Ecological Networks in the Alps

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WWF

CIPRA

ISCAR

Why we are here?

- ➔ Biodiversity Visions 2002 (Workshop Gap, Consortium ALPARC, CIPRA, ISCAR, WWF)
- ➔ Concepts by ALPARC and WWF (2004-05)
- ➔ Platform EN of the Alpine Convention 2006
- ➔ Continuum Pre-Project CP 2007-2008
- ➔ Pilot Region En-Adige (CP & ECONNECT)
- ➔ ECONNECT (1.9.2008)
- ➔ in prep. Continuum Project (2009 -2012)

Ecological Networks in the Alps: Needs and concerns

Main needs and concerns of ecological networks are:

Preserve and improve **ecological connectivity** in landscapes
- for migration of species (fauna, flora)
- for genetic exchange
- for exchange in/between populations

Contribute to **conservation of biodiversity** by
- reduction of landscape & habtiat fragmentation
- adaptation of fauna & flora to land use and climate change
- **better effectiveness of nature protection in protected areas, nature reserves and Natura 2000 sites**
- safeguard landscape functions and ecosystem services

For implementation of ecological networks are needed
- transsectoral cooperation („**sectoral connectivity**“)
- transboundary cooperation („**territorial connectivity**“)

The Continuum
Project

Work packages

A. Review of applied methodologies: ISCAR

B: Catalogue of appropriate measures: ALPARC

C. Involvement of stake-holders, communication: WWF

D. Coordination, details for main project, finances: CIPRA

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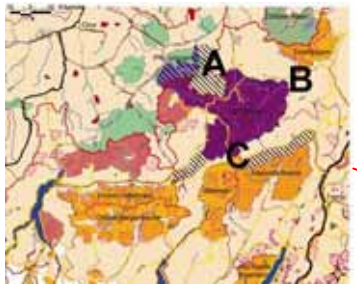
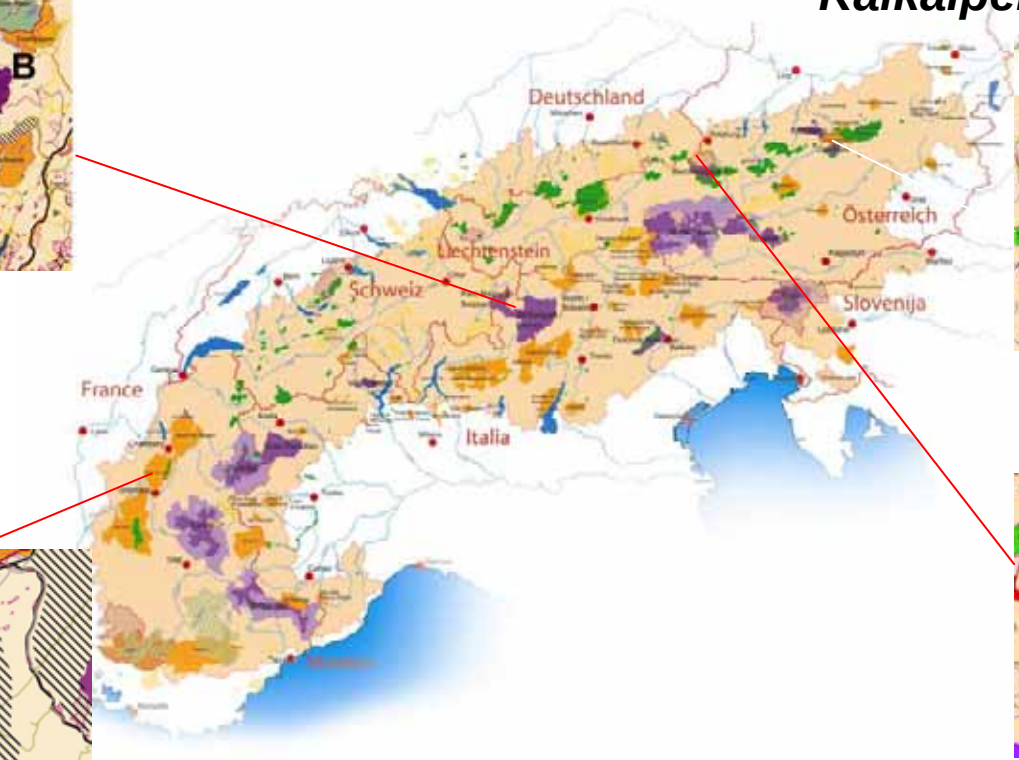
Project

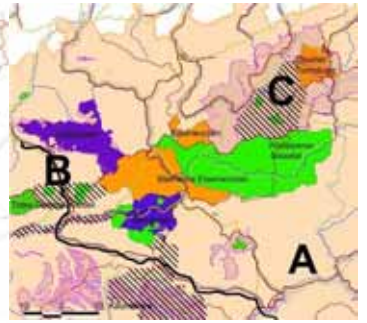
4 pilot regions

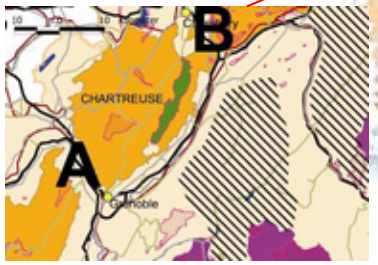
Engadin – Alto Adige - Valle dell'Adige (Grisons – South Tyrol – Trentino)

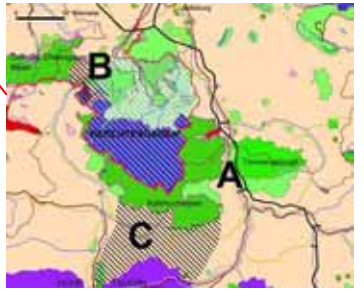
The Eastern Austrian region around the National Parks Kalkalpen and Gesäuse











