Outline

– EP Resolution on Wilderness in Europe (Feb 2009) and the Message from Prague (May 2009)
– Need for wilderness guidelines (definition), register and coordinated mapping
– Focus on EU, Europe and immediate neighbours
– Wilderness quality mapping
  • Connected landscapes: Cores, Corridors and Carnivores
  • Trans-boundary connectivity
  • Protecting what’s left and creating more
Wilderness in Europe

- Feb 2009 European Parliament Resolution 2008/2210(INI) 528 votes for and only 19 against
  - call for improved protection for wilderness areas through mapping, research and awareness raising

- May 2009 Conference on *Wilderness and Large Natural Habitat Areas*, Prague.
  - an Agenda for Europe’s Wild Areas “Poselství from Prague”
  - important because of their indirect and direct economic, health, social, research and cultural values
  - mapping wilderness in Europe using appropriate definitional and habitat criteria and level of scale to support plans for protecting and monitoring
Wilderness Mapping

• Wild(er)ness is an understanding of what came before modern humans moved out of Africa:
  – based on remnant areas of low human modification as well as areas of ecological restoration where human influence has been withdrawn
  – subject to individual perception, social and cultural background, and personal experience...
  – an idea... or an ideal... as much as it has a scientific basis... a place that exists in the mind as much as it does on a map!

“One man’s wilderness is another’s roadside picnic ground.” (Nash, 1982)
World wilderness distribution (After McCloskey and Spalding, 1989)

- areas greater than 1 million acres (404,700ha)
- essentially roadless
- unaffected by permanent habitation or structures
- based on DCW 1:5 million scale digital map data
The shrinking wilderness (After Brun, 1992)
Australian Wilderness Inventory (After Lesslie and Maslen, 1995)

Wilderness Continuum Concept
Global human impacts (After Globio/UNEP, 2002)

The probability of impact is a function of the distance from:
• power lines or pipelines
• roads
• settlements, cabin resorts, or construction-related facilities
The Human Footprint (After Sanderson et al., 2002)

Uses four types of data as proxies for human influence:

• population density
• land transformation
• accessibility
• electrical power infrastructure
“Uninhabited and often relatively inaccessible countryside where the influence of human activity on the character and quality of the environment has been minimal.”

(NPPG 14, 1998)

“There are parts of Scotland where the wild character of the landscape, its related recreational value and potential for nature are such that these areas should be safeguarded against inappropriate development or land-use change.”

(SNH, July 2002)

Conservation values are rarely black and white – more often than not they are a shade of gray”

(Stokes and Morrison, 2003)
Wilderness Quality Index (WQI) based on:
- Distance from nearest road/railway
- Population density
- Land use
- Terrain ruggedness

Top 10% wildest areas highlighted in blue

- Shows marked altitudinal and latitudinal trend (plus lowland wetland e.g. Danube Delta, Sooma, etc.)
Effects of personal/expert weightings
Correspondence with existing protected area networks

- Poor correlation with Natura 2000
- Better correlation with IUCN 1 & 2

- Indicates “wisdom” in the location of stricter IUCN protected areas

Other potential correlates with WQI
- “wilderness dependent” species in Annex 2 of Habitats Directive?
- Correlation of wolverine SAC with high WQI
- Correlation of wolf SAC with high WQI
Wilderness in Europe
Natura 2000 Annex 2 areas: European brown bear (central and eastern areas)

Correlation of bear SAC with high WQI

http://www.lcie.org/Docs/LCIE%20IUCN/bear_pop_map.jpg
Correlation of lynx SAC with high WQI
Connectivity and habitat networks

CCC (Cores-Corridors-Carnivores)
Examples in Europe:
• EHS (Netherlands)
• PEEN
• MAK-NEN
• Etc.
Overview over existing transboundary ecological network initiatives in the study area
(detailed list see text)
GIS tools and information for designing wildlife corridors

Our goal is to transfer everything we’ve learned about designing wildlife corridors to the general public to facilitate better conservation, science, and dialogue.

Learn about corridors
- Learn the important conceptual & technical steps for designing wildlife corridors

Download GIS tools
- Download Coral designer, results of ArcGIS tools for designing and evaluating corridors

Linkage Designs
- Download reports and GIS data for linkage design considerations of habitat

Corridor Design Blog
- 2015 08 2013
  - No wildlife corridors world? Stock shores for suggesting corridors
  - Real bear and elk densities in Northern America! A density test is needed for real life wildlife corridors, and it's far a GIS. This is free if you suggest this is useful in your planning study.

