Cruachan Power Station Biodiversity Survey 2024

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Produced by David Fotheringham, Blue Leaf Nature, for Cruachan Power Station, April 2025

A close-up of a Dor Beetle Geotrupes stercorarius which was caught in one of the moth traps – the first Cruachan record since 2018

1.0 EXECUTIVE SUMMARY

Welcome to the 14th Biodiversity Survey Report prepared by Blue Leaf Nature for Cruachan Power Station.

Cruachan is a pumped storage power station with a capacity of 440MW situated at Loch Awe, Argyll, at grid reference NN0791226753. Its turbine hall is located 1km underground, generating water supplied from Cruachan Reservoir to the north of the site.

The station is set in a celebrated landscape close to one of the finest examples of an old oak woodland in Scotland and framed by the impressive massif of the Ben Cruachan horseshoe. Blue Leaf first carried out surveys for Cruachan in 2009, initially for ScottishPower. We are delighted to continue our work for Drax, who obtained the site in 2018.

In 2024, Blue Leaf's surveyor visited Cruachan on five days to carry out a Breeding Bird Survey (BBS), a moth-trapping session and continue to monitor insects and other species present on the Drax landholdings.

1.1 BREEDING BIRD SURVEY

- A total of 45 species of birds was recorded at Cruachan Power Station during the Blue Leaf survey in 2024. All of these are common and widespread species associated with woodland, upland and waterside habitats.
- Ten Red List species – those of highest conservation concern in the document Birds of Conservation Concern 5 – were found. These include Great Black-backed Gull, which was elevated to the Red List in 2024. We report on this species' occurrences at the power station since 2009.
- In addition, 11 Amber List birds of medium conservation concern were recorded along with 24 Green List birds – those deemed to have a favourable conservation status.
- The total of 45 species recorded at Cruachan in 2024 is well below the 15-year annual average of 49.9. In fact, only two years – 2015 and 2022, when 43 species were seen – have held lower species' totals.
- Thirty species (67%) were Confirmed as nesting on or adjacent to Drax's landholdings – a new record high confirmed rate, surpassing the old record of 57% set in the 2023 survey. House Sparrow and Common Mallard nested successfully at the station for the first time.

Black-spot Marble, one of 11 new micro moths found in 2024

1.2 MAMMAL REPORT

- Six species of mammal were recorded in 2024, including the IUCN "Near Threatened" European Otter at the Loch Awe area. Small mammal trapping was carried out on a single night while the use of a thermal imager proved useful in identifying deer at upland Cruachan.

1.3 INVERTEBRATE SURVEY

- A total of 157 species of invertebrates was recorded in 2024. These involved a woodlouse, three dragonflies, a grasshopper, five true-bugs, 12 beetles, 90 moths and butterflies, 32 true-flies and 13 species of bees and wasps. This is an improvement on 124 in 2023 and 115 in 2022.
- A total of 35 insects was recorded by Blue Leaf for the first time at Cruachan in 2024. Comparison with available datasets suggests that 25 of these have not previously been recorded in Cruachan's 10km^2 (NN02). Since the survey started in 2009, a total of 327 species, apparently new to NN02, have now been recorded by Blue Leaf.
- At a higher resolution, two of the micro-moth species reported in 2024 have apparently not previously been recorded from Argyll Mainland (Vice-county 98, VC98). If we include these species, found by Butterfly Conservation Scotland, a total of 79 new species for Argyll Mainland have been reported by the Blue Leaf at Cruachan since 2009.
- The two moth-trapping sessions in 2024, combined with daytime finds, broke previous records for both the numbers of species identified and total moths caught.
- 84 moth species were recorded while a trapping session, overnight on 16-17/7, resulted in 353 moths of 52 species being retained – including 174 individuals in a single trap at the rocky, narrow section of dam access road. The previous largest total catch in a single night was 148 in May 2018.
- In 2024, 24 new moths were recorded, equivalent to 28% of the total, increasing to 217 the number of moth species that have now found at the station. These include five new species in 2024 that are listed as being "Nationally Scarce".
- Despite this success, it proved a challenging year for finding many insect families. There were low totals of just three dragonfly species and only six species of butterfly, likely linked to the cool and dull weather that prevailed over the summer as well as extreme rainfall totals in August.
- A total of 32 species of true-flies were recorded in the 2024 survey, with representatives of eight orders. Diversity and numbers of all Dipterans were much reduced due to the weather, however, representatives of two new families were recorded: the *Dolichopidae* and *Dryomyzidae*.
- 13 species of bee and wasp were recorded in 2024, with healthy numbers of aculeates visiting the dam road margins in spring and early summer. A new species of sawfly was recorded as well as a "Nationally Rare" mining bee which, although first seen in 2021, we report on for the first time.

1.4 GENERAL CONSERVATION UPDATES

- This report updates on the progress towards the launch of a new Scottish Biodiversity Strategy. Consultation on the draft *Scottish Biodiversity Strategy to 2045: Tackling the Nature Emergency in Scotland* with the findings of the consultation programme carried out in 2023.
- We discuss Ash Dieback, a highly destructive disease of the UK's native ash species, Common Ash *Fraxinus excelsior*. Unfortunately, several live ash trees at Cruachan demonstrated evidence of dieback, or Chalara, infection. Meanwhile, dead ash trees near the visitor centre entrance gate have likely already succumbed to the disease and were removed by Drax over the winter 2023-24.

Looking west along the Brander Pass at sunset on the July moth trapping night

2.0 INTRODUCTION

Welcome to the 14th Cruachan Power Station biodiversity survey report by Blue Leaf Nature.

This detailed account is based on five fieldwork days carried out in 2024 that aimed to develop station management's understanding of the fauna and flora at the station's landholdings at Cruachan, near Lochawe, Argyll.

Blue Leaf carried out its first survey for Cruachan in 2009 and has since delivered a series of reports that describe the breeding birds, mammals, invertebrates and other species that are present on its landholdings and areas that may be affected by station operations.

We have also produced detailed reports discussing Cruachan and the Global Reporting Initiative, Invasive Non-native Species at the site and a habitat survey.

The broad objectives during the year were to:

- Continue the Breeding Bird Survey (BBS), plotting changes since 2009 and confirming, if possible, additional bird species as having bred.
- Monitor invertebrate species to improve the site's knowledge of several under-recorded families. In particular, to examine in greater detail the moth diversity at the site, by carrying out trapping with artificial lights.

Cruachan Power Station is located at NN080267 to the west of the village of Lochawe. Its boundary encloses a wide range of habitats – from the reservoir on the slopes of Ben Cruachan to the office gardens by the banks of Loch Awe.

The report examines the ecological context of the survey at Cruachan, the main focus areas for fieldwork and the best-practice survey methodologies that were used.

The findings of this year's effort are presented in the report's systematic list along with a discussion of the latest conservation status of the species that were recorded.

The various surveys help to form an inventory of species and provide a baseline against which changes in species' occurrence and population can be measured going forward.

Such fundamental information will be particularly important in the context of any future development at Cruachan Power Station. Finally, the significance, in a local and national context, of each species recorded in 2024 is also explored.

Coille Leitire SSSI is important for Pearl-bordered Fritillary

3.0 BIODIVERSITY POLICY

3.1 DESIGNATED SITES

The United Kingdom supports a wide variety of species and habitats that are deemed important in a local, national and international context.

The key policy tool for conserving special areas and important wildlife is the designation and management of protected sites – areas of land, inland water and the sea that have special legal protection. Such protection to prevent damaging activities is enshrined in international treaties as well as European and UK legislation.

Cruachan Power Station is on or adjacent to the Coille Leitire Site of Special Scientific Interest (SSSI), designated in 1986, which is a native broadleaved woodland on the north edge of Loch Awe.

SSSI designations protect wildlife and land features of outstanding quality and are notified in Scotland by NatureScot (formerly Scottish Natural Heritage) under the Nature Conservation (Scotland) Act 2004. Under SSSI legislation, landowners and operators must inform NatureScot and gain consent for any proposed operation that may affect the notified features of the protected site. The woodland is also a component in the wider Loch Etive Woods Special Area of Conservation (SAC) designated site and the power station is adjacent to the Loch Etive and Glen Fyne Special Protection Area (SPA), designated in 2010 for its population of Golden Eagle *Aquila chrysaetos*.

SACs are designated to protect rare or vulnerable habitats and species that are listed in the 1992 EU Habitats Directive. SACs are designated in Scotland under the Conservation (Natural Habitats) Regulations 1994 (as amended).

Special Protection Areas aim to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, or certain regularly occurring migratory species. Although the UK has left the EU, the Scottish Parliament has passed legislation to ensure that Scotland's nature will remain protected to the same standard as before.

COILLE LEITIRE SSSI

The Coille Leitire woodland SSSI extends over 101 hectares and is notified for its Atlantic oak woodland features and its resident population of European Otter *Lutra lutra*.

The mixed deciduous woodland has a rich field layer of tall herbs and woodland grasses and is dissected by numerous burns, some with spectacular gorges, that support rich assemblages of ferns and stoneworts that require shade and high humidity to thrive.

The site supports a strong woodland bird community and its invertebrate fauna includes the Scottish Biodiversity List (SBL) butterflies Pearl-bordered Fritillary *Boloria euphrosyne* and Small Pearl-bordered Fritillary *Bolaria selene*.

In its most recent assessment, in July 2000, the SSSI's condition was described as '"Favourable Maintained" although it faced negative pressures from the spread of invasive Rhododendron and grazing by deer. There were no change to the designation in 2024 and limited case work.

Cruachan's Site Offices, Visitor Centre and Contractors Compound are within 20m of the Coille Leitire's southern boundary, which starts on the north side of the Glasgow to Oban railway line.

Within the SSSI are two water sources serving the station. A small pool, measuring approximately 4m x 3m, at NN07962686 provides water for the contractors

compound. A rough stone-built dam about a metre high contains the water that is piped to the compound.

The second source at NN08142671, which serves the Site Offices and Visitor Centre, is a much more permanent structure. It consists of a concrete water trap, 6m x 4m, that intercepts a stream that tumbles in a mini waterfall into a pool approximately 4m x 3m and 2m deep.

Meanwhile, the north edge of the Coille Leitire SSSI is adjacent to the Cruachan Reservoir Access Road for about 1.5km of its length and the woodland heavily influences the range of birds, mammals and other species present.

The management statement for Coille Leitire recommends removal of invasive Rhododendrons to the north of the site, to prevent their spread into the SSSI.

It also highlights the beneficial impact of the management of powerline wayleaves associated with Cruachan for creating suitable conditions for invertebrates, such as the Small Pearl-bordered Fritillary.

LOCH ETIVE WOODS SAC

The Coille Leitire SSSI is a component in a wider protected area designation, the Loch Etive Woods Special Area of Conservation (SAC).

The SAC consists of nine distinct ancient woodlands covering 2639ha in North Argyll and Highland.

Loch Etive Woods is considered one of the finest old Sessile Oak *Quercus petraea* woodlands in the UK. Its qualifying features include its old Sessile woodlands, such as found at Coille Leitire and nearby Glen Nant, and its Tilio-Acerion forests that occur in the deeply-incised rocky gorges and ravines, including canopy species such as Common Ash *Fraxinus excelsior*.

The SAC's woodland features were described as "Unfavourable Recovering" in the most recent assessment (2001) due to the pressures of deer and invasive Sitka spruce and Rhododendron. The SAC was unchanged in 2024 and there was limited case work.

GLEN ETIVE AND GLEN FYNE SPA

The Glen Etive and Glen Fyne Special Protection Area (SPA), designated in 2010 for Golden Eagle, includes the entire Ben Cruachan range and area to the south, enclosing Cruachan

The Allt Cruachan burn has carved a deep ravine through the Coille Leitire SSSI, seen here at the contractors compound area

Reservoir. On its west side, the SPA extends down to the main road at the Pass of Brander. The SPA boundary follows the 150m contour east from the reservoir site. The SPA extends over 81,104ha, divided into two distinct sections: Glen Etive to the north and Glen Fyne to the south.

The SPA cites recreation/disturbance as potential risks to the eagle population but an assessment, in 2015, found the notified interest to be "Favourable Maintained".

3.2 PRIORITY HABITATS AND SPECIES

The allocation of resources and prioritisation of biodiversity action in the UK has been guided by the development of the UK Biodiversity Action Plan (UK BAP), which was developed by the UK Government to meet its commitments under the Convention of Biological Diversity, signed in 1992.

Since December 2012, responsibility for implementing biodiversity improvement has been passed to the devolved authorities, including the Scottish Government. The Scottish Biodiversity Strategy (SBS) was first published in 2004 as Scotland's response to its obligations under the Convention of Biological Diversity and the UK BAP.

The strategy, which is currently being reviewed (see panel right), highlights those animals, plants and habitats that are considered to be of principal importance for biodiversity conservation in Scotland.

The SBS has cascaded down to local government – a local biodiversity action plan is administered by Argyll and Bute Biodiversity Partnership, a coalition of more than 30 organisations including Argyll and Bute Council.

The current version of the plan operated between 2016 and 2021 and is due to be updated. The Plan has adopted an ecosystems approach to the protection of habitats and species – three ecosystems are relevant to Cruachan Power Station: Freshwater and Wetland, Woodland and Upland.

Using this approach and working with partners and landowners, the Plan seeks to improve habitat quality and extend habitat connectivity to help the species present. The council recently published its Biodiversity Duty Compliance Report 2021-2023 that sets out recent achievements.

3.3 ROLE OF THE JNCC/RED DATA LISTS

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to the UK Government on UK and international nature conservation. The JNCC contributes to maintaining and enriching biological diversity, conserving landscapes and habitats and sustaining natural systems.

Lesser Redpoll is one of the Red List birds recorded in past Cruachan surveys – but the finch was not found in 2024

JNCC also leads the Species Status Assessment Project that provides status information for terrestrial and freshwater species, some marine species and terrestrial habitats.

These include the Population Status of Birds in the UK (Gregory *et al* 2002) that placed birds in one of three lists – Red, Amber or Green. Red List species are those of the highest conservation concern usually due to a population decline or contraction in their breeding range. Amber List species are those of medium conservation concern while Green List species enjoy favourable conservation status.

The lists of birds of conservation concern were reviewed in December 2021 in the document *Birds of Conservation Concern 5* (BoCC5, Stanbury *et al* 2021).

Similar JNCC status reports exist for vascular plants, mammals, dragonflies, freshwater fish, other branches of invertebrates, fungi, lichens and mosses, liverworts and stoneworts etc – and these follow a similar selection criterion to that of birds. The following species summaries in the

3.4 SCOTTISH BIODIVERSITY STRATEGY

Scottish Government's consultation for its new draft strategy document *Scottish Biodiversity Strategy to 2045: Tackling the Nature Emergency in Scotland* was concluded by December 2023.

The new strategy sets out plans to address the twin crises of climate change and biodiversity loss by 2045 and deliver landscape-scale, transformative change to meet the Scottish Government's statutory targets.

Priority actions will focus on accelerating nature restoration, expanding and improving protected areas and helping vulnerable species to recover. The tranche of measures is based on the principle of tackling the nature and climate emergencies together.

It is the first full rework of the strategy since the original was published in 2004 and its authors hope it will come into effect, after consultation, within a year – although there had been no formal annoucements by the time of the Cruachan report being finalised.

The new strategy would introduce statutory targets for the restoration of nature and seek to deliver transformational changes to protect and restore terrestrial, freshwater and marine biodiversity in Scotland, backed by qualitative evidence and supported by a £65million investment fund.

It will be underpinned by a series of five-year Delivery Plans containing more than 100 actions to accelerate the pace and scale of the Scottish Government's efforts to address the biodiversity crisis.

The strategy would also result in a revision of the Scottish Biodiversity List – the species and habitats that are deemed priorities for conservation and develop effective species' recovery schemes.

The Scottish Government announced its summary of consultation findings in November 2024.

They concluded there was general support from respondents about the objectives of the Delivery Plan, particularly relating to the addition of a new objective of tackling the indirect drivers of biodiversity loss – although some stakeholders felt the plan didn't go far enough towards achieving its objectives.

2023 report includes reference, where applicable, to those that appear on the various Red Data Lists.

3.5 WILDLIFE AND COUNTRYSIDE ACT 1981

The Wildlife and Countryside Act 1981 and its amendments is the principal mechanism for the legislative protection of birds, animals and plants in Great Britain.

Part 1 of the Act legislates for the protection of birds, animals and plants. For instance it prohibits the intentional killing, injuring or taking of any wild bird and taking or destroying eggs. Species listed on Schedule 1 enjoy even greater protection and it is an offence to disturb these birds at the nest.

There are other schedules that offer similar protections for wild animals, mammals and plants. Schedule 9 of the Act deals with invasive animals and plants.

At Cruachan Power Station and its assets, Part 1 of the Act is of importance in relation to the presence of protected species that may breed on the station land or may be affected by station operations.

3.6 CRUACHAN AND THE NBN

The National Biodiversity Network (NBN) is a charity established to provide a more joined-up approach to biological recording in the UK.

The NBN is a partnership of UK conservation and wildlife groups, Government and central authorities, biological record centres, environmental agencies and many voluntary groups, such as bird clubs and natural history societies.

The organisation collates all available data on UK species and enters individual records on to a national database – the NBN Atlas – to produce maps of national occurrence for birds, mammals, insects, plants etc.

More than 298 million records had been processed in this way by December 2024, making the NBN Atlas a valuable tool for researchers.

Cruachan Power Station is located in the 100km square denoted by the prefix 'NN' which is subdivided into a hundred units measuring 10km^2 (a hectad).

The Site Offices, Visitor Centre, Cruachan Reservoir and much of the Reservoir Access Road are located in the 10km square NN02. The main part of Drax's landholding is located at the northeast edge of the hectad.

TABLE 1: NUMBER OF ALL-TYPE SPECIES RECORDED IN HECTAD NN02 AND VICE-COUNTY VC98 ON THE NBN ATLAS DATABASE

SPECIES TYPE	NN02	NN12	VC98
BIRDS	124	124	295
MAMMALS	22	22	53
FISHES	14	13	99
REPTILES/AMPHIBS	5	5	13
INSECTS	793	583	c2900
MOLLUSCS	71	43	450
SPIDERS & ALLIES	18	6	145
PLANTS	1037	914	c2400
FUNGI	507	229	c2600
TOTAL SPECIES	**2611**	**1956**	**c 8955**

The NBN maps can provide useful information on the status of species recorded in the survey although as the data is displayed on a hectad basis, the Atlas' records may not necessarily relate to Cruachan's landholdings – but they do indicate a presence (or lack of it) in the general area.

The NBN Atlas highlights 2611 species as occurring in NN02 hectad at the end of December 2024, including 124 birds, 22 mammals, 14 fishes, five reptiles and amphibians, 793 insects, 71 molluscs, 18 spiders and allies, 1037 plants and 507 fungi.

The eastern part of the dam access road, up to the area of the shepherd's cottage, is located in the neighbouring hectad NN12.

In this 10km square, there has been 1956 species reported, with most recording taking place at Loch Awe and Aalong the course of the River Orchy.

The main taxonomical groups recorded in NN12 include: birds (124 species), mammals (22), fishes (13), reptiles and amphibians (five), insects (583), molluscs (43), spiders and allies (six), plants (914) and fungi (229).

OTHER DATASETS

To gain the best possible information in compiling this report, we have consulted with national recording schemes that specialise in individual families, particularly of invertebrates.

This proved useful, especially for families where the NBN Atlas is known to be deficient in its coverage.

For instance, the Hoverfly Recording Scheme has not uploaded to NBN its database of almost two million *Syrphidae* records for at least a decade, resulting in the Atlas maps being grossly out of date.

This report refers to the species' mapping developed by the Hoverfly Recording Scheme (HRS) as well as datasets and national status resources supplied by, among others, the National Agromyzidae Recording Scheme, Andrew Green's The Sawflies (Symphata) of Britain and Ireland website and the Bees, Wasps and Ants Recording Scheme.

Buglife Scotland's Scottish Species Checklists also proved useful in establishing species known to occur in Scotland, distribution data sources and identification resources.

3.7 WATSONIAN VICE-COUNTIES

Vice-county boundaries were originally defined by H.C. Watson in 1852 to identify recording areas of approximately equal size throughout Great Britain

Many biological record schemes – for instance moth recording groups – still use the vice-county boundaries, which have remained unchanged, unlike modern county boundaries that are subject to revision.

Main Argyll (vice-county 98, VC98) encompasses the Argyll mainland from Loch Leven in the north to the Crinan Canal in the south, and incorporating all of Cowal.

The bounary then goes up Loch Long, over the summit of Ben Lui, encompasses the bulk of Rannoch Moor and then follows the Blackwater Reservoir and River Leven back to Loch Leven.

VC98 also includes the islands of Lismore, Kerrera, Seil and Luing, and the smaller islands close to these or to the mainland – but it excludes the larger islands of Islay, Jura, and Mull as well as the portion of Argyll in Kintyre.

