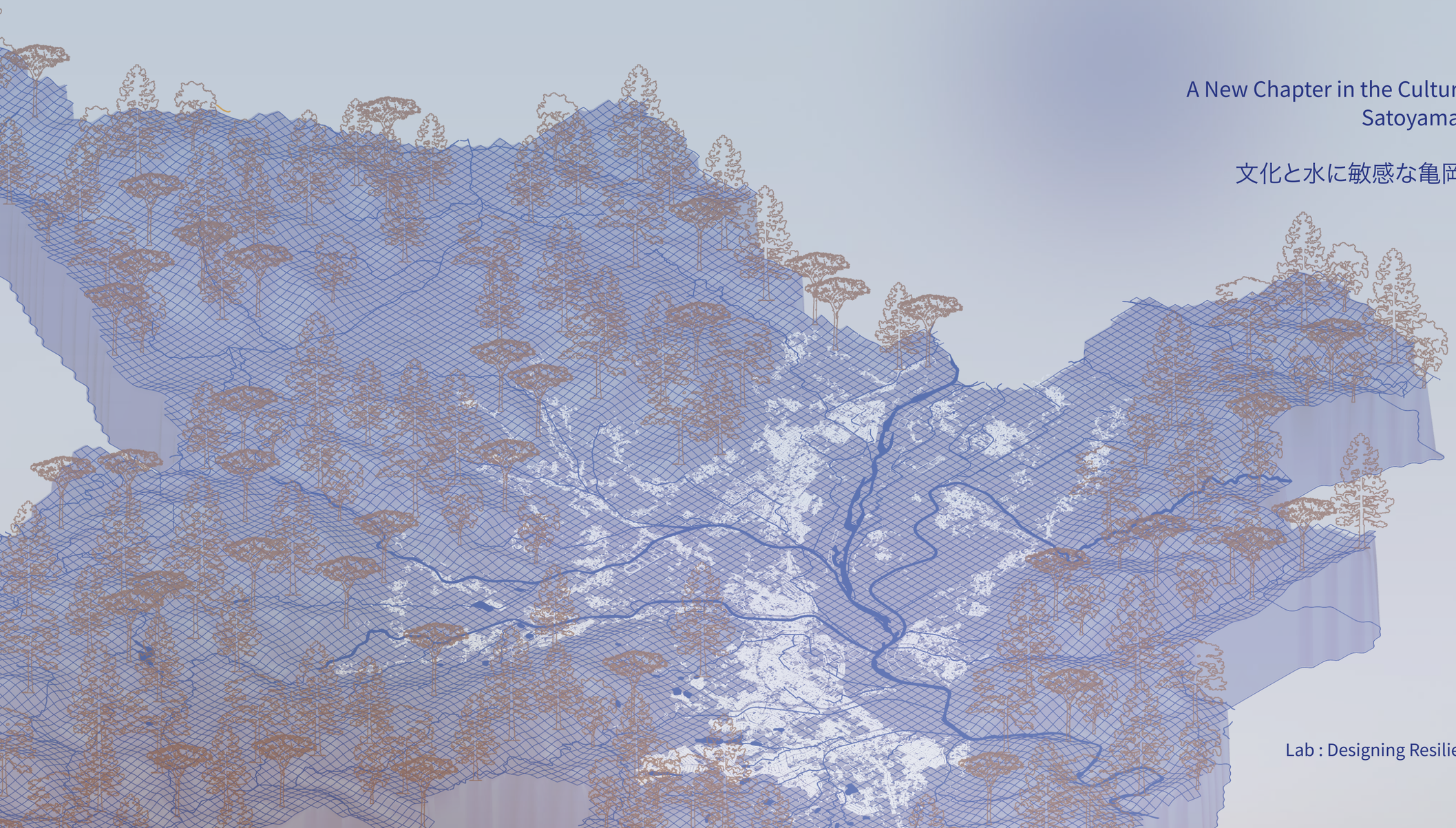
SATOYAMA 2.0.
里山 2.0.



A New Chapter in the Culturally and Water-Sensitive Satoyama Landscape of Kameoka

-

文化と水に敏感な亀岡の里山景観の新たな章

-

katerina pavlou

P5 Presentation
June 17th
Lab : Designing Resilient Coastal Landscapes (DRCL)

A

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Personal fascination & theoretical framework
Problem analysis
Context
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B

Design goals
Landscape strategies
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Strategic interfaces Design

Conclusion

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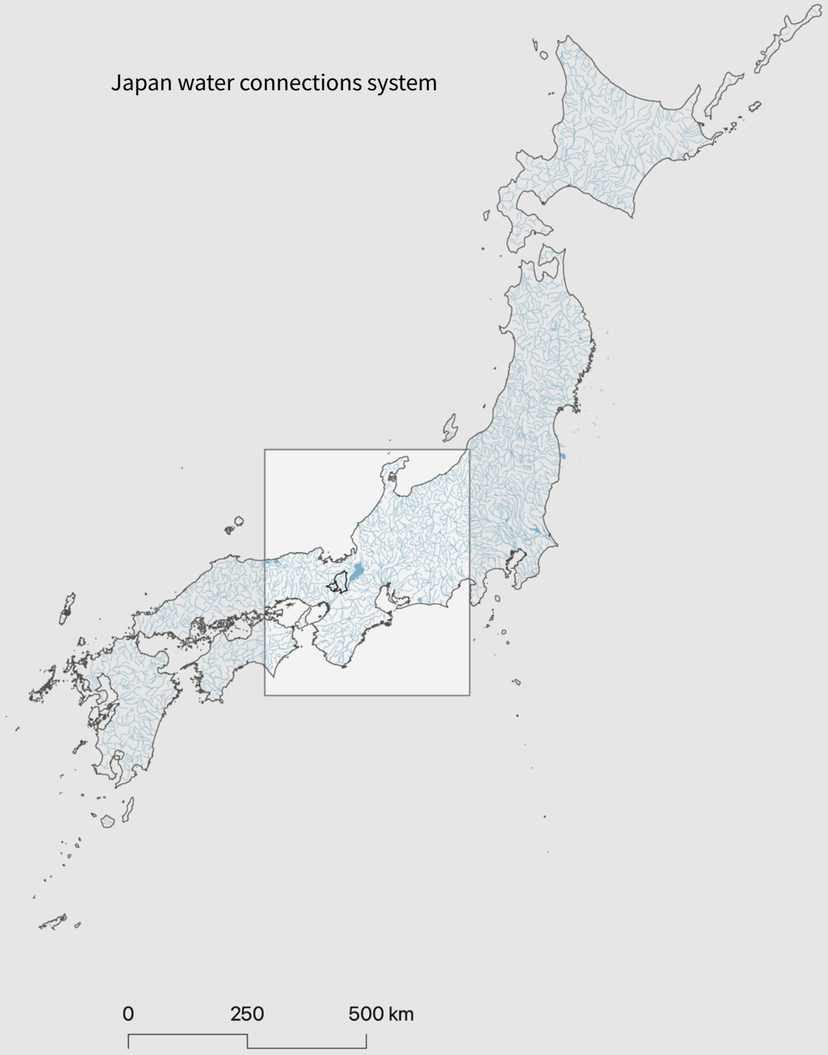
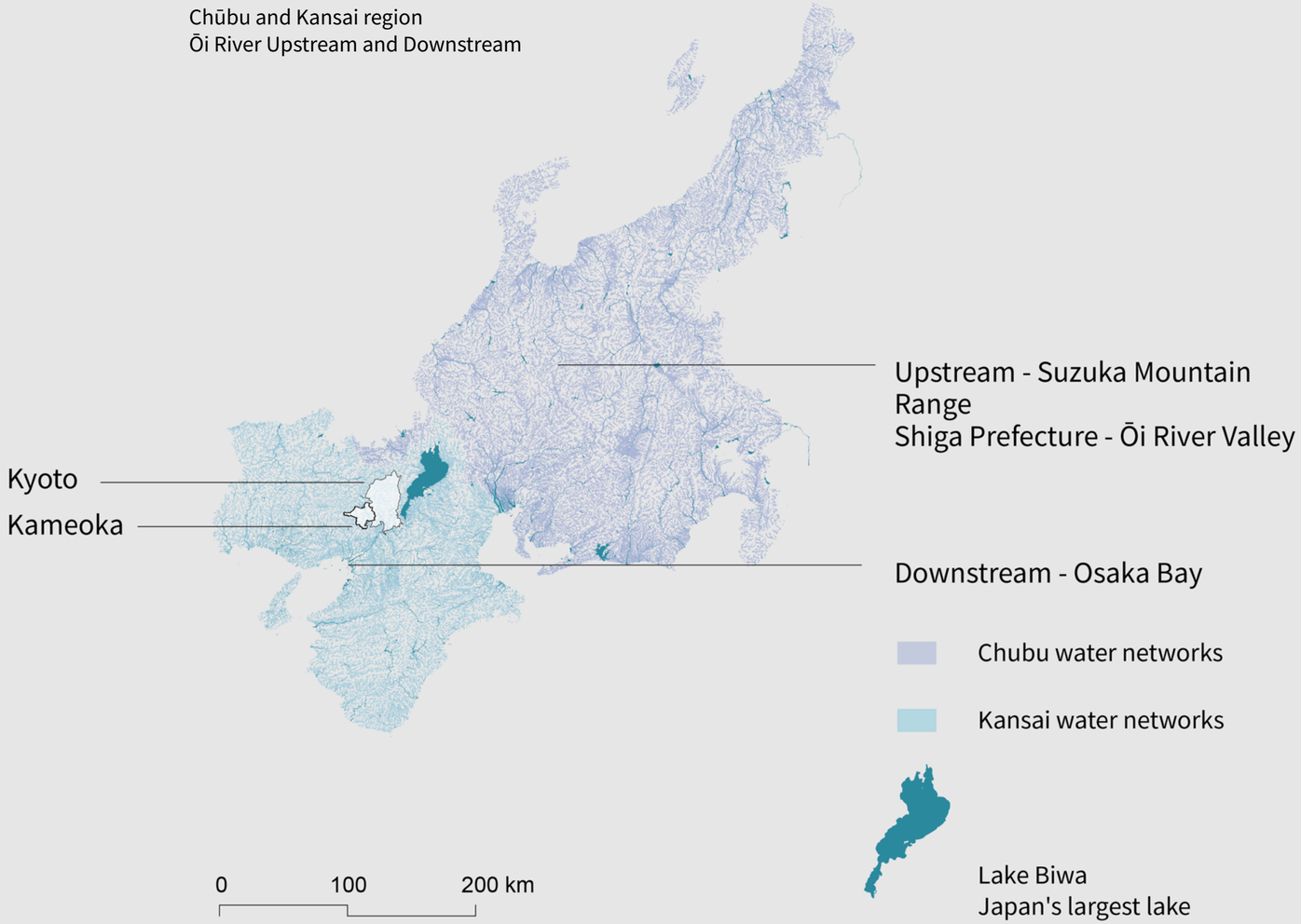
Project introduction

Upstream and downstream of the Basin

Japan water connections system



Chūbu and Kansai region
Ōi River Upstream and Downstream



Satoyama · 里山

里 - village

山 - mountain

Aerial photo of Kameoka.

Satoyama - the area between mountain foothills and arable flat land.
A mosaic of mixed forests, rice paddy fields, dry rice fields, grasslands, streams, ponds, and reservoirs for irrigation.

Satoyama landscape of Kameoka

Understanding the landscape typology

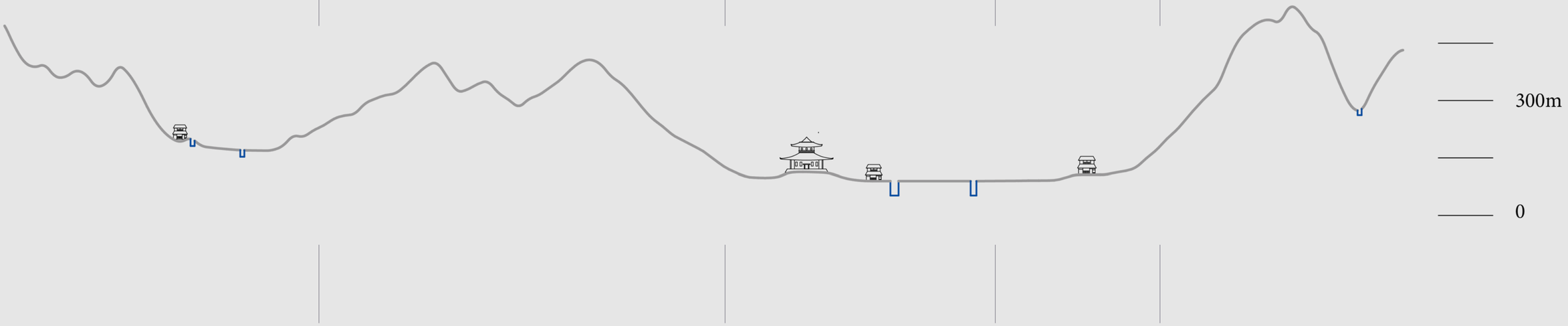
Village settlements near water tributary surrounded by mountains

Forests are limited to the mountains

Urban, agriculture, main river stream

Rice terraces hillsites

River tributary mountains



Posed problem

Complex Challenges: River Landscapes in Japan within the Anthropocene Epoch

floods
environmental
degradation
and cultural decline

–

result of human interventions and urbanisation

Nanatani River banks-soft edges are transformed into concrete hard edges.

https://japantoday.com/category/features/opinions/japan-is-paying-families-¥1-million-to-move-to-country-side-–-but-it-won’t-make-tokyo-any-smaller

Posed problem

Complex Challenges: River Landscapes in Japan within the Anthropocene Epoch

Earth’s geology
ecosystems
and river
environments

Sky News. (n.d.). Japan typhoon: Deaths and evacuations. Retrieved from https://news.sky.com/story/japan-typhoon-deaths-and-evacuations-10434185

Project introduction
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Personal fascination & theoretical foundations

Fascination- Motivation

Entropy is the measure of disorder, and it reveals the steady impact of time effects on landscapes. As we witness the unfolding of geological time, we are confronted with the profound interconnectedness of human activities and natural processes.

Our responsibility lies not only in preserving what remains but also in understanding our role within the broader narrative of Earth’s history.

An interpretation inspired by Robert Smithson’s ideas

. Considering the ethical dimensions of integrating entropy and geological time within the context of landscape management, design, and sustainability.

Landscape authenticity
Landscape - based approach

spatial quality and identity
looking at the landscape as an integrated whole:
a living system, history and spatial experience

Genius loci - the spirit of the place

The relationship between human and environment

Geologic time -Robert Smithson

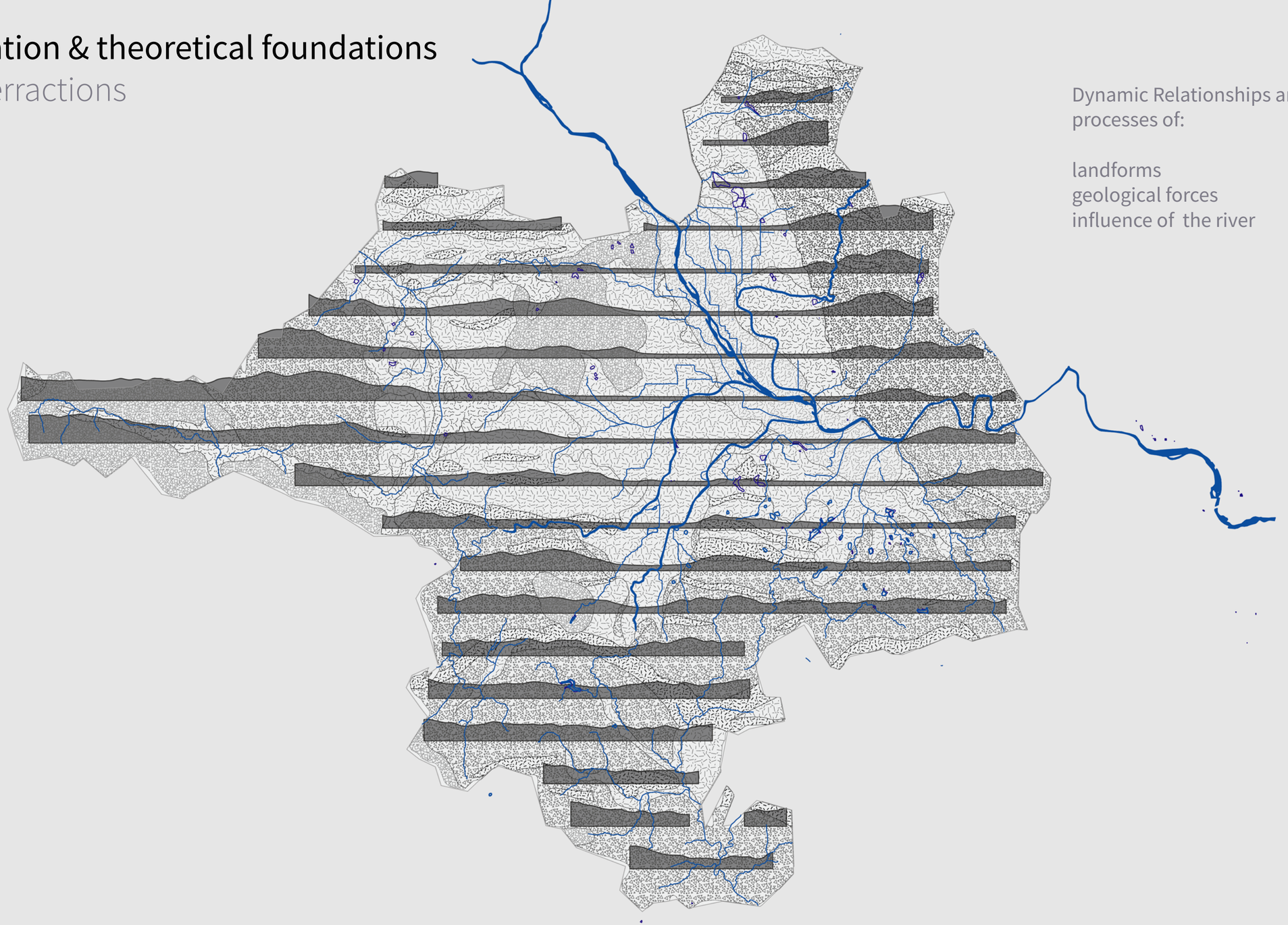
Explore the long-term of actions
The relationship between human actions and the natural world

Personal fascination & theoretical foundations

Geomorphic interractions

Dynamic Relationships and processes of:

landforms
geological forces
influence of the river



Project introduction
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Problem analysis

Problem focus

River landscapes in Japan, such us Kameoka and Oi River subsystem, face challenges including floods
ecosystem degradation,
water quality decline
and cultural loss
due to human activities, reflecting the impactful interventions of the Anthropocene epoch.

Problem analysis

Problem statement

There is an urgent need to develop comprehensive and sustainable strategies for river landscape management in regions like Kameoka and Oi River, addressing
ecological preservation
cultural revitalization
and flood mitigation
to protect the environment and cultural heritage
transitioning towards more sustainable practices

Problem analysis
Proposition

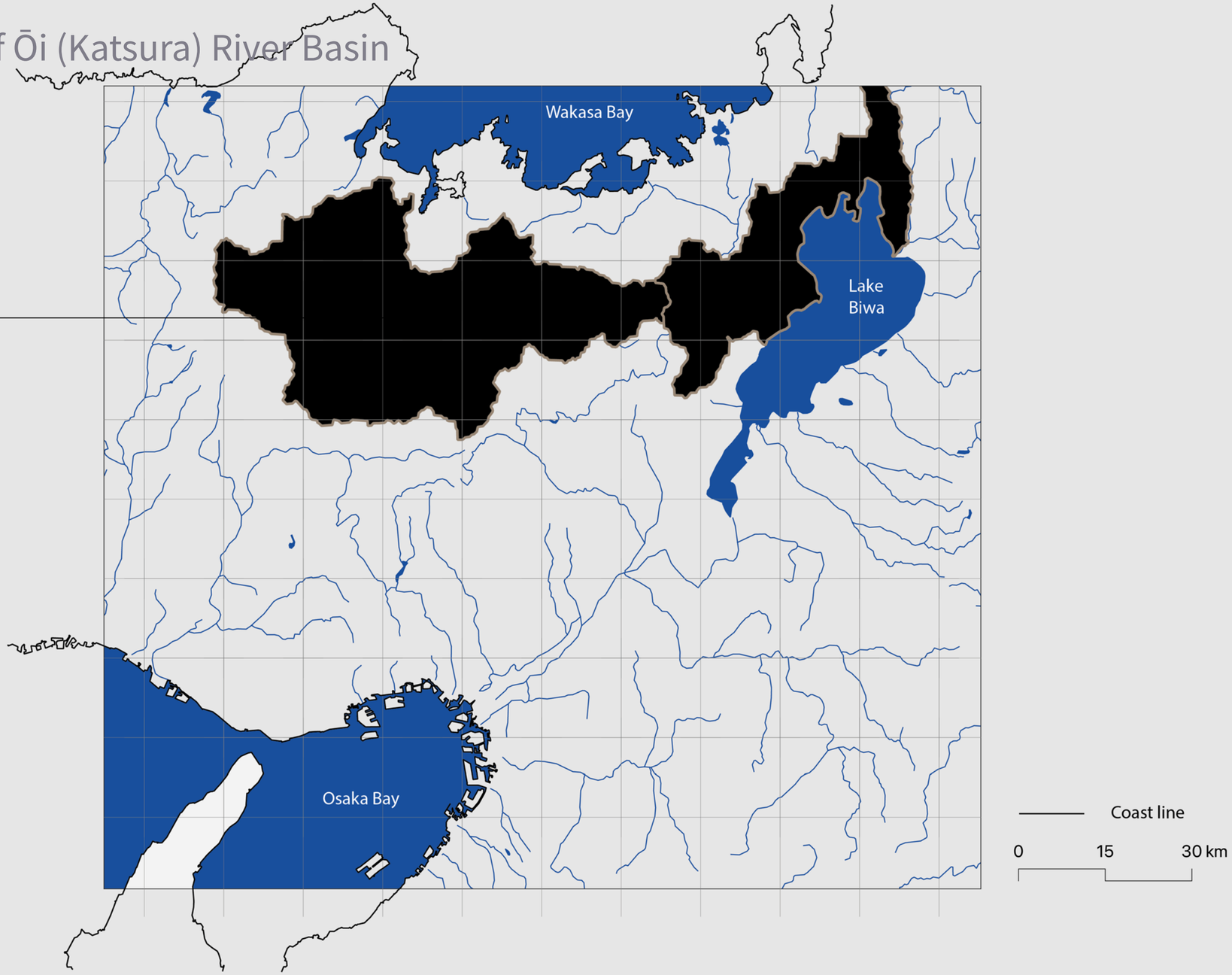
The project proposes an integrated approach within landscape architecture that establishes an inclusive framework for managing river landscapes, using Japan as a paradigm. Prioritizing sustainable principles and strategies, interventions will focus on understanding and respecting the diverse forms of existence both human and non-human.

Context

Hydrological Zones of Ōi (Katsura) River Basin

Upper Basin

High elevation
Steep gradient
Forested areas



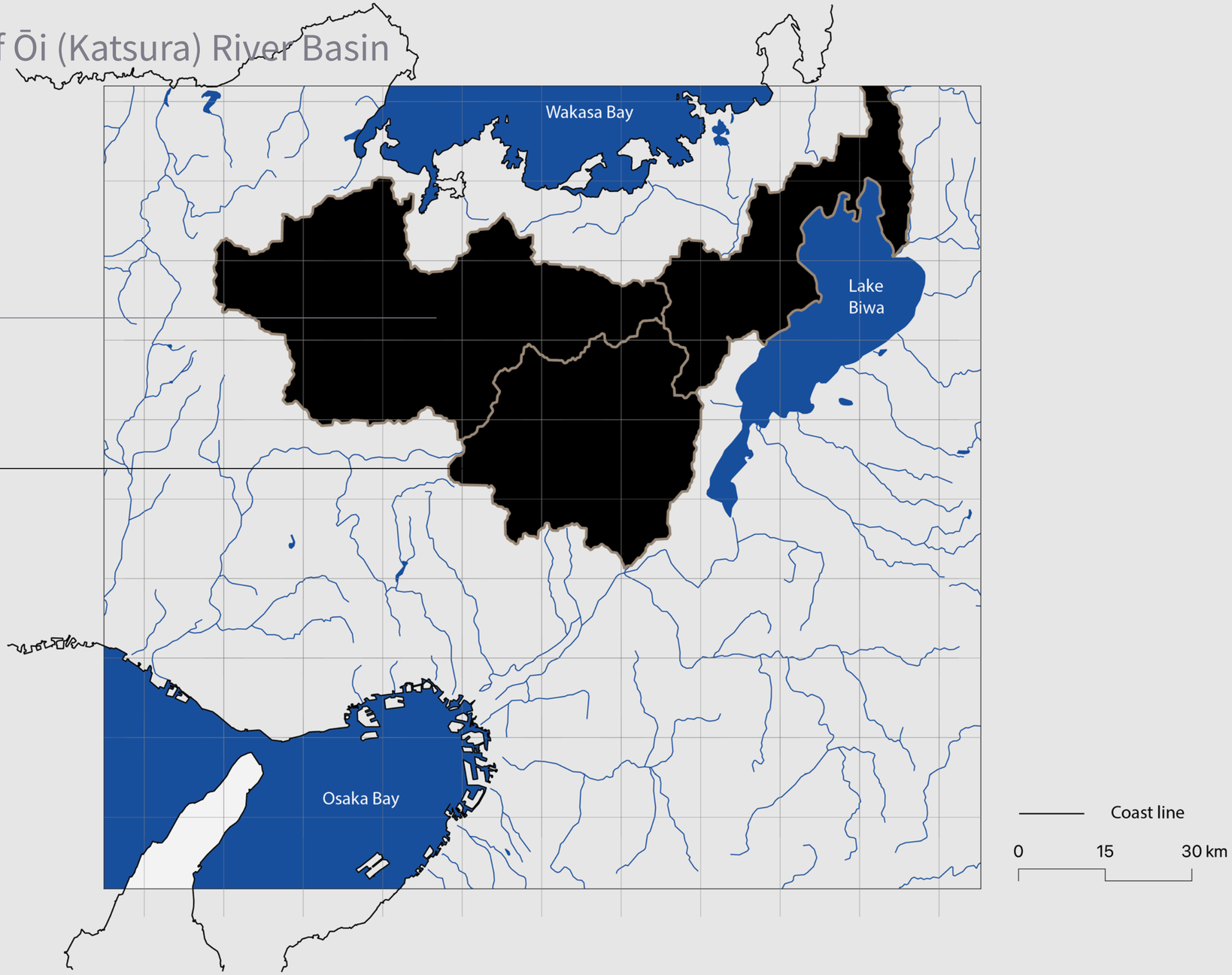
Context

Hydrological Zones of Ōi (Katsura) River Basin

Upper Basin

Middle Basin

Intermediate elevation
Wider channels
More human habitation and agriculture



Context

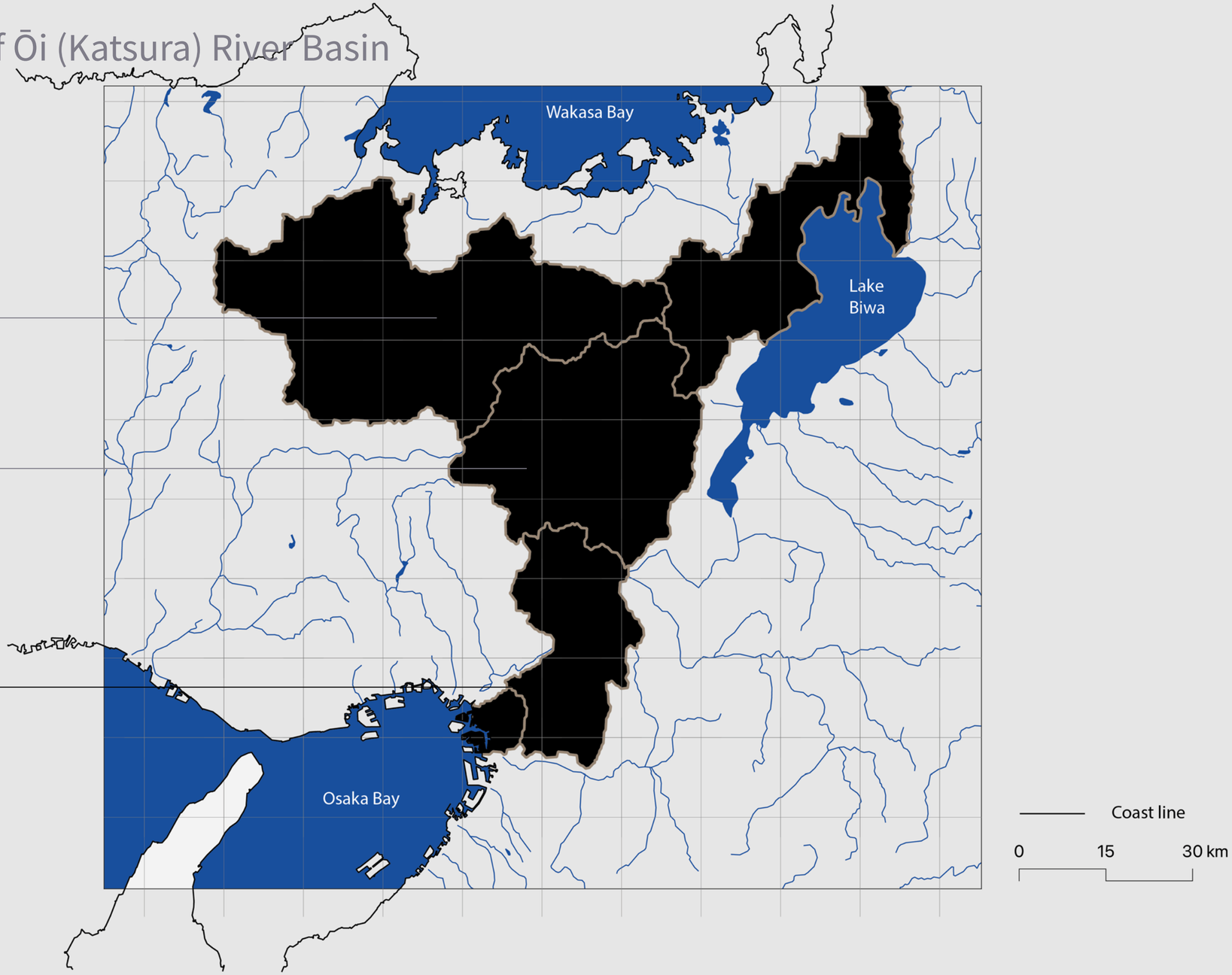
Hydrological Zones of Ōi (Katsura) River Basin

