

## The Borrowdale yews, *Taxus baccata* L.

The “Fraternal Four” near Seathwaite, Borrowdale.

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### Location and approach

Location O/S 1:50,000 Sheet 90 Grid ref. 235125. Elevation: c150m above sea level.

Below, the hillside location of these yews (arrowed), photographed from the single track road to Seathwaite. The yews are best accessed by stopping at the stone bridge and taking the footpath up the beck at the base of the slope, moving right to left in the photograph.



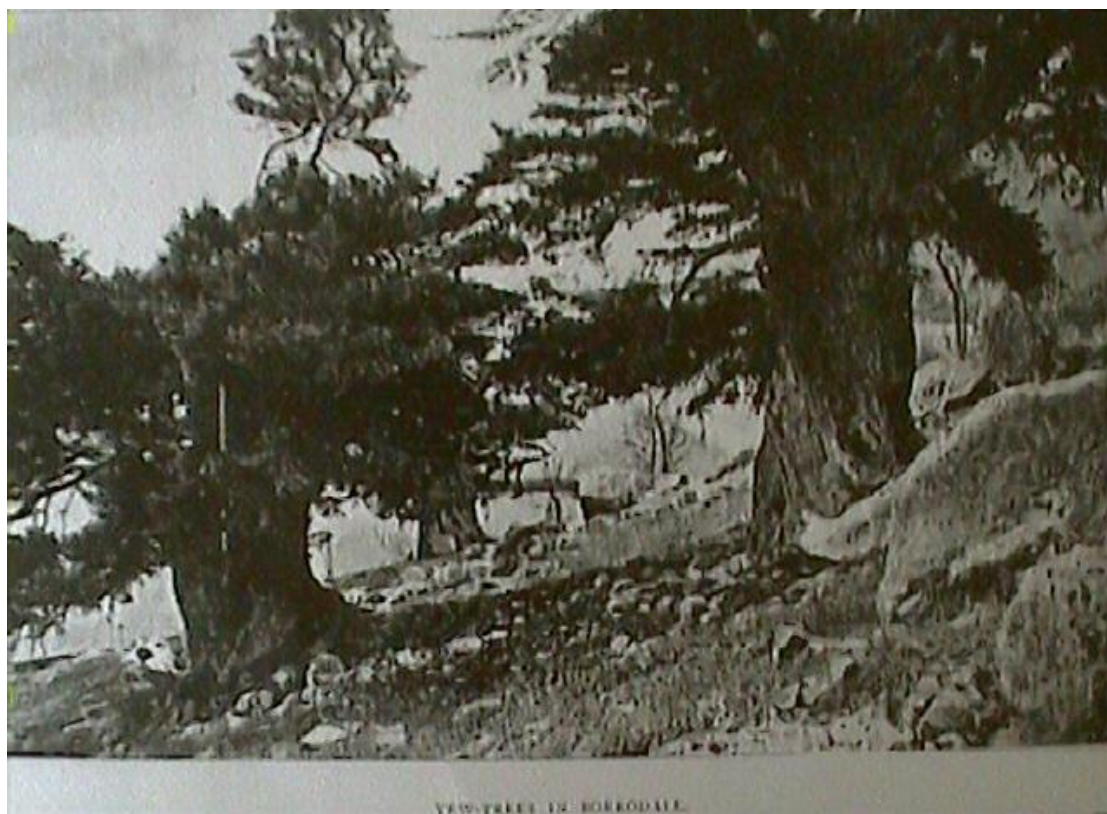
Go through a kissing – gate then walk up the short incline to the yews. Below the grove site is a female riverbank yew with a low and substantial canopy which had a minimum girth of 10’10” near the base in 2003.



There are two signs at the site, the first is a Tree Council plaque celebrating the Golden Jubilee of Queen Elizabeth II in 2002, and naming The Borrowdale yew one of the fifty great British trees. Presumably Yew 1 (the largest yew) is the individual selected, being apparently oldest, although Dr A. Moir's provisional work at Borrowdale (1) casts doubt on this assumption, as does the further possibility that these yews were deliberately planted as a group rather than being wild trees.

The second sign is a National Trust information board showing a C2004 photograph of the largest girthed of the yews before the storm induced collapse of its crown and upper bole, which is dated at January the 6th 2005. The information includes a statement of the age of the yew (not sourced but dated 2004), suggesting that it is 1,500 years old. Also mentioned are William Wordsworth's 1803 poem *The Fraternal Four*, (2) which was inspired by these yews, and general yew links to Celtic people, its toxicity, use of its wood etc. This happily prophetic and correct statement appears at the end: "Despite the loss of so much canopy the tree can survive if left undisturbed. New growth will appear over time and eventually a new canopy will develop." The yew is indeed renewing its canopy with considerable vigour.

