

A pre-feasibility study



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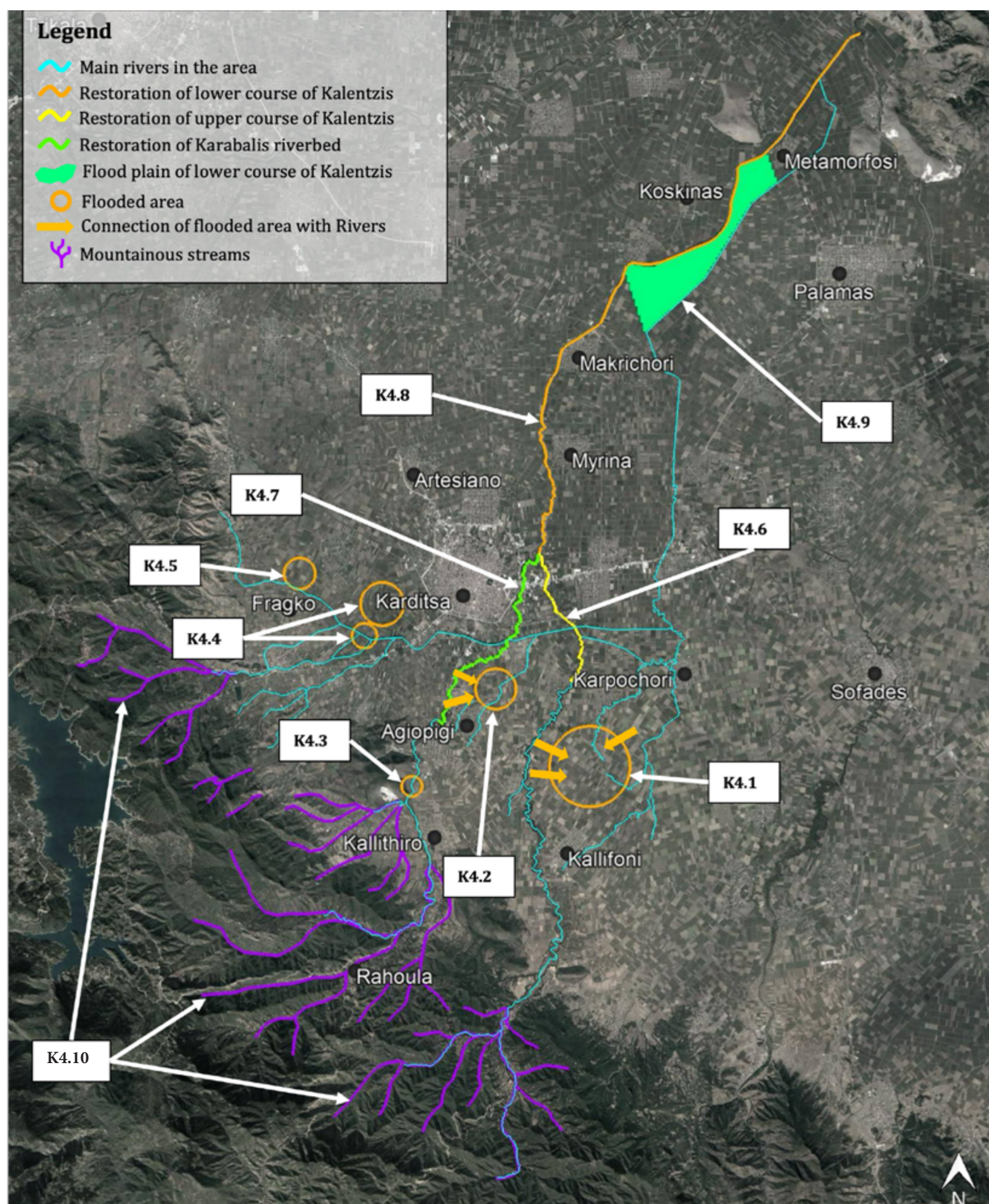


Figure 1. Proposed NBS for mitigating flood risk within the Kalentzis river basin