French department Isère

Berchtesgaden – Salzburg cross-boundary region

ECONNECT: 6 pilot regions

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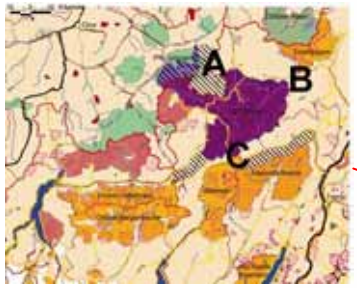
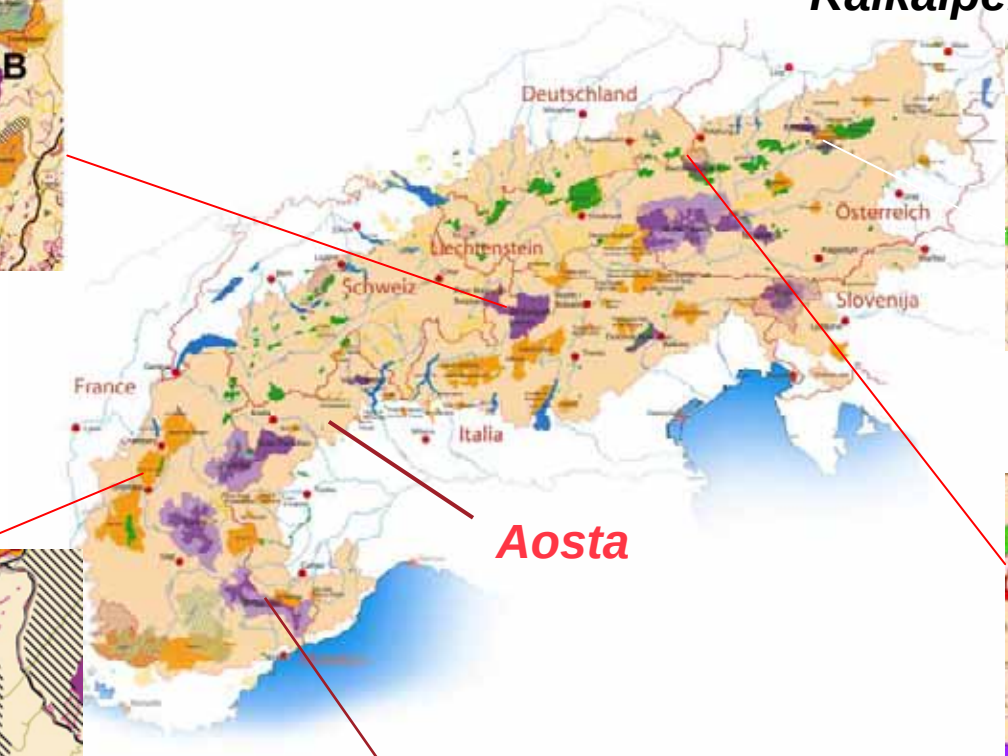
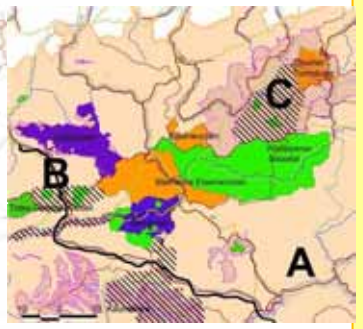
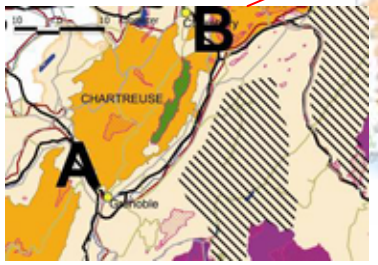
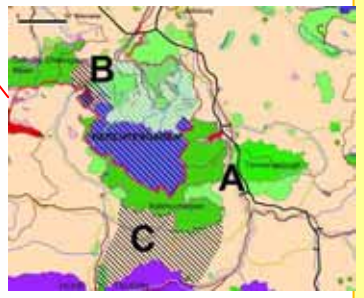
The Eastern Austrian region around the National Parks Kalkalpen and Gesäuse











Aosta

Alpe Marittimi / PN Mercantour

French department Isère

Berchtesgaden – Salzburg cross-boundary region

The Continuum Project

Evaluation of 4 approaches

- A Biodiversity visions network / functional connectivity (developed by **WWF**)
- B Cross-border ecological networks/structural connectivity (developed by **ALPARC)**
- C Pan-European ecological network **PEEN** / European perspective
- D Swiss ecological network **REN** / national perspective

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WWF CIPRA ISCAR

Project

Further approaches

- Austria:
  - Wildöklogische Raumplanung für Schalenwildarten im Alpenraum. Reimoser, F., 1996: In: Sauteria, Salzburg, Bd. 8, 207-220.
  - Catchment approach in Vorarlberg (yet in elaboration)
  - Der Alpen-Karpaten-Korridor (WWF Austria; http://www.wwf.at/de/menu80/)
  - Wildkorridore (BOKU model; http://ivfl.boku.ac.at/upload/)
  - Rechtsverbindliche Richtlinien BMVIT für Wildtierpassagen (WTP) an Verkehrswegen (http://www.fsv.at/)
- EU
  - Natura 2000, Smaragd
  - IBA (Important Bird Areas) build a network of stepstones for birds;
  - Natura 2000/Emerald: Network for threatened animals, plants and habitats
- France:
  - Trame verte et bleue
  - Résaux écologiques dans les Parc naturels réionaux (PEEN/REN)
  - Réseau écologique Isére (REDI) & Rhônesner-Alpes (PEEN/REN)
- Finland: planning tools: www.helsinki.fi/consplan).
- For rivers: Muhar et al. (1998) and Dynesius & Nilsson (1994)

The Continuum Project

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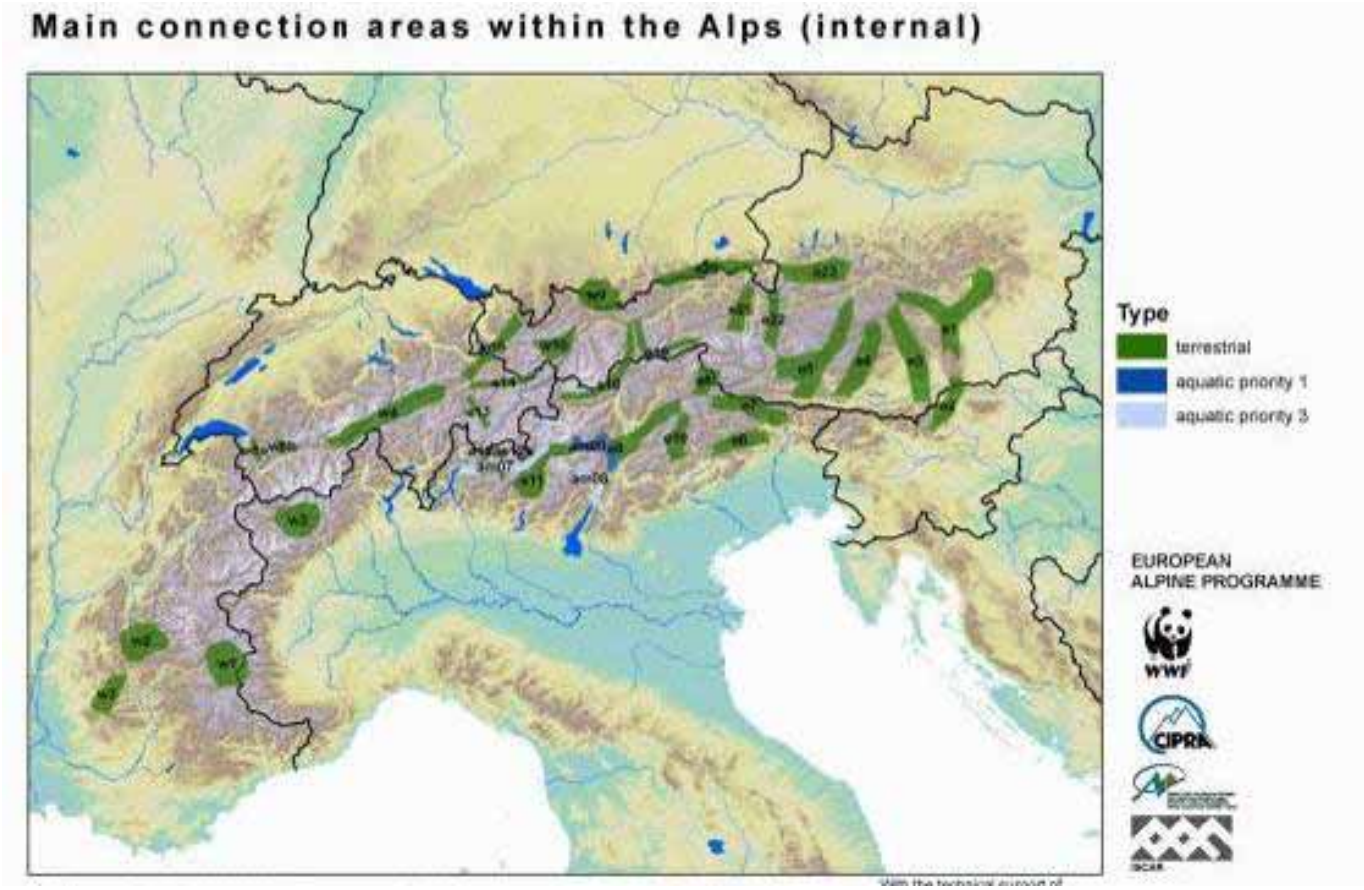
The Continuum Project

