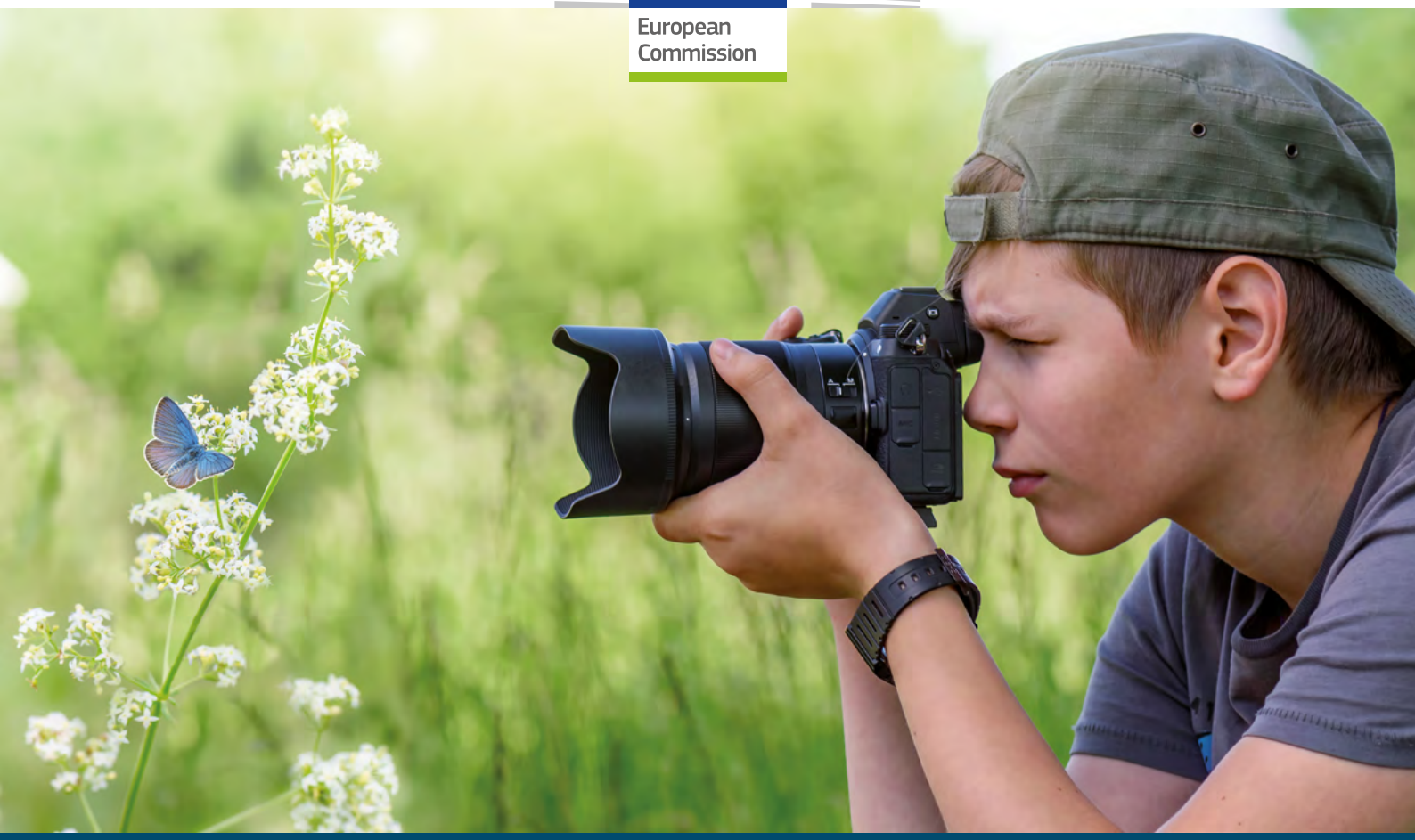
European Commission



Bringing nature back through LIFE

The EU LIFE programme's impact on nature and society

Environment

EUROPEAN COMMISSION
ENVIRONMENT DIRECTORATE-GENERAL

LIFE *("The Financial Instrument for the Environment and Climate Action")* is a programme launched by the European Commission and coordinated by the Environment and Climate Action Directorates-General. The Commission has delegated the implementation of many components of the LIFE programme to the Executive Agency for Small and Medium-sized Enterprises (EASME).

The contents of this publication *Bringing nature back through LIFE* do not necessarily reflect the opinions of the institutions of the European Union.

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Forewords


Photo: European Commission

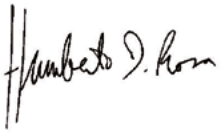
The global spread and impact of COVID-19 in 2020 is truly unprecedented in the modern era. The coronavirus continues to claim lives and cripple economies worldwide, and has literally changed how human beings interact.

Terrible as the pandemic is, it does present us with some valuable opportunities for learning and reflecting. We have seen on the one hand a wide range of governmental strategies to deal with the crisis and the various health outcomes they have produced. On the other hand, we can observe the considerable tension involved in attempts to contain the virus while limiting the economic harm to citizens as the pandemic continues. But one way or another, many of us have experienced just how important it is to have some natural areas and green infrastructure around us during this crisis.

Notably, it was not the ongoing climate crisis, but rather COVID-19, that has forced governments into deciding which human services are 'more essential' and 'less essential'. What is beyond doubt, upon reflection, is that nature itself remains our primary supplier of essential services. Nature and biodiversity sustain all life on Earth – human life included, of course.

Over the course of more than four decades, the EU has been building legal and policy frameworks and related programmes aimed at good stewardship of Europe's biodiversity. Created in 1992, the LIFE programme, a relatively small slice of the EU budget, continues to punch above its weight in terms of implementing the EU's two key Nature Directives – the Birds Directive and the Habitats Directive. It is earmarked for a substantial budget increase of the LIFE sub-programme on nature and biodiversity for the 2021-2027 funding period. This would help to achieve EU aims to put Europe's biodiversity on a path to recovery, as expressed in the recently adopted EU Biodiversity Strategy for 2030, a core component of the European Green Deal.

This publication displays what, in addition to concrete conservation achievements, has been gained as invaluable knowledge, vast experience, networks and partnerships between various actors and increased awareness and appreciation of nature. All this thanks to the small but dedicated LIFE fund, enabling authorities, scientists, conservationists, business operators and volunteers to establish long-term goals and clear strategies, mobilise additional resources and implement effective conservation actions on the ground, involving all relevant stakeholders and carrying out continued monitoring and follow up. I believe that the LIFE programme is a success story, based on an approach that can be replicated around the world to help solve big problems, whether the challenge is biodiversity decline or the prevention of further pandemics.



Humberto Delgado Rosa
Director for Natural Capital,
DG Environment, European Commission


Photo: European Commission

With the United Nations Decade on Biodiversity drawing to a close in 2020, the EU presented its Biodiversity Strategy for 2030 earlier this year. The strategy's ambitious targets include protecting 30% of land and 30% of seas in Europe, planting three billion trees, reducing pesticide use by 50% and halting the decline of pollinator species.

It is easy to see why such action is needed. Nature is suffering. We are losing plants and animals at rates far greater than at any other time in recorded history. Globally, the population of wild species has fallen by 60% in just 40 years, and roughly one million species are currently at risk of extinction.

At the same time, it is important not to despair. We need to believe that a better future is possible and that we have the means and ability to craft policies and take actions that can restore nature to health for the benefit of future generations.

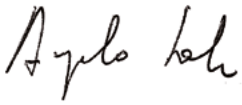
Biodiversity is essential for life! We depend on nature for food, medicine, recreation and mental wellbeing. There are also rock-solid economic arguments for conservation: more than half of global GDP depends on nature.

I always look to examples where good policies result in positive outcomes, and where successful projects lead to species and habitat stabilisation or recovery. Successes, even on a small scale, point the way forward to projects, policies and programmes that can lead to large-scale, long-term improvements.

At European level, the LIFE programme has a long and rich history of conservation success stories. This brochure offers a comprehensive overview of LIFE projects that have had the greatest positive impacts. It also shows how the LIFE programme works in coordination with the Natura 2000 network – the world's largest coordinated network of legally protected areas.

These pages are full of fresh hope and inspiration. I hope you will agree.

Happy reading!



Angelo Salsi
Head of Unit of the LIFE Programme at EASME

List of terms and abbreviations found in this document

CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
conservation status	Good, poor, bad, unknown
CS	conservation status
CSO	civil society organisation
EBP	EuroBirdPortal
EC	European Commission
EU	European Union
GDP	gross domestic product
ha	hectare
IAS	invasive alien species
IMPEL	EU Network for the Implementation and Enforcement of Environmental Law
IP	Integrated Project
IUCN	International Union for Conservation of Nature
km	kilometre
LC	least concern
Member State	EU Member State
Nature Directives	Birds Directive & Habitats Directive
NGO	Non-governmental organisation
NNL	no net loss
No	number
PAF	Prioritised Action Framework
pSCI	Site of Community Importance (proposal stage)
pSPA	Special Protection Area (proposal stage)
RDP	Rural Development Programme
Red List	IUCN Red List of Endangered Species
RSPB	Royal Society for the Protection of Birds
SNaP	Strategic Nature Project
SAC	Special Area of Conservation
SCI	Site of Community Importance
SDGs	UN Sustainable Development Goals
SPA	Special Protection Area
trend	(+) improving, (-) deteriorating, (=) stable, (x) unknown)
TSI	trophic state index
UN	United Nations
VU	vulnerable

Abbreviations of EU Member States[1]

AT	Austria	FR	France	NL	The Netherlands
BE	Belgium	GR	Greece	PO	Poland
BG	Bulgaria	HR	Croatia	PT	Portugal
CY	Cyprus	HU	Hungary	RO	Romania
CZ	Czechia	IE	Ireland	SE	Sweden
DE	Germany	IT	Italy	SI	Slovenia
DK	Denmark	LT	Lithuania	SK	Slovakia
EE	Estonia	LU	Luxembourg	UK	United Kingdom
ES	Spain	LV	Latvia		
FI	Finland	MT	Malta		

[1] Including the United Kingdom

Photo: LIFE10 NAT/BG/000152 - © Vasyl's Dimitris

Bringing nature back through

LIFE

Introduction

Executive summary

The EU LIFE programme is Europe's key funding instrument for nature conservation, and biodiversity health in the EU would be poorer without it. This brochure, "Bringing nature back through LIFE", is based on a new study highlighting LIFE programme accomplishments in terms of protecting endangered EU habitats and species, growing the Natura 2000 network, promoting sustainable development, facilitating good governance, combatting wildlife crime and expanding the LIFE network.

The list of LIFE achievements is impressive. Since its beginning in 1992, the programme has:

- made a tremendous contribution towards the identification and designation of both the **marine and terrestrial Natura 2000 network**, and also plays a crucial role in defining site management regimes. For example, thanks to LIFE, Spain identified and designated its marine Natura 2000 network and is now working on integrating its management in all relevant sectorial policies. In Europe, by the end of 2019, over 5 400 Natura 2000 sites had benefited from LIFE funding. LIFE has played an important part in making Natura 2000 the largest network of protected areas in the world.
- **purchased tens of thousands of hectares** of Europe's most rare and endangered habitat types and restored even more land (peatlands and coastal dunes mostly, but also grasslands and forests), leading in many cases to measurable recoveries of habitats such as seagrass beds and dynamic dune systems, and their associated species pools at either local or regional levels.
- **safeguarded numerous species from extinction,** either locally or for Europe as a whole. The programme has been particularly successful in recovering populations of birds of prey species such as the Bearded vulture, and additional bird species like the Azores bullfinch, Aquatic warbler and Blue chaffinch. Other species brought back from the brink include the Iberian lynx, the Brown bear, the Pyrenean desman and the Mediterranean monk seal.
- ensured the **recovery of many local and endemic species**, particularly plants and invertebrates that are often overlooked by nature conservation. Also, myriad non-targeted species caught in the LIFE project 'slipstream' have benefited as a result of conservation efforts focusing on particular habitats or species.
- demonstrated the added value and effectiveness of **transnational conservation** approaches, particularly in relation to restoring fish migration routes and coherent site networks for migratory birds. Projects to improve wintering and staging grounds along flyways are boosting the population of several migratory bird species, such as the Lesser white-fronted goose, while the restoration of fish migration routes in Sweden has made it possible for the Atlantic salmon to return to spawning grounds after a lengthy absence.
- supported practical measures on the ground to prevent, control and eradicate **invasive alien species (IAS)**. The programme has been particularly effective in developing guidance, raising awareness, and producing tools to help stakeholders reduce the pressure by IAS on native species and natural habitats. This experience and know-how, coupled with effective awareness raising of the threats and impact from IAS, facilitated the adoption of the EU's IAS Regulation.
- supported the **transition towards more sustainable agriculture, forestry and fishery**, for example through the development of conservation-oriented agri-environment measures under the Common Agricultural Policy (CAP). Thousands of farmers and land managers across Europe joined agri-environmental schemes thanks to the help of LIFE projects. They now receive CAP financial to support species-rich grasslands or hay meadows, for example, or implement management plans for farmland species like the Aquatic warbler, Danube clouded yellow, Little bustard and many others.
- provided added value by demonstrating the **social and economic benefits that nature provides**. The programme has facilitated and initiated dynamics in nature conservation that involve, motivate and provide private landowners from various sectors to engage in conservation measures that often go beyond what the law requires.
- **reached out to tens of millions of Europeans** through a wide array of communication channels to become a recognised brand for nature conservation and restoration across Europe. LIFE, without a doubt the most powerful communication tool for Natura 2000, has changed attitudes towards nature conservation and provided a positive image of the EU to many of its citizens.
- **punched harder than its weight in terms of budget** through the mobilisation of national and other co-funding – and not just during project periods but afterwards as well, thereby ensuring long-term continuity. LIFE Integrated Projects, which mobilise complementary funds (since 2014, nature IPs have a cumulative mobilisation target of €1.4 billion), are a great tool for multiplying resources available for conservation work; their approach will be scaled up with the introduction of Strategic Nature Projects (SNaPs) within the new LIFE programme phase (2021-2017) – likely providing another fundraising boost.

Even though LIFE is not sufficiently resourced to stop the overall decline of nature and biodiversity throughout the EU, the programme has been instrumental in **many local and regional conservation successes** in which habitat or species decline has either been halted or set back on the road to recovery. One thing is clear: the LIFE programme has prevented the state of nature in the EU from being worse than it would be otherwise. The Living Planet Report 2020 (WWF, 2020) shows that biodiversity decline in Europe is relatively lower than in other regions of the world, and points out that the LIFE programme, the EU Nature Directives and the Natura 2000 network are all of global significance.

In taking **a hands-on conservation approach**, LIFE is also helping to grow a community of public, NGO and private sector conservation practitioners. This increases their capacity to run the larger-scale projects needed to achieve ambitious targets within the EU Biodiversity Strategy for 2030.

LIFE is all about people! Everyone who has worked to make the LIFE programme successful over the years can be proud of their contribution. This brochure draws our attention to the programme's many successes, but also indicates how much more vital work remains to be done in the coming years.

EU nature legislation

EU efforts to preserve Europe's biodiversity are coordinated through a strong, unified legal framework that enables all Member States to work together in protecting valuable habitats and species across their entire range within Europe, irrespective of political administrative boundaries.

The EU's current nature-protection regime is based on two pieces of landmark legislation: the Birds Directive[2] (1979), and the Habitats Directive[3] (1992). Jointly the two directives extend protection to approximately 1 500 animal and plant species and some 200 habitat types. The directives articulate a holistic approach that puts habitat conservation on an equal footing with protection of individual species. At the same time, they aim towards establishing a coherent, continent-wide ecological network of protected areas, called Natura 2000.

The Natura 2000 network, which spans all 28 EU countries, has since 1992, grown into the world's largest coordinated network of protected areas. As of 2019, Natura 2000 includes nearly 28 000 sites, covers 18% of the EU's total land area and over 10% of its sea area.

In 2019, acknowledging the immense economic value of nature protection, the European Commission presented the European Green Deal[4], an ambitious package of measures developed to enable European citizens and business to benefit from sustainable green transition. The European Green Deal also recognises that all EU policies should contribute to preserving and restoring Europe's natural capital, as is reflected, for example, in the EU Biodiversity Strategy for 2030 and the development of 'blue economy' initiatives for the protection and sustainable management of marine environments.

Other EU policies related to habitat and species conservation efforts include the Water Framework Directive, Invasive Alien Species Regulation, Marine Strategy Framework Directive, and Adaptation Strategy. The EU plans to introduce a new Forest Strategy in 2021 and many other policy initiatives. It will also propose new legislation on restoration to fill existing gaps.

Much, however, remains to be done. The EU Nature Directives are being improved to facilitate partnerships with different stakeholder communities in Member States and across the EU to deliver more effectively and efficiently on the ground.

EU Biodiversity Strategy for 2030

One of the cornerstones of the European Green Deal is the EU Biodiversity Strategy for 2030, which aims to unlock €20 billion per year for biodiversity through various sources, including EU funds and national and private funding. This would position the EU as a world leader in addressing the global biodiversity crisis.

The previous EU Biodiversity Strategy to 2020, adopted in 2011, aimed to halt biodiversity loss and the degradation of ecosystem services. The EU failed, however, to reach its 2020 targets and it became clear that a more ambitious approach was required.

The main aim of the new strategy is to expand legally protected areas in Europe to at least 30% of land area and 30% of sea area – with at least 10% of these areas under strict protection – and to integrate ecological corridors as part of a true Trans-European Nature Network. Furthermore, the strategy includes 14 specific actions and targets aimed at restoring degraded land and sea ecosystems across Europe.

The LIFE programme will undoubtedly play a crucial role in helping Member States to achieve various targets of the EU Biodiversity Strategy for 2030. There are already numerous projects in place to assist in the recovery of highly threatened species and the restoration of thousands of hectares of degraded habitats. LIFE projects are also helping to identify 'high nature value' (HNV) areas that are not yet protected, as well the ecological corridors needed to ensure connectivity between Natura 2000 sites and establish a coherent Trans-European Nature Network by 2030. Finally, the LIFE programme is delivering hundreds of kilometres of free-flowing rivers, planting hundreds of thousands of trees, working with stakeholders, building partnerships and increasing public awareness of the indispensable services that nature provides.

EU Nature Restoration Plan: key commitments by 2030

1. Propose legally binding EU nature restoration targets in 2021, subject to an impact assessment. Restore significant areas of degraded and carbon-rich ecosystems by 2030; habitats and species to show no deterioration in conservation status and trends, and at least 30% to reach favourable conservation status or show a positive trend.
2. Reverse the decline in pollinators.
3. Reduce chemical and hazardous pesticide use by 50%.
4. Bring at least 10% of agricultural area to include high-diversity landscape features.
5. Bring at least 25% of agricultural land under organic farming management.
6. Plant three billion new trees in the EU, while fully respecting ecological principles.
7. Make significant progress in the remediation of contaminated soil sites.
8. Restore at least 25 000 km of river to a free-flowing state.
9. Reduce the number of Red List species threatened by invasive alien species by 50%.
10. Reduce nutrient losses from fertilisers by 50%, and decrease use of fertilisers by at least 20%.
11. An urban greening plan should be in place for all cities with at least 20 000 inhabitants.
12. No chemical pesticides are to be used in sensitive areas, such as EU urban green areas.
13. Substantially reduce negative impacts of fishing and extraction activities on sensitive species and habitats, including on the seabed, to achieve good environmental status.
14. Reduce or eliminate species by-catch to levels that allow species recovery and conservation.

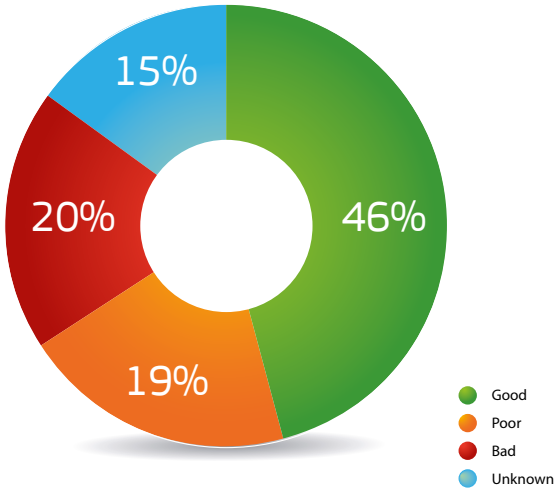
[2] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds
[3] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
[4] https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

The state of nature in the EU

The European Environment Agency published the third EU State of Nature report in 2020 (EEA, 2020). Based on the report's aggregated results for birds, other species and habitat types, there are some encouraging trends, but the overall picture is still quite poor.

While 46% of assessed bird species have a good population status in the EU, the number is 5% lower than it was five years ago. At the same time, the combined total of poor and bad status of bird species has increased during the same period to reach 39%.

Figure 1: EU population status of bird species*



*Categories: Good (secure), Poor (near threatened, declining, depleted), Bad (threatened)

Source: EEA, 2020

Photo: European roller - LIFE13 NAT/CY/000176 - © Christodoulos Makris

More than half of EU regional assessments for plant and animal species other than birds report a poor (42%) or bad (21%) status. Above a quarter (27%) are in good status, however – an increase of 4% on the last reporting period. Due in part to a narrowing of knowledge gaps regarding species, the number of regional assessments classified as 'unknown' has fallen from 17% to 10%.

Figure 2a: Conservation status of species at EU level

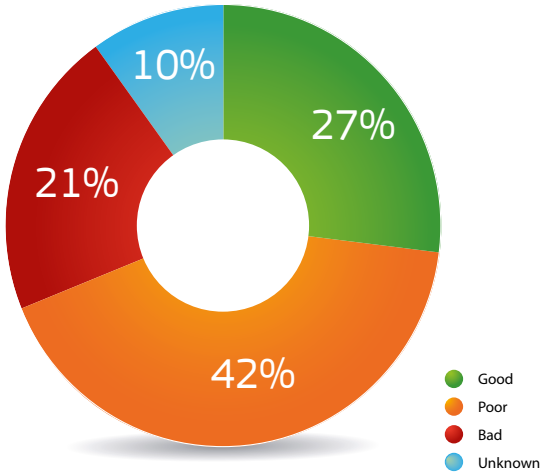
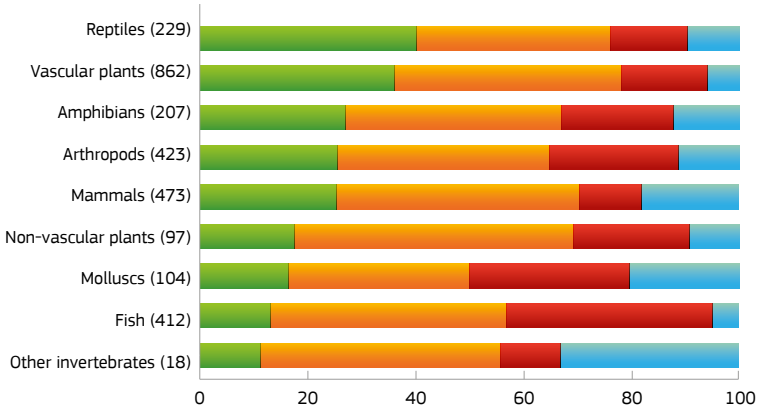


Figure 2b: Conservation status per species group at EU level



Source: EEA, 2020

Photo: Forest-Alp Natura 2000 - LIFE05 NAT/RO/000176

Assessments for habitat types at the EU regional level show that the vast majority have an unfavourable conservation status (45% poor and 36% bad). Compared to the last reporting period, the bad conservation status for habitats has increased by 6%, while 15% of habitat assessments report a good conservation status.

Figure 3a: Conservation status of habitats at EU level

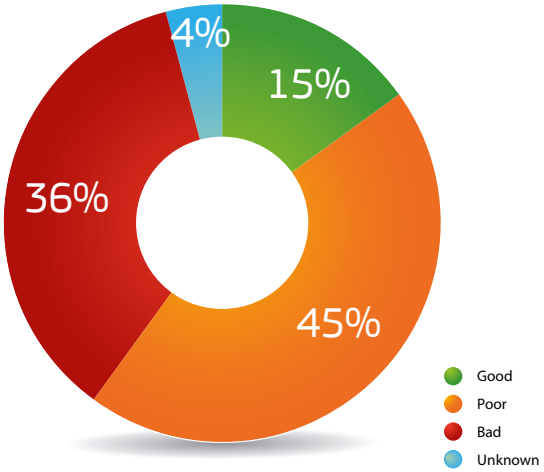
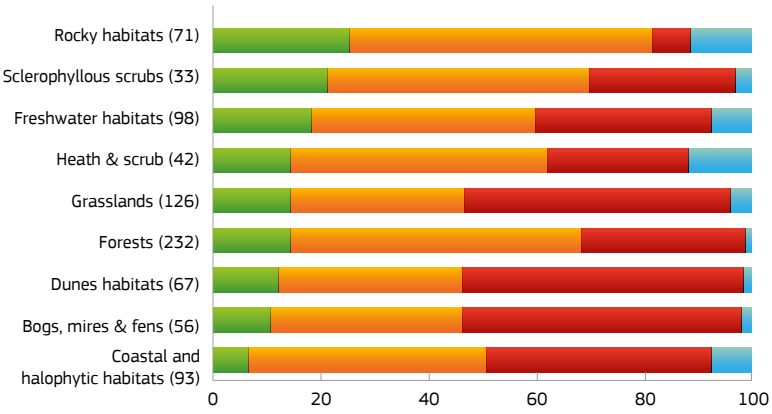


Figure 3b: Conservation status per habitat group at EU level



Source: EEA, 2020

The LIFE programme

The LIFE programme, launched in 1992, has co-financed more than 1 700 projects on nature and biodiversity and is one of the main sources of EU funding for implementing the Birds and Habitats Directives. LIFE co-funds projects that work to conserve the species and habitats listed in the annexes of the two Nature Directives, across the entire Natura 2000 network, including marine protected areas. It also supports activities targeting species and habitats with a status of 'endangered' or worse in the IUCN's European Red Lists.[5]

LIFE plays a vital role in Member State efforts to identify and manage Natura 2000 network sites, both on land and in marine areas. The programme's nature and biodiversity projects can support a wide range of measures for the management and restoration of Natura 2000 sites through means other than EU funding instruments, including communication and outreach activities. Endowed with the flexibility and capacity to develop partnerships with multiple stakeholders for effective and efficient project implementation, LIFE projects provide excellent value for money.

LIFE Integrated Projects (IPs) were introduced in the latest funding period to help Member States implement key environmental legislation through a more strategic and joined-up approach. Relative to nature protection, IPs support Member States in implementing their Prioritised Action Frameworks (PAFs). The 15 nature IPs funded up to 2018 will utilise more than €1.2 billion from EU agricultural and regional funds and other sources, on top of LIFE's €164 million contribution.

[5] https://www.iucn.org/regions/europe/our-work/european-red-list-threatened-species/life-european-red-lists

A LIFE chronology

The LIFE programme is now entering its sixth incarnation, and a brief summary of its development helps in charting the trajectory of its growing success and influence.

LIFE I (1992-1995)

LIFE I funded 731 projects focused on promoting sustainable development, protecting habitats and wildlife, improving environmental services and their administration, and facilitating environment-related actions in non-EU countries.

LIFE II (1996-1999)

LIFE's second phase saw a programme budget increase and a split into three categories: LIFE-Nature, dedicated to conservation actions; LIFE-Environment, focused on implementing EU environment policy and legislation; and LIFE-Third Countries, which addressed actions in Mediterranean and Baltic shoreline countries.

LIFE III (2000-2004, extended to end-2006)

LIFE III ran for five years with an increased budget of €640 million. Continuing work within the preceding scope, the new phase introduced accompanying measures to encourage multinational projects and multi-stakeholder networking within projects.

LIFE+ (2007-2013)

LIFE+ carried the torch for seven more years with a budget increase of more than €2 billion and was also split into three categories: LIFE+ Nature and Biodiversity, which built on the former LIFE-Nature programme; LIFE+ Environment Policy and Governance, which continued efforts of the LIFE-Environment programme; and LIFE+ Information and Communication, which introduced co-financed projects related to multimedia messaging and awareness raising.

LIFE (2014-2020)

The current LIFE programme has a budget of €3.4 billion and is divided into two sub-programmes focused respectively on the environment (75%) and climate action (25%). A new category emerges as well – jointly funded Integrated Projects (IPs) – which operate on larger territorial scale and enable authorities in EU Members States to implement and enforce environmental and climate legislation to the fullest extent possible.

LIFE (2021-2027)

With a proposed budget increase to €5.4 billion, the LIFE programme enters exciting new territory with an expansion into four sub-programmes: nature and biodiversity, circular economy and quality of life, climate change mitigation and adaptation, and clean energy transition.

The new LIFE programme

In June 2018, the European Commission proposed to establish a new LIFE programme for 2021-2027.[6] Subject to approval by the European Council and Parliament, the new programme will see a budget increase of 60% to €5.45 billion.

The Commission proposal earmarks 40% of the total programme budget for conservation of nature and biodiversity, which will surely contribute to implementation of the EU Biodiversity Strategy for 2030, part of the European Green Deal, and the fulfilment of EU commitments under the Convention on Biological Diversity.

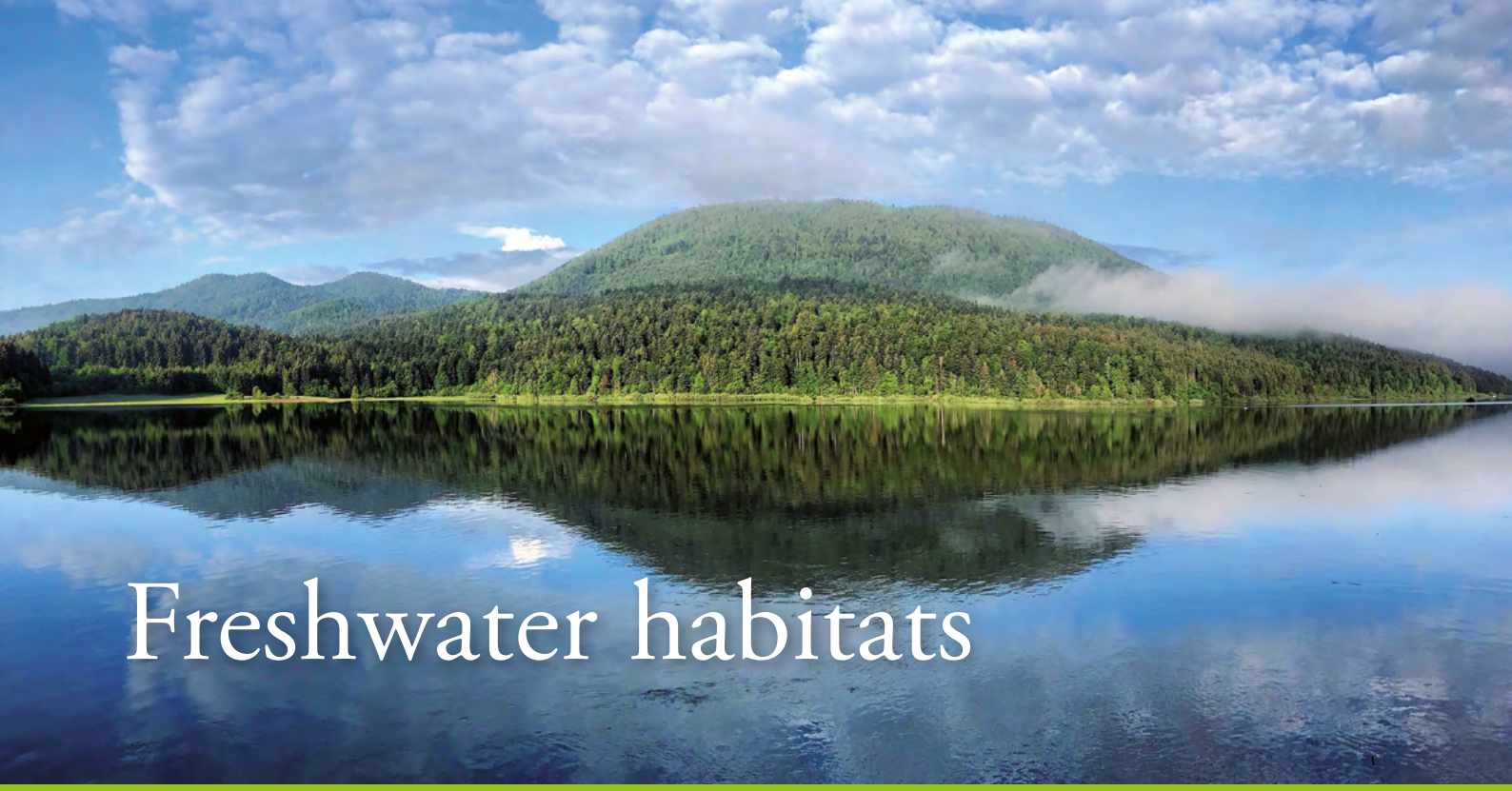
In the next financial period, the LIFE sub-programme on nature and biodiversity will maintain a focus on supporting projects with conservation and restoration targets. Particular attention will be paid to projects that help implement the EU Birds and Habitats Directives, Natura 2000 and the IAS Regulation. There will also be some new approaches to obtain further support and higher rates of co-financing. Several species included in the EU Red Lists will come under the spotlight. while long-term conservation strategies to upscale conservation outcomes will be introduced at national and regional level. The LIFE programme will also build on its experience from Integrated Projects outcomes by introducing Strategic Nature Projects (SNaPs). SNaPs will support Member State actions to mainstream nature and biodiversity policy objectives into other EU policies, such as agriculture and rural development.

