Republic of Serbia

#ЕУ ЗА ТЕБЕ

This project is funded by the European Union

EU for Green Agenda in Serbia

CHALLENGE CALL FOR INNOVATIVE PROJECTS ON WETLAND CONSERVATION IN AND AROUND PROTECTED AREAS

Conditions and Guidelines for applicants

The Project is implemented by UNDP, in collaboration with

Шведска Sverige

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Schweizerische Eidgenossenschaft
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Project "EU for Green Agenda in Serbia: Protecting and investing in biodiversity and water for enhanced climate resilience"

This public call is published within the project "**EU for Green Agenda in Serbia: Protecting and investing in biodiversity and water for enhanced climate resilience"**, funded by the Government of Sweden, as part of the broader initiative "EU for Green Agenda in Serbia". The project contributes to Pillar 4 of the EU's Green Agenda in Serbia.

The Project focuses on biodiversity, water and wetlands, as well as climate resilience, by improving the legal and policy framework and by supporting further work on nature-based solutions (activities aimed at protection, sustainable management and restoration of natural ecosystems, which also address challenges such as climate change, food and water security or natural disasters) through implementation of innovative ideas and promoting opportunities for mobilisation and scale-up of climate and biodiversity financing. The main objective of the project is to improve the management of ecosystems through increased capacities for planning, implementation and enforcement of nature, water and climate policies by 2026.

About the Challenge Call

The public call is aimed at **innovative project proposals for the application of nature-based solutions in order to protect and preserve wetland habitats within protected areas or in their immediate vicinity**, in the Republic of Serbia.

This public call aims to collect project proposals that can contribute to the efforts of the Republic of Serbia to protect and preserve wetlands and fulfil obligations arising from ratified international agreements in the field of nature protection and conservation, such as the Convention on Biological Diversity (CBD) and the Convention on Wetlands (RAMSAR). Also, projects and ideas that this public call aims to support shall contribute to the Serbia's European Union accession process, given that the protection and restoration of these important ecosystems is part of the European Union Biodiversity Protection Strategy until 2030, as well as the new EU Nature Restoration Law.

Nature-based solutions (NbS)

The term "Nature-based solutions – NbS" represents a wide set of concepts and practices, which include interventions and management practices in natural and other infrastructures with the aim of sustainability and probable future self-preservation.

One of the alternative definitions of NbS is given by the European Commission, which states that NbS are: " Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions."

NbS are practical actions for the protection, sustainable management and restoration of natural or modified ecosystems, which effectively and adaptively respond to societal challenges, while providing benefits for human well-being and biodiversity.

Within this call, special priority shall be given to projects that apply NbS through actions (interventions) that:

- have the effect of ecosystem protection, sustainable management of ecosystems and their restoration;
- solve social challenges (contribute to climate change mitigation and/or climate change adaptation, disaster risk reduction, economic and social development, human health, food and water safety, environmental and biodiversity preservation);
- are effective and adaptive (adaptability is very important due to the impact of climate change on other dynamic system changes);
- provide benefits for human well-being, provided they protect natural resources, including biodiversity, land, water, air, food and livelihoods as equally important and preserve their symbiotic functioning as a sustainable pathway for the future).

Wetland habitats

Wetland habitats in a broad sense include different types of terrestrial surface waters such as lakes, ponds, marshes (including salt marshes), backwaters, deltas of large rivers, mangroves. Pannonian salt steppes and saline meadows, i.e. habitats that are saturated with water during most of the year or constantly, including those where specifically adapted vegetation occurs.

Wetlands represent important centres of biodiversity and are considered one of the most productive ecological systems. Although they occupy only 3% of the Earth's surface, they contribute to the storage of a third of carbon on land, which is twice as much as all the world's forests combined. Peatlands store large amounts of carbon in the soil itself in a stable form, helping to mitigate climate change by removing carbon dioxide from the atmosphere. Also, by retaining excess water, they prevent floods and economic damage. Because of their vegetation, wetlands contribute to water purification and thereby reduce the impact of various sources of pollution. In addition to the above-mentioned important characteristics, wetlands enable the protection of riparian and coastal areas, the preservation of groundwater levels and the regulation of soil moisture.

According to various sources, it is estimated that the global value of the ecosystem services of currently provided by existing wetland ecosystems is $47.7 trilion per year. Wetlands contribute with more than 20% of the total value of ecosystem services globally, exceeding the contributions of terrestrial forests and coral reefs.

However, despite their potential, today they are disappearing at a rate three times faster than forest habitats, and over the past 45 years a third of all wetland habitats on Earth have been lost. Therefore, although they belong to the most productive ecosystems, they are also the most sensitive. The wetland habitats are severely affected by even the smallest changes in climate, the rise in sea level, as well as by the decrease in surface and underground water levels.

Wetland habitats and protected areas in Serbia

Protected areas in the Republic of Serbia currently cover 762,960 hectares, which is approximately 8.62% of the national territory. There are 471 protected areas, divided into 7 different categories, namely: 5 national parks, 20 nature parks, 31 landscapes of exceptional features, 66 nature reserves, 5 protected habitats, 309 natural monuments and 35 areas of cultural and historical importance. Protected areas are natural assets of general interest of a country, which have important biological, geological and landscape diversity, and usually also represent important habitats for migratory species. They contribute to the preservation of global biodiversity through the improvement of habitats, their connectivity and the preservation of ecosystems.

Out of the total number of protected areas on the territory of the Republic of Serbia, the presence of different types of wetland habitats was identified within 67 of the existing protected areas. Wetland habitats, according to the national habitat classification in Serbia, occur within different natural habitat categories, namely: terrestrial surface-water habitats; swamp, peatland and ridge habitats; grassland habitats; scrub habitats and tundra; forests and forest habitats; intracontinental habitats with poorly developed vegetation. They are spread within different categories of protected areas, from national parks, through special nature reserves, natural monuments, protected habitats, landscapes of exceptional characteristics and nature parks.

Due to the exceptional importance of wetlands, representatives of numerous governments and international organizations adopted the Convention on Wetlands of International Importance in 1971 - today known as the Ramsar Convention. Over 2,300 wetlands around the world are currently protected by the Ramsar Convention, covering an area of over 2.5 million square kilometres. The Republic of Serbia, as a member country of the Ramsar Convention, declared eleven wetlands and wetlands of international importance (Special Nature Reserve (SNR) "Peštersko polje", SNR "Gornje Podunavlje", SNR "Koviljsko-Petrovaradinski-rit", SNR "Labudovo okno", SNR "Ludaško jezero ", SNR "Obedska bara", SNR "Slano Kopovo", SNR "Stari Begej-Carska bara", SNR "Zasavica", Landscape of outstanding features "Vlasina" and National Park „Djerdap") which in total occupy an area of over 130,000 hectares.

Human activities pose the most significant threats to wetlands, with degradation resulting from uncontrolled urbanization, industrial development, pollution, drainage for agriculture, peat extraction and other activities such as overfishing and illegal hunting, which directly threaten the wildlife in wetlands. Furthermore, climate change effects, manifested through shifting precipitation patterns and increasing frequencies of droughts, challenge the natural balance of these ecosystems.

It is clear that the remaining wetland areas need to be preserved and the degraded wetlands restored through the application of nature-based solutions, as these ecosystems are of vital importance for both nature and humans.

Conditions and guidelines for participation in the public call

All the conditions of the call, as well as the instructions for the preparation, submission and implementation of the project proposal are given below in this document and within the Annexes.

WHO CAN APPLY?

The following legal entities can submit project applications as the project lead:

- **All managers of protected areas**;
- **Public enterprises**;
- **Legal entities from the private sector**;
- **Scientific and research institutions and organizations;** and
- **Local self-government units.**

The applicant:

- must be authorized to perform the activities proposed in the application;
- must provide a copy of the formal agreement between the applicant and the protected area manager when submitting the final project proposal (if the main applicant is not the manager of the protected area where the proposed actions will take place);
- must be registered in the Serbian Business Registers Agency;
- cannot be in liquidation proceedings, bankruptcy proceedings or under a temporary ban on activities;
- as a lead proponent, can propose a maximum of three project proposals within the call;
- can implement the project independently or in partnership.

All proposed actions must be in compliance with the national legislation.

