

Functional Monitoring Approach (FMA): Preliminary solutions for the region

PART I Application Toolbox-Functional Monitoring Approach (AT-FMA)

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Moric Jurecka, Field biologist

The **aim** of the developed **monitoring procedure** is

- to **determine mitigation measures** and
- **minimum habitat requirements**

based on the evaluation results and the analysis of ecological corridor segments with functional and non functional connectivity.

Structural vs. Functional Connectivity



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SaveGREEN

- Most of the **existing ecological corridor designations** are more or less based on the concept of structural connectivity.
- The next logical step forward is therefore, the further development of the designated corridors **from the structural connectivity** to the **functional connectivity perspective**.
- The monitoring concept developed within T1 is therefore designed as a **two-stage process**.
- Stage I covers
 - **the designation of ecological corridors** and
 - **classification of the permeability of segments within the ecological corridors** based on the **structural connectivity**.
- Stage II is focusing on the
 - **field based collection of all required parameters for the evaluation of functional connectivity**

Functional connectivity ??



What we understand by functional connectivity



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Definition functional connectivity



"Connectivity" can be broken down into "structural connectivity" and "functional connectivity."

“Structural connectivity refers to **the physical relationship between landscape elements**

whereas

functional connectivity describes **the degree to which landscapes actually facilitate or impede the movement of organisms between areas of habitat.**

© http://www.landscope.org/explore/natural_geographies/wildlife_connections/terminology/, last visit 27.05.2022

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Preparation of monitoring plans



- **Based on the results of the structural monitoring approach and the developed and condensed methodology of the functional monitoring**

NOTES:

- Each PA has its own landscape and ecological characteristic!
- Therefore, PP agreed to define moderate minimum requirements for the functional monitoring

Preparation of monitoring plans



Minimum requirements for each PA

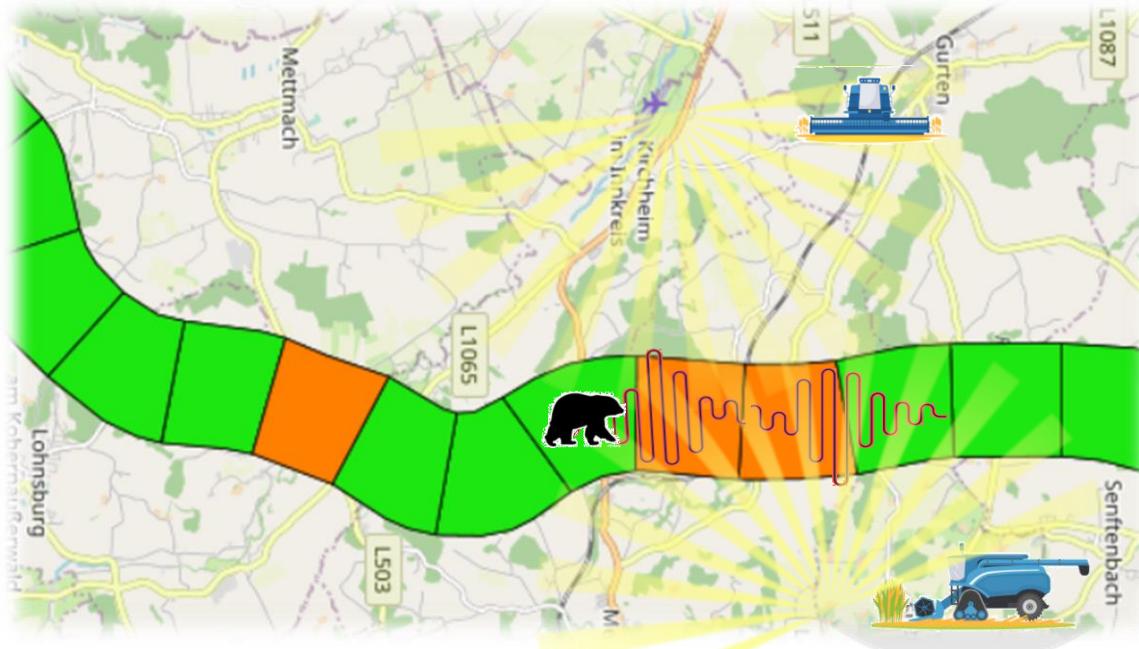
- **Target Species:** Red deer / wild boar / large carnivores
- **Monitoring methods:** Photo traps / tracks / other activity signs
- **Quantity**
 - 10 monitoring sites
 - minimum 1 over- and 1 underpass
 - minimum 3 corridor sites
 - results of the structural monitoring approach should be considered by the selection of the monitoring sites

Monitoring Approach

STAGE II: FUNCTIONAL CONNECTIVITY ANALYSIS



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Monitoring Approach

FUNCTIONAL CONNECTIVITY ANALYSIS



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Monitoring Approach

FUNCTIONAL CONNECTIVITY ANALYSIS – APPLICATION TOOLBOX



Footprints and other activity signs are collected along the whole length of the corridor

Monitoring Approach

STAGE II: FUNCTIONAL CONNECTIVITY ANALYSIS – APPLICATION TOOLBOX



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Data synchronization procedure
Harmonized Data Model

