G1.Ab Ravine woodland

Summary

This habitat is dominated by fast-growing, deciduous broadleaved trees which favour the nutrient-rich soils and humid micro-climate of shady slopes and ravines in the temperate zone and in locally suitable situations further south. Typically, such conditions occur on hard, base-rich, though not always calcareous, rocks in steep-sided immature river valleys of the foothills, sub-montane and high mountain belts, where the terrain is typically complex and rocky, with a heterogenous and sometimes unstable soil cover. Beneath the tall canopy and low shrub layer, there is an abundance of luxuriant nitrophilous herbs and a contingent of moisture-loving vernal plants. Ferns and bryophtes can also be diverse and extensive. Significant pressures are from transportation and service corridors as well as hydropower development, forestry, intensive grazing and, in some regions, fungal micropathogens. Climate change may affect the necessary high local humidity. Careful spatial planning, limitation of inappropriate silviculture and grazing are important conservation measures.

Synthesis

The habitat is Near threatened for the EU28, because of a negative quantitative trend (-25%) during the past 40-50 years. This is combined with a moderate decrease in quality over about a quarter of its area, and an assumed slight decrease over a distinctly larger area. The situation in the EU28+ is slightly better, leading to the conclusion Least Concern. Continuing pressures and threats such as losses by extending hydropower use or infrastructure in valleys and ravines are present. Data availability and reliability is medium to low with data gaps in the often dispersed small occurrences. Because of relatively high values of EOO and AOO the habitat does not qualify under criteria B1 and B2, hovever its dispersed occurrences are often very small. Assessments of historic trends were not possible due to data deficiencies.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	A1	Least Concern	-

Sub-habitat types that may require further examination

While the habitat type is more homogenous than other forest habitats due to its specific azonal character, there is a distinct geographic variation in herb-layer plants and characteristic animal species. Several geographic subtypes (e.g. Annex I types in the Atlantic or Boreal region) have been affected by a slight to moderate decline over larger parts of their range. Hydropower dams in certain mountain regions may have affected some geographical subtypes much more. The upper higher slopes with thermophile ravine forests usually classified as different associations are more easily accessible for intensive forestry, but in general the forestry pressures are usually lower than in many other forest types.

Habitat Type

Code and name

G1.Ab Ravine woodland

G1.Ab Ravine woodland in spring with *Allium ursinum* and *Corydalis cava* in the herb layer, Leuengraben, Germany (Photo: Axel Ssymank).

G1.Ab Ravine woodland (*Tilio-Acerion)*, former coppice, Czech Republik (Photo: John Janssen).

Habitat description

One striking situation in Europe where beech and oaks can be out-competed by such fast-growing trees as *Fraxinus excelsior*, *Acer pseudoplatanus*, *A. platanoides*, *Ulmus glabra* and, *Tilia platyphyllos* and *Tilia cordata* is on the nutrient-rich soils that accumulate in the humid micro-climate of shady slopes and ravines. Here, with downwash and percolation of ground water, the brown earth soils can be deep and moist, but usually they are free-draining and show a brisk turnover of nutrients and mull humus. Typically, such situations are associated with hard, base-rich, though not always calcareous, rocks and they occur widely throughout steep-sided immature river valleys of the foothills, sub-montane and high mountain belt right across Europe. The terrain is typically complex and rocky, with a heterogenous soil cover and the structure of these woodlands has been vividly described as ‘impetuous’. The distinctive kind of terrain necessary to sustain this habitat means that through Europe, these woodlands have a basic floristic and structural similarity, though variations in regional climate support distinctive contingents of associates with more Continental, Boreal, Alpine, Mediterranean or Atlantic affinities. There is also some floristic variation according to whether the habitat is on very moist colluvium, is humid primarily because of shade or gets some warmth at ravine tops or by virtue of being in more southerly latitudes. More generally across the range, *Quercus robur*, *Q. petraea* and *Fagus sylvatica* can make a minority contribution to the canopy along with *Carpinus betulus* and *Sorbus aucuparia*. Through France, Germany, Austria and Switzerland, there is a tendency for more montane stands to be dominated by *Acer platanoides, A. pseudoplatanus* or *A. opalus* while those at lower altitudes have abundant lime (*Tilia spp.*). More particularly, *Tilia platyphyllos* is the lime more confined to ravine forests while *T. cordata* is more widely characteristic of G1.Aa Mesic deciduous woodland. The difficult terrain which has protected against exploitation of these woodlands and the extraordinary longevity of both limes means that these ravines can harbour some of the most ancient and majestic trees of Europe.

