

#### TAKING COOPERATION FORWARD

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Nature and society facing the Anthropocene challenges and perspectives for landscape ecology

Green Infrastructure at regional and local scale -Assessing connectivity and functionality through stakeholder involvement.

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## **PROJECT COORDINATES**



MaGICLandscapes Managing Green Infrastructure in Central European Landscapes

- Duration: 07/2017 06/2020
- Interreg Central Europe Programme (ERDF)
- I0 partners from AT, CZ, DE, IT, PL
- 9 case study areas
- 33 Associated Partners



MaGICLandscapes

## PARTNERSHIP





University of Vienna

Thayatal National Park

Silva Tarouca Research Institute for Landscape and Ornamental Gardening

Krkonoše Mountains National Park

Technische Universität Dresden (LP)

Leibniz Institute for Ecological Urban and Regional Development

Saxon Regional Foundation for Nature and the Environment

Metropolitan City of Turin

Italian National Agency for New Technologies, Energy and Sustainable Economic Development

Karkonosze National Park



## CASE STUDY AREAS



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## BACKGROUND



- Multiple demands for land use
- Output Change, conservation, social change → need for integrated planning approaches
- Soncept of Green Infrastructure (GI): cross-sectoral approach
- Justify investments in GI by using assessment approaches that highlight the needs and opportunities for GI at all spatial levels

# WHAT IS GREEN INFRASTRUCTURE?



'Green Infrastructure is a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services and functions such as water purification, air quality, space for recreation and climate change mitigation and adaptation. This network of green (land) and blue (water) spaces can improve environmental conditions and therefore citizens' health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity.'

(DG Environment: http://ec.europa.eu/environment/nature/ecosystems/index\_en.htm)

TAKING COOPERATION FORWARD

## **OBJECTIVES AND TASKS**



- Inventory of GI regarding its spatial structure, functionality and ecosystem services on transnational, regional and local level
- Integrated approach: considering cross-sectoral policy and planning objectives
- Providing decision support for politicians, planners, land users/managers and communities to invest in GI
- Raising awareness of the GI concept as (informal) aid for spatial planning
- Operation Communicating the benefits of GI

## **BENEFITS OF GI**





## GI AT REGIONAL AND LOCAL SCALE



Austrian case study areas

# Western Weinviertel & Eastern Waldviertel Nationalpark Thayatal



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- Western Weinviertel & Eastern Waldviertel
- Nationalpark Thayatal







- Western Weinviertel & Eastern Waldviertel
- Nationalpark Thayatal

Districts Hollabrunn and Horn 24 + 20 = 44 municipalities



50.705 + 31.275 = **81.980** inhabitants

Population density: 50 inh./km<sup>2</sup> | 40 inh./km<sup>2</sup>









- Western Weinviertel & Eastern Waldviertel
- Nationalpark Thayatal



#### **Protected areas**







#### Landcover based on CORINE

Westliches Weinviertel und östliches Waldviertel & Nationalpark Thayatal

- 211: Non-irrigated arable land
- 312: Coniferous forest
- 311: Broad-leaved forest
- 313: Mixed forest
- 221: Vineyards
- 112: Discontinuous urban fabric
- 243: Land principally occupied by agriculture, with significant areas of natural vegetation
- 242: Complex cultivation patterns
- 121: Industrial or commercial units
- 131: Mineral extraction sites
- **324:** Transitional woodland-shrub
- 142: Sport and leisure facilities
- 111: Continuous urban fabric
- 231: Pastures
- 512: Water bodies









#### Development of an assessment method/tool

- for functionality of GI in terms of
  - connectivity and
  - provision of landscape services
- Easy to use decision support tool for politicians, planners, land users/managers and communities for investments in GI



#### Development of an assessment method/tool

- Application on three levels
  - **Transnational:** <u>CORINE landcover (CLC)</u>

• **Regional:** CLC supplemented by available <u>national</u> <u>and regional data</u>