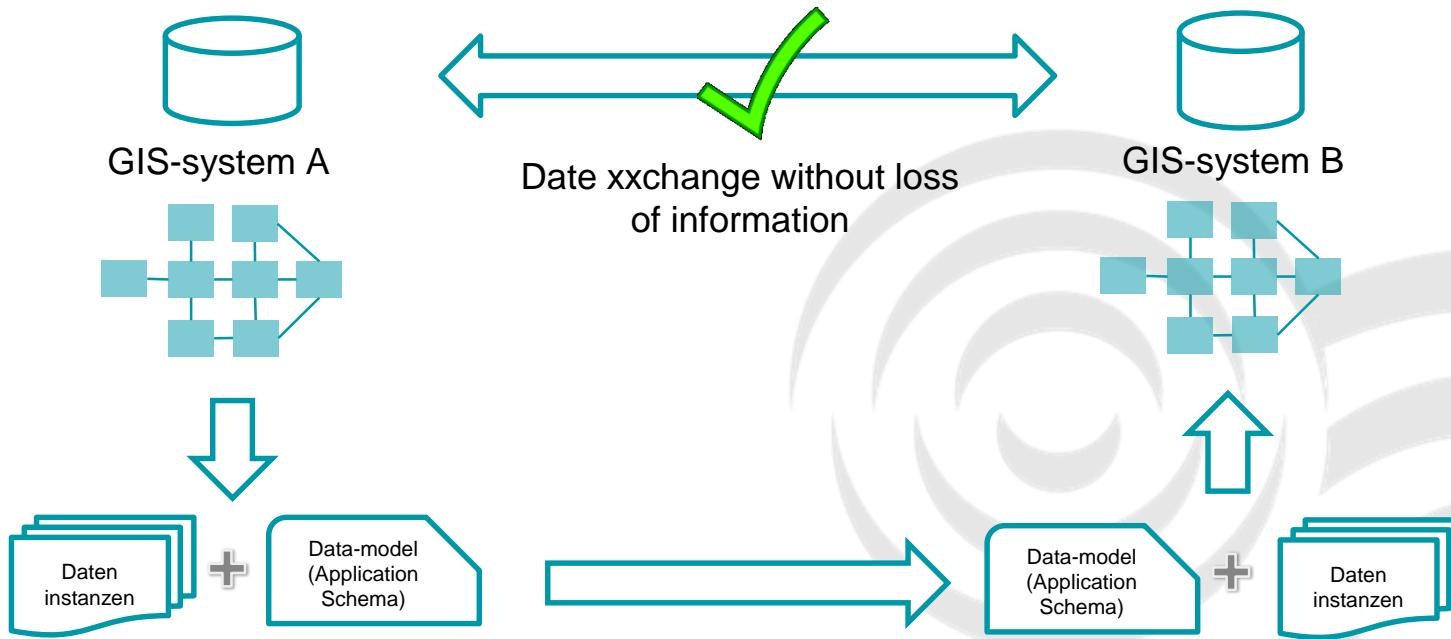


Harmonized generic data model



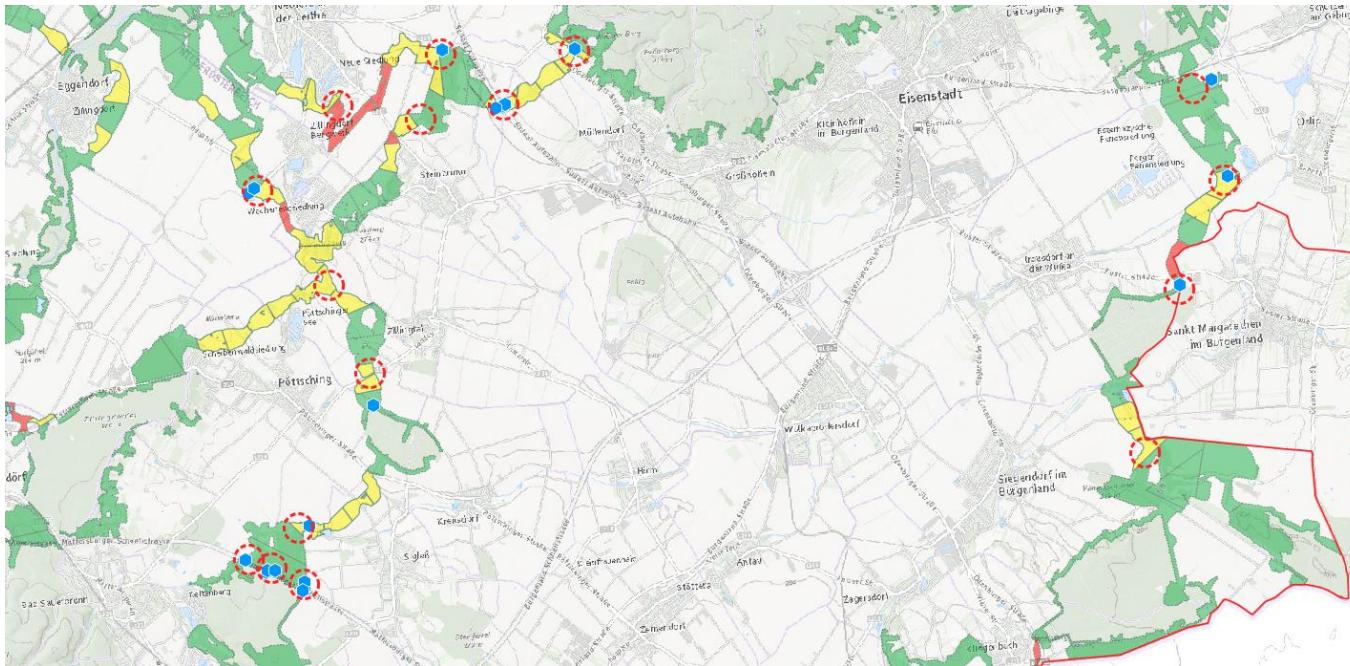
- **The core of the AT-FMA is the harmonised generic data model**
- The generic data model defines the essential objects (feature types) and their properties (feature type properties) that must be mapped within the framework of the FMA.
- It defines the model semantic (UML, from which the logical and physical data model can be directly derived)
- The generic core model can be easily extended (additional attributes or objects)
- The same physical database schema is always created independently of the database system (= table and attribute names are always named the same).
= Data are interoperable and can be easily used and extended in future projects!

