

## 10 Table T10 – Other disturbances affecting forest health and vitality

### 10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.
Category	Definition
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

### 10.2 National data

#### 10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Condition Survey	H	Insects, diseases	1989 to 2003	As reported in UK Indicators C9.
National Inventory of Woodland 1995-99	H	Other (windblow)	1995-99	As reported in UK Indicators C10.
FR monitoring (catastrophic storms)	M	Other (windblow)	1950 to 2000	As reported in UK Indicators C10.
Forestry Commission website and Information Notes	H	Diseases		Source for information about <i>Phytophthora</i> diseases

#### 10.2.2 Classification and definitions

National class	Definition
Damage by insects, fungi	Common or abundant damage (categories 3+4) by insects, and by fungi, as measured by Forest Condition Survey and reported in UK Indicators C9. Gives area with damage present, not area suffering disturbance in year.
Windblow	Two measures available from National Inventory of Woodland 1995-99: <ul style="list-style-type: none"> <li>• Blown woodland that remains uncleared and not regenerated</li> <li>• Woodland with signs of windblow</li> </ul>

### 10.2.3 Original data

#### Forest condition survey: insect damage

% of trees surveyed showing common or abundant insect damage (cats 3 + 4)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Beech</b>		19.4	23.7	27.4	31.5	29.1	26.3	20.7	19.5	10.9	22.0	23.9	20.6	23.6	12.4
<b>Norway spruce</b>	10.3	13.7	7.7	6.4	4.9	3.7	3.3	0.6	2.6	2.7	1.6	1.7	4.7	5.2	2.9
<b>Oak</b>		17.9	21.3	44.2	49.9	31.1	35.6	26.4	19.4	13.1	14.5	11.7	12.0	15.4	23.1
<b>Scots pine</b>	2.6	3.2	2.7	0.6	2.3	2.3	2.4	2.6	0.7	1.1	1.0	0.9	0.5	0.9	1.0
<b>Sitka spruce</b>	15.5	16.4	12.1	7.5	8.0	6.0	5.5	2.9	5.3	8.5	2.9	4.5	4.0	7.5	4.2

Data for 1989-2000 used for chart in UK Indicators of Sustainable Forestry C9.

Data for 2001-2003 from same source, used for indicator update.

#### Forest condition survey: damage by fungi

% of trees surveyed showing common or abundant damage by fungi (cats 3 + 4)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Beech</b>		0.0	0.5	0.1	0.1	0.1	1.3	2.4	2.8	2.8	1.4	0.0	0.1	0.8	0.1
<b>Norway spruce</b>	0.0	1.4	0.0	0.2	0.4	1.4	1.8	3.0	2.2	2.7	2.6	2.7	2.5	2.5	5.0
<b>Oak</b>		0.8	0.4	0.2	2.4	0.7	0.0	0.1	0.4	0.3	0.3	0.3	0.0	0.1	0.3
<b>Scots pine</b>	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.5	0.7	1.0	2.7	0.6
<b>Sitka spruce</b>	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.6	0.1	0.1	0.1	0.2	0.0	0.0

Data for 1989-2000 used for chart in UK Indicators of Sustainable Forestry C9.

Data for 2001-2003 from same source, used for indicator update.

**Mammal<sup>1</sup> damage (bark stripping and browsing) in GB** (from National Inventory of Woodland 1995-99), reported in UK Indicators of Sustainable Forestry C10)

	% of high forest area <sup>2</sup>			
	England	Scotland	Wales	GB
<b>Mammal Bark Stripping – Total</b>	<b>5.2</b>	<b>7.2</b>	<b>0.9</b>	<b>5.7</b>
< 20 % of trees with bark stripping	2.5	5.6	0.2	3.8
20-50 % of trees with bark stripping	2.1	1.1	0.5	1.4
> 50 % of trees with bark stripping	0.6	0.5	0.2	0.5
<b>Mammal Browsing – Total</b>	<b>0.9</b>	<b>11.0</b>	<b>0.1</b>	<b>5.7</b>
< 20 % of trees browsed	0.5	6.6	0.0	3.4
20-50 % of trees browsed	0.3	2.3	0.1	1.3
> 50 % of trees browsed	0.1	2.1	0.0	1.1

**Source: NIWT 1995-1999**

<sup>1</sup> Mammal damage includes damage from livestock, squirrels, deer, rodents and humans.

<sup>2</sup> High forest is woodland excluding open land and coppice.

**Forest windblow in GB** (from National Inventory of Woodland 1995-99), reported in UK Indicators of Sustainable Forestry C10

- Blown woodland that remains uncleared and not regenerated = 5507 ha
- Woodland with signs of windblow = 133,704 ha

#### Invasive species

Up to 5 species present in each of up to 5 layers could be recorded in the structure assessments in NIWT 1995-99. A special analysis of the NIWT dataset in January 2009 showed that 3.7% of sample squares contained rhododendron (*Rhododendron ponticum*), and that this was the only woody invasive species recorded in substantial quantities. Take the presence of rhododendron in any layer of the structure assessment as evidence that the square is affected, so this implies that around 3.7 % of woodland was affected.

### **10.3 Analysis and processing of national data**

#### **10.3.1 Estimation and forecasting**

For insect damage, there is a problem of going from area showing damage (the normal basis for monitoring) to area newly affected in a year. Any figures would be speculative, and probably not comparable with figures reported for other types of damage. It is therefore preferred to adopt for the UK a much higher threshold “cause mortality or such severe dieback that the forest ecosystem changes” (the FAQ guidance leaves it open to countries to choose their own criteria). Regular monitoring data are not available on this basis, but expert advice is that on this basis the area newly affected in a year is less than 1,000 hectares on average.

