Placing riparian areas in the context of Green Infrastucture and Ecosystem Services

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cost
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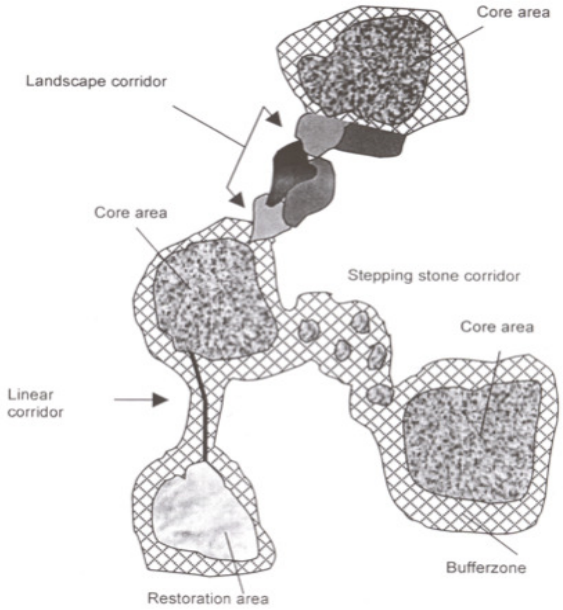
Point of departure: need for universal supporting conceptual frames

- focused to WG2, and synergies with other WGs (WG3!)

- WG2: **to identify the European responses to RV degradation**

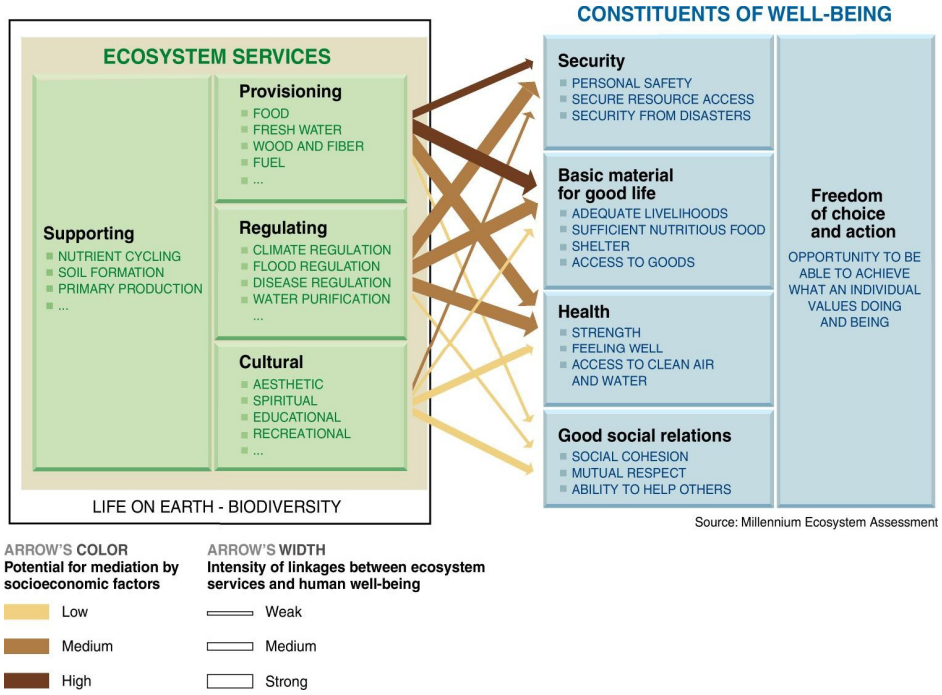
Supporting concepts/agendas

1.



Green Infrastructure concept
Figure after Bouwma et al 2002

2.



