Marine recreation evidence briefing: Motorised personal watercraft

This briefing note provides evidence of the impacts and potential management options for marine and coastal recreational activities in Marine Protected Areasn(MPAs). This note is an output from a study commissioned by Natural England and the Marine Management Organisation to collate and update the evidence base on the significance of impacts from recreational activities. The significance of any impact on the Conservation Objectives for an MPA will depend on a range of site specific factors. This note is intended to provide an overview of the evidence base and is complementary to Natural England's *Conservation Advice* and *Advice on Operations* which should be referred to when assessing potential impacts. This note relates to motorised personal watercraft. Other notes are available for other recreational activities, for details see *Further information* below.

Personal watercraft

Definition

A personal water craft (PWC) is a recreational watercraft that the rider rides or stands on, rather than being located inside of, for example, in a boat. Models have an inboard engine driving a pump jet that has a screw-shaped impeller to create thrust for propulsion and steering. These craft are often referred by the brand names such as Jet Ski.

Distribution of activity

PWC are launched directly in the water from PWC ports/ pontoons (located in harbours and marinas) or through using a small trailer to launch on beaches or slipways. In general, they are used in shallow coastal waters although they are sometimes used further offshore. Activity generally occurs around the coast, however, popular locations in England include the South Coast (such as the Solent, Poole Harbour and Brighton), the Thames Estuary (including the Essex and Kent coast), Devon and Cornwall. The establishment of PWC clubs, for example in north west England, east Yorkshire, the Solent) attract PWC users and newcomers to the sport (David Poucher, Personal Watercraft Partnership, pers. comm. 14 February 2017).

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Levels of activity

In 2015, 171,000 people participated in PWC activity in the UK (Arkenford, 2015). In 2017, it is estimated that there are 15,000 PWC users in the UK (David Poucher, Personal Watercraft Partnership, pers. comm. 14 February 2017).

Pressures

This note summarises the evidence on the pressures and impacts arising from the launch/recovery of PWC and from use of PWC at sea.

The direct pressures considered to arise from each functional aspect of the activity are shown in Table 1 and the potential biological receptor groups affected by the pressures are shown in Table 2. The information presented on pressures associated with the activity builds upon, and is complementary to, Natural England's Conservation Advice and Advice on Operations which should be referred to for MPA specific information and sensitivities of specific MPA features to those pressures[1].

The main pressure-receptor impact pathways arising from this activity are considered to be:

- Abrasion/disturbance of surface and sub-surface sediments (in intertidal and shallow subtidal habitats) from the launch and recovery of vessels from 'unofficial access' points, for example using a vehicle and a trailer to launch a vessel from a location without a slipway. In this situation the pressure may arise from trampling and/or the equipment (e.g. trailer) used. Established slipways/access points have been chosen to be accessible at high and low tides which minimises disturbance to sediment (UK CEED. 2000). It has also been assumed that, should it occur, the launch/recovery of a PWC from an unofficial access point would only be attempted on sandy, mixed or coarse sediment as opposed to on mud or rock for reasons of safety and/or possible damage to the craft.
- Abrasion/disturbance of the surface and sub-surface sediment in shallow subtidal habitats through engine wash.
- Underwater noise disturbance of marine mammals and birds, related to engine operation during the activity.
- Above water noise and visual disturbance, of hauled out seals and birds related to people and/or vehicle noise during PWC launch/recovery and from engine operation and the craft moving through waves (craft striking waves or 'hull slap') during the activity.
- Visual disturbance of marine mammals and birds, related to the presence of people and the craft during launch/recovery and during the activity.

The main pressures of changes in air-borne or underwater noise once the craft has been launched and/or abrasion of any subtidal substratum associated with engine use have been considered during 'operation' of the vessel.

[1] https://www.gov.uk/government/collections/conservation-advice-packages-for-marine-protected-areas

For table 1 and 2 please see page 14

Impacts

For each of the receptor groups below, a high level summary of the evidence of impacts will be provided. Within each summary – note features of high sensitivity and site-specific factors which may influence the significance of impact

Intertidal and shallow subtidal habitats

Abrasion/disturbance of surface/sub-surface sediments from launch/recovery of PWC

PWC can be launched from trailers, although they can be carried short distances where access is more difficult. The launching of PWC from formal/constructed access points is likely to have minimal impact on marine features except where it involves trampling and scouring of the feature. However, where such a facility encourages high levels of usage, the nature conservation value of the site may be affected (UK CEED, 2000, although no specific evidence cited). The launching of PWC from non-constructed access points, which is relatively common, may result in compaction and erosion of features and damage to vegetation (UK CEED, 2000; no specific evidence cited).