• Local: Field mapping of EUNIS habitats











#### Three-staged key factors





## Analysis of connectivity

- GuidosToolbox software package European Commission, Joint Research Centre (JRC)
  - Morphological Spatial Pattern Analysis (MSPA)
    - Facilitates the description of the geometry and connectivity of raster image components at any scale



- Measuring Euclidean Distance
  - Measures the degree of intactness, shape and spatial arrangement of patches on a given binary map



#### MSPA (MORPHOLOGICAL SPATIAL PATTERN ANALYSIS)







#### Examples of highly important bridges/links



## **MEASURING EUCLIDEAN DISTANCE**





Hot spot/cold spot map of GI connectivity



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## **MEASURING EUCLIDEAN DISTANCE**



# Examples of efficient links and connecting pathways in the network of GI



GREEN INFRASTRUCTURE FUNCTIONALITY ASSESSMENT

## Field work: Identification of elements of GI

- External working contracts for 3 topics of interest
  - Woodland and remnants of forest

• Wetlands and water bodies

• Dry and semi-dry grasslands









## Analysis of Landscape Services (LS)

- Capacity Matrix: score assignment for the provision of LS for each broader habitat type
  - Expert assessment
  - Stakeholder validation



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12)Promotypi       1       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       4       4       5       5       5       5       4       5 <t< td=""><td>11</td><td>nland marshes</td><td>8</td><td>4</td><td>4</td><td>3</td><td>5</td><td>3 4</td><td>4</td><td>3</td><td>3 2</td><td>2</td><td>2</td><td>1</td><td>3</td><td>3</td><td>4</td><td>4</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1 7</td><td>1</td><td>1</td><td>0 0</td><td>2</td><td>1</td><td>2</td><td>2 1</td><td>0</td><td>0</td><td>3</td><td>3</td><td>3 3</td><td>1</td><td>2</td><td>3</td></t<>	11	nland marshes	8	4	4	3	5	3 4	4	3	3 2	2	2	1	3	3	4	4	1	1	1	1	0	1 7	1	1	0 0	2	1	2	2 1	0	0	3	3	3 3	1	2	3
21 Shreementse       3       4       3       3       3       4       4       3       3       3       3       3       3       3       4       4       4       3       4       4       4       4       4       4       4       4       4       4       4	12	Peatbogs	1	4	4	3	5	5 4	4	3 /	1 3	5	4	0	3	4	3 (	3	2	3	4	0	0	2 C	0	0	0 0	0	0	0	0 0	0	0	3	4	2 3	8 0	2	4
22 Simerica       1       0       0       0       0       1       1       0       1       0 <td< td=""><td>21</td><td>alt marshes</td><td>3</td><td>4</td><td>3</td><td>3</td><td>5</td><td>3 4</td><td>3</td><td>3</td><td>1 2</td><td>2</td><td>1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>2 3</td><td>1</td><td>1</td><td>2</td><td>0</td><td>0</td><td>0 1</td><td>1</td><td>0 1</td><td>0 0</td><td>2</td><td>1</td><td>1</td><td>0 0</td><td>0</td><td>0</td><td>3</td><td>3</td><td>3 4</td><td>17</td><td>3</td><td>4</td></td<>	21	alt marshes	3	4	3	3	5	3 4	3	3	1 2	2	1	0	1	2	3	2 3	1	1	2	0	0	0 1	1	0 1	0 0	2	1	1	0 0	0	0	3	3	3 4	17	3	4
32) Increasing factor       1       2       1       1       4       2       2       1       0	22 :	Salines	1	0	0	0	0	0 0	0	1	1 0	0	2	0	0	0	0 0	0 0	0	0	0	0	0	0 0	0	0	0 0	0	0	0	0 0	0	0	0	2	0 0	0 0	0	0
