Annex*

LIFE programme: Short summaries of projects resulting from the LIFE 2018 call for proposals

**The list of projects is being updated as new grant agreements are signed; the list will be finalised by the end of December 2019.*

Projects are listed by country of the project leader (coordinator). In addition, organisations from your country might be involved in transnational projects that are coordinated in a different country.

Austria

Nature (NAT)

Removing barriers to fish migration on the Danube (LIFE Network Danube+)

The Danube river and its floodplain habitats have little of their original ecological characteristics remaining, due to power plants, dams and river regulation infrastructure. A key missing habitat type is permanently-connected river side arms. These provide spawning grounds and nurseries for fish species that prefer swiftly-flowing water and shelter from ship-induced waves. The Austrian power company Verbund will create around 35 hectares of this habitat, allowing fish to migrate without barriers to one of the last free-flowing sections in the Upper Danube, as well as to several tributaries and other floodplain areas.

Project summary

Restoring habitats along the Danube in Austria and Slovakia (Dynamic LIFE Lines Danube)

Alluvial forests and pioneer vegetation of mountain rivers like the upper Danube are among the most endangered habitats in Europe. They have decreased dramatically in recent decades due to river regulation, hydropower plants, flood protection measures and forestry. Fish species that prefer fast-moving water are seriously affected. This LIFE project focuses on threatened habitats and species along more than 100 km of the Danube in Austria and Slovakia. The project partners will restore floodplain forests and muddy river banks in both countries, benefiting fish and other species.

Project summary

Belgium

Nature (NAT)

Innovative approach to controlling invasive American bullfrog (LIFE3nBullfrog)

Invasive American bullfrog (*Rana catesbeiana*) occurs over an area of 152 000 hectares in the valley of the Grote Nete in Flanders, to the detriment of native species. The LIFE3nBullfrog project team will demonstrate an innovative methodology for reducing the bullfrog's population size and halting its further dispersion. This will involve rearing and releasing sterile larval individuals into the population, combined with traditional control methods. PXL University College will also provide training in American bullfrog management and raise public awareness to gain support for the American bullfrog control programme. Population control through infertility is considered more humane than trapping and killing.

Project summary

Returning agricultural land to nature (LIFE Nardus & Limosa)

The 'Species-rich Nardus grasslands' priority habitat type of the EU Habitats Directive is restricted to nutrient-poor sandy soils with some loam in the Netherlands and Belgium. Here, it provides favourable conditions for rare species, including black-tailed godwit (*Limosa limosa*). The project team led by Natuurpunt will implement cross-border restoration of meadow-heathland ecosystems rich in Nardus grasslands and other grassland and heath habitats that host meadow birds. The project team will focus on testing and implementing a 'phosphorus-mining' (P-mining) method that takes breeding birds into account. This involves adding nitrogen to former agricultural fields to increase biomass production, which extracts phosphorus when the biomass is mown and removed, thereby speeding up nutrient reduction.

Project summary

Environment (ENV)

Plant growth-promoting bacteria and new wetlands to clean waterways of heavy metals (LIFE NARMENA)

Building reservoirs and other water retention areas is one way to reduce flooding risks, which will be increased due to climate change. But widespread pollution from heavy metals, which threatens natural habitats, wildlife and human health, needs to be addressed. Under LIFE NARMENA, the Public Waste Agency of Flanders will demonstrate a nature-based approach to remove chromium, arsenic cadmium and radium from polluted waterways. The project team will use a bacteria-assisted phytoremediation technique on waterways and construct wetlands over another 33 hectares – an area the size of 33 rugby pitches. It aims for at least 165 000 m^3 of new

water storage capacity, equivalent to about 65 Olympic swimming pools, and almost complete reduction in heavy metals.

Project summary

Complete solution for recycling thermoplastics from automotive and electronics sectors (LIFE PlasPLUS)

More than 26 million tonnes of thermoplastics were used by industries, including the car and electrical equipment sectors, in 2016. These are made from virgin plastic and are currently not properly separated by recycling facilities, partly because they contain additives like fillers or flame retardants. Reclaimed thermoplastics do not meet quality levels required by the automotive and electronics industries. A team from the metal recycling company Comet Traitements SA will demonstrate a recycling unit which uses air bubbles combined with triboelectricity – static electricity or other electric charge generated by friction – to process plastic waste. It will recycle 45% of plastic concentrate, separate flame-retardant containing plastic, and produce high quality thermoplastic. The separation process will also use a scalable artificial intelligence database for rapid sorting.

Project summary

Climate Change Mitigation (CCM)

Replacing F-gas with natural refrigerant (NATURAL HVACR 4 LIFE)

Fluorinated gases, so-called F-gases, are highly potent greenhouse gases used in refrigeration. It is a top industry priority to replace F-gases with climate-friendly refrigerants, under the EU F-gas Regulation. The NATURAL HVACR 4 LIFE project partners will demonstrate the viability of a combined air conditioning and refrigeration system that uses carbon dioxide (CO_2) as a natural refrigerant. Daikin Europe N.V., a leading heating, ventilation and air conditioning manufacturer, is leading this project and looking to remove market barriers to introducing CO_2-refrigerated air conditioning and refrigeration systems. Project results will help policymakers define standards and energy labelling schemes by providing risk management procedures dealing with flammability and toxicity of natural refrigerants.

Project summary

Climate Governance & Information (GIC)

Guiding governments to deliver national energy and climate plans (LIFE UNIFY)

To meet the 2015 Paris Agreement targets, the EU needs appropriate coordination and monitoring tools in its Member States, as well as the full support of civil society. Current emissions reduction targets for 2030 do not match the Paris Agreement targets. LIFE UNIFY, run

by Climate Action Network Europe, will give national governments guidance and recommendations to help them put in place their national energy and climate plans and encourage more ambitious 2030 targets through the Covenant of Mayors network. It will also report on where EU funds like the cohesion funds should be better aligned with EU-wide and national energy and climate plans. The project will target authorities in Belgium, Czechia, Denmark, Germany, Estonia, Spain, France, Croatia, Poland, Portugal and Slovenia.

Project summary

Croatia

Nature (NAT)

Restoring grasslands for wildlife and the local economy (Dinara back to LIFE)

Association BIOM and other members of the project team will protect and restore abandoned dry grassland habitats and their characteristic species in Natura 2000 sites in the Dinara Mountains of Croatia. This will be achieved by developing easily-transferable technical guidelines for dry grassland restoration and sustainable management, reducing negative attitudes to controlled burning as a grassland management method, and developing skills within stakeholder groups and the wider community to support conservation actions. The project team aim to promote synergies between EU policy areas and to connect nature conservation with socio-economic development, thereby laying the groundwork for long-term and sustainable grassland management.

Project summary

Cyprus

Nature (NAT)

Saving the griffon vulture in Cyprus from extinction (LIFEWithVulturesCY)

The griffon vulture (*Gyps fulvus*) is on the brink of extinction in Cyprus, with only 20 individuals left. The species requires urgent conservation work to ensure its survival. The illegal use of poisoned baits (targeting foxes and stray dogs) is the most critical threat. Others include shortage of food and collisions with electricity power lines. The LIFE project team's goal is first to prevent the griffon vulture's extinction in Cyprus, and then to improve its conservation status. To that

end, BirdlLife Cyprus will tackle critical threats to the species and boost the local population by introducing birds from Spain.

Project summary

Czechia

Nature (NAT)

Sustainable grassland and forest-steppe management (LIFE SouthMoravia)

Grassland and forest-steppe habitats in the South Moravian region of Czechia suffer from overgrowth, often by invasive alien plant species, due to land abandonment or inappropriate management. The LIFE project team will improve the conservation status of five priority habitats of the EU Habitats Directive. They will build on previous LIFE project work, but on a much larger scale and with improved approaches involving grazing and eco-tourism to make the outcomes more sustainable. A fundamental objective is to develop a comprehensive system of habitat management by reintroducing traditional farming practices, particularly grazing, at the lowest possible cost.

Project summary

Denmark

Nature (NAT)

New protection measures for threatened coastal species in Denmark (LIFE Clima-Bombina)

In Denmark, numerous coastal species and natural habitats are under threat from climate change and rising sea levels. Threats to amphibians and reptiles, in particular the European fire-bellied toad (*Bombina bombina*), include loss of genetic diversity due to small isolated populations, fragmented habitats, poor water management and insufficient grazing. LIFE Clima-Bombina aims to protect populations of European fire-bellied toad, while also supporting the conservation of other species and habitats. The project team, led by the Vordinborg local authority, will construct 30 pools above sea level, secure new breeding areas, and introduce individuals to restock populations.

Project summary

Environment (ENV)

Improving the sustainability of reusable food packaging (LIFE NAUTILUS)

In EU food supply chains, cardboard and wood packaging is being replaced by reusable plastic crates, such as those made by Euro Pool System Denmark, the company leading this project. However, washing and drying the crates still puts a burden on the environment, in terms of energy and resource use and CO2 emissions. The LIFE NAUTILUS project team will develop an innovative technology, comprising a next-generation washer combined with a novel centrifuge for drying, to minimise the energy used during the cleaning of plastic crates. This will make the reusable packaging more sustainable and resource-efficient. The method will be transferable to other industries and sectors.

Project summary

Environmental governance & information (GIE)

Enabling effective implementation and enforcement of the EU Timber Regulation in 6 key timber importing countries (LIFE - Support EUTR II)

Loss of habitats and biodiversity from the world's tropical forest regions threatens the survival of endangered primates and can undermine efforts to tackle climate change. Illegal logging in forest producer countries also results in the release of millions of tonnes of CO_2. The European Union Timber Regulation (EUTR) bars illegally logged timber from the EU market, but the law's implementation could be improved. The project team of LIFE - Support EUTR II, run by the private non-commercial organisation NEPCon, will work to increase awareness of the EUTR and to help relevant companies in six EU countries put in place due diligence systems to stop illegal timber imports.

