

“Methodology for pilot regions”.

A common initiative of WP 4, 5 and 7

Updated version: june 2010

The following procedure, structured in **three main steps**, is strongly recommended for the implementation in pilot regions. For each step the activities that should be carried out are detailed. This document is a further development of the documents proposed by the Continuum Project (Methodology assessment, Guidelines for pilot regions) and the working documents elaborated in the ECONNECT working groups.

This common methodology is recommended in order to ensure a harmonised approach of the pilot regions and to guarantee a minimum of comparability between the different initiatives. This document proposes the steps that should be followed by all pilot regions which imply also the work with similar data types. The concrete activities for each step can and have to be adapted to the local situation of each pilot region.

The following workflow is based on a common agreement of WP leaders 4-5-7 and the Lead Partner of ECONNECT.

I) Preparation, contact with stakeholders, organisation

Step N°	Activity	Description / procedure	Timeframe Deadline	Result/ Output	Workflow WP 4-5-7	Interface between WP 5-7
1	Cartographic delimitation of the concerned region (precise map, identification of frame, format, scale, insure good resolution, give rough definition of thematic content)	In accordance with the main stakeholders the area of work should be fixed. Selection criteria could be water bodies, administrative borders, habitat types, etc.	Already done by all PR	- Map	WP7 - WP4 back to Pilot regions for control and implementation in GIS	Use of the map for the alps wide approach (WP5) and for the ECONNECT mapping tool.

2	<p>Identification of the areas defined as priority types of areas for the work in the Alps.</p> <p>Integration of the Priority areas into the cartographic delimitation of step 1</p>	<p>Cartographic identification of the priority areas according to list n°1.</p> <p>The identification will be based on CORINE Landcover data</p>	June 2010	- Map	<p>- WP7 Leader gives a definition of the different types of priority areas according to list n°1. Check by WP5 Leader if these definitions can be used as well by WP5</p> <p>- The Pilot regions and the LP of WP5 define their priority areas or landscapes types and communicate the data to WP4</p> <p>- WP4 will realise the mapping of those areas for WP5 and WP7 and identify where deficits and gaps can be found.</p> <p>(Data harmonisation is needed and insured by WP 4)</p> <p>- Pilot regions have to evaluate and to control these mappings for their regions</p>	<p>In cooperation with WP5 on the alpine level to illustrate the Interfaces between both approaches.</p> <p>SCALE: <u>WP5:</u> 1:500.000 <u>WP7:</u> 1: 50.000</p>
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Priority areas concerned (list n°1):

NB: The definition of the priority areas is not based on absolute values in order to allow to the PR a choice which is relevant for their region.

1) Areas with high biodiversity values (PCA, Natura 2000, etc.)

Definition proposal: areas with a outstanding diversity of species compared to the surrounding regions or with very specific features like the presence of endemic species.

2) Riverine systems as connectivity elements of the wider landscape

Definition proposal: Rivers and streams with importance for species and ecosystems beyond the local scale.

3) Densely populated low altitude areas, roads...

Definition proposal: Valleys with 2 times the average population density index of the region or for especially fragile spaces even a lower density index.

4) High risk areas/areas with high pressure/ through intensive agriculture, tourism, energy infrastructures

Definition proposal: Areas where a significant lost of species is predicted or observed by experts since at least 5 years.

5) Border areas of the existing protected areas

Definition proposal: the official border area as defined by the protected area or if not existent the border of the directly connected communities ("park communities" having a part of their territory inside the protected area).

6) Areas linked to large scale European networks such as PEEN, Alpine-Carpathian network (key corridors), IBAs etc.

Definition proposal: areas which are officially part of the networks or special projects (refer to network or project descriptions).

7) Large scale forest areas

Definition proposal: forests with a total surface over 1000 hectares. In the case of fragmented forests the focus will be to restore connectivity, in the case of non fragmented forests, priority should be given to use them as important elements for the continuum concept.

8) Data deficiencies

Definition proposal: areas which can't be classified in one of the categories because of deficiencies of information and evaluation possibilities but which obviously should play a role as elements of the continuum.

9) Special local constraints areas

Definition proposal: according to local definition and needs expressed by Pilot regions or by the WP5 Leader.