Harmonized generic data model



Monitoring plans for PA-Austria

AT1: PA Pötsching



Project co-funded by European Union funds (ERDF)

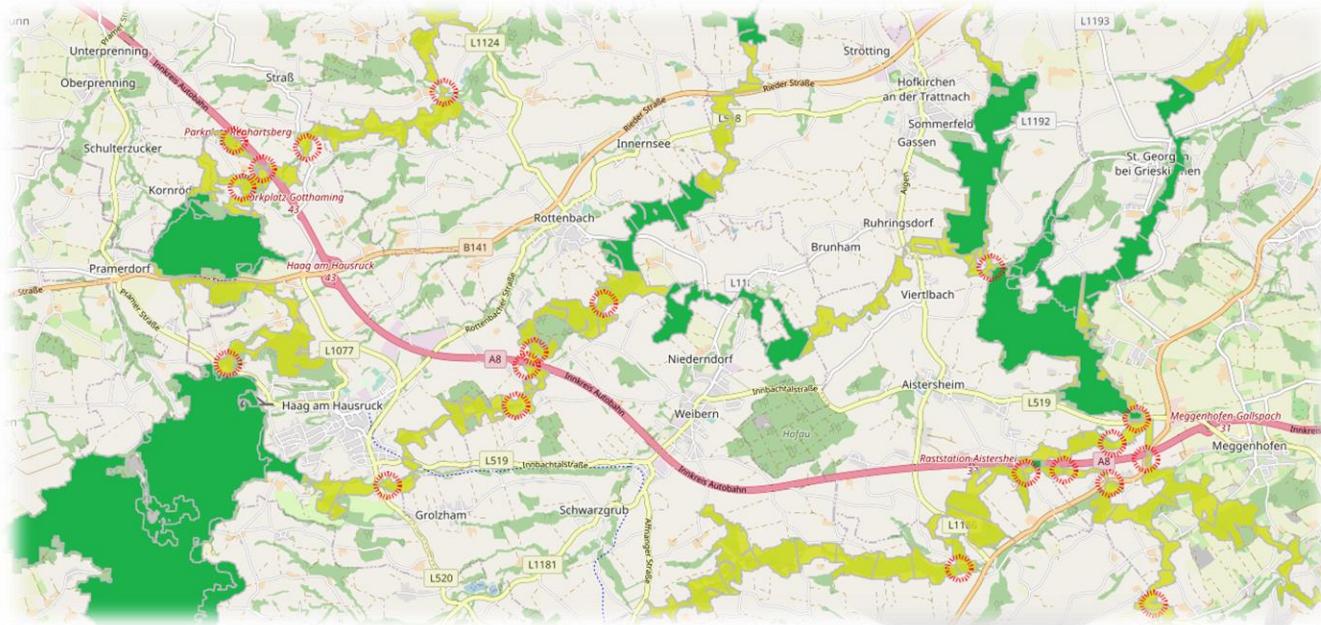
www.interreg-danube.eu/savegreen

Monitoring plans for PA-Austria

AT2: PA Kobernausserwald



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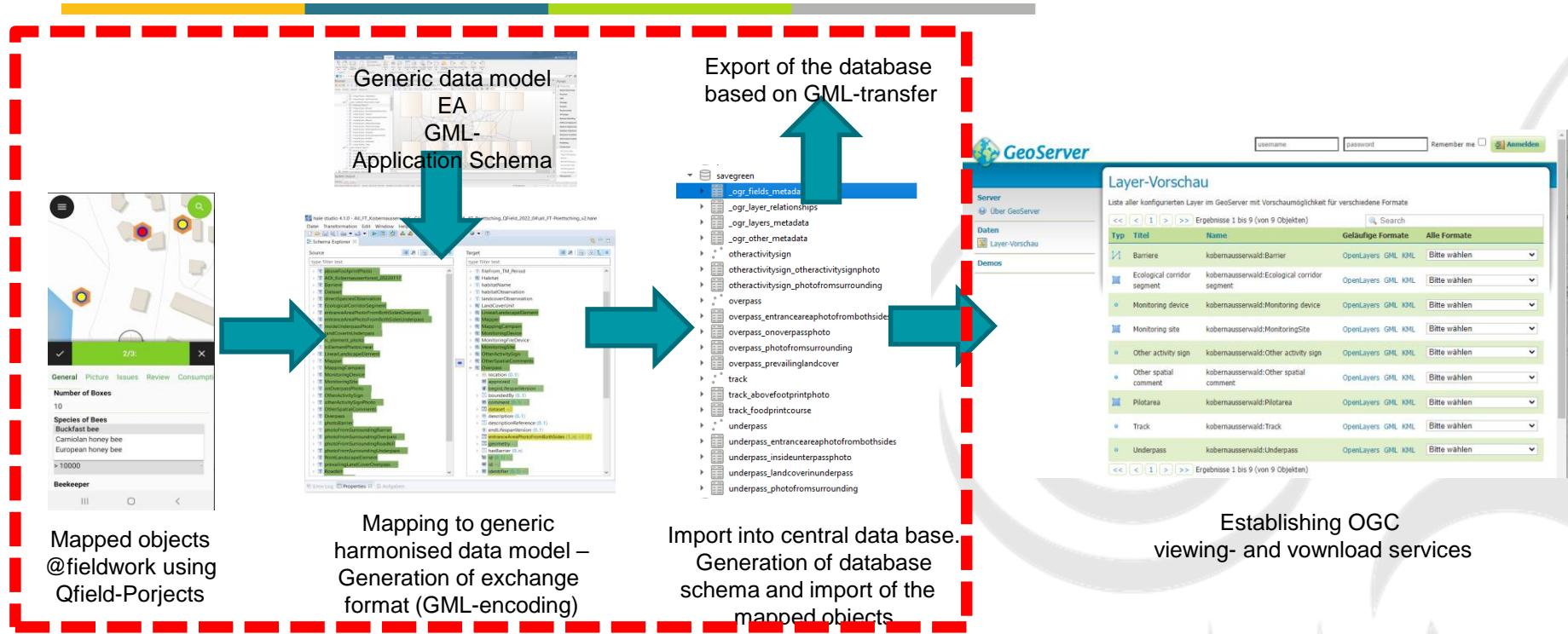