Upper Basin

Middle Basin

Lower Basin/ Discharge

Lower elevation
Slower water flow
Increased urbanization



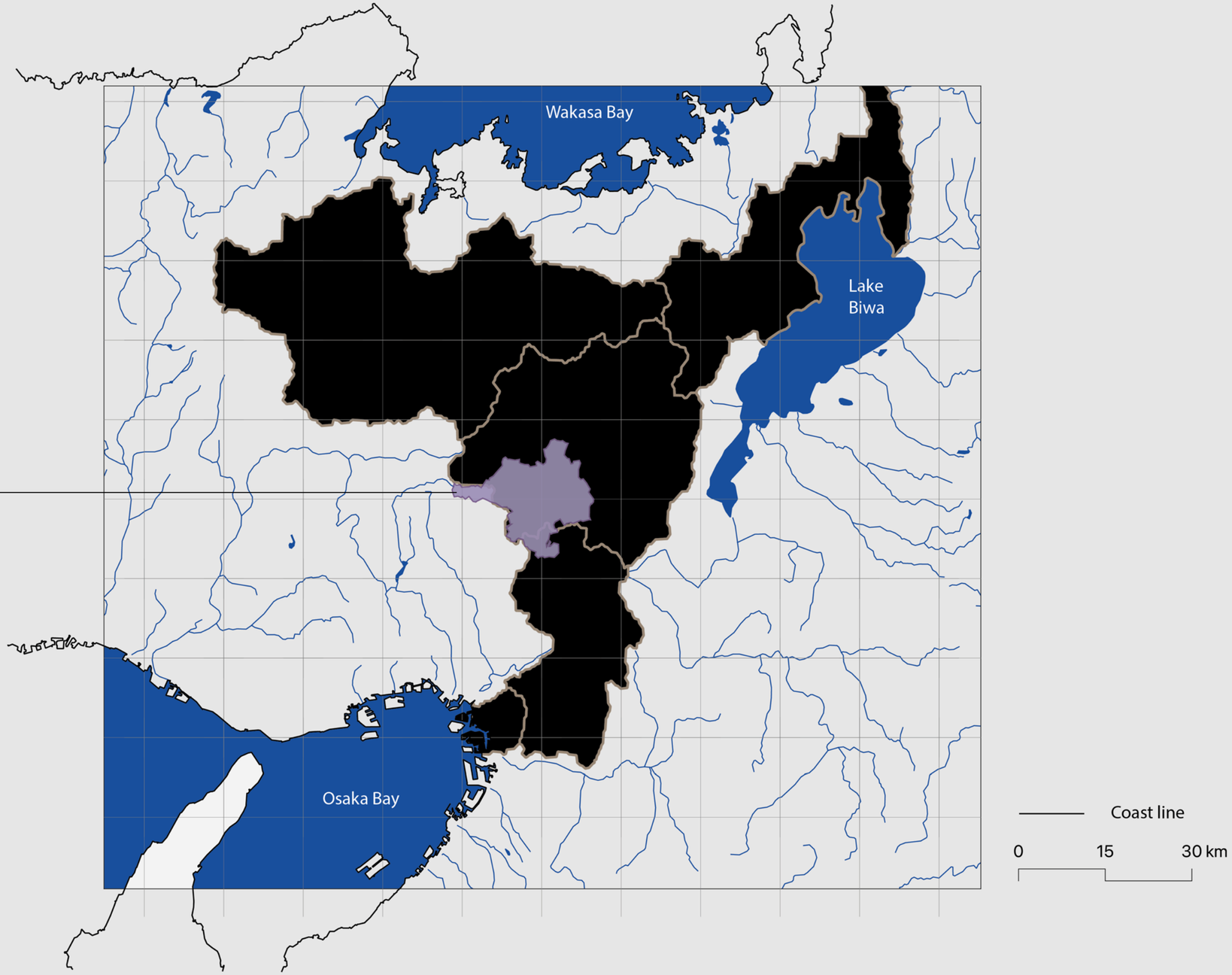
Context

Focus area

Kameoka

Middle Basin

Intermediate
elevation
Wider channels
More human habitation
and agriculture



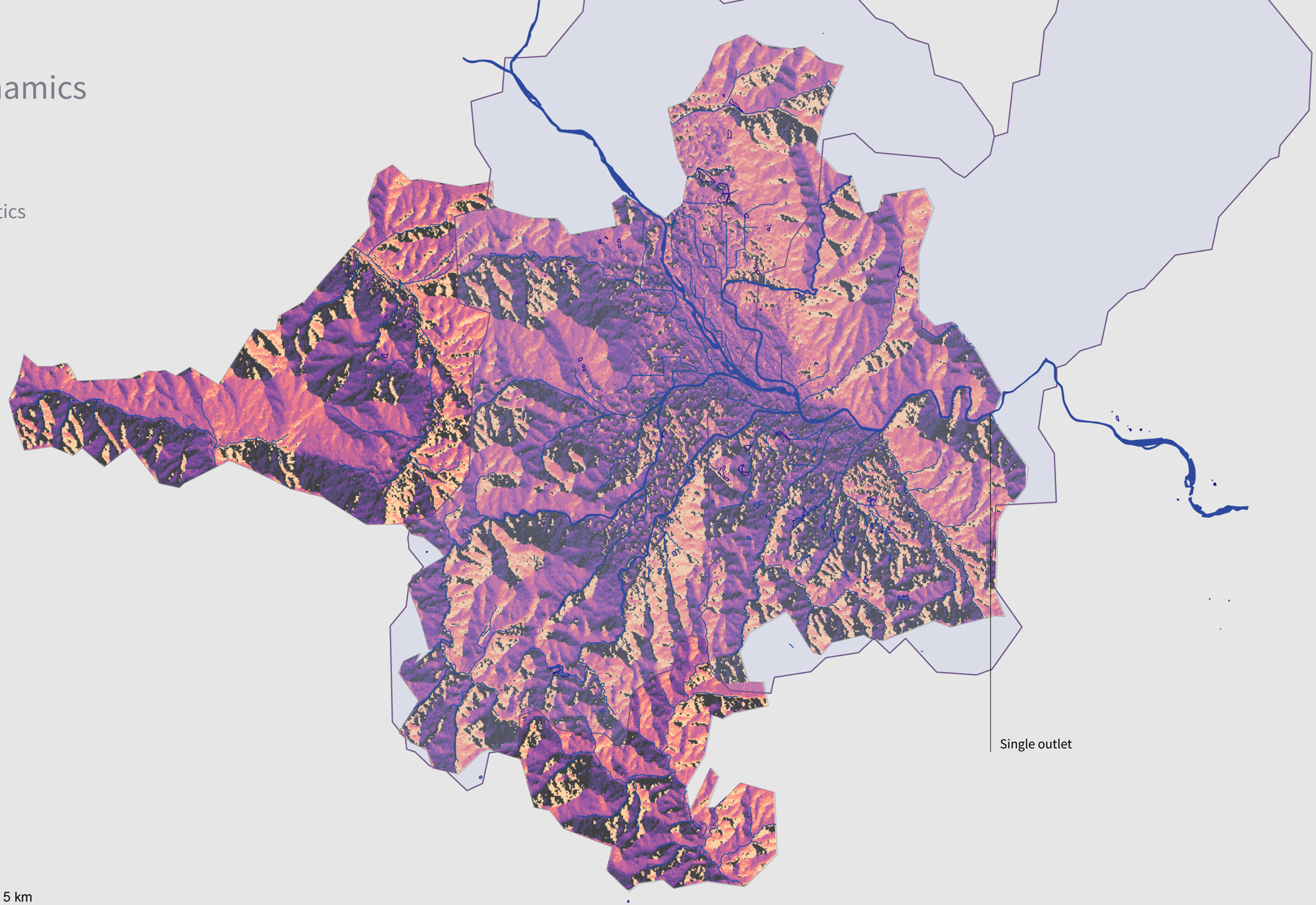
Context

Water flow dynamics

hydrological characteristics

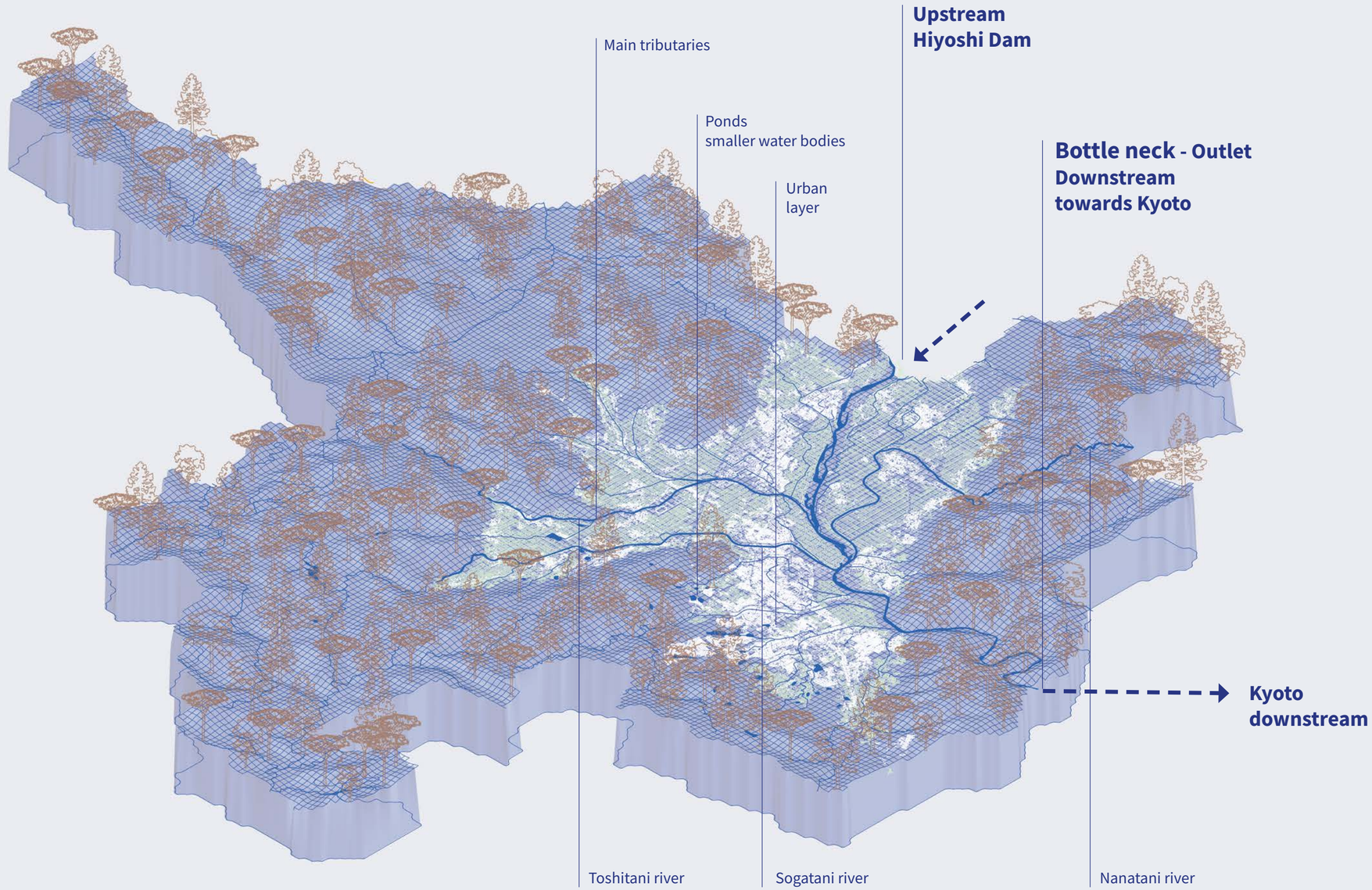
drainage patterns

northword flow



Satoyama landscape of Kameoka

Upstream and downstream of Katsura River

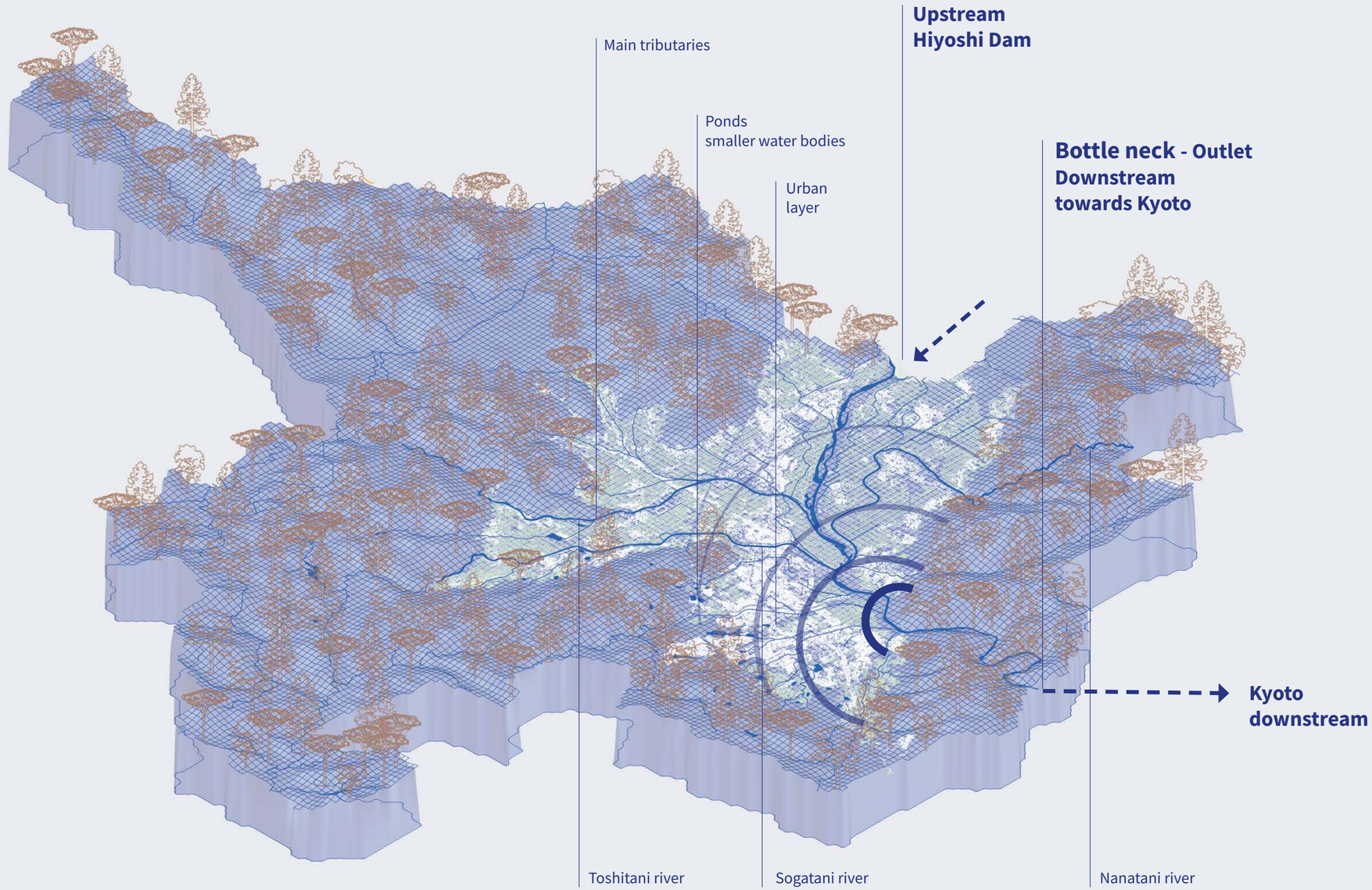


Urban

Paddy fields

Satoyama landscape of Kameoka

Upstream and downstream of Katsura River



Urban

Paddy fields

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Research question

Main research question

How can **landscape-based approach play a fundamental role as a key factor for comprehensive and sustainable management of the Ōi River** (大井川, Katsura River) watershed? In the context of the Kameoka riverfront community, **what landscape-based design strategies and principles** can be **translated spatialy to address** but also make use of the potentials of diverse challenges, including **ecological preservation, cultural revitalization, and urban resilience?**

Research question

Main research question + subquestions

1. How did the Ōi River landscape operate in the past, and what is its current condition?
DIAGNOSIS

1.1. How do the aspects of the Anthropocene influence the overall ecological health and adaptation to seasonality in the Ōi River watershed?
CHALLENGES + POTENTIALS

2. What landscape-based principles and strategies are essential for mitigating flood hazards while enhancing the cultural importance of Kameoka?
DESIGN TOOLBOX: LANDSCAPE PRINCIPLES + NATURE-BASED SOLUTIONS

How can **landscape-based approach play a fundamental role as a as a key factor for comprehensive and sustainable management of the Ōi River** (大井川, Katsura River) watershed? In the context of the Kameoka riverfront community, **what landscape-based design strategies and principles** can be **translated spatialy to address** but also make use of the potentials of diverse challenges, including **ecological preservation, cultural revitalization, and urban resilience?**

3. How can they be applied to the context of Kameoka?
SPATIAL DESIGN IMPLEMENTATION

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Methodology

Exploration

- Personal Fascination
- Problem Field
- Problem Focus
- Problem Statement
- Problem Proposition
- Research Questions

Methodology

- Theoretical Framework
- Landscape Authenticity
- Genius Loci
- Geologic Time
- Field Trip
- Workshop

Approach:Analysis

- Analysis
- Unraveling the Landscape
- Design Strategies
- Design Principles
- Design Goals

Research by Design

- Regional Vision
- Principles application
- Design locations
- Site 1
- Site 2
- Site 3

Reflection

- Conclusion
- L.A Perspective
- Ethical Perspective

Methodology

Exploration

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Workshop

Approach:Analysis

Ana

Unraveling th

Design S

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Research by Design

critical method for gathering experiential data and insights

Reflection

sion

pective

spective

Methodology

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Genius Loci

Geologic Time

Field Trip

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Approa

Unraveling

Reflection

Conclusion

L.A Perspective

Ethical Perspective

opportunity for collaboration, cultural exchange, and innovative idea generation.

Project introduction
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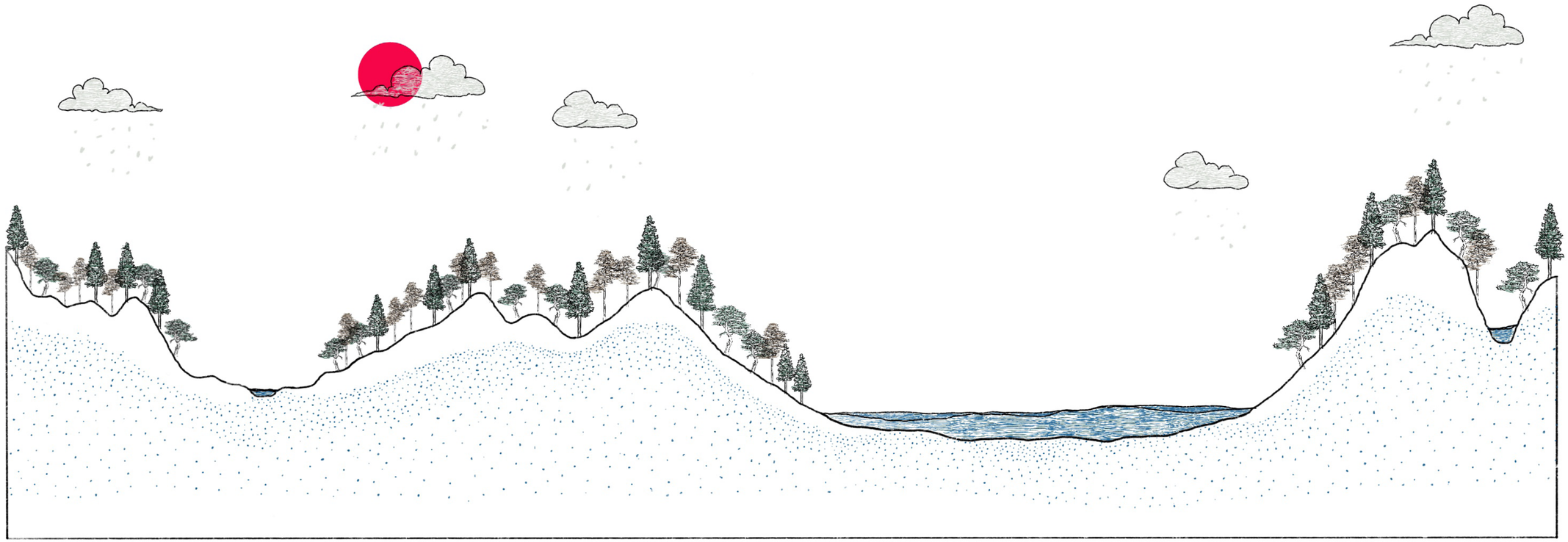
Landscape of Kameoka Before

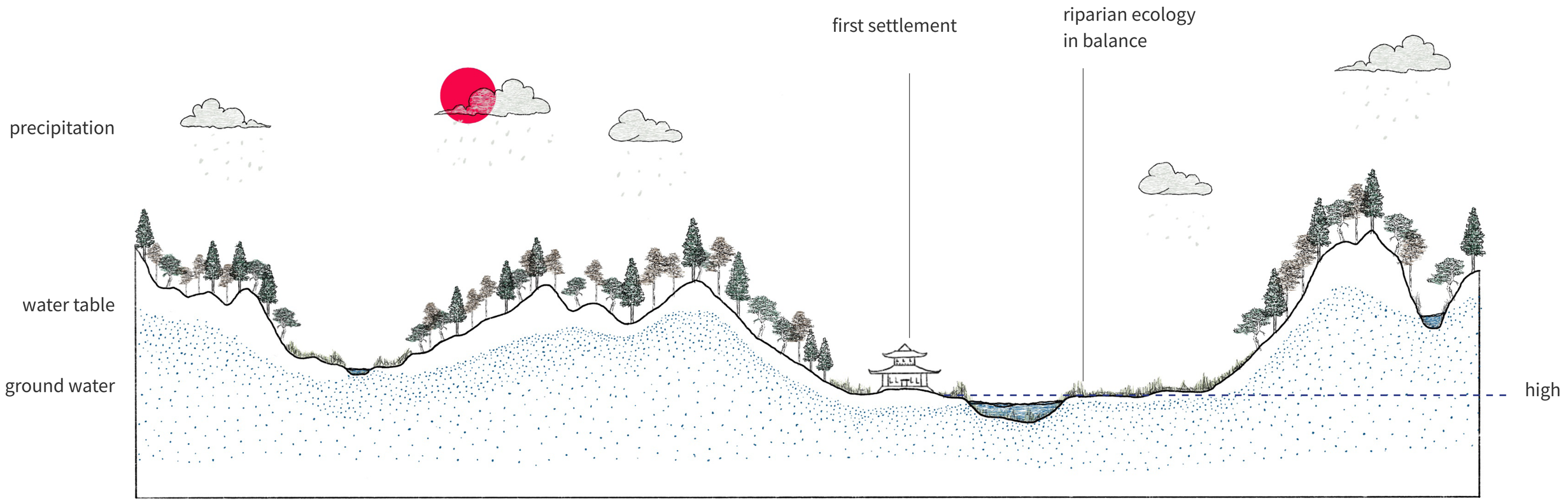
Kameoka Basin was a big lake in the past - Jōmon period