Project summary

Finland

Nature (NAT)

Supporting wolf populations and livestock in Finland (LIFE BOREALWOLF)

Over the last 10 years, the breeding range of the grey wolf has expanded across Europe. It is now present in south and west Finland for the first time in 100 years. However, conflicts between man and wolf, particularly concerning livestock, and lack of public acceptance pose a major threat to wolf conservation. The LIFE BOREALWOLF team, led by Natural Resources Institute Finland, aim to maintain a minimum of 25 wolf packs in the country, while addressing societal tension and

reducing illegal killing. The project team's new tools for preventing livestock damage and controlling illegal wolf killing will be supported by educational materials and a volunteer network.

Project summary

France

Nature (NAT)

Combating invasive species on military land (LIFE VALBONNE)

The Valbonne military camp in the Provence-Alpes-Côte d'Azur region of France includes three Natura 2000 network sites that host five grassland and wetland habitats, and many species that depend on these habitats, including the little bustard (*Tetrax tetrax*) and red-footed falcon (*Falco vespertinus*). The Ministry of Armed Forces will restore 700 hectares of habitats, including priority dry grassland and wetlands habitats. A key action will be the eradication of invasive alien plant species. The little bustard population will be supported through bird reintroductions and habitat enhancement measures. In addition, a new integrated management system will establish ecological priorities for military and hunting activities.

Project summary

Environment (ENV)

Recycling glass wool from demolished buildings into glass products (I-LOOP LIFE)

Construction and demolition waste (CDW) accounts for up to 25-30% of waste generated in the EU. It contains numerous materials, some not currently recycled. LIFE I-LOOP outcomes will significantly decrease the amount of CDW that is landfilled. The project team will implement a new recycling technology for glass wool, based on a technology patented by French project lead ISOVER Saint-Gobain. The team will demonstrate the technical feasibility of recycling glass wool waste into high-value cullet for glass-making, and the economic viability of a circular economy model involving actors along the CDW value chain. Partners will replicate the technology elsewhere in France, the Benelux and Sweden.

Project summary

Making the seas less noisy (LIFE-PIAQUO)

Levels of underwater noise have massively increased over the past 50 years, mainly due to marine shipping, with negative impacts on marine wildlife. LIFE-PIAQUO, headed by the French state-owned Naval Group, will develop measures to reduce this noise pollution. These include optimising propeller design to limit cavitation, which reduces bubble formation, and conducting

ship speed reduction trials in vulnerable areas based on real-time underwater noise readings. The project team will also support harbour authorities and Marine Protected Area managers to implement noise-reduction practices. One result will be the mapping of noise emission levels over a wide area, using a network of buoys fitted with sensors, to help authorities test incentives to reduce underwater noise.

Project summary

Clean alternatives to aircraft engine maintenance (LIFE MACLEAN)

Cleaning products used to maintain aircraft engines contain mixes of chemicals, including chlorinated hydrocarbons, alkalis, silicates, phosphates and hydrochloric or sulphuric acids. These are hazardous to human health and the environment, and new environmentally-friendly alternatives are needed. LIFE MACLEAN is the first commercial project which will develop a new cleaning process, focusing on helicopter engines, which uses laser and ice blasting. Team members from the project lead SAFRAN GROUP will seek to qualify the process for the ISO 14001 certification, reduce overall chemical mixtures by at least 85% and cut water and energy use by 80% and 30%, respectively. Its demonstrator line will manage 700 engines per year.

Project summary

Putting recovered food waste to good use (SOLI FOOD WASTE)

The project addresses food waste that is still fit for human consumption, which in the EU could account for up to 20% of the total food produced. This represents a massive economic loss and a huge environmental impact in terms of resource use and greenhouse gas emissions. Staff from the non-profit Handicap Travail Solidarité will build a unit to transform discarded or unsold bread, fruit and vegetables into other foodstuffs like soups or jams. Part of this work will be to demonstrate if the process brings good value for money. One innovation being tested is a low-energy bread drying process. The project will lead to the creation of sustainable employment for disabled people, through the launch of additional food transformation units, and these will donate a share of their products to local food banks.

Project summary

Environmental governance & information (GIE)

To promote and strengthen the army as a Natura 2000 site manager, in France and in Europe (LIFE NATURARMY)

Military sites are often home to a wider variety of rarer biodiversity than civilian areas. In France, 329 Natura 2000 sites include a military location but France's Ministry of the Armed Forces needs to improve its capabilities to manage these sites effectively. The NATURARMY project, led by the Ministry of the Armed Forces, will integrate biodiversity protection principles into the management of land dedicated to military use and will improve cooperation with conservation

groups. The project team will also increase the area of military Natura 2000 sites by about 25%, adding 11 000 new hectares – the size of 11 000 rugby pitches – to the existing 44 000 hectares.

Project summary

Climate Change Adaptation (CCA)

Countering higher artificial temperatures with new green spaces in cities (LIFE Greenheart)

The impacts of heatwaves are amplified by urban heat island effects – areas in cities which have higher temperatures because of infrastructure and human activity. For example, in Toulouse, France, temperatures are an average of 4 °C higher than the surrounding area. There, a city-centre exhibition hall is being relocated to the outskirts, freeing space in the heart of the city for regreening. Actions in the Greenheart project will be geared towards reducing average local temperature by 3 °C during heatwaves in this newly-vacated 30-hectare city centre site on the Ile du Ramier. Led by the Toulouse metropole, the project will generate new green space and vegetation, restore biodiversity and consolidate green and blue infrastructure. The project team will also limit air and noise pollution by discouraging cars and developing cycling and walking routes, and creating tools to support urban development policy.

Project summary

Guadeloupe's port authorities on board to restore precious Caribbean coastlines (LIFE Adapt'Island)

The port authorities in the French Caribbean region of Guadeloupe are looking to protect more than 5 500 hectares of coastline and strengthen the territory's adaptability and resilience to climate change, benefitting over 90 000 of its islands' inhabitants. LIFE Adapt'Island will restore parts of Guadeloupe's precious coral reefs, mangrove forests and seagrass meadows. These provide vital ecosystem services such as carbon storage and water retention, as well as essential defence against climate change, but are threatened by degradation, hurricanes, and human impacts like waste and ocean acidification. The restoration work sets out to show how the Caribbean islands can better protect their habitats and biodiversity from climate change, while pursuing sustainable socio-economic development.

Project summary

Climate Change Mitigation (CCM)

An innovative alternative for sulphur hexafluoride, used in energy transmission (LIFESF6FREE)

LIFESF6FREE will give EU regulators the necessary proof of concept to update rules on sulphur hexafluoride (SF6), the world's worst-rated gas in terms of global warming potential. Sulphur

hexafluoride is used in medium-voltage switch gears – part of energy transmission and distribution lines – but regulators have so far been unable to find a recognised alternative. The project team from Schneider Electric Industries will run prototypes under real-life conditions, which replace sulphur hexafluoride with dry air or a gas called HFO within an innovative breaking device.

Project summary

Demonstration of emissions-reducing software for heavy goods vehicles (LIFE ECOTRAVID)

The LIFE ECOTRAVID project team will demonstrate the efficiency of a new virtual drive simulator, or 'virtual measurement campaign' software, for heavy road vehicles. Road transport is responsible for almost 20% of the EU's greenhouse gas emissions, and by 2050 heavy freight transport vehicles are set to become the main source of CO_2 from surface transport. With hybrid or electrical vehicles not yet used for long-distance haulage, the project's specialised telematics software looks to reduce truck and trailer fuel consumption and related CO_2 emissions by 5-10%. Experts from project leader Collecte Localisation Satellites will run the software on 20 heavy vehicles. The resulting data will feed into a planning and decision-support toolkit for haulage companies, to determine which routes offer the best energy and cost savings for each of their vehicle types.

Project summary

Greenhouse gas reduction process with innovation in high voltage circuit breakers (LIFE GRID)

Sulphur hexafluoride (SF6) is an excellent insulator and switching medium for high-voltage electrical applications, but it is also an extremely powerful greenhouse gas. The LIFE GRID project, led by Grid Solutions SAS, aims to replace sulphur hexafluoride in high-voltage circuit breakers with an environmentally-friendly alternative called g3. The technical feasibility has been demonstrated in 145 kV gas-insulated substations (GIS), but the project will demonstrate it at 420 kV, the highest voltage level in Europe, where an alternative solution is still needed. Project partners will prepare for an integrated 420 kV SF6-free GIS solution on the European transmission network, with the support of transmission system operators.

Project summary

Germany

Nature (NAT)

Restoring habitats for endangered duck species (LIFE Marbled duck PSSO)

The German NGO Pro Biodiversity Foundation will lead work to protect the Sicilian breeding habitats of marbled duck (*Marmaronetta angustirostris*) and ferruginous duck (*Aythya nyroca*), both protected under the EU Birds Directive. These species are increasingly under threat due to

land drainage and various human activities. The LIFE Marbled duck PSSO project team will restore optimal breeding conditions for these two vulnerable duck species, and several other protected bird species, in one of the most important remaining wetlands in Sicily (Italy). Habitat restoration and management activities will be focused on creating optimal areas for bird breeding and overwintering.

Project summary

Environment (ENV)

Black soldier fly – a protein resource for animal feed (LIFE Waste2Protein)

Global demand for animal protein continues to rise and this can damage the environment. Impacts include deforestation for soy production, overfishing for aquaculture feed, higher antibiotics in aquaculture and more organic waste. LIFE Waste2Protein, run by researchers from the startup Madebymade, will expand a small-scale prototype which produces insect protein, fat and oil from black soldier fly larvae to achieve large-scale annual production. It will produce 730 tonnes of insect protein from biowaste – equivalent to the average annual meat consumption of 10 000 Europeans – as well as substrate for fertilisers and high-value fat. This will also cut costs of protein production by 80% compared to traditional methods and almost completely eliminate water consumption.

Project summary

Zero-emissions power supplies for construction and outdoor workers (LIFE CLEANAIRMM)

Non-road mobile machinery (NRMM), including mobile construction tools and vehicles not intended for carrying passengers or goods, cause significant pollution and greenhouse gas emissions, despite being far fewer in number than cars. A development team from battery specialists Instagrid GmbH will push for a zero-emissions battery supply system which can be used wherever a power supply is needed – on construction sites, underground or in remote areas. Users of these systems will benefit from a 100% reduction in local emissions. The project will also develop a green procurement model with the city of Stuttgart, and work more widely to strengthen emissions regulations on low-power NRMM.

