RURAL ECONOMY AND CONNECTIVITY COMMITTEE
SALMON FARMING IN SCOTLAND
SUBMISSION FROM The Friends of the Sound of Jura

This subject is important, complex and multifaceted. We have tried hard to be concise and apologise for not managing to fit our comments onto 4 A4 sheets.

The Friends of the Sound of Jura is a community organisation based in mid-Argyll. In our area every job matters. We are not against salmon farming in principle, but on the west coast, aquaculture directly employs far fewer people than those whose jobs depend on the health of the sea.
The environmental impacts of salmon farming, as practiced currently, threaten many of our existing long-term, sustainable jobs: in the crustacean fishery, shellfish diving, seaweed harvesting, angling for wild sea trout, salmon and flapper skate, and in wildlife & landscape tourism - the primary reasons given by visitors for visiting Argyll. Many people also come to enjoy watersports.
Our quality of life also depends on the health of the sea, but the SPICe-commissioned SAMS report shows that waste and chemicals from the industrial scale farming of salmon in open-cages are polluting the water and harming seabed animals.
One pesticide, emamectin benzoate, is associated with a significant decline of crustaceans very far from farms, according to the SARF098 'PAMP2' report[1].
The SPICe/SAMS report shows that populations of wild salmon and sea trout are being harmed by sea lice from farmed fish and by huge numbers of escaped fish. It also shows that unsustainable numbers of wrasse are caught in the wild, as cleaner fish (they are all killed afterwards), that seals are being shot and cetaceans displaced by acoustic seal scarers.
These are all consequences of farming fish in open cages - an unsustainable method. In addition, the SAMS report shows that expanding the industry is likely to require unsustainable fisheries, such as krill, to produce Omega3 oils for salmon feed.
Aquaculture should not seek to expand until it has solved these problems.

The justification for this expansion is the industry's over-optimistic *Aquaculture Growth to 2030* report, which says: *'The farming of Scotland's seas contribute over £1.8 billion annually to the Scottish economy'; a* figure often quoted uncritically, as are the number of jobs to be created and the extra income to Scotland resulting from doubling aquaculture production.

The HIE's *Value of Aquaculture to Scotland* report[21] says that, because of *'the predominantly overseas ownership of Scotland's salmon producers', '…subsequent profits do not generally accrue to Scotland residents'.*
means that Scotland's economy mainly benefits from corporation tax and VAT, and from the companies' spending here.
The HIE report goes on to say that the basis used for working out the economic impacts in *'Aquaculture Growth to 2030*',

> *'… is an estimate of gross output across the value chain of the sector, and not a meaningful measure of net economic impact...'*

The same report says that even HIE's preferred (and much lower) measure, GVA, overestimates net economic impact, because**:**

'With international ownership of the main companies, GVA is arguably not as useful an impact measure as earnings from employment and self-employment …'

and goes on to point out that *'…earnings include money paid to migrant workers (particularly in processing) that will to an extent be spent in their home country.'*

According to the report's figures, a significant amount of the GVA 'benefit' are due to the industry buying high volumes of pesticide to treat sea lice. The SSPO's figures show that 30% of £55m (ie £16.5m), was spent on chemical treatments in 2016. The use of so much pesticide is counted as a positive thing in the economic analysis!

Aquaculture Growth to 2030 says the industry could support 18,000 jobs by 2030[25]. In 2016, only 294 people worked in salmon smolt production and 1,486 in fish production[24]. The majority of jobs in finfish aquaculture are in processing, which mostly happens near population centres, sometimes in England. To reach 18,000 jobs, the direct job total has been inflated by an estimated number of indirect jobs, then inflated again by 19%, to cover 'induced employment' in trades utterly unrelated to fish farming, then inflated by 50% (see below). In rural economies like ours, direct employment in fish farming and its indirect jobs are dwarfed by the number of existing sustainable jobs, a total that could also be inflated to include induced employment. Many of these jobs could co-exist with aquaculture if it were not harmful to the environment.

The industry promotes the idea that if salmon production doubled by 2030, full time equivalent, direct, indirect and induced jobs would rise by about 50%, but the HIE report's *'PROSPECTS TO 2030'* section, calls this 'highly optimistic'. HIE's own scenario forecasts only a 20% gain in GVA, jobs and employment returns. Just a fifth of direct and indirect aquaculture jobs are on or near the farms[22], so the gain would be smallest in those areas where the entire environmental impact falls, threatening pre-existing businesses there.