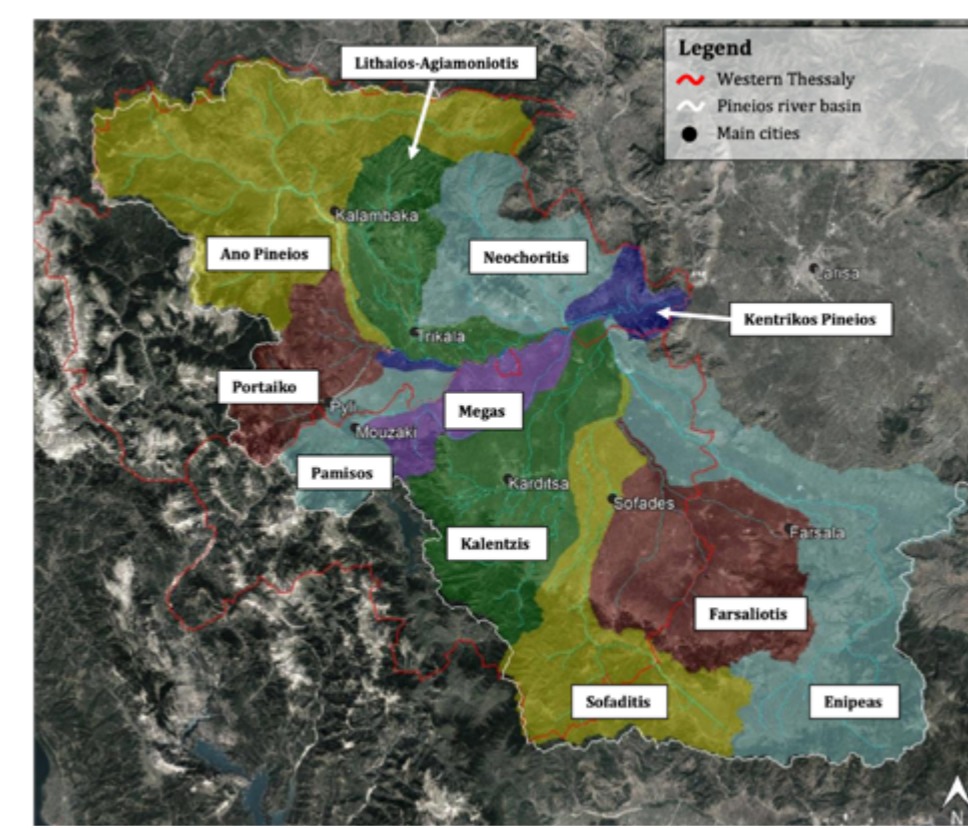


Figure 2. Sub-basins within the Pineios river basin

Context

In Thessaly, Greece, frequent and devastating flooding results in casualties and significant economic losses, which has led to a reconsideration of traditional infrastructure approaches to manage flood risk.

In cooperation with local stakeholders, a **pre-feasibility study** on the use of a range of Nature-based Solutions (NbS) for flood risk reduction, water quality and quantity improvements, and other co-benefit in the Western part of the region of Thessaly in Greece was conducted.

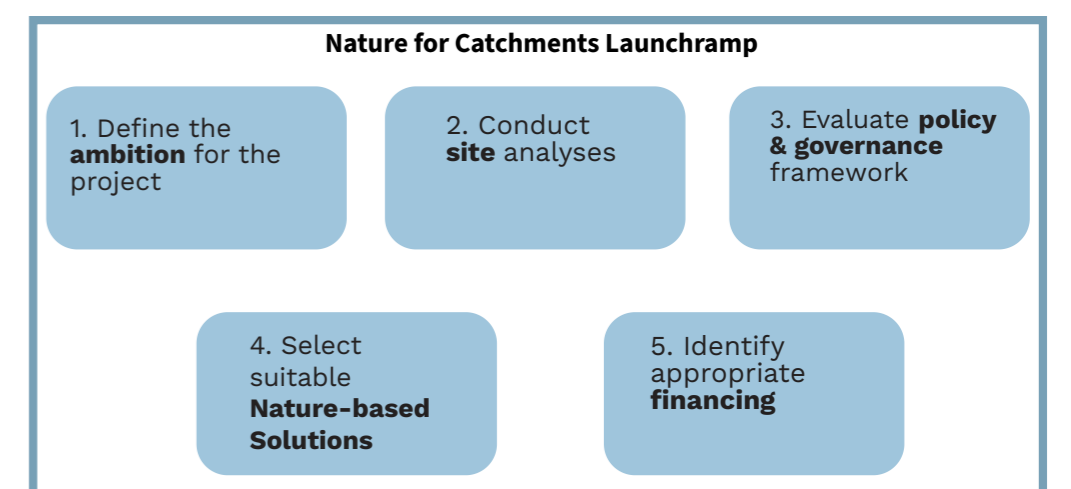
Here, the focus is on the **Kalentzis sub-basin**, where the main objective is to reduce flooding and protect Karditsa city and the villages in the lower course of the basin.