Partnership

Civil society organizations can participate as partners. Exceptionally, a civil society organization can be the project holder if it is also the manager of the protected area.

In case of partnership, partner organizations must be registered in Serbia.

In the case of a partnership, it is necessary to submit a completed Annex 5 form (data of partner institutions or organizations), as well as a cooperation agreement, signed and stamped by the partner parties in the project, where the activities and responsibilities of each partner are clearly defined.

Protected areas

For all projects implemented in protected areas, it is necessary that the manager of the protected area has formal consent from the competent authority for the ten-year management plan and the annual program for the year 2024.

Conditions applicable to the project proposal

As part of this call, **only** those projects that are implemented **within or in the immediate vicinity of legally protected areas** on the territory of the Republic of Serbia and whose project activities are exclusively related to the **protection, preservation and/or restoration of wetlands** can be proposed.

Projects whose project activities can be implemented in a period that is **not shorter than six months nor longer than 18 months**.

Preference in the selection of projects for implementation shall be given to those projects whose activities have a measurable positive impact on wetlands through the **protection of species and/or ecosystem biodiversity, preservation of ecosystem services of wetlands, adaptation to climate change and mitigation** of its negative consequences, **stimulation of traditional forms of use of wetlands** with the aim of their long-term preservation.

Also, priority shall be given to projects:

• in which innovative nature-based solutions, in compliance with the current national legislation of the Republic of Serbia, are applied;

• in which the application of the NbS contributes to the restoration of habitats and the implementation of policies and regulations of the European Union in the areas of nature protection, water protection and adaptation to climate change;

• which represent solutions that can be replicated and/or further upgraded for use in other protected areas;

• whose activities and applied NbS have clearly defined end users and an implementation plan;

• that propose partnerships that contribute to the long-term preservation and protection of wetlands;

• that contribute to solving social challenges (gender equality, marginalized groups, unemployment) and integrate the conservation of wetlands and the goals of sustainable development of local communities in the protected area and the wider environment.

THE PROCESS FROM APPLICATION TO IMPLEMENTATION

1. First step: Applicants are invited to prepare the **initial concept notes for their innovative solutions/project ideas** and submit them to UNDP through a special online form.

The UNDP Project Team shall review and rank the received project ideas. After the first round of review and evaluation, each candidate shall be informed of the results, receive comments and guidelines either for further development and submission of a **complete project proposal (second step)** or for resubmission of the project idea.

2. Second step: After the first round of reviews and evaluations, applicants shall be invited to a **training** for the development of a full project proposal, where they shall receive detailed guidelines for the next stage.

3. Third step: Project applicants shall prepare and submit a **complete project proposal** based on the "Application Form" (see below). Detailed instructions (with evaluation criteria) and application form are contained in this document below.

Only applications submitted via the online form, with the requested additional documentation submitted via e-mail, shall be considered for further evaluation.

Applications **must** be filled out and submitted at the following **LINK**, and the entire documentation must be sent to the electronic address **zelena.agenda.rs@undp.org**.

When sending documents, please put the following in the email subject: "Challenge call for innovative projects on wetland conservation in and around protected areas ".

Only complete applications, i.e., fully filled out forms and submitted documentation, as stated below, will be accepted for evaluation.

Project proposals are submitted in the **Serbian** language.

Applicants must fill in the application forms clearly and precisely, so that they will be evaluated in the best possible way.

The applicant shall bear any, and all costs related to the preparation and/or submission of the project proposal, regardless of whether its project proposal was selected or not. UNDP shall in

no case be responsible or liable for those costs, regardless of the conduct or outcome of the process.

Mandatory documents to be submitted by e-mail to zelena.agenda.rs@undp.org for **complete project proposals** are:

• Application form for complete project proposals(Annex 1);

• Time frame form (Annex 2);

• Tabular and narrative budget form (Annex 3);

• Profile of the applicant, which includes the corresponding signed statements (Annex 4);

• Project partner profile, which includes a corresponding signed statement (Annex 5);

• Agreement on the cooperation of all partners including clearly defined roles and responsibilities of each partner;

• All necessary permits, approvals, conditions and consents for implementation.

The Challenge call is continuously open. The next submission deadline shall be in 2025.

Important notes:

• After the expiration of the deadline for submitting project proposals, and before making the final decision on financing, the evaluation committee can propose certain changes to the project proposal, in terms of the budget and in terms of the activities planned in the project in order to improve the project proposal. The project applicant has the right to accept or reject these proposals. The required funds are subject to a verification process that precedes the signing of the contract. Checks may include a request for additional explanations, and based on them, the evaluation committee may propose budget changes. Therefore, it is in the interest of every applicant to provide a realistic budget with the most favourable prices.

• Applications submitted after the abovementioned deadline will not be considered in the first cycle of the public call, rather they will be considered in the following cycle.

• The evaluation committee may request additional information during the application evaluation process.

• UNDP shall confirm receipt of the application package no later than one week after the deadline for submission.

• UNDP shall inform all applicants about the results of this call after the evaluation is completed and the final results are published.

• Reasons for rejection of applications may include, but are not limited to the following:

- submission of the application package after the deadline;
- incomplete application;
- incompatibility with the objectives of the call;
- low rating due to the technical quality of the application and the inconsistency of the proposed activities with the budget proposal;
- unapproved management plan and/or programme for 2024, for the protected area where the project is to take place.

4. Fourth step: The Project Evaluation Commission, which consists of external evaluators and members of the Project Management Board, shall analyse and evaluate the submitted full project proposals based on pre-defined criteria, and select solutions that shall proceed to the next phase and receive technical support through the so-called "acceleration".

5. Fifth step: Acceleration - technical support for successful project proposals represents support to candidates in the further development of their innovative project proposals and in the preparation of the **Final Project Document**. The acceleration process may include the provision of **technical and professional support** for: improving the technical, innovative, financial aspects of the projects, enabling access to financing, securing the necessary permits, and finally support in the development of final projects that shall have a direct positive impact and contribute to the objective of the Challenge Call. During this phase, candidates shall be provided with individual mentoring, as well as additional training for biodiversity and ecosystem conservation, nature-based solutions, business plan development, marketing planning, additional funding, public presentations, gender mainstreaming and other relevant topics.

6. Sixth step: After the completion of the acceleration phase, UNDP shall re-evaluate each project document to determine the projects that are ready for implementation. The most successful among the projects shall be allocated funds for co-financing. Co-financing shall be provided through the mechanism of **Performance-based Payment Agreements (PBPA),** in accordance with the Project Document, and according to the available budget. Within this public call **co-financing of up to 70%** of the estimated total investment value of the project is allowed.

Conditions applicable to the project budget

Through this public call, UNDP provides co-financing of the project in the **maximum** amount of **70%,** while the applicants are obliged to provide their own participation or participation from other sources in the **minimum** amount of **30%**.

The following shall be accepted as the applicant's **own participation** or participation from another source:

- provision of direct financial contribution;
- activities that directly contribute to the overall implementation of the project (ex. preparation of project technical documentation; purchase of machinery necessary for the maintenance of wetland habitats, etc.);
- engagement of employees whose work is directly related to the project activity.

The maximum percentages per item of **own participation** are:

- Human resources - maximum 10%;
- Communication and visibility activities - maximum 5%;
- Administrative costs - a maximum of 5% of the total acceptable costs;
- Travel expenses - a maximum of 5% of the total eligible expenses.

• Activities that are indirectly related to the restoration and improvement of the condition of wetlands (ex. research, monitoring, education, etc.) can be supporting activities with a maximum participation in the total budget of 10%.

The main part of the budget must be reserved for activities related to the restoration or improvement of the condition, that is, the preservation of wetland habitats.

In the event that the project proposal is seeking co-financing in an amount greater than **$50,000.00 USD**, it is necessary to submit a statement from the applicant (Annex 4) confirming experience in managing projects that were worth the same or more than the project proposal they are applying for.

The **maximum co-financing** amount that can be claimed for a project is **$150,000.00 USD.**

Guidelines applicable to project budget preparation

The project budget represents the monetary amounts of project activities. The costs stated in the project budget must be based on real market prices and standard tariffs, which means that during the development of the project proposal, that is, in the phase of drawing up the project budget, all appropriate information should be collected.