The HIE report also points out that the high cost of expanding farms offshore, *'possibly up to 4,000-6,000 tonnes per site'*, under SEPA's new DZR scheme, will require economies of scale, resulting in substantially fewer jobs per farm:

'…producing twice as much salmon in the average year from a new site than from an existing site would require much lower than proportionate site staffing (with automatic feeding), and also with logistical economies in feed supply and transportation from sites for harvesting,'

Creel fishing for crustaceans is one pre-existing, sustainable business that is vital to our community and to many others on the west coast, in the Outer Hebrides and the Northern Isles. In 2016, the total creel landings for Scotland (uninflated by economic multipliers) were worth £49.7m23. The west coast and Northern Isles had 870 creel fishing boats. On the west coast alone they provided 296 direct FTE jobs. Applying the Type1 30% multiplier used by government to estimate the indirect jobs in the fishing sector adds 89 FTE jobs. Including aquaculture's 19% multiplier for induced impact gives a total of 458 FTE west coast jobs. The equivalent in the Northern Isles/Outer Hebrides would approach 400 FTE jobs.

The SAMS report shows that parasitic sea lice are evolving resistance to chemicals. In response, salmon farms have been applying very high levels of pesticides, which can harm and kill other crustaceans, including commercial species. One of these, emamectin benzoate (EMB), is fed to the farmed fish. Once excreted, it breaks down so slowly that it can remain active on the seabed for more than four years.

The 'PAMP 2' study *(SARF098)*[1] found a correlation between the use of EMB and a c. 60% decline in crustaceans, at sea loch scales and at levels too low to be detected by SEPA's standard monitoring.

SEPA produced an *EMB Response Options*[2] paper, which makes it clear that the agency had not been routinely analysing its monitoring data on EMB use/ abundance and diversity of animals on the seabed, to spot large scale harm:

> *'To date effects such as those described in SARF098 have not been evident, indeed … the original PAMP report demonstrated no detectable effects from the use of these medicines.* ***In part though this is down to our not having been in a position to undertake analysis of the data that we hold and this could be seen as a significant failing on our part, especially in the light of anecdotal claims of impacts on crustacean fisheries.'***

There are indeed widespread reports from creel fishermen in Scotland as well as in Norway that their crustacean catches are declining in fish farming areas. Despite this, SEPA's environmental monitoring does not include the regular sampling of commercial species and it seems that no studies have been conducted to specifically assess this risk. Why is this?

SEPA's Response Options' report also states that,

> *'…the waters in which salmon farming is practiced are usually the same waters in which Scotland's valuable crustacean fisheries are located…it is not tenable for SEPA to adopt a position where commercial shellfish species are impacted by the day-to-day activities of fish farms, activities which SEPA will have knowingly authorised under CAR… SARF098 reveals that there is a significant risk of failure to provide such protection.'*

SEPA's aquaculture specialist recommended banning EMB, which became the agency's policy until the ban was shelved just before its public announcement, after industry lobbying, according to the *Herald*[3].
Small wonder then, that public confidence in the independence of the industry's regulator has been eroded.

SEPA has since issued a lower interim Environmental Quality Standard (EQS) for EMB, but applies it only to licences for <u>new</u> fish farms in a limited number of protected areas, and not to the expansion of existing farms there.
The EQS remains unchanged outside MPAs, pending an ongoing review.
The PAMP2 results show that it is not safe to assume that no harm is being done by the EMB used by existing farms, including those inside MPAs.

As a consenting agency as well as the Scottish regulator of pollution and the enforcer of compliance with fish farm licence terms, SEPA has a key role in controlling aquaculture's impacts and its future expansion.
In Mr A'Hearn's 28th March letter to ECCLRC convener, Mr Dey[4], he states that during 2015-17, surveys of Scotland's 224 active salmon farms revealed 129 breaches of SEPA's seabed impact standards. Although the biomass of

fish was reduced at 42 farms, 20% have yet to show sufficient improvement, while another 33% have yet to report. Nor is it clear whether the seabed has recovered at the farms where biomass was not reduced.

