Parliamentary Briefing

The Ecological Importance of Small Freshwater Bodies and Riparian Habitats

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Summary

Small Freshwater Bodies include ponds, lochans, ditches, springs, seepages and flushes. All of these provide huge ecological benefits, supporting a wide range of aquatic species and offsetting some of the negative impacts of many environmental issues facing us such as climate change, flooding, chemical and noise pollution. Riparian habitats are the terrestrial sites in close proximity to the freshwater habitats and provide critical habitats for insects, amphibians and other wildlife, and make valuable contributions to our natural capital.

What are they?

Ponds support an extraordinary two thirds of all freshwater species including Common frog, Common toad, Teal, Pond mud snail, Tadpole shrimp, Northern damselfly, Broad-leaved pondweed, Great Crested Newt, Grass snake, Pillwort, and Medicinal leech. Ponds are also used by a wide range of other wildlife as a source of drinking water including hedgehogs and birds.

One third of ponds are thought to have disappeared in the last fifty years or so and of those that remain more than 80% are considered to be in 'poor' or 'very poor' condition (Freshwater Habitat Trust). This has had an enormous impact on aquatic wildlife.

Creating clean new ponds is one of the simplest and most effective ways to protect freshwater wildlife. Where it is not a viable option to create new ponds, restoring existing depleted ponds is greatly beneficial.

Ditches are man-made waterbodies that are used mainly to drain the land. They are distinguished from streams in that they are usually straight and follow linear field boundaries; they show little relationship with natural landscape contours. There are over half a million kilometers of ditches in the British landscape. They are found in a wide range of habitat types from lowlands to hills and can have as much biodiversity as some of our best rivers. In addition, they often support temporary water specialists which are often not found in other freshwater habitats.

As ditches drain land, what lives in them is dependent on how polluted they are, on their gradient and how often they flow. Unpolluted, high quality ditches are in the minority, with perhaps only 10% of the UK ditches qualifying (Freshwater Habitat Trust).

Springs are places where underground water emerges at the surface. They may turn into tiny seepages and become flushes, or they may be the beginning of substantial water courses. They are found all over the country in all landscapes and are dominated by small animals and plants such as mosses and liverworts, cold water flatworms, caddis flies and the larvae of two-winged flies. Many of these species are found very close to the start of springs and seepages. If the spring is permanent it may also be used by fish.

Seepages and flushes are areas where water from underground flows out onto the surface to create an area of saturated ground. Flushes vary from open, stony ground with sparse plant cover to dense cover of flowering plants, usually sedges or rushes, with mosses and liverworts forming a ground layer under the canopy. They are found all over the country and support a wide variety of wetland plants, invertebrates and other uncommon smaller wildlife.

The ecological benefits of **riparian areas** are huge. They provide habitat for many species such as water vole and create habitat corridors by linking fragmented and isolated habitats through which species can migrate. They are also a great food source for many species, particularly invertebrates.

Why are they important?

Small freshwater and riparian habitats are biodiversity hotspots, collectively acting as small ecosystems and supporting a massive range of wildlife species.

They are also remarkably good carbon sinks. Carbon sinks are reservoirs that absorb and store atmospheric carbon through physical and biological processes. Ponds in particular are more active in nearly all of these processes than larger lakes, marine ecosystems and terrestrial ecosystems (Downing, 2010). Small ponds sequester 79-247g of organic carbon per square metre annually, a rate 20-30 times higher than woodlands, grasslands and other habitat types (Taylor et al., 2019). Céréghino et al., (2014) suggested that some 500m² ponds may even be capable of sequestering up to 1000kg of carbon per year. Although ponds take up only 0.0006% of land area in the UK, a tiny proportion compared to the 36% of grasslands (Carey et al., 2008), their high rates of carbon burial suggest that their overall contribution is significant.

Biological processes carried out by aquatic vegetation are pivotal in carbon sequestration. Photosynthesis contributes to the sequestration of carbon dioxide by turning it into oxygen and biomass. One kilogram of algae uses an average of 1.87 kilograms of carbon dioxide a day (Anguselvi et al., 2019). Algae in ponds also contribute to reducing additional greenhouse gases such as nitrous oxide (N_2O). Nitrogen is a key component in chlorophyll and thus used in farm fertiliser. Excess nitrogen could react with oxygen in the air to become N_2O. The presence of algae in farm ponds to capture this excess can prevent this reaction from occurring and limit emission of greenhouse gas. A study found that two thirds of farm ponds act as N_2O sinks (Webb et al., 2019), making them an important contributor to combating climate change, particularly as N_2O traps heat at 300 times the rate of CO_2.

Freshwater habitats and soft ground act as flood defences and with flood incidence increasing they can make a huge contribution to offsetting the environmental and social damage that is caused by flooding.

Finally Freshwater habitats absorb noise and can offset noise pollution in highly populated noisy urban environments.