Before signing the contract, project proposals are subject to verification and may lead to a request for additional explanation as well as a proposal to change the budget, by the Evaluation Commission for scoring project proposals. Therefore, it is in the interest of the applicant and the service provider to draw up a realistic budget with real, justified and acceptable costs.

For costs that cannot be precisely determined, it is necessary to give an estimate and explain in the narrative budget (Annex 3) how these costs were estimated. This particularly applies to activities that the applicant presents as his own participation or from other sources.

The contributions of the applicant and other donors should be separately stated in the tabular budget in the appropriate column and explained in the narrative budget (if the contribution is provided under certain conditions, they must be stated).

When filling out the budget in the application, it is particularly important that:

• all costs are budgeted and listed in US dollars (USD). Payment shall be made in Serbian dinars (RSD) according to the effective UNORE rate, whilst reporting shall be both in Serbian dinars (RSD) and US dollars (USD);

• all costs must be stated in gross amounts;

• costs of procurement of goods and services should be reported with VAT.

The applicant is responsible for the independent audit, therefore this activity should be foreseen in the budget.

Monitoring and evaluation will be carried out separately within the project *„EU for Green Agenda in Serbia: Protecting and investing in biodiversity and water for enhanced* climate resilience **"**, and these costs do not have to be reflected in the applicant's budget;

Anticipate unplanned costs in the amount of up to 3% of the sum of all other project costs.

During the implementation of the project, the purchase of goods and services have to be in full compliance with the national legislation of the Republic of Serbia.

Eligible costs in the project proposal for UNDP co-financing include the following**:**

- Necessary costs for the implementation of activities and in accordance with the principles of legality and economical financial management, which is especially related to value of money invested and cost effectiveness (best value for money invested);
- Actual costs incurred by the applicant or his partners during the period of project realization;
- Costs recorded during the project implementation, in calculations or tax documents of the applicant or his partners, to be recognizable and verifiable, and supported by the original documentation on the basis of whose copies they are justified to UNDP;
- Indicated in the estimated overall budget of the action.

Non eligible costs in the project proposal for UNDP co-financing include the following:

- Costs not directly related to project implementation and reaching objective of the project;
- Costs for individual items which are disproportionate to the total project budget;
- Costs covered by another donor (unless this is a part of own co-financing);
- Any kind of compensation to the personnel of national administration (civil servants);
- Commercial costs;
- Debts and debt service charges;
- Currency exchange losses;
- Costs of acquisition of land and/or property;
- Costs of political or religious activities;
- Costs related for purchase or alcohol, tobacco products, weapons and medicines.

The narrative budget is an integral part of Annex 3 - Project budget and represents an integral part of the project budget. It describes in detail and shows the cost structure for each budget item and sub-item separately.

EVALUATION

The project proposal evaluation process is composed of three phases:

• **Phase One**: the **initial project concept notes** shall be **screened by the UNDP project team** in order to check if the applicant fulfills the eligibility crieria and the application meets Challenge Call's technical requirements

• **Phase Two:** the **full project proposals** shall be **evaluated by a team of independent evaluators** based on the evaluation criteria listed in the table (given below). Selected projects shall enter **the Acceleration phase** (and obtain technical assistance in improving their proposals);

• **Phase Three**: the **best and most mature projects after acceleration** shall be **proposed for financing,** to be approved by the Project Steering Comittee (including representatives of the Swedish Embassy, the Ministry of Environmental Protection and UNDP).

The evaluation criteria are the following:

No.	Description:	%	Points
1.	Capacities of the applicant for the unhindered implementation of the project proposal	10%	10
1a	Relevant experience of the applicant in the field of improvement of natural values of protected areas, restoration of habitats and/or application of NbS		0-10
2.	Purpose and relevance of the project proposal	10%	10
2a	Compliance of the project's objectives with the requirements of the call and the objectives of the European Union Biodiversity Protection Strategy until 2030.		0-5
2b	Clarity of defined project objectives		0-5
3.	Plan of activities and proposed implementation methodology	30%	30
3a	Is the Plan of activities properly linked to the project objectives?		0-15
3b	Are the project activities significant for the conservation of wetlands?		0-15
4.	Project effectiveness	30%	30
4a	The impact of activities on the long-term conservation of wetlands		0-15
4b	Is it possible to implement the proposed activities within the proposed budget and timeframe?		0-15
5.	Budget	20%	20
5a	Justification of the budget		0-10
5b	The way and form of securing one's own participation in the project		0-10
	TOTAL	**100%**	**100**

Project „EU for Green Agenda in Serbia"

"EU for Green Agenda in Serbia: Get Started, Take Action, Scale-up" is a project funded by the EU Delegation and implemented by UNDP, in collaboration with the Swedish International Development Agency and the European Investment Bank, with support of the Ministry of Environmental Protection of the Republic of Serbia.

The project's primary objective is to contribute to the efficient, inclusive and sustainable implementation of the Green Agenda for the Western Balkans (EC, 2020. Link) and its' Action Plan (RCC, 2021. Link) in the Republic of Serbia, by building broad engagement and societal participation. This will be achieved through policy support and capacity building, knowledge exchange and awareness-raising campaigns, as well as Challenge Calls for Proposals for innovative piloting actions to support green transition. These Challenge Calls are developed and applied by UNDP, in close cooperation with the EU Delegation and relevant institutions.

The project will contribute to the green transformation and decarbonization of the economy and society in Serbia, as well as to achievement of the Paris Agreement goals, reducing environmental pollution (air, soil, and water) and support the alignment of Serbia's regulatory framework with the EU acquis in following five pillars of the Green Agenda:

1. Climate action, decarbonization, energy efficiency, and green industries;
2. Circular economy for resource efficiency and industrial symbiosis;
3. Depollution of the environment with a strong focus on air quality;
4. Protecting and investing in biodiversity and ecosystems;
5. Sustainable food systems for sustainable rural livelihood.

Through the challenge call for innovative solutions for biodiversity and ecosystem preservation, improving nature capital and climate resilience, we wish to contribute to a more favourable environment for the green transition and green recovery, as well as Serbia's alignment with the EU Green Agenda for the Western Balkans, taking into account the following:

- The European Green Deal and the EU Green Recovery Plan (Europa.eu, 2020 Link);
- The EU's Green Agenda for the Western Balkans, which extends the European Green Deal policy to the candidate countries of the Western Balkans (Europa.eu, 2020 Link);
- EU Strategy on Green Infrastructure (Europa.eu, 2013 Link).
- EU Biodiversity Strategy for 2030 (Europa.er, 2020 Link);
- Guidance on a strategic framework for further supporting the deployment of EU-level green and blue infrastructure (Europa.eu, 2019 Link).

Additional information:

For any additional information or technical questions regarding this call**, please contact** pavle.jovanovic2@undp.org **or** zelena.agenda.rs@undp.org

POTENTIAL PROJECT COMPONENTS FOR THE CHALLANGE CALL

Below is a limited number of illustrated examples of projects and specific components that may be of relevance for the development process of similar and/or new project proposal ideas for this Challenge Call.