WWF

Priority conservation areas (PCA) networks (Ecoregion); Maintenance/restoration of viable populations (for indicator species); maintenance/restoration of ecological and evolutionary processes, functional connectivity, data from expert workshops

Source: WWF (2006): A biodiversity Vision for the Alps. Proceedings of the work underatken to define a biodiversity vision for the Alps. Technical Report. WWF European Alpine Programme, Milano (unpublished).

WWF approach: Internal connectivity



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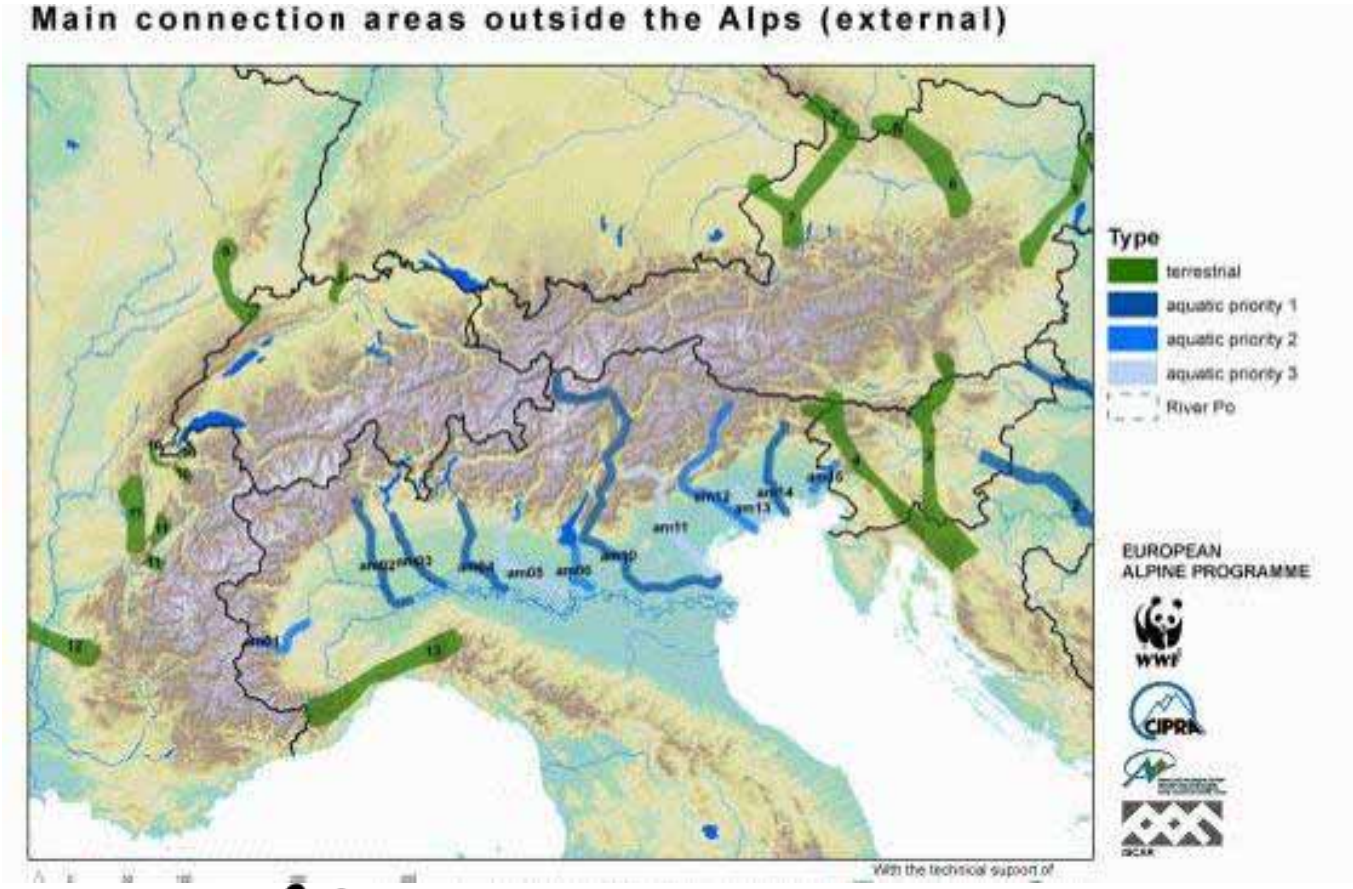
WWF

