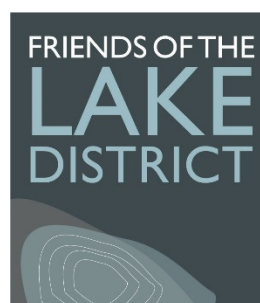

Control of infestation of Himalayan balsam at Rydal



Report for 2019 and Proposals for 2020 and beyond

October 2019



Executive Summary

There is a major infestation of the invasive non-native species Himalayan Balsam (HB) to the east and west of Rydal Water, at the very heart of the Lake District National Park. Left untouched, it will continue to expand, further threatening the area's biodiversity, visual appeal and cultural heritage.

South Cumbria Rivers Trust (SCRT) and Friends of the Lake District (FOLD) have come together to spearhead a campaign to bring the infestation under control and hopefully, in time, eradicate it. The centrepiece of this campaign in 2019 was a 'Fight the Aliens Day', which took place on 20th July; with a follow-up day on 21st August. On this day, volunteers recruited by FOLD, group leaders recruited by (SCRT) and strimmer operators provided by landowners (plus individual contractors working for free) were deployed in 8 patches of infestation. Further work was done up to late August by landowners, volunteers and strimming contractors funded by landowners (including tackling a 9th patch).

As a result of these efforts:

- Patches 1, 2, 3, 7 and 9 were virtually all cleared;
- Patches 4, 5 and 6 were substantially cleared by end of July but experienced a lot of re-growth afterwards;
- Patch 8 was partially controlled;
- Patches 10 and 11 were not touched.

Perhaps more significantly are the 'qualitative' achievements:

- Realisation amongst all those involved as to how bad the infestation has become;
- Demonstration of what can be done at a local community level when everyone works together;
- Engagement of many people in hands-on countryside management.

For the next few years, HB control has to rely principally on mechanical means (wheeled vehicles and trimmers) supported by hand pulling. To acquire the former, cash or in-kind contributions are needed, and hand pullers will be recruited from volunteers (principally by FOLD). It will be necessary to seek assistance from a wide range of sources – landowners, local authorities, grant-giving bodies/charities. In the next few months, SCRT/FOLD will be striving to put in place commitments to provide what is needed to continue what was started in 2019.

Contents

Executive Summary

1.	Introduction	1
1.1	Background	1
1.2	Balsam control	1
1.3	Extent of the problem	2
2.	Activities in 2019	6
2.1	Introduction	6
2.2	Fight the Aliens Day – 20 th July 2019	6
2.2.1	Pre-planning	6
2.2.2	Activities on the day	7
2.2.3	Inputs, Outputs and Outcomes	7
2.3	Ad hoc control activity in July	9
2.4	Fight the Aliens 2 - August 21 st	9
2.4.1	Pre-planning	9
2.4.2	Activities on the day	10
2.4.3	Inputs, Outputs and Outcomes	10
3.	Proposals for 2020 and Beyond	13
3.1	Lessons learnt	13
3.2	Proposals for 2020	13
3.2.1	Resource requirements	14
3.2.2	Sourcing	14
4.	Acknowledgements	16
4.1	Appreciation	16

Maps and Tables

Map 1.1:	Known extent of balsam in autumn 2019	3
Map 1.2:	Revised extent of Patches 7, 8, 10 and 11	5
Table 2.1:	Extent of control by Patch after Fight the Aliens Day	8
Table 2.2:	Extent of control by Patch	11
Table 3.1:	Estimates of resources needed by patch for each of the next 3 years	14

Appendices

- Appendix 1 Known extent of balsam patches (as per autumn 2019)
- Appendix 2 Before and After photographs (July 20th)
- Appendix 3 Photographs of volunteers in action on Fight the Aliens Day
- Appendix 4 Photographs from 20th and 21st August

1. Introduction

1.1 Background

The Rydal area has been infested with Himalayan balsam (*Impatiens glandulifera*) (HB) for some years (reports about its control up to 2011 have been found) but, according to anecdotal reports, there seems to have been a rapid spread and intensification of the infestation over recent years. This has prompted a joint campaign between South Cumbria Rivers Trust (SCRT) and Friends of the Lake District (FOLD), working with a range of other partners, to attempt to bring it under control and, hopefully, eradicate it in due course.

