels within an area, changes in circumstances and subsequent alteration of the navigational environment cannot be understood and the risk assessed. The mitigation required for the safety of navigation can therefore be extended to include the monitoring of location and condition of derelict vessels as an indirect control.

The deterioration of derelict vessels due to lack of maintenance, including becoming adrift, sinking or breaking apart creates direct hazards to the navigational environment, including:

- Grounding on underwater obstructions;
- Collision with floating objects;
- Stranding of vessels caught on underwater obstructions;
- Fouling of machinery or the hull due to nets, cordage, other similar debris; and
- Loss of hull integrity due to impact with submerged components.

The fouling of primary navigational areas, such as, channels, marinas, recreational areas or fishing grounds by the deterioration of derelict vessels is a risk to the safety of navigation. A derelict vessel or the marine waste which it may produce, when adrift, poses the greatest threat to navigation due to its unpredictable nature and unknown condition. Authorities are required to act through their own efforts due to the lack of responsibility provided by ownership. Authorities rely on their own monitoring or notification methods for awareness of such hazards and respond at their own expense.

### 1.2.4 Protection of the environment

There are multiple impacts and hazards that can arise from derelict vessels. The nature and scale of effects to the environment are dependent on the size and material of the vessel, the condition of the vessel and fixtures, the quantity and containment of hazardous substances and the extent to which litter contained in the vessels enters the environment (Turner and Rees, 2016). The following impact pathways have been identified and are discussed below:

- Habitat loss and change from vessel grounding;
- Marine litter and degradation of vessels;
- Chemical contamination; and
- Change in amenity and visual impacts.

## Vessel grounding

Derelict vessels abandoned and grounded on the seabed will cause smothering and crushing of infaunal and epifaunal species and result in the displacement of benthic communities (Turner and Rees, 2016). They may also cause a reduction in sunlight reaching the seabed, and any debris released from the vessel or accumulating around it would increase the footprint of impacted habitat. Therefore, the presence of derelict vessels itself can result in a loss of habitat. The size of the vessel and the sensitivity of benthic habitats where the vessel grounds will affect the scale of the impact, and further damage may be caused by wave action and movement during storms. However, the change in substrate and presence of the vessel may allow other species to colonise (e.g. barnacles settling on hard hull surfaces).

Scour due to meso/microscale current alteration around grounded vessels may also cause impacts to habitats (IMO, 2019). The influence of scour ranging from 1 to 30 m was recorded in seagrass beds where vessels had sunk and shoot height and seagrass density increased with distance from sunken vessels and debris (Lord-Boring *et al.*, 2004). However, current changes were mainly related to larger vessels.

## Marine litter and vessel degradation

Equipment (such as rope, fenders, boxes, fishing nets or lines) contained within vessels may also escape into the environment and become marine litter. Litter from vessels deposited on the seabed may cause smothering, abrasion or dislodgement of benthic habitats. For example, Green *et al.* (2015) found that the presence of conventional and biodegradable plastic bags in mudflats created anoxic conditions within the sediment along with reduced primary productivity and organic matter and significantly lower abundances of infaunal invertebrates. Evidence suggests litter accumulates on the strandline on sandflats and mudflats (Mathalon and Hill, 2014). This is thought to be due to the low energy environments that induce higher deposition rates of easily transported litter, such as lower density plastics. Estuarine vegetated communities can also act as litter traps; the largest litter densities tend to be found in the high marsh strata formed by large, dense and perennial vegetated communities only inundated during extreme tidal events (Mazarrasa *et al.*, 2019).

Marine litter, particularly plastics given their persistence in the marine environment, also poses a risk to seabirds, fish and invertebrates through ingestion and entanglement. Ingestion can lead to choking or a false sense of satiation in birds, marine mammals and fish. Ingestion in birds is generally found to be higher in Procellariiformes or tubenoses (e.g. European storm petrel *Hydrobates pelagicus*, fulmar *Fulmaris glacialis* and Manx shearwater *Puffinus puffinus*) (Roman *et al.* 2019; OSPAR, 2020). There are fewer examples of ingestion in gannet, cormorant and auks, probably because they are pursuit divers that follow prey, but there is evidence of entanglement in the marine environment possibly due to higher rates of interaction with floating litter during swimming and diving (Gall and Thomson, 2015). Studies of marine litter ingestion by waders generally suggests low residence times in stomachs (Lourenço *et al.*, 2017) and a low rate of incidence for entanglement given they spend most of their time at the edge of the marine environment, foraging in shallow waters or in intertidal areas. Evidence suggests the greatest risk to marine mammals from marine litter is through entanglement, with regular accounts of damage from fishing line, nets and rope on seals (Allen *et al.*, 2012) and bottlenose dolphin (Levy *et al.*, 2009). Sub-lethal effects of ingesting marine litter are generally unknown for marine mammals, but it is unlikely they are significant given generally low rates of ingestion (Nelms *et al.*, 2019).

The breakdown of larger composite plastic items from derelict vessels (e.g. from the hull or fittings, rope, rigging, netting) can be a source of microplastics. Microplastics can accumulate in the environment and can cause effects to smaller species (i.e. invertebrate, fish) through ingestion and have been shown to result in biological effects. For example, Wright *et al.* (2013) found microplastics in intertidal sediment impacted deposit-feeding marine worms by depleting energy reserves. This may

have arisen from a combination of reduced feeding activity, longer gut residence times of ingested material and inflammation. Microplastics may also bioaccumulate and biomagnify in higher organisms (Wright *et al.*, 2013), or pass directly to higher planktonic feeding organisms such as basking shark and whales (Fossi *et al.*, 2014). Toxic effects caused by chemicals released from or adhered to plastic can also impact marine organisms. Rochman (2015) states that long chain molecules that form plastics may be 'chemically inert' but many of the monomers to which they break down are known to be toxic. For example, bisphenol can be an endocrine disruptor as can styrene which is also associated with carcinogenic and/or mutagenic responses. Adsorption of other marine pollutants to plastics may also occur and increase uptake in marine organisms (likened to a 'Trojan horse' effect) (Galloway *et al.*, 2017). However, bioaccumulation of other pollutants is not always increased by exposure to microplastics compared with natural sediments (e.g. Browne *et al.*, 2013). The effects of microplastic accumulation on animal health are still relatively unclear and there remains uncertainty over the potential for impact in conditions and plastic concentrations found in the natural environment (Van Cauwenbergh *et al.*, 2015).

Some older vessels tend to be made from inert natural materials such as wood (see Section 1.2.1). These decompose quickly and pose relatively little risk to the marine environment. Modern vessels made from FRP and other synthetic materials (see Section 1.2.1) may pose a greater risk to the environment when they breakdown and degrade. As summarised by the IMO (IMO, 2019) FRP breaks down over time due exposure to weather, with the main factors being temperature and humidity leading to 'environmental stress cracking'. Ultraviolet (UV) light can also lead to break down of FRP materials. It may be assumed that the period for weather and/or sunlight degradation is potentially longer than the suggested lifespan of FRP vessels. The plastic pollution resulting from this is poorly understood, but it can be reasonably assumed that FRP breaks down to microplastics (impacts described above). This is likely to be a lengthy process given the material strength of FRP, and particles are expected to sink relatively quickly and concentrate in nearshore or shallow subtidal environments where vessels are abandoned.

It also possible that fibreglass may be released during the breakdown of vessels made from FRP (also known as glass reinforced polymer (GRP)). As noted above, FRP/GRP fragments have a higher density than sea water and will likely concentrate nearshore, close to where vessels are abandoned, disposed of or wrecked (GESAMP, 2015).

The impacts of fibreglass on marine life are poorly understood. Galimany *et al.* (2009) first recorded uptake of glass fibres by mussels (*Mytilus galloprovincialis*) in the environment. Ciocan *et al.* (2020) present the first evidence that particulate glass and plastics detected in the digestive tubules and gills of mussels under laboratory conditions can induce inflammatory reactions. They also found polymer particles and fibreglass adhered to the filament hairs on appendages on water fleas *Daphnia magna* which caused swimming impairment and sinking of the animals. It is important to note that environmental concentrations of fibreglass are not fully known so there is uncertainty regarding effects of fibreglass exposure in the environment.

### Chemical contamination

Hazardous substances can be leached from various components of derelict vessels and accumulate in sediment, interstitial water or the water column (Turner and Rees, 2016). Deteriorating and flaking paint on derelict vessels potentially represents a long-term environmental problem as it contains biocidal components, including Copper and various organic compounds that are toxic to marine life (Takahashi *et al.*, 2012; Turner, 2010). A particular concern with abandoned vessels is that paint may contain substances that have since been banned or restricted in use since their original application (Rees *et al.*, 2014). For example, Tin, an indicator of organotin (e.g. tributyltin (TBT)), was found up to concentrations of 4%, and Lead found up to concentrations of 20% on paint fragments scraped from vessels abandoned on sediment flats in UK estuaries (Turner *et al.*, 2015). Rees *et al.* (2014) found that compounds of

Copper, Zinc and Lead in flaking paint on decaying boats in the Orwell and Blackwater estuaries resulted in enrichment of these metals in local sediment. Lead in the paints resulted in the greatest contamination of local sediment, with concentrations exceeding the Canadian Sediment Quality Guidelines for the Protection of Aquatic Life probable effect level (PEL) for Lead (112 µg/g dry weight) in several instances.

Both small fragments of paint in the sediment, and the gradual dissolution of metals and adsorption to the sediment surface, was attributed to elevated metal concentrations in the sediment. Deleterious effects of metals in the marine environment are well known, and include increased mortality rates caused by Pb in *Mytilus edulis* (Ansari *et al.*, 2004), increased mortality and reduced burrowing activity in *Hediste diversicolor* due to Copper (Thit *et al.*, 2015), and the superimposition of male genitalia in female dogwhelks *Nucella lapillus*, (known as imposex) caused by TBT (Bryan *et al.*, 1987). Furthermore, birds have been observed pecking at loose peeling paint on vessels and therefore waterfowl may be poisoned directly by derelict vessels (Rees *et al.*, 2014).

Combustible materials, such as fabric, cushions, foam, coatings of electronics, plastics and paint have compounds known as flame retardants added to them (Turner and Rees, 2016). These resist ignition and prevent fires spreading and, as such, are likely to be present in vessel equipment and soft furnishings. Brominated Flame Retardants (BFR) include Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) and organophosphates. BFRs are of environmental concern because they are highly lipophilic and thus are easily removed from the aqueous environment and sorb onto sediments, particulate matter or to fatty tissue, promoting bioaccumulation (Rahman *et al.*, 2001). They also have a high resistance to degradation which aids their distribution in the environment (Law *et al.*, 2013; Rahman *et al.*, 2001). BDE-209 has shown thyroid and endocrine disruption properties (Noyes *et al.*, 2013; Lee *et al.*, 2010), and both BDE-209 and Dechlorane plus (DP) (an alternative to BDE-209) induced oxidative DNA damage in *Mytilus galloprovincialis* (Barón *et al.*, 2016). Regulatory controls have been put in place for some BFR products (for example, production and use of both the penta-mix and octa-mix PBDE formulations are banned in the EU) though alternative chemicals are used (Barón *et al.*, 2016; Law *et al.*, 2013). Derelict vessels may constitute a source of these chemicals as equipment and furnishing begins to corrode and decay.

PBDEs are structurally similar to Polychlorinated Biphenyls (PCBs) and dichloro-diphenyl-trichloroethane (DDT) and, therefore, their chemical properties, persistence and distribution in the environment follow similar patterns (Rahman *et al.*, 2001). PCBs may be released from corroding batteries or electronics aboard derelict vessels (Dimitrakakis *et al.*, 2014). Organochlorine (OC) and PCBs have a range of species-specific and dose-dependent toxic effects such as immunosuppression and reproductive impairment in all mammalian species tested, including marine mammals (Law *et al.*, 2012; Jepson *et al.*, 2005). PCBs were banned in closed systems in 1980s, but concentrations remain high in the marine environment due to its persistence and ongoing PCB inputs into the European marine environment (e.g. from PCB contaminated material) (Jepson *et al.*, 2016). Jepson *et al.* (2016) found that several European cetacean species, specifically bottlenose dolphins, striped dolphins and killer whales, currently have markedly elevated blubber PCB concentrations (above known marine mammal toxicity thresholds) due to biomagnification in marine food webs. This is thought to be the predominant factor in suppressing reproduction and subsequent recruitment at individual and population levels (Jepson *et al.*, 2016). Residual oils and fuels associated with derelict vessels can also release Polycyclic Aromatic Hydrocarbons (PAHs) and other oil related hydrocarbons into the marine environment (IMO, 2019; Turner and Rees, 2016). PAHs pose an environmental risk because of their toxic effects, including immunotoxicity, embryonic abnormalities and carcinogenicity in wildlife including fish, benthic organisms and marine vertebrates (Honda and Suzuki, 2020).

## Amenity and visual impacts

When located in the intertidal environment, derelict vessels present an issue for the landowner and/or the public. Decaying boats in this area cause a visual impact and can be detrimental to landscape/seascape value and amenity. The Milford Haven Waterway is considered an area of high natural beauty and the upper reaches of the estuary fall within the Pembrokeshire National Park (see Section 2.3). Therefore, derelict vessels may cause a greater impact in these areas and affect tourism and the local economy (IMO, 2019).

The vessels can also impede public access to the foreshore and water, as well as access to privately owned facilities. These impacts are exacerbated in areas where derelict vessels accumulate (see Section 2.2). Conversely, some derelict vessels or wrecks may be important from a historical or archaeological perspective. In these cases, they may contribute to marine archaeology and the cultural heritage of an area (Historic England, 2012), see Section 1.3 of this report. Advice on derelict vessels that may hold historic or archaeological value may be sought from national bodies specific to maritime heritage, such as National Historic Ships UK (<https://www.nationalhistoricships.org.uk/>), the Maritime Heritage Trust (<https://maritimeheritage.org.uk/>) and the West Wales Maritime Heritage Society (<http://www.westwalesmaritimeheritage.org.uk/>).

### 1.2.5 Sociological issues

The presence of derelict vessels within an area and the effect they have is impacted by sociological issues which include:

- Cause for dereliction;
- Areas of abandonment;
- Governance responsibility; and
- Social responsibility.

A principal cause of dereliction, as discussed in Section 1.2.1 is due to EOL costs, stemming from greater issues around lifecycle management, the materials used in construction and the cost of disposal/recycling. When a vessel loses its inherent value and is abandoned, for the reasons described in Section 1.1, it can be speculated that the owner became unwilling to finance the repair, maintenance or disposal of the vessel. As with the decision by authorities to take on the responsibility of a derelict vessel, the decision to attempt abandonment by an owner stems from the assessment of costs and benefits.

The cause of a vessel becoming derelict may be linked to its area of effect. Where dereliction is unintentional, such as through loss or accident, the area of impact is more likely to be a near or adjacent to a fairway or other primary navigational area. Examples of this may include a collision in a navigational channel, sinking at its berth or a vessel breaking free of its moorings and becoming adrift, with its movements affected by wind and current. Where vessels become derelict through neglect or abandonment; these vessels tend to be beached, moored or grounded in secluded areas, often higher up on the intertidal.

The management of derelict vessels is guided by governance and the responsibilities of the authorities in the area. Controls and options available for responding to perceived risk by affected authorities is driven by independent objectives set by policy. Where there may be an overlap, as with local and National Government or a marine asset owner (for example, a marina) located in a Statutory Harbour Authority (SHA) area, controls and effort may be duplicated. It is also possible that opportunities for the more efficient management of derelict vessels may be missed, including the shared use of resources or powers.

As with the example provided in Appendix A, the introduction of a shared model, including objectives and standards, agreed between local authorities and supported by National bodies has provided means for the reduction, control and disposal of derelict vessels.

The estimated lifespan of vessels constructed from FRP (Section 1.2.1) indicates that the number requiring disposal will increase, alongside the increase seen in the recreational sector (IMO 2019), there is ample potential for increased dereliction in future years. This marine waste is likely to impact on local communities though the increase in abandoned hulls, components and general marine waste becoming more visually acute. The aesthetic effect, being more tangible than others, may lead to a greater emphasis on the governance of derelict vessels and the responsibility of vessel owner, marine facility operators, Councils, port and harbour authorities, local and National bodies to take action.

### 1.3 Historic wrecks, maritime heritage and war graves

Wrecks that are considered historically, archaeologically or artistically important can be listed under Section 1 of the Protection of Wrecks Act 1973 (Historic England, 2021). This provides protection to the wreck site by making it a criminal offence to do any of the following, without a licence granted by Cadw (in Wales):

- Tamper with, damage or remove any part of a vessel lying wrecked on or in the seabed or any object formerly contained in such a vessel;
- Carry out diving or salvage operations directed to the exploration of any wreck or to removing objects from it or from the seabed, or use equipment constructed or adapted for any purpose of diving or salvage operations (this is likely to include deployment of remotely operated vehicles); and
- Deposit anything including anchors and fishing gear which, if it were to fall on the site, would obliterate, obstruct access to or damage any part of the site.

As summarised by Cadw (2020a), in Wales, there are six protected wrecks. The nearest to Milford Haven is the Smalls Viking Wreck Site, located 25 km off the coast of Pembrokeshire (SM 4644 0876). It is the findspot of an important Viking sword guard of 11th century date, on the trade route between Viking Dublin and Denmark. There are no protected wrecks within Milford Haven.

All wreck material (including anything that has been lost at sea such as equipment or cargo that has fallen overboard, or a piece of the vessel itself), whether it is recovered at sea or on the shore, must be reported to the 'Receiver of Wreck' under the Merchant Shipping Act 1995 (Cadw, 2020b). The Receiver of Wreck is responsible for assessing the historic and archaeological value of the material and, if possible, finding the owner of wreck material (Cadw, 2020b). This is captured within Section 2 of the Protection of Wrecks Act 1973, which relates specifically to dangerous wrecks, and is administered by the Maritime and Coastguard Agency (Historic England, 2021).

In the UK, some military vessels and all crashed military aircraft are designated under the Protection of Military Remains Act 1986, administered by the Ministry of Defence (Historic England, 2021). These are known as War Graves but are more correctly known as 'Military Maritime Graves'. The designation offers protection to the last resting place of UK service personnel (or other nationals), and designated vessels do not need to have been lost during wartime. Under the Protection of Military Remains Act 1986, there are two types of designation; one where protected places can be visited by divers on a 'look don't touch' basis but where it is an offence to disturb or remove anything, and controlled sites where all operations including diving require a licence from the Ministry of Defence (Cadw, 2020b).

### 1.3.1 Sunderland wreck exclusion zone

MHPA has placed the 100 m exclusion zone between the Pembroke Dock waterfront and Llanstadwell and Hazelbeach around the wreck site of a Sunderland flying boat. No one is permitted to dive the wreck without permission. The wreck is protected under the Human Remains Act 1986 with the exclusion zone providing an extra level of protection.

## 1.4 Derelict vessels key points

- Due to the lack of lifecycle planning in the small boat industry, the cost of disposal and recycling is high. Vessels are often left to degrade once no longer seaworthy.
- There has been continued and increasing use of synthetic materials such as FRP for the construction of small private craft from the 1960s onwards. The lifespan of these vessels is estimated to be 40-60 years (EU 2011), therefore the number of vessels require disposal and the EOL issues are likely to increase.
- A common understanding of the risks, responsibility and available actions for those impacted by derelict vessels provides for a more effective approach to reduction, control and disposal.
- The risks to public health, safety of navigation and protection of the environment caused by derelict vessels lies with the authority(s) impacted.
- Assessing the risks posed by derelict vessels individually is fundamental in determining the appropriate action required.
- Multiple potential impacts pathways for derelict vessels to impact environment, with some evidence of environmental effects from derelict vessels in similar estuarine settings (physical, chemical, and aesthetic/social)
- Effects are likely to be localised and limited to the nearshore environment but may be more significant where numerous vessels are abandoned and accumulation in the marine environment occurs.
- Concerns over the historic or archaeological value of a derelict vessels or wrecks may be consulted with national bodies or government departments.
- The nature and scale of effect will be influenced by several interacting factors (size of boat, construction materials, hazardous material containment, environmental conditions).
- The cause and management of derelict vessels stems from social issues involving awareness of impact and the responsibility of owners, authorities and communities.