CIPRA International

ISCAR

WWF approach: External connectivity



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Project

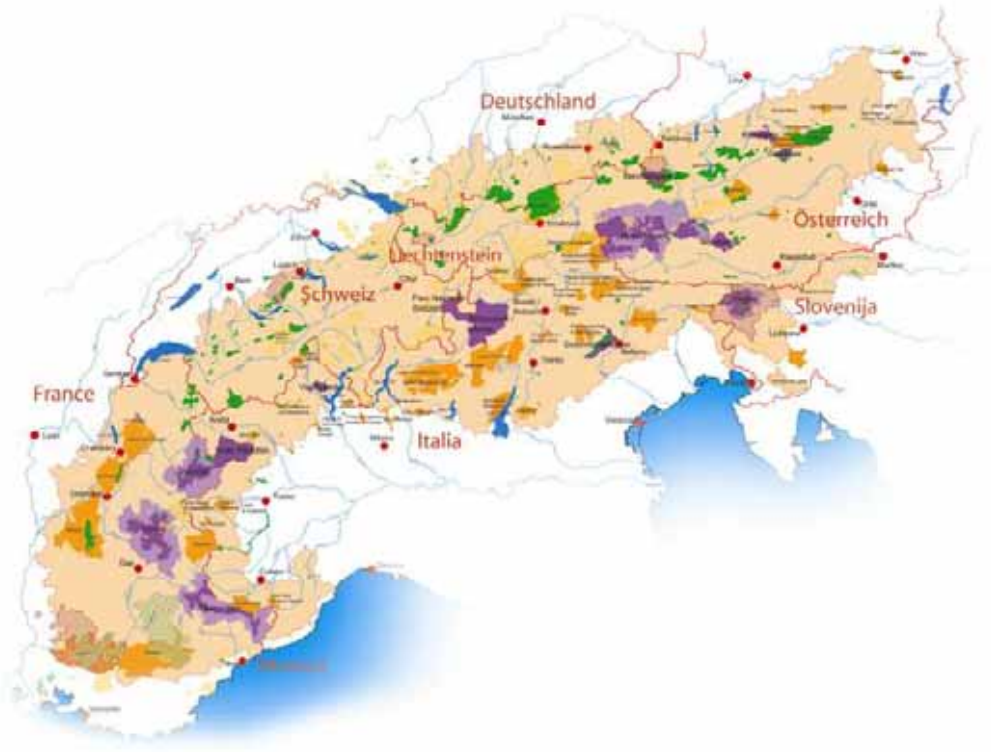
ALPARC approach

Improving the current structural connectivity situation for protected areas; presentation of strategies / measures / regulations for the regional networking of protected areas, establishing ecological corridors, and ensuring species migration at the national and cross-border level.

Source: Netzwerk Alpiner Schutzgebiete (2004): Grenzüergreifender ökologischer Verbund. Alpensignale 3, Innsbruck (German, French, Italian and Slovenian)

ALPARC approach: Ecological Continuum in the Alps

Transboundary protected areas and ecological networks in the Alps



Alps-wide study in 2004 and ministerial agreement

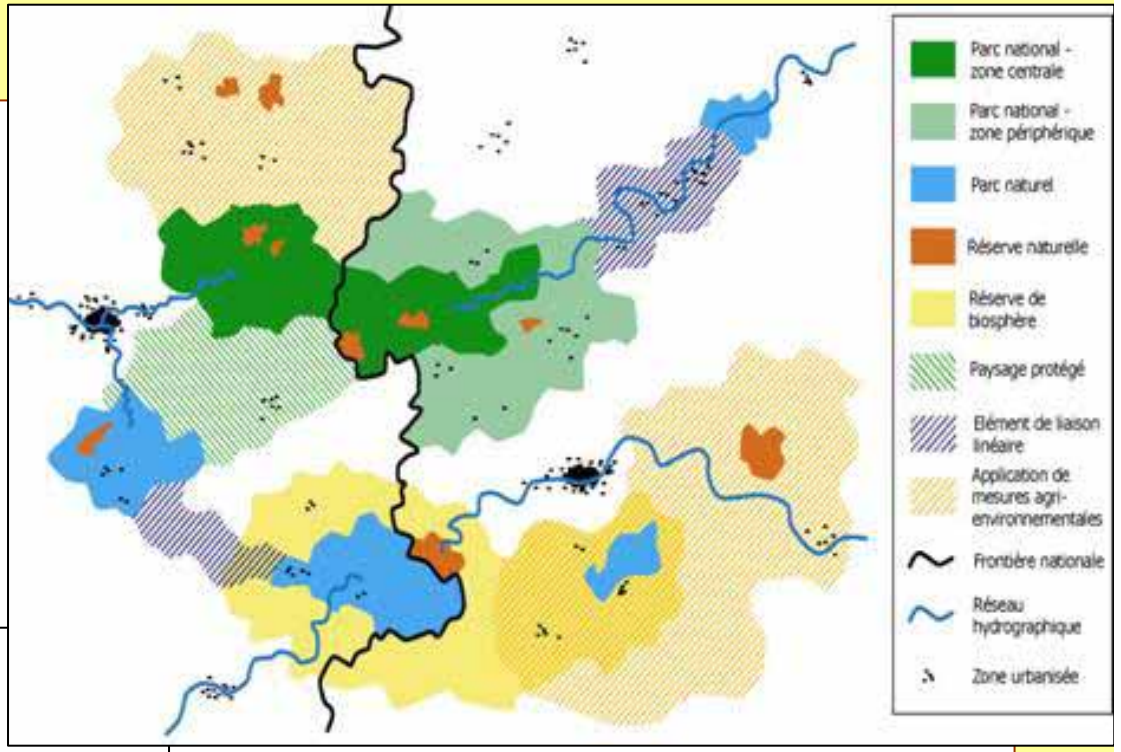
Alpine Convention platform “Ecological networks”

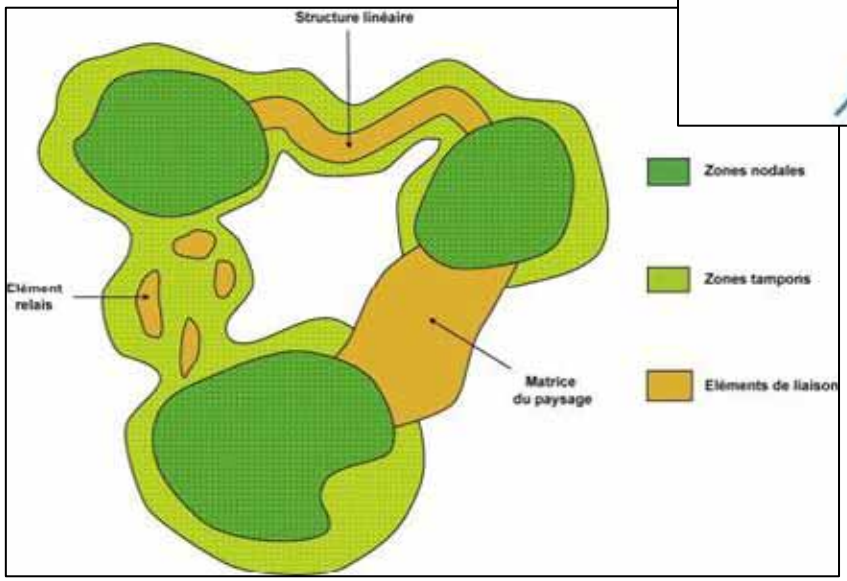
Implementation since 2007 based on local and regional