Satoyama 0.0. landscape of Kameoka Before

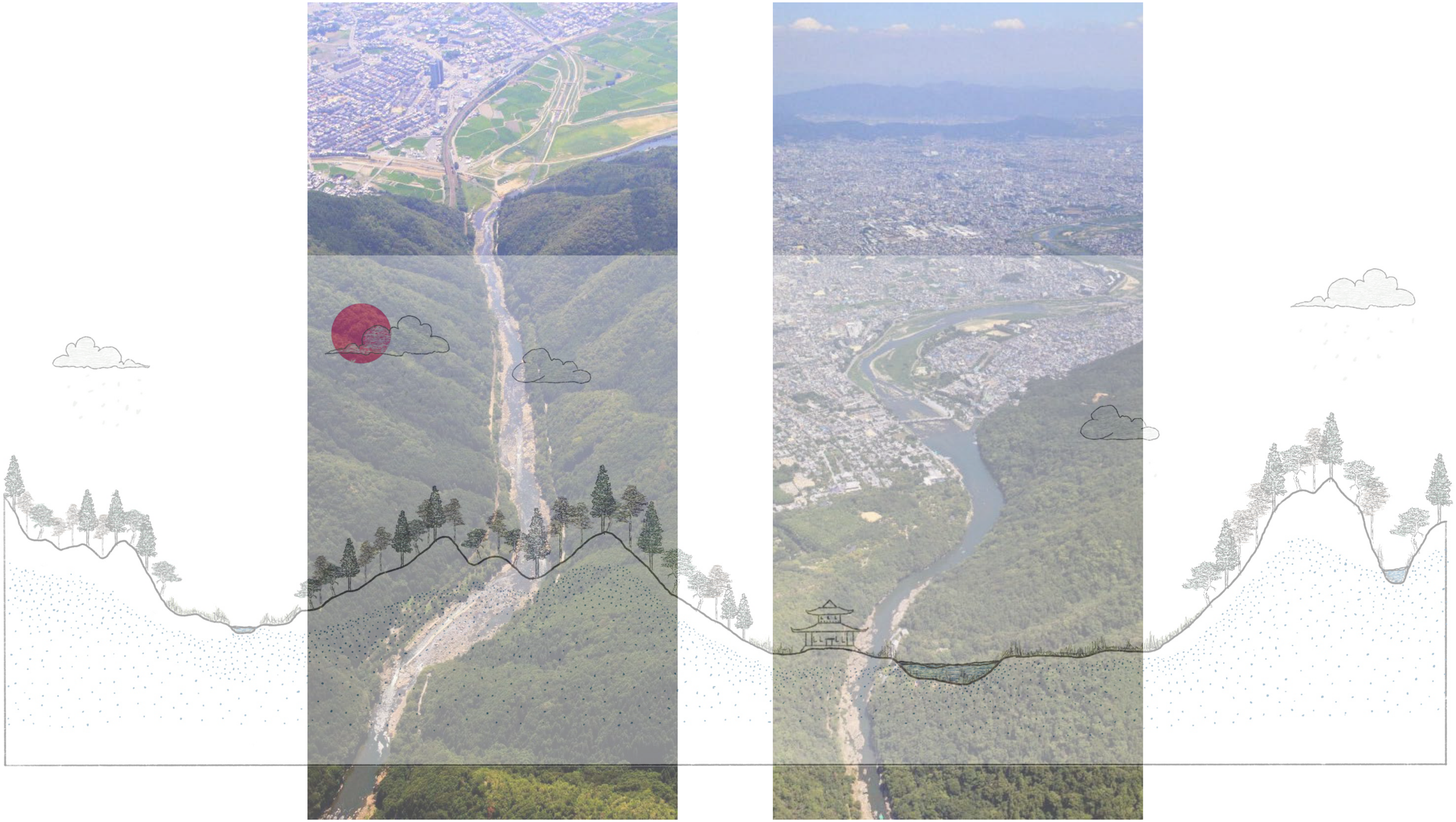
Landscape dynamics - Edo period 1600-1868

Establishing the fundamental relationship
between humans and the landscape



Satoyama landscape of Kameoka Before

Traditional landscape practise -water connection 1929



Oi river (Katsura river) water transport (Kameoka site)

Oi river (Katsura river) water transport (Kyoto site)

Satoyama landscape of Kameoka Before

People used to have a strong connection with the land

cultural relationship

Satoyama landscape of Kameoka Before

People used to have a strong connection with the land

spiritual/sacret relationship

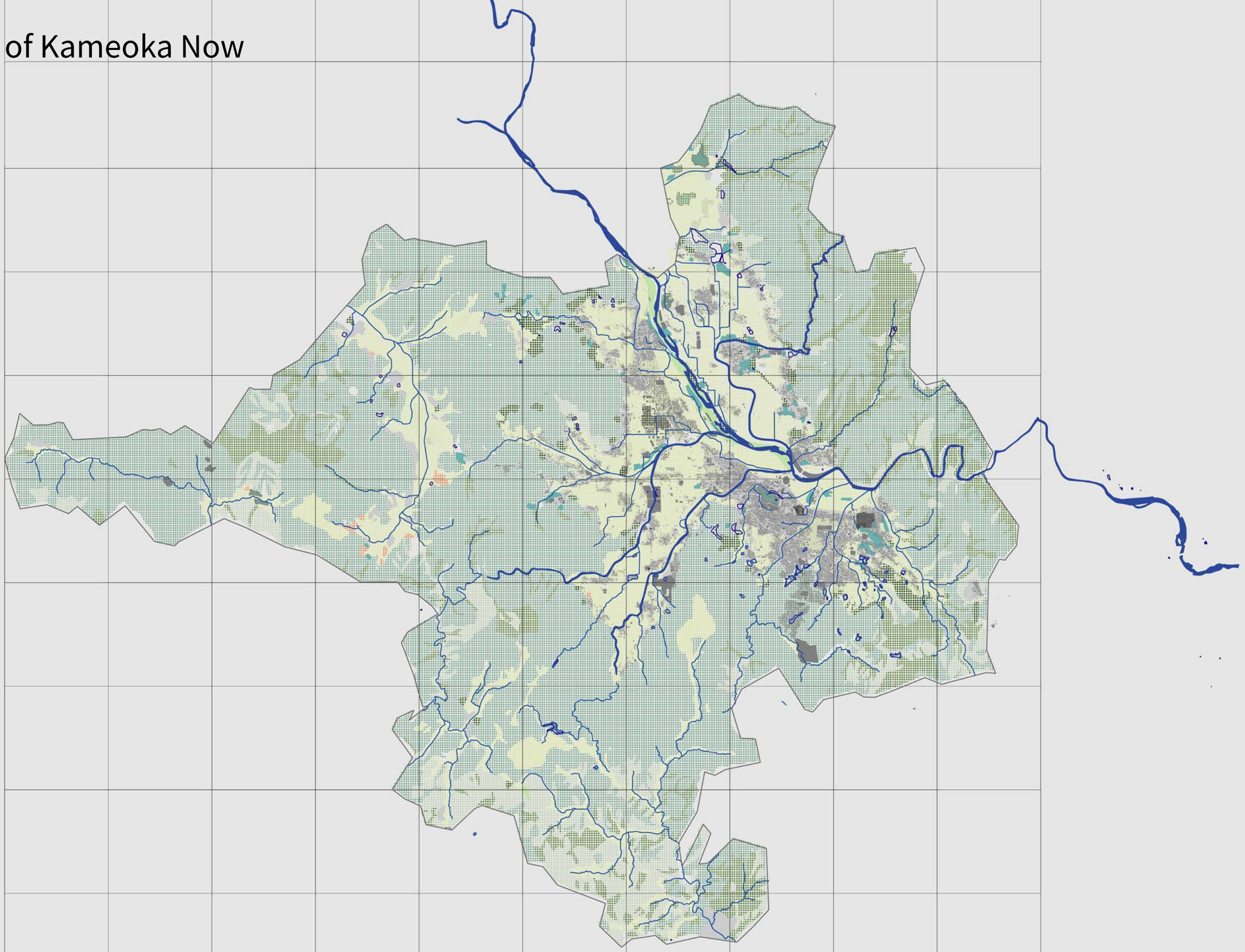
Satoyama landscape of Kameoka Before

People used to have a strong connection with the land

sense of place

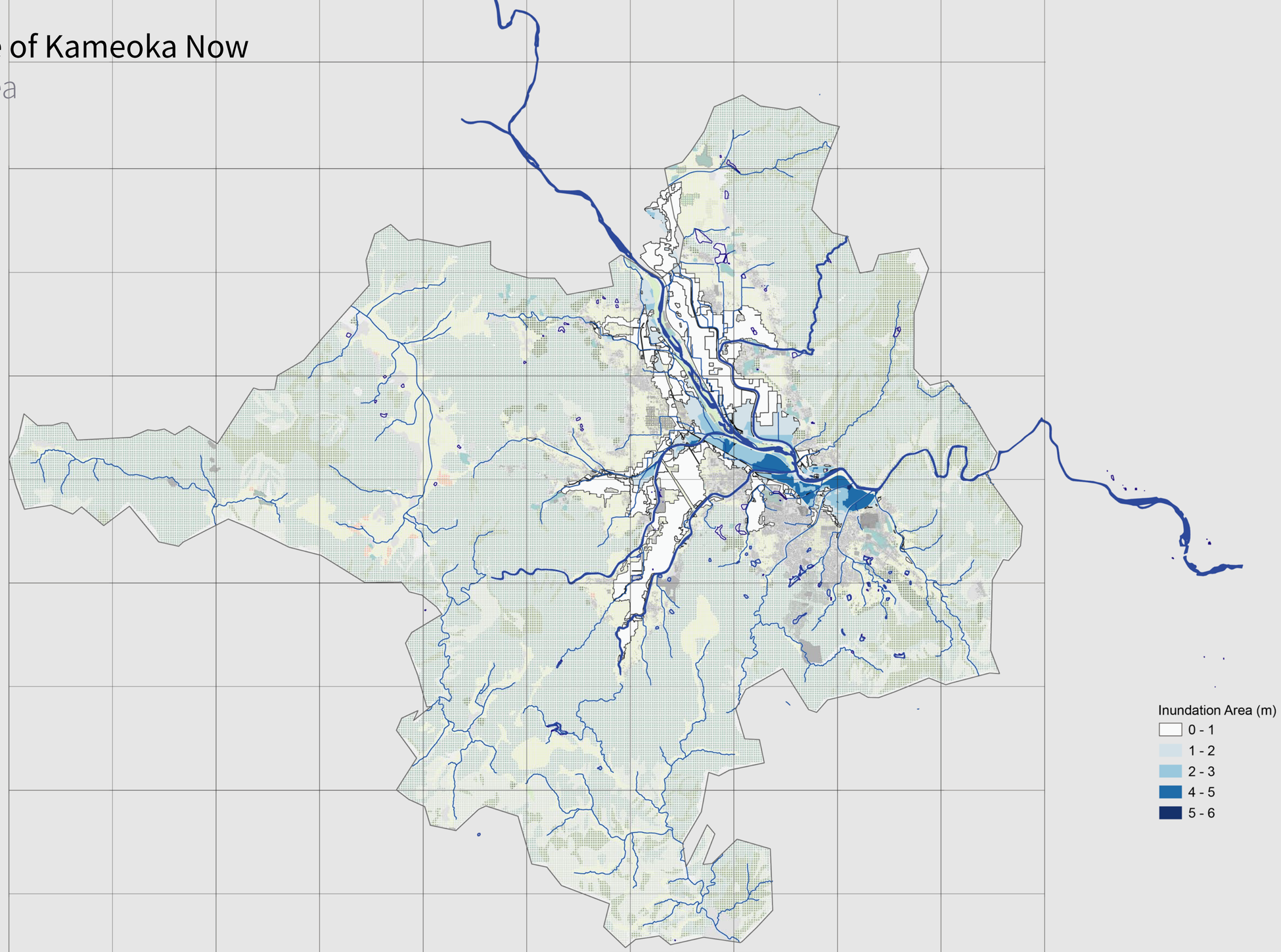
Satoyama landscape of Kameoka Now

Land Use



Satoyama landscape of Kameoka Now

High-risk flooding area



Satoyama landscape of Kameoka Now

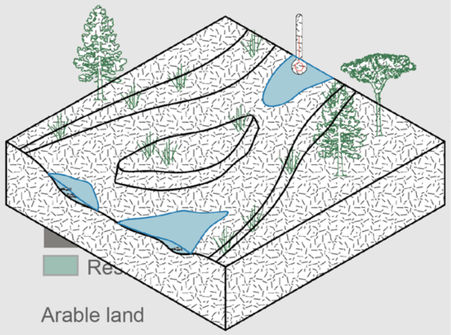
High-risk flooding area

Flooding situation
Yagi Town
Typhoon No. 13, 1953

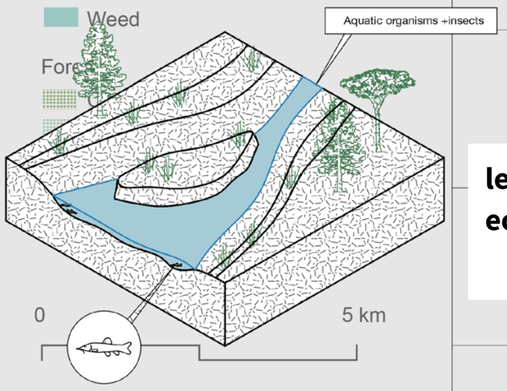
Satoyama landscape of Kameoka Now

High-risk flooding area

vulnerability of historical settlements



approach of keeping streams dry in response to these floods

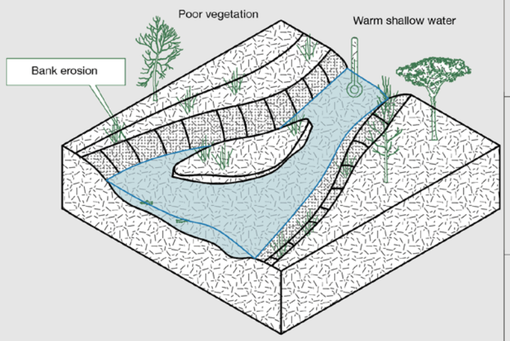


leads to the decline of both ecology and wetlands

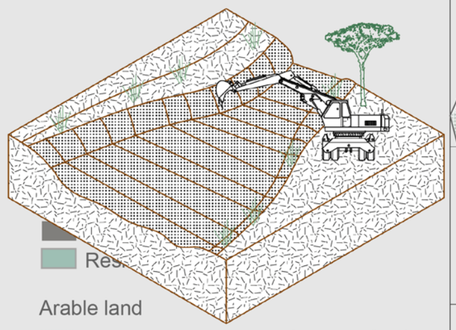
Inundation Area (m)
0 - 1
1 - 2
2 - 3
4 - 5
5 - 6

Satoyama landscape of Kameoka Now

Sediment erosion cause



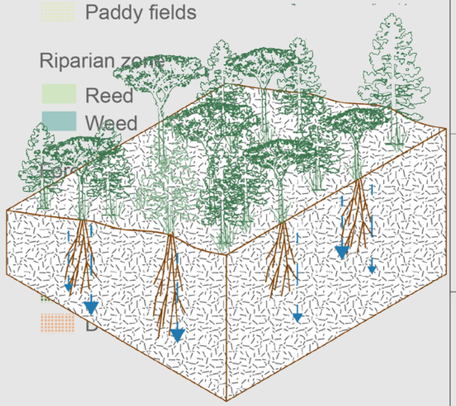
Erosion results in poor vegetation



Arable land

Paddy fields

No water infiltration



Decrease in the forest's sponge capacity

0 2.5 5 km

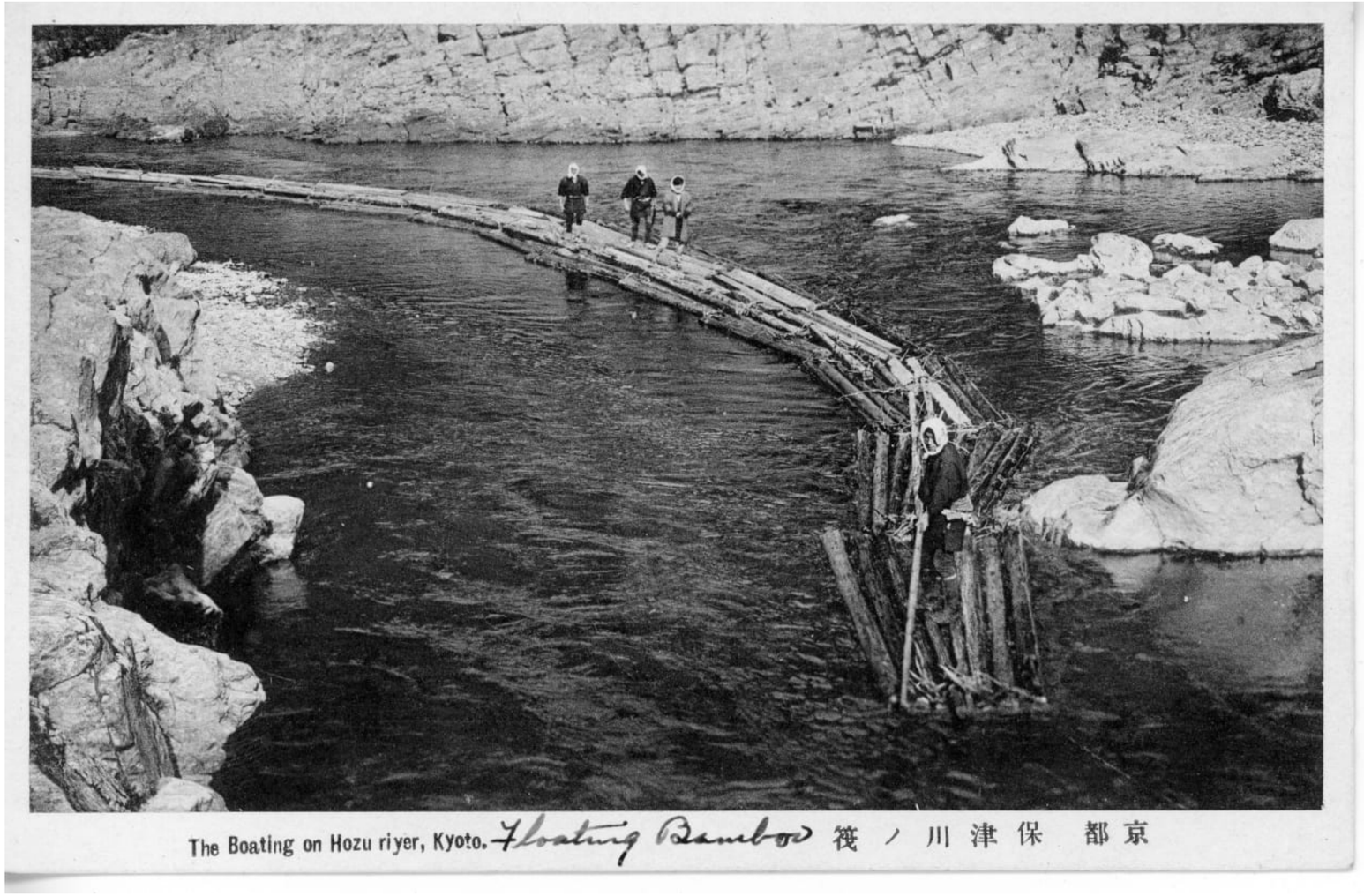
sediment erosion areas

interface between mountains and flatlands

Sediment Disaster Alert Area

Satoyama landscape of Kameoka Now

Forest layer



Tree trunks were used for water transportation, highlighting historical human interference in the forest ecosystem

Satoyama landscape of Kameoka Now

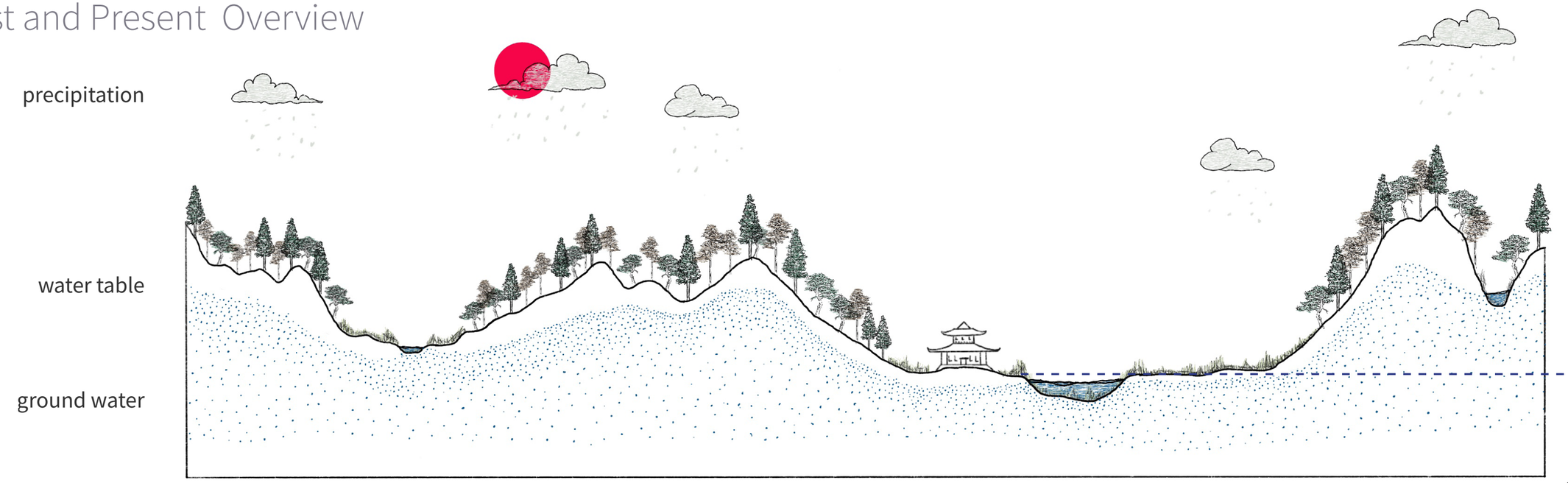
Sediment erosion cause

river edges transformed from soft, natural to hardened concrete structures

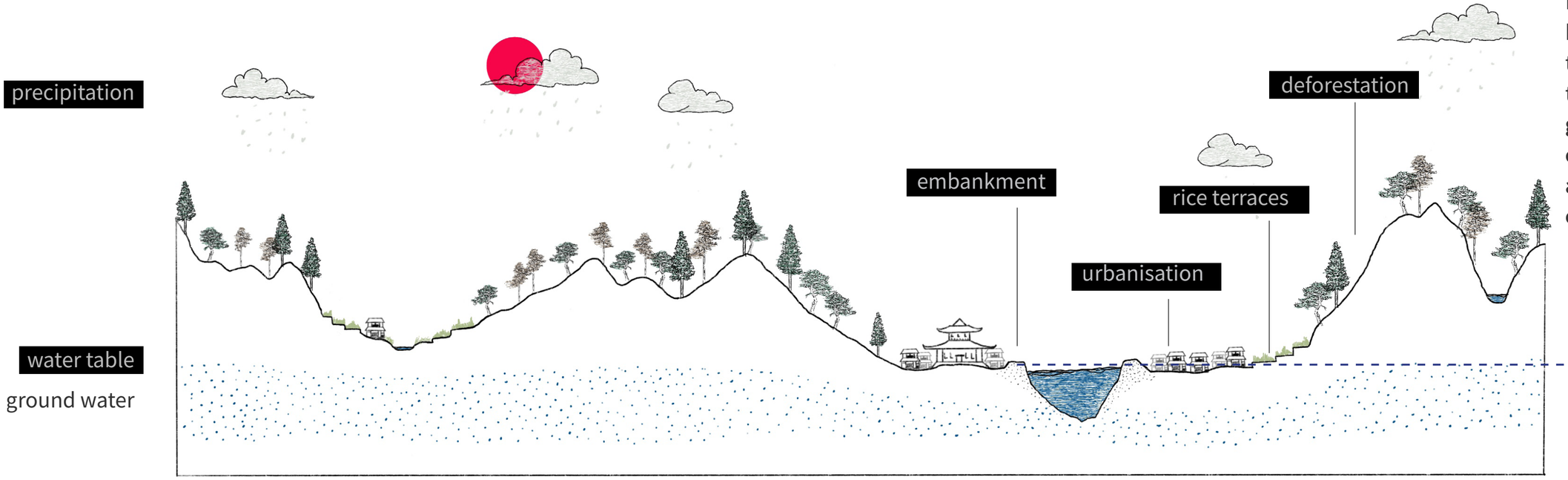
Satoyama landscape of Kameoka

Past and Present Overview

Satoyama 0.0



How the landscape has changed and how these changes altered the **groundwater level ecology and the Sustainability of the landscape**



Satoyama 1.0

Satoyama landscape of Kameoka

Limited seasonality adaptation

Satoyama landscape categories

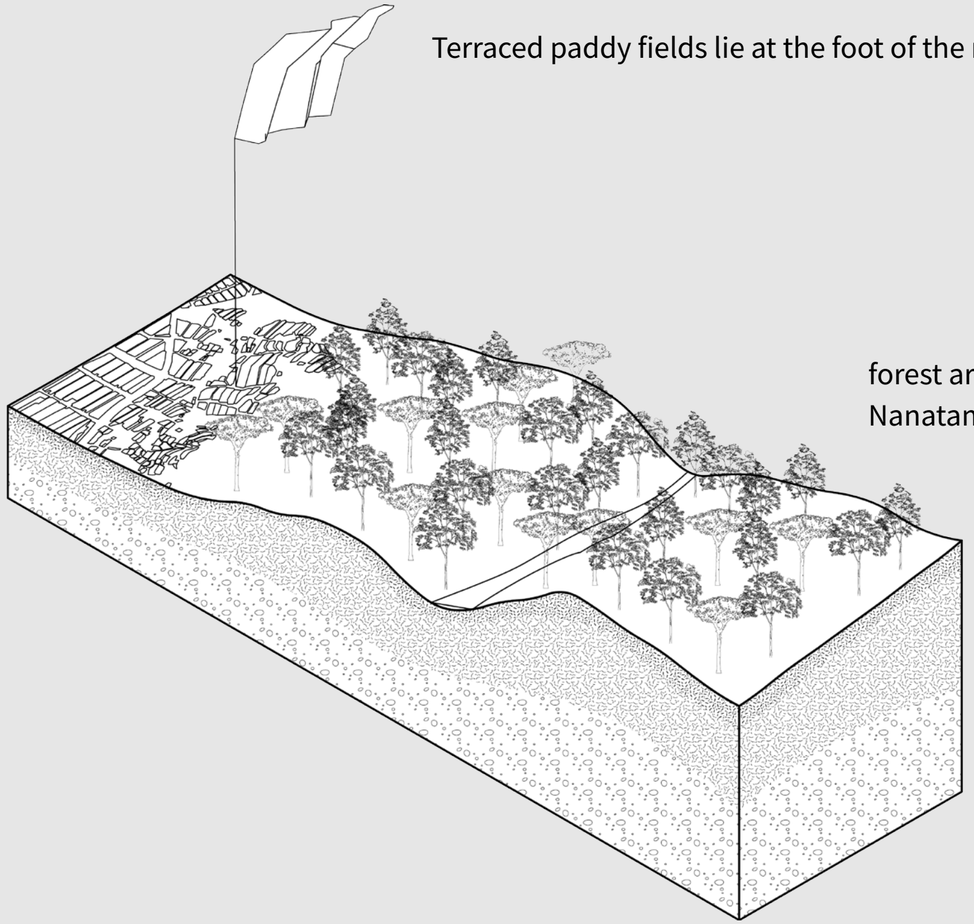
Headwaters and Foothills

A terracing system:

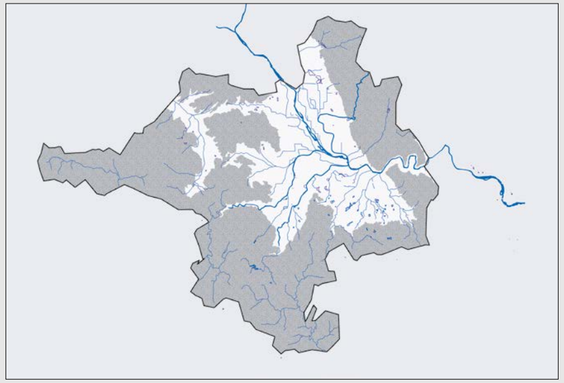
. **to maximize arable land**

. **prevent soil erosion**

. constant water supply strengthen the water managemen



paddy fields terracing system (satoyama landscape feature)
that creates a harmony between nature and agriculture



Satoyama landscape categories

Headwaters and Foothills

Satoyama landscape categories

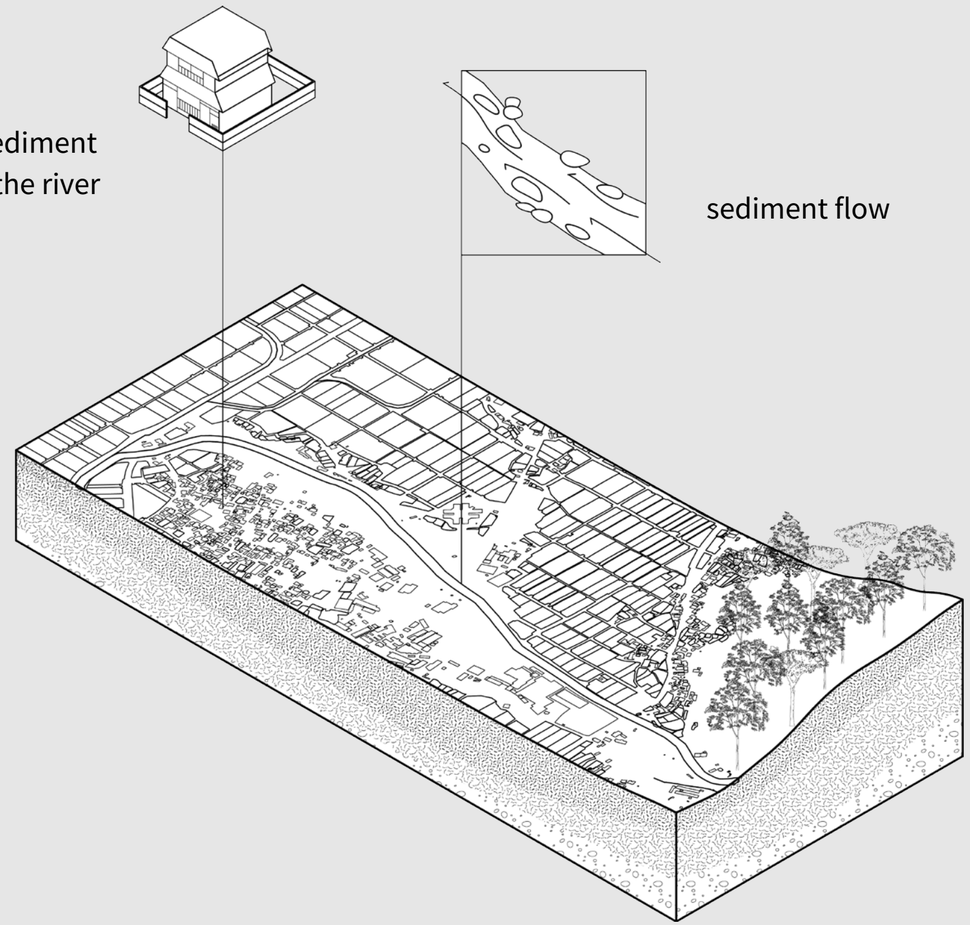
Hillsides

stream flow is slower
sediment

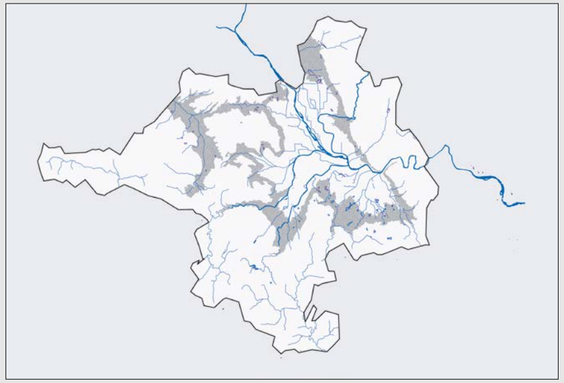
sediment was used as a natural material for flood protection

settlement fence
created from the sediment
transport through the river

sediment flow



sediment use as building material and
creates infrastructure for flood protection of the cultural- historical layer



Satoyama landscape categories

Hillsides

Satoyama landscape categories

Hillsides

Satoyama landscape categories

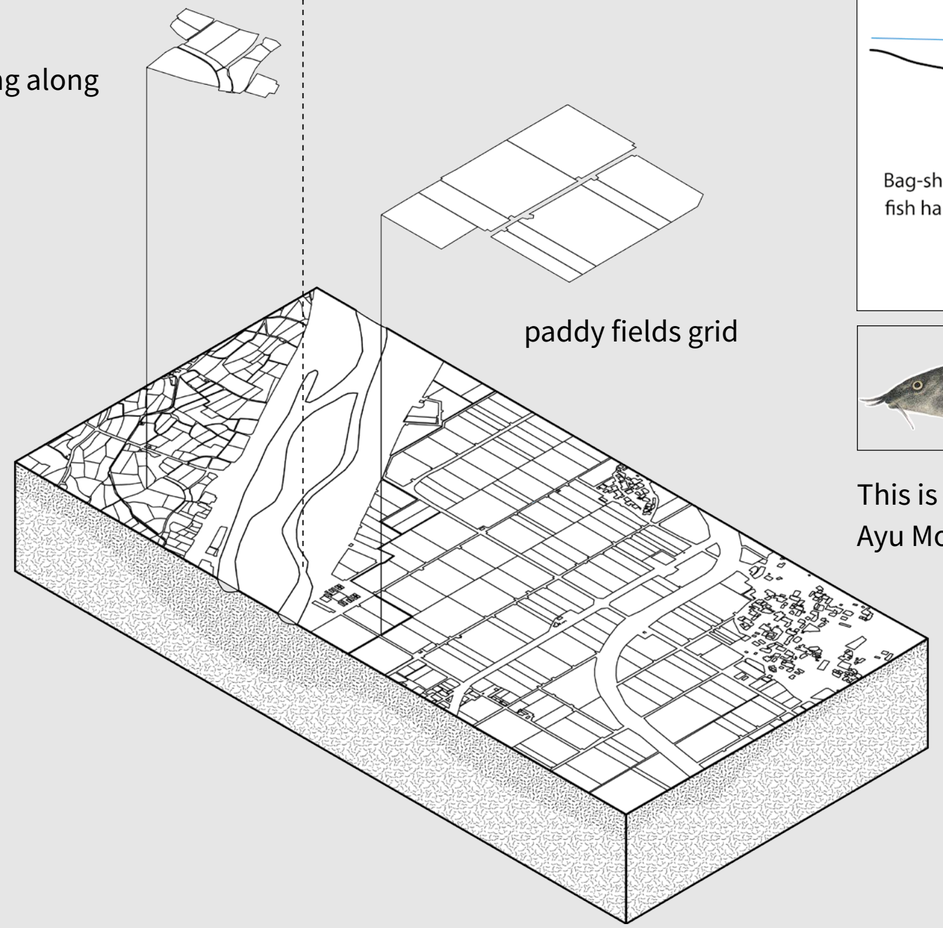
Hillsides

Tanba Kameyama Castle bult on a higher ground level from floodplains.

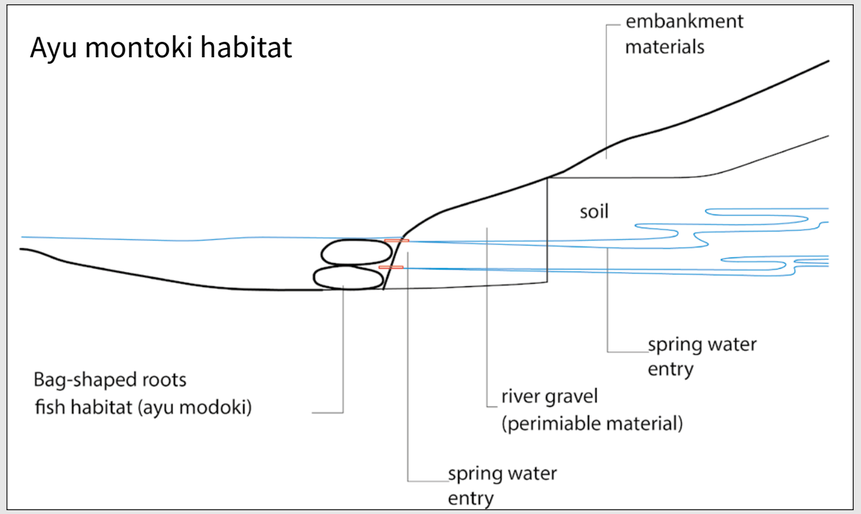
Satoyama landscape categories

Flatlands - Main river stream

riparian
agriculture- farming along
river banks

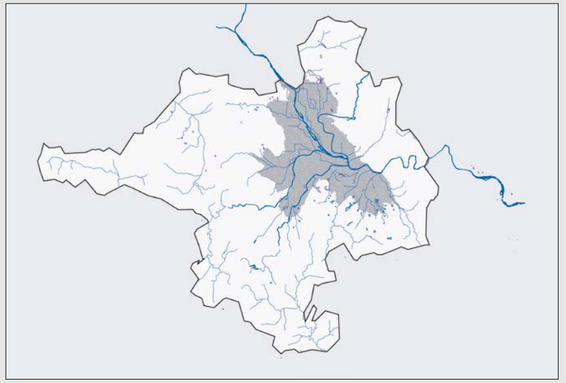


paddy fields grid



This is one of the most important areas where the Ayu Modoki fish thrives

The riparian agriculture practiced in the flatlands benefits from the fertile soil derived from the river's alluvial deposits



Satoyama landscape categories

Flatlands - Main river stream

B

Design goals
Landscape strategies
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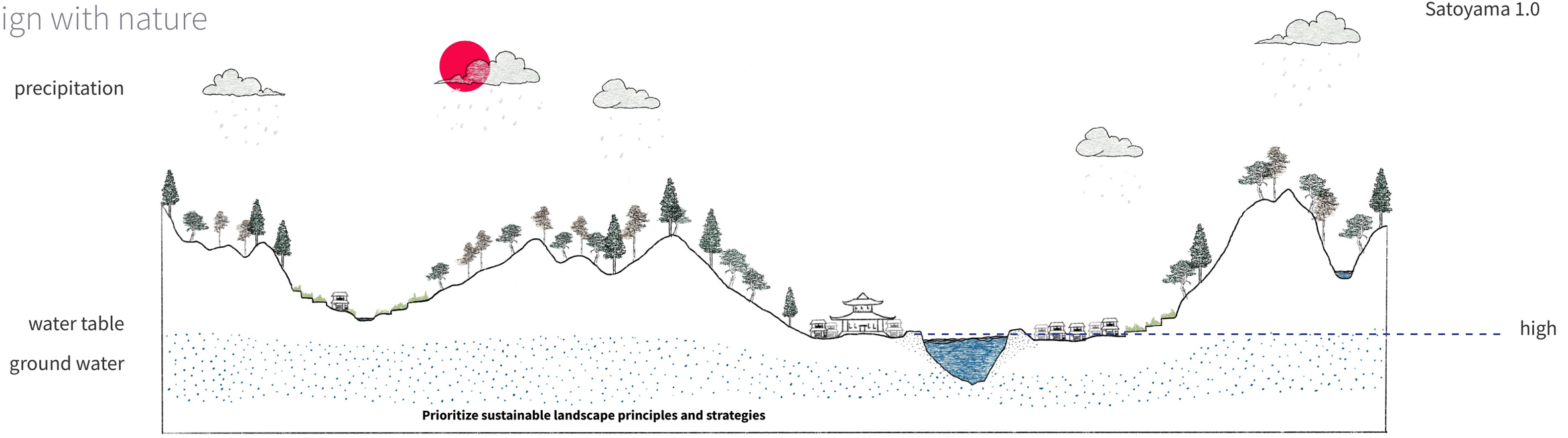
Strategic interfaces

Conclusion

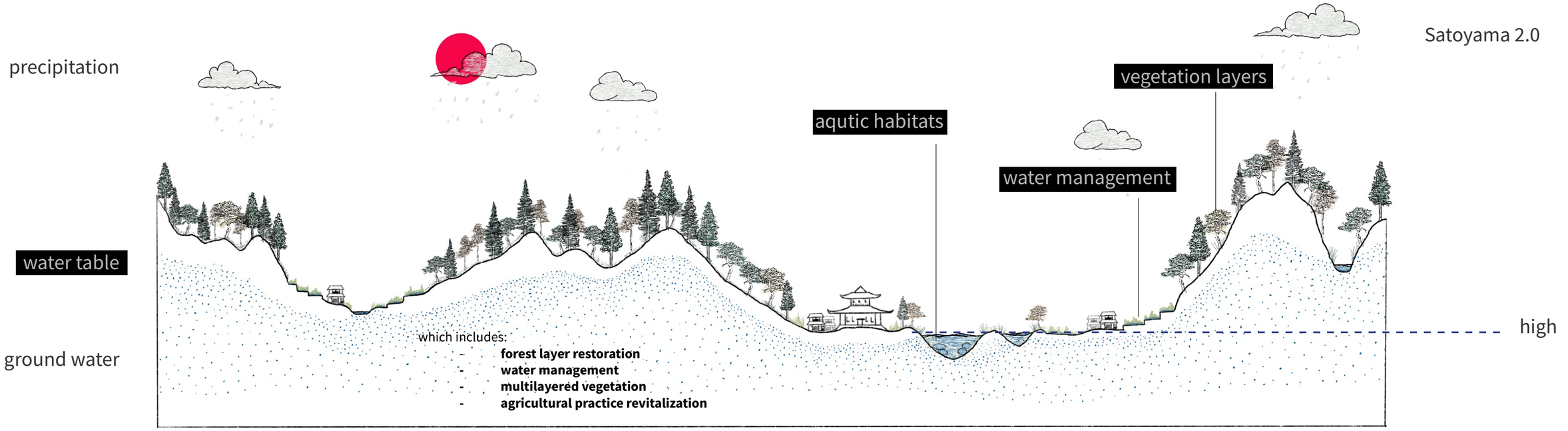
Design goals

Design with nature

Satoyama 1.0



Satoyama 2.0



Design goals
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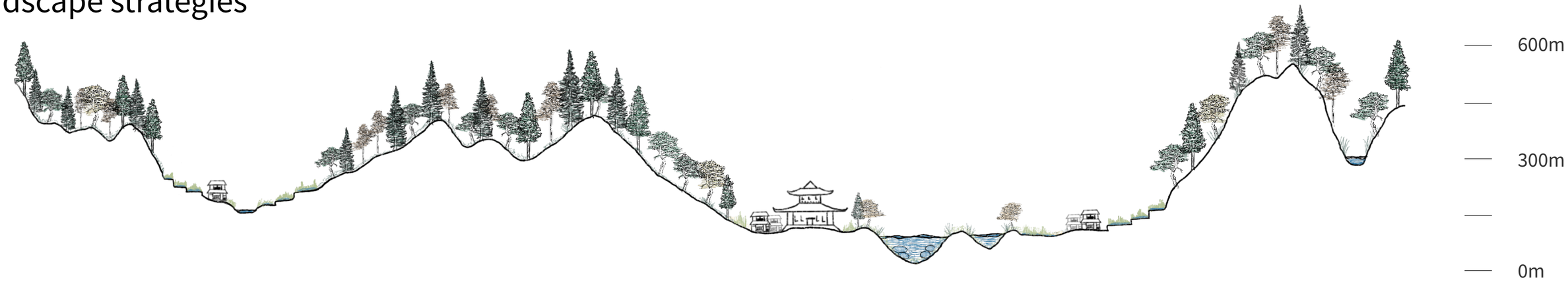
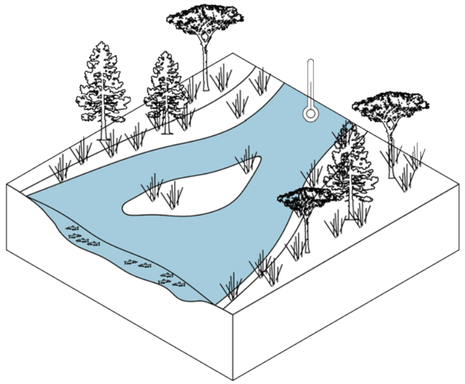
Conclusion

Landscape strategies

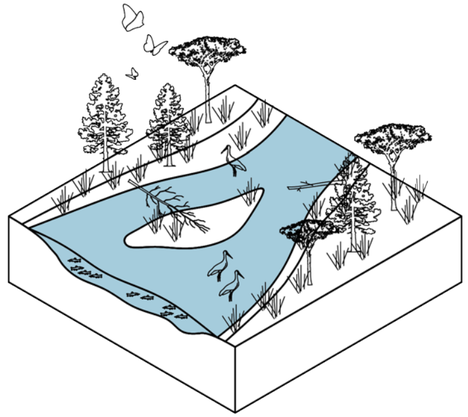


Flood-Resilient Design and Floodplain Management



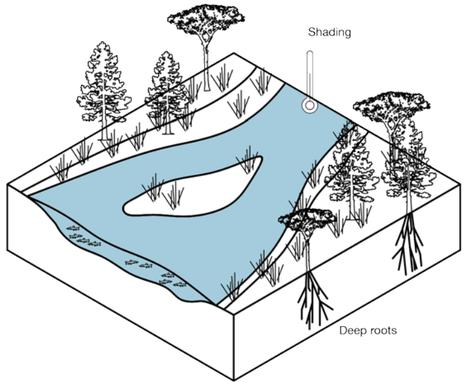
-increase water volumes and depth and flow
-restore wetlands

Preservation of Natural Habitats



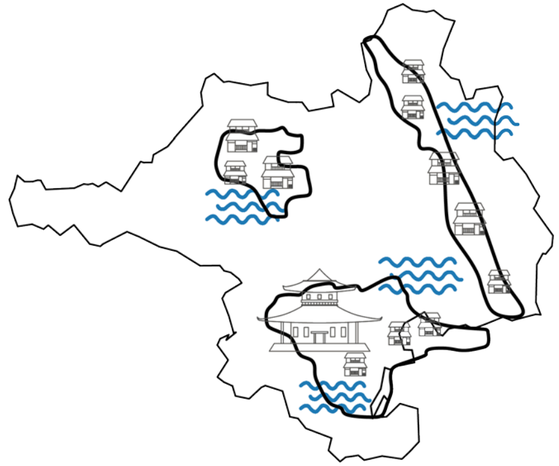
-wood debris - provides habitat shading
-increase aquatic organisms

Natural processes Riparian Restoration



-deep roots to maintain bank structure and reduce erosion
-native vegetation

Urban adaptive management



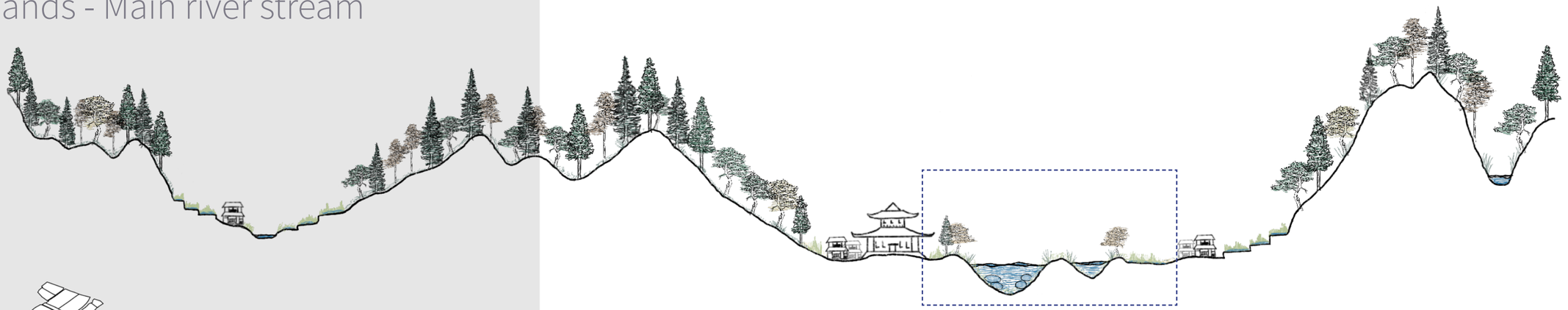
Protect urban layer
- flood mitigation

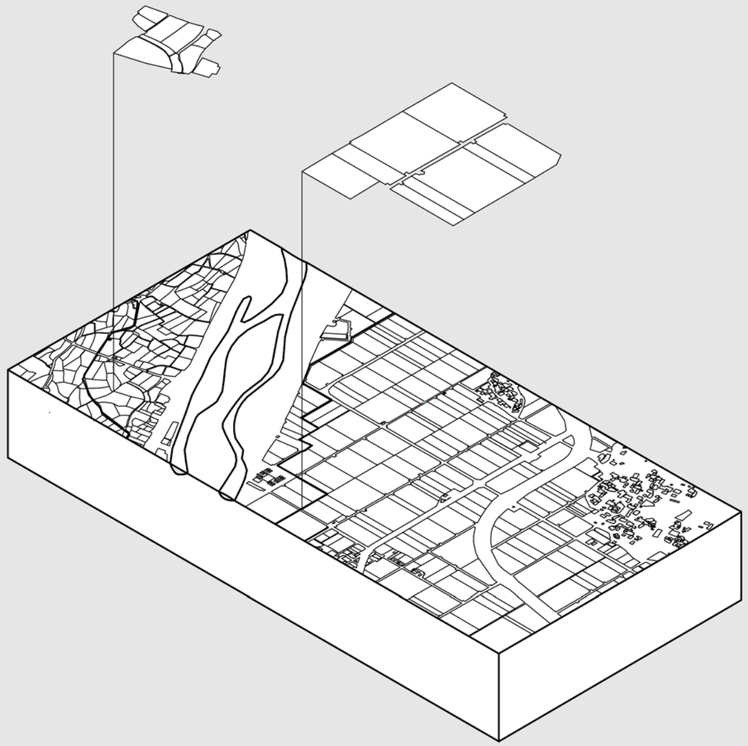
Design goals
Landscape strategies
Landscape principles
Regional application - Vision
Strategic interfaces