## 2 Milford Haven

### 2.1 Habitats and sensitive environmental areas

Milford Haven is located in Pembrokeshire, on the southwest Wales coast. The estuary is classified as a Ria-type estuary<sup>7</sup>, formed from a drowned river valley, which was flooded at the end of the last Ice Age. The mouth of the waterway opens out into the outer approaches to the Bristol Channel, whilst up-estuary, the rivers Cresswell, Carew and Cleddau all feed into the Haven. These rivers are tidal for significant distances, with the tidal influence extending to Cresswell Mill (River Cresswell); Carew/Sageston (River Carew); Haverfordwest (Western Cleddau); and Blackpool Mill, near Robeston Beck (Eastern Cleddau).

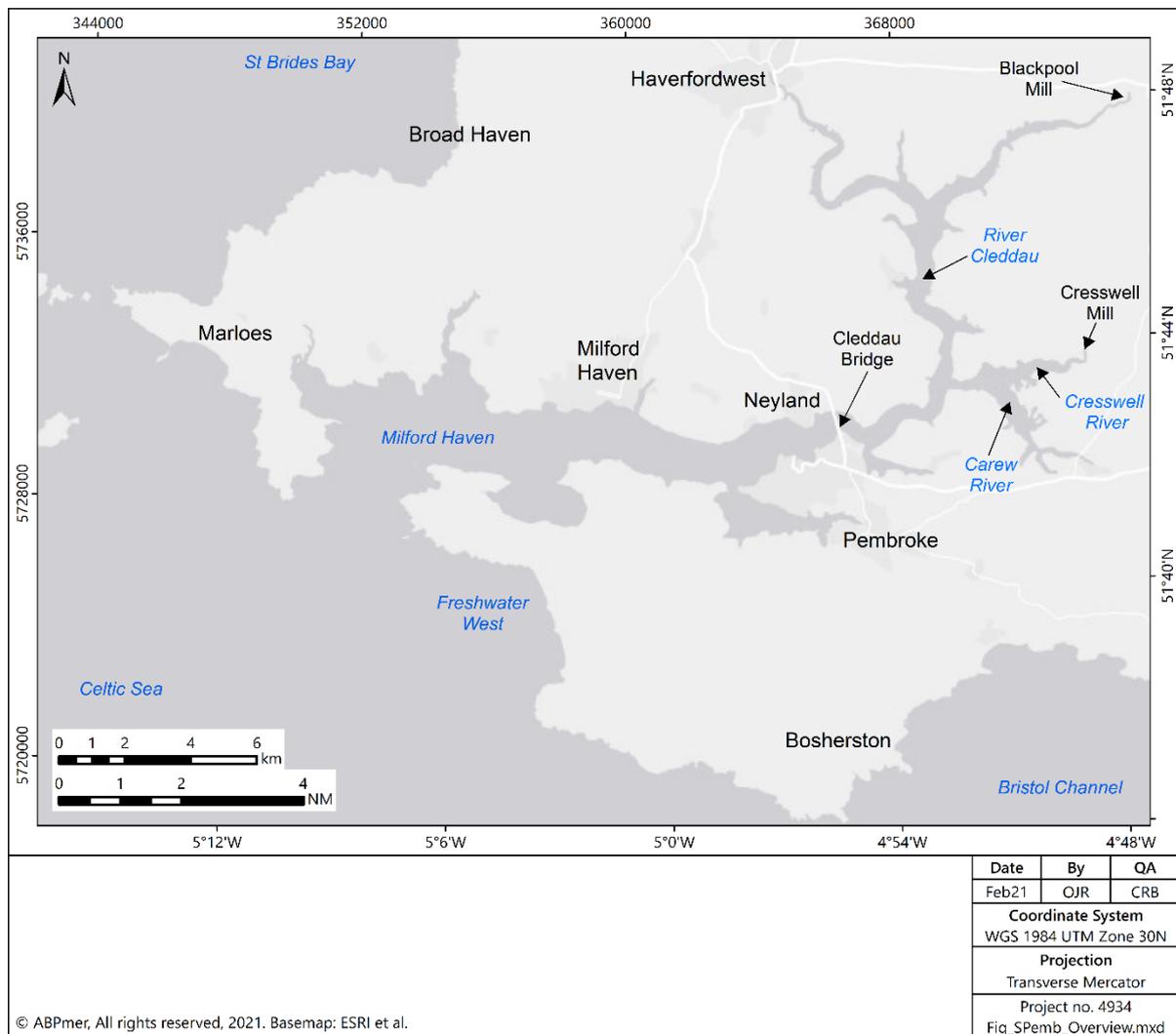
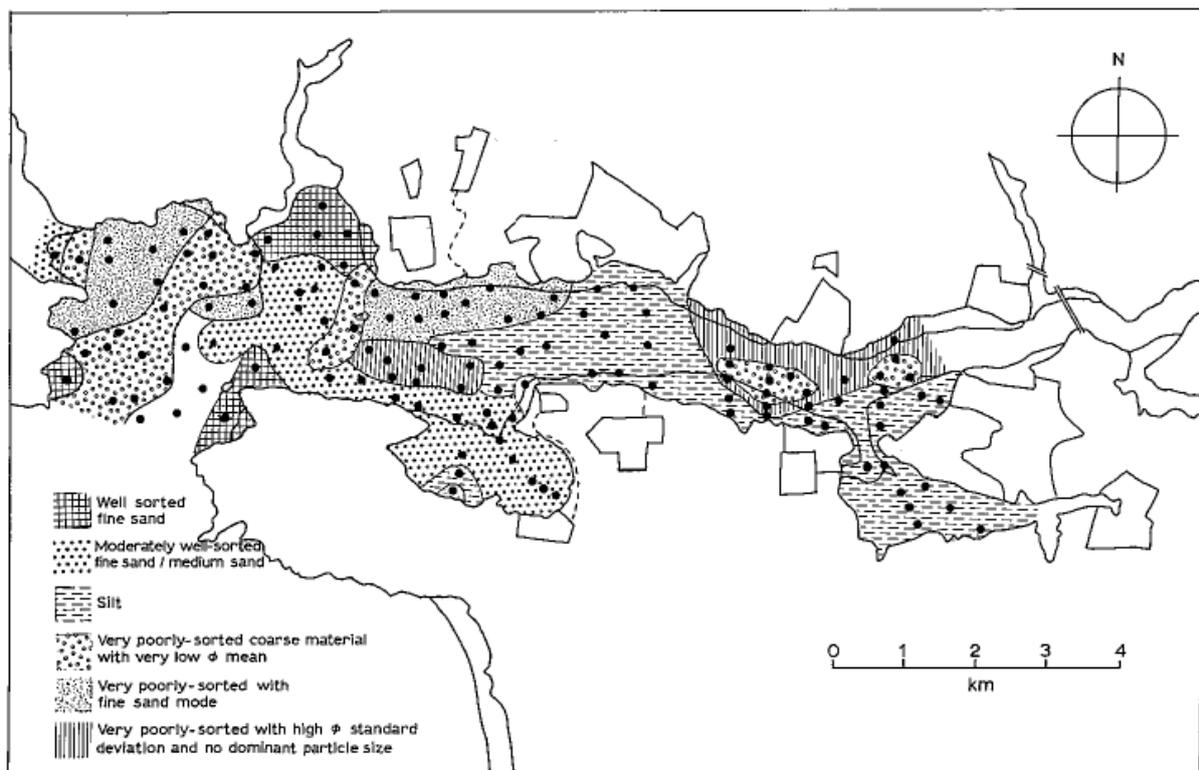


Figure 1. Location plan

<sup>7</sup> <http://www.estuary-guide.net/search/estuaries/details.asp?jncctype=Ria&fileid=15>

The waterway is considered macrotidal, with a tidal range of 6.3 m, a shoreline length of 170 km, and a channel length of 35 km. The local and regional geology coupled with the prevailing hydrodynamic conditions and fluvial inputs influence the sediment regime of the Milford Haven system. The general distribution of seabed surface sediments in the lower part of Milford Haven is shown in Figure 2 (Rostron *et al.*, 1986). At the mouth, where the wave activity is greatest, the seabed and intertidal areas largely comprise exposed sandstone bedrock or with coverage of coarse boulders or pebbles. Where tidal currents are relatively strong (and/or wave activity is high), sediments tend to be poorly sorted, although some well-sorted sands can be located in sheltered areas, such as embayments. With increasing distance up-estuary, deposits vary through sands and shell/sand to muddier sediments within the inner Haven, up-estuary of Cleddau Bridge (Little *et al.*, 1987). Between the town of Milford Haven and Neyland, the intertidal area includes extensive mud banks (containing varying proportions of sandy mud and gravel), which are exposed by larger (spring) tides (Little and Hiscock, 1987). Of the 55 km<sup>2</sup> area, over 30% (17.1 km<sup>2</sup>) is intertidal habitat (Burton, 2008).



Source: Rostron *et al.* (1986)

Figure 2. General distribution of seabed sediments in Milford Haven

Milford Haven has extensive oil industry facilities including jetties, tank farms and refineries; the build and development of these facilities have been subject to extensive consenting processes. Part of this process requires a high level of environmental monitoring. The monitoring of Milford Haven has been coordinated for many years by the Milford Haven Waterway Environmental Surveillance Group (MHWESG). The following sections summarise the environmental designations and key habitats and species located in the Milford Haven Waterway.

### 2.1.1 Nature conservation sites

Milford Haven and the adjacent coastline is afforded protection under multiple designated sites, at both an international and National level. The features of these sites include marine habitats and species but also included within the designations are terrestrial and geological features. For the purpose of this section of the report, the marine habitats and features are focussed upon as any impact arising from derelict vessels are most likely to impact marine features. The following designated sites are located within the Milford Haven Waterway:

- Pembrokeshire Marine/ Sir Benfro Forol Special Area of Conservation (SAC);
- West Wales Marine SAC;
- Milford Haven Waterway Site of Special Scientific Interest (SSSI);
- Arfordir Penrhyn Angle / Angle Peninsula Coast SSSI; and
- Dale and South Marloes Coast SSSI.

Both the Pembrokeshire Marine SAC and the Milford Haven Waterway SSSI cover the majority of the extent of the Milford Haven Waterway. The West Wales Marine SAC, Arfordir Penrhyn Angle/Angle Peninsula Coast SSSI, and the Dale and South Marloes Coast SSSI are located towards the entrance to the Milford Haven Waterway. The location of these designated sites is shown in Figure 3.

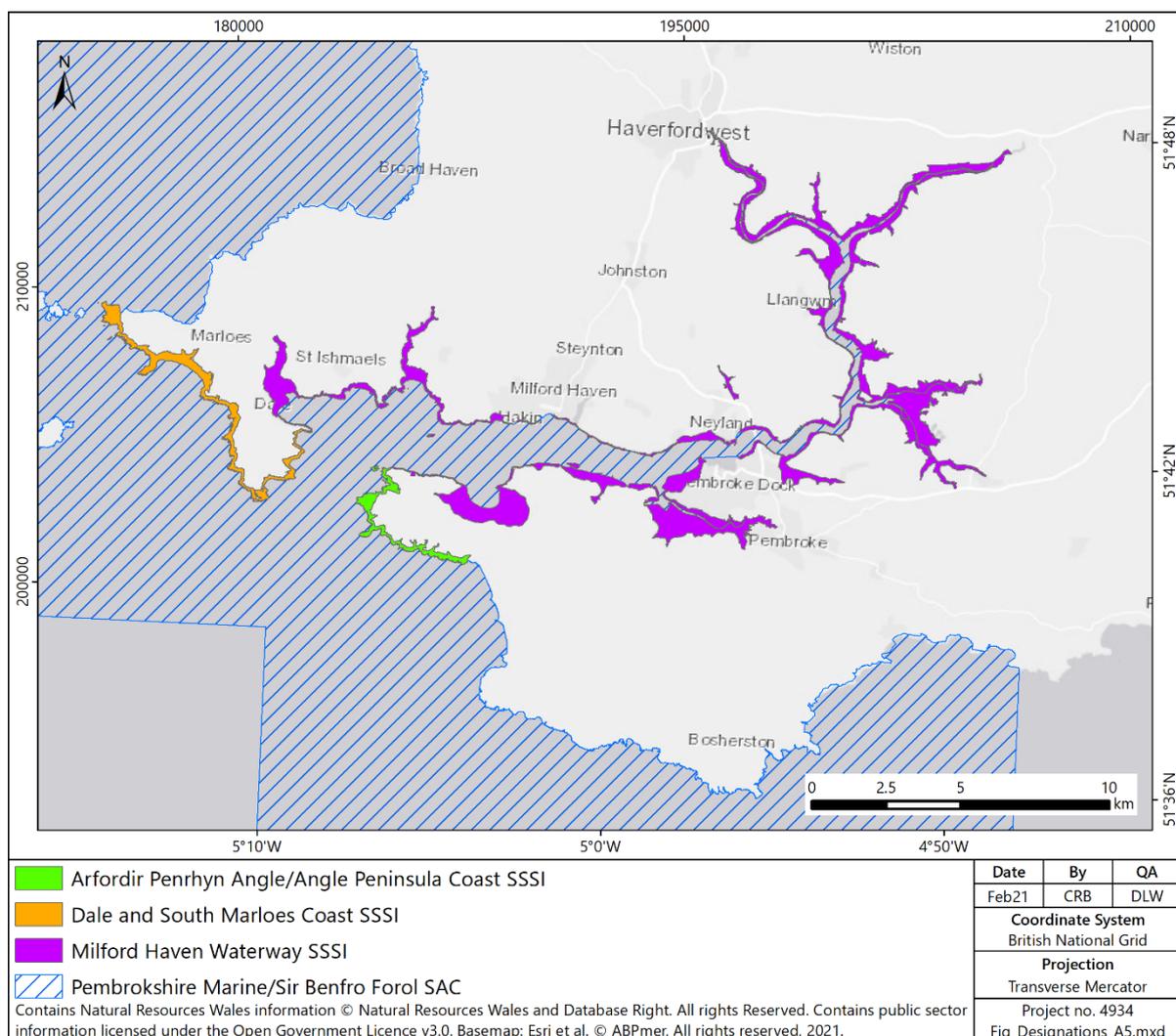


Figure 3. Designated Sites in Milford Haven

Table 2 identifies the qualifying features for International and Nationals in Milford Haven's waterway.

**Table 2. Milford Haven Waterway Qualifying Features of Designated Sites**

Site	Qualifying Features
Pembrokeshire Marine/Sir Benfro Forol SAC	<p>Annex I habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>▪ 1130 Estuaries;</li> <li>▪ 1160 Large shallow inlets and bays; and</li> <li>▪ 1170 Reefs</li> </ul> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>▪ 1110 Sandbanks which are slightly covered by sea water all the time;</li> <li>▪ 1140 Mudflats and sandflats not covered by seawater at low tide;</li> <li>▪ 1150 Coastal lagoons (Priority feature);</li> <li>▪ 1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>); and</li> <li>▪ 8330 Submerged or partially submerged sea caves.</li> </ul> <p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>▪ 1364 Grey seal <i>Halichoerus grypus</i>; and</li> <li>▪ 1441 Shore dock <i>Rumex rupestris</i></li> </ul> <p>Annex II species present as a qualifying feature, but not a primary reason for site selection:</p> <ul style="list-style-type: none"> <li>▪ 1095 Sea lamprey <i>Petromyzon marinus</i>;</li> <li>▪ 1099 River lamprey <i>Lampetra fluviatilis</i>;</li> <li>▪ 1102 Allis shad <i>Alosa alosa</i>;</li> <li>▪ 1103 Twaite shad <i>Alosa fallax</i>; and</li> <li>▪ 1355 Otter <i>Lutra lutra</i>.</li> </ul>
West Wales Marine SAC	<p>Annex II species that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>▪ 1351 Harbour porpoise <i>Phocoena phocoena</i></li> </ul>
Milford Haven Waterway SSSI	<p>Milford Haven Waterway is of special interest for its geology, ancient woodland, marine biology, saltmarsh, swamp, saline lagoons, rare and scarce plants and invertebrates, nationally important numbers of migratory waterfowl, greater and lesser horseshoe bats <i>Rhinolophus ferrumequinum</i> and <i>R. hipposideros</i>, and otter <i>Lutra lutra</i>. The site extends from the mouth of the Haven at Dale Point and Thorn Island to the upper reaches of the Daugleddau at Haverfordwest in the west and Blackpool Mill in the east. Adjacent towns include Milford Haven and Pembroke Dock.</p> <p>The waterway is an exceptional example of a ria (a system of valleys drowned by post-glacial rise in sea level) that consists of a number of estuaries, embayments and inlets. Cliffs in the southern regions are mostly developed in rocks of the Old Red Sandstone, whereas the geology of the upper reaches is relatively complex. In the outer part of Milford Haven vertical cliffs are common but elsewhere the cliff profile is often composed of a slope with a vertical rock face below it, the slope being a remnant from an earlier landform (river valley) that has not yet been eroded by the sea. In many locations stony clays mantle the middle section of the cliff profile and are exposed above the rock faces.</p>
Arfordir Penrhyn Angle /	<p>Arfordir Penrhyn Angle/Angle Peninsula Coast is of special interest for its geology, its wide range of intertidal rock, sand, and gravel habitats and communities, particularly rockpools, caves, tide-swept and under-boulder</p>

Site	Qualifying Features
Angle Peninsula Coast SSSI	communities, and for its population of roosting and feeding chough. The site is located at the western extremity of southern Pembrokeshire, extending south from the mouth of the Milford Haven Waterway. It encompasses Thorn Island and the coastline around the Angle Peninsula to the sandy beach at Freshwater West. The small village of Angle lies adjacent to the site, approximately four miles from the town of Milford Haven. West Angle Bay is underlain by Carboniferous Limestone, exposed in cliffs and an extensive wave-cut platform adjacent to a sandy beach. There is a thick cover of Quaternary deposits (mostly clays and stony clays) behind and just to the north of the beach. Rocks of Old Red Sandstone type (mudstones, siltstones, sandstones and conglomerates) are present in the cliffs to the north and south of the bay.
Dale and South Marloes Coast SSSI	<p>The site is of special interest for its rocky and sandy shore marine communities, including rock pool and overhang communities, a nationally scarce green algal community on the upper shore fringes and a nationally scarce red alga <i>Gigartina pistillata</i>, grey seals <i>Halichoerus grypus</i>, maritime grassland and maritime heath, maritime cliff crevice and ledge vegetation, coastal scrub, its assemblage of nationally rare and scarce lichens, the golden hair lichen <i>Teloschistes flavicans</i>, the scaly cricket <i>Pseudomogoplistes vicentae</i>, as an important feeding and roosting area for chough <i>Pyrrhocorax pyrrhocorax</i>, for the nationally rare shore dock <i>Rumex rupestris</i>, the rare prostrate broom <i>Cytisus scoparius ssp maritimus</i>, an assemblage of nationally rare and scarce plants, and its geology.</p> <p>This site stretches for approximately 12 km from Martin's Haven in the west, to Dale Point in the east, and is located approximately 8 km west of the town of Milford Haven. This indented coastline encompasses steep vertical cliffs ranging in height from 30 to 55 metres, interspersed with bays and beaches consisting of boulders, cobbles, gravel and/or sand.</p> <p>There are spectacular exposures of Silurian rocks around the Marloes Peninsula, including lavas and highly fossiliferous sedimentary rocks which are unique to this area. The lower part of the Old Red Sandstone sequence is exposed around the Dale Peninsula and at Gateholm. Folds, faults and associated structural interest are also clearly evident. Soils are variable, mainly developed on glacial/fluvioglacial deposits including stony clays and sandy gravels</p>

In addition to the five designated sites present within the Milford Haven Waterway, there is also the Skomer, Skokholm and the Seas off Pembrokeshire / Sgomer, Sgogwm a Moroedd Penfro Special Protection Area (SPA) approximately 3 km from the mouth of Milford Haven. The qualifying features of this SPA are breeding seabirds on the islands. These species are not regularly occurring within Milford Haven and therefore the site is not described further.