stakeholder involvement

The ALPARC-concept

Linking core zones with high biodiversity value…





…based on existing protected areas – a pragmatic approach

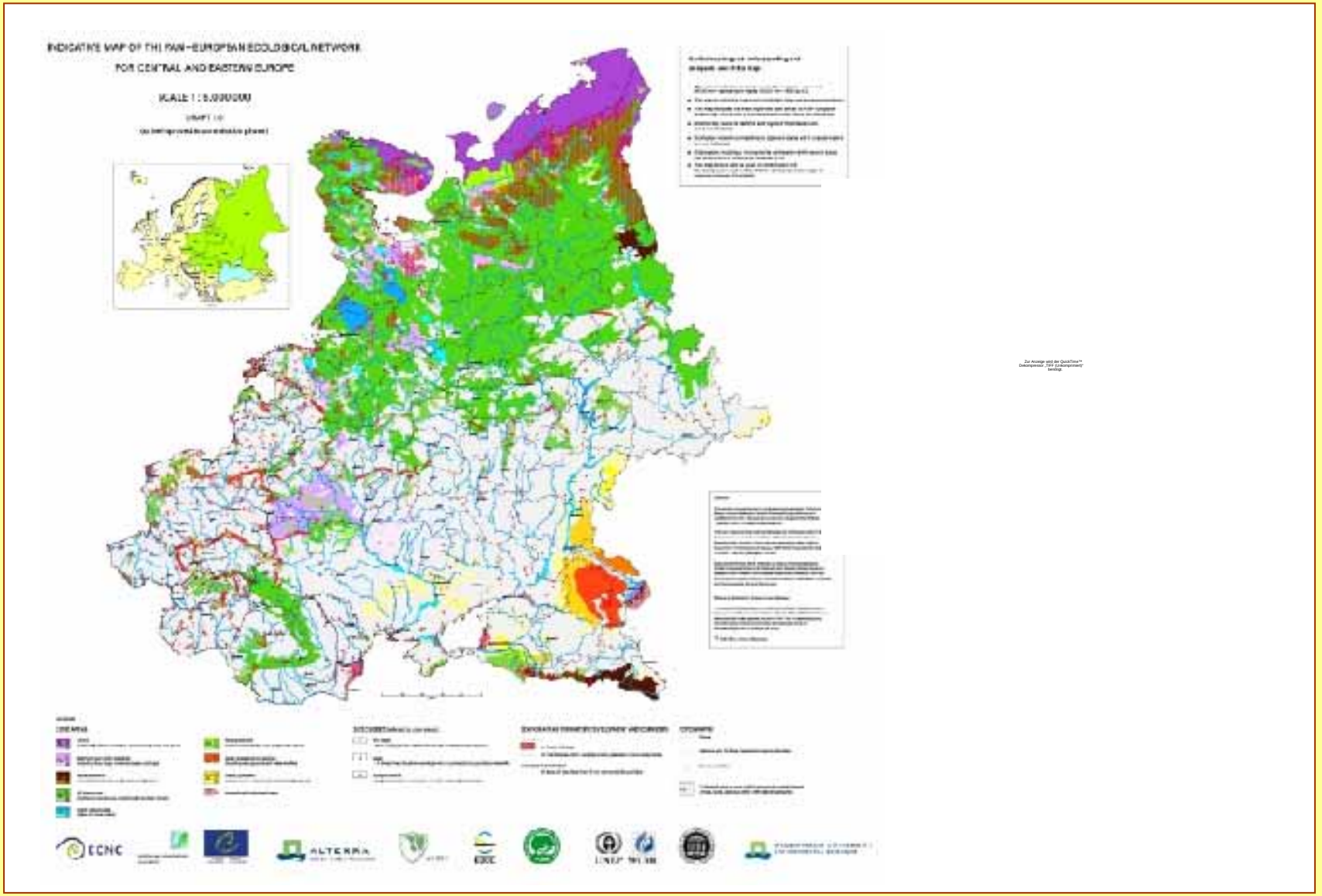
Project

Pan-European Ecological Network PEEN

PEEN is part of the Pan-European Biological and Landscape Diversity Strategy. The components of the Network are core areas, buffer zones and corridors. PEEN ensures an appropriate interconnectivity (by corridors, buffer zones) between a coherent assemblage of core areas representing the natural and semi-natural landscape elements that are needed to be conserved or managed in order to saveguard biodiversity..

Source: COUNCIL OF EUROPE (2007): The Pan-European Ecological Network: taking stock. Nature and Environment Nr. 146, Strasbourg

Pan-European Ecological Network (PEEN)