In the shrub layer *Sambucus nigra* is characteristic along with *Corylus avellana*, while the field layer is dominated by luxuriant nitrophilous herbs such as *Urtica diocia*, *Aegopodium podagraria* and *Impatiens noli-tangere*, moisture-loving vernal plants like *Allium ursinum* and, on the typically base-rich soils, *Mercurialis perennis*, *Geranium robertiamum*, *Brachypodium sylvaticum* and *Circaea lutetiana*. More especially distinctive are *Lunaria rediviva*, *Helleborus viridis*, *Aruncus dioicus*, *Actaea spicata*, *Aconitum vulparia*, *Corydalis cava*, *Equisetum hiemale*, *Polygonatum verticillatum*, and *Aconitum paniculatum*. Sometimes *Allium ursinum* can dominate the herb layer. Then, reflecting the high humidity, there are often abundant ferns such as *Phyllitis scolopendrium*, *Polystichum aculeatum*. *P. setiferum* and *Gymnocarpium robertianum* and bulky mosses thrive on the bare ground exposed by the rapid breakdown of herbage and litter at the close of the growing season. Lichens can also be well developed with species such as *Lobaria pulmonaria* or *Gyalecta ulmi*.

In the Atlantic zone, where the climate is more generally cool and humid, woodlands of this kind are less confined to ravines, particularly where base-rich rocks are extensively exposed. Also, approaching or beyond the limits of *Acer pseudoplatanus*, *A. platanoides* and even the limes, as in north-west Great Britain, there is a tendency for stands to be dominated by *Fraxinus excelsior* and *Ulmus glabra*, or even *Corylus avellana* in situations exposed to humid oceanic winds. Similar vegetation reported from southern Scandinavia also falls within this habitat type. Northern montane plants such as *Prunus padus*, *Ribes saxatilis*, *Actaea spicata, Trollium europaeus*, *Crepis paludosa*, *Cirsium helenioides* and *Geranium sylvaticum* can here give this habitat a Boreal feel. Towards southern Europe and particularly in sunny ravines at lower altitudes in Czechia, Hungary, Romania and the Pyrenees, there is a thermophilous contingent in this habitat including *Cotoneaster integerrimus*, *Sesleria caerulea*, *Athericum ramosum*, *Vincetoxicum hirundinaria* and other species more typical of the G1.7a and G1.7b thermophilous woodlands. South of these latitudes, the habitat occurs locally in the Italian pre-Alps and reaches its southern limit in the humid north-facing ravines of the Appennines. In ravines among G3.1c Mediterranean mountain *Abies* woodland in such situations, there can be occasional *Abies alba* among the canopy trees.

Indicators of quality:

• No forest exploitation

• Maintenance of the complex ravine topography, micoclimatic conditions and woodland structure

• Sufficient structural diversity/ complexity (semi)natural age structure or completeness of layers

• Sufficient proportion of historically old (ancient) woodland with high species diversity

• Presence of old trees and a variety of dead wood (lying and standing) and the associated flora, fauna and fungi

• Rich and luxuriant field and ground layers protected by continuous canopy and locally high humidity with typical flora and fauna composition of the region

• Absence of non-native tree species and absence of invasive aliens in all layers (fauna, flora)

• No signs of eutrophication or pollution, absence of nitrophilous adventives

• No fragmentation and isolation (no major disruptions in the ravine forests with coniferous plantations).

Main Characteristic species:

Tree canopy: *Fraxinus excelsior*, *Acer pseudoplatanus*, *A. platanoides*, *A. opalus, Ulmus glabra*, *Tilia cordata*, *T. platyphyllos*;

Field layer: *Urtica diocia*, *Aegopodium podagraria*, *Impatiens noli-tangere*, *Allium ursinum*, *Mercurialis perennis*, *Geranium robertiamum*, *Brachypodium sylvaticum*, *Circaea lutetiana*, *Lunaria rediviva*, *Helleborus viridis*, *Aruncus dioicus*, *Actaea spicata*, *Aconitum vulparia*, *Corydalis cava*, *Equisetum*

hiemale, *Aconitum paniculatum*, *Phyllitis scolopendrium*, *Polystichum aculeatum*, *P. setiferum*, *Gymnocarpium robertianum*.