Project summary

Testing new mass-technology for biodegradable, EU-sourced nappies and absorbent products (LIFE EcoCare)

Production of absorbent products like nappies and female care items is growing, and relies heavily on fossil fuels. These non-biodegradable items are also the third greatest volume of consumer waste in EU landfill. Procter & Gamble, leading the LIFE EcoCare project, will demonstrate new sustainable, environmentally-friendly alternatives using superabsorbent

polymers, novel cellulose material and EU locally-sourced fibres. The project team aims to reduce fossil-derived raw material use, cut end-of-life waste by up to 25%, as well as limit greenhouse gas emissions.

Project summary

Producing iron powders from industrial waste (LIFE GreenPowder)

Only a small amount of iron oxide is recovered from sludge after metal-working operations; most is landfilled. One recycling opportunity is to obtain fine spherical iron powders (FSIP), but current processes are expensive, low-yielding, have high energy demands, and generate toxics. LIFE GreenPowder aims to overcome the disadvantages associated with processes that recycle FSIP from industrial wastes. The project team will demonstrate the production of FSIP from by-products of steel production using a methodology that does not produce hazardous substances, cuts energy and carbon footprint by half, and decreases costs. The FSIP produced can be used for metal injection moulding applications. LIFE GreenPowder will be headed by OSTEC, a German company specialising in vacuum and plasma technologies.

Project summary

A new approach to river revitalisation on the Danube (LIFE CityRiver)

The river Danube has been significantly modified around the town of Donauwörth in Germany. Flood protection measures and barrages have led to deepening of the riverbed, sinking groundwater levels and missing floodplains, among other issues, resulting in poor habitats for fauna and flora. People rarely have access to the river, and drinking water supply and agriculture are affected. The LIFE CityRiver project, headed by a subsidiary of Bavarian energy supplier Lech Werke AG, will take a new approach, to better serve the needs of flood protection, flora, fauna and citizens. The project team will stabilise the riverbed by constructing a 'breach ramp', an environmentally-friendly solution stretching about 1 km in the river. This will help provide near-natural river structures with good passage for fish, spawning areas and valuable habitats.

Project summary

Climate Change Adaptation (CCA)

Climate change adaptation at the heart of urban planning (LIFE Roll-out ClimAdapt)

Europe needs to adapt to climate change at regional and national level. Regions and cities therefore require tools to help them become more climate resilient, while climate change adaptation must be put at the heart of urban planning. Researchers at the University of Dortmund, running the project LIFE Roll-out ClimAdapt, will design adaptation processes which

can be replicated between regions, improve data on climate change impacts in regional vulnerability assessments, and support capacity-building. By developing new training and networks, the project team will enable more regions to put better climate change adaptation measures in place.

Project summary

Climate Governance & Information (GIC)

Sustainable finance climate action (LIFE FinACTION)

Research has shown that companies that measure their greenhouse gas emissions achieve greater emission reductions over time. The team at CDP Europe running the project LIFE FinACTION aim to help European companies comply with existing reporting requirements and to support the EU action plan for financing sustainable growth, with a focus on climate actions. The project will produce best practices to help businesses provide transparent, consistent, comparable data and improved metrics on climate-related performance to capital markets. In particular, this will help them contribute to management solutions in areas where climate impacts will be most keenly felt: water management, land use change and biodiversity.

Project summary

Boosting awareness about fluorinated gases (Ref, Nat! for LIFE)

Emissions of fluorinated refrigerants from refrigerators, air conditioning and heat pumps jeopardise the EU's 2030 climate targets. Use of this equipment is increasing, yet fluorinated refrigerants often have very high global warming potential. Alternatives with low or no global warming potential have been available for many years, but face barriers such as low awareness among end-users and a lack of specific skills among installers. Many equipment manufacturers and several large food retailers have switched to alternatives, but owners of small shops in particular lack easy access to reliable and tailored information. The Ref, Nat! for LIFE project, led by the climate change consulting company HEAT GmbH, aims to build capacity in the equipment distribution chain and raise awareness among end-users about fluorinated gases.

Project summary

Greece

Nature (NAT)

Living in harmony with bears (LIFE ARCPROM)

Around 250 brown bears (*Ursus arctos*) are present in northern Greece. The LIFE ARCPROM team, led by the NGO CALLISTO, will protect brown bear in two sub-population areas, by minimising bear-human conflicts and by reducing human-caused bear mortality to a sustainable level. The project team aims to raise awareness and promote the added value of brown bear to agricultural and tourist products and services. They will train national park personnel in bear management, establish an emergency bear response unit, and promote the use of livestock guard dogs. In addition, project staff will help improve the storage of food waste, so that it is less accessible to "problem" bears.

Project summary

Early detection and eradication of invasive American mink (LIFE ATIAS)

American mink (*Neovison vison*) have become established in north-western Greece, and have been recorded in two wetland Natura 2000 sites designated for the conservation of threatened water birds. The LIFE ATIAS project team will eradicate or at least contain the feral population of American mink to prevent severe damage to biodiversity, by developing early detection and rapid eradication systems. The team, led by staff from the Aristotle University of Thessaloniki, will apply management measures at local and regional level for American mink and other invasive alien species, which can be upscaled nationally. In addition to protecting biodiversity, project actions will also reduce damage to farm animals and crops caused by American mink.

Project summary

Environment (ENV)

Eliminating saline wastewater and creating resources from waste in Polish coal mines (LIFE BRINE-MINING)

Coal mining generates huge amounts of saline wastewater which harms ecosystems and causes water shortages when drained directly into streams. The industry is having an alarming impact in Poland and on the country's 10 international river basin districts. The LIFE BRINE-MINING, which comprises partners from Greece and Poland, will install an innovative, economically viable system to eliminate pollutants and fully-recover resources in coal mining wastewater, at source. This will prevent brine effluent and chlorides being released, to produce quality water equivalent

to the annual water usage of 200 family households. The process will also recover marketable materials as part of a new revenue stream.

Project summary

Climate Change Mitigation (CCM)

A circular economy system to produce biofuels from multi-source biomass (LIFE CIRCforBIO)

There is a need to incorporate more renewable energy solutions in the transport sector to meet greenhouse gas (GHG) reduction targets. The CIRCforBIO project aims to achieve high GHG emission savings by substituting fossil fuels with advanced biofuels, and by promoting the implementation of a circular economy concept for biomass. Researchers from the National Technical University of Athens will demonstrate an innovative biorefinery concept for the production of bioethanol. This will use bioproducts from biomass produced from household, catering and industrial food waste, and agricultural residues – collectively known as second generation biomass. Another result of the project will be to create an interactive platform for achieving a circular economy concept for using second generation biomass in Greece.

Project summary

Hungary

Nature (NAT)

Boosting the population of Hungarian meadow viper (LIFE HUNVIPHAB)

Hungarian meadow viper (*Vipera ursinii rakosiensis*) is one of Europe's most endangered venomous snakes. It is threatened by the degradation of grassland habitats, increased predation, and problems arising from reduced genetic diversity due to small population sizes. The LIFE HUNVIPHAB project team will significantly improve the conservation status of the species. This will be achieved by restoring its former range, and releasing captive-bred vipers to increase the size and extent of its population. The project team will also introduce predator control in viper habitats and reduce habitat fragmentation by establishing ecological corridors. The project will be coordinated by MME BirdLife Hungary.

Project summary

Ireland

Environment (ENV)

Converted cheese-making waste into animal feed (Whey2LIFE)

Whey permeate is a by-product obtained during cheese production. If pumped without proper treatment into the environment it is a significant pollutant. Technologies exist for whey permeate treatment, but there has been little investment in developing the innovative biorefining processes to manage it. Whey2LIFE, headed by the Irish company Lanber Holding ulc, will overcome the barriers to the valorisation of whey permeate. The project will upgrade an anaerobic digester facility into an integrated bio-refinery to produce whey permeates cost-effectively. In this way, it the project team will show how the proteins and lactose in whey permeates can be reused in other products, such as animal and aquaculture feed to replace costly soy and potato-based proteins and fish oils.

Project summary

Climate Change Mitigation (CCM)

Mitigating climate effects of meat production with organic animal feed and better land management (LIFE Farm4More)

Rearing livestock for food results in high greenhouse gas emissions and excess nutrients, especially nitrogen and phosphorus that can cause water pollution. Engineering staff from the University College Dublin working on LIFE Farm4More will deliver climate change mitigating impacts for meat production by implementing an economically-viable organic animal feed, a biochar production process, and an environmentally-sustainable land management strategy. New feeding strategies for cattle and poultry will reduce nutrient emissions. The project team will also optimise biorefinery protein products for a range of feed applications.

Project summary

Italy

Nature (NAT)

Saving the critically endangered Sicilian fir (LIFE4FIR)

The Parco delle Madonie in northern Sicily hosts the world's only natural population of the Sicilian fir (*Abies nebrodensis*). Classed as critically endangered in the International Union for Conservation of Nature's Red List, the species' relict population comprises just 30 adult trees and 165 saplings. These are threatened by extensive grazing, cross-breeding with non-native fir species, and the poor state of health of individual plants. The LIFE4FIR project team, led by the National Research Council of Italy, aims to strengthen the genetic diversity of this highly endangered fir. It will protect the existing trees and carry out reforestation work, as well as establishing a seed bank to safeguard the species' future.

Project summary

Supporting biodiversity in the Brenta river basin (LIFE Brenta 2030)

Biodiversity in the Natura 2000 site Medio Corso del Fiume Brenta, in the Veneto region of Italy, is adversely affected by a variety of man-made impacts. These include agricultural run-off and water contamination, alterations to rivers caused by gravel mining, extraction of freshwater for irrigation and drinking water, and the fragmentation of habitats. Coordinated by the public utility company ETRA, this LIFE project aims to create new wetland habitats, including humid meadows and alluvial forests, restore aquatic ecosystems, and protect several bird and amphibian species.

Project summary

Tackling invasive species in the Tuscan Archipelago (LIFE LETSGO GIGLIO)

The biodiversity of Giglio island in the Tuscan Archipelago is threatened by several invasive alien species, such as the mouflon (*Ovis aries*), the European rabbit (*Oryctolagus cuniculus*) and the yellow-bellied slider turtle (*Trachemys scripta*). These degrade the island's grassland and forest habitats, in turn affecting protected bird species. LIFE LETSGO GIGLIO will tackle the invaders, eradicating the mouflon and slider turtle, and intensively managing the rabbit population. This should improve the overall ecosystem quality as well as the conservation status of protected habitats and species, in line with the EU Birds and Habitats directives, EU legislation on invasive alien species, and the EU biodiversity strategy.

