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CONE

REPORT

ON LOCAL POLICY FRAMEWORKS OF 5 „MODEL REGIONS"

FOR NBS AND THE DEVELOPMENT

Report prepared within the framework of the project: CONE - CITIES OF NATURE: NATURE-BASED-SOLUTIONS IN URBAN LIVING LABS

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TABLE OF CONTENTS

1. Introductory information regarding the project

Due to significant environmental, socio-economic, and human health impacts, Central European regions must increase resilience to climate change. According to the conceptual framework of the Joint Research Centre (JRC) on resilience, it is defined as the ability to face shocks and lasting structural changes in such a way that social welfare is maintained without compromising the heritage of future generations (JRC). To achieve this and ensure further urban development and adaptation of the local urban environment, CONE aims to address identified challenges and needs through local innovation living labs that engage actors from the quadruple helix: public sector, private sector, civil society, and academia.

Despite the numerous negative effects of climate change on the environment and people's health, climate risk awareness is generally quite low among citizens. To change this, there is a need to target and actively involve all generations.

The CONE project helps city authorities to work better together with citizens to make cities greener. The partners design and test new participatory and digitally-driven processes that support the application of nature-based solutions in five urban pilot areas. Learnings from these urban living labs are then evaluated and inform a new transnational strategy for the introduction of urban greening plans.

The project aims to establish a multidimensional "Living Lab" to apply nature-based solutions in local contexts as a cross-sectoral, more digital, and democratic approach to mitigating and adapting to climate change. The project contributes to increasing resilience to climate change and natural disasters by implementing tailored measures with a participatory approach and supporting integrated climate adaptation policies at the local and regional levels.

The Urban Living Lab method includes three implementation phases:

1. Joint research and context analysis to confirm identified challenges and recognize needs and barriers in the local context.
2. Experimental phase, which includes ideation of innovative solutions, their incubation, and strategy development.
3. Experiments and feedback: testing the implemented solution, collecting feedback, suggestions for improvements, validation, and replication.

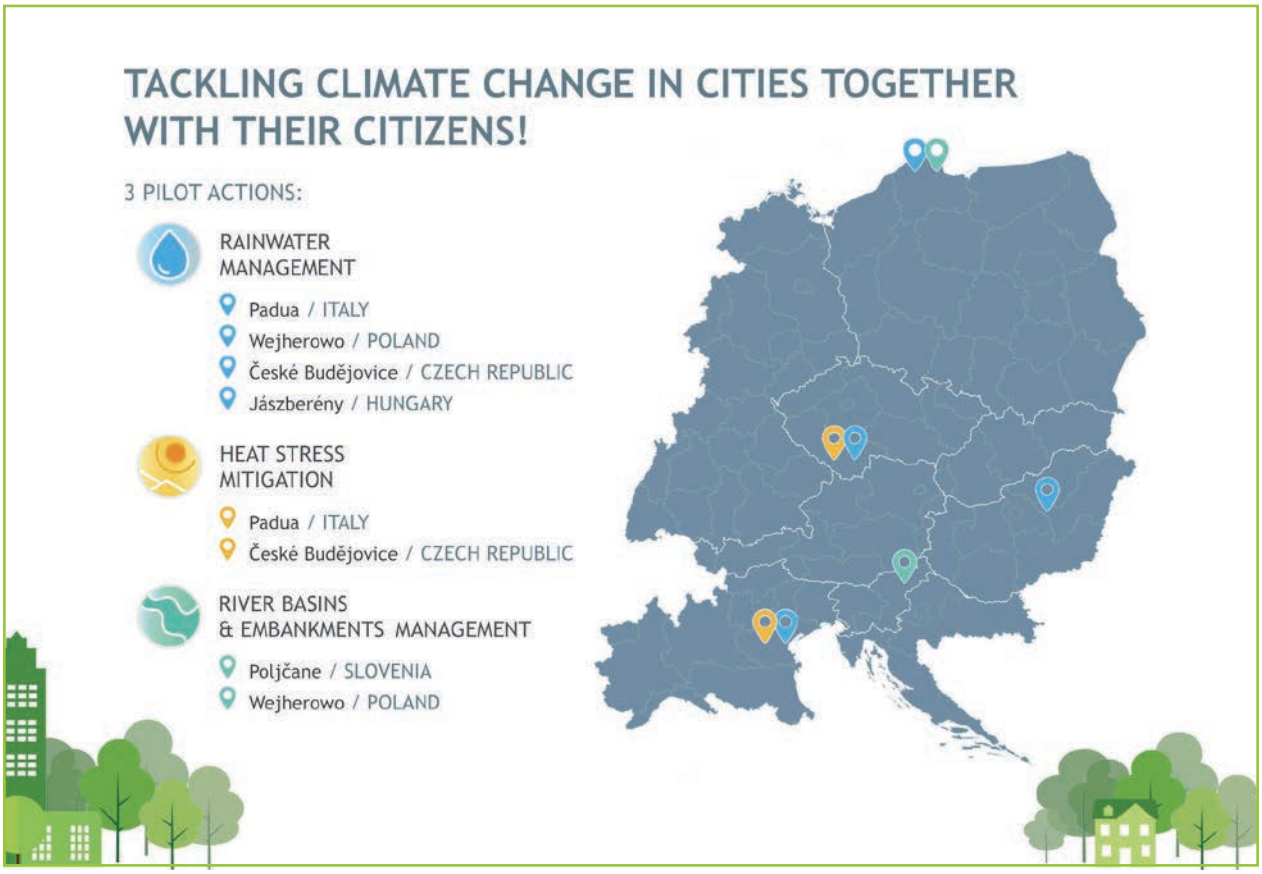
There is a strong need to incorporate climate change issues into strategic risk-based planning and resilience-enhancing measures. Therefore, the innovation lies in a more democratic and data-driven approach that leads to community empowerment and raising awareness regarding climate change and potential mitigation and adaptation solutions. Within this framework, even if not technologically advanced, nature-based solutions can be a valuable and sustainable ally in combination with a participatory approach.

The CONE project will explore how the Urban Living Lab approach can be scalable and adaptable in more rural, small, and medium-sized settlements in Europe. The partnership will select co-creation / participatory design, implementation, and monitoring methods for NBS that are feasible and affordable in such Central European municipalities. The main focus will be on exploring and testing specific "living lab" methods that help municipalities design and implement - based on broader citizen engagement and better data collection, management, and use.

Focusing on three areas of the NBS relating to:

- Rainwater management
- Heat Stress Mitigation actions
- River Basins and Embankments management

Partners must conduct a thorough analysis of the situation before taking action and implementing the activities themselves.



The CONE partners preparing themselves and local stakeholders to implement specific investments related to testing the adopted optimal NBS solutions, which in turn requires appropriate background knowledge related to legal and strategic preparation, enabling the planned activities to be positioned within the relevant legal acts and strategic frameworks.

The above report constitutes an DELIVERABLE 3.1 of the CONE project under the name: Report on local policy frameworks on NBS and development of 5 "model regions"

This rapport serve as a 'replication plan' for implementing NbS in Central Europe and raising awareness and knowledge among citizens and decision-makers aim to facilitate the understanding and application of concepts and guidelines, including legal ones, relating to the implementation of NBS in Europe, with particular regard to the conditions in Central Europe. It was developed on the basis of in-depth and detailed analyses of guidelines and strategic and legal frameworks for conducting activities and implementing investments using NBS, carried out by consortium members under the leadership of the Association of Municipalities of the Baltic Euroregion.
The above report was prepared in detail on the basis of research conducted in five areas participating in the Cone project from the Czech Republic, Hungary, Italy, Poland and Slovenia.
It was created as a result of secondary research - desk research, i.e. the compilation, analysis and processing of data and information from existing sources, and then formulating conclusions based on them regarding the problem under study.

The report on case studies concerning strategies and frameworks for nature-based solutions includes an introduction to the issue, a multidimensional discussion of overarching guidelines, a summary of both current legislation and dedicated NBS policies for Europe and the case countries, as well as a description of the specific cases analysed and the local and national specificities in the project, for subsequent replication and consideration of the guidelines indicated by successors and entities wishing to start investment activities in the field of NBS and comply with the existing legal framework.
The report focuses in particular on acts and strategies that relate to methods of improving rainwater management, heat stress, and rivers and flood defences.

Purpose of the document:
The protocol is an ex ante, process-oriented document that guides municipalities and partners step by step through the process of understanding the legal and strategic umbrella that must be taken into account when testing nature-based solutions (NbS).

Report aims:

- serve as a repeatable guide for cities wishing to initiate similar processes, focusing on the preparatory and planning phase, prior to physical implementation,
- provide a compendium of access to normative and legal acts focused on NbS
- ensure minimum compliance with legal requirements in Central European and EU countries,
- support respect for the law by ensuring co-creation, transparency and repeatability.

2. Definition of NBS and the most important legal acts relating to it at European level.

2.1. How should we understand NBS?

Definitions in the EU. The European Commission defines nature-based solutions as "solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits, and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes through locally adapted, resource-efficient and systemic interventions." The definition also emphasises that "nature-based solutions must benefit biodiversity and support the delivery of a range of ecosystem services."

Definitions existing in the literature. In March 2022, at the fifth United Nations Environment Assembly (UNEA-5), the United Nations agreed a resolution on nature-based solutions, which shows many similarities to the European Commission's definition. This relates to Resolution No. 48/13 "The human right to a clean, healthy and sustainable environment," adopted by the Human Rights Council in 2022. Although the resolution does not focus directly on NBS, it recognises the planetary crises (climate change, pollution, biodiversity loss) and creates a legal context in which supporting nature-based solutions as a way to address these challenges is natural.The resolution refers to key challenges facing humanity such as climate change, pollution and biodiversity loss.

Nature-based Solutions (NBS): Although not the main subject of the resolution, NBS are an integral part of actions linked to implementing the human right to a clean environment. NBS are nature-inspired solutions that deliver ecological, social and economic benefits, helping with climate adaptation and building resilience.

Definitions existing in Poland. Nature-based solutions (NbS) are solutions inspired and supported by nature that are cost-effective while providing environmental, social and economic benefits and helping to build the resilience of cities and non-urban areas. They use a comprehensive, systemic process of co-design and co-creation of innovative ideas adapted to local conditions and efficient in the use of existing resources (definition published in "Nature-supporting solutions in the city – A guide and inspirations," City of Poznań).

Key components of the definition

- **Purpose** – counteracting the negative effects of climate change in the areas of biodiversity, retention, and the use of blue-green infrastructure.
- **Inspiration by nature** – nature is a direct constituent element of the solution.
- **Broad implementation benefits** – environmental, social and economic advantages.
- **Financial viability** – economic efficiency of the solutions.
- **Universal character** – a tool applicable in urban and non-urban areas, providing an alternative to linear city-management approaches.
- **Enrichment of fauna and flora** – bringing more nature into cities through well-planned, local and resource-efficient actions.

What the mainstream definitions agree on?

Across the European Commission (EC), the UN system, IUCN and specialist communities, a clear centre of gravity has formed. NBS are actions that use living systems and natural processes as the primary mechanism to solve societal challenges (climate, water, health, hazards), while delivering net benefits for biodiversity and multiple co-benefits (social and economic). The EC's formulation stresses locally adapted, resource-efficient, systemic interventions that "bring more - and more diverse - nature and natural processes" into cities, landscapes and seascapes and explicitly requires biodiversity benefit and ecosystem-service delivery. UNEA-5/5 (the current intergovernmental reference) similarly frames NBS as actions to protect, conserve, restore, sustainably use and manage natural or modified ecosystems, thus making space for hybrid/urban contexts. IUCN's *Global Standard for NbS* turns these ideas into eight criteria and 28 indicators, widely used by funders and authorities to check credibility.