Launching PWC from non-constructed access points, may involve the use of a vehicle and trailer on the foreshore. There is limited information on the effects of intertidal vehicle movements (Tyler-Walters and Arnold, 2008). In general, the passage of a vehicle is likely to compact sand, cause rutting and crush infaunal organisms. Brown and McLachlan (2002) suggested that vehicles driven along a wet foreshore would have little impact. However, access based on vehicular access on seagrass *Zostera angustifolia* beds in Wales (associated with cleaning up after an oil spill) resulted in patchy beds with wheel ruts up to a metre deep (Hodges and Howe, 1997). ABPmer (2013) assessed seagrass beds as having a medium to high sensitivity to vehicle-related trampling.

Abrasion/disturbance of surface and/or sub-surface sediments during activity

The design of PWC allows them to operate in relatively shallow areas and the ability to travel at speed suggests that larger open areas of water are preferred to smaller enclosed water bodies. The small size, shallow draft and jet drive system allow the craft to enter areas which are not normally navigable for other motorised craft. This may cause physical disturbance to sensitive habitats (UK CEED, 2000). While PWC do not generally have propellers, the turbulence produced by the jet propulsion may still disturb plant growth and sediments, especially during acceleration or turns when the thrust may be oriented downward (Asplund, 2000). PWC are widely perceived to scar nearshore and intertidal seagrass beds but researchers in New Hampshire and the Florida Keys found no significant PWC-related damage after subjecting test beds to extensive PWC use (Anderson, 2000; Continental Shelf Associates, 1997; both cited in Currey, 2002).

Fish

Underwater noise changes and visual disturbance

PWC are considered to be less noisy than propeller-driven vessels (Koschinski, 2008). Propeller-driven vessels generally have been shown to increase stress response and potentially mask vocalisations in fish (Celi *et al*., 2015; Neenan *et al.,* 2016) although no

information with specific respect to PWC was available. The response of fish will also be dependent on sensitivity of these species with fish with a swimbladder generally considered to have better hearing than those without (Nedwell *et al.,* 2004).

In general, fish species are generally not considered sensitive to visual disturbance. However, the foraging and courtship behaviour of basking sharks occur at the surface in UK waters (particularly South West England, the Isle of Man and Hebrides) seasonally in the spring and summer (Sims, 2008). This makes them potentially sensitive to the visual presence of a motorised vessel as well as due to noise stimuli. Therefore, these pressures on basking sharks are reviewed collectively.

Compared with cetaceans, basking sharks are considered more difficult to disturb (Speedie and Johnson, 2008). Specific research on the impacts of disturbance (including PWC) on basking sharks is limited. The level of response will be dependent on how closely a PWC approaches a basking shark with a close encounter likely to cause a startle response (often involving the shark thrashing the tail or diving) (The Shark Trust, 2007; Kelly *et al.,* 2004). Repeated disturbance could cause a disruption in foraging or courtship behaviour.

Marine mammals

Underwater noise changes and visual disturbance

It is considered difficult to disentangle the combined effects of noise and boat physical/visual presence which could in combination or separately cause disturbance (Pirotta *et al.,* 2015). These pressures are therefore reviewed collectively in this section.

PWC are considered to be less noisy than the propeller-driven vessels but have been documented to elicit similar or greater disturbance impacts to marine mammals (Koschinski, 2008; Mattson *et al.,* 2005; Kelly *et al.,* 2004). For example, Nowacek *et al*., (2001) found that PWC were more likely to cause changes in behaviour than boats with an outboard engine. This is considered to be because the erratic movements of PWC are unpredictable for the animals and intensified the observed escape reaction. Behavioural effects associated with PWC include changes in dive patterns, with animals spending more time underwater, increased swimming speed and changes of direction away from the craft (Koschinski, 2008). Nowacek *et al*. (2001) conclude that the main factors influencing avoidance reactions of PWC was the predictability of movement, the speed, the presence of juveniles and the water depth.

Above water noise changes and visual disturbance (hauled out seals only)

An environmental test of air-borne noise generated by PWC indicated a noise level of about 84db at 25m (David Poucher, PWP, pers. comm. 14 Feb, 2017).

It is very difficult to separate out the relative contribution of noise and visual stimuli in causing a disturbance response to seals due to motorised vessels (including PWC) and the available literature generally makes no distinction. Therefore, these pressures are reviewed collectively.