Photo: LIFE in action: making islands safe for seabirds - LIFE07 NAT/P/000549 - © Luis Ferreira

[6] European Commission (2018) *Proposal for a Regulation of the European Parliament and of the Council establishing a Programme for the Environment and Climate Action (LIFE) and repealing Regulation (EU) No 1293/2013*. COM(2018) 385 final.

LIFE preserves Habitats

Chapter 1



Freshwater habitats

Photo: Lake Cerknica - LIFE16 NAT/SI/000708 - © Jošt Stergaršek

Freshwater ecosystems of running and standing open water include lakes and ponds, rivers, streams, springs and wetlands. Widely distributed across Europe, these ecosystems provide critical habitats for a large number of aquatic species, of which several migratory and threatened. The main threat categories to these habitats – all related to human activities – are pollution, intensive agriculture and modification of natural conditions. EU-protected freshwater ecosystems are not in great shape overall, with less than 20% in good condition, and there is no evidence that threats and pressures on these habitats are easing. Measures to protect freshwater habitats include restricting dam building, reducing pesticide use, establishing protected wetland areas, and regulating water withdrawal for human use.

Conservation status

EU State of Nature report 2020

Trends in conservation status

In the EU State of Nature report 2015, the conservation status assessments for rivers and lakes habitats were 16% assessed as good and 56% assessed as poor. Bad made up a further 17% of assessments, while 11% were unknown.

Although the State of Nature 2020 report shows some encouraging signs with a 4% increase in good status across all classifications since the previous reporting period, there is still some way to go as the headline data of 42% still in poor or bad condition suggests.

Examples of genuine improvements in freshwater habitats linked to LIFE

Habitat type showing improved status	Member State	Biogeographical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Turloughs (3180*)	SI	CON	Poor to good (genuine improvement in status)	No LIFE projects identified but see the section below
Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation (3270)	NL	ATL	Poor to good (genuine improvement in status)	Connection with Floodplain Development (LIFE11 NAT/NL/000771)

*Priority habitat

Photo: LIFE05 NAT/B/000091

Typical activities carried out within the LIFE programme's freshwater project portfolio include restoring hydromorphological functions, improving in-stream habitats, establishing riparian zones, controlling invasive species, and addressing pollution from land-based sources. In many cases, success is only possible when a series of projects targets the same habitat type.

Lack of genuine improvement reported for freshwater habitats makes it difficult to draw firm conclusions about the scale of LIFE programme contributions. Genuine improvement from poor to good condition of rivers with muddy banks, reported by the Netherlands, could be linked to **Floodplain development** (LIFE11 NAT/NL/000771) project activities, but this small area of restored habitat is unlikely to have a major positive impact in terms of overall conservation status.

Some LIFE projects, however, have made a possible contribution to habitat status maintenance. Consecutive LIFE projects, **HAPPYFISH** (LIFE07 NAT/EE/000120) and **LIFE HAPPYRIVER** (LIFE12 NAT/EE/000871), both restored habitats impacted by hydrological changes through riparian vegetation management and physical removal of sediments in the water.

Despite these small advances, there are many more instances where – despite the presence of an ongoing LIFE project – a deterioration in conservation status has been recorded. This illustrates the fact that upstream issues can have disrupting effects downstream.

We now know that the only way to improve the conservation status of rivers and lakes is to adopt a holistic and catchment-based approach. LIFE Integrated Projects, typically of 10-year duration, embody such an approach: as such, they can take targeted actions to reduce downstream impacts and address cross-border and transnational issues.

Key messages

- **LIFE projects present numerous local successes, mainly in standing waters, such as through the creation of large networks of ponds.**
- **Running waters are more difficult to improve due to the often transnational nature and upstream issues disrupting recovery.**
- **LIFE projects show innovative approaches to river restoration and barrier removal, reconnecting river courses to wider catchments.**
- **LIFE increased the knowledge about freshwater systems and how to restore them.**
- **The only way to improve the conservation status of rivers and lakes is to adopt a holistic and catchment-based approach.**
- **LIFE Integrated Projects take targeted actions to reduce downstream impacts and address cross-border and transnational issues.**

SUCCESS STORIES

Standing water

These types of water body are often discrete and many are relatively small in size, so the impact of any intervention might be expected to be more effective than in faster-flowing waters. Various land-based influences, however, continue to limit opportunities for success.

Mesotrophic ponds with vegetation recover in Belgium and the Netherlands

Photo: View of a mesotrophic pond - LIFE05 NAT/B/000091

This habitat's clear soft water contains low to moderate levels of plant nutrients and supports a unique array of plant species, with *Littorella uniflora* – a type of shoreweed – typically predominant. In Belgium, where the habitat status is reported as bad, a series of successive projects, going back as far as 1997[7], have improved the local conservation status. **Dommeldal** (LIFE05 NAT/B/000091), the fifth project in the series, had a transboundary component to promote habitat connectivity between Belgium and the Netherlands, where the habitat status is also reported as bad. The project restored almost 50 hectares of mesotrophic ponds, mostly in the Netherlands. Post-project monitoring revealed the presence of *L. uniflora* and demonstrated that recovery could be quite rapid, provided the right conditions are established. The last project in the series, **Triple E Pond area M-L** (LIFE08 NAT/B/000036), focused on restoring pond hydromorphology but also carried out river improvements by removing scrub and trees from dried-up areas. Over 80 hectares of mesotrophic ponds (3130) were restored.

Drainage times prolonged for Slovenian turloughs

Turloughs (3180), seasonally flooded lakes in karstic limestone areas, are not so widespread across the Member States. Filled by subterranean waters from ephemeral springs, they drain back into the groundwater table and have no natural surface outlet. In a positive example from Slovenia, the LIFE project **Cerknisko Jezero** (LIFE06 NAT/SI/000069) set out to prolong drainage time in this intermittent lake and to hold back water during the driest summer months. Hydrological conditions improved along 1 350 m of successfully restored stream courses. Related to these efforts, most of the abandoned meadows in the project area have been purchased on terms of proper management. A new project, **LIFE STRŽEN** (LIFE16 NAT/SI/000708), aims to further improve the status of Lake Cerknica through longer durations of water retention: this involves dredging and reprofiling a 2.1 km stretch of riverbed along the Stržen watercourse.

Photo: Stržen watercourse - LIFE16 NAT/SI/000708 - © Jošt Stergaršek

[7] Midden-Limburg - LIFE97 NAT/B/004208; Dijlevallei - LIFE98 NAT/B/005171; Haine - LIFE00 NAT/B/007148; Life Grote Nete - LIFE05 NAT/B/000090; Dommeldal - LIFE05 NAT/B/000091; Triple E Pond area M-L - LIFE08 NAT/B/000036

Running water

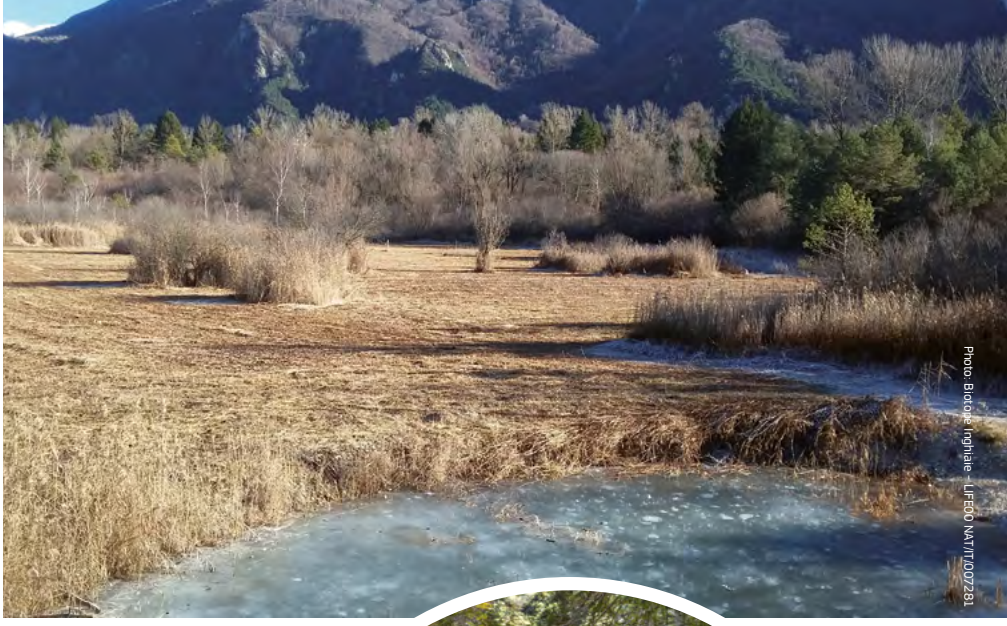


Photo: Biotope Inghiale - LIFE00 NAT/IT/007281

Many river restoration projects have been implemented across Europe, but there are very few cases where river habitats have shown genuine improvement in conservation status. LIFE projects rarely target all factors impacting river habitats, but there are some notable examples of LIFE making a difference at the local level.

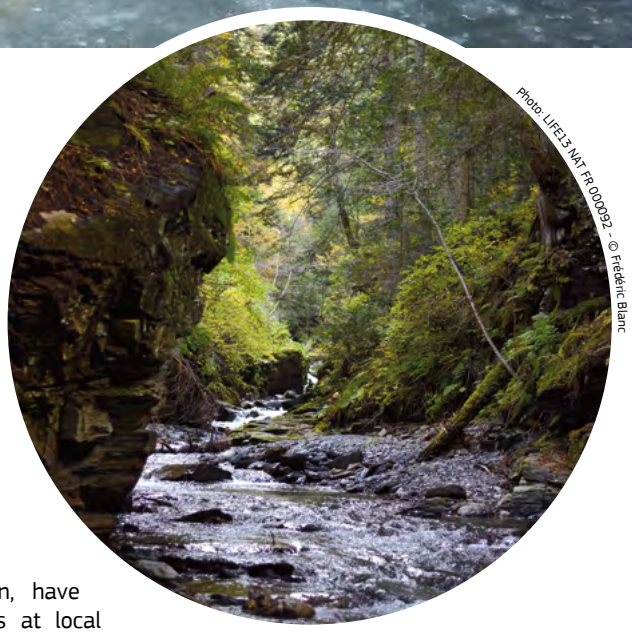


Photo: LIFE13 NAT FR 000092 - © Frédéric Blanc

Multiple projects in Italy target Alpine rivers and vegetation

In Italy, alpine rivers with German tamarisk (*Myricaria germanica*) vegetation are reported as being in bad condition in both the Continental and Alpine regions. The **Taro** (LIFE98 NAT/IT/005138) project improved knowledge about the habitat in the Continental region through implementing restoration measures and raising awareness. Thousands of new tamarisk plants were produced and planted, and several surveys carried out on the wild plants found along the river. A habitat with a similar bed type and flow regime, but distinguished instead by the presence of *Salix elaeagnos* (a type of willow), is found in Italy's Alpine, Continental and Mediterranean biogeographical zones. Three LIFE projects, all in the Alpine region, have brought positive changes at local level: **NECTON** (LIFE97 NAT/IT/004089) increased the habitat area by almost 4 hectares; **NEMOS** (LIFE00 NAT/IT/007281) succeeded in expanding and reinforcing the Natura 2000 network following the establishment of new Special Protection Areas (SPAs); and **Fiume Toce** (LIFE02 NAT/IT/008572) restored river banks and artificial embankments to cut erosion, reduced invasive trees and shrubs in thermophilous (warmth-loving) shrub habitats, and created new alluvial forests by planting numerous seedling varieties.

Other LIFE projects

LIFE CONNECTS
(LIFE18 NAT/SE/000742)

DRAVA LIFE
(LIFE14 NAT/HR/000115)

LIFE Lech
(LIFE15 NAT/AT/000167)

LIFE Flusserlebnis Isar
(LIFE14 NAT/DE/000278)

LIFE+SCALLUVIA
(LIFE12 NAT/BE/000596)

LIFE Potamo Fauna
(LIFE12 NAT/ES/001091)

LIFE REGENERA LIMIA
(LIFE13 ENV/ES/000227)

LIFE Continuité écologique
(LIFE10 NAT/FR/000192)

Looking ahead

There are several million kilometres of flowing water and thousands of freshwater lakes within EU Member State boundaries, some of which connect with neighbouring countries, adding an important transboundary aspect to this habitat type. While past LIFE projects targeting this habitat have focused typically on conservation actions in specific locations to bring about benefits at a local scale, more deeply coordinated large-scale efforts will be needed in future to deliver greater impacts. LIFE Integrated Projects currently underway involve a catchment-based and holistic approach that is also capable addressing the cross-border complexities involved in the conservation of freshwater habitats. How successful these efforts will be remains to be seen, as the projects have yet to run their full course.

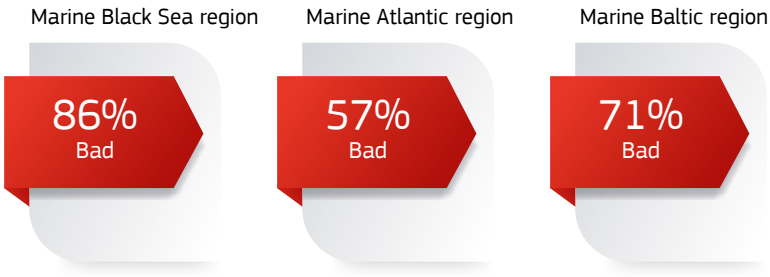
Marine habitats

Photo: Deep-sea habitat off the Spanish coast - LIFE07 NAT/E/000732 - © WWF Juan Carlos Calvin

Marine ecosystems, distinguished by waters with a high salt content, support a diverse range of species and habitats and bring a wealth of cultural, social and economic benefits to human societies. Five sea basins surround Europe's land – the Mediterranean Sea, Black Sea, Baltic Sea, North Sea, and the North Atlantic Ocean – and just five Member States lack a coastline. The main threats to marine habitats in Europe are urbanisation (coastal modifications, tourism and leisure, pollution), extractive industries (dredging, mining) and exploitation (mariculture, fishing). These habitats are not in the best of health, and there have been only two improvements in marine conservation status since the last reporting period. Obtaining more data is one key aspect of future efforts to protect marine biodiversity.

Conservation status

EU State of Nature report 2020



Trends in conservation status

The 2015 EU State of Nature assessed marine ecosystems differently from the latest report. Its conclusion was that marine habitats close to the land were largely in poor or bad conservation status and only 6% were in a good condition.

The 2020 EU State of Nature report makes only broad conclusions. Marine regions exhibit less good status than terrestrial regions on average, with good conservation status only reported for the Black Sea. The Marine Baltic and Marine Atlantic regions have a particularly high share of bad status assessments. Overall, marine habitats have the highest share of unknown conservation status. Building the knowledge base is urgently needed.

Worlds of difference

Europe's marine waters vary significantly in character – from the brackish, nutrient-rich conditions found in the Baltic and Black Seas, through the warm and relatively nutrient-poor Mediterranean, to the exposed western coastlines with cool, well-mixed waters of the Atlantic Ocean. Physical, chemical and oceanographic characteristics can also create wildly different conditions within the same large body of water. The western Baltic mixing with the open water of the North Sea is fully saline, while to the extreme east the Baltic is almost fresh water. In the Black Sea only the upper layers support high diversity, while waters below 100 m are depleted entirely of oxygen.

Complications of habitat classification

The table below summarises the different habitat types included in this chapter. For some of these it is difficult to distinguish or differentiate between 'marine' and 'coastal' habitats, as they have overlapping characteristics – due in large part to tides.

Habitat type and identification number	
Sandbanks which are slightly covered by sea water all the time	**(1110)**
Posidonia beds	**(1120)**
Estuaries	**(1130)**
Mudflats and sandflats not covered by sea water at low tide	**(1140)**
Coastal lagoons	**(1150)**
Large shallow inlets and bays	**(1160)**
Reefs	**(1170)**
Submarine structures made by leaking gases	**(1180)**
Boreal Baltic narrow inlets*	**(1650)**
Sea caves*	**(8330)**

*Not included under Open Sea and Tidal Areas in Annex I of the Habitats Directive

The LIFE programme has promoted the marine component of the Nature Directives in developing inventories to set up offshore Natura 2000 networks, implemented concrete conservation and management measures within existing Natura 2000 marine sites, facilitated conflict resolution amongst marine stakeholders, and advanced new approaches to monitor the impact of human activities on critical marine habitats and species.

From the small range of projects available, many of them deal with spatial planning and the need to change stakeholder behaviour. Enforced management measures and limited restoration techniques for specific habitat types have also been trialled, and there are fresh challenges in terms of controlling invasive alien species and pollution from land-based sources.

At the same time, several marine species – sea turtles, seals, cetaceans and sea birds – are benefiting from LIFE projects taking a more species-focused approach. This publication covers these efforts in more detail (see the sections on Reptiles and amphibians, Mammals, and Birds).

Baltic MPAs (LIFE05 NAT/LV/000100) pooled resources from Latvia, Lithuania, and Estonia to perform a detailed study of important marine sites for species and habitats of conservation interest. The project stands out as it combined data collection with addressing the concerns of stakeholders.

The **FINMARINET** (LIFE07 NAT/FIN/000151) project conducted inventories, planned the marine Natura 2000 network in Finland, and carried out physical and biological surveys of the seabed and water column. A similar project in Lithuanian waters, **DENOFLIT** (LIFE09 NAT/LT/000234), produced an inventory of marine species and habitats for development of the Natura 2000 network in the offshore waters of Lithuania.

INDEMARES (LIFE07 NAT/E/000732), an ambitious project based in Spain, collected data over a wide expanse of Spanish waters and identified 10 new marine Natura 2000 sites. This laid the foundation for two ongoing Integrated Projects: **LIFE-IP INTEMARES** (LIFE15 IPE/ES/000012) involves the implementation of management plans for these protected areas; **LIFE IP Marine Habitats** (LIFE16 IPE/FR/000001) deals with the effective and equitable management of marine habitats in France.

Key messages

- **LIFE has played a vital role in the identification and designation of the marine Natura 2000 network.**
- **Over the past five years, the marine Natura 2000 network expanded by 100% and now covers a more diverse range of habitats under the broad classification of 'reefs'. The offshore network has also grown.**
- **LIFE has also been key in growing the knowledge base to gradually fill the large data gap on marine ecosystems.**
- **Key LIFE successes include the recovery of seagrass beds in the Mediterranean and reefs in the North Sea.**

SUCCESS STORIES

Seagrass beds benefit from a long legacy of LIFE projects

Photo: View of the seagrass - LIFE00 NAT/E/007303

Posidonion oceanicae is a seagrass species endemic to the Mediterranean, and its rehabilitation is the focus of several LIFE projects. In 2000, **Posidonia Baleares** (LIFE00 NAT/E/007303) was one of the first projects to recognise the impact of boat anchoring on seagrass beds. The project introduced an information campaign to reduce these impacts and launched simultaneously a ground-breaking citizen science project to collect data using scuba divers. Three new marine reserves were created as well, and several marine species benefited from the measures undertaken. In 2009, the **Life Posidonia Andalucía** (LIFE09 NAT/ES/000534) project set up artificial reefs to reduce the impact of illegal trawling, installed monitoring buoys to reduce erosion and the dispersal of IAS by free anchoring, and set up monitoring protocols that relied on a citizen science approach. The project represents a cornerstone for the conservation of seagrass beds in Andalusia, has contributed directly to the implementation of relevant EU and national legislation and has a high demonstration value. The final project to highlight is **LIFE Blue Natura** (LIFE14 CCM/ES/000957), which is ongoing and aims to assess the carbon content of seagrass bed habitats in Andalusia.

Photo: LIFE09 NAT/ES/000534 - © Agustín Barrajón

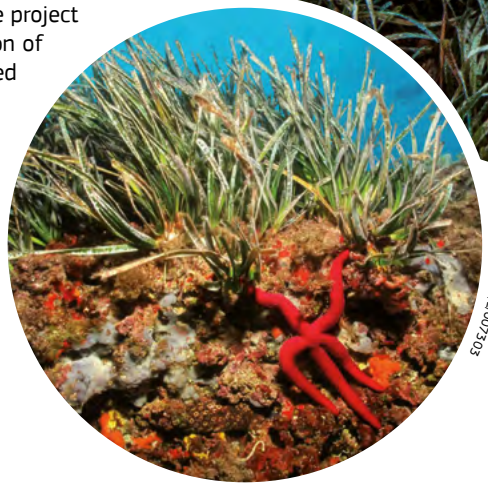


Photo: LIFE00 NAT/E/007303

LIFE projects take on the tough challenge of restoring reef habitats

Photo: Ship carrying boulders - LIFE06 NAT/DK/000159 - © Danish Nature Agency

Photo: LIFE18 NAT SE 000959 © Nina Luckas

Reefs are particularly difficult habitats to restore, and LIFE's **BLUEREEF** (LIFE06 NAT/DK/000159) project involved some truly heavy lifting. The project aim was to rebuild boulder reefs in the Kattegat sea area, from which boulders had been moved originally to build sea defences. The boulders came from Norway and restoration costs were high. The project succeeded in increasing marine life, including the restoration of six tonnes of macroalgal vegetation and three tonnes of bottom-living fauna. There was also a three- to six-fold increase in cod in the reef area. This is impressive local-scale input, even if the conservation status of reefs in Denmark's Marine Atlantic remains bad.

LIFE LOPHELIA (LIFE18 NAT/SE/000959) is a landmark 'traditional' LIFE project in that it explores the relatively deep-water reefs of the Skagerrak entrance to the Baltic. This ongoing project uses innovative restoration materials and seeding methods to revive 25 hectares of deep-water corals to promote fish production and biodiversity. Reefs in Sweden in both the Marine Atlantic and Marine Baltic Regions are classified as bad, but the extent and diversity of the habitat offer considerable opportunity for improvement.

Photo: The boulders are laid out - LIFE06 NAT/DK/000159 - © Danish Nature Agency

Looking ahead

Practical marine conservation measures are well behind those for terrestrial systems, and marine habitats and species have emerged only slowly in the LIFE programme focus. While the EU has made advances in designating protected marine areas, the vast majority of marine habitats and species needs better network protection to achieve good conservation status.

General lack of data makes it difficult to determine appropriate measures to implement, and while marine habitat types are underrepresented compared to freshwater and terrestrial habitats in the Habitats Directive, a much wider and more representative set of marine habitats is included in the IUCN Red Lists of Habitats, and those with threatened status or worse are now eligible for LIFE funding.

Coastal habitats

Photo: View of embryonic and white dunes - LIFE+12 NAT/BE/000631 - © Marc Leten

Europe's nearly 68 000 km of coastline feature a wide range of habitat types – from arid sand dunes to seagrass meadows and wet lagoons. These locations provide breeding grounds and habitats for marine organisms, shorebirds, sea turtles and other wildlife. Nearly half the EU's population lives within 50 km of the sea, and one in seven EU citizens lives within 500 m of the coast: not surprisingly, high coastal population densities and human activities are the main drivers of coastal habitat degradation. There have been some successes but Europe's coastal habitats are in bad conservation status overall, with few signs of improvement in recent years. Furthermore, an estimated 4 500 km^2 of Europe's coastal wetlands will likely disappear from sea level rise linked to climate change.

Conservation status

EU State of Nature report 2020

Trends in conservation status

The 2015 EU State of Nature report highlighted the critical status of dune habitat in Europe. Consequently, through the Natura 2000 Biogeographical Process, there has been much coordinated work in the Atlantic region which holds about half of all *Shifting dunes* (2120), *Fixed dunes* (2130*) and *Humid dune slacks* (2190) in Europe. This work has borne fruit as can be seen in the 2020 EU State of Nature report, which states that there are some encouraging improvements in the conservation status of coastal habitats at Member State level.

Examples of genuine improvements in coastal habitats linked to LIFE

Habitat type showing improved status	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (2120)	DK	ATL	Bad to poor (genuine improvement in status)	REDCOHA-LIFE (LIFE12 NAT/DK/001073)
	NL	ATL	Poor-improving to good (genuine improvement in status)	Dutch Coastal Dunes (LIFE05 NAT/NL/000124); Revitalising Noordduinen (LIFE09 NAT/NL/000417); Dutch dune revival (LIFE09 NAT/NL/000418)
Fixed coastal dunes with herbaceous vegetation (grey dunes) (2130*)	SE	CON	Bad-deteriorating to bad-improving (genuine improvement in trend)	SandLIFE (LIFE11 NAT/SE/000849)
Humid dune slacks (2190)	BE	ATL	Bad-improving (genuine improvement maintained)	FEYDRA (LIFE02 NAT/B/008591); ZENO (LIFE06 NAT/B/000087); Life FLANDRE (LIFE12 NAT/BE/000631)
Machairs (21A0)	UK	ATL	Poor-improving to good (genuine improvement)	Scottish machair (LIFE08 NAT/UK/000204)
Coastal lagoons (1150*)	FR	MED	Bad to poor-improving (genuine change in status and trend)	LAG'Nature (LIFE07 NAT/F/000193); LIFE+ ENVOLL (LIFE12 NAT/FR/000538)
	DK	CON	Bad to bad-improving (genuine change in conservation status and trend)	CONNECT HABITATS (LIFE09 NAT/DK/000371); Better BirdLIFE (LIFE17 NAT/DK/000498)
Boreal Baltic coastal meadows (1630*)	EE	BOR	Poor to poor-improving (genuine change in conservation status and trend)	URBANCOWS (LIFE10 NAT/EE/000107)
	FI	BOR	Bad-improving to poor-improving (genuine change in conservation status)	Kokemäenjoki-LIFE (LIFE06 NAT/FIN/000129); Vattajan dyyni LIFE (LIFE05 NAT/FIN/000104); Species-rich LIFE (LIFE10 NAT/FI/000048); Light & Fire -LIFE (LIFE13 NAT/FI/000099)

Since 1992, more than 300 LIFE projects have targeted coastal habitats listed in the Habitats Directive, focusing on measures such as habitat creation, controlling invasive species and enhancing natural dynamics. There has been a strong focus on improving the status of priority habitats across biogeographical regions, such as fixed dunes in the Atlantic and Continental region, dunes with Juniper in the Mediterranean region, and coastal lagoons in several regions.

Boreal Baltic coastal meadows is a priority habitat which has declined by more than 50% in the past 50 years. LIFE projects such as **CoastNet LIFE** (LIFE17 NAT/FI/000544), **LIFE CoHaBit** (LIFE15 NAT/LV/000900) and **LIFE Coast Benefit** (LIFE12 NAT/SE/000131) have led efforts to re-establish traditional land management with mowing and grazing to help rescue this endangered habitat.

Coastal habitat successes are rare, however, and much hard work lies ahead. The 2013-2018 reports show numerous setbacks and continued pressure on several coastal habitats at Member State and EU biogeographical levels. LIFE projects for coastal and dune habitats have emphasised the implementation of pilot actions and disseminating best practice through national and international coastal networks.

Key messages

- **Key LIFE successes include the ongoing recovery of the entire global area of the rare machair habitats in the British Isles, the restoration of coastal lagoons in the Mediterranean and the rejuvenation of shifting sand dunes in the Netherlands**
- **Although national and EU improvements are scarce, there are many local successes.**
- **LIFE projects have uniquely helped restore natural dynamics in coastal ecosystems.**
- **Cooperation between LIFE actors across countries, such as in the Biogeographical Process, resulted in positive impacts.**
- **At EU level, efforts should be scaled up and conservation measures planned and implemented with cross-border networks.**

SUCCESS STORIES

LIFE projects are instrumental in reviving coastal dunes

Photo: View of a dune slack – LIFE09 NAT/NL/000418 - © Jan Dirk Bol

Photo: Dune pansies – LIFE09 NAT/NL/000418 - © Jan Dirk Bol

There are 17 coastal dune habitat types in the EU, and LIFE projects have played an important role in their protection. By removing vegetation and plantations a series of LIFE projects in the Netherlands, including **Dutch dune revival** (LIFE09 NAT/NL/000418) and **Amsterdam Dune project** (LIFE11 NAT/NL/000776), demonstrated how active sand-drift can be restored both in mobile dune habitats and in the fixed-dune landscape. In Denmark, where there are over 40 000 hectares of fixed dunes, the project **REDCOHA-LIFE** (LIFE12 NAT/DK/001073) targeted five habitat types and removed over 100 hectares of conifer plantations which were planted originally to prevent sand-drift. Along the coast of Belgium, urbanisation has destroyed many dune areas and left the remaining areas fragmented and at risk of further deterioration: **FEYDRA** (LIFE02 NAT/B/008591), **ZENO** (LIFE06 NAT/B/000087) and **Life FLANDRE** (LIFE12 NAT/BE/000631) (Belgium/France) are noteworthy rehabilitation projects.

Machair habitats benefit from reintroduction of traditional practices

Photo: Scottish machair - LIFE08 NAT/UK/000204 - © NEEMO EEIG/Donald Lunan

Machair is a type of coastal dune grassland found only along the western coasts of Scotland and Ireland. A decline in traditional systems of land management and more intensive agricultural methods have damaged this rare habitat and its associated species, such as the Corncrake (*Crex crex*) and Chough (*Pyrrhocorax pyrrhocorax*). **Scottish machair** (LIFE08 NAT/UK/000204) targeted two-thirds of the world's machair and helped improve its conservation status from bad in 2006 to good by 2018. The project worked closely with farmers to help them maintain traditional practices, such as the spreading of seaweed on the sandy soils as a natural fertiliser, shallow cultivation, and late harvesting of crops. The **LIFE Aran** (LIFE12 NAT/IE/000995) project, meanwhile, targets Ireland, which has a third of the total habitat area of machair. Conservation measures include extensive cattle and sheep grazing, application of seaweed as fertiliser, control of rabbit populations and cutting back invasive bracken. While much work remains to be done, Ireland's current machair habitat state is an improvement over its bad status reported in 2012.

LIFE brings stability to coastal lagoons

Photo: Seagrass bed - LIFE16 NAT/IT/000663

Photo: The real time monitoring of the salinity in the lagoon project area - LIFE16 NAT/IT/000663

Photo: Sods before transplantation - LIFE12 NAT/IT/000331

Coastal lagoons, expanses of shallow salt water wholly or partially separated from the sea by sand banks or pebble accumulations called 'shingle', are found in all biogeographical regions with a coastline, and often exist in association with other habitat types. Salt content varies from brackish (common in the Baltic) to hypersalinity (common in the Mediterranean) depending on rainfall, evaporation and inputs of seawater. Some specialised bird species, such as the Avocet (*Recurvirostra avosetta*), feed on the supply of invertebrates from coastal lagoons. The most common threats to coastal lagoon habitats are changes to water body conditions, pollution, over-harvesting of aquatic resources and urbanisation.

In Italy, more than 20 LIFE projects since 1992 have helped to maintain good conservation status of the country's coastal lagoon habitats. Current projects such as **LIFE LAGOON REFRESH** (LIFE16 NAT/IT/000663), **LIFE AGREE** (LIFE13 NAT/IT/000115), **LIFE-SeResto** (LIFE12 NAT/IT/000331), and **LIFE AUFIDUS** (LIFE11 NAT/IT/000175) are carrying out a range of helpful actions, including in the famed 3 660-hectare Venice lagoon. Main measures include reducing nutrient inputs, controlling fishing activity – particularly clam dredging – and improving integrated management.

Other LIFE projects

SandLIFE
(LIFE11 NAT/SE/000849)

URBANCOWS
(LIFE10 NAT/EE/000107)

LIFE-IP ForEst&Farmland
(LIFE18 IPE/EE/000007)

Living with the sea
(LIFE99 NAT/UK/006081)

LIFE Baie de l'Aiguillon
(LIFE14 NAT/FR/000669)

MC-SALT
(LIFE10 NAT/IT/000256)

Salt of Life
(LIFE11 NAT/BG/000362)

MANSALT
(LIFE09 NAT/SI/000376)

10GEMETEN
(LIFE04 NAT/NL/000202)

ZTAR
(LIFE09 NAT/BE/000143)

TaCTICS
(LIFE07 NAT/UK/000938)

Looking ahead

LIFE experience with coastal habitats shows that the biogeographical approach does work, especially where traditional LIFE projects are set within an integrated approach to coastal zone management linked to national policies for shoreline management. For greater impact at the EU level, efforts need to be scaled up with conservation measures planned and implemented through cross-border networks.

Climate change brings added pressures to coastal habitats but 'no net loss' (NNL) planning at regional or national level presents new opportunities. NNL is a policy goal in which development impacts on biodiversity are balanced or outweighed by measures taken to avoid or minimise impacts, and finally to offset residual impacts so that no loss remains. This is particularly important for estuarine habitats of mudflats, sandbanks and saltmarshes.

The Atlantic biogeographical seminars in 2012 and 2016 brought awareness to Member States of the pressures and threats to Atlantic dune habitats and the role that LIFE projects have played in developing and disseminating good practice. At the same time, a LIFE platform meeting[8] within the framework of the biogeographical process, held in 2016 in the Netherlands, produced a rolling roadmap for networking and knowledge exchange.

