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DANUBE4all Milestone 11

Multi-Method Approach for Evaluating Economic & Ecological Benefits of Nature-Based Solutions (NBS) in Danube4All – Draft methodology

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Executive Summary

This report delivers the draft methodological framework and analytical structure for **Milestone 11 (M11) of the DANUBE4All project**. It establishes a generic, scalable economic impact model for assessing ecological restoration investments along the Danube River Basin, covering various national economies. The model is designed to support evidence-based decision-making for river managers and policymakers, enabling cross-country comparability, scalability beyond pilot sites, and alignment with environmental economics best practice. A key insight underpinning the model is that while restoration measures differ ecologically, their investment cost logic (CAPEX/OPEX) follows highly similar sectoral spending structures, making a measure-agnostic IO model feasible and defensible.

The methodological framework integrates:

- *Input–Output (IO) modelling* as the core quantitative instrument, answering the high-level policy question: What is the macroeconomic effect of 1 EUR invested in river restoration? IO results quantify sectoral output, GVA (GVA), and employment propagation, which represent economic activity redistribution, not welfare gains, and are therefore not additive to CBA benefits to avoid double counting.
- *Cost–Benefit Analysis (CBA)* as a selective and complementary welfare assessment, applied only where ES benefits can be robustly quantified and monetised using avoided damage or market-linked valuation methods (e.g., floods, nutrients, fisheries, water tariffs, carbon pricing).

The model therefore proposes (1) IO to simulate how investment expenditure and monetised ES flows propagate across national economies, without interpreting GVA as welfare benefit. CBA results are incorporated in IO only as calibrated demand shocks (e.g., increased tourism expenditure or marketable fish biomass), while non-monetizable ES remain in the benefits narrative without being forced into CBA and (2) CBA to quantify Total Economic Value (TEV) of monetizable ecosystem service improvements using standard valuation principles (market price, avoided cost, replacement cost, ETS, travel cost, hedonic pricing).

The final output is a transferable analytical structure that supports cross-country comparability, avoids welfare overestimation, excludes double counting between production effects and welfare benefits, and enables policymakers and river managers to interpret both the economic footprint and the ecological value of Danube restoration investments in a rigorous and operationally feasible framework.

Table of Contents

List of figures

List of tables

1. Introduction

The purpose of this document is to present the consolidated methodological framework and the sequence of analytical steps undertaken for Milestone 11 (M11). The milestone aims to develop a **general model for the economic evaluation of river restoration investments** along the Danube. This model will quantify the **macroeconomic effects of restoration spending** and, where feasible, assess the **monetizable ecosystem service (ES) benefits** generated by restoration actions.

Over the past year, the project team has undertaken a comprehensive methodological exploration to identify the most robust and scalable approach for evaluating the economic implications of restoration across a wide variety of ecological and socio-economic contexts in the Danube Basin. Given the heterogeneity of restoration measures, ecological functions, and data availability, the development of a general model required testing and comparing **multiple analytical pathways**, including:

- restoration measure–specific modelling structures,
- ecosystem service valuation frameworks and principles (e.g. TEV),
- Nature-based Solutions (NBS) typologies,
- life-cycle cost structures for restoration investments, and
- combinations of Input–Output (IO) modelling with Cost–Benefit Analysis (CBA).

This exploratory phase was an essential step in determining which components could be generalized and which required case-specific treatment. It ensured that the methodology remains firmly grounded in environmental economics while also aligned with the operational needs and data realities of Danube4All.

River restoration generates benefits through **two main channels**:

1. **Investment-driven economic effects** – arising from planning, construction, materials, labour, engineering and maintenance.
2. **Ecosystem service improvements** – which may include flood regulation, water purification, habitat quality, recreational value, or non-use benefits such as biodiversity conservation.

Because these two channels differ substantially in how they can be measured, the methodological framework integrates concepts from **environmental economic theory**, **ecosystem valuation**, and **macroeconomic modelling**. This dual structure reflects the fact that some restoration benefits can be monetised and modelled quantitatively, while others cannot and require quantitative or qualitative treatment.

Following the systematic review of options and the discussions held during the September 2025 methodology meeting, the analytical approach has been consolidated into a **two-component general model**:

1. **A macroeconomic Input–Output (IO) model** that estimates the economic effect of 1 EUR invested in restoration activities. This is the core analytical output of the general model. IO analysis draws on representative restoration cost structures, which—despite differences in absolute budgets—show consistent sectoral patterns across restoration measures and therefore allow for a generalisable modelling approach.
2. **A selective Cost–Benefit Analysis (CBA)**, applied only where ecosystem service benefits can be credibly monetised using established valuation methods. Many ES, particularly non-use and regulating services, cannot be monetised reliably; these will be addressed quantitatively

or qualitatively. CBA serves as a complementary component, enriching the interpretation of ecological benefits without overreaching the available data.

This methodological refinement results in a framework that is **rigorous, feasible, and replicable** across countries and restoration types, while recognising the limitations inherent in ecosystem service valuation. The exploratory work undertaken earlier—mapping restoration measures, NBS, ES, life-cycle cost structures, and valuation datasets—feeds directly into the tools, templates, and analytical logic applied in the IO and CBA components.

The sections that follow describe the methodology in detail, present the preparatory results obtained to date, and outline the next steps required for the completion of Milestone 11.

2. General theoretical framework

2.1. Ecosystem services – the starting point

Nature's benefits as monetizable and exchangeable services were included in the economic school in the 1960's with the emergence of Environmental and Resource Economics, which recognized that nature's benefits can and should be monetized. Environmental Economics broadly broadened the scope of conventional Neoclassical economics, which significantly neglected the economic value of environmental benefits due to their limited analysis[1]. According to the neoclassical economic framework, ecosystem goods and services were only valued at market prices, while ecosystem services (ES) that are utilized without involving market transactions were considered positive externalities. Within the Environmental and Resource Economics school various approaches to quantify these externalities were developed. This was done with the objective of integrating them into extended cost-benefit analyses and internalizing the externalities[2]. The field of Environmental Economics has been advancing, creating various methods to assess external environmental costs and benefits, broadening the understanding of the economic value of the environment, and recognizing different types of economic worth of ecosystem services.

However, there are a significant number of ecosystem services that are difficult to monetize or pose intrinsic value that cannot be expressed in monetary terms at all. Consequently, the comprehensive array of ecosystem services constitutes the Total System Value (TSV), which entails a combination of monetary values, quantitative metrics, and qualitative assessments. Owing to data constraints and the inherent difficulties in monetizing ecosystem services, the economic value of an ecosystem typically has a more limited representation in the Total System Value. In contrast, qualitative assessment is the richest source of information[3].

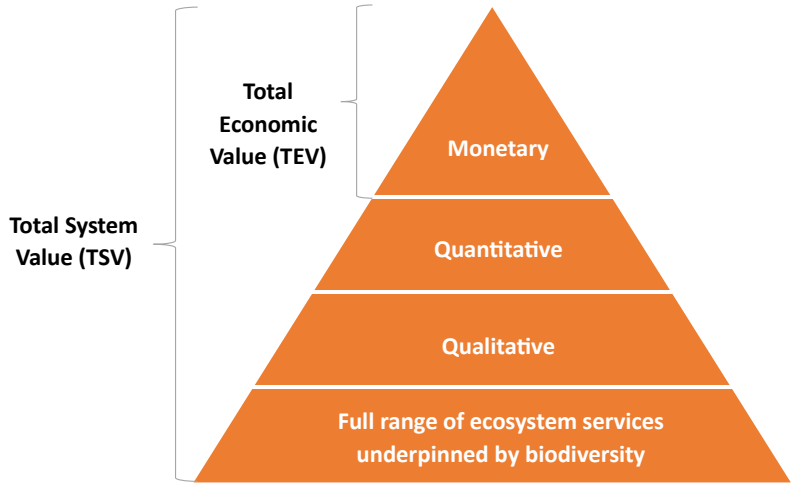
[1] Gómez-Baggethun, E., de Groot, R., Lomas, P. L., & Montes, C. (2010). The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes. Ecological Economics

[2] Luke Brander, Erik Gómez-Baggethun, Berta Martín-López, Madhu Verma (2010), Chapter 5 The economics of valuing ecosystem services and biodiversity, TEEB: The Ecological and Economic Foundations

[3] ten Brink P., Badura T., Bassi S., Daly, E., Dickie, I., Ding H., Gantioler S., Gerdes, H., Kettunen M., Lago, M., Lang, S., Markandya A., Nunes P.A.L.D., Pieterse, M., Rayment M., Tinch R., (2011). Estimating the Overall Economic Value of the Benefits provided by the Natura 2000 Network. Final Report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038. Institute for European Environmental Policy / GHK / Ecologic, Brussels 2011

- **Total Economic Value (TEV)** is defined as "the sum of the values of all service flows that natural capital generates both now and in the future, appropriately discounted. These service flows are valued for marginal (incremental) changes in their provision. TEV encompasses all components of (dis)utility derived from ecosystem services using a common unit of account: money or any market-based unit of measurement that allows comparisons of the benefits of various goods."[4]. **TEV is the standard valuation framework in assessing the ES monetary value used for conducting a CBA analysis.**
- **Quantitative** assessment of an ecosystem service involves the measurement or estimation of the actual physical quantities or numerical values associated with that service. It aims to provide concrete, measurable data regarding the benefits derived from a particular ecosystem. For river ecosystems, quantitative assessments might involve measures such as: Cubic meters of purified water, fish biomass, flood regulation capacity, sediment retention, carbon sequestration, share of population affected by loss of food provisioning, etc.
- **Qualitative** assessment involves appraising the benefits offered by the specific ecosystem under scrutiny. This method seeks to understand the non-quantifiable aspects of these benefits, taking into account factors such as cultural, aesthetic, and experiential values. By considering the range and significance of these advantages, a qualitative assessment provides valuable insights into the broader, non-monetary dimensions of ecosystem services.

Figure 1 The benefits pyramid and Total Economic Value versus Total System



Source: Institute for European Environmental Policy, Estimating the Overall Economic Value of the Benefits provided by the Natura 2000 Network. Final Report to the European Commission, 2011

Under the TEV framework presented above, the value of the benefits is generally classified into 2 main groups: **use** and **non-use values**[5].

- **Use Values** refers to the tangible, quantifiable benefits that individuals or communities use, and which are reflected in the economic market. The use values can be divided into direct use values

[4] Luke Brander, Erik Gómez-Baggethun, Berta Martín-López, Madhu Verma (2010), Chapter 5 The economics of valuing ecosystem services and biodiversity, TEEB: The Ecological and Economic Foundations

[5] Bregje van Wesenbeeck, Sien Kok, Camilo Benitez Avila, Robyn Gwee, Ellis Penning, *Economic Rationale of NBS in Freshwater Ecosystems*, 2021

and indirect use values. Additionally, use values can encompass option values, also known as quasi-options:

- **Direct use values** are directly obtained from using the ecosystem services, such as goods and services that are physically consumed, harvested, or experienced. These types of services mainly fall under the category of "provisioning services". Examples of direct use values include raw products such as fish and construction materials, recreational activities like fishing and tourist services that can be marketed. Direct use values can often be estimated through market transactions or by assessing the costs individuals would incur if the ecosystem service were not available;
- **Indirect use values** refer to the benefits that people receive from ecosystem processes or functions that support and maintain the conditions for various direct uses. Unlike direct use values, these benefits are not immediately consumed or experienced, but they play a crucial role in enabling the provision of direct services and are usually associated with regulating services. Indirect use values encompass ecosystem services that safeguard both natural and human systems, like mitigating floods and water purification;
- **Option value** refers to the perceived worth that individuals attach to the assurance of future access to ecosystem services for their personal benefit, even when the specific benefits are not currently well-defined or utilized. For example, conserving genetic resources could be assessed as "option values"[6]. However, it is worth mentioning that it has been debated whether option value should be included in Total Economic Value analysis. Option value can be thought of as a way of framing TEV in uncertain situations, similar to an insurance premium or the value of deferring a decision until the uncertainty is resolved. As an insurance premium, the option value can also be defined as "the added
  amount a risk averse person would pay for some amenity, over and above its current value in consumption, to maintain the option of having that amenity available for the future, given that the future availability of the amenity is uncertain"[7].

- **Non-use values** pertain to the benefits derived from ecosystems that do not involve direct or indirect consumption or utilization of a specific ecosystem service. Instead, they stem from the satisfaction individuals gain from knowing that biodiversity and ecosystem services are preserved, and that others either currently have or will enjoy access to them in the future. There are two main categories of non-use values: existence values and philanthropic values which encompass altruistic values and bequest values.
  - **Existence Values** refer to the satisfaction people experience simply knowing that a particular ecosystem or species exists, regardless of any direct or future use they may have for it. For example, the appreciation of rare or endangered species solely for their existence falls under existence values;
  - **Altruist values** relate to the satisfaction individuals derive from knowing that others will have access to and benefit from a preserved ecosystem and it concerns intra-generational equity. More recent studies replace the altruist value, with **stewardship**

[6] Bregje van Wesenbeeck, Sien Kok, Camilo Benitez Avila, Robyn Gwee, Ellis Penning, *Economic Rationale of NBS in Freshwater Ecosystems*, 2021

[7] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

value, which is defined as "the value placed by society on the maintenance of a healthy environment for all living organisms and not just humans"[8].

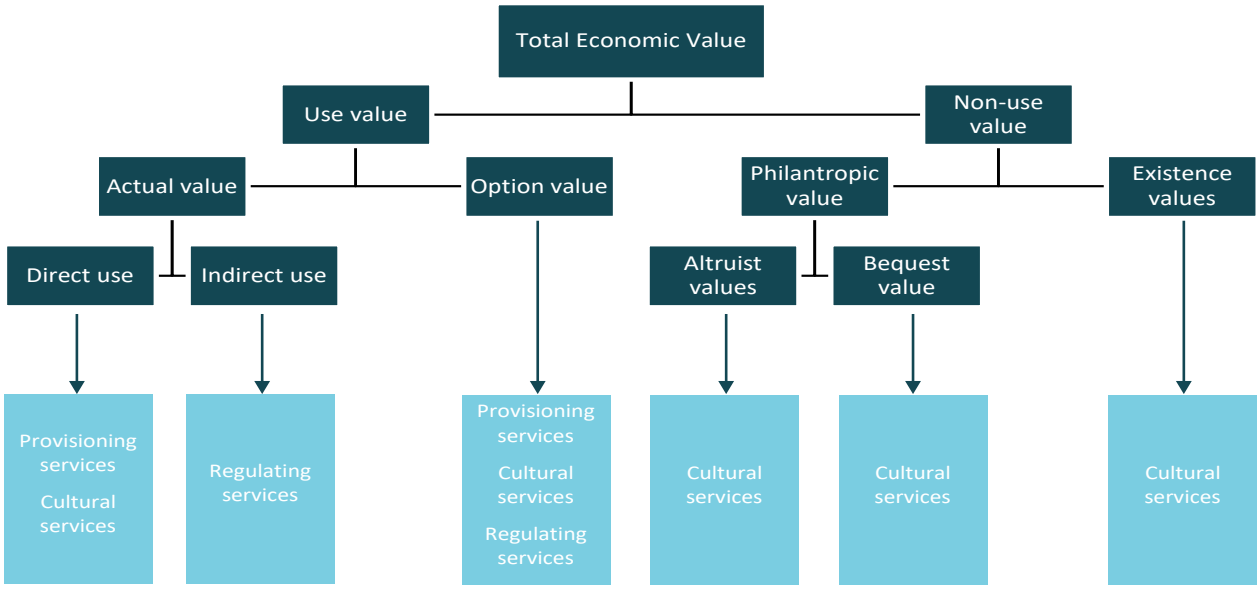
- **Bequest values** concern the desire to pass on intact ecosystems and their associated services to future generations as a legacy, emphasizing the importance of inter-generational equity.

Assessing the economic value of non-use values is more challenging compared to use values, as non-use values are intangible and typically can't be monetized, such as moral, religious, or aesthetic aspects. Non-use values create experiences which are valued only in the valuer's mind[9].

The TEV is strongly tied to the ecological services they provide. When these services diminish, for instance due to pollution, it can lead to a devaluation of how people perceive environmental quality. Ultimately, this can result in reduced social benefits associated with the environment. Thus, the economic value doesn't directly measure the inherent quality of the environment, but rather mirrors people's perception of that quality[10].

Evaluating the TEV of an ecosystem hinges on identifying and comprehending all its ecosystem services. Nevertheless, it's crucial to acknowledge the inherent limitations of economic assessments, particularly when it comes to non-use value. Given the complexity of valuing ecosystem services, it requires careful selection and application of valuation methods tailored to the specific context and requirements of a given situation. While aiming for high accuracy requires using the best valuating techniques and methods, assessing the TEV is often highly time and resource consuming.

Figure 2 Value types of ecosystem services within the TEV approach



Source: Adapted from TEEB (2010) and Pascal et al. (2010)

[8] ELD Initiative (2019). ELD Campus. Module: Valuation of ecosystem services

[9] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

[10] European Commission Directorate-General for Regional and Urban policy, *Guide to Cost-Benefit Analysis of Investment Projects, Economic appraisal tool for Cohesion Policy 2014-2020*, 2014

2.2. Valuation methods for benefits

When it comes to valuing the services provided by ecosystems, various methods come into play depending on the type of benefit being assessed. The TEV framework reveals 5 main categories and subcategories of valuation approaches:

- **direct valuation;**
- **cost-based approach[11];**
- **revealed preferences approach;**
- **stated preference approach;**
- **benefit transfer approach.**

Each of the valuation approaches encompass a range of valuation methods that can be applied to reveal the economic value of an ES. Each method comes with its own set of challenges that can influence the valuation estimates. Therefore, it is recommended to use more than one method to enable comparison between the revealed results. Some results may provide valuable rough estimates, while others may be considered more experimental. Using a multiple method has higher chances of yielding reliable results, but this largely depends on the availability of data on site values. Additionally, acknowledging the existence of uncertainties in economic valuation of ecosystem services, the TEEB methodology also recommends that the results are presented as ranges[12].

Benefit transfer

Determining the value of ecosystem services would ideally require conducting comprehensive ecological and economic studies for each ecosystem under consideration. However, these studies are often costly and time-consuming, which can make them impractical in many cases. Benefit transfer provides an economical alternative for conducting economic valuations of ecosystem services, in areas where conducting a full valuation study may be impractical due to constraints such as time, resources, or data availability. It leverages existing information revealed in previous studies, making it a more cost-effective option compared to other valuation methods[13].