Basis: CORINE Land cover (definition standard)

N°	Activity	Description	Timeframe Deadline	Result / Output	Workflow WP 4-5-7	Interface between WP 5-7
3	Overview of existing projects and initiatives in the defined area and localisation of those projects	Listing, spatial identification (point or polygon), map, and contact with all other projects and initiatives concerning the topic taking place in this area	June 2010	- List (EXCEL) - Point data, polygons - map with coordinates - Description of projects, contact persons	WP7	Both WP's need this identification and map
4	Identification of main stakeholders and localisation of those stakeholders	Listing and contact with the main stakeholders identified for the region	done for the list Mapping June 2010	- List (EXCEL) contact persons - Map with localisation stakeholders (point data)	WP7	Both WP's need this identification and map
5	Organisation of local project structure	Time frame, project responsibilities and planned activities	June 2010	- Document + Project plan	WP7 (no need of data)	

Summary/

Data needs for the first step:

- GIS Data: administrative borders, topography (30 meters, quality and use of this data has still to be assessed on a regional scale), hydrological layer (scale 1: 500 000 alpine-wide level; 1: 25 000 pilot region level, riverine system (this will be done on the basis of the Water Framework Directive and respective data), population density, land use,, protected areas, infrastructure, forest (to determinate according to the pertinence).

Only if more precise data is available in Pilot Regions these will be transferred to WP4 for harmonisation. WP4 cooperation requested for lack of data.

If WP5 Leader needs more information it will contact the Pilot Regions.

- Information on local projects/initiatives
- Contact data for main stakeholders

The WP4 supports Pilot Regions for data harmonisation and mapping

II) Target-setting and analysis, selecting priority activities

This complete step requires a mandatory close collaboration with WP4 and WP5. The aim is to define what is relevant for the Pilot Region.

N°	Activity	Description	Timeframe Deadline	Result/ output	Workflow WP 4-5-7	Interface between WP 5-7
6	Definition of objectives for the pilot region (wishes and vision)	Using the methodology established by the Continuum project for the Pilot Regions concerned (see matrix)	December 2010	- Matrix of main objectives with indications of names of priority areas Integration of climate change aspects	WP7	Verifying if redundancies between those areas between WP5 and WP7 and (if yes) control whether there are the same goals

General goals (wishes) of Pilot regions Define which is relevant for each Pilot Region (visions) Priority areas presented in a map to support planning activities	Improve/ preserve connectivity for species or populations	Improve/ preserve habitat diversity and connectivity between habitats	Improve 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 (priority conservation areas)	Focus on priority species (groups):	Improve connectivity for the survival of large carnivores
Areas with high biodiversity values (PCA, Natura 2000, etc.)							
Riverine systems as connectivity elements of the wider landscape							

Densely populated low altitude areas							
Areas with high pressure through intensive agriculture, tourisme, energy infrastructures							
Border areas of the existing protected areas							
Areas linked to large scale European networks such as PEEN, Alpine-Carpathian network (key corridors), Apennins, Pyrénées, IBAs (bird areas) etc.							
Large scale forest areas							

In this matrix should be filled in the local name (denomination or a serial number) of the areas defined as one of the priority area of the Pilot region (p.e. an area around local pics, villages or rivers... or define a number system for each pilot region allowing the exact localisation of the area) and its GPS coordinates (centre of each priority area). This matrix has no "contractual" value, it presents strategic goals that's why you are asked to join for each localised goal a probability factor of realisation going from 1 to 10 (10 is the highest probability of realisation within the next 10 years).

N°	Activity	Description	Time-frame Deadline	Result / Output	Workflow WP 4-5-7	Interface between WP 5-7
7	Selection of species for the pilot regions and alps-wide species	Consult the list of species developed in the frame of ECONNECT (see list n°2 and n°3). Alpine-wide species defined for WP5 (list n°2). Species for Pilot regions see list n°3. These lists are not exhaustive; you can choose other species for the pilot region approach.If possible more precise data provided	December 2010	- List of species (EXCEL) Distribu-tion by Point data	WP5 is asking WP7 for precise data in their PR concerning the alps wide species: - home range - distribution - migration habits - availability of these data for alpine level (shape files and meta data) WP5 will complete	For the alps wide species WP 5 will do the modelling - also for the regions.

