



Appendix VIII

Marine Environment of West Loch Tarbert Introduction and context

The information presented in this Appendix on the marine environment, historical context and current conservation initiatives within West Loch Tarbert was provided by Action West Loch (AWL) at the request of FLS. The content reflects AWL's extensive knowledge and involvement in ongoing environmental restoration and conservation projects within the loch.

Action West Loch (AWL) is a community conservation organisation based in Tarbert, Argyll, covering the area of the former Kilcalmonell Parish. The organisation is currently seeking Scottish Charitable Incorporated Organisation (SCIO) status through the Office of the Scottish Charity Regulator (OSCR). Current partners of AWL include Argyll Countryside Trust (ACT), Roslin Institute, Heriot-Watt University, Our Rainforest Futures, Marine Conservation Society, Seasearch, and Sea-Changeers.

AWL is dedicated to protecting and restoring the landscapes and waters of West Loch Tarbert, from Atlantic rainforest and native woodlands to burns, shorelines, seagrass beds and marine habitats. Its work aims to deliver long-term benefits for biodiversity, strengthen ecological resilience, and support the communities that depend on these environments.

FLS working with AWL

Subject to agreement, a Memorandum of Understanding (MoU) between FLS and AWL is currently being developed, to provide a framework for ongoing engagement, collaboration and delivery of shared objectives relating to PAWS restoration and coastal rainforest recovery.

This collaborative approach will support the restoration, resilience and expansion of native woodland and coastal rainforest habitats within the Torinturk forest block, strengthening ecological connectivity both within the forest block and across the wider landscape.

A sediment monitoring programme is being explored jointly by FLS and AWL in relation to planned clearfelling adjacent to West Loch Tarbert. Subject to agreement, monitoring would

establish baseline conditions and assess any changes in sediment levels before, during and after operations.

Geography and tidal exchange

West Loch Tarbert is a long, narrow, sheltered sea loch on the north-west side of Kintyre, about 16 km long, with roughly 23% of its area intertidal. Much of the loch is less than 10 m deep; a shallow sill of about 8 m lies at the mouth, behind which a deeper basin reaches about 32 m. The deeper central basin is mainly soft or sandy mud; around the shallower margins the seabed becomes more varied, with gravel, stone, rock and shell — the clean, stable substrate that native oysters and other sessile marine life need for settlement.

The loch's shape, shallow margins and restricted entrance make water movement very gentle. Historic oyster investigations recorded currents in the upper loch of less than about 0.1 mile per hour even on spring tides, and a later hydrodynamic assessment estimated a spring-tide current of about 0.13 m/s at the sill and a whole-loch flushing time of roughly five days. This slow exchange is fundamental to the loch's ecology: it helps retain plankton and oyster larvae inside the loch long enough for settlement, but it also means that fine sediment, nutrients or pollutants entering from burns and shoreline catchments disperse and leave the system only slowly. The same slow, sheltered water movement that made West Loch Tarbert an exceptional oyster loch also makes it sensitive to what enters the water from the surrounding catchment.

Statutory protection and designations

The loch is not only ecologically sensitive; it also lies within designated sites, set out below. Inner West Loch Tarbert (1.90 km²) and Loup, further down the loch, were designated as shellfish growing waters in 2002 under the former Shellfish Waters Directive regime. These designations were not carried forward into the current Shellfish Water Protected Areas (Designation Orders 2013, 2016 and 2026), so West Loch Tarbert is not at present a Shellfish Water Protected Area. Monitoring under the former regime nevertheless recorded persistent pressure on water quality: apart from 2007 and 2010, Inner West Loch Tarbert failed the Guideline standard for faecal coliforms in each year from 2003 for which results were reported.

The loch also lies within the Sound of Gigha Special Protection Area, classified on 3 December 2020 and covering 363.27 km² from Machrihanish Bay north to the entrance of Loch Caolisport. The Scottish Government's regulatory assessment for the site states that the SPA includes the sheltered waters of West Loch Tarbert, and records beds of seagrass, sea pens and gastropods there. The qualifying birds — great northern diver, Slavonian grebe, common eider and red-breasted merganser — all feed by diving from the surface and pursuing prey underwater, so water clarity bears directly on the site's qualifying interest.

On the terrestrial side, SEPA's former site report for the Inner West Loch Tarbert shellfish growing water lists Tarbert Woods Special Area of Conservation among the conservation designations relevant to these waters. Tarbert Woods was designated on 17 March 2005 for Western acidic oak woodland. It covers about 1,576 ha of coastal broad-leaved woodland with good stands of old sessile oak and is important for its oceanic bryophytes: 180 bryophyte species have been recorded, including 47 Atlantic species. The numerous streams crossing the site have cut deep ravines which, together with the sheltered aspect, provide the humid conditions those communities depend on. Woodland and freshwater management in this catchment therefore bears on a European-designated woodland site as well as on the loch.