Below, a photograph of the Borrowdale yews from John Lowe's 1896 book *The Yew-Trees of Great Britain and Ireland*, (3) taken facing up the dale. Here, the largest remaining yew which was damaged in 2005 is on the right in the picture. On the left is a double which is clearly regenerating after heavy damage (note the few thin wandering branches, remnant of the old canopy); the left hand section of the double has since fallen and is now an intact but rotten hollow tube 10'4" in girth lying down the slope in situ from its collapse: the ground level girth of the yew has been reduced by over 4 feet due to the loss. In the background is the third yew, the condition of which cannot be seen. In the rest of this document the yews are numbered 1, 2, and 3 in the above order, the lost yew being number 4. All of the yews here are female, although the lost Yew 4 is of unknown sex.



## A scene of ruin and regeneration: Yews 1 and 2



Above is a photograph taken up slope from the grove in 2012. Yew 3 is hidden behind the yew on the right, Yew 1.

Yew 2, the former double trunked tree, is on the left and shows a substantial lean down the slope. Several branches have grounded, increasing stability. At the top of the bole regeneration is visible as the tree starts to take advantage of the higher light levels in the gap between it and its neighbour since the destruction of 2005.

It is extremely important that the grounded branches are retained because the new growth will increase in weight and the tree is leaning- the sudden growth of canopy beginning now could unbalance and fell this yew without the natural props that the grounded branches represent. The remainder of the girth of Yew 2 in 2003 was 15'3" (TRH) following a tape run that gave a minimum figure, the measurement site is pictured below (2003), essentially a root crown measure, which is now 15'5".



Yew 2 in 2012 showing the base of the fallen section and its origin.



The largest girth tree, Yew 1, is now a hollow shell, and has lost a great deal of upper bole and most of its old canopy since the visit of 2003. At that date it measured 22'3" with a level tape starting just above the top of the embedded boulder and rising to about five feet from ground on the lowest ground point. In 2012 the same measure was 22'1", implying that some bowing effect of the weight of the upper bole and canopy has since been relived, causing an apparent decrease of 2" plus any cambium increase since the earlier measure. In 1847 the tree was measured at 7 yards in girth at 4 feet from ground (4), and it is likely that the level measure from just above the top of the embedded rock described above approximates to this 7 yard measure site, as the tape in the 2003 and 2012 measures pass five feet above the lowest ground point.

Metric information: Yew 1 measured 640cm 165 years ago in 1847, and is now 673cm. It has been increasing its girth by 2mm per year.

The yew is now in two living sections. The first is pictured in the centre of the trunk with white wood either side of it. This section is healthy and is growing canopy despite having white wood either side of it. To the right a very large section of good healthy living bole comprises 50% of the whole circumference remainder of the bole, and is the second growing section.

The dead remainder from the left hand edge of the first section, clockwise to the edge of the second section measures 9 feet. This large dead bole portion is a bulwark holding back a mass of rotted yew compost from spilling down the slope. Included in the mass are a number of internal stem stumps. Knowing the history of this yew, and taking into account the degree of rot, these structures were probably fatally damaged by canopy loss in the great gale of 1883 (5). Three separate internal stems

are measurable, 12" in girth emanating from the dead interior wall surface at interior ground level, 10" free standing the opposite side of the hollow cavity, and a central complex mass comprising at least 2 roots which together must have exceeded 4 feet in girth, and is now rotting. The internal stems traverse the diameter of the hollow, suggesting that the tree was split in a vertical plane and held together while it rotted, rather than rotting out in a cylinder from the centre.



Above, Yew 1. The view is from near Yew 2 facing towards the up slope, and shows the large dead portion of bole as well as the new canopy that is developing. The branch to the left is grounded and may layer in time. The level of the rot contained in the bole reaches the lowest point of the v split on the trunk.

The site of the non-continuous cambium layering described and pictured in close-up below is visible in this photograph, to the centre of the dead section.