In total, the vice-county extends over an area of 6762 square kilometres and, in this much larger area, the species list increases to around 8955 species – including 295 birds, 53 mammals, 99 fishes, 13 reptiles and amphibians, 2900 insects, 450 molluscs, 145 spiders and allies, 2400 plants and 2600 fungi.


WEST SIDE DAM TRANSECT
DAM WALL
CRUACHAN DAM 'BOWL'
PENTHOUSE POND
ALLT CRUACHAN BRIDGE
SOUTH DAM TRANSECT
DAM ROAD NARROWS
MID SECTION
'NEW' GATE
SHEPHERD'S COTTAGE
OLD QUARRY
DAM ROAD TRANSECT
TAILRACE
CONTRACTORS COMPOUND
TUNNEL
VISITOR CENTRE
SITE OFFICES
mt
sm
Allt Cruachan
Cruachan Reservoir
Beinn a' Bhùiridh
Falls of Cruachan
Fionn Allt
Coille Leitire
Lochawe
A85
KEY TO SYMBOLS
TRANSECT ROUTES
MOTH TRAP SITES
MAMMAL TRAPS

4.0 METHODOLOGY

4.1 PROCEDURE

The visits to Cruachan Power Station followed a procedure that was established in 2009, when Blue Leaf was first commissioned to undertake biodiversity work.

Station boundaries and areas of operation were identified, health, safety and environmental considerations were established – particularly lone working in a potentially hazardous environment – and procedures were set out for site visits and reporting. Regular meetings were held with Health, Safety and Environmental Advisor Roddy Davies, at which survey procedures were reviewed.

4.2 BREEDING BIRD SURVEY

A Breeding Bird Survey (BBS) forms the main element of the biodiversity species survey carried out by Blue Leaf at Cruachan in 2024. The BBS is based on the methodology devised jointly by the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB) and JNCC.

The methodology requires three visits to be made to a site in the breeding season, from March to July, to gather evidence of birds' breeding status.

Two transects have been plotted and have now been in use since the first survey in 2009. One transect runs along the western edge of Cruachan Reservoir while the other runs from the dam wall, at 340m above sea level, south to 276m.

A third transect was established in 2017 to improve the surveillance of woodland birds at the reservoir access road. The 1km route runs west along the roadway from the site of the former entrance gate.

The reservoir road transect was developed in June 2023 when the surveyor walked a 3.7km of its length between Lochawe village and the approach to Cruachan Reservoir.

This proved useful in identifying the breeding status of several species and an entire-length transect was completed again in June 2024.

Birds observed on all transects are recorded along with notes about behaviour indicative of breeding taking place.

The limited landholdings at the Station Offices/Visitor Centre and elsewhere at the reservoir road make it more practical to plot birds seen or heard on to a base map. Other areas, outwith the key study sites, such as the 'Penthouse Pond' and elsewhere along the dam access road, were visited several times over the survey period to assess the species present. Cruachan Substation has not been included in the Breeding Bird Survey since 2014.

DETERMINATION OF BREEDING STATUS

The behaviour, sex, age and location of individual birds recorded allow conclusions to be reached about their breeding status, based on three categories devised by the European Ornithological Atlas Committee (EOAC) 1979.

The categories are: Confirmed (C), Probable Breeder (PR) and Possible Breeder (PO) – although it is also possible that a bird may be merely present in a habitat and not breeding. Breeding evidence in this report follows EOAC guidelines.

Examples of confirmed breeding could include an adult bird carrying a faecal sac or food for nestlings; adults carrying out distraction displays or showing anxiety near a possible nest site; a nest with eggs or young; or fledged juveniles that have recently left their nest.

Breeding can be considered probable if a territory has been established for a period of longer than two weeks; if a pair of birds is seen in suitable habitat; if courtship is observed; or if adults are seen with nesting material. Possible breeding can be assumed if a bird is found in suitable habitat on a single visit.

4.3 INVERTEBRATE SURVEYS

A range of methodologies was employed to survey invertebrates at Cruachan. These follow guidance in the Natural England report NERR005 'Surveying terrestrial and freshwater invertebrates for conservation evaluation' (Drake, C.M *et al* 2007).

The principal aim of the Blue Leaf survey was to produce an indicative list of species that are present at Cruachan so that their conservation value could be assessed.

Sunny, south-facing and sheltered sites, with a range of vegetation types and structures, were prime areas for searches. Such sites include the Visitor Centre meadow, the north embankment of the contractors compound, the north side of the Reservoir Road and the Penthouse Pond.

Flowering plants, sunny leaf surfaces, tall stalks and stems, fenceposts and tree trunks and open areas, were all visually searched, for instance, for flies and aculeates. Objects, such as rocks, were lifted to look for beetles.

Blue Leaf has scaled down its efforts to record some of the more complex species of insect. Usually, specimens of difficult tribes that could not be identified in the field are collected and retained for laboratory investigation. Only eight specimens were collected in 2024 with a resulting time-saving, both in the field and in microscopy work.

Blue Leaf carried out moth trapping on two nights using a range of artificial light traps. A session was held at the site offices and visitor centre in June and at upland Cruachan the following month, which was the most successful trapping night since the inauguration of the survey.

Best practice, as described in the Moth Recorders' Handbook (Randle 2013), was followed in delivering the sessions and handling the catch.

4.4 SURVEY LIMITATIONS

Visits were planned, often at short notice, to take advantage of optimum weather conditions for undertaking wildlife surveys. However, it is not possible to record every bird, butterfly or plant etc. on a site during seven visits and it is likely that some species could have been overlooked.

The weather in 2024 was notable for its dull and cool conditions from June, then above average rainfall in August, when it did not prove possible to arrange a fieldwork day. A full summary of weather conditions in 2024 is on Page 11.

TABLE 2: FIELDWORK DATES AT CRUACHAN 2024

DATE	TIME	WEATHER CONDITIONS
10/5	0800-1500	12-17ºC, light west wind, cloudy after sunny start
24/6	1500-0000	15-18ºC, light SW wind, bright, some sun, 70% cloud
25/6	0000-1400	14-20ºC, light SSE wind, sunny intervals, 50% cloud
15/7	1430-0000	15-18ºC, light SW wind, bright, 70% cloud
16/7	0000-1200	10-14ºC, light SW wind, overcast, low cloud, drizzle

One of the 18W actinic battery Heath moth traps in place before dusk in mid July close to the east approach road to the dam

4.5 WEATHER IN 2024

The weather in spring/summer 2024 bucked the recent trend of increasingly warmer seasons.

After record warmth in 2023, June to September inclusive during the Cruachan survey were cooler than the long-term average and it was often duller than usual.

After a particularly wet month of April, with rainfall 160% of the long-term average, May proved to be the warmest on record in West Scotland with mean temperatures 3ºC warmer than normal.

It was unsettled though, with slightly more rain than expected and only 76% of the normal sunshine.

Low-pressure anchored off Scandinavia had a pronounced influence on the weather in June. The cool air flow from the north and a succession of frontal systems resulted in temperatures 0.6ºC below the long-term average, with less sunshine than normal.

It was drier than normal, however, with 81% of the expected rainfall totals and this trend continued into July, which saw only 77% of its normal rain, although it was often dull and cool.

Temperatures in July were 0.6ºC below the long-term average and, with 131 hours of sunshine,

West Scotland only clocked up 88% of its usual hours of sunshine.

The drier-than-normal conditions broke in August, which was a very wet month, dominated by winds from the southwest that brought in a succession of Atlantic low-pressure systems.

It was the third wettest August in West Scotland since 1836, with double (286mm) the average rainfall totals and it rained on 23 days.

Not surprisingly, it was 0.2ºC cooler than normal and sunshine was 83% of average figures.

West Scotland experienced a relatively dry and sunny September, although it was still cooler than normal (down 0.3ºC). Rainfall was about half of the mean while there was 20% more sunshine.

5.0 THE SURVEY SITES

5.1 CRUACHAN RESERVOIR

Cruachan Reservoir, at an altitude of 340m above sea level, is a man-made waterbody constructed for the storage and supply of water to Cruachan Power Station, a pumped storage plant that produces around 10% of its generated output from conventional hydro operations.

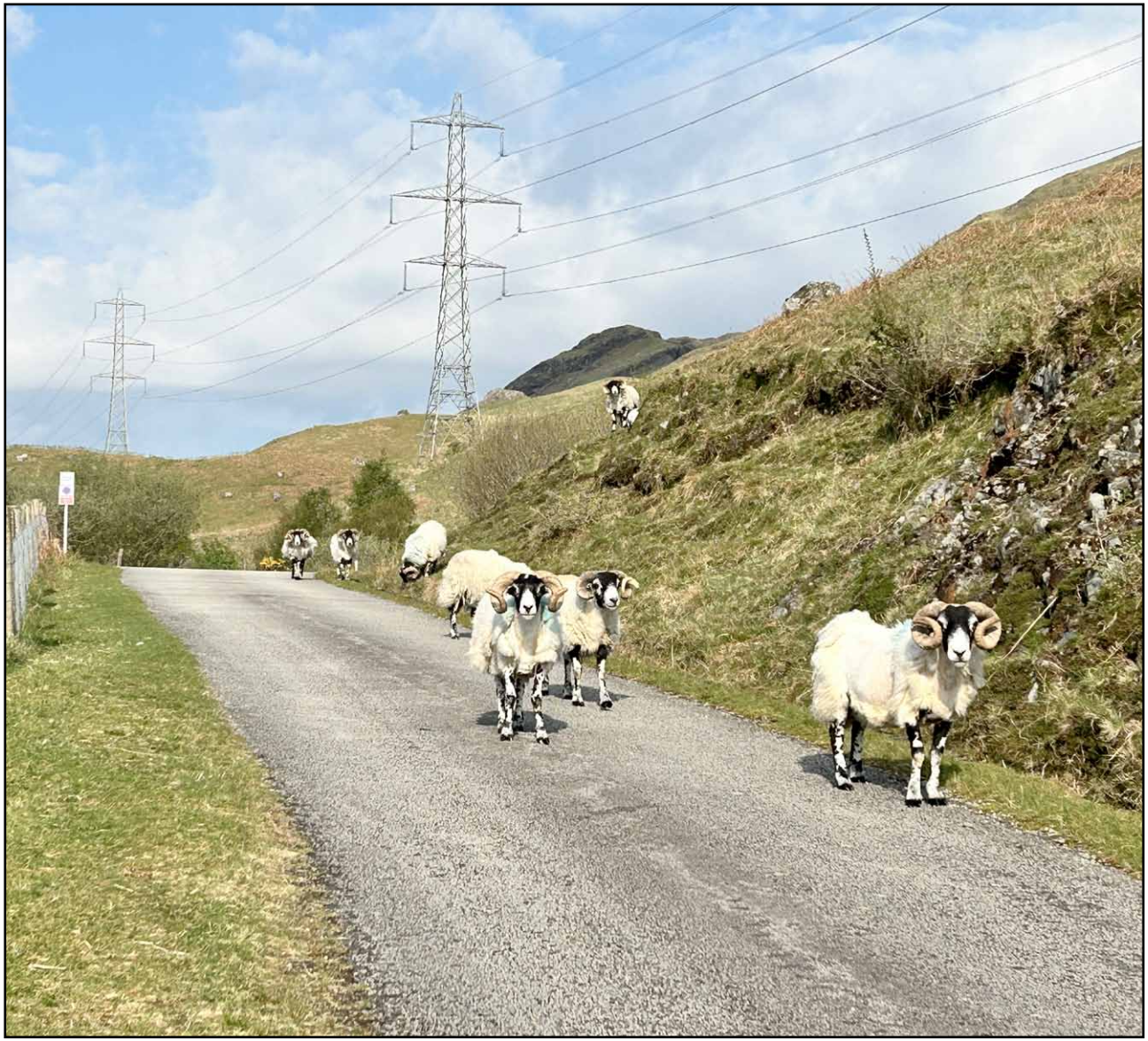
The reservoir occupies an area of approximately 44ha and is bounded on three sides by the Cruachan horseshoe, which rises to a height of 1126m at Ben Cruachan, the highest peak in Argyll. At its southwestern edge, a 316m-long buttress dam contains the water of the reservoir.

Land around the edges of the reservoir is unenclosed open hill ground, grazed by sheep. The habitat is largely semi-improved acid grassland with pockets of unimproved grassland and marsh supporting the typically vegetative communities that exist in acidic podzols and peat.

The characteristic plants around the reservoir include various grasses and sedges, and mosses of the genus *Sphagnum*. Typical wildflowers include Tormentil *Potentilla erecta*, Common Lousewort *Pedocularis auriculata*, Heath Spotted-orchid *Dactylorhiza maculata*, Creeping Thistle *Cirsium arvensis* and Marsh Thistle *Cirsium palustre*, with small numbers of other species such as Common Dog-violet *Viola riviniana*. In general, however, the habitat at Cruachan Reservoir lacks botanical interest, likely as a result of overgrazing by sheep.

A steep area of road embankment in the southeast corner of the reservoir contains a richer diversity of plant species, including Arctic-alpine saxifrages. Another characteristic of the reservoir's surrounds is large numbers of granite boulders that provide habitat for mountain-breeding birds, although these occur in low densities.

Survey method: A 1.5km transect has been established from NN08262942 at 415m above sea level to NN07812813 at 400m above sea level. This route (mapped in previous reports), along the western edge of the reservoir, is walked and birds seen or heard plotted on a BBS record sheet. Casual monitoring of other wildlife takes place and moth trapping has taken place in past years close to the reservoir and at the access road to the southeast of the dam.



Sheep grazing the margins of the dam road at its east end. One of the survey's Breeding Bird Survey transects follows this route

Bog Myrtle among Soft Rush NVC M23 habitat

Yellow Saxifrage on ledges at the reservoir

Common Cottongrass at the Penthouse Pond

White Clover in the margins of the dam road

5.2 SOUTH OF THE DAM WALL

The Allt Cruachan burn and an access road to the west side of the dam structure dissect the large bowl-shaped area south of the dam wall.

The area is dominated by semi-improved acid grassland, similar to the National Vegetation Classification (NVC) U4 community – with Sharp-flowered Rush *Juncus acutiflorus* rush mire (similar to NVC M23a) in wetter areas at the south and east of the site, and small areas of tertiary habitats including flush and Bracken *Pterodium aquilinum*.

Species present are similar to those listed above but include wet grassland species such as the carnivorous plants Round-leaved Sundew *Drosera rotundifolia* and Common Butterwort *Pinguicula vulgaris*, plus Common Cotton-grass *Eriophorum angustifolium*, Bog Myrtle *Myrica gale* and Devil's-bit Scabious *Succisa pratensis*.

The area has a limited range of breeding birds but the Allt and its wetlands host a varied invertebrate assemblage and was the site of the only Cruachan record of Beautiful Demoiselle *Calopteryx virgo*. The river has also hosted amphibians, including Palmate Newt *Lissotriton helveticus*.

Survey method: A 1km transect starts at NN07922792 at 340m above sea level to NN08092736 at 276m above sea level, just above the tree line. This route is walked and birds seen or heard are plotted on a record sheet. Casual monitoring of other wildlife takes place on the transect walk.

5.3 THE PENTHOUSE POND

The Penthouse Pond is the name given by Blue Leaf to identify a small permanent pool at NN0797227658, approximately 0.7km south of Cruachan Reservoir.

Despite measuring just 20m x 7m, the waterbody is an oasis of freshwater life in an area generally lacking in other pond features. Around 1.5m deep at its south end, the pool becomes increasingly shallow then grades out into marsh and wet grassland at its north and west edges.

As an eutrophic standing water, it has high levels of nutrients and supports healthy populations of invertebrates.

The presence of various water snails and beetles, and a small colony of Palmate Newt is an indicator of excellent water quality. The Pond is also the key site for damselflies and dragonflies in the survey area, hosting up to eight breeding species.

There is limited marginal vegetation, possibly due to grazing, but this includes various sedges, Common Cottongrass *Eriophorum angustifolium*, Soft Rush *Juncus effusus* and Purple Moor-grass *Molinia caerulea*.

5.4 THE RESERVOIR ROAD

The Reservoir Access Road extends for approximately 5km and permits vehicles to access Cruachan Reservoir from Lochawe Village (NN11262660). The single-track metalled road starts at 50m above sea level but climbs to 350m beside the reservoir dam wall.

For much of its length, the road runs parallel to the Coille Leitire SSSI. The mixed deciduous woodland is particularly close to the road at the eastern, lower end – where a new transect route was established in 2017.

Drax own both the road and its immediate margins and maintenance has been carried out in recent years both to cut back where vegetation is encroaching the roadway and to realign areas of embankment to prevent rock falls.

The Reservoir Access Road was highlighted as an area of High Biodiversity Value in Blue Leaf's report *Biodiversity at Cruachan and the GRI Index* (Fotheringham 2010), mainly for its interesting rockface plant community.

These are found on the steepest parts of the road embankment – the "dam road narrows" in the west part of its route and include Arctic-alpine plants such as Yellow Saxifrage *Saxifraga aizoides*, Starry Saxifrage *Micranthes stellaris* and Alpine Lady's-mantle *Alchemilla alpina*.

Elsewhere along its length, the road margins contain a range of nectar plants, such as Bird's-foot Trefoil *Lotus corniculatus* and White Clover *Trifolium repens* that have proven important for feeding insects.

Since 2015, eroded areas of road embankment have been examined for nesting solitary bees and wasps. Some of the

key areas closely looked at in the survey include:

- NN1202656: The vegetated road margins north of Loch Awe village. Key species: *Salix* saplings, *Juncus* wet meadow, Marsh Thistle, Devil's-bit Scabious. Solitary wasps and bees, Common Lizard *Zootoca vivipara*, Pearl-bordered Fritillary, Small Pearl-bordered Fritillary, Chequred Skipper.
- NN10802646: The vegetated road margins near a river gorge. *Key species: Salix* saplings, *Juncus* wet meadow, bracken, Tormentil, White Clover. Pollinating insects, including Blaeberry Bumblebee *Bombus monticola,* Tormentil Mining Bee *Andrena tarsata* and breeding Common Furrow Bee *Lasioglossum calceatum*. Violet Oil Beetle *Meloe violaceus* (at NN1057326380) in 2022.
- NN09492649 and NN08452698: Eroded road embankments. Key species: Tormentil, Wild Thyme *Thymus serpyllim*, Bird's-foot Trefoil. Pearl-bordered Fritillary. Ground beetles. Pollinating insects.
- NN08182807: Exposed rockface near Cruachan Reservoir. Key species: Yellow Saxifrage, Starry Saxifrage, Tormentil, Alpine Lady's-mantle, Rose-root *Rhodiola rosea*. Yellow-ringed Carpet *Entephria flavicinctata*, Grey Mountain Carpet *Entephria caesiata*, Red Carpet *Xanthorhoe decoloraria*. Pollinating insects.

Survey method: The BBS transect starts from the site of the old entrance gate (NN11262659) and continues west for 1km to (NN10552638) near the shepherd's cottage. In June 2023, this transect was extended from the original start point to NN0828127223 where the road turns north on the approach to Cruachan Reservoir – a distance of 3.7km – and this new transect will be adopted in future reports. In 2024, moth trapping was carried out at the dam road narrows and other points of the route.

5.5 SITE OFFICES AND VISITOR CENTRE

Located on the northwest shore of Loch Awe, Cruachan's Site Offices and Visitor Centre landholdings occupy an area of approximately 32 hectares.

The grounds contain the station offices and workshops, storage areas, the Visitor Centre, hardstanding for car parking and areas of gardens. The gardens are laid out with native and naturalised species of shrubs and trees.

Native species include Common Ash *Fraxinus excelsior*, Common Hawthorn *Crataegus monogyna*, Downy Birch *Betula pubescens*, Common Rowan *Sorbus aucuparia* and some mature Sessile Oak *Quercus petraea* trees. Over the winter 2023-2024, a number of dead ash saplings at the west end of the visitor centre compound were removed by station management. These had apparently sucummbed to Chalara ash dieback disease (see panel right).

A number of naturalised species are also present including Sycamore *Acer pseudoplatanus*, Eucalyptus *Eucalyptus globulus* and non-native conifers plus shrubs such as Rhododendron *Rhododendron ponticum* and the buddleia species *Buddleja davidii* and *Buddleja globulosa*.

The car parks are bordered by perennial lawn but the less-intensively managed road embankment north of the Visitor Centre building, and other parts of the site, have been set aside as a 'wild garden' or mini wildflower meadow.

The banks of the loch are overgrown with Common Gorse *Ulex europaeus*, providing cover and foraging for wildlife. To the north of the tailrace, trees include Ash, Sycamore and Downy Birch, backed by more dense scrub, mostly blackberry, with emerging saplings and tall herbs, notably Rosebay Willow-Herb *Chamerion angustifolium*.