Pembrokeshire Coast National Park is situated at the mouth of Milford Haven and also the upper reaches of Milford Haven, with the boundary beginning to the northeast of Burton Ferry. The National Park's aim is to conserve enhance the natural beauty, wildlife and cultural heritage of the Park area and to promote opportunities for the understanding and enjoyment of the special qualities of the area by the public.

In the latest review of the Pembrokeshire Marine SAC, nine of the 15 qualifying features were assessed as "Unfavourable", five as "Favourable" and one as "Unknown" (NRW, 2018). The unfavourable condition of the features was often associated with anthropogenic impacts (e.g. increased nutrient pollution and increased metal contamination).

## 2.1.2 Benthic ecology

The Milford Haven Waterway consists of a main channel that has extensive rocky shores, with large sandy beaches in embayments near the entrance, and mudflats in sheltered areas further up the channel and in muddy creeks (pills) at intervals along the length of the inlet. The foreshore supports good examples of a variety of intertidal marine habitats including muddy gravels, sheltered mud, moderately exposed sand, and sheltered rock (Carey *et al.*, 2015). These shore types support a diverse range of intertidal communities (Warwick, 2017; West *et al.*, 2020), with species-rich rock pools, eelgrass *Zostera* spp. beds (Bertelli *et al.*, 2017), and overhang and under-boulder communities. Tidal water movements are particularly strong in places, allowing the development of tide swept lower shore communities that are particularly rich in animal species. Other communities include beds of native oyster *Ostrea edulis* and areas of mixed sediment supporting segmented worms of the family Syllidae.

Milford Haven supports three saline lagoons; the Pickleridge lagoon within the Gann Estuary, a weired pool at Westfield Pill near Neyland, and the old Millpond within the grounds of Carew Castle. Saline lagoons are an unusual and rare habitat both in the UK and elsewhere, supporting a number of characteristic species that are rarely found in other habitats. Species found in the above three sites include the nationally scarce tentacled lagoon worm *Alkmaria romijni* and the crustacean *Gammarus chevreuxi*, along with the lagoon cockle *Cerastoderma glaucum* (CCW, 2002; West *et al.*, 2020).

Saltmarshes occur within the Haven, predominantly in sheltered areas within the upper regions of the main channel, and in the muddy creeks (pills) and embayments found at intervals along the length of the inlet. A variety of saltmarsh communities exist in the estuary, the most extensive being characterised by the pioneering species common cord-grass *Spartina anglica* on the lower shore. Other dominant species include sea purslane *Atriplex portulacoides*, common saltmarsh grass *Puccinellia maritima* and red fescue *Festuca rubra*. These grade into upper saltmarsh or brackish communities with occasional sea rush *Juncus maritimus* and saltmarsh rush *Juncus gerardii*. In some areas, there is a transition zone from upper saltmarsh into areas of reed-bed dominated by *Phragmites australis*. Species found within the saltmarsh include the nationally scarce lax-flowered sea-lavender *Limonium humile* and the one-flowered glasswort *Salicornia pusilla*.

Of particular note is the presence of both *Zostera noltii* and *Z. marina* in extensive beds, which are thought to represent the largest seagrass beds in Wales. There was an estimated 181 ha of seagrass in total, with 158 ha of the intertidal *Z. noltii* and 23 ha of the subtidal *Z. marina* (Unsworth *et al.*, 2017; Bertelli *et al.*, 2017). The largest extent of seagrass is within Angle Bay and on the south west banks of the Pembroke River (Bertelli *et al.*, 2017). All intertidal seagrass beds surveyed by Unsworth *et al.* (2017) had shown an increase in extent between survey periods (2007 and 2014).

The only known living maerl bed in Welsh waters is situated within Milford Haven. They are found on the northern side of the outer Milford Haven, and exist in this location (at least in part) because the area is tidally swept and exposed to wave action. There is evidence to show that it has been present within the Haven for thousands of years' but monitoring over the last 15-20 years has indicated a significant decline in extent of live maerl. The cause of the decline is unknown, but it is known that maerl is highly sensitive to smothering through sediment deposition.

## 2.1.3 Fish and shellfish

Fish surveys in Milford Haven are undertaken by NRW during monitoring of the Milford Haven Inner Water Framework Directive transitional waterbody. Seine and fyke net surveys undertaken upriver of the Cleddau Bridge have predominantly recorded gobies *Pomatoschistus* spp, sand smelt *Atherina presbyter* and sea bass *Dicentrarchus labrax*, with lower numbers of clupeids including sprat *Sprattus sprattus* and herring *Clupea* spp. Three species of mullet – thick lipped *Chelon labrosus*, thin lipped *Liza*

*ramada* and golden grey *Liza aurata* - were regularly recorded, albeit in low numbers. Ballan wrasse *Labrus bergylta* and 15-spined stickleback *Spinachia spinachia* have also been occasionally recorded. Species of conservation interest which have been recorded in the seine and fyke net surveys, albeit extremely rarely, include Atlantic salmon *Salmo salmar*, sea trout *Salmo trutta* and European eel *Anguilla anguilla*.

The otter trawl surveys conducted by NRW in the Milford Haven Waterway outer coastal waterbody have typically recorded a different assemblage of species (as would be expected for a different trawl method in an area further towards the mouth of the Waterway). However, the captures from the trawl survey also appear to have been dominated by gobies. The otter trawls have also recorded demersal species including plaice *Pleuronectes platessa*, flounder *Platichthys flesus* and solenette *Buglossidium luteum*. The Upper Cleddau within Milford Haven (north east of Neyland) is designated as a Shellfish Water with commercial shellfisheries present particularly for native oyster *Ostrea edulis*. Native oysters are threatened throughout their range and are designated a UK BAP priority species. There are other shellfish beds, with areas of mussels *Mytilus edulis* (the outer mouth of Angle Bay and up near Sprinkle Pill Spit), cockles *Cerastoderma edule* (Angle Bay east, Gann Flat, Sandy Haven and Pembroke River) and carpet shell clams *Ruditapes decussatus* (Milford and Pwlicrochan Shelves) (Cefas, 2012).

#### 2.1.4 Marine mammals

Milford Haven has been surveyed previously for the development of the port and multiple other projects and the most frequently recorded marine mammal were harbour porpoise and bottlenose dolphin (RPS, 2018). The records were restricted to the outer sectors of Milford Haven and it is considered unlikely that dolphins or porpoise to travel further into the waterway.

It is considered that the seal population in Wales consists almost entirely of grey seal (Baines and Evans, 2012; Russell *et al.*, 2017). Approximately 2 % of the UK's pups are recorded within the Pembrokeshire Marine SAC, with the latest numbers from regularly recorded seal locations indicating an exponential growth in numbers (NRW, 2018). The regularly recorded pupping sites for grey seals are located on the open coast and not within Milford Haven. It is likely that some seals will go into the waterway to forage.

The Pembroke Marine SAC includes otter as a qualifying feature, with the catchment around Milford Haven one of the best places in the UK for the species. The Cleddau catchment has consistently provided some of the highest proportions of sites where positive signs of otter have been found since the first national survey in 1977/8 and the 2009-10 survey was no exception, with 97% of sites positive (Strachan, 2015).

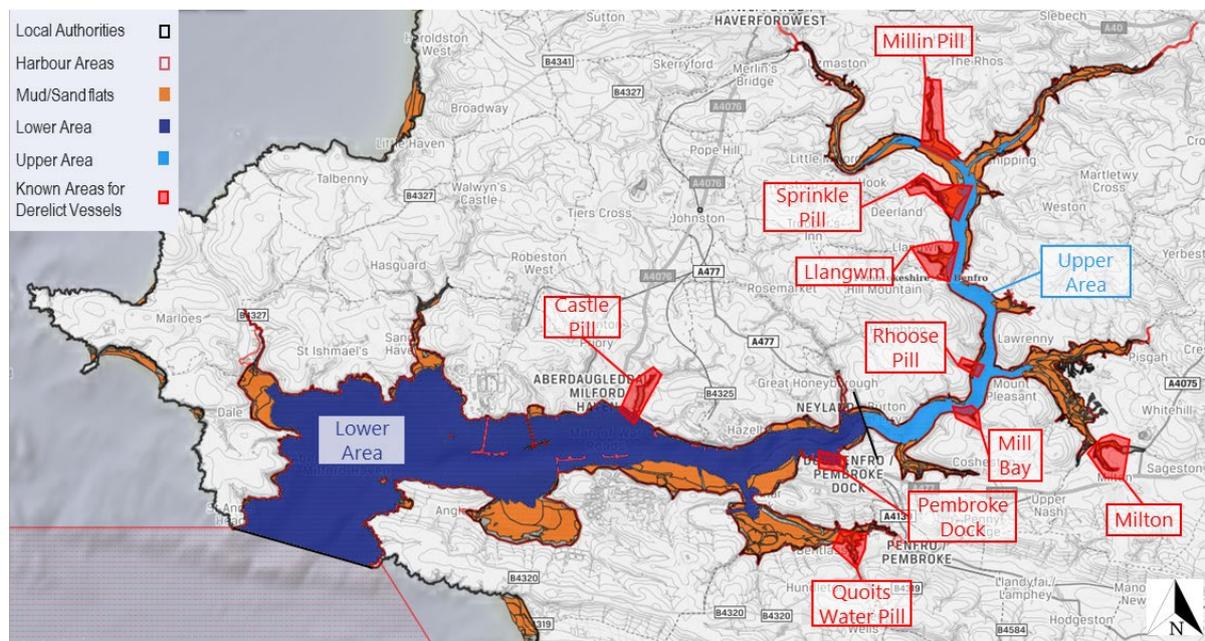
#### 2.1.5 Coastal waterbirds

The saltmarsh and mudflats within Milford Haven support significant numbers of over-wintering wildfowl and waders (Haycock, 2019; Frost *et al.*, 2020). Milford Haven and the Cleddau Estuary regularly support approximately 20,000 birds each winter (Frost *et al.*, 2020). This number rises during particularly hard winters, when the mild Pembrokeshire climate results in the Haven population becoming augmented by wildfowl and waders coming in from other estuaries to the east that have become frozen. Species of special interest within Milford Haven include Little Grebe *Tachybaptus ruficollis*, Shelduck *Tadorna tadorna*, Wigeon *Anas penelope*, Teal *Anas crecca*, Dunlin *Calidris alpina* and Curlew *Numenius arquata*, all of which are qualifying features of the Milford Haven Waterway SSSI.

In addition to the SSSI qualifying features, over the last five years of the British Trust for Ornithology's (BTO's) Wetland Bird Survey (WeBS), Greenshank *Tringa nebularia*, Wigeon and Light-bellied Brent Goose *Branta bernicla* have occurred in numbers that are nationally important. Wigeon numbers have increased in recent winters, with birds using Pembroke River to the greatest extent, often recorded

foraging on the seagrass beds which have increased in extent (Frost *et al.*, 2020). In contrast the numbers of Little Grebe have decreased, with the population wintering in Milford Haven representing approximately 14 % of the UK population. Areas used to the greatest extent include Pembroke River, Angle Bay, Cosheton Pill, and Black Mixen Pool due to these areas having the greatest extent of mudflat available for the coastal waterbirds to forage on (Frost *et al.*, 2020).

## 2.2 Disposition of derelict vessels



Source: Welsh Government, 2021.

Figure 4. Derelict vessel areas within Milford Haven

The disposition of derelict vessels in the Milford Haven estuary has been documented through anecdotal information from authorities within the area.. These 'known' areas are shown on Figure 4 with indicative extents at each location identified by a coloured zone. The study area has been separated into an **Upper** and a **Lower** area, using the A477 road bridge crossing to demarcate the areas. The specific areas identified as common location for derelict vessels are:

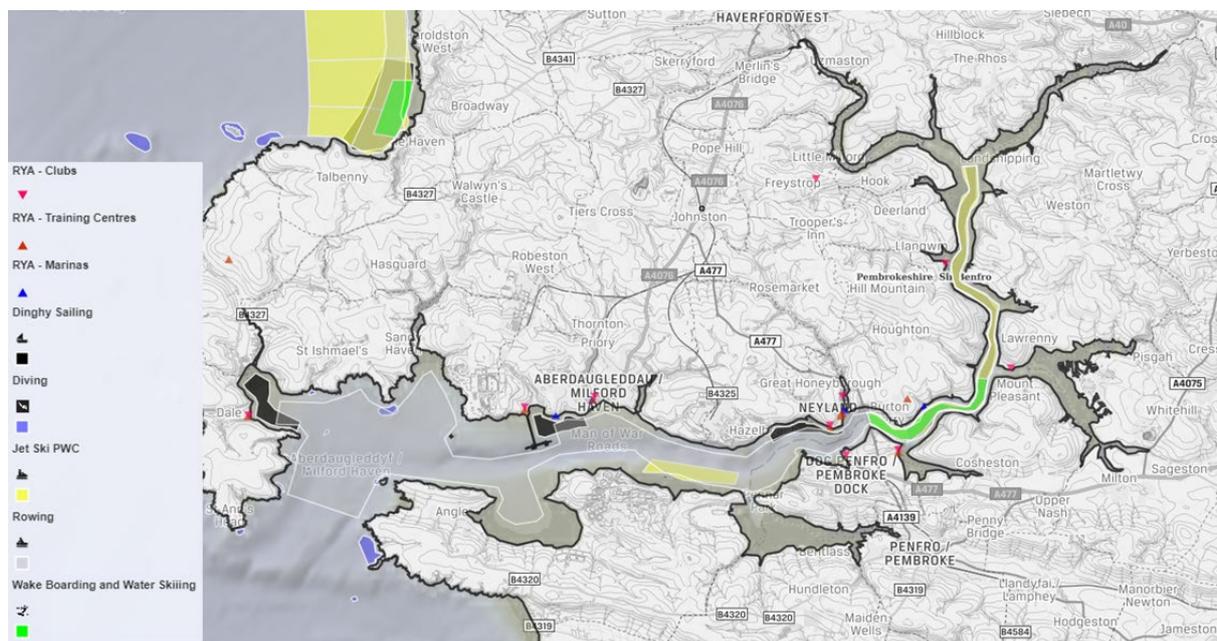
- Millin Pill;
- Sprinkle Pill;
- Llangwm;
- Rhoose Pill;<sup>8</sup>
- Mill Bay;
- Milton;
- Pembroke Dock;<sup>9</sup>
- Quoit's Water Pill; and
- Castel Pill.

<sup>8</sup> This name is used as the unnamed pill is situated within an area that has colloquial names prefixed with Rhoose; such as, Rhoose lodge and Rhoose Ferry road.

<sup>9</sup> Specifically, an area adjacent to the commercial quay and the towns Martello tower.

## 2.2.1 Upper area

Derelict vessels within the Upper area are more commonly found to have been landed and abandoned within the Pills<sup>10</sup>, inlets and rivers. The Upper area is of a more riverine nature and does not experience much in the way of commercial vessel activity. Use of the waterway is primarily by recreational vessels and personal watercraft (PWC) operating from marinas, water sports centres and other local community facilities. Figure 5 and Figure 6 show use of the waterway from recreational activities by those on the water and those requiring access from the shore. Derelict vessels which become adrift in this area either ground within a relatively short period or drift into the Lower area. Those vessels which have been landed<sup>11</sup> are subject to gradual decomposition and may break apart to produce floating debris. The impact associated with derelict vessels is discussed in Section 1.2, the hazards for the Upper area concern the nature or type of derelict vessels, accessibility by the public, interaction with waterway users and the environmental sensitivity of the area.



Source: Welsh Government, 2021.

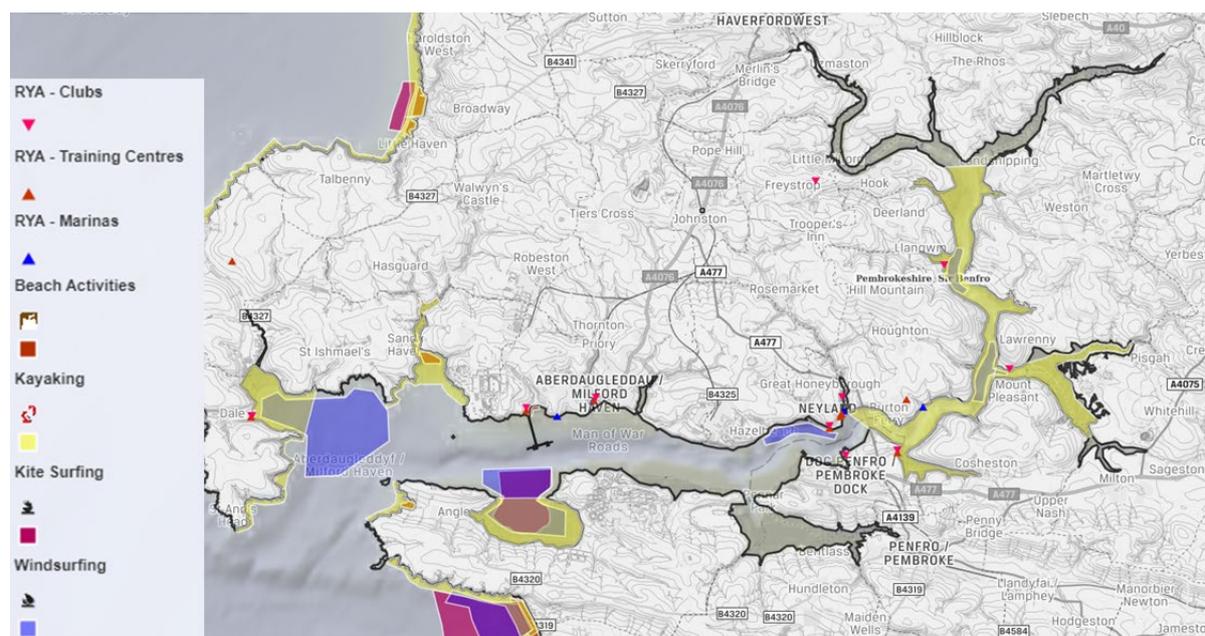
Figure 5. Recreational activity on the water

## 2.2.2 Lower area

The Lower area is a larger body of water with more coastal characteristics than the Upper area. As with the Upper area, derelict vessels which have been landed are located within the more riverine areas, as shown in Figure 4. Due to the nature of commercial operations within the Lower area, hazards to navigation are more readily identified (for example, the Milford Haven Port Authority Ranger Service, Pilots, Pilot Boat Launch Crew, small commercial workboats, marina staff, etc). This allows for more prompt action to deal with an abandoned or drifting vessel regardless to the status of the vessel or debris. Anything that may be a danger to navigation is acted upon and reported to the Vessel Traffic Services (VTS) which has the ability to task a local patrol, pilot or workboat to investigate.

<sup>10</sup> Tidal inlet, creek or harbour.

<sup>11</sup> Landing a vessel is a wilful action and used as an antonym to grounding.



Source: Welsh Government, 2021.