Project summary

New Europe-wide alpine wolf management practices (LIFE WOLFALPS EU)

Efforts to coordinate wolf management set up under a previous LIFE project have not yet led to an overall conservation approach for the wolf in the Alps, mainly because institutions remain fragmented. The alpine wolf population continues to suffer from poisoning, conflicts with livestock owners and hunters, and interbreeding with dogs. The LIFE WOLFALPS EU project team

will set up five international groups to coordinate technical, scientific and other conservation activities. It will also train 2 000 supervisors on wolf surveillance and explore ways to reduce conflict hotspots though preventative measures and education, working alongside hunters.

Project summary

Eradicating rats and other invasives to protect seabirds (LIFE DIOMEDEE)

The objective of the project is to protect seabirds and habitats, listed in the EU Birds Directive and Habitats Directive from the threat of invasive non-native species, in Natura 2000 sites in the Gargano National Park, Italy. The project team will eradicate the black rat in the Diomedee Islands to improve the conservation status of shearwater species. The national park authority will also eradicate the invasive non-native blue crab that threatens aquatic habitats, eradicate the South African ragwort that threatens protected dry grassland habitats, and control the spread of *Ailanthus altissima* and other invasive plant species that threaten the park's biodiversity.

Project summary

Restoring dry grassland habitats to boost biodiversity (LIFE DRYLANDS)

The project aims to restore dry-acidic Continental open habitats in eight Nature 2000 sites of the western Po plain in Italy, including three habitat types listed in the EU Habitats Directive: inland dunes, European dry heaths and semi-natural dry grasslands. The project team, coordinated by staff at the University of Pavia, will restore characteristic features of these habitats, such as bare soil areas, and increase plant diversity through re-planting. The project team will also create ecological corridors to reduce habitat fragmentation and increase connectivity, and control the invasive woody plant species that cause biodiversity loss.

Project summary

Promoting shark-friendly fishing gear (LIFE ELIFE)

Since the 1980s, cartilaginous fish, such as sharks, skates, rays, have increasingly been caught as accidental by-catch in the Mediterranean Sea, by commercial fisheries using bottom trawl nets and longlines. The LIFE ELIFE project team, led by Stazione Zoologica Anton Dohm, will protect endangered shark and ray species by promoting best practices in these fisheries operations, and by carrying out demonstration actions in Italian harbours. The project team aim at reducing the mortality of species, such as sandbar shark and basking shark, through the introduction of low-impact fishing gear, and will work with fishermen to facilitate its introduction.

Project summary

Reducing human impacts on sea turtles (MEDTURTLES)

The project aims to improve the conservation status of the EU populations of two sea turtles, *Caretta caretta* and *Chelonia mydas*, that are listed as conservation priority species in the EU Habitats Directive. The project team will reduce the impact of human activities, including commercial fishing, by modifying fishing gear and establishing voluntary best practices on fishing boats, in turtle foraging grounds in Spain, Italy, Tunisia, Turkey and Albania, and on nesting beaches in Spain and Albania. This will help secure long-term protection of suitable nesting habitats and ensure that young turtles survive to maintain healthy populations. The project will

also establish a network of sea turtle research and conservation organisations, and raise citizen awareness about Mediterranean Sea turtle conservation.

Project summary

Supporting the red kite in Italy and on Corsica (LIFE MILVUS)

The red kite (Milvus milvus) population is declining in its main nesting areas of Spain, France and Germany, although increasing in some other European countries. In Italy, it was once a common species but today the red kite's distribution is highly fragmented. In the Aspromonte National Park in Calabria, no nesting pairs have been recorded, while in Corsica (France), the red kite is listed as near threatened on the International Union for Conservation of Nature Red List of breeding birds. The LIFE MILVUS project team, led by the national park authority, aims to reintroduce a self-sustaining red kite population into the Aspromonte National Park and promote long-term conservation of the species in Corsica.

Project summary

Beneficial flooding in the Venetian lagoon (LIFE FORESTALL)

LIFE FORESTALL will protect and manage Natura 2000 sites in the Valle Averto Oasis in the Venetian Lagoon, Italy. The project team will restore existing patches, and create new areas, of the EU Habitats Directive 'Calcareous fens' and 'Alluvial forests' priority habitats. The non-profit organisation CORILA and other project partners will improve water level regulation and circulation, especially in flood areas, to favour the development of the target habitats. They will also reduce the occurrence of invasive plant species, particularly black locust and sea myrtle, and the Wels catfish that threatens the fish community of the Valle Averto Oasis. The project's plan to install rafts should also increase the occurrence of breeding bird species.

Project summary

Environment (ENV)

Genetic and biodiversity model to give foresters better sustainable management tools (LIFE SySTEMIC)

Healthy forests need to be genetically diverse so they can be resilient to environmental changes. But up to 60% of threatened forest habitats in the EU are under threat from fragmentation, unsustainable management, invasive species and more. These reduce biodiversity and the ability of Europe's forests to adapt. Forestry researchers from the University of Florence, who coordinate LIFE SySTEMIC, will build a new genetic biodiversity and silvicultural model to help foresters manage forests more sustainably. The project team will put this into practice in three different EU countries.

Project summary

Better air quality in large pig sheds for healthier animals and workers (LIFE-MEGA)

Intensive pig farming makes up the majority of European swine production, but it has a heavy impact in terms of water, soil and air pollution. Large pig sheds develop poor air quality, with especially high levels of ammonia, methane, particulate matter and volatile organic compounds. This poor air quality harms the health of both animals and workers. Environmental scientists from the University of Milan, running LIFE-MEGA, will develop an online tool to monitor air pollutant concentrations in pig sheds and keep them below a threshold. They will also test two different cleaning prototypes, leading to reductions in ammonia and particulate matter by 70% and 80%, respectively.

Project summary

Looking for reduction on tyre noise levels from electric vehicles (LIFE E-VIA)

Electric cars could bring many benefits compared to combustion-engine vehicles, including less noise. Noise pollution affects many Europeans. However, little work has been done on tyre noise from electric cars. In the municipality of Florence, which will run the LIFE E-VIA project, researchers will assess noise levels from different electric and hybrid vehicles using two special test road surfaces, including a surface designed to minimise noise. The project team will also evaluate the CO_2 savings from vehicle tyres running on optimised, low-noise road surfaces.

Project summary

Enhance, nurture and vitalise crops to increase yield and healthy plant growth (LIFE ENVISION)

To feed a rising world population, agriculture needs to become more productive. But it must do this in the context of the changing climate, the need to save water and minimise inorganic pesticide input. One answer could be biostimulants – formulas made from micronutrients such as organic acids or plant nutrients – to improve the efficiency of plant growth. The LIFE ENVISION team will test new biostimulants on cereals, sugar beet, corn, strawberries and tomatoes. It is expected this will lead to an increase in yields in the pilot areas of 15%, while water consumption will be reduced by 9% and fungicide use by 65%. The project will be led by SCL Italia, an agricultural chemicals and products company.

Project summary

Mother and infant dyads: Lowering the impact of endocrine-disrupting chemicals in milk for a healthy life (LIFE Milch)

Human exposure to endocrine disrupting chemicals (EDCs), or chemicals that interfere with the hormone system, occurs from the moment of conception onwards. Unborn babies and infants could be especially vulnerable to the substances. Under LIFE Milch, researchers from the neuroscience unit at the University of Parma will improve knowledge about the correlation between levels of maternal exposure to EDCs or milk contamination and the health status of infants. They will study the extent of EDC contamination of mothers and children in rural and urban areas in Italy, and make recommendations to companies and policymakers on ways of reducing exposure.

Project summary

Closing the loop for carbon fibres from vehicles (LIFE-CIRCE)

The use of carbon fibre reinforced polymer (CFRP) composites in the transport sector has grown rapidly, enabling light-weight and more fuel-efficient vehicles. However, there are still crucial barriers to overcome, in terms of reclaiming complex fibre scraps and recycling the material for the market. A team from HP Composites, a company which designs CFRP, will demonstrate how scraps of CFRP that have been impregnated with resins can be used in different sectors without the need for complicated energy-intensive reprocessing, thus lowering raw material and manufacturing costs. The project team will design and construct two pilot machines to process CFRP and make it reusable in new products, and prove their technical and economic viability.

Project summary

Recycling absorbent hygiene products into raw materials (LIFE HUB'n'SPOKE (H&S))

Absorbent Hygiene Products (AHPs), including nappies and sanitary pads, are considered non-recyclable in municipal waste and are thus landfilled or incinerated. But 30% of this waste by weight comprises plastics, cellulose fibre and superabsorbent polymer, all having huge potential as secondary raw materials (SRMs). LIFE HUB'n'SPOKE (H&S) partners will set up a pilot plant to demonstrate the feasibility of reusing materials from AHP waste in consumer products such as printing paper or plastic pellets. The project team will foster markets for SRM in Europe by creating a new circular economy model based on an innovative AHP waste collection and pre-treatment system. They will also work to optimise the technology used as well as the supply connections between relevant industries. The project will be coordinated by Fater SpA, an Italian AHP manufacturer.

Project summary

Innovative process turns green waste into biogas and fertiliser (LIFE STEAM)

Green waste, consisting of leaves, wood cuttings, cut grass and agricultural residues, has high potential for biofuel production through anaerobic digestion. However, the predominance of non-soluble fibres made of lignin, called lignocellulosic fibres, currently means such waste is difficult to degrade, and much is landfilled or incinerated. LIFE STEAM aims to demonstrate a pilot plant that uses an innovative steam explosion technology to convert low-value lignocellulosic green waste into high-value biogas and biomethane as fuel for transport applications, and into a digestate which can be used as a fertiliser or soil amender. The project team will assess the economic viability and environmental benefits of the new process. LIFE STEAM will be led by the Italian environment, water and energy company Hera SpA.