		<p>from Pilot regions (according to method of WP5)</p> <p>Definition of species which should be treated within the CSI procedure</p>			<p>these data</p> <p>WP5 will identify the interfaces between the alps-wide and the regional approach</p> <p>WP5 will develop a modelling system for the alps-wide approach (scaling down for the PR approach if needed). WP7 will use this system.</p> <p>WP4 will prepare the data and realise the mappings of the Alps wide species for WP5 and WP7 (by online distribution and visualisation)</p> <p>Integration of climate change aspects with climate change sensitive species</p>	
8	<p>Selection of indices for the pilot region</p>	<p>Using the list of indices developed in the frame of ECONNECT (see list n°4). This list is not exhaustive. The pilot region can choose beside the minimum number of indices other indices (Continuum Suitability Indices required for PR at least: n°1, 2, 3, 4, 6, 7, 11, 12).</p>	<p>December 2010</p>	<p>- List of indices</p>	<p>WP4-WP5-WP7</p> <p>The Pilot regions are waiting for the results of the WP5 on the alpine scale whose data has been provided by WP4.</p> <p>The CSI (Continuum Suitability Index) is valid for the 2 approaches (Alpine and regional) to measure the connectivity potential and barriers (fragmentation) by WP5. The Alpine wide model will be scaled down for the pilot regions.</p> <p>This approach is valid according to data availability and has to be used in a flexible</p>	<p>WP5 will start with modelling by beginning 2010; the first results will be available in spring 2010 (depends on data-availability).</p>

					<p>way.</p> <p>This procedure is a process through the whole project period.</p> <p>Integration of climate change aspects</p>	
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This part is an interface which links alpine wide and regional approach for a harmonized approach between the WP5 and WP7 to:

- identify the spaces where the alps-wide barriers get in contact with the pilot regions areas and identify the main corridors of the alps-wide species and the opportunity of the pilot regions to function as refuges of these species.
 - identify the most promising links between protected areas on a supra-regional scale to create an alps-wide ecological continuum of non fragmented spaces and for the most endangered species identified in the project.
- In case of the same species, identify the migration of those species more in detail in the pilot regions.

Alpine-wide species selection. This selection is not binding for the Pilot Regions (list n°2):

- Red deer (*Cervus elaphus*)
- Black grouse (*Tetrao tetrix*),
- Fish otter (*Lutra lutra*)
- Bullhead (*Cottus gobio*)
- Wolf (*Canis lupus*),
- Brown Bear (*Ursus arctos*),
- Lynx (*Lynx lynx*)
- Griffon vulture (*Gyps fulvus*).

Species proposed by the Pilot regions (list n°3):

	Habitats	Species
Hohe Tauern/ Natural Parks of Southern Tyrol	grasslands	Mountain arnica
	grasslands	Mountain Marsh Fritillary
	linking grasslands and woodlands	Red deer
	linking grasslands and woodlands	Black grouse
	woodland	Three-toed woodpecker
	woodland	Red deer
	river and water system	Brown trout
	river and water system	Bullhead
	river and water system	Grayling
	river and water system	Tamarisk
	wetlands	Grass frog
	wetlands	Forester
	Gesäuse / Kalkalpen / Wildernis Area	natural forests

Dürrenstein

river and water system	Brown trout
river and water system	Bullhead
grasslands	Apollo/Mountain Apollo

Monte Rosa

linking woodlands	Bear, lynx, wolf
alpine pastures	Black grouse
	Rock ptarmigan
	Chough
	Snow finch
	Carabus latreilleanus
	Cychnus cordicollis
ophyolithe complex	Asplenium cuneiformis
ophyolithe complex	Cardamine plumieri
calcareous background	Arabis bellidifolia stellulata
calcareous background	Thlaspi sylvium

**Alpi
Marittime/
Mercantour**

alpine pastures	Black Grouse
alpine pastures	Rock Partridge
linking woodlands	European hedgehog
linking woodlands	Fox
migratory roads	Honey Buzzard
migratory roads	Griffon Vulture
migratory roads	Short-toed Eagle
river and water system	Marble Trout
river and water system	European Bullfish
river and water system	Freshwater Caryfish
river beds and xerich habitat	Groundsel
river beds and xerich habitat	Giant goldenrod
woodland	Red Deer
woodland	Black Locust