Figure 6. Recreational activity requiring access from the shore

Derelict vessels which have become adrift respond to environmental conditions such as tide, current and weather which will determine their movement and eventually, their grounding or beaching location. Drifting vessels pose a greater hazard to navigation (as discussed in Section 1.2.3) and are often acted upon more promptly than for the Upper area due. Drifting vessel which have become grounded or beached are less likely to be notified to an authority, presenting a greater challenge to monitoring. Vessels that become adrift are most likely to be those which have broken moorings or been lost through neglect, drifting vessels are therefore likely to originate from marine facilities and moorings within the area. Landed vessels are likely to have been abandoned and, as discussed above, located in riverine areas that are less noticeable. As landing a vessel is a wilful action these vessels may or may not have originated from the Milford Haven area.

## 2.3 Authority areas in Milford Haven

### 2.3.1 Relevant national authorities

A primary national body with an interest over the impact from derelict vessels is Cyfoeth Naturiol Cymru/Natural Resources Wales (NRW) due to the potential effect of vessel decomposition on the environment and waste management during disposal. NRW is also responsible for advising on the management of hazardous waste, large scale fly-tipping, waste duty of care for organisations and how to classify waste. The Health and Safety Executive (HSE) are responsible for enforcing health and safety at workplaces, this may include derelict vessels depending on the setting or the disposal method used for a vessel and or waste. The Maritime and Coastguard Agency (MCA) is an executive agency of the UK tasked with preventing the loss of lives at sea and is responsible, through the Secretary of State for Transport to Parliament, for implementing British and International maritime law and safety policy.

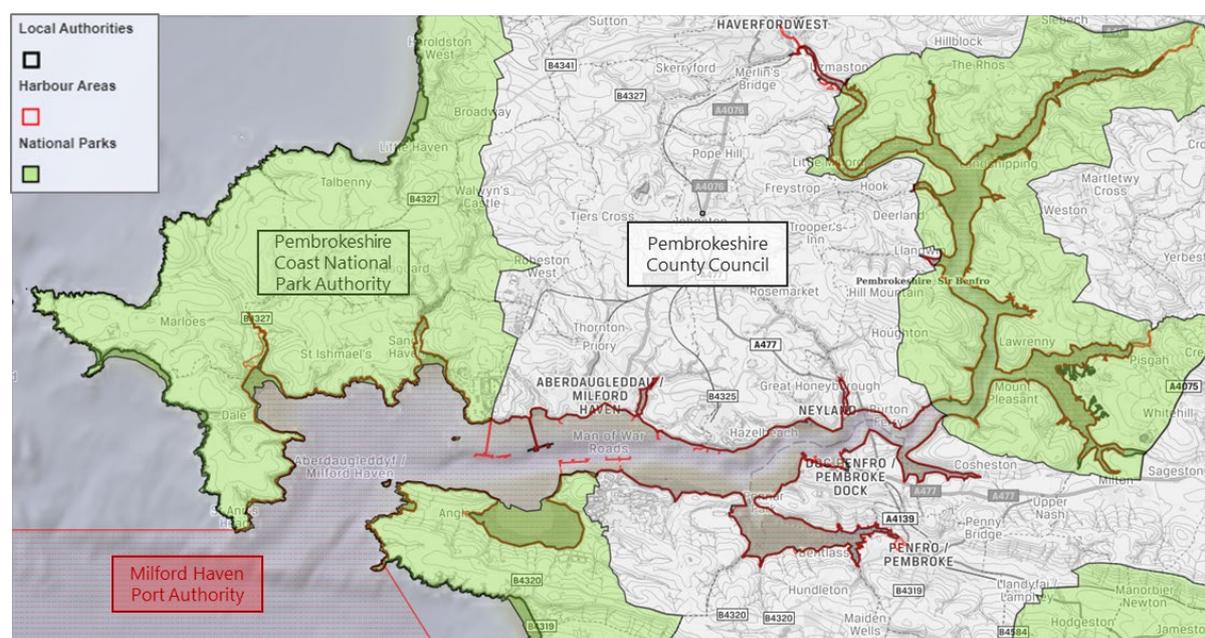
### 2.3.2 Relevant local authorities

The impact of derelict vessels may cover an area greater than that of a single authority, these areas may overlap, and the responsibilities of each authority will differ. The actions required for the management of derelict vessels is determined though the powers available, risks posed, and costs involved. The

authorities and organisations with boundaries and powers in respect to actions that can be taken to manage derelict vessels in Milford Haven include:

- Pembrokeshire County Council (PCC);
- Pembrokeshire Coast National Park Authority (PCNPA);
- Milford Haven Port Authority (MHPA);
- Private Statutory Harbours associated with Docks, Oil and Gas Terminals; and
- Private landowners.

Figure 7 illustrates the three authorities within the Milford Haven area that are directly concerned with the management of derelict vessels. These are namely PCC, PCNPA and MHPA. The areas shown in Figure 7 have been extracted from the Welsh Marine Planning Portal (Welsh Gov, 2021).



Source: Welsh Government, 2021.

Figure 7. Authority areas within Milford Haven

**Pembrokeshire County Council (PCC)** has authority over the Milford Haven area with responsibilities in public safety, transport and waste management down to the waterline of Mean Low Water Springs (MLWS). Local authorities are responsible for dealing with most types of small scale waste removal such as fly-tipping on publicly owned land. This applies to areas down to the MLWS mark where the illegal discarding or deposit of waste materials and rubbish products on land or water is contrary to the Environmental Protection Act 1990.

**The National Park (PCNPA)** has three areas that interact with Milford Haven, they include the north and south bank of the Haven west of the commercial terminals and an area covering the majority of the estuaries above the A477 road bridge. The PCNPA area is leased from The Crown Estate and includes the foreshore and areas of seabed within some Pills, these areas are specified in the excerpt from the lease agreement provided in Appendix (B) The PCNPA is a statutory authority with responsibility over their areas (see Figure 7) for: conserving and enhancing the natural beauty, wildlife and cultural heritage of the area and promoting opportunities for the understanding and enjoyment of the special qualities of those areas by the public.

The Milford Haven Port Authority (MHPA) is a Trust Port, brought into existence by a specific Act of Parliament 'The Milford Haven Conservancy Act 1958'. There have been subsequent acts of Parliament to amend this original Act, with the result that the following acts of Parliament essentially encompass the entire body of legislation and consolidate the various acts that constitute the Port in its present form 1958 to 2012. MHPA is a Statutory Harbour Authority (SHA) with a defined boundary known as the 'Harbour Limits' which are shown on Figure 8. Within this boundary, by virtue of the Merchant Shipping Act 1995, Section 193, MHPA is also the Local Lighthouse Authority (LLA) and responsible for the Aids to Navigation.

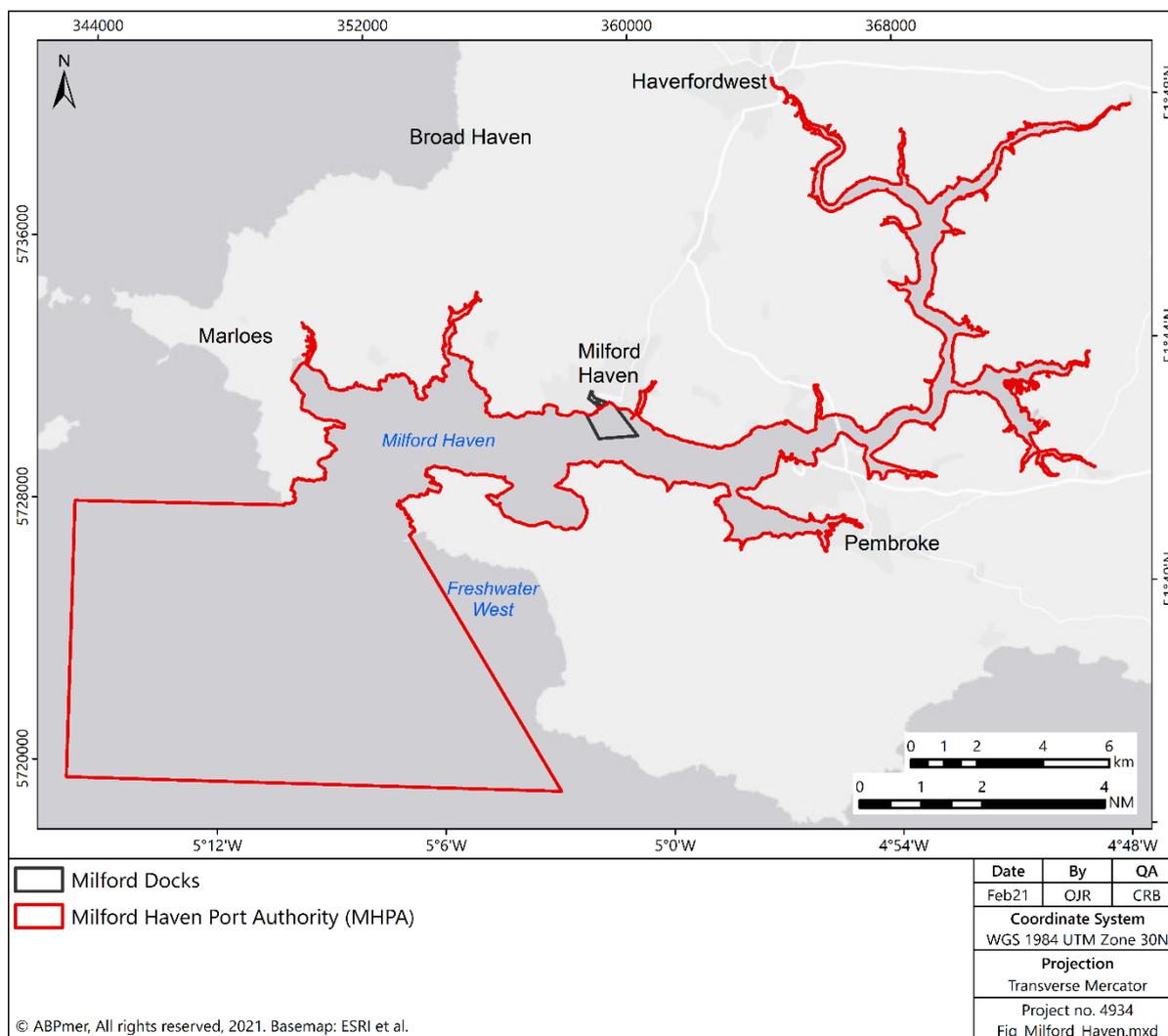


Figure 8. Milford Haven Port Authority (MHPA) and Milford Docks

Each commercial terminal within Milford Haven has a Statutory Harbour encompassing its area, these SHAs sit within the wider boundary of MHPA which runs throughout the area. Milford Docks is also a separate and specific SHA covering the enclosed docks and dock approaches, the approach area overlaps with the MHPA SHA but the enclosed docks are outside of MHPA's area. Figure 9 shows the mapped SHA boundaries known at the time of this study. The SHA areas for terminals are not defined on Admiralty Charts are have therefore not been mapped. The location of each Terminal with an SHA area has been labelled on Figure 9. Each SHA has separate legislation which may be used for the management of derelict vessels; however, these are limited to the extents of the SHA.

Private landownership exists within authority areas, landowners do not hold authority themselves but do carry a responsibility regarding the potential impact from derelict vessels. Llangwn is privately owned and is a known area where derelict vessels have been historically located; management including removal and disposal of derelict vessels involves interaction with the local community and landowner if the impact from the vessel crosses the ownership boarder. The use of statutory powers depends on the jurisdiction of the authority in the area and will involve consultation with the landowner. For private land not under the jurisdiction of an authority, the management of derelict vessels falls within the means of the landowner alone, however national legislation may apply.

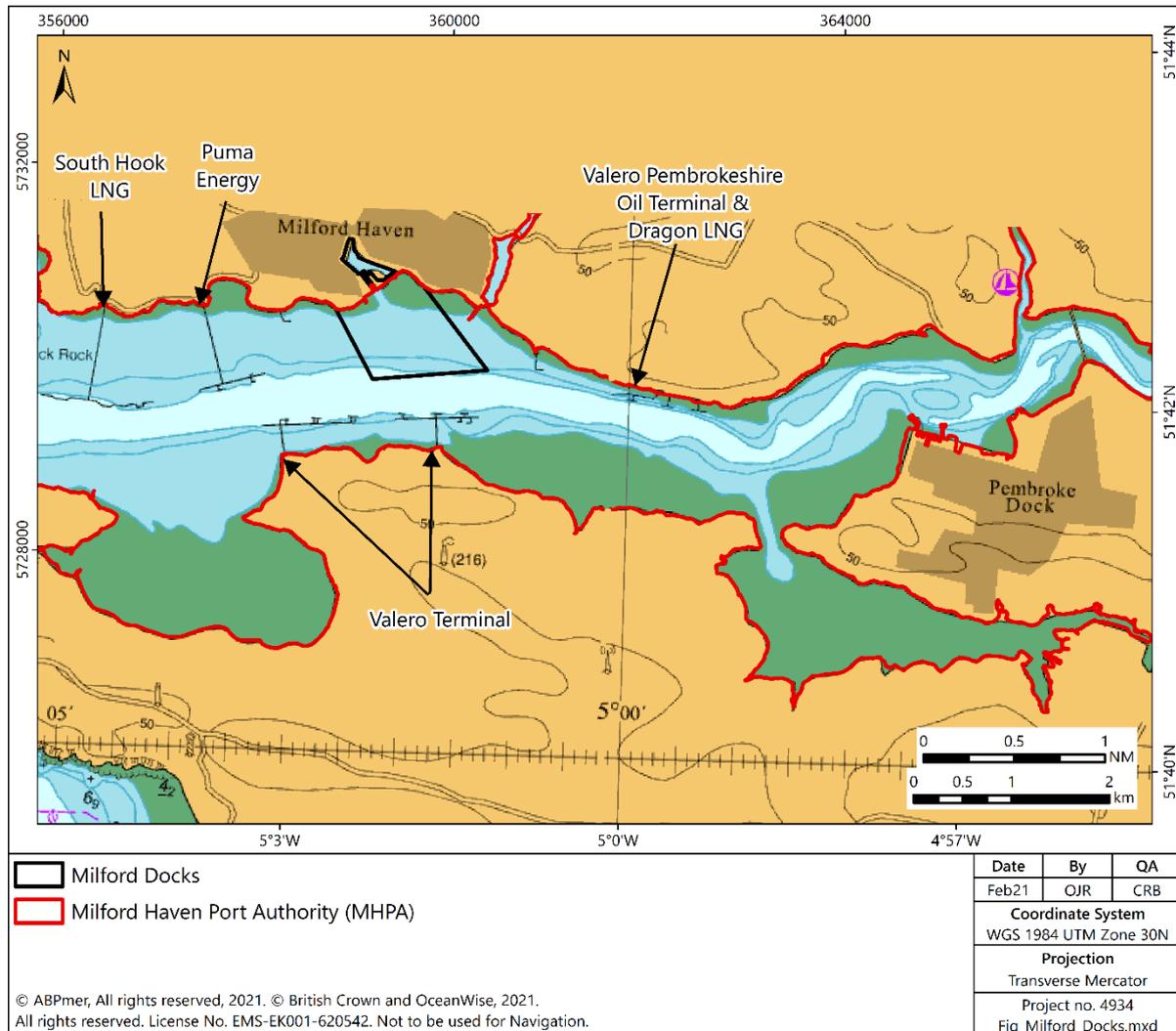


Figure 9. Terminals and Jetties with Statutory Harbour Authority Boundaries

As the area of effect from the impact of a derelict vessel may cover several authority areas, their management is subject to the priorities of each authority and the powers available. Where the boundaries between authorities meet or overlap the use of management techniques or exercise of powers should be conducted in accordance with agreed practice and within the specific authorities remit subject to that agreement. It is possible that in these circumstances one authority may agree with another the use of its powers, so far as possible to manage a derelict vessel in line with its responsibilities.

The management of derelict vessels may impinge on privately owned land or within local community areas. Where this is the case the private body may have its own objectives and require consultation in the management process. The assumption of rights and responsibilities over a third party's property brings with it a range of risks (and potentially an ongoing duty of care) and should be carefully considered before any removal or remediation action is taken.

## 2.4 Derelict vessels in Milford Haven key points

- Larger derelict vessels are often landed in more riverine areas, particularly in the Upper area (north of the A477 road bridge).
- Drifting vessels tend to originate from local moorings and facilities due to neglect or a lack of maintenance, where these vessels ground depends on environmental conditions and is often at locations accessible by the public. Drifting vessels in the Lower area are notified and acted upon efficiently due to the presence of commercial operations.
- The powers available to authorities is dependent on their remit and their use dependent on responsibility. Where authority boundaries meet or overlap the management of derelict vessels should be agreed.
- Where the impact from derelict vessels crosses authority boundaries or interacts with private land (including the seabed) consultation is required between stakeholders. The exercise of powers available should be in-line with any Memorandum of Understanding or agreement.

## 3 Legislation

The following Chapter provides information gathered through research relating to National and Local legislation in place for authorities having an interest in the management of derelict vessels in Milford Haven.

This information is presented as an academic exercise and should not be used as an interpretation of the legal position. Authorities are advised, that prior to exercising any powers, the actual legislation which contains the power should itself be reviewed.

The following Chapter summarised the powers available for authorities to manage derelict vessels and waste generated by derelict vessels, as available to the authors at the time of writing.

The Chapter has been presented in the following sections:

- Statutory Harbour Authorities
- Pembrokeshire County Council
- Pembrokeshire Coast National Park Authority
- Private Land Owners; and
- National Legislation

### 3.1 Derelict vessel powers: Statutory harbour authorities

The legal powers available for the management of derelict vessels has been reviewed for the Statutory Harbour Authorities in the area. These Acts, Orders and Byelaws include:

- Section 252 of the Merchant Shipping Act 1995 (with amendments);
- Section 1 Dangerous Vessels Act 1985;
- Section 56 HDPC Act 1847 (Removal of wrecks & C);
- Section 57 HDPC Act 1847 (Unserviceable vessels);
- Milford Haven Conservancy Act 1983;
- Milford Haven Harbour Byelaws 1984;
- Milford Docks Act 1953;
- Amoco (U.K.) Act 1971;
- Esso Petroleum Act 1957; and
- Gulf Oil Refining Act 1965.

A summary analysis of these powers relating to the management of derelict vessels for each of the Statutory Harbour Areas in Milford Haven has been presented in Table 3 to Table 7.

As the largest SHA covering both Milford Haven and a sizeable area of the sea in the approaches (see Figure 8), MHPA operates under a range of legislation and a set of Byelaws with applicable powers. These are detailed in Table 3.

**Table 3. Milford Haven Port Authority: derelict vessel powers**

Legislation	Comments
Section 252 Merchant Shipping Act 1995	Applicable through the Milford Haven Conservancy Act 1983 - Section 52: Protection of Crown Interests in wrecks.
Section 1 Dangerous Vessels Act 1985	Applicable
Section 56 HDPC Act 1847 (Removal of wrecks & C)	Not applicable
Section 57 HDPC Act 1847 (Unserviceable vessels)	Not applicable
Milford Haven Conservancy Act 1983	Applicable sections include: Section 21: Harbour Masters powers (re removal of wrecks etc.). - Section 24: Power to raise and remove wrecks ( <i>Section 54: Protection of the water authority; and Section 55: Protection of the Electricity Board apply</i> ). - Section 25: Power to prevent or reduce oil pollution. - Section 26: Further powers with regard to wrecks. - Section 27: incorporation of Merchant Shipping (Oil Pollution) Act 1971. - Section 28: Provisions relating to oil pollution and raising wrecks. - Section 52: Protection of Crown Interests in wrecks.
Milford Haven Harbour Byelaws 1984	Applicable sections include: - Byelaw 19: Unserviceable vessels to be removed and not destroyed.