<https://maps.savegreen.at/mapstore/#/viewer/openlayers/1>

Live demo data flow AT-FMA



Danube Transnational Programme
SaveGREEN

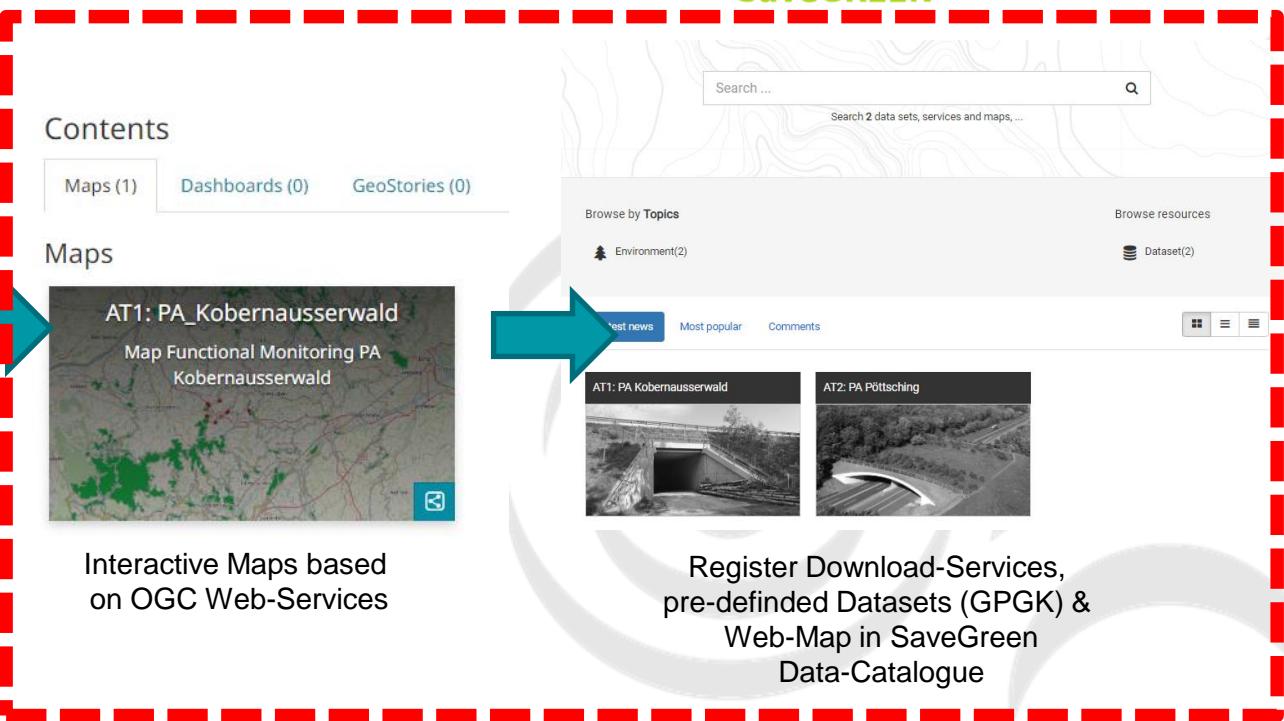


Live demo data flow AT-FMA

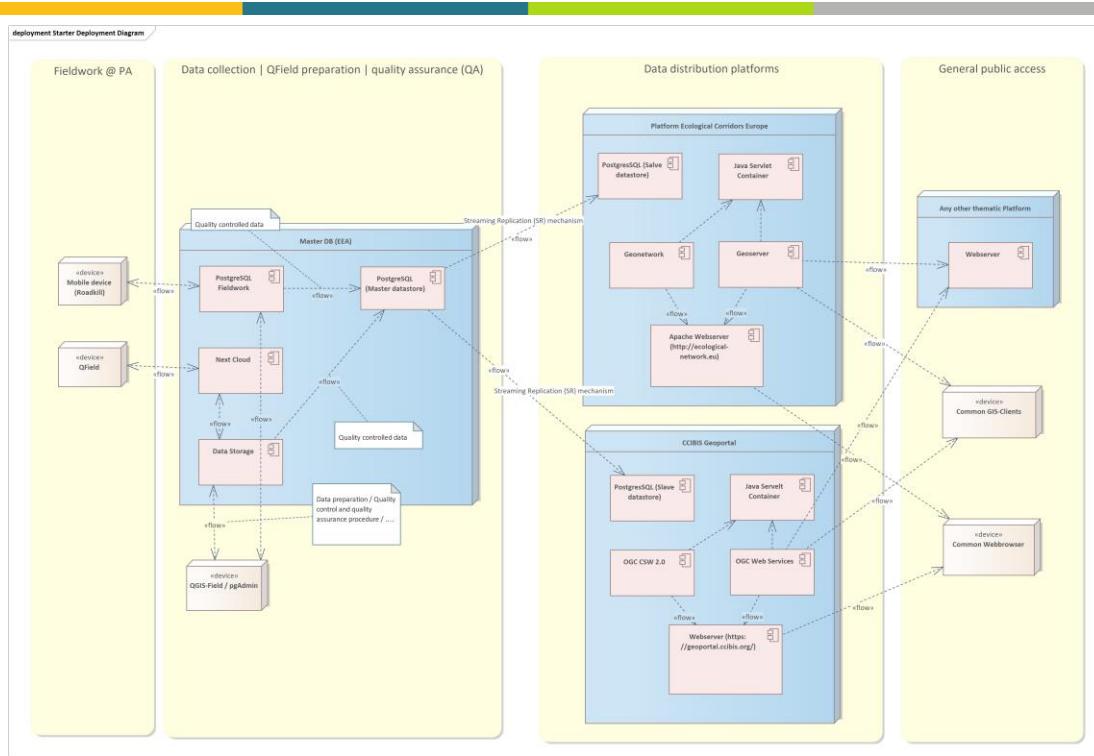


The screenshot shows the GeoServer Layer-Vorschau interface. It displays a list of layers categorized by type (e.g., Barrier, Ecological corridor segment, Monitoring device, Monitoring site, Other activity sign, Other spatial comment, Pits/area, Track, Underpass) and name (e.g., kobernausserwald/Barrier, kobernausserwald/Ecological corridor segment, kobernausserwald/Monitoring device, kobernausserwald/Monitoring site, kobernausserwald/Other activity sign, kobernausserwald/Other spatial comment, kobernausserwald/Pits/area, kobernausserwald/Track, kobernausserwald/Underpass). Each entry includes a 'Geschäftsformate' dropdown menu with options like OpenLayers, GML, KML, and 'Bitte wählen'.

Establishing OGC
Viewing- and Download-Services

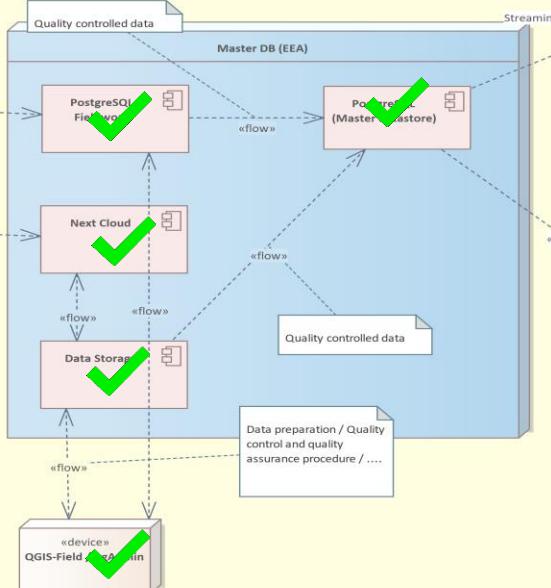


Outlook



Fieldwork @ PA

Data collection | QField preparation | quality assurance (QA)

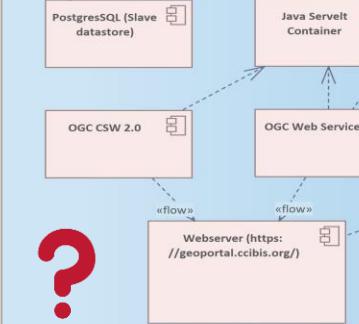


Data distribution platforms