2.2. Synergistic concepts and terms related to NBS.

Specialised terms sit under the same umbrella:

- **EbA / Eco-DRR** emphasise adaptation and disaster-risk reduction;
- **NCS** (Natural Climate Solutions) emphasise mitigation;
- **Green/Blue-Green Infrastructure** underline networked urban form;
- **NNBF / Engineering with Nature** are engineering-led families for flood/coastal safety.

In practice they are **subsets or adjacent approaches** whose acceptance as NBS depends on **biodiversity safeguards and multi-benefit performance**, not only on their primary objective.

In reference to NbS - Nature-based Solutions, the items below have a direct relationship to NbS.

Acronym	Full name	Author	Definition	Brief description / relation to NbS
NCS	Natural Climate Solutions	Griscom et al. (2017), *Proceedings of the National Academy of Sciences*	Actions that protect, better manage, and restore ecosystems in order to reduce greenhouse-gas emissions and store carbon.	Climate change mitigation; a subset of NbS.
EbA / EBA	Ecosystem-based Adaptation	IUCN (2017), *Ecosystem-based Adaptation: A Resource Book*	The use of ecosystems to help people adapt to climate change.	Climate adaptation; a subset of NbS.
EbM / EBM	Ecosystem-based Mitigation / Ecosystem-based Management	IUCN; IPCC (2017), *IPCC Special Report on Climate Change and Land*	Protection and restoration of ecosystems for carbon sequestration or integrated resource management.	Mitigation or resource management in the NbS context.
Eco-DRR	Ecosystem-based Disaster Risk Reduction	UNDRR (2020), *Ecosystem-based Disaster Risk Reduction: Implementing Nature-based Solutions*	Managing ecosystems to reduce disaster risk (floods, storms, landslides).	Disaster-risk reduction within NbS.
NBI / NbI	Nature-based Infrastructure	European Commission (2020), *EU Biodiversity Strategy for 2030*	Integration of natural systems with technical infrastructure (e.g., retention, slope stabilisation).	Infrastructure that supports ecosystem functions.
NNBF	Natural and Nature-Based Features	USACE (2020), *Engineering With Nature*	Natural and semi-natural features used in coastal engineering / flood protection.	Ecosystem engineering in NbS practice.

GI / BGI	Green Infrastructure/ Blue-Green Infrastructure	European Commission (2020)	Networks of green and blue-green areas in cities (green roofs, parks, wetlands).	Urban form of NbS.
NN / NbR	Nature-based Recovery / Nature-based Restoration	IUCN (2022), *Nature-based Solutions for Recovery*	Post-disaster recovery; green reconstruction of the economy.	Restoring ecosystem functions; a form of NbS.
EbMgt / EBMgt	Ecosystem-based Management	IUCN (2019), *Guidelines for Ecosystem-based Management*	An ecosystem management strategy; a broader approach that supports NbS.	Ecosystem management; a framework for implementing NbS.
EBAFOSA	Ecosystem-Based Adaptation for Food Security Assembly	FAO; UNCCD (2019), *EBAFOSA: A Framework for Action*	A network promoting ecosystem-based adaptation in agriculture and food security.	Agricultural sector; climate adaptation within NbS.
SBN / SbN	Solutions (Based on / Inspired by / Supported by) Nature	Seddon et al. (2020), *Nature Sustainability*	Less frequently used synonyms for "Nature-based Solutions."	Synonym of NbS.
NbF / NBF	Nature-based Finance	EIB (2023), *Investing in Nature-based Solutions*	Financing mechanisms for NbS projects (green bonds, carbon credits).	Financing the implementation of NbS.
NbI (finance)	Nature-based Investments	JP Morgan (2025), *Sustainable Investment Report*	A banking/ESG term for investments that support NbS projects.	NbS-oriented investments.
EWN / Eco-ENG	Engineering With Nature	USACE (2020), *Engineering With Nature*	A concept that combines ecosystem solutions with engineering.	Integration of engineering and ecosystems within NbS.
LBI	Landscape-based Interventions	Pauleit et al. (2017), *Land Use Policy*	Actions at the landscape scale (river renaturation, agroforestry).	Landscape interventions supporting ecosystem functions.

2.3. Typologies that help organise policy and delivery

There is no single "official" EU typology of NBS, but practice-oriented classifications are well supported in the literature and EU guidance. Foundational work by EKLIPSE (for the European Commission) and by IUCN shows that NBS can be grouped along functional themes (e.g. water, biodiversity, urban systems) and along policy domains (climate, biodiversity, water, soil, zero pollution) to help decision-makers translate objectives into portfolios of measures. EKLIPSE explicitly presents NBS diversity along axes of ecosystem engineering and spatial scale and recommends thematic groupings for planning and evaluation. IUCN's Global Standard frames NBS as living-system actions delivering multi-objective outcomes, which policy domains can then operationalise. The EEA and EU handbooks further use thematic families such as Natural Water Retention Measures (NWRM) and SuDS within water policy, while EU green-infrastructure guidance groups urban blue-green interventions as a network that often qualifies as NBS when designed for ecosystem function and biodiversity.

Division I — by dimension & geographical level (global → local)

When analysing references to the NBS and seeking a basis for understanding the related strategic frameworks, we should rely on the first categorisation based on dimension and geographical character.

1. **International/Global dimension**
2. **European dimension**
3. **National dimension**
4. **Regional dimension**
5. **Local dimension (municipal, urban)**

Summary: Classifying NBS by governance level helps map who sets goals (international/EU), who transposes and funds (national/regional), and who implements and maintains (local/municipal). It shows how strategies cascade from broad standards into concrete place-based actions and monitoring responsibilities.

Division II — by operational theme (supported by EKLIPSE, EEA, NWRM/SuDS guidance)

1. **Water and water management.** River and floodplain restoration, NWRM (e.g., wetlands, riparian buffers, re-meandering), urban SuDS and source-control measures that deliver hydromorphology, retention, attenuation and water-quality gains under WFD/FD planning. These families are widely documented and standardised at EU level through NWRM guidance and the SuDS Manual.
2. **Biodiversity legislation and nature management.** Habitat restoration/enhancement, ecological connectivity, fish passage, invasive control, close-to-nature forestry and peatland rewetting—interventions aligned with Natura 2000 objectives and now with binding targets under the Nature Restoration Regulation.
3. **Green and blue infrastructure and NBS (urban).** De-sealing, permeable/vegetated streets, rain gardens, street trees, green roofs/walls and park water features that function as blue-green networks. These qualify as NBS when they use living systems to address defined risks (heat, stormwater, air/noise) and deliver biodiversity outcomes, as described in the EC Green Infrastructure approach and EKLIPSE urban guidance.

Summary: Grouping by themes (water management, biodiversity and nature management, urban blue-green infrastructure) organizes portfolios into well-documented measure families like NWRM/SuDS, habitat restoration/connectivity, and de-sealing/green roofs/streets. This makes technical guidance, performance metrics and co-benefits easier to compare and combine across projects.



Division III — by policy domain (consistent with EU strategies and IUCN/EEA framing)

1. **Climate.** NBS for adaptation and disaster-risk reduction (cooling, drought/flood management, coastal resilience) with mitigation co-benefits (carbon sinks), as highlighted by the EU Adaptation Strategy and IUCN's standard.
2. **Biodiversity.** Measures that restore habitats and networks in line with the EU Biodiversity Strategy and Natura 2000 safeguards (and the Nature Restoration Regulation's targets).
3. **Water.** Catchment and urban NBS delivering WFD status via hydromorphology, pollution control and retention (RBMPs/FRMPs; NWRM/SuDS families).
4. **Natural resources, regeneration, revitalisation, zero pollution.** De-sealing, soil/biomass reuse, circularity and diffuse-load reduction consistent with the Zero Pollution Action Plan and urban regeneration practice referenced by EKLIPSE/EEA.

5. **Soil strategy (Earth).** Soil health for infiltration, fertility, carbon and erosion control (agroforestry, hedgerows, wet meadows, peatland rewetting) as promoted in the EU Soil Strategy and recognised in the IUCN/EEA NBS framing.

Summary: Aligning NBS with domains (climate, biodiversity, water, zero-pollution/circular regeneration, soil) links actions directly to EU strategies and regulatory targets, clarifying funding routes and evaluation criteria. It also supports multi-objective design - e.g., measures that serve adaptation while delivering WFD status gains and biodiversity restoration.

Division IV - by region type

1. **Urban/Metropolitan** - Dense settlement, heat islands, stormwater stress, typical NBS Focus: Green roofs, SuDS, pocket parks
2. **Agricultural/Rural** - Intensive land use, soil/water retention needs, typical NBS focus: Hedgerows, agroforestry, re-wetting peatlands
3. **Forest/Mountain** - steep slopes, erosion risk, biodiversity value, typical NBS focus: woodland restoration, slope stabilization
4. **River Basin/Floodplain** - high hydrological variability, flood management, typical NBS focus: Floodplain reconnection, wetland buffers
5. **Coastal/Marine** - Sea-level rise, erosion, saline intrusion, typical NBS focus: Dune rebuilding, seagrass restoration.

Summary: Context-based grouping matches typical pressures to an indicative "menu" of NBS (e.g. SuDs in cities, hedgerows/agroforestry in farmland, floodplain reconnection in river basins). This helps practitioners prioritize fit-for-place measures and coordinate the right stakeholders.

2.4. Practical applications and challenges of the NBS definition

Where definitions diverge?

- Scope of "nature." UNEA explicitly includes modified ecosystems (e.g., streets, brownfields), whereas many early EU texts implied "natural" settings. The practical effect is that urban SuDS, pocket wetlands, bio-engineered embankments are unequivocally eligible as NBS if they meet biodiversity and performance tests.

- Biodiversity as a hard criterion vs. soft co-benefit. The EC and IUCN place biodiversity gain (or at least no-net-loss) at the core. Some mitigation-oriented NCS or minimalist "green infrastructure" usages historically accepted functional gains (cooling/carbon) with weak biodiversity evidence; these are increasingly screened out unless redesigned with habitat value, native structure, and monitoring.

- Primary-objective bias and metrics. EbA/Eco-DRR communities lead with risk metrics (return periods, damage avoided), NCS with carbon accounting, NNBF with safety/performance standards. Without a shared verification frame, projects risk being judged by incommensurate criteria. The IUCN Standard and EEA guidance help harmonise expectations (hydraulic, water-quality, biodiversity, microclimate, social use).

- Evidence & maintenance. Definitions are often silent on O&M and monitoring. Practice is converging on performance-based approval (design storms, draw-down times, pollutant-removal proxies, habitat indices, canopy/cooling KPIs) and biodiversity-aware maintenance (mosaic/seasonal regimes), which turns definitions into operational acceptance.

Energy efficiency - how NBS deliver (and how to claim it credibly).

NBS contribute to operational and embodied energy efficiency, although definitions seldom highlight this explicitly:

- **Operational energy**: urban trees/blue-green corridors reduce cooling demand via shade and evapotranspiration; floodplain reconnection and natural retention lower pumping energy and peak-flow energy in drainage; soil/vegetation pre-treat stormwater, reducing treatment energy at plants.
- **Embodied energy**: bio-engineering, de-sealing and reuse of soils/biomass can displace high-energy materials and heavy civil works.