**Berchtesgaden
/ Salzburg**

Extensive grasslands	Red deer
Forest	White-backed woodpecker
	Grouse
	Bats
	Butterflies
	Mountain arnica

Inn / Etsch

alpine pastures	Black grouse
woodland e alpine pastures	Three-toed woodpecker
woodland	Red deer
woodland	Bearded vulture
migratory roads	Common trout
wetlands	Brown trout
river and water system	Myricaria germanica
river and water system	Bullhead
river and water system	Apollo/Mountain Apollo
extensive grasslands	
grasslands linked	
settlement area	Alpine long eard bat
extensive grasslands	Nigra honey bee
extensive grasslands	Chazara briseis
extensive grasslands	Dracocephalum austriacum
extensive grasslands	Adder

Isère

river and water systems	Bullhead
Woodland	Hedgehog

Woodland	Red fox
Woodland	Roe deer
Woodland	Squirrel
Woodland and water systems	Brown frog

For the methodology to model habitats, corridors and analysis of indicators species in the PR, you can refer to the document "modelling distribution and corridors of large mammals in the Alps", Johannes Signer Austrian Environmental Agency (Umweltbundesamt) Vienna from 15th November 2009. WP5 will be in charge to develop the methodology of modelling for the alps-wide and the regional approach.

Indicators for the Indices: "The Continuum Suitability Index (CSI)" (list n°4):

***available at alpine-wide level too**

The CSI will be developed one time by an expert/contractor and afterwards used/implemented for all Pilot Regions

The CSI is a challenging task because it consists of several sub models which need to be aggregated to the overall CSI.

Not all indices have to be used by the Pilot regions, but at least the following 8 indices: **1, 2, 3, 4, 6, 7, 11, and 12** (proposal made by the WP7 Leader)

- 1) Realized or planned **ecological measures (restoration)** index
- Number, type, quality and coverage of the ecological measures per area unit
Explanation: To define if in the concerned area already a positive attitude and measures towards ecological integrity exist. (The indexation should make sure the linkage to connectivity).
- 2) **Fragmentation by human infrastructure** index (negative: road, railways, walls and fences...) *
- Number, type, intensity, surface (best precision available) and coverage (best precision available) of roads and railways per area unit
Explanation: To define the degree of fragmentation of natural or semi natural spaces by human infrastructure.
- 3) **Landscape heterogeneity** index (positive fragmentation)*
- Number and distribution patterns of landscape patches per area
Explanation: To define capacity of step stones for migration of species in an area
- 4) Environmental **protection** index based on **legal status** *
- IUCN Categories (1-6)
- NATURA 2000 and Emerald network
- Other protected areas status
Explanation: To define if in the concerned area and in the state already a positive attitude and measures towards ecological integrity exist. (The indexation should make sure the linkage to connectivity).
- 5) **Pollution** index*
- Air Pollution (international system)
- Water Pollution (nitrates, phosphates, "Saprobic system")
- Light pollution
- Noise pollution
- Soil pollution
Explanation: To define the level of disturbances and human impacts on eco-systems and species migration.
- 6) **Population** index*
- Number of inhabitants per area (best precision available)
- Tourist overnights per area (tourists/winter/area)
- Tourist overnights per area (tourists/summer/area)
Explanation: To define the general human pressure in an area by activities and including tourist activities and settlements.

7) **Infrastructure** index*

- *Overhead Electricity power lines*
- *Tourist infrastructure (cable cars, ski stations, golf courses...)*
- *Airports*
- *Hydropower dams*
- *Dams for flood regulation*
- ...

Explanation: To evaluate the impact of diverse infrastructure on ecological integrity

8) **Land use** index (intensive/extensive agriculture, tourism...)*

- *Industrialisation (% per area based on land consumption)*
- *Type and intensity of agriculture and forestry (sustainability)*
- *Risk areas according to natural hazards*
- *Ski alpinisme (ski touring; ski de randonnée)*

Explanation: To evaluate the coherence of activities with the type of landscape according to principles of sustainability

9) **Urbanisation** index*

- *sealed surfaces per area (best precision available)*
- *number of suburbs in big agglomerations*
- *commuters (daily)*
- *number of villages of a certain size (number > 5000 habitants/area)*

Explanation: Pendular movements from cities and agglomerations affecting migration corridors of species and fragmenting the area during a certain time period.