The station gardens and the contractors compound on the opposite side of the A85 trunk road host mainly a woodland breeding bird assemblage while water birds are often seen on Loch Awe.

The area is also well-watched for insect species and a number of "first" records for Argyll Mainland have been recorded at the Site Office, Visitor Centre and contractors compound grounds. In 2023, the rare Scottish cranefly *Dictenidia bimaculata* was caught at the Visitor Centre – the first sighting for Argyllshire.

Blue Leaf has carried out moth trapping at the Visitor Centre, Site Offices and contractors compound on the north side of the A85 since 2017 – and this was continued on a single night in 2024.

Survey Methods: The 400m length of the compound is walked and birds seen or heard are logged on a base map along with casual monitoring of other wildlife. In addition, species observed on Loch Awe are recorded, as are birds seen or heard on the north side of the A85 that could conceivably hold territory at the station grounds.

5.6 ASH DIEBACK

Ash Dieback is a highly destructive disease of ash trees (*Fraxinus* species), especially the UK's native ash species, Common Ash *Fraxinus excelsior*.

It is caused by a fungus named *Hymenoscyphus fraxineus* – spread by wind-blown spores – which prevents water and nutrients from moving in the tree's vascular system, causing significant blackening and wilting of leaves and shoots, bark lesions and, eventually, the dieback in the crown of the tree.

Unfortunately, several live ash trees at Cruachan survey area demonstrated evidence of dieback, or Chalara, infection. Meanwhile, dead ash trees near the visitor centre entrance gate have likely already succumbed to the disease and were removed by Drax over the winter 2023-24.

Ash Dieback has been present in Scotland since 2012 and the implications are devastating for what is the third most common species of tree in the UK.

It is estimated that 80% of the country's ash tree stock will be lost at an economic cost of £15billion.

As well as commercial importance, ash is one of our most useful and versatile native tree species, providing valuable habitat for a wide range of dependent species.

It grows in a variety of soils and climatic conditions. The 'airy' nature of its foliage allows light to penetrate to the woodland floor, encouraging ground plants and fauna. A number of insects, other invertebrates, lichens and mosses depend wholly on ash for habitat.

A landowner is not legally required to take action if infected ash trees are on their land, unless served with a Statutory Plant Health Notice (SPHN) by forestry officials or other authority.

There is now a general presumption against felling infected trees as there is evidence that some may be immune to Chalara infection and that even some diseased trees may recover to good health.

Forest Research has published a Chalara manual with advice and guidance for woodland managers.

Stock shot of a juvenile (first summer) Great Black-backed Gull, showing its stout build, and (inset) adult taken at Loch Awe

6.0 BIRDS

6.1 BIRDS OF CONSERVATION CONCERN UPDATE

The Red List of birds of conservation concern was expanded in 2024, following a review of the extinction risk status of 28 seabird species that breed on Britain's shores (Brown *et al* 2024).

As a result, the declining fortunes of Great Black-backed Gull *Larus marinus*, a species that occurs at Cruachan as a non-breeding summer visitor, has led to it being added to the Red List for the first time.

The 'Great Black-back' is the world's biggest gull species and is recorded almost annually on Loch Awe – there have only been four gap years in the survey since 2009.

There are around 17,000 breeding pairs in the British Isles, mostly on the Scottish islands, but its population has halved since 1985, as a result of suspected food declines, loss of its coastal habitat to development and the threats of pollution and entanglement in fishing gear.

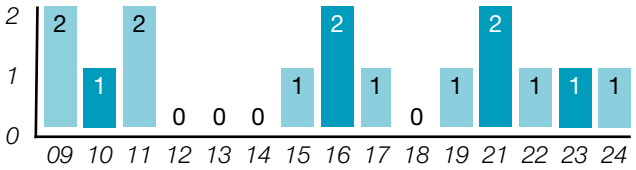
It is also one of the many seabird species that have been affected by Highly Pathogenic Avian Influenza, which has ripped through breeding colonies, causing high mortality of adults and young.

Internationally, the Great Black-backed Gull breeds in coastal areas throughout the northern hemisphere although recent estimates (Lopez *et al* 2022) suggest its numbers have crashed by 42-48% between 1985 and 2021 and there may only be as few as 150,000 pairs worldwide.

The authors of the study have recommended that the species should be uplisted to 'Vulnerable' to extinction on the IUCN Red List of Threatened Species.

At Cruachan, adults and sub-adults are recorded each

GRAPH 1: NUMBERS OF GREAT-BLACKED BACK GULLS IN EACH YEAR OF THE CRUACHAN SURVEY 2009-2019 AND 2021-2024



summer in low numbers – no more than two birds in any one year. These are non-breeders, likely attracted to Loch Awe by the presence of easy pickings at the fish farm, and easily separated from other gulls by their massive size and, in the case of adults, their jet-black wing coverts.

Juveniles have the same mottled plumage as other gull species but are generally darker and their massive bulk is unmistakable, even at distance.

A further four seabird species were added to the Red List in September 2024: Leach's Storm Petrel *Hydrobates leucorhous*, Arctic Tern *Sterna paradisaea* and Great Skua *Stercorarius skua* as well as Common Gull *Larus canus*, which could conceivably occur at Cruachan.

There are 29 Common Gull records for NN02 on the NBN Atlas, including apparent sightings from Loch Awe area – although it has not been seen in Blue Leaf surveys.

These changes, added to the Birds of Conservation Concern's fifth review (BoCC5), published in 2021, mean that of 245 regularly occurring bird species in the UK, 73 (30%) now appear on the UK Red list of species of high conservation concern.

The first Birds of Conservation Concern report was published in 1996 and has been updated approximately every six years, with the next full assessment due in 2027.

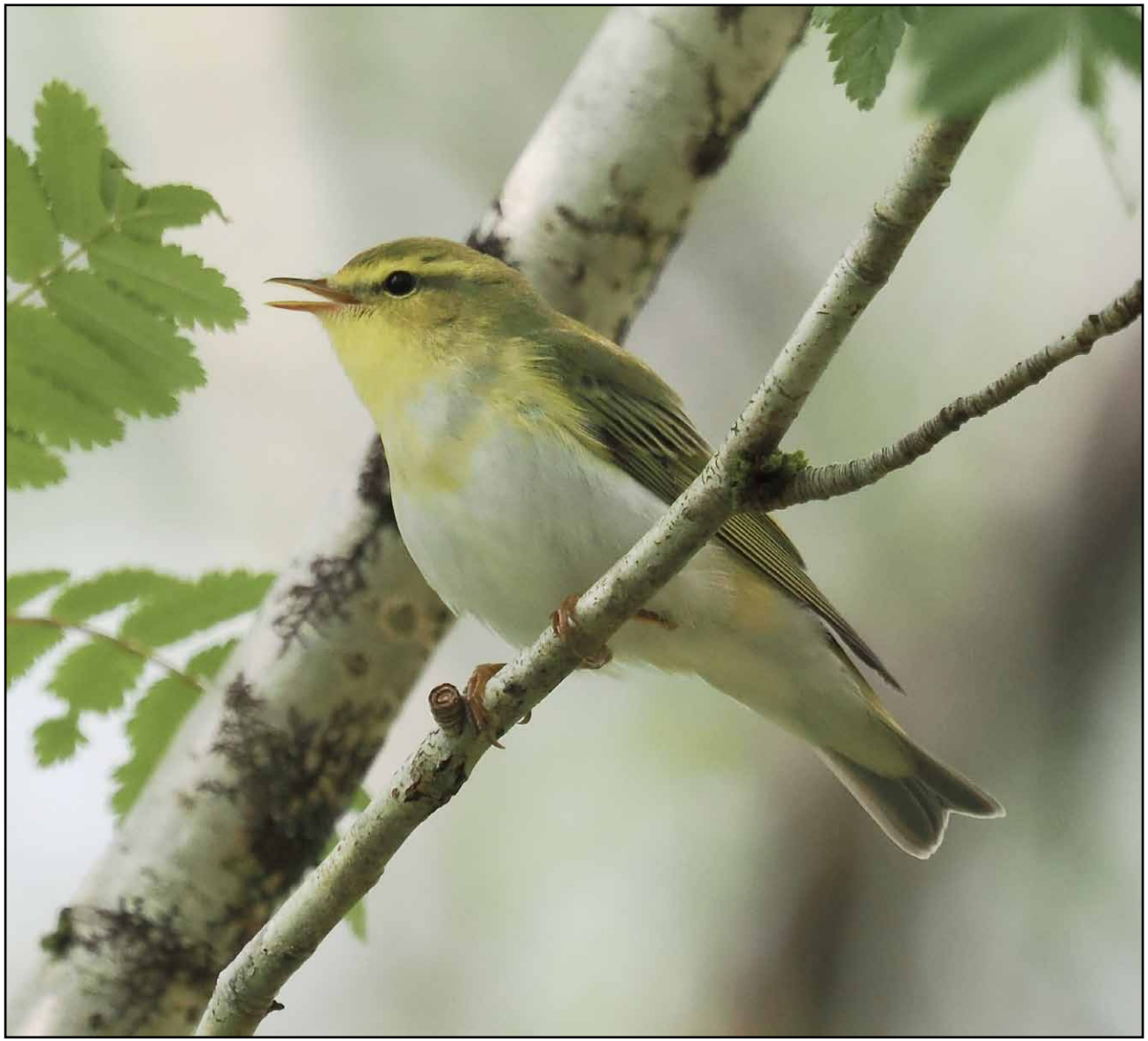
6.2 BREEDING BIRD SURVEY IN 2024

A total of 45 species of birds were recorded at the Cruachan Power Station during the Blue Leaf survey in 2024. All of these are common and widespread species associated with woodland, upland and waterside habitats.

Of the 45 species recorded, 30 (67%) were Confirmed (C) as having nested on or adjacent to Drax's landholdings at Cruachan – a new record high confirmed rate.

A further five (11%) species Probably Nested (PR) at the sites and six species (13%) were considered to have Possibly Nested (PO). The remaining five species were not thought to be breeding species at Cruachan in 2024 – they were observed outwith the nesting season or merely flying over the survey areas.

Ten of the species recorded are Red List species – those of highest conservation concern in the document BoCC5.



Male Wood Warbler singing from oak and birch woodland at the east end of the dam road, part of the only pair found in 2024

In addition, 11 Amber List species of medium conservation concern were recorded during fieldwork along with 24 Green List birds – those deemed to have a favourable conservation status. A total of 14 Red and Amber List species were confirmed as having bred at the Cruachan Power Station in 2024.

RED LIST

European Herring Gull *Larus argentatus* NB

Record numbers were recorded at Loch Awe in June, when 21 were seen loafing at the fish farm, the south shore of the loch and occasionally around the tailrace area. The count included 16 adults and five sub-adults and likely involved a non-breeding group attracted to easy pickings at the fish farm. Numbers were inflated on other dates with 12 on 10/5 (4ad, 6 sub-ad and 2juvs) and 15 on 17/7 (10ad and five sub-ad) and easily eclipsed past counts on Loch Awe.

Great Black-backed Gull *Larus marinus* NB

A new addition to the Red List, the only record in the 2024 survey was an adult on Loch Awe, associating with Herring Gulls, on the south bank of the loch (24/6).

Common Cuckoo *Cuculus canorus* PR

The first returning birds in spring were heard around the site offices at the end of April, a fairly typical time. Singing males were heard at two locations within Coille Leitire on 10/5, with one near the site offices and one from the dam road transect in woodland near the new access road gate. As usual, breeding was not confirmed – this would require luck and finding of a young bird out of the nest, being fed by its surrogate parents.

Whinchat *Saxicola rubetra* PR

The first Cruachan survey records since 2013 involved a pair that settled at the east side of the dam road, among a stand of Bracken near the old quarry. The male and female were present on 10/5, with the male seen on 24/6, issuing contact calls, in the same area. Unfortunately, breeding was not pinned down and birds had departed the site by 17/7.

Mistle Thrush *Turdus viscivorus* C

After a blank year in 2023, a pair was confirmed as having nested at the mid-section of the dam road. A singing male was present on 10/5, within the wooded gorge at NN 09556 26486, with an adult carrying food at the same site on 24/6.

Whinchat

House Sparrow

Tree Pipit

TABLE 3: RED LIST BIRDS AT CRUACHAN POWER STATION 2024, SCOTTISH BIODIVERSITY LIST STATUS AND BREEDING STATUS

RED LIST SPECIES	SBL LIST	BREEDING STATUS
European Herring Gull	YES	NB
Great Black-backed Gull	NO	NB
Common Cuckoo	YES	PR
Whinchat	NO	PR
Mistle Thrush	NO	C
Ring Ouzel	YES	PO
Wood Warbler	YES	C
House Sparrow	YES	C
Tree Pipit	YES	C
Twite	YES	C

Ring Ouzel *Turdus torquatus* PO

The first sighting since 2018 was a male, on 10/5, seen briefly on the ground then in flight at the narrowest section of the dam access road, near the raised pylon service area. It was not singing or displaying other territorial behaviour and it was felt likely it was a bird stopping off on its passage north.

Wood Warbler *Phylloscopus sibilatrix* C

Sightings were fairly scare this year, however, a pair nested in oak woodland near the location of the former dam access road gate, close to Lochawe village. A displaying male was present on 10/5 and, by 24/6, adults were seen carrying food to the nest. Just 1AOT in the survey area is a low total after 3AOT in last year's survey.

House Sparrow *Passer domesticus* C

Breeding was confirmed for the first time. After the influx of territorial pairs in 2023, a single pair was at the Visitor Centre on all visits. On 25/6, the male and female were seen making repeated visits to the bird feeders then to the eaves on the south side of the building, which presumably contained a nest. Then, on 17/7, up to four birds were at the feeders, including three females or juveniles.

Tree Pipit *Anthus trivialis* C

Numbers remain stable with a minimum of four territorial pairs in the survey area, mostly along the route of the dam access road. 2AOT were consistent on the dam access road transect, from Lochawe village, with singing males near the hazel copse and another near the quarry. Further males or pairs AOT were found further west along the road at the "narrows" and the turn to the dam, on both 10/5 and 24/6. Adults with food were seen near the quarry on 24/6, confirming that nesting had taken place. Two were heard in flight over the dam road on 17/7, possibly return migrants.

Twite *Linaria flavirostris* C

Numbers appeared to have finally reduced to pre-2021 figures, with only two pairs present during visits in the breeding season. On 10/5, five apparently unpaired birds were found on the hillside above the dam road near the Allt Cruachan bridge. It is possible the very heavy rainfall in April had suppressed early breeding activity. On 25/6, single pairs AOT were recorded at the west side of Cruachan Reservoir and at the gabions at the dam road where it turns north towards the dam. On 16/7, two juveniles feed on weed seeds at the east side car park at the dam wall. Several were heard and seen on 17/7, including juveniles, at upland Cruachan but low cloud meant that counts were not possible. This follows breeding record totals of 6AOT in 2023 and 4AOT in 2022.

AMBER LIST

Common Mallard *Anas platyrhynchos* C

A female with three small ducklings were recorded near the tailrace and Visitor Centre shore on 24/6 – the first recorded breeding at the station since survey work began in 2009. Mallard usually occurs as a non-breeding visitor from late summer, although nesting has been suspected in several years – for instance, bonded pairs present in spring. A male was present at the tailrace on 10/5 while four eclipse adults or juveniles were on the bank of the Visitor Centre on 17/7.

Osprey *Pandion haliaetus* PO

An adult was reliably reported on 20/6, perched on boulders at the north end of Cruachan Reservoir. This is the first sighting for the survey since 2016 of this former breeder.

Common Sandpiper *Actitis hypoleucos* C

After none was seen in 2023, nesting was confirmed in the current survey at the embankment of the Visitor Centre car park – the same venue as successful breeding in 2022. A pair was first seen on 10/5 on the shingle shore at the location and, on 24/6, the birds became extremely agitated on approach, with one bird engaging in distraction displays – suggesting a nest or young were nearby.

Lesser Black-backed Gull *Larus fuscus* NB

Adults were ever-present on Loch Awe, often around the fish farm and south bank of the loch but, on occasions, visiting the power station tailrace. The peak count was three adults on 24/6 with 1ad (10/5) and 2ad on 25/6 and 17/7 – numbers that are comparable to last year's survey.

TABLE 4: AMBER LIST BIRDS AT CRUACHAN IN 2024, SCOTTISH BIODIVERSITY LIST STATUS AND BREEDING STATUS

AMBER LIST SPECIES	SBL	BREEDING STATUS
Common Mallard		C
Osprey		PO
Common Sandpiper		C
Lesser Black-backed Gull		NB
Song Thrush	YES	C
Northern Wheatear		C
Willow Warbler		C
Meadow Pipit		C
European Bullfinch	YES	C
Dunnock	YES	C
Winter Wren		C

Song Thrush *Turdus philomelos* C

Transect counts on 10/5 and 25/6 revealed 2AOT at the east end of the dam road and 2AOT at Loch Awe side, including territorial males at the contractors' compound and site offices. A newly-fledged juvenile was also seen near Loch Awe village on the latter date. This is the third year in a row that 4AOT have been found in the survey, indicating the local population is stable.

Northern Wheatear *Oenanthe oenanthe* C

Just 4AOT were counted on the transects at upland Cruachan – equalling the record low total in recent years. These included 3AOT at the west side of the reservoir and 1AOT in the boulder field south of the dam wall on both 10/5 and 25/6. There was little evidence of breeding success – the only juvenile seen was at the car park at the east side of the dam wall on 16/7.

Willow Warbler *Phylloscopus trochilus* C

Numbers appeared to be reduced on the record 19AOT that were present in 2023. In the current survey, 9AOT were logged on 10/5, increasing to 14AOT on 25/6 – with 10AOT along the length of the dam access road and 4AOT at the site office and visitor centre. Adults were seen carrying food on 25/6 at the site office lochside and the river gully near the shepherd's cottage. By 17/7, post-breeding flocks containing juveniles had started to form, with eight in Bracken at the east end dam road and 20+ within the tree-line at the rocky, narrow section of dam road, further to the west.

Meadow Pipit *Anthus pratensis* C

A maximum of 17AOT were recorded – a drop from the record 25AOT in 2023 but a figure consistent with previous years and still a count on the high level of the scale. These included 5AOT on the transect at the west side of Cruachan Reservoir, 6AOT on the west and south of the dam wall and 3AOT from the dam access road transect. By 25/6, at least four adults were seen carrying food for young at the west side of the dam with two fledgelings out of the nest at the west part of the dam road the same day. Numbers were inflated also on 17/7, with flocks of 12 at the east dam road and 10 near the shepherd's cottage.

European Bullfinch *Pyrrhula pyrrhula* C

A party of two males, a female and three juveniles was recorded on 24/6 in birches at the west end of the dam access road. This formerly scarce breeding species at Cruachan has now been proven to have nested in three consecutive years. Meanwhile, a pair was present at loch embankment the site office on 10/5 but not seen on subsequent visits.

Dunnock *Prunella modularis* C

Adults and juveniles were seen around the Visitor Centre bird feeders on 24/6, confirming that nesting had taken place. On the BBS transects, 3AOT were counted, involving 2AOT at the site offices/visitor centre and 1AOT in the gorge near the new dam access road gate.

Winter Wren *Troglodytes hiernalis* C

A total of 7AOT were found on the BBS transects – an average figure, down on the 2023 total (10AOT) but

Below, juvenile Northern Wheatear at Cruachan Dam and, above from left, Common Sandpiper, Meadow Pipit and Dunnock

comparable to previous years. Most were present at the dam road, with 4AOT on 24/6. Just one territory was found at the Loch Awe transect while, unusually, a singing male was recorded in the gorge at the base of the dam wall in upland Cruachan. Adults carrying food were seen on 24/6 at the Visitor Centre loch embankment – potentially an additional pair – and two family parties of juveniles were seen on 17/7 at the Loch Awe transect.

GREEN LIST

Grey Heron *Ardea cinerea* NB

There was a single record on the evening of 24/6, of an adult flying west up Loch Awe towards Brander Pass before alighting on the south side of the loch. Again, no daytime roost was present on the banks of the south inlet.

Canada Goose *Branta canadensis* C

Three pairs were recorded at Loch Awe on 10/5, including 1pr just offshore at the west end of the visitor centre. There was the usual noisy and conspicuous post-breeding congregation on the loch, involving 46 adults and juveniles on 24/6, many of which were loafing on the shore opposite the site offices.

Goosander *Mergus merganser* PO

The first sighting of this elegant “sawbill” fish-eating duck since 2017, and only the third record for the survey, was a male on Loch Awe, on 10/5, seen from the west side of the visitor centre.

Common Buzzard *Buteo buteo* PR

Records were rather few and far between with, unusually, none seen in flight around Cruachan Reservoir. Two were recorded at the east dam road transect on 10/5 and 24/6, usually floating high over the woodland, along with one calling from within the Coille Leitire SSSI, from the visitor centre, on the latter date.