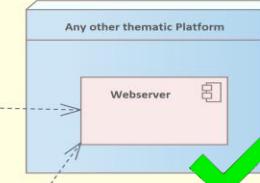
OGC Server SaveGreen



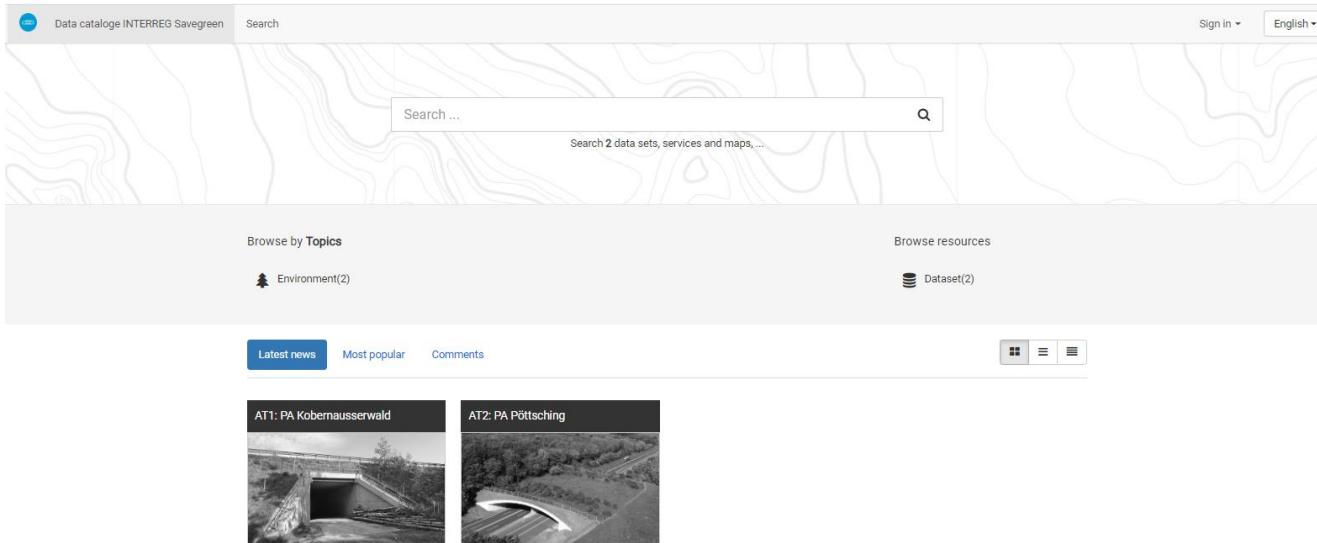
CCIBIS Geoportal



General public access



LIVE DEMO – SaveGREEN Data Catalogue



The screenshot shows the homepage of the SaveGREEN Data Catalogue. At the top, there is a navigation bar with a "Data catalogue INTERREG Savegreen" link, a search bar containing "Search ...", and language selection buttons for "Sign in" and "English". Below the navigation bar is a large background image of a topographic map with contour lines. In the center of the map is a search bar with placeholder text "Search ...". Below the search bar, it says "Search 2 data sets, services and maps,...". To the left, under "Browse by Topics", there is a category for "Environment(2)" represented by a tree icon. To the right, under "Browse resources", there is a category for "Dataset(2)" represented by a stack of documents icon. At the bottom of the main content area, there are tabs for "Latest news", "Most popular", and "Comments", along with a grid view icon. Below these tabs are two thumbnail images: "AT1: PA Kobernaußerwald" showing a bridge over a river, and "AT2: PA Pötsching" showing a road through a forest.