Ecosystem services and Human wellbeing concept
Figure from Millennium Ecosystem Assessment 2005

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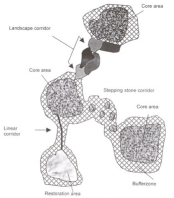
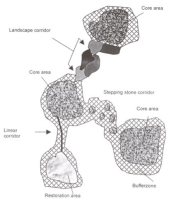
GI: riparian area at landscape context



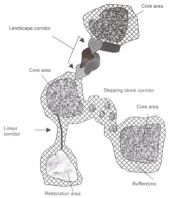
- With time, natural landscapes have been replaced with managed landscapes dominated by urban and agricultural lands
- These semi-natural elements form, at landscape level, a network of habitats called the “Green and Blue Infrastructure, or shortly Green Infrastructure – GI”(Naumann *et al.,* 2011) as opposed to the network of artificialized land covers such as urban, industrial, transport called “Grey Infrastructure”.
- GI provides natural habitats to wild species, thereby supporting ecological processes such as e.g. primary productivity, nutrient cycling or biotic interactions and the ecosystem services supply capacity depending on them.

Green Infastructure policies



- Green infrastructure (GI) approaches have recently attracted increased attention both from political and management perspectives at different levels of governance.
- **EU Strategy on green infrastructure** (2013) provides the foundation for the establishment of a Europe-wide green infrastructure network. This network of green (land) and blue (water) spaces aims to improve environmental conditions and therefore citizens' health and quality of life.
- to enable three main functions of green infrastructure: ensuring **ecological connectivity**, conservation of EU **biodiversity** and **multi-functionality** of landscapes and ecosystems.

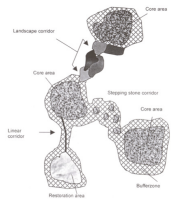
EU Habitat Directive



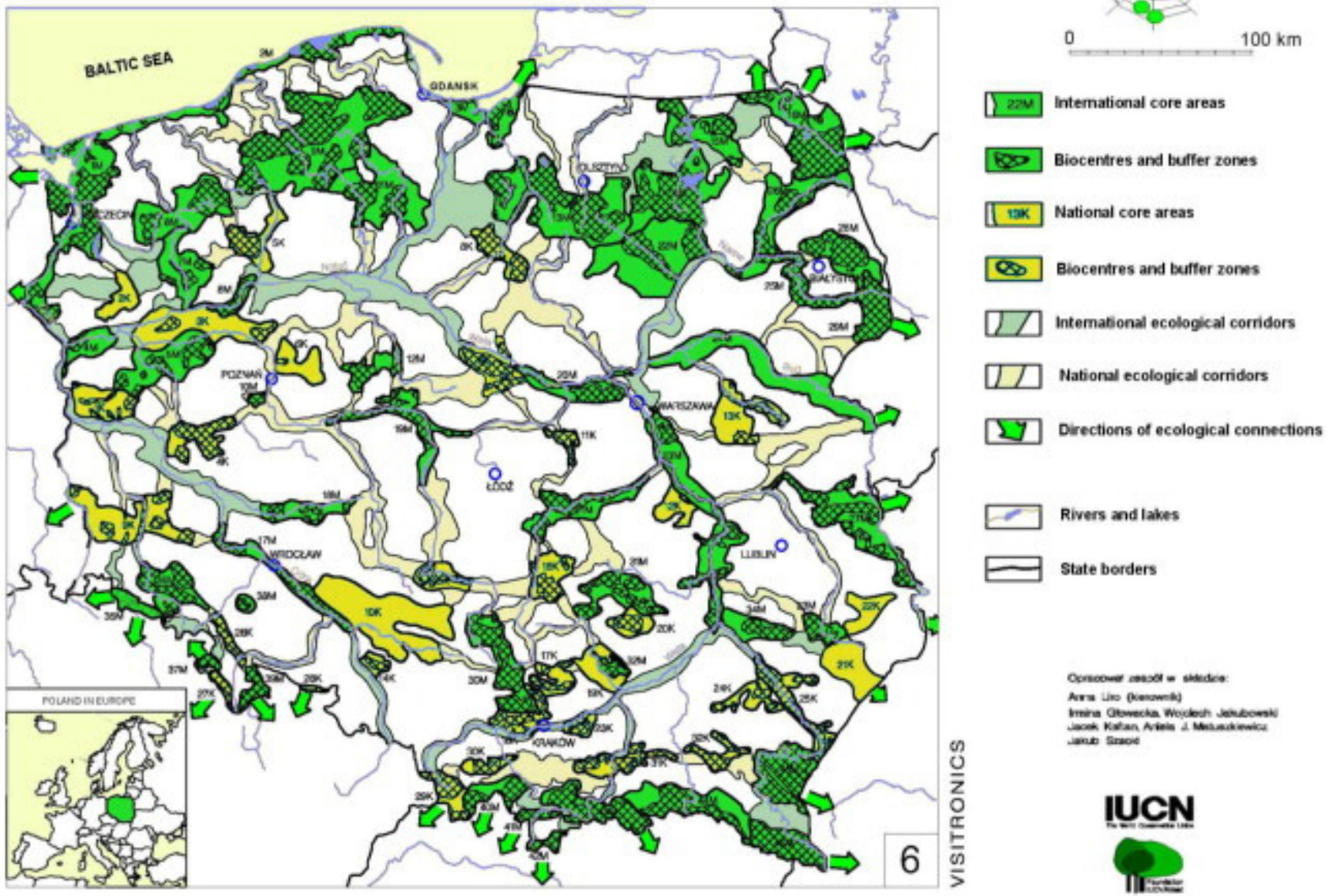
Article 10 requires that:

- *"Member States shall endeavour, where they consider it necessary, in their land-use planning and development policies and, in particular, with a view to improving the **ecological coherence** of the Natura 2000 network, to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure (such as rivers with their banks or the traditional systems for marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species."*

National Green Infrastructures



- Several European national GI systems are based on river networks (core of the ecological network) (Jongman ea 2004)
  - Denmark
  - Germany (Rheinland Pfalz)
  - Poland
  - Netherlands



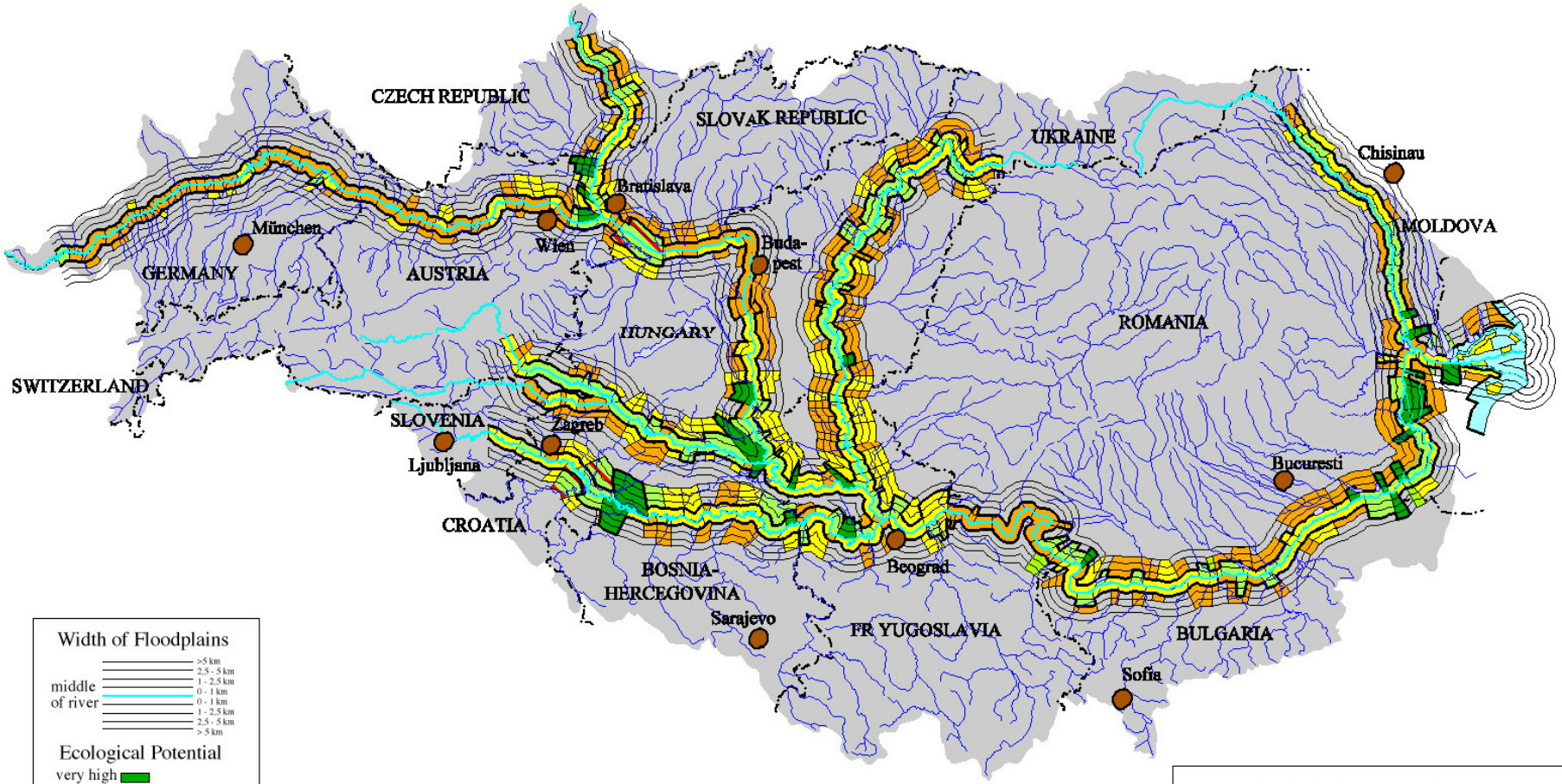
- International core areas
- Biocentres and buffer zones
- National core areas
- Biocentres and buffer zones
- International ecological corridors
- National ecological corridors
- Directions of ecological connections
- Rivers and lakes
- State borders