Project summary

Environmental governance & information (GIE)

Made green in Italy scheme (LIFE MAGIS)

In 2018, Italy adopted in law the 'Made Green in Italy' scheme, the first national initiative based on the EU Product Environmental Footprint (PEF). Through the scheme, the environmental footprint of products can be evaluated, providing guidance to consumers and helping companies reduce their environmental impacts. The LIFE MAGIS project will be run by the Italian technology and energy agency ENEA. Its team will target consumers and producers to support the launch and spread of the PEF method and of the PEF-based 'Made Green in Italy' scheme. They will also define category rules that will underpin PEF studies on a number of product types: food products (snacks, ice cream, fruit, cheese and coffee), leather products, window fittings and cosmetics.

Project summary

A new approach to cut waste and boost recycling (LIFE-REthinkWASTE)

The EU has a recycling target of 65% by 2035. Many areas across Europe are still below this level, but some municipalities have reached separate collection rates of 80-85% using innovative incentive schemes. 'Pay as you throw' is one of the most effective ways to increase recycling. But uptake in southern Europe is poor, with waste fees not reflecting the amounts generated. This hampers better waste separation and recycling. LIFE-REthinkWASTE aims to provide public authorities with ready-to-use decision support system software to get 'pay as you throw' recycling up and running. The goal of the project, led by the public utilities company ETRA, is to increase separate collection of waste, reduce residual waste per capita and boost the recovery rate, whilst simultaneously cutting the average household waste bill.

Project summary

Wild pollinator conservation in the Mediterranean (LIFE 4 POLLINATORS)

Wild pollinators have declined because of changes in land use, intensive agriculture, pesticides, pollution, invasive alien species, diseases and climate change. Research suggests almost one-tenth of the EU's wild bees are threatened with extinction, while data are lacking for over half. Information is particularly scarce on the Mediterranean basin, which harbours the majority of endemic wild bees and is considered a biodiversity hotspot. The knowledge gap on wild pollinators and their role is one of the main obstacles to halting this decline in the Mediterranean. Researchers from the University of Bologna leading this LIFE project seek to improve pollinator conservation by raising awareness about the problem and the importance of wild pollinators.

Project summary

Cutting microplastic pollution of lakes in Germany and Italy (LIFE BLUE LAKES)

High levels of microplastic pollution have been found in lakes, even in remote locations. Microplastics get into the food chain and accumulate in animal species, with negative consequences for human health. One source of these particles entering the aquatic ecosystem is wastewater treatment plants. The project team from Legambiente, Italy's largest environmental organisation, seeks to prevent and reduce microplastic waste in five lakes in Germany and Italy, by combining governance, training, information and awareness-raising

activities. It will produce a support tool and suggestions on plastic waste treatment, discharge limits, monitoring programmes and improvements to the wastewater treatment process.

Project summary

Climate Change Adaptation (CCA)

Traditional dry-stone walls regenerated as a climate change adaptation tool (STONEWALLSFORLIFE)

Drystone terraces are considered an important measure in the Mediterranean region to counteract the effects of climate change on the local economy and environment, and prevent soil loss. The STONEWALLSFORLIFE project team will demonstrate the viability of drystone terraces as a climate change adaptation measure in the Cinque Terre National Park in Italy. Park authorities running the project will restore abandoned drystone terraces for use by local farmers. Innovative techniques will be used to improve the performance of drystone terraces in terms of drainage and landslide prevention. Additional techniques will be trialled in Spain to also counteract wildfires.

Project summary

Climate Change Mitigation (CCM)

Data building for better managed, more resilient mountain forests (GreenChainSAW4LIFE)

Rural mountain areas are critical for achieving climate mitigation targets. However, unmanaged reforestation and land abandonment has reduced their resilience. The GreenChainSAW4LIFE project, run by laser and plasma tech company Iris S.r.l, will demonstrate a new participatory model of forest management which meets energy and climate adaptation and mitigation objectives. The project partners will bring together local rural forestry managers in northern Italy and create an online decision-support system with data on forest resources, a business model and a carbon flow calculator for different forest management scenarios.

Project summary

Greener refrigeration in the ice-cream sector (LIFE ICEGREEN)

Hydrofluorocarbons (HFCs) are used in a variety of refrigeration equipment, such as commercial ice cream machines. When released into the atmosphere, HFCs have significant global warming potential and contribute to almost 8% of the world's greenhouse gas emissions. Propane is an excellent and economic substitute, with near-zero global warming potential. Nemox International s.r.l, the ice cream machine producer leading the project, aims to show that using propane as a refrigerant in innovative commercial ice cream machines is technically feasible, safe

and commercially viable. This is in line with the EU's F-gas regulation, under which HFCs must be phased out and replaced with alternatives that have near-zero global warming potential.

Project summary

Preventing soil degradation in the Emilian Apennines (LIFE agriCOlture)

Many hilly and mountainous areas of central Italy suffer from soil degradation due to intensification of agriculture on the most productive land and the abandonment of land that has deteriorated. The loss of soil organic carbon is an indicator of this problem. Under LIFE agriCOlture, the land reclamation authority of Emilia Centrale plans to apply sustainable soil management techniques and show their effectiveness in protecting soil organic carbon in mountainous areas of the Emilian Apennines, a region prone to soil degradation.

Project summary

Climate Governance & Information (GIC)

Collaborative transformation of urban green spaces in Mediterranean cities (LIFE CLIVUT)

Urban green spaces are a critical resource for cities to become more climate resilient, supporting air quality, soil stability, biodiversity and noise reduction. LIFE CLIVUT, run by the civil engineering department at the University of Perugia, will develop an urban green asset strategy for four medium-sized Mediterranean cities in Italy, Greece and Portugal, to help city planners make the most of their urban green spaces. The project team will get businesses and city residents involved in this strategy, encouraging businesses to sign up to climate-responsible business practices. Its tree planting will remove 230 tonnes of CO_2 and 2 600 tonnes of particulate matter from the air per year. The team will also help restore native plants and trees, and eradicate invasive alien species which harm biodiversity in the cities.

Project summary

Deepening international cooperation on emissions trading (LIFE DICET)

There is a need for enhanced international cooperation to integrate global carbon markets. The EU Emissions Trading System plays a world-leading role in this area. The LIFE DICET project team from the European University Institute aims to support policymakers at EU and Member State level in their efforts to deepen international cooperation on developing and integrating carbon markets. In particular, the project will help regulators and policymakers acquire knowledge of how carbon markets function, and communicate and exchange relevant information. The institute will establish an expert group, a carbon market policy dialogue between the European Commission and other regulators, and a knowledge-sharing platform.

Project summary

Latvia

Climate Change Mitigation (CCM)

Testing ways to cut emissions from nutrient-rich soils (LIFE OrgBalt)

Managed soils that are rich in organic nutrients are one of the largest sources of greenhouse gas emissions in Europe's temperate region. Theoretically, climate change mitigation measures have the potential to reduce these emissions by almost 20 million tonnes of CO_2 equivalent per year. Under the LIFE OrgBalt project, the Latvian State Forest Research Institute (Silava) will apply sustainable and cost-effective measures suitable for nutrient-rich organic soils, to verify their impact and see whether this approach to emissions reduction is realistic.

Project summary

Luxembourg

Nature (NAT)

Stronger connections between habitats for endangered bats and birds in Luxembourg (LIFE Bats & Birds)

LIFE Bats & Birds will improve habitats for six endangered bat and bird species in Luxembourg, by planting 2 500 trees and 125 000 shrubs, restoring abandoned grassland, and the appropriate management of fruit trees and hedges in the project area. Target species, including the little owl (*Athene noctua*) and Eurasian wryneck (*Jynx torquilla*), are threatened by habitat loss. For example, suitable orchards have decreased by 80% over the last 100 years in the country. The project team, led by the non-profit nature conservation organisation Natur&ëmwelt Fondation Hëllef fir d'Natur, will connect existing and potential habitats, and counter the negative impacts on habitats from intensive farming.

Project summary

Netherlands

Nature (NAT)

Restoring raised bogs in the Netherlands (AddMire LIFE)

The Netherlands once hosted a large portion of Europe's raised bogs habitat, covering an area of one million hectares before its exploitation pre-1600. By 2000, just 3 600 hectares were left. Thanks to successful restoration projects, 15 hectares of Dutch active raised bogs have recovered over the past 50 years. In the Engbertsdijksvenen Natura 2000 site, a small active raised bog is still present, surrounded by degraded raised bogs. The AddMire LIFE team will take actions to keep the water level more stable, to provide the permanent wet conditions that are beneficial for the regeneration of degraded active bogs and to enhance the quality of the active raised bogs. The project will be led by the authority for the Province of Overijssel.

Project summary

Controlling invasive coypu and muskrat in river ecosystems (LIFE MICA)

Coypu (*Myocastor coypus*) and muskrat (*Ondatra zibethicus*) are large semi-aquatic rodents of American origin that are spreading in a range of wetland, lowland and reed habitats in Belgium, the Netherlands and Germany. Here, they present a threat to protected habitats and species, such as bittern and freshwater mussel. Under the leadership of the Dutch Water Authority Rivierenland, the project team will improve the efficiency of trapping these invasive alien species, by demonstrating innovative methods. These include the use of e-DNA, an analysis of DNA left by animals in the environment, to detect low-level populations. The project team will also apply rapid eradication and preventive actions, and restore affected ecosystem services, such as flood prevention.

Project summary

Making the flyway safer for pelicans (Pelican Way of LIFE)

The Mediterranean-Black Sea flyway of the Dalmatian pelican (*Pelecanus crispus*) accounts for about 42-54% of the global population, but the species is threatened along this flyway by collisions with power lines, disturbance to colonies, habitat loss, and direct persecution. The project team, coordinated by Netherlands-based Stichting Rewilding Europe, will reduce the threats and improve habitats in 27 Natura 2000 sites in Romania, Bulgaria and Greece, covering the EU breeding range, and in Ukraine. They will also promote research activities in Turkey, Albania, Montenegro and North Macedonia. Satellite tracking will be used to improve knowledge, mortality from collisions with power lines will be reduced using visual devices, and disturbance reduced through patrols.