This transfer can be applied across various dimensions, including time, space, populations, and at times, even across different types of ecosystem goods. Notably, the benefit transfer is mostly useful in valuating recreational values, assuming a high degree of similarity between sites and recreational experiences provided. However, when applying the benefit transfer method, it is crucial to adapt the estimation to account for any variations between the site that was values and the site under valuation, as overlooking significant differences between sites can lead to inaccurate estimations.

Direct valuation methods

The direct market valuation methods draw upon real-world market data, providing a reflection of actual preferences or costs for individuals. In this approach, estimating the economic value of an

[11] As the cost-based approach of the ecosystem value is also based on real market prices, some methodologies view it as a subcategory of the market valuation approach

[12] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

[13] Kok S., Grondard N., Lenz M.I., Bangalore Suresh N.T., Garcia X., Llorente O., Estrada L., Acuna V., Birk S., 2025. Guidance Document – Cost-Benefit-Analysis in freshwater ecosystem restoration. EU H2020 research and innovation project MERLIN deliverable D3.4. 20-21 pp. https://project-merlin.eu/files/merlin/downloads/deliverables/MERLIN_D3.4_revised_Oct2025.pdf

ecosystem service involves utilizing readily available and easily obtainable data types like prices, quantities, and costs.

- **Market price-based method**
  - Relies on actual market transactions to assign a value to ecosystem services. The value is directly obtained from the prices people are paying for these goods or services
  - Examples: increased land value, revenues from tickets paid.

Advantages	Challenges and limitations
• it accurately captures an individual's willingness to pay for both the costs and benefits associated with goods that are actively exchanged in markets, such as fish, timber or recreational and cultural services, for which people have to pay • easily available data, making it a practical and reliable approach • using observed data on actual consumer behaviour ensures that the valuation process is grounded in real-world scenario • one of the most widely accepted economic techniques, due to its reliability and credibility of the valuation process.	• may be constrained by the availability of market data • market imperfections can lead to distortions in market prices, potentially resulting in an inaccurate reflection of the economic value of goods or services to society as a whole. • Seasonal fluctuations and other factors influencing prices also require careful consideration in the analysis. • it typically does not account for the market value of other resources involved in bringing ecosystem products to market, potentially leading to an overestimation of benefits
Conclusion: should be applied with careful consideration and in combination with other methods to elicit the TEV of an ecosystem service[14]	

- **Production-based approach**
  - It is used when a marketable good is created by combining the goods or services provided by an ecosystem with other inputs. This approach is based on the fact that enhanced ecosystem services can lead to improvements in income or productivity, subsequently resulting in lowered costs, increased quantities of marketable goods due to either an increase in the number of consumers or the number of producers[15].
  - Example: improved water quality – increased fish production – increased fish farming – higher profits
  - It estimates the increase of output in the economic sectors directly impacted by the technical solution implemented

Advantages	Challenges and limitations
• relatively straightforward and has limited data requirements, which makes it accessible and easy to implement. • It often relies on readily available information, streamlining the valuation process and potentially reducing expenses associated with data collection and economic analysis. • These factors increase the cost-effectiveness of the method, and enhance the method's practicality.	• even though widely utilized in evaluating the impact environment services have on the economic activity in a region, it is constrained to valuing resources that can be directly utilized as inputs in the production of marketable goods. • requires a good understanding of the economic activity and processes, as well as the relationship between the quality or

[14] https://www.ecosystemvaluation.org/market_price.htm

[15] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

	quantity of a resource and the actual outcomes achieved[16]. • the application of the method is relatively straightforward in single-use systems (one ecosystem service impacts one economic activity).
Conclusion: Should be applied with careful consideration and in combination with other methods to elicit the TEV of ecosystem services[17] Sometimes, the increased output is not apparent, such as in national parks where economic activities are limited.	

Cost-based approach

These methods assess the value of ecosystem services by estimating the costs associated with either their replacement (the ecosystem service needed to be artificially recreated) or restoration (in case of a natural disaster), as well as cost savings provided by an ES.

There are three primary methods:

- **Replacement cost** – involves determining the cost of artificial substitutes for environmental goods or services. This approach provides an estimate of the economic value of goods or services based on the costs incurred to replicate them artificially.
  - Example: instead of a built concrete wall, maybe a stone revetment would be built in order to consolidate the river banks. The method compares the cost for each option.
  - This method is helpful for approximating indirect ecosystem benefits where estimating the damage costs is impossible due to a lack of data.
  - Should be used in combination with either stated or revealed preference methods. This is essential to determine if there is a willingness to pay for the replacement cost option. Not having enough willingness to pay would indicate an overestimation of the value of the ecosystem service, making the cost of replacement simply an expense rather than an accurate representation of the ecosystem service's value[18].
  - Additionally, ensuring that the replacement solution maintains net benefits equal to or less than the original function can be challenging[19].
- **Damage cost avoided** - evaluates the benefits offered by an ecosystem by calculating the costs that would have been incurred in the absence of ecosystem services and estimates either the value based on the costs of avoiding damages due to lost services to property or the expenses incurred in preventing damages.
  - provides a tangible and measurable economic value by estimating the cost that could arise in the absence of an ecosystem service. This approach is particularly effective in cases where clear cause-and-effect relationships can be established between environmental changes and the associated economic impacts.
  - While the avoided damages costs method offers valuable insights, it also comes with some potential drawbacks. One significant challenge is accurately estimating the potential damages that would occur without preventive action, which can be complex and uncertain. Another disadvantage is that this method may not capture the full spectrum of non-use values

[16] https://www.ecosystemvaluation.org/productivity.htm#:~:text=The%20productivity%20method%2C%20also%20referred,production%20of%20commercially%20marketed%20goods.

[17] https://www.ecosystemvaluation.org/market_price.htm

[18] https://www.conservation-strategy.org/

[19] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

associated with ecosystems, such as existence or bequest values, which are important considerations in holistic environmental valuation. It can also be sensitive to assumptions and uncertainties in economic models, potentially leading to overestimation or underestimation of values. Implementing this method may require a comprehensive understanding of the environmental processes and systems involved, which can be resource-intensive and time-consuming.
    - Example: assume that in the absence of river bank consolidation works, erosion would lead to a decrease in land value price, loss of useful land, floods, and deterioration of infrastructure.
- **Mitigation/restoration cost** – how much would it cost to repair/reduce the damage in the absence of the solution proposed?
    - Refers to the expenses incurred by individuals or communities in taking actions to reduce or avoid the negative impacts of environmental degradation, in the absence of an ecosystem service that would do so[20].
    - In the context of a river ecosystem, mitigation costs might involve actions taken to preserve or restore the services provided by the river. For instance, this includes expenses for preventive measures in the absence of wetland services, which play an important role in flood mitigation (flood barriers) or relocation costs[21].

Revealed preferences approach

Examine individual economic decisions within existing markets related to a specific ecosystem service. This methodology asserts that economic actors (people) "reveal" their preferences through their market behaviour and the choices they make. The primary valuation methods under this approach are:

- **Hedonic pricing/wage method** - values ecosystem services by estimating their impact on the property prices and wages in the surrounding environment.
    - This approach assumes that changes in property prices reflect the value individuals place on specific characteristics, including environmental attributes, of the surrounding area.
    - For example, an increase in the provision of ecosystem services (water purification, landscape, air quality) in a specific area will directly lead to the rise in property value of the real estate, as well as an increase in wages in that area.
    - Property markets and wages are known to efficiently reflect the value of willingness to pay/willingness to accept, making them reliable indicators. Obtaining data on property sales and average wages is usually straightforward, with numerous sources readily accessible.
    - This method is only applicable to environments where ecosystem services are viewed as valuable by society, and the environmental characteristics have an impact on the proprietary prices or wages, indeed.
- **Travel cost method -** quantifies the value of an ecosystem service by calculating the individuals' willingness to pay for access to that ecosystem service.

[20] ELD Initiative (2019). ELD Campus. Module: Valuation of ecosystem services. Available from www.eld-initiative.org

[21] TEEB (2010), The Economics of Ecosystems and Biodiversity: Chapter 5 - The economics of valuing ecosystem services and biodiversity

- This method is mainly applied in the valuation of recreational values related to biodiversity and ecosystem services, by calculating the costs individuals incur in order to access a specific recreational area/site
- Examples: travel expenses, admission fee, on-site spending

Stated preference approach

The stated preference approach involves directly asking individuals about their willingness to pay for an environmental change and the associated services it provides, under different scenarios. This method is particularly valuable when estimating non-use values for ecosystem services, as well as use values in situations where no actual market exists to derive the economic value of the ecosystem services. There are two main valuation methods under the stated preference approach:

- **Contingent valuation method (CVM)** - entails directly asking individuals, typically through surveys, about the amount they would be willing to pay for a particular ecosystem service.
  - In certain instances, individuals may also be asked about the compensation they would accept (willingness to accept) in exchange for foregoing specific environmental benefits.
  - Under this method. Individuals explicitly state their willingness to pay, contingent on a specific hypothetical scenario and a detailed description of the ecosystem service in question.
- **Choice (or contingent) modelling method (CM)** - In a choice modelling study, participants are presented with multiple options, each defined by different characteristics.
  - Among these characteristics, a price or compensation is included.
  - Respondents are then tasked with evaluating all options by weighing the various attributes against each other.

Which methods to use?

Selecting the appropriate valuation method is crucial to the economic analysis of a nature-based solution that provides ecosystem services. As noted earlier, ecosystem services provide multiple values, ranging from direct use values to non-use values, which are often intangible and difficult to quantify. As such, the following principles and steps will be applied:

- Clearly define the objectives and scope of the valuation;
- Develop a comprehensive list of ecosystem services and their value, to understand their nature and relevance to the site;
- Determine possible methods of valuation to use for each value of the ecosystem service;
- Identify the resources and data available to identify the applicable valuation method for the analysed case.

Choosing the most appropriate valuation method also depends on the costs of conducting the evaluation as well as any time constraints. Some valuation methods, and even specific techniques, can be a lot more expensive than others and can also require more time.

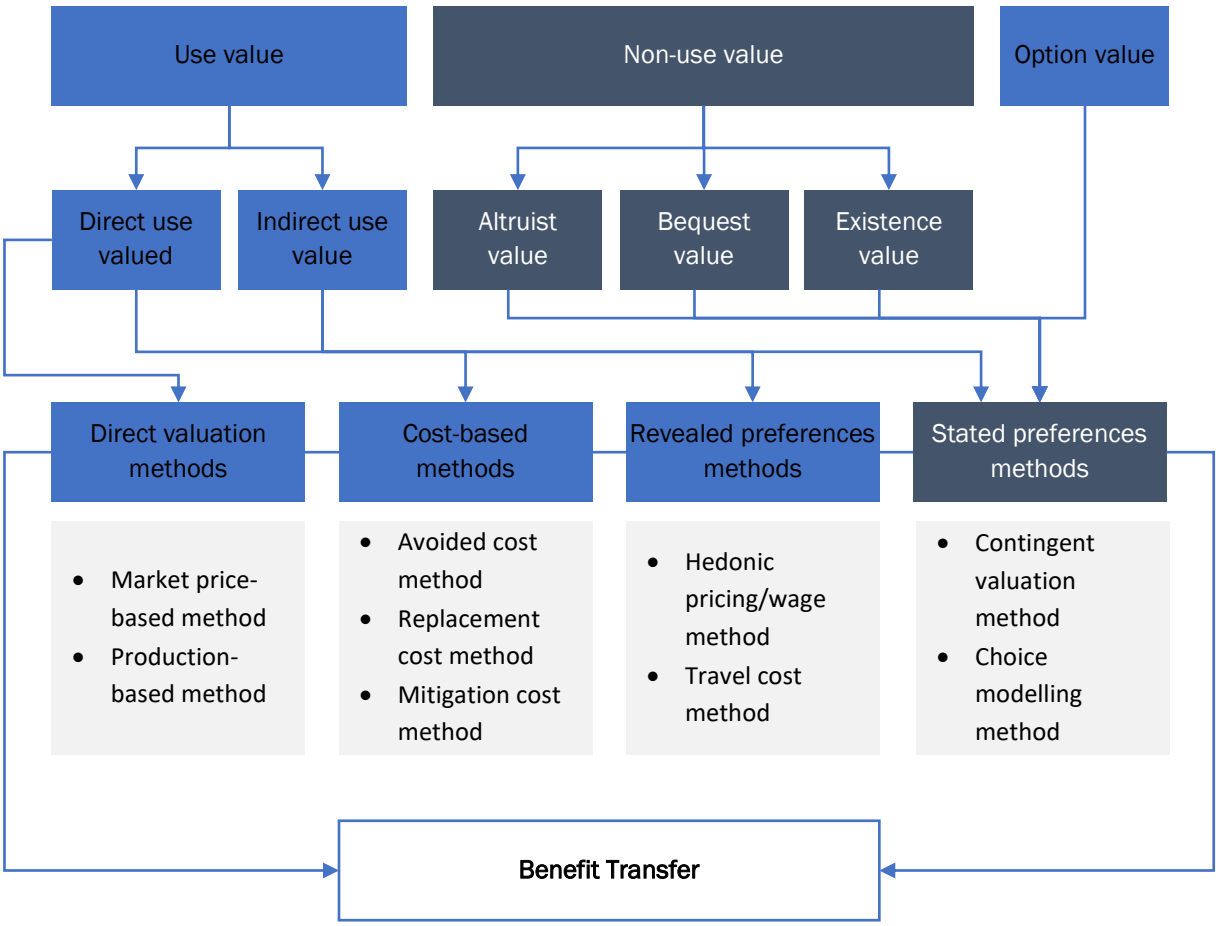
Various valuation methods are employed to assess different types of values associated with ecosystem services:

- **Direct valuation methods**, such as market price-based and production-based method are used in valuation of ecosystem services that have an established market and have **direct use value.** However, the production-based method could also be applied to ecosystem services with **indirect use value**;

- **Cost-based methods**, such as avoided cost method, replacement cost method and mitigation most method could be used to evaluate ecosystem services that hold use value, both **direct and indirect use value**;
- **Revealed preference methods**, such as hedonic pricing method and travel cost method could also be used for valuation of ecosystem services that hold use value, both **direct and indirect use value**;
- **Stated preference methods** are the most widely used valuation methods and they can be applied to determine the economic value of any type of ecosystem service, with both **use value and non-use value as well as option value,** and are the only means for valuing non-use and option values[22];
- **Benefit transfer** is based on all the other valuation methods thus it also can be applied to **any type of ecosystem services**.

When evaluating an ecosystem service, a "hybrid" valuation method can be used, combining multiple valuation approaches to take advantage of the strengths of each valuation method and compensate for their limitations.

Figure 3 Ecosystem services values and total economic valuation methods



Source: Author's illustration based on ELD Initiative (2019). ELD Campus. Module: Valuation of ecosystem services & Bartkowski, Bartosz & Massenberg, Julian. (2022). The economics of soils' contribution to human well-being

[22] Kramer, Randall. (2008). Economic Valuation of Ecosystem Services

Regarding the types of ecosystem services, different ecosystem services require different valuation methods:

- **Provisioning services** encompass products obtained from ecosystems (e.g. fresh water, food, fibre, fuel, genetic resources, biochemical, natural medicines, and pharmaceuticals). Thus, the **market-based method** is the most appropriate for estimating their economic value[23];
- **Regulating services** provide benefits obtained from the regulation of ecosystem processes, e.g. water regulation, erosion regulation, water purification, waste regulation, climate regulation, etc.[24]. Regulating services usually do not yield products that can be traded in the market, and their value is not usually directly expressed in prices. Thus, indirect valuation methods are most suitable for these types of services. **Cost-based methods** and **stated preferences methods** are the most used valuation methods for regulating services[25];
- **Cultural services** when they are not directly traded on the market (e.g. there is no entry fee for a national park) hold only spiritual value and energy from people's perception. Thus, **stated preferences methods** are mostly applied to estimate the economic value of the cultural services of an ecosystem;
- **Supporting services** refer to the functions required for the generation of all other ecosystem services. They distinguish themselves from provisioning, regulating, and cultural services as they often have indirect effects on society or appear over long periods of time. In valuating supporting services, the most widely used methods are **stated preferences methods and cost-based methods**.

2.3. Valuation methods for costs

Evaluating the costs of an NBS relies on the application of the Life Cycle Costs (LCC) methodology. LCC, also referred to as Total Cost of Ownership (TCO), takes into account the overall expenses arising from implementing and maintaining the nature-based solution. The proper identification of LCC offers the information required to determine the necessary investments to implement and maintain the NBS, while also presenting an overview of cost distribution over time.
In the life cycle of a NBS project the following expenditure categories incur[26]:

- **CAPITAL EXPENDITURES (CAPEX)**: expenses related to the initial stages of an NBS project. These include activities like design and planning, conducted by professionals like engineers and landscape architects. Additionally, CAPEX covers costs for obtaining necessary permits from various public entities, acquiring land, and potentially resettling communities if deemed necessary and appropriate. It also involves site preparation and construction tasks carried out by a contracted third-party entity. This may involve activities like planting trees, vegetation, and installing various components of the NBS solution. A subcategory of the CAPEX is the replacement cost, which occur during the implementation period to replace any short-life machinery and/or

[23] Luke Brander, Erik Gómez-Baggethun, Berta Martín-López, Madhu Verma (2010), Chapter 5 The economics of valuing ecosystem services and biodiversity, TEEB: The Ecological and Economic Foundations
[24] Russi D., ten Brink P., Farmer A., Badura T., Coates D., Förster J., Kumar R., and Davidson N. (2013) The Economics of Ecosystems and Biodiversity for Water and Wetlands. IEEP, London and Brussels; Ramsar Secretariat, Gland.
[25] TEEB (2010) The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions, and recommendations of TEEB
[26] Boris van Zanten, Gonzalo Gutierrez Goizueta, Luke Brander, Borja Gonzalez Reguero, Robert Griffin, Kavita Kapur Macleod, Alida Alves, Amelia Midgley, Luis Diego Herrera, and Brenden Jongman (2023). Assessing the Benefits and Costs of Nature-Based Solutions for Climate Resilience: A Guideline for Project Developers. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO

equipment. Allocation of costs over the years must align with the envisioned physical accomplishments and adhere to the implementation timeline.