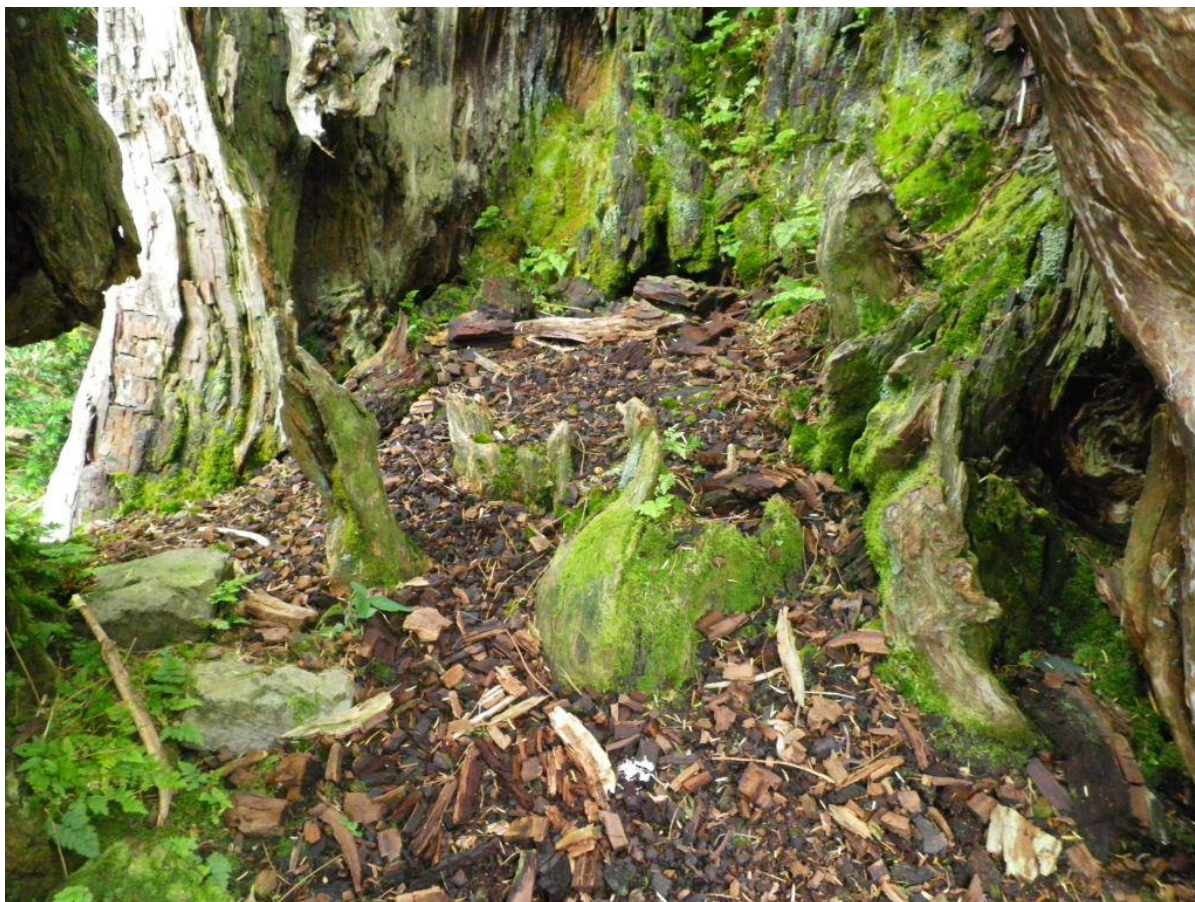
Above, Yew 1 in 2003, having already lost some upper bole and canopy, and hence beginning regeneration over a period of years in a relatively tenable staggered fashion.



There are a number of features near these yews which faintly suggest very old terracing or similar building within the grove. Left, a shot of the ground near Yew 2 showing the root system following what appears to be the foundation of an old wall. Ground features near Yew 3 suggest the same thing, and there is a case for saying that these yews were deliberately planted on the edge of a purpose built terrace.

Further evidence is their uniqueness in the landscape- there are no non-domestic yews in this part of the dale except those mentioned in this document. I find that the notional mean girth (allowing for known recently lost wood etc.) is 581 cm, so if all the yews were planted together then statistically they would be c800 years old in a sheltered southern site (6).

Although the site elevation is not extreme, it is still high and very exposed, at relatively high latitude, and the soil is poor. The yews are subject to constant wind damage, and, when considered as a potential single planting, are clearly substantially older than 800 years.



Above, a photograph of the internal structures of the largest girth tree, Yew 1. Evidently there were once three substantial internal stems which ran down the centre of the yew. Structures like these depend on specific regions of canopy, originating from the base of a branch where it meets rot within the bole which can support rooting activity. The resulting root grows down within the bole often reaching the soil under the tree and supporting the growth of that part of the canopy. If the branch is destroyed, then the internal stem or root usually dies.

There is still a substantial depth of composted yew material within the bole, with ferns growing in it against the inside of the trunk. To the right of the picture is a sweep of wood that suggests that a large vertical stem was at some time incorporated into the bole. The join appears seamless from the outside (on the up-slope side).





The largest bole and canopy section lost from Yew 1 in 2005, pictured in 2012. Several ring counts were taken on the exposed wood which had been nearest ground. The sections are pictured below against a scale of centimetres divided into 2mm increments, except the photograph of the internal wood which is in situ and has a finger as a scale guide.

Calculation of mean annual radial increase

A Count 127 in 10.0 cm = 0.78 mm. B (Count 32 in 2.0 cm = 0.62 mm). C Count 137 in 12.0 cm = 0.88 mm, D Count 148 in 8.4 cm = 0.57 mm. Mean = 0.73mm

The projected radial increase in 165 years is 12 cm, equivalent to 75cm or 2'5" girth increase less no growth areas of white wood following the canopy loss and corresponding cambium death on the trunk in 1883, which is an unknown reducing factor. Observed growth for the period 1847-2012 is 33 cm or 1'1.5".



