Friends of the Sound of Jura response to Marine Scotland - Wild Seaweed Harvesting, West Coast of Scotland - Scoping opinion request

The Friends of the Sound of Jura represents members of coastal communities in mid-Argyll who are concerned about harm to the marine environment on which our sustainable jobs and quality of life depend. We feel that the plans of Marine Biopolymers Ltd to mechanically harvest up to 30,000 tonnes of kelp a year from 20km^2 will do irreparable damage to the marine environment and to these jobs, and we object to this method of seaweed harvesting.

Kelp forests are one of the most biologically diverse habitats in the ocean. Many other seaweeds, hydroids etc grow on the stipes and holdfasts, and many species burrow into these parts of the plant. Kelp forest offers vital shelter for other animals, in particular juvenile fish, and are of great importance as hunting grounds for seal and otters, in exactly the situations where the company states that the highest kelp densities typically occur; close to shore in water depths <20m and on hard substrates. It is illegal to disturb otters. The company is right to state that 'effects to protected species such as otter, dolphins, porpoise, whale and seals are possible due to wild seaweed harvesting' but it is naïve to state that 'To avoid impacts, embedded mitigation will also be employed in the form of seasonal restrictions to harvesting in areas used by marine mammals, including seal haul outs and breeding colonies.' These animals depend on finding food in the kelp forests in their territory all year. This is not a seasonal resource for them. How can the consequence of its loss possibly be judged by a 'desk-based assessment'? The otter map in the appendix (fig 4.4.15) is absurdly over-simplified and casts doubt on the accuracy of the other species distribution maps.

The 'predicted viable resource predictions for Coll, Tiree and Canna, show substantial overlaps with areas of vital importance to basking shark, at the heart of the proposed MPA for this species.

A recent study from Norway shows that in harvested areas there are 93% fewer young gadoids than in non-harvested areas, and correspondingly there are fewer diving birds. We do not accept the argument that small additional percentage losses of these species due to this new industry would be insignificant.

MBL refer to the habitat they want to remove as a monoculture. Only cultivated crops are monocultures. A kelp forest could not be less like a monoculture.
The stipe and holdfast are the area of the kelp that supports the most life, as the base of the plant can be up to 17 years old. Even if the fronds are removed by winter storms, the stipe often isn't. MBL say they will throw the holdfasts away. Mechanical harvesting would be the end of this richest of habitats in harvested areas.

In addition kelp sequesters carbon and protects the coast from erosion by absorbing wave energy.

Studies in Maine show that where kelp has been commercially removed, sea urchins take over and graze the area, creating 'barrens'. This is because their natural predators have gone with the kelp. These barrens appear to be permanent. Norwegian study suggests

that it takes five years for the kelp to recover to its pre-harvest density, but there is no evidence that the kelp forest's animal communities have recovered in the same period.

Harvesting method

The proposed method of harvesting *L. hyperborea* by MBL is at complete odds with the current guidelines set by SNH and with the granting of leases by Crown Estate Scotland for the wild harvesting of seaweed. Hand harvesting licenses have strict rules about where the kelp is cut, leaving the stipe and a large part of the frond. Our communities include wild seaweed harvesters.

The Crown Estate Scotland Codes of Conduct include the following:

- *'All seaweed should be cut by hand and no length to be cut below that which would inhibit re-growth'.*

- *'Sensitive methods of collection should be used, including avoidance of mechanical harvesting, avoidance of uprooting any plant, cutting heights as high as possible and only removing a proportion of the plant, ie one third.'*

- *'Sustainable quantities of biomass to be harvested in relation to standing crop biomass should be estimated, taking into account the* ***precautionary principle****'* (This is in contrast to the 'adaptive management' plan as proposed by MBL.)

- '*Community composition should be monitored to ensure no changes (above natural variation) in assemblage structure. There should also be no change in habitat structure. The potential impacts on associated species should be considered, for example, blue-rayed limpets, hydroids, bryozoans, echinoderms and particularly for any protected species that may be present. Invertebrate by-catch should be quantified and recorded'.*

- *'Coastal erosion should be considered in any method statement as some algal communities, particularly kelp forests are known to dissipate wave energy and stabilise coastlines.'*

By contrast, mechanical seaweed harvesting is a form of dredging.
The Scoping Report states that the harvesting head/dredge will be trawled at 3 knots. The weight of the head is likely to be considerable. This high speed and the 'bouncing' by the dredge on the seabed will cause immediate damage to anything in its way. MBL acknowledge that kelp does not grow on a flat substrate, but on rocks and boulders. What technology does the company have that allows their dredge to dodge obstacles? The potential for haphazard dredging is considerable.