A remarkable native-oyster history

West Loch Tarbert supported a major native-oyster fishery for well over a century. Oysters were being sold in Campbeltown and Glasgow by the late eighteenth century, and the loch became the principal native-oyster producing area of the Inveraray district. Around 1890 the population was estimated at at least one million oysters, with annual landings of roughly 150,000 during the peak years. No proper survey was carried out at the time, so that figure is a contemporary estimate and a floor rather than a measured population. The fishery was actively managed: oysters were moved between beds, predators were controlled, and stock was imported to replenish the beds. At Rhu, a tidal spatting pond was used to produce young oysters for restocking the loch, and the remains of that pond still survive today; this historic pond will be restored as part of AWL's oyster restoration project.

Overexploitation drove a severe decline, and commercial landings had ceased by the late 1930s. Restoration experiments in the 1940s and 1950s introduced more than 200,000 oysters, and R. H. Millar's 1961 Scottish Oyster Investigations identified West Loch Tarbert as one of Scotland's most promising sites for renewed oyster cultivation. Millar also estimated that the beds could carry a stock of around 5 million oysters — several times the estimated population at the 1890 peak — which gives some sense of the scale restoration could eventually rebuild. Native oysters have survived in the loch to the present day, so current work is restoration of a surviving population rather than reintroduction from scratch. The loch also contains recorded Priority Marine Features, including native oysters, seagrass beds, maerl and blue mussel beds, and historically supported globally rare biogenic reefs built by the tube worm *Serpula vermicularis*.

Priority Marine Features

Priority Marine Features (PMFs) are habitats and species of marine conservation importance found in Scottish waters. Several of these occur in West Loch Tarbert.

- **Native oyster (*Ostrea edulis*).** The loch holds a nationally significant population, and an active restoration project is under way, run by Action West Loch in partnership with the

Marine Conservation Society. As filter feeders, oysters are vulnerable to any increase in sedimentation.

- **Seagrass beds (*Zostera marina* and *Zostera noltii*).** The loch contains two species of seagrass. There are extensive beds of the subtidal *Z. marina* west of Kennacraig, along the northern shore, including one bed over 1 km in length, and two smaller beds of the intertidal dwarf eelgrass *Z. noltii* have also been recorded, one of them first found in July 2026. Surveys in the 1970s recorded both species at the head of the loch, but recent surveys have failed to find them there. As a flowering plant, seagrass is vulnerable to any increase in the turbidity of the water.
- **Serpulid reefs (*Serpula vermicularis*).** Reefs formed by this polychaete worm are known from only a handful of Scottish sea lochs and were reported present in West Loch Tarbert in the 1980s. Recent surveys have found numerous examples of relict reefs but no live reefs. An ongoing restoration project, carried out by AWL in partnership with a variety of other community groups, is working to aid their recovery. Serpulids are filter feeders, so any increase in sedimentation within the loch is likely to be detrimental to the project.
- **Maerl beds.** There are old records of maerl towards the loch entrance. Maerl grows at roughly 1 mm per year and is highly sensitive to smothering by sediment, with a low or negligible rate of recovery.
- **Other PMFs.** Other PMF species such as salmon, sea trout and blue mussel beds are also found within the loch and would be adversely impacted by any increase in turbidity or sedimentation. Sea trout have been observed running up the Torinturk Burn, which drains the planned felling area directly into the loch. The West Loch is also part of the Sound of Gigha SPA, which cites four species of sea bird: Slavonian grebe, great northern diver, common eider and red-breasted merganser. The SPA is classified for wintering populations of all four species; common eider is present year-round and red-breasted merganser mainly in winter, both using the loch as a feeding area.

Habitats that cannot readily recover

Maerl grows at roughly 1 mm per year, so beds accumulate over thousands of years. It depends on light for photosynthesis, and NatureScot's management advice records that maerl beds are sensitive to increased sedimentation, which smothers the maerl and blocks the exchange of oxygen, nutrients and food, and that they have a low or negligible rate of recovery because of that exceptionally slow growth. Maerl beds are a Priority Marine Feature, a UK BAP habitat and an OSPAR threatened and declining habitat. In practical terms, damage to maerl is not reversible on any management timescale.