What needs to happen?

We need to accelerate the implementation of both strategic and specific actions to manage small freshwater bodies in ways that reduce freshwater pollution and improve water quality. We need an ongoing funded programme to **undertake restoration works on existing smaller freshwater bodies.** This needs to be a rolling programme to avoid the current trend of small freshwater body succession at such a late stage that restoration is no longer an option and the body becomes defunct for biodiversity benefits. In order to address the estimated 50% loss in small freshwater bodies we need **investment to create new smaller freshwater bodies**.

These interventions will both support nature's recovery, and help the freshwater environment **become more resilient to the impacts of climate change**. Nature-based solutions to climate change are increasingly recognised as an essential approach to water management and we must restore smaller freshwater bodies in ways that promote ecosystem processes. **Restoring and creating new smaller freshwater bodies is a key nature-based solution to climate change, with the scope to lock up carbon, benefit biodiversity and enhance human well-being.** However, nature-based solutions are not yet sufficiently incorporated into strategic and project plans.

Next steps for the Scottish Parliament:

With the scrutiny of the Scottish Government's proposals for the fourth National Planning Framework (NPF4) currently underway by parliament, there are a number of areas where the protections and regulations relating to freshwater bodies could be improved. LINK members urge MSPs to consider the following measures:

- **Seize the opportunity to align nature-based solutions to flood management with NPF4, Scottish Planning Policy and the Land Use Strategy**. The 'mainstreaming' of nature-based solutions across government policies is a key step in tackling the climate and nature emergencies.
- **Focus on the restoration of natural processes as the most sustainable footing for biodiversity recovery.** Such habitats must also include smaller water bodies including ponds, ditches, springs and wetlands. Both cost and technical feasibility have limited action in these waters to date; to counter this, natural ecosystem function should underpin a 'no-regrets' approach to restoration.
- **Preference must be given to schemes which utilise nature-based solutions/natural flood management wherever possible**. It will not always be possible to adapt to climate change and the pressure to implement hard engineering solutions in order to attempt to do so must be resisted; we must instead think in terms of mitigating the impacts of a changing climate and select solutions which work with nature. Working with natural processes is now more readily

considered but there remain questions that concern some stakeholders, such as around long-term maintenance, liabilities and so on, which would benefit from resolution.

- As our understanding of such techniques grows, findings must be **widely communicated** amongst stakeholders, particularly to Local Authorities, to ensure that all involved in **Flood Risk Management** are able to draw upon techniques that work with natural processes in the widest sense.
- Small water bodies must be given the **same priority** as other important habitats, given their important contribution to Scotland's environment, wildlife and tourism sectors.
- Connectivity is a key attribute required for healthy, functioning ecosystems. Habitat restoration and creation, planned and prioritised through a spatially mapped **national Nature Network in NPF4**. Informed by local knowledge, this could be used to enhance connectivity, as well as by considering the quality of connected habitats. Mapping of priority wetland habitats would also identify existing areas of good-quality habitat as well as opportunities for restoration and allow the identification of areas where habitat restoration or re-creation will be valuable to support biodiversity delivery.
- **Habitat restoration and creation should be funded by a combination of sources** including Water Framework Directive, Scottish Rural Development Programme payments, the Nature Restoration Fund from government, Flood Risk Management funding, Scottish Water investment programme and other sources. Together, this spatial planning and framework integration can deliver the "urgent step change in effort" that the biodiversity crisis demands.
- **Improving joint working**, including via the sharing of information so that stakeholders are clearer on the contributions that they could make to improving the state of estuarine and coastal waters by undertaking work further up the catchment. Funding criteria for catchment-based projects should include an assessment of whether they have incorporated actions which will contribute to improvements.
- Finally, it is important to monitor our progress towards addressing loss of our smaller freshwater bodies. A **target should be developed**, and progress towards meeting that target should be reported on a regular basis as part of the Scottish Government's **Environment Strategy**.

Where property development is essential due diligence must be awarded to existing freshwater bodies. These bodies are crucial habitats for many species such as amphibians and invertebrates. With much smaller ranges than some other species, they are unable to travel a great distance to populate new habitats. Associated infrastructure, such as roads, railways and cycle tracks need to take into account species migration routes. Mortality of wildlife in the country as a result of habitats being fragmented by infrastructure is a huge issue. Species such as toads, which use hereditary migration routes, can suffer huge mortality rates crossing roads.

For more information contact:

Craig Macadam
Conservation Director, Buglife Scotland
Convener of LINK Freshwater Group
craig.macadam@buglife.org.uk
07880316029

Juliet Caldwell
Advocacy Officer, LINK
juliet@scotlink.org
07522031110

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Registered Headquarters: 5 Atholl Place, Perth, PH1 5NE
Advocacy Office: Dolphin House, 4 Hunter Square, Edinburgh, EH1 1QW