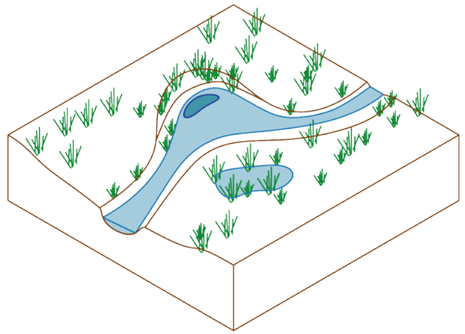
Conclusion

Landscape principles

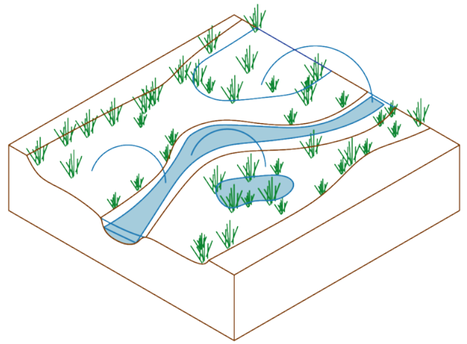
Flatlands - Main river stream



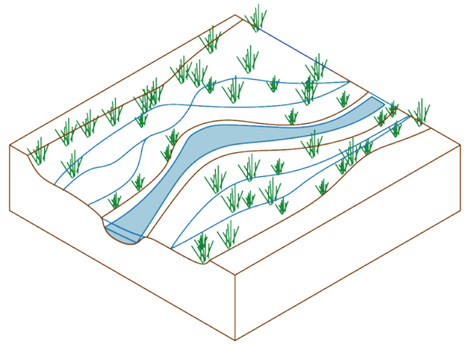




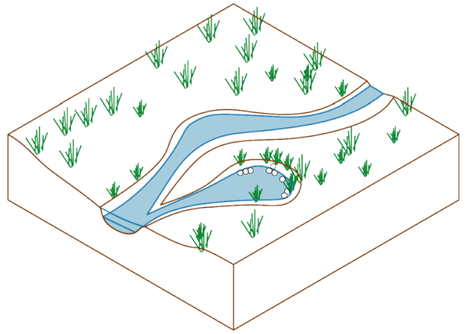
On-line bays creation



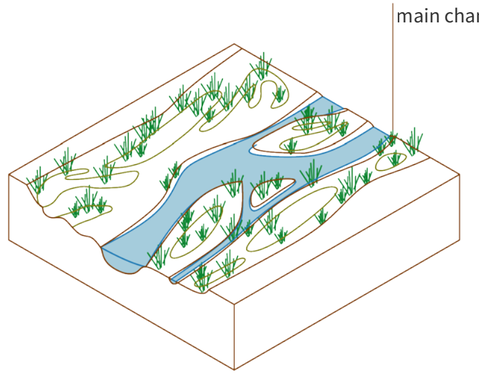
Re-Activate River Floodplains



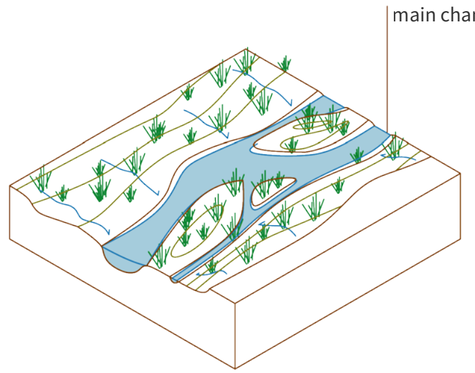
Re-store old meanders



Backwaters



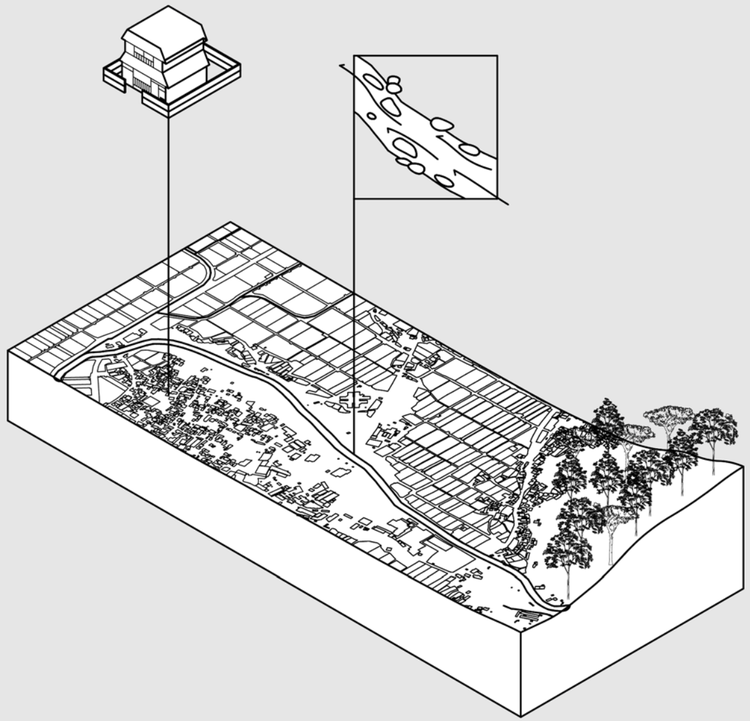
River bypasses
Restore Inland wetlands

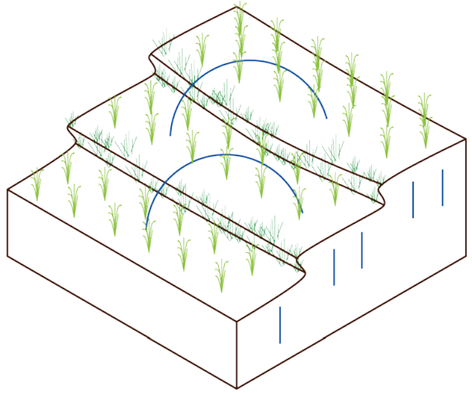


Construct Inland Wetlands

Landscape principles

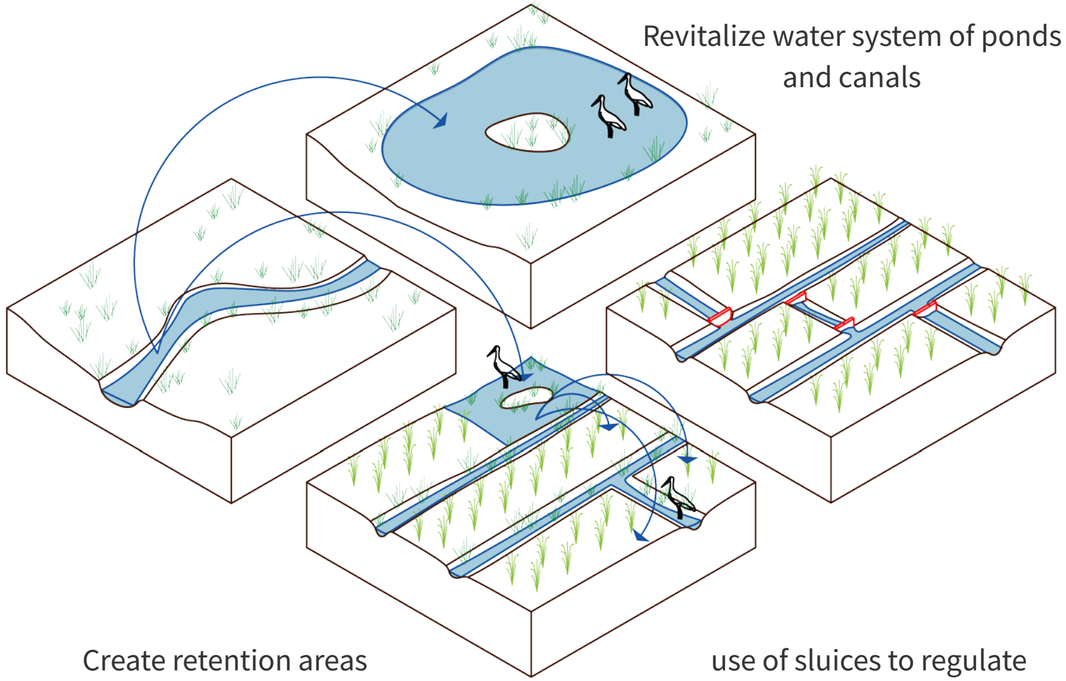
Hillsides - Paddy fields





Paddy Terraces and Slopes
store water

Revitalize water system of ponds
and canals

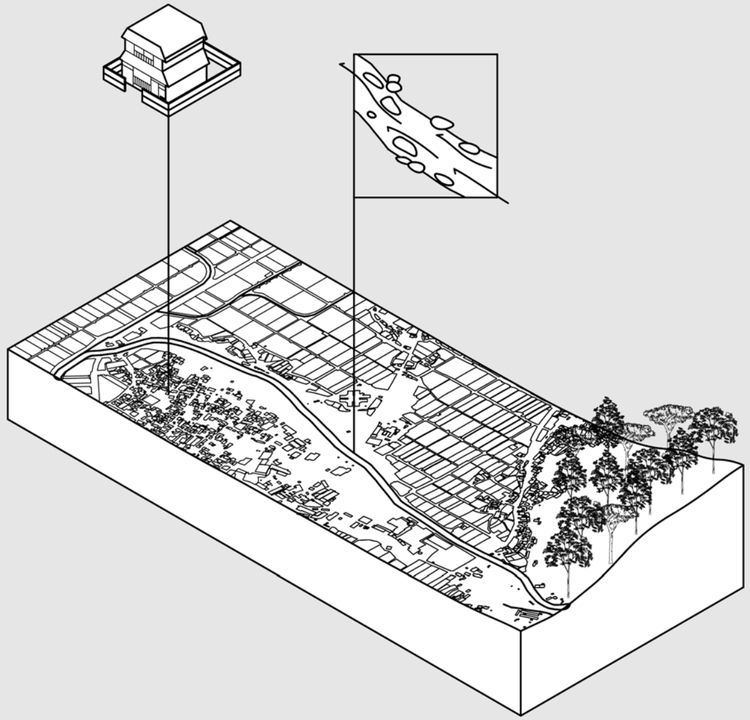


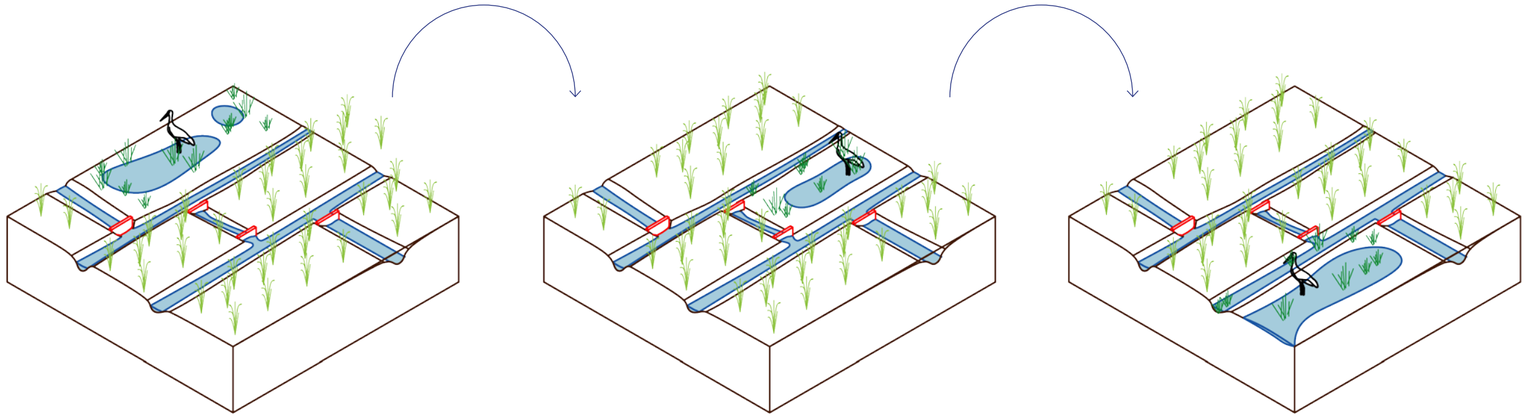
Create retention areas
withing agricultural land

use of sluices to regulate
water during dry periods

Landscape principles

Hillsides - Paddy fields

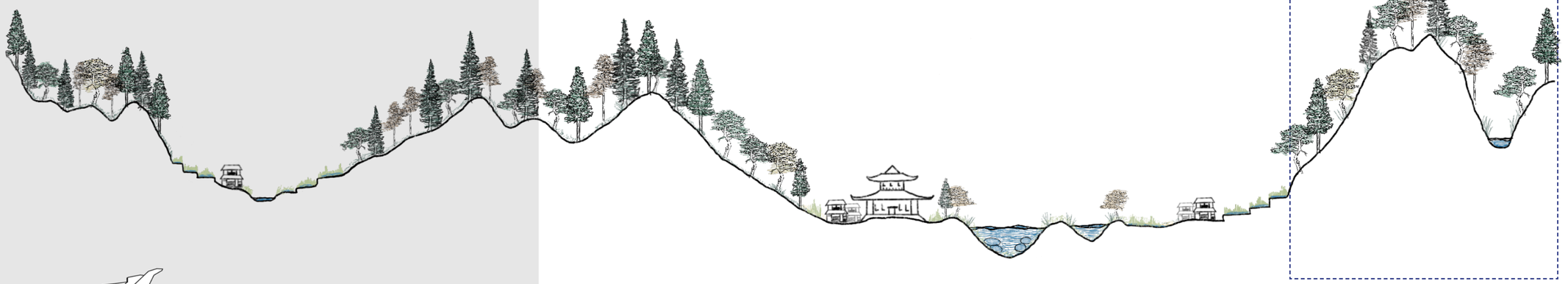


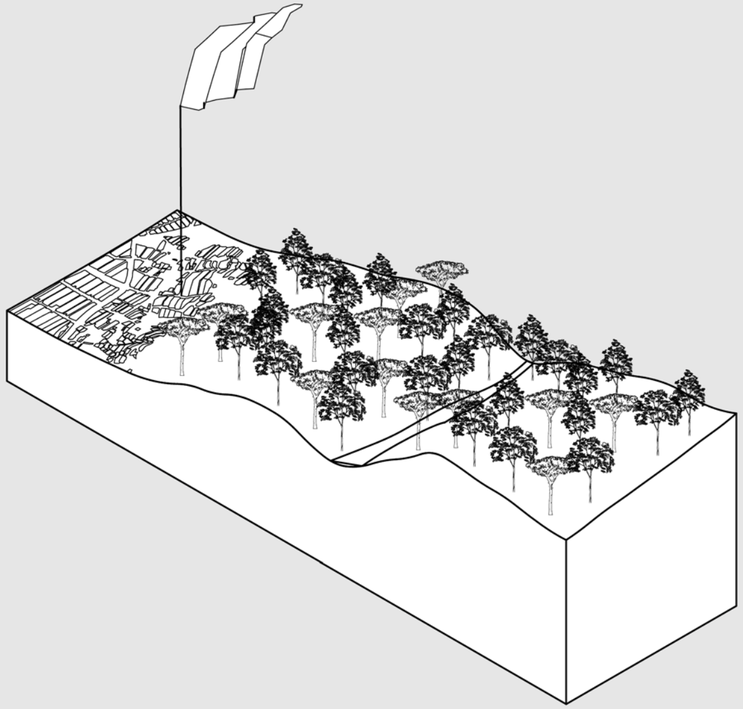


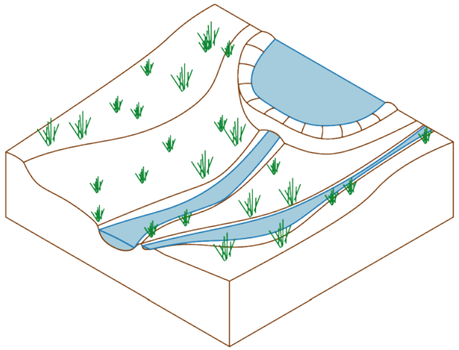
‘Sacrifice’ paddy fields
for irrigation, rotation and
biodiversity rise

Landscape principles

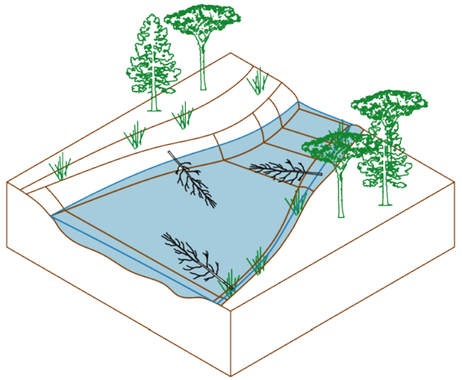
Headwaters and Foothills



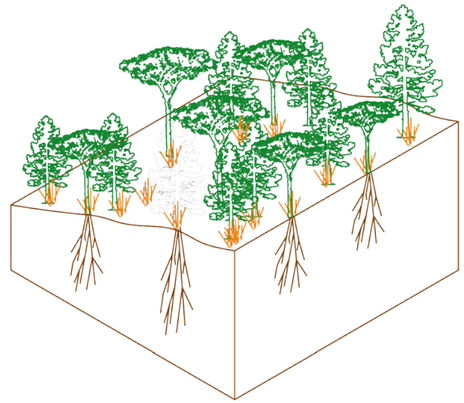




Dams bypasses



Tributaries
flow diversity
reduce bank erosion

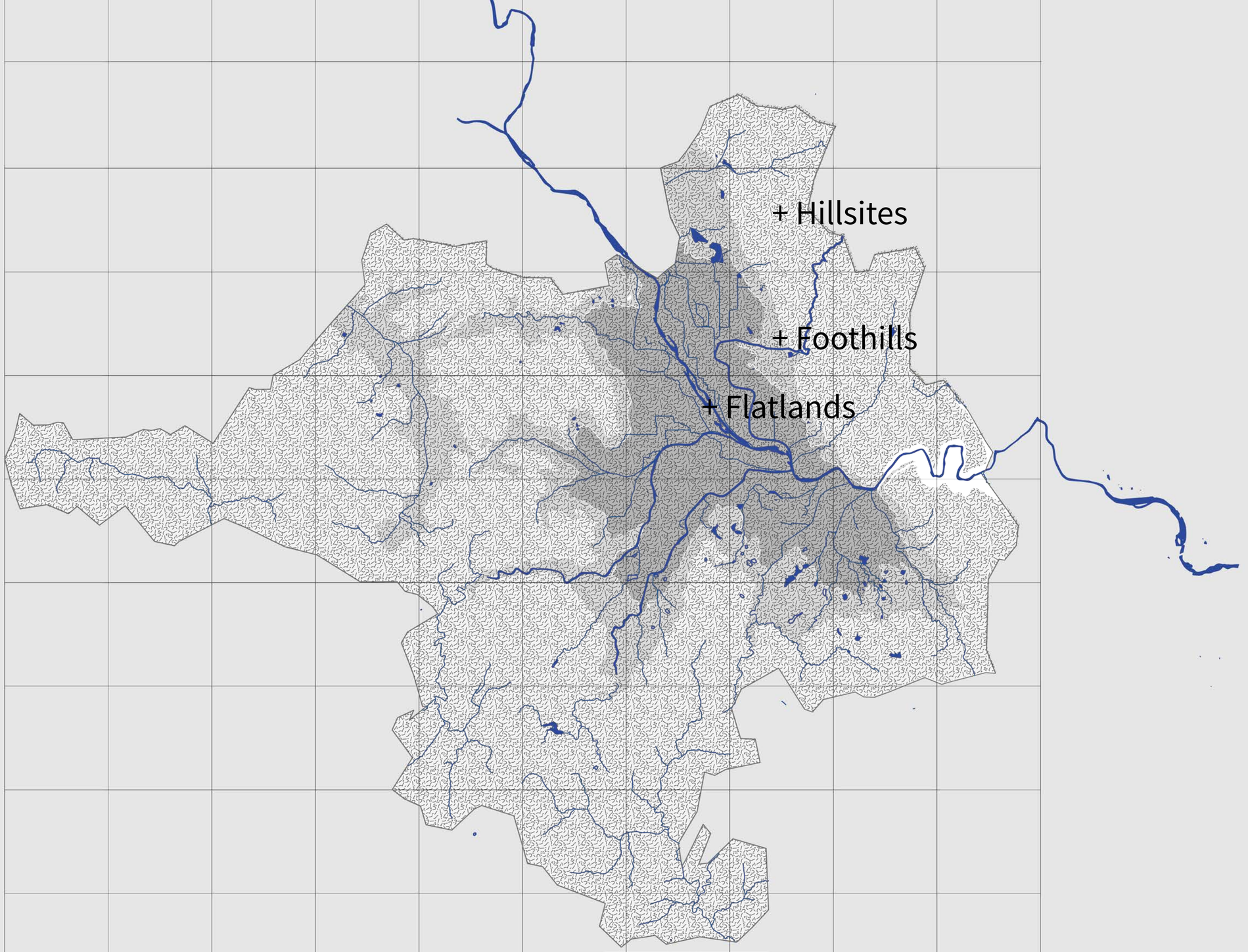


Multilayered cultivation
Reduce runoff, and contribute to groundwater recharge

Design goals
Landscape strategies
Landscape principles
Regional application - Vision
Strategic interfaces

Conclusion

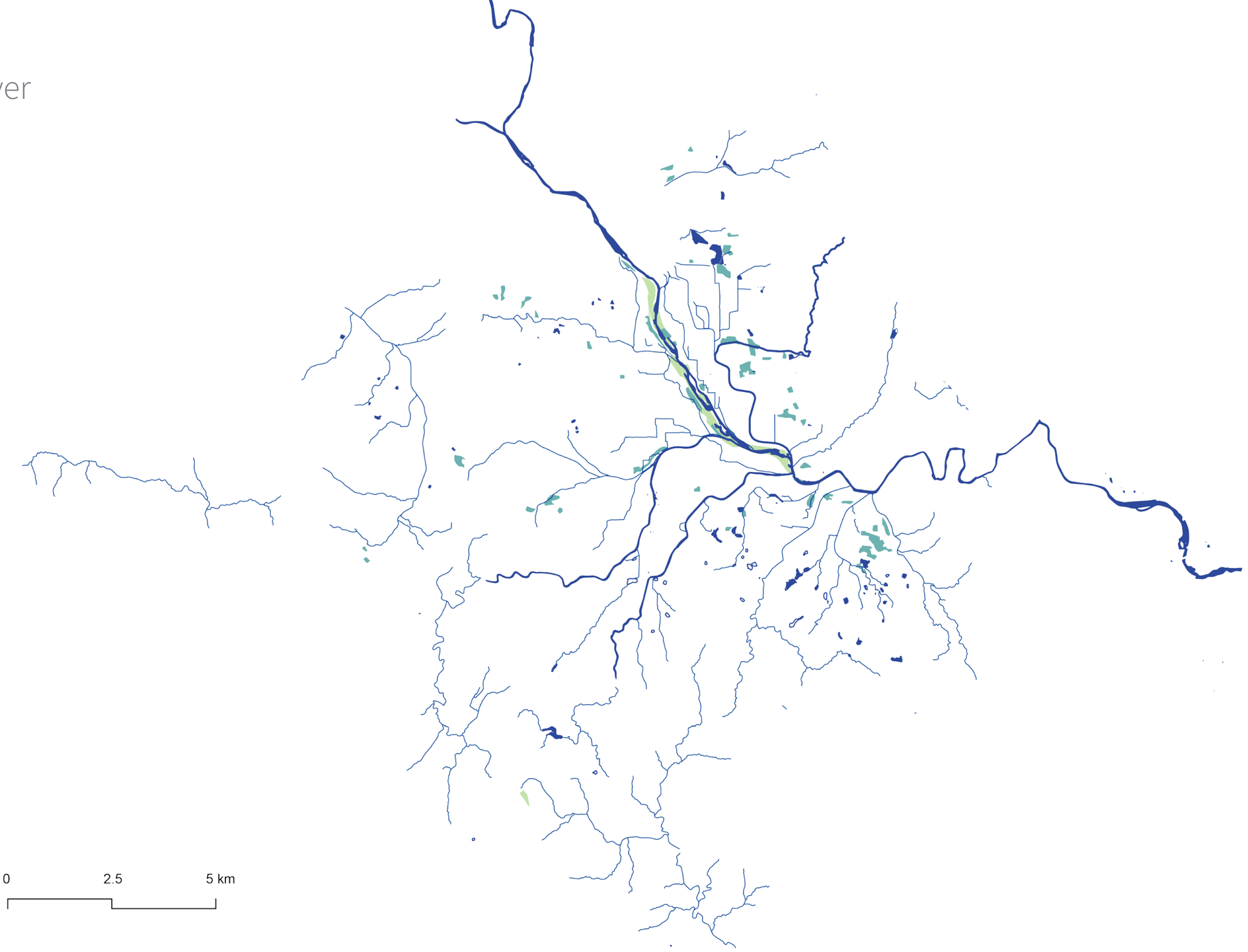
Regional application



Regional application

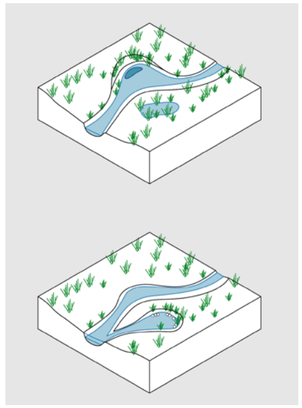
The essential basis layer

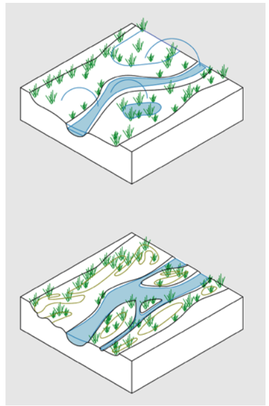
The natural context
relief
water, soil
geological substructure
climate

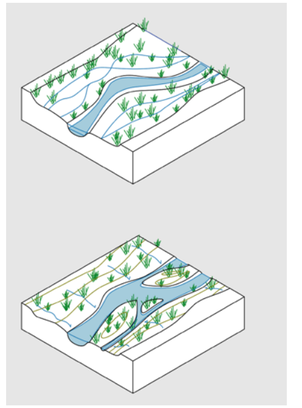


Regional application

First layer



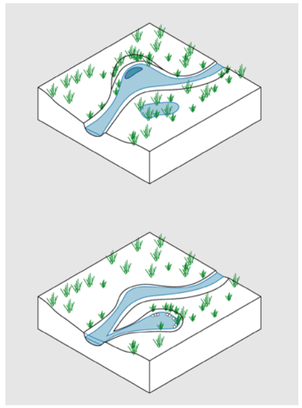


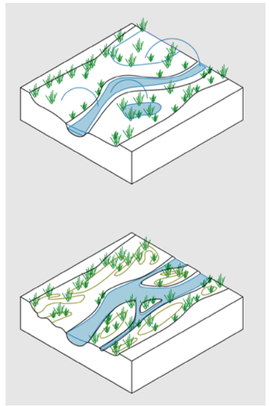


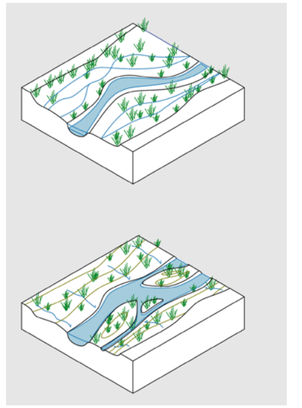
Natural processes activation:
green-blue networks
green edges

Regional application

Second layer



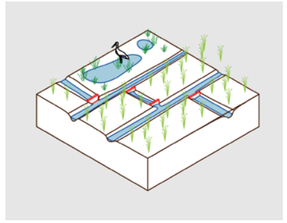


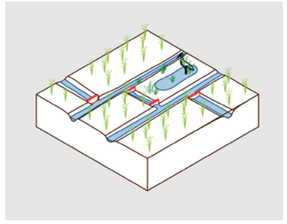


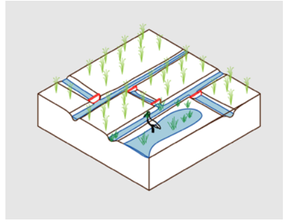
Utilize paddy fields
for agriculture
and their sponge capacity