Opracowali zespół w składzie:
Anna Liro (koordynator)
Irmina Głowacka, Wojciech Jakubowski
Jacek Kaflan, Arkadiusz J. Matuszkiewicz
Jakub Szacki

IUCN

WARSZAWA
1995

Ecological potential of floodplains in the Danube River Basin



Width of Floodplains

middle of river

>5 km
2,5 - 5 km
1 - 2,5 km
0 - 1 km
0 - 1 km
1 - 2,5 km
2,5 - 5 km
> 5 km

Ecological Potential

- very high
- high
- moderate
- low
- special problem areas

Border between recent and former floodplains

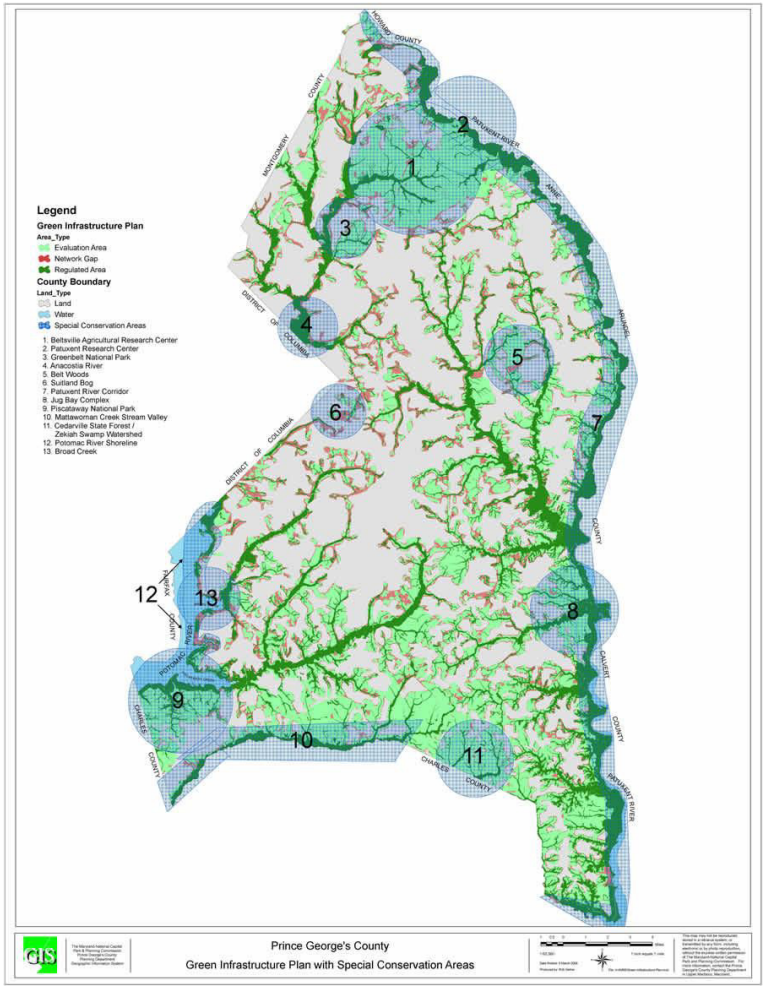
0 50 100 150 kilometers

Danube Pollution Reduction Programme

United Nations Development Programme
Global Environment Facility
ICPDR - Programme Coordination Unit
1400 Vienna, P. O. Box 500, Austria

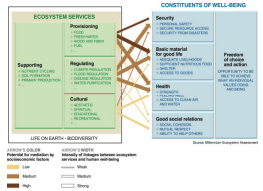
Produced by WWF Danube-Carpathian-Programme
WWF-Auen-Institut (WWF-Germany)
Josefstr. 1, D-76437 Rastatt 1999

WWF



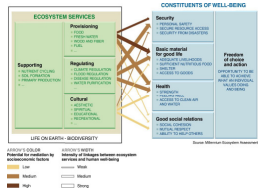
http://www.pgparks.com
Maryland, US

Ecosystem services

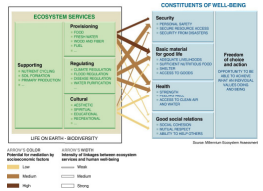


- Riparian habitats (network) has high potential to lower flood risk and provide an array of other ecosystem services.