- **OPERATING EXPENSES (OPEX)**: the ongoing costs that arise over the duration of the NBS life cycle. These expenses include the management and maintenance of the NBS such as overseeing protected areas, upkeeping urban green spaces, monitoring the quality of air and water, eradicating invasive species, as well as activities like fertilization and the allocation of land use payments to landowners if necessary. Understanding the operating costs of an NBS is important for identifying sustainable funding sources and designating accountable entities to oversee and carry out maintenance and monitoring responsibilities post-project completion.
- **TRANSACTION COSTS**: expenses for upstream studies, technical assistance, and engaging stakeholders. Stakeholder engagement is often necessary for defining benefits, establishing goals, collaboration between the community and the project team to identify specific investments for implementation. Due to their comprehensive and cross-sectoral nature, transaction costs for NBS projects can be relatively substantial. It is often necessary to engage extensively with the community and stakeholders to appropriately define, plan, and implement the project. This engagement serves the dual purpose of increasing awareness of the benefits and ensuring the project's long-term sustainability.
- **DISSERVICES**: the negative effects the implementation of a NBS can have on human wellbeing. For instance, certain NBS projects, such as the construction of barriers or embankments, may alter or even destroy existing habitats for native flora and fauna, potentially leading to disruptions in the local ecosystem. Accounting for significant disservices is advised in order to understand the effects on various parties and the distributional repercussions of an NBS project.

OPPORTUNITY COSTS: "those costs associated with the foregone alternative, which can be measured by the net benefit foregone because the resources that provide the services cannot be used in their next beneficial use"[27]. The opportunity costs of a good, service, or resource is equal to their value if used in an alternative way. For example, implementing an NBS would require both land and water resources, which could otherwise be used in an alternative way. In this context, the primary opportunity costs to consider are the net gains that could have been achieved if the land and water resources were allocated to other income-generating activity, such as agriculture, rather than the NBS. Land is a particularly valuable resource for nature-based solutions, as the use of land is higher compared to grey-infrastructure alternatives. Thus, the opportunity cost for land could be significant. Determining the opportunity costs can be accomplished through straightforward calculations, either by quantifying the income foregone due to the resources not being utilized in their most lucrative alternative, or by calculating the cost of compensation in cases involving property rights loss. In the case of agricultural land, the opportunity cost can be calculated using data on the average income per unit of land, while for urban land, the calculation can be based on the market price of land, or, similar to agricultural land, by estimating the profit that would have incurred by the subsequent economic activity.An important factor when determining the opportunity costs is consulting the specific stakeholder groups bearing these costs, such as farmers, local communities, commercial developers, or governmental entities, to be able to conduct an accurate analysis.

[27] Graveline, N., Joyce, J., Calatrava, J., Douai, A., Arfaoui, N., Moncoulon, D., Manez, M. De Ryke H., Zdravko K. (2017): "DELIVERABLE 4.1: General Framework for the economic assessment of Nature Based Solutions and their insurance value". EU Horizon 2020 NAIAD Project, Grant Agreement N°730497

Table 1 NBS cost components

CAPEX	OPEX	TRANSACTION COSTS	OPPORTUNITY COSTS[28]	DISSERVICES
• Design and planning • Securing permits • Land acquisition • Community resettlement • Site preparation • Construction • Tree planting	• Monitoring labour and technology • Tree and vegetation maintenance • Invasive species removal • Land use (for example, rent or other payments to landowners) • Land protection, including managing and controlling access	• Scoping studies and other technical assistance • Community engagement / stakeholder outreach • Goal setting and prioritization	• Value of using land for other purposes such as agriculture or residential/ commercial development • Opportunity cost of local labour and materials used for implementing the NBS project	• Negative impacts from NBS (for example, mosquitoes, pests)

Source: Boris van Zanten et al. "Assessing the Benefits and Costs of Nature-Based Solutions for Climate Resilience: A Guideline for Project Developers" (2023)

3. Translating the framework into real-life work

This chapter describes how the theoretical concepts, valuation logic, and economic modelling principles are translated into a practical workflow. The objective is to operationalise the methodological framework for Milestone 11 and develop a general model that can be applied both to the demo sites and, subsequently, across the Danube Basin.

Given the need to collect and process data systematically, the team developed templates and workflows to ensure coherence and to generate multiple model iterations based on the required context. As such, this approach serves as the operational backbone for translating the theoretical framework into practical modelling steps. These templates fulfil three key functions:

1. Structuring the economic inputs for IO modelling. Although restoration measures differ in scale and ecological specifics, their cost structures (planning, construction, materials, labour, maintenance) are sufficiently comparable to be aggregated into a **standardised cost allocation vector**. The templates consolidate these components and map them to economic sectors, allowing any intervention to be translated into IO-compatible inputs, regardless of country or measure type.

2. Screening ecosystem services for selective monetisation.

The templates enable the consistent documentation of ecosystem services, their classification, and their monetisability assessment. Only ES with robust monetary values—derived from market data, avoided costs, or credible literature-based transfers—are carried forward into the CBA. This supports the project's methodological orientation:

- **IO analysis = core evaluation tool**,
- **CBA = selective and complementary**, applied only where data justify monetisation.

[28] Avoid double counting between opportunity cost and CAPEX/OPEX cost components. For example, do not include land acquisition costs in CAPEX while also calculating the opportunity cost of land

3. Providing a reusable repository for scaling the model. The templates function as a harmonised data structure that practitioners can use when applying the general model to new sites. They contain the indicators, valuation options, and sector-allocation rules that ensure methodological consistency without requiring the creation of measure-specific submodels.
The exploratory work undertaken through these templates—testing ES valuation pathways, NBS classifications, and cost structures—provided essential evidence for the refined, high-level methodological approach. It also forms the basis for the Stage V toolkit that will enable practitioners to apply the general model efficiently and consistently across the Danube Basin.

Overview of the implementation stages

The analytical workflow for Milestone 11 is structured into **five interconnected stages**, moving from creating a knowledge and information base, to valuation, modelling, impact assessment, and finally generalisation.

Given the time constraint, the novelty of the work to be carried out (i.e. testing the model on demo sites being developed under the Danube4All project) and the need to deliver real solutions based on real data that feed into a model to be further employed in the future in other intervention sites at various scales and geographies along the Danube, we propose a **bottom up approach, starting from the demo sites as a test site for the economic modelling.** This approach will allow – for all involved stakeholders – to better understand what can and cannot be achieved at this intersection between ecology and economics, what are the limitations and mitigation measures with respect to data available and its ability to feed reliable models in order to provide comprehensive pictures of individual sites but which can be further added up to provide larger intervention pictures in wider areas (i.e. intervention in Upper Danube) or across similar types of interventions (like groynes). Although the stages were initially designed to allow a high degree of granularity, the refined methodological orientation agreed with partners—particularly the emphasis on a high-level, generalisable IO model—ensures that each stage now contributes in a streamlined and strategically coherent manner. Structured around the three key functions mentioned above, the implementation phase requires a few steps to help accomplish the main result, which are summarised below:

3.1. Stage 1 – Structuring the economic inputs of investment measures

As outlined above, in order to fulfil this function, the following actions have been designed:

Data collection at the demo site level

The following table is intended to collect information on the **demonstration sites** in order to use it as a demo for assessing economic benefits using the IO method. Instructions on how to fill in the table are provided in each category.

Table 2 Data collection table – sample for investments at the demo site level

Information Category	Description
1. Project Details	Project name and location (i.e. name of the demo site). *Additional info required:*

	- *Please provide info on the location of the investment and of the area served from an administrative point of view (on which NUTS2 or 3 is the site located, incl. area of interest/of expected benefits)* Description of the nature-based ecosystem project, including its **objectives**, **scope**, and **target ecosystem(s)**. *Additional info required:* - *Is it located in a protected area? Which one? How does that impact the work that needs to be done?* Please provide any useful documents
2. Project Timeline and Stage	Start date and anticipated completion date - *How much does the construction work take?* - *Which is the expected duration of the operation and maintenance stage?* Current stage of development (e.g., planning, design, implementation, monitoring).
3. Budget and Funding	Total project budget and breakdown of costs (e.g., capital investment, operational expenses) as per section 1.2 (table 2 below) Sources of funding (e.g., government grants, private investments, philanthropic donations) for the **construction stage** and the **operation/maintenance stage**.
4. Nature-Based Solutions	Description of the nature-based solutions being implemented (e.g., wetland restoration, reforestation, green infrastructure). *Additional questions:* - *Will the investment: (1) create new ecosystem services, (2) enhance existing ones, (3) reduce/destroy existing ones?*
5. Expected Benefits	Anticipated ecosystem services provided by the project Estimated quantities or magnitudes of benefits. Expected limitations (e.g. normally you would expect to see fishing but because the demo site is located in a protected area, this ES is restricted)
6. Assumptions and Uncertainties	Assumptions made in estimating project costs and benefits *Please refer to:* - *Are there local companies involved in providing the work? Which ones and in which economic sectors are they operating?* - *How many employees are dedicating to the investment work?* Sources of uncertainty and risk factors affecting the accuracy of estimates.
7. Project indicators	Plan for monitoring project implementation and assessing performance over time Indicators used to track progress and measure outcomes.
8. Stakeholders	Description of stakeholder engagement processes and community involvement in project planning and implementation Feedback received from stakeholders regarding project objectives, priorities, and concerns.
9. Environmental and Social Considerations	Environmental impact assessments and mitigation measures Social benefits including impacts on local communities

Financial data regarding the investment – Table 2 line 3 – continued.

Data collected at this stage is in line with insights from the literature, summarized in Table 1 above. After collecting quantitative data about the demo sites, we will be able to start calculating the economic impact of the investment in the demo site. Depending on the granularity of the data collected, we will be able to allocate it by economic sector of the national economies in which the demo sites are located, and compute how they multiply across the economy. The more details we

have, the more economic sectors we can include in our analysis, providing a more comprehensive picture of how they interact.

Table 3 Financial data covering the demo site

Name of the demo site	Data about investment	Details	Amount (in EUR)
Upper Danube	*Initial investment – **planning***	*Please provide a brief description of the planning phase – what was needed to set up the investment project (feasibility study, technical studies, on-site measurements, etc.)*	
	1.1. Planning		
	1.1. Approval and permits		
	1.2. Legal support		
	1.3. Accounting		
	1.4. Marketing and communication	*If applicable – in case stakeholders were involved*	
	1.5. Management	*If done by third parties*	
	1.6. Human resources	*Gross payment to employees involved by type of work (planning, approval, legal etc.)* *Number of FTE involved*	
	1.7. Other	*e.g. office supplies, subscriptions, software, telecom, delivery – any support products and services used*	
	*Initial investment - **implementation***	*Please provide a brief description of the implementation phase – please refer to: involvement of local companies, transportation of materials / machinery / etc, related work that might have been billed separately,*	
	2.1. Materials used		*If transportation and other related work was paid separately from materials, please specify amounts for each*
	2.2. Machinery/equipment		
	2.3. Construction		
	2.4. Human resources	*Gross payment to employees involved by type of work (materials, machinery operation, construction)*	

		Number of FTE involved	
	2.5. Other	*e.g. office supplies, subscriptions, software, telecom, delivery – any support products and services used*	
	Operation and maintenance	*Please provide details on the types of post-implementation activities involved as well as the expected duration of these operations*	
	3.1. Human resources	*Gross payment*	
	3.2. Supervision /monitoring	*Either gross payment or services contracted for monitoring*	
	3.3. Maintenance work	*Expenses with construction, materials, transportation, etc.*	
	3.4. Other	*Anything else not covered above*	

Literature review to collect broader data on NbS restoration measures

In addition to the demo site level data, in order to provide a more general framework of economic impact measurement, we are currently collecting data from NbS case studies that are relevant for river restoration.

So far, NWRM provided an extensive list of case studies that still require processing and validation of data in order to become a valuable source of monetary value for the modelling exercise. Natural Water Retention Measures (NWRM)[29] are *multi-functional measures that aim to protect and manage water resources and address water-related challenges by restoring or maintaining ecosystems as well as natural features and characteristics of water bodies using natural means and processes. Their main focus is to enhance, as well as preserve, the water retention capacity of aquifers, soil, and ecosystems with a view to improving their status. NWRM have the potential to provide multiple benefits (see benefits table), including the reduction of risk of floods and droughts, water quality improvement, groundwater recharge and habitat improvement. The application of NWRM supports green infrastructure, improves or preserves the quantitative status of surface water and groundwater bodies and can positively affect the chemical and ecological status of water bodies by restoring or enhancing natural functioning of ecosystems and the services they provide (see ecosystem services). The preserved or restored ecosystems can contribute both to climate change adaptation and mitigation.*

Therefore, the focus of this stage is to **collect monetary data (CAPEX and OPEX) for a variety of restoration measures and to express them by kilometre or sq kilometre, thus obtaining input data for IO on various types of interventions.**

In a nutshell – these are essentially investment costs and should be treated as such into the model. Data used refers to CAPEX and OPEX (the latter produces effects together with the ES services described below).

CAPEX data is more readily available compared to ES valuation. In practice, NBS investment produces a shock on demand by increasing the output for the various parts used in doing the investment (construction, materials, equipment, utilities, technical services, legal, marketing, etc). The value of the investment is allocated on the relevant economic sectors by % of contribution.

An example would look like this:

[29] https://www.nwrm.eu/list-of-all-case-studies

A 10 mil. EUR (NBS) investment in a 15 sq.km area [the restauration of a floodplain] creates a 15 mil. EUR final demand in the whole economy, split by sector: 7 mil. EUR in construction, 4 mil. EUR in manufacturing, 2 mil. EUR in professional services and 2 mil. EUR in administrative services. Of the total additional output created, 9 mil. EUR are in value added, 5 mil. EUR in wages and 1 mil. EUR in taxes. The amount of investment and area / length can be multiplied and the economic impact will multiply accordingly.

Data collection, processing and validation is work in process and results obtained so far are included in Annex 1 (NBS table).

3.2. Stage 2 - Screening ecosystem services

Similar to the data collection exercise in Key Function 1, focusing on ES is necessary in order to produce a repository of data regarding the monetised benefits of restoration measures in general.

The ES repository has been compiled starting from the IDES Tool Manual[30] and further developed based on additional sources. The full list of ES identified and currently studied can be found in Annex 2 (ES Table).

A short list of ES with (1) the highest potential of transferability of benefits, thus being useful in the modelling, as well as (2) displaying variability of monetary data by country, can be found below. This ES list has a double purpose:

- Represents the list of benefits to select from when applying the general model
- Provides specific data to feed the model either by country or by measure

Based on the repository, the "selective monetisation" of ES and thus inclusion in the model, will be based on the following logic and categories:

A. ES services that are "market related" – they generate increased output / higher production of the ecosystem (food, touristic activity, resources, etc.). Their impact is on demand. The higher the ES "activity", the higher the sectoral output.

Based on the table above, the following ES fall into this category. Moreover, their shock on demand is seen on the following economic sectors (*in italic, should be further discussed).*

- API – Arable crop production – *Agriculture (A01 mainly)*
- PBI – Plant biomass grassland - *Agriculture*
- CFI – Commercial fishing – *Agriculture (A03 – fishing)*
- TPI – Timber production – *Wood production*
- CHI – Commercial hunting (recreational / tourism) – *Tourism, Recreation (sector I, sector R, some H maybe)*
- WF – Wild foods (to a small extent, but still a provisioning service)
- AES – Abiotic energy sources (hydro)
- NWA – Opportunities for non-water-related activities (nature recreation) - *Tourism, Recreation (sector I, sector R, some H maybe)*
- WRA – Opportunities for water-related activities (water recreation) - *Tourism, Recreation (sector I, sector R, some H maybe)*

Using data collected from the literature, we create assumptions (that need to be validated by ecologists), to model the increased the demand, obtaining macroeconomic benefits (how the

[30] Stäps J., Gericke A., Lungu A. and Stammel B. (eds.) (2022). Ecosystem services in floodplains and their potential to improve water quality – a manual for the IDES Tool. Eichstätt, Berlin, Bucharest, https://doi.org/10.17904/ku.edoc.30670.

investment's operation is multiplied in the economy). The focus of data collection is on output. *e.g. Due to an NBS (from our list), API increases by 10%, which means a 5 mil. EUR final demand in sector A01, resulting in 13 mil. EUR total output, of which 7 mil. EUR are in value added, 4 mil. EUR in wages and 2 mil. EUR in taxes.*

B. ES services with "regulation & maintenance" function – they generate higher productivity rather than higher output, and their impact is on value added, not on output.

How:

- they reduce costs (fertilizers – nitrogen, phosphorus captured, water treatment, flood damage avoided, erosion reduction), (e.g. the agricultural output is still 1 tonne/ha, but pays less on fertilizers, leading to lower production costs but higher margin / VA)
- improve productivity (better soil for economic activities, better water etc.), e.g. the water is treated less by the water company because it contains less chemicals to be cleaned – more water can be treated at the same cost
- or they reduce risks (flood damage control) e.g. less loss to businesses and households compared to no intervention

Based on the table above, the following ES can be included in this category:

- NRI – N retention
- PRI – P retention
- GHG – GHG regulation & carbon sequestration
- FRI – Flood risk regulation
- LFI – Low flow regulation
- SRI – Sediment regulation
- SFI – Soil formation in floodplains
- LCR – Local climate regulation/cooling
- FW – Freshwater provision (partially)

Assumption: *the impact is on VA, as these services do not change the structure of the economy*
The modelling includes a VA shock (of avoided cost) S_j VA, for which we need data on avoided costs/ year on the specific sectors (e.g. NRI, PRI – savings in sectors C20-C21, water treatment, maybe health)
An example would look like this: 5 mil. EUR / year of avoided costs in water and fertilizers represent around 12 mil. EUR final demand surplus in the 2 impacted sectors, multiplying to X mil. EUR total output and Y mil. EUR value added, of which wages and taxes are a b c.
Alternatively, in CBA, where they should be treated at the base value (the value of avoided cost) while the modelling show how it multiplies further in the economy.