Classification
This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

One of two divisions within G1.A Meso- and eutrophic [Quercus], [Carpinus], [Fraxinus] [Acer], [Tilia], [Ulmus] and related woodland, split off from G1.Aa Carpinus and Quercus mesic deciduous woodland;

EuroVegChecklist:

Tilio platyphylli-Acerion Klika 1955

Annex 1:

9180 Tilio-Acerion forests of slopes, screes and ravines

Emerald:

G1.A4 Ravine and slope woodland

MAES-2:

Woodland and forest

IUCN:

1.4 Temperate Forest

EFT:

5.8 Ravine and slope forest

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
No

Justification
This is an zonal forest habitat, linked to specific topographic situations, soil and microclimatic conditions, which occurs throughout many biogeographical regions, but usually dispersed, more frequent in the Alpine biogeographic region and in mountain ranges of the Continental region.

Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Austria	Present	350 Km^2	Unknown	Stable
Belgium	Present	13 Km^2	Unknown	Unknown
Bulgaria	Present	380 Km^2	Decreasing	Decreasing
Croatia	Present	1.29 Km^2	Stable	Stable
Czech Republic	Present	220 Km^2	Decreasing	Decreasing
Estonia	Present	unknown Km^2	Unknown	Unknown
Finland	Finland mainland: Present	0.3 Km^2	Decreasing	Decreasing

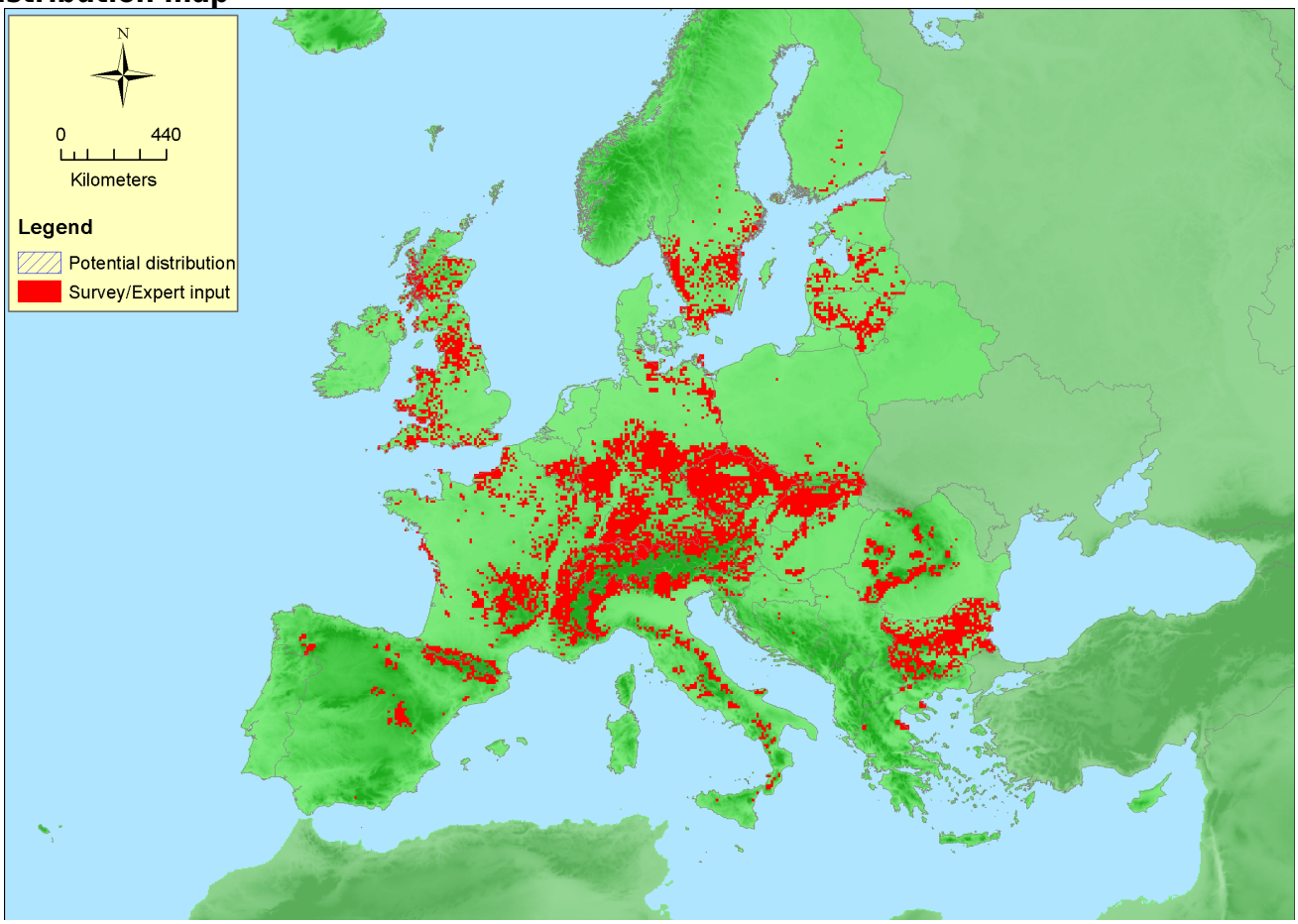
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
France	Corsica: Uncertain France mainland: Present	295 Km^2	Stable	Stable
Germany	Present	233 Km^2	Decreasing	Decreasing
Greece	Greece (mainland and other islands): Present	116 Km^2	Unknown	Decreasing
Hungary	Present	85 Km^2	Decreasing	Decreasing
Ireland	Present	2 Km^2	Unknown	Stable
Italy	Italy mainland: Present	603 Km^2	Decreasing	Decreasing
Latvia	Present	65 Km^2	Decreasing	Decreasing
Lithuania	Present	370 Km^2	Stable	Decreasing
Netherlands	Uncertain	Km^2	-	-
Poland	Present	2.7 Km^2	Decreasing	Decreasing
Romania	Present	30 Km^2	Decreasing	Decreasing
Slovakia	Present	280 Km^2	Decreasing	Unknown
Slovenia	Present	13 Km^2	Decreasing	Decreasing
Spain	Spain mainland: Present	35 Km^2	Stable	Decreasing
UK	United Kingdom: Present	128 Km^2	Unknown	Decreasing