Common Pheasant *Phasianus colchicus* PO

Recorded for a third consecutive year, a male was seen north of Loch Awe village on 10/5 close to the Coille Leitire woodland edge. It or another was heard calling nearby on 24/6 and breeding was considered possible.

Sand Martin *Riparia riparia* C

Small numbers returned to the new colony established at a steep section of embankment at the west end of the dam access road. Four individuals were present on 10/5, but none was seen to be entering nesting holes. Then on 24/6, at least two nest holes were occupied and containing chicks – with birds still present in the area on 16-17/7. Unusually, two alighted on the tailrace carriageway on 24/6 – the first record of Sand Martins occurring here, although breeding has been suspected nearby in A83 road embankment drainage holes to the west of the visitor centre.

Barn Swallow *Hirundo rustica* C

Nesting was attempted for a second consecutive year, with an adult on nest (24/6) on the west side of the tunnel entrance, although apparently the nest was not successful, with no presence of any birds here on the July visit. Three fed near the sheep byre at the dam road the same day and two hunted over Loch Awe early morning on 17/7.

Great-spotted Woodpecker *Dendrocopos major* C

Breeding was confirmed on 16/7 when two juveniles were in oak trees at the visitor centre, being fed by a female from peanuts at the feeding station. Earlier, a territorial male was at the east dam road on 10/5, issuing its "drumming" display, and an adult was within the Allt Cruachan gorge at the contractors compound the same day.

Pied Wagtail *Motacilla cinerea* C

At least two pairs were recorded in the BBS in May and June: 1AOT at the narrow part of the dam access road and another around the dam wall area. Breeding was confirmed on 24/6, when the pair at the dam road were feeding at least one juvenile out of the nest. There was no evidence of breeding at Loch Awe area, although a male was at the tailrace on 10/5 and 16/7.

European Robin *Erithacus rubecula* C

Juveniles were recorded at the Loch Awe tailrace access road on 10/5 and the dam access road transect on 24/6, while at least 7AOT were recorded in the BBS. These involved 4AOT at the dam road and 3AOT at the Loch Awe transect. An adult was well above the treeline at the Allt Cruachan bridge on 16/7.

TABLE 5: GREEN LIST BIRDS AT THE CRUACHAN POWER STATION 2023, SCOTTISH BIODIVERSITY LIST STATUS AND BREEDING STATUS

GREEN LIST SPECIES	SBL	BREEDING STATUS
Grey Heron		NB
Canada Goose		C
Goosander		PO
Common Buzzard		PR
Ring-necked Pheasant		PO
Sand Martin		C
Barn Swallow		C
Great-spotted Woodpecker		C
Pied Wagtail		C
European Robin		C
European Stonechat		C
Common Blackbird		C

GREEN LIST SPECIES	SBL	BREEDING STATUS
Eurasian Blackcap		PR
Common Chiffchaff		PO
Eurasian Nuthatch		PO
Eurasian Treecreeper		C
Blue Tit		C
Coal Tit		C
Great Tit		C
Common Raven		PR
Hooded Crow	YES	C
Common Chaffinch		C
Eurasian Goldfinch		C
Eurasian Siskin	YES	C

European Stonechat *Saxicola rubicola* C

A pair was feeding at least three juveniles in an area of Bracken near the old quarry at the east end of the dam road on 24/6, one of two pairs recorded in this year's survey. The other pair was present at the west end of the dam road, at the turn north to the dam, on 10/5 and 24/6, but did not appear to produce young.

Common Blackbird *Turdus merula* C

Breeding was confirmed on 10/5 when a male was seen with food at the site office entrance, while at least two newly-fledged juveniles had emerged at the contractors' compound on 24/6. In the BBS, 3AOT were recorded, including 2AOT at the Loch Awe sites and 1AOT at the east dam road.

Eurasian Blackcap *Sylvia atricapilla* PR

Four pairs were found on the transects, including 2AOT at Loch Awe and 2AOT at the east dam road on 10/5 and 24/6. However, there was no further evidence of breeding – the first time this warbler hasn't been confirmed since 2021.

Common Chiffchaff *Phylloscopus collybita* PO

The first survey record since 2021 was a single male singing from the large Eucalyptus tree in the site office gardens. It was a one-day wonder, however, and not re-recorded, suggesting it was a migrant moving through the area.

Eurasian Treecreeper *Certhia familiaris* C

A pair was present in oak woodland at the east end of the dam access road in May and June and breeding was confirmed on 24/6, when an adult was seen carrying a bunch of craneflies, likely a parcel of food for its brood, to a dead ash tree. This is the first confirmed breeding in the survey area since 2022.

Eurasian Nuthatch *Sitta europaea* PO

Numbers appeared to be reduced, especially during the breeding season when there was a single record: an adult at the visitor centre bird feeders on 24/6. One was also at the east end of the dam access road on 17/7, but there was no suggestion of nesting.

Pied Wagtail

European Robin

Common Chiffchaff

Common Chaffinch

Eurasian Goldfinch

Eurasian Siskin

Blue Tit *Cyanistes caeruleus* C

The BBS transects identified 6AOT on the transects, a total similar to previous years. These included 4AOT at the east dam road and 2AOT at the Loch Awe transect. Broods were seen on 24/6 at the visitor centre bird feeders, contractors compound, Loch Awe village and at two sites at the west dam road. It seems to have been a productive year, spurred on by fair weather at the start of the breeding season.

Coal Tit *Periparus ater* C

Breeding activity was confined to the Loch Awe area, where at least two territories were recorded in the BBS. One pair associated with the firs at the site office gardens, with the other at the contractors' compound woodland, while birds were regular at the visitor centre bird feeders throughout. The latter included multiple juveniles on 24/6 and 17/7.

Great Tit *Parus major* C

A pair nested once again at the mature oak at the site office entrance, with adults carrying in food on the early date of 10/5, suggesting egg laying had started early. Later, at least three young visited the feeders at the visitor centre on 24/6. In addition, 2AOT were recorded at the dam road transect, with 1AOT at the gorge near the access road entrance gate in May and June.

Common Raven *Corvus corax* PR

Two adults fed at a sheep corpse south of the Allt Cruachan bridge on 10/5 but all other records were of birds in flight: singles at the north end of Cruachan Reservoir (also 10/5) and two over the west end of the dam road on 24/6.

Hooded Crow *Corvus cornix* C

Breeding took place at the site offices from May, when a pair took up residence in an eucalyptus tree, causing disturbance to staff members and attacking window seals. The BBS detected 2AOT at the east dam road transect in May and June while one was at Loch Awe side on 10/5 and two adults were at the Loch Awe tailrace on 24/6. The final record involved four, likely a family party, at the mid-section of the dam road on 17/7.

Common Chaffinch *Fringilla coelebs* C

A total of 14AOT recorded in the BBS is slightly down on the record 16AOT present in 2023. These involved 9AOT over the length of the dam access road, with 5AOT at the Loch Awe transect. There was little evidence of breeding success, however, with no juveniles recorded at the visitor centre feeders on 24/6 and only one juvenile on 16/7.

Eurasian Goldfinch *Carduelis carduelis* C

Just 1AOT was located during the BBS, associating with the fir trees at the site office gardens – but this represents a reduction from the average 3AOT found in past years. There was evidence of successful breeding, however, with a juvenile at the visitor centre feeders on 24/6.

Eurasian Siskin *Spinus spinus* C

Several juveniles appeared at the visitor centre bird feeders on 24/6, with at least eight birds, including adults, present at times. The fair weather in May encouraged territorial behaviour and at least 5AOT was recorded, including 4AOT at the Loch Awe transect, including two pairs at the site office firs, where nesting was considered highly likely. A further 1AOT, with a male singing and in territorial flight, was at the east dam road transect. A decent year, compared with just 2AOT in 2023.

DISCUSSION

The total of 45 species recorded at Cruachan in 2024 is well below the 15-year annual average of 49.9. In fact, only two years – 2015 and 2022, when 43 species were seen – have held lower species' totals.

A number of near-annual birds were absent during field-work in 2024, including the Red-listed species Spotted Flycatcher and Lesser Redpoll (the first gap year since 2010). We also failed to record other reliable survey species including Common Snipe *Gallinago gallinago*, Grey Wagtail *Motacilla cinerea*, Common Redstart *Phoenicurus phoenicurus*, Garden Warbler *Sylvia borin*, Goldcrest *Regulus regulus* and Long-tailed Tit *Aegithalos caudatus*.

Nevertheless, it proved an interesting year with a record high rate of confirmed breeding while the absences were balanced by the reappearance of some scarcities.

The Red-listed Whinchat was seen in the survey area for the first time since 2013, with a pair present in suitable nesting habitat in May and June and which probably bred.

This little chat was formerly widespread in Britain but changes in landscape management have led to its decline by 60% (1995-2022) and retreat into less intensively managed pasture and moorland in uplands habitats.

The area used at Cruachan, north of the old quarry at the east end of the dam road, is a close fit with Whinchat's preferred habitat – open areas of structurally diverse grassland for foraging insect prey and stands of Eagle Fern (Bracken) *Pteridium aquilinum* for perching and nesting.

Indeed, breeding occurred nearby at the dam road in 2012, with adults and several juveniles present in July of that year. All other survey sightings (2009, 2010 and 2013) were at Cruachan Substation, which is no longer assessed.

Another former breeding species, the Amber-listed Osprey, was reliably recorded at Cruachan for the first time since 2016. The large fish-eating raptor nested for many years on the south side of the Loch Awe inlet, opposite the site offices. It remains present in the area, nesting at the Brander Pass, but despite hours' of observation of the loch in inter-vening years, it has remained elusive.

One was reliably reported by station contractors in June 2024, seen perched on boulders at Cruachan Reservoir.

Meanwhile, Ring Ouzel occurred for the first time since 2018, with a male seen briefly in May – although this was likely a migrant passing through the survey area.

It was generally a challenging bird breeding season, with cool and dull temperatures that may have had an impact on some insectivorous species.

Nevertheless, the confirmed breeding rate, at 60%, was the highest we've ever recorded, surpassing the old record of 57% set in last year's survey. Part of this may be reflective of the low species' total recorded in 2024 but, nevertheless, some irregular breeders were pinned down and two species nested at the station for the first time.

It felt as if House Sparrow was edging ever closer to nesting at Cruachan in recent seasons, with a male holding territory at the visitor centre in 2022 then a significant influx, involving 4AOT, in 2023. It was gratifying, then, to finally confirm the first ever successful breeding in the current survey when a pair nested under the eaves of the visitor centre, raising at least three juveniles.

Common Mallard was also confirmed as having successfully nested, with a female with a brood of three small ducklings close to the tailrace and visitor centre.

Mallard has been recorded in 11 out of the 15 survey years, so is near annual, and females in spring have been seen fairly regularly. On that basis, a breeding attempt is no surprise – although the small size of the brood suggests some young may have already succumbed to predation.

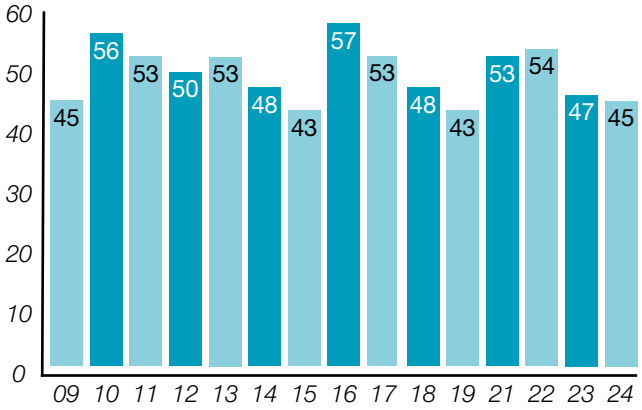
The addition of House Sparrow and Common Mallard increases to 46, the number of known confirmed breeding species at Cruachan since the start of the survey.

Meanwhile, irregular breeders Common Sandpiper and Mistle Thrush were confirmed as nesting for the first time since 2013 and 2021 respectively, while the Sand Martin colony, re-established in 2023, remains viable, with at least two nesting holes containing chicks in June 2024.

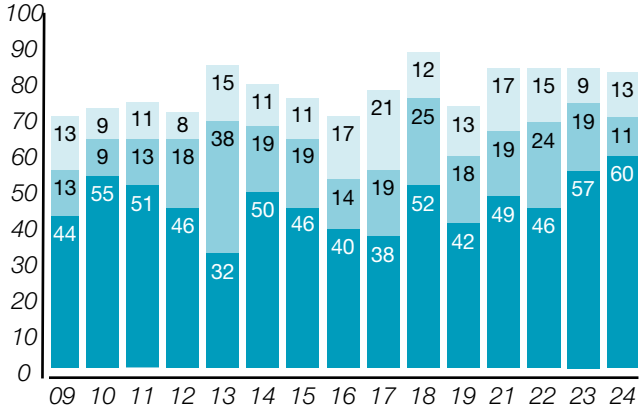
A further five (11%) species Probably Nested and six species (13%) were considered to have Possibly Nested at the Cruachan survey area in 2024.

The total number of species recorded at Cruachan continues to stand at 79 – no new species have been added since Eurasian Nuthatch in 2018.

GRAPH 2: NUMBERS OF BIRD SPECIES RECORDED IN EACH YEAR OF THE CRUACHAN SURVEY 2009-2019 AND 2021-2024



GRAPH 3: CONFIRMED BREEDING SUCCESS RECORDED IN EACH YEAR OF THE CRUACHAN SURVEY 2009-2019 AND 2021-2024



Breeding birds per survey year as percentage of total number recorded: Solid blue represents Confirmed breeding; medium blue represents Probable breeders and light blue represents Possible breeders. Non-breeders form the balance.

7.0 MAMMALS

Six species of mammal were recorded in 2024, including one species of rodent that was caught in a small mammal trapping session at the west dam road.

Three humane BioEcoSS tube traps were set out at separate locations in June – all located close to the deer fence line along a 500m stretch at the dam road narrows.

These were supplied with straw bedding material and baited with seeds and nuts, then left open to allow rodents to get used to their presence.

On the July moth trapping session – overnight on 16/7 – the traps were resupplied with food and bedding then set, with the contents checked in the morning.

The 2017 Cruachan report contains full details of methodology, ethical and health and safety considerations and survey limitations.

All three traps were found to contain a single Bank Vole *Myodes glareolusa*, which was the most abundant species in the inaugural 2017 small mammal survey.

An innovation in 2024 was the use of a Hikmicro Falcon FQ35 professional thermal imaging device to investigate the presence of mammals using the site at night time.

The thermal imager was used on both moth trapping sessions with encouraging results, revealing the presence of deer that would otherwise have gone unnoticed.

Bank Vole *Myodes glareolus (Cricetidae)*: Bank Vole was the only species recorded in the small mammal trapping session at the west dam road, in July, where the habitat included woodland edge, heath and tall grassland. The individuals were each checked and included two pregnant females and a male. The 100 per cent uptake of the traps suggest that the local population was high in summer 2024.

Wood Mouse *Apodemus sylvaticus (Muridae):* As in 2022, a Wood Mouse was encountered beneath an old car bonnet near the pylon at the east end of the dam road. It was seen on both 10/5 and 24/6, along with many nibbled hazel nuts that had been consumed by this species.

European Otter *Lutra lutra (Mustelidae):* Otters have now been recorded at Loch Awe's north bank in six consecutive survey years. On 24/6, about 2130, an adult female was

Record shot of adult female and cub Otters near the tailrace

shadowed by its half-grown kit at the tailrace area – the juvenile constantly chirping to attract attention. The pair was seen to enter the oil boom area before swimming off east towards the site office loch embankment.

Red Deer *Cervus elaphus (Cervidae):* The thermal imager proved a revelation for spotting Red Deer on the high hillside above Cruachan Reservoir. At least 10 individuals were recorded overnight on 16-17/7, mostly on the slopes to the west of the reservoir.

Roe Deer *Capreolus capreolus (Cervidae)*: The first sighting at Cruachan since 2018 was an adult male at the Coille Leitire, seen at 2330 on 16/7, and located through the thermal imager. The buck was feeding on the margins of the Allt Cruachan, near the woodland edge, at approximately NN 08156 27286.

Red Fox *Vulpes vulpes (Canidae):* Signs of fox were again found near Lochawe Village, with fresh scat found at the dam access road on 10/5, continuing a run of recent records.

8.0 AMPHIBIANS & REPTILES

Common Frog *Rana temporaria (Ranidae)*
Young frogs were frequent on the 24/6, with dozens in damp Soft Rush grassland near the old quarry at the east end of the dam access road, and several at the Visitor Centre road embankment. An adult was, unusually, in the burn near the Allt road bridge (10/5).

Palmate Newt *Lissotriton helveticus (Salamandridae)*: At least three females and two males were near the surface at the Penthouse Pond on 10/5, no doubt sunning in the warm weather, but there were no subsequent sightings.

Common Lizard *Zootoca vivipara (Lacertidae)*
Warm weather on the May visit (15/10) resulted in a series of sightings at locations along the dam access road. At least one was disturbed from the roadside at the east end transect, with another sunning on rocks near the turning spot near the new access road gate and two heard as they darted away from the surveyor at the dam road narrows. Then, on 24/6, more were encountered, with one at the south end of the south dam transect, just above the tree line, and two sunning on a fallen metal sign near the shepherd's cottage.

Common Lizard on rocks at the south dam BBS transect

9.0 INVERTEBRATES

A total of 157 species of invertebrate was recorded in the 2023 survey at Cruachan Power Station. These included a woodlouse, three dragonflies, a grasshoppers, five true-bugs 12 beetles, 90 moths and butterflies, 32 true-flies and 13 species of bees and wasps.

It proved to be a challenging year with the summer months characterised by cooler and cloudy conditions. Meanwhile, it was one of the wettest Augusts on record with rain on two-thirds of its days – see weather (page 11).

With fewer days of sunshine, and cooler conditions than normal, the July visit was made in sub-optimal conditions for insects. This may have resulted in some of the very low totals, for instance, of butterflies.

It wasn't all bad news. Notably, our moth trapping efforts in 2024 continue to be successful and, in 2024, helped to identify five species of moths found that are listed as Nationally Scarce – meaning they have only been recorded in between 16 and 100 hectads (10km squares) in Great Britain between 2000 and 2014.

The micro-moth Strawberry Dot *Ectoedemia arcuatella* and the macro species Barred Tooth-stripe *Trichopteryx polycommata* were both found at the Coille Leitire by surveyors from Butterfly Conservation Scotland. Meanwhile, the micro-moth Golden-rod Pearl *Anania terrealis* and a macro-moths Scotch Annulet *Gnophos obfuscata* and Thyme Pug *Eupithecia distinctaria* all occurred in the trapping survey at the west dam road.

As highlighted in last year's report, Drax's landholdings have been included in a new non-statutory designation that recognises the area's value for invertebrates. Insect charity Buglife has identified a series of Important Invertebrate Areas (IIA) – sites that host nationally or internationally significant invertebrate populations and their habitats.

The Mid Argyll IIA includes all of the Coille Leitire SSSI, the Cruachan Dam access road, the Site Office/Visitor Centre and mountain areas east of Cruachan Reservoir. Buglife has not yet published a profile for the Mid Argyll IIA, which will characterise its habitats and important species, but the area is likely to have been recognised for the importance of its assemblage of rare or threatened invertebrates. At the time of press, none of the Scottish IIAs has been profiled.

The Hawthorn Shieldbug is a new species of Hemipteran at Cruachan in 2024, with one at the tailrace the first record for NN02

9.1 ISOPOSA (WOODLICE)

A woodlouse was formally recorded at Cruachan for the first time in 2024, although individuals have occasionally been encountered in past survey years. The Woodlice *Oniscidae* are detritivores and play an underappreciated but significant contribution to decomposition and nutrient recycling.

Common Shiny Woodlouse *Oniscus asellus:* This is the common ground 'slater' found in woodlands and gardens, even entering houses. There was a single record of one found at night, on 25/6, crawling over the surface of the road near the actinic trap at the dam road narrows. It is a very common species nationally and there have been four past records from NN02, including at Coille Leitire SSSI (2018).

9.2 ODONATA (DRAGONFLIES)

It was another rather poor year for dragonfly recording at Cruachan, with just three species recorded – the joint lowest total since surveys began in 2009.

Large Red Damselfly *Pyrrhosoma nymphula (Coenagrionidae):* Good numbers were present in fine weather on 10/5, with 10+ at the Penthouse Pond and a similar number at the Allt Cruachan near the 275kW bridge. A male was also found away from the usual hotspots at the contractors compound the same day. Numbers had reduced by 25/6, in cooler conditions, but two persisted at the Penthouse Pond.

Common Blue Damselfly *Enallagma cyathigerum (Coenagrionidae):* A male was present at the Penthouse Pond along with larger numbers of its close relative above. This is the first survey sighting since 2016,

Golden-ringed Dragonfly *Cordulegaster boltonii (Cordulegastridae):* Two males hawked over the dam access road on 10/5 (east end and mid section) with a female, on 24/6, resting on vegetation near the new dam road gate.