Sample A: Mean ring width 0.78mm over 10 cm. (Yew 1 outer bole section fell 2005).



Sample B: Mean ring width 0.62mm over 2 cm (Yew 1 inner bole section growing c1700? CE)



Sample C: Mean ring width 0.88mm over 12cm (Yew 1 outer bole section fell 2005)

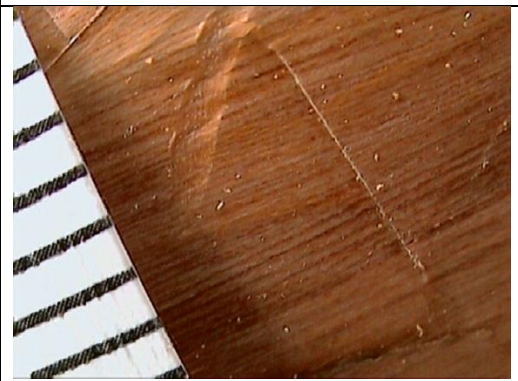


Sample D: Mean ring width 0.57mm over 8.4cm. (Yew 1 outer bole section fell 2005)

Fallen wood counts were also taken in 2003, a bole section from about nine feet up in the up-slope side of Yew 1 showed 224 rings in a radius of 80mm (image below) from the inner edge of the (missing) cambium to the unreadable rot. Probably this substantial piece fell as white wood, and has the extreme ring density normally associated with branch wood. A detached branch related to this piece yielded a count of 193 annual rings, almost a complete count with internal stem activity starting but probably aborted by the death of the branch or loss/drying of the rooting medium while it was still on the tree. Another 20 or thirty rings might be expected in the rotten core. The girth of the branch was 4'0" at 1' from the bole. Finally a fallen 6'2" (at 1' from the trunk of yew 1) girth branch was examined, and yielded 385 rings with the likelihood of a further 60 in the rotten core.



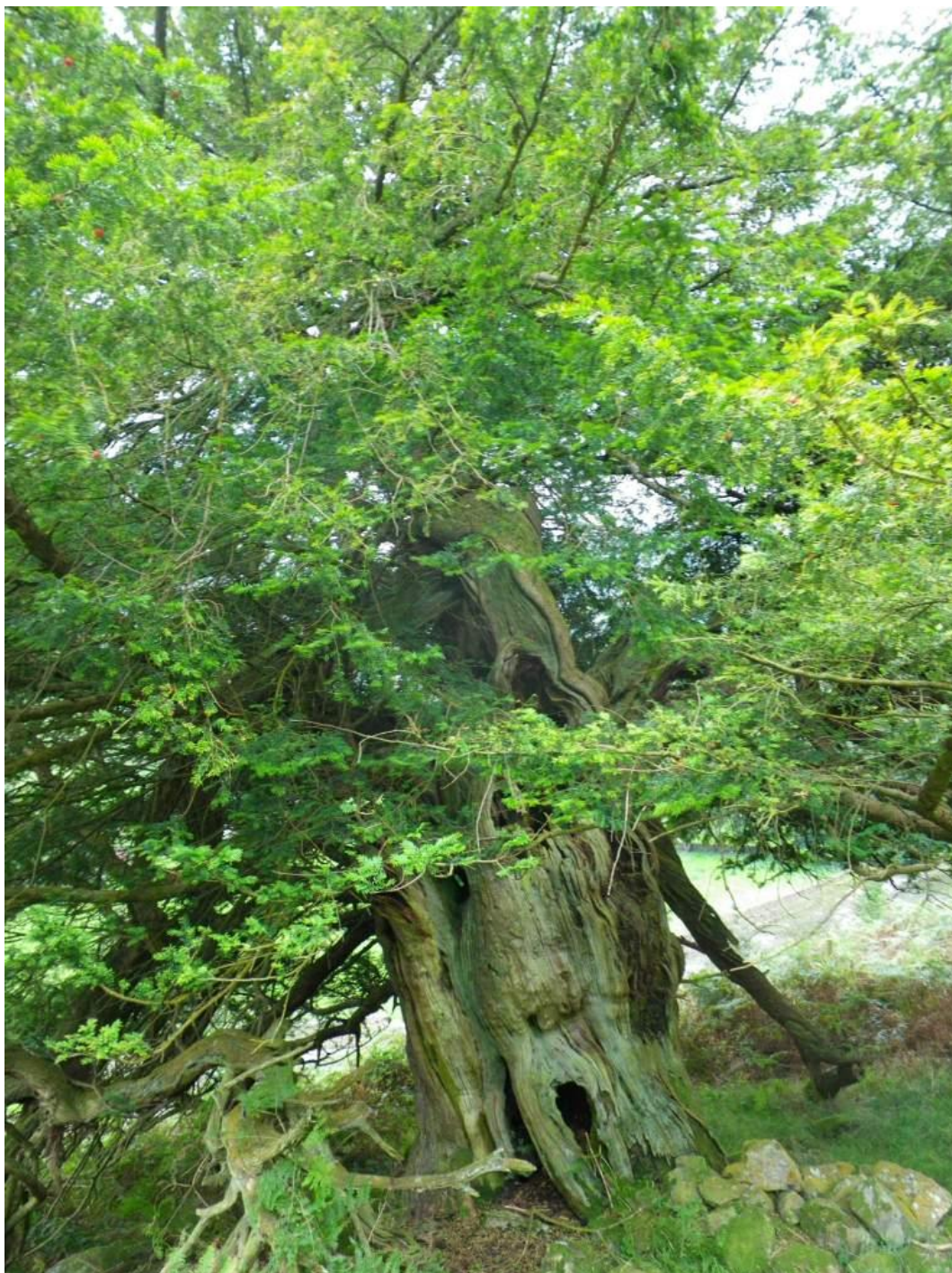
Yew 1: The fallen upper bole section examined in 2003, assumed fallen in 1987/91. Area examined is left of the bag, showing orange in the photograph. Below, count sample, scale 2mm.



