

Friends of the Sound of Jura
Tayvallich
Argyll

Our Ref: AA/SB/030818
Your Ref:

If telephoning ask for:
Anne Anderson

2 August 2018

Dear John

Thank you for your patience and understanding of the significant competing demands which the Aquaculture team have been under to conclude our next stage and address ongoing regulatory work, I appreciate that this response to your letter dated 20 April 2018 has taken longer than would normally be expected. In the following I have not addressed each the individual questions that you have posed; as I have previously explained, this is mainly due to the larger portion of your questions relating to areas of policy which remain under development. Notwithstanding this, I hope that I am able to provide you with answers to some of your questions and a helpful update on the wider issues where SEPA is currently in the process of developing its position. I remain keen to meet up again to discuss these matters further if you feel that this would be helpful.

Regarding our regulatory approach, fish farms and other types of discharge are similar in that there is an area around the discharge point where SEPA expects that some environmental standards will be breached, in the case of land based facilities discharging through a pipe to the sea the same approach applies to fish farms as to other point source discharges. SEPA places limits on the scale and intensity of the impacts in this area to ensure that the area where standards are breached is not too large nor intensive. Marine cage fish farm discharges differ from other sectors in that the discharge point is not a discrete point in the environment but a release from a wide area and, the components of the effluent are not buoyant but tend to sink to the seabed, as such they have required a different approach to controlling emissions as is demonstrated through our licence conditions to control these. Most "end-of-pipe" effluents are buoyant and tend to rise from a discharge point on the seabed.

There are many sectors with multiple discharge locations around the country where there is some impact on the water environment and where measures such as ITI will show a degree of environmental degradation. There is no other single sector making discharges to the water environment which will have a same total cumulative extent of impacts as fish farms, though there are other industries that are not regulated by SEPA such as fishing with mobile gear where the impacts will likely be more extensive, if perhaps less intense.

Modelling

Fish farm impacts have in the past been modelled using the DEPOMOD modelling package but SEPA is moving towards a position where by default, in addition to DEPOMOD modelling a hydrodynamic modelling approach will be required to accompany applications for permits for marine cage fish farms. The discharges from other sectors will sometimes be modelled using this latter type of approach but not in all cases, it is dependent on the scale of the discharges involved. .

As you are aware, previous modelling of discharges from aquaculture sites has focussed on the AutoDepomod and BathAuto models. As acknowledged during our meeting, these models are relatively crude and include a number of simplifications, approximations and omissions in relation to the physical systems that they attempt to represent. And as with any modelling, the usefulness of the model depends on understanding the model structure and limitations and interpreting any outputs appropriately. These models have been used within a regulatory framework which has sought to identify risks to the environment and to apply appropriate policy responses. The models should not, therefore be judged in isolation in terms of their simplifications or comparisons with sparse observational data, but instead on the extent to which the environment has been afforded adequate protection.

AutoDepomod sets biomass in relation to predicted intensity of under cage seabed impacts. When a site fails its ecological compliance criteria at cage edge locations it is therefore an indication that the modelling may not have been sufficiently conservative to afford the correct level of protection to the most intensely impacted areas of the seabed. In the past 3 years, of 337 benthic surveys undertaken at peak biomass levels, 97 were considered unsatisfactory, of which 16 were because of failing intensity standards next to the cages. As a percentage of all farms surveyed in this period, this therefore translates to 5% of farms failing their cage edge standards. This is the figure which measures how well AutoDepomod (and the surrounding regulatory framework) has done in conservatively limiting biomass to safe levels. We would prefer this value to be 0% but a 95% success rate for the sustainable biomass estimates is not considered to represent a badly failing policy. Other breaches of seabed ecological compliance criteria do not indicate that the modelling has been insufficiently conservative but are instead related to other challenges that are under review as part of the DZR consultation and subsequent developments.

Material that has been predicted to leave the local area represented by the AutoDepomod domain, such as in the case of Emamectin Benzoate, has been dealt with in the past in the case through the limitation of licence quantity in the situation where “exported” quantities exceed a risk threshold. Discharges of organic solids have not historically been limited due to “export” considerations and this was acknowledged to be a recognised regulatory challenge during our meeting. SEPA is currently developing waterbody scale environmental standards in order to deal with larger scale dispersion of discharges and cumulative impacts from multiple discharges.