Seals which are hauled out on land, either resting or breeding, are considered particularly sensitive to visual disturbance (Hoover-Miller *et al*., 2013). The level of response of seals is

dependent on a range of factors, such as the species at risk, age, weather conditions and the degree of habituation to the disturbance source. Literature has generally focused on powered watercraft rather than PWC specifically although responses are expected to be similar (Wilson, 2014). In this respect, hauled out seals have been recorded becoming alert to powered watercraft at distances of up to 800 m although seals generally only disperse into the water at distances <150-200m (Wilson, 2014; Young, 1998; Suryan and Harvey, 1999; Henry and Hammill, 2001).

Birds

Above water noise changes and visual disturbance

It is very difficult to separate out the relative contribution of noise and visual stimuli in causing a disturbance response to birds due to motorised vessels (including PWC) and the available literature generally makes no distinction. Therefore, these pressures are reviewed collectively.

In general, regular and defined human movements are less disturbing than erratic and random movements to birds (Smit and Visser, 1993). PWC are able to operate in shallow environments with the erratic motion, high speeds and noise associated with PWCs causing unpredictable movements and a high degree of disturbance stimuli to waterbirds (RSPB, 2015).

In general, the primary responses observed are likely to include increased vigilance, avoidance walking and flight responses. The level of response will vary depending on a range of factors including the frequency of disturbance and the level of habituation as a result of existing activity (IECS, 2009).

Some disturbance effects may have more direct negative impacts (loss or failure of eggs or chicks leading to decreased breeding productivity) to birds than others (temporary displacement from feeding or roosting areas leading to increased but non-lethal energetic expenditure).

Repetitive disturbance events can result in possible long-term effects such as loss of weight, condition and a reduction in reproductive success, leading to population impacts (Durell *et al.,* 2005; Gill, 2007; Goss-Custard *et al*., 2006; Belanger and Bedard, 1990).

Research suggests that PWCs elicit similar or higher disturbance responses than other motorised boats with most disturbance events occurring within 100 m of a receptor (Rodgers and Schwikert, 2002; Burger, 1998). However, PWC are less restricted to channels and other defined navigable areas due to the shallower draft and size of a PWC. This allows them to travel closer to potentially sensitive areas such as nesting sites or roosts.

Assessment of significance of activity-pressure

The following assessment uses the evidence base summarised above, combined with generic information about the likely overlap of the activity with designated features and the sensitivity range of the receptor groups, to provide an indication of:

i) the likelihood of an observable/measurable effect on the feature group; and

ii) the likelihood of significant impact on Conservation Objectives based on the effect on the feature group.

The assessment of significance of impacts has been based on the potential risk to the achievement of the conservation objectives for the features for which a site has been designated. The assessment is made using expert judgement and is designed to help identify those activities that are likely to be of greatest or least concern, and, where possible, suggest at what point impacts may need further investigation to determine potential management requirements within MPAs to reduce the risk of an adverse effect on the integrity of the site. Note, the assessment only considers the impact pathways considered in the evidence section (pressures which were considered negligible in Tables 1 and 2 are not considered in this assessment).

The outputs are shown in Table 3. The relative ratings of likelihood of significant impact on Conservation Objectives (COs) are defined as:

- Low – possible observable/measurable effect on the feature group but unlikely to compromise COs.
- Medium – observable/measurable effect on the feature group that potentially could compromise COs.
- High – observable/measurable effect on the feature group that almost certainly would compromise COs.

The relative risk ratings are based on the activity occurring without any management options, which would be considered current good practice, being applied. The influence that such management may have on the risk rating is discussed in the Management Options section below.

It must be noted that the above assessment only provides a generic indication of the likelihood of significant impacts, as site-specific factors, such as the frequency and intensity of the activity, will greatly influence this likelihood. As such, further investigation of the risk to achieving COs will need to be done on a site specific basis, considering the following key site-specific factors:

- the spatial extent of overlap between the activity/pressure and the feature, including whether this is highly localised or widespread;
- the frequency of disturbance e.g. rare, intermittent, constant etc.;
- the severity/intensity of disturbance;
- the sensitivity of specific features (rather than the receptor groups assessed in Table 3) to pressure, and whether the disturbance occurs when the feature may be most sensitive to the pressure (e.g. when feeding, breeding etc.)
- the level of habituation of the feature to the pressure; and
- any cumulative and in-combination effects of different recreational activities.