This document reports on the activities done in 2019 by various parties to start this process of control. **Chapter 4** lists all those individuals and organisations to which thanks are due.

1.2 Balsam control

There are various inter-related pieces of legislation that relate to HB. It is probably not necessary to go into this in depth here but a short summary may be justified:

- HB is on the EU's 'Union List' of invasive species which are of concern;
- It is also listed in Part II of Schedule 9 of the Wildlife and Countryside Act 1981, which means that...
 - o it is not an offence to have HB growing on land but it is an offence to allow it to spread into the wild (taken to mean the wider environment);
 - o plant material and soil containing its seeds are classified as 'controlled waste' which has to be disposed of within the procedures set out in the Environment Protection Act 1990 (s33). Disposing of controlled waste without a licence or outside the provisions of a licence is a criminal offence;
- HB features on a list of "widely-spread invasive species" which are the subject of the Invasive Alien Species (Enforcement and Permitting) Order 2019 - which is due to come into force on 1st December 2019;
- There are provisions within agri-environment schemes (past and present) to support the control of invasive non-native species such as HB.

For widely-spread species of concern (of which HB is one), the new Order referred to above will require effective management measures to be put in place, so that the impact of these widely-spread invasive species on biodiversity, the related ecosystem services and, where applicable, on human health or the economy are minimised. Management measures consist of lethal or non-lethal, physical, chemical or biological actions aimed at eradication, population control and containment of a population of species of Union concern.

In short, control of HB and restricting its spread is ‘a good thing’. A ‘Technical Note’ is available on request which explores the legal and policy background, and range of control measures available.

A key point to bear in mind is that HB is an annual and relies on seed germinating each year to maintain itself. It is not totally clear how long seeds remain viable in the ground. Many reports suggest 1 – 2 years but direct experience of HB control leads us to suggest that seed viability may decline exponentially over time, meaning that (where there is a huge burden of seed in the soil) some seeds will remain viable for longer than this. Plants are self-fertilising, so one plant can produce viable seeds. Consequently, a programme of HB control of a badly infested site needs to spread over several years, not just one or two.