The Continuum

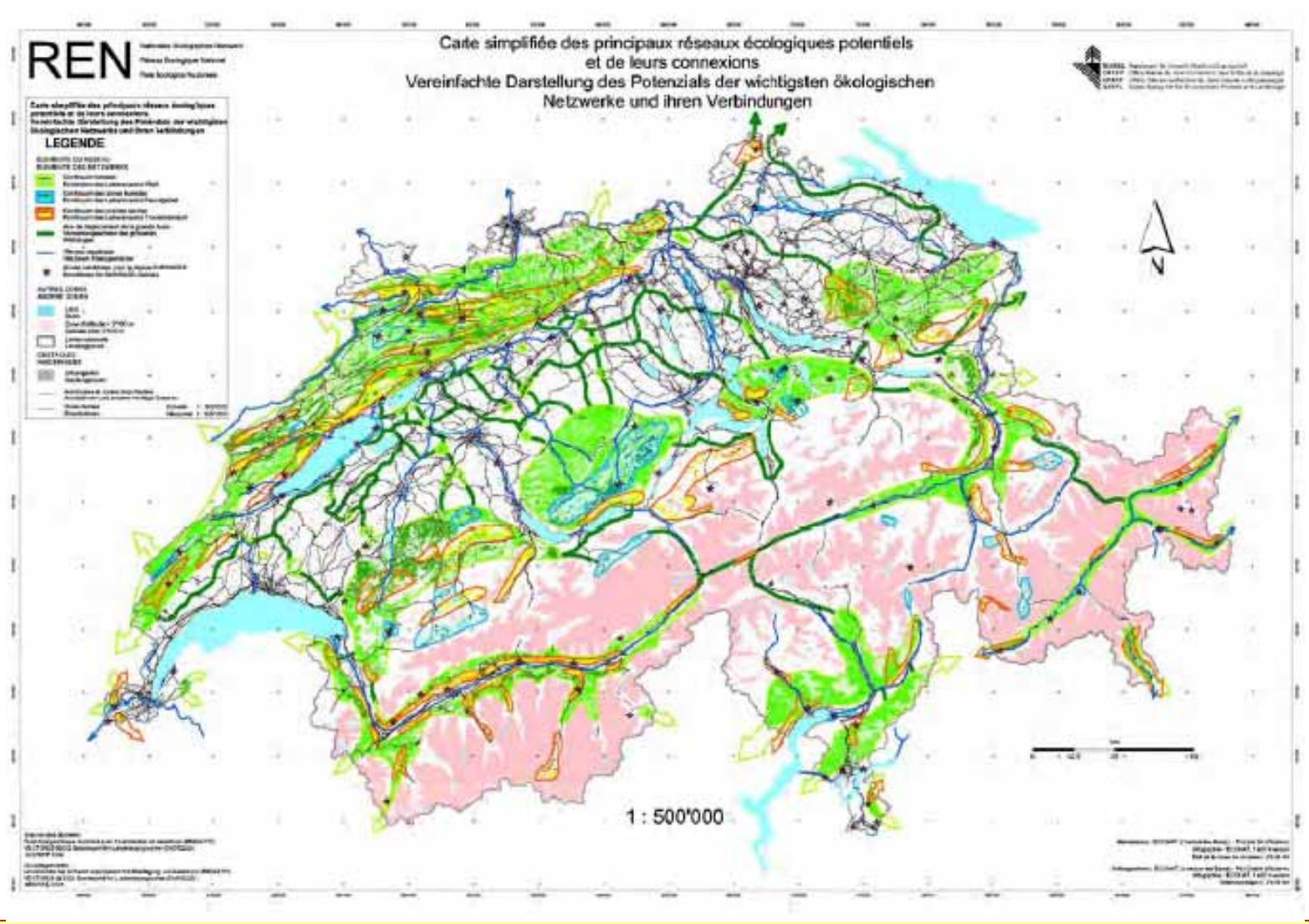
Project

REN

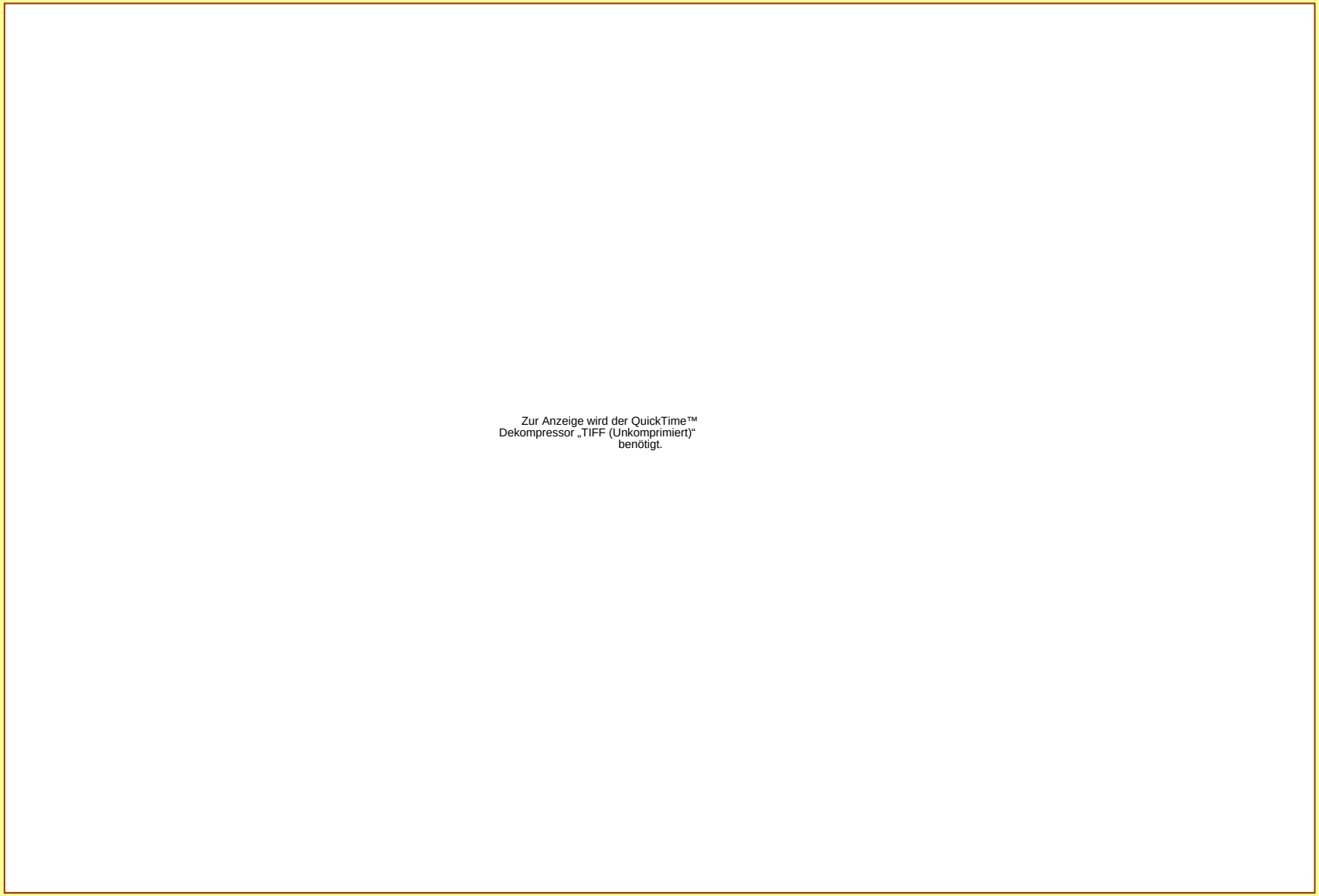
The Swiss REN follows the same overriding objectives as the PEEN (recording and presenting the various functions of the landscape and its potential) and is designed to contribute towards the protection and restoration of habitats to ensure genetic exchange; the linkage of important habitats and their connection through ecological corridors; reducing the fragmentation of ecosystems; the linkage of ecological compensation areas in agriculture; the improvement of the quality and diversity of agriculture.

Source: Bundesamt für Umwelt (2004): Nationales Ökologisches Netzwerk REN. Schriftenreihe Umwelt Nr. 373, Bern (German and French)

Swiss National Ecological Network (REN)



Swiss National Ecological Network (REN)



The Continuum

Project

Evaluation of approaches: 10 Questions to experts

Aims of the evaluation

- Suitability of the 4 approaches to be applied in pilot regions
- Develop a procedure for applying in the Alps & in pilot regions

General (1-4)

- **1.** What are the **three most important problems** when improving ecological connectivity in the Alps?
- **2.** On what **types of area** (list) should the project focus?
- **3.** What are the **most important aims** (list) which can be reached by improving ecological connectivity in the Alps?
- **4.** Do you know **other approaches**?

Comparison (5-10)

- **5.** How far the presented methods are appropriate for **identifying areas** with a high need for connectivity ?

Project

Evaluation of approaches: 10 Questions to experts

- **6**.Which of the 4 approaches can be used for working on pan-alpine (>1:500 000), regional (< 1:500`000) or local **scale** (< 1:200 000)
- **7.** Please compare the application of the 4 approaches regarding **data** need, data availability of needed data, data consistence (different countries) and costs.
- **8.** Which **measures** for implementation mentioned in the four approaches are most suitable for improving ecological connectivity on pan-alpine, regional and local level?
- **9.** How far the proposed 4 approaches are **fitting with aims** mentioned in question 3)?
- **10.** What would be the **concrete steps for implement-ing an ecological continuum** with the help of the (combinations) of the presented approaches?

The Continuum

Project

Focus on wHich areas?