For Table 3 see page 15

Management options

Potential management options for marine recreational activities (note, not specific to PWC activity), include:

On-site access management, for example:

- designated areas for particular activities (voluntary agreements or underpinned by byelaws)
- provision of designated access points e.g. slipways, in locations likely to be away from nature conservation access (voluntary or permit condition or underpinned by byelaw)

Education and communication with the public and site users, for example:

- signs, interpretation and leaflets
- voluntary codes of conduct and good practice guidance
- wardening
- provision of off-site education/information to local clubs/training centres and/or residents

Legal enforcement, for example:

- of legislation to protect wildlife from disturbance (the Wildlife and Countryside Act 1981 and The Conservation of Habitats and Species Regulations 2010;
- of byelaws which can be created by a range of bodies including regulators, Local Authorities and landowners (collectively referred to as Relevant Authorities); and
- of permitting or licence conditions.

The Personal Watercraft Partnership (PWP) highlight potential regulatory (non-voluntary) management measures for PWC use including shore-based management tools such as access control, registration and launch fees, and in-water management tools such as speed restrictions and zoning. Voluntary (non-regulatory) management tools include good signage and information, publicity and self-regulation through clubs.

Specific examples of management measures which have been applied to PWC activities are described further in a Management Toolkit which can be accessed from **Marine evidence > Marine recreational activities** and include:

- codes of conduct;
- voluntary zonation (e.g. launch, use and exclusion areas); and
- permit system (including the requirement for registration and launch fees, with conditions attached to the permits which can be revoked if not adhered to), sometimes underpinned by byelaw, and enforced by relevant authority

Based on expert judgement, it is considered that where management measures, which would be considered current good practice, are applied to motorised watercraft activities, adhered to and enforced, the likely risk of significant impact on a site's Conservation Objective's would be **Low** in relation to all activity/pressure impact pathways.

For further information and recommendations regarding management measures, good practice messaging dissemination and uptake, refer to the accompanying project report which can be accessed from **Marine evidence > Marine recreational activities**.

National governing body and good practice messages for motorised watercraft activities

National governing body

There is no National Governing Body for PWC activities. However, the Personal Watercraft Partnership (PWP) is Group of bodies involved in the personal watercraft industry in the UK (including manufacturers, the RYA, the British Marine Federation, security and insurance brokers). The PWP mission statement includes "To encourage environmental awareness and responsible behaviour".

The PWP does not have a Code of Conduct on their website specifically for PWC users, however the website does provide a link to the Green Blue Initiative. PWP has also produced a document titled 'Managing Personal Watercraft: A Guide for Local and Harbour Authorities' (under revision in 2017) which provides guidance to local and harbour authorities on how to manage PWC use, including in relation to environmental impacts. The document includes sections on the natural environment, conflicts with marine species, designated areas, legislation and case studies of management schemes. This guidance document is available here: **http://www.pwp.org.uk/wp-content/uploads/MPW_Jan08.pdf**.

Good practice messaging

There is no national level good practice messaging or guidance relating to minimising impacts specifically from PWC activities on the environment/wildlife. As this activity was anecdotally reported by numerous stakeholders to be an activity of concern in some areas, this is considered to be a gap.

However, PWP have been and are currently involved in the production of site-specific Codes of Conducts for PWC users (for example Flamborough Head European Marine Site) which are tailored to a site's specific issues, features and solutions. Furthermore, other local PWC Codes of Conduct have also been developed by stakeholders (e.g. the Port of London Authority's Personal Watercraft in the Thames Estuary Code of Conduct) and these existing resources could be drawn upon if a national level code is considered appropriate by conservation advisors, relevant authorities and the National Body. Key messages regarding minimising impacts within these existing resources include (some text summarised):

Abrasion/disturbance of habitats:

- only launch, moor and land your PWC from authorised launch sites and do not use saltmarsh, mudflats or sandbanks for these purposes; and
- avoid shallow waters where you may erode the underwater seabed.

Noise (above and below water) and visual disturbance:

- do not launch from or approach roosting or nesting sites for birds, especially around high tide;

- if wildlife is encountered, maintain a steady direction and a slow 'no wake' speed away from the wildlife;
- never harass or chase wildlife;
- remember that a fast-moving craft doesn't allow time for birds to get out of the way;
- if you see groups of birds on the sea whilst using your personal watercraft, slow down to a no wake speed and go around the group;
- if you are within 300m of the cliff-face, maintain a no-wake speed. If you see any birds flying away from the cliffs in response to your presence, move further out from the shore;
- avoid the low water mark where birds may be feeding;
- do not approach birds during wintering periods (September - March) as birds use this time to conserve energy, feed and roost;
- marine mammals, are susceptible to disturbance. If you see these animals, slow down and keep a constant speed and direction to avoid startling them.
- do not approach or go onto sandbanks/mudflats when seals are hauled out of the water. This is time for seals to breed, moult, recover from foraging and conserve their energy.