Milford Docks includes the enclosed docks and an approach area within Milford Haven estuary (see Figure 9). The approach area overlaps with the SHA for MHPA. Relevant legislation applicable to Milford Docks is shown in Table 4.

**Table 4. Milford Docks: derelict vessel powers**

Legislation	Comments
Section 252 Merchant Shipping Act 1995	Applicable
Section 1 Dangerous Vessels Act 1985	Applicable
Section 56 HDPC Act 1847 (Removal of wrecks & C)	Applicable
Section 57 HDPC Act 1847 (Unserviceable vessels)	Applicable
Milford Docks Act 1953	Applicable sections include: - Section 14: Removal of sunk stranded or abandoned vessels.

The Puma Energy terminal is located on the north shore of Milford Haven, the SHA area is not definitively mapped, but is known to extend 300 feet (91.4 m) from the jetty structures (see Figure 9). Relevant legislation applicable to Puma Energy (through the Amoco (UK) Act 1971) is shown in Table 5.

**Table 5. Puma Energy: derelict vessel powers**

Legislation	Comments
Section 252 Merchant Shipping Act 1995	Applicable through the Amoco (U.K.) Act 1971 - Section 39 extends to include recovery of costs from the owner of the Vessel. <ul style="list-style-type: none"> <li>▪ Requires 48 hours prior notice required to owner except in case of emergency and ability for owner to serve counter notice within the 48 hour period and then remove the vessel itself.</li> <li>▪ Must give notice in writing to MHPA before exercising the power</li> </ul> - Section 40: Protection for Crown Interests in Wrecks
Section 1 Dangerous Vessels Act 1985	Applicable - provided not considered a 'subordinate' pier master.
Section 56 HDPC Act 1847 (Removal of wrecks & C)	Applicable
Section 57 HDPC Act 1847 (Unserviceable vessels)	Applicable

The South Hook LNG terminal is located on the north shore of Milford Haven, to the west of the Puma Energy jetty. Again, the SHA area is not definitively mapped, but is known to extend 100 yards (91.4 m) from the jetty structures (see Figure 9). Relevant legislation applicable to South Hook LNG (through the Esso Petroleum Act 1957) is shown in Table 6.

**Table 6. South Hook LNG: derelict vessel powers**

Legislation	Comments
Section 252 Merchant Shipping Act 1995	Applicable
Section 1 Dangerous Vessels Act 1985	Applicable - provided not considered a 'subordinate' pier master.
Section 56 HDPC Act 1847 (Removal of wrecks & C)	Applicable
Section 57 HDPC Act 1847 (Unserviceable vessels)	Applicable
Esso Petroleum Act 1957	Applicable sections include: - Section 37: Removal of sunk stranded or abandoned vessels

Valero Pembrokeshire Oil Terminal & Dragon LNG is located on the north shore of Milford Haven, to the east of Milford Docks. Again, the SHA area is not definitively mapped, but is known to extend 300 feet (91.4 m) from the jetty structures (Figure 9). Relevant legislation applicable to Valero Pembrokeshire (through the Gulf Oil Refining Act 1965) is shown in Table 7.

**Table 7. Valero Pembrokeshire Oil Terminal & Dragon LNG: derelict vessel powers**

Legislation	Comments
Section 252 Merchant Shipping Act 1995	Applicable through the Gulf Oil Refining Act 1965 - Section 40 extends to include recovery of costs from the owner of the Vessel. <ul style="list-style-type: none"> <li>▪ Requires 48 hours prior notice required to owner except in case of emergency and ability for owner to serve counter notice within the 48 hour period and then remove the vessel itself.</li> <li>▪ Must give notice in writing to MHPA before exercising the power</li> </ul> - Section 41: Protection for Crown Interests in Wrecks
Section 1 Dangerous Vessels Act 1985	Applicable - provided not considered a 'subordinate' pier master.
Section 56 HDPC Act 1847 (Removal of wrecks & C)	Applicable
Section 57 HDPC Act 1847 (Unserviceable vessels)	Applicable

The legislation identified in the summary analysis tables above has been annotated with regard to use for the management of derelict vessels and presented in the sections below.

### 3.1.1 Merchant Shipping Act 1995, Section 252

To exercise the powers under Section 252 of the Merchant Shipping Act 1995:

- The vessel must be located in, or near any approach to, any harbour or tidal water under the control of a harbour authority; and
- The harbour authority exercising the powers must be of the opinion that the vessel is or is 'likely to become, an obstruction or danger to navigation or to lifeboats engaged in lifeboat service in that harbour or water or approach thereto'.

If both the above requirements are met the relevant harbour authority can exercise the following powers:

- Taking possession of, raising, removing, or destroying the vessel (or any part of it, including equipment, cargo etc);
- Lighting and buoying the vessel (or any part of it) until it has been raised, removed, or destroyed.
- Selling the vessel (or any part of it) subject to:
  - giving 7 days notice of the intended sale by advertisement in a local newspaper circulating in the area (unless the property is perishable nature or would deteriorate in value);
  - delivering to the owner the vessel / property being sold at any time prior to the sale of it, if the Owner pays fair market value for it (the payment is treated as 'proceeds of sale'.
- Reimbursing itself out of the proceeds of sale, for the expenses incurred by them in relation to the sale and then holding any surplus on trust for the person entitled to it.

However, if the vessel or property to be sold is not of sufficient value to cover the harbour authority's costs, or if there is no sale, there is no mechanism for the harbour authority to recover their unpaid costs from the owner, unless the local harbour legislation applying to a harbour authority has extended the section. Under Section 252 the "owner" is the person who owned the vessel at the time of its sinking, stranding or abandonment. For example, abandoning the vessel does not affect the position regarding who is considered to be the owner under the section.

Under Section 26 of the 'Milford Haven Conservancy Act 1983', any person (which includes all other harbour authorities) within Milford Haven (other than the Secretary of State) must notify the MHPA of its intention to exercise powers with respect to vessels sunk, stranded, or abandoned in such a manner as to be an obstruction or danger to navigation in Milford Haven or its approaches (not being powers exercisable by the Master of a vessel or a competent person on it). In exercising the power, that person must then comply with any direction given by the Port Authority for the prevention of interference with navigation.

### Local legislation amendments

In respect of the harbour authorities present in Milford Haven, the local legislation of Puma Energy and Valero Pembrokeshire Oil Terminal & Dragon LNG (Haven north bank), has amended the application of Section 252 of the Merchant Shipping Act 1995 (through amendment of its predecessor provision) to be as follows:

- Require prior notice to be given to the MHPA before exercise of the power, and except in the case of emergency, to:
  - Haven North Bank only: The Postmaster General if within 150 yards of a submarine cable placed or maintained by the Postmaster General (this post has now been abolished. It may have been transferred to another government department / position).
- Include recovery of reasonable costs from the Owner of the vessel (in so far as there is no sale of the vessel or the sale proceeds are insufficient), provided that:
  - Other than in a case of emergency, the Owner is given not less than 48 hours notice of the intended exercise of the power (other than lighting and buoying); and
  - If the Owner responds before expiry of the notice to confirm that it wishes to dispose of the vessel itself, the Owner then has 7 days (or such longer continuous period during which the Owner proceeds diligently to dispose of the vessel) to do so, as long as they comply with any directions from the relevant harbour authority to prevent interference with navigation.

### 3.1.2 Local powers

The following section provides a commentary on local Legislation and powers that are similar to, but do not amend Section 252 of the Merchant Shipping Act 1995.

#### Milford Haven Port Authority

The local legislation which applies to Milford Haven Port Authority also contains additional free standing powers which are similar to Section 252 of the Merchant Shipping Act 1995, but apply in addition to that power, rather than amending it. To exercise the relevant powers contained in Section 24 of the Milford Haven Conservancy Act 1983:

- The vessel must be located within jurisdictional limits of the Port Authority or the approaches; and
- Sunk, stranded, or abandoned.

If both of these requirements are met, the Port Authority can exercise the following powers:

- Light, mark, etc the vessel until it is removed or managed. to prevent interference with, and ensure safety of, navigation.
- Raise, remove, blown up or otherwise destroy or dispose of the vessel;
  - Subject (except in case of emergency affecting the use of navigation or safety of navigation) to giving 48 hours of the intended exercise of power to the Owner, who may serve counter notice within the 48 hour period that it will remove the vessel.
  - If the Owner does seek to remove the vessel itself, it must:
    - Comply with any directions to prevent interference with or safety of navigation;
    - Proceed diligently;
    - Complete the removal within 7 days or such longer continuous period as it proceeds diligently with the disposal.
  - In an emergency, the Port Authority must notify the Owner as soon as is practicable.
- If the Owner is not known, and there is no business or home address for the Owner, or if the addresses are not in the UK, the notice can be given by displaying it at the Office of the Port Authority for the required time period (and where powers have been exercised in an emergency, for seven days).
- Having given at least 7 clear days prior notice by newspaper circulating in South Pembrokeshire and Preseli of the intended sale, if the vessel was sunk, stranded, or abandoned after 30 April 1958, the Port Authority may sell the vessel (or any part of it including cargo) and (having paid any relevant tax and duties) reimburse itself out of the proceeds of sale, for the expenses incurred by them, holding any surplus on trust for the person entitled to it.
  - NB: The requirement for 7 days clear notice does not apply to property of a perishable nature or that would deteriorate in value by delay.
- If the vessel / property sold is not of sufficient value to cover the Port Authority's expenses, it can recover its unpaid expenses from the owner.

The "owner" is the person who owned the vessel at the time of its sinking, stranding or abandonment. i.e., abandoning the vessel does not affect the position regarding who is considered to be the owner under the section. Except in a case of emergency, where the vessel is located within 200 m of a submarine cable belonging to British Telecommunications ('BT') or a pipeline the harbour master must give BT or the water authority, as appropriate, notice in writing of its intention to remove etc. the vessel.

Sections 54 and 55 of the 'Milford Haven Conservancy Act' 1983 contain further savings for the water authority and electricity board which apply to wreck removal operations. These include provisions regarding any damage sustained to their infrastructure as a result of such an operation.

### Milford Docks and South Hook LNG

The local legislation which applies to Milford Docks and South Hook LNG also contains additional free standing powers which are similar to Section 252 of the Merchant Shipping Act 1995, but apply in addition to that power, rather than amending it. To exercise the relevant powers:

- The vessel must be located within the relevant harbour limits; and
- Sunk, stranded, or abandoned.

If both the above requirements are met the relevant harbour authority can exercise the following powers:

- Take possession of, raise, remove, destroy or blown up the vessel (or any part of it, including equipment, cargo etc);

- Subject (except in case of emergency) to giving 24 hours of the intended exercise of power to the Owner, who may serve counter notice within 12 hours that it will remove the vessel.
- If the Owner does seek to remove the vessel itself, it must:
  - Comply with any directions to prevent interference with navigation;
  - Proceed diligently;
  - Complete the removal within 7 days.
- If not, the harbour authority may proceed instead.
- Having given the Owner 7 days prior notice, sell the vessel (or any part of it) and (having first paid any relevant tax and duties) reimburse itself out of the proceeds of sale, for the expenses incurred by them in relation to the sale and then holding any surplus on trust for the person entitled to it.
- If the vessel / property sold is not of sufficient value to cover the harbour authority's costs the harbour authority can recover their unpaid expenses from the owner (if the amount is disputed there are provisions for arbitration).

The "owner" is the person who owned the vessel at the time of its sinking, stranding or abandonment. i.e., abandoning the vessel does not affect the position regarding who is considered to be the owner under the section. The Milford Docks power also contains a requirement to notify the Postmaster General (see comments above) in writing prior to exercising the power except in the case of emergency.

### 3.1.3 Dangerous Vessels Act 1985, Section 1

To exercise the powers in Section 1 of the 'Dangerous Vessels Act' 1985:

- The vessel may be inside or outside the relevant harbour limits; and
- In the opinion of the relevant harbour master, the condition of the vessel or the nature or condition of anything it contains must be such that its presence in the harbour might involve:
  - a grave and imminent danger to the safety of any person or property; or
  - grave and imminent risk that the vessel may, by sinking or foundering in the harbour, prevent or seriously prejudice the use of the harbour by other vessels.

If the above requirements are met the harbour master may give a direction to the owner, master, person in possession, salvor in possession or to any person who is the agent / employee of the salvor and in charge of the salvage operation. The direction can:

- Prohibit the entry into the harbour limits; or
- Require the removal from the harbour limits.

Any direction of the harbour master can be overridden by a direction from the Secretary of State given under Section 3. The direction would be given by the SOSREP (Secretary of State's Representative). This power is exercised in an emergency situation, and therefore not usually in respect of an abandoned vessel that has been present in the harbour for a period of time, unless there has been a significant change of circumstance. As such it is likely to be of limited use to the types of abandoned vessel being considered in this Report.

### 3.1.4 Harbours, Docks and Piers Clauses Act 1847, Section 56

To exercise the powers in Section 56 of the Harbours, Docks and Piers Clauses Act 1847:

- The vessel (wreck) or other obstruction must be located in the relevant harbour limits or the approaches to them; and
- "Impede navigation".

If so, the relevant harbour master may remove the wreck (or other obstruction) and recover the expense of removing it from the owner of it (at the time the expenses were incurred). The harbour master may hold the wreck pending payment and, if payment is not made, sell it to recover the expenses. Any surplus is payable to the Owner on demand.

Under Section 26 of the Milford Haven Conservancy Act 1983, any person (which includes all other harbour authorities) within Milford Haven (other than the Secretary of State) must notify the Milford Haven Port Authority of its intention to exercise powers with respect to vessels sunk, stranded, or abandoned in such a manner as to be an obstruction or danger to navigation in Milford Haven or its approaches (not being powers exercisable by the Master of a vessel or a competent person on it). In exercising the power, that person must then comply with any direction given by the Port Authority for the prevention of interference with navigation.

### Milford Haven Port Authority

Although the power contained in Section 56 Harbours, Docks and Piers Clauses Act 1847 is not exercisable by Milford Haven Port Authority, a very similar power can be found in Section 21 of the Milford Haven Conservancy Act 1983. To exercise the powers in Section 21 of the Milford Haven Conservancy Act 1983:

- The vessel must be located in within the Port Authority's harbour limits or the approaches to them; and
- "Impede navigation".

If so, the harbour master may remove the vessel and recover the expense of removing it from the owner of it. The harbour master may hold the wreck pending payment and, if payment is not made, sell it to recover the expenses. Any surplus is payable to the Owner on demand. Except in a case of emergency, where the vessel is located within 200 m of a submarine cable belonging to British Telecommunications ('BT'), the harbour master must give BT notice in writing of the harbour master's intention to remove the vessel.

### 3.1.5 Harbours, Docks and Piers Clauses Act 1847, Section 57

To exercise the powers in Section 57 of the Harbours, Docks and Piers Clauses Act 1847:

- The vessel must be located within the relevant harbour limits; and
- Be 'unfit for sea service'.

If so, the relevant harbour master may cause the vessel to be removed from the harbour limits at the expense of the Owner. However, the power is of very limited use because the removed vessel must be placed on the seashore or land adjoining it, in a place where it will not cause injury to any person. As such the power is now rarely, if ever, exercised because it simply shifts the problem vessel from one location to another.

If the expenses are not paid, they can be recovered by sale of the vessel and any tackle etc. but only having secured a Court Order for the debt.

For the above reasons, the power is of limited use.

### 3.1.6 Other local powers

#### Milford Haven Port Authority

The Milford Haven Port Authority has a number of additional local powers that apply within its jurisdictional limits under the Milford Haven Conservancy Act 1983. These include Section 25: Power to prevent or reduce oil pollution. To exercise the power:

- The vessel must be within the Port Authority's jurisdictional limits; and
- Either discharging oil, or in the opinion of the Port Authority, likely to discharge oil into the haven or adjacent waters.

If so, the harbour master may give directions for the purpose of preventing or reducing oil pollution, or the risk of it (unless the Port Authority considers every practicable measure is already been taken).

The directions given / steps taken must be:

- Reasonably necessary to prevent or reduce oil pollution, or the risk of oil pollution;
- The benefit that could reasonably be expected to result from the direction given / steps taken must not be disproportionality less than the expenses incurred or damage suffered as a result of complying.

In considering whether to give a direction or take steps, the Port Authority must take account of:

- The risk and likely extent of oil pollution if the steps had not been taken or the directions not given;
- The likelihood of the steps or the action taken in compliance with directions being effective; and
- The extent of the damage which could reasonably have been expected to result from the directions given or the steps taken.

If the directions are not complied with or no competent person is on board the vessel to comply with them, the Port Authority may board the vessel and carry out the direction and recover its expenses from the Owner (or detain and sell the vessel following non-payment to recover them, any surplus to be provided to the Owner). If the proceeds of sale are insufficient, they can (following a Court Order) be recovered from the person who was the Owner of the vessel at the time the direction was given. The Authority must notify the Secretary of State if it exercises this power.

The section also contains provisions regarding liability (including limits of liability) and Section 27 of the 'Milford Haven Conservancy Act' 1983 is relevant to the status of the Port Authority when exercising the powers under Section 25 (to be regarded as a person performing salvage operations with the agreement of the owner).

Under Section 28 of the 'Milford Haven Conservancy Act' 1983, the Port Authority should also have regard to the desirability of consulting with and co-ordinating with the Owner and must notify the water authority as soon as is practicable. In addition, if the vessel is sunk, stranded, or abandoned within the limits of another harbour authority, or if the vessel in question entered Milford Haven to berth at that harbour authority's docks etc, the Port Authority must in the exercise of the powers, consult with and seek to co-ordinate steps with that harbour authority.

## Byelaws and directions

Byelaws, Special Directions and General Directions can be useful in assisting with dealing with sunk, stranded, or abandoned vessels, albeit their primary purpose is usually to prevent the sinking, stranding or abandonment occurring in the first place. It is important to remember that if the vessel has been abandoned and the Owner / Master cannot be identified, Byelaws and General Directions are of more limited use as there is no identified party to prosecute for breach. For this reason, the byelaws and general directions relating to preventing the abandonment etc. or reporting the sinking etc. of vessels, have not been set out in detail here as this Report focuses on vessels which have already been abandoned.

In addition to the power of special direction (broadly a power to direct a particular vessel to do a particular thing), the following Byelaw is of relevance. In respect of special directions, or harbour master's directions given under the byelaw below, the harbour master (and such persons as required) may carry out the direction if it is not complied with.

### Milford Haven Harbour Byelaws 1984, Byelaw 19

Byelaw 19 is titled: 'Unserviceable vessels to be removed and not destroyed'. This requires that no vessel is permitted to lie within Milford Haven when it is unserviceable or unfit for navigation or be set on fire, destroyed, or broken up, except with the prior written permission of the harbour master. The harbour master may also give directions regarding the time, manner, and condition in which it shall be removed. In addition, the Port Authority may remove, place, or dispose of the vessel itself (but the byelaw does not provide that it can recover its costs for doing so).

### Protection of Crown interests in wrecks

If the vessel in question belongs to the Crown, is in use by the Crown or is otherwise connected to the Crown then there are multiple provisions that apply (depending on powers exercised) protecting the Crown's interests in wrecks. As such the relevant provision will require careful consideration if there is a Crown interest in the vessel. The information provided above is a summary of the legislation applicable to the management of derelict vessels. Prior to exercising any powers, the legislation containing that power should itself be reviewed, the summary provided here does not ensure compliance.

## 3.2 Derelict vessel powers: PCC

The powers available to Pembrokeshire County Council (PCC) for the management of derelict vessels and marine debris allow for the protection of the public and the management of waste. The legislation used may be specific to the council in the form of byelaws or locally enacted powers, or national legislation may also be enforced by the council (see National Legislation, Section 3.5).