[8] https://ec.europa.eu/environment/nature/natura2000/platform/events/258_ecology_morphology_management_of_coastal_and_inland_dunes_en.htm

Rocky habitats

Photo: Repairing internal field walls to control grazing - LIFE04 NAT/IE/000125 - © EC

Ranging from marine wet conditions to the highest and most barren summits of Europe, rocky habitats exist in rough to extreme environmental conditions and offer sparse vegetation. While comprising a small portion of Europe's total land area, the share of rare plant and animal species specially adapted to these habitats is high. Generally inaccessible, rocky habitat types are mostly sheltered from direct impacts of human activity, but are highly vulnerable to indirect impacts such as climate change – with particularly devastating effects on glaciers. Protection measures in these areas tend be highly localised, and their impacts are rarely visible at the country or EU level in terms of conservation status.

Conservation status

EU State of Nature report 2020

Trends in conservation status

As many rocky habitats tend to be mountain slopes in remote areas, they are the habitat group with one of the highest numbers of good assessments and the lowest number of bad assessments. They also show the lowest percentage of declining status. The 2020 EU State of Nature report highlighted just a few concerns in the Atlantic and Boreal regions. There is an issue with knowledge, however, as around one third of all assessments are reported 'unknown' for structure and function.

As rocky habitats are patchy, often small in size and human pressures mostly indirect, LIFE projects cover these habitats only to a limited extent. The main successes are at the local scale, where measures to restore open vegetation can allow rare species to proliferate.

LIFE efforts to minimise threats and ease pressures in rocky habitats have focused on landscape types such as scree, limestone pavement and alvar meadows. Scree habitats are surfaces of accumulated rock fragments found at the bases of crags, mountain cliffs, volcanoes or valley shoulders, and some scree formations are an important priority habitat for rare plants. Deep fissures in flat expanses of limestone allow ferns and other rare plants to flourish out of the reach of grazing animals. Alvar environments exist on limestone plains with thin or no soil and support a distinctive group of plant species.

LIFE projects such as **Violette et Biscutelle** (LIFE06 NAT/F/000137), **Lowland Limestone** (LIFE99 NAT/UK/006094) and **Limestone Country** (LIFE02 NAT/UK/008539) are good examples of approaches to these habitat types that yield a positive outcome. Actions include clearing overgrowth, reducing woodland cover, re-establishing traditional grazing patterns, and easing pressures from human recreational activity.

SUCCESS STORIES

French project expands habitat for endangered flower species

Photo: Viola hispida seed harvest - LIFE06 NAT/FR/000137 - © Emmanuelle Bernet/CEN Normandie

The French project **Violette et Biscutelle** (LIFE06 NAT/F/000137) sought to ensure the long-term preservation of the *Viola hispida* and *Biscutella neustriaca* in their native habitats (scree and scorched chalk grassland respectively). The species, found in only two Natura 2000 sites in the Seine valley, were threatened with extinction. Improved land management practices (e.g. scrub cutting, grazing and weeding) carried out during the project increased the number of locations for *V. hispida* from 13 to 21, but this positive trend could not be sustained. Within five years of the project's end, woody overgrowth brought down the number of locations to 11. While the scree habitat was improved locally, the habitat in the Atlantic region remains poor-bad overall.

Multiple LIFE projects cover Europe's diverse range of limestone habitats

The conservation status for limestone pavement habitats in Europe's Alpine, Mediterranean and Continental regions is generally good, but less so in the Boreal and Atlantic regions. The project **LIFE to alvars** (LIFE13 NAT/EE/000082) opened up 2 500 hectares of alvar meadows in Estonia by reducing woodland cover to less than 40% and maintaining extensive agricultural practices: achieved a positive trend in conservation status (see Box p. 27).

Limestone pavement is a characteristic habitat of the west coast of Ireland and northern England. In Ireland the project **BurrenLIFE** (LIFE04 NAT/IE/000125) controlled scrub invasion and opened up limestone grasslands and limestone pavement. The UK projects **Lowland Limestone** (LIFE99 NAT/UK/006094) and **Limestone Country** (LIFE02 NAT/UK/008539) helped maintain a 'poor-bad but improving' trend for the habitat. Actions included removal of conifer plantations and controlling grazing pressure.

Photo: Improving access for livestock to graze the winterages on the Burren - LIFE04 NAT/IE/000125 - © EC

Key messages

- **As rocky habitats are patchy and often small in size, LIFE projects only cover these habitats to a limited extent.**
- **The main successes tend to be local, where measures help restore open vegetation to make way for rare species.**
- **LIFE actions include controlling recreation pressure, managing vegetation succession, and ensuring that livestock grazing is set at appropriate levels**

Looking ahead

Establishing Natura 2000 sites and providing legal protection have been the most important measures in terms of protecting rocky habitats. Enhanced protection is especially important where habitats and species are at risk from quarrying activity and infrastructure projects.

Grassland habitats

Photo: Grassland habitats at Celmini farm - LIFE16 NAT/LV/000262

Grasslands, shaped over centuries of mowing and grazing, are among the most species-rich habitats in Europe. Among their important ecosystem services are food provision, erosion control, flood regulation and storage of soil carbon. Europe's grassland habitats have come increasingly under threat in recent decades from changes in land use, land abandonment, afforestation, changes in livestock densities, and intensified mowing – all of which lead to negative changes in species composition and vegetation structure. With more than half of Europe's grasslands in poor or bad shape, large-scale projects that involve multiple stakeholders – mainly the farming community – can help reverse this decline. The effective communication of grassland management schemes can also play an outstanding role.

Conservation status

EU State of Nature report 2020

Trends in conservation status

In the 2015 EU State of Nature report, more than 80% of Natura 2000 grassland habitats were in a poor to bad status. In addition, around 49% of EU assessments for the 45 grassland habitat types of Community Importance were in bad condition. According to the 2020 EU State of Nature report more than half of grasslands in poor and bad conservation status are deteriorating. Also, the area of EU grassland has decreased by 45%, the highest of all habitat groups, states the report.

LIFE enters rarefied air in restoring Estonian alvar habitats

Alvar environments are based on limestone plains with just enough soil covering to support sparse yet distinctive grassland vegetation. An extremely delicate habitat vulnerable to spring floods, summer droughts and overgrazing, alvars have a very limited distribution worldwide, and in Europe are found only in coastal western Estonia (ca. 100 km^2 in the Boreal region), southern Sweden (ca. 250 km^2 in the Continental and Boreal regions) and Finland (just 0.5 km). In Sweden's Boreal region the conservation status of this rare habitat declined from good in 2012 to poor in 2019, but the **LIFE to alvars** (LIFE13 NAT/EE/000082) project restored 2 500 hectares of alvar grassland in Estonia – roughly 25% of the global total! – by removing woodlands and forests that developed spontaneously on these sites. The project has also improved the chances of future habitat health by drawing in agri-environmental subsidies to support traditional sheep grazing. Income from the sale of meat and wool now gives local sheep herders an added incentive to carefully manage these rehabilitated alvar grasslands.

Photo: Alvar grassland - LIFE13 NAT/EE/000082 - © Annely Holm

Examples of genuine improvements in grassland habitats linked to LIFE

Habitat type showing improved status	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Nordic alvar and precambrian calcareous flatrocks (6280*)	EE	BOR	Poor-deteriorating to poor-improving (genuine improvement in trend)	LIFE to alvars (LIFE13 NAT/EE/000082).

The LIFE programme has contributed to projects targeting grassland ecosystems within the Natura 2000 network from the very beginning. More than 370 LIFE projects focused directly or indirectly on grassland habitats and species in the first 14 years of the programme, covering nearly all grassland habitat types, and the focus has intensified since then. By 2018, the number of grassland-related projects rose to 528, with more than 100 focused especially on grasslands.

Policy-related actions are particularly important in grassland conservation efforts because of the close links between grassland habitats and agriculture. Within the context of each EU Member State's Rural Development Programme (RDP), many LIFE projects focus on agri-environmental measures that go beyond usual good farming practices, and these can vary considerably depending on grassland habitat characteristics and project objectives.

Surveying projects are carried out to improve our knowledge of habitat characteristics and grassland species, while other projects involve the preparation of Natura 2000 site management plans. Planning projects might also include design and adoption of environmental measures intended to secure post-LIFE grassland conservation status. Another key LIFE activity that helps ensure continued improvement is land acquisition or the securing of long-term land use rights.

The broad spectrum of direct conservation actions includes: reducing nutrient levels; tackling woodland encroachment; sowing, planting or reintroducing management regimes for species enrichment; grazing; fencing of grazed land; mowing management; and eradicating alien species.

Site monitoring is a vital means of gathering information on project impacts, while networking and stakeholder awareness raising are crucial towards ensuring long-term habitat security.

Key messages

- **Grasslands are among the most species-rich vegetation types in Europe.**
- **Almost all biodiverse grasslands are products of traditional management - mowing and grazing - over centuries.**
- **Because they are widespread and threatened, many LIFE projects focus on grassland restoration.**
- **LIFE often facilitates going beyond good farming practices and links habitat restoration to species recovery.**
- **A key success is the restoration of one quarter of the total area of alvar grassland in Estonia**

SUCCESS STORIES

LIFE takes action on grasslands in Latvia

Photo: Restored grassland - LIFE16 NAT/LV/000262

The **Meadows** (LIFE04 NAT/LV/000198) project took a giant first step towards large-scale restoration of Latvia's grassland habitats by targeting 15 floodplain areas covering more 14 000 hectares. These sites are home to the best floodplain meadows in the country, including 50% of its Fennoscandian wooded meadows; they also host Latvia's highest breeding densities of Corn crake (*Crex crex*) and Lesser spotted eagle (*Aquila pomarina*) bird populations.

Photo: Green-winged orchid - LIFE14 NAT/SI/000005

In just four years the project set in motion a coordinated nation-wide programme for the restoration and long-term management of these floodplains. At the same time, some 2 500 hectares of priority-type grassland habitats were restored through clearing woodland overgrowth, initial mowing and re-established grazing. Restoring these grasslands to health significantly improved the conservation status for the project's main target species, namely the Corn crake, Lesser spotted eagle, Greater spotted eagle (*Aquila clanga*), Great snipe (*Gallinago media*) and Ermit beetle (*Osmoderma eremita*).

To ensure project continuity, contracts were signed on condition that land users would apply for funding under national and international agri-environmental programmes for at least five years after the end of the LIFE project, and more than 400 farmers were trained and assisted to apply for these funds. A return visit in 2017 confirmed the project's long-term effectiveness: nine years after the project closed, some 70% to 80% of the floodplain originally included in the project was still under proper management.

The great success of **Meadows** has prepared the way in Latvia for **GrassLIFE** (LIFE16 NAT/LV/000262), which focuses on developing and improving the conservation status of five EU priority grasslands on more than 1 300 hectares by applying best practicing and piloting new restoration methods. There is every reason to expect good results on a regional scale.

LIFE projects bring relief to dry grasslands

Photo: Greater pasque flower - LIFE12 NAT/HU/001028 - © Gyula Kiss

Several LIFE projects have taken a best-practices and management approach in efforts to improve the conservation status of dry grasslands in Europe. **LIFE to Grasslands** (LIFE14 NAT/SI/000005) removed overgrowth and reintroduced grazing and managed mowing to restore 260 hectares of Species-rich *Nardus* grassland habitat in Slovenia. Aside from the physical conservation efforts, policy-related activities are crucial towards assuring long-term sustainability of achieved results. This work includes preparing expert proposals for agri-environmental measures and their integration into Slovenia's Rural Development Policy for 2021-2017, as well as identifying economic incentives for continued sustainable use of dry grasslands.

In Hungary, a sharp decline in extensive livestock farming in recent decades has greatly altered land use, and dry grasslands in the country face threats from spontaneous forest encroachment and the spread of invasive species. The **HUGRASSLANDSLIFE** (LIFE12 NAT/HU/001028) project 2010-2014 worked to rehabilitate three priority habitat types – Sub-Pannonic steppic grasslands, Pannonic loess steppic grasslands and Pannonic sand steppes – by clearing woodland encroachment and re-establishing pastoral systems. Many other LIFE projects in countries such as Czechia, Denmark, Germany and Italy are replicating these efforts to facilitate dry grassland recovery.

Photo: Species-rich Nardus grasslands in project sub-area Pohorje - LIFE14 NAT/SI/000005

LIFE projects explore management alternatives for heavily farmed grasslands

Europe's most fertile grassland habitats are disappearing through conversion into arable use. Formerly common habitats such as *Molinia* meadows, alluvial meadows and lowland hay meadows are giving way to ploughing, fertilisation and intensified livestock grazing. The LIFE programme, however, has its feet on the ground with some exemplary projects targeting these grassland habitats.

LIFE Viva Grass (LIFE13 ENV/LT/000189) made important contributions towards improved land use and nature conservation policies in Lithuania, while also influencing the country's legal framework for long-term maintenance of grassland biodiversity and ecosystem services. The project achieved these ambitious goals through an ecosystem-based planning approach and by promoting economically viable grassland management. In addition to identifying common policy shortcomings and offering constructive recommendations, the project focused on closer coordination between nature conservation and rural development policies. The development and successful testing of an integrated planning tool for sustainable grassland management was a key final outcome.

Photo: Black-tailed godwit - LIFE13 ENV/LT/000189
© Zymantas Morkvenas

Photo: Milk thistle - LIFE13 ENV/LT/000189

Some projects take on multiple conservation problems in the same grassland area. **LIFE MAGREDI GRASSLANDS** (LIFE10 NAT/IT/000243) in north-eastern Italy dealt on one side of the project area with highly porous subsoil and on the other side with heavily farmed dry grassland sites. In the former area, brush overgrowth and the arrival of invasive alien species were worsening already dry soil conditions; meanwhile, ploughing, fertilisation and irrigation for soybean and maize cultivation were taking their toll on the latter group of sites. The project employed combination of restoration methods to regenerate an Eastern Mediterranean dry grassland environment on more than 200 hectares of the former arable land and more than 280 hectares of the former fallow land.

Other LIFE projects have successfully restored a natural mosaic of interlinked habitats. The Slovakian project **PANNONICSK** (LIFE10 NAT/SK/000083) targeted a unique combination of habitats by applying numerous best-practice restoration techniques such as mulching, harrowing, surface levelling, topsoil removal, shrub and tree removal, and the filling in of drainage channels. Follow-up measures included the reintroduction of regular management through mowing and grazing. The project helped to raise the conservation status of all salt marsh habitats and sand dune habitats in Slovakia from 100% bad to 20-23% poor and 46-48% good, respectively.

Other LIFE projects

Trockenrasen Deutschland R-Pf
(LIFE02 NAT/D/008461)

Wetterauer Hutungen
(LIFE08 NAT/D/000004)

Rodgid
(LIFE04 NAT/DK/000020)

RICOPRI
(LIFE09 NAT/IT/000118)

LIFE Xero-grazing
(LIFE12 NAT/IT/000818)

LIFE České středohoří
(LIFE16 NAT/CZ/000639)

LIFE GRASSSERVICE
(LIFE12 BIO/LV/001130)

Pustynia Bdowska
(LIFE09 NAT/PL/000259)

Mikri Prespa
(LIFE02 NAT/GR/008494)

Looking ahead

The pressures from intensive agriculture on grassland habitats are well known, but the EU's Common Agricultural Policy (CAP) and the Rural Development Programmes (RDPs) of Member States are partly to blame for compounding these pressures. The existing regime of financing programmes and incentives are insufficient, and their level of impact too low. At the same time, the profitability of financially supported biofuels production demotivates farmers from participating in agri-environmental grassland conservation efforts.

We are, however, at an important crossroads. The present CAP and RDP period ends in 2020, giving way to a new programming period for 2021-2027. This provides LIFE with a great opportunity to help coordinate and develop region-specific approaches to grassland conservation that can be integrated into the next CAP and RDPs. Furthermore, the EU Biodiversity Strategy for 2030 sets some ambitious ecological targets that can benefit grasslands: to put 25% of agricultural land under organic farming management, to reduce the use of chemicals and high-risk pesticides, and to ensure that at 10% of utilised agricultural area are high-diversity landscapes.

Two things that LIFE can do to help turn back agricultural pressures on grassland habitats are: land purchase with subsequent re-leasing under strict conservation obligations, and supporting sustainable grassland biomass production without site intensification. These decisive approaches stand a good chance of success.

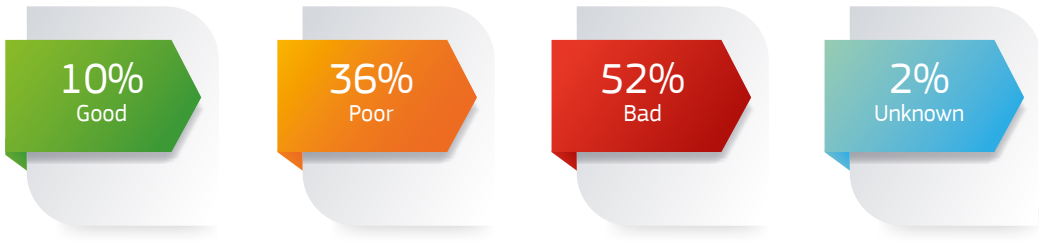
Peatlands

Photo: LIFE14 NAT/EE/000126 - © Maria Maasikamäe

Peat, an accumulation of partially decomposed vegetable and organic matter, is unique to natural areas called peatlands, bogs, mires, fens and moors. The majority of European peatlands are in northern Europe – mainly in Finland and Sweden. Natural peatlands provide invaluable ecosystem services such as climate regulation (through their vast carbon storage capacity) and water filtration and supply, and are also home to several highly adapted rare and threatened species. Peatland degradation and habitat loss is ongoing, and recovery times are slow. The main threats to these habitats include drainage and water extraction, afforestation, fertilisation, peat extraction, built infrastructure, unregulated tourism, use as waste disposal areas, and flooding for hydroelectric power dams, pond creation or water retention. Despite long recovery times, successive peatland restoration projects have delivered massive gains.

Conservation status

EU State of Nature report 2020



Trends in conservation status

According to the 2020 EU State of Nature report, of 62 peatland assessments, just seven had a good status. This concerns primarily peatlands in remote or inaccessible areas in the Alpine, Boreal and Macaronesian (Azores) biogeographical regions. A further 24 assessments are in poor and 31 in bad status. Compared to the 2015 report, together with dunes and grasslands, peatland habitats show the highest proportion of deteriorating trends assessments, more than 50%.

Examples of genuine improvements in peatland habitats linked to LIFE

Habitat type showing improved status or trend	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Active raised bogs (7110)	UK	ATL	Bad-deteriorating to bad-improving (genuine improvement in trend)	Scottish raised bogs (LIFE00 NAT/UK/007078), Cumbrian BogsLIFE+ (LIFE13 NAT/UK/000443), Marches Mosses BogLIFE (LIFE15 NAT/UK/000786), LIFE Welsh Raised Bogs (LIFE16 NAT/UK/000646)
Blanket bogs (* if active bog) (7130)	UK	ATL	Bad-deteriorating to bad (genuine improvement in trend)	Border Mires (LIFE98 NAT/UK/005432), Blanket bog (LIFE00 NAT/UK/007075), Active blanket bog in Wales (LIFE06 NAT/UK/000134), MoorLIFE (LIFE08 NAT/UK/000202), Pennine PeatLIFE (LIFE16 NAT/UK/000725)
Transition mires and quaking bogs (7140)	UK	ATL	Bad-deteriorating to bad (genuine improvement in trend)	Refer to 7110 above
Depressions on peat substrates of the Rhynchosporion (7150)	UK	ATL	Bad-deteriorating to bad (genuine improvement in trend)	Refer to 7110 and 7130 above
Alkaline fens (7230)	BE	CON	Bad-deteriorating to bad-improving (genuine improvement in trend)	Lorraine belge (LIFE99 NAT/B/006285), Herbages (LIFE11 NAT/BE/001060)

The EU Habitats Directive and the Natural 2000 network of protected areas play a crucial role in protecting Europe's peatlands, and so does the LIFE programme. Since 1992, the LIFE programme has funded 363 LIFE projects to conserve and restore peatlands, targeting all 13 habitat types of raised bogs, mires, fens and bog woodland. Peatlands are the primary focus of 28% of these projects, while the others include peatland restoration in association with other habitats.

Commonly applied restoration actions include rewetting by blocking outflow from drainage ditches, installing embankments (bunds), removing dykes and fragmenting infrastructure, stopping pumping in low-lying areas (polders), removing topsoil, and clearing woodland to encourage peat-forming vegetation.

Given the tremendous carbon storage capacity of peatlands, mire and peatland restoration projects are proven to be cost-effective compared to other carbon reducing technologies. With the launch of the LIFE Climate sub-programme in 2014, LIFE rolled out its first climate change mitigation projects focusing on degraded peatlands. These projects have the significant added value of re-establishing multiple benefits arising from peat-forming ecosystems, including enhanced biodiversity and improved habitat conditions.

One such project, **LIFE Peat Restore** (LIFE15 CCM/DE/000138), aims to reduce CO_2 emissions through large-scale restoration of degraded peatlands in northern European lowland states (Estonia, Latvia, Lithuania, Poland and Germany). In addition to significant capture and storage of carbon, the restoration of more than 5 270 hectares of peatlands will also improve their conservation status in the medium term. Peatland and mire restoration projects within the LIFE Climate sub-programme are also delivering innovative restoration techniques – *Sphagnum* spreading on cut-over peat bogs, for example – both inside and outside the current Natura 2000 network, with a long-term objectives of returning these cut-over areas to functional peat accumulating ecosystems. A parallel objective of these efforts is to enlarge the Natura 2000 network.

Mire restoration: Even the best laid plans take time to yield good results

Degraded mire ecosystems, especially raised bogs and blanket bogs, react very slowly to restoration measures – and the more degraded the habitat, the longer it takes to develop target vegetation. Two main factors come into play at the outset of mire restoration activity: firstly, the setting of a long-term optimum groundwater or peatland water level; secondly, the setting of a corresponding nutrient status for the site's peat profile. If both targets are achieved – and this is not always the case – it can still take several decades or even centuries for the vegetation to change enough to report a habitat change from, say, 'Degraded raised bogs still capable of natural regeneration' to 'Active raised bogs'.

Key messages

- **Peatlands represent a large share of Annex I habitat types in Europe, with a corresponding high number of LIFE projects targeting their restoration.**
- **Successive LIFE projects show massive gains, such as the restoration of 170 000 ha of mires in the UK and over 40% of Belgium's peatlands.**
- **Despite long recovery times of the ecosystem, LIFE restoration actions show quick responses in peatland biodiversity.**

SUCCESS STORIES

LIFE undertakes large-scale mire restoration in Lithuania


Photo: Aquatic warbler - LIFE15 NAT/LT/001024 - © EC/Zymantas Morkvenas


Photo: Blocking Amalva bog ditches with plastic piling - LIFE07 NAT/LT/000530 - © EC

Lithuania's 640 000 hectares of peatland occupy nearly 10% of the country's total land area. Nearly 180 000 hectares are in natural or near natural condition, of which around 47 000 are included in the Natura 2000 network. Many of the country's peatlands are degraded and in need of restoration, however, and multiple LIFE projects have been or are involved in achieving large-scale conservation improvements, mostly by improving hydrological conditions.

The first such project in Lithuania, **WETLIFE** (LIFE07 NAT/LT/000530), halted peatland degradation on an area of more than 1 150 hectares. With the **LIFEAukstumala** (LIFE12 NAT/LT/000965) project, extensive rewetting and the removal of vegetation regenerated 91 hectares of degraded bog into active raised bog, while enlarging the good (FV) conservation status of active raised bog by 600 hectares. A third project, **WETLIFE 2** (LIFE13 NAT/LT/000084), achieved good (FV) conditions for the long-term regeneration of active raised bog and bog woodland on more than 700 hectares.

Other LIFE projects in Lithuania have focused on peatland wildlife. The **Tyruliai - Life** (LIFE12 NAT/LT/001186) ensured good (FV) conservation status for the European bittern (*Botaurus stellaris*), Spotted crake (*Porzana porzana*) and migratory Common crane (*Grus grus*) in the Tyruliai bog after rewetting more than 600 hectares of degraded bog habitats. Two other projects, **LIFEMagniDucatusAcrola** (LIFE15 NAT/LT/001024) and **NELEAP** (LIFE05 NAT/LT/000094), have improved Lithuanian mire habitats for the Aquatic warbler (A*crocephalus paludicola)*, European pond turtle (*Emys orbicularis*) and several amphibian species.

LIFE continues long-term engagement with UK peatlands

The UK's humid Atlantic climate creates ideal conditions for peatland habitats, and deep peat covers roughly 11% of the country's land area. In the UK alone, the LIFE programme has carried out a series of 24 projects since 1992 focusing on large-scale restoration of blanket bogs and raised bogs, resulting in the improvement of some 170 000 hectares of degraded mires – around 6.3% of total peatland area and between 17% and 22% of all peat-accumulating mires in the country.


Photo: An excavator closing drainage ditches at the project site - LIFE00 NAT/UK/007075 - © Hans Joosten

Blanket bog (LIFE00 NAT/UK/007075) is a noteworthy project which revitalised 16 600 hectares of blanket bogs in North Scotland. **MoorLIFE** (LIFE08 NAT/UK/000202) restored more than 890 hectares badly damaged bog area that was needed to protected a further 2 500 hectares of active blanket bog frwwm becoming eroded. Finally, **MoorLIFE2020** (LIFE14 NAT/UK/000070) successfully restored 9 500 hectares of raised bogs. These and other LIFE projects, as well as massive intervention from nature conservation agencies, have managed to stop further degradation of *Sphagnum* acid bogs in the UK.

Concerted LIFE efforts revitalise peatlands in the Ardennes midlands

Photo: Recreated wetland - LIFE06 NAT B 000091

A series of successful LIFE Nature mire restoration projects were carried out in Belgium's Ardennes midlands between 2003 and 2019: **Saint Hubert** (LIFE03 NAT/B/000019), **PLTTAILLES** (LIFE05 NAT/B/000089), **Cx SCAILLE** (LIFE05 NAT/B/000087), **PLTHautes-Fagnes** (LIFE06 NAT/B/000091), **Lomme** (LIFE08 NAT/B/000033), and **Ardenne liégeoise** (LIFE10 NAT/BE/000706). All six projects aimed to improve the hydrological conditions, restore various open habitats on peat soils (particularly habitats with peat-accumulating vegetation), reduce habitat fragmentation and improve the connectivity of similar habitats in the Ardennes plateau to enhance species migration. Using a wide range of best practice measures, these concerted efforts improved more than 80% of peatlands in Wallonia and about 40% of all peatlands nationally. Improved peat soil hydrology and other restoration measures – mainly deforestation – revitalised an area of more than 2 500 hectares of peatlands. It may still take several decades[9] before the desired peat-forming vegetation is sustainably restored, but we can safely assume that the large scope of these undertakings and the advanced development of pioneer mire vegetation will soon lead to an improved conservation status of the targeted mire habitats – even on a national scale.

Restoring a raised bog in Denmark

Decades of peat cutting and farming have severely degraded Denmark's Lille Vildmose, the largest active raised bog in north-western Europe. Of its original area of 5 500 hectares, only 2 000 or so hectares remain in their natural state. The **Lille Vildmose** (LIFE10 NAT/DK/000102) project, which ended in June 2020, carried out numerous large-scale restoration measures over 10 years to improve the conservation status of these bog habitats. Work included restoring the bog's 130-hectare Lake Birkes by raising the water level on 770 hectares of peatland and cutting down 200 hectares of woodland encroachment. A further six LIFE Nature projects have combined to carry out concrete restoration measures on 56% of all raised bog sites in the Danish Natura 2000 network.

Photo: Sundew in sphagnum mosses - LIFE10 NAT/DK/000102 - © Jan Skriver

Other LIFE projects

LIFEraisedbogs
(LIFE14 NAT/DK/000012)

LIFE Mires Estonia
(LIFE14 NAT/EE/000126)

LIFE Jura peatlands
(LIFE13 NAT/FR/000762)

LIFE Irish Raised Bogs
(LIFE14 NAT/IE/000032)

Peelvenen
(LIFE11 NAT/NL/000777)

AlkFens_PL
(LIFE11 NAT/PL/000423)

AlkFens_S_PLife
(LIFE13 NAT/PL/000024)

Südlicher Chiemgau
(LIFE94 NAT/D/000432)

Chiemgau
(LIFE97 NAT/D/004224)

Looking ahead

Peatlands are undoubtedly important for biodiversity and for the ecosystems they provide, but their degradation and habitat loss across Europe is still ongoing. Future LIFE projects targeting peatlands should involve experienced peat experts in the preparation of project proposals, as insufficient knowledge of peatland restoration ecology can lead to failure or lacklustre results. Too often, project developers fail to take site hydrology and real chances for improvement into proper account, resulting in insufficient rewetting, which in turn prevents the establishment or development of target habitats and species.

It is also important to remember that peatland restoration takes time. Slow progress on LIFE-restored peatland sites does not mean that there are no conservation benefits in the initial phases following restoration. In general, restored peatlands respond very quickly with a significant increase in biodiversity – often with rare and endangered species. Well-restored peatlands are of remarkably high conservation value at every stage of development; and, like the creation of forests, peatland restoration is an important investment for future generations.

[9] Severe draughts like in 2018 and 2019 can significantly prolong the renaturation periods or, in the worst case, negate all efforts completely.

Forest habitats

Photo: The Laurel Forest area – LIFE03 NAT/P/000013 – © EC/Salgado João

Forest ecosystems are of outstanding importance for biodiversity and a crucial component of the Natura 2000 network. Temperate forests account for most of Europe's forested area, while roughly one-quarter of the continent's forest habitats are in the Boreal and Mediterranean regions. The overall level of forest habitat conservation is low, and few sites are under strict protection. Commercial forestry is the major threat to forest habitats, followed by invasive alien species, intensive agriculture, and infrastructural and urban development. A lack of pronounced status improvements where conservation efforts have taken place is due partly to the long recovery time that is typical for restoring healthy forest habitats. Visible successes are mostly at the local scale.

Conservation status

EU State of Nature report 2020

Trends in conservation status

The 2020 EU State of nature report showed barely a change in forest habitat conservation status assessments, compared to the 2015 report. Still only one out of seven assessments were in a good status and a third is in a bad conservation status. However, forest habitats have the highest share of improving trends (13%).

Examples of genuine improvements in forest habitats linked to LIFE

Habitat type showing improved status or trend	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Fennoscandian wooded pastures (9070)	SE	ALP BOR	Bad-deteriorating to bad (genuine improvement in trend)	SEPA: Forests in N-Götaland (LIFE98 NAT/S/005370), Härjedalen (LIFE03 NAT/S/000070), ROSORIS (LIFE05 NAT/S/000108), GRACE (LIFE09 NAT/SE/000345), LIFE Coast Benefit (LIFE12 NAT/SE/000131), Bush LIFE (LIFE13 NAT/SE/000105), LIFE BTG (LIFE15 NAT/SE/000772)
	SE	CON	Bad-deteriorating to bad-improving (genuine improvement in trend)	
***Luzulo-Fagetum* beech forests (9110)**	AT	ALP CON	Bad to poor-improving (genuine improvement in CS and trend)	Donauwaelder (LIFE04 NAT/AT/000003), LIFE Ausseerland (LIFE12 NAT/AT/000321)
Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae or Ilici-Fagenion*) (9120)	BE	CON	Poor to poor-improving (genuine improvement in trend)	Life Averbode (LIFE06 NAT/B/000081), Life – OZON (LIFE12 NAT/BE/000166)
	DE AT	ATL CON	Poor to poor-improving (genuine improvement in trend)	DE: No LIFE projects identified. AT: WACHAU (LIFE03 NAT/A/000009), Donauwaelder (LIFE04 NAT/AT/000003),
***Tilio-Acerion* forests of slopes, screes and ravines (9180)**	UK	ATL	Bad-deteriorating to bad (genuine improvement in trend)	Core forest sites (LIFE00 NAT/UK/007074), Core ravine woodlands (LIFE03 NAT/UK/000044)
Macaronesian laurel forests (*Laurus, Ocotea*) (9360)	PT	MAC	Poor to good (genuine improvement in status)	PRIOLO (LIFE03 NAT/P/000013), LIFE Laurissilva sustentável (LIFE07 NAT/P/000630), LIFE Terras do Priolo (LIFE12 NAT/PT/000527),
Caledonian forest (91C0)	UK	ATL	Bad-deteriorating to bad (genuine improvement in trend)	Atlantic Oakwoods (LIFE97 NAT/UK/004244)
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (91E0*)	DE	CON	Bad to bad-improving (genuine improvement in trend)	Some 20 LIFE projects
Endemic forests with *Juniperus spp.* (9560)	CY	MED	Good to good-improving (genuine improvement in trend)	JUNIPERCY (LIFE10 NAT/CY/000717)

More than 600 LIFE Nature projects linked to forest habitats have been implemented since 1992. By introducing or advancing various means of sustainable forest management, LIFE projects directly support the implementation of the Nature Directives and other biodiversity-related objectives. Key success factors of the programme's forest-focused projects include strict adoption of sustainable forest management and land purchase to allow strict protection.

Threats and pressures on forest habitat types, which vary significantly across biogeographical regions, include forest fires, windstorms, water or air pollution, drought, invasive alien species, pests and diseases, habitat fragmentation and other land-use developments.

