Horizon 2020 BiodivRestore Joint Call

(http://www.waterjpi.eu/joint-calls/joint-call-2020-biodivrestore)

In the context of their joint BiodivRestore Cofund Action, BiodivERsA and Water JPI launched in October 2020 a joint call to support research on "Conservation and restoration of degraded ecosystems and their biodiversity, including a focus on aquatic systems".

The call was co-funded by the European Commission and covered three non-exclusive themes:

- Studying the biological and biophysical processes at stake for conservation/restoration, and their interactions
- Assessing trade-offs and synergies between targets, benefits and policies for conservation and restoration
- Knowledge for improving the effectiveness and upscaling of conservation and restoration actions

Project duration: 2022-2024

Swedish partners in the following eleven projects are funded by the Swedish EPA.

Project title: Biodiversity restoration and conservation of inland water ecosystems for environmental and human well-being
Short name / Acronym: BioReset

Swedish participant: Malin Hultberg, SLU

Project summary

Pollution is threatening the biodiversity of inland waters that are vital to society and the future of the Earth. A major source of this pollution are effluent discharges from wastewater treatment plants (WWTPs). Treatment processes used in WWTPs do not efficiently remove emerging contaminants (EC), such as pharmaceuticals and microplastics, which lead to health hazards to non-target species, including humans. This polluting source limits the conservation and restoration of freshwater systems. At the same, there is a need for strategies to up-scale restoration solutions and for rapid and simple to use methodologies to assess conservation and restoration progress, i.e. assessment strategies anticipating the success of conservation/remediation measures in suitable timescales, ensuring reliable data comparison over time and space, and guiding intervention measures. So, the BioReset project proposes to advance treatment processes (chemical, physical, biological and their combination) to promote ecosystem recovery and conservation and to develop assessment strategies. Diatoms will be used to model ecosystem conservation and restoration since their communities show high levels of biodiversity. The diatoms will provide an expeditious method to compare different recovery strategies and water treatment processes, allowing to address timescale and key conservation/restoration questions. The full environmental, economic, and social viability of the upgraded and innovative treatment technologies will be assessed using Environmental, Economic and Biodiversity LCA Assessments. Based on this knowledge, scale-up studies in geographically different sites (Portugal and Spain) to ascertain the technical and economic feasibility at a larger scale will be performed and recommended action guidelines will be issued. Furthermore, BioReset also envisages the creation of a representative space-time picture of the presence of EC in inland waters and its correlation to effects on diatom communities. For this purpose, gas- and liquid chromatography will be used. Besides these methods, and to obtain real-time information, miniaturized analytical platforms that can perform fast and on-site monitoring will also be employed. The BioReset project will thus produce data, methodologies and information for policy makers, authorities, WWTP stakeholders and environmental managers who design approaches and interventions to achieve and maintain biodiversity and a good ecological state of freshwater ecosystems. The project activities will be paired with outreach actions addressing all society levels to raise awareness and best practices towards ecosystems conservation. Because diatom communities, which are geographically spread around the world, will be used as bioindicators of ecosystems status, and WWTPs located in different countries are involved, the project will allow to draw implications and assessment strategies of global usefulness.

Project title: Enhancing the role of MPAs in restoring biodiversity while maintaining access to ecosystem services.

Short name /Acronym: MPA4sustainability

Swedish participant: Lena Bergström, SLU

Project summary:

Marine Protected Areas (MPAs) will play a crucial role in the successful implementation of the European Biodiversity Strategy and the European Green Deal. They are locations where we can concentrate efforts to restore biodiversity and support the diversification of the blue economy to boost the sustainable use of marine resources. We have paid a lot of attention to the best ways to design and establish MPAs; yet with more than 17,000 MPAs now designated globally, less than a quarter have a clear management plan. Managing complex socioecological systems (SES) is harder and navigating them towards sustainability is even harder. That is particularly the case for MPAs for which biodiversity targets and the exploitation of regional ecosystem services have to be balanced. This project aims to find practical solutions to guide MPA managers in the best approaches to yield positive biodiversity outcomes while maintaining the ability of neighboring communities to benefit from marine ecosystem services sustainably. Managers of MPAs in Madeira, France, Denmark and Sweden will together with scientists co-create the insights needed to develop this guide, based on a global synthesis of MPA data and detailed functional analyses at three case study sites. We will use data science and statistical modelling to determine the structure of interactions between biodiversity and the provision of ecosystem services (ES) in all current MPAs depending on their SES characteristics. We will then extend recent advances in theoretical ecological modelling to these socio-ecological networked systems to understand how management actions can tip MPA SES towards favorable states using three MPA case studies to benchmark models. With this insight, we will determine the characteristics that will yield desirable SES states. Monitoring is crucial to guide adaptive management plans along this MPA restoration journey. We will determine whether readily available biodiversity and ES indicators can be integrated with rapid sampling to develop a standardized ‘citizen monitoring’ approach that can provide the necessary and sufficient level of information needed to manage the transformative change at MPAs. Finally, we will tackle the policy interaction hurdles managers face when developing plans in regions where multiple MPAs have been designated with varied policy targets. We will determine how best to manage these MPA networks to add value for regional biodiversity and ES targets. This project will produce a decision support system for MPA managers, which we will make available in a user-friendly format complementing current international MPA guidelines to help increase the uptake of management plans for existing MPA networks. In addition, it will produce tangible advice on integrative governance for our practitioners that will meet current urgent needs for the three case study regions.