C. ES services with cultural function – some of them can provide monetary value and thus can be considered that they contribute to final demand increase (first bullet) and are modelled as such (like in A), the other are data-dependant and might be considered for CBA somehow

- NWA, WRA – recreation, tourism → works as ΔD (see point A).
- LAQ – landscape aesthetic quality
- NH – Natural Heritage
- CH – Cultural Heritage
- KS – Knowledge systems

Table 4 Ecosystem services repository

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
		monetisation is based on market prices			
provisioning	**Wood production**	m^3 timber	Market price (stumpage)		Vallecillo Rodriguez, S., La Notte, A., Kakoulaki, G., Kamberaj, J., Robert, N., Dottori, F., Feyen, L., Rega, C. and Maes, J., Ecosystem services accounting - Part II Pilot accounts for crop and timber provision, global climate regulation and flood control, EUR 29731 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-02905-2, doi:10.2760/631588, JRC116334. https://publications.jrc.ec.europa.eu/repository/handle/JRC116334
		m^3/ha/year	Productivity × price	idem	
provisioning	**Wild fish production**	tons/year fish	Market price	€/t (freshwater)	
		biomass/ha	Replacement cost (restocking)	€/t	
provisioning	**Grassland production**	t dry biomass	Forage value	€/t	
provisioning	**Arable crop production**	t/ha	Market price	€/t cereal	Vallecillo Rodriguez, S., La Notte, A., Kakoulaki, G., Kamberaj, J., Robert, N., Dottori, F., Feyen, L., Rega, C. and Maes, J., Ecosystem services accounting - Part II Pilot accounts for crop and timber provision, global climate regulation and flood control, EUR 29731 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-02905-2, doi:10.2760/631588, JRC116334. https://publications.jrc.ec.europa.eu/repository/handle/JRC116334
		yield stability (%)	Damage avoided (yield variance)	€/ha from risk models	

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
provisioning	**Drinking water provision**	m^3 potable water	Avoided treatment cost	€/m^3	
		NO_3/PO_4 reduction	Treatment cost avoided	2–12 €/kg N; 15–45 €/kg P	
monetisation is based on avoided cost / replacement cost / ETS					
regulating	**Flood mitigation**	Change in flood retention volume (m3)/dike height (m) required for flood protection	Avoided flood protection costs	Based on case studies	Vallecillo Rodriguez, S., La Notte, A., Kakoulaki, G., Kamberaj, J., Robert, N., Dottori, F., Feyen, L., Rega, C. and Maes, J., Ecosystem services accounting - Part II Pilot accounts for crop and timber provision, global climate regulation and flood control, EUR 29731 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-02905-2, doi:10.2760/631588, JRC116334. https://publications.jrc.ec.europa.eu/repository/handle/JRC116334
		Number/area of residential/busi n ess/farm properties at flood risk in case of a 100-year flood event	Avoided damages of flood events	Depends on country	Kok S., Grondard N., Lenz M.I., Bangalore Suresh N.T., Garcia X., Llorente O., Estrada L., Acuna V., Birk S., 2025. Guidance Document – Cost-Benefit-Analysis in freshwater ecosystem restoration. EU H2020 research and innovation project MERLIN deliverable D3.4. 25 pp.
					Huizinga, J., De Moel, H. and Szewczyk, W., Global flood depth-damage functions: Methodology and the database with guidelines, EUR 28552 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-67781-6, doi:10.2760/16510, JRC105688. https://publications.jrc.ec.europa.eu/repository/handle/JRC105688

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
				Central value £1.20 m^{-3} yr^{-1}, range £0.19–£1.23 m^{-3} yr^{-1}; replacement cost £2–£50 m^{-3} (mean £14 m^{-3}).	Broadmeadow, Samantha, et al. "Valuing flood regulation services of existing forest cover to inform natural capital accounts." Forest Research (2018)
				Empirical avoided-damage estimates in the £0.2–£1.2 m^{-3} yr^{-1} range.	Defra / Environment Agency (2015–2020). Slowing the Flow at Pickering and Holnicote Natural Flood Management Project evaluation reports.
					FLOODsite (2009). Guidelines for Flood Damage Evaluation (Deliverable D9.1). EU 6th Framework Programme Project. http://www.floodsite.net/html/partner_area/project_docs/T09_06_01_FLOODsite_D9_1_Flood_damage_guidelines.pdf
					Penning-Rowsell, E., Priest, S., Parker, D., Morris, J., Tunstall, S., Viavattene, C., ... & Owen, D. (2014). Flood and coastal erosion risk management: a manual for economic appraisal. Routledge.
					UK EA (Environment Agency) (2020). A review of skills and guidance in flood and coastal risk management benefit cost. Assessment Appendix B: user guide for early calculations of potential scheme benefits. https://assets.publishing.service.gov.uk/media/606dcfdcd3bf7f4017cbef20/A_review_of_skills_and_guidance_in_flood_and_coastal_risk_management_benefit_cost_assessment_-_appendix_B.pdf
regulating	**Low flow mitigation**	additional discharge	Avoided drought losses	€/m^3 (sector dependent)	
		fewer Q<95 days	Industrial water security value	0.5–5 €/m^3	
regulating		Δ°C	Energy savings (cooling)	0.1–0.5 €/m^2/°C/day	

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
	Local climate cooling	evapotranspiration	Cooling-service proxies	location-specific	
regulating	**Sediment regulation**	t sediment retained	Avoided dredging cost	8–25 €/t (EU average) Bulgaria: As low as €3 for general dredging projects in the Danube river basin. Romania: Approximately €3.5 (e.g., in the Galati sector). In specific highly-sedimented areas like the Lower Old Danube, significant volumes (700,000 m³/year) were historically dredged, highlighting a major ongoing cost. Slovakia: Around €15 for mechanical dredging including transport. Croatia: Approximately	Panagos et al. (2024) Understanding the cost of soil erosion: An assessment of the sediment removal costs from the reservoirs of the European Union https://www.sciencedirect.com/science/article/pii/S095965262304341X DanubeSediment: Sediment Management Measures for the Danube www.interreg-danube.eu/danubesediment

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
				€7.5 for dredging in reservoirs. Austria: Costs can reach up to €20, often involving specific treatments for sediments. Germany: The range is broad, from €10 to €100, depending heavily on specific local requirements and potentially contamination levels.	
regulating	**Soil formation**	mm deposition/year	Increased productivity	20–100 €/ha/year / maybe proxy for agricultural productivity available by country on eurostat	
regulating	**Carbon sequestration**	t CO_2eq/year	EU ETS price	40-500 €/t CO_2	Vallecillo Rodriguez, S., La Notte, A., Kakoulaki, G., Kamberaj, J., Robert, N., Dottori, F., Feyen, L., Rega, C. and Maes, J., Ecosystem services accounting - Part II Pilot accounts for crop and timber provision, global climate regulation and flood control, EUR 29731 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-02905-2, doi:10.2760/631588, JRC116334. https://publications.jrc.ec.europa.eu/repository/handle/JRC116334

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
			social cost of carbon (SCC	€282.50 per tonne of CO_2 (2021)	Kok S., Grondard N., Lenz M.I., Bangalore Suresh N.T., Garcia X., Llorente O., Estrada L., Acuna V., Birk S., 2025. Guidance Document – Cost-Benefit-Analysis in freshwater ecosystem restoration. EU H2020 research and innovation project MERLIN deliverable D3.4. 30-34 pp. Nordhaus, W.D. (2017). Revising the social cost of carbon. Proceedings of the National Academy of Sciences, 114(7), 1518-1523. DOI: 10.1073/pnas.1609244114
regulating	**Carbon retention**	t carbon stored	Social cost of carbon	100–200 €/t	
regulating	**Nitrogen retention**	kg N retained	Replacement / fertilizer-replacement cost	€2,000 – €3,000 per tonne	
			Avoided treatment	~€2.2/kg N = ≈€2200/tonne	Brink & vanGrinsven (2011), Costs and benefits of nitrogen in the environment
			Damage cost / welfare loss		Brink & vanGrinsven (2011), Costs and benefits of nitrogen in the environment
regulating	**Phosphorus retention**	kg P retained	Replacement / fertilizer-replacement cost	€2000–8000/tonne	Mollinos-Sennante(2011) Economic Feasibility Study for Phosphorus Recovery Processes
			Avoided treatment		Brink & vanGrinsven (2011), Costs and benefits of nitrogen in the environment
			Damage cost / welfare loss		
regulating	**Habitat maintenance**	restored area (ha)	Habitat restoration cost	€/ha	La Notte, A., Vallecillo Rodriguez, S., Garcia Bendito, E., Grammatikopoulou, I., Czucz, B., Ferrini, S., Grizzetti, B., Rega, C., Herrando, S., Villero, D., Zurbaran Nucci, M. and Maes, J., Ecosystem Services Accounting – Part III - Pilot accounts for habitat and species maintenance, on-site soil retention and water purification, EUR 30856 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42051-4, doi:10.2760/636621, JRC126566.

ES TYPE	ECOSYSTEM SERVICE	INDICATOR	MONETISATION METHOD	VALUES	DATA SOURCES
					Schmidt and Albert (2025) Enhancing multiple ecosystem services: Nature-based measures outperform technical interventions in river management https://www.sciencedirect.com/science/article/pii/S2212041625000993?dgcid=rss_sd_all
	monetisation is based on WTP / hedonic pricing / travel cost etc.				
cultural	**Landscape aesthetics**	scenic quality index property value increase	Hedonic pricing	+1–5% property value	
cultural		no of tourists	Recreation value	5–20 €/visit	
cultural	**Natural & cultural heritage**	restored sites - revenue from operating them	Tourism revenue	€/visitor or €/site	
cultural	**Unspecific water interactions**	no of tourists / visitors	Travel cost	€/visit x no of visits	
cultural	**Water-related activities**	recreation use	Expenditure method	€/visit x no of visits	Vallecillo Rodriguez, S., La Notte, A., Polce, C., Zulian, G., Alexandris, N., Ferrini, S. and Maes, J., Ecosystem services accounting: Part I - Outdoor recreation and crop pollination , EUR 29024 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-77333-4, doi:10.2760/619793, JRC110321.

3.3. Stage 3 - Performing IO and CBA analysis

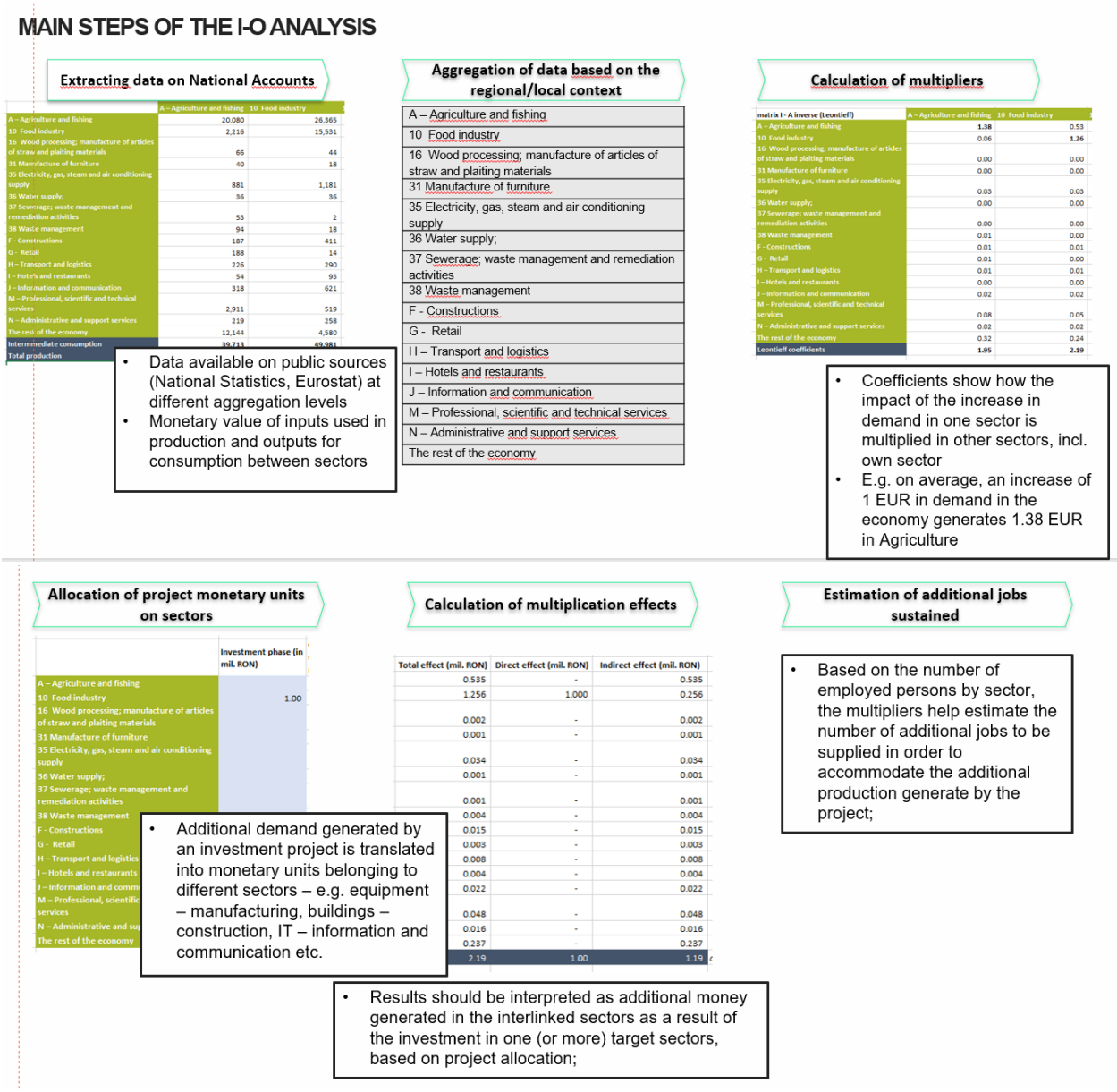
Based on the results of Stages I and II – creating the repositories of data, the economic models can be built for any scenario given, they will be fully expanded and tested on the demo sites.

The **IO analysis** is the backbone of the economic footprint analysis and comprises several **steps**:

- **INPUT-OUTPUT ANALYSIS** is a macroeconomic tool applied to depict the interlinkages between the main activities of a national or regional economy
- Due to differences in national economies' structure (sectors are interlinked differently in the countries along the Danube), it helps show how 1 EUR invested in the upper basin multiplies differently to 1 EUR invested in the lower basin in the same type of intervention. How to be interpreted:
    - The output from one industry as a result of the investment project may become the input of another (Industries use the products of other industries to produce their own products)
    - The investment money represents a shock for the economy as surplus money is introduced in the economy, triggering demand rising in other sectors
    - Main idea: an initial investment creates output in the local economy, as well as jobs, and it quantifies the increase in demand/purchases of goods and services required to deliver that output, with consequences along the supply chain.
        - Shows how relationships between sectors or industries
        - Uses a matrix representation of an economy to predict the effect of changes in one industry on others and the economy as a whole
        - Can be adjusted to different settings depending on the economic sectors involved
        - Coefficients obtained measure the impact of the increase in demand - the higher the multiplier, the higher the impact on the economy
- In practice, the following calculation steps are used:
- Data on National Accounts is extracted for the latest available year (such data usually has a 2-year gap, considering the amount of effort to aggregate it from the microeconomic level). However, it is largely available on any national statistics office or on Eurostat.
- Coefficients are computed for each sector, showing the interaction between economic branches, and how the increase in demand in one sector is used or how it influences output change in another sector. To ensure granularity, we decided to built the tables at the highest level of detail by sector, which means 88x88 matrix or 64x64 in some cases;
- Additional demand generated by an investment project is translated into monetary units belonging to different sectors – e.g. equipment – manufacturing, buildings – construction, IT – information and communication etc.
- Results should be interpreted as additional money generated in the interlinked sectors as a result of the investment in one (or more) target sectors, based on project allocation;
- Based on the number of employed persons by sector, the multipliers help estimate the number of additional jobs to be supplied to accommodate the additional production generated by the project;

The table below summarizes the data needs and availability:

INDICATORS	DATA SOURCE	DATA AVAILABILITY BY COUNTRY	YEAR
Supply-Use tables	Eurostat, *naio_10_cp15, naio_10_cp16*	Germany, Croatia, Hungary, Austria, Romania, Slovakia, Serbia	2021
	National Statistical Institute, Republic of Bulgaria / Moldova	Bulgaria, Moldova	2014, 2021
IO symmetric tables	Ukrstat - Ukrainian Statistical Office	Ukraine	2021
employment by sector	Eurostat, NAMA_10_A64	All	2021
wages by sector	Eurostat, NAMA_10_A64	All	2021
taxes	Eurostat, NAMA_10_A64	All	2021



- Other considerations regarding the IO analysis:
  - I-O analysis is a powerful tool to understand the key sectors of an economy, that show the greatest potential to generate (monetary) impact

- Macroeconomic tool – therefore it presents an aggregated picture at the national level, despite applying it to lower territorial levels; *not always the supply and demand interactions between companies happen at the local or regional level;*
- *I-O is a static instrument – it relies on past (real) data to describe what a potential "shock" (an inflow of money) would cause in interlinked sectors in a specific moment in the past*; the advantage – the structure of the economy does not change that quickly
- *Sometimes allocation of costs within a project by economic sectors are not very easy to make* – but an average representation is still a reliable estimation (as magnitude order)
- Finally, it is a *quantitative instrument* that is fed by data - ecology-related projects are not always easy to convert into monetary units, so they should be assessed through the indirect, spillover effects generated that can be converted into money (e.g. reforestation of an area – difficult to measure, but it may help increase ecological tourism, which in turn creates jobs and consumption, which in turn can be modelled).

- After building the IO tables for each country in which the demo sites are located, data is included in the model in the following way:
  - **Data related to the intervention**: construction costs (outlined in the *Valuation of costs* section) are allocated to various economic sectors based on their use (i.e. €100,000 in construction, €3,000 in legal, €20,000 in manufacturing).
  - **Data related to benefits – those values obtained through valuation methods showing a change in demand are considered** (i.e. market prices, production function, revealed preference). For example, the monetary value of additional fish supply expected to be sold on the market is allocated to sector A – fish farming; additional revenue spent by tourists is allocated to recreational activities or food and beverages, depending on their specificity;
- Although benefits are expected to be obtained over a long period of time, this instrument can provide reliable results as long as the IO table used takes into account similar macroeconomic conditions. Simply put, IO is a static instrument – the macroeconomic landscape changes the most over economic cycles, not year to year, as such it should be used with caution when estimating effects on longer periods of time (longer than 3-5 years). This means it cannot capture the aggregated benefits over 15 or 20 years of estimation. This is why we propose using only: full data available on costs of the investment and 3-5 years of aggregated benefits.
- After computing the GVA change, sustained jobs are derived using data on average wages by sector and total employment. The result is given in number of sustained jobs by the displaced demand (additional GVA created).

Finally, the general model will have the following components:

- IO table for each country;
- Repository of data on restoration measures (by km or sq. km);
- Repository of benefits that can monetised;
- Allocation by sector of each of them in order to create a customizable tool that will be first tested on the demo sites and then expanded to any combination of measures / benefits;

CBA analysis – main steps:

- CBA ensures that the benefits (enhancements in human well-being) outweigh the costs (reductions in human well-being) before implementing a project. This analysis is crucial as it

describes and assesses the direct and indirect effects of the project on human beings and the environment, helping in the selection of the most viable project or program[31].