Project summary

Environment (ENV)

Greening agriculture with new biostimulants (LIFE Plants for Plants)

Conventional agriculture provides for 95% of the world's food production but is very resource-intensive. The LIFE Plants for Plants team from Van Iperen International BV is looking to introduce new organic biostimulants – fertiliser additives derived from a wide range of naturally-occurring sources – into the sector to boost crop production and reduce irrigation and chemical use. It will produce three prototypes of a new group of plant-derived biostimulants that are able to enhance crop resource efficiency. These significantly lower the amount of nutrients, water and pesticides needed to grow plants, while improving crops' resilience to climate change and disease.

Project summary

New raw materials from used drinks cartons and cups (LIFE PULPCYCLE)

Laminated paper containers used in products like drinks' cartons and coffee cups are a fusion of different materials – paper, cardboard, plastics and metals – and so are very difficult to recycle efficiently. Over a million tonnes of potentially valuable materials are incinerated or landfilled every year, with a significant environmental impact. Current recycling initiatives are limited to recovering the paper and cardboard materials. LIFE PULPCYCLE will take a new approach, with the project team building an industrial-scale pulping and treatment facility combined with an existing waste processing and energy plant. With this, the aim is to increase the recycling rate of plastics and aluminum to produce high quality secondary raw materials. The project will be led by Dutch sustainable energy provider HVC Grondstoffen NV.

Project summary

Making the most of waste from energy plants (LIFE ASH 2 MATERIAL)

Bottom ash is a by-product from waste-to-energy plants. Containing large amounts of minerals as well as ferrous and non-ferrous metals, it could be a significant source for raw materials needed in other products. For instance, some metals found in bottom ash are precious, including those listed as critical raw materials. But recycling materials from bottom ash is hampered by hazardous substances and sub-optimal recovery. Reuse of the mineral fraction is also restricted due to contamination with hazardous substances. This LIFE project, headed by recycling company Heros Sluiskil B.V., plans to improve the recovery of heavy non-ferrous metals and the quality of the mineral fraction, using a full-scale treatment facility. Its approach will allow the recovery and recycling of materials that would otherwise be lost or recycled for low-quality applications.

Project summary

New process for obtaining raw materials from sewage (LIFE WATER FACTORY)

Sewage is a potentially important source of biomass and other resources such as ammonium and phosphate, but to date few resources have been recovered from sewage. The Dutch regional water authority Waterschap Vallei en Veluwe will build and implement an innovative full-scale test plant called the LIFE WATER FACTORY, to demonstrate a sustainable and circular sewage

treatment model. Only physical processes will be implemented in this demonstration plant, compared with traditional sewage treatment plants which rely on biological processes that destroy substances that could be recycled. The project will show the potential of sewage as a resource for high-quality water and for raw materials. Possible uses are to supply water to horticultural industry, or to produce raw materials including cellulose, ammonium, phosphate or sand.

Project summary

Climate Change Adaptation (CCA)

Involving local citizens in climate resilience (LIFE CRITICAL)

Climate change adaptation can be difficult to implement in the older, more densely-populated neighbourhoods of cities. Such parts of Dordrecht in the Netherlands, for example, are below sea level and are susceptible to flooding. LIFE CRITICAL aims to exploit the potential of the city's parks for climate change adaptation measures, with the active participation of citizens. The project team from the municipality of Dordrecht will raise awareness of the importance of adaptation to climate change and get citizens on board to participate in maintaining, running and monitoring climate adaptation measures. The municipality will also lay flood-reducing permeable pavement, build new green spaces and install water storage areas.

Project summary

Poland

Climate Change Mitigation (CCM)

Separated collection of waste refrigeration chemicals to limit greenhouse gas emissions (Refrigerants LIFE cycle)

Since 1987 under the Montreal Protocol, ozone-damaging fluorinated refrigerants have been replaced by less harmful alternatives. But these newer substances are often also potent greenhouse gases which are restricted by the Kyoto Protocol. The objective of the Refrigerants LIFE cycle project, run by the Polish-based non-profit PROZON Foundation, is to limit fluorinated greenhouse gases emissions into the atmosphere from the refrigeration and air-conditioning sector. The project team will implement a demonstration installation to separate waste refrigerant mixtures. It will also expand the refrigerant waste collection systems in Czechia and Poland, with extended collection points and services. At the same time, PROZON Foundation will work to increase industry awareness of the environmental impacts of refrigerant emissions.

Project summary

Portugal

Nature (NAT)

Protecting barrier islands and their ecosystems (LIFE Ilhas Barreira)

Barrier island systems have unique ecosystems which are threatened by climate change and the related rise in sea levels. Ria Formosa in southern Portugal is one such system, also threatened by human-related pressures. LIFE Ilhas Barreira will identify the local ecological requirements and the threats to some seabird species and habitats on the islands, in order to carry out effective conservation work. The project's protection and restoration of grey dunes will improve the islands' defences against climate change effects, such as storm-induced erosion and rising sea levels, helping to conserve this fragile ecosystem.

Project summary

Improving habitats for threatened beetles in the Azores (LIFE BEETLES)

Three beetle species found only in the Azores, Tarphius floresensis, Pseudanchomenus aptinoides and Trechus terrabravensis, are classified as critically endangered on the International Union for Conservation of Nature's Red List. The beetles are highly dependent on good-quality habitat, especially native ferns, mosses, liverworts and hornworts, in native woods and shrubland. These habitats are being lost and are threatened by invasive alien species and climate change. The aim of the project is to increase the numbers of these three endemic beetle species. The project team, coordinated by the regional government of the Azores, will increase the quantity and quality of habitat available for the beetles, to reverse the decline in their population sizes.

Project summary

Environment (ENV)

Preventing forest fires in Portugal and Spain (LIFE LANDSCAPE FIRE)

Depopulated rural areas, a uniform landscape and the emergence of highly fire-prone forests have led to bigger and more intense fires in the Iberian Peninsula. Portugal and Spain saw their worst ever year for forest fires in 2017, with a devastating loss of lives and forest. The LIFE LANDSCAPE FIRE project team from the inter-municipal community of Viseu Dão Lafões will develop a fire-prevention procedure for several locations in Spain and Portugal, based on

methods already used successfully in Andalusia and Catalonia. These will use prescribed fires and grazing techniques to reduce forest fuel, converting fire-prone forests into more resilient areas.

Project summary

Climate Change Adaptation (CCA)

New green city planning to transform Lisbon (LIFE LUNGS)

Lisbon faces growing pressures from climate change, with rising temperatures and heavier flooding as the most visible threats. The LIFE LUNGS project team will implement the city's climate adaptation strategy by building up its urban green infrastructure. Through the project, city authorities will trial zero rainwater waste areas to capture and collect rainwater, plant over 100 hectares of trees, and put anti-soil erosion and flood resilience measures in place. With expanded green spaces and better use of water, Lisbon will gain enhanced ecosystem services like improved water drainage and quality, carbon storage in soils, and biodiversity protection. The project will show how urban green infrastructure can be a transformative tool for cities to adapt to climate change.

Project summary

Slovenia

Nature (NAT)

New habitats and safe passages for toads (LIFE AMPHICON)

There has been a general decline in the number of amphibians in Slovenia, Denmark and Germany. This has been attributed to factors such as the loss of habitats and mortality on roads. The LIFE AMPHICON team will improve conditions for European fire-bellied toad (*Bombina bombina*) and other amphibian species in these three countries, within six Natura 2000 sites. The project team, coordinated by staff working for the municipality of Grosuplje, will ensure long-term site management through land purchase or lease in Slovenia and Germany. Project actions will include rearing of European fire-bellied toad and their release to re-colonise restored or newly-created habitats, the establishment of ecological corridors connecting Natura 2000 sites and measures to reduce amphibian mortality, such as tunnels under roads.

Project summary

Environment (ENV)

Transforming the hops-growing industry with biodegradable wire (LIFE BioTHOP)

Growing hops, mostly destined for breweries, tends to be done using wire or polypropylene twine attached to trellises. Around 45 km of this unrecyclable polypropylene twine is used each season in the EU. Together with the majority of the hop plant, which is unused, this produces 15 tonnes of waste per hectare per year – about eight times more in volume than the hops – which cannot be composted or recycled. LIFE BioTHOP aims to change the hop-growing industry by introducing compostable twine into growing practices, and enabling hop waste to be composted, used as fertiliser or transformed into biodegradable products. Around 3 500 kg per year of new biodegradable materials will be recovered, and 4 000 moulded products made to demonstrate the recycling potential. The project will be run by researchers from the Slovenian Institute of Hop Research and Brewing.

Project summary

New clean-up systems for industrial wastewater to counter water shortages (LIFE HIDAQUA)

The EU territory is increasingly affected by water shortages and droughts. These increase the need for new water recycling concepts. Recycling wastewater from high water-use industries like the car industry is one option, but conventional water treatment plants are ineffective in fully removing pollutants like phenols and mineral oils. Researchers from the Slovenian National Building and Civil Engineering Institute, running the project, will treat 4 000 m^3 per year of industrial wastewater using a new electro-dialysis and reverse osmosis system, where water passes through electrically-charged membranes and is purified to remove unwanted substances. The process will produce another 8 000 m^3 per year of drinking water from rain and saline water. This is equivalent to about 50% of the annual water demands of the factory where the new system will be run.

Project summary

Environmental governance & information (GIE)

Turning waste electric equipment into resources (LIFE Turn to e-circular)

Electric and electronic equipment is the fastest growing form of waste, known as WEEE, in the EU. It is expected to reach over 12 million tonnes by 2020. This waste tends to include a lot of equipment that is still functional. Plus, it contains resources that can be reused in electronics production, avoiding the need for new raw materials. The level of WEEE reused is very low due to a number of issues, such as poor awareness, insufficient incentives and a lack of new sales models offering services instead of products. This Slovenian-based project led by the electrical waste management partnership ZEOS aims to change consumers' habits. The team will provide consumers with both information and infrastructure, including a mobile repair shop.

Project summary

Spain

Nature (NAT)

Restoring traditional Spanish livestock roads to reconnect protected nature sites (LIFE CAÑADAS)

Roads traditionally used by livestock farmers are known as drove roads, or cañadas in Spanish. These are being increasingly abandoned but have significant benefits for biodiversity, connecting populations of plants and dispersing plant seed, supporting soil fertility and pollination, and facilitating the movement of wildlife. The LIFE CAÑADAS project team will restore 150 km of these ecological corridors and encourage livestock herders to once again use the drove roads. By setting out a management plan for the network, the project team will re-establish lost connections between Natura 2000 sites and monitor the resulting biodiversity, seed dispersal and wildlife movements. The project will be coordinated by staff in the Department of Ecology at Madrid Autonomous University.