Project title: Quantifying restoration success across biomes by linking biodiversity, multifunctionality and hydromorphological heterogeneity

Short name/Acronym: RESTOLINK

Swedish participant: Ryan Sponseller, Umeå university

Project summary:

Restoration approaches to improve in-stream hydromorphology are increasing worldwide but often fail to recover good ecological status as well as biodiversity. Yet, the evidence for dominant effects of hydromorphology on biodiversity and ecosystem functioning suggests that the strong potential for hydromorphological restoration is not fully explored in stream rehabilitation. We argue that restoration often fails because it does not consider the spatial scales of stream hydromorphology that are most relevant to biodiversity and ecosystem functioning. Moreover, traditional indicators of restoration success based on the composition of biological communities may not show the same recovery trajectory as key ecosystem functions. We propose a novel framework for evaluating restoration success by mechanistically linking three central facets of stream ecosystems: hydromorphological heterogeneity at relevant scales, multi-group biodiversity (microbial and macrobial), and ecosystem multifunctionality. We will apply this framework to streams a broad latitudinal gradient from boreal to tropical biomes and will thus test how biomespecific factors such as climate, vegetation, and hydrology set the boundaries for local responses. With RESTOLINK, we i) identify scales of hydromorphology that need to be restored to induce recovery of microbial and macrobial biodiversity (call theme 3.1), ii) decipher the role of biodiversity for ecosystem functioning (theme 1.1 and 1.2), iii) establish ecosystem functions as novel targets for freshwater restoration (theme 2.2), iv) determine thresholds of biodiversity that must be restored to maximise ecosystem multifunctionality (theme 1.2), and v) evaluate the uncertainties of biodiversity and (multi)functional restoration targets across biomes (theme 3.3). RESTOLINK will advance our fundamental understanding of how physical complexity, biodiversity, and ecosystem functioning are interlinked. Through close collaboration with stakeholders, knowledge delivered by RESTOLINK will be available to water managers tasked with tailoring restoration measures that improve the biodiversity, ecological status, and ecosystem functioning of streams. In doing so, RESTOLINK contributes significantly to the implementation of the biodiversity strategy of the European Union for 2030 as well as the European Water Framework Directive. Functional indicators delivered by RESTOLINK will allow for the implementation of the Aichi Biodiversity Targets, which consider biodiversity and ecosystem functioning as environmental commodities at risk.

Project title: NARRatives On restored Water

Short name/Acronym: NARROW

Swedish participant: Håkan Tunon, SLU

Project summary:

In this transdisciplinary and trans-sectorial project, we examine effective biodiversity conservation and climate change mitigation led by Indigenous peoples and local communities (IPLCs) through protected areas (PAs) and "Other Effective area-based Conservation Measures (OECMs). OECMs now form part of the EU 2030 biodiversity Strategy and the post-2020 CBD biodiversity targets. In the EU, IPLCs and OECMs may be important in the integration of ecological infrastructure into planning instruments and the extension of PAs. Using a typology of sites in Finland and Sweden (e.g. inland waters, wetlands and adjacent meadows) in different phases of restoration and representing different governance systems, we seek to understand how these areas, through the active local commitments to restoration and governance vitality, qualify as OECMs. We bring together a partnership of Finnish, Swedish and Swiss research institutions with an international scientific policy organisation, enabling us to bring local to international perspectives together. Working with different sectors of society (local communities including the Sámi, academics, administrative actors, etc.) we bring together social and ecological methods to examine the success of locally-led restoration projects.
Ultimately, we ask a critical and profound question: what are the ecological, cultural, social and spiritual values that inspire local communities to restore and protect these areas? Why are they important and how are such values determined and reflected in national and international policy contexts?
NARROW employs 6 work packages (Local Governance; Biodiversity & Climate; Narratives; Joint Analysis; Policy Dissemination; Project Management). Our methods include analysis of restoration governance through interviews and dialogues; biodiversity and climate change metrics (e.g. greenhouse gas [GHG] fluxes and biodiversity surveys); collection and analysis of restoration narratives; application and critique of the current OECM guidelines. We will bring the results together to understand the different perspectives on restoration, beyond a single viewpoint that emerges from disciplinary approaches, while also bridging methods that represent local concerns at the national, regional and international levels.
We apply a multi-level communication and dissemination plan that engages site-level and policy partners. We will disseminate findings through local media; web platforms; virtual and in-person meetings; national, regional and international policy meetings; and scientific and policy papers. We will collaborate with related networks such as the OECM specialist group of the International Union for Conservation of Nature; national level restoration and GHG project networks. We anticipate that NARROW will help develop new narratives to understanding human relationships to nature from the local to the international while also contributing to EU biodiversity targets.

Project title: Translocations of flora and fauna for conservation and restoration:
ecological, evolutionary, and socio-economic impacts at multiple scales.

Short name/Acronym: Transloc

Swedish participant: Guillaume Chapron, SLU

Project summary:

The purpose and challenges of conservation and restoration of biodiversity are generally perceived at the immediate levels of our social and political contexts and time frames despite the fact that they may constitute major transitions at the scale of evolution. In that context conservation translocations, i.e, the reintroductions, reinforcements, assisted colonisations or movement of wild populations, are conducted in a wide range of ecosystems and involve a variety of stakeholders with different values, interests and expectations. While initially dedicated to restoring populations, they have potential impacts on social-ecosystems which in return may retroactively affect translocation performance. Current research on conservation translocations aims to improve their success to ensure that they contribute to species/ecosystem recovery in the long term. However, few studies have considered a strategic approach in the assessment and optimization of the allocation of translocation efforts at larger scales. Moreover, in the context of global changes including climate change, land use intensification and biological invasions, the extent to which population restoration projects may assist the conservation of biodiversity at regional, continental or global scale remains unclear. Any assessment of the contribution of translocations to biodiversity conservation at large scales needs to consider that the observed patterns reflect a bottom up accumulation of locally implemented actions that are rarely designed to tackle priorities at larger spatial/organizational scales. Given the debates regarding trade-offs in the economic and human costs of translocation programs, the underlying ethical and environmental questions raised by translocation practices, and their integration into wider environmental management schemes e.g., rewilding, it is of first importance to provide evidence-based arguments to describe how conservation translocations may contribute to conservation and restoration of biodiversity in their evolutionary, functional and social dimensions at larger spatial and organisational scales. The main objective of the TRANSLOC project is thus to investigate and quantify how local conservation translocations impact ecological, evolutionary and sociological trajectories of restoration at multiple scales in the Western Palearctic. Mixing large databases and accurate case studies, this project will particularly aim to i) document, quantify and analyse translocation efforts and efficacy, ii) investigate their congruence with future impacts of global change iii) assess their motivations and socio-economic cobenefits, iv) develop and apply generic and multidimensional criteria to assess their impact on socio-ecosystem in the short and long terms v) engage stakeholders and produce robust science-based policy recommendations for local to European-level action.

Project title: Farmer acceptable REstoration of Semi-natural Habitat to limit Herbicides.

Short name/Acronym: FRESHH

Swedish participant: Mattias Jonsson, SLU

Project summary:

The intensification of agriculture and herbicide use has led to the degradation of farmland ecosystems, with significant loss of farmland terrestrial and freshwater biodiversity and services. Herbicide use within fields has reduced farmland plant (weed) abundance and diversity, destroying these refuge and food resources relied upon by birds, pollinators and natural enemy arthropods. Herbicides have selected for some noxious weeds, damaging to crops, leading to an arms race with more herbicide being used to combat weeds that do relatively well in conditions of herbicide use. This is compounded by agricultural intensification at landscape scales that has led to the loss of semi-natural floral habitat surrounding fields, including areas of meadow, margins, hedgerows and woods that provided overwintering, oviposition and alternative food resources for biodiversity. This lost semi-natural habitat is also no longer able to intercept herbicides, applied in field, leading to an increase in the run-off of these and other pesticides into water courses adjacent to farmland fields where they significantly impact the ecological quality and diversity (ecological status) of freshwaters, within farmland and downstream. In the FRESHH project, we hypothesise that we can reduce herbicide usage by adopting the ecosystem service of weed seed regulation by carabid beetles. Restoration of semi-natural habitat in and around fields, via beetle banks, margins or hedgerows, would increase carabid abundance and diversity by conservation, through the provision of food and refuge resources. These restored habitats could also intercept some of the herbicides that are still applied, preventing run-off into freshwaters. Semi-natural habitat restoration in farmland would therefore have multiple, synergistic effects, playing a role not only in the conservation of carabids and of terrestrial and freshwater biodiversity, but also in the release (rewilding) of weed communities to more natural abundance and diversity within farmland with lower herbicide selection pressure. This FRESHH approach is dependent on the acceptability to farmers of the adoption of carabids, in place of herbicides, and of the installation of semi-natural habitat. FRESHH explicitly uses a transdisciplinary approach, at the interface of socio-economics, ecology and agronomy, to balance our concerns for farmland terrestrial and freshwater ecosystems and farmer needs for weed control. Co-development with farmers will produce acceptable management to restore semi-natural habitat, to foster carabid beetle regulation of the weed seedbank and to reduce impacts on freshwaters through direct herbicide input reduction and greater interception of herbicide runoff.

Project title: Protecting Biodiversity through Regulating Trade and International Business.

Short name/Acronym: BIO-TRADE

Swedish participant: Claudia Ituarte-Lima, Raul Wallenberg Institute on Human Rights and Humanitarian Law, Lund University

Project summary:

The scientific objective of the project is to produce novel understanding of current and future European rules that impact on or target to protect and enhance biodiversity outside Europe. The presumption is that by regulating European business relations, European law can extend its positive biodiversity impacts elsewhere in the world, possibly having a major role in reaching the goals of international environmental and human rights agreements. The BIO-TRADE project assists European regulators and other actors in Europe in developing tools and mechanisms for upscaling the protection and sustainable use of biodiversity outside their territories in an effective way. Both public law and regulation and private instruments (e.g. certification schemes), are examined, and synergies between biodiversity and human rights protection are analysed. Our main research question is: How can the EU and European countries regulate their impacts on biodiversity abroad in order to contribute to positive socio-ecological outcomes through effective, fair and coherent law and policy?
The role of law and regulation on facilitating or frustrating the transformations for safeguarding biodiversity is not well understood. The proposed BIO-TRADE project is novel as it brings together researchers with expertise in law, policy and trade and its nexus with biodiversity, to uncover the root causes of biodiversity loss and degradation of ecosystems and to reveal legal innovations that can be used towards conserving, restoring and sustainably using biodiversity. Strategies for regulating trade and international business rely on differentiating between sustainable and unsustainable practices. Transparent and fair criteria for sustainable production should form the basis for regulating businesses. Therefore, sustainability criteria must acknowledge the strong dependence of human wellbeing on natural resources and ecosystems. BIO-TRADE analyses how scientific knowledge, other knowledge systems, and multiple dimensions of values of biodiversity need to be brought into the shaping of law and the definition of standards and criteria for lawful vs. unlawful activities and products. Taking an ecosystem-based approach will serve to examine the way socio-ecological systems are interconnected: forests, wetlands, farmlands, and aquatic socio-ecological systems cannot be effectively protected or restored separately. In BIO-TRADE, the ecosystem approach will be weaved with legal innovations. Legal rights are interconnected: environmental basic rights cannot be separated from land rights, water rights, right to food, and workers' rights. The project examines European lessons learned and good practices in protecting biodiversity and the right to a healthy environment outside Europe. These practices shall serve as a catalyst for action to address the global biodiversity crisis.

Project title: Interactive effects of local and landscape scale restoration of semi-natural.

grasslands and agricultural fields on species interactions and ecosystem functions in different social-ecological systems.