LIFE projects focusing on forests have to consider the pressures and drivers specific to the habitat type and region. The overall priority objectives are to improve the conservation status of targeted forest habitats (regarding species types, structures and ecological functions) and to restore ecological conditions that provide the best possible habitat for targeted animals or plants. In Bulgaria, for example, LIFE projects are engaged in large-scale restoration of degraded forests through efficient breeding of plant material and massive conservation interventions.

Key messages

- **A small proportion of LIFE projects specifically target forests.**
- **Given the scale of forests and the long time needed to reach good status, LIFE impact can be seen mostly at local level.**
- **Key successes are visible in rare habitats such as Macaronesian laurel forests (9360) and Western taïga (9010).**
- **LIFE projects also look at sustainable forest management, afforestation prevention, invasive alien species and planting saplings.**

SUCCESS STORIES

LIFE rescue of Macaronesian laurel forests preserves crucial food source for endangered Azores bullfinch

The survival of the Azores bullfinch (*Pyrrhula murina*), down to just 100 pairs in 2003, depends on the health of Macaronesian laurel forests. The seeds, flower buds and fleshy fruit of São Miguel Island's once-thriving laurel forests provide food for this critically endangered bird species. Until recently, these forests were succumbing to invasive alien plant species which colonisers brought to the Azores long ago. Three consecutive LIFE Projects took on the main task of saving these forest and bird species for future generations – and appear to have succeeded.

The first, **PRIOLO** (LIFE03 NAT/P/000013), generated high levels of awareness and local and regional stakeholder mobilisation to help rescue the Azores bullfinch. The Special Protection Area (SPA) of Pico da Vara/Ribeira do Guilherme was enlarged to cover the whole species range, and a management plan for the SPA and its vegetation was prepared, as were guidelines for combating invasive alien plant species. After exotic *Cryptomeria* and *Hedychium* stands were removed and replaced with more than 65 000 saplings of native plants cultivated in local nurseries, some 775 birds were counted at the end of the project – a threefold increase from 2005. The **LAURISSILVA SUSTENTAVEL** (LIFE07 NAT/P/000630) project established a special nursery dedicated to the production of native plants and put an expert team in place to run an alien species control programme. The SPA designated for laurel forest conservation was expanded to 2 010 hectares, while conservation and restoration measures were introduced for other endemic forest, heath and peatland habitats. **Life Terras do Priolo** (LIFE12 NAT/PT/000527) concluded the project series by restoring 26 hectares of laurel forest habitat and created a protection ring against the entry of new invasive flora. A total of 277 000 plants of more than 25 native species – half of which were nursery cultivated – were planted in the intervention areas. These combined efforts have made a true difference. The conservation status of Macaronesian laurel forests improved from poor in 2012 to good in 2018, and the Azores bullfinch population has stabilised at between 630 and 2 000 individuals.

Photo: Controlling Alien Plants in Ridges - LIFE12 NAT/PT/000527

Photo: Plantation Development - LIFE12 NAT/PT/000527

Photo: Control and management of IAS residues - LIFE12 NAT/PT/000527

Gene collection and research spur recovery for priority forest habitats in Bulgaria

In western Bulgaria, vast tracts of two priority forest habitats – Pannonian woods with Downy oak (*Quercus pubescens*) and alluvial forests with Common alder (*Alnus glutinosa*) and European ash (*Fraxinus excelsior*) – have been cut down in recent decades and replaced with commercial monocultures of non-native tree species.

Conservation and restoration actions for the Downy oak and European ash were carried out in two designated Natura 2000 network sites in the low mountains of western Bulgaria. The **BGNATURAGENEFUND** (LIFE10 NAT/BG/000146) project improved the conservation status of these species by stimulating natural regeneration patterns. First, saplings were grown in nurseries from genetic material collected from a broad range of forest species found in Natura 2000 sites from different regions. The project then reforested some 40 hectares within the two sites. The growth and development of this newly planted forest enhanced habitat connectivity and improved the conservation status of the target habitats. Importantly, the project demonstrated to the Bulgarian forestry sector that reforestation and restoration of forest habitats deliver long-term environmental, economic and social benefits.

Photo: Growing seedlings from priority tree species LIFE10 NAT/BG/000146
© Forest Seed Control Station

Photo: LIFE16 NAT/BG/000817

Meanwhile, a combination of fires, pests, disease outbreaks and reckless human activity have damaged priority forests in south-west Bulgaria, and a lack of natural reproductive material makes their natural recovery more difficult. The **LIFEFORHAB** (LIFE16 NAT/BG/000817) project aims to restore seven forest habitats in six Natura 2000 network sites in this part of the country, continues extensive work on the gene pool of priority forest species and habitats, and has established a high-capacity production line for containerised seedlings. Project-end targets for 2021 include: collection and processing of 7 tonnes of seeds from 50 forest species, production of more than 860 000 containerised seedlings from priority forest species, and restoration of more than 104 hectares of priority forest habitats.

Other LIFE projects

LIFE Ausseerland (LIFE12 NAT/AT/000321)
Steigerwaldrand Iphofen (LIFE09 NAT/DE/000005)
LIFE FutureForCoppiceS (LIFE14 ENV/IT/000514)
Protection of Western Taiga (LIFE97 NAT/S/004200)
Pohjois-Savo (LIFE99 NAT/FIN/006247)
Taiga/Central Finland (LIFE99 NAT/FIN/006251)
GRACE (LIFE09 NAT/SE/000345)
JUNIPERCY (LIFE10 NAT/CY/000717)
LIFE-TETRACLINIS-EUROPA (LIFE13 NAT/ES/000436)
Core forest sites (LIFE00 NAT/UK/007074)
PINUS (LIFE07 NAT/GR/000286)

Looking ahead

There is need for a common management objective to achieve sustainable management of European forests, both to balance production and biodiversity and to minimise the impacts of threats and pressures. In line with its proposed Forest Strategy, European policy makers plan to increase forest quality, quantity and resilience against fires, droughts, pests, diseases and other pressures from climate change. They will also work with other data providers to further develop its Forest Information System for Europe.
Because it is very difficult to achieve conservation objectives in areas where the economics of intensive forestry have a controlling stake, LIFE projects that focus on issues related to managing forests in the Natura 2000 network are much more likely to succeed.

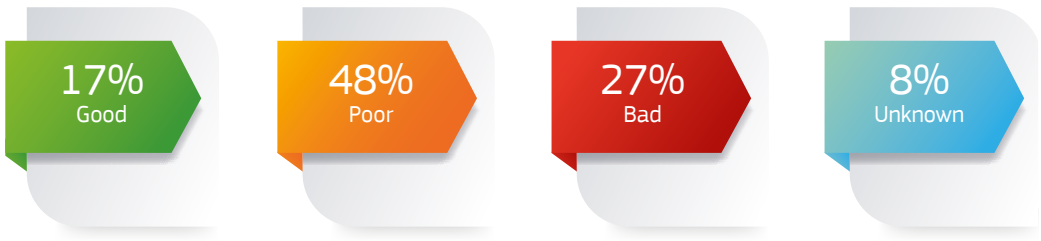
Heath and scrub

Photo: LIFE17 NAT/FR/000007 - © Benjamin Beaufils

Heaths are mostly treeless landscapes where shrub vegetation tends to dominate over sandy nutrient-poor soil. Heath and sclerophyllous scrub (a type of hard leaf vegetation) habitats often teem with life – especially invertebrates – but the type and volume of biodiversity varies greatly according to soil moisture levels. Heathlands have co-evolved with human societies for millennia but are dwindling in size and number, particularly in northern Europe where they were once widespread. Human activities threatening heathland habitats include intensified agriculture, land fragmentation, forestry and urban development, while grazing, fire drought and scrub encroachment are other dangers. Most of Europe's heathlands today are in poor to bad conservation status, but some recent conservation efforts are having a positive impact.

Conservation status

EU State of Nature report 2020



Trends in conservation status

According to EEA data of 2008, in all biogeographical regions besides the Mediterranean, 50-100% of heathlands were in bad or poor condition. Ten years later, the overall conservation status is slightly improving. Currently, heathlands in the best conditions are reported in the Macaronesian region, followed by the Alpine region. Despite this relatively unchanged conservation status, there are cases of genuine positive trends.

Examples of genuine improvements in heath and scrub habitats linked to LIFE

Habitat type showing improved status or trend	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Northern Atlantic wet heaths with *Erica tetralix* (4010)	LV	BOR	Bad to poor (genuine improvement in status)	ADAZI (LIFE06 NAT/LV/000110)
European dry heaths (4030)	UK	ATL	Bad to bad-improving (genuine improvement in trend)	Dorset heaths (LIFE00 NAT/UK/007079), Cornwall Moors (LIFE03 NAT/UK/000042)
European dry heaths (4030)	CZ	PAN	Poor-deteriorating to poor (genuine improvement in status)	Military LIFE for Nature (LIFE15 NAT/CZ/001028)

Examples of genuine improvements in sclerophyllous scrub habitats linked to LIFE

Habitat type showing improved status or trend	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
***Juniperus communis* formations on heaths or calcareous grasslands (5130)**	BE	CON	Bad x to bad-improving (genuine improvement in trend)	Lesse Lomme (LIFE00 NAT/B/007168), Haute Meuse (LIFE02 NAT/B/008593), Ardenne Liégeoise (LIFE10 NAT/BE/000706)

Temperate heathlands and scrub

Between 1992 and 2018, roughly 200 LIFE projects targeted heathlands and scrublands to some extent, 25 of which focused on these habitat types to a greater extent (10) or mainly/exclusively (15). In most cases, heaths are targeted in combination with other habitats, especially with peat bogs in wet locations and grasslands in dry locations. Other LIFE projects have contributed successfully to the conservation of Alpine and Boreal heaths.

Sclerophyllous scrub (mattoral)

No single LIFE project deals exclusively with this comparatively neglected habitat type. Sclerophyllous scrub is, however, often included as part of a habitat mosaic within a broader holistic project approach. LIFE projects focusing primarily on improving vegetation do mention sclerophyllous scrub habitats and species, but do not articulate specific conservation measures.

Photo: Common heather - LIFE06 NAT/B/000091 - © Roger Herman

Photo: LIFE17 NAT/FR/000007

Key messages

- Despite high biodiversity values and great pressures, few LIFE projects target heath and scrub habitats.
- Only a small number of improvements have been reported at national and EU level.
- LIFE successes are usually local and show impressive restoration results.

SUCCESS STORIES

Restoration efforts in northern Europe benefit heath habitats and native wildlife populations

Cornwall Moors (LIFE03 NAT/UK/ 000042) and **"Healthy Heath"** (UK) (LIFE08 NAT/ NL/000192) and **LIFE Avaloirs** (France) (LIFE17 NAT/FR/000007) are examples of highly focused projects targeting a complex of Northern Atlantic wet heaths and European dry heaths. **Cornwall Moors** was carried out primarily to benefit the Marsh fritillary butterfly (*Euphydryas aurinia*) population, which had declined in Europe by 20-50% over the past 25 years, most dramatically in the UK. Managed grazing through the reintroduction of livestock, and the clearance of non-native trees, willow and gorse improved habitat connectivity and increased favourable conditions for the butterfly species across 130 hectares of project sites. "**Healthy Heath**" improved hydrological conditions and carried out large-scale removal to successfully restore two agricultural enclaves over 285 hectares of the Dwingelderveld nature reserve in the Netherlands, the largest remaining continuous wet heathland in western Europe. **LIFE Avaloirs**, just recently underway, targets a complex of dry and wet heathlands, bogs and hay meadows. Mowing, fern control and clearance of woody vegetation over some 120 hectares will benefit local bird populations of Hen harrier (*Circus cyaneus*) and European nightjar (*Caprimulgus europaeus*).

Photo: Field with gorse - LIFE08 NAT/NL/000192 - © Hans Dekker

Photo: Male Hen harrier - LIFE17 NAT/FR/000007 - © Eric Medard

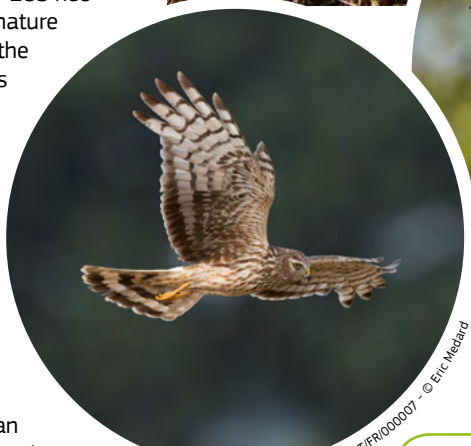


Photo: Female Hen harrier - LIFE17 NAT/FR/000007 - © Eric Medard

Other LIFE projects

RAHID
(LIFE09 NAT/DK/00037)

Ardenne Liégeoise
(LIFE10 NAT/BE/000706

Saint Hubert
(LIFE03 NAT/B/000019)

NATURA2MIL
(LIFE05 NAT/B/000088)

HIGRO – HIGRO
(LIFE09 NAT/PT/000043)

Lynx/Malcata
(LIFE99 NAT/P/006423)

Zahorie Sands
(LIFE06 NAT/SK/000115)

Military LIFE for Nature
(LIFE15 NAT/CZ/001028)

LIFE Drylands
(LIFE18 NAT/IT/000803)

Vipère d'Orsini
(LIFE06 NAT/F/000143)

NORTHWESTGORJ
(LIFE11 NAT/RO/000825)

Osteifel
(LIFE05 NAT/D/000055)

LIFE-RIZOELIA
(LIFE12 NAT/CY/000758)

Looking ahead

Relative to the size of mapped heathland habitats in Member States, LIFE project interventions have been rather limited. LIFE projects do show, however, that heath and scrub habitats respond relatively quickly to conservation efforts, so there is every chance that future restoration projects targeting these habitats in a sustained way and over much larger areas will deliver even greater long-term benefits.

LIFE preserves Species

Chapter 2

Fish

Photo: Saving Danube Sturgeons - LIFE11 INF/AT/000902 - © Lubomir Hlasek

There are roughly 390 species of freshwater fish in EU waters and 1 250 species of marine fish. While fish have a higher improvement trend in conservation status than other species groups, they are also deteriorating at a rate of close to 50%. Of all reported pressures on fish species, nearly 70% are attributed to the modification of natural conditions. Major threats to freshwater fish species include pollution, overfishing, introduction of alien species, over-abstraction of water, interruption of stream connectivity and alteration of in-stream habitats. The main threats to marine fish species are pollution, overfishing, coastal development, energy production and mining. Innovative interventions targeting a wider range of threats and fish species could help to reverse some alarming declines.

Conservation status

EU State of Nature report 2020

Trends in conservation status

In the 2015 EU State of Nature report, fish species showed the lowest proportion of good condition of all species groups. Furthermore, the proportion of assessments classified as poor or bad and declining was particularly high at around 40%.

The latest assessment shows that while fish have a higher improvement trend than other species groups at 9%, they also have one of the highest proportions of deteriorating trends. Despite this, there are some genuine improvements in conservation status.

Examples of genuine improvements in fish species linked to LIFE

Species showing improved status in Article 17 reports	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
European bitterling (*Rhodeus amarus*)	NL	ATL	Poor-improving to good-improving (genuine improvement in status)	Highly probable link to New LIFE for Dutch Fens (LIFE12 NAT/NL/000372)
Atlantic salmon (*Salmo salar*)	SE	CON	Bad-improving to poor-improving (genuine improvement in status)	Highly probable link to UC4LIFE (LIFE10 NAT/SE/000046)
Valencian toothcarp (*Valencia hispanica*)	ES	MED	Bad-improving to poor-improving (genuine improvement in status)	Probable link to three LIFE projects: Dunas Albufera (LIFE00 NAT/E/007339); Enebro Valencia (LIFE04 NAT/ES/000044); Ullals Albufera (LIFE04 NAT/ES/000048)

Between 1992 and 2018, LIFE invested €150 million in fish protection and targeted 64 species of freshwater fish, six of which now show an improving trend. The latest Article 17 reporting indicates several direct links between the LIFE programme and conservation status maintenance or improvement of freshwater fish species. Interestingly, the majority of these success stories have involved multiple projects within a country targeting the same species.

LIFE plays an important role in improving freshwater habitat connectivity by establishing green and blue infrastructure in and between Natura 2000 sites, while activities targeting marine fish focus mostly on optimising fishing practices. At the same time, more and more LIFE projects are focusing on the marine phase of migratory (anadromous) species such as the Atlantic salmon (*Salmo salar*) – the target of 30 LIFE projects alone.

Other LIFE projects with a closer focus on habitat improvement have helped fish species indirectly. One such story features the Danube streber (*Zingel streber*), a member of the perch family that thrives in strong-flowing waters of the Danube. This species, together with 12 other Annex II fish species, has benefited from two Austrian projects: **Mostviertel-Wachau** (LIFE07 NAT/A/00010) and **Netzwerk Donau** (LIFE10 NAT/AT/000016). Both projects attempted large-scale restoration of gravel spawning beds, removed barriers and built power plant bypasses. The latter project, which ended in December 2019, restored river connectivity and fish habitat over a length of 300 km and delivered benefits to the entire complex of fish fauna in the Austrian Danube.

Top 10 fish species featured in LIFE projects

Species	No of LIFE projects
European bullhead (*Cottus rondelei*)	54
Spined loach (*Cobitus taenia*)	33
Atlantic salmon (*Salmo salar*)	30
Brook lamprey (*Lampetra planeri*)	29
European bitterling (*Rhodeus amarus*)	22
Weatherfish (*Misgurnus fossilis*)	19
European river lamprey (*Lampetra fluviatilis*)	16
Huchen, or Danube salmon (*Hucho hucho*)	13
Sea lamprey (*Petromyzon marinus*)	12
Souffia, or Western vairone (*Telestes souffia*)	12

LIFE at the top

Elasmobranchs are a subclass of fish that includes sharks, rays, skates and sawfish. As apex predators, they are one of the most important fish groups in Europe's marine environment. They are also one of most vulnerable. Within the LIFE programme, Italy is leading the way with two important projects targeting these species. **SHARKLIFE** (LIFE10 NAT/IT/000271) successfully changed local regulations to ensure that targeted shark species are tagged and released, while also promoting the use of circular hooks in commercial fishing to reduce quantities of bycatch. **LIFE ELIFE** (LIFE18 NAT/IT/000846) was launched in 2019 to provide marine authorities in Italy and Cyprus with the latest data to assess the status of shark species, as well as to encourage the use of low-impact fishing devices to lower shark bycatch in Italy, Cyprus and Greece.

Key messages

- LIFE has helped improve the conservation status of many fish species in Europe.
- Actions to restore rivers and recreate freshwater habitats can improve conditions for threatened fish species, helping them recover.
- LIFE has helped improve connectivity for fish species by establishing green and blue infrastructure in and between Natura 2000 network sites.
- Migratory fish numbers are however falling fast and more work is needed to remove the main threats.
- More focus on the marine phase of anadromous species is required.

SUCCESS STORIES

Valencian toothcarp's prospects improve with habitat rehabilitation

The Valencian toothcarp (*Valencia hispanica*), a critically endangered species that inhabits marshes, wetlands and springs, is restricted to six locations on the Mediterranean coastal area of Spain. Three projects focused on restoring the priority habitats that support this species may have played a role in its improved conservation status from bad to poor. **Dunas Albufera** (LIFE00 NAT/E/007339), launched in 2000, removed coastal infrastructure, restored and revegetated dunes and reintroduced the Valencian toothcarp. Two further projects in the same location got underway in 2004. **Enebro Valencia** (LIFE04 NAT/ES/000044) restored a large network of temporary ponds for introducing *V. hispanica*, and **Ullais Albufera** (LIFE04 NAT/ES/000048) recovered six hectares of marshland and restored optimum conditions for the species.

LIFE projects in Sweden enlarge spawning habitats for Atlantic salmon

More than 25 LIFE projects have aimed to improve the conservation status of another migratory fish species, the Atlantic salmon (*Salmo salar*). Sweden, home to roughly 15% of the EU's Atlantic salmon population, has funded four LIFE projects focusing on *S. salar*'s freshwater migration phase. **Moälvsprojektet ReMo** (LIFE05 NAT/S/000109), launched in 2005, removed fish barriers, built fish passes, and restored spawning areas in a restocked river that had not seen salmon for many years. The **Vindel River LIFE** (LIFE08 NAT/S/000266) project removed 20 dams along the Vindel River to create suitable spawning conditions along a 288 km stretch of river. **ReMiBar** (LIFE10 NAT/SE/000045) removed or minimised migratory barriers such as road crossings and dams in five larger water systems in northern Sweden encourage salmon population growth. **ReBorN LIFE** (LIFE15 NAT/SE/000892), an ongoing project, aims to restore 202 km of rivers where timber operations previously held sway: the end target is to create 2 300 spawning grounds for Atlantic salmon and Brown trout (*Salmo trutta*).

Photo: A juvenile salmon (*parr*) from Sweden's Råne River - LIFE15 NAT/SE/000892 - © Länsstyrelsen Norrbotten

Photo: Vindel River - LIFE08 NAT/S/000266 - © Inga Racinska

Allis shad begins to recover in Germany

The Allis shad (*Alosa alosa*), a member of the herring family, is a migratory fish species that occurs mainly in the northeast Atlantic and its tributary rivers. As recently as 150 years ago, many hundreds of thousands of shad were caught every year in the Rhine system: since then, overfishing, increased river pollution, construction of dams and weirs and destruction of spawning grounds have reduced the shad population and decreased its range dramatically. The Allis shad's conservation status in the EU is generally bad and mostly still declining, but the trend is improving in Germany at least with the help of two projects

LIFE-Projekt Maifisch (LIFE06 NAT/D/000005), reintroduced 4.8 million Allis shad larvae into the Rhine where the species had become extinct roughly a century earlier – a significant outcome in itself. A follow-on project, **Alosa alosa** (LIFE09 NAT/DE/000008), released a further 6.2 million shad larvae into the river, and reported in 2015 that 250 adults were observed returning to the Rhine from the North Sea: this suggests that several thousand adult shad are returning to the Rhine system each year. Trend improvements for this this species are due entirely to LIFE project activities, but future actions related to barrier removal are needed to deliver an improvement in conservation status.

Photo: The Allis shad - LIFE06 NAT/D/000005 - © EC/Stemmer Bernd

Photo: The re-introduction of Allis shad - LIFE06 NAT/D/000005 - © Stefan Staas

Photo: Juvenile shad - LIFE06 NAT/D/000005 - © RHEINFISCHEREIGENOSSENSCHAFT NRW/Stefan Staas

Other LIFE projects

HAPPYFISH (LIFE07 NAT/EE/000121)
LIFE HAPPYRIVER (LIFE12 NAT/EE/000871)
P.A.R.C. (LIFE07 NAT/IT/000413)
CASS (LIFE04 NAT/GB/000250)

Looking ahead

We clearly need to do more to halt the decline of fish species. Possibilities for action include targeting more species and addressing a wider range of threats, developing more innovative approaches and increasing our knowledge about threatened marine species and their habitats. Marine biodiversity is now given an equal footing in the targets set out in the EU Biodiversity Strategy for 2030, so we need to consider more carefully how Europe reports on these important species in the future.

Reptiles and amphibians

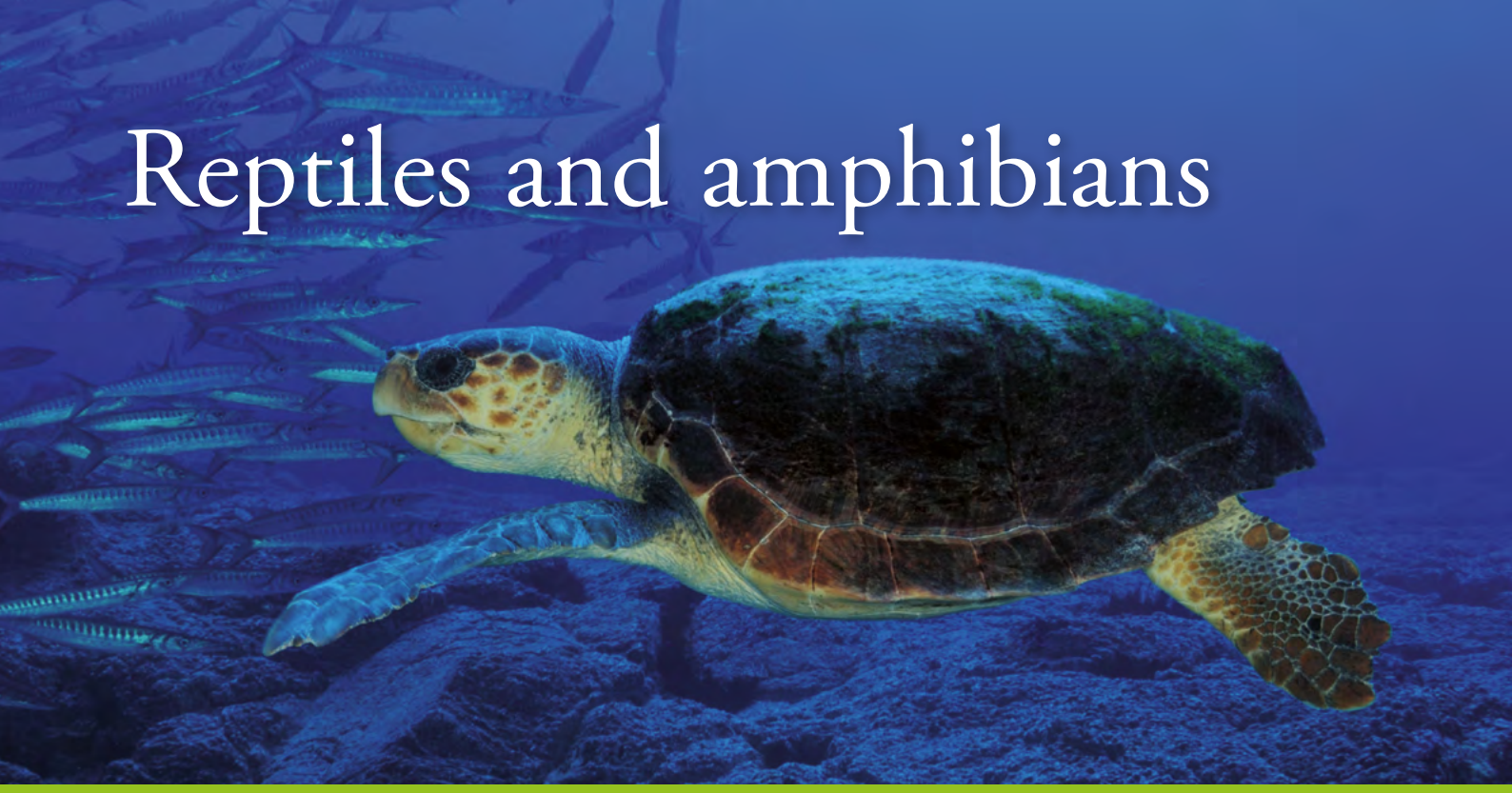


Photo: Loggerhead turtle - LIFE15 IPE/ES/000012 - © Carlos Minguell

There are some 140 reptile species and more than 80 amphibian species in the EU excluding Croatia. Reptile diversity increases from northern to southern Europe and is richest in the Balkan Peninsula. Amphibian diversity is highest in the middle latitudes and in southern Europe. One-fifth of reptile species and one-quarter of amphibian species are endangered. For land reptile and amphibian species, key pressures come from intensive agriculture, urban sprawl and construction works, collection in the wild and climate change. The main threats to sea reptiles are fishing (accidental losses from bycatch), destruction of nesting grounds and water pollution. Site protection is especially important for reptiles and amphibians, as most species hibernate during the winter months, making them extremely vulnerable.

Conservation status

EU State of Nature report 2020

Trends in conservation status

When comparing the latest and previous EU State of Nature reports, it seems that the percentage of amphibians in good condition has not changed significantly. However, around 10% more reptiles had reached a good conservation status in the 2020 report. Some 15% of amphibians and 12% of reptile species have a poor conservation status and still deteriorating. A further 18% of amphibian species and 11% of reptile species have a bad conservation status with their populations unchanged or decreasing. However, there are several examples of genuine improvements to conservation status and trends.

Examples of genuine improvements in reptile and amphibian species linked to LIFE

Species showing improved status in Article 17 reports	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
REPTILES				No LIFE projects identified
AMPHIBIANS				
Yellow-bellied toad (*Bombina variegata*)	DE	ATL	Bad-deteriorating to bad (genuine improvement in trend)	LIFE BOVAR (LIFE16 NAT/DE/000660); LIFE-Amphibienverbund (LIFE15 NAT/DE/000743)
Bombina variegata	LU	CON	Bad to bad-improving (genuine improvement in trend)	LIFE grassland Luxembourg (LIFE13 NAT/LU/000068)
European tree frog (*Hyla arborea)*	BE	ATL	Bad-improving to poor-improving (genuine improvement in trend)	LIFE Green4Grey (LIFE13 ENV/BE/000212); Triple E Pond area M-L (LIFE08 NAT/B/000036)
Hyla arborea	LU	CON	Bad-deteriorating to bad-improving (genuine improvement in trend)	Batraciens (LIFE96 NAT/L/003195)
Agile frog (*Rana dalmatina*)	SE	CON & BOR	Bad to poor-improving (genuine improvement in status and trend)	SemiAquaticLife (LIFE14 NAT/SE/000201)

Since 1992, the LIFE programme has funded 97 reptile and 145 amphibian projects, the majority of which benefit several species at once. LIFE projects targeting these groups take a mostly traditional approach in terms of addressing threats and improving habitats, with an added emphasis on site protection to safeguard nesting sites and hibernating species.

The reptile species most commonly targeted for LIFE project funding are the European pond turtle (*Emys orbicularis*), Loggerhead turtle (*Caretta caretta*), Hermann's tortoise (*Testudo hermanni*), Smooth snake (*Cornella austriaca*) and Sand lizard (*Lacerta agilis*); the most targeted amphibians are the Great-crested newt (*Triturus cristatus*), Yellow-bellied toad (*Bombina variegata*), Fire-bellied toad (*Bombina bombina*), Italian crested newt (*Triturus carnifex*) and Natterjack toad (*Epidalea calamita*). There is also a north-south split between mainly amphibian projects in continental and north-west Europe (e.g. Denmark, Germany, Estonia and Austria) and mainly reptile projects in southern Europe (e.g. Spain, France, Greece and Portugal).

Crucial in several cases of preventing local extinction of reptile and amphibian species, LIFE projects have also been successful in terms of obtaining new knowledge. This is especially important, for example, in carrying out the kind of sustained action needed for long-lived reptiles.

A combination of measures is usually necessary to achieve project objectives. Some LIFE project beneficiaries have run multiple projects for one main species back-to-back – the Meadow viper in Hungary, European pond turtle in Spain and Fire-bellied toad in German, for example – in the hope that the combined measures will lead to a stabilisation or increase of the local population. In some cases, land purchase is the best or only way to provide populations with long-term protection from unfavourable land management.

Photo: Yellow-bellied toad - LIFE13 NAT/LU/000068 - © NEEMO EEIG/Thomas Wouters

Telling the difference

Reptiles and amphibians are cold-blooded creatures with some shared traits and other important differences. Reptiles, for example, live mostly if not exclusively on land and have dry, hard and scaly skin; amphibians live both in water and on land and have smooth, sticky, moist and highly porous skin. Reptiles breathe only through lungs and lay their hard eggs on land; amphibians can breathe through lungs and gills and lay their gel-coated eggs in water.

Key messages

- **Key conservation successes for reptiles and amphibians come through a combination of measures. Site protection is important as most species hibernate in the winter months.**
- **Habitat restoration and improved connectivity are often combined with ex-situ breeding programmes to reintroduce species locally, preventing local extinction.**
- **Removing invasive alien species such as the Raccoon dog and American mink has been successful.**
- **LIFE projects have improved knowledge, essential for sustained action.**

SUCCESS STORIES

LIFE projects provide cover for sea and pond turtles

Photo: European pond turtle - LIFE05 NAT/LT/000094 © Zydrunas Sinkevicius

Photo: Great crested newt - LIFE05 NAT/LT/000094 - © Zydrunas Sinkevicius

The endangered Loggerhead turtle (*Caretta caretta*) is the most common turtle in the Mediterranean Sea and nests in Cyprus, southern Italy and Greece. The greatest threats to the species are accidental losses from bycatch, destruction of nesting grounds and water pollution. **Project MIGRATE** (LIFE11 NAT/MT/001070) improved the store of knowledge of the species and identified three protected areas which also offered refuge for the Green sea turtle *Chelonia mydas*. Winner of a Best LIFE-Nature Projects award, the **Caretta** (LIFE02 NAT/GR/008500) project advanced knowledge of the Loggerhead turtle through a combination of modelling oceanographic data and direct boat-based observations. These efforts have influenced an improving trend in the conservation status of the species in Cypriot waters but such protection efforts must be sustained. *C. Caretta* It is a long-lived species, reaching sexual maturity at about 34 years of age, and it faces many challenges: light pollution is making it difficult for females to find safe egg-laying sites and tourism activity is disturbing nests on sandy beaches.