Project summary

Environment (ENV)

Sustainable biogas purification system in landfills and municipal solid wastes treatment plants (LIFE BIOGASNET)

Biogas generated from landfill sites and waste treatment plants is seen as a renewable energy form. But biogas contains hydrogen sulphide, which can lead to emissions of harmful sulphur dioxide and other negative impacts. Scientists from the Universitat Politècnica de Catalunya will demonstrate an efficient method of removing hydrogen sulphide from biogas, while producing raw materials needed in other products. These include elemental sulphur and ammonium sulphate, which can be reused in line with circular economy principles. The lessons learned from LIFE BIOGASNET should be replicable at landfill sites and waste plants across Europe.

Project summary

New life for hard-to-recycle mixed plastic waste (LIFEPLASMIX)

15% of municipal solid waste is made of mixed plastic, which comprises polypropylene, polystyrene and expanded polystyrene. Mixed plastic is used in products like packaging and bottles. There is currently no widely-implemented solution to recover this type of plastic waste,

which makes up more than 3.5% of EU household waste by weight that goes to landfill every year. The LIFEPLASMIX team will demonstrate a set of cost-effective technologies to recycle mixed plastic into high-quality pellets which can be reused in new food packaging and other products. The pilot plant will produce new plastic with up to 80% recycled from the local municipality's plastic waste. LIFEPLASMIX will be run by Spanish environmental service Fomento de Construcciones y Contratas.

Project summary

More efficient energy and resource recovery from Europe's wastewater (LIFE ULISES)

Wastewater has great energy and resource potential, mostly in the organic matter from sewage sludge. But currently only about 2.5% of Europe's municipal wastewater is reused, mainly because of the high associated costs. Within the LIFE UILSES project, the Spanish water company Aqualia will demonstrate a new set of technologies to make treatment more efficient. Its pilot plant will deliver many new resources including biomethane to fuel 120 cars a year, as well as enzyme-treated biofertiliser – a way to recover nutrients from sludge – and irrigation-ready reclaimed water.

Project summary

Reducing groundwater pesticides in small rural communities (LIFE SPOT)

People living in rural Mediterranean areas rely heavily on groundwater for drinking water. But severe shortages exist due to man-made pollution, with over 10% of groundwater monitoring stations across Europe recording nitrate (NO_3) levels above legal limits. Researchers from the Catalonian institute IRTA will develop a new treatment process in areas with fewer than 50 inhabitants, producing water for human and animal consumption at two sites in Catalonia. Its microalgae-cork treatment plants, combined with other technology, will remove 60-80% of nitrates from targeted water, as well as reusing excess microalgae for composting or biogas.

Project summary

Fibres for car and furniture manufacturers from olive pruning waste (LIFE COMPOLIVE)

Europe's olive industry, the world's biggest producer, consumer and exporter of olive oil, generates over 7 million tonnes of pruning waste every year. Most of this is burned, causing large amounts of pollution. LIFE COMPOLIVE, led by the plastics technology centre Andaltec, will turn this waste into a new generation of biocomposites for the automotive and furniture sectors. During the project's lifetime, 15 tonnes of fibre per year will be produced, reducing the need for fossil-based virgin plastic used by the two sectors.

Project summary

Microalgal pesticide replacement for tomatoes and corn (LIFE ALGAR-BBE)

40% of food in the EU contains pesticide residues, and at least 75% of pesticides used each year are applied in agriculture. They have harmful consequences for human health and the environment, despite being only intended against pests. Spain is the biggest market for pesticides in the EU. LIFE ALGAR-BBE, coordinated by the biotechnology company NEOALGAE, will prove the effectiveness of at least three alternatives to insecticides and fungicides made from microalgal biomass and aromatic plant extracts. The project team will produce around 740 tonnes of tomatoes, as well as corn grain, potatoes and peppers, all pesticide residue-free. The pilot area will meanwhile benefit from over 50% pesticide reduction in its water and soil.

Project summary

Biofuel for transport from landfill sites (LIFE LANDFILL BIOFUEL)

Transport is responsible for almost a quarter of Europe's greenhouse gas emissions, with road transport by far the biggest emitter. Gas captured from landfill waste can be upgraded to produce biomethane, but this has not been fully developed for use as a standardised biofuel for transport. LIFE LANDFILL BIOFUEL will demonstrate a cost-effective way of improving biogas production and recovery from landfills. The resulting biofuel will be suitable for both lightweight and heavy-duty vehicles. The project, run by Spain environmental services company Fomento de Construcciones y Contratas, will help improve air quality and 'green' road transport.

Project summary

Smarter spraying to reduce pesticide residues in food (LIFE – F3)

Pesticide residues are an important food-related concern for EU citizens. Conventional pesticide spraying equipment is still highly inefficient, with more than half of pesticides not reaching the target organisms. Computer-controlled Air Blast H3O sprayer technology facilitates precise treatments according to vegetation characteristics and other parameters. LIFE - F3 aims to demonstrate this highly-efficient advanced pesticide sprayer in a Spanish vineyard and a Portuguese olive plantation. The team from Spanish crop-spraying company Pulverizadores FEDE aim to reduce the use of biocidal products used to protect non-food and feed products, and other pesticides, by over 25% compared to standard pesticide application methods.

Project summary

Removing nitrate pollution from aquifers (LIFE NIRVANA)

Groundwater is an important resource, especially for drinking water, but nitrogen fertilisers and pesticides result in contamination that can pose risks to human health. LIFE NIRVANA aims to reduce nitrate concentrations in contaminated underground water-bearing permeable rock, called aquifers, by in situ remediation with a novel and environmentally-friendly technology. The

project team will use enhanced biological denitrification, known as nitrogen removal, with doses of iron nanoparticles. Experts from Cetaqua Andalucía, the project leader, will design, build and operate a pilot-scale denitrification site in a porous aquifer contaminated with agriculture-origin nitrates, representative of nitrogen-contaminated aquifers at European level. The aim is to reduce nitrate concentrations to below 50 mg/l, above which they are considered to fail the good chemical status set in the EU Nitrates Directive.

Project summary

Increasing the efficiency of nutrient removal from wastewater (LIFE AMIA)

Environmental problems can arise due to micropollutants and pathogens that are not currently removed by conventional wastewater treatment plants. The LIFE AMIA partners will treat and reuse wastewater used in agricultural irrigation and aquifer recharge, to protect the aquatic environment against such pollution. They will also implement a novel wastewater treatment process that reduces the net energy consumption of wastewater treatment. Lower energy use will be achieved by producing biogas from anaerobic treatment – breaking down waste without oxygen - recovering nutrients in algal ponds to produce fertiliser, and using renewable energy. LIFE AMIA will be run by Sociedad Fomento Agrícola Castellonense, a specialist water treatment company in Spain.

Project summary

Restoring areas degraded by mining to improve water quality (RIBERMINE)

Mining has high economic importance for the EU, but polluted runoff and sediment affects downstream water quality, wildlife in rivers, and the flow of rivers and streams. RIBERMINE will minimise pressures on water bodies and improve the water quality of two areas affected by metal and non-metal mining. The work will take place in Spain and Portugal, where a combination of best practices to restore mines over large areas will be demonstrated. Techniques include revegetating areas with native plant species, to reduce contaminated sediment loss from spoil heaps and to recover ecosystem services such as flood protection. The aim is to transfer successful combinations of methods to other mine-degraded areas. RIBERMINE will be headed by Castilla-La Mancha's regional energy and mining administration.

Project summary

Environmental governance & information (GIE)

Tackling emissions in the buildings sector (LifeforLLL(s))

The buildings sector accounts for over a third of greenhouse gas emissions in the EU, half of energy consumption and raw material extraction, and a third of all waste and water usage. Operational emissions in buildings are being tackled, but not those related to other parts of the

sector's life-cycle (e.g. product manufacture, construction). The European Commission created 'Level(s)', a framework of common EU indicators to address the life-cycle environmental performance of buildings, to help the sector reduce its total impact. But companies have found it challenging to apply these indicators. The Spanish construction industry association GBCe, part of the World Green Building Council, will explore how some indicators can be implemented on a pan-European scale, creating the conditions for the construction sector to apply Level(s) more widely.

Project summary

Climate Change Adaptation (CCA)

Securing freshwater from mountain areas through concerted land management practices (LIFE MIDMACC)

Mountain areas are a major source of freshwater, but are also highly vulnerable to climate and man-made changes. Careful land management aimed at diversification is a proven way to support climate change adaptation. This means converting or maintaining a complex variety of agro-forest-pastoral land which encourages greater biodiversity and stronger ecosystem services, like water supply and carbon storage in the soil. The LIFE MIDMACC partners will focus on marginal mid-mountain areas in Spain to promote this type of climate change adaptation. CREAF, the public research centre coordinating the project, will test three approaches in nine areas of scrubland, forest areas and vineyards.

Project summary

Early detection to prevent disease spread in citrus fruits (LIFE Vida for Citrus)

One fifth of citrus fruits are produced in the Mediterranean, and the region accounts for almost three quarters of global exports. But these are vulnerable to a disease called Huanlongbing or citrus greening, caused by *Candidatus Liberibacter* spp., a bacterium which is spread by insects. One of these insects, the African citrus psyllid (*Trioza erytreae*), has been found in Spain and Portugal. There is no known cure for the disease, and control measures cause a heavy environmental toll. Farming professionals from the non-profit association ASAJA Málaga will develop an early detection kit for the disease, test new rootstocks that could be resilient to the disease and to heat, and demonstrate effective, sustainable control measures. In tests in nine orchards in France, Italy, Spain and Portugal, the project will also save 1 000 tonnes of CO_2 – as much as 1 000 trees absorb in their lifetime – and raise awareness among 450 000 people throughout the EU.