Detail of the downslope facing standing bole deadwood of Yew 1 showing non-continuous cambium layering. The browner wood layer is probably a relic of the canopy loss of 1883; as the branches are lost the cambium below them becomes redundant and either produces adventitious growth or dies. Living cambium on either side of a dead area can flow over any debarked area through time producing the effect shown here.

The effect inevitably skews ring width sample based girth projections when it occurs, causing lower observed growth than the projection predicts, because there may be substantial areas of no growth not demonstrated by continuous count samples from elsewhere on the trunk.

## Yew 3



Yew 3, a little way from the others is in a somewhat delicate state. A great deal of the structure is rotten, but several bands of living material support the canopy, which is yellower and thinner than that of the other two. There is no internal root activity in the hollow trunk. This yew was estimated by the dendrologist Dr. A.K.Moir as being approximately 1,500 years old (1), and it is likely that the National Trust sign giving this age refers to Dr Moir's work. The tree measured 14' 9" in girth at 1 to 3 feet from ground in 2003, and is now 14'10" at the same level. It stands, like Yew 2, on a wall remainder, in this case a corner.

## Old references

*“Seatoller Bridge” ...“Near this spot may be seen the Borrowdale Yews among the copse-wood: there are four large trees, and some smaller ones; the finest measuring seven yards in circumference [at 4 feet from the ground], and, although exceedingly old, is not yet decayed.”* (4) p213 1847 Sylvan’s Pictorial Handbook to the English Lakes Re published 1974 Evans and Longley Associates.

In Wordsworth’s time there were four old yews, and the 1847 measure of seven yards girth might, one supposes relate to Yew 4 that was lost in 1883. In fact the measure most probably relates to Yew 1, the largest girth yew currently growing and not the lost tree. At a minimum girth of 22 feet 3 inches and at 2’ from ground a girth of 24’2” in 2003 (22’1” and 24’5” respectively in 2012), and with the ring density showing a less than 1mm annual radial increase, the largest existing Borrowdale yew would have been close to 21 feet (seven yards) in girth in 1847. The dimensions of the lost yew are examined below, and contribute to the above argument as Yew 4 was clearly smaller than Yew 1.

An 1885 reference sheds light on more of the yew history of Borrowdale: *“The size attained by the yew in this district is astonishing. One, which for many years lay prostrate at the other end of Borrowdale, measured nine yards in circumference...”* (7) The English Lake District, Harriett Martineau pub J Garnett 1885 p270. This must be the famous “Horse and Rider” yew, even more ancient than the Fraternal Four. Locating the site once occupied by this phenomenal tree is a task of great importance for the history of the dale.

(8) Lowe 1896 - Borrowdale Yews. - *‘Every visitor to Keswick,’ writes Professor Knight,<sup>1</sup> ‘goes up Borrowdale. Leaving the Honister road at Seatoller, the mountain track over the Sty Pass to Wastdale ascends under the flank of the Gray Knotts and Brandreth to Seathwaite; and there- to the left of the track, and a short distance from Seathwaite Beck- are the remains of a grove of yew-trees as famous as any in the kingdom. It is there that Wordsworth wrote of them in 1803 (see Yew –trees): this grove of yews in Borrowdale; “fraternal four,” – “a brotherhood of venerable trees,” remained uninjured till 1883 – a natural temple, or, as described by Mr. Stopford Brooke; an “ideal grove,” in which the ghostly masters of mankind meet, sleep, and offer worship to the destiny that abides above them, while the mountain flood, as if from another world, makes music to which they dimly listen. But in the great gale of 1883 one of [1 Through the Wordsworth Country pp.253, 54.] them was uprooted; leading branches of the others were wrenched from the main stem, and although three still remain, the solemn majesty of the grove is gone’ ...Mr Goodwin’s sketch represents the grove as it was before the tornado shattered it . In Modern Painters Mr Ruskin speaks of the high action of the imagination in this poem, [sic] and says, “It is perhaps the most vigorous and solemn bit of forest landscape ever painted.”*