9.3 ORTHOPTERA (GRASSHOPPERS)

Common Green Grasshopper *Omocestus viridulus (Acrididae):* The only sighting was of a newly-emerged male at the east end dam road on 24/6.

Common Blue Damselfly

Golden-ringed Dragonfly

Common Green Grasshopper

Spiked Shieldbug early-instar nymphs

Green Leafhopper

Common Froghopper

9.4 HEMIPTERA (TRUE BUGS)

A new species of shieldbug was added to the Cruachan list in 2024 but otherwise it was not a remarkable year. Plans for a systematic sweep survey late in the year were frustrated by poor weather, but this can be carried forward to 2025.

*** Hawthorn Shieldbug *Acanthosoma haemorrhoidale (Acanthosomatidae):*** A new species for the survey, an adult was caught (25/6) in an actinic moth trap placed near the tunnel entrance at the site offices and released nearby. This is a common species nationally but this is the first record for Cruachan's hectad NN02.

Spiked Shieldbug *Picromerus bidens:* This predatory shieldbug appears to be well established at Cruachan with several early-instar nymphs found at the dam road on 25/6. There has now been records in each of the past four surveys and it is clearly breeding at the dam road margins.

Green Leafhopper *Cicadella viridis (Cicadellidae):* Several adults and late instar nymphs were recorded in damp rush grassland at the dam road from 25/6, but there were no subsequent records and sweeping was often impossible late in the year.

Common Froghopper *Philaenus spumarius (Aphrophoridae):* Damp grassland beside the dam road was studded with this froghopper's frothy cuckoo-spit, where its larvae develop, on 25/6.

Alder Spittlebug *Aphrophora alni (Aphrophoridae):* One was beaten of oak leaves at the contractors compound in 25/6, the only record in the survey of this large froghopper.

Green Tiger Beetle

Banded Sexton Beetle

Brown Chafer

Catharis pallida

9.5 COLEOPTERA (BEETLES)

A total of 12 species were recorded in 2024, mostly a predictable expected cast of commonly-recorded beetles. Notably, five species were recorded as an incidental by-catch in moth traps set up around the station landholdings – including a new species for the survey.

Ilybius fuliginosus (Dystiscidae): A new species for the survey, one was attracted to the MV moth trap light at Loch Awe tailrace on 25/6. This is a medium-sized beetle with yellowish stripes on the margins of its elytra and is one of the most common and widespread British predaceous diving beetles. There have been two past records from Cruachan's 10km square (NN02) – at Loch Tromlee (1978) and Loch a Chriondaire (1971). Meanwhile, there are 84 Argyllshire reports on NBN, highlighting a significant recording effort.

Violet Ground Beetle *Carabus violaceus (Carabidae):* One was caught as it crossed the west track at Cruachan Reservoir on 17/7 and its identity was examined in hand. There have now been sightings in three of the past four years after its first discovery at Cruachan in 2021.

Pterostichus strenuus (Carabidae): A small (6mm) black beetle was collected from the road surface at the dam road narrows and later keyed out under the microscope. This is a very common species, found in most habitats, and was last recorded in the Cruachan survey in 2017 (two sightings).

Green Tiger Beetle *Cicindela campestris (Carabidae):* This beautiful ground beetle was back after a gap in 2023, with a series of records on two dates at the dam road. On 10/5, two were at the exposed road embankment at the east end of the access road – a regular location for this species, with a further sighting of a single here on 24/6 – while at least two were at the west end, at the dam road narrows (also 10/5).

Shore Sexton Beetle *Necrodes littoralis (Silphidae):* There was no mass emergence as witnessed in 2023 – but a single was found in the current survey, attracted to an actinic moth trap at the east side of Cruachan Dam (17/7). This can now be considered a regular species in the survey, with records in four years since the start of light trapping in 2018.

Banded Sexton Beetle *Nicrophorus investigator (Silphidae):* The first sighting for Cruachan in 2023 was quickly followed by another, with a male at the actinic moth trap on the east access road to the dam on 17/7.

Brown Chafer *Serica brunnea (Scarabaeidae):* A male and a female were caught in the actinic trap at the east end of the dam wall on 17/7 – the first records of this small ginger chafer in the Cruachan survey since 2021.

Copper Click Beetle *Ctenicera cuprea (Elateridae)*: There was a sizeable emergence Ctenicera at the access road and upland Cruachan on 10/5, with upwards of 20 among Bracken south of the dam wall, eight at the dam road narrows and seven on the east end dam road transect. This represents the largest day counts since 2012, when scores were present (24/5).

Dor Beetle *Geotrupes stercorarius (Geotrupidae)*: One of these very large (25mm) dung beetles appeared in the MV trap at the Loch Awe tailrace on 25/6, the first survey record since 2018. This species is more usually seen crawling over the dam access road or in its vegetated margins.

Cantharus pallida (Catharidae): One of these small orange soldier beetles was swept from oak leaves at the east end dam road on 14/6 and examined in hand. This is the firsyt Cruachan sighting since 2021.

Cantharus nigricans (Cantharidae): This is the most common soldier beetle to occur at the power station landholdings and two were found on 24/6, on emerging Common Hogweed plants at the contractors compound.

Rhagonycha fulva: This orange-and-black soldier beetle was the only beetle found outwith the moth traps on 17/7, when one was recorded on Common Hogweed at the Visitor Centre.

Garden Tiger made an appearance for the first time since 2021, with two in the moth traps located at upland Cruachan in July

9.6 LEPIDOPTERA (MOTHS)

Moth trapping at Cruachan continues to prove enormous amounts of information about the species that occur at the power station and its landholdings.

Two overnight trapping sessions were carried out in 2024 which, combined with chance findings during daytime visits, resulted in 84 moth species being identified.

This sets a new record for the highest annual total at Cruachan, breaking the former best figure from 2018, when 82 species were also identified over four trapping nights.

Light trapping has been a significant feature of annual surveys since 2017, but we continue to add new species to the Cruachan list at an impressive rate. In 2024, 24 new moths were recorded, equivalent to 28% of the total, increasing to 217 the number of species that have now recorded at the station.

The first session was held overnight on 23-24/6, when a mains-powered MV trap was placed at the Loch Awe tail-race and three battery-powered traps were positioned near the tunnel entrance at the site offices, the children's play park at the visitor centre and at the contractors' compound.

This resulted in a catch of 146 moths of 52 species – mostly held in the three identical actinic Heath traps.

The next session was almost a month later, overnight on 16-17/7, when four actinic traps were operated in upland areas around Cruachan Dam and the west end of the access road. This session benefitted from warm and still weather conditions and it proved to be the most successful night's trapping ever organised at the power station.

A total of 353 moths of 52 species were retained in the traps – including 174 individuals in a single trap that was placed at NN0846426911, at the rocky, narrow section of dam access road. As a comparison, the previous largest total catch in a single night was 148 in May 2018.

Just six species were recorded outwith the trapping effort and these include three species that were reliably recorded by surveyors from Butterfly Conservation Scotland.

A full methodology is discussed in the 2017 Cruachan report and best practice, as described in the Moth Recorders Handbook (Randle 2013) was followed in delivering the 2024 trapping survey.

NOTES ON SYSTEMATIC LIST

A total of 499 moths were captured in the light trap survey at Cruachan Power Station in 2024. Despite trapping occurring on only two summer nights, this is the highest total ever recorded since Blue Leaf first began light trapping in 2017.

This effort resulted in 78 species being identified while a further six species were recorded by day.

The following systematic list is grouped by family and follows the order of the British checklist (Bradley 2000). The initial figure is the checklist number, followed by the common and scientific names for each species.

The national status of micro-moths is derived from Mark Cubitt's Scottish distribution maps, which have been collected on the East of Scotland Branch of the Butterfly Conservation website (Cubitt 2024).

The local status of the macro-moths recorded is based on a spreadsheet of the moths of Argyllshire (VC98 and VC101) compiled by local moth recorder David Hill (2023). The Scottish status of macro-moths on the systematic list are as described by Leverton (2020) on his notes on Scotland's macro-moth list. Unless stated otherwise, most species recorded are considered common and typical of the upland, woodland and grassland habitats found at Cruachan.

SYSTEMATIC LIST

18 Map-winged Swift *Korscheltellus fusconebulosa*: Total in trap: 3 in June and July: This common species has been recorded almost annually in the moth trap survey and, in 2023, three individuals were caught: two at the visitor centre on 24/6 and one at the dam road narrows on 17/7.

***30 Strawberry Dot *Ectoedemia arcuatella*:** Leaf mines caused by the larvae of this micro were found by Butterfly Conservation surveyors on the leaves Wild Strawberry Fragaria vesca at the Coille Leitire, close to the steps at the train station, and within one of the ravines at the woodland SSSI. This is just the second location in Scotland this Nationally Scarce 'A" micro-moth has been found – the other site being in Easter Ross.

***356 Elm Leaf-miner *Phyllonorycter tristrigella*:** The first known record for Argyll was obtained from Coille Leitire SSSI

Map-winged Swift is a near annual species at the power station and individuals appeared in both trapping sessions in 2024

Four of the new species of micro-moths that were recorded in the 2024 Cruachan biodiversity survey, pictured from left, Eyed Rush-moth, Golden W, Mottled Oak Tortrix and Barred Grass-moth

in spring when Butterfly Conservation Scotland surveyors found mines on elm leaves. This is a very local species in Scotland, with a handful of records from 10 vice-counties.

***397 Eyed Rush-moth *Glyphipterix thrasonella*:** New for Cruachan, one of these little micros was found near the quarry at the east end of the dam access road on 25/6. As its common name suggests, the species is closely associated with rushes, where its larvae are believed to feed internally inside the stems, This is a very common species in Argyll Mainland, reported from up to 15 hectares.

***410 Gold W *Argyresthia brockeella*: Total in trap: 1 in June:** A small, attractive metallic bronze-and-white spotted micro, the first for Cruachan was retained in an actinic trap at the site offices on 24/6. The species is known from Argyll and its larvae feed on the catkins of birch and alder.

970 Barred Fruit-tree Tortrix *Pandemis cerasana:* Total in trap: 3 in June: Singles were retained in two traps on 24/6, at the visitor centre MV and at the site office actinic. These are the first Cruachan records since 2018.

***1076 Common Marble *Celypha lacunana:* Total in trap: 2 in June and July:** A new species for the survey, singles were caught on 24/6 (visitor centre actinic trap) and 17/7 (dam road narrows actinic). This is a well recorded species in Argyll whose larvae feed on a range of herbaceous plants.

***1083 Marbled Orchard Tortrid *Hedya nubiferana*: Total in trap: 1 in June:** This is one of several Tortrids that mimic bird droppings as camouflage. A single was found, new for the Cruachan list, at the visitor centre MV light on 24/6. With nine previous VC records, it is a scarce species in Argyll but its larval hosts – hawthorn and blackthorn – are ubiquitoius.

***1085 Black-spot Marble *Hedya atropunctana*: Total in trap: 1 in June:** This is another species that is found in Argyll in low numbers. On 24/6, one was attracted to the visitor centre MV trap, another new species for the survey. This is a species of damp grassland and heaths, where its larvae develop on Bog Myrtle *Myrica gale* and willows.

***1165 Mottled Oak Tortrix *Zeiraphera isertana*: Total in trap: 1 in June:** One was caught at the site office actinic trap on 24/6, one of 11 new micro moths found in 2024. This species is associated with oaks, where its larvae feed within folds or spun leaves. It is present in Argyll but uncommon, recorded in only two other hectads in the vice county.

1175 Bramble-shoot Moth *Notocelia uddmanniana*: Total in trap: 7 in June and July: This distinctive micro was recorded for the first time at Cruachan in 2023 but proved more common in the current period. Six were caught on 24/6, at the MV trap and actinics at the site office and visitor centre, with one at the dam road narrows on 17/7.

1294 White-banded Grass-moth *Crambus pascuella*: Total in trap: 1 in July: One appeared in the Heath trap at the narrow section of the dam road on 17/7, the first Cruachan record since 2017.

***1306 Barred Grass-moth *Agriphila inquinatella*: Total in trap: 4 in July:** This grassland species proved fairly common on 17/7, when individuals were caught at three traps at upland Cruachan, including two near the Allt Cruachan bridge. This is mostly a southern species, but it is known to occur in three other Argyll VC98 hectads, and this is the first sighting for the survey.

***1340 Peppered Grey *Eudonia truncicolella*: Total in trap: 2 in July:** Two were retained in the actinic trap at the narrowest part of the dam road on 17/7, the first records for the survey. This is a moorland moth, whose larvae feed in a gallery of silk on top of mosses, which is well recorded in Argyll area.

***1379 Golden-rod Pearl *Anania terrealis*: Total in trap: 1 in July:** One was retained in the actinic trap at the dam road narrows on 17/7, a new species for Cruachan. This is a local species nationally and a rare species in Argyll, with only four past records – but the upper section of the dam road contains the right rocky habitat with its larval host plant Goldenrod *Solidago virgaurea*.

1640 Drinker *Euthrix potatoria*: Total in trap: 12 in June and July: Record numbers were caught this year, kicked off by 11 at the Loch Awe trapping sites on 24/6, including four in both the visitor centre MV and the actinic light at the children's play park, with three at the site office actinic. Then a female was at the trap at the east side of the dam on 17/7, The previous highest count was five in 2017.

***1645 Scalloped Hook-tip *Falcaria lacertinaria*: Total in trap: 1 in July.** This is a widespread species in Argyll, but one trapped at the actinic light at the dam road narrows on 17/7 was the first record for the Cruachan survey. This woodland species has an unusual resting posture, with the wings held in an arch over the back, resembling a dried leaf to help its camouflage. Its larvae feed on birch leaves.

1657 Common Lutestring *Ochropacha duplaris*: Total in trap: 1 in July: Regularly recorded at Cruachan, with only one gap year in the past five surveys, a single was brought in by the actinic light at the narrow, rocky section of the dam road on 17/7.

1666 Large Emerald *Geometra papilionaria*: Total in trap: 2 in June: This large green butterfly-like moth was recorded on the 24/6 trapping session, with singles at actinic traps at the visitor centre and site office. The only previous Cruachan records were in 2016 and 2017.

1694 Smoky Wave *Scopula ternata*: Total in trap: 1 in June. One was attracted to the visitor centre actinic light overnight on 24/6. This is only the second record of this common but declining species for the survey after one was caught in the 2018 trapping sessions.

1713 Riband Wave *Idaea aversata*: Total in trap: 15 in June and July: Riband Wave proved abundant in this year's survey with multiples on both trapping nights. On 24/6, nine were retained in three traps, including five at the site office actinic, then six were caught in the actinic trap at the dam road narrows on 17/7.

1715 Plain Wave *Idaea straminata*: Total in trap: 2 in June: Among the larger catch of Ribband Wave, we identified two individuals of Plain Wave – a similar but much scarcer species, only previously found at Cruachan in 2021. Singles were in the visitor centre MV trap and the actinic light at the site offices. There have been only 23 past Argyll records.

Drinker

Large Emerald

Smoky Wave

Purple Bar

Beech Green Carpet

Narrow-winged Pug

1742 Yellow Shell *Camptogramma bilineata*: The second record for Cruachan was seen by day on 24/6, perched on oak leaves at the east end of the dam access road. The only previous survey record was in 2021.

1752 Purple Bar *Cosmorhoe ocellata*: Total in trap: 5 in July: All records were from upland Cruachan overnight on 16-17/7, including two at the east side of the dam wall and two at the dam access road narrows. There have been records in three past years in the survey.

1758 Barred Straw *Eulithis pyraliata*: Total in trap: 3 in July: Three of these distinctively shaped grassland moths were caught at the dam road's narrowest section on 17/7. A frequent species at Cruachan, found in four past annual surveys, but this is the first sighting since 2022.

1769 Spruce Carpet *Thera britannica*: Total in trap: 2 in July: Two were caught in separate traps at upland Cruachan on 17/7. This cryptic carpet is near annual in the Cruachan survey.

1764 Common Marbled Carpet *Chloroclysta truncata*: Total in trap: 3 in June and July: This is one of the most frequently recorded species at Cruachan and, with records on both trapping nights in 2024, it has now been seen in nine consecutive years of survey work. Singles were recorded on 24/6, at the visitor centre and contractors' compound actinics, then one was part of the enormous catch in the Heath trap at the dam road narrows on 17/7.

The well-camouflaged Scalloped Hook-tip, that has evolved to resemble a fallen leaf, was added to the Cruachan list in 2024

1774 Beech Green Carpet *Colostygia olivata*: Total in trap: 2 in July: This remains a scarce species in Argyll, where it is associated with upland sites with flower-rich grasslands. Two were part of the enormous catch in the Heath trap at the dam road narrows on 17/7 – the first Cruachan record since 2018, when five were caught near the reservoir.

1776 Green Carpet *Colostygia pectinataria*: Total in trap: 9 in July: Green Carpet is a reliable species in the moth trapping survey, with records in five of the past six years. It was present in fair numbers during the current season when, on 17/7, four were trapped at the east side of the dam wall and three at the actinic trap near the Allt Cruachan. Singles were also present in the other two operational traps.

1817 Foxglove Pug *Eupithecia pulchetta*: Total in trap: 2 in June and July: A common and attractive pug, singles turned up in actinic traps at the visitor centre (24/6) and dam road narrows (17/7). This is a frequent species at Cruachan, recorded in four previous survey years.

***1843 Thyme Pug *Eupithecia distinctaria*: Total in trap: 2 in July:** This is a scarce and local species in Scotland and another excellent find from the dam road narrows on 17/7. Two were caught at the actinic trap and these are only the eighth records for Argyll VC98 – past sightings have been from Beinn Lora, Glencoe and some offshore islands. This little pug is associated with flower-rich rocky hillsides and coastal areas where its larvae feed on the flowers of Common Thyme *Thymus vulgaris*. County recorder David Hill believes it may be under-recorded.

1846 Narrow-winged Pug *Eupithecia nanata*: Total in trap: 3 in July: All three individuals were trapped on 17/7 in the actinic trap at the narrow, rocky section of the dam access road. It has been recorded in three past survey years but not since 2018.

1858 V-Pug *Chloroclystis v-ata*: Total in trap: 2 in July: A distinctive green pug, two were caught on 17/7, at the east side dam wall and the rocky narrow section of the dam access road. Past sightings at Cruachan were obtained in 2017 and 2022. V-Pug is described as widespread but local in Argyll VC98.

Double-striped Pug

Clouded Magpie

Tawny-barred Angle, new to Cruachan

Mottled Beauty

1862 Double-striped Pug *Gymnoscelis rufifasciata*: Total in trap: 1 in July: The first sighting since 2021 involved a single second-generation individual that was attracted to the actinic light at the dam road narrows on 17/7.

1867 Treble-bar *Aplocera plagiata*: Total in trap: 3 in July: Three were caught in the actinic trap at the rocky, dam road narrows on 17/7 – a typical upland location for this smart species but in record numbers. Sightings in 2018 and 2021 both involved singles near the dam.

***1880 Barred Tooth-stripe *Trichopteryx polycommata*:** This Nationally Scarce 'A' macro-moth was recorded by surveyors from Butterfly Conservation during its March flight time at the Coille Leitire SSSI, close to the railway station. Its larval host at Cruachan will likely be Common Ash, a tree that has recently been decimated by disease, leading to concerns about its future status. It has been recorded from only 19 Scottish hectads with its main population in parts of Argyll and the Great Glen. It has been included on the Scottish Biodiversity List and is a High Priority species in the Butterfly Conservation's Scottish conservation strategy.

1885 Clouded Magpie *Abraxas sylvata*: Total in trap: 4 in June: This remains a very local species in Scotland and its presence at Cruachan in the early years of the survey highlighted the potential of the station to has uncommon, habitat-dependant moths. However, there were four blank years since the last sighting in 2018 – so it was good to find Clouded Magpie back on the wing in good numbers. In the current survey four were recorded in June (24/6), in the MV and actinic traps at the visitor centre and site offices.

1887 Clouded Border *Lomaspilis marginata*: Total in trap: 1 in June: One of these well-marked brown-and-white moths was retained at the visitor centre actinic trap on 24/6 – making it seven consecutive survey years for sightings.

***1893 Tawny-barred Angle *Macaria liturata*: Total in trap: 1 in June:** This is a local species in Argyll but the first for the survey was caught at the site office actinic trap on 24/6. This attractive geometrid, brown and orange with black markings, is associated with coniferous woodland, especially where Scots Pine *Pinus sylvestris*, its main larval foodplant, is present.

1902 Brown Silver-line *Petrophora chlorosata*: All records were seen by day on 10/5 at the dam access road – continuing the run of sightings every year since the start of the Cruachan survey in 2009. Three were seen at the narrowest section of dam road, with two at the east end during the BBS transect.