Claims should use transparent methods (e.g., kWh/m^2 cooling savings; kWh avoided pumping; LCA of materials) and remain additional to, not a substitute for, biodiversity outcomes.

The most common definitional mistakes

1. **Confusing "environmental" with "nature based."** Actions that are good for the environment (e.g., insulation, end-of-pipe scrubbers) are not NBS unless living systems are the mechanism and biodiversity benefits.
2. **Green veneer**: single-species tree lines, decorative lawns or planters without habitat design, hydrologic function or monitoring do not meet NBS criteria.
3. **"All SuDS are NBS"**: drainage features qualify only if they are designed and managed for ecosystem function and biodiversity, not merely water conveyance/storage.
4. **Offsets in lieu of local solutions**: distant carbon/biodiversity offsets with no local co-benefits do not satisfy NBS expectations in urban adaptation/DRR briefs.
5. **No O&M/monitoring**: projects without KPIs, maintenance regimes and monitoring plans tend to underperform and face weak acceptance.
6. **Social equity omissions**: ignoring access, safety and co-creation undermine the "solutions for people" dimension now expected in EU programming.

EU legal anchors relevant to the definition and use of NBS

There is **no single binding EU legal definition** of NBS. Instead, several instruments collectively embed what NBS do:

- **Water Framework Directive (2000/60/EC)**: achieving good status; restoration, floodplain reconnection and natural retention align with its measures.
- **Floods Directive (2007/60/EC)**: encourages non-structural and nature-based flood-risk reduction.
- **Habitats & Birds Directives** (Natura 2000): set biodiversity baselines and safeguards that NBS must respect and, ideally, enhance.

Strategic anchors that name/promote NBS or their urban form include:

- **EU Green Infrastructure Communication** (COM(2013)249) — first EU policy home for GI/NBS in planning.
- **EU Strategy on Adaptation to Climate Change (2021)** — elevates NBS as priority measures.
- **EU Biodiversity Strategy for 2030** — calls for large-scale restoration, GI investment and mainstreaming NBS.

Internationally, the UNEA-5/5 resolution provides the most cited intergovernmental definition, and IUCN's Global Standard functions as the de facto verification tool for projects and calls.

Practical conclusions for NBS programmes and projects

- Treat UNEA-5/5 + EC as the twin reference to frame eligibility; then use IUCN's Standard to structure design briefs, procurement and monitoring.
- Make biodiversity performance explicit (targets, indicators, baseline) and pair it with sectoral KPIs (hydraulic, water-quality, cooling/energy, social).
- Anchor legal compliance via WFD + Floods + Habitats/Birds, deliver through GI/Adaptation/Biodiversity strategies, and document plan consistency.
- Quantify energy efficiency as a co-benefit with clear methods and do not trade it against biodiversity.
- Avoid the pitfalls: environment ≠ nature; SuDS ≠ NBS by default; offsets ≠ local resilience; no monitoring/O&M.
- In urban settings, agree bespoke cross-sections (permeable/vegetated geometries, tree-root corridors, inlet/outlet details) with road/utility owners; codify mosaic/seasonal maintenance; and secure performance-based acceptance to match NBS' living-system character.

Summary: NBS are framed consistently across the European Commission, UNEA-5 and IUCN as actions that use living systems and natural processes to address societal challenges (climate, water, risk, health), while delivering net biodiversity gains and multiple co-benefits; the IUCN Global Standard operationalizes this through criteria and indicators used by funders and authorities. Compliance with the legal framework requires a thorough, shared understanding of what NBS actually are — not only among implementers but across all involved groups—because clear basic concepts are essential for interpreting subsequent analyses and guidance. This report therefore explains what NBS are, what they are based on, why they matter, and shows their growing prominence across contemporary guidelines and programmes.
This section of the report clarifies adjacent terms (e.g., EbA, Eco-DRR, NCS, GI/BGI, NNBF) and positions them as subsets or neighbours to NBS when biodiversity safeguards and multi-benefit performance are met, improving transferability by giving other actors a clear "starting map." A broader, well-explained definition is explicitly intended to maximise transferability of results and help stakeholders understand where to begin.

There is no single binding EU legal definition; instead, NBS are embedded through a constellation of instruments and strategies. The paper highlights practical pitfalls (e.g., "environmental" ≠ "nature-based," SuDS ≠ NBS by default, weak biodiversity evidence, neglect of O&M/monitoring) and recommends using UNEA-5 plus the EC definition to frame eligibility, with the IUCN Standard to shape design, procurement and verification.

Lead-in to the next section – Main EU-level Guidelines: The raport now turns to the principal European anchors for NBS practice: the Water Framework Directive, Floods Directive, Habitats & Birds Directives (Natura 2000), Nature Restoration Regulation and UN Environment Assembly Resolution on Nature-based Solutions as the key references for compliance, funding alignment and evaluation.

3. Main guidelines at the European level – indication of the most important documents regarding the study

Below are the five most consequential legal instruments at European or UN level that shape how Nature-based Solutions (NBS) are understood, mandated or enabled. Each entry briefly explains scope, obligations, and why it matters for NBS. The selection balances definition, biodiversity safeguards, river-basin governance, flood-risk management, and binding restoration targets.

1) EU Water Framework Directive — Directive 2000/60/EC (WFD)

Scope & obligations. The WFD establishes a basin-scale framework to achieve "good" ecological and chemical status of surface and ground waters via River Basin Management Plans (RBMPs) updated every six years and Programmes of Measures. It requires Member States to diagnose hydromorphology, water quality, pressures and risks, and to select measures proportionate to objectives.
Why it matters for NBS. The WFD is the primary legal home for catchment NBS: river and floodplain restoration, reconnection of side channels, removal or modification of barriers, natural water retention features (wetlands, riparian buffers, re-meandering), and soil-vegetation solutions that reduce diffuse pollution. Because RBMPs guide public spending and permitting, they are the main vehicle for NBS portfolios at scale.

2) EU Floods Directive — Directive 2007/60/EC

Scope & obligations. Complementing the WFD, the Floods Directive requires preliminary flood-risk assessment, hazard and risk maps, and Flood Risk Management Plans (FRMPs)—also on a six-year cycle and aligned to river-basin districts.
Why it matters for NBS. The Directive explicitly promotes non-structural and nature-based approaches (e.g., floodplain reconnection, room-for-the-river, coastal dunes and wetlands) as part of prevention, protection and preparedness. When RBMPs and FRMPs are prepared together, NBS can deliver dual benefits—risk reduction and WFD ecological objectives—improving cost-effectiveness and eligibility for funding.

3) Natura 2000 acquis — Habitats Directive 92/43/EEC & Birds Directive 2009/147/EC

Scope & obligations. These two directives create the Natura 2000 network of protected sites and species safeguards across the EU. Any plan or project likely to significantly affect a site must undergo Appropriate Assessment; conservation objectives and management measures must be set and maintained for listed habitats and species.
Why it matters for NBS. Natura 2000 provides the biodiversity baseline and legal safeguards that distinguish credible NBS from purely "green" infrastructure. Well-designed NBS in or near Natura 2000 (e.g., wetland creation, fish passage, riparian restoration) often advance site conservation

objectives, easing approvals. Conversely, the Appropriate Assessment procedure forces NBS designs to demonstrate ecological fitness, raising quality and long-term resilience.

4) EU Nature Restoration Regulation — Regulation (EU) 2024/1991

Scope & obligations. The NRR sets binding, time-bound restoration targets across ecosystems — rivers and floodplains (including targets for free-flowing rivers), wetlands/peatlands (including rewetting), forests, agro-ecosystems and urban green space. It requires national restoration plans, milestones, monitoring and reporting.
Why it matters for NBS. The NRR shifts NBS from "good practice" to legal obligation: Member States must deliver outcome-based restoration at landscape scale, making NBS the default delivery mechanism for multiple ecosystems. It also catalyses coherence across RBMPs/FRMPs, agricultural policies and urban planning by tying them to measurable ecological recovery.

5) UN Environment Assembly Resolution on Nature-based Solutions — UNEA-5/5 (2022)

Scope & content. UNEA-5/5 provides the most widely cited intergovernmental definition of NBS as actions to protect, conserve, restore, sustainably use and manage natural or modified ecosystems to address societal challenges effectively and adaptively, while delivering human well-being and biodiversity benefits.
Why it matters for NBS. Although not an EU law, UNEA-5/5 is the global definitional anchor now referenced by EU institutions, funders and standards. It clarifies that NBS must use living systems as the mechanism, must benefit biodiversity, and may occur in modified environments (e.g., cities). This framing underpins EU guidance, funding calls and the evaluation of claims (distinguishing NBS from purely "environmental" measures that lack a nature mechanism).

Additionally, it should be noted that, several acts strongly reinforce the five above in practice: the **Marine Strategy Framework Directive (2008/56/EC)** (coastal/marine NBS), the **recast Urban Wastewater Treatment Directive (EU) 2024/3019** (integrated urban water planning where blue-green systems cut loads and energy), and the **LULUCF Regulation (2018/841, as amended)** (carbon accounting that valorises restoration, rewetting and close-to-nature forestry). Depending on project context, these often act as decisive enablers for NBS deployment and financing.

Taken together, the five "most important" instruments presented—**WFD (2000/60/EC), Floods Directive (2007/60/EC), Natura 2000 (Habitats & Birds), Nature Restoration Regulation (EU) 2024/1991,** and the **UNEA-5/5** NBS definition—form the legal and conceptual backbone onto which the EU's forward-looking policy set is now fastening operational detail and finance.

- The **Water Resilience Strategy** builds directly on **WFD/Floods**, turning basin-scale diagnostics and six-year planning cycles into a more integrated drought–flood–demand response where NBS (natural retention, reconnection, buffers) are first-line options and where synergies with urban water (UWWTD recast) and energy efficiency are made explicit.

- The **EU Biodiversity Strategy for 2030** extends **Natura 2000** logic from protection to proactive restoration and connectivity**,** aligning funding and governance with **WFD** hydromorphology goals and with agricultural measures that deliver biodiversity-positive NBS at landscape scale.
- The **Strategy on Adaptation to Climate Change (2021)** elevates **NBS** recommended under **WFD/Floods/Natura**into mainstream resilience policy for cities, coasts and river basins, using **UNEA-5/5** as the widely accepted definitional anchor.
- The **Zero Pollution Action Plan** operationalises chemical and nutrient load reductions and source control; in practice it channels investments toward catchment NBS that help **WFD** status objectives and coastal quality targets (with the Marine Strategy).
- The **EU Soil Strategy for 2030** complements **WFD/Natura** by prioritising soil functions (infiltration, carbon, fertility), thereby validating agro-ecological NBS (hedgerows, agroforestry, peatland rewetting) and closing the land–water loop that RBMPs manage.

Summary: This section of the NBS report identifies the five most consequential instruments shaping how NBS are defined, mandated, and financed: the EU Water Framework Directive (2000/60/EC), the Floods Directive (2007/60/EC), the Natura 2000 acquis (Habitats & Birds), the Nature Restoration Regulation (EU) 2024/1991 with binding restoration targets, and the UN Environment Assembly Resolution UNEA-5/5 that anchors the intergovernmental definition of NBS. These were selected because together they provide the legal and conceptual backbone for basin-scale governance, risk reduction, biodiversity safeguards, and outcome-based restoration—i.e., the essential context and direction-setting framework for NBS across Europe. The chapter also notes enablers frequently used in practice (Marine Strategy Framework Directive, the recast Urban Wastewater Treatment Directive (EU) 2024/3019, and the LULUCF Regulation), and situates NBS within current EU strategies: Water Resilience, Biodiversity 2030, Adaptation to Climate Change, Zero Pollution, and the EU Soil Strategy, which collectively align funding, planning cycles, and monitoring around nature-positive measures.