1.3 Extent of the problem

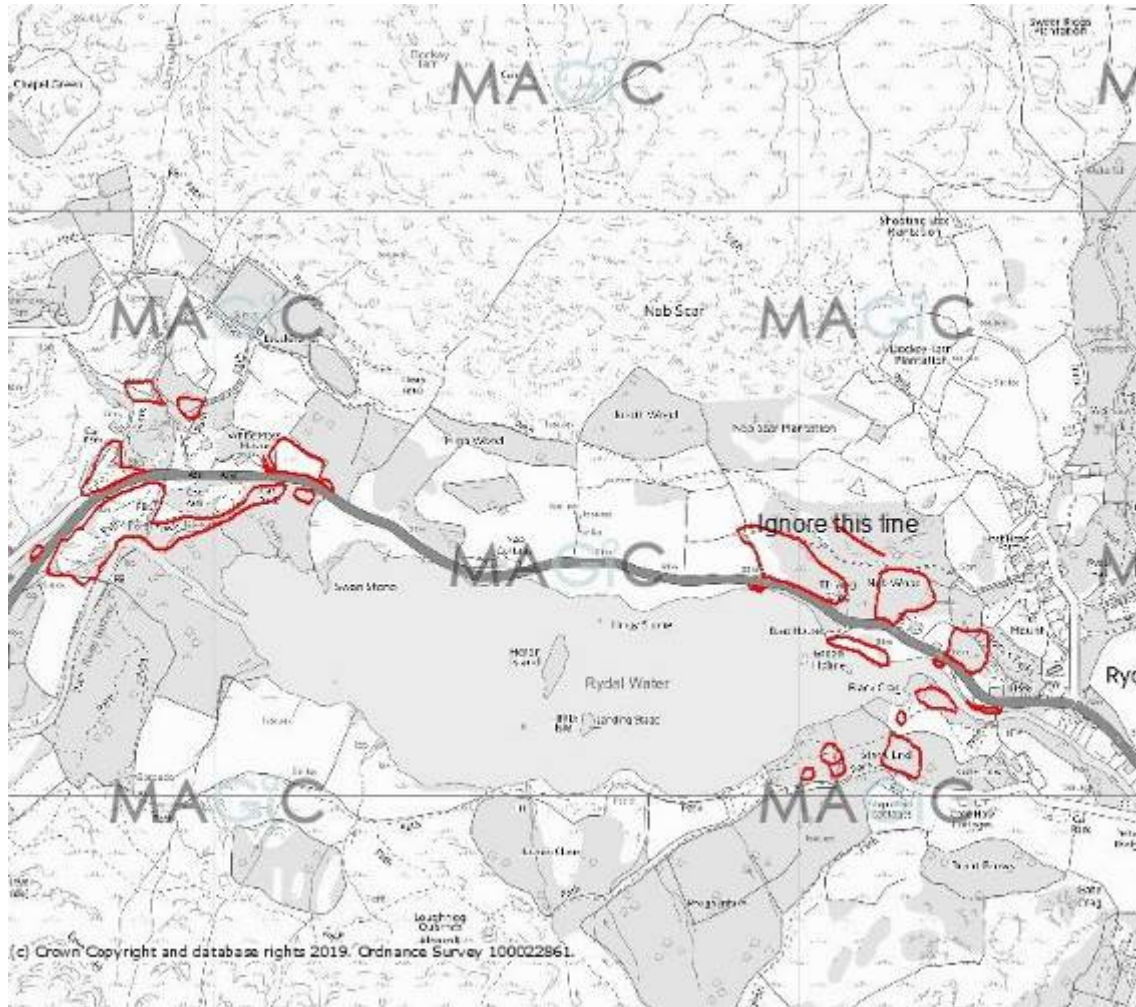
During late summer 2018 and spring of 2019, attempts were made to identify the full extent of the HB infestation. In practice, as more surveys were undertaken, particularly as the plants developed in late spring/early summer, the known extent kept expanding (and may not yet be fully appreciated). Observations prior to ‘Fight the Aliens Day’ suggested the extent was as shown in **Map 1.1**, below. More detailed maps of each ‘Patch’ are given in **Appendix 1**. The downstream limit of the area is the footbridge opposite the Badger Bar (other infestations are known to exist downstream but they are not thought to be as extensive as the Rydal ones).

In addition to the areas ringed in red, ‘outliers’ – individual or small groups of plants – have been observed. Perhaps the most worrying are those near the ‘Coffin Route’, suggesting that the infestation is spreading uphill and not just by seeds transported in water flows.

Some limited attempts to control the HB in Patch 1 (A, B and C – see **Appendix 1** for details) were made in 2018, which was apparent in the reduction in the intensity of infestation in 2019.

In short, it can be said, hopefully without contradiction, that HB has become a major problem locally and a challenge to bring it under control.