11 Wate concet         7         3         3         3         1         4         4         2         1         2         3         3         4         1         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         1         0         0         0         0         0         1         0         0         0         0         0         1         0         0         0         0         1         0         0         0         0         1         4         4         1         3         1         1         0         0         0         1         1         0         1         1         0         1         1         1         1         1         1         1         1         1         1         1 <th1< th="">         1         <th1< th=""> <t< td=""><td>23  </td><td>ntertidal flats</td><td>1</td><td>2</td><td>1</td><td>1</td><td>1</td><td>4 0</td><td>2</td><td>2</td><td>8 1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1 (</td><td>5</td><td>0</td><td>2</td><td>3</td><td>0</td><td>0 1</td><td>0 0</td><td>0</td><td>0</td><td>0 0</td><td>0</td><td>0</td><td>0</td><td>0 0</td><td>0</td><td>0</td><td>2</td><td>4</td><td>2 3</td><td>1 0</td><td>2</td><td>0</td></t<></th1<></th1<>	23	ntertidal flats	1	2	1	1	1	4 0	2	2	8 1	0	1	0	0	0	1 (	5	0	2	3	0	0 1	0 0	0	0	0 0	0	0	0	0 0	0	0	2	4	2 3	1 0	2	0
12) Water bodiet       9       3       6       2       4       3       4       4       2       1       2       0       3       4       0       3       4	11	Water courses	7	з	3	1	1	3 1	3	4	1 2	1	2	1	2	3	3	2 3	0	3	4	1	0	3 0	0	0 1	0 0	3	1	3	1 4	0	4	4	4	4 4	1	3	5
3         4         5         4         5         1         4         5         1         1         0         0         4         4         4         5         1         1         0         0         4         4         4         5         1         1         0         0         4         4         4         5         1         1         0         0         4         4         4         5         1         1         0         0         4         4         4         5         1         1         0         0         4         4         4         5         1         0         0         4         4         4         5         1         1         0         0         4         4         4         1         0         1         0         0         4         4         4         1         0         1         0         0         4         4         4         1         1         1         1         0         0         1         1         1         0         0         1         1         1         1         0         1         1         1         1         1	12	Water bodies	9	3	4	2	4	3 1	4	4	1 2	1	2	0	3	2	2	2	0	3	5	1	0 0	0 0	0	0	0	3	2	3	1 4	0	4	4	5	4 4	1	3	4
22 [Stuaries       1       3       5       4       2       3       3       0       0       0       3       3       0       0       0       4       5       1       0       2       0       0       0       3       3       4       5       4       0       0       0       3       4       5       4       0       2       3       3       0       3       3       0       3       3       0       3       3       0       3       3       0       3       3       0       3       0       3       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       0       0       0       3       0       3       0       3       0       3       0       3       0       3       0       3       0       0       0       0       0       0       3       0       3       0       2       0       3 <t< td=""><td>21</td><td>Coastal lagoons</td><td>3</td><td>4</td><td>5</td><td>4</td><td>4</td><td>3 1</td><td>5</td><td>4</td><td>2</td><td>2</td><td>3</td><td>1</td><td>1</td><td>2</td><td>3 :</td><td>1 4</td><td>1</td><td>3</td><td>5</td><td>1</td><td>1 :</td><td>1 0</td><td>0</td><td>0</td><td>0</td><td>4</td><td>5</td><td>4</td><td>1 0</td><td>0</td><td>0</td><td>4</td><td>4</td><td>4 4</td><td>1 2</td><td>3</td><td>4</td></t<>	21	Coastal lagoons	3	4	5	4	4	3 1	5	4	2	2	3	1	1	2	3 :	1 4	1	3	5	1	1 :	1 0	0	0	0	4	5	4	1 0	0	0	4	4	4 4	1 2	3	4
23 Sea and ocean 3 2 3 2 1 4 0 3 2 2 2 5 3 0 0 5 5 0 2 0 3 3 2 0 1 1 0 0 0 0 5 5 4 3 0 0 2 3 4 4 4 0 2 4	22	Estuaries	1	3	5	4	2	3 0	5	3	3 2	0	0	0	0	3	3 (	3	0	4	5	1	0	2 0	0	0 (	0 0	5	5	4	0 0	0	0	3	4	5 4	: 0	2	3
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