- The CBA of an NBS should employ an incremental approach by comparing a scenario involving the project with a counterfactual baseline scenario (Business as Usual, or BAU) that lacks the project[32]. The "incremental benefits" specifically refer to the extra benefits that come from implementing a project, in contrast to the "gross benefits" that refer to all the advantages that come from a specific site, including all biodiversity and ecosystem services. **This refers to all benefits monetized that result from Stage II.**
- The process of monetization implies that all costs and benefits can be traded off against each other;
- The quantification stage of the CBA uses a net present value (NPV) approach, which estimates the value of the stream of benefits that are expected to be generated over the lifetime of an asset, in this case the natural habitat on which the intervention took place. These values are then discounted back to the present accounting period.
- Three main aspects are involved here:
    - Expected future flow of values – the future annual monetised value of each benefit
    - The asset lifetime – the period over which the flows of values are expected to be generated (usually over 25-30 years, recommendations go even further to 100 years)
    - The discount rate – recommended at 3.5%
- Once NPVs are obtained for each benefit, the total value of each intervention is calculated by summing up the costs and benefits, and a benefit-cost ratio is calculated to assess the trade-off between the two (a value higher than 1 implies positive benefits)

Helps answer the question: *How much value (i.e. benefits) is created for any 1 EUR of investment (i.e. costs)?*

Under this approach, the following categories of monetary values are part of the CBA analysis[33]:

- **Capital and operational costs**: Necessary for the establishment and maintenance of the NBS included in the strategy;
- **Opportunity costs**: Represent foregone benefits, such as areas taken out of production or land used for NBS that cannot be utilized for other purposes like construction;
- **Avoided Damage Costs**: Refers to the damages prevented due to the implementation of a NBS project (e.g., risks from flood damage);
- **Incremental co-benefits**: Include additional environmental, economic, and social benefits generated by NBS, or ecosystem services (all benefits identified in Stage II).

3.4. Stage 4 - Assessment of the post-intervention economic impact

Testing the model in multiple areas is necessary to check its robustness and viability across environments. Thus, this part will help answer the following questions:

- How much does 1 EUR of invested money yield in impact in the three sectors of the Danube (i.e. because there are different countries), or based on the type of investment?
- Which interventions are more “profitable” in terms of benefits?
- Where do national economies benefit more or where do local communities benefit more?

[31] ten Brink P., Badura T., Bassi S., Daly, E., Dickie, I., Ding H., Gantioler S., Gerdes, H., Kettunen M., Lago, M., Lang, S., Markandya A., Nunes P.A.L.D., Pieterse, M., Rayment M., Tinch R., (2011). Estimating the Overall Economic Value of the Benefits provided by the Natura 2000 Network. Final Report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038. Institute for European Environmental Policy / GHK / Ecologic, Brussels 2011

[32] European Commission Directorate-General for Regional and Urban policy, *Guide to Cost-Benefit Analysis of Investment Projects*, *Economic appraisal tool for Cohesion Policy 2014-2020*, 2014

[33] Coënt, P.L. et al. (2021) 'Is-it worth investing in NBS aiming at reducing water risks? Insights from the economic assessment of three European case studies,' Nature-Based Solutions, 1, p. 100002. https://doi.org/10.1016/j.nbsj.2021.100002.

- What happens if you invest the same amount in two countries? How do jobs are affected? How much distance or surface is needed in one country to obtain similar effects to another one?
- Limitations of the models will be discussed here as well, including recommendations for further adjustments to the models.

3.5. Stage 5 - Expanding the model to the general case

Stage V focuses on transforming the methodology tested on the three demo sites into a **general, replicable model** that can be applied to restoration investments across the Danube Basin. In line with the methodological orientation agreed with project partners, the general model builds primarily on the **Input–Output (IO) framework**, complemented—where feasible—by **selective, monetizable ecosystem service (ES) benefits** identified through CBA techniques.

The purpose of this stage is not to develop measure-specific or NBS-specific models, but rather to establish a **scalable analytical structure** that works irrespective of the restoration type, provided that a *representative cost structure* is available. Typical restoration investments display similar CAPEX/OPEX profiles even when absolute budgets differ, enabling the IO approach to be generalised across intervention categories and countries.

Accordingly, Stage V produces a coherent set of **tools and templates** that allow future users to apply the model beyond the demo sites:

• A streamlined ES identification and screening tool

A simplified template to document ES potentially affected by a restoration measure, with guidance on determining whether an ES is:

- **monetizable** (eligible for inclusion in CBA),
- **quantifiable but non-monetizable**, or
- **qualitative only**.

This ensures that ES enter the model consistently without requiring measure-specific modelling structures.

• A valuation guidance note

Instructions on how to apply valuation methods only to those ES where credible monetary values can be established, avoiding unnecessary complexity and reflecting Helmut's requirement that ES valuation remains **selective, not exhaustive**.

• IO model allocation templates

Standardised sheets for allocating restoration costs to economic sectors based on typical cost shares, enabling the IO model to be applied even when only approximate or literature-derived cost structures are available.

• A light CBA annex template

A short methodological template describing how to include specific monetizable ES benefits (e.g., avoided damage) where site-specific data permit, without creating separate models for specific restoration measures.

Outcome of Stage V

Stage V delivers a **fully generalised, user-friendly analytical package** that allows other stakeholders to run the Danube4All economic model on future restoration sites. The model retains a coherent structure centred on IO analysis, enhanced—where data allow—by selective and transparent ES valuation. This ensures methodological consistency across cases while reflecting the practical and data-driven constraints highlighted throughout the project.

4. Results – Structure of the General Economic Impact Model

The generic macroeconomic model developed under Milestone 11 represents the consolidated result of a full year of analytical work, testing, refinement, and methodological alignment with project partners. Its purpose is straightforward: to provide a **robust yet easy-to-apply framework** for estimating the economic effects of restoration investments anywhere along the Danube River Basin. The model must work across countries, across scales, and across restoration types — from groyne removal to floodplain reconnection — while remaining grounded in economic reality and transparent enough for practical use by policymakers and river managers.

At the core of the model lies a simple insight: although the ecological functioning of restoration measures varies widely, the way funds are **spent to implement them is strikingly similar**. Planning, design, construction works, materials, equipment, and labour appear in almost every intervention, differing in magnitude but not in their fundamental economic structure. This recognition became the foundation of a **measure-agnostic** economic model.

Our exploratory work — including the detailed Excel templates developed earlier in the project — initially tested the feasibility of building mini-models for various restoration measures. That stage was critical: it helped us understand the range of cost categories, the types of ecosystem services involved, and the valuation methods that could theoretically be applied. The templates became an organised repository of restoration types, ecosystem services, assumptions, valuation logic, and cost structures. However, as work progressed and the methodological testing became clearer it also became evident that the final economic model **should not be a collection of mini-models**. Instead, it should be a single, overarching macroeconomic model that can accommodate any restoration measure through a representative cost structure. The earlier templates, therefore, remain extremely valuable — but as a **supporting toolkit** rather than a modelling engine. They ensure consistency, help users prepare inputs, and provide the data screening logic for ecosystem services. The model itself, however, is intentionally streamlined and high-level.

Structure of the Generic Macroeconomic Model

The principal component of the general model is an Input–Output (IO) analysis. IO modelling is uniquely suited for this context because the question we must ultimately answer is a macroeconomic one:

What happens in the broader economy when 1 EUR is invested in river restoration?

To answer this, three elements are required:

1. **The total investment cost**, consisting of CAPEX and, where relevant, OPEX.
2. **A distribution of that cost across economic sectors**, derived either from project-specific budgets or from typical cost shares observed in restoration projects.
3. **National IO tables**, which describe how sectors interact and how economic activity propagates through the economy.

One of the most essential methodological conclusions is that the IO analysis **does not depend** on the type of restoration measure, nor on the classification of Nature-based Solutions (NBS), nor on the set of ecosystem services involved. It depends solely on **how money is spent across sectors**. This is why variations among ecological measures—floodplain reconnection, bank stabilisation, side-channel restoration—do not require separate macroeconomic models. Their effects on the construction sector, engineering services, material supply industries, and labour are sufficiently similar for IO

purposes. In practical terms, whether 45% of the investment is allocated to construction or 55% does not fundamentally change the type of sectors affected — it only modifies the magnitude of the multiplier. This finding is entirely aligned with the request from partners: the model must remain **simple, general, and driven by economic structure**, not ecological detail.

Inputs to the IO model

Regardless of the restoration measure, three data elements are required:

1. **Total investment cost** (CAPEX + OPEX, when relevant).
2. **Allocation of costs into economic sectors**, using:
    - project-specific cost data when available, or
    - **typical cost shares** (e.g., 40–60% construction, 10–20% equipment, 20–40% labour) derived from literature and partner experience.
3. **National IO tables**, obtained from Eurostat or national statistical offices.

This means **the model does not depend on the specific measure** (e.g., groyne removal vs. floodplain reconnection), because what matters is **how the investment money is spent**, not the ecological configuration of the measure.

Outputs of the IO model

Using the above inputs, the IO model calculates:

- **Gross Value Added (GVA) generated** in each sector
- **Total economic output stimulated**
- **Number of sustained jobs**, derived from sector-level labour coefficients
- **Distribution of effects across sectors**, showcasing the economic structure of each country

Complementary Component: Selective CBA for Monetizable ES

While many ecosystem services cannot be monetised with confidence, certain benefits—particularly **avoided damage costs or market-linked outputs**—can be integrated.

When CBA is applied

CBA is included only when:

- a clear, quantifiable change in an ES can be identified; and
- there is a credible valuation method (e.g., avoided flood damage, additional fish biomass, avoided water purification costs).

This ensures CBA **adds value** rather than introducing methodological uncertainty.

How CBA integrates with the macro model

CBA results are not a separate model. They:

- provide **additional monetary flows** that can be input into the IO model (e.g., increased revenue from fisheries, increased tourism expenditure); or
- are presented as **standalone net present value (NPV)** calculations when their nature does not allow integration into IO.

Thus, CBA plays a **complementary**, not a structural role.

Role of Ecosystem Services: Selective, Not Structural

Ecosystem services (ES) still have an important place in the model, but their function is different. They are **not** used to structure the IO analysis. Rather, ES serve as indicators of environmental change, and they act as the entry point for **selective valuation** in cases where economic quantification is possible. A small number of ecosystem services may generate monetizable benefits — such as avoided flood damage, increased fish production, or reduced water purification costs. When robust valuation methods and credible quantitative estimates exist, these benefits can be expressed monetarily and incorporated either into the IO model as additional demand shocks or into a standalone Cost–Benefit

Analysis (CBA).
Most ecosystem services, however, cannot be monetised reliably. In such cases, they remain part of the qualitative narrative of benefits, without being forced into artificial numerical modelling.
This approach ensures methodological integrity: we maximise rigour where evidence exists and avoid overinterpreting ecological improvements in monetary terms when data constraints make valuation speculative.

The Final Output: A General, Transferable Danube4All Economic Impact Model

The final general model is composed of:

1. **A cost allocation template**
    - allows rapid structuring of investment budgets into IO-compatible categories.
2. **A macroeconomic multiplier engine**
    - uses national IO tables to generate GVA, employment, and total output effects.
3. **A selective ES valuation module**
    - quantifies monetizable benefits (when possible) and integrates them into the IO impact or presents them in a CBA summary.
4. **A reporting structure**
    - summarises investment effects, ES benefits, and limitations in a consistent, comparable format for any Danube site.

Why This Model Works Across All Restoration Measures

One of the key findings of the exploratory phase was that **although restoration measures differ ecologically**, their **investment cost structures are remarkably similar**. This similarity enables the development of a generalisable IO model that does not require separate models for each type of intervention. Even though restoration measures differ in engineering design and ecological outcomes, **their spending logic is highly similar**.

Cost Component	Measure A	Measure B	Measure C
Planning / Design	10–20%	8–15%	12–18%
Construction	40–60%	35–55%	45–65%
Materials & Equipment	10–25%	15–30%	10–20%
Labour	20–40%	25–45%	30–50%

This similarity enables the IO model to remain valid even when measures differ ecologically.
Ecosystem service benefits, meanwhile, can be added **only when meaningful**, without forcing all projects into a rigid valuation structure.
This ensures:

- methodological consistency,
- scientific credibility, and
- practical usability by river managers and policymakers.

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6. Annexes

Annex 1 NbS measures

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
1	Meadows & pastures	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Maintenance Costs - €159 - €420 (grazing) & €189 - €358 (hay) • Additional Costs (€154) - conversion from arable of €14/ha/yr	• 2013 - maintenance costs • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Meadows & pastures
2	Meadows & pastures	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Maintenance Costs - €159 - €420 (grazing) & €189 - €358 (hay) • Additional Costs (€154) - conversion from arable of €14/ha/yr	• 2013 - maintenance costs • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Meadows & pastures
3	Meadows & pastures	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Maintenance Costs - €159 - €420 (grazing) & €189 - €358 (hay) • Additional Costs (€154) - conversion from arable of €14/ha/yr	• 2013 - maintenance costs • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Meadows & pastures
4	Meadows & pastures	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Maintenance Costs - €159 - €420 (grazing) & €189 - €358 (hay) • Additional Costs (€154) -	• 2013 - maintenance costs • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Meadows & pastures

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				conversion from arable of €14/ha/yr			
5	Buffer strips & hedges	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs -	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				hedgerows management - €63.75/100m • Additional Costs - loss of revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
6	Buffer strips & hedges	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
7	Buffer strips & hedges	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
8	Buffer strips & hedges	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
9	Buffer strips & hedges	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
10	Buffer strips & hedges	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
11	Buffer strips & hedges	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
12	Buffer strips & hedges	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - establishment of 3m buffer strip - 400 to 800 €/ha • Capital Costs - Mean and range payment rates for field margin creation - €454 (€13 to €865) • Capital Costs - Hedgerow planting and maintenance capital costs - €4.73/m • Capital Costs - planting/ replating a hedge - €5.08/m • Capital Costs - coppicing a hedge - €9.45/m • Capital Costs - total programme cost including €601/ha compensation payments to 94 farmers to cover loss of gross margin - €140000/yr • Capital Costs - total costs for 3500m of newly planted hedgerow covering 35000ha - €75000 • Maintenance Costs - maintaining a 3m buffer strip - 75 to 150 €/ha • Maintenance Costs - hedgerows management - €63.75/100m • Additional Costs - loss of	• 2006 - buffer strip • 2011 - margin creation • 2010 - hedgerows • 2006 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Buffer strips & hedges

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				revenue from arable - €140/ha/yr			
13	Crop rotation	Food production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest pressures - range of 400€/ha • Additional Costs - subsidies for	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				supporting crop rotation development - 128€/ha/year (Europe)			
14	Crop rotation	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation
15	Crop rotation	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)			
16	Crop rotation	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation
17	Crop rotation	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)			
18	Crop rotation	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation
19	Crop rotation	Aesthetic / cultural value (landscape heterogeneity)	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - changing crop rotations and increasing fallow index in crop rotations - 32€/ha • Maintenance Costs - ongoing costs of crop rotations will depend on the interaction of crop selection and sequence on nutrient requirements and pest	• 2011 - capital costs • 2008 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Crop rotation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				pressures - range of 400€/ha • Additional Costs - subsidies for supporting crop rotation development - 128€/ha/year (Europe)			
20	Strip cropping along contours	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - labor and/ or fuel, may involve a change in planned cropping sequences - low • Maintenance Costs - may include redistributing deposited sediments - low • Additional Costs - subsidies for soil management - 110€/ha/year (Europe)	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Strip cropping along contours
21	Strip cropping along contours	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - labor and/ or fuel, may involve a change in planned cropping sequences - low • Maintenance Costs - may include redistributing deposited sediments - low • Additional Costs - subsidies for soil management - 110€/ha/year (Europe)	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Strip cropping along contours

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
22	Strip cropping along contours	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - labor and/ or fuel, may involve a change in planned cropping sequences - low • Maintenance Costs - may include redistributing deposited sediments - low • Additional Costs - subsidies for soil management - 110€/ha/year (Europe)	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Strip cropping along contours
23	Strip cropping along contours	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - labor and/ or fuel, may involve a change in planned cropping sequences - low • Maintenance Costs - may include redistributing deposited sediments - low • Additional Costs - subsidies for soil management - 110€/ha/year (Europe)	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Strip cropping along contours
24	Intercropping	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting intercropping development - 110€/ha/year	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Intercropping

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
25	Intercropping	Water Storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting intercropping development - 110€/ha/year	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Intercropping
26	Intercropping	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting intercropping development - 110€/ha/year	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Intercropping
27	Intercropping	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting intercropping development - 110€/ha/year	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Intercropping
28	Intercropping	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting intercropping development - 110€/ha/year	• 2012 - capital costs & additional costs • N/A - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Intercropping
29	Intercropping	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - low • Maintenance Costs - N/A • Additional Costs - subsidies accorded for supporting	• 2012 - capital costs & additional costs • N/A -	• Western Europe • Eastern Europe and Danube	NWRM, Intercropping

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				intercropping development - 110€/ha/year	maintenance costs	• Baltic Sea • Mediterranean	

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
30	No-till agriculture	Food provision (variable - NBS may positively or negatively affect the ES)	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
31	No-till agriculture	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
32	No-till agriculture	Climate change adaptation and mitigation (variable - NBS may positively or negatively affect the ES)	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
33	No-till agriculture	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
34	No-till agriculture	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
35	No-till agriculture	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
36	No-till agriculture	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - direct drilling - 10833€ • Maintenance Costs - fuel (cost reduction) - -30 – -67 €/ha => Fuel costs based on 0.84 €/l • Maintenance Costs - labour (cost reduction) - -21€/ha • Maintenance Costs - herbicide costs - 5 - 18 €/ha • Maintenance Costs - fertiliser costs - 16 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2012/ 2013 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, No-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
37	Low-till agriculture	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - discing - 32-67 €/ha • Capital Costs - rotor-spike/ power horrow - 47-65 €/ha • Capital Costs - multi harrowing - 30-55 €/ha • Maintenance Costs - non-inversion: disc + cultivator drill - 100-113 €/ha • Maintenance Costs - non-inversion: combination machines - 77 €/ha • Maintenance Costs - minimum/ shallow Tillage - 47-86 €/ha • Maintenance Costs - direct drill - 47-59 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2001 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, Low-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
38	Low-till agriculture	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - discing - 32-67 €/ha • Capital Costs - rotor-spike/ power horrow - 47-65 €/ha • Capital Costs - multi harrowing - 30-55 €/ha • Maintenance Costs - non-inversion: disc + cultivator drill - 100-113 €/ha • Maintenance Costs - non-inversion: combination machines - 77 €/ha • Maintenance Costs - minimum/ shallow Tillage - 47-86 €/ha • Maintenance Costs - direct drill - 47-59 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2001 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, Low-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
39	Low-till agriculture	Groundwater / aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - discing - 32-67 €/ha • Capital Costs - rotor-spike/ power horrow - 47-65 €/ha • Capital Costs - multi harrowing - 30-55 €/ha • Maintenance Costs - non-inversion: disc + cultivator drill - 100-113 €/ha • Maintenance Costs - non-inversion: combination machines - 77 €/ha • Maintenance Costs - minimum/ shallow Tillage - 47-86 €/ha • Maintenance Costs - direct drill - 47-59 €/ha • Additional Costs - N/A	• 2013 - capital costs • 2001 - maintenance costs	• Belgium • Germany • Ireland • France • Luxembourg • Netherlands • United Kingdom • Greece • Spain • Croatia • Malta • Italy • Cyprus • Slovenia • Portugal • Denmark • Estonia • Latvia • Poland • Finland • Sweden • Bulgaria • Czech Republic • Hungary • Austria • Romania • Slovakia	NWRM, Low-till agriculture