RESTORATION OF DEGRADED PEATLANDS


Activities: Peatland restoration encompasses activities such as ditch blocking to raise water levels, rewetting the peat, revegetation with peat-forming plants. Peatland restoration is an important global effort to reduce greenhouse gas emissions, protect biodiversity, and maintain ecosystem services. Here are a few examples of peatland restoration projects:

Examples of projects:

The Great Fen Project in the UK: Restoration of fenland (a type of peatland) in the area between the National Nature Reserves of Woodwalton Fen and Holme Fen, creating a 3,700-hectare habitat for wildlife and a natural environment for people.

https://www.greatfen.org.uk/about-great-fen/restoration-project-progress

PEATWISE project in Belarus, Ukraine, and Russia: Promotion of best practices for wise peatland management to prevent wildfires, reduce greenhouse gas emissions and preserve biodiversity. https://www.eragas.eu/en/eragas/research-projects/peatwise.htm

The EU LIFE Peat Restore project: Implemented in five EU countries — Estonia, Germany, Latvia, Lithuania and Poland, its goal was to produce maps of peatlands and estimates of their greenhouse gas emissions and implement pilot restoration actions.

https://en.nabu.de/topics/ecosystems/life-peat-restore.html#:~:text=LIFE%20Peat%20Restore%20aims%20to,excavated%20and%20poorly%20managed%20peatland

Yorkshire Wildlife Trust: Over 1,700 kilometres of grips and gullies have been blocked by Yorkshire Peat Partnership. By blocking these channels, they help to stop water flowing off the peatlands. This helps the land to become saturated again and provide an excellent habitat for plants and wildlife. https://www.ywt.org.uk/how-do-you-restore-degraded-peatland

*References:*https://www.nature.scot/climate-change/nature-based-solutions/peatland-action/peatland-action-case-studies;

https://forestryandland.gov.scot/news-releases/world-wetlands-day-restoring-a-globally-important-habitat

NATURAL HYDROLOGICAL RESTORATION

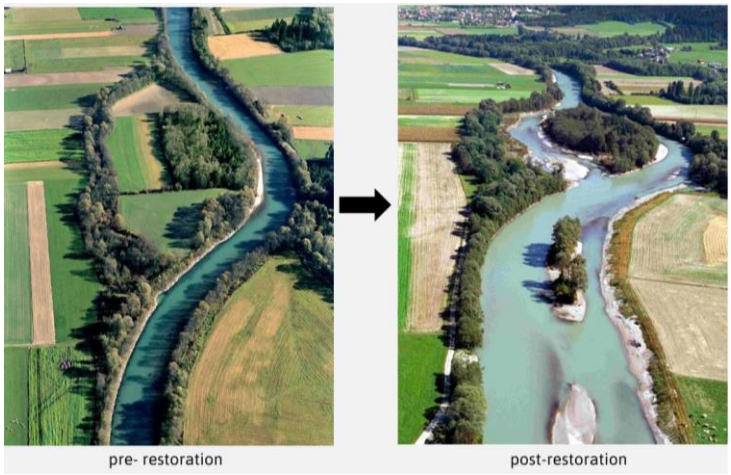


Activities: Restoring altered hydrological regimes to mimic natural wetland conditions, supporting biodiversity.

Example: Dam removal to restore natural water flow to support biodiversity and ecosystem health. Based on a comprehensive assessment of the wetland area and a feasibility study evaluating the potential ecological benefits and the environmental impact of dam removal, the project shall implement the active measure of phased dam removal according to a detailed restoration plan, allowing the natural flow of water to be restored in stages (minimizing sediment transport and allowing for the adjustment of vegetation to changing hydrological conditions). The project shall involve local communities, environmental organizations and regulatory authorities, as well as continuously monitor the hydrological changes, vegetation response, and wildlife activity following dam removal.

References: https://www.wwfadria.org/sr/?4866841/First-Dam-Removal-in-Western-Balkans

MANAGED FLOODING FOR HABITAT RESTORATION



Activities: Implementing controlled flooding regimes to restore natural hydrological patterns, benefiting wetland ecosystems.

Example: The restoration site was in the western part of Austria's province Carinthia. Due to river regulations (straightening, bank stabilization) in the 19th and 20th centuries the degradation of the riverbed led to a monotonous river channel and at the same time to the decoupling of the adjacent floodplain. Two large side arms were disconnected from the main river-system. The restoration project aimed to prevent further riverbed degradation, to re-connect the river with its floodplain area and to initiate the development of typical habitats of the riverine landscape. Bank stabilization structures were removed, and the riverbed was widened. Lateral erosion increased the sediment input and initialized the development of gravel / sand bars and islands. One of the former side arms was reconnected to the river for annual flooding. The second side arm was widened to a width of 30m creating diverse instream structures and thus increasing habitat diversity of the aquatic environment.

This project was designed to reduce human intervention as much as possible and to promote self-dynamic processes of the river. The project aimed to increase flood retention, to reach good ecological status and to provide an appropriate river landscape for recreational use.

Reference:

https://www.reformrivers.eu/river-drau-%E2%80%93-austria-flagship-restoration-measure.html#:~:text=The%20restoration%20project%20aimed%20to,the%20river%20bed%20was%20widened

INVASIVE SPECIES MANAGEMENT


Activities: Controlling and eradicating invasive species threatening wetland biodiversity and ecosystem health.

Example 1: Control and management of the invasive common reed (*Phragmites australis*), and aggressively growing plant in United States of America. When reed spreads it can create monocultures, reducing biodiversity through rapid habitat change. Reed is managed to ensure it continues to serve as quality habitat for marsh birds and other wildlife. Control methods include labour intensive flattening and covering reed patches with a black geotextile material. Heat from the sun raises the temperature of the soil and eventually kills the undesirable vegetation. After the root system of the invasive reed is no longer viable, the geotextile is removed, and native vegetation recolonizes the area.

Reference: https://constitution.audubon.org/conservation/invasive-species-management

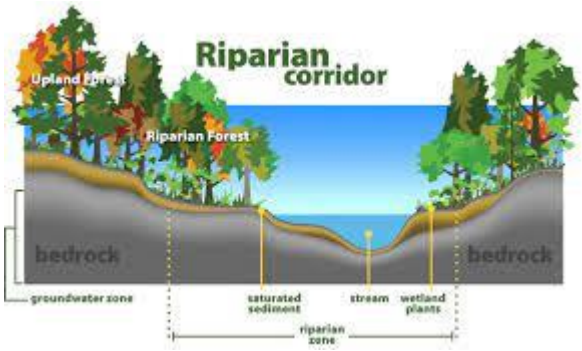
Example 2: Biological control of invasive species in wetlands involves utilizing a species' natural enemies to control its population.

Himalayan Balsam Control (*Impatiens glandulifera*) is a plant that produces large amounts of nectar, attracting pollinators away from native plants and leading to their decline. In some areas of Europe as part of a Swiss-led initiative, a rust fungus (*Puccinia komarovii var. glanduliferae*) from its original habitat has been released to control this invasive plant.

Reference: Tanner, R., Varia, S., Eschen, R., Wood, S., Murphy, S., & Gange, A. (2015). "The successful use of the rust Puccinia komarovii var. glanduliferae for classical biological control of Himalayan balsam in the UK." Weed Research, 55(5), 552-558.

Richardson, D.M. et al. (2000). Invasive alien species in wetlands: A global perspective. In Proceedings of the international conference on invasive alien species in managed and natural ecosystems (Vol. 44, p. 25).

CREATION OF RIPARIAN WILDLIFE CORRIDORS



Activities: Establishing corridors connecting wetlands to facilitate wildlife movement and genetic exchange.

Example: Wetlands play a crucial role as wildlife corridors, providing essential habitats and migration routes for various species. These corridors contribute to biodiversity conservation, ecological connectivity, and the overall health of ecosystems. The project idea could:

- Identify key wetland areas serving as potential wildlife corridors.
- Implement restoration and conservation measures to enhance wetland connectivity.
- Monitor the movement and behaviour of target species within the wetland corridors.
- Raise awareness and engage local communities in wetland conservation efforts.

References:

https://www.researchgate.net/publication/328794500_Identifying_wildlife_corridors_for_the_restoration_of_regional_habitat_connectivity_A_multispecies_approach_and_comparison_of_resistance_surfaces

https://www.researchgate.net/publication/227661037_Do_Habitat_Corridors_Provide_Connectivity

RESTORATION OF WETLAND CONNECTIVITY

Activities: Re-establishing hydrological connections between fragmented wetland areas to promote gene flow and maintain resilient ecosystems.

Example: Wetland restoration - Velka Krcava and Zitavsky luh is focused on restoration of two wetlands situated in south-western and south-eastern part of Slovakia (total area of 155 ha). The natural water regime in both sites have been changed in the past decades by regulation of the rivers to prevent the floods and fertilize the agricultural land. Significant areas of alluvial meadows and pastures, permanent and periodical wetlands have been destroyed together with its unique fauna and flora. The traditional farmland was converted to conventional intensive agriculture land. Ground and underground water level has decreased for years, wetlands were degraded, lateral wetland connectivity was interrupted, and important non-production environmental functions of wetlands are not filled. Both project areas impacted by climate change, especially by droughts and less frequent but dangerous floods. The water management activities allow for the partial simulation of the spring floods. The project aims to improve the water regime of both project areas and restore the degraded wetlands.