All these licence term breaches happened at farms where SEPA had set the biomass of farmed fish at supposedly safe levels.
They may have been due to errors, the over-use of chemicals to treat high levels of sea lice or disease, deliberate overstocking with fish or the failure of SEPA's modelling to predict accurately the impact of waste and chemicals on the seabed. None of these are acceptable reasons and they make us question how well SEPA is able to predict the environmental impact of fish farm waste or to enforce compliance.
There needs to be an urgent independent review of how SEPA makes these assessments, how its modelling results are interpreted and how many existing farms have been granted licences to hold unsafe biomass of fish.

SEPA is also responsible for compliance but, despite many hundreds of breaches of licence terms, the agency has never revoked any aquaculture licences, nor does it seem to have successfully prosecuted any persistent offenders. Nor has FHI.
Environmental harm is more likely to occur if there are no real sanctions for companies that break the rules. SEPA and FHI must properly police their rules and always penalise the companies that breach them.

The regulators must also stop relying on the industry to supply data voluntarily, on the harm that its operations do to the environment. This is a clear conflict of interests and the ECCLR is right to say that:

> *'The current consenting and regulatory framework, including the approach to sanctions and enforcement, is inadequate to address the environmental issues. The Committee is not convinced the sector is being regulated sufficiently, or regulated sufficiently effectively. This needs to be addressed urgently because further expansion must be on an environmentally sustainable basis.'*

SEPA hopes to improve the accuracy of its modelling of fish farm waste deposition by using a new computer model, but the developers of this 'NewDepomod' list among its goals[5], *'supporting industry expansion'*.
This does not inspire public confidence in the regulator's independence.

SEPA regulates fish farm waste differently to pollution from other industries. Despite the government's 'polluter pays' policy, aquaculture is the only polluter allowed to discharge its untreated waste in the sea for free. Nor does it use best environmental practice to avoid doing so.

Mr A'Hearn's letter to Mr Dey[4] shows that, unlike human sewage ('urban waste water'), aquaculture's effluent is allowed to kill or harm most life on the seabed inside an Allowable Zone of Effect, associated with each farm (typically around 75,000m^2 per 2500 tonne farm).

Regarding toxic chemical discharges, SEPA's *EMB Response Options* paper states that: *'Fish farming is unique in that it is a sector which is allowed to discharge substantial quantities of biocides…*'

In addition, rather than using industry-standard hydrodynamic modelling to predict particulate pollution dispersion from its point-source (effectively end-of-pipe) locations, SEPA uses its own smaller scale depositional model.

SEPA acknowledges that this AutoDepomod model under-estimates how much waste will reach and affect the seabed far from fish farms. It also ignores the sometimes large amounts of effluent predicted to leave its limited modelled area. At one proposed fish farm site in the Sound of Jura (Dounie), the AutoDepomod model predicted that 99% of particulate waste, mainly insoluble faeces and emamectin, would be ignored for this reason. SEPA assumes that this waste is dispersed and diluted to oblivion, but the agency's recent trials of hydrodynamic modelling, at Shuna and Fetlar, show that it actually accumulates on the seabed elsewhere, sometimes in combination with waste from other farms. Neither Auto or NewDepomod can account for the wide-scale and cumulative impact of waste from multiple farms, so this is currently ignored by SEPA's consenting process.

NewDepomod has not been peer-reviewed, so its many assumptions on how the sea will transport, deposit & re-suspend waste are opaque to outsiders. Astonishingly SEPA admit (FOI[8]) that its developers have not told them of any limitations. NewDepomod's assumptions and limitations should be published for independent scrutiny before it is used to issue pollution licences.

SEPA should also explain why Marine Harvest has already used NewDepomod to support a planning application for a 3500 tonne farm[9] near Shuna (40% larger than the previous allowable maximum) and for a CAR licence for 3500t farm at Muck, before the new model and the proposed new DZR licensing system for such large farms have been scrutinised or approved by Parliament, and while the industry's wider impacts are still largely unknown.

The SAMS report shows that there is no information on the sensitivity of Scottish marine species to aquaculture's waste and chemicals, especially in combination, cumulatively and at low levels over wide scales. There is also significant uncertainty about the whereabouts of Priority Marine Features. Public data, analysed by NTS in February 2018[6], show that 32% of active salmon farms are within protected areas, yet, astonishingly, SEPA says it has no information on whether existing fish farms are harming marine life, eg maerl, inside MPAs[7]. SNH told the RECC hearing on 18th April that they avoid fish farms when monitoring the condition of MPAs, as the results would not be typical. This reflects the high likelihood that fish farms degrade some MPAs.

