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Councillor Grant Laing
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Your Reference: Loch Leven

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Dear Grant ,

Thank you for your letter raising Perth and Kinross Council's concerns regarding phosphorus pollution of Loch Leven and cyanobacteria algal blooms. As you will be aware, Loch Leven is the largest naturally nutrient rich freshwater loch in the UK and is internationally important for its wintering and breeding wildfowl making it one of Scotland's most important natural assets.

Loch Leven is unusual because it is large and naturally eutrophic (nutrient-rich) in contrast to most large lochs in Scotland, which are oligotrophic (nutrient poor). I understand that, whilst the nutrient rich waters are important in supporting a great wealth of wildlife, nutrient levels that are too high start to cause problems within the ecosystem. Nutrients such as phosphorus and nitrogen entering the loch catchment from manmade sources have historically caused problems with water quality such as the significant cyanobacteria algal blooms experienced in the early 1990s.

Perth and Kinross Council has worked successfully with the Scottish Environment Protection Agency (SEPA), NatureScot, Scottish Water and a range of other stakeholders to improve the water quality of Loch Leven through the work of its Catchment Management Group and Catchment Management Plan. This lead to Loch Leven being nominated as one of four sites across Europe for a prestigious Natura 2000 award in 2018.

At the time, Dr Linda May of the UK Centre for Ecology & Hydrology (UKCEH), who has led the Loch Leven monitoring programme for over 25 years, stated, "The enormous improvements in water quality at Loch Leven over the last 25 years have provided a better habitat for wildlife and increased its amenity value. The loch is now a world-leading example of the benefits to nature and communities of using scientific evidence to inform restoration and management decisions."

However, I am aware that in recent years phosphorous concentrations in the loch have been increasing again and since 2018 there have been a return of summer cyanobacteria algal blooms. Work is ongoing aiming to address these issues through the Loch Leven Catchment Management Group, which is attended by a number of Perth and Kinross Council representatives and councillors, such as Councillor W. Robertson.

As part of this work, an independent study by the UK Centre for Ecology and Hydrology (UKCEH) (Loch Leven nutrient load and source apportionment study) to investigate the main sources of phosphorus within the Loch Leven Catchment was published in 2017. The report also compared the monitoring results with those of previous nutrient loading studies carried out in 1985, 1995 and 2005.

As part of the monitoring of point source discharges from Kinross and Milnathort Wastewater Treatment Works (WwTWs) the study included the monitoring of their storm overflows to assess any impact. Whilst, overall discharges from point sources were found to be decreasing, phosphorus from diffuse sources appeared to be increasing especially in relation to particulate phosphorus. The report suggests that this increase in particulate phosphorus may be due to changes in land use and/or climate. The outcome of the study found that the vast majority (86%) of phosphorus inputs to the catchment come from rural diffuse pollution as shown by Graph 1 & 2 in the Annex taken from the report.

In relation to your first request, that Scottish Government “Instruct SEPA to introduce a weight limit on the amounts of phosphorous permitted to be deposited into Loch Leven”, and I can reassure you that this is already done. Under the Water Environment and Water Services (Scotland) Act 2003 Scottish Ministers set environmental standards for phosphorus through Directions to SEPA as an annual mean total phosphorus concentration for Loch Leven. The phosphorus standard is set at level in the absence of more than very minor phosphorus inputs to the loch resulting from human activities. In the Annex, Graph 3 from the UKCEH study, cited above, illustrates the target limits set by the Loch Leven Catchment Management Plan 1999 in red in comparison with the SEPA target in green.

Under the River Basin Management Planning process SEPA uses the phosphorus standards set by the Scottish Ministers to monitor, assess, and classify Loch Leven’s water quality. Objectives aiming to improve water quality are prioritised where water quality is classified at less than good status in the River Basin Management Plan.

SEPA currently classifies Loch Leven as having poor status overall with the following water quality parameters being at less than good status: Total Phosphorus (Poor); Total Nitrogen (Moderate); Macroinvertebrates (Moderate); Phytoplankton (Moderate); and Macrophytes (Moderate). In SEPA’s opinion it is likely that the ecology (macroinvertebrates, phytoplankton and macrophytes) is impacted by the phosphorus.