## The lost yew 4 and replacements



The above fallen tree is confirmed as yew, and is the individual lost in the Great Storm of 1884, Yew 4. It has fallen uphill. The base is at the downhill end of the fallen bole, located by a biological marker: a wasp nest somewhere in the root voids which caused some moments of frantic activity when discovered. At the former 5 feet from ground level the yew had a minimum diameter of 4'6", found by measuring the exposed section facing the photographer. The length of the bole from the base to the break of crown is 14'6". Three sections remain. The two largest comprised the main bole which has split more or less into two halves, there seems to be a missing region which may have been a split. The third section, not pictured, is smaller and near the base on the photographer's side of the tree as pictured. It was not examined because of wasp activity in what is taken to be the root cavities in the yew's former footprint.

It is notable that the yew was further than expected from the rest of the grove: the third yew and the fallen yew were separated by a gap of 50 feet on the ground, translating to c45 feet horizontally when the slope is accounted for. Wordsworth's poem suggests that the canopies were fully joined in 1803, all the yews must have had a radial spread of at least 20 feet for this to be so, and were therefore clearly in very good condition.

Minimum girth: The diameter found on the bole of Yew 4 suggests a minimum girth for this yew of about 480 cm in 1883 when the yew stopped growing. A cursory examination of the ring density suggested that the expected girth increase over this period to 2012 would be about 60 cm: the yew would now be over 540 cm in girth had it continued growing. The yew's remaining footprint is C21 feet in girth.

Probable girth: Taking the footprint into account, and considering the tree's morphology which is faintly shown in the 1850-69 etching in the Old Images section below, one can get a broad idea of the relationship between footprint and bole. The yew reached a girth of 18 feet plus or minus 2 feet.



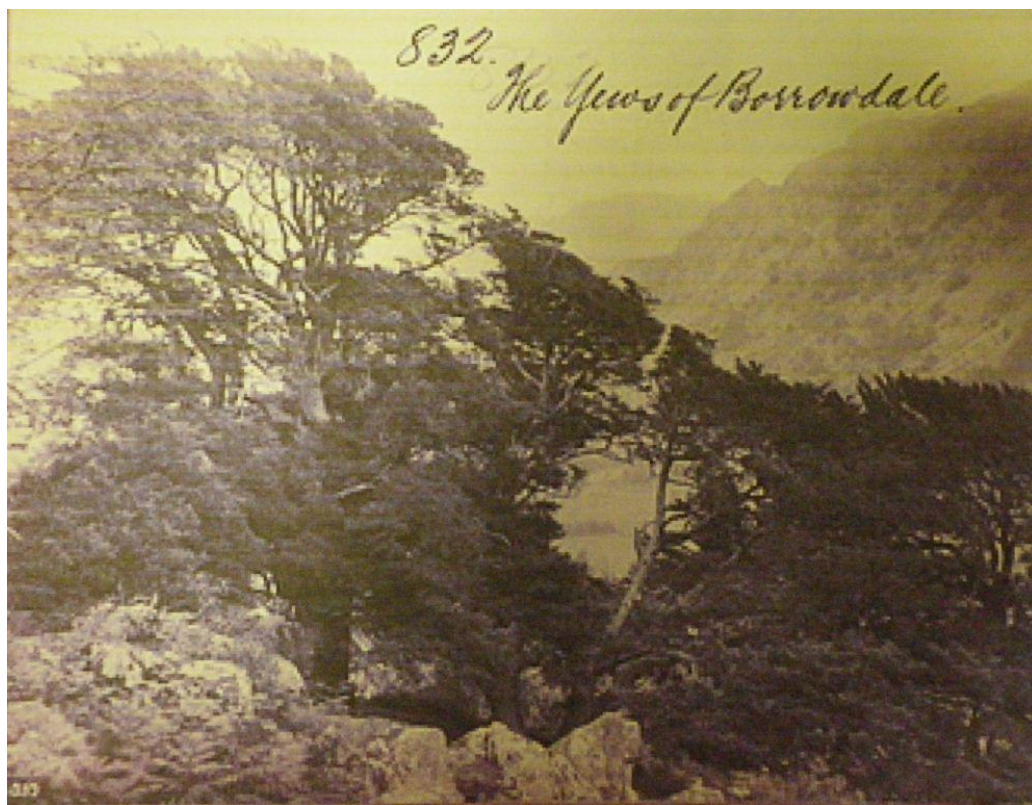
Pictured above, the relative location of the fallen Yew 4, and the wire cage around a replacement planted about 3 years ago at the resting point of the upper end of the bole. The large yew in the photograph is Yew 3; the other two yews are directly behind it in this view, the branchy white wood end of the broken section of Yew 2 visible to the right. The replacement yew is in the wrong place, unfortunately, and should be moved onto the old footprint at the other (root) end of the carcass of the fallen tree- when wasp activity has died down.



