

# Pressure on internationally designated areas

## Background

Internationally designated areas are areas which have been protected because of their exceptional value for nature conservation. These areas are of value not only on the national or regional scale, but they are important on international level because of their significance for biodiversity and habitat conservation.

Therefore it is important to know what are the threats upon these areas posed by human activities.

## Methodology

### Scientific references

none

## Concept

Objective of this exercise was to find out which designated areas are under pressure from urban and agricultural areas and activities as well as transport. Transport has been split up into road and railway transport which can have a different impact on the surrounding land.

The impact on designated areas was examined, to see what impacts directly on the protected area and what are the pressures in the vicinity of the area. Therefore all protected areas were buffered by 1 km to assess the impacts in the neighbourhood.

The designated area database does not contain information on the boundaries of a protected area (no polygon data). The information available (point data) is the location (x, y coordinate) and the surface of the protected site. To obtain a surface for each protected area, the surface of the protected area has been approximated by a circle around its centre point.

It is realised that the approximation of the shape of the protected area by a circle has its drawback, e.g. in the case of elongated areas such as river valley. When such information becomes available the concept presented here can easily applied on this new improved data.

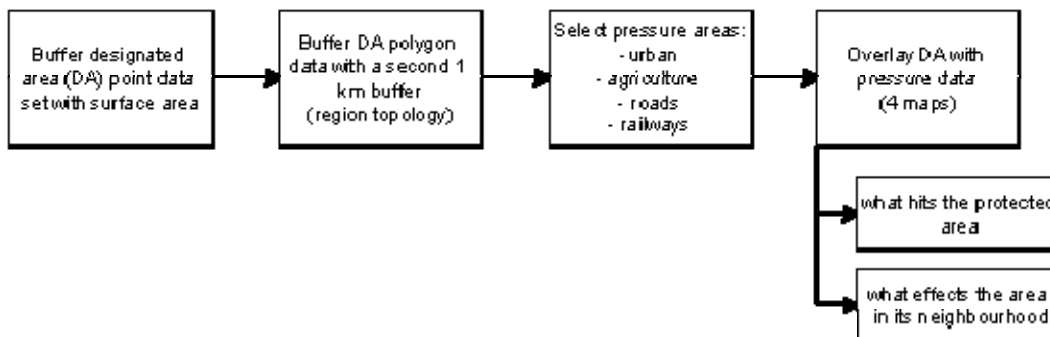
For the map see annex 18 to 21.

## Data input

For the analysis, the data set on designated areas from the GISCO database has been used. This data set contains the centre point of each protected area, a unique identifier (DASICD) and its surface.

For the land cover data the extended CORINE database (LCALL250) has been used and the GISCO road and railway database for the identification of the transport network.

## Actions



### Step 1:

Convert the surface area provided by the designated area data set into a radius of a circle with the same surface. Add this attribute (radius) as new information to the existing data set.

### Step 2:

Buffer the designated areas to create circles for each site corresponding to its official surface. Since many designated areas are close to each other the newly created surfaces (circles) overlap in many cases. In order to find which circle belongs to which designated area, the ARC/INFO command regionbuffer has been used.

This results in circle-shaped regions where the radius is function of the area of the site. Each region has the site code of the designated area as an attribute attached to it (DASICD).

### Step 3:

The urban areas were selected from LCALL250 and a new coverage was created. The CORINE land cover classes included in the selection for the urban area are:

CLC class	CLC name
1.1	Urban Fabric
1.2	Industrial, commercial and transport units
1.3	Mine, dump and construction site
1.4	Artificial, non-agricultural vegetated areas

The land cover classes considered for agriculture are:

CLC class	CLC name
2.1	Arable land
2.2	Permanent crops
2.4.1	Annual crops associated with permanent crops

The main roads and railways were selected from the GISCO database. Only existing links are considered, the planned TEN network is excluded from the analysis. The selection criteria were the following:

#### ***Roads***

RDSGTP	RDSGNM
D	Dual carriage way
DE	Dual carriage way, European
M	Motorway
ME	Motorway, European

#### ***Railways***

RWSGTP	RWSGNM
MD	Main line, double track
MDE	Main line, double track, electrified
MS	Main line, single track
MSE	Main line, single track, electrified

#### Step 4:

Intersect pressure type data sets with buffered designated area regions.