The European pond turtle (*Erys orbicularis*) occurs in northern European lowlands. The Lithuania-led **NELEAP** (LIFE05 NAT/LT/000094) project began in 2005 with a general focus on problems of habitat fragmentation in Estonia, Germany and Lithuania and a rigorous effort to save Germany's last pond turtles. The main preconditions for prolonged activity have been: LIFE project purchase or leasing of land, establishment of buffer zones and compensation measures for landowners, and control of invasive predators which include Raccoon dogs (*Nyctereutes procyonoides*) and American mink (*Neovison vison*). The support of hunters in trapping Raccoon dogs was one important factor in improving the odds in favour of the pond turtles and stabilising a local population facing extinction. At the same time, NELEAP has created improved habitats for two amphibian species, the Fire-bellied toad (*Bombina bombina*) and Great-crested newt (*Triturus cristatus*).

Potent LIFE intervention doubles Hungarian meadow viper population

There are several subspecies of Meadow viper (*Vipera ursinii*) in Europe. The priority species Hungarian meadow viper (*Vipera ursinii rakosiensis*) is a small venomous snake that was on the verge of extinction with less than 500 individuals remaining in Hungary. Three successive LIFE projects – **HUNVIPURS** (LIFE04 NAT/HU/000116), **CONVIPURSRAK** (LIFE07 NAT/H/000322) and **HUTURJAN** (LIFE10 NAT/HU/000020) – targeted 95% of the global species population and these efforts have been repaid in a positive conservation trend. Following the release of 500 individuals from a local breeding centre the Hungarian meadow viper population doubled to 1 000 over a 14-year period. Other conservation measures included improvement of 900 hectares of grassland habitats for the vipers and the establishment of a permanent cattle grazing regime to ensure habitat maintenance. The viper population appears to have stabilised, and public awareness campaigns – including work with the Budapest Zoo – have raised the profile of the species.

Photo: LIFE07 NAT/H/000322 - © EC/Michèle Lischi

Photo: Hungarian meadow viper in Transylvania - LIFE07 NAT/H/000322 - © EC/Balint Halpern

Photo: Wijvenheide nature reserve - LIFE08 NAT/B/000036 - © EC/ François Van Bauwel

Photo: Tree frog - LIFE00 NAT/A/007055 - © EC/An Hyla

‘Triple E’ approach helps enlarge wetland breeding habitats for amphibians

Fens, bogs and ponds, crucial wetland breeding sites for amphibians, are disappearing in the wake of intensified agriculture, and amphibians are suffering as a result. The European tree frog (*Hyla arborea*), for example, has a poor conservation status overall in the Boreal, Continental and Atlantic regions, but a pair of LIFE projects in Belgium – **Life Itter en Oeter** (LIFE09 NAT/BE/000416) and **Triple E Pond area M-L** (LIFE08 NAT/B/000036)– helped improve the frog’s conservation status from bad in 2012 to poor in 2018. The former project involved the purchase of 42 hectares of land for large-scale habitat restoration, while the latter opened up pond habitats by removing sludge, restoring feeder ditches and removing overshadowing trees and scrub. The ‘Triple E’ approach combined ecological, educational and economic approaches to form working partnerships with private landowners and fish farmers to improve habitats for both the tree frog and the Eurasian bittern (*Botaurus stellaris*), a species of heron.

Other LIFE projects

ECONAT (LIFE09 NAT/LT/000581)
Life-HerpetoLatvia (LIFE09 NAT/LV/000239)
EmysTer (LIFE04 NAT/ES/000059)
PROYECTO ESTANY (LIFE08 NAT/E/000078)
LIFE Potamo Fauna (LIFE12 NAT/ES/001091)
SemiAquaticLife (LIFE14 NAT/SE/000201)
DRAGONLIFE (LIFE08 NAT/EE/000257)
Schutz der Knoblauchkröte (LIFE11 NAT/DE/000348)
Atlantic region DE (LIFE15 IPE/DE/000007)
Bombina in the Baltic Region (LIFE04 NAT/DE/000028)
LIFE Auenamphibien (LIFE14 NAT/DE/000171)
LIFE-AMPHIKULT (LIFE08 NAT/D/000005)
PHS in NPR (LIFE04 NAT/LV/000199)
Bombina (LIFE99 NAT/DK/006454)
LIFE4Delta_PL (LIFE17 NAT/PL/000018)

Looking ahead

The Biodiversity Strategy for 2030 contains restoration targets that will clearly help reptile and amphibian species, and restoration aims for freshwater ecosystems will provide amphibians with an added boost.

Some reptile species, especially snakes, are very difficult to spot in the field, making data on population size quite hard to gather. Such challenges are difficult to overcome within the timeframe of a single LIFE project, but back-to-back or multiple projects run in close succession can generate longer runs of data.

Educating school children on the necessity of continuing ongoing conservation and protection work is another important part of a long-term strategy – and reptiles and amphibians are especially popular species for citizen science projects. Also, different stakeholder groups such as private landowners, nature organisations and government bodies can often provide valuable assistance to projects addressing the recovery of reptile and amphibian populations – especially projects targeting species that live to an advanced age.

Invertebrates

Photo: The violet dropwing dragonfly - LIFE13 ENV/ES/000341 - © Núria Bonada

Invertebrates are the most abundant species on earth and include groups as diverse as molluscs, crabs and butterflies. They provide critical ecosystem services such as pest control, pollination, soil creation and water filtration. Most invertebrate species are declining across Europe, due to combinations of unsustainable forest management, agricultural intensification, land abandonment, tourism development, water extraction and pollution, climate change and overall under-protection.
Of the roughly 150 000 invertebrate species in Europe, 181 are listed in the Habitats Directive annexes, and only six have shown a genuine improvement in their conservation status since 2012. The most successful conservation efforts targeting invertebrates involve long-term habitat restoration, but overall knowledge is lacking and more species need to be targeted.

Conservation status

EU State of Nature report 2020

Trends in conservation status

The 2015 EU State of Nature report shows that less than one-quarter of assessments were good for arthropods, molluscs and other invertebrates combined. For molluscs alone, 25% of assessments were rated as bad.

Whereas the overall share of bad status assessments seems to have stabilised in the most recent report, the share of good status has gone down. There are some genuine improvements in conservation status and trends although very few of these are associated with LIFE projects.

Examples of genuine improvements in invertebrate species linked to LIFE

Species showing improved status in Article 17 reports	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
White-clawed crayfish (*Austropotamobius pallipes*)	ES	MED	Bad-improving to poor-deteriorating (genuine improvement in status and trend)	LIFE Potamo Fauna (LIFE12 NAT/ES/001091)
Yellow-spotted whiteface dragonfly *(Leucorrhinia pectoralis*)	BE	CON	Bad-improving to poor-improving (genuine improvement in status)	HELA (LIFE06 NAT/B/000085)
Dusky large blue *(Phengaris nausithous syn. Maculinea nausithous)*	NL	ATL	Bad-deteriorating to bad-improving (genuine improvement in trend)	Blues in the Marshes (LIFE11 NAT/NL/000770)

Since 1992, 76 LIFE projects have targeted 65 invertebrate species, and these efforts have undoubtedly improved the conservation status of many endangered invertebrates in Europe. The most common actions carried out under these LIFE projects involve open habitat restoration, including: reintroducing grazing and mowing, establishing agri-environment schemes, restoring wetlands, forest management and species reintroduction.

LIFE has also contributed to improved knowledge about invertebrates. For example, the conservation status for a number of Saproxylic beetles in Italy – such as the Alpine longhorn beetle (*Rosalia alpina*), Stag beetle (*Lucanus cervus*) and Hermit beetle – is improved due to knowledge obtained from monitoring work carried out within nine LIFE projects targeting these species between 1998 and 2011.

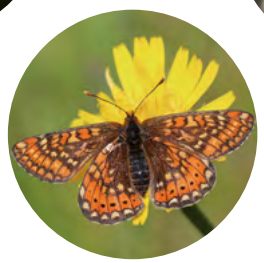
At present, conservation work is being scaled up through LIFE Integrated Projects: these are large-scale, long-term projects designed to support regional or national-level action on biodiversity. The ten-year LIFE project **Atlantic Region DE** (LIFE15 IPE/DE/000007) includes actions targeting the yellow-spotted whiteface dragonfly and covering much of North Rhine-Westphalia and Lower Saxony. Projects like this demonstrate that saving endangered invertebrate species is best achieved through longer-term projects linked to regional or national strategies.

LIFE programme experience in working with threatened invertebrates reveals the scale of the challenge across Europe. Many individual projects have met with success in developing management measures for particular groups of species, but replicating these successes across regions, coupled with ongoing habitat degradation, is a daunting prospect.

Most frequently targeted invertebrate species

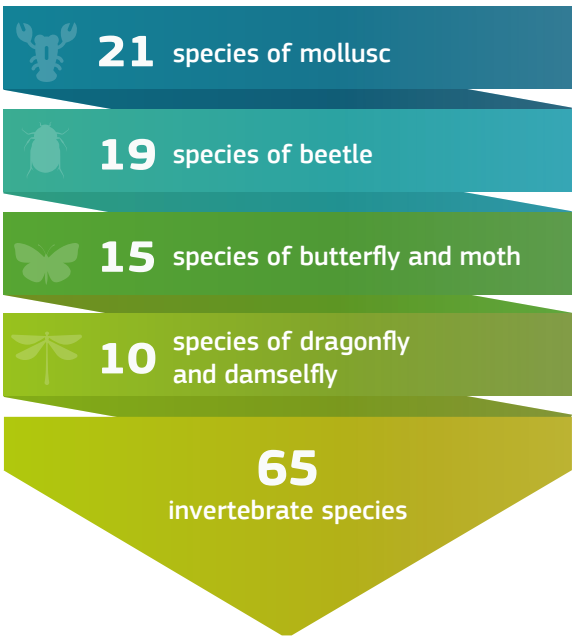
Yellow-spotted whiteface dragonfly (*Leucorrhinia pectoralis*)

Hermit beetle (*Osmoderma eremita*)



Marsh fritillary butterfly (*Euphydryas aurinia*)

Invertebrate species targeted by LIFE projects



Key messages

- LIFE has helped improve the conservation status of many endangered invertebrates in Europe.
- Successes include re-establishing traditional mowing and grazing regimes in grasslands, restoring the natural structure of rivers for molluscs, and creating networks of ponds for dragonflies.
- The impact of LIFE is strongest when in combination with long-term habitat restoration.
- The EU Pollinators Initiative and the EU Biodiversity Strategy for 2030 are great opportunities to further protect invertebrates.

SUCCESS STORIES

Dragonflies return to the Belgian Ardennes

Photo: Female Yellow-spotted whiteface dragonfly - LIFE08 NAT/EE/000257

The LIFE meta-project **Ardenne Plateaux**, comprising six consecutive LIFE projects* over 17 years has been influential in its local recovery.

The Yellow-spotted whiteface dragonfly (*Leucorrhinia pectoralis*) is a small dragonfly that typically inhabits the water bodies of fens and mires. The species is in poor status in all of Europe's biogeographical regions except the Boreal: this is due to habitat loss – pools drying out, eutrophication and acidification of stagnant waters, all of which can lead to overgrowth.

Long-term actions, however, can improve the situation. In Wallonia, southern Belgium, where the Yellow-spotted whiteface dragonfly was declared regionally extinct, these LIFE projects have been influential in its local recovery. More than 10 000 small ponds across this large region were created, which encouraged a natural spread of the species from the east. As a result of this increase, the species status changed from bad-improving in 2012 to poor-improving in 2018. The species is now listed as vulnerable in the regional red list.

The key lesson here is that successive projects, combined with long-term vision and commitment, have made a large and positive impact on peat habitats and associated species.

Bivalve mollusc population trends upward in Spain

Insufficient knowledge of the taxonomy, distribution and habitat requirements of invertebrates is sometimes an unfortunate hindrance, but LIFE projects can still help in developing conservation measures. One such example is the Bivalve mollusc *Unio ravoisieri* (recently differentiated from *Unio elongatulus* listed in Annex II) which is found only in two river basins in Spain. The national Article 17 report for Spain (2013-2018) reports a recovery trend for the species from bad and declining to bad and improving, thanks to two LIFE projects **PROYECTO ESTANY** (LIFE08 NAT/E/000078) **LIFE Potamo Fauna** (LIFE12 NAT/ES/001091). Between 2010 and 2017, species recovery measures were carried out through reintroduction by captive breeding, restoration of rivers, repopulation with native fish and actions against invasive alien species. The captive breeding centre is still operational and the population trend is considered to be upwards.

Photo: LIFE12 NATES001091

Photo: Reproduction in captivity - LIFE08 NAT/E/000078

Mosaic management assists rare butterflies in Czechia and Slovakia

To support the conservation of rare butterflies, several LIFE projects in Czechia and Slovakia have re-established traditional mosaic management of flower-rich meadows. **Butterflies CZ-SK** (LIFE09 NAT/CZ/000364) introduced, tested and promoted patchwork management and developed new agri-environment measures for ten threatened species, including the Danube clouded yellow (*Colias myrmidone*) and Large blue butterfly (*Maculinea arion*).

In practice, this meant clearing long-abandoned meadows and pastures, pruning hedges and opening up forest fringes to allow in more light. The practice of mosaic mowing was also introduced: instead of carrying out a single annual cut over a large area, patchwork cutting of smaller areas takes place two or three times a year. Similarly, instead of intensive livestock grazing, there are alternating periods of grazing and non-grazing.

LIFE for insects (LIFE16 NAT/CZ/000731) builds upon this work by re-establishing traditional management of wet meadows, conserving open-canopy mixed forests and creating 'stepping stones' for species by linking suitable habitats. **LIFE Beskydy** (LIFE12 NAT/CZ/000629) focuses on better management of *Nardus* grasslands threatened by the abandonment of traditional land management practices such as grazing and mowing.

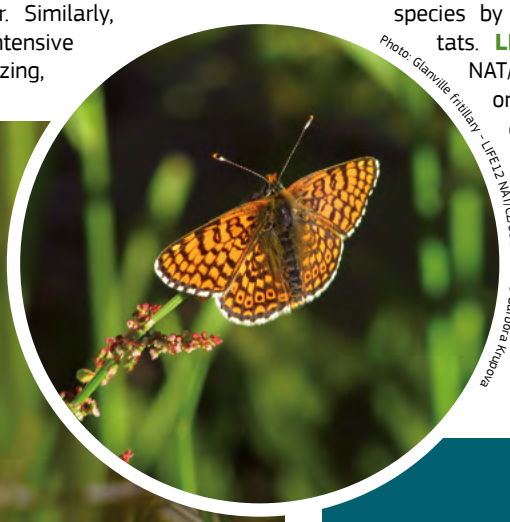


Photo: Glanville fritillary - LIFE12 NAT/CZ/000629 - © Barbara Knapová

Photo: Large blue butterfly - LIFE16 NAT/CZ/000731 - © Bohumil Jagos

Other LIFE projects

Saint Hubert*
(LIFE03 NAT/B/000019)

PLTTAILLES*
(LIFE05 NAT/B/000089)

Cx SCAILLE*
(LIFE05 NAT/B/000087)

PLTHautes-Fagnes*
(LIFE06 NAT/B/000091)

LOMME*
(LIFE08 NAT/B/000033)

Ardenne liégeoise*
(LIFE10 NAT/BE/000706)

Cornwall Moors
LIFE03 NAT/UK/000042)

EcoCo LIFE Scotland
(LIFE13 BIO/UK/000428)

LIFE Jura peatlands
(LIFE13 NAT/FR/000762)

LIFE Mires Estonia
(LIFE14 NAT/EE/000126)

Blues in the Marshes
(LIFE11 NAT/NL/000770)

ASPEA
(LIFE05 NAT/DK/000151)

LIFE-Aurinia
(LIFE09 NAT/DE/000010)

Resto-unio
(LIFE11 NAT/LU/000857)

LIFE REMoPaF
(LIFE15 NAT/ES/000987)

LIFE BEETLES
(LIFE18 NAT/PT/000864)

Prioritising pollinators

The LIFE programme is ready to support priority actions in the EU Pollinators Initiative[10], particularly actions aimed at tackling the causes of pollinator decline by conserving endangered pollinator species and habitats. In Europe, around 84% of crop species and 78% of wild flowering species depend at least in part on animal pollination, and almost €15 billion of the EU's annual agricultural output is directly attributed to insect pollination. The dramatic decline in the occurrence and diversity of all wild insect pollinators – including wild bees, hoverflies, butterflies and moths – is of grave import for both biodiversity and the economy.

Looking ahead

Future LIFE projects will target more species listed in the Habitats Directive and those with vulnerable, endangered and critically endangered status in European Red Lists, which will help expand the store of available knowledge on species conservation requirements, improve monitoring capabilities of conservation status, and help in delivering species and habitat action plans. At the same time, future efforts must increase general awareness of the vital importance of invertebrates.

In 2018, the European Commission launched the EU Pollinators Initiative, which aims at addressing the decline of wild pollinators in the EU. The recently published EU Biodiversity Strategy for 2030 aims to enlarge the network of protected areas throughout the EU and sets ambitious nature restoration targets – developments that could deliver positive impacts for many invertebrates.

[10] https://ec.europa.eu/environment/nature/conservation/species/pollinators/index_en.htm

Mammals

Photo: Wolf in the alps - LIFE12 NAT/IT/000807 - © Michelangelo Giordano

The EU is home to nearly 220 land mammal species and some 40 marine mammal species. Following a dramatic decline in numbers over centuries of increased human settlement and activity, large carnivore mammal species have started to recover in recent decades. Smaller land mammals are also on the increase, and bats have responded well to recent and ongoing conservation efforts. The main threats to land mammals are habitat loss and degradation, pollution, climate change, invasive alien species and disturbances from human activity and road traffic. Sea mammals are amongst the species groups with the highest proportion of unknown assessments and require a great deal more attention. The greatest dangers for sea mammals are pollution, underwater noise and human activity, with fisheries bycatch and ship strikes responsible for a high amount of accidental deaths.

Conservation status

EU State of Nature report 2020

Trends in conservation status

Overall, the 2020 EU State of Nature report concludes that approximately 25% of the mammal species assessed are in good status. This figure remains unchanged since the previous report. Some 12% have a bad status, which is a significant improvement on the last reporting period when almost 40% showed a bad conservation status. Overall, mammals have the lowest proportion of species reported in bad conservation status and the group shows more increasing than decreasing population trends with approximately 20% growing.

Examples of genuine improvements in terrestrial mammal species linked to LIFE

Species showing improved status in Article 17 reports	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Western barbastelle (*Barbastella barbastellus*)	SE	BOR & CON	Bad-deteriorating to good	Bush LIFE (LIFE13 NAT/SE/000105)
Wolf *(Canis lupus)*	SI	ALP & CON	Poor to good-improving	LIFE WOLFALPS (LIFE12 NAT/IT/000807); SloWolf LIFE08 NAT/SLO/000244
Eurasian beaver (*Castor fiber*)	BE	ATL	Bad-improving to poor-improving	LIFE+SCALLUVIA (LIFE12 NAT/BE/000596)
Iberian lynx (*Lynx pardinus*)	ES	MED	Bad-improving to poor-improving	Lince Andalucía (LIFE02 NAT/E/008609); Reintroducción Lince Andalucia (LIFE06 NAT/E/000209) Iberlince (LIFE10 NAT/ES/000570)
Finnish forest reindeer (*Rangifer tarandus fennicus*)	FI	BOR	Poor-improving to good-improving	Wild forest reindeer (LIFE98 NAT/FIN/006325)
Mediterranean horseshoe bat (*Rhinolophus euryale*)	FR	ATL	Bad-deteriorating to poor	CHIROFRSUD (LIFE04 NAT/F/000080)

The LIFE programme has implemented almost 330 projects targeting a total of 71 mammal species. The most commonly targeted species are the Brown bear (*Ursus arctos*), Wolf (*Canis lupus*) and Iberian lynx (*Lynx pardinus*). A wide range of bat species and two cetaceans also feature in the LIFE project profile.

LIFE project conservation measures for larger land mammals include securing food supplies for predators, restoring habitat connectivity for migratory species, and changing stakeholder attitudes and behaviours towards shunned species – wolves, for example. By and large, the adoption of such measures has contributed to the continuing favourable status of some of Europe's large carnivores. Furthermore, multiple LIFE projects addressing the same species and working across national borders are undoubtedly beneficial for large migrators.

In the 1990s, the situation for Europe's brown bear population was grave, with just 50-70 individuals in the western population and a mere 20 in the eastern one. Starting in 1992, consecutive LIFE projects have brought a genuine improvement in the conservation status of both populations, from before bad 2007 to poor in 2018. Not only have Brown bears reinforced their presence where they already occurred, they have returned to many areas from which they had been absent for decades.

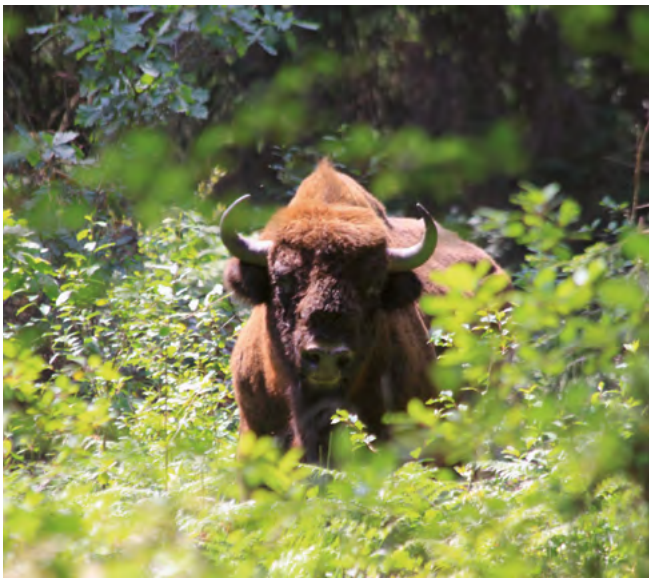


Photo: European bison - LIFE06 NAT/PL/000105 - © EC/Kaminski Tomasz

The LIFE programme has developed 45 projects devoted to the conservation of wolves, a species heavily persecuted for millennia and very nearly exterminated from most of western Europe by the 1960s. Other LIFE projects are focused on animals much less well known – such as the desman, a small semi-aquatic mammal related to moles and shrews. A proficient swimmer and good climber, the Pyrenean desman (*Galemys pyrenaicus*) occupies parts of Spain, Portugal and Andorra, though its range is shrinking due to

Key messages

- **The significant improvement of a wide range of species from a bad to a good conservation status is a LIFE conservation success.**
- **LIFE projects have helped improve the conservation status of large carnivores in countries where it is bad. Good status has been maintained in other countries.**
- **Multiple LIFE projects addressing the same species and working across national boundaries undoubtedly have benefits for large migratory species such as the wolf (*Canis lupus*).**
- **11 species of bats have shown a genuine positive trend, mostly in northern Europe.**
- **The Eurasian beaver (*Castor fiber*) is a standout success with genuine improvements in conservation status in four Member States and a good status in three of the four.**
- **LIFE successes with marine mammals are, instead, scarce due to the lower number of projects addressing this category.**

Photo: Captive bred lynxes - LIFE06 NAT/E/000209 - © EC/Sopeña Aixa

Photo: The Pyrenean desman - LIFE13 NAT/FR/000092 - © Gerard Monge

habitat degradation. **LIFE Desmania** (LIFE11 NAT/ES/000691) and **LIFE+ DESMAN** (LIFE13 NAT/FR/000092) are two important projects that have raised the public profile and knowledge of this generally overlooked species.

The project **LIFE Saimaa Seal** (LIFE12 NAT/FI/000367) helped diminish threats to the world's most endangered seal subspecies, the Saimaa ringed sea (*Phoca hispida saimensis*), by raising local stakeholder and tourist awareness. Although a five-year project provides little scope for long-term assessment, the Saimaa ringed seal population has begun to grow slowly from an initial estimated population of 310 individuals to around 400 by the end of the project – a great success.

By and large, there has been significant improvement for a wide range of mammal species over the past five years. Long-term habitat conservation efforts are particularly effective, and some species rely on sustained action to not slip back into endangered status. Changing stakeholder attitudes towards certain mammal species, whether through education or incentives, is another approach that can yield good project results.

Where Europe's mammals thrive

The mountainous regions of temperate and Mediterranean Europe – including the Cantabrian mountains, Pyrenees, Massif Central, Alps, Apennines, Carpathians and mountains of the Balkan Peninsula – stand out clearly as areas of high species richness. Southern Europe – particularly south-eastern Europe – contains a greater diversity of mammal species than in the north. In the marine realm, species richness is higher in the open Atlantic Ocean than in the enclosed Baltic, Mediterranean and Black seas. The diversity of endemic mammal species is especially wide-ranging in the higher-altitude regions of the Pyrenees, Cantabrian Mountains, Alps and Apennines. The Italian and Iberian peninsulas also hold important concentrations of endemic mammal species.

Photo: Habitat of Cantabrian capercaillie in the Picos de Europa National Park, Spain - LIFE09 NAT/ES/000513
© EC/Ester Carlomagno

SUCCESS STORIES

LIFE throws a lifeline to the endangered Mediterranean monk seal

Photo: Breeding season - LIFE13 NAT ES 000974

Pinnipeds are a group of aquatic fin-footed mammals. The Mediterranean monk seal (*Monachus monachus*) is a highly endangered pinniped species with an estimated global number of just 650-700 individuals. Mediterranean monk seals were once widely distributed in the Mediterranean and Black seas, and in the North Atlantic waters from Morocco, including the Canary Islands, to the Madeira Islands and the Azores. Nowadays, their distribution is highly fragmented and consists of a handful of isolated subpopulations, mostly in the eastern Mediterranean. Fisheries pose the major threat to the species through bycatch and deliberate killing, followed by habitat destruction and increased tourism, all of which have forced the Monk seal into increasingly marginal habitats.

The LIFE programme has funded a number of projects partly or fully addressing the Monk seal, mainly in Greece, Portugal, and in Cabo Blanco, Mauritania, the only place in the world where Mediterranean monk seals form a true colony. The project LIFE **Madeira Monk Seal** (LIFE13 NAT/ES/000974) improved prospects for long-term conservation of the species in Portugal's Madeira archipelago. In 1988, when Monk seal conservation work began in the Desertas Islands, only six individuals were counted in 1990. The project used autonomous surveillance and monitoring systems to create a fully operational SOS Monk seal network and carried out awareness raising activities for the species' conservation in the archipelago. By the end of the project, the number of individual Monk seals in Madeira had grown from six to 20. While the species remains endangered and extremely vulnerable, this LIFE project has been instrumental in its recovery.

Improved flyway corridors help revive bat populations

The EU's 45 bat species occur in a wide range of habitats and throughout all biogeographical regions, with the number of species increasing southward. Landscape features such as hedges, rivers and cliffs are key elements for bats since they tend to move regularly between roosts and foraging areas – up to 40 km for some species.

The **LIFE PODKOWIEC+** (LIFE12 NAT/PL/000060) project in southern Poland aimed at boosting the populations of the Geoffroy's bat (*Myotis emarginatus*), Lesser horseshoe bat (*Rhinolophus hipposideros*) and Greater mouse-eared bat (*Myotis myotis*). Actions focused on habitat restoration, reducing threats in roost areas and improving flyway corridors. The project improved wintering sites and summer shelters and deployed infrared and ultrasonic technology to map the flight routes of bat colonies, using this information to improve conditions along flyways to foraging areas by means of reforesting and reducing light pollution. It also raised public awareness of bats, establishing special awards for institutions and individuals supporting bat conservation at local level. The conservation status improved for all three bat species targeted – especially the Geoffroy's bat, which is now in good condition.

Photo: Lesser Horseshoe bat - LIFE12 NAT/PL/000060

Photo: Lesser Horseshoe bat - LIFE12 NAT/PL/000060 - © Lukasz Ploskon

Ecosystem infrastructure benefits Eurasian otter

Diverse initiatives have been put in place to protect the Eurasian otter (*Lutra lutra*), and LIFE has implemented 41 projects targeting the species. Eurasian otter populations and range have grown in several regions across Europe as a result of these actions, but the species would return quickly to threatened status if conservation work comes to a halt.

Developments and alterations in river ecosystems such as canalisation, removal of bank vegetation and draining of wetlands have caused habitat fragmentation for otter populations throughout Europe. In Sweden, the destruction of riparian habitats from extensive timber harvesting dating back to the 19th century has been fatal to wild fish populations and other aquatic species as well.

While the Eurasian otter's conservation status remains precarious, the population trend is increasing. A quartet of LIFE projects implemented in northern Sweden dating back to 2005 (**Moälvsprojektet ReMo** (LIFE05 NAT/S/000109), **Vindel River LIFE** (LIFE08 NAT/S/000266), **ReMiBar** (LIFE10 NAT/SE/000045) and **LIFE-TripleLakes** (LIFE13 NAT/SE/000116)) have made a definite contribution to this improvement. Project actions included recovering water connectivity (e.g. eliminating timber infrastructure and installing fish passes for migrating species like Brown trout (*Salmo trutta*), an Otter prey species), restoring streams to enable spawning grounds for fishes, and revegetation of river banks to boost biodiversity. Passages under roads and guide fencing were also built to reduce the number of otter deaths from traffic.

Photo: Eurasian otter - LIFE10 NAT/SE/000045

Wild populations of European bison on the rise in Poland and Romania

The European bison (*Bison bonasus*) is confined to small, fragmented and restricted areas where the concentration of individuals is high compared to available food resources. Other consequences of its isolation are low genetic diversity and high susceptibility to disease.

The European bison's conservation status is poor but the population trend is improving. Two LIFE projects targeting this species have been implemented in Poland's Białowieża Forest, a Natura 2000 site. The **BISON-LAND** (LIFE06 NAT/PL/000105) project strategy for sustainable conservation of European bison included reclaiming meadows, establishing water reservoirs and planting wild fruit trees in the project area, resulting a population growth of 13.6%, an increase in the number of mixed herds from seven to 12, and a growth in total area of species coverage by 32%. **LIFE_BISON_NW_PL** (LIFE13 NAT/PL/000010) picked up where the previous project left off, and when completed the European bison population had grown from 132 individuals to 305. Also, a new B. bonasus herd was created between the existing ones to facilitate genetic exchange.

LIFE RE-Bison (LIFE14 NAT/NL/000987) is an ongoing project that aims to reinforce the European bison population in south-western Romania. The population target within the project is to grow the number of individuals in the wild from 63 to 185.

Photo: European bison - LIFE06 NAT/PL/000105 - © EC/Kaminski Tomasz

LIFE projects help humans to better accommodate rebounding wolf populations

The Wolf (*Canis lupus*) is a highly controversial predator, being simultaneously loved and hated. Nearly exterminated in parts of Europe, there are now more than 10 000 wolves on the continent (excluding Russia and Belarus). The biggest threats for wolves in Europe are: low acceptance in rural communities, persecution (trapping and poisoning) and poaching, habitat loss and fragmentation due to infrastructure development, poor management structures, accidental death and hybridisation with dogs.

LIFE projects fully or partly targeting wolves started in the 1990s, mainly in France, Greece, Italy, Portugal and Romania. Early actions focused on increasing knowledge about the species (distribution, population size, conservation status, availability of prey species), addressing main threats and taking measures to minimise conflict between humans and wolves (upgrading livestock pens, introducing compensation schemes for farmers suffering livestock loss, and launching awareness programmes for local populations, including farmers and hunters).

Italy, Portugal and Spain have ran numerous LIFE projects targeting wolves from 2000 onwards, and more recent efforts include central and eastern Europe – mainly in Romania but also in Croatia, Hungary and Slovenia. Likewise, the first LIFE project targeting a Boreal Wolf population, got underway in Finland in October 2019.

Photo: LIFE12 NAT/IT/000807 - © Gabriele Cristiani

WOLFLIFE (LIFE13 NAT/RO/000205) focused on creating conditions to promote coexistence between wolves and humans. The targeted area covered 18 Natura 2000 sites in the eastern Carpathian Mountains of Romania, where the Wolf is protected. The project collected valuable information on the ecology of *C. lupus*, protected farms against Wolf predation through a dog-training programme, raised awareness amongst stakeholders, tackled Wolf diseases, identified fragmented habitats and developed a National Wolf Action Plan.

LIFE WOLFALPS (LIFE12 NAT/IT/000807), a project implemented in the Alps of Italy and Slovenia, is another success story. Wolf populations in these countries are expanding into areas where they have been absent for decades, leading to regular conflicts with livestock breeders and hunters. The project established anti-poaching teams and put in place preventative measures to decrease Wolf attacks on livestock. At the same time, an innovative ecotourism initiative was launched to enhance local economies through for-profit activities linked to the Wolf.

Photo: Wolf in the Alps - LIFE12 NAT/IT/000807 - © Fulvio Beltrando

Other LIFE projects

LIFE BEAR DEFRAGMENTATION
(LIFE12 NAT/ES/000192)

LIFE DINALP BEAR
(LIFE13 NAT/SI/000550)

WildForestReindeerLIFE
(LIFE15 NAT/FI/000881)

Looking ahead

It is extremely encouraging that so many conservation efforts targeting Europe's mammal populations in recent decades have been successful, and LIFE projects have undoubtedly played an important role in these successes. At the same time, such increases in species numbers and distribution have revived some controversies and conflicts with local people and stakeholders, notably farmers and hunters. Therefore, efforts need to be sustained to avoid setbacks and to stabilise current populations. At the same time, coordinated transboundary conservation efforts will maximise benefits for Europe's larger migratory mammals.