Method

The project team used the **Nature for Catchments Launchcamp**, a project preparation and financing methodology for NbS and adapted it to the local context.

The methodology follows a **five steps approach** to assess the feasibility of the NbS intervention.

To advance the pre-feasibility study, a biodiversity report and hydrological study were conducted for the Kalentzis river basin.



Main outcomes

- The study prompted the historic first integration of NbS into the latest revision of **Flood Risk Management Plans** in Greece.
- Local buy-in** was secured through interviews and the capacity-building workshops conducted in Trikala, Greece.
- Developed a common understanding of the **conditions and requirements** for implementing NbS.
- In-depth understanding of the particular **challenges** and set up for the **feasibility stage**.

NbS in depth

The project team identified a **portfolio of suitable NbS interventions** that have the capacity to generate the desired benefits (Table 1). Suitable locations were mapped and hydrological studies conducted to pinpoint where the interventions can maximize their effectiveness (Figure 1).

Areas	NbS Interventions	Expected magnitude of key services (benefits)				
		Flood risk reduction	Aquifer recharge	Surface water availability	Biodiversity	Recreation
K4.1-K4.5	Floodplain restoration & management	++	++	+		
	Basins, ponds and lakes					
K4.6-K4.8	River restoration					
	Re-meandering					
	Removal of dams and other longitudinal barriers	++	++	+	++	+
	Forest riparian buffers					
K4.9	Floodplain restoration and management	++	++			
K4.10	Restoration of natural infiltration	+	+		+	

Table 1. NbS Interventions for the Kalentzis river basin including key services

Social benefits

The proposed NbS interventions, including river restoration and re-meandering of the river, will first and foremost protect local residents from **insecurity, loss, and destruction** caused by potential future flooding.

Furthermore, the implementation of NbS in the selected sub-basin is expected to bring about additional social benefits for the local community, such as for example recreation in the form of **hiking trails along the river and birdwatching**.

The engagement of the local community through workshops ensures a common understanding and the identification of other benefits (Table 2).

Beneficiaries	Primary Benefit	Other benefits					Resourcing methods
	Flood risk reduction	Biodiversity	Surface water availability	Aquifer recharge	Water quality	Recreation	
Municipalities	✓		✓	✓	✓	✓	✓
Region of Thessaly	✓		✓	✓	✓	✓	✓
Decentralised Authority	✓		✓	✓	✓	✓	✓
Ministries	✓	✓	✓	✓	✓	✓	✓
Farmers	✓		✓	✓			
NGO's	✓	✓	✓	✓		✓	
SME's	✓		✓	✓		✓	
Development Banks	✓	✓	✓	✓		✓	✓
Insurance Companies	✓		✓	✓			✓

Table 2. List of stakeholders and expected associated other benefits of NbS

Environmental benefits

As part of the study, **biodiversity indicators** were selected and expected benefits were identified for the Kalentzis sub-basin:

Habitat extent: Increase of freshwater habitats and riparian forest habitats

Habitat fragmentation: Reduce fragmentation, increase connectivity to improved ecosystem functioning across the basin

Species abundance: Improve and expand space and resources to increase the number of individuals per taxa

Species richness: Increase number of species inhabiting the freshwater and their riparian forests

Species diversity: Changes in species richness, abundance & habitat extent will alter species diversity



<https://shorturl.at/mPAmf>

Hydrological benefits

The different NbS interventions selected show evidence of **high impact** on flood risk reduction and aquifer recharge, and a **medium impact** on surface water availability (Table 1). The hydrological study highlights the efficiency of the proposed NbS interventions in the Kalentzis sub-basin (land cover changes, altering river roughness). The peak discharge in the flood hydrograph is expected to be reduced by 28% after implementation of NbS, and the time to peak is expected to increase by one hour.

Biodiversity benefits

The proposed NbS interventions (i.e., river restoration, re-meandering, removal of dams and forest riparian buffers) show a high positive impact on biodiversity (Table 1) improving ecosystem functioning and resilience.

Economic benefits



The **expected economic benefits** are:

- Avoided economic losses and potential casualties
- Cost-effectiveness of NbS interventions with lower maintenance and rehabilitation costs

Further **technical and financial** studies are needed to estimate costs and benefits for the proposed measures.