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
40	Green cover	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
41	Green cover	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
42	Green cover	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
43	Green cover	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
44	Green cover	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
45	Green cover	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
46	Green cover	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
47	Green cover	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - green crops seeds - 29 - 91.5 €/ha (depending on literature) • Maintenance Costs - green cover - 52.70 - 62.80 €/ha • Additional Costs - subsidies accorded for supporting crop rotation development - 144 €/ha	• 2005/ 2012 - capital costs • 2005 - maintenance costs • 2012 - additional costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green cover
48	Early sowing	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing
49	Early sowing	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
50	Early sowing	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing
51	Early sowing	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing
52	Early sowing	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing
53	Early sowing	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	As the measure is a change in land management practices, even though some different pest and disease risk has been identified, no direct cost has been identified.	• 2005	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Early sowing
54	Traditional terracing	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - existing structures - 0 • Capital Costs - new terracing construction, using heavy	• 2010 - capital costs • 2010 -	• Mediterranean • Eastern Europe and Danube	NWRM, Traditional terracing

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				machinery - 893 €/ha/year • Maintenance Costs - 200 €/ha/year	maintenance costs		
55	Traditional terracing	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - existing structures - 0 • Capital Costs - new terracing construction, using heavy machinery - 893 €/ha/year • Maintenance Costs - 200 €/ha/year	• 2010 - capital costs • 2010 - maintenance costs	• Mediterranean • Eastern Europe and Danube	NWRM, Traditional terracing
56	Traditional terracing	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - existing structures - 0 • Capital Costs - new terracing construction, using heavy machinery - 893 €/ha/year • Maintenance Costs - 200 €/ha/year	• 2010 - capital costs • 2010 - maintenance costs	• Mediterranean • Eastern Europe and Danube	NWRM, Traditional terracing
57	Traditional terracing	Aesthetic / cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - existing structures - 0 • Capital Costs - new terracing construction, using heavy machinery - 893 €/ha/year • Maintenance Costs - 200 €/ha/year	• 2010 - capital costs • 2010 - maintenance costs	• Mediterranean • Eastern Europe and Danube	NWRM, Traditional terracing

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
58	Forest riparian buffers	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
59	Forest riparian buffers	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
60	Forest riparian buffers	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
61	Forest riparian buffers	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
62	Forest riparian buffers	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
63	Forest riparian buffers	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
64	Forest riparian buffers	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
65	Forest riparian buffers	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
66	Forest riparian buffers	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
67	Forest riparian buffers	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • possible for 10-100/ 100-1000/ > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Forest riparian buffers
68	Basins and ponds	Water storage	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
69	Basins and ponds	Fish stocks and recruiting	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
70	Basins and ponds	Natural biomass production	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
71	Basins and ponds	Biodiversity preservation	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
72	Basins and ponds	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
73	Basins and ponds	Flood risk reduction	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
74	Basins and ponds	Erosion/ sediment control	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
75	Basins and ponds	Flitration of pollutants	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets +	N/A	• Western Europe • Eastern Europe and Danube	NWRM, Basins and ponds

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				sediment trash dredging - aprox. 60 €/ ha/year		• Baltic Sea • Mediterranean	
76	Basins and ponds	Recreational opportunities	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
77	Basins and ponds	Aesthetic/ cultural value	• 0 - 0.1 sq. km	• Capital Costs - construction costs - aprox. 44.000 €/ha • Maintenance Costs - quarterly inspections of inlets and outlets + sediment trash dredging - aprox. 60 €/ ha/year	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Basins and ponds
78	Wetland restoration (and management)	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
79	Wetland restoration (and management)	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
80	Wetland restoration (and management)	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
81	Wetland restoration (and management)	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			100-1000/ > 1000 sq. km	stakeholders - a few thousands - 500.000 €			
82	Wetland restoration (and management)	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
83	Wetland restoration (and management)	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
84	Wetland restoration (and management)	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
85	Wetland restoration (and management)	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
86	Wetland restoration (and management)	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			100-1000/ > 1000 sq. km	stakeholders - a few thousands - 500.000 €			
87	Wetland restoration (and management)	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)
88	Wetland restoration (and management)	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1 - 10 sq. km • 10-100 sq. km • possible for 100-1000/ > 1000 sq. km	• Land Acquisition Costs - if used for agricultural purposes - >1210 €/ha • Investigations & Studies - technical/ design projects - 16.000 - 600.000 €/ study • Additional Costs - awareness raising activities/ involvement of stakeholders - a few thousands - 500.000 €	• 2014-2017	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Wetland restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
89	Floodplain restoration (and management)	Water storage	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
90	Floodplain restoration (and management)	Fish stocks and recruiting	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
91	Floodplain restoration (and management)	Natural biomass production	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
92	Floodplain restoration (and management)	Biodiversity preservation	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
93	Floodplain restoration (and management)	Climate change adaptation and mitigation	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
94	Floodplain restoration (and management)	Groundwater / aquifer recharge	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
95	Floodplain restoration (and management)	Flood risk reduction	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
96	Floodplain restoration (and management)	Erosion/ sediment control	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
97	Floodplain restoration (and management)	Filtration of pollutants	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
98	Floodplain restoration (and management)	Recreational opportunities	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
99	Floodplain restoration (and management)	Aesthetic/ cultural value	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - residential area - 700.000 €/ha • Land Acquisition Costs - industrial area - 24.000 €/ha • Land Acquisition Costs - recreational area - 12.000 €/ha • Land Acquisition Costs - agricultural area (high-value crops) - 10.000 €/ha • Land Acquisition Costs - houses - 100.000 € • Land Acquisition Costs - farms - 250.000 € • Land Acquisition Costs - companies - 250.000 € • Land Acquisition Costs - destruction cost - 30.000 € • Capital Costs - dyke heightening (standard) - 300 - 2.000 €/m • Capital Costs - dyke heightening (wall on top) - 800 - 2.500 €/m • Capital Costs - dyke heightening (sheet pile wall) - 3.500 - 5.000 €/m • Capital Costs - dyke heightening (quay wall) - 16.100	• not provided, however, the data has been extracted from the Sigmaplan programme	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Floodplain restoration (and management)

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				€/m • Capital Costs - flood control area (inner dike adaptation) - 770 €/m • Capital Costs - flood control area (outer dike construction) - 840 €/m • Capital Costs - outlet sluices - 19.000 €/ha • Capital Costs - Inlet sluices CRT - 4.000 €/ha • Capital Costs - engineering cost - 10% of investment cost • Maintenance Costs - 0,5 - 1,5% of investment cost • Additional Costs - 5% of investment cost			

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
100	Controlled traffic farming	Food provision	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - machinery cost savings - -213 €/ha • Net benefits - cost of changing to control traffic farming - 22.8 €/ha • Net benefits - overall reduction costs - 51.60 €/ha	• 2012 - capital costs & net benefits (overall reduction costs) • 2013 - net benefits (cost of changing to control traffic farming)	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Controlled traffic farming
101	Controlled traffic farming	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - machinery cost savings - -213 €/ha • Net benefits - cost of changing to control traffic farming - 22.8 €/ha • Net benefits - overall reduction costs - 51.60 €/ha	• 2012 - capital costs & net benefits (overall reduction costs) • 2013 - net benefits (cost of changing to control traffic farming)	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Controlled traffic farming
102	Controlled traffic farming	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - machinery cost savings - -213 €/ha • Net benefits - cost of changing to control traffic farming - 22.8 €/ha • Net benefits - overall reduction costs - 51.60 €/ha	• 2012 - capital costs & net benefits (overall reduction costs) • 2013 - net benefits (cost of changing to control traffic farming)	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Controlled traffic farming

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
103	Controlled traffic farming	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - machinery cost savings - -213 €/ha • Net benefits - cost of changing to control traffic farming - 22.8 €/ha • Net benefits - overall reduction costs - 51.60 €/ha	• 2012 - capital costs & net benefits (overall reduction costs) • 2013 - net benefits (cost of changing to control traffic farming)	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Controlled traffic farming
104	Controlled traffic farming	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - machinery cost savings - -213 €/ha • Net benefits - cost of changing to control traffic farming - 22.8 €/ha • Net benefits - overall reduction costs - 51.60 €/ha	• 2012 - capital costs & net benefits (overall reduction costs) • 2013 - net benefits (cost of changing to control traffic farming)	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Controlled traffic farming
105	Reduced stocking density	Food production (negatively affected)	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	No direct capital or maintenance costs, but indirect capital costs - new housing (860 - 2500 €/ cattle head) - and maintenance costs may be incurred if greater housing capacity is required. A direct opportunity cost results from reduced output, though this can be offset by compensating management	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Reduced stocking density

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				changes, such as shifting to less intensive production or intensifying other farming areas.			
106	Reduced stocking density	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	No direct capital or maintenance costs, but indirect capital costs - new housing (860 - 2500 €/ cattle head) - and maintenance costs may be incurred if greater housing capacity is required. A direct opportunity cost results from reduced output, though this can be offset by compensating management changes, such as shifting to less intensive production or intensifying other farming areas.	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Reduced stocking density

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
107	Reduced stocking density	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	No direct capital or maintenance costs, but indirect capital costs - new housing (860 - 2500 €/ cattle head) - and maintenance costs may be incurred if greater housing capacity is required. A direct opportunity cost results from reduced output, though this can be offset by compensating management changes, such as shifting to less intensive production or intensifying other farming areas.	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Reduced stocking density
108	Reduced stocking density	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	No direct capital or maintenance costs, but indirect capital costs - new housing (860 - 2500 €/ cattle head) - and maintenance costs may be incurred if greater housing capacity is required. A direct opportunity cost results from reduced output, though this can be offset by compensating management changes, such as shifting to less intensive production or intensifying other farming areas.	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Reduced stocking density

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
109	Reduced stocking density	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	No direct capital or maintenance costs, but indirect capital costs - new housing (860 - 2500 €/ cattle head) - and maintenance costs may be incurred if greater housing capacity is required. A direct opportunity cost results from reduced output, though this can be offset by compensating management changes, such as shifting to less intensive production or intensifying other farming areas.	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Reduced stocking density
110	Mulching	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - mulch cost (depending on thickness, mulch type and % of soil cover) - 0.05 - 0.15 €/ sq. m	• 2003 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Mulching
111	Mulching	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - mulch cost (depending on thickness, mulch type and % of soil cover) - 0.05 - 0.15 €/ sq. m	• 2003 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Mulching
112	Mulching	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km	• Capital Costs - mulch cost (depending on thickness, mulch type and % of soil cover) - 0.05 - 0.15 €/ sq. m	• 2003 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Mulching

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
113	Controlled drainage	Excess soil-water retention	• Size of 2.38 ha (Dotnuvélè River Basin)	• Administrative Costs - 5000 € (Dotnuvélè River Basin)	• 2015 (Installation date for Dotnuvélè River Basin)	• Dotnuvélè River Basin • Upper Zglowiaczka River Basin	NWRM, Controlled drainage
114	Controlled drainage	Intercept pollution pathways	• Size of 2.38 ha (Dotnuvélè River Basin)	• Administrative Costs - 5000 € (Dotnuvélè River Basin)	• 2015 (Installation date for Dotnuvélè River Basin)	• Dotnuvélè River Basin • Upper Zglowiaczka River Basin	NWRM, Controlled drainage
115	Maintenance of forest cover in headwater areas	Water storage	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
116	Maintenance of forest cover in headwater areas	Fish stocks and recruiting	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas
117	Maintenance of forest cover in headwater areas	Natural biomass production	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - limited to none			
118	Maintenance of forest cover in headwater areas	Biodiversity preservation	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
119	Maintenance of forest cover in headwater areas	Climate change adaptation and mitigation	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas
120	Maintenance of forest cover in headwater areas	Groundwater/ aquifer recharge	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - limited to none			
121	Maintenance of forest cover in headwater areas	Flood risk reduction	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
122	Maintenance of forest cover in headwater areas	Erosion/ sediment control	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas
123	Maintenance of forest cover in headwater areas	Filtration of pollutants	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - limited to none			
124	Maintenance of forest cover in headwater areas	Recreational opportunities	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
125	Maintenance of forest cover in headwater areas	Aesthetic/ cultural value	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none • Additional Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas
126	Maintenance of forest cover in headwater areas	Energy production (through biomass provisioning)	• possible for 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - ranging from nil to extremely high (dependent on ownership of land and compensation for expropriation) • Capital Costs - tree planting, steps necessary to ensure seedling establishment, thinning and suistainable forest management - no exact value has been reported • Mainentance Costs - limited to none	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Maintenance of forest cover in headwater areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - limited to none			
127	Afforestation of reservoir catchments	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
128	Afforestation of reservoir catchments	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
129	Afforestation of reservoir catchments	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
130	Afforestation of reservoir catchments	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
131	Afforestation of reservoir catchments	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
132	Afforestation of reservoir catchments	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
133	Afforestation of reservoir catchments	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
134	Afforestation of reservoir catchments	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
135	Afforestation of reservoir catchments	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
136	Afforestation of reservoir catchments	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
137	Afforestation of reservoir catchments	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - responsible authority owns much of the surrounding catchment - relatively minor • Land Acquisition Costs - responsible authority does not own the land - prohibitive cost (easements or landowner agreements to be considered) • Capital Costs - low (as opposed to costs for reservoir operation and provision of drinking water) • Maintenance Costs - thinning - no exact value has been reported • Additional Costs - construction of roads, under certain aspects - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Afforestation of reservoir catchments
138	Targeted planting for catching precipitation	Natural biomass production	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
139	Targeted planting for catching precipitation	Biodiversity preservation	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation
140	Targeted planting for catching precipitation	Climate change adaptation and mitigation	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation
141	Targeted planting for catching precipitation	Groundwater/ aquifer recharge	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported			
142	Targeted planting for catching precipitation	Flood risk reduction	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation
143	Targeted planting for catching precipitation	Erosion/ sediment control	• 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - change in subsidies or other support systems to encourage afforestation - land acquisition would be too expensive • Investigations & Studies - NBS is based on rigorous scientific studies, however, no unequivocal evidence that the measure is functional - no exact value has been reported	N/A	• Mediterranean	NWRM, Targeted planting for catching precipitation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
144	Land use conversion	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion
145	Land use conversion	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• possible for > 1000 sq. km	management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported			
146	Land use conversion	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
147	Land use conversion	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion
148	Land use conversion	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• possible for > 1000 sq. km	management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported			
149	Land use conversion	Grounwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
150	Land use conversion	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion
151	Land use conversion	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• possible for > 1000 sq. km	management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported			
152	Land use conversion	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
153	Land use conversion	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion
154	Land use conversion	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • possible for 100-1000 sq. km	• Land Acquisition Costs - limited evidence - not financially feasible to purchase high-value agricultural or urban land for conversion • Capital Costs - costs associated with afforestation (tree planting etc.) - no exact value reported • Maintenance Costs - context-dependent (trails and public access points, thinning, other	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Land use conversion

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• possible for > 1000 sq. km	management costs) - no exact value reported • Additional Costs - foregone income associated with land use prior to afforestation - no exact value reported			
155	Continuous cover forestry	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
156	Continuous cover forestry	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
157	Continuous cover forestry	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
158	Continuous cover forestry	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
159	Continuous cover forestry	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
160	Continuous cover forestry	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
161	Continuous cover forestry	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
162	Continuous cover forestry	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
163	Continuous cover forestry	Flitration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
164	Continuous cover forestry	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
165	Continuous cover forestry	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km • possible for 100-1000 sq. km • possible for > 1000 sq. km	• Land Acquisition Costs - no additional costs, as compared to conventional forestry • Investigations & Studies - lacking empirical evidence for the water quality and natural water retention properties of continuous cover forestry, however there are theoretical reasons - no exact value has been reported • Capital Costs - unclear whether new equipment is required • Maintenance Costs - similar to those incurred with conventional (clearcut) forestry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Continuous cover forestry

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - currently under research			
166	Water sensitive driving	Fish stocks and recruiting	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to the overall costs of forest	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				harvesting (no exact value has been reported)			
167	Water sensitive driving	Biodiversity preservation	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				the overall costs of forest harvesting (no exact value has been reported)			
168	Water sensitive driving	Flood risk reduction	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				the overall costs of forest harvesting (no exact value has been reported)			
169	Water sensitive driving	Erosion/ sediment control	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				the overall costs of forest harvesting (no exact value has been reported)			
170	Water sensitive driving	Filtration of pollutants	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				the overall costs of forest harvesting (no exact value has been reported)			
171	Water sensitive driving	Aesthetic/ cultural value	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km • possible for 1-10 sq. km	• Investigations & Studies - additional planning before forest harvesting/ other use of heavy machinery in forests (ensure that equipement is not driven on wet or sensitive soils, preventing soil compaction and rutting) - no exact value has been reported • Capital Costs - increased, for measures that prevent machinery from compressing soils - no exact value has been reported • Additional Costs - planning and potentially longer driving times - should be minimal, compared to	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Water sensitive driving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				the overall costs of forest harvesting (no exact value has been reported)			
172	Appropriate design of roads and stream crossings	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
173	Appropriate design of roads and stream crossings	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
174	Appropriate design of roads and stream crossings	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
175	Appropriate design of roads and stream crossings	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
176	Appropriate design of roads and stream crossings	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
177	Appropriate design of roads and stream crossings	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
178	Appropriate design of roads and stream crossings	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
179	Appropriate design of roads and stream crossings	Navigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • possible for 10-100 sq. km	• Investigations & Studies - field studies required to confirm that planned roads and stream crossings will not cause excessive sediment mobilization or impede expected water flows - no exact value has been reported • Capital Costs - longer forest roads to avoid excessive slopes and to follow landscape contours - greater costs to implement than if it weren't (no exact value has been reported) • Maintenance Costs - roads and stream crossings are less likely to be destroyed by heavy rainfall	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Appropriate design of roads and stream crossings

