

THE BEAUFORT SCALE AS A TOOL IN TREE RISK MANAGEMENT

The Beaufort Scale was originally developed for the Royal Navy in 1805 (by one captain Francis Beaufort) and was adapted for use by 'land-based observers' in 1906. As can be seen from the descriptions in Table 1, the land version relies on the behaviour of trees under wind action (instead of on waves), such that, at higher wind speeds, the observations define failure thresholds. The UK Meteorological Office uses the land version of the Beaufort Scale in issuing severe weather warnings to predict the likely level of damage from forecasted high winds. Thus the Beaufort Scale can be used to identify a measure of foreseeability of tree failure.

Beaufort Scale, Specification on Land

Beaufort Force	Description	Specification on land	Speed		
			Knots	km/h	mph
0	Calm	Smoke rises vertically	Less than 1	Less than 1	Less than 1
1	Very Light	Direction of wind shown by smoke drift but not by wind vanes	1 - 3	1 - 5	1 - 3
2	Light breeze	Wind felt on face, leaves rustle, ordinary wind vane moved by wind	4 - 6	6 - 11	4 - 7
3	Gentle breeze	Leaves and small twigs in constant motion, wind extends white flag	7 - 10	12 - 19	8 - 12
4	Moderate breeze	Wind raises dust and loose paper, small branches move	11 - 16	20 - 29	13 - 18
5	Fresh breeze	Small trees in leaf start to sway, crested wavelets on inland waters	17 - 21	30 - 39	19 - 24
6	Strong breeze	Large branches in motion, whistling in telegraph wires, umbrellas used with difficulty	22 - 27	40 - 50	25 - 31
7	Near gale	Whole trees in motion, inconvenient to walk against wind	28 - 33	51 - 61	32 - 38
8	Gale	Twigs break from trees, difficult to walk	34 - 40	62 - 74	39 - 46
9	Strong gale	Slight structural damage occurs, chimney pots and slates removed, branches break from trees	41 - 47	75 - 87	47 - 54
10	Storm	Trees uprooted, considerable structural damage occurs	48 - 55	88 - 101	55 - 63
11	Violent storm	Widespread damage	56 - 63	102 - 117	64 - 73
12	Hurricane	Widespread damage	>64	>119	>74