AQUATIC ENVIRONMENTS

Aquatic Environments

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Dear

Aquatic Environments investigation of intertidal decapod mortalities on the northeast coast.

Field investigation results:

Aquatic Environments was contracted by the Environment Agency to investigate the current status of the decapod fauna on the coast of the northeast of England. This request was made in response to a wreck of "crabs and lobsters" in the inshore waters of the specified coast between Hartlepool and Whitby in October and November 2021.

The attached table summarises the results of the two days of field work on the intertidal of the Durham, Cleveland and North Yorkshire coasts.

Yours sincerely

Principal Consultant

20/01/22 Low water at River Tees (Entrance),11:17 hrs, 1.27m aCD

Seaham Featherbed Rocks:

Way point	Time	Shore and biotope description	Photo numbers
54.84124 N -1.33092 W	09:20-09:50	Magnesian limestone reef with a mosaic of limpet/barnacle (LR.HLR.MusB.Sem.FvesR) biotopes and sediment floored rockpools (LR.FLR.Rkp.SwSed). Dominant taxa were *Fucus vesiculosus, Ulva spp., Osmundea pinnatifida,* corallinaceae crusts*, Corallina spp., Chondrus crispus, Mastocarpus stellatus, Patella spp., Littorina littorea, Semibalanus balanoides, Spirobranchus sp.,* spirorbidae and *Actinia equina.* No crabs found.	0002-0016
54.83898 N -1.32674 W	09:55	On leaving Seaham, the northern side of the harbour was also checked for appropriate habitat, as this has been a sheltered boulder shore in the past. But on this occasion the beach was found to be one of pure sand and an unsuitable habitat for decapod crustaceans.	

Hartlepool Headland:

Way point	Time	Shore and biotope description	Photo numbers
54.69379 N -1.17822 W to 54.69353 N -1.17835 W	10:35-11:05	A level reef of Magnesian limestone and conglomerates covered with a mixed fucoid biotope dominated by *Ascophyllum nodosum* (LR.LLR.F.Asc.FS). Occasional bare patches on larger boulders support limpets and barnacles. Shallow pools occur where there are breaks in the bedding planes (LR.FLR.Rkp.SwSed). Dominant taxa were *Ascophyllum nodosum, Vertebrata lanosa, Fucus vesiculosus, Ulva spp., Osmundea pinnatifida,* corallinaceae crusts, *Corallina spp., Chondrus crispus, Mastocarpus stellatus, Cladophora sp., Patella spp., Semibalanus balanoides, Littorina littorea, Littorina obtusata, Nucella lapillus, Steromphala cineraria, Steromphala umbilicalis, Spirobranchus sp.,* spirorbidae, and occasional *Lepidochitona cinerea.* Beneath the boulders were frequent shore-fish species, breeding, worm pipes with common blenny and five bearded rockling. Where the boulders trapped or were embedded in sediment, then both errant and sedentary polychaete worms were found with small brittle stars (*Amphipholis squamata*). Under the boulders were also found live specimens of the common hermit crab (*Pagurus bernhardus*) and a single live small squat lobster (*Galathea sp.*).	0017-0056

South Shields (South Groyne)

Way point	Time	Shore and biotope description	Photo numbers
55.00733 N -1.42688 W	12:01 – 12:20	A boulder slope at the base of the sea wall in the lower shore adjacent to a discreet sandy beach. The boulders were often embedded in the sediment and most boulders had several live shore crabs (*Carcinus maenas*) beneath them, confirming their presence on the shores of the northeast of England unaffected by the event in the autumn. The dominant taxa on the boulder shore were *Fucus serratus* and *Rhodothamniella floridula* though *F. vesiculosus* and *Chondrus crispus, Patella sp*., *Spirobranchus sp.,* spirorbidae, *Actinia equina* and *Semibalanus balanoides* were also present in this sheltered biotope (LR.LLR.F.Fserr.FS)	0057-0077

21/01/22 Low water at River Tees (Entrance),11:51 hrs, 1.30m aCD

Saltburn (Hunt Cliff)

Way point	Time	Shore and biotope description	Photo numbers
54.58755 N -0.948189 W	10:03 – 10:18	A lower shore of bedrock dotted with large boulders grading into a steeper boulder accumulation at the base of the sheer cliffs comprising the uppershore. Small shallow rockpools (LR.FLR.Rkp.SwSed) were also scattered throughout the reef. The dominant biotopes were a mosaic of *Corallina sp*. and *Osmundea pinnatifida* on exposed lower eulittoral bedrock (a regional variant of the LR.HLR.FR.Coff biotope) with *Chondrus crispus*, corallinaceae and *Sabellaria spinulosa* also present and a limpet/ barnacle biotope on the large boulders and some large areas of bedrock (LR.HLR.MusB.Sem.Sem). Here the dominant taxa include *Patella sp*, *Semibalanus balanoides*, *Littorina littorea*, *Steromphala cineraria*, *Nucella lapillus* and *Actinia equina.* No true crabs were found in either biotope, but many live common hermit crabs (*Pagurus bernhardus*) were found in the shallow rock pools and under the small boulders with spirorbidae, *Spirobranchus sp.,* anomiidae, *Sabellaria spinulosa* and *Steromphala cineraria.*	0078 - 0096