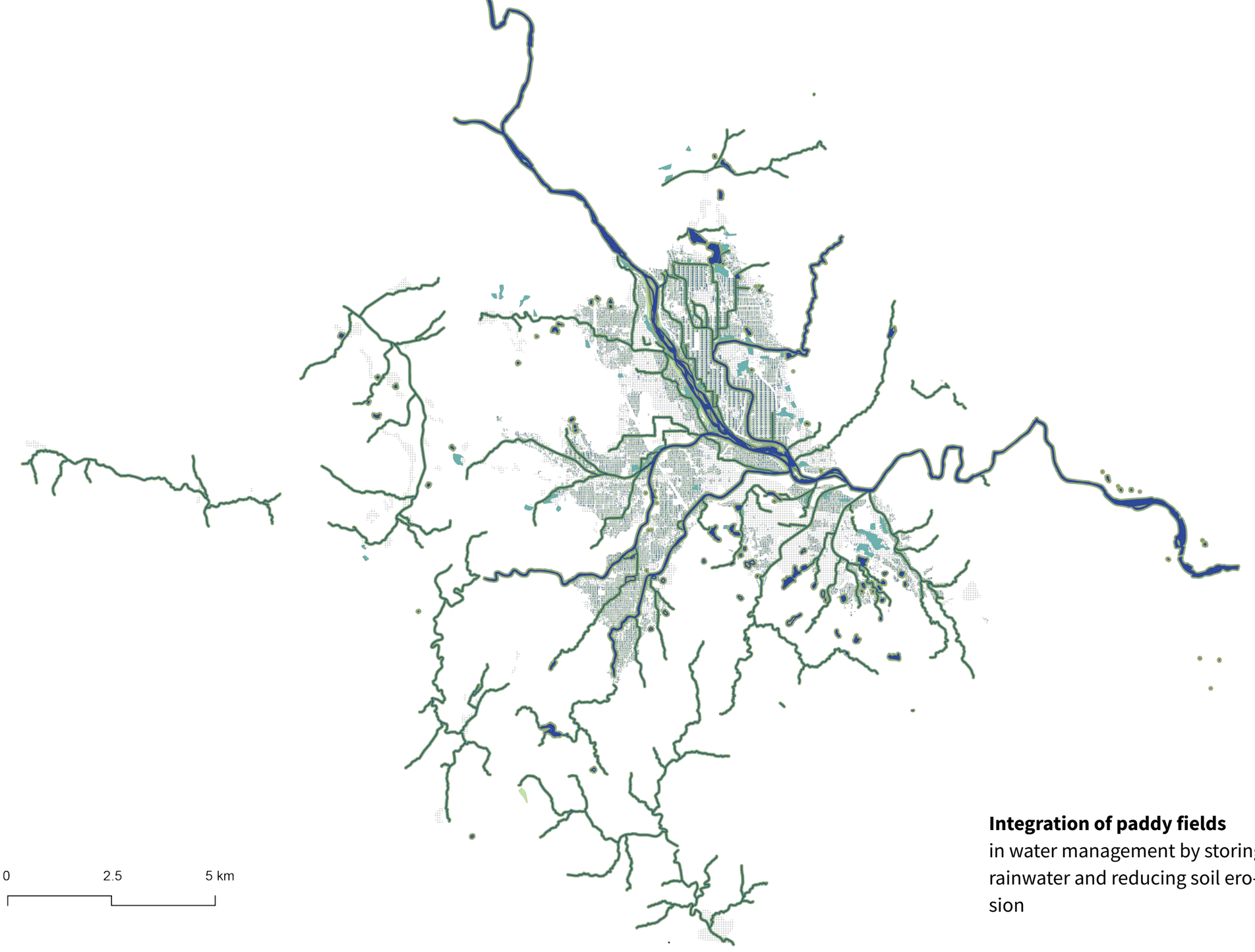
Regional application

Third layer





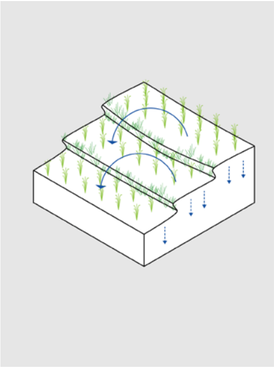


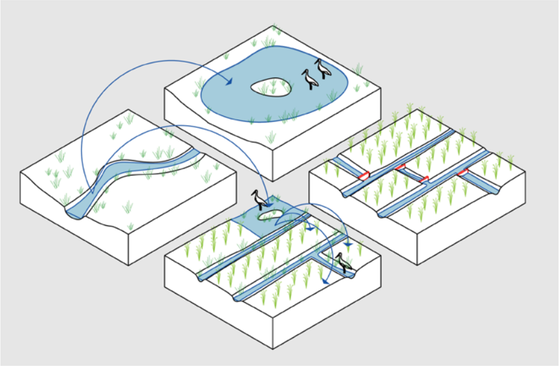


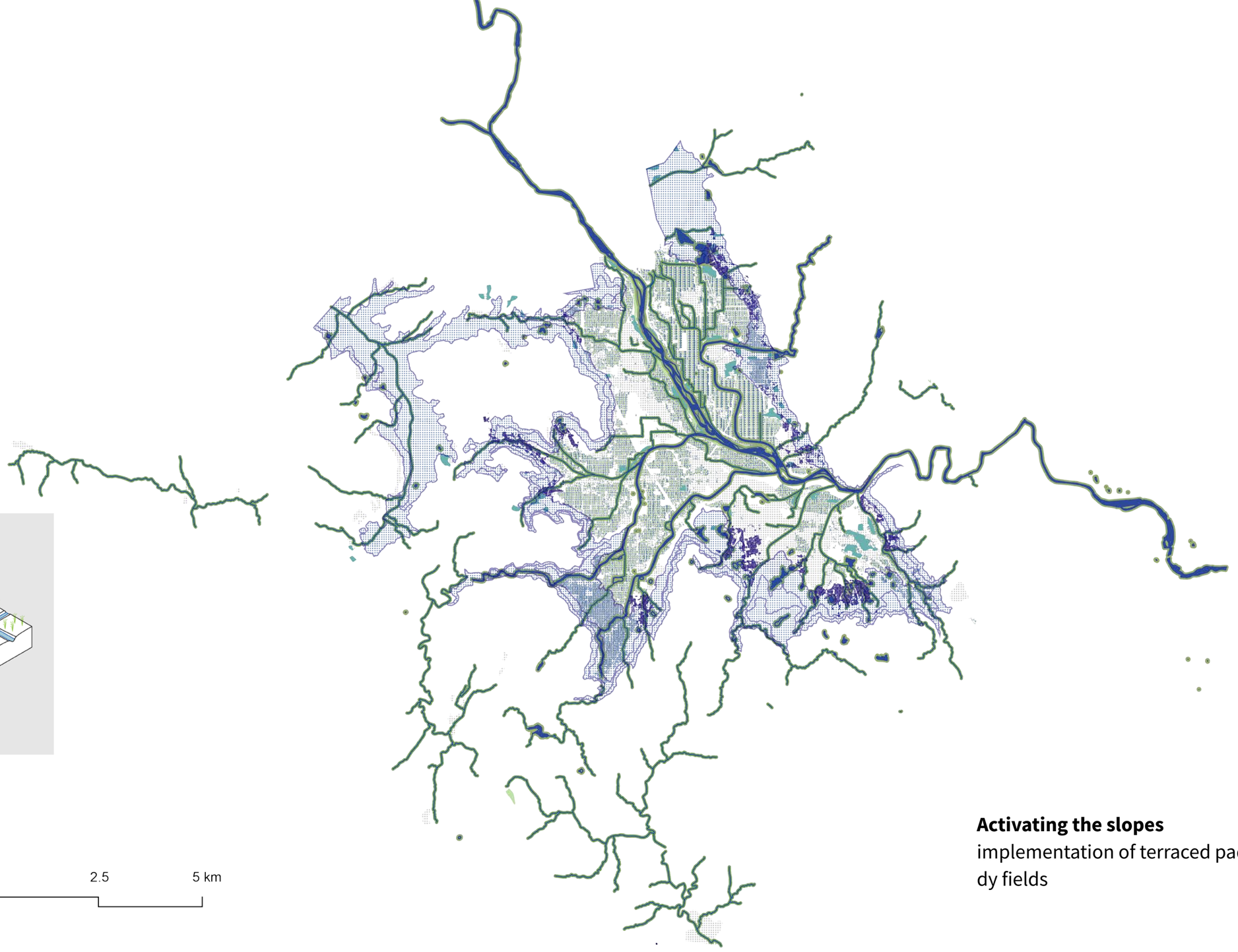
Integration of paddy fields
in water management by storing rainwater and reducing soil erosion

Regional application

Fourth layer





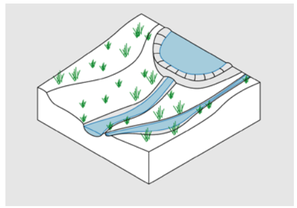


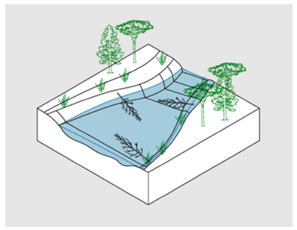
0 2.5 5 km

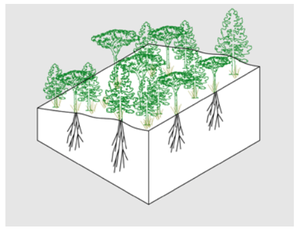
Activating the slopes
implementation of terraced paddy fields

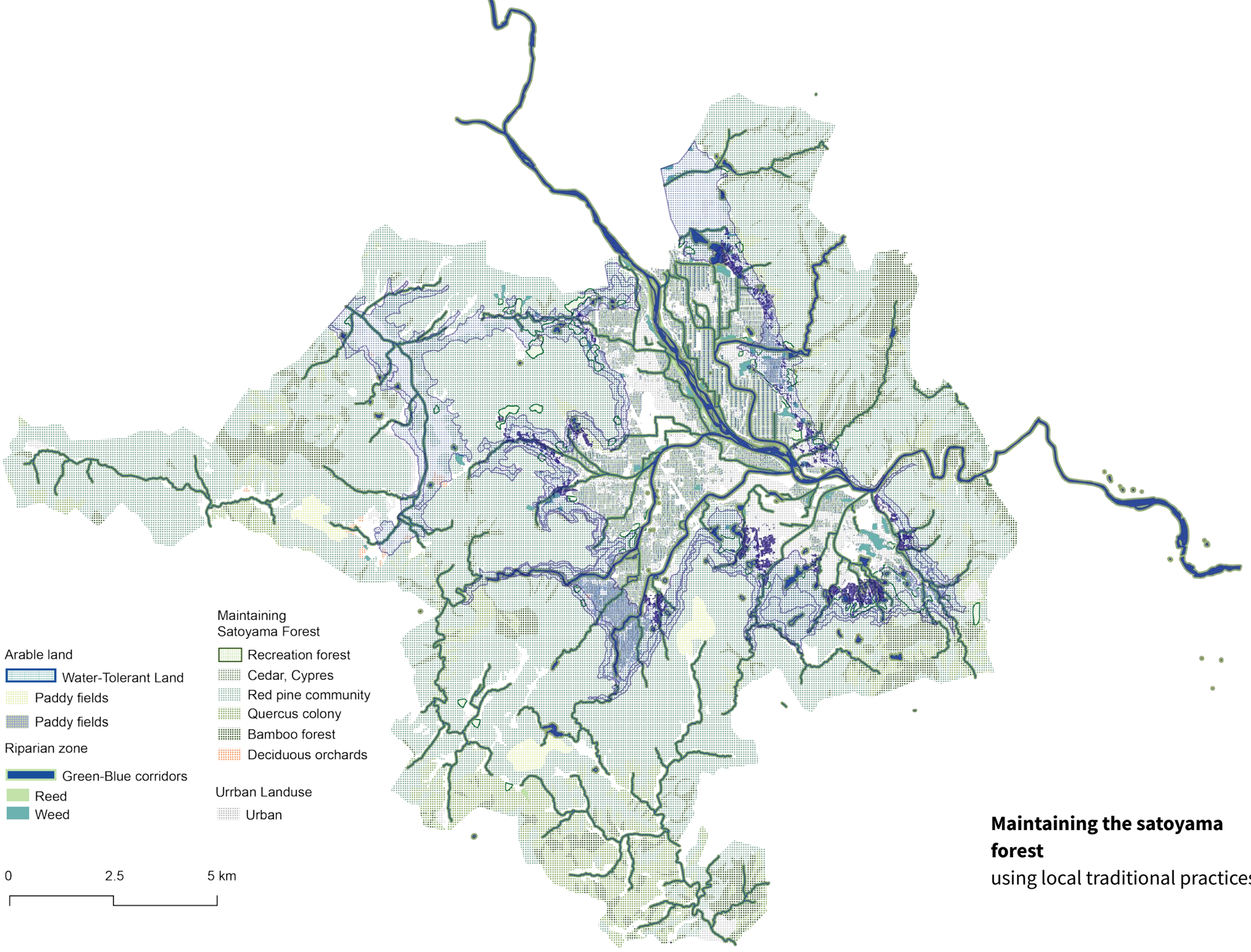
Regional application

Fifth layer









Maintaining the satoyama forest
using local traditional practices

Design goals
Landscape strategies
Landscape principles
Regional application - Vision
Strategic interfaces

1. Flatlands - Oi River
2. Flatlands - Hillsides
3. Headwaters

Conclusion

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Natural Context as the Basis

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

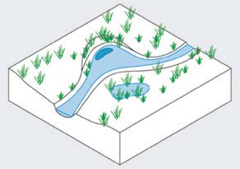
On-line Bays

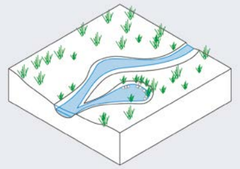
Backwater

Old Meanders Restoration

Braided Streams

Floodplain Activation



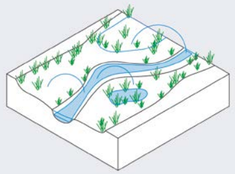


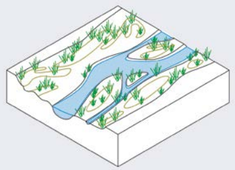
Flatlands - Ōi (Katsura) River

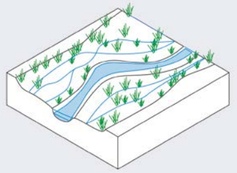
Flood safety and Ecology

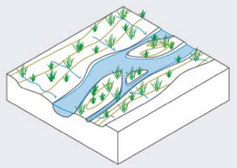
Softened River Edges

Restore Riparian-Bio Defenses









Flatlands - Ōi (Katsura) River

Flood safety and Ecology

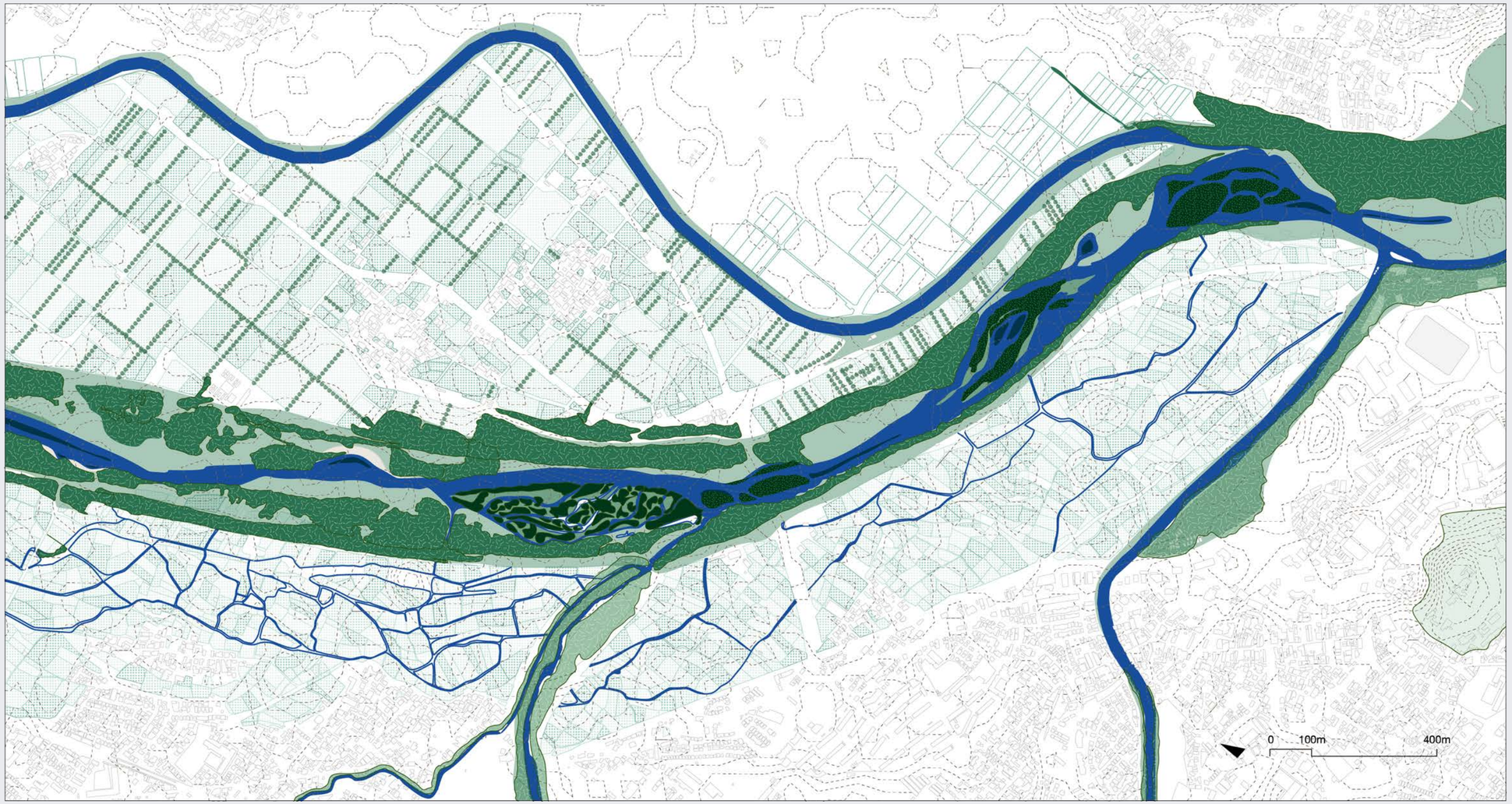
Revitalize Vegetation Layer:

Productive Islands

Trees

Wetlands

Tree Lines in the Pasture

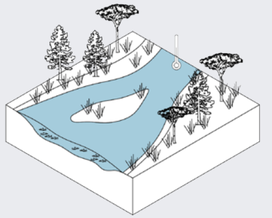


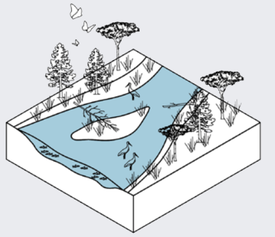
productive islands

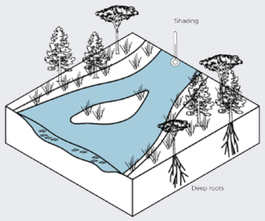
trees

wetlands

tree lines

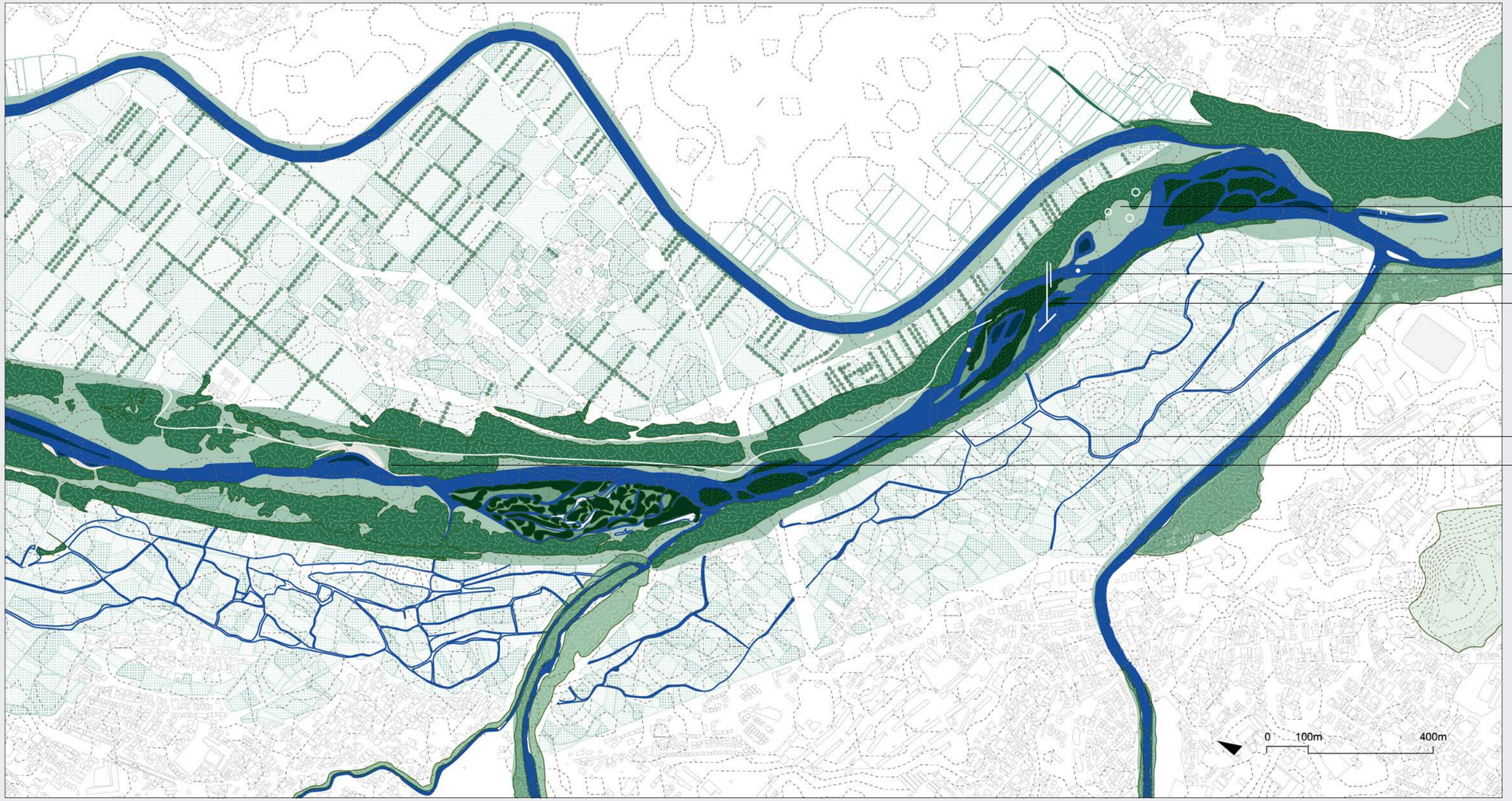






Flatlands - Ōi (Katsura) River

Flood safety and Ecology



Cultural layer

camping space

bird habitat

platform

wayfinding/ path

on-line river bays

productive islands

trees

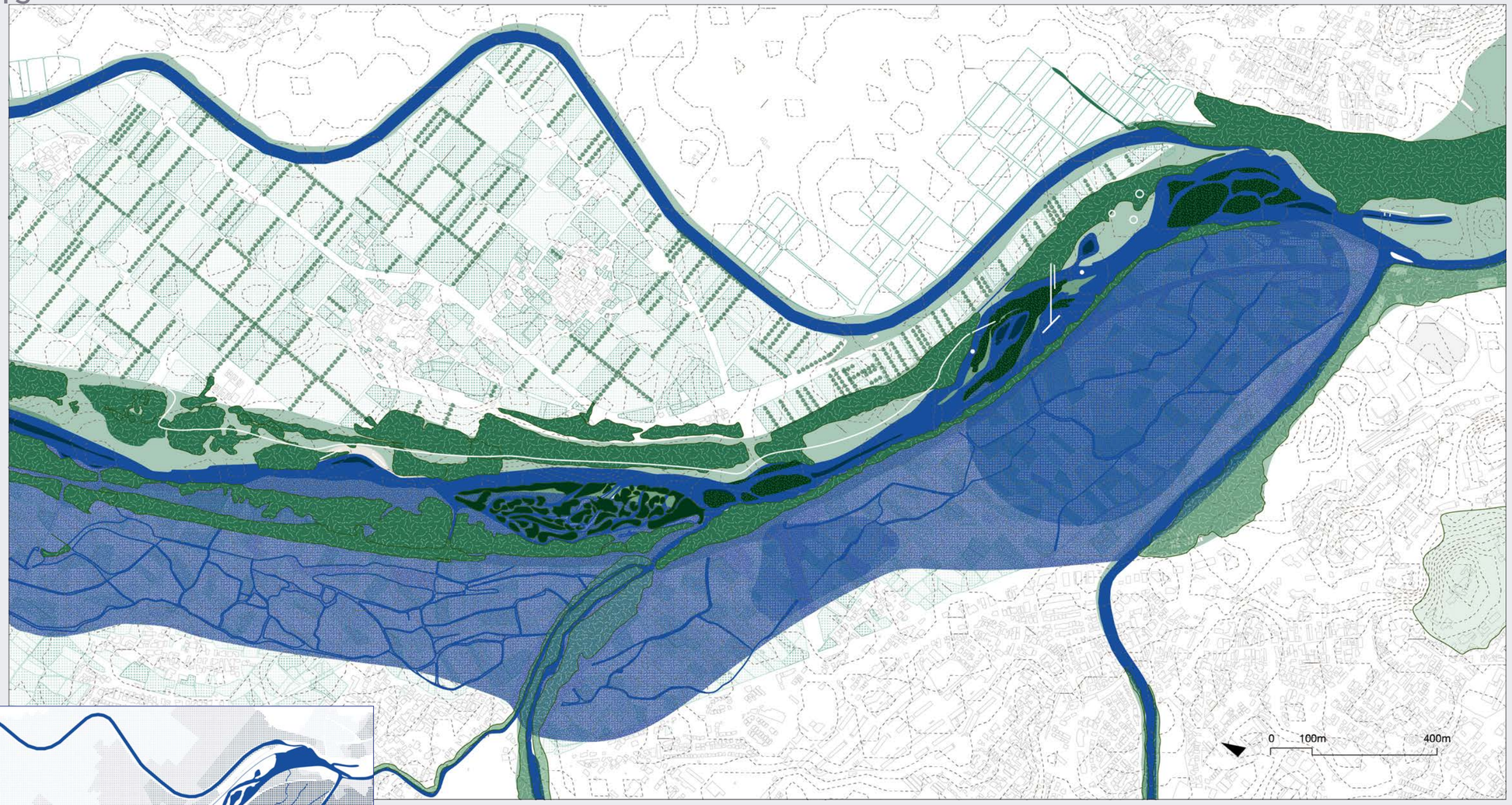
wetlands

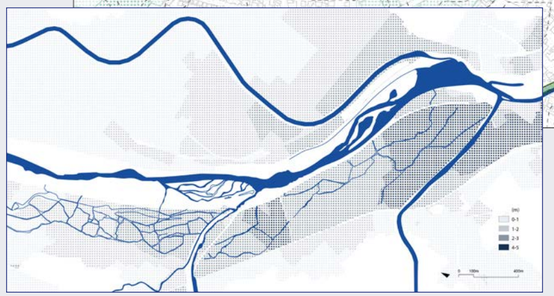
tree lines

Flatlands - Ōi (Katsura) River

Landscape state during a controlled flood event

Every 10 years



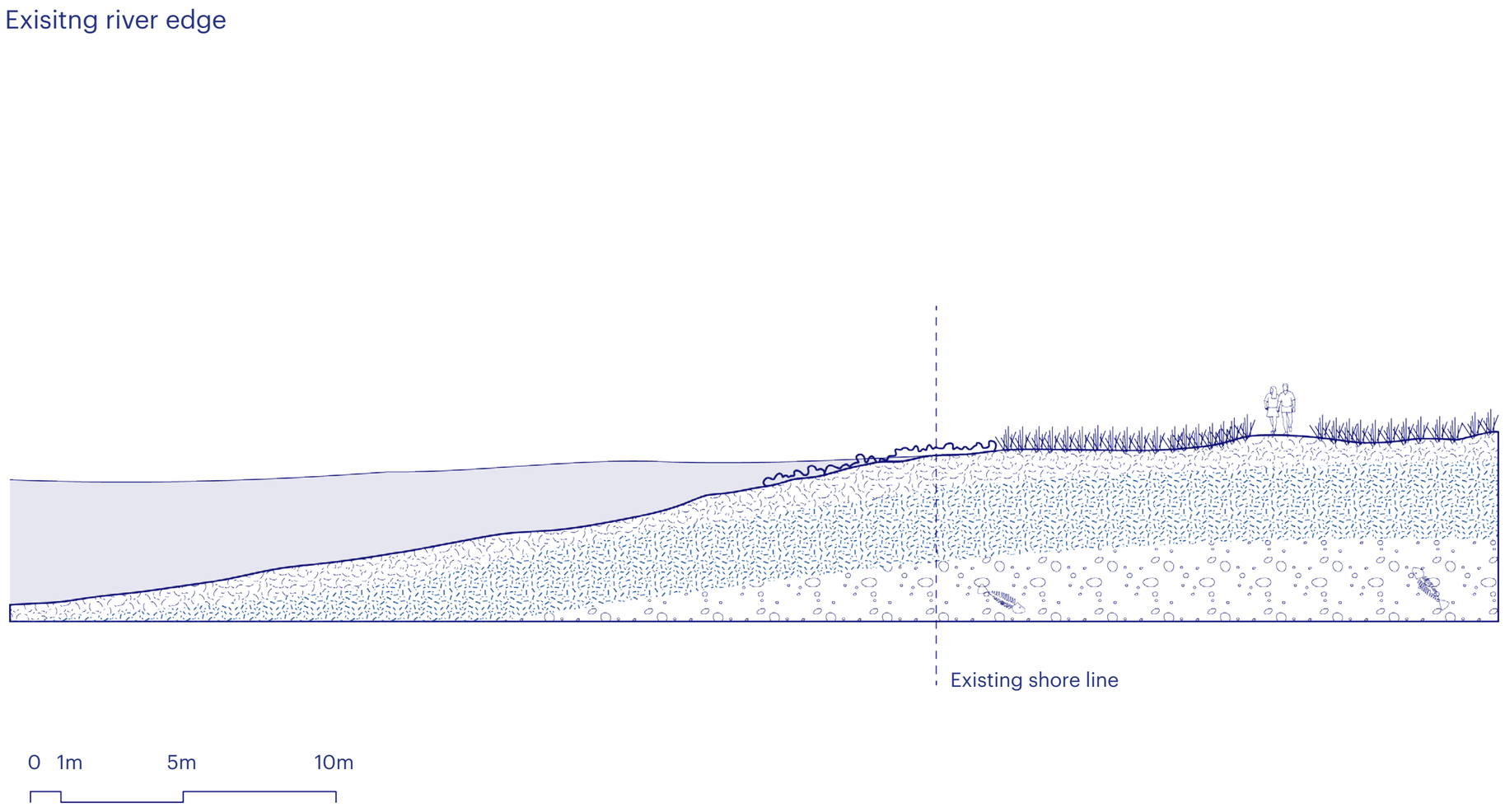


Inundation depth

manage excess water by utilizing natural floodplain
allowing river overflow into designated zones