The PCC operates in the interests of the public and has jurisdiction over municipal spaces, local communities and transport. Within Milford Haven PCC consults with the neighbouring authorities and the local community to establish the requirement to remove derelict vessels and establish the powers available. The council has the power to remove waste down to the level of Mean Low Water Springs (MLWS). Where this overlaps with the intertidal zone managed by the PCNPA or the MHPA, consultation is conducted to establish the most appropriate power to remove abandoned items.

### 3.3 Derelict vessel powers: PCNPA

The PCNPA was designated under the National Parks and Access to the Countryside Act 1949 with the authority established in 1996 under the Environment Act 1995. The statutory purposes of the authority are to conserve and enhance the natural beauty, wildlife and cultural heritage of the National Park and to promote opportunities for public enjoyment and understanding of its special qualities.

The PCNPA has the power to make byelaws under the National Parks and Access to Countryside Act 1949 (as a planning authority) and the Local Government Act 1933, those relevant to the management of derelict vessels and marine waste include:

- Pollution of water: No person shall wilfully, carelessly or negligently, foul or pollute any lane, pond, stream or other water; and
- Broken Glass, etc: No person shall throw, place or wilfully leave on the access land any glass, china, earthenware or metal article (whole or broken) in such a position as to be likely to cause injury to any person or animal on the access land.

For the removal of derelict vessels and marine waste the PCNPA has jurisdiction over the foreshore area and seabed within specific Pills. The authority will liaise with PCC, MHPA and local communities in order to take action against derelict vessels (see case studies in Section 4.1.3). Where no objections have been raised and having provided a 28 day notice period, the PCNPA will dispose of a derelict vessel or marine waste.

### 3.4 Private land ownership

The majority of the land bordering the waterway of Milford Haven is privately owned and sits within the authority of either PCC or PCNPA. Ownership of the seabed does not include the tidal water above it. Private land is not subject to local authority powers, however National legislation may cover the management of derelict vessel or marine waste on the foreshore or seabed (see National Legislation, Section 3.5).

### 3.5 National legislation

Certain sections and clauses from National legislation provide powers to deal with waste. The extension of these powers to dealing with derelict vessels is less clear. The removal of waste in the form of litter and illegally disposed of household, industrial and commercial waste is addressed in a range of National legislation. The action which may be taken by authorities under National legislation in relation to waste, which may extend to waste generated from abandoned or decaying vessels, is summarised in this section. Any use of National legislation will be dependent on the location of the waste, the responsibilities of authorities in the area and the seabed, foreshore or land ownership.

**Merchant Shipping Act 1995**, addresses wreck recovery. If wreck material is recovered within UK territorial waters, or wreck material is brought into UK territorial waters, it must be reported to the Receiver of Wreck. It is the role of the Receiver of Wreck to administer salvage as laid out by the Merchant Shipping Act 1995, on behalf of the Secretary of State, the function currently sits within the MCA. The Receiver of Wreck will research and establish who owns the wreck and liaise with the finder and owner, plus any other interested parties. Section 255 of the Act defines wreck as including: *“jetsam, flotsam, lagan and derelict found in or on the shores of the sea or any tidal water”*. Derelict describes property, whether vessel or cargo, which has been abandoned and deserted at sea by those who were in charge of it without any hope of recovering it. If a boat comes off its moorings, it isn't generally classified as a wreck for the purposes of the Merchant Shipping Act 1995, as it has not been abandoned

without hope of recovery. The Receiver of Wreck's remit extends to tidal waters in the UK, so it doesn't cover lakes or rivers beyond tidal reach. The Receiver aims to give owners the opportunity of having their property returned and to make sure a fair salvage award payment is made where necessary. The Receiver will also recover any costs paid from the public purse during this process. If wreck material is recovered, it must be declared within 28 days giving a full description. If wreck from UK waters remains unclaimed at the end of one year, it becomes the property of the Crown (UKGov, 2021).

**The Marine and Coastal Access Act 2009** has consolidated existing legislation and introduced changes to the system of licensing general activities in the seas around the UK. Licences are currently issued for a range of activities including: replacement of sand on beaches; construction works; removal of any substance or object from the seabed; land reclamation; burials at sea; renewable energy (wind, wave and tidal); aggregate dredging, and the construction of sea defences. The Act has also modernised enforcement powers so that officers enforcing licensing, fisheries and nature conservation legislation have access to a core set of enforcement powers for carrying out routine inspections and follow-up investigations. From 2011 onwards, a single marine licence replaced the previous consent system. For the most serious and/or persistent breaches of licensing conditions, NRW has powers to institute civil and criminal proceedings where necessary. Activities carried out during an official salvage operation to ensure the safety of a ship or prevent pollution do not need a marine licence. UK Government guidance (UKGov, 2021) identifies that a marine licence is required for the removal of any substance or object from the seabed when using a vehicle, vessel or floating container. Further guidance advises that 'recovery of a wreck or material from a wreck may require a licence from the appropriate authority' linking to the relevant National administration (UKGov, 2021). For Milford Haven, this is NRW.

**Environmental Protection Act 1990**, as amended by the 'Clean Neighbourhoods and Environment Act' 2005, makes it a criminal offence and punishable by a fine to fly tip in the UK. The 1990 Act usefully defines, for the purpose of determining into what medium a substance is release, any release into: "the sea or the surface of the seabed" or "any river, watercourse, lake, loch or pond, or reservoir or the surface of the riverbed or of other land supporting such water" (Part 1, Section 1(11) of the Environmental Protection Act 1990). Fly-tipping is defined as the illegal disposal of household, industrial, commercial or other 'controlled' waste contrary to Section 33(1)(a) of the Environmental Protection Act 1990. Local authorities are responsible for investigating, clearing and taking appropriate enforcement action in relation to small scale fly-tipping on public land. On private land, it is normally the responsibility of the landowner to remove the waste. Waste is a devolved issue. In Wales, NRW is responsible for dealing with larger-scale fly-tipping (more than a lorry load), hazardous waste and fly-tipping by organised gangs. The Welsh Government has published a strategy for tackling fly tipping (Welsh Government, 2015) which does not comment on illegal waste disposal in the marine environment or abandoned vessels. Fly-tipping is a criminal offence punishable by a fine or 12 months imprisonment if convicted in a Magistrates' Court. The offence can attract an unlimited fine and up to 5 years imprisonment if convicted in a Crown Court (UKGov, 2020).

**Environment (Wales) Act 2016**, Section 6, places a duty on public authorities, seek to maintain and enhance biological diversity (referred to as biodiversity). All public bodies, statutory undertakers, Ministers of the Crown and other public office holders are required to apply the duty when they are carrying on any functions in Wales, or in relation to Wales. Where the duty in Section 6 applies, public authorities are required to comply with that duty instead of the duty in Section 40 of the NERC Act 2006. Section 40 of the NERC Act 2006 required all public authorities in England and Wales to have regard to conserving biodiversity when carrying out their functions. In respect of derelict vessels and waste originating from decaying vessel, this places a duty on all public bodies and statutory undertakers in any actions they may take in managing a vessel or clean-up of the wider site.

**Wildlife & Countryside Act 1981**, (as amended) provides for the designation and management of Sites of Special Scientific Interest (SSSI) in England and Wales. Section 28G of the Act places a duty on public authorities to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest.

**Conservation (Natural Habitats &c.) Regulations 2017** (as amended) within Regulation 38 provides for the establishment of management schemes within European Marine sites. Where relevant authorities (including harbour authorities) establish a management scheme, they are to exercise their functions (including any power to make byelaws) so as to secure compliance with the requirements of the wild Birds & Habitats Directives in relation to that site.

**Marine & Coastal Access Act 2009**, (as amended) (Section 125) requires public authorities to exercise their functions in a manner to best further (or, if not possible, least hinder) the conservation objectives for MCZs.

**Harbours Act 1964**, Section 48A addresses 'Environmental duties of harbour authorities' and states that:

*"It shall be the duty of a harbour authority in formulating or considering any proposals relating to its functions under any enactment to have regard to:*

- a) the conservation of the natural beauty of the countryside and of flora, fauna and geological or physiographical features of special interest;*
- b) the desirability of preserving for the public any freedom of access to places of natural beauty; and*
- c) the desirability of maintaining the availability to the public of any facility for visiting or inspecting any building, site or object of archaeological, architectural or historic interest;*

*and to take into account any effect which the proposals may have on the natural beauty of the countryside, flora, fauna or any such feature or facility."*

This places a duty on harbour authorities to meet the requirement of Section 48A. This is typically addressed within environmental policies, which may include provisions for dealing with abandoned or derelict vessel.

## 3.6 Legislation key points

- The use of legislation is specific to conditions, in order to use the powers available, the hazard or state of the vessel must conform to the conditions of the legislation.
- The actions available and function to reimburse costs differ under each legislation. Applicable powers should consider the intended action and finances available.
- Powers available to an authority may be applicable to the whole area or specific areas within, outside or on the approaches to the authority's boundaries, depending on the impact of the derelict vessel to the authority. Powers available under National legislation enable authorities (PCC and NRW) to manage waste and marine litter from decaying derelict vessels.

## 4 Application of powers

### 4.1 Case studies

#### 4.1.1 Miscellaneous small craft and marine litter

Milford Haven Port Authority (MHPA) regularly collect smaller vessels, debris and assorted marine litter from within their SHA. This marine detritus is often adrift, having been washed down from areas further up the Haven. Action to remove this waste is deemed necessary by the Port Authority under its responsibility to preserve the safety of navigation.

Examples of drifting marine waste collected by the Port includes, inflatable tender boats and mooring tackle (Figure 10) although may include any vessel or object that poses a risk to the safety of navigation.



Figure 10. Miscellaneous small craft and marine litter

Miscellaneous small craft and marine litter drifting in the MHPA area of responsibility is removed by the Port Authorities service craft and landed ashore. The routine operation of this recovery is dictated by the perceived risk to navigation-. Notification of recovered objects is provided to the local port community to allow ownership to be claimed before the object is disposed of. Unclaimed objects are disposed of following the Port Authority's Port Waste Management Plan (PWMP).

For the removal of miscellaneous small craft and marine litter, MHPA act in accordance with their powers under the 'Milford Haven Conservancy Act' 1983 or Harbour Byelaws. Use of the 'Milford Haven Conservancy Act' 1983 allows MHPA to remove objects considered to impede navigation and sell the object in order to reimburse their costs, with any additional proceeds being paid to the owner, should one come forward.

Byelaw 19 enables MHPA to remove, place or dispose of vessels if they are deemed to be unseaworthy, unfit for navigation or to have been brought into the area with the intention of being burning, destroyed or broken up without permission. Byelaw 19 does not provide for the sale of recovered vessel and any expense incurred cannot be reimbursed.

There are no obligations under these powers for the Port Authority to provide notice prior to taking action, however notice is routinely provided before the sale or disposal of recovered vessels, to allow owners to come forward and claim ownership.

#### 4.1.2 Dolphin of Rhu

The Dolphin of Rhu was a 29-foot sailing yacht that became unseaworthy and was removed from the waterway in the MHPA SHA. The vessel was subsequently disposed of. The sailing vessel was berthed on an exposed mooring and began taking on water, as all machinery, sails and mast had been removed the vessel could not shift berth without assistance. Due to the worsening weather the Port Authority deemed the Dolphin of Rhu to be unseaworthy and moved the vessel using service craft to a nearby marina. The vessel was maintained afloat by use of salvage pumps before being lifted ashore. The Port Authority allowed a twelve-week window before disposing of the vessel. During this period attempts were made to identify ownership, however this was not successful and the costs incurred could not be recovered.

MHPA acted to prevent the vessel sinking with the concern that if it had sunk, a pollution incident would have followed. Also, a sunk vessel would present a hazard to navigation and potential lead to a salvage operation. The powers used to take action used the Milford Haven Harbour Byelaws (19). This power enabled the Port Authority to either direct the removal of the vessel or remove, place, dispose of the vessel itself. This power does not allow for the sale of the vessel or recovery of costs from the actions taken by the Port Authority.

The vessel may also have been removed, raised, destroyed or disposed of under the 'Milford Haven Conservancy Act' 1983, Section 24, which provides for vessels that are sunk, stranded or abandoned. Section 24 also allows for the vessel to be sold in order to recover the costs incurred.

#### 4.1.3 Sailing yacht lone

The sailing yacht lone was removed and disposed of by the Pembrokeshire Coast National Park Authority (PCNPA) after it began breaking apart whilst alongside at Landshipping Quay. The lone was considered to be a source of marine waste due to the vessel breaking apart. The vessel had no known owner and a notice was provided giving a 28 day period prior action being taken. The notice period is PCNPA's defined policy, which also aligns with the requirement to declare material that is 'wreck' to the Receiver of Wreck at the MCA (see report Section 3.5). Consultation was held with MHPA and PCC, the removal was agreed in principle with PCNPA employees and volunteers assisting in the vessel breaking up and removal. The removal activity was carried out at PCNPA's cost, in the interest of preventing further environmental damage and limiting marine litter.

In carrying out the activity, it was necessary to prevent any further pollution to the environment or impact on human health. This included complying with any requirements under the Hazardous Waste Regulations, in which all waste is carried and stored by registered waste carriers (for example, non-hazardous wastes or consignment notes or hazardous wastes). Activities were also carried out with due regard to the Health and Safety at Work Regulations, this means assessing the risk to employees and other involved persons, plus the provision of Personal Protective Equipment (PPE).

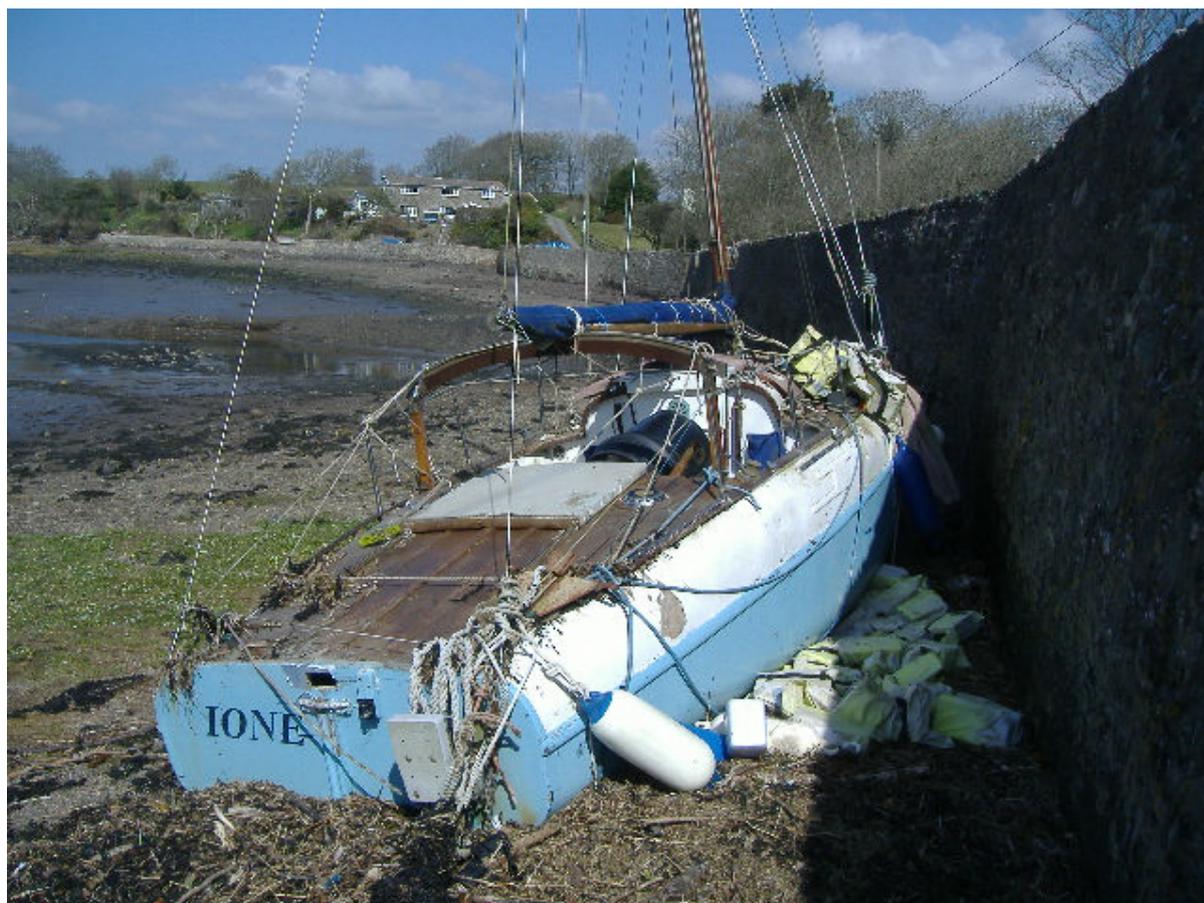


Figure 11. Sailing Yacht Ione

## 4.2 Salvage guidance

Marine salvage is the process of recovering a vessel and its cargo. The 'law of salvage' is a principle of maritime law, where any person who helps recover another person's vessel or cargo in peril at sea is entitled to a reward commensurate with the value of the property salvaged. This project deals with 'derelict vessels' as defined in Section 1 of the report. It may be the case that an authority contracts the services of a salvor, in which case the guidance offered in the Port Marine Safety Code's 'Guide to Good Practice on Port Marine Operations (DfT, 2018) may be followed. This recommends that unless a derelict vessel poses a serious and imminent risk to life, the following generic guidance on salvage is applied:

- THE receiver of wreck at the MCA is contacted by email giving information about the vessel and is notified of the intention to remove it;
- There must be well documented reason(s) for the authority to require the removal of the vessel;
- That ownership of the vessel is established beyond any doubt or evidence obtained to show that the vessel has been abandoned;
- Notice is given to the owner (if known), or posted on the vessel or in a public place that the authority intends to take possession of the vessel and raise, remove or destroy it (so that the owner has a reasonable opportunity to remove the vessel himself);
- Any sale is well advertised in the local press;
- Where the wreck has not sunk, and is still visible, a photographic record of the vessel's condition is made before any attempt is made to salvage it;

- If the vessel is beyond the salvage or dispersal capabilities of the authority, a reputable salvor or wreck removal contractor is engaged to carry out the work under a recognised wreck removal contract (for example; wreckhire, wreckcon, wreckfixed, etc);
- It has suitable insurance to cover any residual liability;
- Any such salvor or wreck removal contractor submits a detailed salvage plan covering;
- The method of raising the vessel including whether explosives are to be used;
- Any temporary lay-by berth for the vessel;
- Arrangements for limiting environmental damage;
- If pollution does occur, how it will be dealt with;
- Agreed delivery location/beaching site/drying berth;
- Diving operations connected with the salvage operation, and an assurance that they are to be carried out in accordance with the relevant diving regulations; and
- A suitable plan for the final disposal of the vessel, whether this involves sale of the entire vessel or part thereof.

### 4.3 Application of powers key points

- As demonstrated by the MHPA use of its powers, derelict vessels and marine objects presenting a danger to navigation can be dealt with under existing local harbour powers (Byelaws or local Acts). It is important to consider which power to use, to ensure that items with intrinsic value can be sold in order to recover the costs incurred.
- Any disposal activities must have due regard to preventing pollution to the environment or any impact on human health. This includes complying with any requirements under the Hazardous Waste Regulations and the Health and Safety at Work Regulations.
- Salvage of a vessel may be considered by an authority wishing to remove a derelict vessel. If Salvage is used, this will be a contractual arrangement and the authority should follow guidance in the Port Marine Safety Code 'Guide to Good Practice'.