The comparison in the scoping document of the total area harvested to the ground covered by a scallop dredger is too vague. A '*single large scallop dredger over the period of around one month'* is not a scientific comparison. There are many variables in the number of dredges that a single large scallop dredger can tow.

Loss of habitat and subsequent change to a monoculture

It is evident that mechanical harvesting of kelp has significant negative impacts on the marine environment. MBL state that a single *L. hyperborea* can support over 40 micro-invertebrate species and 8000 individuals. The proposal to pull off entire plants will also have a severe impact on the seabed's flora and fauna, which will be exposed to direct light, habitat destruction and increased risk of predation.

This change in population structure and habitat is analogous to the changes that occur when terrestrial "old forest" is converted to managed woodland. Mature trees are removed, the ground flora is homogenized, and population structure is altered to produce younger trees of uniform size. The same would happen in the removal of mature kelp plants. There would be a reduction in biodiversity and a much simplified ecosystem.

The constant removal of kelp will never allow the macrofaunal community to re-establish itself fully and the licensing of mechanical harvesting would effectively sacrifice those areas of seabed, preventing them from becoming a natural community again.

Reduction in wave dampening

MBL state that 34% of the kelp biomass is removed by natural processes such as storms. Their proposal will add to this estimated average by exposing what remains of the kelp to more wave action and further damage. Kelp forests would be less effective in their important role in wave dampening. How can MBL's 'desk-based' assessment accurately monitor the wave energy reaching the shore from intended harvesting areas?

Climate change

The climate change predictions that sea levels will rise in Scotland will significantly alter the shape of our coastline and depth distributions near to the shore, and the hydrography of the intertidal and subtidal zones. This will have an impact on the distribution and abundance of seaweed species. Seaweeds are also sensitive to temperature increase. How kelp and other seaweeds respond to a changing climate is critical in assessing the ecological viability of wild seaweed harvesting in the future.

Creel fishing

Creel fishing is integral to our community. The fishermen know that lobsters and velvet crabs, in particular, move in and out of kelp beds depending on the time of the year. They use the *L. hyperborea* for cover when they are casting their shells and berried females also seek protection within it. The Scoping study states that 'There is evidence that some crab species actively settle in macroalgae as well as mussel beds, rocky shores, and seagrass beds (Moksnes, 2002), and that nursery habitats may vary depending on local biotic and abiotic factors (Heraghty, 2013). European lobster *Homarus gammarus* and brown crab *Cancer pagurus* are known to inhabit kelp forests (Smale *et al*., 2013). Juvenile lobster and crab abundance has also been shown to be positively associated with kelp habitats (May, 2015).'

Creel fishing for lobsters and velvets takes place within kelp beds and there will be a direct conflict of interests with mechanical harvesting.

Monitoring and Surveying methods.

MBL state that the possible *'monitoring effort may be scaled up or down once the impact of harvesting is known'*.

The top 20 meters of the sea is the most diverse and dynamic part of the water column. In this ever-changing environment it will be difficult to carry out an impact assessment in just five years. If the monitoring was scaled down as well, the cumulative consequences of harvesting would be under-represented.

MBL intend to survey the kelp forests in the spring. This would not be an accurate representation of shellfish, eg lobsters, brown crabs and velvets, which will be in deeper water at that time. They move into the kelp forests after the spring, when the sea state is calmer and water temperature rises. Surveying in the spring would misrepresent the abundance of shellfish in the kelp forests.

Summary

Although the percentage of *L. hyperborea* to be harvested is small in comparison to the overall biomass, research shows that successively harvesting kelp reduces the overall size of the plant. Inevitable increases in demand and market growth would lead to the spread of a damaging, harmful practice over a greater area.

The Friends of the Sound of Jura believe that this method of mechanical harvesting would result in substantial ecological pressure on natural kelp beds and that this activity is not consistent with the Government's policies to protect biodiversity in the marine environment.

FoSoJ therefore supports research on the cultivation of kelp for harvesting, rather than damaging wild populations by mechanical harvesting. Ocean Rainforest are a successful kelp farm based in the Faeroes. They can get up to 3 harvests of kelp a year and up to 20kg per meter of kelp from their cultivation lines.
We suggest that MBL should invest in farming kelp instead. This would create more than jobs in remote communities like ours than the 42 in this proposal, all but 10 of which are in Mallaig, and would produce a higher quality product with less 'biofouling' than wild harvested kelp.