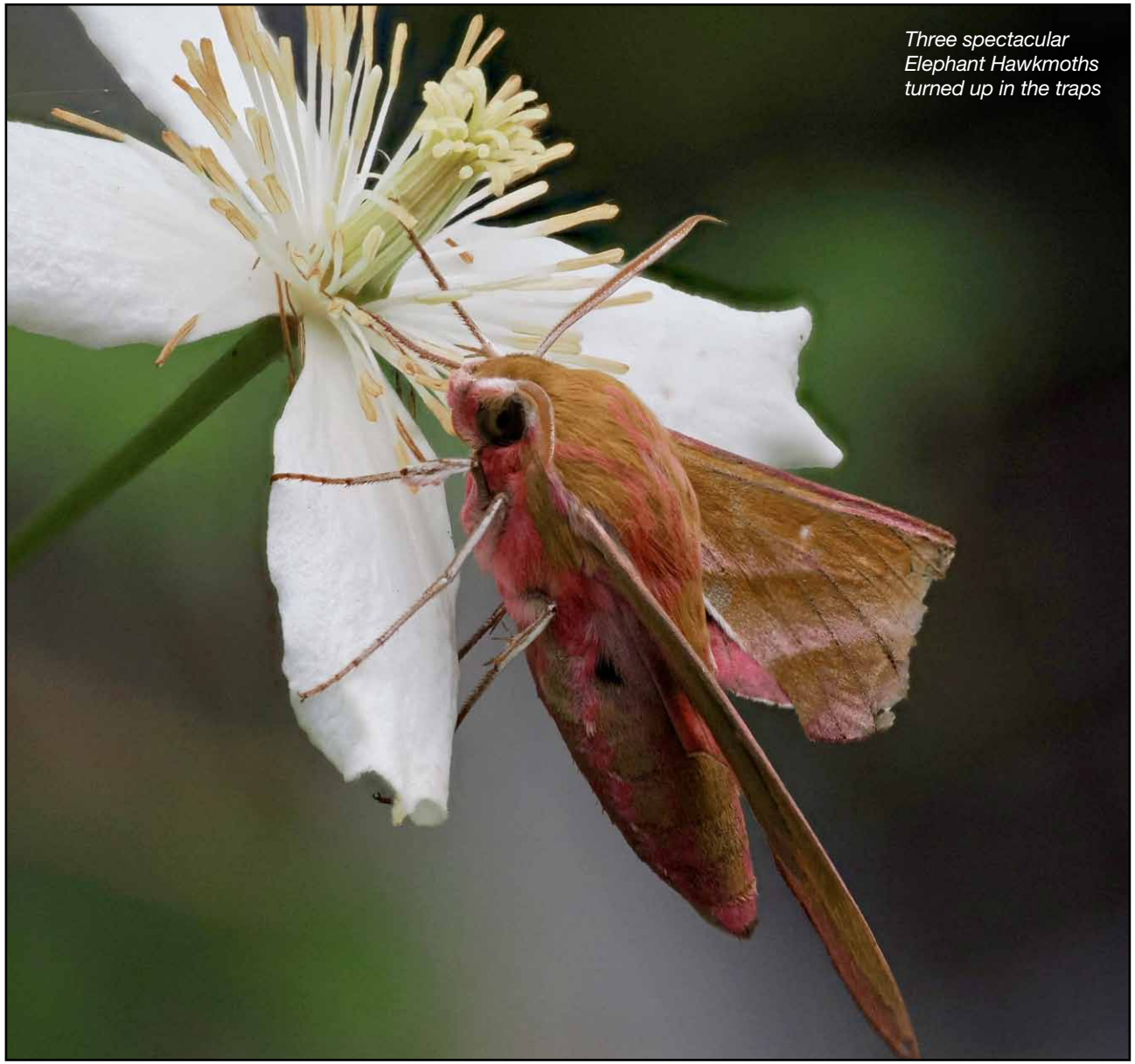
1906 Brimstone Moth *Opisthograptis luteolata*: Total in trap: 8 in June: This common sulphur-yellow moth has not been recorded in surveys since 2018 but it turned up in good numbers on 24/6 at the Loch Awe trappings sites. Eight were retained including four at the contractors' compound and three in the visitor centre MV trap.

1931 Peppered Moth *Biston betularia*: Total in trap: 5 in June: Five is the highest total for this well-camouflaged moth since records began and all were recorded overnight on 23-24/6. These involved two at the visitor centre MV trap, two at the actinic trap at the children's play park and one at the site offices.

1941 Mottled Beauty *Alcis repandata*: Total in trap: 23 in June and July: Record numbers of this large, broad-winged moth were counted. Seven were caught at the contractors' compound on 24/6, with one at the visitor centre actinic the same night. Then, on 17/7, a huge count of 15 crammed into the Heath trap at the narrowest part of the dam access road. The only previous double-figure count was 10 in 2018.

1955 Common White Wave *Cabera pusaria*: Total in trap: 4 in June: This near-annual species was conspicuous in the traps on 24/6, with two at the tailrace MV trap and singles in actinics at the site office and visitor centre grounds. Now found in five of the past six years, with only a gap in 2021.

1961 Light Emerald *Campaea margaritaria*: Total in trap: 7 in June and July: Individuals were caught on both nights and the total of seven is the highest annual count to date.



Three spectacular Elephant Hawkmoths turned up in the traps

On 24/6, six were caught at the Loch Awe trapping sites, including four in the visitor centre actinic and two nearby at the MV trap at the tailrace. Then, on 17/7, a worn adult was caught at the narrow section of the west dam road.

***1963 Scotch Annulet *Charissa obfuscata*: Total in trap: 12 in July:** One of the highlights of this year's moth trapping survey was the discovery of this Nationally Scarce 'B' species at Cruachan. On 17/7, at least 12 were attracted to the actinic Heath trap at the narrowest section of the dam road. This is only the third Argyll VC location, with only single previous records from Glencoe and the isle of Kerrera in the past 40 years (Hill 2024). This is a species of rocky mountain sides, and it is locally distributed, largely confined to northern Scotland. Its larvae feed on moorland plants such as heathers and saxifrages.

1994 Buff-tip *Phalera bucephala*: Total in trap: 5 in June: Good numbers were recorded on 24/6, including five at the visitor centre actinic and one at the site offices. This well-camouflaged moth has been recorded in two past years but not since 2021.

1981 Poplar Hawkmoth *Laothoe populi*: Total in trap: 6 in June: Six were recorded overnight on 23-24/6, including five in the visitor centre actinic trap with the other single at the site offices. Six equals the previous highest annual count for Cruachan, which occurred in 2018.

1991 Elephant Hawkmoth *Deilephila elpenor*: Total in trap: 3 in June: The first multiple records for the site involved two together at the visitor centre MV trap on 24/6, with a single nearby at the actinic trap at the children's play park the same night. Past records in 2017 and 2021 have both involved singles of this medium-sized hawkmoth.

2006 Lesser Swallow Prominent *Pheosia gnoma*: Total in trap: 2 in June and July: Singles appeared at the site office actinic (24/6) and the narrow section of dam road (17/7) – numbers well down on the nine caught in 2023.

2008 Coxcomb Prominent *Ptilodon capucina*: Total in trap: 1 in June: This brown prominent had become fairly scarce after regular sightings in the initial years of the moth trapping survey. However, one was caught in the actinic trap at the contractors' compound on 24/6 – the first since 2021.

2057 Garden Tiger *Arctia caja*: Total in trap: 2 in July: A colourful and distinctive Amber-listed species, two were caught together in the trap at the east side of the dam wall on 17/7. The only previous sighting was also at upland Cruachan in 2021.

2060 White Ermine *Spilosoma lubricipeda*: Total in trap: 2 in June: Singles were in actinic traps at the visitor centre and site offices overnight on 23-24/6. A total catch of two is fairly typical for this regular species.

2061 Buff Ermine *Spilosoma lutea*: Total in trap: 12 in June and July: This Amber-listed species was abundant in this year's survey: a total of 12 is, by some distance, the most in a single year. Overnight on 23-24/6, nine were at actinic lights at the visitor centre and site offices. This was followed up by singles in three Heath traps at upland Cruachan on 17/7. Buff Ermine has been recorded in four past years, most recently in 2022.

***2089 Heart & Dart *Agrotis exclamationis*:** Total in trap: 1 in July: One of these distinctive noctuids was caught at the junction of the dam roads on 17/7, the first record for the survey. This is a common species in Argyll, widespread at lower attitudes but never numerous. Its larvae feed on a wide range of herbaceous plants and shrubs.

2102 Flame Shoulder *Ochropleura plecta*: Total in trap: 3 in June: Three were attracted to the MV light at Cruachan tailrace on 24/6, the third year in which it has been recorded (2017, 2021) and equalling the highest annual total.

2107 Large Yellow Underwing *Noctua pronuba*: Total in trap: 4 in June and July: There were records of this large dark moth at actinic traps on both trapping nights – a single at the site offices (24/6) then two at the east side of the dam and one at the east side dam access road (17/7). A common and familiar species, it has now been recorded in six consecutive years of the trapping survey.

2109 Lesser Yellow Underwing *Noctua comes*: Total in trap: 1 in July: One was attracted to the Heath trap near the Allt Cruachan bridge at upland Cruachan overnight on 16-17/7. There has only been one gap year now (2022) in the past six survey years.

Grey Arches (main picture) is regular at Cruachan and (inset) the Heart and Dart is a new species of macro moth for the survey

2118 True Lover's Knot *Lycophotia porphyrea*: Total in trap: 209 in July: This small moorland species appeared in huge numbers in upland Cruachan during the 17/7 trapping session. Dozens were in each of the four operational actinic traps, with the final tally of 209 including 84 in the trap at the rocky narrow section of the dam road, 56 (east side dam), 26 (east side dam) and 43 (Allt Cruachan bridge area). True Lover's Knot has occasionally been recorded in numbers – for instance 36 in 2021 – but this emergence is significant for a species that is listed as 'Vulnerable' to extinction (Fox *et al* 2021) in the most recent status review.

2120 Ingrailed Clay *Diarsia mendica*: Total in trap: 3 in July: The first sightings since 2018 of this woodland moth involved two at the east side of the dam wall and a single in the trap at the access road narrows on 17/7.

2123 Small Square-spot *Diarsia rubi*: Total in trap: 3 in July: All records were from upland Cruachan overnight on 16-17/7, with two at the trap near the Allt Cruachan bridge and a single at the east side of the dam. This small Noctuid has been near annual at Cruachan since 2021.

***2127 Triple-spotted Clay *Xestia ditrapezium*: Total in trap: 14 in June and July:** This common species was abundant but, strangely, has not been recorded in past surveys. Five were at the actinic trap at the site offices on 24/6, then nine appeared at the actinic light at the dam road narrows on 24/6. This is a woodland moth whose larvae feed on various foodplants including willows and birch.

2128 Double Square-spot *Xestia triangulum*: Total in trap: 12 in June and July: A near annual species in the survey, good numbers were recorded over the two trapping nights. Eleven were caught overnight on 23-24/6, notably including nine in the actinic trap at the site offices. A single also appeared at the dam road narrows trap on 17/7.

2130 Dotted Clay *Xestia baja*: Total in trap: 1 in July: One was attracted to actinic light near the Allt Cruachan bridge on 17/7. This Noctuid was first found at Cruachan in 2021 but has now been recorded in three consecutive years

***2138 Green Arches *Anaplectoides prasina*: Total in trap: 1 in June:** One was caught at the visitor centre actinic trap on 24/6, the first sighting for the survey. This is a local

Three of the macro species that were recorded for the first time in 2024, from left,Triple-spotted Clay, Green Arches and Clay

species throughout much of the country but common in Argyll. The adults' marbled green ground colour affords excellent camouflage when resting on moss-covered trees and fences. Meanwhile, its larvae feed on various woody shrubs such as Blaeberry *Vaccinium myrtillus*.

2150 Grey Arches *Polia nebulosa*: Total in trap: 5 in June: This is a regular species in the moth trap survey with four records in the past six survey years. In the current period, six were retained in the traps on 24/6, including four at the actinic trap at the contractors' compound and a single at the visitor centre Heath trap.

2160 Bright-line Brown-eye *Lacanobia oleracea*: Total in trap: 2 in July: Singles were caught near the Allt Cruachan bridge and at the dam road narrows on 17/7 – only the second record for Cruachan after one in 2022.

2168 Broom Moth *Melanchra pisi*: Total in trap: 5 in June and July: There was a good haul of this Amber-listed species in the traps. A single appeared at the visitor centre actinic on 24/6, a forerunner for four on 17/7 including three in the actinic trap at the east side of the dam wall. This species has also been listed as 'Vulnerable' to extinction (Fox *et al* 2021) in the most recent status review. Past records have been in 2018 and 2021.

2176 Antler Moth *Cerapteryx graminis*: Total in trap: 1 in July: The first since 2021 was a single male trapped at the east side of the dam wall overnight on 17/7.

***2193 Clay *Mythimna ferrago*: Total in trap: 2 in July:** The first records for the Cruachan survey involved two on 17/7 in the traps near the Allt Cruachan and at the dam road narrows. This species is declining but remains a common woodland moth in Scotland. Its larvae feed on various grasses and low plants such as dandelion *Taraxacum*.

2198 Smoky Wainscot *Mythimna impura*: Total in trap: 2 in July: The first since 2021 involved four on 17/7, that were split equally between the east side dam access road and the trap located at the rocky, narrow section of dam road.

2225 Minor Shoulder-knot *Brachylomia viminalis*: Total in trap: 1 in July: One of these large and nicely-marked grey moths was attracted to actinic light at the dam road narrows on 17/7, the first Cruachan record since 2022.

2250 Dark Brocade *Mniotype adusta*: Total in trap: 7 in June and July: There was a record haul of this Amber-listed species in the traps, with sightings on both nights. One was at the MV trap at the Loch Awe tailrace on 24/6 – but most turned up in July. There were individuals in each of the four Heath traps, including two in the collection boxes at the east side dam access road and near the Allt Cruachan bridge. The past highest counts were three in both 2018 and 2022.

2284 Grey Dagger *Acronicta psi*: Total in trap: 1 in June: One of these Amber-listed moths was caught in the visitor centre MV trap on 24/6, the first Cruachan record since the initial light-trapping effort back in 2017.

***2303 Straw Underwing *Thalpophila matura*: Total in trap: 5 in July:** Another new species for the Cruachan survey, it appeared in good numbers overnight on 17/7. Four were attracted to actinic light at the dam road narrows, with a single at an actinic trap at the east side of the dam wall. A video was taken that shows its distinctive yellow-coloured hind wings. This is another uncommon Argyll species that is associated with flower-rich neutral grasslands on hillsides and coastal sites, with 27 previous VC98 records. Its larvae feed on various grasses.

2321 Dark Arches *Apamea monoglypha*: Total in trap: 1 in July: This large moth can often be frequent in the traps but just one was recorded in the current survey – on 17/7, at the actinic trap near the Allt Cruachan bridge. The highest annual count remains 20 in 2022.

***2322 Light Arches *Apamea lithoxylaea*: Total in trap: 1 in July:** One was caught at the dam road narrows on 17/7, another new record for the Cruachan moth list. This large pale noctuid is widespread but local in Argyll area, frequenting meadows where its larvae feed on grass roots and stems.

2326 Clouded-bordered Brindle *Apamea crenata*: Total in trap: 5 in June and July: Four at the actinic trap at the visitor centre play park included one example of the brownish variant *combusta*. A single of the typical form was also caught in the trap at the narrow section of dam access road on 17/7.

2330 Dusky Brocade *Apamea remissa*: Total in trap: 7 in June and July: A good year, with records on both trapping nights. On 24/6, four were in the traps at the Loch Awe sites, including two in the actinic trap at the visitor centre play park. Then, on 17/7, two were at the east side of the dam and one at the dam road narrows. Seven is the highest annual total so far for this Amber-listed species.

***2340 Middle-barred Minor *Oligia fasciuncula*: Total in trap: 1 in July:** A new species for the Cruachan survey, one was caught on 17/7 at the actinic trap at the east side of the dam wall. This is a common Argyll moth, associated with wet areas including marshes, river banks and damp woodland. Its larvae feed on grasses.

Straw Underwing, new to Cruachan

Dark Arches

Clouded-bordered Brindle

Dusky Brocade

Gold Spot, new to Cruachan

Snout

2345 Small Dotted Buff *Photedes minima*: Total in trap: 2 in June and July: Singles of this small wet woodland and grassland species were caught on two trapping sessions – at the visitor centre (24/6) and the dam road narrows (17/7). The only previous Cruachan record was in 2017.

***2439 Gold Spot *Plusia festucae*: Total in trap: 1 in July:** One of these well-marked *Plusia* was caught at the actinic trap at the east side of the dam, the first record for the Cruachan survey. This is often considered a marshland species whose larvae feed on sedges and other waterside plants. It remains common in Scotland despite a marked decline (Leverton 2020).

2442 Beautiful Golden Y *Autographa pulchrina*: Total in trap: 1 in June: A single was attracted to actinic light at the site offices, near the tunnel entrance, on 24/6 – the only sighting in this year's survey. The often reddish-coloured moth, with metallic markings on its forewings, inhabits many habitats including woodland, hedgerows and heathland.

2477 Snout *Hypena proboscidalis*: Total in trap: 1 in June: This grassland moth is coming more frequent, with records in there consecutive years, although numbers remain small. Just one was recorded in the current period, at the site office Heath trap on 24/6. The species uses Common Nettle as its larval foodplant.

Two of the Nationally Scarce moths found in 2024, Scotch Annulet (main pic) and Golden-rod Pearl were both trapped in July

DISCUSSION

The headline from the 2024 moth trapping survey was the discovery of five species that are considered nationally rare along with other species of conservation concern.

At a time when there is pressure on the populations and range of many species, this again highlights the high-quality habitats present at Cruachan and its surroundings.

The Coille Leitire SSSI, with its long history of continuous deciduous woodland cover, is undoubtedly an important feature when many other similar woodlands are becoming fragmented and diminished.

However, based on the results of our trapping efforts at upland Cruachan, it is clear the flower- and herb-rich neutral grasslands on the hill slopes also support several specialist moths.

The five species found in 2024 are listed as Nationally Scarce – meaning they have only been recorded in between 16 and 100 hectads (10km squares) in Great Britain between 2000 and 2014.

The micro-moth Strawberry Dot and the macro species Barred Tooth-stripe were both found at the Coille Leitire by surveyors from Butterfly Conservation Scotland.

Meanwhile, the micro-moth Golden-rod Pearl and a macro-moths Scotch Annulet and Thyme Pug all occurred in the trapping survey at the west dam road.

Of the Nationally Scarce macros recorded, Barred Tooth-stripe is the least widespread, recorded in the in only 48 hectads in the period – just ahead of Thyme Pug (49) with Scotch Annulet (87).

The only previous Nationally Scarce moths recorded at Cruachan have been the mountainside specialists Silver-barred Sable *Pyrausta cingulata* and Yellow-ringed Carpet *Entephria flavicinctata* – the rarest of them all, found in only 35 hectads in the 14-year period.

Meanwhile, several further new species of specialist upland moths were added to the Cruachan list in 2024, many of which have a very restricted range in Argyllshire.

Some of these are monophagous, meaning they occur only on a specific larval host plant. The Golden-rod Pearl

relies on the striking tall herb of the same name that grows in the rocky sections of the west dam access road.

Similarly, Thyme Pug relies on the low-growing Wild Thyme in short-grazed grassland while both Scotch Annulet and Straw Underwing only occur on mountain sides and coastal cliffs in Argyllshire. All three species were caught at the rocky narrow section of dam access road in the July trapping session, which produced record numbers of moths at the actinic traps.

The moth trapping effort in 2024 broke records in terms of number of species recorded and catch totals. This included 353 moths of 52 species that were retained in the traps overnight on the 16-17/7 overnight trapping session – the highest number of moths caught on a single night.

It is encouraging to witness such high numbers of moths in the collection boxes although more than half of the night's catch comprised a single species – True Lover's Knot, a species that feeds on heathers.

True Lover's Knot was listed as 'Vulnerable' in the most recent status review (Fox et al 2019), which examined the extinction risk of species against IUCN criteria.

It was included due to its rapid steep population decline – but it is clearly doing well at Cruachan and it remains common nationally, found in 1565 hectads (2000-2014).

Despite their national rarity, Barred Tooth-stripe, Scotch Annulet and Thyme Pug are all highlighted as Least Concern in the 2019 review.

Meanwhile, eight Amber-listed species, using the 2006 State of Britain's Large Moths assessment, were found in 2024 – including Light Arches, a new species for the survey – which increases to 25, the total number of moths of conservation concern recorded in the light trapping survey.