Serpulid reefs are rarer still. In Scotland, living serpulid reefs are known only from Loch Creran and Loch Ailort in Scotland. Historically reefs were also found in Loch Sween, Loch Teacuis and the West Loch. In recent years reefs in Lochs Teacuis and Creran have degraded and were extinct in Loch Sween and West Loch Tarbert. (SNH Commissioned Report No. 406). Encouraging signs of

reef growth were observed in Loch Sween in 2024 by Seasearch divers and a restoration project started in the West Loch as a direct result of those observations. NatureScot's comparison of flushing times across the Scottish lochs where serpulid reefs are known to have occurred lists West Loch Tarbert (five days) alongside Loch Creran, Loch Ailort and Loch Teacuis — placing this loch among a very small number of sites worldwide that have ever supported the habitat.

AWL treats the hills, forests, burns, shoreline and loch as one connected catchment: most of the burns draining the surrounding hills and forest, including the Torinturk Burn, discharge directly into West Loch Tarbert. Because the loch is very slow flushing, sediment released upstream does not simply disappear when it reaches salt water: fine material can affect water clarity, settle on the hard substrate that oyster and serpulid larvae need, and influence shallow habitats such as seagrass. There is published evidence that the loch's water clarity is already marginal — a 2004–05 survey (UMBSM 2007) recorded underwater visibility at the West Loch Tarbert sites as generally poor, under 2m because of high turbidity, and dropping below 1m after storms. Additional sediment arriving from felling operations would be added to a system already close to the limit for the light-dependent habitats it supports.

In SEPA's former site report for Inner West Loch Tarbert, the land around the formerly designated area is described as semi-natural woodland and coniferous plantation, with smaller areas of improved pasture, in the section dealing with potential diffuse pollution sources. The same report classifies the Abhainn na Cuile, the main freshwater input to the head of the loch, as fair quality, against good quality for the River Bardaravine. The catchment's principal freshwater input is therefore already below good status before any additional pressure is added.

AWL's marine programme today

Over the last decade Action West Loch has recorded the marine life of the West Loch and developed working relationships with a range of organisations including Heriot-Watt University, the Roslin Institute and the Marine Conservation Society.

Initial efforts focused on establishing what was actually in the loch, and numerous survey dives were carried out by volunteer Seasearch divers. Survey diving is an ongoing activity, with almost every dive revealing something new about the loch's marine life. The most significant findings so far are:

- An extensive native oyster population, one of the largest in Scotland, showing clear signs of successful reproduction — making the site a leading candidate for oyster reef restoration.
- Extensive *Zostera marina* seagrass beds, the largest over 1 km long.

- Evidence of the recent presence (1980s) of extensive serpulid reefs throughout the eastern side of the loch.

Oyster surveys

As an initial step, five permanent transects were set up in 2023 to monitor fluctuations in population levels, with oyster numbers recorded along the transect from year to year. That work is ongoing, and a major population survey with the Marine Conservation Society and Seasearch is currently under way (autumn 2026).

These initial surveys showed maximum densities of between 7.36 and 9.72 oysters per m², but as the transect sites were chosen for the presence of oysters, the overall density in the loch will be much lower. These densities are significant by current standards but far below historical levels: the historic population was estimated at at least a million, whereas current estimates of population size are in the low tens of thousands.

Since the oyster fishery collapsed in the first half of the twentieth century, the population has not recovered to pre-exploitation levels. This is probably due to a number of factors. There have been sporadic episodes of illegal collection, most recently in 2025. The oysters in the loch also harbour the haplosporidian parasite *Bonamia ostreae*, which causes increased mortality when the oysters are stressed by events such as spawning and possibly sediment pulses from the land. Illegal collecting and *Bonamia* may explain the absence of large, old oysters in the loch: shells over 130 mm in diameter have been collected, whereas no living oyster has been found with a diameter greater than 100 mm.

Successful reproduction and settlement require a number of conditions to be met — water temperature, water quality, the presence of larval food at the right time, enough oysters in close proximity to allow fertilisation, and suitable substrate for larvae to settle on. Some of these are regularly met in the loch, including temperature and suitable settlement substrate. However, the current population, while abundant enough to allow some recruitment, is scattered, making fertilisation less successful than it could be.

To counter this, AWL is working with Heriot-Watt University and the Marine Conservation Society to set up low-cost spatting ponds using ex-trout-hatchery tanks, and to restore the historic Rhu spatting pond in 2027. If successful, the project will greatly increase the production of larvae in the loch and the subsequent settlement of young oysters.