Powered by GeoNetwork Enterprise 2022.0.0

<https://metadata.savegreen.at/>

Project co-funded by European Union funds (ERDF)

www.interreg-danube.eu/savegreen

LIVE DEMO – Usage GPKG offline



AT1: PA Kobernausserwald

Data sets for the Savegreen pilot area AT1: PA Kobernausserwald

On going	Downloads, Ansichten und Links
Beschreibung	

Über diese Ressource

Kategorien	Datasets	Umwelt
Anderer Schlagwörter	PA Kobernausserwald Q	
Sprache	English	
Kontakt für die Ressource	Environment Agency Austria Originator: DI Roland Grillmayer	
Status	On going	

Technische Informationen

Überarbeitungsintervall	As needed
Darstellungsart	Vector
Koordinatenreferenzsystem	WGS 1984

Informationen über die Metadaten

Metadaten herunterladen	
Kontakt	Point of contact:

Überblick



PA_AT_KOB_entranceareaphotofrombothsidesunderpass_20210926

Keine Bewertungen ★

[Alle Bewertungen anzeigen](#)

[Fügen Sie Ihre Bewertung hinzu](#)

Räumliche Ausdehnung



Zeitliche Ausdehnung

AT1: PA Kobernausserwald

Data sets for the Savegreen pilot area AT1: PA Kobernausserwald

On going

[Beschreibung](#)

[Downloads, Ansichten und Links](#)

Downloads und Links

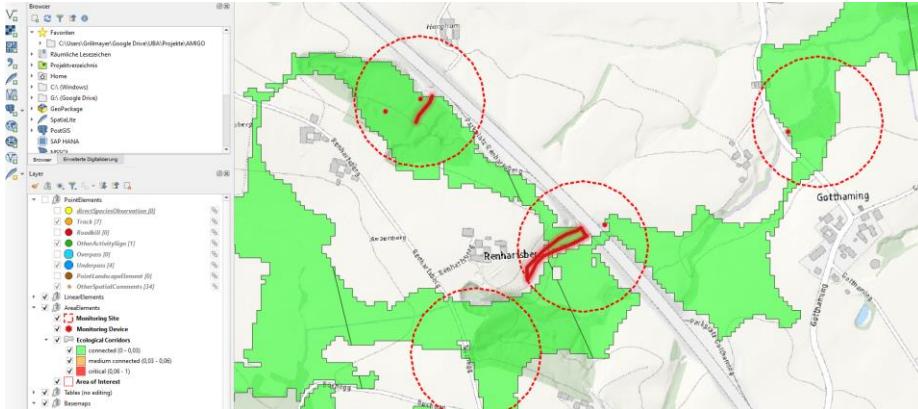


GIS-Datasets & Photos (610 MB) (complete fieldwork data set)

[Link öffnen](#)

Data package with all datasets and photos generated while the fieldwork at PA kobernausserwald. QGIS-project file is provided which guarantees that the 1:N relationships of the datasets and the related tables and images are correct established in QGIS-Software client. How to use: Copy Zip to your project folder Extract ZIP file Open QGIS-project file "PA_AT_Kobernausserwald.qgs" or "PA_AT_Kobernausserwald.qpz" with QGIS Software (Version 22.2 or higher)
https://datastore.savegreen.at/index.php/s/nGC7APqAAyH2MTY/download/PA_AT_Kobernausserwald.zip

LIVE DEMO – Usage GPKG offline



GeoPackage + all images of mapped objects + QGIS-project file (formulas) + web reference to photo trap images

BARRIER - Objektattribute

ID	{db7ac70-4237-4571-bd5c-d6fc7cb64e53}
Type of barrier	fence
Purpose of barrier	agriculture
Material of barrier	electric fence
presence/absentiation	<input type="checkbox"/>
Height of barrier (m)	9
Width of barrier (m)	NULL
Permeability of barrier	medium permeability
Further comments	No exact borders
Date	2023-09-26 13:07:45

Monitoring Device - Objektattribute

id	1
inspire_id	K1-2
inspire_identifier	http://savegreen.at/be5a7955-5f82-42e8-8d44-9519f4c1578/SaveGreen.MonitoringDevice
identifier	http://savegreen.at/be5a7955-5f82-42e8-8d44-9519f4c1578/SaveGreen.MonitoringDevice/k1-2
decotype	wildlife cam
synchronized	<input checked="" type="checkbox"/>
savegreen_name	K1-2
monitoring_data	Camera trap
monitoring_doku	Documentation

FUNCTIONAL MONITORING SAVEGREEN | PL-AT_ALBENAU/TEUFELSPITZE | 2023-09-26 13:07:45 | Ländereigentum der Gemeinde

FUNCTIONAL MONITORING SAVEGREEN | PL-AT_ALBENAU/TEUFELSPITZE | 2023-09-26 13:07:45 | Ländereigentum der Gemeinde