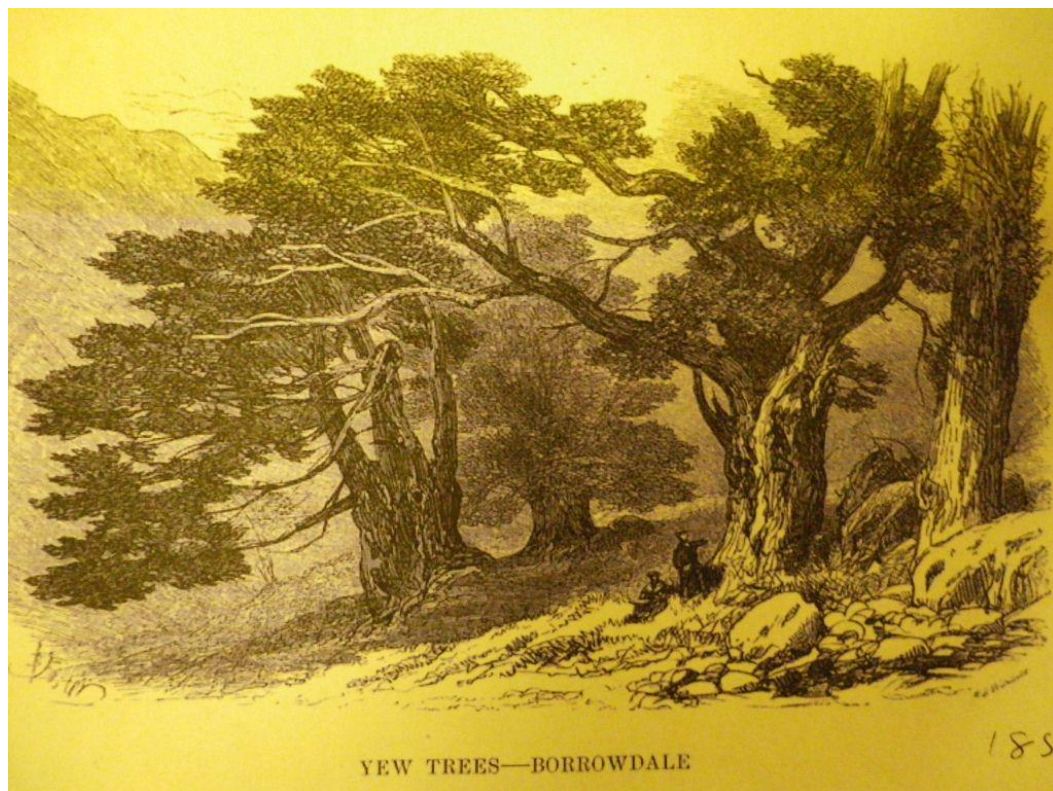
A view from the up slope second replacement yew to Yew 1, which is 46 feet away and with the photographer facing 60 degrees East of North. This young yew is 2'11" high, and has grown enough to be topped by grazing sheep over the top of the guard. Planted between two large stones, there is no clear logic to its inclusion on the site, and as with the other new tree no explanatory signage. Is this an official NT/LDNP planting, or a well-meaning unofficial effort?

It would be good to be sure that these additions to the site are genetic offspring of the existing yews, whether by cutting propagation or by seed or seedling collection. If there are no such assurances then both additions ought to be removed, especially as it is an easy operation at this early stage in their growth, and consideration can then be given to an appropriate alternative strategy.

Old images of the Borrowdale yews



Photograph, 1850-60 Francis Frith (9)