Project summary

Mapping estuaries to plan coastal flood protection and restoration (ADAPTA BLUES)

Coastal systems such as saltmarshes, seagrass meadow and reef-forming organisms help protect coasts against erosion and flooding, as well as capture carbon from the atmosphere. On the Atlantic coast, these ecosystems are mainly based around estuaries. ADAPTA BLUES, run by a joint research centre which includes the University of Cantabria, will map three estuarine areas for factors like potential restoration and flooding scenarios, and standardise how authorities can assess their national estuaries' ecosystem services. The team will run a pilot restoration project in the Mondego estuary in Portugal, restoring vegetation and sediment build-up. These activities will enable researchers to define technical recommendations on climate change adaptation strategies for coastal areas, and also roll out a special diploma programme for university students on the subject.

Project summary

Harnessing the power of fungi to build climate resilience in Mediterranean forests (LIFE MycoRestore)

Mediterranean forests face serious stresses due to climate change, especially from droughts, pests and diseases. LIFE MycoRestore will demonstrate how fungal species like mushrooms together with forest management practices can increase the resilience of Mediterranean forests to drought and forest fires. The team from CSIC, Spain's largest public research body, also aim for the project to generate new income sources and green jobs, based on wood processing and innovative high-value mushroom products, using a circular economy approach. Finally, the project team will provide proof of concept for using natural fungal-based products and native fungal species for controlling pests and diseases.

Project summary

Helping cities cope with the effects of climate change (LIFE WATERCOOL)

Most climate models predict heatwaves will increase in places that experience hot, dry summers, such as Andalusia, putting more pressure on water resources. Urban planners need innovative tools to respond and adapt to the impacts of climate change. LIFE WATERCOOL, run by the Seville-based water supply company EMASESA, will develop and test new ways of coping with high temperatures, temporarily high-water run-off and droughts in an urban environment. The project team will use the water infrastructure in Seville as a vehicle for cooling measures and to improve the efficiency of water use, so maximising sustainability and citizens' well-being.

Project summary

Climate Change Mitigation (CCM)

Joined-up thinking for industries to reduce CO2 emissions (LIFE-CO2-INT-BIO)

In Spain, three energy-intensive industrial sectors that are not expected to reach their targets for carbon dioxide (CO_2) emissions reductions could benefit from taking an integrated approach with

common goals. These three sectors are companies who produce CO_2 from natural gas, biomass power plants, and greenhouse-based vegetable producers. Under the LIFE-CO2-INT-BIO project, run by the public body FPNCYL in Castilla y León, project participants in these sectors will work closer together on energy-efficiency and renewable energy targets. A collective approach will create new value for their products which reflects their sustainability. The companies involved will also work to build shared value chains such as reusing vegetable waste from greenhouses as raw material for power plants, thereby reducing emissions, waste and energy.

Project summary

New life for building waste with very low-emission brick production (LIFE HYPOBRICK)

Ceramics manufacturing consumes large amounts of energy and raw materials and generates, especially for brick and roof-tile products, considerable greenhouse gas emissions. A research team from the Institute of Ceramic Technology in Castellón will demonstrate the feasibility of manufacturing waste-based building products using an extremely low CO_2 emission process, called the alkaline-activation process. This substitutes the firing stage with low-temperature curing, reducing kiln temperatures from over 1 000 °C to below 150 °C. The LIFE HYPOBRICK team also aims to formulate waste-based mixtures for brick manufacturing, define the alkaline-activation process and modify industrial facilities to enable producers to adapt.

Project summary

Making steel production more circular (LIFE CO2 TO FUEL)

Steel production is an energy-intensive process that consumes fossil fuels and generates greenhouse gas emissions. One way of reducing these is by reacting hydrogen with CO_2 to produce methane and water, known as the Sabatier process. Technical limitations mean it has never been implemented at industrial scale, but a new laboratory reactor has succeeded in capturing the emissions and producing synthetic fuels and oil products. The company behind LIFE CO2 TO FUEL, CELSA GROUP™, plans to build and test a pilot plant able to capture CO_2 generated by steelmaking and transform it into hydrocarbons. These can be reused in the steel production chain, cutting emissions and energy requirements.

Project summary

Sweden

Nature (NAT)

Connecting Swedish waterways to boost threatened fish and mussels species (LIFE CONNECTS)

The 13 Natura 2000 sites targeted by the LIFE CONNECTS team are heavily affected by dams, dredging and channel-building, due to forestry, agriculture and hydropower activities in past decades. These modifications to natural rivers reduce habitat connectivity across an area

spanning 150 km, and need to be addressed to improve the conservation status of threatened species. Under the coordination of the Skåne County Administrative Board, the project team will remove dams and install passages for wildlife, focusing particularly on the endangered freshwater pearl mussel (*Margaritifera margaritifera*) and thick shelled river mussel (*Unio crassus*). Benefits will be felt along the coast as well as inland, allowing safe passage for migratory Atlantic salmon (*Salmo salar*) and European eel (*Anguilla anguilla*), and increasing sand deposits on eroding coastlines.

Project summary

Re-naturalising rivers (Rivers of LIFE)

The Rivers of LIFE project aims to restore parts of three river systems in east-central Sweden that were negatively impacted by timber floating infrastructure and channelisation. The project team will improve the condition of river habitats and boost numbers of aquatic species, by restoring habitat quality and stream connectivity, reintroducing boulders and dead wood into rivers, and naturalising river flows. The enhanced ecosystem will increase resilience to climate change. Conservation actions will be linked to the local economy, especially the development of sustainable sports fishing tourism. The project will be coordinated by the County Administrative Board of Gävleborg.

Project summary

Artificial reef construction to support critically endangered cold-water reefs in Sweden (LIFE LOPHELIA)

Cold-water Lophelia coral reefs (Lophelia pertusa) are widespread in the north-eastern Atlantic and Mediterranean, where they harbour rich biodiversity and feeding grounds. But in Sweden, 30-50% of corals have been damaged by bottom trawling and four out of the six reefs in the project area are dead. The Swedish Red List classifies Lophelia reefs as critically endangered. The LIFE LOPHELIA project team, coordinated by the County Administrative Board of Västra Götaland, will build artificial reefs over 25 hectares in one Natura 2000 site to support reef reproduction. They will identify the best placement for artificial reefs, to enable maximum contact and larvae attachment. In installing these reefs, the project team will test the effectiveness of a calcium carbonate industrial by-product as a material for wider reef building and restoration.

Project summary

Environment (ENV)

Turning nitrogen-containing water from waste into resource (LIFE RE-FERTILIZE)

Nitrogen-containing wastewater is a rich potential source for ammonia products like fertilisers, but is regularly disposed of from wastewater treatment plants and agriculture. The LIFE RE-FERTILIZE team from Swedish research and development company Easymining Sweden AB wants to enable these effluents to instead be treated as nitrogen resources. They will demonstrate and

scale up a new cleaning and recycling process which recycles 95% of ammonia to produce fertiliser. Among other benefits, this will cut fertiliser production costs as well as save significant amounts of energy. Another benefit will be almost total reduction in greenhouse gas emissions compared with other conventional and state-of-the-art ammonia production processes.

Project summary

100% recycled fabrics to renew the life of your clothes (LIFE RE:NEWTEXTILE)

Substantial amounts of clothing are thrown away every year in the EU. One of the main reasons is a lack of technological recycling solutions. Alongside a growing fashion industry, in which global clothing consumption doubled between 2000-2015, this means greater environmental pressures including chemical use in cotton production and extreme water use. Researchers from the innovative Swedish clothing company Re:newcell intend to show that clothing recycling is possible. They will test a new, environmentally-friendly material made only from recycled textiles called dissolving pulp. Compared to more traditional wood pulp, dissolving pulp has no fixed fibrous structure and can be easily spun into textile fibres. The team aim to scale-up production levels by one quarter. With its 100% recycled materials, the process will save 70% water, cut energy by almost half, and eliminate all fertilisers compared to current virgin fibre production.

Project summary

United Kingdom

Nature (NAT)

Restoring key features in Scottish Natura 2000 sites (LIFE 100% favourable)

The project will secure all key features for which Natura 2000 network sites have been designated on Royal Society for the Protection of Birds Scotland's reserves. Eleven best practice and management methods will be demonstrations at different sites will restore or maintain habitat and birds in a favourable condition, according to the EU Birds and Habitats directives. The project will show that a major landowner can achieve 100% favourable condition on their holding, thereby setting an example for others. Diverse actions at different sites include optimising grazing to enable oak forest regeneration, removal of invasive woody plant species to restore dune habitats, planting nursery-grown Salix to restore habitat in the sub-arctic Cairngorms, and the creation of nesting sites for seabirds.

Project summary

Enabling life to return upstream (LIFEDeeRiver)

The project team will undertake large-scale restoration of natural river processes and habitats along at least 55 km of the River Dee, within the 'River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid' Natura 2000 site in North Wales. Natural Resources Wales will coordinate actions to remove weirs to enable fish migration and wider ecological connectivity, and improve agricultural and forestry land management to reduce nutrients and sediments entering the River Dee. The project team will also initiate conservation management for the critically- endangered freshwater pearl mussel (*Margaritifera margaritifera*) using captive breeding and release.

Project summary

Reducing the pressure on seagrass beds (LIFE Recreation ReMEDIES)

Seagrass beds provide important spawning, nursery and refuge areas for fish. However, in the UK they are rare and classified nationally as having 'unfavourable' conservation status, with damage by recreational boating being a key factor. The project team, coordinated by Natural England, will implement actions to reduce the negative impacts of recreational activities on the marine environment in Natura 2000 sites where boating has the most impact. These actions will reduce recreational pressures on England's most important and at-risk seagrass beds. The project team will demonstrate large-scale habitat restoration and management techniques, and promote awareness of the importance of the seagrass bed habitat.

Project summary

Enabling a wildcat revival (SWAforLIFE)

Wildcats in Scotland are a critically endangered sub-population of the European wildcat (*Felis silvestris silvestris*), a species listed in the EU Habitats Directive. There are currently only around 200 wildcats in Scotland. The greatest threat is from domestic cats (*Felis catus*) due to problems of interbreeding, competition for territory and resources, and disease transfer. The SWAforLIFE team, led by the Royal Zoological Society of Scotland, will re-establish a viable wildcat population in the Scottish Highlands, by mitigating threats and introducing individual animals, to reverse the decline of Scottish wildcats.

Project summary