As discussed previously, SEPA has drafted new modelling guidance for the aquaculture industry. The objectives of this new guidance are to improve the level of information required to determine licence applications and to provide consistency with how SEPA deals with other industrial sectors. A number of significant changes are presented in this guidance. For example, aquaculture operators will be expected to use a variety of modelling approaches to address risks that are specifically identified in each individual case. It is proposed that these will be agreed via the use of a Modelling Method Statement, submitted and agreed with SEPA prior to any application being made. In some cases, this will involve the use of hydrodynamic modelling, typically to address risks that are perceived to the wider environment – i.e. beyond the scope of non-hydrodynamic models.

Hydrodynamic modelling is used routinely to model some other types of industrial discharges. However, not all non-aquaculture discharges are modelled in this way. The level and type of modelling of industrial discharges depends on levels of risk, scales of dispersion and other idiosyncrasies of each particular case. In some cases, simpler models, such as initial dilution models, suffice to risk assess industrial discharges. In the aquaculture sector, simpler models have been exclusively used in the past but are starting to become augmented with hydrodynamic modelling, in line with the draft new modelling guidance issued to the sector. It is not a routine practice in any sector affecting the marine environment to model many different forms of pollution from multiple discharges to understand cumulative impacts.

This may change in the future as water body scale environmental impacts are considered within a developing new policy framework.

An emphasis has been made, in the draft new modelling guidance, on the modelling principles of calibration and validation. This modelling approach enables models to be contextualised and anchored with observational data and thereby measures and increases the confidence with which model outputs can be interpreted. The process of validation, whereby model results are compared with observations, establishes the demonstrable accuracy of a model and represents basis upon which a particular configuration of the model can be justified. These principles are consistent with modelling standards and expectations used in the regulation of other sectors.

Another notable change in the draft new modelling guidance is the requirement for 90 days of flow data in order to drive NewDepomod simulations. This compares with the 15 days of flow data which have been required historically, and enables simulation to represent flow conditions at each site with greater confidence, including variability through time and the inclusion of extreme weather events. The 90 day threshold was based on detailed analysis on representability contained within the Scottish Government Technical Standard publication for the aquaculture sector.

Cumulative Impacts

Under the pollution control regime that existed before the Water Environment (Controlled Activities) (Scotland) Regulations (CAR), it was not possible for SEPA to consider the cumulative effect of discharges at a waterbody scale in the marine environment. To address the risk that several fish farms within a waterbody may lead to excessive nutrient discharges and benthic effects the Locational Guidelines were developed by the Scottish Government. SEPA agreed to adopt this system as a means of considering the potential for cumulative impacts and retains this position. SEPA is now developing a new approach to the consideration of cumulative impacts at the waterbody scale.

Medicines/Chemicals

Certain industrial discharges from other sectors may contain substances which would have a biocidal effect but the concentration of these is generally strictly limited by licence conditions to ensure any impact is limited to a zone around the point of discharge. Fish farm discharges are also limited by licence conditions, accepting that an area around the farm may be affected by these discharges. The approach used by SEPA accepts that the zone where impacts may occur from fish farm discharges is generally very much larger than from discharges made from other industrial sectors. SEPA intends in the future to move to a scenario where the residues of biocides will require to be treated before discharge.

The EMB options paper quoted discusses a number of options in connection with sea louse medicine management. A review of the environmental standards for Slice is being undertaken by the United Kingdom Technical Advisory Group (UKTAG) and SEPA expects to be given Directions from the Scottish Government on the environmental standards to apply once this review has been concluded. It is possible that further reviews will be undertaken and we are currently developing our approach to require the treatment of residues from the use of medicines before these are allowed to be discharged.

You have posed a number of questions relating to emamectin benzoate and SEPA's approach to the licensing of its use and discharge following treatment of fish for sea lice infestations. SEPA's interim position in relation to emamectin benzoate applies to all relevant protected areas, including MPAs and to all applications which propose a new or increased discharge of emamectin benzoate. Existing sites will be re-assessed once the outcome of the UKTAG review has been concluded and if SEPA receives Direction from the Scottish Government changing the environmental standards.

The development of environmental quality standards is an approach that has a degree of precaution built in, further precaution can be incorporated into the way that such standards are applied. In due course as more evidence becomes available, such standards may require to be revised, during any such revision, an appropriate degree of precaution will be applied to the new standards. European guidance exists explaining how the derivation of standards should be carried out.

SEPA does not collect or produce data on crustacean fisheries or on the stocks that are pursued by fishermen. SEPA has been aware either through direct reports or through information provided indirectly - for example in media stories of a possible change in crustacean abundance which may have been anecdotally linked to the use of sea louse medicines such as emamectin benzoate.