Plants

Photo: Plant Micro-reserve Network in Cyprus - LIFE08 NAT/CY/000453 - © Marios Andreou

Europe is home to 25 000 vascular plant species, nearly 20% of which occur nowhere else on the planet. In several European countries, more than two-thirds of existing plant habitat types are endangered. Water pollution and eutrophication (over-enrichment with minerals and nutrients) are the gravest threats to aquatic plants, while drainage and the drying out of wetland habitats do the greatest harm to wetland and mire species. The greatest pressures for forest and grassland plant species are habitat changes due to intensified farming and forestry practices. The protection of endangered and rare plants and the strengthening of their populations are even more closely linked to the restoration, ecological improvement and conservation of their habitats than for other species groups.

Conservation status

EU State of Nature report 2020

Trends in conservation status

Compared to the 2001-2006 timeframe, the share of plant species in a good conservation status increased from 22% to 39%. This improvement was mostly due to increased knowledge. The percentage share of the species in poor and in bad condition has not changed. The downward trend for plant species in bad and poor condition is five to ten times higher than the positive developments.

Examples of genuine improvements in vascular plant species linked to LIFE

Species showing improved status in Article 17 reports	Member State	Biogeo-graphical Region	Conservation Status change 2012 to 2018	LIFE projects that may have contributed to these improvements
Arctophila fulva	FI	BOR	Bad to poor	Conservation of Liminganlahti wetland (LIFE95 NAT/FIN/000156
Armeria helodes	IT	CON	Bad to poor	LIFE FRIULI FENS (LIFE06 NAT/IT/000060)
Ligularia sibirica	PL	ALP	Poor to good	AlkFens_S_PLife (LIFE13 NAT/PL/000024)
Liparis loeselii	FR	ATL	Bad to poor	Maintbiodiv (LIFE06 NAT/F/000146)
	NL	ATL	Poor to good	Wetland succession (LIFE06 NAT/NL/000074), New LIFE for Dutch Fens (LIFE12 NAT/NL/000372)
Pontechium maculatum subsp. maculatum (6948)	CZ	CON	Bad to poor	RUPICOLOUS (LIFE04 NAT/CZ/000015)
Teline rosmarinifolia	ES	MAC	Poor to good	Inagua (LIFE07 NAT/E/000759)

Up until to 2018, the LIFE programme ran 166 projects that involved conservation actions on vascular plants, most of them within a broader context of habitat restoration or management plans for Natura 2000 sites. While only 30 of these projects targeted vascular plant species directly, overall habitat improvements resulting from LIFE projects do play an important role in the protection of plant species dependent on these habitats.

Plant-facing actions and measures carried out within LIFE projects include species assessments, population or habitat recovery plans, site management plans, direct conservation measures for the protection and management of targeted species and their habitats, the creation or development of designated areas for plant reproduction, and protection from or elimination of invasive alien species.

LIFE carried out its first plant-focused project in Spain in 1993 with the aim of testing and establishing a micro-reserve plant conservation model to rescue, conserve and enlarge specific regional populations of rare, endemic and endangered plant species, as well as the different vegetation types in which they occur. Since then, other Spanish regions and EU Member States have adopted the concept of micro-reserves as a valuable Habitats Directive management tool.

Despite the small number of projects specifically targeting the plant species listed in Annex II of the Habitats Directive, several have had significant impact at the national level. All of the LIFE project 'success plants' (see the table in this section) are rare species that grow only in small and locally limited habitat areas, improvements to which have nonetheless increased the species' nationwide occurrence.

A key distinction

Vascular plants (tracheophytes) are the dominant group of land plants and represent more than 90% of Earth's vegetation. They include clubmosses, horsetails, ferns, gymnosperms (flowerless plants producing cones and seeds) and angiosperms (flowering plants). Vascular plants have two types of specialised vascular tissue: the xylem, which conducts water and minerals throughout the plant; and the phloem, which conducts products of photosynthesis. These plants also form true roots, leaves and stems, with some species capable of achieving a great size and height.
The far less numerous non-vascular plants, which contain simpler tissues to transport water internally, were the earliest plants to evolve and are often the first species to move into new or inhospitable territories. These plant species include mosses, liverworts, hornworts and algae.

Key messages

- **Vascular rare and endangered plant species are targeted via habitat restoration and habitat improvement.**
- **Individual interventions on local populations of selected plant species are generally positive but often remain hidden in internal reports.**
- **Even though a relatively small number of projects specifically focused on Annex II plant species, several had a significant impact on improving the conservation status of the species concerned.**
- **This positive development relates to rare species that only grow in small and locally delimited areas.**
- **For species with a broad distribution range, a series of successive large-scale LIFE projects combining habitat restoration and targeted measures on selected plants are required.**
- **No specific projects have to-date improved the conservation status of non-vascular plants.**

SUCCESS STORIES

Balanced approach extends life for Long-lasting pink

Photo: Long-lasting pink - LIFE06 NAT/H/000104 - © Sándor Bérces

The **HUNDIDI** (LIFE06 NAT/H/000104) project successfully improved the population of the Long-lasting pink (*Dianthus diutinus*) in Hungary. This extremely rare flower species is found in higher ground areas between the Danube and Tisza rivers and is strictly protected under Hungarian law. The project's well-balanced combination of actions included large-scale habitat restoration through deforestation of pine plantations on sandy soils for conversion into grassland, elimination of invasive plant species, and re-establishment of sheep and goat grazing in restored areas. A nursery was also established to rear young plants for eventual cultivation on prepared habitats. Extensive public relations work and awareness raising activities rounded out these conservation efforts.

The number of individual plants grew from 19 000 to nearly 98 000 between 2007 and 2011, not including nursery-grown specimens, and the success rate of reintroduced plants grown off-site was 80%. Close cooperation between conservations and plant scientists played a standout role in delivering these great results. Thanks to **HUNDIDI**, the conservation status of *D. diutinus* improved from bad in 2006 to poor in 2012, and its status remains stable as of 2018.

Photo: Plant Micro-reserve Network in Cyprus - LIFE08 NAT/CY/000453 © Marios Andreou

Photo: Cyprus bee orchid - LIFE08 NAT/CY/000453 - © Marios Andreou

Protecting a plant species native to the Troodos mountains

The Troodos rockcress (*Arabis kennedyae*) is a rare and endangered flowering plant species native to the Troodos Mountains in Cyprus, with only three known populations in 2009 and its habitat in decline. **Comanacy** (LIFE04 NAT/CY/000013), the first ever LIFE Nature project to be financed in Cyprus, aimed to move the country forward in its protection of Sites of Community Interest (SCIs) by targeting several habitats and species, including *A. kennedyae*. **Comanacy** successfully introduced conservation and protection measures in five Natura 2000 sites and developed the capacity necessary for their long-term management, marking an important step forward in Cyprus' nature conservation story. In a second Cyprus-based project, **PLANT-NET CY** (LIFE08 NAT/CY/000453), the chosen approach was to establish and manage a network of five plant micro-reserves in the country to further improve the protection and conservation of rare endemics. This tandem of projects helped to boost the Troodos rockcress' status to good, with a stable conservation trend.

Other LIFE projects

Conservation of Liminganlahti wetland (LIFE95 NAT/FIN/000156)

Myosotis Bregenz (LIFE00 NAT/A/007069)

Inagua (LIFE07 NAT/E/000759)

LIFE+ GARAJONAY VIVE (LIFE13 NAT/ES/000240)

XericGrasslandsPL (LIFE08 NAT/PL/000513)

NATURA2MIL (LIFE05 NAT/B/000088)

Herbages (LIFE11 NAT/BE/001060)

Borstgrasrasen (LIFE06 NAT/D/000008)

UVOR (LIFE06 NAT/A/000124)

CONSERVASTRATRAGALUS-MU (LIFE11 BIO/ES/000727)

KTKK HX (LIFE10 NAT/DE/000007)

FLORANET LIFE (LIFE15 NAT/IT/000946)

Looking ahead

Non-vascular plants are among the best indicators of environmental change of ecosystem fitness. Despite their importance, this 'forgotten' group of species continues to deteriorate at an accelerating rate. To date, no LIFE projects aim at improving the conservation status of non-vascular plants. LIFE projects should therefore pay more attention to these 'lower' plant species within habitat restoration schemes. Targeted monitoring of results could also help to reverse current negative trends.

To improve the status of vascular plant species with a broad distribution range at regional or national level it will be necessary to carry out successive large-scale LIFE projects (mega-projects) that combine habitat restoration efforts with measures targeting selected plants.

Birds

Photo: Roseate terns (Sterna dougallii) of the Morlaix Bay - LIFE05 NAT/F/000137 - © EC/Hervé Ronné

Birds are invaluable indicators of environmental and habitat health, as they are relatively easy to detect and will abandon habitats which do not fulfil their ecological requirements. Europe is home to more than 530 regularly occurring wild bird species with a total estimated breeding population of around 2 billion pairs. The three greatest pressures leading to habitat degradation and loss for bird populations in the EU are intensive agriculture (including pesticide use, abandonment of grazing, and replacement of grassland with arable cultivation), modification of natural conditions (such as changes in waterbody conditions) and direct exploitation (trapping, hunting and collection of birds). Bird species which are specially adapted to threatened habitats are particularly at risk. The Birds Directive, which gives protection to all wild bird species in the EU, applies to the birds themselves, as well as their eggs, nests and habitats.

Conservation status

EU State of Nature report 2020

Trends in conservation status

Article 12 assessments look at short-term trends of 12 years (2007-2018) and long-term trends of 38 years (1980-2018). Regarding short-term trends for breeding birds, around half of species are either increasing (23%) or stable (28%) and a third (29%) is declining with the remaining 20% unknown. And despite numbers of wintering birds either increasing (45%) or stable (15%), there are now more species declining (29%) in the short-term than in the long-term (12%)

Most frequently targeted bird species in the LIFE programme

Species	No of projects in LIFE project database	IUCN category* European Red List of Birds (EU27)
European bittern (*Botaurus stellaris*)	83	LC
Corncrake (*Crex crex*)	66	LC
Common kingfisher (*Alcedo atthis*)	48	VU
Western marsh harrier (*Circus aeruginosus*)	46	LC
Red-backed shrike (*Lanius collurio*)	43	LC
Common tern (*Sterna hirundo*)	41	LC
Woodlark (*Lullula arborea*)	34	LC
Black stork (*Ciconia nigra*)	33	LC
Spotted crake (*Porzana porzana*)	33	LC
European nightjar (*Caprimulgus europaeus*)	32	LC
Lesser kestrel (*Falco naumanni*)	32	LC

*LC = Least concern, VU = Vulnerable

LIFE projects targeting birds by habitat

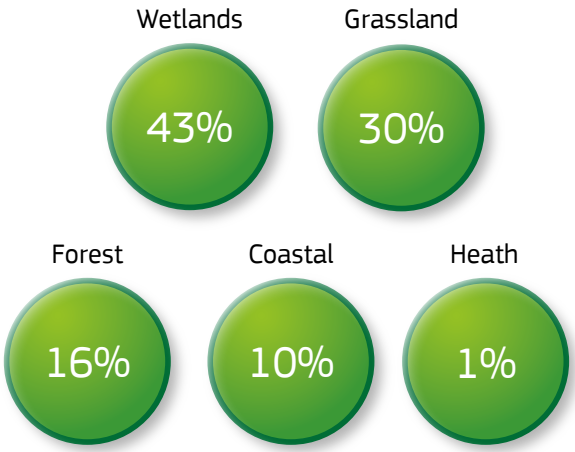


Photo: Audouin's gull - LIFE07 NAT/GR/000285 - © HOS Thanos Kastritis

Improving bird species conservation status through LIFE

Species	Common Name	Member State	LIFE projects
Acrocephalus paludicola	Aquatic warbler	Lithuania	Baltic Aquatic warbler (LIFE09 NAT/LT/000233); LIFEMagniDucatusAcrola (LIFE15 NAT/LT/001024)
Botaurus stellaris	Bittern	Belgium	Dommeldal (LIFE05 NAT/B/000091); Triple E Pond area M-L (LIFE08 NAT/B/000036); LIFE Hageland (LIFE11 NAT/BE/001067); LIFE Delta (LIFE15 NAT/BE/000760)
Coracias garrulus	Roller	Greece	No projects but ROLLER LIFE+ (LIFE13 NAT/HU/000081) had regional impact
Falco vespertinus	Red-footed falcon	Hungary	F.VESPERTINUS HU/RO (LIFE05 NAT/H/000122); REDFOOT (LIFE11 NAT/HU/000926)
Gypaetus barbatus	Bearded vulture	Greece	Gypaetus (LIFE98 NAT/GR/005276); Gypaetus II LIFE02 NAT/GR/008492)
Otis tarda	Great bustard	Hungary	OTISHU (LIFE04 NAT/HU/000109)
Sterna dougallii	Roseate tern	United Kingdom	Roseate tern (LIFE14 NAT/UK/000394)
Tetrax tetrax	Little bustard	France	Little bustard (LIFE96 NAT/F/003207); RENF TETRAX (LIFE04 NAT/FR/000091)

Birds and European wetlands

Wetlands – arguably the habitat suffering the most contraction in Europe – support a wide range of bird species, such as ducks, cranes, curlews and other waterfowl. Just as Article 4 of the Birds Directive requires Member States to protect their wetlands, wetland birds feature prominently in the LIFE portfolio. From the very beginning of the LIFE programme, projects targeting wetland habitats have delivered benefits to a wide range of bird species, many of them endangered. LIFE is building on the results of its wetland successes, and continues to demonstrate how concerted and concentrated action over extended periods pay long-term dividends in habitat improvements and increased populations for targeted species groups.

The LIFE programme helps Member States to achieve conservation objectives of the Birds Directive, but funding from the earlier ACE programme (1984-1991) pointed the way forward and sowed the seeds for future success. When LIFE was established in 1992, LIFE projects were able to hit the ground running and immediately improved the network of Special Protected Areas (SPAs) before moving on to improving habitats and targeting priority species for conservation.

Roughly one-third of all species-focused LIFE projects have targeted birds. Since the establishment of the LIFE programme in 1992, the EU has allocated over €500 million for LIFE projects helping to maintain or improve the conservation status of more than 200 bird species throughout Europe. Of the more than 585 bird-focused LIFE projects carried out up to 2018, most have helped to restore bird habitats and improve their population status, while other high-stakes projects have delivered the crucial difference between species survival and extinction.

Photo: European shag - LIFE07 NAT/GR/000285 - © HOS Giannis Markianos

Photo: Corncrake - LIFE10 NAT/DE/000012 - © EC/Meffert P.

Photo: The Common kingfisher - LIFE07 NAT/SK/000707 - © BROZ/Ján Svetlík

According to BirdLife International, a comprehensive conservation strategy for birds encompasses three components: species conservation, site conservation, and conservation of the wider environment. The LIFE programme is fully in line with this strategy, and LIFE supports the extensive network of NGOs around BirdLife International in forming successful delivery partnerships.

One such partner is the Royal Society for the Protection of Birds (RSPB), an experienced UK-based NGO with involvement in over 30 LIFE projects. The RSPB has developed a model which shows how any successful recovery effort begins with monitoring to detect problems, followed by diagnosis (research), testing solutions (research delivery) and recovery management through to the ultimate goal of sustainable development. Significantly, this model applies to nearly all species recovery work, and based on RSPB experience LIFE funding is most effective at the recovery management stage – that is, when a push is made for self-supporting populations.

In many cases, positive stakeholder engagement is an indispensable condition for a successful outcome. To cite a relevant example, the preferred habitat of the Aquatic warbler (*Acrocephalus paludicola*) becomes overgrown and uninhabitable without repeated mowing and grazing. The LIFE programme has shown repeatedly that it is possible to educate farmers, land managers and landowners to adopt farming methods that also benefit the habitats in which Europe's threatened bird populations thrive.

At the same time, the innovative aspect of LIFE allows for the development and deployment of new conservation methods and techniques. LIFE responds quickly to changes on the priority species list and can direct project activities to where they are most needed. A targeted project focus on persecuted raptor species, for example, has resulted in many of them making a spectacular recovery.

Over the years, LIFE project results have shown that continuity is another key component of conservation success. A clear indicator of the importance of long-term project planning and design is that multiple or successive LIFE projects carrying out a set of specific and related actions over time are delivering the most outstanding improvements. The 'Success stories' summarised below are good examples of these joint efforts.

Key messages

- **LIFE (and ACE) have been key for the successful implementation of the Birds Directive.**
- **LIFE's contribution is recognised by Member States and projects are often cited in Article 12 reports.**
- **Wetlands have been the main focus of LIFE's habitat management.**
- **LIFE runs projects that address urgent needs e.g. the priority species list.**
- **The innovative aspect of LIFE encourages new techniques to develop and proliferate.**
- **LIFE partners with the extensive network of Birdlife International.**
- **LIFE helps species recovery, from diagnosis of the problems through to a return to self-sustaining populations by repeat interventions.**

SUCCESS STORIES

Photo: LIFE14 NAT/UK/000394
© NEEMO EEIG/Karen Lunan

The future looks rosy for the Roseate tern

Photo: Roseate terns - LIFE05 NAT/F/000137 - © EC/Hervé Ronné

The Roseate tern (*Sterna dougallii*) breeds in just two areas of Europe – the Azores and the far north-west – with the north-western population spread across a small number sites in France, Ireland and the United Kingdom. BirdLife International classes the Roseate tern as 'rare' and the species is a priority for LIFE funding. In 2005, the **Dougall** (LIFE05/NAT/F/000137) project targeted French sites where predation and fatal impacts from a nearby wind turbine posed the greatest threats to the species. The project erected fencing around *S. dougallii* nesting areas to prevent the intrusion of Red fox and American mink, and also installed a photovoltaic energy supply to replace the wind turbine.

Since reaching a high point in the 1960s, the Roseate tern population has declined in the UK for reasons not fully understood. **LIFE14 Roseate tern** (LIFE14 NAT/UK/000394), a five-year project that started in 2015, set out not only to improve the prospects for this species in the UK and Ireland, but to improve its conservation status across Europe by working on sites with potential for colony expansion. The project has successfully introduced several methods to control predation from various bird species (e.g. gulls, ravens, crows) and mammal species (foxes, mink, rats, otters) while minimising harm done to the predators themselves: examples include aerosol gull scarers, baited traps and anti-otter and geese fencing. Meanwhile, dramatic coastal management interventions and habitat enhancements such as nest boxes, vegetation management and platform installations have expanded the area available for *S. dougallii* colonisation. At the end of the day, there has been a 30% increase in the number of pairs across all colonies and a positive change in conservation status of this species in the UK and Ireland.

LIFE projects in the Netherlands restore long-lost breeding areas for Crane

In a true 'back from the brink' success story, the Common crane (*Grus grus*) is breeding once again in the Netherlands after not having done so for centuries. Multiple LIFE projects focusing on Common crane habitat restoration have played a key role in this exciting and encouraging development. The projects have been carried out in three areas of the Netherlands: Fochteloërveen, Dwingelderveld and Engbertsdijkvenen.

Photo: Common crane - iStock by Getty Images

Two projects in the first area, **Fochteloërveen** (LIFE99 NAT/NL/006280) and **The Dutch Crane Resort** (LIFE08 NAT/NL/000193), helped establish essential conditions for the species to breed successfully. Rewetting efforts improved the breeding habitat's hydrological conditions, and the zoning of human activity resulted in a larger, disturbance-free breeding ground. **"Healthy Heath"** (LIFE08 NAT/NL/000192), a large-scale, multi-stakeholder restoration project in Dwingelderveld National Park, converted agricultural land into wet and dry heathland, removed a public road, enlarged and rewetted the project area and reduced noise and disturbances. The number of breeding pairs has risen since the project ended in 2013, and the positive effects are spreading to nearby areas as well. Between 2006 and 2008, the **Engbertsdijkvenen** (LIFE06 NAT/NL/000075) dramatically changed water levels in the third breeding area through dam installation, while the **AddMire LIFE** (LIFE18 NAT/NL/000636) project continues with further hydrological restoration efforts in the area. Happily, we can also see an expansion of Common crane breeding sites into areas east and south of the Netherlands where projects such as **Bargerveen** (LIFE04 NAT/NL/000206), **Peelvenen** (LIFE11 NAT/NL/000777) and **Life+GP** (LIFE13 NAT/NL/000079) have improved habitat hydrological conditions on a large scale: the persistence of drought as a climatic threat to the Crane makes this work especially important.

Globally threatened Aquatic warbler benefits from concentrated intervention

Photo: Aquatic warbler - LIFE05 NAT/PL/000101 - © EC/Cezary Pioro

Photo: Aquatic warbler - LIFE05 NAT/PL/000101 - © EC/Mateusz Matysiak

The Aquatic warbler (*Acrocephalus paludicola*) is mainland Europe's rarest globally threatened passerine (perching) bird, with a world population of just 13 500 to 21 000 pairs. It is, quite rightly, a priority species in the LIFE programme. Once widespread and numerous on fens, mires and wet meadows, this habitat specialist has disappeared from most of its former range. Nowadays a true denizen of human-altered habitats and extremely susceptible to changes in traditional land use, the Aquatic warbler is effectively a conservation-dependent species. Habitat drainage, cessation of extensive farming and intensified farming are the principle threats to this species.

Several LIFE projects have combined to address the plight of the Aquatic warbler, including **Aquatic Warbler project** (LIFE05 NAT/PL/000101), **Biomass use for Aquatic Warbler** (LIFE09 NAT/PL/000260) and **Renaturyzacja II_LIFE_PL** (all from Poland) (LIFE13 NAT/PL/000050) and **Baltic Aquatic Warbler** (Lithuania) (LIFE09 NAT/LT/000233). Within this group of projects, the usual first step was to restore natural water levels by closing ditches, building sluices and making adjustments to water pumps, as high water levels prevent trees and bushes from growing on marshes. The second step was to reintroduce traditional mowing and grazing practices to maintain achieve and maintain supportive vegetation structures. The **LIFEMagniDucatusAcrola** (LIFE15 NAT/LT/001024) involved translocating birds from Belarus to support Aquatic warbler populations in Poland and Lithuania and resulted in positive population trends – and by as much as 20% in Poland's Biebrza Valley. In Spain, **LIFE PALUDICOLA** (LIFE16 NAT/ES/000168) has purchased land, controlled grazing, removed biomass, improved hydrology and warded off predators (notably the American mink) to protect the Aquatic warbler, while also taking actions to facilitate autumn migration routes between Europe and Africa.

Gran Canaria's Blue chaffinch rises from the ashes

Photo: Blue chaffinch - iStock by Getty Images

Photo: Restoration of burnt endemic pine woods - LIFE07 NAT/E/000759 - © NEEMO EEIG/Audrey Thénard

Endemic to the Canary Islands and classified as 'near threatened', the Blue chaffinch (*Fringilla teydea*) is restricted to the pine forests of Gran Canaria. Already few in number and at risk from predatory species (especially feral cats), the island's Blue chaffinch population plummeted by nearly half – down to an estimated 140 individuals – following a devastating fire in 2007. The **Inagua** (LIFE07 NAT/E/000759) project set out to protect and restore the depleted pine forest habitat, controlled goat and rabbit populations to allow natural regeneration and established a plan to reduce future fire risk in the area. Meanwhile, the **LAMPROPELTIS** (LIFE10 NAT/ES/000565) project took on the altogether different challenge of reducing the island's quickly growing population of California kingsnake (*Lampropeltis getula californiae*), an invasive and powerful alien predator species with a wide range of targets, including the Blue chaffinch. As a result of these combined efforts, the Blue chaffinch population climbed steadily over the years, recovering to pre-fire levels by 2011. Subsequently, the **LIFE+PINZON** (LIFE14 NAT/ES/000077) project relocated individual birds from the main Inagua site to establish a new population at la Cumbre, where 20 pairs are now breeding. However, even with a slightly larger distribution area and a current estimated population of 430 individuals, the Blue chaffinch is still at risk: regular monitoring and effective management will be crucial towards ensuring its continued survival.

Habitat restoration gives the White-tailed eagle a much-needed lift

Photo: White-tailed eagle - iStock by Getty Images

The White-tailed eagle (*Haliaeetus albicilla*) is a very large raptor species which usually lives most of the year near large bodies of open water. Widely distributed across temperate Eurasia, these birds are often scarce and spottily distributed as a nesting species, due mainly to human alteration of wetland habitats, systematic persecution (dating back to the 1800s) and accidental poisonings. Thankfully, due to a series of 24 LIFE projects spanning from 1995 to 2017, White-tailed eagle populations are growing in Denmark, Lithuania, Poland, Slovakia and Finland.

The first LIFE project in Finland, **Preservation of western taiga habitats sheltering threatened species (White-tailed eagle) in the Baltic Archipelago** (LIFE95 NAT/FIN/000099), focused on habitat security through the purchase of 200 hectares of land and 25 hectares of water area. At the time of its introduction in 2006, **Kokemäenjoki-LIFE** (2006-20012) (LIFE06 NAT/FIN/000129) was the largest holistic wetland restoration project ever carried out in Finland, and the knowledge acquired over its six-year duration has greatly benefited similar projects: restoration efforts on the overgrown Puurijärvi Lake (440 hectares) involved excavation, dredging and reclamation to produce more extensive open water areas; dams were built and drainage ditches were filed to restore mires; coniferous trees were cleared to improve the forest habitat; three small islands were built for breeding birds; and small ponds and mud depressions were excavated for targeted wader bird species. A growing population of White-tailed eagles is just one of several long-term benefits of this ambitious project.

Photo: White-tailed eagle - LIFE07 NAT/SK/000707 - © BROZJAN Sreality

In Lithuania, **LITCOAST** (LIFE05 NAT/LT/000095) restored over 1,600 hectares of seashore habitats and prepared management plans and monitoring schemes for three coastal Natura 2000 sites. Most importantly, the project constructed 20 artificial nesting platforms for the White-tailed eagle and Black kite (*Milvus migrans*).

The **SENNERESTSK** (LIFE06 NAT/SK/000114) project in a Slovakia national nature reserve restored water levels on almost 1,000 hectares of wet meadows. The improved habitat benefited bird populations – including the White-tailed eagle, which started to breed in the reserve for the first time ever. Another successful project from Slovakia, **Danube birds conservation** (LIFE07 NAT/SK/000707), restored dried-up river branches and oxbows, river connectivity, lowland meadows, floodplains and wetlands. These rehabilitated Danube habitats provide long-term resting, feeding and nesting habitats for 15 targeted bird species, with confirmed results showing new nesting pairs and a population increase for the White-tailed eagle.

Photo: Puurijärvi Lake - LIFE06 NAT/FIN/000129 - © Milka Parviainen

Photo: A European roller perched on a power line - LIFE13 NAT/HU/000081

Two other LIFE projects protected endangered bird species, including the White-tailed eagle, from a very different type of threat – powerlines. **LIFEZONE** (LIFE13 NAT/PL/000060) in Poland installed insulators on power transformers lying within the feeding grounds of targeted species, while **LIFE BIRDS on POWER LINES** (LIFE16 NAT/BG/000612) in Bulgaria introduced bird-friendly pylons to reduce mortality caused by collision with overhead powerlines in priority areas in Natura 2000 sites and key corridors.

Other LIFE projects

EuroSAP (LIFE14 PRE/UK/000002)
MALTA SEABIRD PROJECT (LIFE10 NAT/MT/000090)
Anser-Eur (LIFE05 NAT/FIN/000105)
Golden eagle (LIFE00 NAT/IE/007145)
IBAMarinha (LIFE04 NAT/P/000213)
IBA MARINAS (LIFE04 NAT/ES/000049)
LAG'Nature (LIFE07 NAT/F/000193)
LIFE Artina (LIFE17 NAT/HR/000594)
GRACE (LIFE09 NAT/SE/000345)
UITKERKSEPOLDER (LIFE03 NAT/B/000023)
LIFE going up a level (LIFE13 NAT/NL/000162)
LIFEGALLINAGO (LIFE11 NAT/PL/000436)
Mikri Prespa (LIFE02 NAT/GR/008494)
LIFEciconiaPL (LIFE15 NAT/PL/000728)
White Stork Conservation (LIFE07 NAT/LT/000531)
White-backed woodpecker (LIFE95 NAT/S/000517)
Return of the Neophron (LIFE10 NAT/BG/000152)
LIFE TRANSFERT (LIFE05 NAT/F/000134)

Looking ahead

Many LIFE projects have contributed to improving the population size or conservation status of birds, and lessons from completed projects are reliable indicators in terms of which actions to take – or avoid – in future conservation efforts.

Successive LIFE projects with key measures maintained over time – i.e. continuity – are delivering the most outstanding improvements. The positive effects of several projects targeting the same or similar habitats can produce cumulative positive effects for habitats and multiple species alike. At the same time, repeated project interventions are notably successful in improving the status of endangered species.

The LIFE programme should continue to work with farmers, land managers and landowners to implement farming methods that benefit habitats which are home to threatened bird populations. The balance of bird-focused projects by habitat accurately reflects the importance of wetlands for birds, but also highlights some potential gaps in the portfolio that might be addressed.

LIFE
protects

Chapter 3

LIFE contribution to Natura 2000

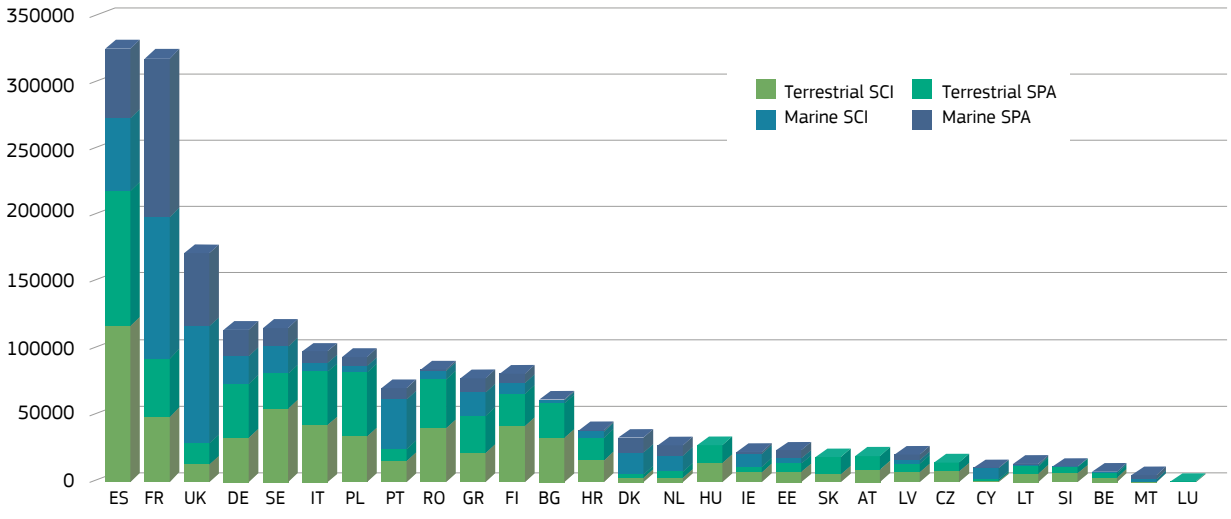
Photo: LIFE Grote NeteWoud project in Belgium - LIFE12 NAT/BE/000438 - © NEEMO EEIG/Darline Velghe

The Natura 2000 network forms the backbone of EU nature conservation policy. Covering more than 18% of land area and over 10% of sea area across the EU, Natura 2000 is the world's largest coordinated network of legally protected areas. The network extends across all 28 EU Member States and includes almost 28 000 sites, encompassing a total area of more than 1.35 million km^2.

From its beginning in 1992 up until 2019, the LIFE programme co-financed conservation actions in more than 5 700 Natura 2000 sites – roughly 20% of the total network. LIFE project coverage of Natura 2000 sites within Member States varies considerably, ranging from 2% to 72% and with an average of 27%.

It is an obligation of the EU Member States to ensure that their Natura 2000 sites form a coherent network which can best guarantee meeting the needs of habitats and species, and there are different strategies for achieving this goal. Some Member States selected large areas for coverage, while others opted for smaller areas targeting only a single habitat or species.