Short name Acronym: InterRest

Swedish participant: Örjan Bodin, Stockholm university

Project summary

Calcareous grasslands were created by traditional land use in European cultural landscapes and are one of the most species-rich habitat types. They harbour many rare and highly endangered species, but are nowadays often threatened, mainly by abandonment and eutrophication. Hence, restoration measures are urgently needed. However, transnational restoration approaches are missing and evaluations within regional restoration schemes focus usually only on indicator species or species richness and ignore their biotic interactions, ecosystem functions and the landscape context. Especially species interactions are important indicators of restoration success as they are often more sensitive to environmental changes and determine vital functions that are necessary to stabilize ecosystems. In this project we will investigate species interactions across different trophic levels including (1) plant-soil, (2) plant pollinator and (3) bird-food resource interactions, in restored and degraded calcareous grasslands that are embedded in different socio-ecological and landscape contexts in three countries (Germany, Spain and Estonia). Additionally, we will measure ecosystem functions including soil functions, pollination and predation. We hypothesize that local restoration measures will lead to more complex and stable interactions and improved ecosystem functions compared to degraded sites. Moreover, we will investigate whether landscape-scale restoration with agrienvironment schemes can make local restoration more effective through additive or synergistic effects. We expect that agri-environment schemes increase the connectivity of calcareous grasslands, especially in isolated sites with no other calcareous grasslands in the surroundings. Moreover, we will analyse the social contexts of the restoration programs and identify key actors who are necessary to achieve local and landscape restoration goals. Importantly, we will investigate how social interdependencies impact biological interactions as indirect drivers. To synthesize the results of this project we will use meta network, multifunctional and social-ecological network approaches, e.g. to identify conservation priorities and possible trade-offs. The results of our project will contribute to several Aichi targets by focusing on habitats with extremely high conservation value. They will inform the European Habitats Directive on the effects of restoration measures on species interactions and ecosystem functions and how they are linked to social networks. Knowledge on the contribution of agri-environment schemes at the landscape scale to the restoration of calcareous grasslands can be integrated in the Common Agricultural Policy. The project will therefore contribute to safeguard the precious biodiversity in calcareous grasslands, their interactions and functions and promote resilient ecosystems in European cultural landscapes.

Project title: Decision-making Support for Forest Biodiversity Conservation and
Restoration Policy and Management in Europe: Trade-offs and Synergies at the Forest-Biodiversity-Climate-Water Nexus

Short name /Acronym: BIOCONSENT

Swedish participant: Karin Beland Lindahl, Luleå technical university

Project summary:

Despite ambitious nature conservation policies and targets at the global and EU levels, biodiversity is under increasing threat. Decline/loss of biodiversity and degradation of ecosystems continue at an alarming rate, especially in forests that harbor 80% of terrestrial biodiversity worldwide. Enhanced conservation and restoration of forest habitats, species and functions are key for biodiversity and provision of ecosystem services (ES). However, ambitious targets are not enough to reverse the current trends. First, strong interdependencies exist between different policies relating to biodiversity, forests, climate and water, and goal achievement presupposes coherent policy design and implementation at (inter-)national and local levels. Second, implementation depends on supportive behavioral responses. Previous research suggests that failures to understand behavioral responses constitute major barriers to achieving desired biodiversity outcomes. Forest owners and conservation managers have to respond to multiple policy, socioeconomic and ecological drivers forcing them to make trade-offs under complexity, uncertainty and climate change. Therefore, the main objectives of BIOCONSENT is to provide novel scientific knowledge and policy support by (i.) analysis of the impacts of policy incentives arising from (in)coherent cross-sectoral policies at the biodiversity-forest-water-climate nexus, (ii.) assessment of actors' behavior and behavioral changes required for transformation towards sustainable socio-ecological systems with improved biodiversity status, and (iii.) integration of biophysical, social, economic and governance drivers shaping the biodiversity-forest-water-climate nexus. The project uses integrative socio-ecological approaches to assess and quantify outcomes of alternative conservation and restoration measures on forest biodiversity and ES provision across spatial and temporal scales. The main scientific and policy contribution is Decision Support: i) better knowledge about trade-offs and synergies between policy objectives and management practices, ii) novel development and application of participatory foresight methods to explore behavioral responses promoting transformational change, iii) agent-based modelling tools that support decision-making by assessing and quantifying synergies and trade-offs associated with forest conservation and restoration measures, and iv) policy and management recommendations, and policy learning through dissemination of knowledge and good practices. By applying a systematic cross-country and EU level comparative design, BIOCONSENT effectively exploits the added value of a transnational project approach and brings together scientists from social and natural sciences. A systematic horizontal and vertical comparative approach will reveal drivers/barriers to goal achievement and enable upscaling of results and learning in a way that go well beyond the scope of national or local research projects.