## 5 Derelict Vessel Management

### 5.1 Removal process

A derelict vessel, as defined in Section 1.1 has no ownership and is considered a nuisance. Lack of direct control presents a hazard to authorities with a responsibility within the area to which the vessel or debris may have an impact (Section 1.2.2). Management of such vessels therefore requires an active approach by these authorities in order to mitigate the perceived risk and prevent further negative impacts. Removal of derelict vessels or debris affords the most effective way to mitigate the associated issues, however this process requires an authority to take direct responsibility (and liability) over the vessel and its subsequent management. The powers available for an authority to take such action may only be used where the conditions of the legislation are met. It is for the authority to evaluate this, with due regard to the requirements for the notification of intended action and/or cost recovery if the derelict vessel or debris has intrinsic value.

A summarised process for the removal of a derelict vessel is presented in Figure 12 and covers the steps to take in order to remove a vessel or debris under existing legislation. The process first requires that a location is established, this provides a clear understanding of which jurisdiction(s) the vessel or debris may be situated. It is possible that a vessel or debris may lie within the jurisdiction of several authorities. From this understanding, available powers can be considered. The removing authority should determine what conditions are required for use of its powers, the actions it proposes and any provisions for the recovery of costs. Actions should be taken in accordance with any specific legal requirements. For example, requirements may include the issuing of notification for the intended action, attempts to contact the owner or the handling of proceeds from sale. Having taken action, the vessel or debris is disposed of in accordance with the requirements of the authority, this may include sale of the vessel, individual components or other means of recycling to recover costs.

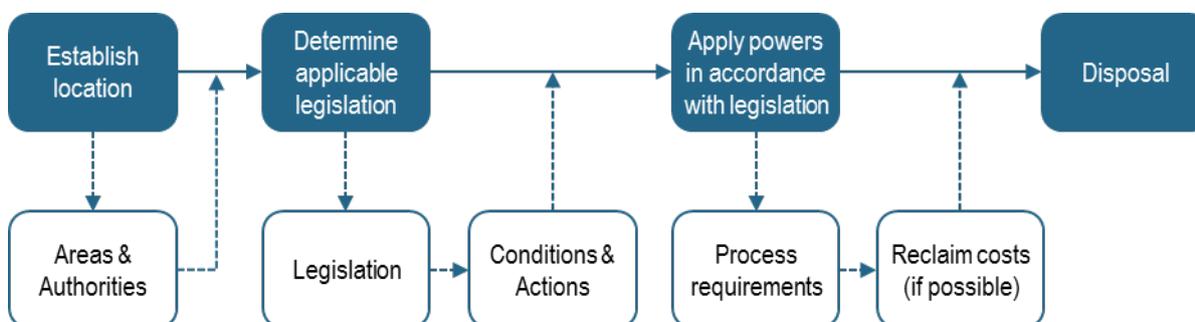


Figure 12. General removal process

The legislation available for the Statutory Harbour Authorities in the study area has been reviewed and summarised in respect of its applicability, conditions, actions, requirements and recovery of costs. This information is provided in Table 8 as a reference guide. The powers listed should not be used as an interpretation of the legal position. Authorities are advised, that prior to exercising any powers, the actual legislation which contains the power should itself be reviewed. The specific removal process for derelict vessels in Milford Haven has been prepared and can be found in Appendix C. This process follows the steps identified above and includes the information presented in Table 8.

Table 8. Statutory Harbour legislation summary

Legislation	Area of Relevance	Location	Condition	Actions	Requirement	Costs
<b>National Parks and Access to Countryside Act 1949</b> <b>Byelaw 'Pollution of Water' and</b>	PCNPA	Within boundary of National Park	Wilful, or negligent, fouling or polluting lane, ponds, streams or other water.	Prosecute	Gather adequate evidence	No cost recover option.
				Removal	In accordance with Hazardous Waste (England and Wales) Regulations 2005	
<b>National Parks and Access to Countryside Act 1949</b> <b>Byelaw 'Broken Glass etc'</b>	PCNPA	Within boundary of National Park	Wilful throwing, placing or leaving of glass, china, earthenware or metal article likely to cause injury to person or animal	Prosecute	Gather adequate evidence	No cost recover option.
				Removal	In accordance with Hazardous Waste (England and Wales) Regulations 2005	
<b>Environmental Protection Act 1990</b>	National PCC	Foreshore down to the Mean Low Water Springs (MLWS)	Large scale fly tipping, small scale fly tipping	Prosecute	Gather adequate evidence	Prosecute under the 'polluter pays' principal
				Remove, raise, destroy large scale fly tipping	NRW proceed in accordance with Hazardous Waste (England and Wales) Regulations 2005	
				Remove, raise, destroy small scale fly tipping	PCC proceed in accordance with Hazardous Waste Regulations 2005	
<b>Merchant Shipping Act 1995 Sec 252</b>	All	Within or in approaches to SHA	Danger to navigation	Remove, raise, destroy.	Any part thereof	Reimbursement from sale only (excess proceeds held in trust for owner) Puma and Valero may recover costs from owner (48 hours' notice required before exercise of power, owner can remove if responding within 48 Hrs).
				Mark for navigation	Any part thereof until removed	
				Sell	7 days' notice in local newspapers (unless perishable) Owner may purchase prior sale	
<b>Milford Haven Conservancy Act 1983 Sec 24</b>	MHPA	Within or in approaches to SHA	Sunk, Stranded or Abandoned	Remove, raise, destroy, dispose	48 Hrs notice of action direct to owner or posted in authorities office	Reimbursement from sale (excess proceeds held in trust for owner). May recover additional costs from owner.
				Mark for navigation	None	
				Sell	7 days' notice in local newspapers (unless perishable)	
Action on a vessel within 200 m of a sub-surface cable or pipeline should be notified to the relevant authority in writing. Sections 54 and 55 contains further protections for the water authority and electricity board (including in relation to their infrastructure) which apply to wreck removal operations.						
<b>Milford Haven Conservancy Act 1983 Sec 21</b>	MHPA	Within or in approaches to SHA	Impeding navigation	Remove vessel	None	Reimbursement from sale if owner does not pay (excess proceeds to be given to owner on demand).
				Sell	None	
Action on a vessel within 200 m of a sub-surface cable or pipeline should be notified to the relevant authority in writing.						

Legislation	Area of Relevance	Location	Condition	Actions	Requirement	Costs
<b>Milford Haven Conservancy Act 1983 Sec 25</b>	MHPA	Within SHA	Discharging or likely to discharge oil	Reasonably necessary actions.	Action must be assessed against cost/benefit	Reimbursement from sale.
				Sell	Required Court order for the recovery of costs in excess of sale proceeds	
The Secretary of State must be notified if the power is exercised. Section 27 establishes status of Port under use of Section 25. Section 28 elaborates on required coordination between interested parties.						
<b>Milford Haven Harbour Byelaws 1984. No. 19</b>	MHPA	Within SHA	Unserviceable, unfit for navigation; For burning, destruction or to be broken-up without permission.	Prevention of entry into SHA	None	No cost recovery provided for.
				Direction for removal; including time, manner and condition	None	
				Remove, place or dispose of vessel	To be done by the authority.	
<b>HDPC Act 1847 (Removal of wrecks &amp; C) Sec 56</b>	Milford Docks Puma energy South Hook LNG Valero	Within or in approaches to SHA	Wreck or obstruction being an impediment to navigation	Removal	None	Reimbursement by charging owner, if owner does not pay reimbursement from sale (excess proceeds to be given to owner on demand).
				Sell	None	
<b>HDPC Act 1847 (Removal of wrecks &amp; C) Sec 57</b>	Milford Docks Puma energy South Hook LNG Valero	Within SHA	Unfit for sea service	Remove	To location adjoining SHA, on sea shore or land that will not cause injury to any person.	Reimbursement from sale.
				Sell	Court order for debt	
<b>Milford Docks Act 1953</b>	Milford Docks	Within SHA	Sunk, Stranded or Abandoned	Remove, raise, destroy.	24 Hrs notice (owner can remove if responding within 12 Hrs.	Reimbursement from sale.
				Sell	7 days notice	
<b>Esso Petroleum Act 1957</b>	South Hook LNG	Within SHA	Sunk, Stranded or Abandoned	Remove, raise, destroy.	24 Hrs notice (owner can remove if responding within 12 Hrs.	Reimbursement from sale.
				Sell	7 days notice	
<b>Section 1 Dangerous Vessels Act 1985</b>	All - provided not considered a 'subordinate' pier master (South Hook LNG, Valero).	Inside or outside of SHA	Vessel or contents a grave and imminent danger/risk to Safety, property or use of harbour	Direction to prohibit entry or removal	None	No cost recovery provided for.
* Emergency situation may be conducted at shorter notice periods subject to the legislation's requirements. ** Any action taken against vessels is to be notified to MHPA *** The "owner" is the person who owned the vessel at the time of its sinking, stranding or abandonment						

## 5.2 Future management measures

As discussed in Section 1.2.1, the increased use of synthetic materials in vessels is likely to increase the complexity of disposals, prompting abandonment. Combined with the increase recreational use of waterways and the availability cheap End of Life (EOL) vessels, the occurrence of derelict vessels is likely to increase. The management of derelict vessels may be considered in three parts; cause, impact and removal. For each of these parts measures may adopted to improve control and reduce their associated risks.

### 5.2.1 Cause controls

The main cause of vessels becoming derelict relates to the cost of EOL disposal. This is compounded by the challenge of establishing ownership, which enables vessel owners to avoid their responsibilities. Through the provision and identification of services for the handling of EOL vessels, the process and associated costs for disposal can be more easily identified and publicised in order to raise awareness amongst owners. Through the understanding of the EOL process and the costs involved it is possible that owners will be less likely to abandon their vessel due to a raised awareness of the required process and perception of social responsibilities. A report published by the European Union (EU) states that, with regard to the EOL processes and social responsibility; "Authorities should make available registers of recycling and disposal facilities within the locality that are capable of dismantling a vessel, with the necessary permits. This will also assist responsible owners to dispose of their vessels properly." (EU 2011).

The tracking of vessel ownership in order to prevent abandonment or to allow intervention for preventing a vessel becoming a nuisance is a control mechanism which may be used by authorities in the area. Use of a registration system may be conducted either on a voluntary basis or enforced through the use of byelaws or General Directions. A registration system may be applied to an area, moorings owner, marina or local community and require that any change in ownership, including change to the owners' details be provided to the register. This system may also be used for the tracking of potential hazards associated with vessels, such as, chemical stored on-board, pollutants and other hazards.

### 5.2.2 Impact controls

The impact of derelict vessels is discussed in Section 1.2 and covers aspects of public health, the environment and the safety of navigation. Due to the lack of ownership, vessels are not directly monitored and the level of risk not effectively known without intervention from the responsible authority. Managing the impact from derelict vessels may be under the responsibility of several authorities (Section 2.3). From the case studies examined, it is shown that authorities within the study area do actively coordinate the management of derelict vessels once an issue is perceived.

The use of a standardised assessment, to identify and establish vessels that pose a risk, would provide for a shared appreciation between authorities and enable a proactive approach to management. This approach requires suspect vessels to be identified through monitoring the estuary and may be done in conjunction with local marinas, mooring owners and local communities. Secondly, a standardised risk assessment of vessels, covering the risks posed and the responsibilities of all concerned authorities might be established. From this, the risks posed by vessels that may become derelict in the area can be quantified, allowing pre-emptive action to be taken whilst the vessel is still owned and managed. The use of a registration scheme as described in Section 5.2.1 may also be used in conjunction to facilitate monitoring.

Co-operation between authorities provides for a shared understanding of the responsibilities, powers and processes available for managing the impact of derelict vessels. Through the use of Memorandums of Understanding, agreements or concordats, actions between authorities may be shared, including the use of powers and the recovery of costs.

### 5.2.3 Removal controls

The process for the removal of derelict vessels is dependent on the location of the vessel or debris, the legal powers available to the authority(s) with jurisdiction in that area, and the conditions/actions and requirements of the identified legislation. This process is described in Section 5.1 and provided specifically for Milford Haven in Appendix C.

The issues surrounding the removal of derelict vessels primarily concerns the risk posed, the cost of removal and the legal powers available. The introduction of byelaws specifically for the handling of derelict vessel may include a function for the recovery of costs. However, due to the lack of traceability of ownership, it is rarely possible to recover costs from vessel owners. Although some existing legislation provides for the recovery of costs through the sale of recovered vessel or objects, abandoned or derelict craft often have little residual value.

The cost of removing vessels or marine waste tends to fall on the authority taking the action. As derelict vessels have no ownership and the cost of resale is likely below the expense of recovery (EU 2011), a funding mechanism would assist with the requirement to take action. Funding for the removal or management of derelict may come through provisions made by each authority, a combined fund raised between authorities, a national fund or a charge/insurance place on vessel owners registered within the area. Any system adopted for the provision of funds would require cooperation between local authorities and an agreed method of raising and using capital for the removal or management of derelict vessels, in line with the risks identified from impact controls.

### 5.2.4 Summary of future management measures

Through implementing control measures over the cause, impact and removal of derelict vessels, the associated hazards can be more effectively mitigated, and the occurrences of derelict vessels reduced. An example of these measures having been effectively used is provided in Appendix A, although this example is specific to Australia the principles remain the same and provide an understanding of how to control the issues surrounding derelict vessels.

## 5.3 Derelict vessel management key points

- The removal of derelict vessels requires the location of the object to be established, the authorities and their powers identified, the available powers and their requirements assessed, and a funding source to be available.
- The powers available for removal may apply beyond the boundaries of an authority's area. Where an authority or power overlap an agreement, understanding or concordat should establish which is to be used.
- The management of derelict vessels requires control of their cause, impact and removal.
- The removal of derelict vessels is conducted at the expense of the authority with limited opportunity for reimbursement. Establishing a funding mechanism nationally, locally or through boat owner fees would enable a more proactive approach to management.

## 6 Conclusions

The key points provided for each section summarise the themes of the analysis. Points are identified below for each of the five sections: Derelict vessels, Derelict vessels in Milford Haven, Legislation, Application of powers (case studies and Salvage) and Derelict vessel management.

### 6.1 Key point summary

#### 6.1.1 Derelict vessels

- Due to the lack of lifecycle planning in the small boat industry, the cost of disposal and recycling is high. Vessels are often left to degrade once no longer seaworthy.
- There has been continued and increasing use of synthetic materials such as FRP for the construction of small private craft from the 1960s onwards. The lifespan of these vessels is estimated to be 40-60 years (EU 2011), therefore the number of vessels require disposal and the EOL issues are likely to increase.
- A common understanding of the risks, responsibility and available actions for those impacted by derelict vessels provides for a more effective approach to reduction, control and disposal.
- The risks to public health, safety of navigation and protection of the environment caused by derelict vessels lies with the authority(s) impacted.
- Assessing the risks posed by derelict vessels individually is fundamental in determining the appropriate action required.
- Multiple potential impacts pathways for derelict vessels to impact environment, with some evidence of environmental effects from derelict vessels in similar estuarine settings (physical, chemical, and aesthetic/social)
- Effects are likely to be localised and limited to the nearshore environment but may be more significant where numerous vessels are abandoned and accumulation in the marine environment occurs.
- Concerns over the historic or archaeological value of a derelict vessels or wrecks may be consulted with national bodies or government departments.
- The nature and scale of effect will be influenced by several interacting factors (size of boat, construction materials, hazardous material containment, environmental conditions).
- The cause and management of derelict vessels stems from social issues involving awareness of impact and the responsibility of owners, authorities and communities.

#### 6.1.2 Derelict vessels in Milford Haven key points

- Larger derelict vessels are often landed in more riverine areas, particularly in the Upper area (north of the A477 road bridge).
- Drifting vessels tend to originate from local moorings and facilities due to neglect or a lack of maintenance, where these vessels ground depends on environmental conditions and is often at locations accessible by the public. Drifting vessels in the Lower area are notified and acted upon efficiently due to the presence of commercial operations.
- The powers available to authorities is dependent on their remit and their use dependent on responsibility. Where authority boundaries meet or overlap the management of derelict vessels should be agreed.
- Where the impact from derelict vessels crosses authority boundaries or interacts with private land (including the seabed) consultation is required between stakeholders. The exercise of powers available should be in-line with any Memorandum of Understanding or agreement.

### 6.1.3 Legislation

- The use of legislation is specific to conditions, in order to use the powers available, the hazard or state of the vessel must conform to the conditions of the legislation.
- The actions available and function to reimburse costs differs under each legislation, applicable powers should consider the intended action and finances available.
- Powers available to an authority may be applicable to the whole area or specific areas within, outside or on the approaches to the authority's boundaries, depending on the impact of the derelict vessel to the authority. Powers available under National legislation enable authorities (PCC and NRW) to manage waste and marine litter from decaying derelict vessels.

### 6.1.4 Application of powers

- As demonstrated by the MHPA use of its powers, derelict vessels and marine objects presenting a danger to navigation can be dealt with under existing local harbour powers (Byelaws or local Acts). It is important to consider which power to use, to ensure that items with intrinsic value can be sold in order to recover the costs incurred.
- Any disposal activities must have due regard to preventing pollution to the environment or any impact on human health. This includes complying with any requirements under the Hazardous Waste Regulations and the Health and Safety at Work Regulations.
- Salvage of a vessel may be considered by an authority wishing to remove a derelict vessel. If Salvage is used, this will be a contractual arrangement and the authority should follow guidance in the Port Marine Safety Code 'Guide to Good Practice'.

### 6.1.5 Derelict vessel management key points

- The removal of derelict vessels requires the location of the object to be established, the authorities and their powers identified, the available powers and their requirements assessed, and a funding source to be available.
- The powers available for removal may apply beyond the boundaries of an authority's area. Where an authority or power overlap an agreement, understanding or concordat should establish which is to be used.
- The management of derelict vessels requires control of their cause, impact and removal.
- The removal of derelict vessels is conducted at the expense of the authority with limited opportunity for reimbursement. Establishing a funding mechanism nationally, locally or through boat owner fees would enable a more proactive approach to management.

## 6.2 Summary assessment

A derelict vessel is defined within this report as a vessel (any ship or craft or any structure capable of navigation) that has been abandoned and become a nuisance, specifically those that do not fall into the lifecycle management regime of larger vessels. Smaller non-commercial craft are not subject to 'life-cycle' design where the construction of a vessel also considers its disposal. Due to the lack of regulation for End of Life (EOL) management, the process of disposal and the costs involved often lead to abandonment. This may result from owners lacking the financial means to responsibly dispose of their vessel. It is for that reason that a financial mechanism, such as a central or regional vessel disposal fund, paid into by owners at purchase, or as part of a periodic charge, would provide for EOL management. This would also raise owner and operator awareness of their social responsibility towards the disposal and recycling of obsolete vessels. Manufacturing and operator companies may also address their Corporate Social Responsibility (CSR) through direct recycling schemes or payment into a central fund for vessel disposal.

The environmental and public health impact from derelict vessels is specific to each case, where the construction of a vessel, hazardous substances onboard, the nature of its surrounds and accessibility influence the hazards. As a derelict vessel does not have an owner, monitoring the state of the vessel may not be routinely carried out. Therefore, its condition may not be directly assessed, and further deterioration may not be prevented, leading to eventual decomposition. As a derelict vessel decomposes the contents of the vessel may spill, the hull and equipment break apart, and the vessel's material erode releasing hazardous substances into the environment. With a lack of direct monitoring, the effect on the environment, risk to public health and the safety of navigation may not be perceived until an effect has become noticeable.

Through active management by local authorities, vessels suspected of being derelict may be identified and assessed for their potential impact, including establishing any historic or archaeological value there may be. This will provide for the use of appropriate pre-emptive action to be taken. This may include early attempts to establish ownership and enforce a direction to the owner to remove or the vessel before becomes unseaworthy and breaks apart. Once a vessel has become unseaworthy of the potential for recovering costs through sale diminish rapidly. As the impact of derelict vessels, especially those breaking apart, may have influence across jurisdictional areas and have varied risks associated with them, it is in the interests of all authorities to have a shared understanding of the situation within the wider area (for example, at estuary or coastal embayment level). A vessel breaking apart in one area, or where there is a jurisdictional overlap may result in a risk requiring action by more than one authority. Having a shared understanding allows for co-operation in the implementation of pre-emptive action, the use of available powers or join funding.