FUNCTIONAL MONITORING SAVEGREEN | PL-AT_ALBENAU/TEUFELSPITZE | 2023-09-26 13:07:45 | Ländereigentum der Gemeinde

LIVE DEMO – Usage interactive maps



AT1: PA Kobernausserwald

Data sets for the Savegreen pilot area AT1: PA Kobernausserwald

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PA_AT_KOB_entranceareaphotofrombothsidesunderpass_20210926

Keine Bewertungen ★

- Alle Bewertungen anzeigen
- Fügen Sie Ihre Bewertung hinzu

Räumliche Ausdehnung



Zeitliche Ausdehnung

AT1: PA Kobernausserwald

Data sets for the Savegreen pilot area AT1: PA Kobernausserwald

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How to use: Copy Zip to your project folder Extract ZIP file Open QGIS-project file "PA_AT_Kobernausserwald.qgs" or

"PA_AT_Kobernausserwald.qpz" with QGIS Software (Version 2.2.2 or higher)

https://datastore.savegreen.at/index.php/s/nGC7APqAAyH2MTY/download/PA_AT_Kobernausserwald.zip

[Link öffnen](#)

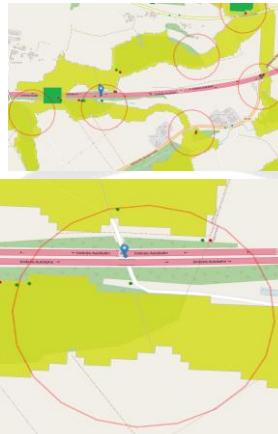
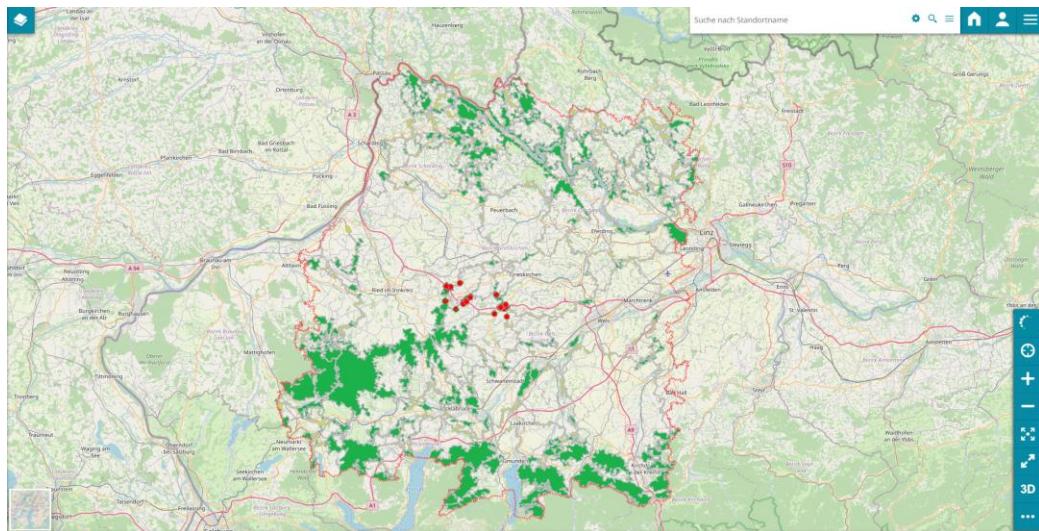


Interactive Map: AT1 - PA Kobernausserwald

Interactive map of the SaveGreen PA Kobernausserwald
<https://maps.savegreen.at/mapstore/#/viewer/openlayers/1>

[Link öffnen](#)

LIVE DEMO – Interactive Map



Underpass
Lat: 48,178 - Long: 13,763

localId: bac1f8e8-c406-4859-b5aa-597dd95f46cc
namespace: http://savegreen.at/be5a7955-5f62-4c2e-a6d4-9519f34c1578/SaveGreen.Barrier
plotarea: http://savegreen.at/be5a7955-5f62-4c2e-a6d4-9519f34c1578/SaveGreen.Mapper/4f375081-90fe-4aae-a01-59fd73fe4a27f
dataset: http://savegreen.at/be5a7955-5f62-4c2e-a6d4-9519f34c1578/SaveGreen.Mapper/4f375081-90fe-4aae-a01-59fd73fe4a27f
mapper: http://savegreen.at/be5a7955-5f62-4c2e-a6d4-9519f34c1578/SaveGreen.Mapper/4f375081-90fe-4aae-a01-59fd73fe4a27f
beignifspannvor: 2021-09-25T16:56:02Z
height: 6 m
width: 8 m
length:
comment: none
openesindex: 0
approved: true
synchronized: true
photo_entrancearea_a: Link photo
photo_entrancearea_b: Link photo
photo_insideunderpass_side_a: Link photo
photo_insideunderpass_side_b: Link photo
photo_surroundingunderpass_a: Link photo
photo_surroundingunderpass_b: Link photo



LIVE DEMO – Download Service

Single object provision

AT1: PA Kobernausserwald

Data sets for the Savegreen pilot area AT1: PA Kobernausserwald

On going

Beschreibung



Über diese Ressource

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Kontakt

• Point of contact:

Überblick



PA_AT_KOB_entranceareaphotofrombothsidesunderpass_2021092

Keine Bewertungen ★

Alle Bewertungen anzeigen

Fügen Sie Ihre Bewertung hinzu

Räumliche Ausdehnung



Zeitliche Ausdehnung



kobernausserwald:Other spatial comment

ESRI Shapefile kobernausserwald:Other spatial comment

ESRI Shapefile kobernausserwald:Other spatial comment

<https://maps.savegreen.at/geoserver/kobernausserwald/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=kobernausserwald%3AOther%20spatial%20comment&outputFormat=SHAPE-ZIP>