Project title: Holistic evaluation and restoration measures of human impacts on freshwater ecosystems across biogeographical gradients (FreshRestore).

Short name/Acronym: FreshRestore

Swedish participant: Pär Byström, Umeå university

Project summary:

Freshwater ecosystems are under tremendous anthropogenic stress both at a global scale (e.g. from climate change) and also at catchment scales (e.g. from land use). A direct result is that freshwater ecosystems hold far more threatened species compared to all other ecosystems. This is not only problematic for biodiversity, but also for human prosperity as a functional freshwater ecosystem provides a range of ecosystem services. A key challenge of the 21st century is therefore to understand and predict how freshwater ecosystems respond to the suite of stressors, and concurrently how we can sustain and restore these systems at a large scale. To achieve this task we need a coherent framework to understand and predict how the suite of stressors influences functional diversity, as the target for mitigation measures, in freshwater systems. Our project, FreshRestore, will use lake ecosystems across Fennoscandia as a model system. The project is based upon existing datasets of abiotic parameters, fish community and population structure and trophic diversity from stable isotopes across large environmental gradients in Fennoscandia. These datasets, collated by consortium members will be expanded and merged with information on climate, land- and waterscape utilization as well as restoration and mitigation efforts (e.g. habitat restorations, wetlands, regrowth of forest and buffer zones). We will develop and employ an integrative modeling framework estimating and merging demographic traits with information on trophic diversity and niche utilization from stable isotope analyses, and how the outcome varies with anthropogenic stressors. The resulting scenarios will be tested for generality at European scale by including case-studies areas with less available data (Spain). We will also combine the ecological knowledge with socio-economic models to evaluate the cost-efficiency of different nature-based solutions (e.g. altered land use) and assess how to improve biodiversity in lakes through simulations of different implementations.

Project title: Marine Forests of animals, plants and algae: nature-based tools to protect and restore biodiversity.

Short name/Acronym: RESTORESEAS

Swedish participant: Ann Larsson, Lund university

Project summary:

RESTORESEAS integrates ongoing long-term research lines of leading experts across Europe and beyond in an unprecedented joint multidisciplinary approach for marine conservation. Marine forests of macroalgae, seagrasses and cold water corals are the focus - taxa upon which biodiversity-rich ecosystems depend, that provide essential services for humanity, the loss of which is a catastrophic tipping point of lost nursery, shelter, feeding grounds, food security and other ecosystem functions as carbon sequestration, for which seagrasses are one of the most efficient ecosystems on Earth. RESTORESEAS is a holistic integration of climate-adaptation in conservation and restoration, at functional scales from gene expression to cross-ocean distributions and long-term baseline shifts including past eDNA imprinted in marine sediments. It develops approaches for conservation and restoration integrating previously overlooked roles of microbes and pathogens. Biodiversity predictions over space and time, compared with past and future climate proxies, will reveal climate-threatened marine forests of the Atlantic Ocean, as regions where restoration plans require climate-adapted strategies. Biodiversity tendencies over time includes estimates using complementary approaches - models trained with global data and eDNA estimates of past and current baselines in biodiversity including estimates from eDNA of ancient sediments of natural and disturbed sites. These are integrated with local empirical restoration test of critical sizes for ecosystem stability (assessed as long-term persistence and biodiversity support indicators) and conditions and thresholds for tipping points. For continuous monitoring of outcomes of longterm effectiveness and efficiency of restoration and conservation, RESTORESEAS will develop ecosystem function indicators based on descriptors of total biodiversity using eDNA of the water, and long-term biodiversity tendencies and carbon sequestration using eDNA of relevant sediments. RESTORESEAS will be proof of concept of the use of genetic and functional diversity in restoration of degraded habitats, including functional genetic diversity (best adapted genotypes), and diversity and role of symbionts and pathogens. The societal outcomes build on expanding the already ongoing successful examples practices of local integration of citizens (fishermen and teachers) in restoration, building education, trust, empowerment and especially ensuring that the willingness to improve these habitats will continue in civil society in the long-term after the project ends. At the policy level, we will continue our work with local and global institutional contacts and involvements and with the support of BiodivERsA in policy communication towards the EU and the UN strategies. RESTORESEAS will spread by going beyond theory in demonstrating results that serve as role models and offering ways to use our support for replication of the same initiatives globally.