Removal of a derelict vessel or part of a degrading vessel requires action to be taken in accordance with the authorities' available powers. Before action is taken, an authority should consider any stakeholder consultation which may be relevant in order to minimise repercussions should ownership later be disputed. A voluntary amnesty scheme may be considered as a solution to allow owners who no longer have the financial capacity to maintain or dispose of their vessel to surrender their ownership to an authority and prevent the vessel becoming derelict.

Disposal of derelict vessels or marine waste should be conducted under the Waste Framework Directive. This requires that where possible the materials, components and equipment recovered should be reused or recycled with as little as possible sent for incineration or landfill. The construction of private vessels is intrinsically complicated and difficult to dismantle. Modern (post 1960) vessels are often constructed from synthetic materials such as Fibre Reinforced Polymers (FRP) which have a limited recycling potential and is restricted from going to landfill. The process of disposal of these vessels is therefore convoluted and costly, with little value in re-sale of recyclable components. The provision of a scheme that identifies a disposal process locally and is supported nationally would allow clarification over the requirements and costs for disposal, streamlining the process, removing ambiguity and improving adherence to the Waste (England and Wales) Regulations.

The current process for the removal of derelict vessels in Milford Haven depends on the collaborative approach of authorities wishing to take action. When the effect of a derelict vessel becomes noticeable, such as drifting debris in a navigational channel or a vessel breaking apart on the foreshore, action is prompted. The principal factor determining the controlling authority, is the location of derelict vessel or debris. If immediate action is not required, as in the case of emergencies, relevant notifications and consultations are conducted between authorities and stakeholders.

Each authority monitors its jurisdictional area for risks including the impacts from derelict vessels. However, to meet the conditions of the legislation, action cannot be taken under the powers available until the effects of these impacts are considered.

The cost of removal often requires that initial expenditure is covered by the acting authority. This and subsequent costs may be recoverable depending on the powers selected for use, although the lack of ownership and limited intrinsic value of derelict vessel and marine waste is unlikely to cover the expenditure required.

In summary, derelict vessels within Milford Haven are monitored and removed when required. However, due to the lack of a funding mechanism and a national strategy the removal of derelict vessels is reliant on the resources of local authorities.

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## 8 Abbreviations/Acronyms

BAP	Biodiversity Action Plan
BDE-209	Decabromodiphenyl Ether
BFR	Brominated Flame Retardants
BT	British Telecommunications
BTO	British Trust for Ornithology
CCW	Countryside Council for Wales
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CSR	Corporate Social Responsibility
DDT	Dichloro-Diphenyl-Trichloroethane
Defra	Department for Environment, Food and Rural Affairs
DNA	Deoxyribonucleic Acid
DP	Dechlorane Plus
EC	European Commission
EOL	End of Life
EU	European Union
EUNIS	European Nature Information System
FAQs	frequently Asked Questions
FRP	Fibre Reinforced Polymers
GESAMP	Group of Experts on the Scientific Aspects of Marine Environmental Protection
GRP	Glass Reinforced Polymer
GT	Gross Tonnes
HDPC	Harbours, Docks and Piers Clauses Act 1847
HKC	Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships' 2009
HM	Her Majesty's
HSE	Health and Safety Executive
IMO	International Maritime Organisation
JNCC	Joint Nature Conservation Committee
LLA	Local Lighthouse Authority
LLP	Limited Liability Partnership
LNG	Liquefied Natural Gas
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
META	Marine Energy Test Area
MHPA	Milford Haven Port Authority
MHWESG	Milford Haven Waterway Environmental Surveillance Group
MLWS	Mean Low Water Springs
MoU	Memorandum of Understanding
NB	<i>Nota bene</i>
NERC	Natural Environment Research Council
NRW	Natural Resources Wales
OC	Organochlorine
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
PAH	Polycyclic Aromatic Hydrocarbons
PBB	Polybrominated Biphenyls
PBDE	Polybrominated Diphenyl Ethers
PCB	Polychlorinated Biphenyls

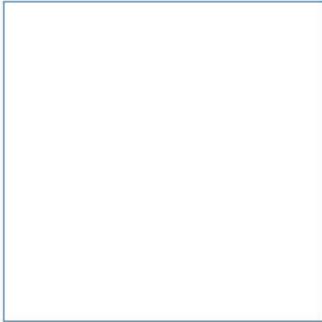
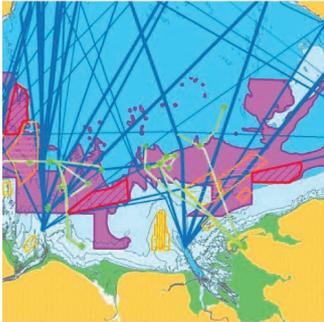
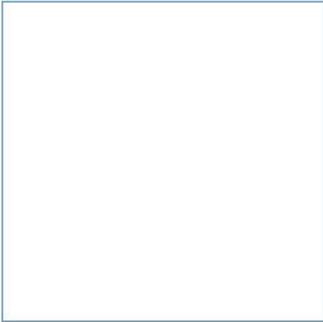
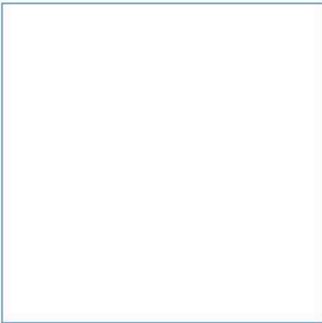
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PCC	Pembrokeshire County Council
PCNPA	Pembrokeshire Coast National Park Authority
PEL	Probable Effect Level
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
PWC	Personal Watercraft
PWMP	Port Waste Management Plan
RPS	RPS Energy
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SHA	Statutory Harbour Authority
SOSREP	Secretary of State's Representative
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TBT	Tributyltin
UK	United Kingdom
UK BAP	UK Biodiversity Action Plan
UKGov	UK Government
US	United States
UV	Ultraviolet
VTS	Vessel Traffic Services
WeBS	Wetland Bird Survey
WRC	Wreck Removal Convention
XRF	X-ray Fluorescence

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

# Appendices



Innovative Thinking - Sustainable Solutions

# A War on Wrecks Taskforce (Australia)

The executive summary of the of the Australian war on wrecks taskforce interim report is provided below, the full report can be found at <https://www.msq.qld.gov.au/-/media/MSQInternet/MSQFiles/Home/WoW-Taskforce-Interim-Report-March-2019.pdf?la=en>

## Executive Summary

The Palaszczuk Government is committed to ensuring Queensland's waterways are safe and free of derelict vessels which pose a hazard to navigation, and to the environment. To this end a \$20 million fighting fund has been established to fund the removal of derelict ships, and a Taskforce created to identify best practice in ensuring that all parties involved a vessel's lifecycle meet their obligations from the time a vessel is first launched until its ultimate disposal.

During the six months which the Taskforce has been operating, 96 vessels have been removed through direct action taken by Government agencies and a further 33 vessels resolved without the need for them to be removed from the water. The Taskforce is pleased to note that a further 36 vessels have been removed by their owners – some in response to directions by the Government, and some due to public awareness activities undertaken by the Taskforce.

Recreational boating is a popular pastime in Queensland, with around 17 per cent of Queenslanders holding a Recreational Marine Drivers Licence, and around 5 per cent of Queenslanders owning at least one registered recreational vessel. This equates to approximately 256,435 vessels registered in Queensland<sup>12</sup>, with this number increasing by approximately 23 per cent during the ten years 2005-2014<sup>3</sup>. Vessels do not last forever and ensuring vessels are disposed of appropriately as they reach the end of their life requires a holistic, strategic approach. Developing a whole of life vessel strategy is important in Queensland given the ageing fleet and change of use from commercial vessels to recreational vessels.

In developing a whole of life management strategy, the Taskforce has considered the financial, social and environmental impacts and their effect on Queenslanders, and striven to ensure that the maximum environmental benefits are realised with the minimum regulatory burden. The taskforce has consulted widely with the boating public, industry and government stakeholders and identified that while regulatory improvements may necessarily impose additional costs upon boat owners, there must be a balance between additional costs and improved safety and environmental outcomes.

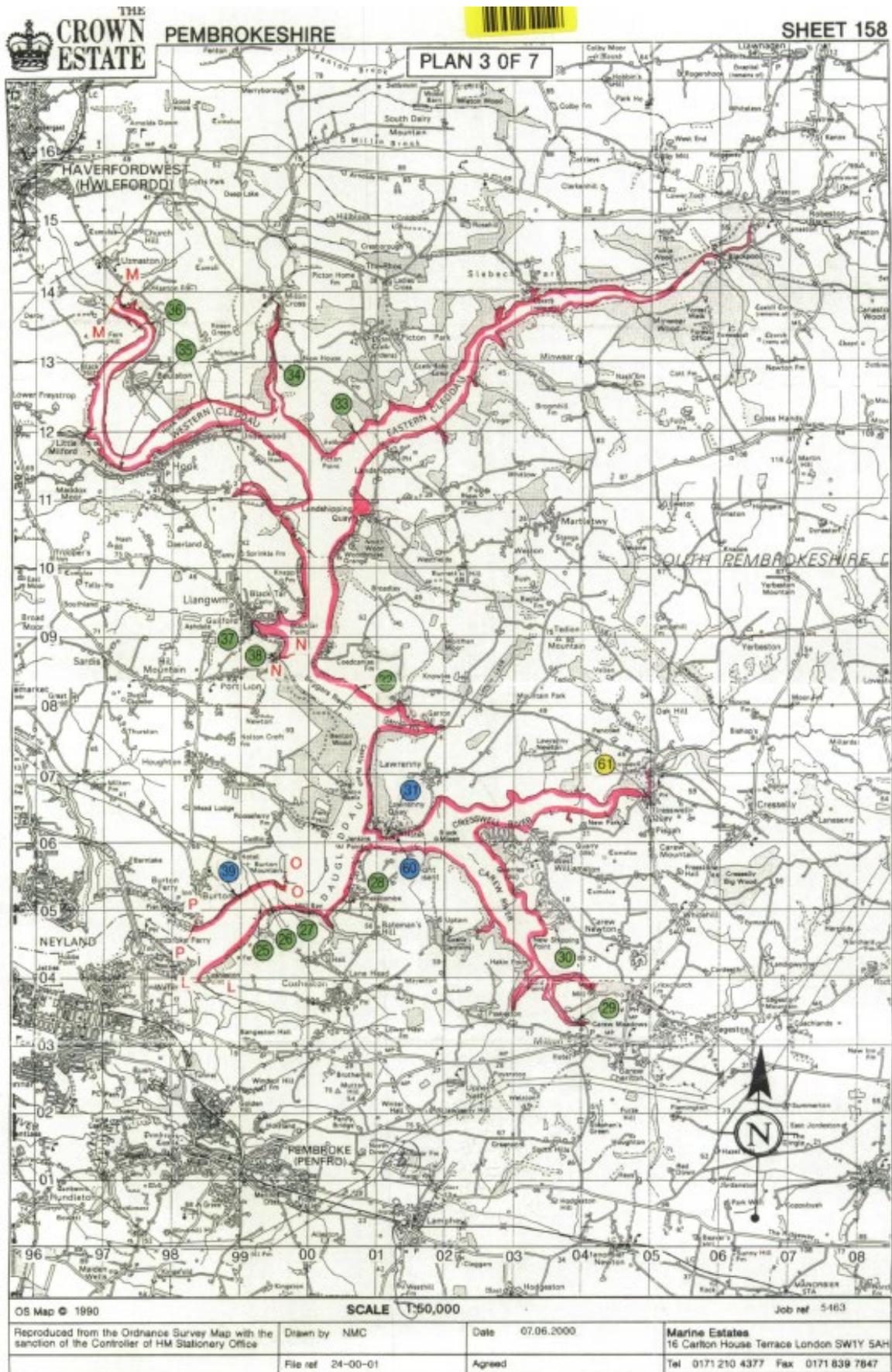
The Palaszczuk Government values and is committed to engaging with organisations with expertise to contribute towards successful environmental and safety outcomes. It is important that the whole of state is represented by advocates who will provide insights and benefits for all of Queensland. This report draws on the information and experience gathered during consultation sessions, analysis of published research and the experience that Taskforce members brought to their role.

The Taskforce considers that the interim report should be a starting point from which to inform the Queensland Government and the community on potential methods to improve the culture of responsible boat ownership, to reduce illegally dumped vessels and to provide a pathway for environmentally responsible disposal of end-of-life vessels.

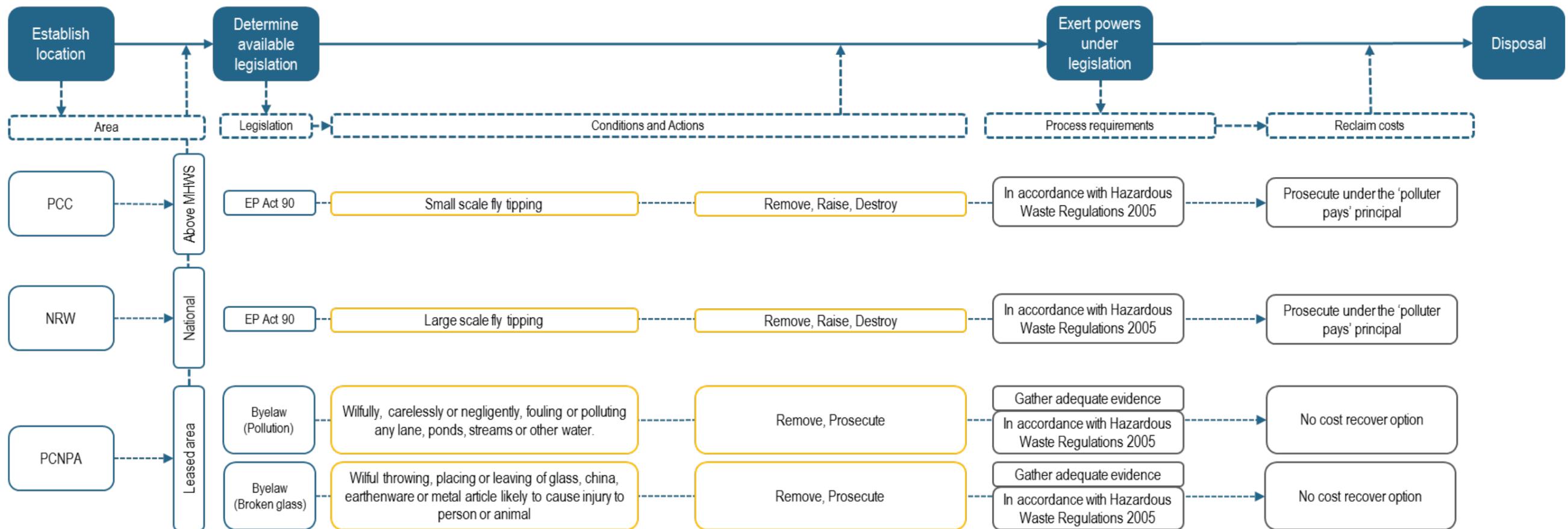
A Responsible Boat Ownership strategy will address the dual priorities of preventing vessels from becoming derelict and ensuring adequate and sustainable funding is available to remove illegally dumped vessels where necessary. The Taskforce will also canvass a wider range of issues including appropriate management of moorings, live aboard vessels and marine infrastructure to improve the overall safety, cleanliness and amenity of Queensland's waterways.

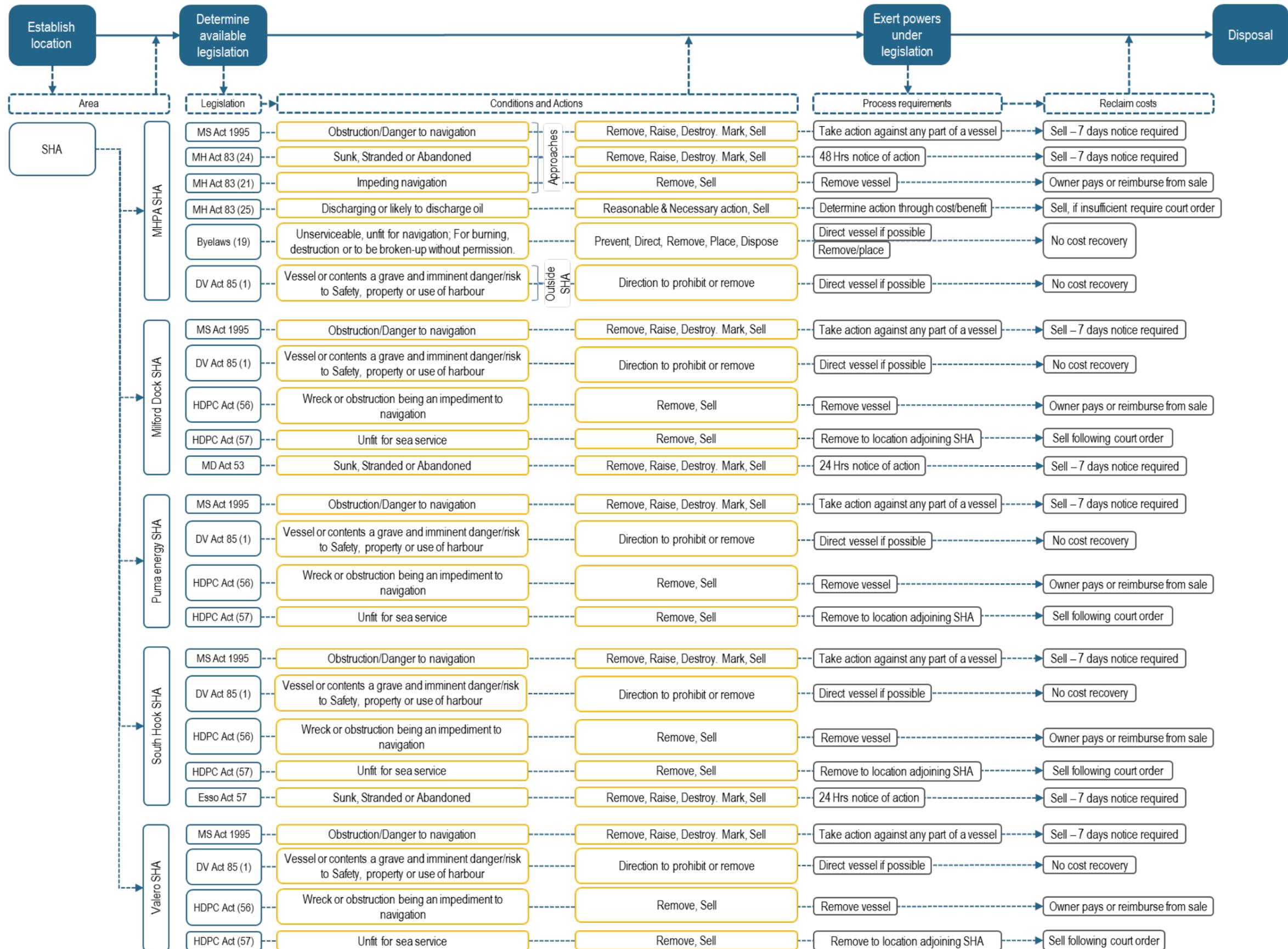
The report makes eleven recommendations which provide a framework to develop a holistic approach towards Responsible Boat Ownership, from time of manufacture until the boat's ultimate disposal.





## C Detailed Process Diagram for Derelict Vessel Removal





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