Scotland’s River Basin Management Plan target objective for Loch Leven water quality is Moderate by 2027 and Good in the long-term. This is an acknowledgement that whilst measures will be put in place aiming to reduce phosphorus and nitrogen pollution before 2027 the natural recovery of the ecology of Loch Leven will take longer.

SEPA’s Priority Catchment farm visits, aiming to reduce rural diffuse pollution started in November 2022 in the North and South Queich rivers which feed into Loch Leven. It is planned that all farm visits in catchments feeding into Loch Leven will be completed by March 2023. Further farm visit within the

Loch Leven catchment will also be undertaken during the remainder of 2023.

SEPA's Priority Catchment farm visit programme, which has been in operation for over ten years across Scotland, was highlighted on a BBC Wales investigative episode into agricultural pollution in 2022 as an innovative and effective approach to reducing rural diffuse pollution.

In relation to your second request regarding tighter controls for Scottish Water sewage discharges I will clarify the current situation below.

Both Kinross and Milnathort Waste Water Treatment Works have had dedicated phosphorous removal treatment since the 1990s. Scottish Water invested £1 million to replace these treatment systems with new ones in 2022 and 2017, respectively. Whilst phosphorus discharge standards are set by SEPA at 3mg/l for Kinross WwTW and 2mg/l for Milnathort WwTW SEPA has indicated that they both perform to the highest level with effluent discharge quality well below 1mg/l for phosphorus meeting industry best practice.

In relation to the monitoring and recording of storm overflows, I understand that at a meeting on the 6 December 2022 between councillors, SEPA and Scottish Water an explanation was provided setting out that Kinross and Milnathort WwTWs storm tank overspill events are monitored and recorded.

Councillors also asked Scottish Water and SEPA about the monitoring of other Combined Storm Overflows (CSOs) and Emergency Overflows (EOs) on the public sewer network, but this information was not available at the time. SEPA has now confirmed to my officials that CSOs and EOs on the Kinross & Milnathort sewer network do not have event recorders installed, and consequently there are currently no records of spill frequency or duration available for these locations.. However, recent inspections on the sewer network by SEPA indicated that there were no signs of frequent discharges from CSOs and EOs further up the sewer network from the sewage works. I am aware that SEPA and Scottish Water are due to feedback to local councillors at their next meeting scheduled for April 2023.

The UKCEH Loch Leven study did acknowledge that there was a notable contribution from Kinross WwTW. Whilst the works themselves are compliant with their licence conditions and routinely perform to a higher standard than stipulated in its licence; it was hypothesised that increased inputs may be coming from storm discharges due to climate change. SEPA is working with Scottish Water to assess its storm water infrastructure to determine where improvements may need to be made to reduce the potential impact on Loch Leven.

Overall, SEPA is committed to tackling both point source and rural diffuse sources via inspection of sites against the requirements of licence conditions and against General Binding Rules under Water Environment (Controlled Activities) (Scotland) Regulations 2011.

At the Loch Leven Catchment Management group meeting in January 2022 Dr Linda May, an independent expert from UKCEH, advised that its monitoring data showed phosphorus levels are highest in the summer and that therefore it is more likely that the recycling of phosphorous in loch sediments due to rising summer loch temperature is the cause of algal blooms rather than sewage discharges.

In 2022, UKCEH recorded an increase in algal blooms across lochs and lakes within both Scotland and England, and the incidence of algal blooms in Loch Leven was not isolated, nor catchment specific. It is

believed to be linked to the higher-than-average temperatures and reduced rainfall levels experienced in 2022. This conclusion is supported by the Scottish Government funded CREW Report Assessing climate change impacts on the water quality of Scottish standing waters, which states, "*Climate change is affecting the water quality of Scottish standing waters, specifically in relation to algal blooms, at multiple scales; mostly through increases in air temperatures and changes in rainfall patterns*."

All the aspects I have highlighted in my letter are being considered and actioned by the Loch Leven Catchment Management Group. I am pleased at the success this group has had in contributing to the reduction of phosphorus pollution and algal blooms in the past. I would encourage Perth and Kinross Council's continued collaboration with NatureScot, SEPA, Scottish Water, UKCEH and other stakeholders in working to resolve the issues you have raised.

Yours sincerely

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