Herunterladen

kobernausserwald:Track

ESRI Shapefile kobernausserwald:Track

ESRI Shapefile kobernausserwald:Track

<https://maps.savegreen.at/geoserver/kobernausserwald/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=kobernausserwald%3ATrack&outputFormat=SHAPE-ZIP>

Herunterladen

kobernausserwald:Ecological corridor

Ecological corridor | Format ESRI Shapefile

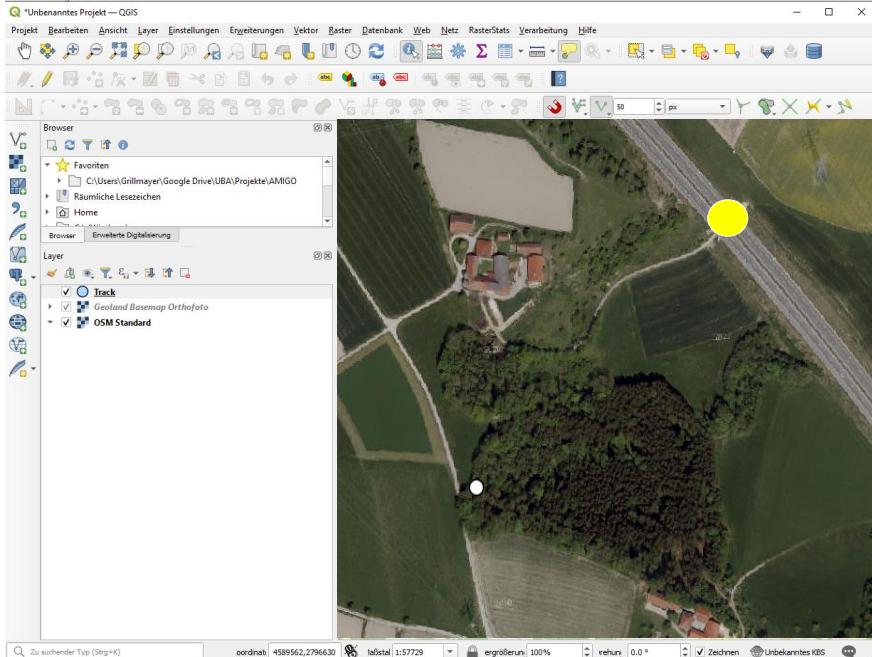
Ecological corridor | Format ESRI Shapefile

<https://maps.savegreen.at/geoserver/kobernausserwald/ows?service=WFS&version=1.0.0&request=GetFeature&typeName=kobernausserwald%3AEcological%20corridor%20segment&outputFormat=SHAPE-ZIP>

Herunterladen

LIVE DEMO – Download Service

Single object provision



Track - Objektattribute

id	savegreen.c4a387cc-8cde-48f6-ac59-2e049fb655db
inspireId	c4a387cc-8cde-48f6-ac59-2e049fb655db
inspireID	http://www.savegreen.at/be5a7955-5f62-4c2e-a6d4-9519f34c1578/SaveGreen.Track
species_sp	Capreolus capreolus
species_id	Capreolus capreolus (Linnaeus, 1758)
species_id1	urn:lsid:faunaeur.org:taxonname:305258
beginlife	10%
numberoffin	
degreeoffin	clearly identifiable
lengthfron	CM
lengthfron0	0
widthfron	CM
widthfron0	0
lengthhind	CM
lengthhind0	0
widthhind	CM
widthhind0	0
steplenght	CM
steplenght0	0
direction	north-west
comment	none
approved	T
reference	
track_abov	PA_AT_KOB_abovefeetprintphoto_20210926131203601.jpg
track_abov0	
track_food	NotAvailable.jpg
track_food0	NULL

OK Abbrechen



Project co-funded by European Union funds (ERDF)

www.interreg-danube.eu/savegreen



Discussion

AT-FMA & Data publishing

- Are there any missing objects/objects properties?
- Any feedback/comments/users experience about the Qfield implementation?
- Handlings sensitive species data?
Feedback from each PP required

Note: AUSTRIA will publish all datasets including the photos & evaluation results of the camera traps & sound/noise sensors



Discussion

Analysis of FMA dataset FMA

- What do we want to make available as final data sets?
- Methodology of the evaluation of wildlife trap records?

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Category	Location and camera information					Information about species							
Attribute	Project name	Camera ID	Name of the locality	Location	Feature	GPS coordinates	Species	Nr of ind	Sex	Age	Note	Date	Time
SaveGREEN			Transcarpathia	Tyshiv	underpass	48.792788 23.087015	Vulpes vulpes	1				24.01.2022	12:58:04
			Transcarpathia	Natali	underpass	48.714422 23.049924	Vulpes vulpes	1				24.01.2022	13:22:27
			Transcarpathia	Natali	underpass	48.714316 23.050204	Lutra lutra	1				24.01.2022	13:32:51
O	P	Q	R	S									
Photo information													
Photo ID		Source = fo	File name	Used for public			User						
{bd096c78-fe47-4f8f-9cd7-bd92cf0be8ca}			PA_UKR_above	Yes				Andriy-Taras Bashta					
{bbea3b35-1106-4591-bd97-d74d37aecd6a}			PA_UKR_abovefootprintphoto	_20220124132844863				Andriy-Taras Bashta					
{ca855829-d69a-4d1a-b6d9-d40651a08ee9}			PA_UKR_abovefootprintphoto	_20220124133417726				Andriy-Taras Bashta					

- Do all PP agree with the EXCEL sheet sent out?
- Expansion of the evaluation procedure to include human activities?

Functional Monitoring Approach (FMA): Preliminary solutions for the region

PART I Application Toolbox-Functional Monitoring Approach (AT-FMA)

Roland Grillmayer, Environment Agency Austria
Moric Jurecka, Field biologist