



# NON-TECHNICAL SUMMARY SEPA VARIATION APPLICATION LOCH TAY FISH FARM

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## Non-Technical Summary – Application to vary SEPA permit Loch Tay Site

Kames Fish Farming Limited, established in 1972, is Scotland's only remaining family-owned trout farm and one of the most significant freshwater aquaculture businesses in the UK. The company accounts for approximately 70% of all trout sold into the UK retail and is the only trout farm in the UK to export Scottish trout internationally.

Loch Tay is a body of freshwater situated in mainland Scotland which runs between Killin and Aberfeldy. The Loch Tay site has been operating since the 1980s, and Kames has been operating it for most of this time. Kames has extensive experience and knowledge operating in fresh water environments and in particular this location.

The Loch Tay SEPA consent CAR/L/1001403 (latest variation VAR01 issued 19 March 2025) permits the annual discharge of 2730.7kg of phosphorus to be discharged in any year. The site is equipped with five 70m circumference cages, three 40m circumference cages, four 10m square cages and two 8.5m square cages with raft and walkways.

Kames are seeking to expand production of Rainbow Trout (*Oncorhynchus mykiss*) at the Loch Tay site, confident that a measured additional production can be accommodated in the environment without adverse impact. The proposal will not require change to the equipment, as it can be accommodated with the existing infrastructure.

The principal environmental concerns associated with freshwater cage aquaculture in loch systems are the discharge of particulate wastes, medicine residues and dissolved nutrients from uneaten food, fish faeces and dissolved excretory products. It is recognised that elevated phosphorus concentrations may contribute to an increase in algal productivity which can lead to a change in the trophic status of water bodies and consequently a potential deterioration in WFD ecological classification. The water classification hub, <https://informatics.sepa.org.uk/WaterClassificationHub/> publishes the most recent results for Loch Tay from 2024 with an overall classification of 'Moderate' and Total Phosphorus 'Good'.

To support this application Kames commissioned the expertise of the University of Stirling (UoS) to carry out modelling to predict the potential effects on the phosphorus loading in the loch with the proposed increase. The modelling assessment has been undertaken by suitably qualified independent environmental scientists at University of Stirling with experience in freshwater nutrient modelling and aquaculture environmental assessment (Burke et al, 2025).

UoS has undertaken water sampling for many years from Loch Tay on behalf of Kames. Collecting water samples throughout the year at multiple locations and depths in the loch. These samples have been analysed for chlorophyll-a and total phosphorus by UoS. This UoS data was also compared with the collected phosphorus data from SEPA sampling, this showed similar characteristics and trends. The UoS-collected data was then used to test the models, comparing predicted total phosphorus (TP) values with measured data to validate model performance.

The catchment model outputs are combined with three different lake models. LakeMab (Hakanson & Brynn, 2008), Dillon and Rigler (1974) and OECD (1982) models, to predict phosphorus levels in Loch Tay under different production scenarios. This gives both static water exchange for annual mean levels and dynamic hydrology for seasonal outputs.

The purpose of the integrated model is to first predict catchment-derived phosphorus loading and aquaculture-derived phosphorus loading in Loch Tay. Phosphorus loading associated with freshwater aquaculture production will be estimated using site-specific data, recognised industry conversion factors and feed nutrient composition data.

Using a series of model scenarios, a detailed assessment has been carried out and a technical report written which is included with the application (12 Modelling of change in total phosphorus and ecological status of Loch Tay – Institute of Aquaculture University of Stirling). The technical report includes the methodology, data used, model assumptions, results and limitations including sensitivity analysis, referenced published information and conclusions. This quantifies and assesses changes in annual mean TP concentrations from the predicted baseline. It evaluates the trophic status, comparing the predicted concentrations with Water Framework Directive (WFD) thresholds and SEPA classification standards. The modelling demonstrates that an additional TP loading of 3053kg per annum from aquaculture in Loch Tay would maintain compliance with the required WFD ecological and water quality status for Loch Tay. It is proposed that the current permitted annual phosphorus discharge limit is increased from 2730.7kg by 3053kg to 5783.7 kg.

There are various possible production forecast scenarios. These vary depending on a number of parameters ie stocking size, frequency of stocking and harvesting, feed conversion ratio (FCR), mortality and feed content, (pellet sizes for differing fish sizes and by feed batch depending on ingredients). The attached Loch Tay Production Forecast (Appendix 5) details a three-year production plan, with predicted phosphorus discharged to the loch. This is calculated from the feed less the quantity of phosphorus entrained by the fish using the SEPA recognised trout formula (Production kg x 0.36%= entrained by trout). The forecast uses prudent figures for achievable FCR, and phosphorus content levels derived from site specific historical data.