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Albania	Present	unknown Km^2	Unknown	Unknown
Bosnia and Herzegovina	Present	90 Km^2	Decreasing	Unknown
Former Yugoslavian Republic of Macedonia (FYROM)	Present	10 Km^2	Decreasing	Decreasing
Kosovo	Present	unknown Km^2	Unknown	Unknown
Montenegro	Uncertain	Km^2	-	-
Norway	Norway Mainland: Present	510 Km^2	Stable	Unknown
Serbia	Present	< Km^2	Unknown	Unknown
Switzerland	Present	180 Km^2	Stable	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	6508950 Km^2	7493	3218 Km^2	minimum, a few data gaps
EU 28+	6508950 Km^2	7671	4008 Km^2	minimum, incomplete data

Distribution map



The map is likely to be incomplete for the Balkan countries and southern Norway, while it gives an overestimation for Bulgaria (where the habitat in fact is restricted to mountain areas). Data sources: EVA, Art17.

How much of the current distribution of the habitat type lies within the EU 28?

At a rough estimate 60-70%; this is an azonal type where the distribution on the Balkan and east of the EU28 into Russia is not covered

Trends in quantity

Ther average recent trend over the past 50 years is -25% decrease for EUR28, ca. -21% for EUR28+ but with less reliability because of bigger data gaps. Differences within Europe are substantial with some countries showing a stable trend, others often around -10 to -15% decrease, some countries like Slovakia and Finland distinctly higher decrease. The average current trend is still slightly decreasing, e.g. in Slovenia, Macedonia or Bulgaria, but in most countries the situation is stable. Future trends are data deficient and difficult to assess, but probably largely stable with some exceptions of continuing decrease e.g. losses for infrastructure of hydropower developments. Long-term historic trend data are to a large extent missing, an average European value is therefore not given; where data are present they confirm a mixed situation with relatively large historical losses of up to 70 % in part of the area, but in situations where forest cover was already low in the 18th century even a positive historic trend.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  No

Justification

However, while the range is large, the habitat is azonal and naturally restricted usually in all sites to a limited area, typically in ravines. The decline is ongoing as ravines are often used for infrastructure or transportation, partially also disappear due to dams for hydroenergy or drinking water use.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No

  Justification

  The overall range is large but the habitat is azonal and naturally restricted usually in all sites to a limited area, typically in ravines.

Trends in quality

Extent of degradation: 25 % (EUR28, 24% for EUR28+), Severity of degradation: ca. -30% (EUR28 & EUR28+), i.a. moderate. The trends have been calculated from >80% of the ravine woodland area. With regard to the highest standard of the indicators of quality completely untouched (pristine) or oldgrowth ancient forests with sufficient dead and dying trees are only present in less than 1 % of the remaining European area. Current trends in quality are on average still decreasing, with a number of countries where it is stable or slightly increasing.

- Average current trend in quality
  EU 28: Decreasing
  EU 28+: Decreasing

Pressures and threats

Both in EU 28 and EU28, forest replanting with non-native trees and removal of dead and dying trees are to different extents pressures to ravine forests, in addition mainly outside EU28 also forest clearance without replanting. In larger ravines with very steep slopes, forestry pressure is generally lower, however serious pressures and threats are complete losses by reservoirs or dams for hydroenergy, changes in hydrology, or partial losses for infrastructure and transportation/ service corridors in the valleys. Regionally invasive species or fungal micropathogens can play an important role (e.g. Dutch elm disease and ash dieback), also grazing is a threat in some countries. Eutrophication can lead to changes in floristic composition, climate change is a potentially more relevant threat in future when global warming affects the humidity in local ravine climate conditions.