Reference:

https://eeagrants.org/archive/2014-2021/projects/SK-CLIMATE-0040

Hobbs, R.J., & Harris, J.A. (2001). Restoration ecology: Repairing the Earth's ecosystems in the new millennium. Restoration Ecology, 9(2), 239-246.

WETLAND RESTORATION THROUGH RIVER RECONNECTION

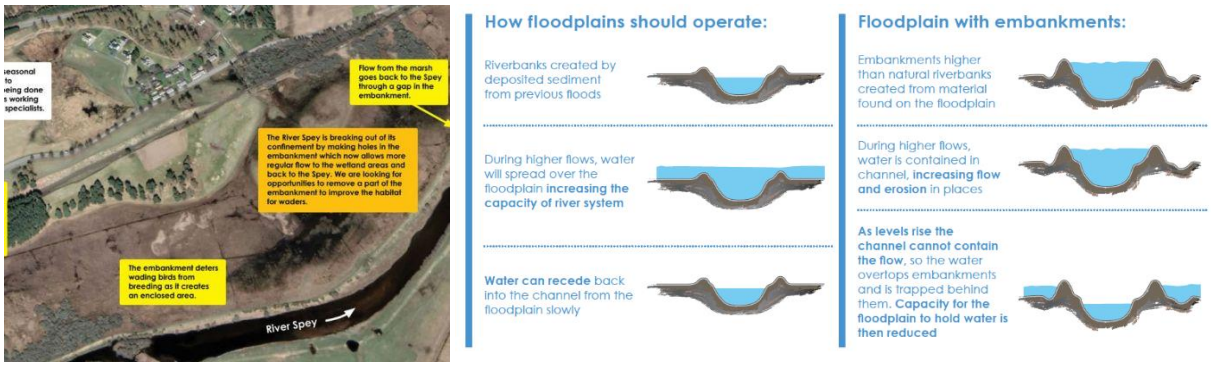

Activities: Reconnecting rivers to wetlands to restore natural hydrological processes and promote ecosystem health.

Example: Reconnecting backwaters (oxbows, side channels) and wetlands with the goal of restoring lateral connectivity between the main river channel and its floodplain. The measure aims to restore the lateral (riverine-riparian-floodplain) dimension of a river system, affected by human activities and to re-vitalize natural processes induces by the river "flood pulse". Therefore, most restoration schemes of river corridors are based on a re-establishment of the river pulse. The evaluation of some implemented projects for reconnecting former floodplain to river showed positive effects on the ecosystem services as support for biodiversity and nutrient retention.

Reference:

https://wiki.reformrivers.eu/index.php/Reconnect_backwaters_and_wetlands

RESTORATION OF HISTORIC WETLAND FEATURES



Activities: Reconstructing historical wetland features to recreate natural landscapes and enhance ecological functions.

Example: Removal of artificial drainage channels and restoring of the floodplain

The Fochabers Floodplain Restoration Project focused on re-establishing natural water flow patterns, removing artificial drainage channels, and restoring the floodplain. The project aimed at improving flood resiliency and enhancing biodiversity in the village of Fochabers, Scotland. This project utilised a natural flood management approach, which includes restoring the floodplain and working with natural processes to reduce the risk of flooding.

This restoration project involved numerous stakeholders, including Scottish Environmental Protection Agency (SEPA), the local municipality council and local landowners.

The project included setting back the flood embankments, allowing the floodplain to naturally store water during flooding events, re-meandering parts of the river and decommissioning three weirs to improve habitat connectivity for fish and other species. These measures significantly reduced the risk of flooding to the local community. They also helped to enhance and diversify habitats, encouraging biodiversity, and benefiting species such as the Atlantic salmon and the globally threatened freshwater pearl mussel.

References: http://www.moray.gov.uk/downloads/file105636.pdf

https://cairngormsconnect.org.uk/projects/insh/current-issues-at-the-marshes

HYDROLOGICAL INFRASTRUCTURE IMPROVEMENT

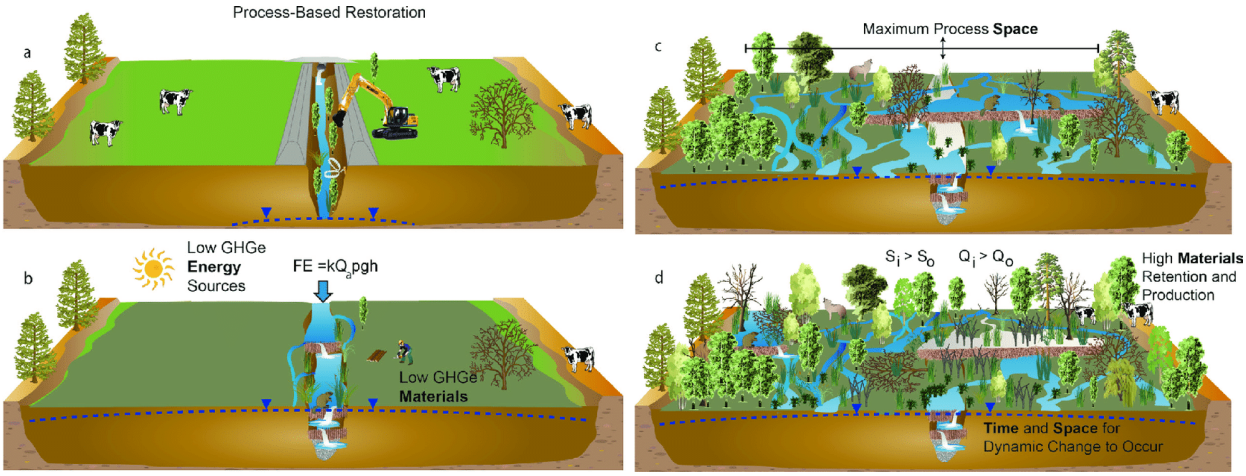

Activities: Upgrading infrastructure to manage water flow and levels more sustainably, benefiting wetland ecosystems.

Example: The Wicken Fen Vision project conducted by the National Trust in the United Kingdom is a notable example of sustainable water flow management benefitting wetland ecosystems. The Wicken Fen Vision project aims to create a diverse landscape on the edge of the Cambridgeshire Fens. The project deals with sustainable water management infrastructure, actively controlling water levels across each component of the wetland. It involves artificially manipulating water levels in certain seasons to mimic the natural water cycle. The project has been successful in restoring the hydrologic conditions of these wetlands, creating a mosaic of open water, reed bed, sedge, and fen habitats that support a rich array of wildlife, including numerous rare species. The Trust has partnered with local communities, engaging them in conservation activities, and promoting a locally-led approach to land and water management.

Reference: *https://www.nationaltrust.org.uk/visit/cambridgeshire/wicken-fen-national-nature-reserve/wicken-fen-vision*

Harding, P. T. (2006). The Changing Wildlife of Great Britain and Ireland, "Continuing the biological recording in the United Kingdom", Taylor and Francis, CRC Press.

HYDROLOGICAL RESTORATION PROJECTS



Activity: Restoring natural water flow patterns to enhance hydrological connectivity and improve the overall health of protected wetlands.

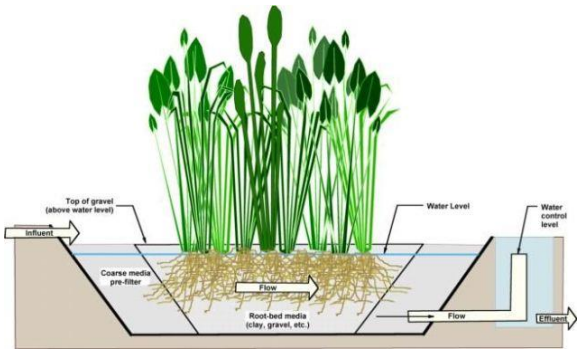
Example: The hydrological restoration of wetlands is an emerging approach for mitigating and adapting to climate change and enhancing ecosystem services such as improved water quality and biodiversity. Process-based restoration of fluvial systems removes human constraints on nature to promote ecological recovery. By freeing natural processes, a resilient ecosystem may be restored with minimal corrective intervention. (a) Infrastructure removal, some using heavy equipment, is an explicit focus to create as large an area as possible for natural habitat forming fluvial processes to occur. In this example, levees and an upstream culvert blocking fish passage are removed, cattle are removed temporarily. (b) Instream work may be extensive but relies on stream energy and natural materials and has a small carbon and disturbance footprint. In this case beaver dam analogues raise water tables to the surface of the floodplain and to encourage side channel formation and sediment deposition. (c) Fluvial energy, sediment, and vegetation develop a complex multichannel system. A productive and biologically diverse system is created; beaver colonize the area, adding further hydrogeomorphic complexity; predators return. (d) Over time the system remains dynamic, with habitat elements forming and disappearing, and reappearing elsewhere.