Monitoring

Concerning monitoring methods and as discussed in the text above your question 3.6, it is very difficult to sample large seabed dwelling creatures in a scientifically representative way without having to trawl over large areas of seabed which may in itself be damaging. If a substance is likely to impact upon these commercially important crustaceans then it is also likely to have an impact upon a range of other non-commercial species, sampling in a way that is designed to determine the presence or absence and the abundance of other species of crustacean will provide data from which it is possible to infer the likelihood of an impact on commercial species. Some monitoring of species such as Nephrops can be undertaken in a qualitative way, for example by video surveys but these will only provide an indication of the presence of the animals, for example by the fact that Nephrops burrows may, or may not be present. In such surveys, it is often not possible to be certain whether the Nephrops burrows are occupied meaning that they are merely indicative rather than authoritative studies.

It is very rare for large commercial species to be found in seabed samples. This is for a variety of reasons, not least because they are by their very nature not particularly abundant anywhere in the environment and the sampling techniques used will be unlikely to lead to them being caught in a grab. As discussed above however, this does not in itself mean that data on the smaller crustacean species which are sampled cannot be used to determine the health of crustacean species in general, including the health of populations of commercial animals.

Our survey in Shetland last year was designed to assess the effect of medicine residues upon crustacean diversity and abundance although not specifically commercial species, for the reasons discussed above.

Monitoring to examine the impacts of sea louse medicine residues is not limited to waterbodies where hydrodynamic modelling has been undertaken although there are clear advantages in undertaking studies in such waterbodies where the modelling outputs can help drive sampling strategies.

The majority of seabed monitoring surveys are self-reported by industry, SEPA undertakes a small number of more comprehensive, targeted surveys during each year such as the Shetland survey referred to above and previous work in Shuna Sound. These aiming to answer specific questions regarding the environmental impact of fish farming. We may also on occasion undertake compliance related surveys at specific sites.

SEPA requires that the laboratory work associated with samples taken by operators, for assessing the quality of the environment in the vicinity of a fish farm is undertaken by professionals with a suitable framework of Analytical Quality Control such as the National Marine Biological Analytical Quality Control Scheme (NMBAQC), members of such schemes will be able to provide evidence of membership and an assurance that they are competent to provide quality data within survey reports to SEPA.

It is possible that fish farm surveys could be undertaken at locations other than those required by the CAR licence for a given farm site. Before a farm is established however, pre-development survey work is undertaken and SEPA can build an understanding of the nature of the site and the seabed at a given location. If samples are taken in a different place it is likely that the nature of the sediment and other characteristics of the seabed may be at odds with what SEPA has previously seen at that farm location. SEPA has no evidence to suggest that this has occurred and the frequency of seabed surveys being classified as unsatisfactory would indicate that this is unlikely to be the case.

A new framework for monitoring the environment around fish farms is in discussion and development in SEPA. It is likely that this will include a substantial increase in the number of transects and sampling stations to allow SEPA to get a clearer picture of impacts from both medicine residues and fish farm waste on the seabed in the vicinity of farms.

Compliance

Regarding compliance with environmental permits, SEPA views this to be non-negotiable and agrees that the current level of non-compliance in the finfish sector is not acceptable. We are working to improve compliance across the sector and with all companies involved to drive up the compliance rate. There is not really a means to compare terrestrial farms and fish farm. Terrestrial farms are not permitted to discharge waste directly to the water environment and their day-to-day activities are either not directly regulated or assessed by SEPA, or are covered under General Binding Rules (GBR) rather than requiring licences, meaning that there is no "compliance score" for such farms. SEPA does assess many farm premises for compliance with GBR each year but these are not included in our compliance figures as they do not relate to licence compliance.

A breach of seabed quality standards such that a seabed survey is classified as "Unsatisfactory" will generally lead to a farm being classed as Poor or Very Poor in CAS. Breaches of the EQS for emamectin benzoate have a lesser effect on the compliance score where the degree of breach is between 2 and 10 times. Breaches of 10 times the EQS will generally lead to a Poor score in CAS. Details of how compliance is assessed are set out in our [CAS manual](#) which also has a specific annex relating to [cage fish farms](#).

The modelling used in connection with licensing marine cage fish farms determines two things, the estimated sustainable biomass for a given location and a footprint limiting the spatial extent of impacts and defining where compliance with environmental standards should occur. Where breaches of seabed standards occur these may be as a result of a wide range of factors including those which you highlight as well as the predicted footprint being at odds with how deposition actually occurs on the ground or other issues such as management of feeding by the farm operator.