This results for urban and agriculture in a polygon-coverage, with region topology, where the affected area for each designated area can be read immediately from the AREA item in the region attribute data file.

To select those designated areas which are directly affected (within the protected area) by urban or agricultural pressure, a relate is made from the DASICD of the designated area data set to the DASICD of the region attribute data file.

For the overlays with roads and railways the situation is more complex, as the result of this operation is a line coverage, where the DASICD is no longer present.

To select the designated areas which are directly affected by road or railway pressure, a threefold relate is executed. See step 9 for further details.

#### Step 5:

Regionbuffer designated areas (polygon data) with a 1 km buffer to assess the effects on the protected area in its vicinity.

This results in circle-shaped regions where the radius is function of the area of the site + 1 km. Each region has the site code of the designated area as an attribute attached to it.

Now 2 region-coverages exist around each designated area : one with a radius according to the area, and one with a radius according to the area + 1 km.

#### Step 6:

The data set for what is happening in the vicinity of a designated area is a special case in so far as the data represents a doughnut shaped object. That means we are only interested in what happens within the 1 km buffer area.

The steps 6 to 8 explain how these doughnut shaped polygons are created.

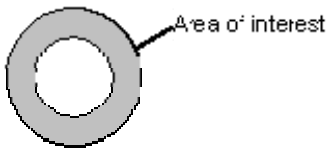
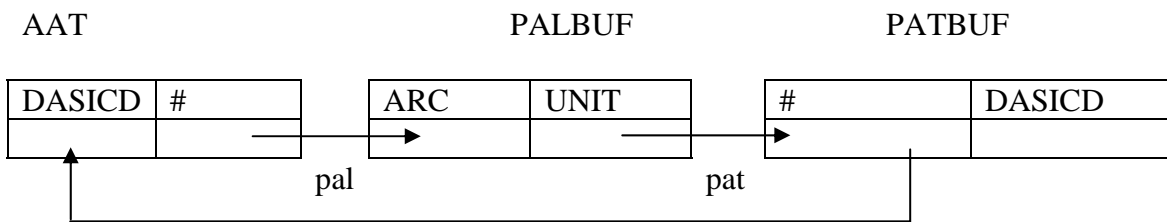


Figure 3: Doughnut shaped polygon

Attach the DASICD to each of the borders (arcs) surrounding a designated area. This provides information about each border line to which designated area it belongs.

- The region polygon attribute file (.pal) contains for each region which arcs belong to it (in the same way as the polygon pat-file contains for each polygon a listing of its constituting arcs.)
- Create line topology for the buffer coverages
- Additem DASICD to aat file of buffer coverages
- Add DASICD to the aat file via a stacked relate



Step 7:

Put the arcs of both coverages into one new coverage with only line topology (no region topology).

- Put the arcs of both coverages into one coverage, but make sure you keep the correct DASICD. Set the tolerances to very low values, to avoid that arcs are not written due to zero length or to be snapped by mistake.

The resulting coverage contains all arcs, with the correct DASICD for each arc.

- Create an empty coverage with one of the existing coverages as ticcover and make the tolerances very small.
- Put all arcs into this empty coverage and create line topology.

- Move the DASICD to this new coverage based on the internal ARC number (#)

#### Step 8:

From this new line coverage, create regions based on the DASICD

Now full region topology is build for the new data set. As the arcs of the inner- and outer-ring (doughnut) have the same DASICD, they are considered as an innerring and an outerring, with a hole in the middle.

#### Step 9:

Intersect pressure data with this new doughnut regions.

This results for urban and agriculture in a polygon-coverage, with region topology, where the affected area for each designated area can be read immediately from the AREA item in the doughnut attribute file.

To select these designated areas where the ringbuffer zone is affected by urban or agricultural pressure, a relate is made from the DASICD of the DA coverage to the DASICD of the doughnut attribute file. Only those designated areas are selected, where the DASICD appears in the doughnut attribute file.

For the overlays with roads and railways the situation is more complex, as the result of this operation is a line coverage, where the DASICD is no longer present.

To select these designated areas where the doughnut zone is affected by road or railway pressure, a threefold relate is executed.

#### Create data sets:

- region buffer data set for designated areas
- 1 km ring (doughnut) data set to analyse effects in the vicinity of the protected area
- overlays with pressure data