Evidence and innovation hold the key to sustainable fish-farming

Aquaculture is an important and ambitious industry in Scotland, helping underpin a successful and sustainable rural economy particularly in the Highlands and Islands. Ensuring that this vital sector operates within the capacity of our world-class coastal environment is essential and a key role for SEPA. One issue in particular, the control of sea lice, continues to prove particularly challenging, but also presents an opportunity to position Scotland at the forefront of innovation and development in marine fish-farming.

Scotland's fish-farming sector is important to a vibrant and sustainable rural economy. Ensuring it can continue to thrive, while protecting our world class coastal environment, is a vital consideration both for the industry and for SEPA as Scotland's principal environmental regulator. New evidence regarding the potential environmental impacts of treatments for sea lice has prompted SEPA and the industry to take swift action, and tap into the sector's capacity for innovation, research and development, to secure a sustainable future for Scotland's aquaculture.

Sea lice are small marine parasites which occur naturally on many species of fish, but can be a problem when large numbers of fish are concentrated in fish-farms. There are a number of methods of controlling sea lice, including the use of authorised medicines either as a bath or in-feed treatment such as Emamectin Benzoate.

The use of these treatments and the resulting release to the marine environment is regulated by SEPA, and is carefully controlled by conditions included in our fish farm licences informed by detailed modelling of the possible impacts from their use. Those conditions are set using the best available evidence, and based on the anticipated frequency and dose of treatment, with the aim of ensuring that the residues in the environment are within independently derived safe environmental standards and environmental impacts are within acceptable levels.

SEPA and the fish-farming sector carry out general monitoring of the overall health of the seabed close to individual fish farms, which shows that at a small number of fish farms residues from the use of Emamectin Benzoate are found to present at levels around or slightly above the safe environmental standard, although at this point there is little evidence of widespread breaches of the safe environmental standard across sea lochs or voes.

While previous monitoring of seabed fauna has generally not shown significant impacts on marine animals in the wider marine environment, we have become aware of anecdotal claims that sea louse treatments might be having an unexpected adverse environmental impact at this scale, resulting in less biodiversity and reductions in some crustacean populations. In response, we have undertaken a more detailed and extensive study into the health of the seabed in the Shuna Sound, area, in which there are a number of fish farms which have used in-feed sea louse treatments. This study has confirmed a more extensive spread within the marine environment of low levels of the residues arising from the use of the sea louse treatment Slice, whose active ingredient is Emamectin Benzoate, than had been expected when the medicine was first authorised or had been predicted by detailed modelling.

Since our regulatory process is based on the best available scientific evidence, we invited the Scottish Aquaculture Research Forum (SARF) to commission research to further analyse our data to determine whether there is compelling evidence of the environmental impacts suggested by the anecdotal claims. This analysis identified a subtle but detectable, and unexpected, association between impact on the marine environment and the use of Slice. The data is highly complex and the conclusions are not absolute but an association is clearly indicated.

We are also aware and are concerned that in many cases the frequency and dose of Slice treatments have regularly exceeded what was expected when the current licence framework was developed. In most cases there is no suggestion that the treatments are breaching the licences set by SEPA but it is possible that the fate and behaviour of the medicine once it has been fed to fish differs from that which was assessed when setting the safe environmental standard. The new treatment patterns may reflect the fact that the treatment is becoming less effective, probably as sea lice become more resistant to the medicine.

Where robust evidence suggests that some part of our regulatory regime is not providing the expected and required level of environmental protection, we must take action to reduce or remove the potential for those impacts. In this case, and following careful consideration, we are intending to change the way in which Slice use is permitted by conditions in fish farm licences. This will allow continued use of the medicine but subject to tighter restrictions on use. These arrangements are likely to remain in place for a period of two years allowing the sector or the company which markets Slice to carry out further research to confirm or confound the apparent link between Slice use and unexpected distribution of residues and possible environmental effects. SEPA will also be undertaking further analysis and monitoring work during this period. If during the next two years no compelling case is made to support the continued use of the product, it is likely that the ability to use Slice will be phased out completely.

We have informed fish farm operators of SEPA's position that, unless we see new and compelling evidence to support continued use, the ability to use Slice is likely to be phased out in 2018. We are also working in partnership with the Industry, the Scottish Government, the Scottish Aquaculture Innovation Centre and other key partners, to explore the potential for the development of alternative means of controlling sea lice, which minimise the risk to our marine environment. The challenge of controlling sea lice in fish farms is not unique to Scotland, and the research and development of these alternative means represents a significant opportunity for Scotland to establish itself as a leader in the field, and could benefit both the aquaculture sector and Scotland's wider economy in the long run.

A new computer model, created by researchers at the Scottish Association for Marine Science (SAMS), with support from the Scottish Government and SEPA, will become a key tool in the future regulation of fish farms. This model will be available for use in applying for fish farm licences later this year and will enable a better understanding of how discharges from fish farms affect the seabed. NewDEPOMOD will replace the current AutoDEPOMOD model, which has been in use since 1999. SEPA recently launched a new survey vessel, , designed specifically to enhance our capability to monitor the environmental impacts of marine fish farms.

SEPA's statutory purpose is to protect and improve the environment, where possible in ways which contribute to health and well-being and sustainable economic growth. Our approach to working with Scotland's aquaculture industry to help turn this environmental challenge into

an opportunity to ensure a thriving and sustainable fish-farming sector is just one example of us putting this purpose into practice.

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