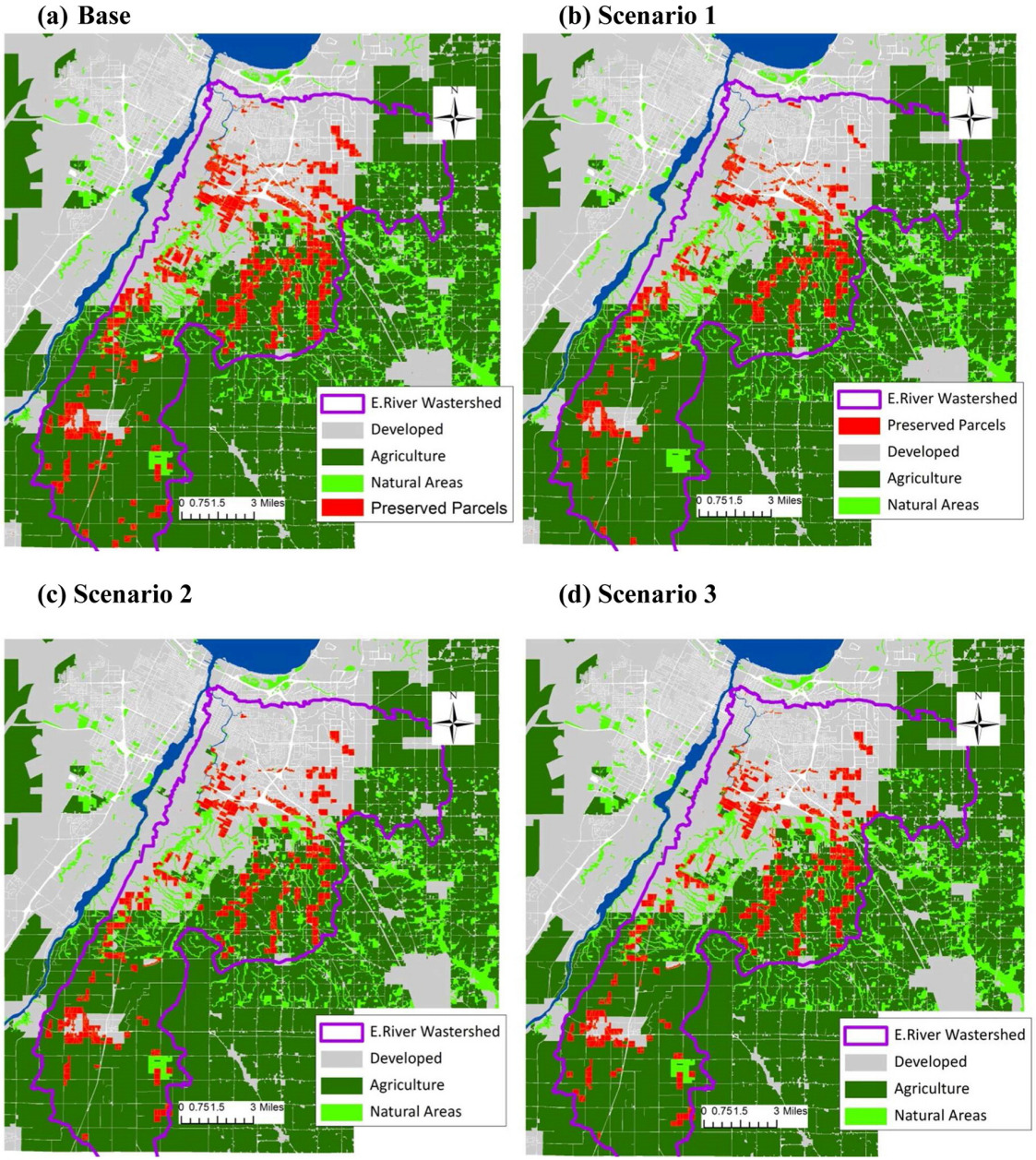
ESS and sustainable management



- **sustainable territorial management** requires a transition from the management of natural resources that degrades the **ecological integrity of ecological systems** to an **adaptive management** that preserves it while improving **human wellbeing**
- transition requires a better understanding of **interactions within ecosystems**, but more importantly **between ecosystems and society** (Millennium Ecosystem Assessment, 2005)



- There are approaches and models available, which demonstrate how any flood-prone community can use a geographic-information-based model to estimate the flood damage reduction benefits of green infrastructure, compare them to the costs, and target investments to design cost-effective nonstructural flood damage mitigation policies.
- Results suggest that the costs of preventing conversion of all projected floodplain development would exceed the flood damage mitigation benefits by a substantial margin.



Kousky et al 2013

Green Infrastructure Benefits and Practices

This section, while not providing a comprehensive list of green infrastructure practices, describes the five GI practices that are the focus of this guide and examines the breadth of benefits this type of infrastructure can offer. The following matrix is an illustrative summary of how these practices can produce different combinations of benefits. Please note that these benefits accrue at varying scales according to local factors such as climate and population.