TABLE 6: MACRO MOTHS OF CONSERVATION CONCERN FOUND AT CRUACHAN IN 2024, STATUS, HECTADS PRESENT & RED LIST

SPECIES	RARITY	No. OF HA	RED LIST
Barred Tooth-stripe	NS	48	
Scotch Annulet	NS	87	
Thyme Pug	NS	49	
Light Arches	NS	1527	AMBER

Species of conservation concern: left, the Amber data-listed Light Arches is new to Cruachan; right, True Lover's Knot is a 'Vulnerable' macro species but appeared in huge numbers in 2024; and, below, Thyme Pug is 'Nationally Scarce"

Overall, it was a very encouraging couple of trapping sessions, with the new species increasing the Cruachan moth list to 217 species.

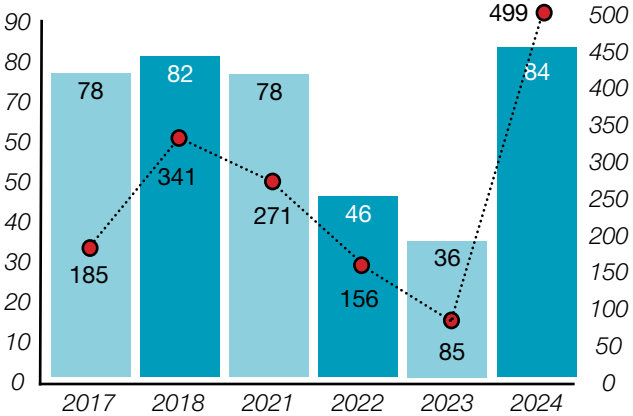
There are undoubtedly more discoveries still to be made, with Argyll VC98's macro-moth list (excluding the micros) sitting at 415 species at the end of 2024.

However, we have commented in previous reports about the potential detrimental impact of artificial security floodlights on moth trap catch totals.

In 2024, the floodlighting at the visitor centre and tailrace may have contributed to a very low catch in the 125W MV trap – normally the most efficient method of attracting and retaining.

Just 29 out of the 146 moths caught in the June overnight session were in the MV trap and Blue Leaf may seek to relocate the trap if station management can identify another suitable main power supply.

GRAPH 4: NUMBER OF MOTH SPECIES RECORDED IN SURVEYS AT CRUACHAN AND TOTAL NUMBERS CAUGHT ANNUALLY



Blocks = annual number of species. Lines: Annual total §moth catch

9.7 LEPIDOPTERA (BUTTERFLIES)

Only six species were recorded at Cruachan in 2024 – a disappointing total, which is the second lowest annual count since survey work began.

Meanwhile, and continuing a trend of recent years, the populations of individual species were depressed, with no large counts recorded during fieldwork.

Local environmental conditions – such as the generally cool, dull and wet weather during the survey period – may have been a factor, especially at such an exposed site.

However, the snapshot at Cruachan mirrors recent evidence – both peer-reviewed studies and anecdotal observations – that many species in Britain are under pressure.

The State of the UK's Butterflies (Fox and Dennis 2022) highlights that 80% of butterfly species in the England and Wales have declined in numbers in the past 50 years.

Scotland is the only UK country where butterflies show a pattern of overall long-term increases – up by more than a third in abundance (1979-2019) along with a modest 3% increase in distribution. However, while wider countryside species have increased in abundance and distribution, habitat specialists in Scotland have shown the same decline as suffered nationally.

In total, 38% of specialist Scottish species have suffered a significant contraction in their range and 8% have decreased significantly in abundance.

Most the butterflies recorded at Cruachan are considered to be species of the wider countryside, visiting the station landholdings to make use of the abundant resource of nectar plants.

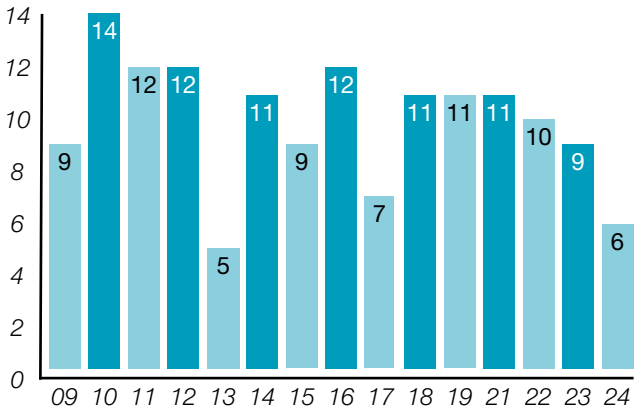
Meanwhile, many of the recorded species were among those that showed declines in the 2024 Big Butterfly Survey organised by Butterfly Conservation.

The number of butterflies seen in the nationwide survey reduced by 50% compared with 2023, prompting the charity to declare a "national butterfly emergency" in September 2024 and call for a total ban on neonicotinoid pesticides in the United Kingdom.

The total number of species seen in Scotland during the July-August recording effort was reduced by just over a quarter (26%). The survey found that *Nymphalidae* butterflies were particularly reduced compared with 2023 – including Peacock (-94%) and Small Tortoiseshell (-79%) – both of which were seen in low numbers at the station.

It was a poor year for butterflies but some of the species seen (from left) were Orange-tip, Green-veined White and Small Heath

GRAPH 5: NUMBERS OF BUTTERFLY SPECIES RECORDED IN EACH YEAR OF THE CRUACHAN SURVEY 2009-2019 AND 2021-2024



SYSTEMATIC LIST

Orange-tip *Anthocharis cardamines (Pieridae):* There were two May sightings of this spring-flying butterfly – males at the site offices and the east dam road transect.

Green-veined White *Pieris napi (Pieridae):* Few sightings and small counts were features of the year. Two were at the east dam road transect on 10/5, with singles at the visitor centre and Allt Cruachan, south of the dam, both on 24/6.

Common Blue *Polyommatus icarus (Lycaenidae):* A male was recorded on 24/6, at the open-habitat dam road embankment just east of the shepherd's cottage. This has become a regular location in recent years for this brightly-coloured species due to the proliferation of Bird's-foot Trefoil *Lotus corniculatus* on the embankment.

Small Heath *Coenonympha pamphilus (Nymphalidae):* All records were from 24/6, when several were recorded at sites on or adjacent to the dam road. At least five were flushed at the east end transect, with two at the mid-section and two at the dam road narrows.

Pearl-bordered Fritillary *Boloria euphrosyne (Nymphalidae):* A decent day-count of five was obtained on 10/5, with adults visiting dandelion and Bugle beside the dam access road, particularly at its east end. This represents the earliest ever emergence of this Priority A species of conservation concern (Butterfly Conservation) and the highest count since 2017.

Peacock *Aglais io (Nymphalidae):* An early sighting was a single at dandelion at the tailrace on 10/5, which had likely overwintered as an adult. One was at Creeping Thistle at the east dam road on 17/7, despite cool conditions.

9.8 DIPTERA (TRUE FLIES)

A total of 32 species of true-flies were recorded in the 2024 survey, with representatives of eight orders.

Both diversity and numbers of all Dipterans were much reduced, however, with prevailing cool and cloudy conditions from June onwards making individuals hard to find.

As usual, the largest family recorded was the hoverflies (*Syrphidae*) but fewer species of other families were found, reflecting the challenging fieldwork conditions.

Seven species were recorded that are new for the survey – three craneflies, a long-legged fly, a hoverfly, a Dryomyzid and a dung-fly – all of which are considered to be first sightings for Cruachan's hectad (NN02). Individuals of two new Dipteran familes were also recorded.

The following systematic list follows the taxonomic hierarchy described in the *Manual of Nearctic Diptera Vol.3* (McAlpine & Wood 1989). For the first time in a Cruachan report, we include common names for many species which follow the new nomenclature for members of various Dipteran tribes popularised by national authority Steven Falk (2024) on his Flickr website.

TIPULIDAE – CRANEFLIES

Three new species were recorded for the survey, increasing to 15 the total number of cranefly species to be recorded in the survey.

Nephrotoma lunulicornis: What is believed to be the first Scottish record in more than 40 years was a female that turned in the MV trap at the visitor centre on 15/6. The only modern sighting was at the River Findhorn in 1982, although there are six ancient Argyll records from three separate hectads (nearest at Isle of Seil in 1926). This is the first of the so-called tiger craneflies, named on account of their yellow-and-black colouration, to be recorded in the survey. It has a very restricted range in Britain, associating with rivers in upland areas.

Pedicia rivosa: This very large cranefly with boldly-patterned wings was recorded for the second time on 17/7, when two males were caught in the Heath trap at the dam road narrows. The previous sighting was in 2021, also in a moth trap at upland Cruachan.

The woodland cranefly Tipula fascipennis is a new species for the survey after it was first seen struggling in a spider's web

Tricyphona immaculata

Dark-edged Bee-fly

Male Tipula scripta – one of a pair that was retained in the trap at Cruachan Dam

***Tipula fascipennis:** A female was rescued on 24/6, after being caught in a spider's web at the site office entrance porch. This is a common orange-bodied cranefly that frequents woodland edge and hedgerows – but this is the first sighting for the Cruachan survey.

***Tipula scripta:** This is another orange-bodied species and occurred on 17/7, when a mating pair was found in the actinic moth trap at the east side of Cruachan Dam. The only previous site record was in 2021.

***Tipula paludosa:** A male was attracted to actinic light at the east side of the dam on 17/7, with three disturbed from their roost in damp grassland at the east end of the dam road the same day. A very common species nationally, it has now been recorded in five consecutive survey years.

***Tricyphona immaculata:** This is a rather plain, grey medium-sized hairy-eyed cranefly that is associated with water-logged bogs and marshland. The first sighting for the survey was a male, which was recorded on 10/5 and the east end of the dam access road.

BOMBYLIDAE – BEE-FLIES

Dark-edged Bee-fly *Bombylius major:* Warm, sunny weather on the May visit resulted in sightings of three inviduals at two locations at the dam access road (10/5): two investigating the road embankment at the east end, for bee nests in which to deposit their eggs, with a single at the narrow section of road at the west end, the first record for here. This species is now near annual in the survey, with the only one gap year since 2016.

SYRPHIDAE – HOVERFLIES

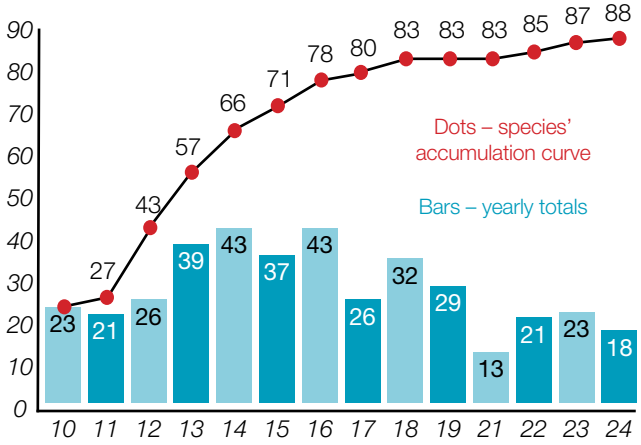
Like most insects, numbers of hoverflies were suppressed from June onwards by the predominately cool and dull weather conditions.

Nevertheless, a total of 18 species were recorded, which compares with results of surveys since 2021. The year got off to a decent start with fine weather on the May fieldwork date (10/5), when 15 species were found, including the Early Epistrophe *Epistophe eligans* – a new species for the survey, which increases to 88, the total number of hoverfly species recorded at Cruachan since 2009.

Long-winged Duskyface *Melanostoma scalare:* An annual species at Cruachan, there was a decent emergence in May then typically low numbers. On 10/5, four visited flowering Ramsons at the contractors compound with one at willow blossom at the dam road. It was also present on 24/6, with a female at dandelion at the east dam road.

Gossamer Hoverfly *Baccha elongata:* The first Cruachan record since 2018 was a male on 24/6, recorded at the road embankment at the east end dam road. All previous records, in a run from 2013-2016, of this small, slim hoverfly were from the visitor centre and contractors compound areas.

GRAPH 6: NUMBERS OF HOVERFLY SPECIES RECORDED IN THE SURVEY (2009-2019 AND 2021-2024) AND ACCUMULATION CURVE



Grey-spotted Boxer *Platycheirus albimanus:* Present in small numbers throughout, with a female at Lesser Celandine *Ficaria verna* at the dam road (10/5), two on dandelion at the visitor centre (24/6) and one resting on Buddleia at the tailrace (17/7).

Humming Syrphus *Syrphus ribessi:* A female was taken as a specimen on 24/6, as it visited dandelion at the dam access road, and identified using a hand lens. This is a very common species, and annual in the survey, but there was no late summer emergence.

Hairy-eyed Syrphus *Syrphus torvus:* A male was swept as it visited willow blossom at the mid-section of dam access road on 10/5, and identified in the hand using a hand lens to determine its hairy eyes. There have been records in five survey years, but none since 2018.

Marmalade Hoverfly *Episyrphus balteatus:* Low numbers were recorded, including two at azaleas at the site office on 10/5 and one at dandelion at the east end of the dam road on 24/6. This migratory species is annual at Cruachan, recorded in every survey year since 2009.

Yellow-girdled Fleckwing *Dasysyrphus tricinctus:* A spring-generation male visited dandelion beside the dam road near Lochawe village on 10/5, the second sighting for the survey after one in 2018.

Early Epistrophe *Epistrophe eligans: A long-predicted species for the station, this early spring hoverfly finally appeared on 10/5 at two locations in the survey area, the first records for NN02. A male visited willow blossom at the east end of the dam road while a female perched on oak leaves at the contractors compound the same day. Its larvae are known to be aphidophagus on a range of shrubs.

Northern Spearhorn *Chrysotoxum arcuatum:* Sightings of this convincing wasp mimic were confined to 10/5, when three individuals were recorded: males on dandelion at the east dam road and site office gardens and a female on willow catkins at the mid-section of the dam road.

Spotted Meliscaeva *Meliscaeva auricollis:* Two individuals, a male and a female, were found visiting Creeping Buttercup on 24/6, at the east end of the dam road. These are the first survey records since 2015.

Grey-spotted Boxer

Humming Syrphus

Yellow-girdled Fleckwing

A male Spotted Meliscaeva visiting Creeping Buttercup at the dam access road

Marmalade Hoverfly

Spring Halfband

Spring Halfband *Melangyna lasiopthalma:* This early spring species is associated with flowering willow trees and a female was seen on 10/5, at the east end of the dam road. This hoverfly was formally recorded annually at Cruachan Substation – but this is the first record in the actual station area and first sighting since 2015.

Common Dronefly *Eristalis tenax:* A near-annual species in the survey, the only record in 2024 was a male on 10/5 that was making use of the copious willow blossom at the east end of the dam access road.

Tapered Dronefly *Eristalis pertinax:* Unusually, this *Eristalis* was seen on only a single day (10/5) – a male holding territory at the east end of the dam access road. *E.pertinax* is normally the most common species recorded at Cruachan but its scarcity reflects the prevailing cool and dull summer conditions.

Furry Dronefly *Eristalis intricaria:* Recorded on two dates, a male was visiting willow blossom at the mid-section of dam access road on 10/5. Then, on 24/6, a pair were at the visitor centre road bank, where they were visiting dandelion and Creeping Buttercip. This continues an unbroken run of sightings since 2016.

Batman Hoverfly *Myathropa florea:* A newly-emerged female visited willow catkins on 10/5, at the narrow section of the west end of the dam road.

Yellow-barred Peat Hoverfly *Sericomyia silentis:* This large bog hoverfly had a very early emergence during warm conditions in May (10/5), with males at the east end of the dam road and at the rocky road embankment at the west end. Sightings of this species are normally from late June, and the only previous May record in the survey was in 2023 (23/5), perhaps hinting at a changing phenology.

White-barred Peat Hoverfly *Sericomyia lappona:* Recorded for only the fourth survey year, a male basking on Rhododendron at the contractors compound on 10/5 was also the earliest ever sighting.

Orange-belted Leaf-licker *Xylota segnis:* The only sighting this year was a single visiting Ramsons in the Allt Cruachan gorge at the contractors compound (10/5).

DOLICHOPIDAE – LONG-LEGGED FLIES

This is a new Dipteran family to be recorded in the Cruachan survey. The “Doli” flies are, collectively, a large and diverse family of attractive, small metallic-looking flies with an alert stance. Adults and larvae are predators that can be found in all wet biotopes – the larvae are aquatic or semi-aquatic and are useful indicators of environmental quality.

Dolichopus atratus: A female found on Bracken at the east end of the dam road on 25/6 was taken as a specimen and keyed out as this widespread British species. This is a bog and mire-loving species but apparently scarce in Argyll, with just three known occupied hectads.

White-barred Peat Hoverfly

Yellow-barred Peat Hoverfly

Orange-belted Leaf-licker

RHAGIONIDAE – SNIPE-FLIES

Downlooker Snipefly *Rhagio scolopaceus:* Two were perched on posts on the verge of the dam access road on 24/6. This is the most common dance-fly at Cruachan, but this is the first sighting since 2021.

Small Fleck-winged Snipefly *Rhagio lineola:* A male was swept from Bracken at the east end of the dam road on 24/6, the first Cruachan record since 2018 and first away from the Loch Awe sites.

DRYOMYZIDAE – DRYOMYZID FLIES

There are three British species of acalypterate Dryomyzid flies, which are typically medium to large in size and of yellowish or brownish colouration. The larvae of all species appear to be saprophagous in carrion and possibly dung and rotting fungi, where adults will often congregate.

***Hooded Dryomyza *Dryomyza anilis*:** The first sighting of this common species for the survey occurred on 24/6, when a male was photographed then taken as a specimen at the contractors compound. This is a reddish fly with orange eyes and infuscated cross veins on its wings and it is the most common Dryomyzid in Britain, occurring in humid woods or dense scrub.

MUSCIDAE – MUSCID FLIES

Small False-greenbottle *Neomyia cornicina:* A female was at Ramsons iat the contractors compound on 10/5. This is the third record of this shiny green Muscid at Cruachan, after sightings in 2017 and 2023.

SCATHOPHAGIDAE – DUNG-FLIES

Yellow Dung-fly *Scathophaga stercoraria*: Several were present on 10/5, usually seen at willow catkins but also visiting dandelion at the dam access road, with two resting on Rhododendron at the Loch Awe tailrace the same day. Two were also recorded at the dam road transect on 24/6.

***Furcate Dung-fly *Scathophaga furcata*:** A new species, a female was swept from Soft Rush at the east end dam road on 10/5 and later keyed out under the microscope. This is the second most-common Scathophagid in Britain, after the previous species. It is thought to prefer more shaded, humid conditions than *sterocoraria* and is more frequent in woodland and uplands, where its larvae develop in sheep dung.

9.9 HYMENOPTERA (BEES AND WASPS)

A total of 13 Hymenopterans were recorded in this year's survey, including a sawfly new to the survey and an *Andrena* bee which is being reported on in reports for the first time.

Significantly, a series of records from May and June highlighted again the importance of eroded and open ground road embankments at the dam access road as a breeding site for ground-nesting aculeates. Several species were observed searching for suitable nesting places at the low but steep west-facing slopes at the east end and mid-section of the road.

One of these, Northern Mining Bee *Andrena ruficrus*, is Red Listed due to its national rarity. This species was recorded at Cruachan in 2021 but identified too late for inclusion in that year's report.

Few species were recorded after June, however, in the cool and cloudy conditions that characterised the summer months. In particular, numbers of bumblebees were very disappointing – reflecting the findings of the Stirling-based Bumblebee Conservation Trust, which declared that 2024 was the worst year for bumblebees since records began.

Numbers declined by almost a quarter (22.5%) compared to the 2010-2023 average, likely as a result of the cold and cloudy conditions in spring and early summer. The charity stated: "The poor weather severely impacted many species in their most vulnerable period, the colony establishment stage, where queen bumblebees function as single mothers and must feed themselves and their growing larvae while also incubating the nest."

Species that typically reach their maximum abundance – the total number of individuals of a species present in a given area – in June or July suffered dramatically.

Of the species recorded in surveys at Cruachan, Tree bumblebee *Bombus hypnorum* declined by 39% while Garden bumblebee *Bombus hortorum* reduced by 12.5% and Buff-tailed bumblebee *Bombus terrestris* (minus 9.5%).

Many species were able to stage a partial recovery later in the year but 2024 still had the second-worst July and August counts on record.

Counts of Common Carder Bee *Bombus pascuorum*, whose numbers peak in late year, were down 16% on the long-term average.

Numbers of Common Carder-bee were reduced in 2024, in line with national surveys that found its numbers declined by 16%

SYSTEMATIC LIST

Common Bracken Sawfly *Strongylogaster multifasciata (Tenthredinidae)*: A female, with its black-and-tan striped abdomen, was netted from its associate plant at the east end of the dam road on 10/5, a first sighting for the survey. This is the most frequent and widespread British species of *Strongylogaster*, found in a variety of Bracken-rich habitats where its larvae feed on the plant's foliage – but there are no previous records for NN02.