This section of the report should be linked directly to Annex 1 — "Relevant EU And Cross-Border Strategies & Frameworks Recommended by Consortium Members as a Legal Basis Of Reference to the NBS Area" — which enumerates 28 additional acts considered pivotal for understanding the broader policy context and for operationalising NBS across sectors and geographies.

4. Analysis of the framework at the European level

Where NBS "live" in EU policy and law.

The European Union has no single, binding legal definition of Nature-based Solutions (NBS), yet a robust enabling architecture makes them practicable across sectors. In water policy, the Water Framework Directive (WFD) requires good ecological and chemical status, legitimising river restoration, floodplain reconnection, natural water retention and soil–vegetation measures as core instruments in programmes of measures. The Floods Directive complements this by promoting non-structural, nature-based approaches within six-year planning cycles at river-basin scale. Biodiversity law—the Habitats and Birds Directives and the Natura 2000 network—operates both as safeguard and opportunity: NBS in and around protected sites must pass appropriate assessment, but restoration and ecological connectivity are fully consistent with site objectives. Strategically, the European Green Deal provides the political umbrella. The 2021 EU Strategy on Adaptation to Climate Change elevates NBS as priority instruments for resilience; the EU Biodiversity Strategy for 2030 mainstreams restoration and green infrastructure; and the Nature Restoration Regulation (EU) 2024/1991 moves NBS from pilots to outcome obligations by setting binding targets for wetlands, rivers and floodplains, peatlands, forests and urban green. Recent water policy updates reinforce this direction: the Union's Water Resilience Strategy frames NBS as essential to balance demand and supply, address droughts and floods and mobilise finance. Other sectoral acts open additional pathways: the recast Urban Wastewater Treatment Directive requires integrated urban water planning, source control of micropollutants and energy neutrality—contexts where blue-green infrastructure reduces hydraulic loads and energy use. The EU Soil Strategy 2030 and the Zero Pollution Action Plan encourage riparian buffers, wetlands and regenerative land practices; the EU Forest Strategy 2030 emphasises close-to-nature forestry, protective forests and tree-planting in support of water, microclimate and risk-reduction functions. At macro-regional level, the EU Strategy for the Baltic Sea Region (EUSBSR) provides a transnational coordination space for nutrient reduction, river continuity and coastal resilience, particularly relevant for Polish partners (GUT, APC ERB, Wejherowo, Tolkmicko). Finally, National Energy and Climate Plans (NECPs), prepared under Regulation (EU) 2018/1999, are an underused lever: by recognising cooling-demand reduction, avoided pumping/treatment energy and carbon sinks, Member States can connect NBS to energy-system goals and funding.

Additional instruments to note.

Beyond the core water–nature–climate acquis, marine and land-use laws significantly widen the legal home for NBS. The Marine Strategy Framework Directive (2008/56/EC) requires Good Environmental Status and favours dune, reef and wetland restoration as NBS for risk reduction and water quality; paired with the Environmental Quality Standards Directive (2008/105/EC, as amended by 2013/39/EU) it tightens chemical constraints and supports catchment NBS that curb pollutant loads before they reach coasts and estuaries. The LULUCF Regulation (2018/841, amended by 2023/839) brings binding carbon accounting for soils, wetlands and forests—directly valorising restoration, rewetting and close-to-nature forestry as NBS. The 8th Environment Action

Programme (Decision (EU) 2022/591) operationalises Green Deal goals and repeatedly points to nature-based approaches. The reformed Common Agricultural Policy (2023–27) via Regulation (EU) 2021/2115 enables eco-schemes for riparian buffers, hedgerows, agroforestry and peatland rewetting—agro-ecological NBS that also reduce diffuse pollution. Urban integration is steered by the EU Urban Agenda Partnership on Sustainable Land Use & NBS and the Green Infrastructure Communication, while the Water Resilience Strategy (2025) and the UWWTD recast (2024/3019) mainstream nature-based retention, source control and energy-neutral, integrated urban water plans; macro-regionally, the EUSBSR aligns nutrient-reduction and river-continuity NBS across borders and funding streams.

Discrepancies, ambiguities and definitional frictions

Because there is no uniform legal definition, practice borrows from the European Commission's formulation and from intergovernmental and standard-setting sources (UNEA-5/5; IUCN Global Standard). Differences persist in scope and acceptance tests. UNEA explicitly includes natural and modified ecosystems, which suits urban and hybrid settings; early EU texts sometimes implied "natural" settings, leaving uncertainty for street-embedded SuDS or bio-engineered embankments unless biodiversity benefits are explicit. Another friction concerns biodiversity: the Commission's usage and the IUCN Standard treat biodiversity outcomes as a hard criterion, whereas some mitigation-focused "natural climate solutions" or minimalist "green infrastructure" deployments have historically accepted functional gains (cooling or carbon) with weak habitat design and monitoring. Sectoral lenses also diverge: ecosystem-based adaptation and Eco-DRR prioritise risk metrics; NNBF and "engineering with nature" emphasise hydraulic and safety performance; carbon projects stress mitigation accounting. Without a shared verification frame, projects risk being judged by incommensurate criteria.

Regulatory gaps

Three gaps recur in implementation. First, there is no EU-wide operational standard for urban NBS that sets design, performance and maintenance expectations comparable to those used for grey assets—e.g., design storms and draw-down times, pollutant-removal proxies, biodiversity KPIs and mosaic/seasonal maintenance regimes. This leaves acceptance uneven among road and utility managers. Second, procurement and financing frameworks still presume fixed-output assets; living infrastructure needs performance-based contracts that accommodate ecological maturation and adaptive management over multiple years. Third, monitoring under the WFD focuses on ecological and chemical status, but multi-benefit data (heat mitigation, biodiversity, water-quality proxies, social use and energy co-benefits) are not yet systematically embedded, limiting replication and scale-up. In parallel, many NECPs underplay NBS as energy-efficiency and system-integration measures, leaving avoided operational energy and embodied-carbon gains uncaptured.

Regulatory bottlenecks

Promoters often face fragmented permitting: water authorities, nature bodies, heritage and landscape services, road authorities and utilities may each act as gatekeepers. Without early, coordinated scoping, approvals become sequential and slow. Legacy maintenance regimes in flood management favour "clear and convey" practices that can erode NBS function by removing habitat complexity and hydraulic roughness; safety and ecology can be reconciled only if selective maintenance and seasonal windows are explicitly codified. Prescriptive tendering and rigid liabilities deter adaptive planting and phased establishment. Finally, municipal and utility teams frequently lack biodiversity-savvy specifications and budgets for long-term monitoring.

Opportunities for NBS

The Nature Restoration Regulation creates binding momentum: free-flowing rivers, peatland rewetting and urban green targets directly translate into catchment-scale and city-scale NBS portfolios. The Water Resilience Strategy and the wastewater recast provide formal urban pathways for blue-green source control, storage and energy-neutral water services. Biodiversity, Soil and Forest strategies legitimise soil-first retrofits, riparian buffers, close-to-nature forestry and tree-canopy expansion for microclimate and slope stability. EUSBSR enables cross-border flagships for eutrophication control, floodplain reconnection and coastal resilience in the Baltic macro-region, improving eligibility and visibility of municipal projects. NECPs can recognise NBS as energy-system measures—cooling-load reduction, avoided pumping/treatment energy, resilience benefits and bio-based material substitution—opening complementary funding and KPI alignment.

Organic farming

The Green Deal's Farm-to-Fork agenda, together with CAP eco-schemes and the Soil Strategy, creates space for agro-ecological NBS: riparian buffer strips, hedgerows, agroforestry, wet meadows and peatland rewetting. These practices reduce nutrient loads and erosion, enhance infiltration and water retention, boost pollinators and biodiversity, and can lower energy inputs (irrigation and fertiliser manufacture). They also help reconcile Natura 2000 objectives with productive landscapes. Implemented at landscape scale, organic and regenerative farming thus becomes both a delivery mechanism and a beneficiary of NBS, especially when linked to RBMP measures for diffuse pollution and hydromorphology.

River Basin Management Plans

RBMPs remain the natural home for catchment NBS portfolios. Best-practice plans quantify retention and attenuation targets, integrate Floods-Directive hazard and risk maps, identify "space for rivers" and reconnection sites, and weave in Nature Restoration Regulation milestones and wastewater source-control. Crucially, they attach maintenance and monitoring protocols that preserve ecological function alongside safety. This is also where cross-sector links to agriculture (buffers,

wetlands, agroforestry), forests (protective stands, riparian shading) and urban areas (de-sealing, SuDS networks) can be made explicit, giving basin authorities a coherent path from strategy to projects.

Recommendations and de lege ferenda.

The Commission should issue an EU-level operational standard for NBS—via Recommendation or guidance—aligned with the IUCN Standard, covering design criteria, KPIs, monitoring and biodiversity-aware O&M, with annexed street cross-sections and SuDS templates. RBMPs and Flood-Risk Management Plans should be required to include quantified retention and river-space targets and selective-maintenance protocols, linked to restoration milestones. Implementing acts and guidance under the wastewater recast and NECPs should standardise methods to count cooling-load reduction, avoided pumping/treatment energy and embodied-carbon savings, allowing NBS to qualify under energy-efficiency and system-integration finance. Model procurement clauses for living infrastructure should be published to enable performance-based, adaptive contracts. Natura 2000 guidance should clarify screening and appropriate-assessment pathways for restoration in modified urban settings, with monitor-and-adapt conditions. In the Baltic, EUSBSR flagships should explicitly bundle nutrient-reduction NBS with transnational monitoring and knowledge transfer. Finally, the EU should support basin- and city-level NBS observatories that track hydraulic, biodiversity, water-quality, energy and equity indicators and require open data as a condition of co-financing.

5. Analysis of national legal acts identified in 5 countries (at national, local and regional levels).

5.1. Poland

National operating context: institutions, consents, synergies, frictions

At national level, the enabling "mandate" for NBS comes primarily from PEP2030 (National Environmental Policy 2030), SPA2020 (Strategic Adaptation Plan), basin-scale instruments (River Basin Management Plans—RBMPs) and the Drought Plan (PPSS), complemented by air-quality policy (KPOZP/NEC) and the broad environmental assessment framework (SEA/EIA). In practice, however, the decisive gatekeepers for most NBS are Wody Polskie (Polish Waters)—through water-law permits for any intervention that changes water conditions—and the environmental protection authorities in the Natura 2000 and protected-area regimes.

Key institutions you must plan around. **Wody Polskie** issue water-law decisions (permitting works that alter water relations; surface/groundwater intakes; discharges; retention; reshaping of channels, banks and floodplains; and construction/operation of water devices). **The Minister for Climate and Environment** sets policy; **GDOŚ/RDOŚ** (General/Regional Directorates for Environmental Protection) run Natura 2000 screenings/appropriate assessments and decisions on environmental conditions for many projects; GIOŚ/Regional Inspectorates handle monitoring and enforcement; **Voivodeship marshals and assemblies** adopt regional strategies and air programmes; **County (powiat) starostas** and **municipalities** handle building, spatial planning and local environmental programmes; and **sanitary inspectorates** (Sanepid) may be needed where public health/water quality is implicated (e.g., constructed wetlands near bathing waters or infiltration close to supplies). In forested or upland areas, **State Forests** are landowners and operational partners; in coastal/lagoon areas (Tolkmicko), the **competent Maritime Office** is the shoreline authority.

