

Loch Tay Water Watch — Phosphorus Monitoring Summary

Prepared in support of the Loch Tay Association objection to SEPA application APP2026-00001781

1. Summary

Between March and August 2026, Loch Tay Water Watch volunteers collected 129 water samples from 40+ locations around Loch Tay, testing for nitrate and phosphorus using field test kits. Twenty-two samples (17%) returned phosphorus readings above the background detection band (“<20 µg/L”).

These elevated readings are not randomly distributed. They cluster strongly around the east end of the loch, in the immediate vicinity of the Kames Fish Farming salmon farm — the site of the phosphorus discharge increase proposed under application APP2026-00001781. Sites well away from the fish farm, at the opposite end of the loch (Killin, Fearnan), returned clean background readings on every single sample taken across the whole survey period.

This pattern is consistent with, though does not on its own prove, the fish farm as a contributing source of phosphorus enrichment in this part of the loch. It provides clear grounds for SEPA to examine this question closely before considering any increase in permitted discharge.

2. Readings from sites close to the fish farm

The following sites were identified by local volunteers as being in close proximity to the fish farm: Fish Farm East, Fish Farm West, Bay North (recorded interchangeably as “North Bay”), Bay South (recorded interchangeably as “South Bay”), and Acharn Burn. Rows shaded pink are readings above the background band; the bold figure marks the phosphorus result.

Fish Farm East

Immediately adjacent to the fish farm cages.

Site	Sample date	Phosphorus (µg/L)
Fish Farm East	02 Apr 2026	20–50
	29 Apr 2026	<20
	27 May 2026	100–200
	24 Jun 2026	<20
	17 Jul 2026	<20
	30 Jul 2026	50–100

Fish Farm West

Immediately adjacent to the fish farm cages.

Site	Sample date	Phosphorus (µg/L)
Fish Farm West	02 Apr 2026	<20
	29 Apr 2026	<20
	27 May 2026	<20
	24 Jun 2026	<20
	17 Jul 2026	<20
	30 Jul 2026	<20

Bay North / North Bay

East-end bay, close to the fish farm.

Site	Sample date	Phosphorus (µg/L)
Bay North / North Bay	31 Mar 2026	<20
	28 Apr 2026	20–50
	25 May 2026	50–100
	24 Jun 2026	<20
	13 Jul 2026	<20
	27 Jul 2026	50–100

Bay South / South Bay

East-end bay, close to the fish farm. Most consistently elevated site in the survey.

Site	Sample date	Phosphorus (µg/L)
Bay South / South Bay	31 Mar 2026	20–50
	28 Apr 2026	20–50
	12 May 2026	<20
	25 May 2026	20–50
	24 Jun 2026	100–200
	13 Jul 2026	20–50
	27 Jul 2026	100–200

Acharn (burn, east & west)

Close to the fish farm. Elevated readings confined to early season (April) only.

Site	Sample date	Phosphorus (µg/L)
Acharn (burn, east & west)	01 Apr 2026	<20
	01 Apr 2026	20–50
	01 Apr 2026	20–50
	28 Apr 2026	20–50
	28 Apr 2026	<20
	28 Apr 2026	<20
	27 May 2026	<20
	27 May 2026	<20
	27 May 2026	<20
	24 Jun 2026	<20
	24 Jun 2026	<20

Site	Sample date	Phosphorus (µg/L)
	24 Jun 2026	<20
	28 Jul 2026	<20
	28 Jul 2026	<20
	28 Jul 2026	<20

3. Comparison with control sites elsewhere on the loch

By contrast, sites at the opposite end of the loch from the fish farm — Killin (head of the loch) and Fearnan — returned background (“<20 µg/L”) phosphorus on every sample taken across the survey period:

Control sites (away from fish farm)	Samples	Elevated
Killin North & South (head of loch)	9 samples	0 elevated
Fearnan up/downstream	9 samples	0 elevated

A number of scattered, isolated readings above background were also recorded elsewhere around the loch, but without the consistency or clustering seen at the east end, particularly around the fish farm area.

4. Observations

- Bay South / South Bay is the single most consistently elevated site in the survey: 5 of its 7 samples were above background, including the two highest readings recorded anywhere in the dataset (100–200 µg/L).
- Fish Farm East and Bay North each showed elevated readings in roughly half of samples, including a 100–200 µg/L peak at Fish Farm East on 27 May.
- Fish Farm West was comparatively clean throughout, suggesting any influence is not uniform even across the immediate fish-farm area — consistent with localised dispersal rather than loch-wide mixing (see Section 5).
- Acharn Burn's elevated readings were confined to early season (April) only, which may point to a separate or seasonal contributing source rather than a sustained one — worth noting as a caveat rather than overstating the fish farm link at this particular site.

5. Note on the well-mixed assumption in the Stirling modelling

Kames Fish Farming's application relies entirely on modelling from the University of Stirling's Institute of Aquaculture (“Modelling of change in total phosphorus and ecological status of Loch Tay with increase in fish cage biomass”, Project Ref. 2232315, finalised 12/06/2026) to argue that a substantial increase in production would not breach SEPA's WFD phosphorus thresholds. That conclusion rests on one core assumption, set out in Section 1 of the report: that the loch is well mixed, with phosphorus evenly distributed across its full 1.6×10^{12} L volume.

This assumption is not supported by the Association's own field data. Loch Tay is approximately 23 km long, and our monitoring shows sharp, localised phosphorus elevation at the east-end sites nearest the fish farm — particularly Bay South — against consistently clean readings at Killin and Fearnan, at the opposite end of the loch. A loch-wide average remaining below threshold does not mean conditions near the cages are unaffected; it only means any local effect is too small, once diluted across the whole loch, to move that average. Because the application's case depends on whole-loch averaging, and the Association's evidence indicates the loch does not mix and dilute in that way, the modelling cannot be relied upon to rule out localised ecological harm near the farm. SEPA should give this localised field evidence direct weight, rather than treating the loch-wide model as conclusive.

Caveat: our field kit reads phosphorus directly from the water sample; the Stirling report's thresholds are for laboratory-analysed total phosphorus (TP), obtained via acid digestion. The two may not be numerically identical fractions, so this summary rests on the spatial pattern in our data rather than a direct comparison against the 8.81 or 12 µg/L TP thresholds.

6. Methodology note

The field test kit gave readings in mg/L of phosphorus. These have been converted to µg/L throughout this summary, as that is the standard unit used in SEPA's own water quality reporting.