Many Priority Marine Feature species are mobile, which means they may not spend their whole lives inside protected areas. This does not mean that they can escape aquaculture's impacts by swimming away – they may live in the only place suitable for them, or have to migrate past salmon farms: wild salmonid migration routes are little understood, for instance.
With good reason the ECCLRC concluded that:

> *'There are significant gaps in knowledge, data, monitoring and research around the adverse risk the sector poses to ecosystem functions, their resilience and the supply of ecosystem services. Further information is necessary in order to set realistic targets for the*

industry that fall within environmental limits.'

These environmental limits must be known before the industry expands. SEPA's policy of allowing most seabed animals to be killed inside each farm's Allowable Zone of Effect is gross pollution, however you look at it. So is allowing 99% of waste and pesticide to leave a predictive model, unaccounted for. The justification given for harming most life in the AZE is that the seabed will recover within a few years if the farm is removed - but some seabed organisms are much more sensitive to pollution than others and they may never fully recover, eg maerl. Very few farms are ever removed, and now the industry wants to double in capacity by 2030, making this even less likely.

Fundamentally, SEPA's approach to licensing fish farm pollution takes no account of how much waste and biocidal chemicals can be absorbed by Scotland's marine ecosystem before it suffers permanent harm. This capacity is not known, but it should be.

SEPA's current consenting and modeling regime is not the 'cohesive framework' that the ECCLR Committee's report calls for. We agree with the committee that this expansion,

'does not take into account the capacity of the environment to farm that quantity of salmon'

We also agree with the ECCLRC that:

'*If the current issues are not addressed this expansion will be unsustainable and may cause irrecoverable damage to the environment',*

and that an independent assessment of the environmental sustainability of the predicted growth of the sector is essential and needed now.

A sign of the depth of these problems is that ten million Scottish farmed salmon died prematurely in 2016. During the ECCLRC hearing, the FHI agreed that it is unacceptable for the industry to expand while harmful algal blooms (HABs), disease, sea lice and their chemical and physical treatments are killing a quarter of its stock.

In 2016 HABs caused an ecological and economic catastrophe in Chile's aquaculture region[14], while smaller blooms have also closed valuable Scottish shell-fisheries temporarily. Climate change makes HABs more likely. The SAMS report and its authors' hearing suggest that HABs are purely natural events, triggered by changes in dissolved nutrients far offshore, but the report also states that 5-10% of the dissolved nitrogen in the Minch is already derived from salmon farming, and (*Heath et al* (2002)), that nutrient inputs from aquaculture in parts of the west coast contributes more than 80% of land-derived inputs. According to the SAMS report just the solid nutrient inputs from aquaculture will reach 500,000 tonnes by 2030 (more than the untreated sewage of half of Scotland's people), while its dissolved nutrients[15] already total twice that much and will have doubled by 2030. There seems to us to be a significant risk, coupled to warming seas, that these nutrients will increase the occurrence of HABs, with dire economic and ecological consequences. Is this risk being studied and assessed as thoroughly as it should be?

The aquaculture industry wants to double in size in a little over a decade,

before solving these unprecedented problems, yet the repercussions of much larger farms would be dire, for wild salmonids alone, as sea louse numbers are a direct consequence of the number of fish, multiplied by the number of gravid female lice per fish.
SEPA's argument for allowing such large farms is that they will be sited in high-energy sites, where tidal currents are supposed to be able to disperse thousands of tonnes of waste per year. SEPA assumes that all sites of this type would be far offshore, away from coastal communities, sensitive seabed animals, sea lice and wild salmonids, yet the HIE report says,

> *'From our consultations, producers' focus pre-2025 is on **near-shore**, more exposed sites in less sheltered lochs or further off mainland Scotland into the Outer Isles than current seawater sites.'*

These near-shore sites include the Sound of Jura, Shuna and many others that are convenient for fish farm operators, but these mega-farms would be directly in the path of migrating wild salmon and in the year-round habitat of sea trout, both of which, as the SAMS report shows, are profoundly affected by sea lice from fish farms. The west coast populations of both of these Scottish Government Priority Marine Feature species are falling faster than their populations elsewhere in Scotland; a direct, population-level effect of the west coast's fish farms, according to the SAMs report and an independent review of the science, produced by NINA[10].