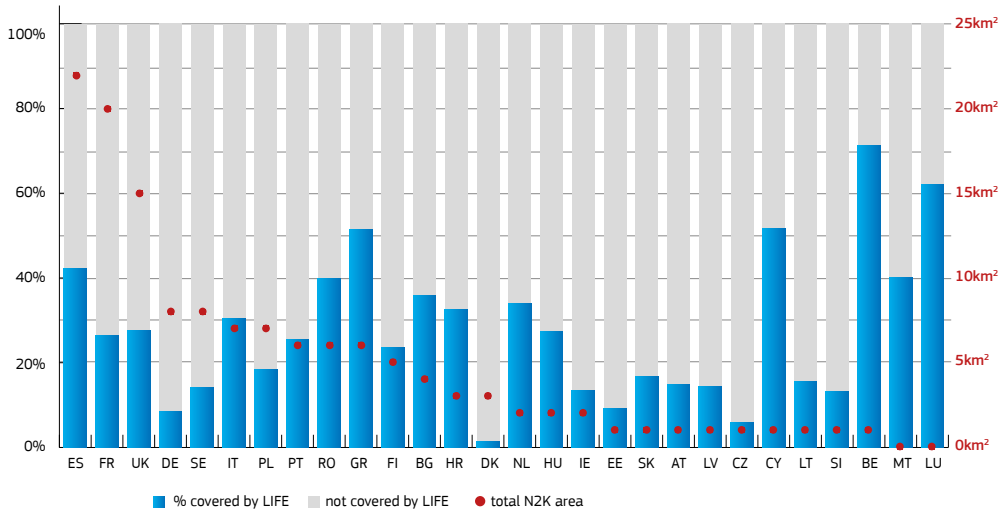
Total area (km^2) of Natura 2000 sites per EU Member State (as of end-2019)[11]



SCI = Site of Community Importance, SPA = Special Protection Area

[11] https://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/ENG%20Nat2k47%20WEB.pdf

Percentage of Natura 2000 sites with LIFE project coverage per EU Member State (1992-2018), compared to the total Natura 2000 network area for each Member State (in 10 000 km²), as of end-2019



Source: LIFE database

Member States are obliged to establish conservation objectives and appropriate measures to safeguard species and habitats protected in any given Natura 2000 site in their territory. By collecting information on habitats and species within Natura 2000 sites, LIFE projects provide valuable assistance in helping Member States to set the appropriate conservation objectives and measures, in addition to playing a notably crucial role in performing conservation and restoration work on these sites.

The vast majority of LIFE projects (92%) carried out between 1992 and 2019 targeted habitats and species on land, while just 8% focused on marine conservation. Among the latter, one-third focused specifically on marine species and habitats out at sea, while two-thirds carried out actions at sea as well as on islands or in coastal areas.

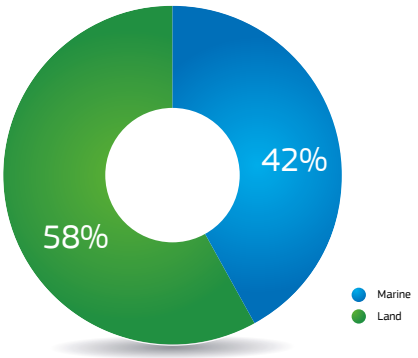
The LIFE programme fully intends to raise its marine conservation and restoration project portfolio. The marine Natura 2000 network has more than doubled in area since 2012, and approximately 42% of the network now consists of marine sites. At the same time, marine habitat types are underrepresented in the Habitats Directive compared to listed freshwater and land habitats: just nine of all 233 listed habitat types in the Directive's Annex are marine. The IUCN Red Lists of Habitats include a much larger and more representative set of marine habitats, and those with threatened status or worse are eligible for LIFE funding, which creates relevant opportunities.

Marine conservation challenges are several and significant. While the EU is making steady progress towards completing the marine component of Natura 2000, more tailored management practices need to be in place to reduce the high percentage of EU protected marine habitats and species that are far from achieving good conservation status. The current lack of data on marine species and habitats is another conservation challenge. Significant data gaps make it difficult to conduct conservation status assessments accurately and efficiently. The EU State of Nature 2020 report, meanwhile, highlights high percentages of 'unknown' assessments for nearly all marine biogeographical regions, and available data on marine mammals are particularly deficient.

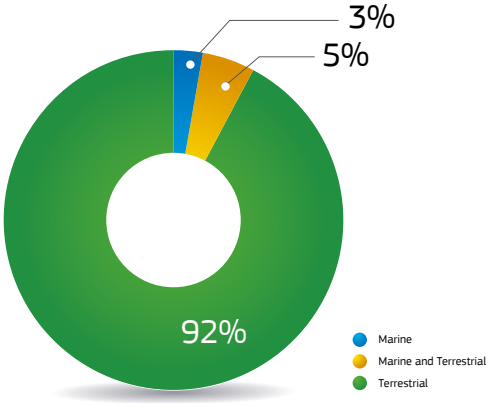
Despite being low in number, LIFE projects focusing on marine habitats have made a substantial contribution to increasing knowledge about these habitats. One such example is best practice on measures to restore seagrass beds and reefs. Furthermore, LIFE supported marine Natura 2000 deployment by dealing with spatial planning and changing the behaviour of marine stakeholders.

The headline target of the EU Biodiversity Strategy for 2030 is to expand legal protection to 30% of EU land areas and 30% of EU seas, one-third of which is to be strictly protected. Viewed in this context, around 10% of EU marine territories are currently designated as Natura 2000 areas, and only 1% are strictly protected. If these areas are to expand considerably over the next decade, the LIFE programme has a good opportunity both to close existing knowledge gaps and step up marine conservation and restoration efforts.

Percentage of marine and land areas in the Natura 2000 network



Percentage of LIFE projects focusing on marine areas, terrestrial areas or both (1992-2018)[12]



[12] https://ec.europa.eu/environment/nature/info/pubs/docs/nat2000newsl/nat45_en.pdf

LIFE and the designation of Natura 2000 sites

Photo: Alkaline fens in Northern Poland - LIFE11 NAT/PL/000423

LIFE projects support the Natura 2000 network both by enabling the designation of new Natura 2000 areas or by changing and extending site boundaries. Many LIFE projects have also purchased land parcels within Natura 2000 sites. Within notary deeds these sites are destined for conservation indefinitely, further strengthening their protection. These different approaches go hand in hand within the LIFE programme, are mutually reinforcing, and ensure conservation at EU, national and site levels.

Natura 2000 expansion

Member States are expected to identify Natura 2000 sites, but LIFE funding is sometimes used to help with site identification and the preparation of conservation objectives, measures and management plans.

Although the identification and designation of the Natura 2000 land network is mostly complete and there is now a greater focus on site management, LIFE projects remain well placed to put forward cases for additional Natura 2000 sites or extensions to existing ones. In recent years, LIFE projects have helped to identify marine Sites of Community Importance (SCIs) and Special Protection Areas (SPAs) and are thus contributing significantly to the expansion of the marine part of the network.

One condition of programme financing is that LIFE projects must address the specific needs of Natura 2000 sites or other sites which are likely to be designated as Natura 2000 sites by the end of a given project. One such example is the **DBPRBRI** (LIFE09 NAT/IE/000222) project, which addressed threats to raised bogs on five Natura 2000 sites and 12 Natural Heritage Areas in the Irish midlands: this work led to the creation of 12 new Natura 2000 sites.

At the same time, LIFE projects working on existing Natura 2000 sites are in a good position to assess opportunities to extend a site area if needed or to identify new site features that qualify for protection. During the **Sefton Coast LIFE** (LIFE95 NAT/UK/000818) project in the UK, for example, a rare type of liverwort, *Petallophylum ralfsii*, was added to the Natura 2000 site's list of protected species.

LIFE and nationally protected areas

Several areas designated as Natura 2000 sites fall partially or entirely under other national or international protection regimes (national park, nature park, UNESCO Biosphere Reserve etc.), and such designations often provide a site with greater visibility, more secure management and greater access to funding. Regardless of the type of management regime chosen, for any area designated as a Natura 2000 site, Member States must respect the conservation provisions stipulated in Article 6 of the Habitats Directive[13].

In the context of different management regimes, LIFE is often able to step in and help strengthen national governance and boost NGO capacity to improve conservation efforts. One such example

[13] https://ec.europa.eu/environment/nature/info/pubs/docs/others/ECJ_rulings%20Art_%206%20-%20Final%20Sept%202014-2.pdf

is the **AlkFens_PL** (LIFE11 NAT/PL/000423) project in Poland, which targets the conservation and restoration of alkaline fens within multiple Natura 2000 sites. The conservation NGO 'Klub Przyrodnikw', has been able to carry out restoration of natural hydrology, tree removal and extensive mowing to restore alkaline fens. The project has also established five new nature reserves in respective Natura 2000 sites in the north-west region of the Pomeranian Voivodeship and drafted management plans for each of them.

In Slovenia, **LIFEDRAVA** (LIFE11 NAT/Sl/000882) restored three arms of the Drava River and implemented restoration actions at two lakes – both of which are Natura 2000 sites – to improve breeding conditions for various fish and bird species. This LIFE project was also a catalyst for restoring former wastewater basins of the Ormož sugar factory. Work to restore these basins started in the 1980s, but more recent efforts have transformed the site into a 55-hectare wetland with a permanent water influx and several islets. Now a stopover area for large flocks of water birds, the site was declared a nature reserve in 2017.

Consecutive LIFE projects in Belgium – **LIFE Grote Netewoud** (LIFE12 NAT/BE/000438) and **Life Grote Nete** (LIFE05 NAT/B/000090) – have been influential in proposing regional park status for an area within a Natura 2000 site that contains one of the finest brook valleys with alluvial forests in Flanders. Also, in Belgium, Flemish and French authorities have agreed a Memorandum of Understanding within **Life FLANDRE** (LIFE12 NAT/BE/000631) to prepare the first cross-border nature park between both countries. The park, which includes four Natura 2000 sites, will help secure the protection of a vast area of shifting and fixed dunes.

Some of the more remarkable LIFE achievements are the result of policy meeting practice. **Cumbrian BogsLIFE+** (LIFE13 NAT/UK/000443) in the UK restored a degraded raised bog, but the truly great outcome of the project was the declaration of the Natura 2000 site Bolton Fell Moss as a National Nature Reserve, as well as the production of a combined management plan for the Bolton Fell Mosses and Walton Mosses National Nature Reserve. The transformation from a milled peat site in 2013 to a Special Area of Conservation and then a National Nature Reserve in just six years is a fantastic accomplishment.

Photo: Raised bog in the Irish midlands - LIFE09 NAT/IE/000222 - © EC/Durieux Eveline

Critical assistance: LIFE land purchase and Sweden's Western taïga

Forests cover 65% of Sweden's land surface, but only about 5% of this total is designated and protected as 'natural forest'. In the 1990s the Swedish government lacked sufficient national funds to provide urgently needed support for its rapidly vanishing Western taïga habitat and turned to the LIFE fund for assistance. A series of LIFE projects to protect natural forests and mires from commercial forestry and other activities was launched in Sweden between 1995 and 1998, with land purchase and legal protection as the main project actions. The results of these projects were straightforward, sustainable and required little management intervention. In total, the Swedish Environment Protection Agency received €11.8 million for 12 projects, and the Swedish government used this support wisely and effectively to target immediate threats.

One of the projects, **Protection of western taïga in Svealand and Götaland** (LIFE98 NAT/S/005369), purchased 1 262 hectares of forest. An ex-post mission conducted in 2012 – 10 years after project ended – found that the areas benefited from protection in the Natura 2000 network, that management plans were in place, and that a new 600-hectare nature reserve was being established. The mission also found that Sweden's national funds to protect nature areas are today much greater and that there is no longer a need to apply to the LIFE Programme for land purchase.

Photo: LIFE05 NAT/B/000090

Photo: Waterway and landroad during restoration works - LIFE05 NAT/B/000090 - © Willem Laermans

LIFE and legal protection through land purchase

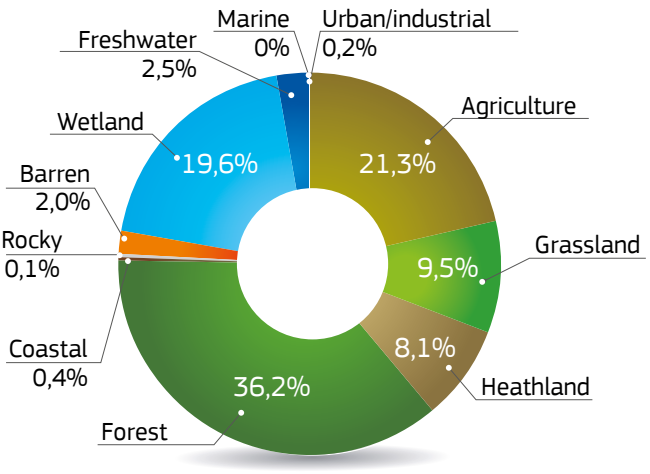
European nature conservation objectives are delivered, whenever possible, in partnership with landowners. Management agreements, covenants and funding support through mechanisms such as the Rural Development Programme are some of the tools available to facilitate such partnerships. In some cases, however, obtaining control over land is the only feasible way to protect a species or restore a habitat.

A unique feature of the LIFE programme is its co-financing of land purchase – usually together with national conservation agencies or NGOs – to secure land in perpetuity for nature conservation. All land purchased with LIFE support requires the inclusion of a special clause in the land register which assigns the land indefinitely for purposes of nature conservation. Land purchase usually enables the application of vital conservation measures, but sometimes the sole aim of purchase is to safeguard land at risk. Where habitats and species are at severe risk – as in the case of the Madeira laurel forest or the Western taiga in Sweden – a strategic programme of land purchase can help create core zones of protected habitat and strengthen the Natura 2000 network.

The estimated total area of purchased land parcels within the EU LIFE programme exceeds 200 000 hectares across all EU Member States[14]. The figure to the right shows the types of land purchased within the LIFE+ programme (2007-2014). The actual size of purchased land is not the only important consideration: the selection of strategic parcels to connect habitats, such as stepping stones or corridors, is equally critical.

Land purchase must be justified and is to take place only when alternative arrangements, such as management agreements, have been ruled out. Regarding the case of the Spanish imperial eagle (*Aquila adalberti*), for example, a trio of LIFE projects in Extremadura found that the preferred solution was to develop land stewardship agreements with private landowners. In other cases – such as large expanses of blanket bog in Scotland (see immediately below) or aapa mire in Finland (**Aapi & Avi** (LIFE00 NAT/FIN/007060) – land purchase was the only solution that allowed project beneficiaries to fully deliver their own restoration plans.

Percentage of land purchased by LIFE projects (2007-2014) by landuse class



Source: CORINE and Habitats Directive

Conservation of active blanket bog in Scotland and Northern Ireland (LIFE94 NAT/UK/000802) was the first LIFE project to involve the Royal Society for the Protection of Birds. The project combined the purchase of more than 8 300 hectares of land with management agreements on roughly 93 500 hectares to bring more than 60% of the total area of high conservation value under some form of management. A follow-up project, **Blanket bog** (LIFE00 NAT/UK/007075), purchased more than 1 500 hectares of afforested blanket bog and removed the plantations. The

Photo: Imperial eagle - LIFE13 NAT/PT/001300 - © José Luis Barros

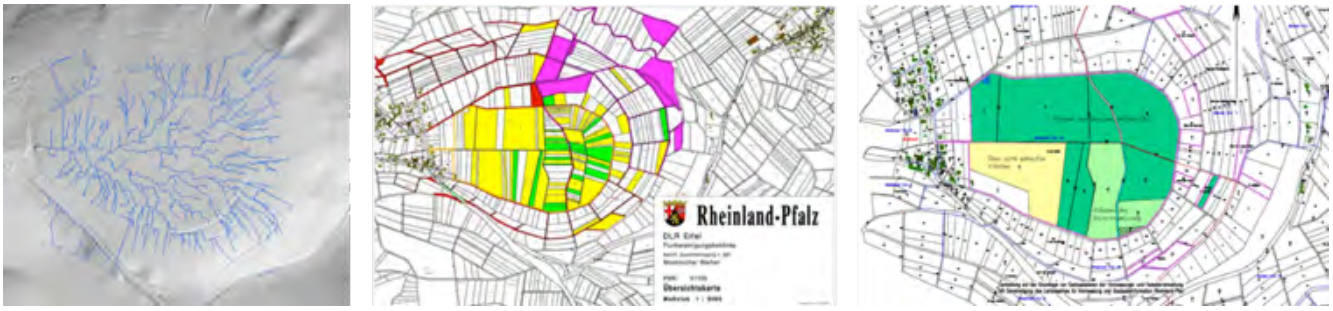
[14] LIFE improves NATURE (EC, 2018a).

The benefits of LIFE land purchase

Land purchase, which is at the heart of many successful LIFE projects, is used to:

- **Secure pristine habitats under threat (e.g. old growth forests in Finland and Sweden)**
- **Obtain large areas to restore original habitats (areas of uneconomic afforestation or degraded peat bogs are two such examples)**
- **Acquire a series of essential areas to reconnect landscapes through patches and corridors, either at a small scale (e.g. an individual wetland) or regional scale (to allow species dispersal)**
- **Secure 'strategic spots', such as a natural source of a spring-fed fen to gain control a site's hydrology**
- **Operate a 'land swap' system by purchasing plots of land in a Natura 2000 site and providing compensation to displaced owners**
- **Consolidate an entire area of wetlands and peatlands as a necessary condition for allowing necessary rewetting**
- **Allow an NGO to purchase or extend a nature reserve to increase their capacity to protect habitats.**

Land purchase and consolidation for purposes of wetland restoration



(Left) Hydrology of the depression; (Middle) Fragmented private land ownership before LIFE (purchased parcels in yellow); (Right) Consolidated land in public ownership allowing total rewetting of the site.

project also acquired 2 275 hectares of active blanket bog and carried out drain blocking, which improved the condition of more than 18 000 hectares of peatlands. Finally, **Blanket bog** also developed long-term management plans for the project area.


Photo: Dot-tailed whiteface dragonfly - LIFE11 NAT/DE/000344 - © Heiner Wilke

Photo: Cranberry blue butterfly - LIFE11 NAT/DE/000344 - © Region Hannover Team Gestaltung/Christian Stahl

The **Hang- und Hochmoore** (LIFE09 NAT/DE/000009) project in Germany successfully secured the entire catchment area of the Mosbrucher Weiher kettle mire thanks to targeted land acquisition and land consolidation, thereby enabling the complete rewetting and development of target habitats. The graphics above show how land purchase was used effectively to consolidate wetland restoration efforts.

Hannoversche Moorgeest (LIFE11 NAT/DE/000344), a project in Lower Saxony, applied the land purchase approach on a much larger scale in its attempt to restore four degraded bog complexes. It took more than a decade to advance an extensive land acquisition and swap involving more than 2 200 individual plots of land, but in the end a total of 1 775 hectares of bog woodlands, raised bogs and transition mires are left to benefit from natural ecological succession with little or no human intervention.

In some cases, through the purchase of important land parcels, LIFE projects can even pave the way for the establishment of large nationally protected areas. Such possibilities, however, involve plenty of negotiating with stakeholders and national authorities. One successful example is the **Cabañeros** (LIFE99 NAT/E/006327) project in Spain, which managed to purchase two private estates adjacent to one another on a total area of nearly 8 000 hectares. Both estates were on land of exceptional value for breeding pairs of the Cinereous vulture (*Aegypius monachus*), the project's main target species. The land purchase was a key factor in the consolidation and establishment in 1995 of Cabañeros National Park on an area of 390 km^2.

LIFE manages nature

Photo: Restoration in action under the PANNONICSK project - LIFE10 NAT/SK/000083

Management of protected areas is crucial for ensuring effective species and habitat conservation within the Natura 2000 network. After a particular area is identified as a Site of Community Importance (SCI), Member States have six years to adopt the site's specific conservation objectives and conservation measures and to designate the site as a Special Area of Conservation (SAC).The LIFE programme supports these efforts by gathering information about habitats and species within these sites, and by generating knowledge concerning various conservation approaches.

Member States are encouraged, though not obliged, to develop appropriate management plans or other action plans to help achieve a site's conservation objectives.

Numerous LIFE projects fulfil the important role of carrying out tasks that precede the development of management plans, such as data collection, land use analysis, identifying key actors and initiating negotiations with stakeholders. Projects that have performed this often time-consuming but essential work include **SIMARINE-NATURA** (LIFE10 NAT/SI/000141) and **Resto-unio** (LIFE11 NAT/LU/000857).

Management plans for Natura 2000 sites are elaborated within the framework of many LIFE projects, both in consultation with stakeholders and local populations, and subject to approval by the competent authorities.

Roughly 20% of LIFE+ projects produced management plans between 2007 and 2013, and LIFE projects have developed several excellent management plans that have obtained approval – often for multiple Natura 2000 sites – and which the competent authorities have set into motion. Management plans developed in the projects **Comanacy** (LIFE04 NAT/CY/000013) and **PANNONICSK** (LIFE10 NAT/SK/000083) served as role models for future management plans in Slovakia and Cyprus, for example, and were instrumental in shaping national guidelines for the elaboration of management plans for Natura 2000 areas in both countries.

The extent of suggested conservation management and proposed management plans varies greatly across sites; the same is true concerning duration, which can range from five to 35 years. By way of example, the **NATNET** (LIFE10 NAT/FI/000047) project in Finland developed 35 management plans for 24 Natura 2000 sites on a total area of more than 5 000 hectares, greatly improving overall coherence of the Natura 2000 network in Lapland.

The EU State of Nature report for 2020 shows a significant increase in the number of Natura 2000 sites with comprehensive management plans during the 2013-2018 period, as well as an increase in the cumulative area of managed Natura 2000 sites from about 280 000 km^2 to 360 000 km^2. There is no doubt that the LIFE programme has made a key contribution to both of these improvements and is therefore playing a central role in achieving long-term improvement of Natura 2000 areas.

A more recent development is the role of LIFE Integrated Projects in boosting development of management plans at both regional and national scale to ensure full coverage of all Natura 2000 sites.

Integrated Projects (IPs) and Natura 2000

Photo:View of the Black lake (Schwarzes Meer) LIFE15 IPE/DE/000007 - © Thomas Kutter

During the 2014-2020 funding period, the LIFE programme introduced a new tool to strengthen its impact on the Natura 2000 network: Integrated Projects (IPs). These 10-year endeavours promote a more strategic and joined-up approach that helps Member States to follow through on important environmental and climate legislation, primarily by boosting the development of management plans at regional or national scale.

Specific ways that IPs enhance Natura 2000 network governance include: building relationships between multiple stakeholders – including otherwise reluctant parties; identifying conservation priorities and objectives and developing strategies to achieve set goals; enabling communication between actors at different levels (vertical) and actors at the same level (horizontal); and opening doors to cross-border cooperation.

Photo: Bockholter Berge nature reserve - LIFE15 IPE/DE/000007 - © Corinna Kaiser/Bezirksregierung Münster

A total of €1.2 billion from EU agricultural and regional funds and other sources, on top of a €164 million contribution from the LIFE programme, was poured into 15 nature IPs between 2014 and 2018. This funding has opened up new possibilities to carry out important actions identified in the Prioritised Action Frameworks (PAFs) of EU Member States.

PAFs are planning tools at country level that help integrate measures relevant to nature conservation across either a broad or entire geographic area. The German IP **Atlantic Region DE** (LIFE15 IPE/DE/000007), for example, targets 15 habitats and 10 animal and plant species over an area covering much of North Rhine-Westphalia and Lower Saxony.

At present, LIFE is running 19 nature IPs, but their long duration means waiting a few more years to see some hopefully impressive results.

SPA expansion and successful management provide long-term protection for the Azores bullfinch

Photo: Working at a Special Protection Area (SPA) - LIFE12 NAT/PT/000527

The **Life Terras do Priolo** (LIFE12 NAT/PT/000527) project in Portugal revised the management plan for a Special Protection Area (SPA) of more than 6 000 hectares. With the help of an earlier LIFE project, **PRIOLO** (LIFE03 NAT/P/000013), the SPA tripled in size and now covers the entire range of the Azores bullfinch (*Pyrrhula murina*), a bird species endemic to São Miguel Island in the Azores archipelago. During the management planning phase, the project performed extensive vegetation mapping to develop a risk map and strategy to combat invasive plant species – work that was based on citizen science.

These tools contributed to the drafting of a management plan for the entire Natural Park of Ilha de São Miguel, and also helped define post-LIFE conservation efforts to be implemented. The Azores Autonomous Region Governing Council recently approved the SPA management plan, and the Azores bullfinch now receives effective long-term habitat protection.

Photo: Azores bullfinch (Priolos) - LIFE12 NAT/PT/000527 - © Ruben Coelho

Photo: LIFE10 NAT/BG/000152 - www.NatureImages.eu - © Svetoslav Spasov

LIFE empowers

Chapter 4

LIFE: governance and capacity building

Photo: iStock by Getty Images

Making an immediate and positive impact is no small achievement for any nature conservation project, but it takes sustained and coordinated effort to achieve long-term conservation gains. The **'LIFE makes a difference'**[15] report from 2018 highlighted three factors needed to ensure the sustainability of LIFE project results. Two of these factors, closely interlinked and summarised together here, are governance and capacity building (the third factor, continued funding, is covered later in this chapter). In providing decades of support through appropriate governance measures and capacity building, LIFE projects are ensuring that long-term conservation strategies in Europe are paying off.

LIFE and governance

Good governance engages all relevant stakeholders in defining clear and relevant conservation objectives, translating objectives into coherent actions, and integrating objectives into other policies. It also requires the capacity of institutions and stakeholders to enforce legislation and to mainstream sets of nature conservation objectives into other policy areas. Broadly speaking, a well-governed project has a stable organisation behind it and sufficient levels of support from the authorities and stakeholders involved.

From its inception the LIFE programme has supported the development of Natura 2000 governance systems and training programmes by working with nature conservation organisations, Member State authorities, scientific bodies, landowners and land managers. Related LIFE project actions include setting up governance and management regimes, establishing monitoring techniques for Natura 2000 sites, raising awareness and supporting decision makers in actions to involve different stakeholders.

The LIFE Nature programme made several early and important contributions to Natura 2000 policy[16]. In the late 1990s, for example, France and Italy became the first Member States to produce guidelines for managing Natura 2000 sites, and two LIFE projects[17] played a crucial role in their development[18] Through its work on inventories, LIFE Nature obtained enough local acceptance to propose several sites for the Natura 2000 network, while helping French and Italian authorities to develop structural policies for Natura 2000 sites and their own networks of protected areas. LIFE Nature also supported the conservation work of local bodies in line with Natura 2000 network development, while also helping NGOs to become more professional. Finally, LIFE programme

[15] https://ec.europa.eu/easme/sites/easme-site/files/life_makes_a_difference_xp_2018.pdf
[16] https://ec.europa.eu/environment/archives/life/publications/lifepublications/lifefocus/documents/lifefornatura_en.pdf
[17] Experimental drawing up of management plans for future French Natura 2000 sites (LIFE95 NAT/F/00533) and The Natura 2000 Network in Italy: management models (LIFE99 NAT/IT/006279).
[18] https://ec.europa.eu/environment/archives/life/publications/lifepublications/lifefocus/documents/managingnatura_lr.pdf

efforts brought socio-economic stakeholders into partnership with conservation-friendly initiatives.

LIFE has also made important contributions in assisting new Member States with enhanced governance processes. In Slovenia, **SI Natura2000 Management** (LIFE11 NAT/SI/000880) established a Natura 2000 management programme for the 2015-2020 period which laid the foundation for achieving improved conservation status of species and habitat types in the country. The management programme also provided Slovenia with a means through which to apply for EU funds. In a follow-through, consistent with good governance, programme measures are already integrated into other programmes covering a wide range of sectors and operations, including the EU Rural Development Programme. At the same time, Slovenia's Ministry of Environment and Spatial Planning used LIFE funding and gained valuable experience in preparing the Prioritised Action Framework (PAF) and additional documents.

Gulf of Finland (LIFE03 NAT/FI/000039) is another LIFE project that shows how good governance is important for sustaining conservation results. The project established a network of 12 Natura 2000 wetland areas along the northern coast of the Gulf of Finland flyway. This resulted in conservation improvements for targeted coastal wetland habitats and greater numbers of breeding and staging birds. Participatory planning processes – which defined clear goals and the procedures through which to attain them – were used to settle conflicts between nature conservation objectives and other land-use objectives, and to prepare management plans for 10 sites. The planning stage also identified further funding sources and the parties responsible for post-project management. The technical, financial and administrative expertise obtained through partner organisations during the project has been instrumental in successful long-term site management. In addition, the good working relationships established between various stakeholders during the project period remain strong and active to this day.

LIFE and capacity building

Policy makers, administrators, farmers, site managers, local businesses and other actors must all work together to achieve good long-term results, but they also need the right tools and resources to work with – and in sufficient quantities. To this end, capacity building to assist different stakeholders is one of the LIFE programme's most significant achievements[19].

LIFE has enhanced capacity building in all Member States from the beginning of the programme, as the following example from Romania illustrates. Three LIFE projects focusing on large carnivore conservation – **Vrancea** (LIFE02 NAT/RO/008576), **Carnivores Vrancea II** (LIFE05 NAT/RO/000170) and **URSUSLIFE** (LIFE08 NAT/RO/000500) – helped to establish an independent network of

Photo: School children learning about conservation - LIFE05 NAT/RO/000170 - © 2006 EC

experts and managers who were then able to advise the Romanian Ministry of Environment on appropriate actions. It all started in 2002 with a team of just three people, and by 2013 more than 25 individuals were working on large carnivore conservation issues, either within URSUSLIFE or in other projects running in parallel. Two further LIFE projects have taken over since 2013 – **LIFE FOR BEAR** (LIFE13 NAT/RO/001154) and **WOLFLIFE** (LIFE13 NAT/RO/000205) – and the project operators now have the know-how and capacity to lead large nature conservation projects. Thanks in part to these capacity building efforts, the 'good' conservation status of the Wolf (*Canis lupus*) remains stable in Romania.

During the 2014-2020 period, the LIFE programme introduced a new tool that builds and strengthens stakeholder capacity, among others. LIFE Nature Integrated Projects (IPs) bring added value to Natura 2000 governance. IPs are set up to carry out large-scale nature conservation plans or strategies (such as Prioritised Action Frameworks) in accordance with specific EU legislation. In order to do this, however, a well-functioning governance structure needs to be in place that establishes clarity between all involved stakeholders and sectors in terms of objectives and responsibilities. At the same time, stakeholders need to be involved in promoting coordination and mobilisation of at least one other EU, national private funding source. IPs facilitate good governance by providing the capacity to:

- Strengthen relationships and communication between multiple actors and at different levels
- Jointly develop national and regional strategies, conservation priorities and objectives
- Facilitate cross-border cooperation
- Provide the European 'weight' necessary to open doors to stakeholders who might otherwise be reluctant to engage.

Looking ahead

Building on its experience from the IPs, the LIFE programme for the 2021-2027 period includes an exciting new tool to reinforce aspects of good governance and capacity building. Strategic Nature Projects (SNaPs) will help Member States to integrate nature and biodiversity policy objectives into other policies and financing mechanisms, including rural development programmes within the EU's Common Agricultural Policy (CAP), Common Fisheries Programme, Regional Development Programmes etc.

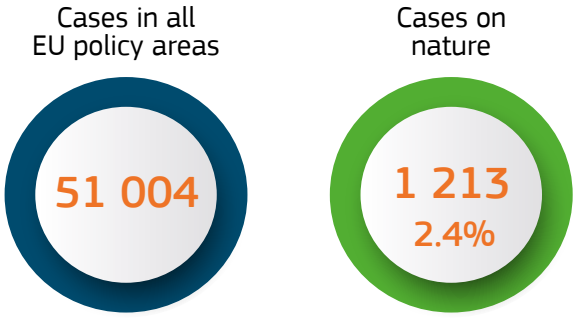
[19] Long-term impact and sustainability of LIFE Nature' (EU, 2014).

LIFE and wildlife crime

Photo: Egyptian vulture - LIFE10 NAT/BG/000152 - © HOS/Dimitris Vavylis

Highly profitable and difficult to detect, wildlife crime is to blame for much biodiversity loss across the world, and in some EU Member States hindering species recovery and frustrating the conservation efforts of LIFE projects. Developing cross-border nature conservation policy and EU legislation is an essential step towards halting biodiversity loss, but ultimately of no consequence without effective on-the-ground efforts, which need to be stepped up. Member States are primarily responsible for inspection and enforcement in this area, but there are also international organisations and bodies to provide assistance.

Number of infringement cases since 2002



The EU Network for the Implementation and Enforcement of Environmental Law (IMPEL), for example, works to enforce Nature Directive requirements and also plays an important role in combatting the illegal activities, mainly killing of birds. IMPEL's Green Expert Team strengthens the implementation of EU nature legislation by raising awareness, exchanging best practices and organising joint inspections. It also performs important work in extending networks and furthering collaboration between environmental experts (at NGOs, for example) and law enforcement experts such as EU prosecutors and judges.

Through a new project, **LIFE SWiPE** (LIFE19 GIE/BG/000846), LIFE and IMPEL are developing a robust knowledge base of European wildlife crime in 11 target countries based on reliable evidence.

HELICON reverses crime-related drop in Hungary's eagle population

An exponential rise in deliberate killings of the Eastern imperial eagle (*Aquila heliaca*) in Hungary is a serious threat to the conservation status of the species. More than 50 are believed to have been killed between 2005 and 2010 – nearly 25% of the species population in Hungary and above 14% of the total breeding population in the EU. The **HELICON** (LIFE10 NAT/HU/000019) project established a working group, firm anti-poisoning protocols and the region's first anti-poison dog unit to achieve a 36% increase in the species, reaching 205 occupied nests by 2016.

Thanks to **HELICON**, poisoning was detected and prosecuted more effectively, and the annual number of detected bird crime incidents fell by an average of 37% in the last three years of the project. The team also purchased 10 farms to create optimal breeding environments for Eastern imperial eagles.

Photo: Eastern imperial eagle - LIFE10 NAT/HU/000019

LIFE tackles wildlife crime

The LIFE programme has invested more than €70 million in over 45 LIFE projects targeting illegal activities connected to wildlife. Most of the projects have focused on preventing the poisoning of protected bird species such as raptors and vultures, but large carnivores are included as well. Other projects have honed in on illegal hunting, trapping and poaching, as well as animal trafficking.

