

Strathnaver



Left: River Naver © Rob Purvis CC BY-SA 2.0 DEED via Geograph. Right: Freshwater Pearl Mussel (*Margaritifera margaritifera*) © Sue Scott/Naturescot

The Strathnaver Important Invertebrate Area (IIA) follows the River Naver and the River Borgie and their tributaries on the north coast of Scotland.

The Strathnaver IIA encompasses the River Naver and its banks, from above Loch Naver in Strath Vagastie and Loch Choire, through Strathnaver, Carnachy and Achargary, down to the tidal limit of the river at Invernaver. The IIA also includes the River Borgie and its banks from Loch Slaim, through Borgie, down to the tidal limit at Torrisdale Bay. The IIA includes the River Naver Special Area of Conservation (SAC) and River Borgie SAC and Site of Special Scientific Interest (SSSI). Both rivers flow through the Caithness and Sutherland SAC and associated SSSIs.

The IIA supports a population of the Freshwater Pearl Mussel (*Margaritifera margaritifera*), with large numbers of juvenile mussels present, indicating successful recruitment to the population. The mussel is a filter feeder, removing organic and inorganic particles from the water column, helping to clean the river in the process. The species relies on populations of salmonid fish, particularly in their first year, as their larvae live in the gills of young salmon and trout. As an adult, the mussels live in the beds of clean, fast-flowing rivers.

The species has suffered historic declines due to overexploitation and is now additionally threatened by issues linked to climate change. Water temperature in the rivers in this area may rise to levels which will affect the behaviour and survival of Atlantic Salmon (*Salmo salar*), and this will be exacerbated by extreme low flows in summer months.



Reasons for Selection

The Strathnaver IIA supports a nationally and internationally important population of the Critically Endangered Freshwater Pearl Mussel, one of Britain's most endangered molluscs. Associated almost exclusively with clean unpolluted rivers, the UK is a stronghold for the species, with populations of international importance. Approximately 50 rivers in Scotland are thought to still hold significant populations, but less than six in England and fewer still in Wales and Northern Ireland. There have been recent findings of the species in still waters associated with rivers.

Threats and Opportunities

Running water

Threats

- Water pollution and nutrient enrichment from agricultural run-off (e.g. artificial or natural fertilisers, worm treatments and pesticides), sewage discharges, or chemical water treatment affect the water quality and disrupts Freshwater Pearl Mussels, particularly when they are starting to establish themselves in the bed of the watercourse.
- Exploitation of populations as a result of illegal pearl mussel fishing.
- Engineering activities such as flood alleviation schemes, straightening of watercourses, dredging and water storage have modified flows in some rivers and streams, lowered water tables and removed available habitat. This is particularly exacerbated when there are incidents of sediment flushing down the water course.
- Barriers such as weirs and dams disrupt natural

flow processes and prevent salmonid fish from moving freely. Walls and piling prevent the watercourse from spreading onto its floodplain, replenishing wetlands and creating damp habitats.

- Removal of riparian vegetation, particularly trees can result in increased water temperatures which make conditions in the river less suitable for salmonid fish. This in turn may lead to the failure of pearl mussel larvae to find a host. Conversely, excessive scrub encroachment on the channel through the lack of grazing or woodland management can lead to overshading.
- Activities such as ploughing and development can increase sediment run-off into streams and rivers, which smothers Freshwater Pearl Mussels in the bed, changes the habitat, and oxygen and light levels.
- Non-native species such as Himalayan Balsam and Japanese Knotweed can be a particular problem to rivers and their associated wetlands, crowding out native plant species and habitats.
- Low flows due to drought and abstraction can result in sedimentation and deterioration of river habitats.

Opportunities

- Monitor water quality and protect running waters from land-borne pollution through negotiations with local farmers and businesses.
- Restore a more natural flow regime by removing barriers (e.g. weirs) and by re-profiling watercourses from fast-flowing, straight and steep channels to meandering shallow channels with varying speed in water flows. This helps increase the quality and accessibility of the river habitats for salmonid fish and therefore the first year stage of Freshwater Pearl Mussels that are struggling to establish.
- Establish vegetation buffers and woodland around running waters to improve water quality and habitat for invertebrates – this helps with trapping pollutants in run-off events, stabilises riverbanks, and creates shaded areas, which will help to reduce water temperatures.
- Keep livestock and vehicles from entering the watercourse or moving across gravel bars and beaches as this compacts the gravels disturbing and potentially damaging the adult Freshwater Pearl Mussels living within the substrate. It can also increase bank erosion and nutrient

Freshwater Pearl Mussel (*Margaritifera margaritifera*) Joel Berglund, CC BY-SA 3.0



concentrations, as livestock enter the watercourse and defecate directly into the water.

- Aim to reduce or eliminate the use of artificial lighting around watercourses wherever possible.
- Control or remove invasive species.

Other interests

Although the Strathnaver IIA qualifies as an IIA on the basis of its Freshwater Pearl Mussel populations, it does also support populations of three endemic species of invertebrate. These are the Orange-striped Stonefly (*Perlodes mortonii*) and the Large Pale Stonefly (*Perla carlukiana*) which also rely on the clean, fast-flowing habitats of the River Borgie and Naver, and the Northern February Red Stonefly (*Brachyptera putata*) which is known from the River Borgie.

In Invernave SSSI, to the north of the IIA, there is a population of the Alpine Slender (*Parornix alpicola*). This micro-moth feeds on Mountain Avenas on coastal hillsides in the north of Scotland.



Northern February Red Stonefly (*Brachyptera putata*) © Gus Jones

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Left: River Borgie © Bill Henderson CC BY-SA 2.0 DEED via Geograph. Right: Freshwater Pearl Mussel (*Margaritifera margaritifera*), Boldie © CC BY-SA 3.0 via Wikimedia Commons



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