Flatlands - Ōi (Katsura) River

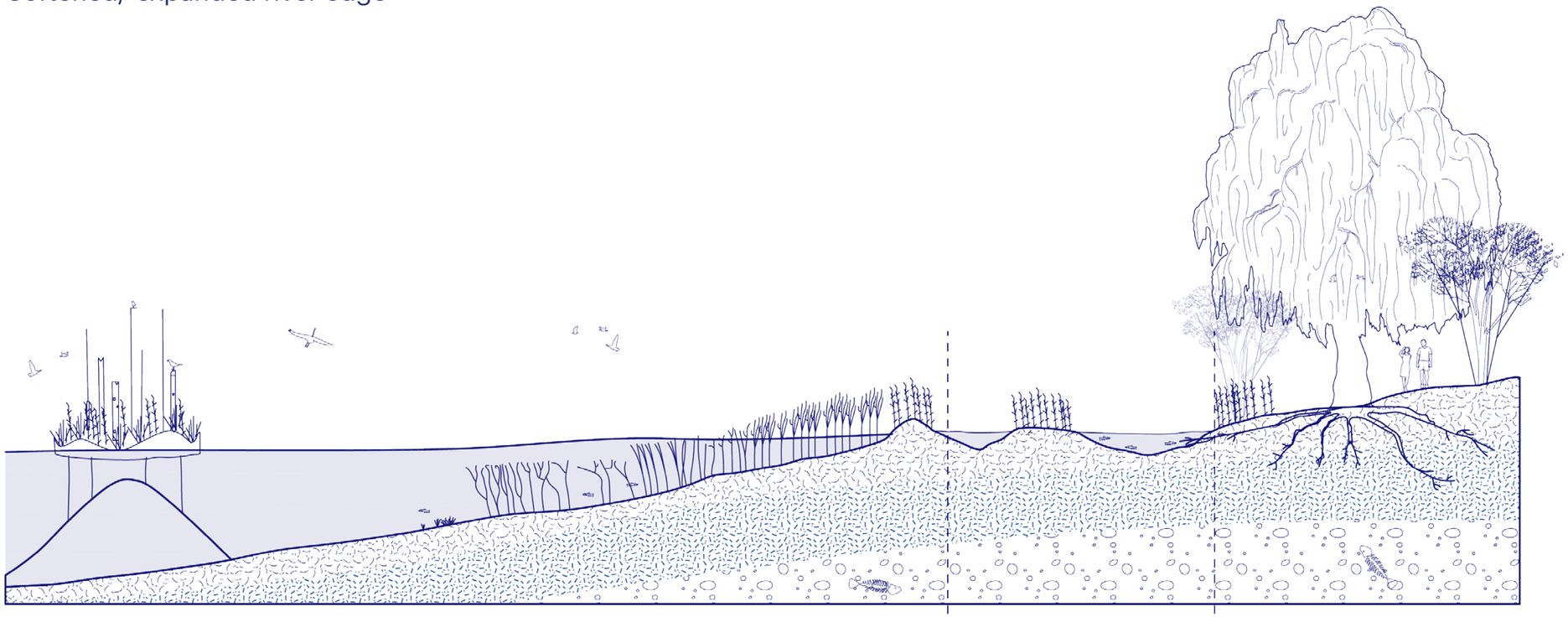
Flood safety and Ecology



Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Softened/ expanded river edge

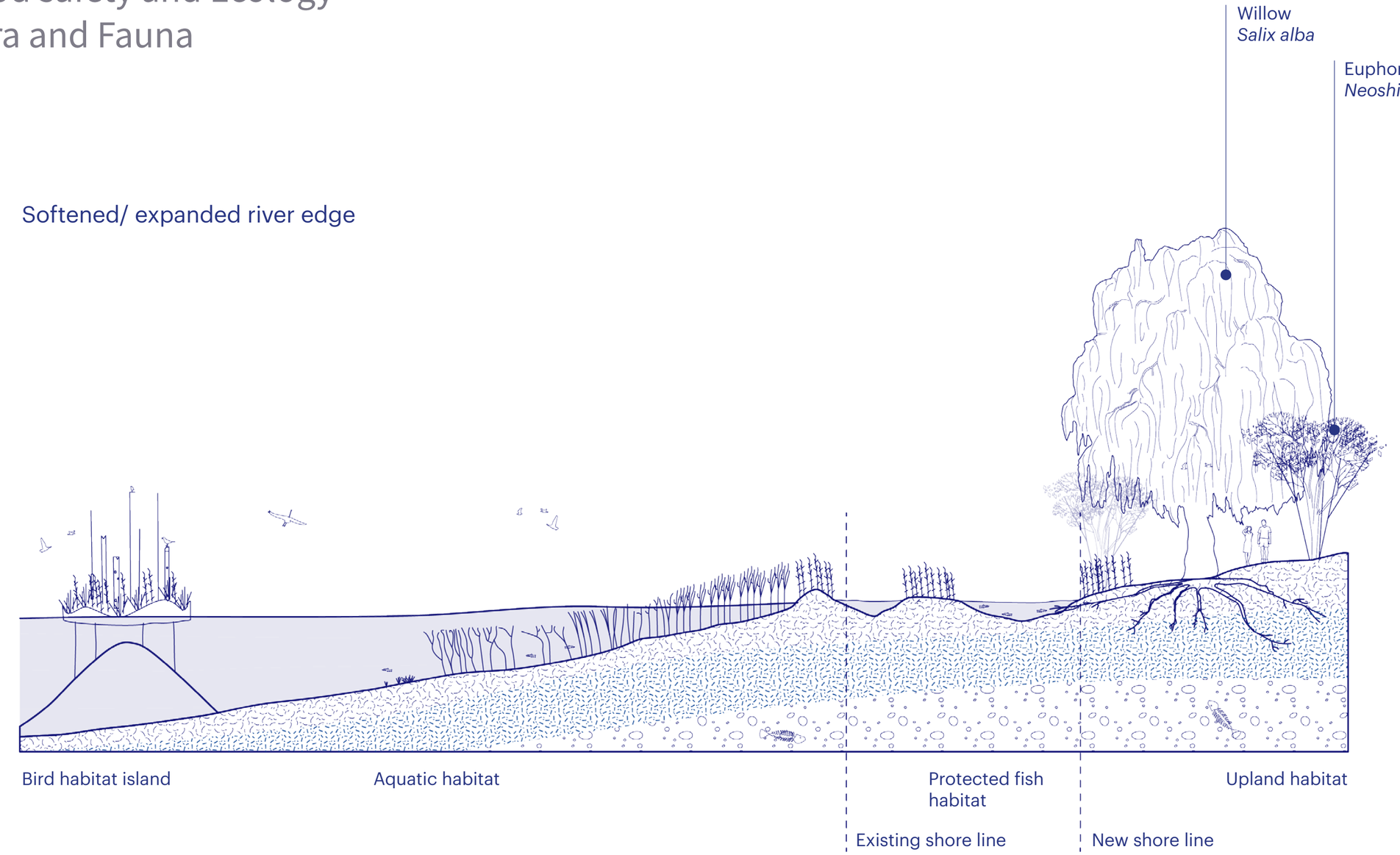


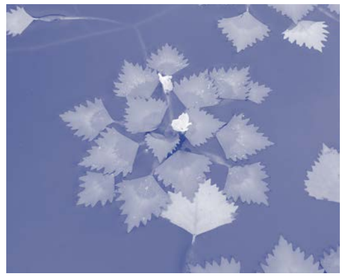
Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Flora and Fauna

Softened/ expanded river edge





Water chestnut
Trapa jeholensis

Broadleaf cattail
Typha latifolia

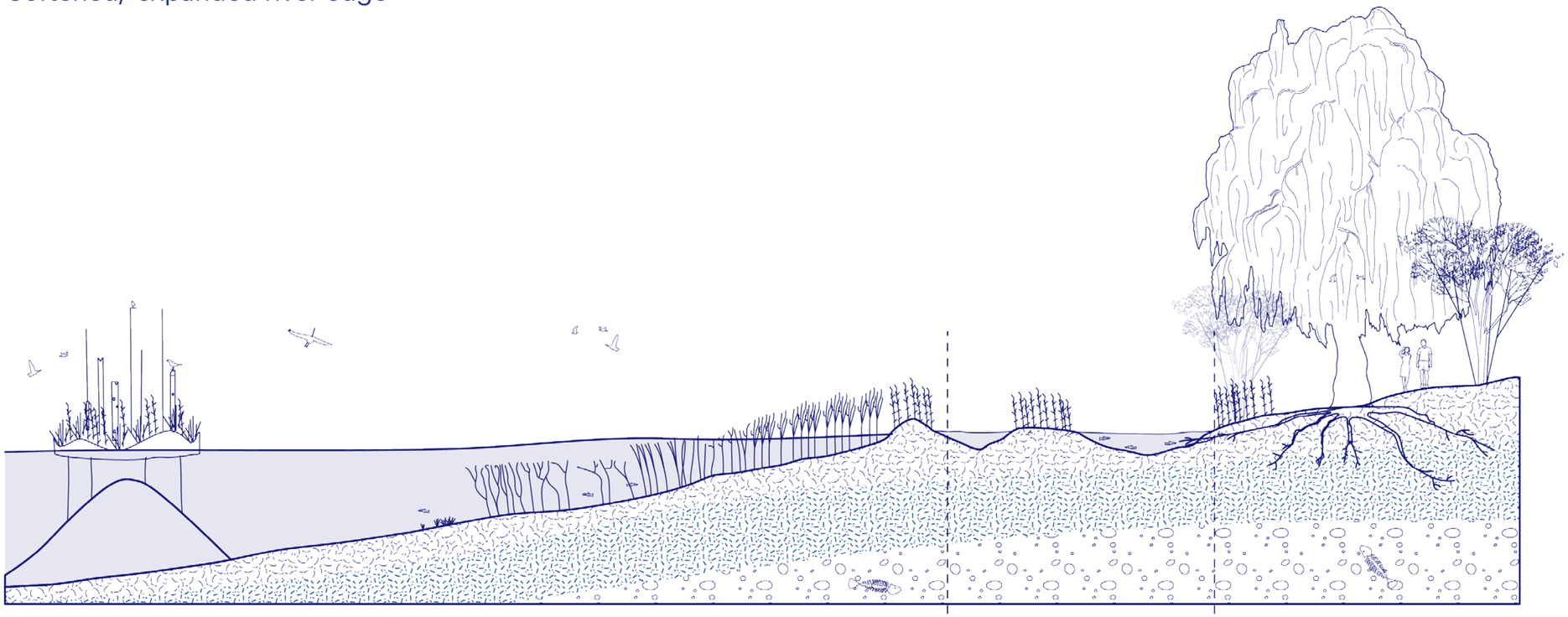
Water-chickweed
Stellaria aquatica

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Flora and Fauna

Softened/ expanded river edge



Cyprinidae

Loanchidae

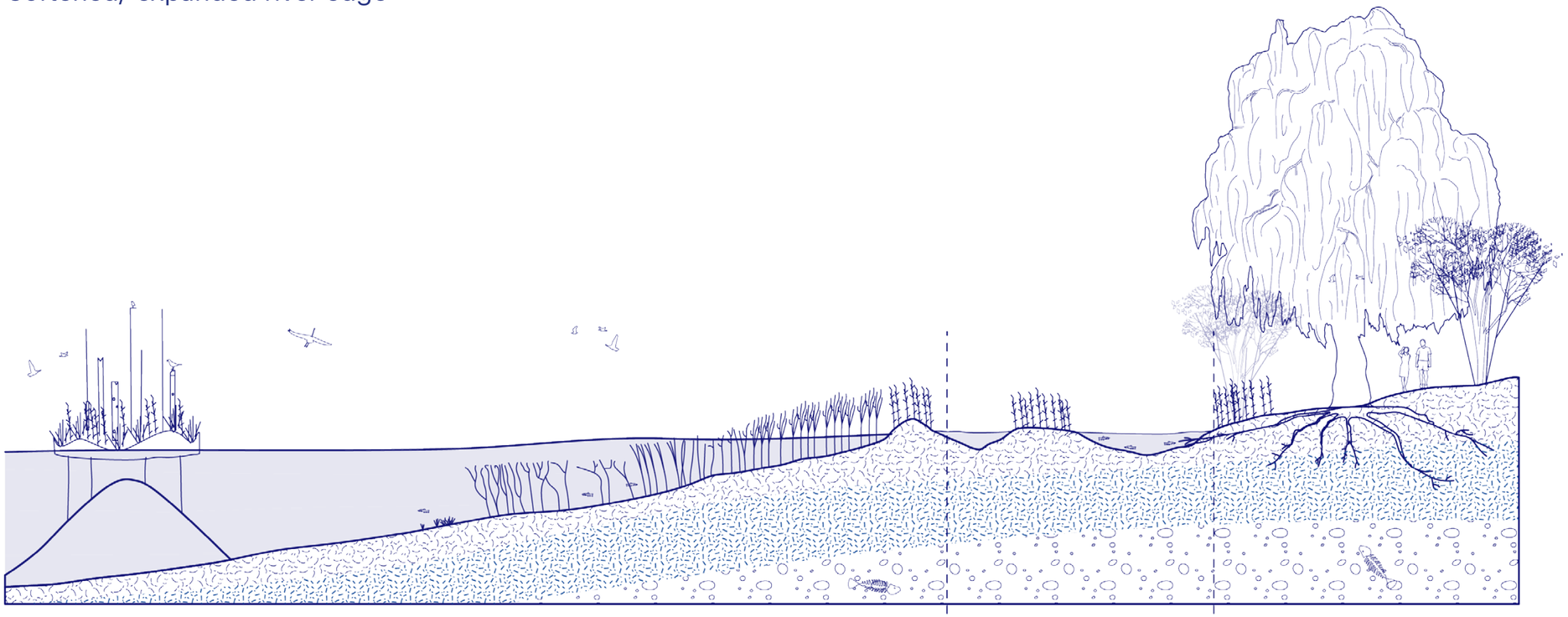
Goby

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Flora and Fauna

Softened/ expanded river edge



Kingfisher

Oriental stork

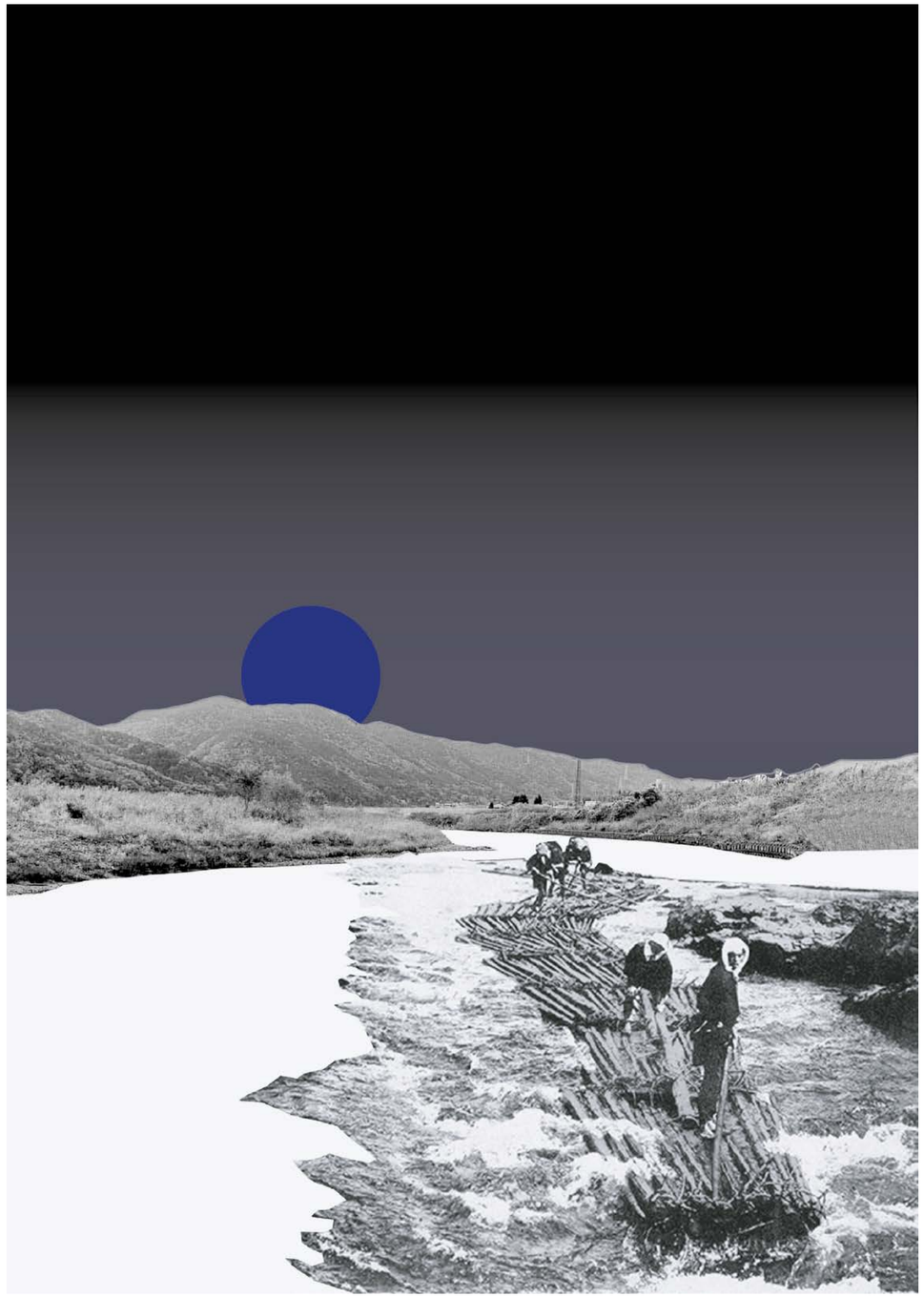
Cormoran

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Time frames

Water transportation



Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Time frames

Satoyama 2.0 landscape taking action
2024

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Time frames

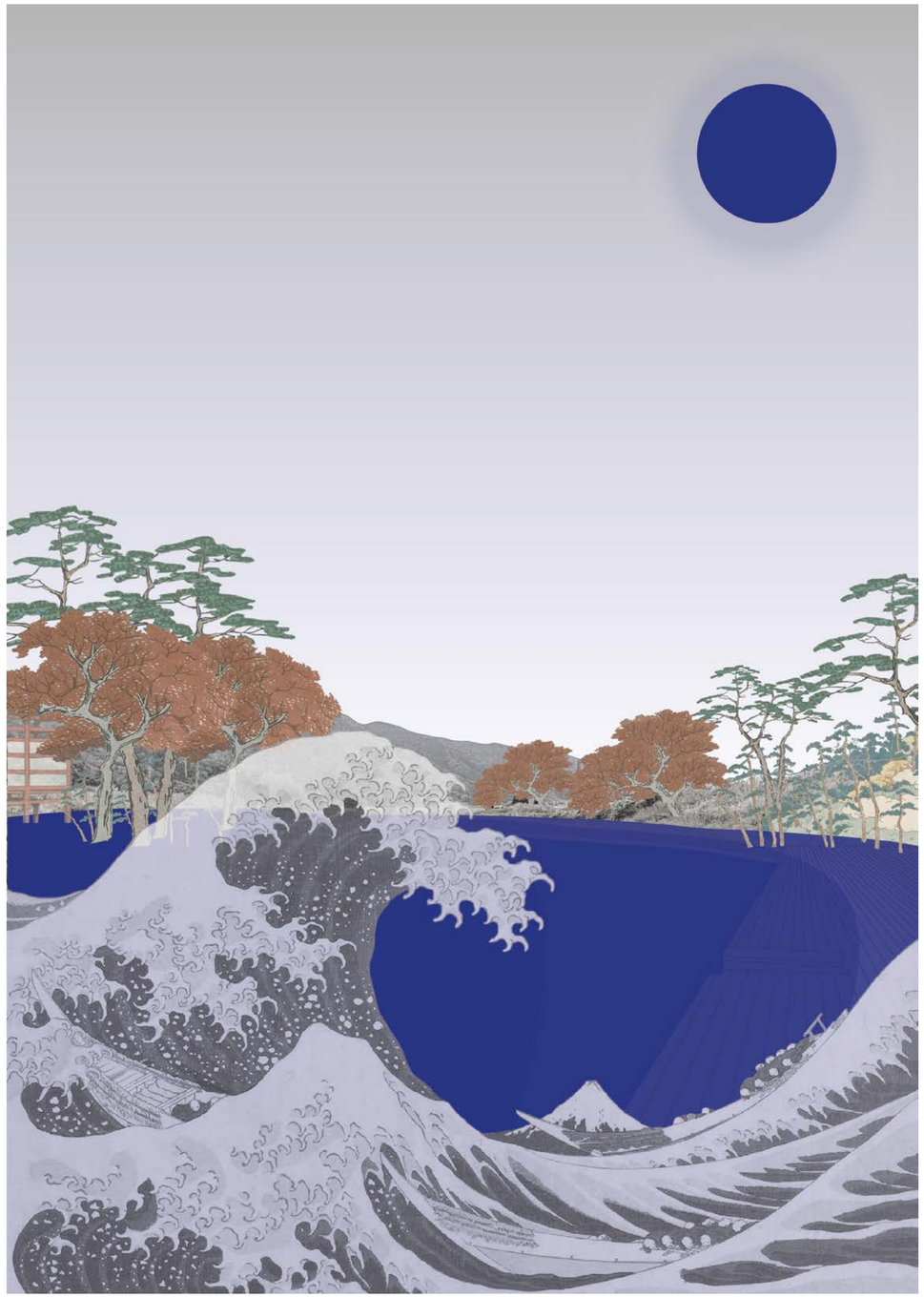
Satoyama 2.0 landscape
2054

Flatlands - Ōi (Katsura) River

Flood safety and Ecology

Time frames

Satoyama 2.0 landscape
control flood situation



Design goals
Landscape strategies
Landscape principles
Regional application - Vision
Strategic interfaces