SEPA's biodiversity responsibilities include wild salmonids. Only SEPA has the existing power to vary a farm's licensed biomass, yet it refuses to do so to control sea lice numbers to protect wild salmonids, saying that Marine Scotland and the local authorities are better suited to this role. However, Marine Scotland (FHI) is only responsible for farmed fish health, while A&B Council's written evidence to ECCLR[11] shows that local authorities are largely unable to limit the impact of multiple farms on wild salmonids by using Environmental Management Plans because EMPs, *'… cannot influence the management of other sites in the same farm management area...'*

New, large farm applications usually require Environmental Impact Assessment, but EIAs often do not apply to expanding biomass at existing farms. A&B Council added[12] that the planning system often cannot address the cumulative effect of multiple farms in these & some other cases, because,

> *'… **there is no express requirement for the applicant to provide cumulative information**… It is clearly appropriate to ask an operator of a suite of farms to address their response to a condition in the light of those farms which they operate which could reasonably be expected to present cumulative issues, but **it is less practical to ask them to address issues arising from farms in the control of others, where their access to information will not be the same.'***

> …adding that Environmental Management Plans *'…**are not an appropriate means to provide an area wide response to the overall impact of sea lice'***

> and that, *'many pre-existing sites (are) operating without EMP's, and without any prospect of such unless an application should be made to alter a farm in the future'. 'EMP's are resorted to by Planning Authorities **given the lack of an overall area based approach to wild fish interests founded around cumulative impacts'** '…providing a somewhat random and ad hoc response to an issue which is ongoing…'*

'They are in effect a sticking plaster, not a systematic means of assuring well-being in the wider environment.'

In addition, local authorities have no remit to inspect farms for fish biomass, sea lice numbers or chemical and waste impacts on the environment. They have no effective mechanism to vary biomass once permanent planning permission is granted. They have no expertise at making these judgements, and in the council's Aquaculture Liaison Group's minutes, Argyll & Bute's planners complain that they receive non-committal advice from Marine Scotland on wild fish impacts. A&B Council also said[12]

'The ***haphazard response*** *to date via a small number of EMP's would suggest that* ***responsibility for wild fish interactions has been inappropriately allocated to Planning Authorities, who given their reactive role, are not in my opinion the best placed regulator to address this issue on a comprehensive basis, taking into account cumulative effects.****'*

The peril of this failure to control sea lice at large scales is laid bare by the latest research[13], showing that currents can transport sea lice not just between farms, but from the mainland to the Outer Hebrides and back.

The ECCLRC said that: *'Scotland's public bodies have a duty to protect biodiversity and this must be to the fore when considering the expansion of the sector.'* SEPA's position, that its biodiversity duties can be shifted to other agencies, is not consistent with this and must be challenged.

A single agency should be assigned the legally-binding responsibility for protecting wild salmonids from the effect of fish farming, in particular from sea lice released by farmed fish, but also from diseases and the genetic and other effects of the huge numbers of escapes, which total more than half of Scotland's entire wild salmon population every year, according to the SAMS report.
Marine Scotland must urgently study gene introgression and disease transfer to wild fish, and it must address the enormous numbers of escapes.
FHI told the ECCLRC hearing that severe storms cause many of these failures. The level of containment is clearly inadequate, not least because climate change is making powerful storms more frequent.
Marine Scotland told the Friends of the Sound of Jura by telephone that all salmon cages and their moorings must be able to withstand a once in 50 year event, adding that MS relies solely on the applicants to assure them of this, and that it does not check cage designs or assess the exposure of each site. Now the industry is actively expanding into more exposed locations and pressing to be allowed much larger farms, increasing the risk of escapes.
The ECCLRC is right to conclude that, *'…there appears to have been too little focus on the application of the precautionary principle in the development and expansion of the sector.'*

The SAMS report omits the visual impact of salmon farms on the landscape, for which SNH is the statutory consultee. In Visit Scotland's latest (2015-16) survey[16], visitors cite Scotland's landscape as its main attraction. Tourism is worth about £11bn to Scotland, rising to c.£23bn by 2025[17]. It provides many jobs in small coastal communities like ours, and at

least 100 times more Scottish jobs than those directly employed on fish farms. More than 10% of jobs in Argyll & Bute are tourism-related, the highest proportion in Scotland[17].