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				events - no exact value has been reported			
180	Sediment capture ponds	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds
181	Sediment capture ponds	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)			
182	Sediment capture ponds	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds
183	Sediment capture ponds	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
184	Sediment capture ponds	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds
185	Sediment capture ponds	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds
186	Sediment capture ponds	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)			
187	Sediment capture ponds	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km	• Capital Costs - creation of ditch networks - low (no exact value has been reported) • Maintenance Costs - dredging - low (no exact value has been reported) • Additional Costs - costs associated with the removal of forest land from production - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Sediment capture ponds
188	Coarse woody debris	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
189	Coarse woody debris	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris
190	Coarse woody debris	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris
191	Coarse woody debris	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
192	Coarse woody debris	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris
193	Coarse woody debris	Navigation (negatively affected)	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Coarse woody debris
194	Urban forest parks	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
195	Urban forest parks	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
196	Urban forest parks	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
197	Urban forest parks	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
198	Urban forest parks	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
199	Urban forest parks	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
200	Urban forest parks	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
201	Urban forest parks	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
202	Urban forest parks	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
203	Urban forest parks	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
204	Urban forest parks	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1-10 sq. km • possible for 10-100 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Urban forest parks
205	Trees in urban areas	Water storage	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
206	Trees in urban areas	Natural biomass production	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
207	Trees in urban areas	Biodiversity preservation	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
208	Trees in urban areas	Climate change adaptation and mitigation	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
209	Trees in urban areas	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				or drought prone areas) - no exact value has been reported			
210	Trees in urban areas	Flood risk reduction	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
211	Trees in urban areas	Erosion/ sediment control	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
212	Trees in urban areas	Filtration of pollutants	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
213	Trees in urban areas	Recreational opportunities	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry or drought prone areas) - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas
214	Trees in urban areas	Aesthetic/ cultural value	• 0 - 0.1 sq. km	• Capital Costs - for trees to be planted, depends on age of the tree - no exact value has been reported • Maintenance Costs - pruning and maintaining trees - no exact value has been reported • Additional Costs - irrigation (dry	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Trees in urban areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				or drought prone areas) - no exact value has been reported			
215	Peak flow control structures	Water storage	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures
216	Peak flow control structures	Fish stocks and recruiting	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
217	Peak flow control structures	Biodiversity preservation	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures
218	Peak flow control structures	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures
219	Peak flow control structures	Flood risk reduction	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment -	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				low (no exact value has been reported)			
220	Peak flow control structures	Erosion/ sediment control	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures
221	Peak flow control structures	Filtration of pollutants	• 0 - 0.1 sq. km • possible for 0.1 - 1 sq. km	• Capital Costs - establishment of structures - low (no exact value has been reported) • Capital Costs - instalment of control pipes - low (no exact value has been reported) • Maintenance Costs - periodic removal of settled sediment - low (no exact value has been reported)	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean (Possible)	NWRM, Peak flow control structures

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
222	Overland flow areas	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
223	Overland flow areas	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
224	Overland flow areas	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
225	Overland flow areas	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
226	Overland flow areas	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
227	Overland flow areas	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
228	Overland flow areas	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
229	Overland flow areas	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
230	Overland flow areas	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
231	Overland flow areas	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • possible for 1 - 10 sq. km	• Investigations & Studies - studies to determine the likely volume and timing of runoff - no exact value has been reported • Additional Costs - opportunity costs, if sited over productive forest land	N/A	• Western Europe (Possible) • Eastern Europe and Danube (Possible) • Baltic Sea	NWRM, Overland flow areas
232	Re-meandering	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
233	Re-meandering	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
234	Re-meandering	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
235	Re-meandering	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq.	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			km • 100-1000 sq. km • > 1000 sq. km				
236	Re-meandering	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
237	Re-meandering	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
238	Re-meandering	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
239	Re-meandering	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
240	Re-meandering	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq.	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			km • 100-1000 sq. km • > 1000 sq. km				
241	Re-meandering	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering
242	Re-meandering	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - compensation costs for natural areas and for land acquisition - 610 €/ha • Capital Costs - additional river length - 400.000 €/ km	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Re-meandering

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
243	Stream bed re-naturalization	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
244	Stream bed re-naturalization	Fish stocks and recruiting	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
245	Stream bed re-naturalization	Natural biomass production	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq.	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			km • 100-1000 sq. km • > 1000 sq. km	the local context • Capital Costs - materials and vegetation - fully dependent on the local context			
246	Stream bed re-naturalization	Biodiversity preservation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
247	Stream bed re-naturalization	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
248	Stream bed re-naturalization	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
249	Stream bed re-naturalization	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
250	Stream bed re-naturalization	Filtration of pollutants	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq.	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			km • 100-1000 sq. km • > 1000 sq. km	the local context • Capital Costs - materials and vegetation - fully dependent on the local context			
251	Stream bed re-naturalization	Recreational opportunities	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization
252	Stream bed re-naturalization	Aesthetic/ cultural value	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - agricultural or urbanised - fully dependent on the local context • Investigations & Studies - project planning and eco-engineering - fully dependent on the local context • Capital Costs - materials and vegetation - fully dependent on the local context	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Stream bed re-naturalization

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
253	Restoration and reconnection of seasonal streams	Water storage	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
254	Restoration and reconnection of seasonal streams	Fish stocks and recruiting	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
255	Restoration and reconnection of seasonal streams	Natural biomass production	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
256	Restoration and reconnection of seasonal streams	Biodiversity preservation	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
257	Restoration and reconnection of seasonal streams	Climate change adaptation and mitigation	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
258	Restoration and reconnection of seasonal streams	Groundwater/ aquifer recharge	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
259	Restoration and reconnection of seasonal streams	Flood risk reduction	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
260	Restoration and reconnection of seasonal streams	Erosion/ sediment control	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
261	Restoration and reconnection of seasonal streams	Filtration of pollutants	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
262	Restoration and reconnection of seasonal streams	Aesthetic/ cultural value	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration and reconnection of seasonal sstreams
263	Reconnection of oxbow lakes and similar features	Water storage	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						Project - Danube Delta (Romania)	
264	Reconnection of oxbow lakes and similar features	Fish stocks and recruiting	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
265	Reconnection of oxbow lakes and similar features	Natural biomass production	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features
266	Reconnection of oxbow lakes and similar features	Biodiversity preservation	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	
267	Reconnection of oxbow lakes and similar features	Climate change adaptation and mitigation	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
268	Reconnection of oxbow lakes and similar features	Groundwater/ aquifer recharge	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features
269	Reconnection of oxbow lakes and similar features	Flood risk reduction	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	
270	Reconnection of oxbow lakes and similar features	Erosion/ sediment control	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
271	Reconnection of oxbow lakes and similar features	Filtration of pollutants	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features
272	Reconnection of oxbow lakes and similar features	Recreational opportunities	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	
273	Reconnection of oxbow lakes and similar features	Aesthetic/ cultural value	• 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - based on relevant case studies figures - 0 - 60.000 € • Investigations & Studies - based on relevant case studies figures - 0 - 100.000 € • Capital Costs - based on relevant case studies figures - 100.000 - 2.000.000 € • Maintenance Costs - based on relevant case studies figures - 10.000 - 1.000.000 €	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean • Some case studies that are mentioned include Mura river (Slovenia), Scarpe river (France), Babina Restoration Project (Romania) & Fortuna Restoration Project - Danube Delta (Romania)	NWRM, Reconnection of oxbow lakes and similar features

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
274	Riverbed material restoration	Water storage	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
275	Riverbed material restoration	Fish stocks and recruiting	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
276	Riverbed material restoration	Natural biomass production	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
277	Riverbed material restoration	Biodiversity preservation	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
278	Riverbed material restoration	Flood risk reduction	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
279	Riverbed material restoration	Erosion/ sediment control	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
280	Riverbed material restoration	Filtration of pollutants	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -
281	Riverbed material restoration	Aesthetic/ cultural value	• 1-10 sq. km • 10-100 sq. km • 100-1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Riverbed material restoration -

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
282	Removal of dams and other longitudinal barriers	Fish stocks and recruiting	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers
283	Removal of dams and other longitudinal barriers	Biodiversity preservation	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers
284	Removal of dams and other longitudinal barriers	Flood risk reduction	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
285	Removal of dams and other longitudinal barriers	Erosion/ sediment control	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers
286	Removal of dams and other longitudinal barriers	Navigation	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers
287	Removal of dams and other longitudinal barriers	Energy production	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km	• Investigations & Studies - about 10% of the capital costs • Capital Costs - removal of single dam or weir - 50.000 - 1.000.000 € • Maintenance Costs - assumptions based on figures from case studies - 1-5% of capital costs	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean (Possible)	NWRM, Removal of dams and other longitudinal barriers

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
288	Natural bank stabilisation	Water storage	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
289	Natural bank stabilisation	Fish stocks and recruiting	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
290	Natural bank stabilisation	Natural biomass production	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
291	Natural bank stabilisation	Biodiversity preservation	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
292	Natural bank stabilisation	Climate change adaptation and mitigation	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
293	Natural bank stabilisation	Groundwater/ aquifer recharge	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
294	Natural bank stabilisation	Flood risk reduction	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
295	Natural bank stabilisation	Erosion/ sediment control	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
296	Natural bank stabilisation	Filtration of pollutants	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
297	Natural bank stabilisation	Recreational opportunities	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
298	Natural bank stabilisation	Aesthetic/ cultural value	• 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• In theory, the measure can be applied to any river with artificial bank reinforcement	NWRM, Natural bank stabilisation
299	Elimination of riverbank protection	Water storage	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
300	Elimination of riverbank protection	Fish stocks and recruiting	• 1-10 sq. km • 10-100 sq. km	• No specific information, as this measure is generally	N/A	• Western Europe • Eastern Europe and Danube	NWRM, Elimination of riverbank protection

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• 100 - 1000 sq. km • > 1000 sq. km	implemented as a component of more complex projects		• Baltic Sea • Mediterranean	
301	Elimination of riverbank protection	Natural biomass production	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
302	Elimination of riverbank protection	Biodiversity preservation	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
303	Elimination of riverbank protection	Groundwater/ aquifer recharge	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
304	Elimination of riverbank protection	Flood risk reduction	• 1-10 sq. km • 10-100 sq. km	• No specific information, as this measure is generally	N/A	• Western Europe • Eastern Europe and Danube	NWRM, Elimination of riverbank protection

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• 100 - 1000 sq. km • > 1000 sq. km	implemented as a component of more complex projects		• Baltic Sea • Mediterranean	
305	Elimination of riverbank protection	Erosion/ sediment control	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
306	Elimination of riverbank protection	Filtration of pollutants	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
307	Elimination of riverbank protection	Recreational opportunities	• 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• No specific information, as this measure is generally implemented as a component of more complex projects	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Elimination of riverbank protection
308	Elimination of riverbank protection	Aesthetic/ cultural value	• 1-10 sq. km • 10-100 sq. km	• No specific information, as this measure is generally	N/A	• Western Europe • Eastern Europe and Danube	NWRM, Elimination of riverbank protection

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			• 100 - 1000 sq. km • > 1000 sq. km	implemented as a component of more complex projects		• Baltic Sea • Mediterranean	
309	Lake restoration	Water storage	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration
310	Lake restoration	Fish stocks and recruiting	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				development - no exact value has been reported			
311	Lake restoration	Natural biomass production	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
312	Lake restoration	Biodiversity preservation	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration
313	Lake restoration	Groundwater/ aquifer recharge	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
314	Lake restoration	Flood risk reduction	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration
315	Lake restoration	Erosion/ sediment control	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
316	Lake restoration	Filtration of pollutants	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration
317	Lake restoration	Recreational opportunities	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
318	Lake restoration	Aesthetic/ cultural value	• possible for 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	• Land Acquisition Costs - No information • Investigations & Studies - No information • Capital Costs - habitat restoration at Croxall Lakes Nature Reserve - 4.000 €/ha • Maintenance Costs - minimal - no exact value has been reported • Additional Costs - infrastructures for green tourism development - no exact value has been reported	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Lake restoration
319	Restoration of natural infiltration to groundwater	Water storage	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
320	Restoration of natural infiltration to groundwater	Climate change adaptation and mitigation	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater
321	Restoration of natural infiltration to groundwater	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater
322	Restoration of natural infiltration to groundwater	Flood risk reduction	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq.	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
			km • 100 - 1000 sq. km • > 1000 sq. km				
323	Restoration of natural infiltration to groundwater	Erosion/ sediment control	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater
324	Restoration of natural infiltration to groundwater	Geological resources	• 0 - 0.1 sq. km • 0.1 - 1 sq. km • 1-10 sq. km • 10-100 sq. km • 100 - 1000 sq. km • > 1000 sq. km	N/A	N/A	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Restoration of natural infiltration to groundwater

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
325	Re-naturalization of polder areas	Water storage	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas
326	Re-naturalization of polder areas	Fish stocks and recruiting	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						(Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	
327	Re-naturalization of polder areas	Natural biomass production	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
328	Re-naturalization of polder areas	Biodiversity preservation	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas
329	Re-naturalization of polder areas	Groundwater/ aquifer recharge	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						(Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	
330	Re-naturalization of polder areas	Flood risk reduction	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
331	Re-naturalization of polder areas	Erosion/ sediment control	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas
332	Re-naturalization of polder areas	Filtration of pollutants	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						(Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	
333	Re-naturalization of polder areas	Recreational opportunities	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
334	Re-naturalization of polder areas	Aesthetic/ cultural value	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea (Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	NWRM, Re-naturalization of polder areas
335	Re-naturalization of polder areas	Navigation	• 100 - 1000 sq. km	N/A	N/A	• Western Europe (Poland - Stobrawa Polder, Ukraine - South of the Odessa olbast, Kilia rayon) • Eastern Europe and Danube (Germany - Altenheim, Peene Valley) • Baltic Sea	NWRM, Re-naturalization of polder areas

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
						(Possible) • Mediterranean (Italy - Delta of the river Po such as Bonifica Valle del Mezzano)	
336	Green roofs	Natural biomass production	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs
337	Green roofs	Biodiversity preservation	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
338	Green roofs	Climate change adaptation and mitigation	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs
339	Green roofs	Flood risk reduction	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs
340	Green roofs	Filtration of pollutants	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
341	Green roofs	Recreational opportunities	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs
342	Green roofs	Aesthetic/ cultural value	• 0 - 0.1 sq. km	• Capital Costs - for extensive design - 25 - 130 €/ sq. m • Capital Costs - for intensive design - 130 - 300 €/ sq. m • Maintenance Costs - general maintenance every 6-12 months - up to 55 €/ sq. m of green roof/ each maintenance event	• 2007/ 2010/ 2014 - capital costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Green roofs
343	Rainwater harvesting	Water storage	• 0 - 0.1 sq. km	• Investigations & Studies - assessing the available rainfall and demand to optimise the tanks - 0 - 10.000 € • Capital Costs - depends on the system design and how it is incorporated - 5-60€/ sq. m of roof area services • Maintenance Costs - broad range - 0.25 - 1 €/ sq. m of roof area services	• 2007 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean	NWRM, Rainwater harvesting

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
344	Rainwater harvesting	Climate change adaptation and mitigation	• 0 - 0.1 sq. km	• Investigations & Studies - assessing the available rainfall and demand to optimise the tanks - 0 - 10.000 € • Capital Costs - depends on the system design and how it is incorporated - 5-60€/ sq. m of roof area services • Maintenance Costs - broad range - 0.25 - 1 €/ sq. m of roof area services	• 2007 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean	NWRM, Rainwater harvesting
345	Rainwater harvesting	Flood risk reduction (none to low)	• 0 - 0.1 sq. km	• Investigations & Studies - assessing the available rainfall and demand to optimise the tanks - 0 - 10.000 € • Capital Costs - depends on the system design and how it is incorporated - 5-60€/ sq. m of roof area services • Maintenance Costs - broad range - 0.25 - 1 €/ sq. m of roof area services	• 2007 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea (Possible) • Mediterranean	NWRM, Rainwater harvesting
346	Permeable paving	Water storage	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year			
347	Permeable paving	Climate change adaptation and mitigation	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving
348	Permeable paving	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
349	Permeable paving	Flood risk reduction	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving
350	Permeable paving	Erosion/ sediment control	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving
351	Permeable paving	Filtration of pollutants	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations to confirm underlying soil/ geology conditions prior to construction - 0 - 5.000 € • Capital Costs - range of design	• 2007/ 2010/ 2012 - capital costs • 2007 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Permeable paving

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				approaches & construction materials available - 40 - 90 €/ sq. m • Maintenance Costs - 1 - 5 €/ sq. m/ year			
352	Swales	Water storage	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales
353	Swales	Natural biomass production	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable,	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				depending on swale design - 0.50 - 4 €/ sq. m			
354	Swales	Biodiversity preservation	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales
355	Swales	Climate change adaptation and mitigation	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m			
356	Swales	Groundwater/ aquifer recharge	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales
357	Swales	Flood risk reduction	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m			
358	Swales	Erosion/ sediment control	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales
359	Swales	Filtration of pollutants	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales

ID	Type of Intervention	ES Benefits	Scale (at what scale it can be done)	Monetary Value (Cost)	Year (For Monetary Value)	Location	Sources
				• Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m			
360	Swales	Aesthetic/ cultural value	• 0 - 0.1 sq. km	• Investigations & Studies - geotechnical investigations may be required to confirm the suitability of underlying soils and groundwater conditions prior to construction - 500 - 2.000 € • Capital Costs - variable, depending on the design - 15 - 80 €/ sq. m • Maintenance Costs - variable, depending on swale design - 0.50 - 4 €/ sq. m	• 2006/ 2007/ 2010/ 2012 - capital costs • 2007/ 2009 - maintenance costs	• Western Europe • Eastern Europe and Danube • Baltic Sea • Mediterranean	NWRM, Swales

Annex 2 – ES Repository

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Provisioning									

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Arable crop production	Used arable crops	cereals	interventions that aid in „drought mitigation”	• peatland restoration • wetland restoration • re-meandering	water availability in crop production during droughts				
Arable crop production	Used arable crops	vegetables and crops	interventions that aid in „drought mitigation”	• peatland restoration • wetland restoration • re-meandering	water availability in crop production during droughts				
Arable crop production	Used arable crops	root crops	interventions that aid in „drought mitigation”	• peatland restoration • wetland restoration • re-meandering	water availability in crop production during droughts				
Arable crop production	Used arable crops	etc	interventions that aid in „drought mitigation”	• peatland restoration • wetland restoration • re-meandering	water availability in crop production during droughts				
Plant biomass grassland	plant biomass used for agricultural purposes		interventions that aid in „drought mitigation”	• peatland restoration • wetland restoration • re-meandering	water availability in crop production during droughts				
Commercial fishing	commercial fish catches								