Consents and procedures that recur. Most water-touching NBS will need a **water-law permit (pozwolenie/zgoda wodnoprawna)**, often accompanied by hydraulic modelling for flood-risk compatibility. Projects of larger scale or located in sensitive areas typically require a **decision on environmental conditions** (EIA screening/scoping; full EIA where significant effects are likely). In or near Natura 2000, a screening and, if needed, appropriate assessment is mandatory—even when the solution is "nature-friendly". Works in landscape parks/reserves require the protected-area authority's consent; tree felling in urban settings may need a permit under the Nature Conservation Act. Urban measures on public streets require the road manager's consent and compliance with technical standards. Where shoreline or lagoon edges are affected (Tolkmicko), **maritime/coastal consents** join the list. Depending on the design, a **building permit** (or prior notification) under the Construction Law may apply to culverts, weirs, outfalls, headwalls, retaining structures or engineered wetlands.

Synergies: what "works together". There is strong vertical alignment between PEP2030 (funding mandate), SPA2020 (adaptation logic), PPSS (explicit prioritisation of natural and artificial retention) and RBMPs (programmes of measures). Together, they give NBS a "must-consider" status for flood/drought resilience, water quality and ecological status. Air-quality policy (KPOZP/NEC) and voivodeship anti-smog rules add a supportive narrative for urban greening, permeability and ventilation corridors, making it easier to justify NBS that tackle heat, particulates and NOx indirectly. Regional environmental programmes translate these national goals into measurable tasks, and municipal environmental/adaptation programmes make them actionable locally.

Contradictions and frictions to manage. Four tensions recur across Poland. First, maintenance rules vs. renaturation: routine channel "maintenance" and vegetation clearance required by some drainage practices can pull against habitat creation and morphological complexity sought by NBS. Second, spatial planning vs. flood maps: legacy zoning or investment pressures can conflict with flood-hazard mapping; NBS require space and multi-functional zoning that not all local plans provide. Third, urban standards vs. permeability: street/parking norms and utility protection zones may promote sealed surfaces or cross-falls that undermine SuDS; explicit deviations or updated standards are often needed. Fourth, procedural parity: NBS frequently face the same (or higher) engineering-grade documentation as grey works, even when risk profiles are lower—this lengthens approvals unless scoping is agreed early with the authorities.

Where guidance is thin. Poland still lacks unified national technical standards and performance benchmarks for many urban NBS (e.g., standard SuDS sizing/acceptance criteria, O&M norms, whole-life cost templates). There is also limited national guidance on outcome-based monitoring for NBS (hydraulic, water quality, biodiversity and social KPIs integrated), and no single, authoritative compensation/offsetting playbook tailored to nature-positive solutions under the Natura regime. As a result, authorities often default to case-by-case expectations or foreign guidelines; agreeing a project-specific "evidence pack" early is critical.

Regional layer: Pomorskie (Wejherowo) vs. Warmińsko-Mazurskie (Tolkmicko)

In Pomorskie, the Regional Development Strategy 2030 and the Regional Strategic Programme for Environmental and Energy Safety provide an explicit policy bridge for blue-green infrastructure, natural retention and coastal protection. Two instruments sharpen restrictions: the regional anti-smog resolution for towns and cities (fuel/boiler restrictions) and the Regional Air Protection Programme (POP) with corrective measures and reporting deadlines. These do not hinder NBS; rather, they condition design choices—for example, favouring tree canopies and permeable networks along active-mobility corridors to co-deliver air and climate benefits. Institutionally, the Voivodeship Marshal's Office (environment and agriculture departments), the Voivodeship Fund for Environmental Protection, Regional Inspectorate of Environmental Protection, and regional units of Wody Polskie and RDOŚ are the principal interlocutors beyond the municipality and county.

In **Warmińsko-Mazurskie**, the 2030 Strategy and the regional Environmental Protection Programme foreground exceptional natural capital, ecological connectivity, restoration of native habitats, and climate-risk reduction. For Tolkmicko, this is enabling, but the setting is sensitive: the Elbląg Upland Landscape Park and multiple Natura 2000designations intersect with the Vistula Lagoon shore. The competent Maritime Office oversees shoreline belts and aquatic structures; RDOŚ Olsztyn handles Natura screening/assessment; Wody Polskie manage water-law decisions; park management sets conditions within the landscape park; and State Forests are essential neighbours on upland slopes. The implication is not that NBS are constrained—soft shoreline, reedbed restoration, wet meadows and ravine stabilisation are typically preferred—but that baseline data, seasonality and adaptive management must be built into permits. Expect more iterative reviews and multi-body consultations than in a typical urban setting.

Local reality: how delivery is governed in Wejherowo and Tolkmicko

Wejherowo has aligned strategies that point directly to NBS: the Development Strategy 2023–2033 elevates the spatial-environmental dimension (green public space, storm-rain management, drought and heat mitigation); the Municipal Environmental Protection Programme sets objectives across eight domains; and the Climate Adaptation Strategy under preparation is already linked to an investment task on stormwater and small retention. The Study of Conditions and Directions (Studium) and municipal ordinances on cleanliness and waste underpin implementation. Institutionally, the city's environment and investments departments, the road manager, county starosta (for building-law competences), RDOŚ Gdańsk, Wody Polskie, and (where relevant) Sanepid are the core approval constellation. Frictions to anticipate include reconciling SuDS with street cross-sections, utilities and parking ratios, and negotiating land tenure where optimal infiltration/retention sites involve mixed ownership. Approvals are smoother when the city presents a SuDS network concept (not only site-by-site) tied to POP/anti-smog benefits (canopy, permeability, ventilation corridors) and supported by a clear O&M model.

Tolkmicko presents a different mix. The municipal environmental and spatial instruments work within regional priorities, but permitting plays out across Wody Polskie, RDOŚ Olsztyn, the Landscape Park, and the Maritime Office. Designs should reflect lagoon morphodynamics, hydroperiods and species/habitat needs (reedbed dynamics, fish corridors, bird nesting and migration). Consents may sequence across authorities; for example, Natura 2000 screening conclusions inform water-law permitting, and maritime consent conditions feed back into detailed design. Because measures span upland–lowland–shoreline, phasing and construction windows (outside nesting/spawning) are often embedded in permits. Here, a catchment suite—upland slope stabilisation and forestry edge management, lowland wet meadows/wetlands for nutrient retention and flood storage, and soft shoreline works—usually meets the region's restoration logic while satisfying sensitive-area requirements.

Legal-act synergies and conflicts. High-value synergies. PEP2030 + SPA2020 justify NBS as mainstream adaptation; PPSS and RBMPs prioritise natural retention and water-status improvement; regional strategies/programmes translate those into local tasks and funding lines; municipal environmental/adaptation programmes operationalise them. For urban settings, air-quality policy (KPOZP/POP/anti-smog) synergises with urban greening and SuDS, improving the business case and eligibility across funds (regional ERDF, national funds, Interreg/LIFE).

Likely conflicts to pre-empt.

- Drainage "maintenance" vs. NBS morphology—agree vegetation management regimes in permits so habitat features are not stripped out annually.
- Legacy zoning vs. flood hazard—secure plan adjustments or special area plans that reserve space for floodplain reconnection and storage.
- Urban technical standards vs. permeability—obtain written acceptance for permeable pavements, shallow swales, reduced kerb upstands, alternative cross-falls and tree-root corridors.
- Shoreline hardening vs. soft protection—document wave/ice performance for soft-engineering solutions to satisfy maritime safety while avoiding unnecessary armouring.
- O&M uncertainty — embed ownership and maintenance responsibilities and performance monitoring in consent conditions; otherwise, authorities may hesitate.

Project teams should be ready to propose design/acceptance criteria for SuDS and wetlands (sizing, freeboard, drawdown, pollutant removal); integrated KPI dashboards (hydraulic, water quality, biodiversity, microclimate, social use); maintenance plans with cost curves and regimes compatible with biodiversity goals; adaptive-management protocols for lagoon/river dynamics.

Final practical note

Across both sites, the fastest approvals come when you (a) present a vertical-alignment memo proving that the project *implements adopted policy* (national → regional → local → basin); (b) agree an approvals map with authorities at concept stage (who issues what, in what order); (c) table a concise evidence pack (hydraulic, ecological, water quality, urban climate) that anticipates Natura questions; and (d) include clear O&M and monitoring commitments in your applications. Where regulations seem to pull in different directions—channel "maintenance" vs. habitat, sealed street standards vs. permeability, hard shore protection vs. soft—use pilot data, modelling and phased designs to secure written acceptance of nature-positive departures that still meet safety and performance requirements.

5.2. Italy

National level

At the national level, the policy mandate for Nature-Based Solutions (NBS) is created by a cluster of strategies and laws that, taken together, legitimise ecosystem restoration, floodplain reconnec-

tion, urban green-blue infrastructure and soil/water retention as mainstream responses to climate and water risk. The Ministry of the Environment and Energy Security (MASE) sets the overarching direction on climate adaptation, biodiversity and water policy (including the National Adaptation Plan and the National Strategy for Sustainable Development). The Ministry of Infrastructure and Transport (MIT) and the civil-works arms (Genio Civile - Genio civile is a governmental technical body responsible for overseeing, regulating, and ensuring the safety of civil works and infrastructure, as well as managing territorial and environmental risks. It is staffed by professionals such as civil and hydraulic engineers, geologists, architects, technicians) shape hydraulic safety, river works and public-works standards, while the Ministry of Culture (MiC)—through the Soprintendenze Archeologia, Belle Arti e Paesaggio—acts as gatekeeper for landscape authorisations under D. Lgs. 42/2004 wherever landscape restrictions (*vincoli*) apply. National technical oversight is complemented by ISPRA and the regional environmental agencies (ARPA), which provide monitoring and binding/consultative technical opinions that frequently condition permits. The national legal architecture also establishes the principal environmental assessment procedures: strategic environmental assessment "Valutazione ambientale strategica" VAS (SEA) for plans and programmes and VIA(EIA) for projects likely to cause significant effects; and it requires environmental impact assessment "Valutazione di Incidenza (VIncA)" in or near Natura 2000 sites (screening first, then appropriate assessment if significant effects cannot be excluded). Where discharges or intentional infiltration connect to the water cycle, authorisations under D.Lgs. 152/2006 (water chapter) may be necessary. National synergies are strong between EU-derived water and flood law, the Nature Restoration agenda, the Urban Wastewater recast, Law 10/2013 on urban green areas and the National Forest Strategy, all of which collectively validate NBS and open funding channels (notably PNRR and cohesion policy). Guidance gaps remain at this level for standardised SuDS design/acceptance criteria, O&M norms and integrated KPI frameworks; in practice, project teams should table a concise, project-specific evidence pack (design criteria, monitoring, maintenance) for agreement with competent authorities.

