

Tayside mesotrophic lochs:

An environmental improvement action plan

Background

- The conservation of mesotrophic lochs is a key responsibility for SEPA, and is driven by the UK, Scottish and local biodiversity action plan targets, the Water Framework Directive and responsibilities under the Nature Conservation (Scotland) Act 2004.
- The UK Lakes Habitat Action Plan Group has selected 32 mesotrophic lochs across Scotland that have a recorded presence of biodiversity species which are under threat or in decline and in need of conservation. These species include Slender naiad, Shetland pondweed, Pillwort, and some Stoneworts.
- The lochs face various anthropogenic pressures (eutrophication, fish stocking, invasive alien species etc) which threaten their ecology and water quality.
- Through partnership working, SEPA is pursuing local biodiversity projects to address these threats, to improve the ecological status of the lochs and to safeguard the populations of priority native plant assemblages. The aim of the project is to provide protection and remediation for these lochs, implementing measures which are the responsibility of a whole range of stakeholders – that is, public bodies, non-governmental organisations, landowners etc. Working in partnership will ensure environmental benefits are augmented, taking a holistic catchment management approach to conservation.

- The lochs are spread across seven regions and included in three-year (2008–2011) environmental improvement action plans. SEPA develops these plans in order to deliver additional improvements which are complimentary to its role as a regulator. For example, they help secure resources for investigative monitoring work.
- SEPA's contribution in terms of partnership projects includes the analysis and provision of water chemistry data; aquatic macrophyte data; a review of discharges/consents; commission research eg "the control of invasive non-native species in priority mesotrophic lochs" March 2009; provision of advice and project co-ordination.

Objectives

- To work in partnership to pursue local biodiversity projects to address pressures, to improve the lochs ecological status and to safeguard the populations of priority native plant assemblages.
- To deliver UK lakes habitat action plan targets.
- To contribute to Water Framework Directive targets of achieving 'good' ecological status.

The Lochs

Fingask Loch (Tayside)	Tangy Loch (Argyll)
White Loch (Tayside)	Loch a Chlair (Argyll)
Loch Monzieviard (Tayside)	Loch Kindar (Dumfries)
Monk Myre (Tayside)	Loch Eye (Highland)
Loch of Lintrathen (Tayside)	Loch Flemington (Highland)
Loch of Butterstone (Tayside)	Loch of Asta (Shetland)
Loch of Craiglush (Tayside)	Loch of Tingwall (Shetland)
Loch of Drumellie (Tayside)	Loch Grogary lower (Western Isles)
Lindores Loch (Fife)	Loch Croghearraidh upper (Western Isles)
Moor Loch (Fife)	Loch Scaraidh (Western Isles)
Loch Skerrols (Argyll)	Loch nan Cnamh (Western Isles)
Loch Gorm (Argyll)	Loch a Mhadaidh (Western Isles)
Lower Glenastle Loch (Argyll)	Loch Gearraidh Mhic Iain (Western Isles)
Glenastle Loch (Argyll)	Loch Ussie (Western Isles)
Loch Lossit (Argyll)	Loch Runabhat (Western Isles)
Loch nan gad (Argyll)	(Loch an Nostaire-dropped, access difficult)

Plans for the Tayside region

The environmental improvement action plan for the Tayside region covers lochs Fingask, White, Monzieviard, Lintrathen and Monk Myre. It also includes the Lunan chain lochs (Butterstone, Craiglush, and Drumellie), which Scottish Natural Heritage are leading on through their Natural Care Scheme.

SEPA's involvement in the plan includes:

- collecting, analysing and presenting chemistry and macrophyte data on the lochs;
- engaging with external partners to initiate and undertake partnership projects;
- investigating the cause of eutrophication in the lochs and reviewing those factors which SEPA regulates (septic tanks, combined sewage overflows etc);
- preparing an annual status report on the lochs and raising awareness;
- annually revising and re-submitting the Tayside lochs regional plans.



Fingask and White loch

Fingask and White lochs are small linked lochs just south of Blairgowrie in Perthshire. Both support a flora indicative of mesotrophic status, but lie in a high alkalinity catchment and so may be eutrophic by nature. Three biodiversity action plan priority species have previously been found in these lochs: Slender naiad (*Najas flexilis*), Pillwort (*Pilularia globulifera*), and Shetland pondweed (*Potamogeton rutilis*). Rough stonewort (*Chara aspera*) and bristly stonewort (*C. hispida*) have also been recorded in past surveys. More recent non-quantitative sampling carried out at

the site in 2005 and 2008 has shown that Shetland pondweed remains widespread; however, the Pillwort and Slender naiad populations are very small and in decline. In recent years both lochs have undergone nutrient enrichment and suffered cyano-bacterial blooms impacting on the trout fishery. Sources of nutrient loading may be attributed to:

- diffuse pollution from agricultural run-off;
- the possibility of some urban run-off and some unlicensed septic tanks in the area;
- angling (Fingask is stocked with rainbow trout, and brown and blue trout in White).

Fingask and White loch partnership project

To address eutrophication at Fingask and White loch a Tayside lochs partnership was established and secured funding from Tayside Biodiversity Fund (SITA) for remediation measures. Project partners include Tayside Biodiversity Partnership, Farming and Wildlife Advisory Group (FWAG), Blairgowrie Angling Club, Rosemount Golf Club, Kindrogan Field Studies Centre and SEPA. The project managed by FWAG included a diffuse pollution audit of farms in the catchment, soil nutrient budgets, provision of advice to land managers, and funding to create bufferstrips around both lochs. SEPA is

also reviewing existing nutrient inputs from septic tanks, slurry drainage and the operation of an old combined sewage overflow.