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Timber production	Timber production harvest from managed forests	used as material							
Timber production	Timber production harvest from managed forests	used for energy							
Commercial hunting	Commercial hunting yield	-							
Freshwater provision	water withdrawal	drinking water purposes	transition to organic diary farming	financial incentives for farmers who transition to organic practices	• nitrate levels in drinking water decrease to safe levels, before treament • reduced operational costs at the water treatment step		operational savings for water utility	Munich, Germany	
Freshwater provision	water withdrawal	irrigation	transition to organic diary farming	financial incentives for farmers who transition to organic practices	• nitrate levels in drinking water decrease to safe levels, before treament • reduced operational costs at the		operational savings for water utility	Munich, Germany	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
					water treatment step				
Freshwater provision	water withdrawal	cooling purposes	transition to organic diary farming	financial incentives for farmers who transition to organic practices	• nitrate levels in drinking water decrease to safe levels, before treament • reduced operational costs at the water treatment step		operational savings for water utility	Munich, Germany	
Wild foods	Food resources that can be foraged in the wild	-							
Abiotic energy sources	generated energy	hydropower plants	• peatland restoration • wetland restoration • re-meandering		• enhanced hydropower potential				
Abiotic energy sources	generated energy	wind	• peatland restoration • wetland restoration • re-meandering						

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Abiotic energy sources	generated energy	etc	• peatland restoration • wetland restoration • re-meandering						
Mineral resources	creation of aggregate material	sand quarry							
Mineral resources	creation of aggregate material	gravel quarry							

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Water provisioning services	- capacity of ecosystem to provide water: a large share of surface water is generated in the Upper Danube and Middle Danube. A significant amount of groundwater is generated in the Upper Danube and in the central highlands of the basin. Overall, the greatest amount of renewable water is produced in the western and southern sub-basins.	renewable water	Hydrological model SWAT (Soil and Water Assessment Tool) – no physical intervention	Hydrological model SWAT (Soil and Water Assessment Tool) – no physical intervention	-The highest level of water yield (surface and groundwater) originates in the forest areas (73%) - Only 17% of renewable water is produced in the agricultural lands despite the large surface they cover (42%) - Water use: energy 44%, industrial water 17%, agricultural 20%, livestock 6%, public water supply 13% - The highest expenditure for water provisioning services occurs in Germany,	Floodplain area used in reconnection scenarios (km²)		Austria, Germany, Slovakia, Hungary, Serbia, Romania, Bulgaria, Croatia, Slovenia, Bosnia and Herzegovina, Moldova, Ukraine	https://www.sciencedirect.com/science/article/pii/S2212041615300 19X#f0020 Mapping water provisioning services to support the ecosystem–water–food–energy nexus in the Danube river basin

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
					Croatia, Austria, Hungary, and Romania, ranging between 50–90 million EUR per year. The spatial distribution of value depends on water use quantity and national water prices.				
Regulation and Maintenance									

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Nitrogen retention	permanent elimination of Nitrogen (N)	denitrification (N2)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Nitrogen retention	temporary retention	incorporation into stationary biomass (mussels)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Nitrogen retention	temporary retention	incorporation into stationary biomass (floodplain vegetation)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Nitrogen retention	temporary retention	incorporation in river sediments (sedimentation)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Nitrogen retention / Phosphorus retention	t N/P retained per year	the avoided cost of extra fertilizer	fertilizer-replacement valuation approach		Avoided environmental damages + improves WWTP operation		~€2–8 per kg P (€2000–8000 per tonne P		Molinos-Senante, M. et al. (2011)

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Phosphorus retention	temporary retention of phosphorus	incorporation into stationary biomass (bivalves)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Phosphorus retention	temporary retention of phosphorus	incorporation into stationary biomass (macrophytes)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Phosphorus retention	temporary retention of phosphorus	incorporation into stationary biomass (floodplain vegetation)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Phosphorus retention	permanent retention of phosphorus	uptake into sediments (deposition)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Phosphorus retention	permanent retention of phosphorus	uptake into sediments (sorption)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	• reduced water treatment costs • improved health outcomes • reduced eutrophication			Europe	
Water purification	Retention of nitrogen	nutrients retention	• restoration of floodplains and riparian zones • reconnection of water bodies • dyke relocation	riparian buffer	better nutrient removal	EU rivers		Europe	
Water purification	Retention of phosphorus	nutrients retention	• restoration of floodplains and riparian zones • reconnection of water bodies • dyke relocation	riparian buffer	better nutrient removal	EU rivers		Europe	
Water purification	Retention of organic carbon	nutrients retention	• restoration of floodplains and riparian zones	riparian buffer	better nutrient removal	EU rivers		Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
			• reconnection of water bodies • dyke relocation						
Water purification	Sediment retention	nutrients retention	• restoration of floodplains and riparian zones • reconnection of water bodies • dyke relocation	riparian buffer	better nutrient removal	EU rivers		Europe	

Nutrient retention / Water quality & ecosystem protection	Reduced nitrogen pollution / improved water quality	nutrients retention	Natural water retention / floodplain restoration (NBS)		estimates societal damages from excess N (health impacts due to high nitrate levels in drinking water, ecosystem impacts due to eutrophication, fisheries losses e.g. in the Black Sea due to eutrophication). These can produce higher per-kg values but depend on geographic scope estimates environmental damages from reactive nitrogen in the whole of Europe at at 70-320 billion Euros annually		Damage cost / welfare loss (externalities avoided) , €70–320 billion/year EU-wide sau €10–30/kg Nr avoided		Brink & vanGrinsven 2011) EU JRC + (Sutton, M. A., Howard, C. M., Erisman, J. W., Billen, G., Bleeker, A., Grennfelt, P., ... & Grizzetti, B. (Eds.). (2011). The European nitrogen assessment: sources, effects and policy perspectives. Cambridge University Press, downloadable´ from https://www.nine-esf.org/node/360/ENA-Book

Water purification	Annual nitrate-N removal: 33,200 t NO_3–N/year (≈6.5% of total N emissions)	denitrification (NO3)	Floodplain reconnection		• Floodplains remove approximately 33,200 t NO_3 -N per year • Floodplain reconnection increases nitrate removal by an additional ~14.5% • Lower Danube floodplains show the highest absolute nitrate removal • Highest denitrification rates are observed in the Yantra and Tisza floodplains	"Upper Danube (uD) - Active floodplain: 680.7 km² - Potential floodplain: 83.4 km² Middle Danube (mD) - Active floodplain: 989.6 km² - Potential floodplain: 288.9 km² Lower Danube (lD) - Active floodplain: 536.7 km² - Potential floodplain: 656.6 km²"		Austria, Germany, Slovakia, Hungary, Serbia, Romania, Bulgaria	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Avoided treatment / water-quality improvement	Removal of nitrogen from water => reduced treatment needs	Regulating	avoided cost of additional wastewater treatment or remediation in case the river didn't remove the N/P		Many European ecosystem-accounting studies use this for N and get values ~€2.2/kg N = ≈€2200/tonne)		~€2.2/kg N = €2200/tonne N		Brink & van Grinsven (2011)
Greenhouse gas regulation and carbon sequestration	Emissions and sequestration of greenhouse gases	carbon dioxide (CO2)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	a decrease of 1469 measure units of CO2 emissions	g/sq meters/ year		Europe	
Greenhouse gas regulation and carbon sequestration	Emissions and sequestration of greenhouse gases	methane (CH4)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of	peatland rewetting	an increase of 21.3 measure units of methane emissions	-		Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
			ditches • reprofiling of exposed peat						
Greenhouse gas regulation and carbon sequestration	Emissions and sequestration of greenhouse gases	nitrous oxide (N2O)	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	peatland rewetting	a decrease of 0.1 measure units of N2O emissions	g/sq meters/ year		Europe	
Greenhouse gas regulation and carbon sequestration	Emissions and sequestration of greenhouse gases	CO2 equivalents	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches	peatland rewetting	a decrease of 774.6 measure units of carbon dioxide equivalents emissions	g/sq meters/ year		Europe	

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
			• reprofiling of exposed peat						
Greenhouse gas regulation & carbon sequestration	Soil organic carbon accumulation		Floodplain soil restoration via natural sediment deposition		carbon sequestration rates in reconnected floodplains				
Flood regulation / risk reduction	Reduction of flood damages (economic losses avoided)	Monetary value	Natural flood regulation processes (hydrological and landscape functioning)	-	Projected flood damages significantly increase in Central Europe South under future climate scenarios. Residential buildings represent the largest share of losses (~80%). The region remains among the most impacted in the EU in both the 2030s and 2080s.	EU-wide	€7.2 bn/year projected flood damages (2030s scenario)	Europe, including Danube region	European Commission, JRC — PESETA III: Economic integration and spillover analysis (2018)

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Flood regulation / flood-risk reduction	Reduced flood peaks => avoided flood damages	avoided loss	Nature-based floodplain & upstream storage		The annual value of avoided damages due to upstream storage reducing flood peaks €0.2–€1.5 per m³ storage per year (central ≈ €1.2/m³·yr)		€0.2–€1.5 per m³ storage per year (central ≈ €1.2/m³·yr)		European Commission, JRC — PESETA III: Economic integration and spillover analysis (2018)
Flood regulation / risk reduction	Reduction of flood damages (economic losses avoided)	Monetary value	Natural flood regulation processes (hydrological and landscape functioning)	-	Projected flood damages significantly increase in Central Europe South under future climate scenarios. Residential buildings represent the largest share of losses (~80%). The region remains among the most impacted in the EU in both the 2030s and 2080s.	EU-wide	€12.1 bn/year projected flood damages (2080s scenario)	Europe, including Danube region	European Commission, JRC — PESETA III: Economic integration and spillover analysis (2018)

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Flood Regulation// flood risk reduction	Reduction of peak flood volume (effective flood storage)	Quantitative (m^3 of water stored) and economic (avoided damages, £)	Nature-Based Solutions / Natural Flood Management	Leaky barriers Floodplain reconnection River restoration Run-off attenuation Offline storage areas	Reduction of downstream flood damages	1 km^2 grid cells used for downstream benefit propagation	Avoided Annual Average Damages (AAD), calculated using NaFRA2	Inland freshwater environments (non-coastal)	Environment Agency (2025). Natural flood management benefits estimation method. FCERM Research & Development Programme, Research Report FRS23248/R1.
	functional and structural quality								

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Flood regulation & Water quality improvement (after floodplain restoration)	Welfare benefit (public benefit perception)	Monetary valuation	Floodplain restoration (Nature-based)		Increased willingness-to-pay for reduced flood risk + better water quality			Danube River Basin (Austria, Hungary, Romania	European Commission, JRC — PESETA III: Economic integration and spillover analysis (2018)
Low flow regulation	sustained minimum flow of water for drought mitigation	hydrological self-regulation by macrophyte growth and morphology (reduction of water level)	• peatland restoration • wetland restoration • re-meandering		Through implementation of NBS that lead to ES which aid in „drought mitigation", there is a direct improvement of recharge rates, both for natural and artifical reservoirs, and it also supports higher baseflows in rivers. ↑ water availability during				

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
					droughts ↓ • hydropower generation • irrigated agriculture • cooling • drinking water supply • preservation of navigable water levels => inland shipping • preservation of general water quality and levels => water-based recreation				

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Low flow regulation	sustained minimum flow of water for drought mitigation	compensation by strong groundwater inflow, if applicable (expert assessment)	• peatland restoration • wetland restoration • re-meandering		Through implementation of NBS that lead to ES which aid in „drought mitigation", there is a direct improvement of recharge rates, both for natural and artifical reservoirs, and it also supports higher baseflows in rivers. ↑ water availability during droughts ↓ • hydropower generation • irrigated agriculture • cooling • drinking water supply • preservation				

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
					of navigable water levels => inland shipping • preservation of general water quality and levels => water-based recreation				
Sediment regulation	evaluation of the internal sediment balance of the river	naturalness of morphological structures							
Sediment regulation	evaluation of the internal sediment balance of the river	effects of transverse structures on sediment consistency							
Sediment regulation	evaluation of the internal sediment balance of the river	morphological effects							

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Sediment regulation	Sediment capture & reduced erosion	Regulating service	River reconnection + overbank flooding		↑ stability of floodplain soils ↓ sediment export downstream	Floodplain river corridors			
Soil formation in floodplains	evaluation of natural fen formation	peat accumulation							
Soil formation in floodplains	increased floodplain soil accretion through sediment deposition		Nature-based river restoration	floodplain reconnection, riparian vegetation restoration, riverbed rehabilitation	Positive response in most evaluated restoration projects	River floodplains in Europe	Not quantified		
Soil formation in floodplains	evaluation of anthropogenically caused fen degradation	lowering of the water body and groundwater level							
Soil formation in floodplains	evaluation of anthropogenically caused fen degradation	changes in flood dynamics							
Soil formation in floodplains	evaluation of floodplain soil formation	Soil accretion & soil organic matter increase	Regulating service	Floodplain reconnection + Wetland/floodplain restoration	↑ soil development ↑ natural soil fertility ↑ carbon stored in soil	Local floodplain sites (Europe)	Not provided	Europe	JRC – Ecosystem Services Accounting

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Local climate regulation/ cooling	reduction of ambient air temperature	cooling potential of different land cover types	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	• peatland restoration • wetland restoration • re-meandering	Minimising Greenhouse Gases and CO2 (plus equivalents) emissions, as well as through drought mitigation measures, there is an overall cooling effect, which in turn, regulates the local climate				
Local climate regulation/ cooling	reduction of ambient air temperature	cooling potential of different land use types	• land works • ash fertilization • trees sowing • bog vegetation restoration • duckboards building • blocking of ditches • reprofiling of exposed peat	• peatland restoration • wetland restoration • re-meandering	Minimising Greenhouse Gases and CO2 (plus equivalents) emissions, as well as through drought mitigation measures, there is an overall cooling effect, which in turn, regulates the local climate				

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Climate regulation (local cooling)	Cooling of local ambient temperatures		Floodplain & riparian restoration	Riparian shading, water surface cooling	Cooler microclimate near restored floodplains				https://www.sciencedirect.com/science/article/pii/S2212041625000993?dgcid=rss_sd_all
Climate regulation	Carbon sequestration	Amount of carbon sequestered (CO_2e/ha/year)	River restoration Floodplain reconnection Woodland management Peatland restoration	Ecosystem restoration and land-use management	Reduction of atmospheric CO_2 concentrations		Floodplain reconnection: £824/ha/year Woodland management: £1,408/ha/year	Floodplains, woodlands, peatlands	Environment Agency (2025). Natural flood management benefits estimation method. FCERM Research & Development Programme, Research Report FRS23248/R1.

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Habitat provision	functional and structural quality	typical floodplain habitats	riparian buffer						
Habitat provision	functional and structural quality	typical floodplain communities	riparian buffer						
Habitat provision	functional and structural quality	typical floodplain species	riparian buffer						
Habitat & species maintenance	Increased biodiversity and ecological integrity		Nature-based floodplain restoration	Habitat restoration, riparian vegetation recovery, floodplain reconnection	↑ species richness, ↑ habitat heterogeneity	River floodplains (Europe)			https://www.sciencedirect.com/science/article/pii/S2212041625000993?dgcid=rss_sd_all
Cultural									
Opportunities for non-water-related activities	recreation, mental health & eco-tourism	nature observation	restoration of freshwater systems		increase the species abundance and diversity => attracting wildlife watchers				
Opportunities for non-water-related activities	recreation, mental health & eco-tourism	cycling	restoration of freshwater systems		increase landscape diversity and quality				

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Opportunities for non-water-related activities	recreation, mental health & eco-tourism	walking	restoration of freshwater systems		increase landscape diversity and quality				
Opportunities for water-related activities	recreation, mental health & nature-based recreation	recreational fishing	• restoration of freshwater systems • floodplain reconnection • creation of permanently flowing side channels		• increase the interconnected ness and size of surface waters • increase fish diversity and abundance and accessibility of open water for anglers				
Opportunities for water-related activities	recreation, mental health & nature-based recreation	swimming	restoration of freshwater systems		increase the interconnected ness and size of surface waters				
Opportunities for water-related activities	recreation, mental health & nature-based recreation	non-motorized boating	restoration of freshwater systems		increase the interconnected ness and size of surface waters				
Opportunities for water-related activities	recreation, mental health & nature-based recreation	motorized boating	restoration of freshwater systems		increase the interconnected ness and size of surface waters				
Heritage	natural sites	natural							
Heritage	natural beauty of objects	natural							

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Cultural heritage & diversity	Enhanced cultural landscape identity	Recreation (incl. eco-tourism and outdoor activities		Habitat and landscape protection	aestethic of landscape				https://www.sciencedirect.com/science/article/pii/S2212041625000993?dgcid=rss_sd_all

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Cultural ecosystem services: recreational, aesthetic, spiritual, cognitive benefits; sense of place	Tourists' perceived socio-cultural values of coastal ecosystems	Qualitative and semi-quantitative (perceptions, attitudes, preferences from questionnaires)	Conservation of natural coastal ecosystems in protected areas	Protection and regulated use of a wild beach within a Biosphere Reserve (rules, access control, camping regulation)	High appreciation of recreational experience, landscape aesthetics, wilderness, and emotional attachment to place		Not monetised (non-monetary socio-cultural valuation)	Danube Delta	Sima, M., Dumitrașcu, M., Grigorescu, I., Costache, A. (2024). Tourists' perception of socio-cultural values of ecosystem services and management perspectives at the Vadu wild beach, Danube Delta Biosphere Reserve, Romania.
Sense of place, cultural identity									
Heritage	features of value from the	natural							

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
	point of view of science & conservation								
Heritage	human mental reflection of tangible natural assets	cultural							
Heritage	human cultural reflection of tangible natural assets	cultural							
Heritage	intangible living cultural expressions	cultural							
Landscape aesthetic quality	artistic inspiration	landscape diversity	restoration of freshwater systems		• increase the species abundance and diversity => attracting wildlife watchers • increase landscape diversity and quality				
Landscape aesthetic quality	artistic inspiration	landscape uniqueness							
Landscape aesthetic quality	artistic inspiration	landscape's perceived naturalness							

Ecosystem service	Output	Type of output	Type of intervention leading to the ES (in general)	Type of intervention	Result	Area	Monetary value	Location	SOURCE
Knowledge systems	value of the landscape for research projects	learning and intellectual stimulation in the floodplain areas	restoration of freshwater systems		increase the species abundance and diversity => attracting wildlife watchers				
Knowledge systems	value of the landscape for educational activities	learning and intellectual stimulation in the floodplain areas	restoration of freshwater systems		increase the species abundance and diversity => attracting wildlife watchers				
Knowledge systems	etc	learning and intellectual stimulation in the floodplain areas	restoration of freshwater systems		increase the species abundance and diversity => attracting wildlife watchers				