Regional level (Veneto / Po River District)

At the regional scale, institutions translate the national mandate into operational rules for water, landscape and spatial planning. The Po River District Authority sets basin objectives and measures; for anything that touches a water body or floodplain in Veneto (including Padova), the decisive operational actors are the regional Genio Civile and the Consorzi di Bonifica (e.g., Consorzio di Bonifica Bacchiglione), which issue hydraulic/water-law permits for works that alter channels, banks or floodplains (new wetlands, reconnections, in-channel structures, removal of embankments, outfalls) and, where relevant, concessions on the public water domain. The regional environmental agency ARPAV provides monitoring and technical opinions that often shape permit conditions. In protected areas or Natura 2000 sites, the regional/park authority and the competent Natura office decide screening and appropriate assessment; where regional parks are involved (e.g., Parco Regionale dei Colli Euganei), the park's authorization "nulla osta" is a hard gate prior to works. Regional flood-risk zoning (PGRA/PAI) and the Regional Territorial Plan orient green-blue corridors and de-sealing and should be explicitly referenced in applications. Typical regional-level tensions arise between routine hydraulic safety maintenance (vegetation clearance, bank regularisation) and renaturation goals; between flood-risk zoning and legacy spatial planning that has

encroached on floodable land; and between inherited urban technical standards (road cross-sections, kerb heights, impermeable surface assumptions) and the permeability and surface-water storage NBS require. These tensions are best managed by co-designing maintenance regimes (selective/mosaic management), establishing special planning overlays that reserve floodplain space for retention, and obtaining written acceptance from road managers/utilities for permeable pavements, swales, alternative cross-falls and tree-root corridors. Where landscape constraints under D.Lgs. 42/2004 apply, early "Landscape authorization" Autorizzazione Paesaggistica with a landscape architect on the team prevents late redesigns. Finally, procurement frameworks should allow performance-based specifications and adaptive-management clauses so living systems are not forced into rigid, one-off public-works models.

Local level (Province/City of Padova)

At local level, municipalities (Comune di Padova and neighbouring communes) and the Province of Padova control spatial planning, public-realm works, utilities interfaces and local ordinances, and water-service governance structures (e.g., Consigli di Bacino/ATO) may issue opinions on network interfaces and discharges. This is where urban NBS—SuDS in streets and squares, pocket wetlands, green roofs/walls, riparian buffers—are designed, permitted and maintained. Consents follow the institutional chain: urban SuDS typically require road-manager consent, utility-owner clearances, and either a building permit (permesso di costruire) or a works notification (SCIA/CILA) through the municipal one-stop building desk (SUE); works inside parks or regional reserves add a park authorization "nulla osta". If excavations are substantial, the Soprintendenza may require archaelogical investigations "preventive archaeology". Slope or woodland bioengineering can require a hydrogeological permit and consents from State Forest authorities or forestry offices "vincolo idrogeologico permit and State Forests/forestry consents". In or near Natura 2000 sites, VIncA is mandatory; if the site also lies under a landscape vincolo, an landscape authorization "Autorizzazione Paesaggistica" is required and frequently conditions materials, earthworks profiles and vegetation. The primary local contradictions to anticipate are: the clash between street design standards and SuDS geometry/permeability; the need for space where legacy urban form is tight; and the mismatch between public-works procurement (fixed outputs) and living systems (adaptive performance). These are resolved by preparing site-specific cross-sections accepted by the road manager and utilities at concept stage, using special area plans or implementation plans to reserve space for retention and floodplain reconnection, and embedding O&M responsibilities and monitoring KPIs in the permit set so the owning authority recognises the assets and funds their upkeep.

Final note. In Veneto and Padova, NBS are fully compatible with the legal landscape and—in many cases—explicitly encouraged by planning and water-risk instruments. Success depends on bringing the right institutions to the table early (Genio Civile, Consorzio di Bonifica, ARPAV, Soprintendenza, Po District Authority, Park/Natura offices, municipal engineering and green-space departments), sequencing consents so that landscape/Natura conditions inform hydraulic permits rather than collide with them, and filling guidance gaps with a concise, shared set of design criteria, O&M routines and monitoring KPIs. Do that, and you convert supportive policy into buildable, maintainable NBS that withstand technical scrutiny and deliver the risk-reduction, ecological and urban-climate outcomes your consortium is aiming for.

5.3. Slovenia

National level

Slovenia's national framework gives Nature-Based Solutions (NBS) a clear mandate and an increasingly practical route to approval. The Long-Term Climate Strategy to 2050 (ReDPS50) commits to climate neutrality and couples mitigation with adaptation, biodiversity protection and resilient water/land management; the Integrated National Energy and Climate Plan (NECP) translates near-term targets to 2030; and the Spatial Development Strategy 2050 (ReSPR50)directs planners to adopt water-compatible, morphology-sensitive designs that minimise flood risk—language that fits NBS. The legal backbone is the Water Act (ZV-1), which requires that planning and interventions do not deteriorate water status, sustain natural processes and riparian ecosystems, and ensure protection against harmful water effects while enabling sustainable use. Two implementation tools convert this into practice: the General Guidelines for Water Management (Water Directorate, 2022), which instruct municipalities to reduce instantaneous runoff at source (retention, infiltration, grass swales, dry basins), and the Nature Conservation Guidelines for watercourse interventions in the Danube River Basin District (Government, 2023), which set expectations for riparian vegetation, natural-material bank protection, continuity, sediment handling and timing of works. After the 2023 floods, the ZORZFS law added a strong lever by requiring that—especially outside built-up areas—the possibility of using NBS be examined in water-infrastructure rehabilitation, provided they ensure at least equivalent flood-risk effectiveness.

Key institutions are the Ministry of the Environment, Climate and Energy (MOPE), housing the Water Directorate and the Directorate for Spatial Planning and Construction; ARSO (the environment agency) for hydrology, flood mapping and environmental oversight; and the Natural Resources and Spatial Planning Inspectorate for enforcement. For nature impacts and Natura 2000 decisions, the competent nature-conservation authority under MOPE leads screening and appropriate assessment. The Urban Planning Institute functions as a national methods/knowledge actor.

Consents follow from ZV-1 and spatial law. Expect water-management conditions and permits for any works that alter water relations (wetland creation or reconnection, bank reshaping, in-channel features, floodplain set-backs, controlled infiltration). ZUREP-3 governs spatial placement and the construction/works procedures; plans and programmes may trigger SEA (VAS), while projects in sensitive settings undergo EIA (VIA) screening and, where relevant, full EIA. In or near Natura 2000, screening and appropriate assessment are obligatory; timing and methods often follow the Danube-district Guidelines. None of these instruments are NBS-specific, but they generally favour NBS where impacts are lower and co-benefits are clear.

Synergies are strong: ReDPS50 + NECP + ReSPR50 set direction; ZV-1 + Water-Directorate Guidelines (2022) + Danube-district Guidelines (2023) translate direction into technical expectations; and ZORZFS (2023) adds a duty to consider NBS in post-flood works. Likely frictions include "effectiveness" tests that, if not well evidenced, can bias choices toward familiar grey options; traditional conveyance-oriented maintenance that conflicts with NBS roughness/habitat; uneven national standards for urban SuDS (sizing, draw-down, acceptance), O&M norms, and integrated KPIs; and

legacy zoning that limits space for floodplain reconnection. Areas of restriction include Natura 2000 sites and riparian protection strips, flood-hazard zones, and groundwater protection areas for infiltration—conditions that shape design and phasing rather than prohibitions.

Regional level (Podravje / Drava basin)

Regionally, the Podravje Regional Development Programme 2021–2027 (though not using the term "NBS") prioritises a low-carbon, greener region, green spaces and biodiversity—an enabling policy hook for catchment retention, river-corridor restoration and urban blue-green networks. The Regional Development Agency Podravje – Maribor is the programming counterpart and helps align projects with EU/national funding lines. Technically, Poljčane sits within the Drava (Danube) River Basin District, so the Danube-district Nature Conservation Guidelines (2023) and the Water-Directorate runoff-reduction Guidelines (2022) are directly applicable, alongside basin programmes of measures and regional flood-hazard maps prepared under ZV-1/WFD.

Most regional "permits" are issued by national bodies through regional units (Water Directorate, ARSO, Inspectorate), but early regional coordination is valuable. Convening a single scoping session to confirm permit needs, the order of decisions (e.g., Natura screening before water permits) and the shared evidence base (hydraulic model domain, design storms, ecological baselines, sediment budgets) prevents serial, stop-start reviews. The main tensions here are jurisdictional rather than legal: the same project may require opinions from Water Directorate, ARSO (hydrology/flood), nature-conservation services, the Inspectorate, and in some cases agrarian/forestry offices. Aligning a maintenance regime that satisfies both hydraulic safety and biodiversity (mosaic/seasonal clearance) addresses the common conflict between legacy drainage expectations and retention-first design.

Restrictions tighten where projects intersect mapped floodplains, Natura 2000 polygons or riparian strips. These do not bar NBS, but they do lengthen review unless timing and method statements reflect the Danube-district Guidelines (e.g., work windows outside fish spawning and bird nesting, natural-material bank protection, sediment protocols). Presenting paired metrics—peak-flow attenuation and no increase in residual risk—plus a feasible maintenance plan is decisive for acceptance.

Local level (Municipality of Poljčane – OPN Ordinance, 2020)

Locally, the Ordinance on the Municipal Spatial Plan (OPN) of Poljčane, 2020 determines where NBS can be sited, relevant land uses, and how public-realm works integrate with roads and utilities. Delivery is coordinated by municipal urban planners and line departments, supported by komunala (municipal utility) and landholders (notably farmers, where valley-bottom retention, riparian buffers and hedgerows require private parcels). The municipality implements national law through its procedures: location compliance with the OPN; building/works authorisations under ZUREP-3; and the collection of state-level clearances (water-management conditions/permits; Natura screening/assessment) before issuing local approvals.

For urban/peri-urban NBS—rain gardens, swales, permeable pavements, pocket wetlands, street trees—the municipality typically requires OPN conformity (or minor amendment), road-manager consent, utility-owner approvals, and stormwater design consistent with the runoff-reduction guidance (pre-treatment, storage, controlled release/infiltration). A concise maintenance plan should define who maintains what (komunala vs. parks vs. roads), how often, and with which biodiversity safeguards (mosaic mowing, no blanket clearance). For river-corridor or floodplain NBS—set-back berms, side-channel reconnection, riparian planting, lowland wet meadows—add water-management permits under ZV-1, Natura screening/appropriate assessment where relevant, and seasonal restrictions in line with the Danube-district Guidelines. Where agricultural land is converted to wet meadow or buffer strips, the municipality should help arrange easements/agreements/compensation.

The most frequent local contradictions are geometric and managerial. Existing street standards (kerb heights, turning radii, fixed cross-falls) and dense utility corridors can make SuDS appear awkward even when technically sound; producing agreed cross-sections at concept stage (permeable surfaces, alternative cross-falls to vegetated strips, tree-root corridors with utility offsets) avoids late redesign. A second tension is O&M realism: NBS approved as capital projects can underperform without assured maintenance budgets; approvals move faster when the O&M responsibility/cost matrix is explicit and aligned with komunala's routines. A third is data sufficiency: where floodplain space is scarce, site-scale hydraulic modelling and soil infiltration testing help demonstrate compliance with peak-attenuation and draw-down targets without raising residual risk.

To close local guidance gaps, attach project-specific acceptance criteria (design storms, storage depth, allowable discharge, maximum draw-down hours), a biodiversity-aware maintenance manual, and a brief monitoring plan with practical KPIs—storage (m^3), time-to-peak shift, infiltration/recharge estimates, suspended-solids/nutrient proxies, canopy gain and permeability, summer surface-temperature reduction. Areas of restriction that shape method and phasing include mapped flood-hazard zones, Natura 2000 sites/buffers, riparian protection strips, groundwater protection areas (for infiltration), and parcels with valuable topsoil or active drainage where historic maintenance regimes exist.