Cowbar Nab (north)

Way point	Time	Shore and biotope description	Photo numbers
54.55961 N -0.79660 W	11:12 – 11:37	Another lower shore of bedrock dotted with large boulders running for the most part up to the base of the sheer cliffs, which comprise the uppershore. Small shallow rockpools (LR.FLR.Rkp.SwSed) also scattered throughout the biotope. The dominant biotopes were a mosaic of the *Corallina sp*. and *Osmundea pinnatifida* biotope on exposed lower eulittoral bedrock (a regional variant of the LR.HLR.FR.Coff biotope) with *Chondrus crispus*, Corallinaceae, *Cladophora sp*. and *Sabellaria spinulosa* also present and a limpet/ barnacle biotope on the large boulders and some large areas of bedrock (LR.HLR.MusB.Sem.Sem). Here the dominant taxa include *Patella sp*, *Semibalanus balanoides*, *Littorina littorea*, *Nucella lapillus, Verrucaria mucosa* and *Actinia equina.* No true crabs were found in either biotope, but there were an abundance of live common hermit crabs (*Pagurus bernhardus*) found in the shallow rock pools and under the small boulders with spirorbidae, *Spirobranchus sp.,* anomiidae, *Sabellaria spinulosa Botryllus schlosseri* and *Steromphala cineraria.*	0097 - 0122

Runswick Bay (north)

Way point	Time	Shore and biotope description	Photo numbers
54.53394 N, -0.74768 W	12:05 – 12:40	A bedrock reef covered with several mosaics; in the middleshore a mixed fucoid biotope dominated by *Ascophyllum nodosum* (LR.LLR.F.Asc.FS) in sheltered locations between large boulder aggregations. Other present taxa included *Vertebrata lanosa, Fucus serratus, Fucus vesiculosus, Ulva spp., Rhodothamniella floridula, Lomentaria articulata, Osmundea pinnatifida,* corallinaceae crusts, *Corallina spp., Chondrus crispus, Mastocarpus stellatus, Cladophora sp., Patella spp., Semibalanus balanoides, Littorina littorea, Littorina obtusata, Nucella lapillus, Steromphala cineraria, Steromphala umbilicalis, Spirobranchus sp.,* spirorbidae. On the boulder tops and exposed sides, a limpet/barnacle biotope (LR.HLR.MusB.Sem.Sem). These large boulders support *Patella vulgata, Semibalanus balanoides* and sparse *Nucella lapillus* and *Littorina littorea*. Shallow pools also occur between the boulders (LR.FLR.Rkp.SwSed). Dominant taxa in the pools were corallinaceae crusts, *Corallina spp., Chondrus crispus, Polysiphonia spp., Ceramium spp., Ahnfeltia plicata, Lanice concheliga, Steromphala cineraria, Steromphala umbilicalis, Spirobranchus sp.,* spirorbidae and anomiidae. No live shore crabs or swimming crabs were found in the pools, but many live hermit crabs were found along with one live squat lobster (*Galathea sp*.) and a solitary live porcelain crab (*Pisidea longicornis*).	0123 - 0154

Summary: Having visited the six shores on the north east coast of England in quick succession on the 20th and 21st of January 2022, following the mortality event that occurred in the autumn of 2021, it appears that there has been a significant impact on the 'true crab' intertidal populations. No shore crabs or swimming crabs were recorded within the known zone of the event, whilst healthy populations were seen outside the area. Shore hermit crabs and possibly squat lobsters appear to have been less affected by the event, as their populations appear to be recovering and they were found (sometimes in good numbers) on the shores in the south of the area. From the limited observations made on these single post-event visits, it appears that the rest of the 'rocky shore' ecosystem has survived intact. For example the limpet, barnacle, periwinkle and dogwhelk populations, all keystone species, seem to have been relatively unaffected by the event, as healthy populations were recorded on all of the shores. It must be said however that the true impact of removing the shore crabs and any other taxa that were affected by the event, will only become visible once seasonal changes start to occur in the spring, as growth cycles begin amongst the animals and algae found on the shores.