Ranking (high - middle - low priority)	h-m-l
1. Areas with high biodiversity values	**8**-2-1
2. Riverine systems	**7**-3-1
3. Densely populated low altitude areas	**6**-3-2
4. Areas with high man-made pressures	**6**-3-1
5. Border areas of the existing protected areas	4-**5**-1
6. Areas linked to European networks	3-**4**-3
7. Large scale forest areas	0-3-**5**

The Continuum

Project Implementation in pilot regions

Main landscape types with need for action:

➔**densly urbanised and cultivated valleys** (barriers bv settlements, traffic, etc.) -> pilot region Isère

➔areas between **protected areas**, Natura 2000 and other areas with a high or specific biodiversity
-> pilot regions Kalkalpen/Gesäuse & Berchtesgaden/Salzburg

➔degraded (de-connected) **rivers** -> pilot region En/Adige

➔areas linking the Alps with surrounding **lowlands and other mountain ranges** -> pilot region Adige

➔functional areas over transnational territories -> pilot regions Berchtesgaden/Salzburg & En/Adige

The Continuum Project

Focus on which aims?

Ranking (high - middle - low priority)

– **General aims:**

1. improve both, habitat connectivity and connectivity for specific species or populations **12**-1-0
2. improve/preserve habitat diversity and connectivity between habitats 4-2-0
3. improve/preserve connectivity for (endangered) species or (isolated) populations 1-0-2

– **Specific aims:**

1. identify and overcome important ecological barriers **6**-3-0
2. focus on connectivity in and between protected areas (PA) and priority conservation areas (PCA,..) **6**-2-1
3. focus on priority species (groups) 2-**4**-1
4. improve connectivity for large carnivores 2-0-**4**

The Continuum

Project

General aims

General aims	WWF	ALPARC	PEEN	REN
3. Improve/preserve connectivity for (endangered) species or (isolated) populations	**Fit =3** Partly fit =1 Not fit =1	Fit =1 **Partly fit=2** Not fit =1	**Fit=2** **Partly fit=2** Not fit =1	**fit =5** Partly fit =1 not fit =0
2. Improve/preserve habitat diversity and connectivity between habitats	**Fit =3** Partly fit =2 **Not fit =3**	**Fit =4** Partly fit=2 Not fit=1	Fit =1 **Partly fit=4** Not fit =2	**Fit =8** Partly fit=0 Not fit =0
1.Improve both, habitat connectivity and connectivity for specific species or populations	**Fit=4** Partly fit =2 Not fit=2	**Fit =3** Partly fit=2 Not fit=1	Fit =2 Partly fit=2 **Not fit=3**	**Fit=7** Partly fit=1 Not fit=0

The Continuum

Project

Specific aims

Specific aims	WWF	ALPARC	PEEN	REN
Identify and overcome important ecological barriers (terrestrial and aquatic)	fit =2 **partly fit=5** not fit =2	fit =4 **partly fit=5** not fit =0	fit =1 **partly fit=4** **not fit =4**	**fit =8** partly fit =2 not fit =0
Focus on connectivity in and between protected areas and priority cons. areas	**fit =3** partly fit =1 not fit =2	**fit =5** partly fit=2 not fit=0	**fit=3** partly fits =2 not fit=1	**fit =5** partly fit=1 not fit =1
Focus on priority species (groups): which ones?	fit =3 **partly fit=4** not fit =0	**fit =3** partly fit =2 **not fit =3**	**fit =4** partly fit=3 not fit =1	**fit =5** partly fit =1 not fit=2
Improve connectivity for the survival of large carnivores	**fit =4** partly fit =1 not fit =1	fit =2 **partly fit=3** not fit =2	fit =2 **partly fit=3** not fit =2	**fit=4** partly=1 not fit=2

The Continuum

Project Summary approaches / aims

7 Aims	WWF	ALPARC	PEEN	REN
for species (functional)	1	2	2	1
between habitats (structural)	3	1	2	1
linking species & habitats	2	2	3	1
overcome barriers	2	2	3	1
in/between protected areas	1	1	1	1
environm. dynamics/change	3	3	3	2
for large carnivores	1	2	2	1

1= fit; 2=partly fit; 3= do not fit;

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Project Summary approaches / application

	WWF	ALPARC	PEEN	REN
Identification of problems	2	3	1	1
Scale:panalpine	2	2	1	3
Scale regional	2	2	3	1
Scale local	3	3	3	1
Data need	high	low	medium	high
Data availöability	medium	good	medium	good
Data costs	low	low	medium	medium
Impelentaion of measures	3	3	3	3
Application in the Alps	1	1	3	2

1= fit; 2=partly fit; 3= do not fit;

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Project

Scale

	Pan-alpine ecological networks (>1:500'000)	**Regional ecological networks(1:100'000 – 1: 500'000)**	**Local ecological networks (< 1:100'000)**
Biodiversity visions network / functional connectivity (WWF)	++ (n=7)	++ (n=6)	+ (n=2)
Cross-border ecological networks / structural connectivity (ALPARC)	++ (n=7)	++ (n=7)	+ (n=3)
Pan-European ecological network PEEN / European perspective	+++ (n=12)	+ (n=2)	(n=0)
Swiss ecological network REN/national perspective	+ (n=2)	+++ (n=10)	+++ (n=13)

The Continuum

Project

Scale

	Pan-alpine ecological networks (>1:500'000)	**Regional ecological networks(1:100'000 – 1: 500'000)**	**Local ecological networks (< 1:100'000)**
Biodiversity visions network / functional connectivity (WWF)	++ (n=7)	++ (n=6)	+ (n=2)
Cross-border ecological networks / structural connectivity (ALPARC)	++ (n=7)	++ (n=7)	+ (n=3)
Pan-European ecological network PEEN / European perspective	+++ (n=12)	+ (n=2)	(n=0)
Swiss ecological network REN/national perspective	+ (n=2)	+++ (n=10)	+++ (n=13)

Connectivity: Reality and Pragmatism

Functional connectivity
Spatial population dynamic models

Functional connectivity
Statistical /expert models

Structural connectivity

Boundary length penalty
Sites nearest to selected sites
Diameter of the reserve network
Sum of inverse inter-patch areas

Methodology harmonization

Full spatial dynamic model

Statistical, expert-based model aimed at functional connectivity

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Structural connectivity

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Project

General characterisation of approaches

	Structural connectivity (biotopes, land use)	**Mixed Struc./Func.** (habitats, potentials)	**Functional connectivity** (species, populations)
Region	ALPARC	Isère REN Swiss REN	
Nation & Alps		Swiss REN	WWF-Ecoregion
Europe		PEEN Alps-Carp. thian-Corr.	

Existing concepts: conclusion

1) The unique concept for planning an integral, alp-wide ecological network doesn`t (and will not) exist.

2) Existing concepts are **top down** and orientated on specific data or species (beside Swiss REN, which provides large basic information)

   ➔ Concepts are failing to provide practical information on how to build ecological networks

3) **We have an implementation problem**: a lot of concepts, few realisations, no real validation in practice, no integration of stakeholders

   ➔ At least some examples: Green bridges, river restorations (Rhone in prep.), Isère (in prep.)