The partnership produced a tea towel 'make the link to your sink' to raise awareness of the problems of elevated phosphorus levels in freshwater, and suggest how people can help by using low-phosphorous detergents and maintaining septic tanks. The tea towel was distributed to householders and businesses in the catchment during spring 2009. Perth & Kinross Ranger Service are engaging with the local primary school to raise awareness of the project and importance of freshwater ecosystems.

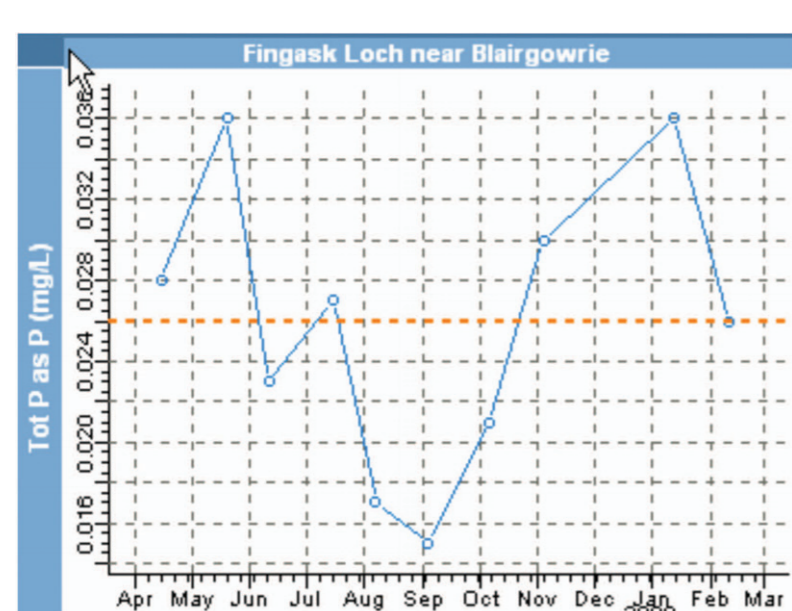


Figure 1: Total phosphorus (TP) and chlorophyll values at Fingask Loch

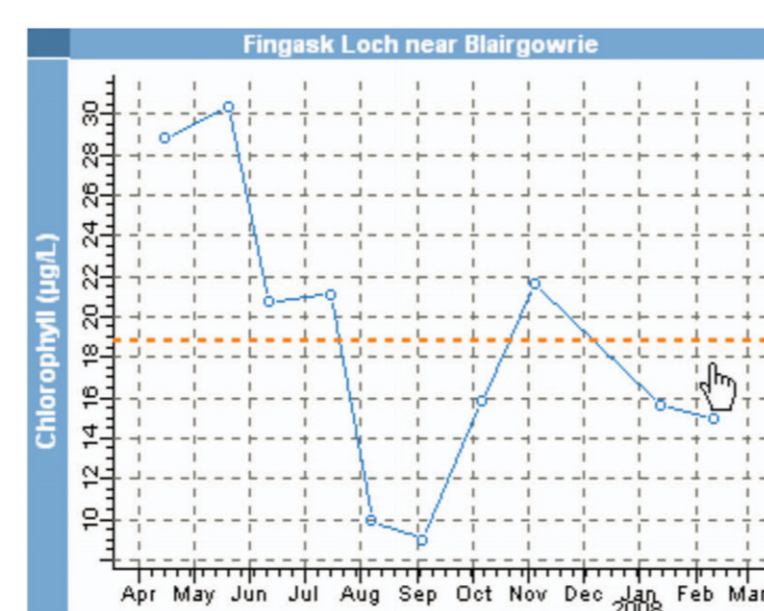
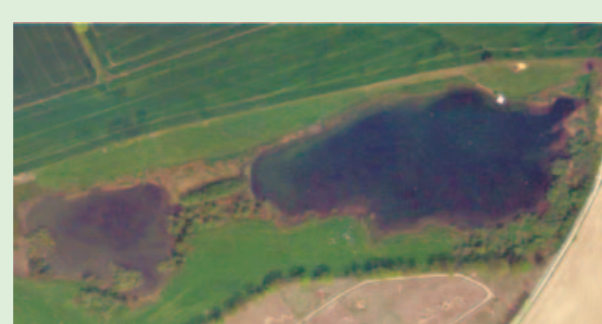


Figure 2: Total phosphorus (TP) values at White Loch

Other Tayside lochs

Catchment projects are also being initiated by SEPA through the Tayside Biodiversity Partnership for action at Loch Monzieviard (near Creiff), Monk Myre and Loch of Lintrathen (Angus). Although, at an early stage of investigation, partnership meetings have already been held and data on ecological conditions collated and analysed.



Piston coring at White Loch
Photo: Helen Bennion



Palaeoecology Study: February 2009

White Loch was also included in a palaeolimnology project, which employed multi-proxy palaeoecological methods (diatoms, Cladocera, plant macrofossils) to define reference conditions and to assess ecological changes in the loch over the last 100 to 150 years. Results show that all of the biological elements experienced marked and synchronous changes over the period represented by the White Loch cores, indicative of nutrient enrichment. The data suggest that the present day plant community has few taxa in common with those observed in the reference assemblages, having experienced the loss of *Isoetes lacustris* and a reduction in charophytes, with elodeids becoming the dominant component of the aquatic vegetation.