Blunt-tailed Digger Wasp *Crossocerus dimidiatus (Crabronidae)*: The June visit (24/6) produced two species of ground-nesting *Crossocerus* digger wasps that were found searching for nest sites in the sandy, exposed and low embankment at the east end of the dam access road. A large (10mm) wasp with black-and-yellow markings on the abdomen was collected as it looked in the field to be a rarer species of *Crabro* wasp. On inspection, however, it proved to be a male *Crossocerus dimidiatus*, the second record for Cruachan after one was recorded at the contractors compound in 2016.

***Crossocerus varus (Crabronidae)*:** In contrast with the previous species, *Crossocerus varus* is a small (5mm) all-black wasp that somewhat resembles a winged ant. A female was collected on 24/6 flying close to the road embankment and later keyed out successfully. This species was also laast recorded in 2016 at the Visitor Centre.

Common Wasp *Vespula vulgaris (Vespidae)*: The only sighting in this year's survey was on 24/6, when at least six workers that were harvesting pollen from a flowering cotoneaster shrub above the old quarry at the east end of the dam road.

Early Mining Bee *Andrena haemorrhoa (Andrenidae)*: A female was recorded on 10/5 visiting willow blossom at the mid-section of the dam road. A typical early-year sighting of our commonest *Andrena* bee, found in eight past survey years.

Northern Mining Bee *Andrena ruficrus (Andrenidae)*: This Red Data Book 2 species was recorded at Cruachan for only the second year, when a female was confirmed at the east end of the dam road with at least one likely male in the same area (24/6). This is an upland species that is closely associated with willow blossom in spring and which nests in exposed soil. The previous record from 31/05/21, was taken as a specimen nearby at the 'Titanic' but not identified in time for inclusion in the annual report, so we will report later on *A.ruficrus* as a new species for the survey.

Crossocerus dimidiatus

Sphecodes cf monilicornis

Tree Bumblebee

Box-headed Blood Bee *Sphecodes monilicornis (Halictidae):* A female was swept at the east end of the dam road on 10/5 and examined in hand to confirm the box-shaped head in a top view. At least three other *Sphecodes* were seen in the same area. This is a fairly regular species at exposed sites along the dam road, with records in four past years.

Common Furrow Bee *Lasioglossum calceatum (Halictidae)*: There were records on two dates at the dam road, associating with the eroded road embankments. On 10/5, a female was found at the east end roadside then, on 24/6, this species proved fairly abundant with perhaps a dozen *Lasioglossum* present that were presumed to be this species. This is another ground nester and has proven to have nested in burrows in exposed road embankments in the area.

Western Honey-bee *Apis mellifera (Apidae)*: At least two visited willow at the dam road transect on 10/5, with a single at Rhododendron at the site offices the same day.

"white-tailed Bumblebee" *Bombus lucorum isl (Bombidae)*: Individuals of this species' complex were regularly seen in the survey but in low numbers. The first two were visiting willow blossom at the east dam road on 10/5, with one at White Clover *Trifolium repens* and six at cotoneaster blossom at the same site on 24/6. It was the only bumblebee recorded on 17/7, with small numbers visiting flowering Heather at the dam road narrows.

Tree Bumblebee *Bombus hypnorum (Bombidae)*: A new addition to Cruachan as recently as 2021, Tree Bumblebee has now been seen in four consecutive years. In 2024, a worker was visiting Common Lavendar *Lavandula angustifolia* at the Visitor Centre herb garden with another at willow blossom at the dam road (24/6).

Common Carder-bee *Bombus pascuorum (Bombidae)*: Two queens were seen on 10/5, visiting willow catkins at the dam road, with three at Bird's-foot Trefoil near the shepherd's cottage on 24/6. A fairly average set of records of this common bumblebee and none was seen later in the year, when it is usually more abundant.

Buff-tailed Bumblebee *Bombus terrestris (Bombidae)*: This large bumblebee has been intermittent in the survey but a queen was recorded on 10/5, visiting willow catkins along with other species at the east end of the dam road. The last sighting was in 2021 but there has also been records in the 2011 and 2014 surveys

10.0 ASSESSING THE VALUE OF THE RECORDS

Blue Leaf has examined available biodiversity record databases in an attempt to put into a local and regional context, the new species found at Cruachan Power Station during the 2024 survey.

Argyll's freshwater and upland areas have long been recognised as important landscapes and special habitats while the region is a stronghold for its Atlantic Rainforest with its special biodiversity interest.

The region has a small cohort of professional and non-vocational biodiversity recorders, many of whom will submit records to recording schemes to improve the scientific knowledge of species in the area and further afield.

Many other records have been generated by condition assessment of the region's SSSIs, such as Coille Leitire woodland SSSI near the power station and reservoir.

There is a number of ways to access this information but the main routes used by Blue Leaf have been the NBN Atlas database, atlases of species' occurrence and datasets held by recording schemes.

10.1 COMPARISON WITH NATIONAL DATASETS

A total of 35 species were recorded by Blue Leaf Nature for the first time at Cruachan Power Station in 2024. These involved a shieldbug, a beetle, 24 moth species, seven true-flies, a sawfly and a mining bee.

These species were examined against the NBN Atlas database and other sources to determine their past occurrences locally (in NN02) and their status nationally.

As a result of this research, 25 species have apparently not previously been recorded in the hectad.

These include the shieldbug, 17 moths, seven species of true-fly and both Hymenopterans. Since the survey started at Cruachan in 2009, a total of 327 species, apparently new to NN02, have now been recorded by Blue Leaf.

At a higher resolution, two of the micro-moth species reported on in 2024 have apparently not previously been recorded from Argyll Mainland (Vice-county 98, VC98). If we include these species, found by Butterfly Conservation Scotland, a total of 79 new species for Argyll Mainland have been reported by the Blue Leaf at Cruachan since 2009.

Hawthorn Shieldbug has colonised Scotland since 1946

The predaceous diving beetle Ilybius fulginosus

HEMIPTERA

Hawthorn Shieldbug is a very common and widespread species – in fact, it's a surprise it has not previously been recorded from Cruachan's hectad NN02.

However, this is one of the invertebrates that's expanding its range, possibly as a result of milder winters that have helped the survival of overwintering adults.

Historically, it was only known from the south of England and, by the early 1900s, it had spread no further north than the English Midlands.

It arrived in southern Scotland in 1946 then sightings became sporadic: Rum (1959), Loch Lomond (1969) and Kintyre (1973). Between 1990 and 1995, there were 12 records before the first VC98 sighting at Isle of Seil (2001).

Almost all the 48 Mid-Argyll records have occurred since 2010 and it is now present in 14 hectads including the adjacent hectad (NN03) at Taynuilt in 2013.

TABLE 7: HEMIPTERANS NEW FOR CRUACHAN, OCCUPIED HECTADS IN ARGYLL VC98 & OCCURRENCE AT NATIONAL LEVEL

HEMIPTERANS NEW TO SURVEY	ATLAS RECORDS FOR ARGYLL MAINLAND	SCOTTISH STATUS AND RECORDS
Hawthorn Shieldbug	Nil NN02, 14 OH VC98 nearest Taynuilt (2010)	2085 Scottish records, common & widespread

COLEOPTERA

Just one new species of beetle was recorded – *Ilybius fuliginosus,* one of the most common and widespread British predaceous diving beetles.

Aquatic beetles tend to be well recorded as a result of formal surveys of the vice-county's wetland sites by Buglife and those carried out under the auspices of the Balfour-Browne Club, whose members survey for aquatic and semi-aquatic species.

This family also benefits from having active recording schemes for the key families that upload regularly to NBN, giving con dence that the NBN Atlas maps are up to date and accurate.

There have been 84 Mid-Argyll reports captured by NBN, highlighting this significant recording effort, including two previous records from NN02, although none recently – at Loch Tromlee (1978) and Loch a Chriondaire (1971).

TABLE 8: COLEOPTERANS NEW FOR CRUACHAN, OCCUPIED HECTADS IN ARGYLL VC98 & OCCURRENCE AT NATIONAL LEVEL

COLEOPTERANS NEW TO SURVEY	ATLAS RECORDS FOR ARGYLL MAINLAND	SCOTTISH STATUS AND RECORDS
Ilybius fuliginosus	2 NN02 records (Loch Tromlee 1978), 84 VC98	1430 Scottish records, common & widespread

LEPIDOPTERANS – MOTHS

It proved an excellent year for new moth species with 24 additions to the Cruachan list and a record catch.

The database of micro-moth records on the NBN Atlas is considered incomplete, therefore the distribution of the micros that appear on Table 9 were established using Mark Cubitt's national distribution maps available on the East of Scotland Branch of Butterfly Conservation's website.

However, the Atlas is considered reliable for macro-moth records as a result of the efforts to produce recent atlases and the input of the National Moths Recording Scheme.

Both these sources were used to assess the species that were recorded for the first time in 2024.

It is clear that many of these new species are common and widespread in Scotland. The macro-moths Heart & Dart and Middle-barred Minor have both reached five-figure totals in the national database while most macros have occurred in their thousands in the country.

However, 17 of the moths could be considered new to hectad NN02 as well as the power station list.

The systematic list (Page 28) already establishes the apparent rarity in Scotland of the micro-moths Strawberry Dot and Elm Leaf-miner, both found at the Coille Leitire SSSI by surveyors from Butterfly Scotland.

Local moth recorder David Hill (pers comm 2024) has remarked that the presence of species such as Strawberry Dot reflects the high-quality habitats in Cruachan area.

However, Cubitt (2024) suggests three other micro-moth species – Mottled Orchid Tortrix, Black-spot Marble and the "Nationally Rare" Golden-rod Pearl – may only occur in a single other VC98 hectad.

A few other micros appear to be uncommon in VC98 although widely found in Scotland. This may be an artefact of low observer effort, as micro-moths are typically less well-recorded nationally, although the situation is improving as more observers test their identification skills with the challenges the group presents.

The three "Nationally Rare" macro-moths are all known from Mid-Argyll in a handful of hectads. Their rarity and heightened conservation status has likely meant greater targeted recording effort – for instance, Barred Tooth-stripe (231 Scottish records) was specifically looked for by Butterfly Conservation Scotland in its suitable birch habitat at Coille Leitire SSSI.

TABLE 9: MOTH SPECIES NEW FOR CRUACHAN, OCCUPIED HECTADS IN ARGYLL VC98 & THEIR OCCURRENCE AT NATIONAL LEVEL

MOTH SPECIES NEW TO SURVEY	ATLAS RECORDS FOR ARGYLL MAINLAND	SCOTTISH STATUS AND RECORDS
Strawberry Dot	Nil NN02 records Nil VC98	One Scottish record, Caithness (pre 2016)
Elm Leaf-miner	Nil NN02 records Nil VC98	Present in 10 Scottish VCs, including Mull
Eyed Rush-moth	Nil NN02 records 11 OH VC98	Present in all Scottish VCs, very common
Gold W	Nil NN02 records 7 OH VC98	Present in all Mainland VCs, very common
Common Marble	Present NN02 7 OH VC98	Present in all Scottish VCs, very common
Marbled Orchard Tortrix	Nil NN02 records 3 OH VC98	Present in most VCs, common
Black-spot Marble	Nil NN02 records 1 OH VC98	Present in most VCs, absent SE Scotland
Mottled Oak Tortrix	Nil NN02 records 1 OH VC98	Present in most VCs, expanding east
Barred Grass-moth	Nil NN02 records 3 OH VC98	Present in most VCs, except far north
Peppered Grey	Present NN02 4 OH VC98	Present in all Mainland VCs, very common
Golden-rod Pearl	Nil NN02 records 1 OH VC98	Present in 16 Scottish VCs, including Mull
Scalloped Hook-tip	1 NN02 (Glen Nant 2008), 7 OH VC98	2093 Scottish records, common & widespread
Thyme Pug	Nil NN02, 4 OH VC98 (nearest Ledaig, 2015)	105 Scottish records, local & widespread
Barred Tooth-stripe	Nil NN02, 7 OH VC98 (nearest NN03, 2012)	231 Scottish records, West and Great Glen
Tawny-barred Angle	Nil NN02, 17 OH VC98 (nearest Dalmally 2012)	3313 Scottish records, common & widespread
Scotch Annulet	Nil NN02, 6 OH VC98 (nearest Barcaldine 1981)	1249 Scottish records, most north of C/Belt
Heart & Dart	Nil NN02, 15 OH VC98 (nearest Dalmally 1978)	14,541 Scottish records, common & widespread
Triple-spotted Clay	3 NN02 (Struan House 2019), 19 OH VC98	3383 Scottish records, Widespread west coast
Green Arches	6 NN02 (Struan House 2019), 19 OH VC98	6605 Scottish records, common & widespread
Clay	Nil NN02, 11 OH VC98 (nearest NN03, 2012)	5644 Scottish records, common & widespread
Straw Underwing	Nil NN02, 7 OH VC98 (nearest NN03, 2012)	633 Scottish records, mostly coastal areas
Light Arches	Nil NN02, 14 OH VC98 (nearest Glen Aray, 2015)	6619 Scottish records, common & widespread
Middle-barred Minor	9 NN02 (Struan House 2019), 18 OH VC98	18,311 Scottish records, common & widespread
Gold Spot	2 NN02 (Struan House 2019), 12 OH VC98	6840 Scottish records, common & widespread

The other Nationally Rare macro-moths, Thyme Pug (105) and Scotch Annulet (1249), were found at upland Cruachan where the vegetative communities present reflect their usual habitat in coastal areas of Argyll: specifically, the flower-rich and herb-rich neutral grasslands on the hill slopes.

This is also the case for regional scarcities such as Straw Underwing (633) and the micro Golden-rod Pearl.

While the focus of much conservation interest at Cruachan has been the ancient woodland SSSI, there is a strong case to be made for renewed effort to catalogue fully the area's important upland Lepidopteran fauna.

Five of the macro moths on Table 9 have previously been found in NN02, although recording effort is definitely fairly sparse in the hectad, with no local resident trapping enthusiasts and any trapping carried out by visitors.

This is shown by common species, such as Heart & Dart, being unrecorded and other common moths, like Middle-barred Minor being unseen in NN02 for six years.

DIPTERA

Seven species of true-fly were recorded for the first time in 2024, all of which have not previously been reported from Cruachan's hectad NN02.

The cranefly *Nephrotoma lunulicornis* is the rarest of the new flies recorded, with just 10 Scottish sightings.

Most of these past sightings have been obtained in West Central Scotland but all are ancient, dating between 1897 and 1925.

The only modern sighting was from the River Findhorn in 1982, making the Cruachan sighting the first in Scotland for more than 40 years. The only other Argyll record is from Isle of Seil in 1926.

Stubbs (2021) highlights an apparent association with shaded river banks with exposed sediments where water tumbles rapidly from the uplands – a fairly close description to the Falls of Cruachan nearby.

However, Stubbs cautions that many old records are unreliable, dating from a time when species' characteristics were poorly known, and there remains knowledge gaps over

TABLE 10: TRUE-FLY SPECIES NEW FOR CRUACHAN, OCCUPIED HECTADS IN ARGYLL VC98 & OCCURRENCE AT NATIONAL LEVEL

DIPTERA SPECIES NEW TO SURVEY	ATLAS RECORDS FOR ARGYLL MAINLAND	SCOTTISH STATUS AND RECORDS
Nephrotoma lunulicornis	Nil NN02, 1 OH VC98 Isle of Seil (1926)	10 Scottish records, most West Central Belt
Tipula fascipennis	Nil NN02, 8 OH VC98 nearest Taynuilt (2012)	210 Scottish records, common & widespread
Tricyphona immaculata	Nil NN02, 12 OH VC98 nearest Ben Lui (1986)	472 Scottish records, common & widespread
Dolichopus atratus	Nil NN02, 2 OH VC98 nearest Ben Lui (1986)	134 Scottish records, most West and North
Epistrophe eligans	Nil NN02, 3 OH VC98 nearest Oban (2010)	248 Scottish records, common in lowlands
Dryomyza anilis	Nil NN02, 6 OH VC98, nearest Inverawe (2013)	202 Scottish records, common in lowlands
Scathophaga furcata	Nil NN02, 3 OH VC98, nearest Kerrera (1999)	275 Scottish records, common & widespread

The tiger cranefly Nephrotoma lunulicornis is a very rare species in Scotland, occurring in sediment by waterfalls and rapids

Epistrophe eligans

Dolichopus atratus

Dryomyza anilis

Scathophaga furcata

its distribution. The two other new craneflies recorded in 2024 are much more common, although both are previously unknown from Cruachan's 10km square NN02.

Tipula fascipennis has been found in five VC98 hectads, including in the neighbouring hectad (NN03) at Taynuilt (two sightings in 2012).

It is a widespread species in lowland districts, occurring in woodland edges and hedgerows.

Meanwhile, *Tricyphona immaculata* has been reported from 12 Argyll hectads but no closer than Ben Lui (NN22) in 1986. Nationally, it is common and widespread species associated with wet muds by ponds and streams, marshes and seepages, often in moorland peat in upland areas (Stubbs 2021).

The long-legged fly *Dolichopus atratus* is the first of the *Dolichopidae* family to be found in the Cruachan survey.

This species has a western distribution in Britain, often in upland areas with willow-lined river systems or expanses of moor or heath.

It is known from only two other hectads in Argyllshire, adjacent squares covering the Ben Lui mountain complex (1986) but it has also been recorded to the south in Kintyre (VC101) at Largiebaan Scottish Wildlife Trustreserve near Campbeltown (2005).

The hoverfly *Epistrophe eligans* is a distinctive, medium-sized spring-emerging Syrphid that is associated with scrub and open woodland. Its Scottish range is mostly confined to the Central Belt but this species is altering its habits, likely as a result of the changing climate.

It is expanding its range northwards and its phenology is also changing, with males emerging up to two weeks earlier compared with 20 years ago.

It remains a scarce species in Argyll, however, with no previous sightings in Cruachan's 10km square (NN02) and only three other occupied hectads in the vice-county: Oban (2010), Tarbert (2017) and Taynish (1994).

The first Dryomyzid for the survey *Dryomyza anilis* was collected at the contractors compound. This is an interesting fly that shows territorial behaviour, males defending the small animal carcasses on which females lay their eggs and driving away other species.

It is a common species in Scotland with six occupied hectads in VC98, including the neighbouring hectad NN03 at Inverawe.

Finally, *Scathophaga furcata* is a common and widespread species of dung-fly, although records in Scotland are mostly in the west. This species should be regular at Cruachan, as it is associated strongly with sheep dung, while it is known to inhabit a wide range of environments, including grassland, woodland, and wetland areas.

HYMENOPTERA

The Northern Mining Bee *Andrena ruficrus* is recognised as "Nationally Rare" in the Red Data Book 2, which examines the threat-level of British invertebrates.

As its common name suggests, it has a northern distribution in Britain, with records from Yorkshire to the north of Scotland.

It is strongly associated with sallow, or willow blossom, and requires soft sandy banks in which to create its nesting tunnels, which may limit its range.

It has been relatively well recorded in Mid-Argyll VC98, with at least 15 records from nine occupied hectads, mostly along the coastal western side of the region.

Meanwhile, a specimen taken during the Cruachan survey in May 2021 was subsequently determined as this species

TABLE 11: HYMENOPTERANS NEW FOR CRUACHAN, OCCUPIED HECTADS IN ARGYLL VC98 & OCCURRENCE AT NATIONAL LEVEL

HYMENOPTERANS NEW TO SURVEY	ATLAS RECORDS FOR ARGYLL MAINLAND	SCOTTISH STATUS AND RECORDS
Strongylogaster multifasciata	Nil NN02, 4 OH VC98 nearest Kerrera (2020)	37 Scottish records, local & widespread
Andrena ruficrus	Nil NN02, 9 OH VC98 near Ardchattan (2020)	193 Scottish records, local & widespread

Female Common Bracken Sawfly leaving the surveyor's net

following the publication of that year's annual report. Despite its rarity, there appears to be a greater range expansion underway, with recent records moving into northeast Scotland while the first Irish record occurred in spring 2025.

The species has a short and early emergence time, being on the wing from April to mid May, which may also contribute to it being under-recorded.

The Common Bracken Sawfly *Strongylogaster multifasciata* appears, on the face of it, is a rarer species, with only 37 Scottish sightings on NBN.

However, sawflies have historically been unappreciated and, until recently, there did not exist a recording scheme to manage and collate records for upload to NBN.

The launch of the excellent resource of Andrew Green's The Sawflies (Symphata) of Britain and Ireland website has helped generate greater interest in this important family and a formal recording is now in place.

S.multifasciata is associated with Bracken so there should be no constraint in its national range.

All Mid-Argyll records have been since 2020 but it is likely recording has improved instead of the species becoming more common.

Female Northern Mining Bee Andrena ruficrus, with its characteristic clear yellow hind leg, on Bracken at the dam access road

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On the cover: *The Red-listed Twite is a characteristic breeding bird at upland Cruachan. Top right, the micro moth Notocelia uddmanniana and, below, the mining bee Andrena ruficrus*