Operating note. Engage MOPE/Water Directorate, ARSO, the Inspectorate, the Regional Development Agency, and—locally—the Municipality of Poljčane, komunala and landholders at concept stage; confirm permits and sequence (Natura → water-management → local works); submit a compact evidence pack (hydraulic, ecological, water-quality, microclimate) with O&M and KPIs; and schedule works within the seasonal windows prescribed by the Danube-district Guidelines. This turns an enabling national framework into buildable, maintainable NBS that deliver flood/drought resilience, ecological gains and better urban–rural liveability.

5.4. Hungary

National level

Hungary's framework gives Nature-Based Solutions (NBS) a solid mandate, with water and spatial rules providing the operative pathway. Strategically, NKP5 (2022), NÉS2 (2015) and the Clean Development Strategy 2020–2050 (2021) set climate objectives; the 3rd National Biodiversity Strategy (2023) and National Landscape Strategy 2017–2026anchor habitat connectivity, invasive control and landscape-scale planning. The National Sustainable Development Framework (2018) supports cross-sector alignment. For water, the VGT3 River Basin Management Plan (2022–2027) and the ÁKK Flood Risk Plan (periodic) are decisive: they prioritise good status, natural retention, flood-risk prevention and drought resilience—core NBS outcomes. Forested/riparian measures align with the National Forest Strategy 2016–2030, soils with the Soil Protection Action Plan. In urban areas, two recent levers—the TÉKA basic planning/construction decree (2024) and Gov. Decree 282/2024 on municipal green infrastructure/green-space certificate/green label—can embed green infrastructure and SuDS expectations into settlement-level controls.

Institutions to engage. Policy leadership sits with the Ministry of Agriculture (nature, forests, soils, water), the Ministry of Construction & Transportation (planning/building; TÉKA), the Ministry of Energy (climate/NECP), and the Ministry of Public Administration & Regional Development (territorial coordination). Permitting is delivered through County Government Offices (environment, construction, nature units) and the territorial water directorates—here the Middle Tisza Valley Water Authority (KÖTIVIZIG).

Core consents. NBS that touch waters/floodplains typically require a water rights licence (planning + implementation phases) from KÖTIVIZIG, with hydraulic calculations and flood-risk compatibility. Depending on scale/sensitivity, obtain environmental impact screening/permit from the County Government Office and nature-conservation consent/assessment for Natura 2000/ protected sites (often with timing/method conditions). Built elements and significant earthworks need construction/works permits; works in road corridors need road-manager and utility-ownerapprovals. Forestry or soil actions may trigger forest authority notifications and soil-protection decisions.

Synergies. Strong alignment exists where NKP5/NÉS2/Clean Development (climate), Biodiversity/ Landscape(ecology) and VGT3/ÁKK (water/flood) intersect—supporting floodplain reconnection, riparian buffers, wetlands, drought storage and urban SuDS. The green-infrastructure decree and TÉKA help formalise urban GI/SuDS standards and certification.

Contradictions and gaps. Recurrent tensions arise between conveyance-focused maintenance (channel clearance, hardening) and morphology-based retention; between legacy agricultural drainage and rewetting/buffer strips; and between standard street cross-sections and SuDS geometry/permeability. Guidance remains uneven on SuDS sizing/acceptance, O&M norms and multi-benefit KPIs, and procurement often prefers rigid specifications over performance-based, adaptive maintenance suited to living systems.

Areas of restriction. Expect tighter scrutiny in Natura 2000/protected areas, flood-hazard zones, river protection strips, groundwater protection zones (for infiltration) and prime agricultural soils (for conversion). These shape design, siting and seasonality rather than block NBS outright.

Regional level (Jász-Nagykun-Szolnok County / Middle Tisza)

The county tier translates national aims into place-based priorities and coordinates approvals. The County Climate Strategy and the Territorial Development Concept & Programme (2021–2027) support risk reduction, water efficiency, green infrastructure and ecological connectivity, providing a programming hook and funding alignment for NBS portfolios. The Jász-Nagykun-Szolnok Government Office consolidates environmental, construction and nature functions; the Middle Tisza Valley Water Authority (KÖTIVIZIG) licenses water works and manages floodplains; the County Administration coordinates development instruments.

Consents and sequencing. Regionally, most formal decisions are issued by national-law authorities operating at county/territorial scale. Good practice is to convene a joint scoping with KÖTIVIZIG and the Government Office (environment, construction, nature) to confirm permits required; order of decisions (e.g., Natura screening informing water rights); and the evidence base (hydraulic model domain, design events, groundwater/infiltration tests, ecological baselines). Where county roads or regional utilities are affected, secure asset-owner approvals early.

Synergies and frictions. ÁKK hazard maps and VGT3 measures reinforce natural retention and flood prevention; county climate goals favour cooling corridors, tree canopy, de-sealing. Frictions emerge where flood-safety routines demand rapid conveyance/vegetation clearance, or where agricultural drainage conflicts with seasonal inundation. These are resolved by demonstrating paired performance—no increase in residual risk and measurable peak-attenuation/storage—plus mosaic/seasonal maintenance compatible with biodiversity.

Restrictions. The Tisza/Zagyva sub-basins have extensive floodplains; designs must respect hazard zones, levee set-backs and operational corridors. In Natura polygons, expect work-window constraints (nesting/spawning) and natural material/method requirements.

Local level (Municipality of Jászberény)

Local planning instruments provide the levers for siting and integrating NBS:

- **TFK – Településfejlesztési koncepció (2015):** long-term vision; policy anchor for resilience and green-blue networks.
- **ITS – Integrált településfejlesztési stratégia (2022):** medium-term projects; embed NBS in streets, parks and redevelopment packages.
- **HÉSZ (2017):** binding local building rules; codify **permeability ratios, drainage corridors, tree-pit/soil volumes, set-backs**; amend if needed to reflect **TÉKA** and the **green-infrastructure decree**.
- **ITVT – Integrált települési vízgazdálkodási terv (2022):** technical reference for **stormwater, infiltration, storage and controlled release**.

- **Települési vízkárelhárítási és vízminőség-védelmi terv (2020):** emergency/flood and water-quality protection—align NBS to demonstrate **damage avoidance**.
- **TKP – Települési Környezetvédelmi Program (2022):** settlement-level environmental objectives (canopy, de-sealing, habitat links).

Local institutions to involve. Municipality (urban planning, public works/roads, green management); JVV Zrt.(utility/water services); Eszterházy Károly Catholic University – Jászberény Campus (monitoring/education); neighbourhood associations and landowners (for easements/access); local branches of national authorities via the **County Government Office**.

Consents and typical packages.

- Local conformity: show alignment with TFK/ITS/HÉSZ/ITVT/TKP; prepare HÉSZ adjustments where permeability/sections need updating (supported by TÉKA and GI decree).
- Road/utility approvals: cross-sections for permeable pavements, swales, tree-root corridors, utility offsets and overflow routes; road-manager and utility sign-offs.
- Water rights licence: for outfalls, infiltration galleries, wetlands, reconnections, floodplain set-backs—issued by KÖTIVIZIG.
- Environmental/nature: EIA screening as required; Natura 2000 assessment where applicable; work-window/method conditions.
- Construction permit/notification: for structures/earthworks via the Government Office.
- Forestry/soil: if riparian planting, reforestation or soil works are involved.

Where rules pull apart—and how to reconcile.

- Street standards vs. SuDS geometry: secure bespoke agreed sections (kerb heights, cross-falls to vegetated strips, inlet/outlet details) and reference TÉKA/HÉSZ.
- Conveyance maintenance vs. habitat/roughness: embed mosaic/seasonal regimes and reference them in licence conditions.
- Agricultural drainage vs. rewetting/buffers: combine seasonal inundation with farm access and soil-protection; use easements/compensation backed by the Soil Action Plan.
- Procurement rigidity vs. adaptive systems: specify performance targets (storage m^3, time-to-peak shift, draw-down hours, TSS/nutrient removal) and adaptive O&M, not only fixed items.

Guidance still thin locally. Standard SuDS sizing/acceptance, O&M norms and multi-benefit KPIs are not yet harmonised. Attach a concise project evidence pack: design storms and storage targets; infiltration/groundwater checks; pre-treatment and water-quality logic; biodiversity-aware O&M; and a monitoring plan with practical KPIs (storage, time-to-peak, infiltration/recharge estimate, TSS/nutrient proxies, canopy/permeability, surface-temperature reduction).

Areas of restriction. Closer scrutiny in ÁKK flood-hazard zones, Natura 2000/protected areas, river protection strips, groundwater protection zones (infiltration), and utility corridors; these shape method, siting and seasonality.

Operating note. Start with a joint scoping (KÖTIVIZIG + County Government Office) to confirm permits and sequence (Natura → water rights → construction/road). Submit a 2–3 page plan-consistency memo (national ↔ county ↔ local). Attach a compact evidence pack and O&M/monitoring plan with performance KPIs. Where conflicts appear, obtain written acceptances (and HÉSZ updates if necessary) supported by TÉKA and the green-infrastructure decree. This enables Jászberény to lawfully and efficiently deliver NBS that reduce flood/heat risks, improve ecological status and public amenity, and meet national climate-biodiversity commitments.

5.5. Czech Republic

National level

The national spine for NBS combines climate, biodiversity, circular economy and innovation. The Climate Change Adaptation Strategy (Gov. Res. 785/2021) frames risks (drought, floods/flash floods, cloudbursts, heat, wind, fires) and promotes measures that reduce vulnerability of people and ecosystems. The Biodiversity Protection Strategy 2016–2025underpins habitat quality, connectivity and invasive control—key for catchment restoration, riparian buffers and wetlands. The Circular Economy Framework 2040 supports de-sealing, soil/biomass reuse and water efficiency, complementing urban NBS. The RIS3 Strategy 2021–2027 enables piloting and co-funding with city–university–industry partnerships.

Institutions to involve. Ministry of the Environment (MŽP) (adaptation, biodiversity, circular), Ministry of Regional Development (MMR) (territorial instruments, EU funds), Ministry of Industry & Trade (MPO) (RIS3). On the ground: water authorities/basin administrators for river/floodplain works; nature authorities (AOPK ČR/regional nature units) for protected areas; Regional Sanitary Station and Fire Rescue where public health/safety interfaces exist.

Core consents

- **Water-management permits** for works in/near watercourses, wetlands, outfalls, infiltration, floodplain reconnections (with flood-risk compatibility).
- **Nature-conservation screening/consent** (Natura 2000/protected species; method and timing conditions).
- **EIA screening** (and SEA for plans) where scale/sensitivity triggers apply.
- **Building/works permits** plus **road-manager/utility approvals** for right-of-way SuDS.

Synergies vs. conflicts. Adaptation + Biodiversity + Circular agendas reinforce natural retention, floodplain reconnection, riparian restoration and urban SuDS; RIS3 adds innovation finance. Frictions: conveyance-oriented maintenance vs. morphology-based NBS; legacy zoning/land take vs. space for floodplains; urban standards (kerbs, cross-falls, utility corridors) vs. SuDS geometry/permeability; procurement favouring fixed specs over performance-based, adaptive O&M.