Map 1.1: Known extent of balsam in autumn 2019

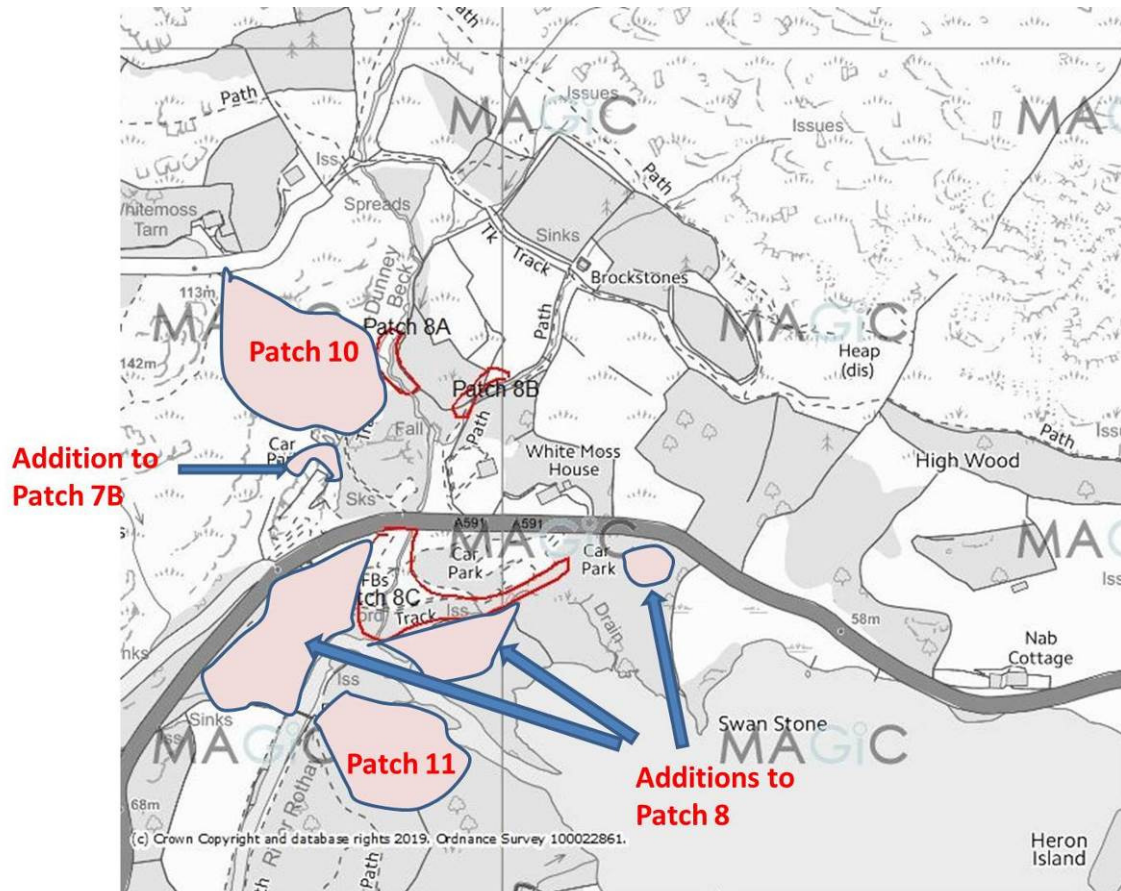


The canoe survey also revealed a further challenge – HB infestation has extended south of the Rothay and now affects the banks of the river which in places are very difficult to access (see pictures below). These were discovered too late to incorporate into plans for the Fight the Aliens Day, but will need to be addressed next year.



In preparation for the 2nd bash (on August 21st), another walking survey was undertaken on the day before. This led to the discovery of two ‘new’ significant infestations, now labelled as Patches 10 and 11. **Map 1.2** shows the approximate extent of these additional patches. The bash on 21st August revealed yet more HB in Patch 7B.

Map 1.2: Revised extent of Patches 7, 8, 10 and 11



The resources needed to tackle these new and extended areas will need to be factored into planning for 2020 and beyond (see **Section 3**).

2. Activities in 2019

2.1 Introduction

At about the time that insights were being reached into the severity of the problem (autumn 2018), FOLD contacted SCRT volunteers with a request – could FOLD volunteers be deployed on a balsam bash? If so, when and where? As a result of this, the ‘Fight the Aliens’ campaign was born. It was envisaged as a partnership of SCRT and FOLD, with support from other partners as necessary.

Volunteers experienced in balsam bashing and acting for SCRT put together a set of proposals for HB control at Rydal and circulated this widely amongst potential partners, including landowners. Telephone discussions were held with property owners directly affected by the HB infestation. A very positive reaction was received from all contacted, with offers of financial support either in cash or in kind from many.