Further information regarding site-specific Codes of Conduct for PWC users can be found in the Management Toolkit which can be accessed from **Marine evidence > Marine recreational activities**.

Further information

Further information about the National Representative Body for PWC activity, good practice messaging resources, site specific conservation advice and management of marine recreational activities can be found through the following links:

- the personal watercraft partnership: **http://www.pwp.org.uk/**
- conservation Advice - Advice on Operations
- for site specific information, please refer to Natural England's conservation advice for each English MPA which can be found on the Designated Sites System **https://designatedsites.naturalengland.org.uk/** This includes Advice on Operations which identifies pressures associated with the most commonly occurring marine activities, and provides a broad scale assessment of the sensitivity of the designated features of the site to these pressures.
- for further species specific sensitivity information a database of disturbance distances for birds (Kent et al, 2016) is available here: **http://www.fwspubs.org/doi/abs/10.3996/082015-JFWM-078?code=ufws-site**
- some marine species are protected by EU and UK wildlife legislation from intentional or deliberate disturbance. For more information on the potential requirement for a wildlife licence: **https://www.gov.uk/guidance/understand-marine-wildlife-licences-and-report-an-incident**
- the Management Toolkit which can be accessed from **Marine evidence > Marine recreational activities**.

Information Notes for other marine recreational activities which can be accessed from **Marine evidence > Marine recreational activities** and include the following activities:

- boardsports with a sail (windsurfing and kitesurfing)
- boardsports without a sail (surfing)
- coasteering
- diving and snorkelling
- drones (recreational use at the coast)
- general Beach Leisure
- hovercraft
- motorised and non-motorised land vehicles (including: the use of quad bikes, scramble bikes and cars on the foreshore and the activities of sand yachting, kite buggying and landboarding)
- motorised watercraft;
- light aircraft (including small planes and helicopters, microlights, paramotors and hang gliding)
- non-motorised watercraft (including dinghy, day boats or other small keelboat without a motor and the paddlesports sea kayaking, surf kayaking, sit-on-top kayaking, Canadian canoeing and stand up paddle boarding)
- wildlife Watching (from land and from vessels)

Natural England Evidence Information Notes are available to download from the Natural England Access to Evidence Catalogue **http://publications.naturalengland.org.uk/** For information on Natural England contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk**.

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Table 1 Potential direct pressures arising from use of Personal Watercraft

	Abrasion/disturbance of the substrate surface	Abrasion/disturbance below substrate surface	Underwater noise changes	Above water noise changes	Visual disturbance
Access (launch/recovery)	✓[1]	✓[1]	Negligible	✓[4]	✓[5]
Activity (use of PWC)	✓[2]	✓[2]	✓[3]	✓[4]	✓[5]

X - No Impact Pathway

1 - Pressure relates to use of a vehicle and trailer to launch/recover PWC

2 – Pressure relates to the potential abrasion/disturbance of the substratum surface and sub-surface through scour created by the engine wash in shallow water

3 – Pressure relates to changes in underwater noise created by engine operation during activity

4 – Pressure relates to changes in air-borne noise created by people and/or vehicles during launch/recovery of PWC and from engine operation and the craft moving through waves (craft striking waves or 'hull slap') during the activity

5 – Pressure relates to the presence of people and the PWC during launch/recovery and during the activity

Table 2 Biological receptors potentially affected by the pressures arising from Personal Watercraft

	Abrasion/disturbance of the substrate surface	Abrasion/disturbance below substrate surface	Underwater noise changes	Above water noise changes	Visual disturbance
Intertidal Habitats	✓ (launch/recovery)	✓ (launch/recovery)	Impact pathways scoped out	Impact pathways scoped out	Impact pathways scoped out
Subtidal Habitats	✓ (during activity)	✓ (during activity)			
Fish	Impact pathways scoped out	Impact pathways scoped out	✓		✓ (basking sharks)
Marine Mammals			✓	✓ (hauled out seals)	✓
Birds			✓	✓	✓

Table 3 Assessment of indicative likelihood of significant impacts from Personal Watercraft launch/recovery and activity