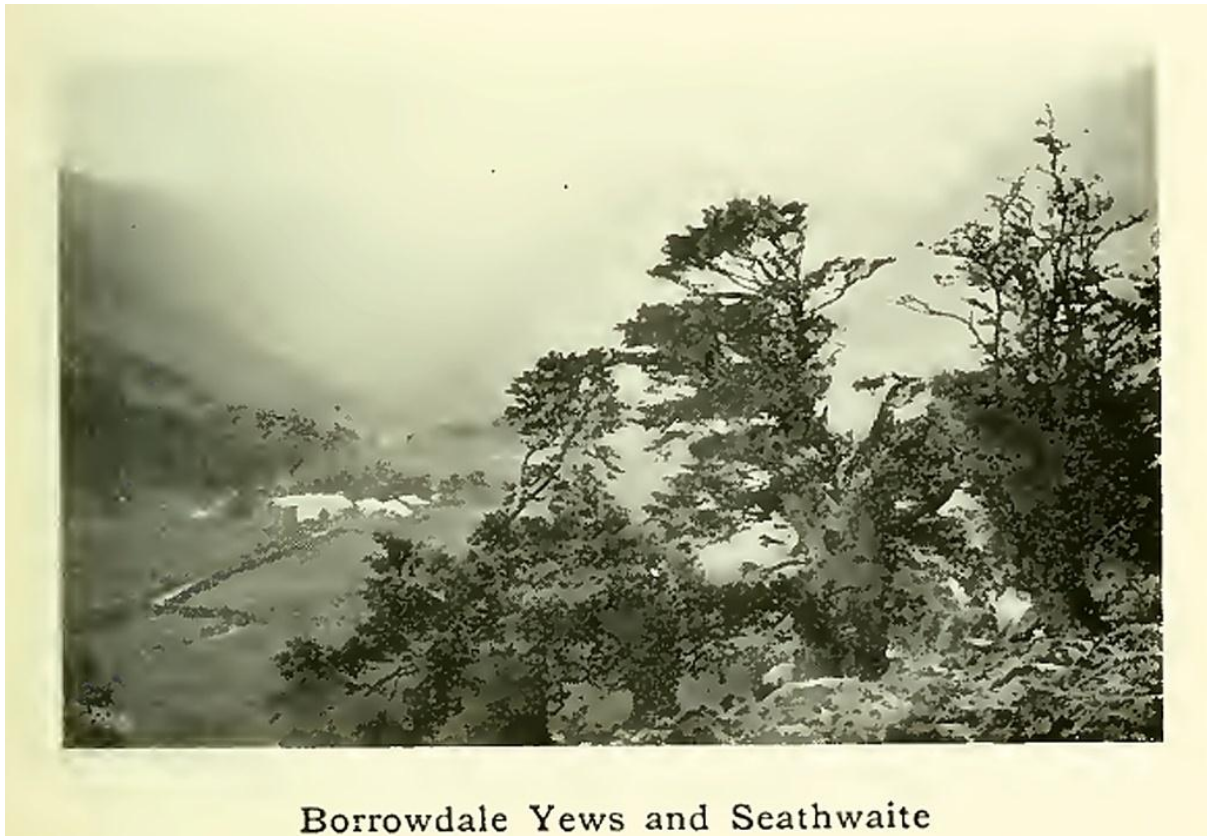


Engraving, B. Foster engraved E. Evans 1850-69 (10)



Watercolour, image still within copyright

Alfred Heaton Cooper 1922 (11)



Photograph, Cambridge County Geographies, Cumberland J. Marr 1910, digitally spoiled image. (12)

The right hand tree in Marr's image is not a yew, and is not lost by 1910 so cannot be the individual lost in the great storm. Yew 4 is shown by B. Foster, very faintly in the engraving of 1850-69 to the left of the bole of Yew 2, which he shows as triple stemmed.

## References

- 1 A.Moir (2004) (A provisional dendrochronological analysis) and in Paul Greenwood (2005) *Ancient Yew in Upland and Cliff Habitats in the UK*, AYG, <http://www.ancient-yew.org/mi.php/ancient-yew-in-upland-and-cliff-habitats-in-the-uk-new-research/69>.
- 2 William Wordsworth's 1803 poem *Yew-Trees*, Reproduced in Lowe, J. (1896) *The Yew-Trees of Great Britain and Ireland* pp.173-4
- 3 John Lowe (1896), *The Yew-Trees of Great Britain and Ireland* opp. p68
- 4 Sylvan (1847) *Sylvan's Pictorial Handbook to the English Lakes* p213, re-published 1974 Evans and Longley Associates
- 5 John Lowe(1896), *The Yew-Trees of Great Britain and Ireland* probably fatally damaged by canopy loss in the great gale of 1884, or December 1883 according to Lowe, p 67.
- 6 Toby Hindson (2011). *Classification Protocols Part II, Ancient, Veteran and Notable: The Specifics of Protocols Application*, AYG, <http://www.ancient-yew.org/userfiles/file/Protocol2fc.pdf>
- 7 Harriett Martineau (1885), *The English Lake District*, p270, J Garnett.
- 8 John Lowe (1896), *The Yew-Trees of Great Britain and Ireland* p. 187
- 9 Photograph, 1850-60 Francis Frith
- 10 Engraving, B. Foster engraved E. Evans 1850-69
- 11 Alfred Heaton Cooper 1922, watercolour, *The Borrowdale Yews*.
- 12 Photograph, Cambridge County Geographies, Cumberland J. Marr 1910, digitally spoiled image.



A phenomenally beautiful place.

C. Toby Hindson 2012