SPF 18 2013
- Linkage Mapper GIS tool now available
  - Linkage Mapper: a GIS tool developed to suggest real-life habitat connectivity analysis for the northern America's landscape region. It is now available for free to those interested in wildlife.
Mapping frontiers – too much yellow!!!!!!

- Need for consistent and comprehensive data sets across all of Continental Europe
- speculative mapping on networks is a start eg.

Indicative map of the Pan-European Ecological Network for central and eastern Europe
The spatial distribution of species protected in Russia is linked more with low disturbed natural areas and so may be used for assessing potential ASCI's” – Nickolai Sobolev 2012

Species rich countries (i.e. with carnivores) can identify co-location areas for conservation.
Possible habitat networks connecting core wilderness based on high WQI
“There are opportunities for rewilding landscapes from farmland abandonment in some regions – in Europe, for example, about 200,000 square kilometers of land are expected to be freed up by 2050. Ecological restoration and reintroduction of large herbivores AND CARNIVORES will be important in creating self-sustaining ecosystems with minimal need for further human intervention”

Global Biodiversity Outlook 3, 2010

- Evolution of mapping approaches in the species rich Carpathian Mountains

- Romania as an example of co-location of species of conservation concern with carnivores

Romanian Carpathians and top10% WQI
Special Areas of Conservation (SACs) for large carnivores in Romania

- Correlation with areas of high WQI
- Co-location of carnivore species
- “Wisdom” of carnivores!!
Focal bird species in the Carpathian Mountains

Occurrence of 8 focal Bird species (Aquela promarina, Crex crex, Dendrocopos leucotes, Monticola saxatilis, Strix uralensis, Tetrao urogallus and Tichodroma muraria) in the Carpathians.

THE STATUS OF THE CARPATHIANS
Carpathian Ecoregion Initiative November 2001
http://www.carpates.org/docs/publications/status.pdf

Carpathians and top 10% WQI
Mapping environmental suitability for large carnivores in the Carpathians, Salvatori, 2004

Environmental variables describing the distribution were based on information of the behaviour of carnivores from experts & published literature, refined by data from local experts on the species' presence.

Carpathians and top10% WQI
Safeguarding the Romanian Carpathian Ecological Network. A vision for large carnivores and biodiversity in Eastern Europe 2006


Reported numbers per hunting unit in Romania in 2005

Wolf

Lynx

Bear
Preliminary Carpathian Ecological Network Vision Map for the safeguarding of at least 60% of the current large carnivore populations.

Also contains hotspots (sizeable populations) for herbivores and other important species like the reintroduced beaver.

- ‘Large carnivore umbrella’ protects other hotspots, including old-growth forest (primary forest), insects, butterflies, vascular plants, herpetofauna (amphibians and reptiles) and birds.
The potential of large carnivores as conservation surrogates in the Romanian Carpathians

Rozyłowicz and others 2011
Biodiversity & Conservation 20:561–579

Carpathian Mountains in Romania

Area of analysis shown as hatched

Romanian Carpathians and top10% WQI
- 67% of the area of Carpathians in Romania have all three carnivore species
Forestry operations as a disturbance factor in the Carpathians

Changes in forest cover expressed as percent clearcut from start of period

- Most disturbance in Eastern Carpathians
Co-location between carnivores and 10 mammal and 55 bird species of European conservation concern - forest specialists, habitat generalists, and non-forest species.

Presence of one large carnivore species in a quadrat qualified as “umbrella species present”

- 55% of the bird and 80% of mammals species are under the carnivore umbrella
- Forestry practices are not a natural disturbance regime, but redistribute species
- New protected areas in Romania should capture high opportunity co-locations
Conclusions

• Wilderness Register (ongoing) will deliver a new, unified WQI for Europe but:
  • Needs to be extended into adjoining areas in the east
  • Only a broad brush indicator
• More opportunity mapping for PAs based on overlaps identified from multiple layers
• Importance of the “moving frontier” of carnivore distribution towards NW Europe
• Need for *mapping champions* across the whole of Continental Europe to work at national/regional/local scale using coordinated methods/data