Reference: *https://www.researchgate.net/publication/352877729_Design_Criteria_for_Process-Based_Restoration_of_Fluvial_Systems*

https://www.sciencedirect.com/science/article/pii/S0048969724000159

Hughes, F.M.R. et al. (2019). Review: Hydrological, ecological, and ecological aspects of floodplain wetlands: A review. Freshwater Biology, 64(11), 933-951.

CREATION OF ARTIFICIAL WETLANDS



Activities: Constructing artificial wetland areas to treat and purify wastewater (reducing pollution in protected areas) and to compensate for lost or degraded natural wetlands (providing essential habitats for wildlife).

Example: Constructed wetlands are artificial wetlands for biological treatment of municipal, industrial, and agricultural wastewater and contaminated surface water, whose treated effluents can be used without problems to the environment and agriculture. These wetlands use a blend of biological (decomposition), physicochemical (adsorption), and chemical (oxidation) processes between plants and substrates (such as neutral porous media such as soil, sand, rock, gravel, etc.) for wastewater treatment, so that the physicochemical properties of the substrate (particle size distribution, permeability coefficient, etc.) play a key role in the efficiency of this process. Constructed wetlands, which are built to treat agricultural runoff and municipal wastewater, have also become important for maintaining biodiversity as they also provide sub-optimal habitat for many species and, in turn, their purification function can be strongly influenced by the biodiversity that they support. There are some difficulties when using CWs to conserve biodiversity because some key characteristics of these engineered ecosystems vary from natural wetlands, including some fundamental ecological processes. Without proper management intervention, these features of CWs can promote biological invasion, as well as form an 'ecological trap' for native species. Management options, such as basin-wide integrative

management and building in more natural wetland components, can partially offset these adverse impacts.

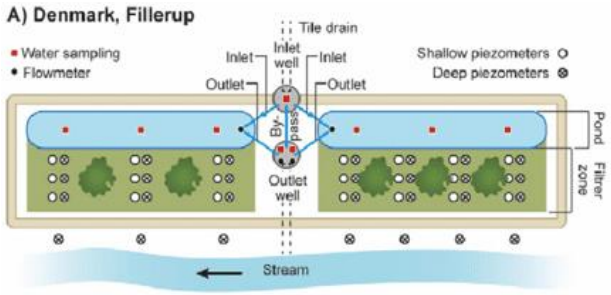
References:

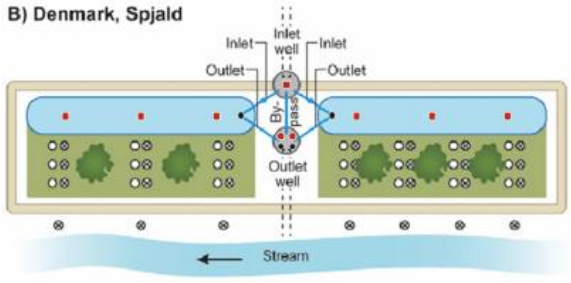
https://www.epa.gov/sites/default/files/2018-07/documents/constructed_wetlands_for_wastewater_treatment_and_wildife_habitat_17_case_studies_epa832-r-93-005.pdf

https://www.mdpi.com/2071-1050/12/4/1442

https://www.researchgate.net/publication/46007977_Constructed_Wetlands_for_Wastewater_Treatment_Five_Decades_of_Experience

ESTABLISHMENT OF BUFFER ZONES





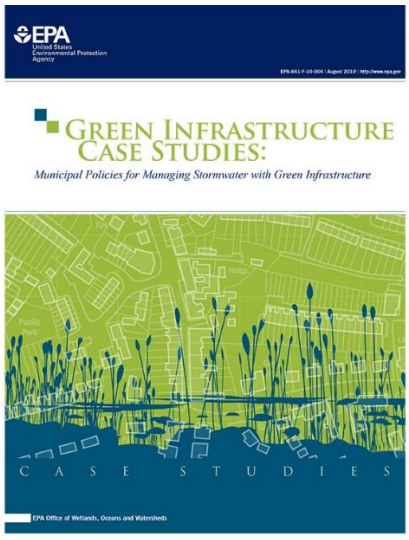
Activities: Creating buffer zones around wetlands to minimize human impact and pollution, safeguarding water quality.

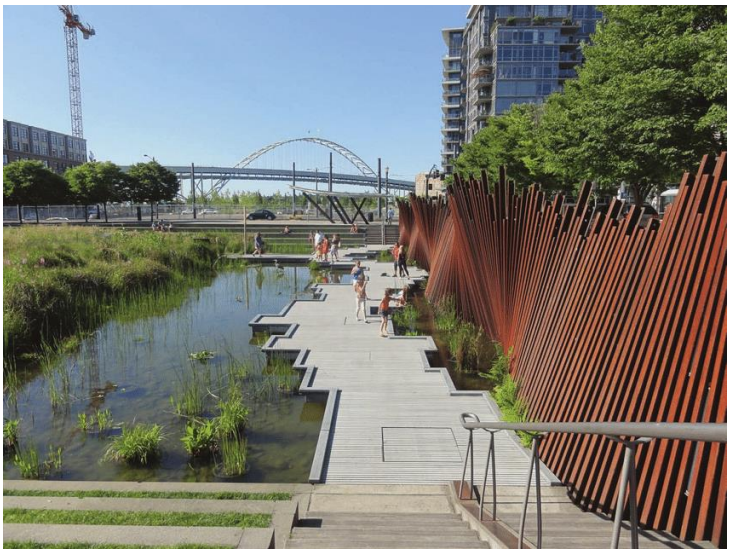
Example: Integrated buffer zones (IBZs) improve the delivery of ecosystem services. Tile drainage in agriculture, which previously discharged directly into the streams, is now intercepted within the IBZ. Specifically, the design of IBZs combines a pond, where soil particles present in drain water or surface runoff can be deposited, and a planted subsurface flow infiltration zone. Together, these two components provide an optimal environment for microbial processes and for the plant uptake of nutrients, resulting in nutrient reduction in the water and biodiversity enhancement. IBZs are effective enhancements to traditional buffer zones, as they

reduce total nitrogen and phosphorus loads to small streams and rivers, act as valuable improved habitats for aquatic and amphibian species and offer economic benefits by producing fast-growing wetland plant biomass.

Reference:
https://www.researchgate.net/publication/330454099_An_Assessment_of_the_Multifunctionality_of_Integrated_Buffer_Zones_in_Northwestern_Europe

GREEN INFRASTRUCTURE IMPLEMENTATION





Activity: Integrating green infrastructure solutions, such as vegetated swales and permeable surfaces, to manage stormwater runoff and protect wetlands.

Example: Green infrastructures can provide multiple benefits and play an important role in cities' resilience to extreme stormwater events caused by climate change. Additionally, these techniques can contribute to the protection of transport infrastructures, averting major environmental and economical adversities. Stormwater can be treated through several processes, some processes being more effective than others for specific contaminants.

Reference: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100FTEM.PDF?Dockey=P100FTEM.PDF

https://www.mdpi.com/2504-3900/48/1/7

Benedict, M.A., & McMahon, E.T. (2006). Green infrastructure: Smart conservation for the 21st century. Renewable Resources Journal, 24(4), 12-17.

EROSION CONTROL MEASURES

Activities: Employing erosion control structures and vegetation to prevent wetland degradation due to erosion

Example: Vegetated wetlands along the shores of lakes and rivers can protect against erosion caused by waves along the shorelines during floods and storms. Wetland plants are important because they can absorb much of the energy of the surface waters and bind soil and deposited sediments in their dense root systems.