Because of the presence of *Bonamia ostreae*, the loch is subject to a Confirmed Designation Notice (CDN2020003, served 14 May 2020 under the Aquatic Animal Health (Scotland) Regulations 2009) restricting the movement of oysters out of the loch. *Bonamia ostreae* is a major threat to oyster reef restoration projects across Europe. Working with the Roslin Institute, AWL has been instrumental in successfully testing a new non-lethal test for the parasite. This will allow the project to test potential broodstock oysters for *Bonamia* before placing them in the

spatting ponds, which should reduce post-spawning mortality to acceptable levels. The Roslin Institute has advised that, because the population carries *Bonamia ostreae*, it is more vulnerable to additional environmental stressors, and that maintaining good water quality is important for its long-term conservation (Roslin Institute, letter to AWL, 29 July 2026; Regan et al. 2025).

Once larvae have been produced they need suitable substrate to settle on, preferably oyster shell. The West Loch is unusual in that a great deal of oyster shell still lies on the seabed, reducing the need to introduce additional substrate. But for settlement to succeed the shells must be lying on the seabed, not buried under sediment. At present the oysters are concentrated in a narrow depth band from the shore to a depth of around 2 m, below which soft mud predominates. Any increase in sediment settling in shallow water would be of concern, as it would smother the oyster shell and prevent settlement. Increased sediment loading would also reduce larval survival by preventing larvae from feeding.

Seagrass beds

The Seasearch surveys also recorded significant areas of seagrass, the largest stretching for over 1 km along the northern shore west of Kennacraig. The largest area is sublittoral *Zostera marina*, but the littoral seagrass *Zostera noltii* is also present, and a new, previously unrecorded *Z. noltii* bed was found as recently as July 2026. Both species rely on clear water to thrive. Seagrass was recorded at the head of the loch in the 1970s but recent searches have failed to find any. Seagrass is sensitive to increased turbidity, so any increase in the sediment loading of watercourses flowing into the loch is likely to be detrimental. AWL is currently surveying rather than restoring seagrass, but seagrass is as sensitive to silt as the oysters: as a flowering plant it depends on light reaching the seabed for photosynthesis. Seagrass restoration is a high-profile public cause on the west coast, with organisations such as Seawilding and Highlands Rewilding actively restoring beds.

Serpulid reefs

The polychaete worm *Serpula vermicularis* is a common resident in sea lochs all over the west coast of Scotland. It secretes a hard calcareous tube, often attached to rock or mollusc shells, usually as individuals. In a few locations, however — notably Loch Creran — the worms join together to form highly biodiverse biogenic reefs. Other locations where this is known to have occurred include the nearby Loch Sween and Loch Teacuis. The serpulid reefs in Loch Sween died out in the 1990s, and the reefs in Loch Creran and Loch Teacuis have been deteriorating over the last decade. There are records of live reefs in West Loch Tarbert in the 1980s, and Seasearch survey divers have located relict reefs in a number of locations in the loch. It is quite possible that when oyster populations were higher the loch also supported extensive serpulid reefs.

Seasearch divers in Loch Sween recorded resurgent serpulid reefs growing on old discarded clay field drains in 2024. Accordingly, AWL has started a project, funded by Sea-Changers, working

with local schools to produce clay structures which will be placed on the seabed in the hope that serpulids will settle on them and form biogenic reefs. This would be a world first if successful. Serpulids are filter feeders, and any increase in sediment loading is likely to be detrimental to their survival.

Ongoing work

The Seasearch surveys carried out to date have concentrated on the upper reaches of the loch. In the coming years there are plans to extend the surveys to the loch entrance, where there are old records of maerl beds — yet another Priority Marine Feature.

Key sources

Cefas/FSA West Loch Tarbert sanitary survey (2010);
R. H. Millar, Scottish Oyster Investigations (1961);
OysterArk2 Feasibility Study (2026);
Seasearch Scotland survey records and oyster belt-transect data;
Roslin Institute native-oyster research;
Regan, T., Vythalingam, L., Nascimento-Schulze, J., Paisley, O., Karmitz, A., Hanley, N.M., Sanderson, W.G. and Bean, T.P. (2025), Non-invasive detection method for *Bonamia ostreae* infected *Ostrea edulis*, *Aquaculture* 599, 742153;
Roslin Institute letter to Action West Loch (29 July 2026);
Scottish Government, Confirmed Designation Notice CDN2020003 (2020);
UMBSM (2007), Conservation of the Native Oyster *Ostrea edulis* in Scotland, SNH Commissioned Report No. 251;
SEPA shellfish water site reports 104 (Inner West Loch Tarbert) and 105 (Loup);
JNCC Special Areas of Conservation, Tarbert Woods (UK0030286); Scottish Government,
Sound of Gigha SPA business and regulatory impact assessment (2020);
NatureScot maerl bed and serpulid reef guidance and conservation advice;
NatureScot Research Report 1349; Tyler-Walters, H. et al. (2016), Descriptions of Scottish **Priority Marine Features**, SNH Commissioned Report No. 406.