10) **Economical activity** index (primary, secondary, tertiary sector)*

- *% of employees for the primary sector per area unit*
- *% of employees for the secondary sector per area unit*
- *% of employees for the tertiary sector per area unit*

Explanation: To define the weight of the different categories of economic activities (agriculture, mining, industry, tourism, services) as an impact towards ecological connectivity.

11) **Land use planning** index

- *Types and distribution patterns of future activities and infrastructures*
- *Planning of ecological connectivity (existing concepts and political agreements)*

Explanation: Evaluate future developments which could have consequences for ecological connectivity

12) **Altitude** index*

- *Altitudinal distribution in % of the surface of the investigated area*
- *Relief energy and slope (altitude difference)*
- *Absolute altitude*

Explanation: To express the potential to establish ecological network in lower altitudes (conflicts of use)

13) **Public opinion and policy index** (governance)

- *Number of initiatives of population*
- *Existence of Landscape concept plan in the considered area*
- *"Climate initiative" of communities*
- *Political acceptation index, willingness of ecological connectivity*

14) **Artificial light** index*

- *Brightness per area*

Explanation: Expression of the daily use of the landscape

N°	Activity	Description	Timeframe Deadline	Result / Output	Workflow WP 4-5-7	Interface between WP 5-7
9	Identification of legal barriers	<p>Legal barriers: Necessity of a legal expertise (work on land law, urbanism law)</p> <p>Questionnaire in English for Pilot Regions (in local languages)</p>	June 2010	<p>- List and description of legal barriers</p> <p>Presentation of intermediary results</p> <p>Integration of climate change aspects</p>	WP6 in cooperation with WP7 by adapting the questionnaire of WP5 for the PR	WP6 makes analysis and synthesis for WP5 and WP7 allowing a comparison between the results for the alps wide and the regional legal situation.
10	Identification of physical barriers	<p>Physical barriers: identify the existing infrastructures and barriers (urbanisation, highways, fences for agriculture plantings, rectified or canalised rivers and especially the accumulation of those barriers p.e. a highway doubled by a national road, fences and a river...</p> <p>Overlay with species distribution in order to produce a map of lack of connectivity linked to species and presenting an obstacle for the ecological continuum.</p>	August 2010	<p>- Map with physical barriers within the PR</p> <p>- Map with superposition of barriers and species relevant for the Pilot region and for the alps-wide species</p> <p>As well with photos</p> <p>Integration of climate change aspects</p>	Preparation and Harmonisation of data by WP 4	<p>Task of WP5 for alpine selected species on the alpine scale; Identification of important migration routes and barriers (in or at the edge of PR) for detailed analysis.</p> <p>Task for each RP to identify these barriers.</p> <p>Interface because a barrier can be an obstacle at both levels (alpine wide map by WP4).</p>
11	GIS-analysis in pilot regions 1 Data set	<p>Combine essential cartographic data, basic information, and the analysis of priority objectives and areas to create a regional map.</p> <p>Use this to analyse the corridors, obstacles and connecting areas (potential CSI), including inadequacies and opportunities. Use of list of habitat/species.</p>	October 2010	<p>Map of the regional ecological network by common base for mapping (ECONNECT MAPPING TOOL* based on google maps)</p> <p>Tool proposed by</p>	<p>Based on harmonization of data by WP 4</p> <p>Take over model from WP5</p> <p>WP4 and</p>	<p>Compare map of alps wide situation and regional situation, interpretation, evaluation of fragmentation and potential of connectivity on alpine level.</p> <p>Development of a common application for</p>

		Use of the JECAMI web map for pilot regions and alpine wide approach to calculate and visualize connectivity		PNS with ARINAS the contractor	WP5, SNP and ARINAS	visualizing the CSI in the PR
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*** Tool developed by the partner SWISS NATIONAL PARK in cooperation with ALPARC This approach allows presenting the PR with indices (harmonised approach). Star contracts signed by the PR with Arinas. See the Annex A description of tasks JECAMI web map for PR and alpine wide approach to calculate and visualize connectivity**