The Continuum

Project Guidelines for pilot regions

Guidelines aiming at coordinated bottom-up work in pilot regions (sheet) -> ECONNECT

1. Delimitation, communication, integration stakeholders, estblishing project structure, integration and support of current projects

2. Basic data, anaysis of needs, select focus habitats and species, define corresponding aims, select focus activities and approproiate methods/measures (in coordination with other pilot regions)

3. Starting ecological network projects with regional partners

The Continuum

Project Tools for pilot regions

Guidelines aiming at coordinated bottom-up work in pilot regions: TOOLS (beside ECONNECT)

1. - Communication (Bropchure, Homepage)

2. - Catalogue of measures
   - Matrix 1: Crosscutting main areas and general goals of ecological networks: find main problem fields
   - Matrix 2: Definition of focus activities (pan-alpine / regional-local) for main problem
   - Matrix 2+: Find appropriate approaches for the work on focus activities

3. - Matrix 3: Steps to follow for focus activities

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Project

Matrix 1: Analysis of main problem fields

General goals **Main areas**	Improve/ preserve connectivity for species or populations	Improve/ preserve habitat diversity and conn-ectivity between habitats	Improve/pre-serve habitat connectivity and connec-tivity for species or populations	Identify and overcome important ecological barriers (terrestrial and aquatic)	Focus on connectivit y in and between protected areas and PCAs	Focus on priority species (groups): which ones?	Improve connectivit y for the survival of large carnivores
Areas with high biodiversity values (PCA, Natura 2000, etc.)	R: 3 B: 1	**R: 9** B: 5	**R: 8** B: 5	**R: 9** **B: 9**	**R: 9** B: 4	R: 2 B: 5	R: 4 B: 1
Riverine systems as connecitivity elements of the wider landscape	R: 4 B: 3	R: 6 B: 1	R: 2 B: 0	**R: 8** **B: 15**	R: 2 B: 0	R: 3 B: 0	R: 0 B: 0
Densely populated low altitude areas	R: 0 B: 5	R: 4 B: 5	R: 3 B: 3	R: 6 **B: 14**	R: 2 B: 0	R: 1 B: 4	R: 1 B: 1
Areas with high pressure through intensive agriculture, tourisme, energy infrastructures	R: 2 B: 3	R: 5 **B: 11**	R: 5 B: 5	R: 6 **B: 12**	R: 5 B: 0	R: 1 B: 5	R: 1 B: 2
Border areas of the existing protected areas	R: 1 B: 1	R: 0 B: 3	R: 3 B: 3	R: 1 B: 3	R: 2 B: 3	R: 1 B: 3	R: 2 B: 0
Areas linked to large scale European networks such as PEEN, Alpine-Carpathian network (key corridors), IBAs etc.	R: 2 B: 0	R: 3 B: 2	R: 4 B: 2	R: 4 B: 3	R: 3 B: 1	R: 1 B: 0	R: 2 B: 0
Large scale forest areas	R: 0 B: 0	R: 2 B: 0	R: 1 B: 4	R: 2 B: 3	R: 3 B: 3	R: 0 B: 0	R: 1 B: 0

The Continuum

Project

Matrix 2: Listing of Focus activities

General goals **Main areas**	Improve/ preserve habitat diversity and connectivity between habitats	Improve / preserve habitat connectivity and connectivity for species or populations	Identify and overcome important ecological barriers (terrestrial and aquatic)	Focus on connectivity in and between protected areas and PCAs
Areas with high biodiversity values (PCA, Natura 2000, etc.)	**A: Panalpine:** Activity 1: Management plans for habitats (transboundry) Activity 2: Natural disturbance regimes	**B: Panalpine** Activity 3: Habitats that are important for species of conservation interest Activity 4: Permeability between high biodiversity value areas	**C: Panalpine** Activity 5: Biogeographical analysis Activity 6: Mapping of large scale barriers **D: Regiona/Local** Activity 7: Functionality of connectivity areas for selected species	**E: Panalpine** Activity 8: Implement large scale transects Activity 9: Strengthen contractual nature protection measures Activity 10: Make sure that process goes on
Riverine systems as connectivity elements of the wider landscape			**F: Panalpine** Activity 11: Analysis/ evaluation of riverine systems / catchments: **G: Regiona/Local** Activity 12: Implementation of EU-water framework directive	
Densely populated low altitude areas			**H: Regiona/Local** Activity 13: Identify ecological barriers in valleys Activity 14: Spatial planning: Find agreements on barrier free “windows”	
High risk areas/areas with high pressure/ through intensive agriculture, tourism, energy infrastructures	**K: Regiona/Local** Activity 21: Improvement of low intensity farming Activity 22: Implement best practices Activity 23: Share experiences with other areas		**J: Regiona/Local** Activities 15-19: Identify ecological barriers Activity 20: Special measures for high altitude areas	

The Continuum

Project Matrix 2+: Appropriate approaches for Focus activities

Focus activities	A (WWF)	B (ALPARC)	C (PEEN)	D (REN)	Remarks
High biodiversity					
1 Intervention need		Best for management	complement ary		Natura 2000/Emerald
2 Disturbance regimes	Layer ecological processes				Habitalp (regional), Natural hazard maps; link to riverine areas processes F1
3 Protection need	ok		Ok (migra-tory birds)	Ok (guilds, corridors)	
4 Permeability			Ok buffer areas, landscape corridors	Ok, most appropriat e	
5 Biogeographical situation					Basic data for species (available/needed), basic for Activity 3 and 4, climate change
6 Identify		OK		OK layer (to be verified)	
7 Functionality	–	–	–	–	Link Activity 4. Hard work, not only connectivity
8 Transects		OK (areas between existing PA)	PEEN (birds)		C1 (needed barriers) F1, combination with Natura 2000 (Piemont/ Lombardy new), not species needs
9 Contractual measures	indrectly	Partly (indicator)	–	Partly in implement ation	Important for implementation (in- and outside PA, Natura 2000, PCA)
10 Support/Coordination					

The Continuum

Project

Matrix 3: Planning of selected Focus activities

step	**Focus Activity 6: Identify barriers**	**Focus Activity 2: Disturbance Regimes (sc.)**
Step 1	Required data (recent, aerial f., land cover, land use ..) for needed scale (max. 1: 100`000 ca.)	Typology of disturbance
Step 2	Collect available data, identify databases, use existing data-base (converse Geostat/Corine)	Pan-alpine communication
Step 3	Define what is a barrier on large scale	Choose case study sites
Step 4	(ev. + identify potential = high risk areas by regional experts or working subgroups)	Analysis of disturbed areas and of potential areas (related to human activities)
Step 5	Data analysis / define hierarchy of information / modelling (indicators)	Colonisation events & migration of pioneer species; indicator how dynamic a region is
Step 6	Map barriers between PA/PCA (/result)	
Step 7	Verification of mapping	
Step 8	Typology of barriers & areas (all) and define action need	
Step 9	Develop guidelines for measures (= sensibilisation/ information)	
Step 10	Up-date of data & information (follow-up)	

Thank you for your attention!

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