SEPA has a wide range of enforcement powers available to deal with situations where operators fail to comply with conditions in permits or where environmental standards are breached. The approach taken by SEPA to deal with breaches of environmental standards has been to invoke a reduction in the authorised biomass with subsequent reductions if these are required. No marine cage fish farm licences have been revoked by SEPA for persistent breach of licence terms and there have not been any successful prosecutions of marine cage fish farm operators for non-compliance with licence conditions in the recent past.

SEPA has taken enforcement action against sites which fail to meet environmental standards by reducing the authorised biomass or the conditions relating to the use of medicines at such sites. This approach has been challenged at appeal when the arguments posed in your question were made by the fish farm operator. SEPA's stance at the time of that appeal was that it did not in itself matter how accurate the biomass or AZE prediction was, what mattered was that in accepting a CAR licence with a

certain set of conditions it was the operator's responsibility to ensure compliance with those conditions. SEPA's view was supported in the ultimate determination of the appeal.

The validity of evidence of different types within the setting of a report to the Procurator Fiscal is a complex area however, in any case within the various frameworks of environmental legislation which SEPA regulates, if environmental evidence is important in the case, SEPA would normally seek to collect our own evidence from environmental or monitoring surveys and include this as part of the submission which we would make to the Procurator Fiscal.

Site visits to the cages at a fish farm are not really a means of assessing the biomass at a fish farm but allow an inspecting officer to get a feel for how the site is run and also to look for other pertinent issues such as the presence of non-medicinal means of sea louse treatment for example, lumpfish in the cages and the presence of louse skirts. The primary means of assessing biomass depends on records held by the fish farmer and returns submitted to SEPA, this is supplemented by the more detailed audit of records which can be obtained from a number of different sources.

For medicinal treatments, it is possible for SEPA to be present during the treatment event to assess how the treatment is carried out but in the majority of cases SEPA will depend on the returns from fish farmers and examining other documentation held by fish farm operators and their contractors. In-depth audits are also carried out to check that the records kept and provided by operators are accurate. SEPA would not agree with your statement that there are "soaring quantities of chemicals found on the seabed".

It is not unusual for farms which have a poor compliance record to have an increase in biomass granted if for example that change in the permitted biomass is associated with change in the configuration of the farm that may lead to a predicted reduction in overall impacts. This might be predicted if for example a revised cage configuration leads to a more dispersed release of effluent.

Future work

SEPA is currently finalising its consideration of the consultation on Depositional Zone Regulation which will cover a number of the issues that you have raised such as the possibility of licensing sites of 3500 tonnes and the resourcing of monitoring work.

As you are aware [Sector planning](#) is our new approach to how we work with different industries. It enables us to consider an industry's whole environmental footprint. Each plan will set out the steps we will take, and those we expect the sector to take, to secure [One Planet Prosperity](#), our regulatory strategy for protecting and improving the environment in ways that, as far as possible, also deliver social and economic success. Our first sector plans were published in March for the landfill sector; whisky sector; and the metals sector.

The plan for fin fish farming is currently under development and the current timeline would indicate an October/November period for public consultation. This plan will describe how we will:

- (a) protect the environment and biodiversity by ensuring fish production is matched to environmental capacity;
- (b) encourage the capture and beneficial use of organic wastes, where appropriate;
- (c) reduce medicine releases into the environment;
- (d) strengthen the evidence base; and
- (e) support action to protect wild fish.

The actions will include:

- (a) increasing the quality and quantity of environmental evidence that fish farm businesses must provide when applying to us for authorisation;
- (b) the use of strengthened scientific modelling techniques to assess the capacity of the environment to sustainably accommodate farm developments;
- (c) strict, clear and simple licence conditions to ensure fish farm business are in no doubt about what is expected of them;
- (d) enhanced monitoring and auditing of the environmental performance of farms;
- (e) improved coordination with other regulators; and
- (f) on-going engagement with industry leaders to support and encourage innovation in sustainable fish production.

I trust that I have been able to provide you with some clarity on SEPA's position in relation to some of the matters which you have raised. As previously agreed I am happy to meet up again during the period of consultation of the Sector Plan with you and other community representatives to discuss these matters further if you feel that this would be helpful. I would suggest that we identify a potential date, venue and attendees jointly over this next month to ensure advance notification such that we maximise our day.

Yours sincerely

A handwritten signature in black ink that reads "Anne Anderson". The signature is written in a cursive, flowing style.

Anne Anderson
Chief Officer, Compliance and Beyond