The inter-relationship of the balsam infestations was recognised (patches are capable of re-infesting each other) and so an acceptance that the problem is a collective/community and should be regarded as one major problem for the area rather than lots of little ones. The strategy was to amass and co-ordinate all resources needed to enable all areas of HB to be tackled simultaneously on a single day and for every plant in the area to be pulled or cut. The proposed timing was chosen so that all involved would be able to see, firstly the seriousness of the problem and, subsequently, the impact made by the group’s efforts. To achieve this, and enable easy identification of plants, a date for the big bash was chosen of 20th July 2019.

It was always recognised that subsequent bashes would be needed, and so a second one was fixed for 21st August 2019.

2.2 Fight the Aliens Day – 20th July 2019

2.2.1 Pre-planning

It was recognised that the success of the day depended on a sufficient supply of accessible balsam and a manageable ‘army’ of willing pullers. It was agreed that SCRT would be responsible for managing the HB ‘supply side’ (which included finding experienced leaders for each group and strimmer/brush cutter support where appropriate), whilst FOLD would be responsible for the recruitment of the willing volunteers (including Public Relations/Publicity).

One of SCRT’s main roles is the control of invasive species such as HB. Over recent years, various volunteer groups have been operating throughout Cumbria, typically on a catchment-by-catchment basis. It was some of these volunteers that gave the impetus to the Fight the Aliens Day organisation. Using their experience from elsewhere, the area was divided into manageable patches, estimates were made of what resources would be needed to clear each patch (both by hand pullers and mechanical means) and briefing notes prepared. Nearby parking was needed (especially for strimmer operators) and was sourced with help from land and property owners.

FOLD have for some years organised 'Fell Care' days, each taking a similar approach – gathering an army of volunteers to tackle a series of tasks (e.g. litter picks, path repairs, drain cleaning) in a single locality on a specific date. They drew on this experience to publicise the event, enlist volunteers, and develop suitable support infrastructure (including documentation such as registration system, risk assessments, emergency protocols).

Leaders and machine operators were briefed by email, over the telephone and in some cases in person on the day. Leaders were asked to familiarise themselves with their patch before the big bash. Regular contact was maintained with land and property owners throughout the planning process.

Volunteers were sent a briefing note a few days ahead of the 20th July, which told them about the activity, what to bring and expect and allocated them to a specific group (with their group leader identified).

2.2.2 Activities on the day

The volunteer 'army' was divided into 8 groups, each with a leader experienced in leading groups for HB pulling. Seven professionals were deployed with trimmers/brush cutters in areas where they could be most effective (i.e. very dense stands of HB), who kindly volunteered their time. The groups were centred around the east and the west of the lake, in separate car parks (provided free by landowners), where they were met by their group leaders and led to the respective sites for a briefing and to get going!

Most groups got to work by 09.30 and continued through until lunchtime, despite damp conditions, without any breaks. There was very little difficulty in identifying HB from amongst the native vegetation – in many areas there was nothing but balsam and bracken!

Leaders were asked to instruct pullers to keep well clear of trimming operations by sticking to the edges of the patches where it was either too difficult or not time-effective to deploy trimmers. In contrast, trimmer operators were asked to stick with the dense, central patches of balsam. As the morning progressed it became obvious that it would not be possible to clear all areas; consequently, trimmers were asked to try to cut a 'boundary' around the outer edges of the patch, so that the HB infestation could be contained.

By 13.00, everyone was ready to stop (apart from Group 7, who continued for at least another 30 minutes, inspired by their enthusiastic leader). FOLD had arranged for drinks and cakes to be available for volunteers from this time (Rydal Hall provided the venue free of charge). This was appreciated by all who attended and provided a great opportunity to exchange experience, say thanks and ask people to sign up for future events (which many did, having enjoyed their experience).

2.2.3 Inputs, Outputs and Outcomes

Inputs can perhaps be summarised quantitatively:

- 54 hand pullers signed up for the day;
- 8 group leaders;
- 7 trimmer/brush cutter operators;
- 3 organisers.