In determining whether a wetland is significant for the erosion control through binding and stabilizing the soil function, at a minimum, consider the extent to which it protects a shoreline,

riverbank or streambank from excessive erosion by dissipation of wave and current energy or by binding and stabilizing the soil. Prevention of erosion by binding or stabilizing the soil is important in maintaining the natural condition of the stream or river corridor.

Reference:

https://dec.vermont.gov/watershed/wetlands/functions/erosion-control

https://www.stormwater.com/erosion-control/vegetation-management/article/13000994/constructed-wetlands-for-erosion-control

Richardson, C.J., & Mack, J.J. (1989). Wetland seed banks of the Okefenokee Swamp

SEDIMENT CONTROL MEASURES

Activity: Introducing measures to control sedimentation in wetlands, preserving water clarity and improving overall ecological health.

Example: Depressional wetlands in agricultural landscapes are easily degraded by sediments and contaminants accumulated from their watersheds. Several best management practices can reduce transport of sediments into wetlands, including the establishment of vegetative buffers. Buffer effectiveness is dependent on several factors, including vegetation structure, buffer width, attributes of the surrounding watershed (i.e., area, vegetative cover, slope and topography, soil type and structure, soil moisture, amount of herbicides and pesticides applied), and intensity and duration of rain events. To reduce dissolved contaminants from runoff, the water must infiltrate the soil where microbes or other processes can break down or sequester

contaminants. But increasing infiltration also diminishes total water volume entering a wetland, which presents threats to wetland hydrology in semi-arid regions. Buffer effectiveness may be enhanced significantly by implementing other best management practices (e.g., conservation tillage, balancing input with nutrient requirements for livestock and crops, precision application of chemicals) in the surrounding watershed to diminish soil erosion and associated contaminant runoff. Buffers require regular maintenance to remove sediment build-up and replace damaged or over-mature vegetation.

*Reference:*https://www.eversource.com/content/docs/default-source/Tranmission/wetlands.pdf

Mitsch, W.J., & Gosselink, J.G. (2015). Wetlands (5th ed.). John Wiley & Sons.

CONSERVATION GRAZING PRACTICES

Activities: Introducing controlled grazing to manage vegetation and promote biodiversity in wetland areas.

Example: Grazing animals help shape many of our semi-natural habitats, which developed rich and diverse wildlife communities. Grasslands, meadows, moorland and heathland habitats are all shaped by human activity and grazing is often the most effective and sustainable way to maintain them and their huge variety of plants and animals. Stocking densities for conservation grazing are usually low and the timing and duration of grazing is carefully managed. Both over- and under-grazing will reduce the wildlife value of a habitat, so management plans are needed

for each grazed site outlining the grazing regime required to maintain or restore the habitats found there. Livestock grazing has a less instantaneous impact than burning or cutting, so it allows less-mobile wildlife to thrive. The grazing animals can also access areas that machinery can't.

References: *https://www.greatfen.org.uk/big-ideas/habitat-restoration/conservation-grazing*

https://grazelife.com/

https://www.rewildingeurope.com/wp-content/uploads/publications/grazelife-leaflet/index.html

PROMOTION OF SUSTAINABLE AGRICULTURE IN WETLAND CATCHMENTS

Activities: Encouraging sustainable agricultural practices in the catchment areas to minimize runoff and water pollution.

Example: In some areas, the drainage and reclamation of wetlands for agriculture has been widespread, but there is increasing recognition of the critical interdependencies between agriculture and healthy wetlands. Some agricultural practices can lead to increased levels of nutrients and pollutant loads (in the form of pesticides, fertilisers and animal faeces), resulting in increased phytoplankton and aquatic plant growth leading to algal bloom. The regulation of rivers and streams can change the frequency, duration and extent of flows, affecting critical life stages of water dependent species. This affects the health of wetlands and their roles in the formation and replenishment of soils and in maintaining water quality. Some of the largest impacts are through the drainage or conversion of wetlands to cultivated land and the disturbance of ecosystem functions.

One of the most significant challenges in managing wetlands in agricultural areas is that most wetlands occur on privately owned land but require cooperative efforts between catchment management authorities and governments and, at times, adjacent landowners. A whole-of-catchment approach is critical for preventing or managing changes to water regimes, salinity, excess nutrient runoff, sedimentation and rising water tables that may result from catchment-wide practices such as land clearing, irrigation, stock management and use of fertilisers.

Cooperative approaches to building landowner capacity and supporting sustainable environmental flows are critical to maintaining the dual role wetlands play in providing support for agriculture while sustaining a wide range of ecosystem services.

*Reference:*https://www.dcceew.gov.au/water/wetlands/publications/factsheet-wetlands-agriculture

RESTORATION OF TRADITIONAL WETLAND MANAGEMENT PRACTICES

Activities: Incorporating traditional ecological knowledge from local communities for wetland management, ensuring cultural and ecological sustainability.

Example: Changes in current approaches to wetland conservation and restoration through the integration of local communities and the traditional knowledge. Local traditional ecological knowledge, which combines the interests of local communities and the environment, could be used in restoration projects. Unfortunately, this type of knowledge is systematically overlooked. Local stakeholders' involvement and strong establishment of their position in the habitat restoration processes should be reconsidered. The application of local ecological knowledge has large potential for improving water resources management and restoration of aquatic and wetlands ecosystems and remains a key factor in a successful future of river restoration.

Reference: https://www.mdpi.com/2079-9276/9/4/47

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. Ecological Applications, 10(5), 1251-1262.

FLOATING TREATMENT WETLANDS



Activities: Deploying floating wetland mats to absorb nutrients and pollutants from water bodies, improving water quality, enhancing habitat and providing a unique nature-based solution.

Floating treatment islands are small artificial platforms that allow aquatic plants to grow in water that is typically too deep for them. The unique ecosystem that develops creates the potential to capture excess nutrients and transform common pollutants into harmless by-products.

Reference: *https://www.iisd.org/projects/floating-treatment-wetlands*

https://www.sciencedirect.com/science/article/pii/S1687428520300492

Kadlec, R.H., & Wallace, S.D. (2009). Treatment Wetlands (2nd ed.). CRC Press.

FISHERY MANAGEMENT IN WETLAND ECOSYSTEMS

Activities: Implementing sustainable fisheries practices in wetland areas to balance conservation and resource use.

Example: Fisheries support the protein needs and livelihoods of more than a billion people globally, particularly in the developing world. Fisheries are dependent on the vitality of a range of wetland types. Sustainable fishery management is a complex socioeconomic and ecological undertaking, requiring a systemic, participatory, and adaptive approach.

Reference:

https://agritech.tnau.ac.in/fishery/fish_cap_inland_wetland.html

Cowx, I.G. (2002). Recreational fisheries in the European Union. Fisheries Management and Ecology, 9(5), 317-322.

COMMUNITY-BASED WETLAND CONSERVATION


Activities: Engaging local communities in wetland conservation efforts, fostering stewardship and sustainable resource use.

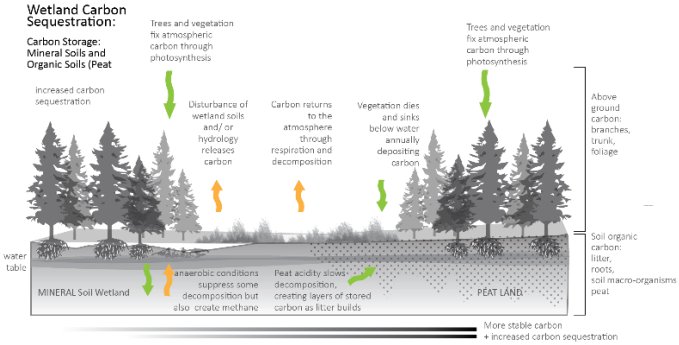
Example: A number of examples of projects engaging local communities in wetland conservation exist. These projects developed and promoted more sustainable practices for the local community, largely comprising fishermen and farmers through training and capacity building on sustainable fishery techniques. Diversifying the income and reducing the pressure on resources, the project fostered ecotourism development, providing a boost to the local economy while enhancing awareness about wetland conservation. Educational programs and training workshops were organized to enhance the understanding of wetland ecology, the importance of conservation, and the role of sustainable practices. Local communities were actively involved in wetland restoration activities, and they also participate in the management of the biosphere reserve, giving them a direct role in conserving their natural heritage.