Fish farm cages never feature in tourism adverts - probably because, as a SARF-funded study[18] discovered: 48% of respondents said the expansion of fish farming would negatively impact the scenery, and 46% said it would negatively impact the natural environment. A quarter did not want to see an increase in the number of fish farms, over a third didn't want to see them get any bigger & 10% said they would be less likely to visit these locations.

In the face of its many impacts it is wrong to justify fish farm expansion on the basis that its economic benefits will reach all those living closest to the proposed fish farms. There may be some benefits, but substantial losses too.

In our community the majority of people have said clearly that they want no such developments. Marine Harvest says it will respect community opinion and will not force fish farms on those that do not want them, but it applies this only to island communities. What difference does it make whether small coastal communities are on islands or on peninsulas, such as ours?
In choosing the sites and sizes of farms, more weight should be given to the opinions of those whose livelihoods depend on the health of their local environment. At present this is only done, in a very patchy way and with a strong bias in favour of development, through the local authority planning process, and by writing to SEPA about CAR licences.

Before permitting salmon farming to expand, sustainable solutions must found to its present problems and shown to work. It is not sufficient just to licence a new set of toxic chemicals and to relocate the most polluting farms to exposed places, in the belief that their faster currents will deposit the pollution far enough away for its impacts to go unnoticed. As the ECCLRC said:

> *'Scotland needs an ecosystems-based approach to planning the industry's growth and development in both the marine and freshwater environment, identifying where salmon farming can take place and what the carrying capacity of that environment is.'*

And that:

> *'Industry growth targets … do not take into account the capacity of the environment to farm that quantity of salmon.*
> *If the current issues are not addressed this expansion will be unsustainable and may cause irrecoverable damage to the environment.'*

SEPA told us that its new Sector Plan will include a review of all fish farm licences, perhaps starting in 2019. This review is essential, but any action resulting from it will not be applied for about four years, because SEPA says that additional monitoring will be needed through a full 2-year fish production cycle, by which time much of the industry's expansion will already have happened, including the consenting of many much larger farms.

That is too long to wait to solve these problems. We urge the RECC to apply the precautionary principle by recommending a moratorium on fish farm expansion, at least until the Parliamentary Inquiry report is published and has been acted upon, and until sufficient information has been gathered to judge the environmental effects of salmon farming, at its present size and after

expansion. Anne Anderson at SEPA told us she is not keen on a moratorium. We feel this shows an unhealthy closeness of the regulator to the industry.

Separating farmed fish from the open sea would solve most of the industry's problems and we agree with the ECCLRC that independent research on this should be commissioned as a matter of urgency,

> *'…including a full cost-benefit analysis of Recirculating Aquaculture Systems (RAS), and a comparative analysis with the sector as it currently operates in Scotland, alongside further development and implementation of alternative technical solutions, supported by the use of incentives.'*

In Norway the industry is moving towards closed-containment, encouraged by licence fees costing more for the companies that do not invest in this innovation. The newly devolved Crown Estate gives Scotland an opportunity to do the same thing. The industry's argument that closed containment would be too expensive is in part because then it would have to match the standards applied to industries on land. This is no reason to set aside the legal and ethical principle that the polluter pays.

There should be a timetable for moving the entire industry in freshwater and in the sea to closed-containment, starting with protected areas.

In order to tackle non-compliance, the Scottish Government should also put a levy on salmon farm profits to fund a publicly-trusted programme of enhanced and fully independent monitoring, and the subsequent analysis of environmental impacts, including long-term trends. As the ECCLRC concluded:

> *'There should be a requirement for the industry to fund the independent and independently verified research and development needed.'*

Industry pressure to 'streamline' the consenting process[20] must be resisted, if that means communities are given less involvement, or time to prepare.

Salmon farming here should not aim to be as cheap as Chile. Scotland's farmed salmon should be the best in the world, and so should the safeguards to protect our precious marine environment and the many sustainable jobs depending on it.

We agree entirely with the ECCLRC's conclusion:

> 'Further development and expansion must be on the basis of a precautionary approach and must be based on resolving the environmental problems. **The status quo is not an option**.'

References:

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