List of pressures and threats

Sylviculture, forestry

Forest and Plantation management & use
- Forest replanting (non native trees)
- Forestry clearance
- Removal of dead and dying trees
- Thinning of tree layer

Forest exploitation without replanting or natural regrowth
Grazing in forests/ woodland

Transportation and service corridors

Roads, paths and railroads
- Roads, motorways

Utility and service lines

Urbanisation, residential and commercial development

Urbanised areas, human habitation

Invasive, other problematic species and genes

Invasive non-native species
Problematic native species

Natural System modifications

Human induced changes in hydraulic conditions
Reservoirs
Small hydropower projects, weirs

Natural biotic and abiotic processes (without catastrophes)

Introduction of disease (microbial pathogens)
Damage by herbivores (including game species)

Climate change

Changes in abiotic conditions

Conservation and management

Restoring of ravine forests, where coniferous plantations have been established in the past; Allowing for more wilderness areas and in used forests for more dead wood and old trees. Spatial planning should avoid transportation and new infrastructure in the often narrow valleys or cutting roads into the hillsides in ravine forests. Large reservoirs or dams should not be built in valleys with species-rich ravine forests. Regionally specific grazing regimes or plans to manage invasive species might be needed.

List of conservation and management needs

Measures related to forests and wooded habitats

Restoring/Improving forest habitats
Adapt forest management

Measures related to hunting, taking and fishing and species management

Regulation/Management of hunting and taking

Measures related to urban areas, industry, energy and transport

Specific management of traffic and energy transport systems

Conservation status

Annex I types:

9180: ALP U2, ATL U2, BLS U1, BOR U2, CON U1, MED U1, PAN U1

When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

Both naturally and through interventation full recovery of the habitat usually needs time-spans over 200 years. While the tree species can be planted, already the characteristic species of the herb layer include many myrmecochore species (seeds dispersed very slowly over small distances by ants). The full set of characteristic species includes many saproxylic intertebrates and fungi which need a historic habitat continuity, all of these need old and dead trees in a late development stage of forests, some of them even after 2-3 tree generations unable to recolonise new forest stands. Pristine remnants and any ancient woodland therefore needs highest conservation priorities. Ravines where the hydrology of the river has been largely modified might need additional efforts in restoring the hydrology and thus also the typical

cool and humid climatic conditions of the ravine forests on the slopes.

Effort required

200+ years
Both

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-25 %	unknown %	unknown %	unknown %
EU 28+	-21 %	unknown %	unknown %	unknown %

The average trend in quantity has been calculated based on data from ca. 83% of the total area, with some data gaps remaining (within the EU from UK, Greece, Denmark). Differences within Europe are substantial with some countries showing a stable trend, others often around -10 to -15% decrease, some countries like Slovakia and Finland distinctly higher decrease. The calculated span for EU28 is between minimum of -19% and maximum of -33% decrease.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	>50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No

EOO is very large, AOO much smaller due to the dispersed ocurrences. Numerous locations of the habitat exist.

Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	25 %	30 %	unknown %	unknown %	unknown %	unknown %
EU 28+	24 %	31 %	unknown %	unknown %	unknown %	unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%
EU 28+	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%

The overall extent and severity are weighted average calculated from ca. 60% of the area, where all necessary data were present in territorial data sheets. The data situation outside EU28+ is less reliable and detailed data are difficult to obtain, because these often small occurrences are not covered by Forest Inventories and only partially mapped in many countries. The calculated extent affected seems to take into account mainly moderate severity and has been applied differently by territorial experts. A slight reduction in quality is present over a larger percentage of the area. Information on long historical trends or future trends is incomplete and could not be used for criteria CD2, CD3. Reduction in quality usually affected both abiotic and biotoc changes with in some countries biotic changes prevailing. Criteria C and D were not split in the assessments.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	unknown
EU 28+	unknown

No habitat modelling for ravine woodland exists, however climate change will to some extent influence this azonal habitat in distribution and quality, as it is linked to humid soil and microclimatic conditions.

Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	NT	DD	DD	DD	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	A1	Least Concern	-

Confidence in the assessment

Low (mainly based on uncertain or indirect information, inferred and suspected data values, and/or limited expert knowledge)

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