BirdLife International reported in 2017[20] that Europe's highest incidences of wildlife crime take place in southern and central Europe. LIFE projects dealing with wildlife crime are as a result most active on the ground in these locations. While several Member States have yet to implement a LIFE project addressing wildlife crime, some LIFE projects in this area are focused on cross-border actions, such as the Bulgaria-led **Return of the Neophron** (LIFE10 NAT/BG/000152) project, which is also active in Greece.

With a wide array of Roadmap actions at its disposal, the LIFE programme has several ways to increase project effectiveness in fighting wildlife crime. New satellite tagging technologies help in monitoring and data collection, and an evolving database of incidents has the potential to become pan-European in scope.

The extension of crime prevention networks is another hallmark of LIFE project activity. There are now anti-poison detection and prevention patrols in nearly all EU Mediterranean countries, as well as anti-poison networks involving hunters and shepherds. At the same time, awareness raising campaigns targeting authorities and law enforcement personnel are prevalent across Member States. Most importantly, strong and clear penalties are being routinely enforced.

Number of LIFE projects addressing wildlife crimes, by type (up to 2017)[21]

Looking ahead

In 2018, the European Commission presented its 'Roadmap towards eliminating the illegal killing, trapping and trade of birds'[22]. The roadmap identifies five domains of support for Member States in charge of enforcement:

- Awareness raising for competent authorities and civil society
- Funding projects
- Coordinating efforts at EU level
- Processing data provided by Member States in the context of reporting obligations or enquiries
- Initiating legal procedures.

The roadmap also lists four action categories available to LIFE projects focused on wildlife crime:

- Monitoring and data collection
- Information exchange, training and awareness raising
- Enforcement and legal aspects
- Prevention.

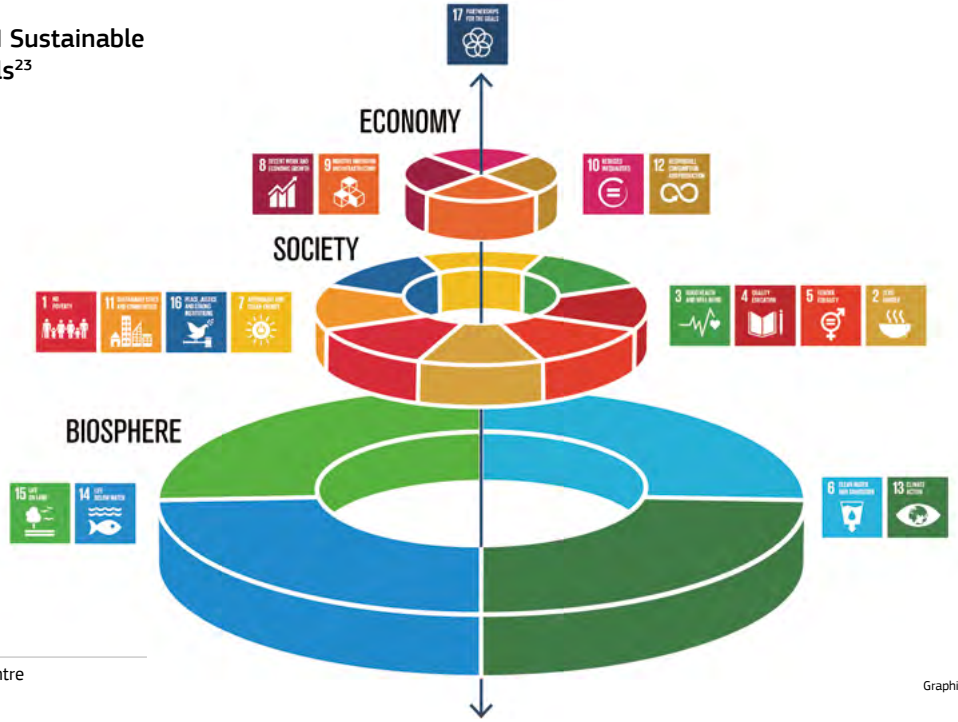
[20] https://www.birdlife.org/sites/default/files/the_killing_2.0.pdf
[21] LIFE and wildlife crime, EC and LIFE publication, 2017 https://ec.europa.eu/environment/archives/life/publications/lifepublications/flippingbook/life-wildlifecrime/HTML/files/assets/common/downloads/publication.pdf
[22] https://ec.europa.eu/environment/nature/conservation/wildbirds/docs/Roadmap%20illegal%20killing.pdf

LIFE and sustainable development

Photo: View of nature reserve in Corvo island - LIFE07 NAT/P/000649 - © Luis Ferreira

Human, social and economic development is impossible without Earth's biosphere, the worldwide sum of all ecosystems – but the biosphere is paying a steep price for being a generous host. Finally recognising the urgent need to scale back the amount of harm done to our planet and its biodiversity through growth, pollution, habitat destruction and wasteful levels of consumption, all United Nations member states adopted 17 Sustainable Development Goals (SDGs) in 2015, to be achieved by 2030. The SDGs are at the heart of the European Green Deal and the EU Biodiversity Strategy for 2030. The LIFE programme has made a strong impact on efforts to meet the EU's biodiversity-related goals, and this section highlights several of the over 300 LIFE projects connected to the theme of sustainable development.

Focus areas of UN Sustainable Development Goals[23]



[23] Stockholm Resilience Centre

Graphics by Jerker Lokrantz/Azote

LIFE restoration of ecosystems and their services

LIFE projects targeting ecosystem services, green infrastructure and nature-based solutions deliver added value to other conservation investments focused on greater opportunity for human well-being. Ecosystem services, often facilitated by nature-based solutions, are a prominent feature of the Biodiversity Strategy for 2030. While not yet a large component of the LIFE programme profile, LIFE projects in this domain generally take one of the four following approaches:

- Assessment and mapping of ecosystem services
- Restoration of habitats and selected ecosystem services
- Development of green infrastructure and nature-based solutions
- Awareness raising through models, training and publications.

The LIFE projects highlighted below provide a broad overview of each of these four approaches.

Photo: Mudflat restoration - LIFE14 NAT/FR/000669

Assessment and mapping of ecosystem services

In Belgium, **LIFE Ardenne liégoise** (LIFE10 NAT/BE/000706) assessed nine ecosystem services for six habitat types: forest clear-cuts, forest plantations, natural forests, heathlands, peatlands, and grasslands. Based on mapping and assigning indicator values to land types, the project team calculated the following production and value increases of ecosystem services from restored target habitats: heritage value (71%), pollination (69%) and carbon sequestration (57%).

Restoration of habitats and selected ecosystem services

Two French projects, **LIFE Baie de l'Aiguillon** (LIFE14 NAT/FR/000669) and **LIFE Ad'Apto** (LIFE16 CCA/FR/000131) reduced impacts from mass tourism, promoted a wider understanding of shoreline dynamics and restored more than 110 hectares of Atlantic coastal ecosystems (mudflats, salt meadows, grey dunes and eutrophic lakes). The restored habitats now promote conditions for a well-balanced ecosystem and offer greater natural protection against the effects of sea level rise.

Developing green infrastructure and nature-based solutions

LIFE IGIC (LIFE16 NAT/GR/000575), an ongoing project in Greece, is developing and maintaining a demonstration network of green infrastructure components in 30 pilot fields to counteract habitat fragmentation on Crete's western Messara Plain, a fertile area that lies atop the island's largest aquifer. To reverse the degrading effects of overgrazing and intensive use of agrochemicals and irrigation, the project is developing low-intensity solutions on 30 pilot fields to minimise water loss and soil depletion. Successful delivery will enhance ecosystem services such as pest control, pollination and nutrient provision, while boosting local agro-biodiversity and improving connectivity between surrounding Natura 2000 sites.

Photo: Olive groves in the western Messara plain - LIFE16 NAT/GR/000575 - © EOPS Lab, HMU

Shades of infrastructure

Grey infrastructure, generally speaking, consists of engineering projects made of concrete and steel, such as dams, pipes, channels, dykes and sewerage treatment works.

Green infrastructure is any planned network of natural and semi-natural areas that are designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings.

Blue infrastructure refers to features in the landscape relating to water and is commonly associated with green infrastructure in the urban setting. Blue-green infrastructure is when the two are used in combination.

Photo: Cows grazing in the Flemish polders of the eastern Belgian coast - LIFE12 NAT/BE/000252 - © Wim Dirckx

Raising awareness through models, training and publications

LIFE Green-Go!Carpathians (LIFE16 GIE/PL/000648) is raising awareness of the need to maintain and restore ecological connectivity on Natura 2000 network sites in the Polish Carpathians, while sharing knowledge with local stakeholders about the importance of ecosystem services for sustainable local development. There has been a particularly strong project focus on stakeholder involvement in developing an action plan for the introduction and enhancement of green infrastructure in the project area.

LIFE supports sustainable practices

Intensive resource-harvesting practices are in large part to blame for Europe's continuing biodiversity decline. Agriculture, forestry and fishing are vital human industries, but also cause a great deal of harm to species, habitats and ecosystems when left to operate in ways that are unsustainable. The following examples demonstrate how LIFE projects are helping to encourage sustainable practices across sectors while increasing ecosystem benefits.

Support for sustainable agriculture

Polders are parcels of land in low-lying coastal areas that have been reclaimed from water through the building of dykes or drainage canals. In the Flemish polders in Belgium a series of three LIFE projects – **Flemmish polders** (LIFE99 NAT/B/006295), **UITKERKSEPOLDER** (LIFE03 NAT/B/000023) and **LIFE Oostkustpolders** (LIFE12 NAT/BE/000252) – focused on both restoring saline coastal grasslands and promoting sustainable farming. The projects managed to raise water levels and engaged 45 farmers who switched to adaptive land-use practices. These successful efforts resulted in a massive expansion of the nature reserve area and offered a better economic future for local farmers, while also increasing the combined project area's water storage and carbon sequestration capacity.

Support for sustainable forestry

LIFEMontserrat (LIFE13 BIO/ES/000094) implemented a local land management model at Spain's Montserrat mountain range, an area prone to recurring forest fires. Project work in pine woodlands reduced tree density to bring livestock grazing into the forest. This brought increased commercial forest value, enabled the establishment of new livestock farms and enhanced overall biodiversity through habitat diversification. The recovery of two open habitat types – Pseudo-steppe with grasses and annuals (*Thero-Brachypodietea*), and Mediterranean tall humid grasslands – has also greatly reduced the risk of large forest fires.

Photo: Reduced tree density under the LIFEMontserrat project LIFE13 BIO/ES/000094© Arxiu Fotogràfic de la Fundació Catalunya-La Pedrera

Support for sustainable fisheries

The Italian project **TARTALIFE** (LIFE12 NAT/IT/000937) helped to create the 'Turtle Safe' quality certification for fishing vessels that adhere to principles developed in collaboration with the NGO 'Friend of the Sea'. This is the first commercial

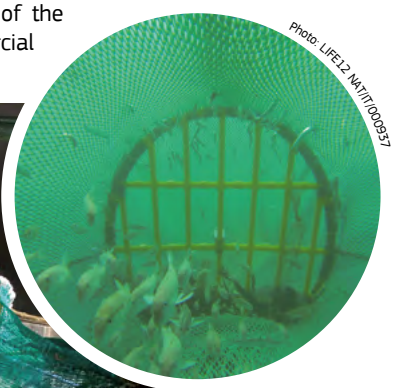


Photo: LIFE12 NAT/IT/000937

Photo: Keeping sea turtles safe LIFE12 NAT/IT/000937

branding in the entire Mediterranean region that acknowledges low-impact fishing activities for sea turtles – in particular, the Loggerhead (*Caretta caretta*). The project's **communication campaign** included nearly 5 000 promotional events and reached nearly 1 million tourists. National, local and internet news services have produced nearly 600 articles on project activities.

Photo: LIFE13 NAT/UK/000209

LIFE combats invasive alien species

Invasive alien species (IAS) are today one of the main threats to biodiversity and related ecosystem services, especially in geographically and evolutionarily isolated ecosystems, such as small islands. Between 10% and 15% of the roughly 12 000 alien species in Europe are invasive, and the damage they can do comes through habitat alteration, predation, competition, disease transmission and genetic pollution and replacement of native species through hybridisation. They also pose threats to human health and harm the economy.

LIFE has a long history of involvement in this area, but the EU Regulation on the prevention and management of the introduction and spread of invasive alien species[24] gives a boost to LIFE efforts to eradicate, control or manage IAS. In addition to carrying out field measures, LIFE has been effective in developing guidance, raising awareness and producing tools to help stakeholders reduce IAS pressure on native species and natural habitats.

Terrestrial threats from IAS

LIFE Shiants (LIFE13 NAT/UK/000209) successfully eradicated the Black rat (*Rattus rattus*) on seabird islands in the UK. The project took a comprehensive and holistic approach in managing invasive rat populations in the Shiants Isles Special Protection Area (SPA). Well-established best practices included the use of poisoned-bait stations (with minimal impacts on other species) and other customised methods for remote and large islands with difficult terrain. The project also developed biosecurity protocols to ensure the prevention of rat re-introduction through early detection and 48-hour rapid response measures, including the establishment of 56 permanent monitoring stations, tracking tunnels and camera traps.

Riparian and aquatic threats

Invasive alien species are not just a land-based threat. **RAPID LIFE** (LIFE16 NAT/UK/000582) is delivering a package of measures to reduce the impact and spread of IAS in freshwater aquatic, riparian and coastal environments across England. The project has been very successful in demonstrating the effective use of biological controls to address IAS threats, such as the use of rusts (pathogenic fungi) to treat the invasive Himalayan balsam (*Impatiens glandulifera*). The project also investigated whether jumping plant lice could combat Japanese knotweed (*Fallopia japonica*), and the results were impressive. The project also demonstrated novel monitoring and control techniques for combatting the Signal crayfish (*Pacifastacus leniusculus*), such as the use of e-DNA and male sterilisation.

Photo: Puffins from the Shiants Isles - LIFE13 NAT/UK/000209

RAPID LIFE is a great example of good practice in stakeholder and volunteer involvement. The project produced IAS management toolkits for water asset managers and water users, along with protocols for the prevention, detection and control of IAS. The project also established an accreditation scheme for managers who demonstrated excellence in biosecurity. Also, in collaboration with stakeholders, **RAPID LIFE** produced Regional IAS Management Plans (RIMPs) for each of the five regions in England. The RIMPS included regional IAS blacklists and rapid response protocols to aid in the early detection and control of IAS introduction and re-introduction. In tandem, the project developed a web platform with IAS lists and mappers to record IAS sightings.

Photo: The Signal crayfish - LIFE16 NAT/UK/000582 - © Bristol Zoological Society

[24] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1417443504720&uri=CELEX:32014R1143

LIFE community

Photo: Volunteers annual meeting - LIFE12 NAT/ES/000180 - © Jose Lobera

The LIFE programme is the sum of its parts: donors, programme administrators, project team members, researchers and scientists, monitoring teams, policy makers, government authorities, NGOs, park rangers and nature reserve personnel, fish and game wardens, conservationists, activists, freelance specialists, volunteers, and the list goes on. It takes a vast and committed community of groups and individuals to develop LIFE projects, to get them up and running on the ground, to share new information and promote positive outcomes, and to ensure long-term impact through follow-up actions when projects end.

This chapter covers the different ways that the LIFE programme extends this unique community – a community committed to protecting Europe's most threatened habitats and species. The main approaches are through networking, stakeholder engagement, public awareness and fundraising.

LIFE networking and sharing of experience

LIFE projects cover hundreds of sites across Europe with similar habitat types or species groups, so networking and the sharing of experiences between various project actors are essential. Networking boosts resource efficiency and increases the impact of project investment. It also takes on various forms: between partners within projects, from one project to the next in the same region (meta-projects), between projects across biogeographical regions, or between other stakeholders.

While networking is a standard requirement for all LIFE projects, some projects are designed with networking as a key outcome, a good example of which is **CAP DOM** (LIFE09 NAT/FR/000582). This project focused on the threatened bird species and their habitats in French departments and overseas territories on three continents: Réunion, Martinique, and French Guiana. The project developed strong ties and collaboration with local actors and volunteers to establish a conservation network, while setting up a counterpart to the Natura 2000 network that can build on expertise available from Europe. This joint toolbox for conservation has spurred growing populations of several threatened bird species in areas far distant from the EU.

The Spanish project **LIFE RESECOM** (LIFE12 NAT/ES/000180) demonstrated the effectiveness of coordinating a diverse set of monitoring specialists (rangers, scientists, technicians, freelance specialists and volunteers) to form a robust monitoring network able to continue on its own after the project ended in 2018. The project invested in training these network members to monitor the distribution and population of 26 endangered plant species over a range of 13 habitats in the Aragón region. Increased knowledge of one of the target species, *Centaurea pinnata*, resulted in an improved conservation status from poor to good.

LIFE meta-projects, on the other hand, involve a type of networking that is complementary and delivers greater combined impact. One such example is a series of dune habitat restoration projects in Denmark and Belgium that involved international meetings to share experiences and scientific knowledge. Three projects in Denmark – **LIFE LAESOE** (LIFE11 NAT/DK/000893), **LIFE WETHAB** (LIFE12 NAT/DK/000803) and **REWETDUNE-LIFE** (LIFE13 NAT/DK/001357) – developed new approaches to dune management by working closely with private landowners to control scrub and tree growth, introduce grazing and remove invasive alien species. Meanwhile, the Belgian dune-restoration project **Life FLANDRE** (LIFE12 NAT/BE/000631) offered fresh networking opportunities by holding an international workshop, 'Management of coastal dunes and sandy beaches'.

Photo: Successful rewetting of degraded bog at Råbjerg Mose in Denmark - LIFE12 NAT/DK/000803

Photo: Morning at Raabjerg Hede - LIFE13 NAT/DK/001357 - © Karsten Frisk

Finally, a much wider networking opportunity is offered through the Natura 2000 Biogeographical Process and the Natura 2000 Communication Platform[25]. The European Commission launched the process 10 years ago to help Member States achieve good conservation status for habitats and species protected under the EU Nature Directives. The process involves multiple stakeholders cooperating at biogeographical level through seminars, workshops, networking events and joint activities.

The LIFE programme supports this process by:

- Building knowledge on habitat and species conservation needs at biogeographical level
- Forging partnerships between stakeholders for Natura 2000 management
- Sharing best practices on habitat management and restoration at biogeographical level
- Providing funding and identifying complementary funding opportunities
- Raising awareness of the Natura 2000 network
- Establishing networks for exchanging experiences, case studies and best practices across the EU on habitat and species conservation.

Photo: Field data collecting - LIFE12 NAT/ES/000180

[25] https://ec.europa.eu/environment/nature/natura2000/platform/index_en.htm

LIFE and stakeholder engagement

Stakeholder engagement is the real key to ensuring that LIFE projects continue to have an impact long after they end, and is in itself a key impact of the LIFE programme. The best and most sustainable way to manage Natura 2000 sites is to work closely with landowners, land managers and stakeholder groups in or around individual Natura 2000 sites and to agree on the most appropriate ways to conserve species and habitats, while at the same time respecting any local socio-economic and cultural contexts that come into play.

Volunteering

One specific group of stakeholders, volunteers, have been an integral part of more than 160 LIFE projects. Volunteer mobilisation helps to protect nature in numerous ways: enabling activities that would otherwise not be possible and involving society in conservation activities that lead to greater public awareness, trust, and ownership of the process. The experience of volunteering can help people learn new skills, become socially integrated and contribute to a better future. An understanding of what motivates volunteer participation is an important element in the design and provision of programmes looking to harness the talents and contributions that volunteers can bring to conservation efforts.

Photo: Volunteers at work - LIFE12 NAT/ES/000180

Two projects in southern France – **CHIROFRSUD** (LIFE04 NAT/FR/000080) and **COREXERUN** (LIFE07 NAT/F/000188) – harnessed the full potential of volunteers in targeted efforts to rescue three cave-dwelling bat species with populations in spectacular freefall. The project established a network of volunteer bat specialists from across the region to raise awareness amongst local populations and cavers. This volunteer network worked with yet another group of 200 non-specialist volunteers to carry out numerous studies which are of ongoing value for further efforts to aid the imperilled bat species.

Citizen science monitoring

'Citizen science' is when members of the public contribute to scientific work, often in collaboration with professional scientists. This type of public participation has grown tremendously in recent years, aided in part by new technologies. LIFE projects benefit from the involvement of volunteers in, for example, monitoring the impact of restoration works, detecting invasive alien species or tracking species migration.

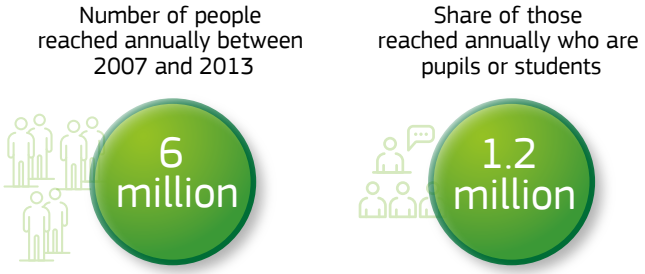
Within the **LIFE Euro Bird Portal** (EBP; LIFE15 PRE/ES/000002) project, partners of the European Bird Census Council developed a full-fledged web portal[27] (EBP) that shows the distribution of 105 bird species across Europe. Bird observation data are collected on a daily basis from 28 European countries and submitted automatically to a central repository. The main project outcome is the production of daily maps and graphs displaying near real-time information. The EPB view and central database now cover all EU countries (except Malta) plus Norway, Switzerland and Turkey. More than 120 000 birdwatchers across the EU have provided more than 320 million records of new data since the LIFE project started in 2016.

Life and public awareness raising

All LIFE projects entail awareness raising actions to target stakeholders, including the general public. This is a key reason why the LIFE programme has become a leading brand for nature conservation and restoration across Europe. LIFE-enabled grassroots movements at local level, for example, are starting to generate impacts at national level and even EU-wide. LIFE's many types of public awareness raising activities include:

- Creating sightseeing infrastructure (visitor trails, observation platforms etc.)
- Producing and distributing information (notice boards, leaflets, bird nest webcams etc.)
- Promotional campaigns (mobile exhibitions, films and videos, social media, photo contests etc.)
- Educational activities for schoolchildren and other target groups
- Awareness raising events (large public conferences, small-scale meetings, guided field tours etc.).

LIFE reaches out



One of the main objectives of the seven-year **LIFE Mires Estonia** (LIFE14 NAT/EE/000126) project is to promote a greater knowledge and appreciation of internationally valuable wetlands, current conservation issues, important EU habitats and the Natura 2000 network. This is an ongoing region-wide effort that targets the inhabitants of local communities. Project partners emphasise the links between natural and cultural heritage through a wide

[27] https://eurobirdportal.org/ebp/en/#home/HIRRUS/r52weeks/CUCCAN/r52weeks/

How EU Natura 2000 Day started

Care is the consequence of awareness. With this maxim in mind, the **LIFE Activa Red Natura 2000** (LIFE11 INF/ES/000665) set out to improve overall awareness and understanding in Spain of the Natura 2000 network. At the start of the project in 2011, just 10% of Spanish people had heard of Natura 2000.

Within the project, the NGO SEO/BirdLife joined forces with Spanish international news agency Agencia EFE to carry out a range of communication activities. These include a series of beautifully filmed and narrated half-hour documentaries showcasing Natura 2000 sites and their local communities across different regions of the country. The documentaries attracted a television audience of some five million viewers and a further 800 000 listeners via radio.

The project developed a set of toolkits for people that live and work in Natura 2000 areas, as well as for those working in local administrations and other relevant authorities. Meanwhile, a handbook was created for journalists that offered details and practical tips on how best to raise awareness of the importance of nature among the wider public. An extensive information campaign on Natura 2000 took place in 50 hypermarkets across 14 Spanish regions. One of the main achievements of the project was the declaration of 21 May as **EU Natura 2000 Day** by the European Commission, European Parliament, the Council Presidency and the Committee of the Regions. This declaration was signed at a special European Commission event that marked the 25th anniversary of the EU Habitats Directive and the LIFE Programme and is now celebrated annually.

By the time the project ended in 2017, the number of people familiar with the Natura 2000 network in Spain had increased from 10% to 22%. The degree of interest in Natura 2000 had also increased: in 2003, 76% of the people who knew the network had visited at least one of the sites, and by 2017 this had risen to 90%.

Photo: LIFE14 NAT/EE/000126 - © Maria Maasikamäe

range of awareness raising tools, such as information boards, a wheelchair-compatible nature trail, hiking trips in the wild – even a fairy tale book for children. Volunteers have also been brought in to promote a conservation-friendly message, and the project enjoys very good press coverage.

Sometimes public awareness raising is needed to turn around negative attitudes about a particular species to improve the conservation odds. The Eurasian hamster (*Cricetus cricetus*), which forages in fields, has a long-held reputation, primarily amongst farmers, as a pest. In France, the **LIFE ALISTER** (LIFE12 BIO/FR/000979) project aimed at reversing this hard-to-shake reputation. Prior to its communication and awareness raising actions, the project team conducted a study on local perceptions of the Eurasian hamster to develop an appropriate strategy. In the end, the team settled on an approach which included 118 playful activity-oriented events for children and the general public, and their efforts reached more than 13 000 people between 2015 and 2017. The project produced three games (including a video game) and created a popular mascot which became an effective means of projecting a positive image of the hamster.

LIFE and fundraising

Nothing comes from nothing, and many conservation activities would either never take place without LIFE programme funding or be implemented too late to prevent significant biodiversity loss. LIFE funding acts as a catalyst that triggers substantial additional funding from other sources to be mobilised for implementing the Nature Directives and other EU nature policy priorities. A successful LIFE project that sets the scene can make it easier to attract bigger-scale funding from sources such as Interreg, Horizon 2020 or the private sector. Complementary funding may apply either to a LIFE project in progress or a project that has finished.

With the advent of LIFE Integrated Projects (IPs), mobilising complementary funds is now a key strategy for multiplying resources available for conservation work. For example, the 19 nature IPs in the 2014-2018 period had a budget of €340 million and mobilised over €1.4 billion in complementary funding from other EU and national funds and the private sector. The introduction of Strategic Nature Projects (SNaPS) within the new LIFE programme phase (2021-2027) will likely see another fundraising boost.

Photo : Getting to know the Eurasian hamster - LIFE12 BIO/FR/000979

Photo: Coloriage - LIFE12 BIO/FR/000979

Photo: Hen harrier - LIFE13 NAT/UK/000258

Photo: Hen harrier - LIFE13 NAT/UK/000258 - © Guy Anderson

Several successful projects managed to secure contributions from agri-environmental schemes funded by the European Agricultural Fund for Rural Development (EAFRD). In some cases, a clear link can be made between a LIFE project, an agri-environmental scheme or measure and positive conservation results.

There are numerous examples of LIFE projects using Interreg projects (funded under the European Regional Development Funds mechanism) to follow-up on or complement LIFE actions. One such example is LIFE IP **FRESHABIT** (LIFE14 IPE/FI/000023), which has generated several Interreg projects to treat riparian forests and thereby improve the ecological status and biodiversity of water body habitats within Finland's Natura 2000 network.

There are also numerous examples where successive LIFE projects on the same species or habitat – whether in the same area or across multiple regions – have led to conservation successes. These projects target substantial funding over a long period.

The private sector is another important funding source for several LIFE projects. One notable example is **LIFE hen harriers** (LIFE13 NAT/UK/000258), which ran in the United Kingdom from 2014 to 2019. The Royal Society for the Protection of Birds (RSPB) regularly launches fundraising campaigns linked to LIFE projects to offset costs and create a fund for project continuity. **LIFE hen harriers** fitted satellite transmitters to 117 birds through public and private donations (the original project target was 24 tags). For every euro that RSPB spent, the project attracted €8 in direct funding and in-kind support.

Number of LIFE projects targeting the same species or habitat to achieve greater impact

Species or habitat type	Country	No of LIFE projects
Yellow-spotted whiteface *(Leucorrhinia pectoralis)*	Belgium	7
Eurasian otter (*Lutra lutra*)	Sweden	4
Spanish imperial eagle *(Aquila adalberti)*	Portugal, Spain	5
Iberian lynx (*Lynx pardinus*)	Spain	28
Arctic fox (*Alopex lagopus*)	Sweden	2
Azores bullfinch (*Pyrrhula murina*)	Spain	2
Lesser kestrel *(Falco naumanni)*	France	2
Great bustard *(Otis tarda)*	Austria, Hungary, Slovakia	4
Yelkouan shearwater (*Puffinus yelkouan*)	Malta	3
Bittern (*Botaurus stellaris*)	Belgium	6
Brown bear (*Ursus arctos)*	Spain	5
Pied avocet (*Recurvirostra avosetta*)	UK	4
European pond turtle (*Emys orbicularis*)	Spain	3
European nightjar (*Caprimulgus europaeus*)	Belgium	19
Hungarian meadow viper *(Vipera ursinii rakosiensis)*	Hungary	3
European bison (*Bison bonasus*)	Poland	2
Alpine rivers	Italy	4
Shifting sand dunes	The Netherlands	2
Boreal coastal meadows	Baltics	5
Coastal lagoons	France, Italy	6
Semi-dry forest	La Réunion island	3
Fennoscandian wooded meadows	Sweden	4
Blanket bogs and raised bogs	UK	3

Photo: An IP protecting freshwater habitats in Finland - LIFE14 IPE/FI/000023 - © Isojoki Pauliina Louhi/Metsähallitus

Photo: LIFE09 NAT/ES/000513 - © NEEMO EEIG/Audrey Thénard

Afterword

The broad aim of the LIFE programme for 2021-2027 is to make a significant contribution towards reaching European environmental goals. Specifically, this means speeding the shift towards a clean, circular, energy-efficient, low-carbon and climate-resilient economy; and halting and reversing biodiversity loss, thereby contributing to sustainable development.

As previously mentioned, the European Commission proposes a budget increase of 60% for the new LIFE programme and four sub-programmes of activity:

- Nature and Biodiversity
- Circular Economy and Quality of Life
- Climate Change Mitigation and Adaptation
- Clean Energy Transition.

With a proposed 40% of total programme funding, nature and biodiversity conservation remains an important sphere of action for LIFE. Work over the coming years in this area will contribute to EU commitments under the Convention on Biological Diversity. Already referred to in this publication, Strategic Nature Projects (SNaPs) are a new feature within the LIFE programme. These actions are designed to help EU Member States to mainstream their nature and biodiversity policy objectives into other EU policies, such as the common agricultural policy (CAP) and Rural Development Programme (RDP).

The EU Biodiversity Strategy for 2030 articulates a clear ambition to protect and restore Europe's nature assets, but estimates indicate that at least €20 billion in annual spending on nature priorities, including Natura 2000 and green infrastructure, is required to meet strategy targets. This will require in turn the mobilisation of private and public funding at both the national and the EU level – including a range of different programmes, such as LIFE – in the next long-term EU budget.

Even in the midst of a pandemic, 2020 is an important year for sowing the seeds of scaling up LIFE programme efforts to protect Europe's biodiversity. The LIFE programme demonstrates time and time again the power of collective action and effective government intervention to take positive steps forward in securing healthy biodiversity in Europe for future generations.

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LIFE "L'Instrument Financier pour l'Environnement" / The financial instrument for the environment

The LIFE programme is the EU's funding instrument for the environment and climate action

Period covered 2014-2020

EU funding available approximately €3.46 billion

Allocation of funds

Of the €3.46 billion allocated to LIFE, €2.59 billion are for the Environment sub-programme, and €0.86 billion are for the Climate Action sub-programme. At least €2.8 billion (81% of the total budget) are earmarked for LIFE projects financed through action grants or innovative financial instruments. About €0.7 billion will go to integrated projects. At least 55% of the budgetary resources allocated to projects supported through action grants under the sub-programme for Environment will be used for projects supporting the conservation of nature and biodiversity. The total budget earmarked for the co-financing of NGO operating grants is €12 million each year.

Types of projects

Action Grants under the Environment and Climate Action sub-programmes are available for the following:

> "Traditional" projects – these may be best-practice, demonstration, pilot or information, awareness and dissemination projects in any of the following priority areas: LIFE Nature & Biodiversity; LIFE Environment & Resource Efficiency; LIFE Environmental Governance & Information; LIFE Climate Change Mitigation; LIFE Climate Change Adaptation; LIFE Climate Governance and Information.

> Preparatory projects – these address specific needs for the development and implementation of Union environmental or climate policy and legislation.

> Integrated projects – these implement on a large territorial scale environmental or climate plans or strategies required by specific Union environmental or climate legislation.

> Technical assistance projects – these provide financial support to help applicants prepare integrated projects.

> Capacity building projects – these provide financial support to activities required to build the capacity of Member States, including LIFE national or regional contact points, with a view to enabling Member States to participate more effectively in the LIFE programme.

Further information

More information on LIFE is available at http://ec.europa.eu/life.

How to apply for LIFE funding

The European Commission organises annual calls for proposals.
Full details are available at https://ec.europa.eu/easme/en/life

Contact

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European Commission – Directorate-General for Climate Action – B-1049 Brussels (clima-life@ec.europa.eu).
European Commission – EASME – B-1049 Brussels (easme-life@ec.europa.eu).

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