12	Define an action plan of possible measures and actions to be realised	<p>Interpretation of the regional ecological network map:</p> <ul style="list-style-type: none"> - Identify and list all necessary activities/actions - Rank all identified activities - Select the 1 spatial link and the 3 contractual measures that will be realised in the frame of ECONNECT according to their financial feasibility – refer to the catalogue of measures (http://www.alpine-ecological-network.org/index.php/component/content/article/33) 	November 2010	<ul style="list-style-type: none"> - General list of actions - Specific list of the actions to realise in the frame of the project - Mapping of those actions in a common base by attributing categories to each measure (types) 	WP7	
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Summary/

Data needs for the second step:

2 levels: Alpine-wide approach and Pilot region approach:

- GIS Data:

Rivers, lakes (hydrology) and catchment's areas

Elevation model

Corine Landcover – Level 3 (CH: either CLC equivalent with 29 classes or more detailed but not cross-boundary comparable "Realstatistik" data)

Artificial structures which affect the rivers and brooks: e.g. dams, weirs, roads, culverts, canalisations

Morphology of water features

Corine-Dataset -level 3 or detailed description of riparian vegetation (e.g. floodplain forests)

Fish regions

Species distribution and migration routes for aquatic animal taxa (if available for fish, amphibian, waterbirds, reptiles and mammals) and for some focal species

Transport infrastructure (Road, Rail, Airports), settlement areas, current and planned land use, ski areas, cable cars, Protected Areas (incl. Biotopes, N2K sites), Overhead Power lines, (monuments), fences (fences won't be available in many regions)

III) Detailed planning and realisation of the identified activities in the pilot regions

N°	Activity	Description	Timeframe Deadline	Result/output	Workflow WP 4-5-7	Interface between WP5-7
13	Detailed organisation of each action	For each of the 4 actions to be realised in the frame of ECONNECT: <ul style="list-style-type: none"> - define responsibilities - detailed plan: budget, timeframe, human and technical resources 	January 2011	<ul style="list-style-type: none"> - 3 contractual measures (this means not necessarily contracts but it has to be documented as a measure, i.e. the inscription of a "connectivity policy" in the documents of the physical planning of the region, agreements or conventions, etc.). The finance of such measures should be insured in a middle or long term (5 – 25 years) by the public administrations. - 1 spatial link Detailed plan on how to proceed for each action	WP7	To compare with recommendation of actions on alps wide level.
14	Start Action	Consultation and definition of objectives	August 2011	Actions realised (one spatial link, three measures)	WP7	
15	Realisation	<ul style="list-style-type: none"> - terms of reference - signatures -Accomplishment of 	August 2011	Concrete actions	WP7	

		the work on the ground				
16	Monitoring of actions	Based on indicators defined by WG of WP7 indices in cooperation with WP5 and WP4.	During realisation	control	WP7 (proposal link to competence network)	Common definition of indicators for long term monitoring of actions by WP4,5 and 7.
17	Evaluation of the activities	Evaluation of the ecological, social and economic effects, long term perspectives.	After end of project	Assessment reports Self-evaluation	WP5 - WP7 - WP8	Synthesis with recommendations for alps-wide and regional level.

The document could be completed on various points:

- Organise on hierarchical basis the importance of the data (opinion of an expert SIG + to know well what one wants like result!).
- Specify which data are available (and where) / which data are not available.
- Give precise technical information like: "Gis-analysis will be performed using ArcGis 9.3 and ArcView 3.3 as well as some additional software for ArcGis like e.g fragstat 3.3. (Coordinate System: UTM - WGS84 / ETRS89)" or "Identify connectivity and effective fragmentation by calculating "Mesh size" (meff) and "degree of landscape division "(D) in special ArcGIS with tools like "mefftool" (Lang and Al 2008), the extension off ArcGis "V-Late 1.1" and the software "fragstats 3.3" - **assessment by a specialist of GIS and connectivity.**

DOCUMENT DEVELOPPED BY TFP / SPCA FOR ALPARC WITH THE COOPERATION OF THE LEAD PARTNER, THE SWISS NATIONAL PARK AND THE WP4 AND WP5 LEAD PARTNERS

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