Benefit	Reduces Stormwater Runoff				Increases Available Water Supply	Increases Groundwater Recharge	Reduces Salt Use	Reduces Energy Use	Improves Air Quality	Reduces Atmospheric CO_2	Reduces Urban Heat Island	Improves Community Livability					Improves Habitat	Cultivates Public Education Opportunities
	Reduces Water Treatment Needs	Improves Water Quality	Reduces Grey Infrastructure Needs	Reduces Flooding								Improves Aesthetics	Increases Recreational Opportunity	Reduces Noise Pollution	Improves Community Cohesion	Urban Agriculture		
Practice										CO_2								
Green Roofs	●	●	●	●	○	○	○	●	●	●	●	●	◒	●	◒	◒	●	●
Tree Planting	●	●	●	●	○	◒	○	●	●	●	●	●	●	●	●	◒	●	●
Bioretention & Infiltration	●	●	●	●	◒	◒	○	○	●	●	●	●	●	◒	◒	○	●	●
Permeable Pavement	●	●	●	●	○	◒	●	◒	●	●	●	○	○	●	○	○	○	●
Water Harvesting	●	●	●	●	●	◒	○	◒	◒	◒	○	○	○	○	○	○	○	●

● Yes ◒ Maybe ○ No

Final WWKY GI Report, 8/7/2012

https://www.wku.edu/cees/images/gm_infrstrc_bnfts_practices_grid.jpg

Mainstreaming riparian targets with GI and ESS

- GI planning and management with ESS targeting in riparian ecosystems includes all 3 types of responses to RV degradation:
  - production of knowledge,
  - management practices and tools, and
  - social responses.

  (to build knowledge maps)

NB!

Do not forget urban context!

Thank you!

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