Pressure	Likely overlap between activity and feature (confidence)	Evidence of impact (confidence)	Sensitivity of feature to pressure (confidence)	Likelihood of observable/measurable effect on the feature	Likelihood of significant impact on Conservation Objectives
Surface and sub-surface sediment disturbance – intertidal and shallow subtidal habitats (from trampling and launch/recovery of PWC)	**Low – Medium** depending on availability and use of established slipways for launch of craft (low)	No direct evidence of surface abrasion/ penetration/disturbance from launch/recovery Evidence suggests that vehicle use on a wet foreshore (where launching from unofficial; access point) would have little impact, but some communities are more vulnerable than others (low) Direct evidence of impacts of vehicle access on seagrass beds (medium)	**Low–High** Sensitivity will depend on habitat type and therefore will be site- specific. An example of a feature with high sensitivity is seagrass	**Low –** based on likelihood of overlap of pressure and lack of direct evidence of impact	**Low**
Sub-surface sediment disturbance in shallow subtidal habitats (from engine wash)	**High** the relatively small size and shallow draft allow PWC to enter areas which are not normally navigable for other motorised craft	Two non-UK studies suggesting no significant PWC-related damage to seagrass beds (low)	**Low–High** Sensitivity will depend on habitat type and therefore will be site-specific. An example of a feature with high sensitivity is seagrass	**Low-Medium** based on high potential for pressure to overlap with sensitive features. However, low confidence regarding impact on such features	**Low**
Underwater noise changes – Fish	**Low–High** depending on location of activity e.g. coastal, inshore or further offshore (low)	No direct evidence of impact from PWC use Little direct evidence of motorised vessel noise on fish, although some evidence of increased stress response and masking of vocalisations (analogue pressure) (medium). PWC considered less noisy than propeller-driven vessels Basking shark: No direct evidence of impact from PWC use. Evidence of short-term displacement	**Low–High** (fish general) depending on species **Medium** (basking shark) during sensitive periods (low)	**Low–Medium (fish general)** based on predicted responses to analogue pressure **Medium (basking shark) –** based on the potential of overlap between pressure and feature (in some locations) during periods of important feature behaviour and feature response to analogue pressure	**Low (fish general)** **Low (basking shark)**

Pressure	Likely overlap between activity and feature (confidence)	Evidence of impact (confidence)	Sensitivity of feature to pressure (confidence)	Likelihood of observable/measurable effect on the feature	Likelihood of significant impact on Conservation Objectives
		response to small motorised vessel from one study (analogue pressure) (low)			
Underwater noise changes and visual disturbance – Marine mammals (seals and cetaceans)	**Low-Medium** depending geographical location of activity (high)	Evidence of pressure causing changes in dive patterns (longer underwater), increased swimming speed and changes in direction away from craft (medium)	**Medium–High**	**Medium–High** based on confidence in evidence base showing disturbance effects and sensitivity to pressure. Impact likely to be most pronounced when PWC deliberately seek direct interaction with feature	**Medium**
Above water noise changes and visual disturbance – seals (hauled out only)	**Low–High** depending on geographical location of activity	No direct evidence for PWC, although response expected to be similar to response to motorised watercraft Evidence of seals dispersing into sea (flushing) when motorised vessels generally within 150-200m (analogue pressure) (high)	**High** - hauled out seals sensitive to visual disturbance (medium) Evidence suggests common seals more sensitive to pressure than grey seals (high)	**Medium–High** based on potential for high level of overlap between pressure and feature, related to PWC ability to access shallow water. Where overlap occurs, strong evidence base for impact and high feature sensitivity to analogous pressure (noise from motorised watercraft)	**Medium**
Above water noise changes and visual disturbance – Birds	**Low–High** depending on geographical location of activity (high)	Some evidence of PWC eliciting disturbance response similar or greater than that by other motorise craft (medium)	**Low-High** Sensitivity will differ between species. Some species e.g. red-throated diver, curlew, are highly sensitive to disturbance; other species e.g. gulls, have high thresholds (low sensitivity) to disturbance Certain behavioural activities are considered more susceptible to disturbance e.g. nesting seabirds or breeding birds	**Medium–High** based on potential for high level of overlap between pressure and feature, related to PWC ability approach potentially sensitive areas closely	**Medium**

Pressure	Likely overlap between activity and feature (confidence)	Evidence of impact (confidence)	Sensitivity of feature to pressure (confidence)	Likelihood of observable/measurable effect on the feature	Likelihood of significant impact on Conservation Objectives
			(expert judgement)		