For damage by fungi, there is again the problem of converting from area showing damage to area newly affected in a year. If we adopt a higher threshold “cause mortality or such severe dieback that the forest ecosystem changes” (as for insects) then the figures are likely to round down to 0 thousand hectares for each year.

For disturbance by other biotic agents (mainly mammal damage), NIWT records the proportion of forest area with damage present, not the area damaged in a single year. Where present, mammal damage is likely to have been persistent for many years, so the presence of new damage need not imply that the area is newly affected. There can be overlaps between the areas recorded with mammal bark stripping and mammal browsing. The highest category recorded (more than 50% of trees affected) applied to more than 30,000 ha; as even this may not be enough to exceed the threshold adopted for FRA reporting, a plausible assumption is around 3 thousand hectares newly affected in each year.

For disturbance by abiotic factors (windblow), the relevant area is the average annual area of growing stock windblown, rather than the much larger area affected by windblow. NIWT reports the area of blown woodland that remained uncleared at the survey date. To convert this to an estimate of the area blown in a year, we need an assumption about the average lag before clearance. Some may be cleared quickly, if it has good quality timber in a sizeable area with good access, but other areas may be left uncleared for years; there will also be variations between species in extent of timber deterioration over time. If we assume that the area blown remains uncleared for 1 year on average, the area blown in a year would be about the same as the area recorded by NIWT. Estimate similar level for 1990, 2000 and 2005 (5 year averages), as there were no catastrophic storms with estimated windthrown growing stock exceeding 2 million m<sup>3</sup> or 2000 ha in any of these periods (the last was in October 1987).

Given the high threshold adopted for reporting, there is likely to be little overlap between areas damaged from more than one cause, so add the areas to get total area affected in a year.

For invasive species, assume that the same percentage of UK woodland was affected in 2005 as was found for GB woodland in 1995-99 (3.7%). Applying this to the total UK woodland area for 2005 gives an estimate of 105,000 ha affected.

#### **10.3.2 Reclassification into FRA 2010 categories**

No reclassification undertaken

## 10.4 Data for Table T10

**Table 10a – Disturbances**

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects	1	1	1
Disturbance by diseases	0	0	0
Disturbance by other biotic agents	3	3	3
Disturbance caused by abiotic factors	6	6	6
<b>Total area affected by disturbances</b>	<b>10</b>	<b>10</b>	<b>10</b>

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

The total area affected by disturbances is not necessarily the sum of the individual disturbances as these may be overlapping.

**Table 10b – Major outbreaks of insects and diseases affecting forest health and vitality**

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (1000 hectares)	If cyclic, approx. cycle (years)
Pine beauty moth ( <i>Panolis flammea</i> )	<i>Pinus contorta</i>	1987	*	6-7 years
Pine looper moth ( <i>Bupalus piniarius</i> )	<i>Pinus sylvestris</i> , <i>P. contorta</i>	2004	*	6-7 years
Phytophthora ramorum	<i>Quercus falcata</i>	2003	*	
Phytophthora kernoviae	<i>Fagus sylvatica</i> , <i>Quercus spp</i>	2004	*	
Phytophthora disease of alder	<i>Alnus spp</i>	1993	15% of affected areas	
Oak Processionary Moth ( <i>Thaumetopoea processionea</i> )	<i>Quercus spp</i>	2006	*	
Horse chestnut leaf miner ( <i>Cameraria ohridella</i> )	<i>Aesculus hippocastanum</i>	2008	*	
Horse Chestnut Bleeding Canker ( <i>Pseudomonas syringae</i> pathovar <i>aesculi</i> )	<i>Aesculus hippocastanum</i>	2003	Around 50% showed symptoms	
Great spruce bark beetle ( <i>Dendroctonus micans</i> )	<i>Picea spp</i>	1995	Local mortality but widespread distribution	
Red band needle blight ( <i>Dothistroma septosporum</i> )	<i>Pinus nigra var maritima</i> , <i>Pinus spp</i>	2007	70% of stands of <i>P. nigra</i>	
Dutch elm disease ( <i>Ophiostoma ulmi</i> )	<i>Ulmus procera</i>	1960s	25 million trees, most before 1990	

Green spruce aphid ( <i>Elatobium abietinum</i> )	<i>Picea abies</i> , <i>P. sitchensis</i>	2008	Virtually all spruce in UK	Frequent but not cyclic
Oak pinhole borer ( <i>Platypus cylindrus</i> )	<i>Quercus spp</i>	2008	*	

Note: Area affected refers to the total area affected during the outbreak. (\* = <500 ha)

*P. ramorum* and *P.kernoviae* have affected a limited number of trees; the main hosts are *Rhododendron ponticum* and *Viburnum spp* for *P.ramorum*, and *R. ponticum* for *P.kernoviae*

**Table 10c – Area of forest affected by woody invasive species**

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
<i>Rhododendron ponticum</i>	105
<b>Total forest area affected by woody invasive species</b>	105

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping.

### 10.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects		
Disturbance by diseases		
Disturbance by other biotic agents		
Disturbance caused by abiotic factors	Windblown trees.	
Major outbreaks		
Invasive species		

Other general comments to the table