Reference:

https://wwfeu.awsassets.panda.org/downloads/so6_4340_community_basedwetlandmanagementinnorthernthailand23_final.pdf

Dickinson, J.L. et al. (2012). The current state of citizen science as a tool for ecological research and public engagement. Frontiers in Ecology and the Environment, 10(6), 291-297.

WETLAND CARBON SEQUESTRATION



<u>Activities: Promoting wetlands as carbon sinks, mitigating climate change through carbon sequestration.</u>

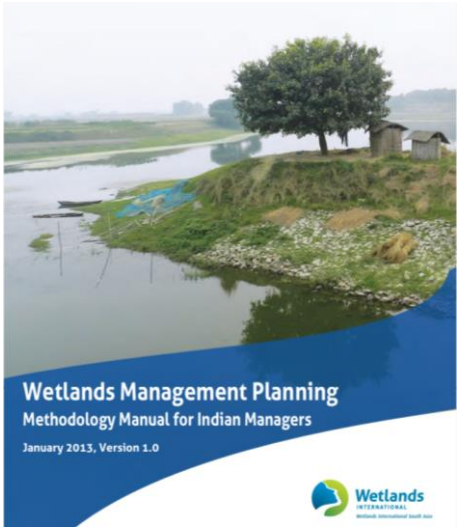
Example: A project aimed at maximizing carbon sequestration in wetland ecosystems to mitigate climate change effects with a focus on a wetland recognized for its significant carbon storage potential.

The project focus is on:

- Enhancing carbon sequestration in wetlands through ecological restoration and sustainable management.
- Development of a mechanism for quantifying and valorising the carbon stored in wetland ecosystems.
- Creating economic incentives for wetland conservation by exploring carbon credit markets and sustainable product development.
- Market-based Instruments and establishment of partnerships with carbon offset markets and companies interested in investing in projects that contribute to sustainable development goals.
- Local community Involvement and training for sustainable land use practices.

Reference: https://boreal.ducks.ca/estimating-carbon-sequestration-wetlands/

INTEGRATING WETLAND CONSERVATION INTO PROTECTED AREA MANAGEMENT PLANS



Activities: Incorporating wetland conservation into broader protected area management strategies for holistic protection.

Example: In order to ensure that wetlands continue to provide their ecosystem services and support biodiversity, it is essential that a well-defined strategy and actions are identified for their conservation and wise use. An Integrated Management Plan reflects a common understanding between various stakeholders on the management purpose, significant threats and constraints limiting conservation and wise use, opportunities and specific actions for addressing these threats, and mainstreaming wetlands within the wider developmental planning. The Integrated Management Plan is formulated to serve the following purposes: Identify the objectives of wetland management, Identify the factors that affect or may affect the wetland; Resolve conflicts between various stakeholders; Define monitoring requirements and research needs; Help obtain financial resources for managing the wetland; Enable communication between different wetland managers, organizations and stakeholders; Ensure compliance with extant laws and regulation; and Demonstrate that management is effective and efficient.

Reference:https://water.unl.edu/documents/Wetland-Planning-Guidebook-2020.pdf

https://www.oieau.fr/eaudoc/system/files/33163.pdf

WETLAND MONITORING AND RESEARCH PROGRAMS

Activities: Implementing comprehensive monitoring and research initiatives to assess wetland health and inform conservation strategies

Example: The most remote areas of wetlands have been managed in conventional and traditional manners, with minimal infrastructure support, which hinder management improvements. Today, natural and social phenomena such as extreme weather, labour shortage and more, have brought challenges to wetland stewardship. In order to tackle management challenges faced by wetland stakeholders, novel solutions with innovation and technology elements should be applied.

For more efficient management of wetlands, the project shall contribute through:

1. Research innovation and technology solutions for wetland monitoring, especially by introduction of wireless Internet sensors that can contribute to management and conservation of wetland landscape;
2. Wetland Monitoring Technology: Employ advanced monitoring technologies such as satellite imagery and sensors to track carbon sequestration rates and ecosystem health.
3. Establishing a wetland pilot site to demonstrate proof of concept by deploying wireless sensors and remotely collect wetland monitoring data; and
4. Analysing collected data, evaluate effectiveness and settings of wireless sensors applications and share experience to local and regional stakeholders in the wetland stewardship communities.

References:

https://www.linkedin.com/posts/wwf-hong-kong_patagoniahongkong-maiponaturereserve-wildlife-activity-7165170634237431809-k1v4/

https://boreal.ducks.ca/solutions/gis-and-remote-sensing/

SUSTAINABLE WETLAND TOURISM INITIATIVES

Activities: Developing eco-friendly tourism programs to raise awareness and generate funds for wetland conservation; Implementing sustainable tourism practices to minimize the ecological impact of visitors on wetland ecosystems in protected areas.

Example: Many wetlands are prime locations for tourism. The impacts of tourism on the ecological values of wetlands derive from tourism-related transport and infrastructure; the construction, maintenance and use of tourist accommodation and facilities; and the presence and activities of tourists in wetland areas. These impacts may be both direct and indirect and may be short-term or long lasting. Tourism can also contribute to a growing awareness of the value of nature in general and wetlands in particular. In this way tourism can create public support for the conservation of wetlands. The development of tourism can also be a way to make wetlands economically viable, and can provide employment and income for local people. A project proposal could in part deal with:

- Promotion of eco-friendly tourism practices that minimize the impact on wetland ecosystems.
- Development of sustainable infrastructure and facilities for visitors.
- Generation of revenue to fund wetland conservation and community development projects.
- Increasing awareness about the importance of wetland ecosystems among tourists and local communities.

References:

https://edepot.wur.nl/31505

https://www.ramsar.org/sites/default/files/documents/library/ramsar-wwd2012-leaflet-en.pdf

https://www.researchgate.net/publication/337608186_Destination_Wetlands_-_Supporting_sustainable_tourism

EDUCATIONAL OUTREACH PROGRAMS

Activities: Conducting educational programs to raise awareness about the importance of wetlands and their conservation.

Example: Develop educational programs for local schools and communities to raise awareness about the importance of wetlands and carbon sequestration. Interpretive signage to inform visitors about the ecological importance of wetlands in protected areas.

*Reference:*https://www.researchgate.net/publication/352382039_Effectiveness_of_a_conservation_education_program_among_school_students_on_the_importance_of_mangrove_ecosystems_in_Setiu_Wetlands_Malaysia

WETLAND-FOCUSED RESEARCH AND EDUCATION CENTERS

Activities: Establishing research and education centres dedicated to wetland ecosystems within protected areas.

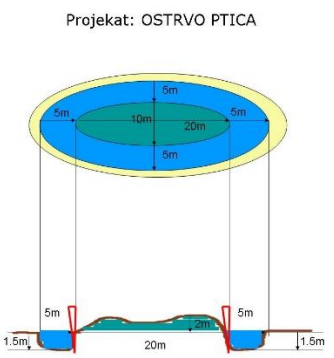
Example: The Convention on Wetlands' Programme on communication, capacity building, education, participation and awareness (CEPA) Programme encourages the establishment of wetland education centres, recognizing their value in promoting the Convention's principles of wetland conservation and wise use. Wetland centres across the world connect people with

nature and raise their awareness of wetland values and sustainable lifestyles. They range from high-tech centres designed to welcome significant numbers of visitors, to simple, non-staffed centres giving small numbers of people a limited but effective wetland CEPA experience.

The CEPA Programme identifies the global Wetland Link International (WLI) network of centres as an effective network to link centres and provide an opportunity for sharing experiences, materials and innovative display and engagement ideas. WLI has over 300 member centres and has established several regional networks.

Reference: https://www.ramsar.org/wetland-education-centres

BIRD-FRIENDLY WETLAND DESIGN



Activity: Artificial bird islands, artificial water ponds

Examples: *Designing wetlands with features that attract and support bird populations, contributing to avian biodiversity conservation.*

References: Boon, P.J., & Davis, J.A. (2016). The Ecology of Natural and Constructed Wetlands. Routledge.

https://www.sciencedirect.com/science/article/abs/pii/S0048969720375926