Guidance gaps. Nationally uniform SuDS sizing/acceptance, biodiversity-aware O&M, and integrated KPIs (hydraulic, water quality, ecology, microclimate, social use) are uneven. Submit a concise evidence pack (hydraulic model, soil/infiltration tests, habitat baseline, monitoring plan) and agree it early with MŽP's regional arms and water authorities.

Areas of restriction. Natura 2000 sites/buffers, flood-hazard zones, riparian protection strips, groundwater protection zones, and critical infrastructure **corridors**—they shape method, timing and documentation rather than prohibit NBS.

Regional level (South Bohemia Region / JAIP / interface with City)

The region translates national aims into spatial rules and programmes. The Principles of Spatial Development set corridors/limits (flood-risk areas, ecological networks, green-blue axes). The Development Programme 2021–2027provides funding hooks for resilience, water efficiency and urban quality. The Adaptation Strategy of South Bohemia 2024–2034 prioritises heat mitigation, stormwater retention, flood and drought resilience, encouraging natural water retention measures.

Institutions to involve. South Bohemian Regional Authority (Urban Planning/Building, Environment/Nature, Water, Roads/Transport); JAIP and regional research bodies (Biology Centre CAS, Global Change Research Institute CAS, University of South Bohemia) for baselines/monitoring; Regional Sanitary Station, Fire Brigade, and network operators for early technical alignment.

Consents & sequencing. Typically: nature screening → water permits → building/road consents (SEA/EIA if triggered). For works in regional corridors, secure administrator approvals and construction windows (spawning/nesting; flood season). Cite Principles of Spatial Development and the Regional Adaptation Strategy for plan consistency.

Synergies vs. frictions. Regional adaptation and development programmes support floodplain reconnection, wetlands, urban SuDS, canopy expansion. Frictions: standard road cross-sections vs. permeable/vegetated sections; river maintenance regimes vs. roughness/habitat. Resolve with paired performance metrics (no increase in residual risk + peak-attenuation/storage gains), mosaic/seasonal maintenance, and agreed cross-sections with road/utility owners.

Restrictions. Regional set-backs from watercourses, ecological network safeguards and landscape protection condition materials/profiles/vegetation—early design response typically favours NBS.

Local level (City of České Budějovice)

Delivery is governed by the Zoning Plan (new master plan in preparation), the Local Adaptation Strategy (2022), the Strategic Plan (2018) and "České Budějovice 21 Smart Green City". Together they justify SuDS networks, de-sealing, canopy growth, riparian buffers and park water features as mainstream infrastructure and provide the policy base for funding and approvals.

Institutions to involve. City Urban Planning, Building Authority, Environmental/Nature, Roads/Transport, Greenery/Parks, ČEVAK (water/utility), plus E.GD (gas), electricity DSO and telecoms for corridor agreements; Regional Sanitary Station and Fire Brigade on health/safety.

Consents & typical packages

- Plan conformity: siting within the Zoning Plan (or minor adjustment); reference Local Adaptation & Strategic Plans.

- Water permits: outfalls, infiltration, wetlands, bank/floodplain works (with hydraulic calculations; no adverse flood-risk effects).
- Nature consents: Natura/protected-species screening; timing/method agreements (natural materials, sediment protocols).
- Building/road/utility approvals: cross-sections for permeable pavements, swales, tree-root corridors, overflow routes; right-of-way and utility offsets.
- Health & safety: Sanitary Station opinion for open-water/wetlands (mosquito, bathing/odour); Fire Brigade for access/egress.
- O&M/monitoring: clear responsibilities/frequencies, biodiversity-aware regimes; KPIs (storage m^3, time-to-peak, draw-down hours, TSS/nutrient proxies, canopy/permeability, surface-temperature reduction, habitat indicators).

Where rules pull apart - practical reconciliations

- Street standards vs. SuDS geometry: agree bespoke sections (kerb heights, alternative cross-falls, inlet/outlet details) at concept stage.
- Conveyance maintenance vs. habitat/roughness: codify selective/mosaic mowing and seasonal restrictions in permits and contracts.
- Land take vs. floodplain space: reserve space in the new master plan; treat NBS as risk-reduction infrastructure.
- Procurement rigidity: specify performance targets and adaptive management instead of only fixed outputs.

Guidance gaps. City-level SuDS sizing/acceptance, O&M manuals and multi-benefit KPIs are not fully harmonised; fill with a project-specific acceptance note agreed by Building/Environment and ČEVAK. During the master-plan transition, attach a short policy-consistency memo linking to the Local and Regional Adaptation Strategies.

Areas of restriction. Flood-hazard zones, Natura 2000 buffers, riparian strips, groundwater protection areas, utility corridors—affect siting, methods, seasonality and evidence, but do not preclude NBS.

Operating note. Engage MŽP/MMR/MPO for policy/funding; regionally the South Bohemian Authority and research partners; locally the city's planning/environment/roads/greenery/utilities teams and operators. Sequence approvals (nature → water → building/road), ground applications in plan consistency, and attach a compact evidence pack plus O&M/monitoring with agreed KPIs. Where regulations conflict (conveyance vs. retention; street norms vs. SuDS), secure written departures tied to performance targets. This enables České Budějovice to lawfully and efficiently deliver NBS that reduce flood/heat risks, improve water quality and biodiversity, and enhance urban liveability.

6. Summary

Nature-based solutions (NBS) have moved from pilot ideas to a central pillar of European climate, water, and biodiversity policy. This report assembled the European legal architecture and examined five regional/national contexts (Poland, Italy, Slovenia, Hungary, Czech Republic) to show how NBS can lawfully deliver flood and drought resilience, water-quality gains, biodiversity recovery, urban cooling, and social co-benefits. The overarching message is straightforward: NBS are now a mainstream expectation, but turning that expectation into buildable, permittable and maintainable projects requires clear understanding of legal acts and their interrelationships, early coordination across institutions, and practical guidance that treats living systems with the same operational seriousness as grey infrastructure. Further work—both at EU committee level (to standardise definitions, methods and monitoring) and at national level (to align sectoral statutes, permits and standards)—is essential to sustain momentum. In Poland in particular, there is no statutory definition of NBS, which complicates acceptance and procurement.

The report therefore stresses, it is vital not to confuse "green and blue infrastructure" (BGI) with NBS. BGI refers to networks and elements (parks, swales, permeable streets); NBS is broader term — it is action using living systems as the primary mechanism to address societal challenges and must deliver measurable biodiversity benefits alongside other outcomes. Many BGI elements can be NBS, but only when designed, permitted and maintained for hydrologic, ecological and social performance—not merely for amenity.

What the legal architecture enables—and how it fits together

At EU level, the Water Framework Directive (WFD) and Floods Directive establish the basin-scale planning cycles and risk logic where catchment NBS (floodplain reconnection, side-channel revival, natural retention, riparian buffers) are the default measures. The Habitats and Birds Directives (Natura 2000) set hard biodiversity safeguards that distinguish credible NBS from purely "green" aesthetics. NBS must pass appropriate assessment and, done well, help achieve site conservation objectives. The Nature Restoration Regulation turns ambition into binding, time-bound restoration targets across rivers, wetlands/peatlands, forests, agro-ecosystems and cities, making NBS a compliance pathway rather than a nice-to-have. The Adaptation Strategy, Biodiversity Strategy 2030, Soil Strategy 2030 and Zero Pollutionframework give strategic cover and metrics, while sectoral acts (e.g., Urban Wastewater recast) promote blue-green source control and energy-neutral water services in cities. Macro-regional strategies (e.g., EUSBSR in the Baltic) knit cross-border funding and priorities—useful for the Polish coastal and lagoon contexts highlighted in the report.

Across Member States and the five model regions, the institutional map is consistent: basin authorities and water administrations license works affecting rivers and floodplains; environmental/nature bodies screen/assess Natura 2000 and protected areas; regional parks or cultural-landscape guardians issue landscape permissions; municipalities and road/utilities owners gatekeep street-level SuDS; and public-health or sanitary services weigh in where open water intersects amenity. Where teams approached these actors early with a shared evidence pack (hydraulic modelling, soil/infiltration tests, habitat baselines, KPIs, O&M regime), approvals accelerated and late redesigns were avoided.

Key cross-cutting findings from the five regions

Synergies are strong. Flood/drought risk planning dovetails with WFD hydromorphology and biodiversity goals. Agricultural eco-schemes and soil policy support riparian strips, hedgerows, wetlands and rewetting. Urban adaptation strategies legitimise de-sealing and SuDS networks. **Bottlenecks are recurring**. Legacy "clear-and-convey" maintenance can strip habitat and roughness that NBS need. Street standards and utility corridors can make SuDS geometry hard to approve. Procurement and liability regimes are tuned to fixed outputs, not adaptive living systems. **Guidance gaps** remain on standard SuDS sizing/acceptance, biodiversity-aware O&M, and integrated KPIs that track hydraulic, water-quality, biodiversity, heat-mitigation and social use. The report documents practical reconciliations—selective/mosaic maintenance, special planning overlays that reserve floodplain space, agreed street cross-sections, and performance-based contracts.

The Polish context—definitions and distinctions

Poland's strategic spine (PEP2030, SPA2020, drought and basin plans) enables NBS, and institutions such as Wody Polskie (water-law permits) and GDOŚ/RDOŚ (Natura 2000) are decisive gatekeepers. Yet Polish law lacks a formal NBS definition, leaving practice to import EC/UNEA/IUCN language. This is workable, but it increases interpretive risk in permits and procurement. Operational experience from municipal utilities such as Gdańskie Wody highlights three essentials for city-scale success: (i) a retention-first, network approach (distributed SuDS connected to receiving waters with overflow routes); (ii) maintenance designed in from day one (seasonal, mosaic regimes; ownership and budget clarity); and (iii) public communication and co-creation (rain-garden programmes, parcel-scale retention incentives, and clear guidance for property owners). These practices turn strategy into day-to-day routines and are directly transferable to other cities in the report's model regions. (See Gdańskie Wody's publicly available materials and programmes as reference for governance, standards and engagement approaches.)

What needs to happen next (EU committees and national levels)

At EU committee level, a concise operational standard for NBS—aligned with the IUCN Global Standard—should codify design criteria (e.g., design storms, draw-down times), biodiversity and water-quality KPIs, monitoring protocols, and biodiversity-aware O&M (mosaic/seasonal maintenance), with annexed street cross-sections and acceptance templates for SuDS and wetlands. Implementing guidance under the wastewater recast and NECPs should count energy co-benefits (cooling-load reduction; avoided pumping/treatment energy; embodied carbon) to unlock additional funding lines without diluting biodiversity requirements.

At national level, authorities should:

- adopt or reference an NBS definition (Poland urgently), clarifying that BGI ≠ NBS unless living systems and biodiversity benefits are central;
- update street/utility standards to recognise permeable geometries, root corridors and vegetated conveyance;

- align maintenance codes so hydraulic safety and habitat are reconciled (selective, seasonal regimes);
- publish model procurement clauses for performance-based, adaptive contracts; and
- mandate compact evidence packs for NBS (hydraulic, ecological, water-quality, microclimate and social KPIs, plus O&M and monitoring).

Closing thought

NBS are not a fashion—they are the most scalable, multi-benefit route to meet Europe's legal duties on water status, flood risk, biodiversity, soil health and urban resilience. The law already provides many of the tools; the task now is to operationalise them consistently: define clearly (especially in Poland), plan at basin and city-network scales, coordinate consents early, and resource long-term maintenance and monitoring. Done this way, NBS will not only satisfy compliance—they will leave more resilient, biodiverse and liveable places for the next decades.

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