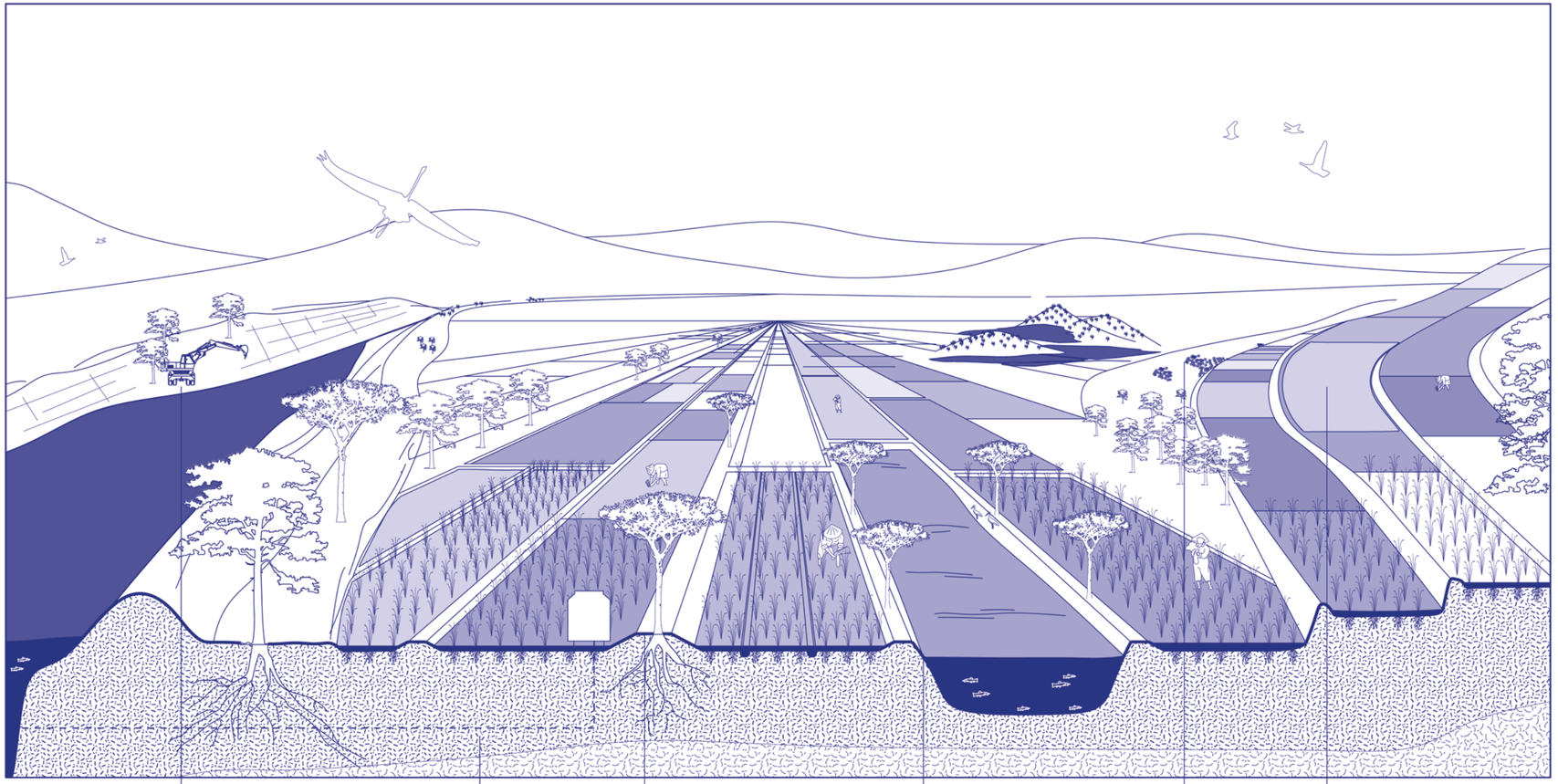
Conclusion

1. Flatlands - Oi River
2. Flatlands - Hillsides
3. Headwaters

Flatlands - Hillsides

Agricultural, Cultural, and Ecological Aspects

WET SEASON
WATER GRADIENTS



Remove patches of concrete restore riparian edges

Pumping water from the river

Agro-farming

Use Paddy Fields for water retention and ecology

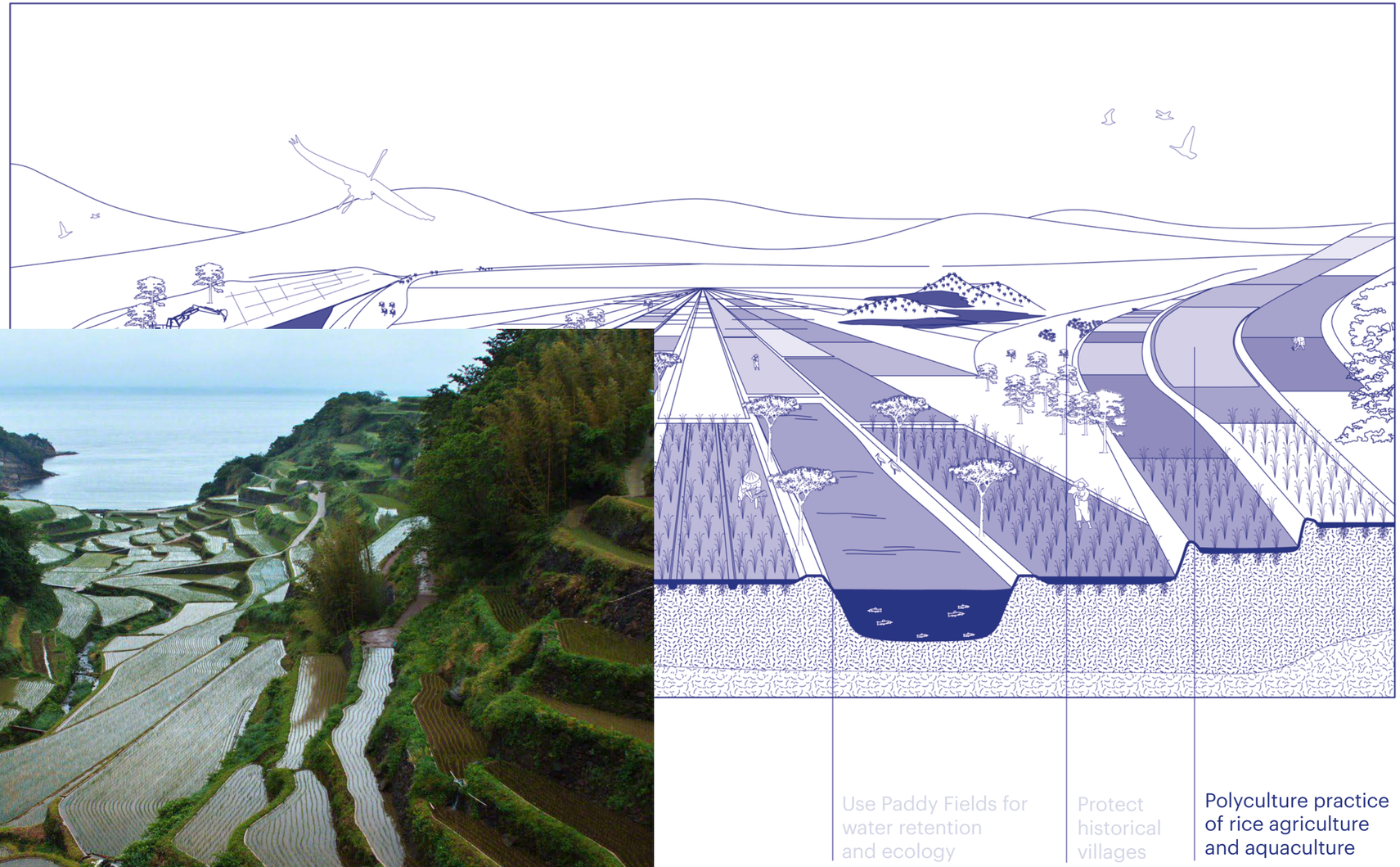
Protect historical villages

Polyculture practice of rice agriculture and aquaculture

Flatlands - Hillsides

Agricultural, Cultural, and Ecological Aspects

WET SEASON
WATER GRADIENTS

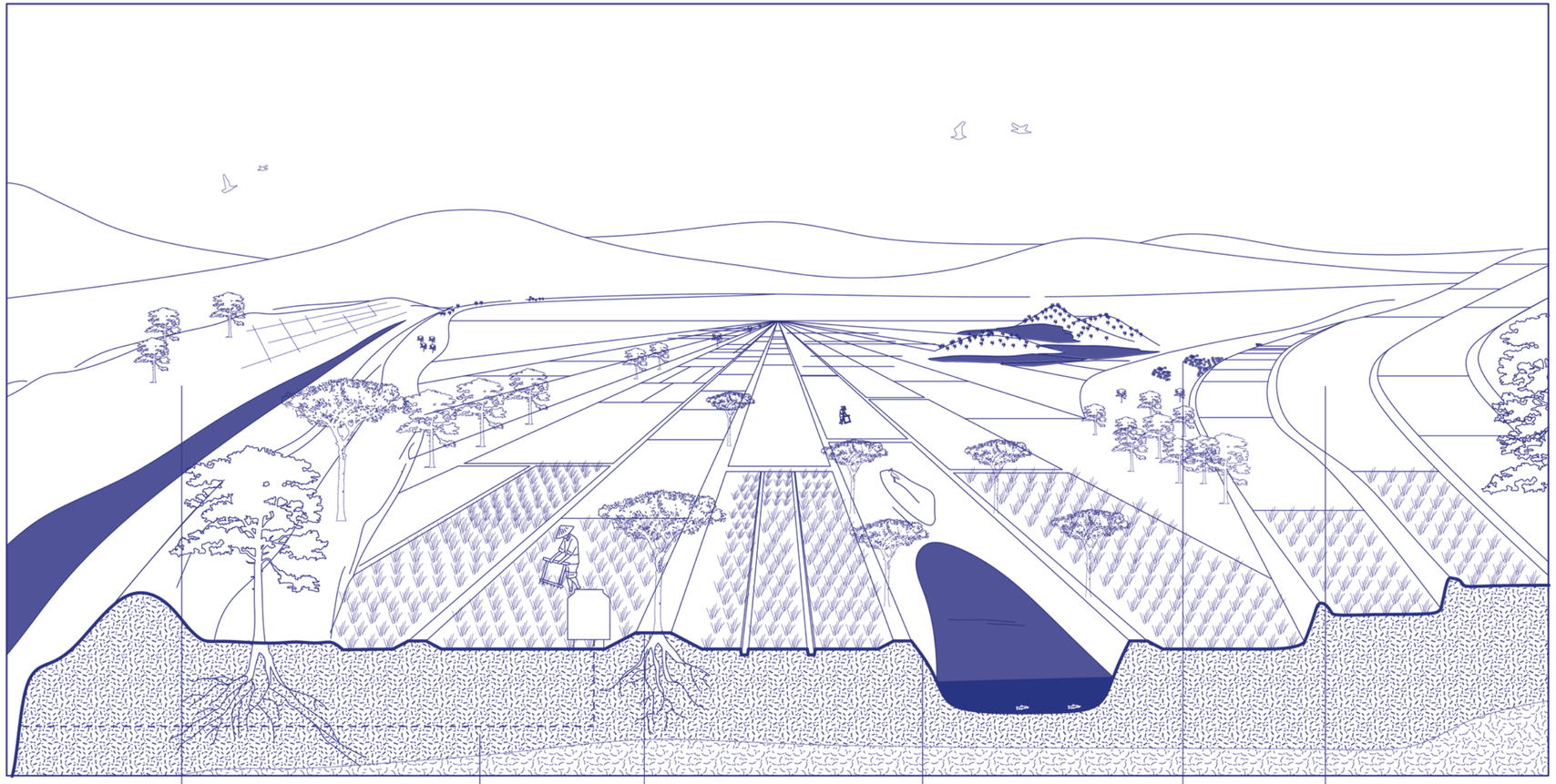


traditional agricultural practice of ‘tanada’ - sustainable farming and water managemen

Flatlands - Hillsides

Agricultural, Cultural, and Ecological Aspects

DRY SEASON



Remove patches of concrete edge to restore riparian edges

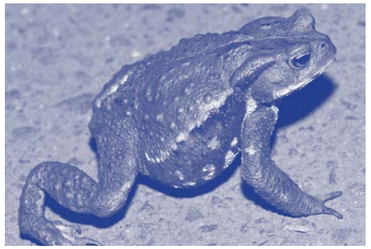
Pumping water from the river

Agro-farming

Use Paddy Fields for water retention and ecology

Protect historical villages

Polyculture practice of rice agriculture and aquaculture



Flatlands - Hillsides

Agriculture in the past

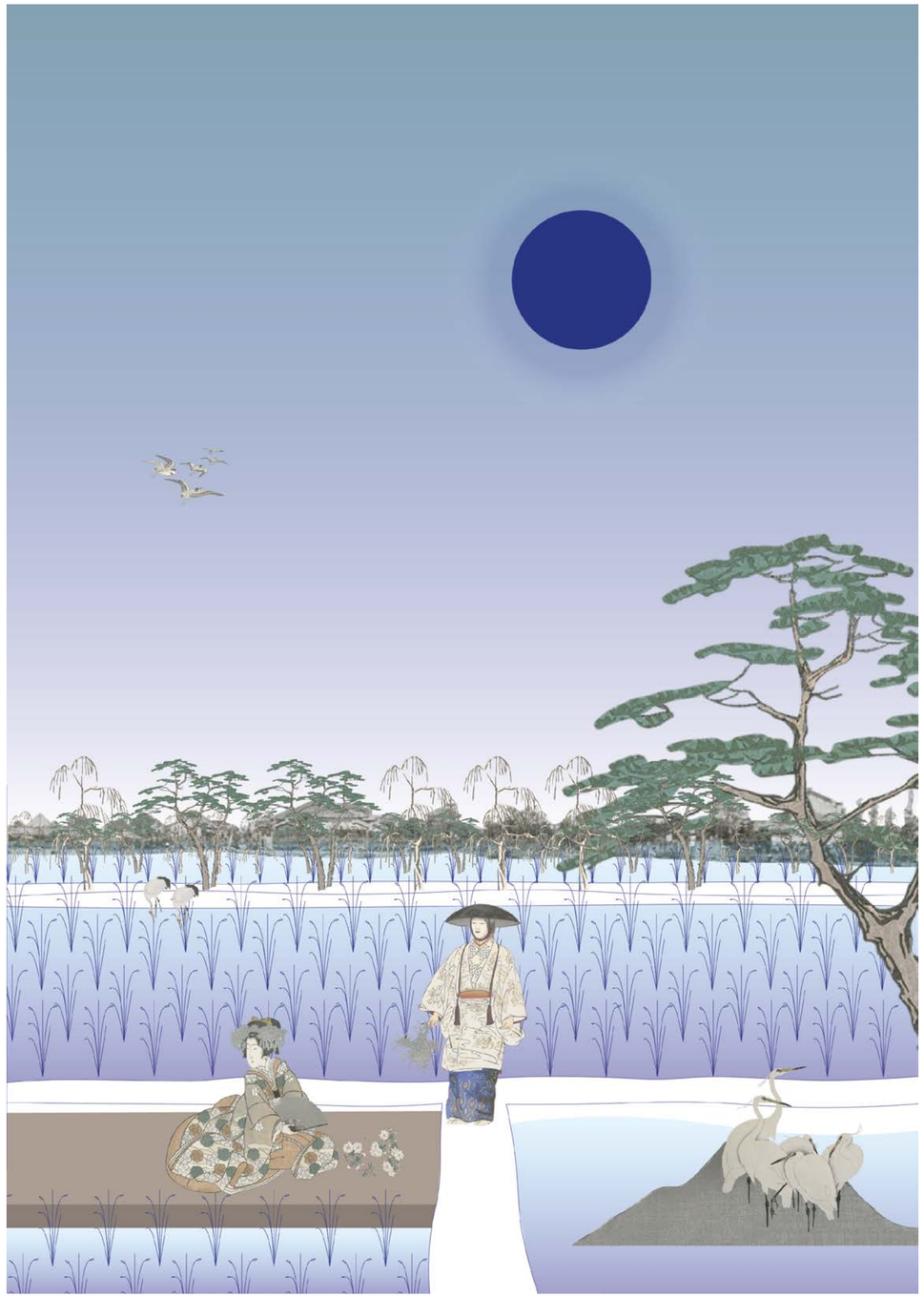
Flatlands - Hillsides

Agriculture in 15 years

promoting groundwater recharge

recreation

community engagement



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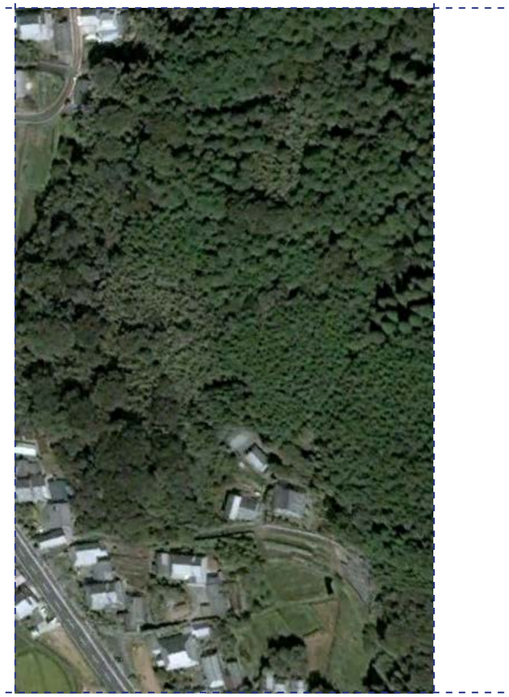
Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest



2010

2018

2021

2024

0 10m 50m

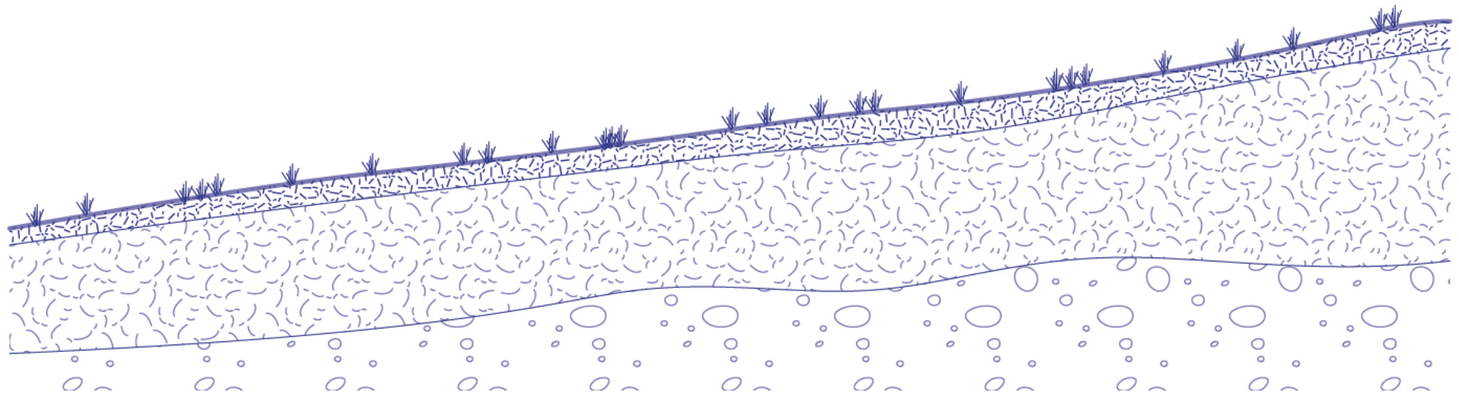
knit forest together

implementing
contour planting design

Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest

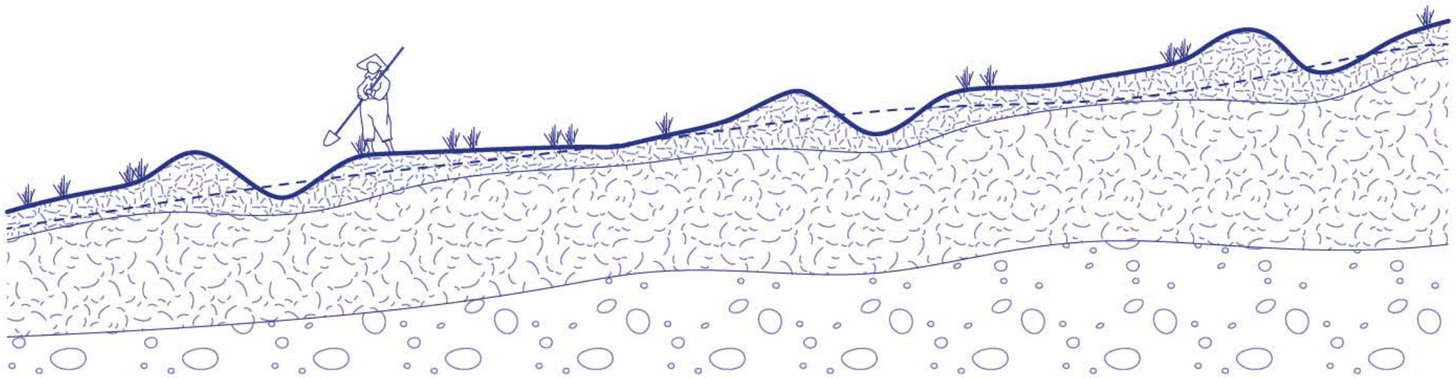
Current situation



Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest

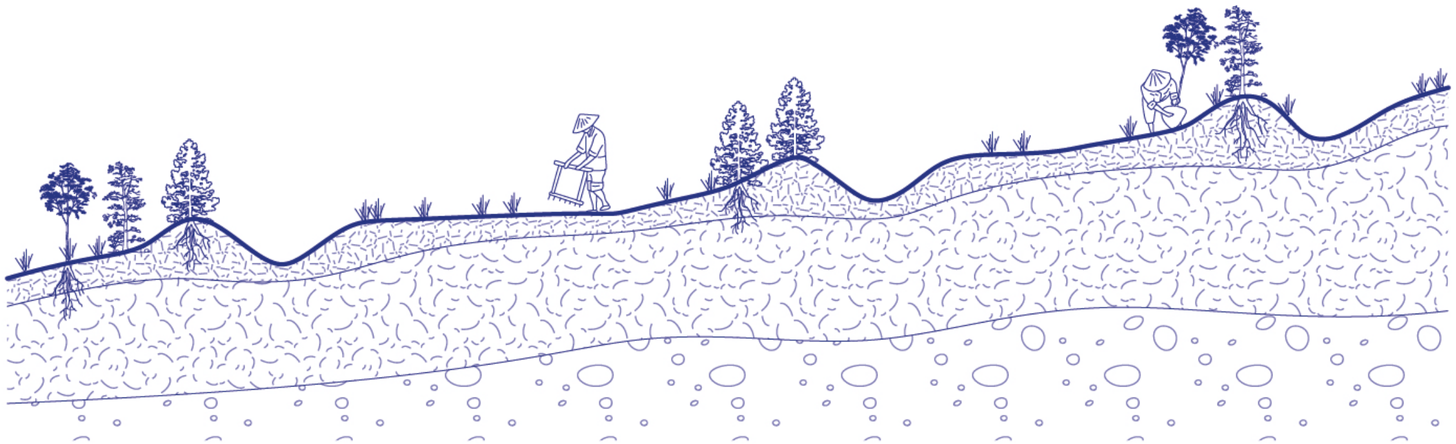
Creating Dikes



Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest

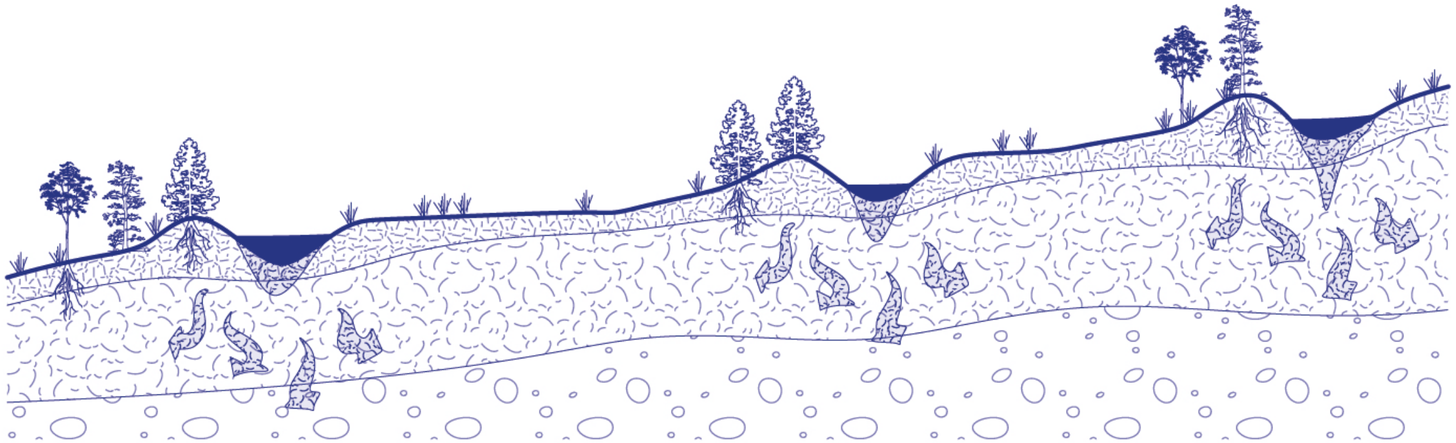
Planting Indigenous tree species



Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest

Wet Season: Collecting runoff water & infiltration



Headwaters

Knitting Together- Restoring the Satoyama Forest

Forest Garden

Loquat
Eriobotrya japonica

Asian Pear
Pyrus pyrifolia

Citrus Trees
Yuzu, Mikan, Sudachi

Ecology

Mammals:
Japanese Marten

Birds:
Japanese Pheasant

Reptiles:
Japanese Rat Snake

Insects:
Giant Japanese Hornet

Cultural/sacred Spaces

Groundwater recharge

Headwaters

Knitting Together- Restoring the Satoyama Forest

embracing the sacred significance of Shintoism

Cultural/sacred Spaces

Headwaters and Forest

Knitting Together- Restoring the Satoyama Forest

Shiiba-Style Forestry
-selective logging and planting to

maintain forest health

continuous regeneration

biodiversity

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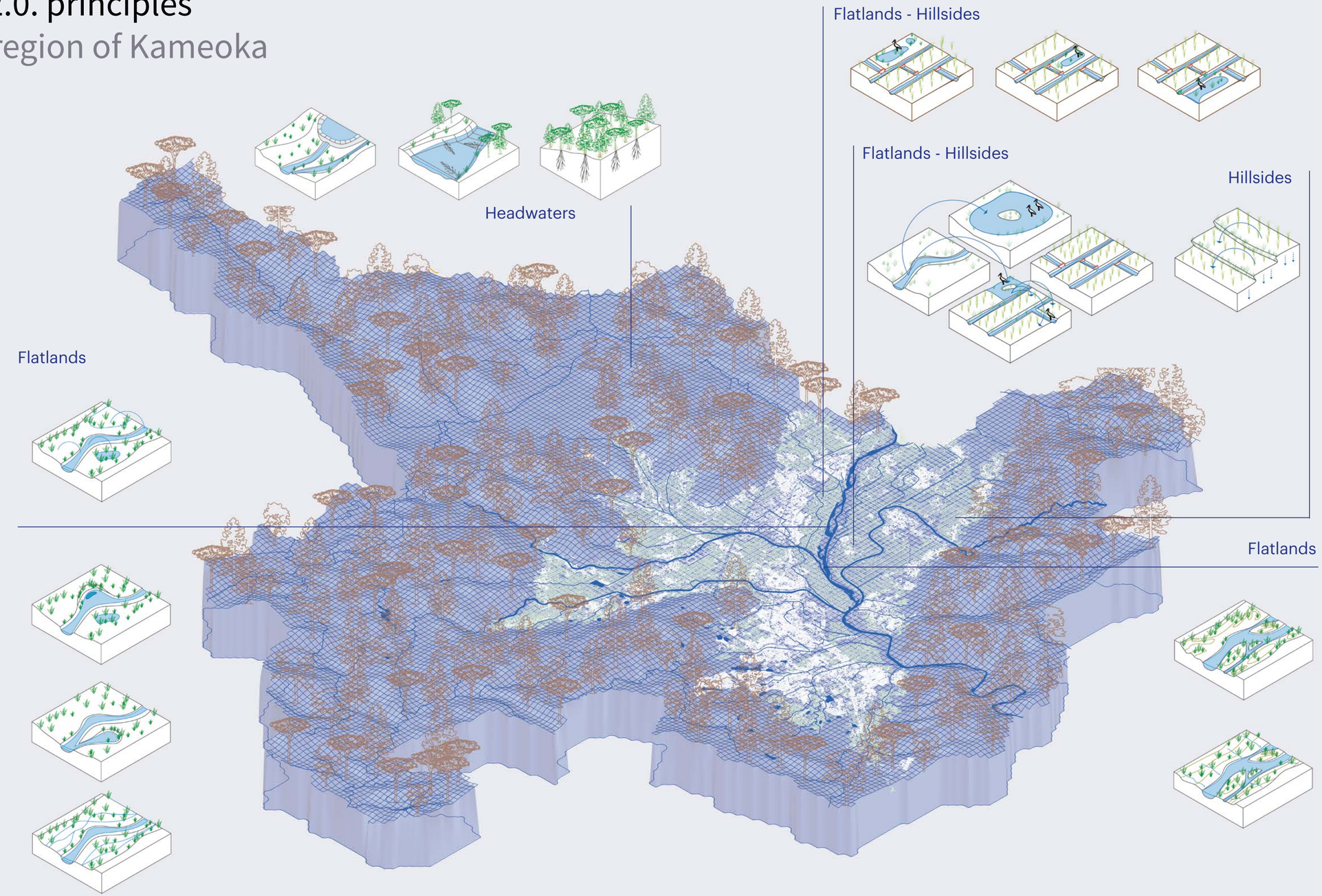
SYNOPSIS - CONCLUSION

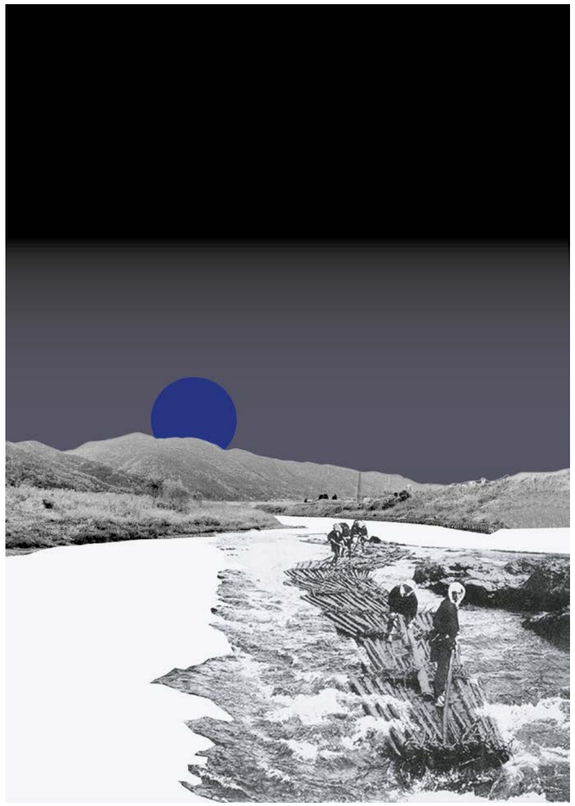
Satoyama 2.0. principles

Across the region of Kameoka



Satoyama 2.0. principles

Exploring the long-term of actions



Water transportion

Satoyama 2.0 taking action
2024

Satoyama 2.0 landscape
2054

Satoyama 2.0 landscape
control flood situation

SATOYAMA 2.0.
里山 2.0.

An Essence of Design, Principles, and the Spirit of Place.

Workshop and field visit, Kameoka, Japan
Design goals
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Conclusion

Explored ecological preservation, cultural revitalization, and flood mitigation as interconnected challenges in river landscapes

Addressed the urgent need to manage river landscapes in water-sensitive territories like Kameoka and the Oi River watershed

Planning and design face **limitations** in addressing complex river landscape challenges in places like Kameoka and the Oi River watershed due to their interdisciplinary nature, requiring collaboration across diverse fields

Biases in design often favor modernization and infrastructure-centric solutions, overlooking the cultural and ecological values of traditional landscape practices

Questions posed are complex and cannot be fully answered using current tools and approaches in landscape and design.
Such us how to incorporate diverse cultural and ecological values into landscape management and how to balance modernization with the preservation of traditional landscapes.

Eembrace ongoing reflection and adaptation to address evolving challenges, ensuring that designs remain relevant, responsive, and resilient in an ever-changing world