SEAGRASS

Gear and feature/subfeature combination:	**Towed (demersal) and seagrass**
Matrix risk category **- RED**	**Explanation for categorisation:** Although empirical evidence describes impact to *Posidonia spp*, given the similarities between species, it is reasonable to assume analogous impact to *Zostera spp* in the UK. This is supported by the evidence for dredging, which has a comparative impact to trawling and is for *Zostera spp.*

Impacts

Trawling has major direct and indirect impacts on seagrass beds (Moore and Jennings 2000); substrate is lost or destabilised, seagrasses are uprooted and damaged (Tudela 2004) and sediment resuspension reduces light necessary for seagrass photosynthesis (Ardizzone et al 2000). Recovery is variable and rapidity is dependent on extent of removal. Rates may be slow where adjacent seed sources and viable grass beds are present, but can be between 60-100 years where the removal of rhizomes has occurred (Gonzalez-Correa et al 2004 and Moore and Jennings 2000).

Evidence Moore and Jennings (2000), Tudela (2004), Ardizzone et al (2000), Gonzalez-Correa et al (2004).

Evidence is from the Mediterranean Sea *(Posidonia spp).*

Directly relevant peer reviewed literature	Directly relevant grey literature	Inference from studies on comparable habitats, gears or geographical areas.	Expert judgement
×			×

Confidence

High

There is peer reviewed evidence from the Mediterranean Sea *(Posidonia spp).* Given the similar ecological requirements and sensitivities of this species and the evidence concerning impacts of towed demersal fishing gears, this evidence is considered to be highly relevant scientific information which directly supports the conclusions on categorisation of this activity/sub feature combination.

Gear and feature/subfeature combination		**Dredge (towed) and seagrass**	
Matrix risk category - RED		**Explanation for categorisation:** Empirical evidence for impacts of dredge fishing on seagrass is extensive. Recovery rates are extremely variable; however shorter rates reported under experimental conditions are not considered to be representative of commercial fishing activity and therefore have not been considered further in the assessment of risk.	
Impacts: Both scallop dredging and other shellfish dredges immediately reduce shoot density and biomass (Peterson et al 1987, Fonseca et al 1984, Neckles et al 2005 and De Jonge and de Jong 1992) increase turbidity and have indirect consequences for trophic structures (Bishop et al 2005). Recovery is variable, demonstrated experimentally to range from months (at a non-commercial level of intensity) to many years, dependent on the extent of shoot damage (Cabaco et al 2005) and the extent and intensity of damage. In summary, recovery rates have been considered analogous to those for biogenic (sponge and coral) habitats (Ruesink and Rowell 2005).			
Evidence Peterson et al (1987), Fonseca et al (1984), Neckles et al (2005), De Jonge and de Jong (1992), Bishop et al (2005), Cabaco et al (2005), Ruesink and Rowell (2005).			
Evidence is for *Zostera spp* in the USA, Holland and Portugal.			
Directly relevant peer reviewed literature	Directly relevant grey literature	Inference from studies on comparable habitats, gears or geographical areas.	Expert judgement
×			
Confidence **High** There is peer reviewed, highly relevant scientific information to directly support the conclusion			

Gear and feature/subfeature combination	**Dredge (other) and seagrass**
Matrix risk category - RED	**Explanation for categorisation:** Evidence for this categorisation is largely taken from grey literature, with one empirical source assessing trampling in New Zealand and one assessing hand collection in Portugal. However, this limitation reflects the absence of peer-reviewed literature on this subject rather than a lack of confidence in the conclusion as a high risk category. This is because it is reasonable to identify the consequent impacts of suction dredging and propeller action as analogous to impacts identified from gears above. Therefore evidence from the grey literature is also supported by an expert consideration of sensitivity to the mechanical impacts exerted by the activities detailed below.

Impacts

Suction dredging removes seagrass and causes siltation which may result in further indirect negative effects (Davidson and Hughes 1998). Propellor wash or cutting also removes shoots and leaves to cause scars in seagrass (Short and Wyllie-Echeverria 1995) which can increase bed fragmentation by reducing the integrity of the bed and increasing vulnerability to further erosion (Turner and Schwarz 2006). Trampling (Eckrich and Holmquist 2000) and hand-collection (Cabaco et al 2005) has also been shown to have significant detrimental effects.

Evidence [1]Davidson and Hughes (1998), [2] Short and Wyllie-Echeverria (1995), [3]Turner and Schwarz (2006), 4Eckrich and Holmquist (2000) 5Cabaco et al (2005),

Evidence is for *Zostera spp* in the UK and Portugal and for other species in New Zealand.

Directly relevant peer reviewed literature	Directly relevant grey literature	Inference from studies on comparable habitats, gears or geographical areas.	Expert judgement
	×	×	

Confidence

Medium

There is directly relevant scientific information to support the conclusion but it comes from ‘grey literature’ sources

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