Outputs can be measured by assessing the extent of HB brought under some sort of control. An 'heroic' estimate was made of 640,000 plants destroyed, extrapolating from a count undertaken by one puller and from a series of assumptions about strimming rates. Another measure is by area, and this can be expressed approximately as a percentage of each patch (as summarised in **Table 2.1**).

Table 2.1: Extent of control by Patch after Fight the Aliens Day

Patch	Approximate extent of growing plants cleared	Comment
1	All cleared	This area had been worked on last year, so density was low
2	All cleared	Proved to be more extensive than first thought but numbers of pullers were about right to clear it
3	All cleared	Small but very dense patch cleared despite being a bit 'light' on volunteers
4	About 60%	Unknown agents had started to clear this patch using slashers. Fringes cleared by hand pullers and strimmers cleared most of the central area. Outliers on the upper slope remain
5	About 35%	HB extended further up the slope and across a wider front than expected.
6	About 50%	Simply just a big patch. The lower and eastern fringes were cleared by hand and the central patch cut, but some of the western fringe and most of the garden of White Moss House remain to be cleared
7	Nearly all cleared	All of 7B was cleared but only part of 7A
8	25%	This area proved to be hugely bigger than originally anticipated. Urgent need of control next year due to proximity to river and lake.
9	0%	This was a 'late discovery' and not included in the plans for Fight the Aliens day. But, see Section 2.3 below.
10	0	Not discovered until 20 th August
11	0	Not discovered until 20 th August

Appendix 2 contains some 'before and after' pictures of some patches.

Outcomes are perhaps harder to identify and quantify but:

- All agreed that the arrangements worked well, which means they can be used for future events and as a template for events elsewhere;
- The realisation amongst major landowners of the seriousness of the infestation, and therefore the need to do something about it, is perhaps the most significant outcome;
- Many of the volunteers were new to balsam bashing and appeared to enjoy it. They may well volunteer again or take a more pro-active role in direct control work and/or promoting understanding of HB as a problem in some areas;

-
- Community benefits were evident in the way that people locally came together for a common purpose.
 - The process of control/eradication at Rydal will be a long one, but at least it has started;
 - It was a great 'partnership' event and shows what can be achieved when people work together.

Appendix 3 contains some photographs of volunteers in action.

2.3 Ad hoc control activity in July

One of the significant outcomes of the Fight the Aliens day was a greater realisation amongst landowners of the serious nature of the infestation and the urgent need for control. Subsequent to 20th July, some ad hoc work was arranged at very short notice, implemented by the landowners:

- Commercial contractors were brought in to trim the whole of Patch 9 (which had only been 'discovered' at a late stage and so could not be incorporated into the plans for the Fight the Aliens Day);
- Chris Hodgson used agricultural machinery to mow parts of Patches 4, 5 and 6 which were passable by tractor;
- Commercial contractors helped trim part of Patch 5 (which were inaccessible by tractor);
- One of the householders started to pull balsam in their grounds.

The higher output of mechanical control measures is evident and is believed to be the key to control in the next few years. This is discussed more fully in **Chapter 3**.

2.4 Fight the Aliens 2 - August 21st

2.4.1 Pre-planning

It was agreed amongst the lead partners that the follow-up event would be something of a 'mopping up' exercise, rather than attempting to pull in areas that had not so far been tackled. This was largely due to the fact that, by this date, it was expected that seeds would be 'popping' and so it would be very time consuming to apply any sort of effective control (ideally, when plants reach this stage, seeds should be caught in a plastic bag, then the headless plant pulled and destroyed in the normal way).

A more achievable priority was to consolidate control in the areas already tackled by removing any remaining plants arising from:

- ones missed in the earlier event;
- newly germinated plants;
- those not totally destroyed and which were recovering.

Planning followed a not dissimilar process to that for July 20th, although numbers were scaled down and no trimmers were used.

2.4.2 Activities on the day

The focus was on areas fully cleared by this date – namely Patches 1, 2, 3, 7 and 9. The aim was to have groups of 4 or 5 volunteers, plus a group leader. One group was allocated to Patches 1 and 2, with one group for each of the other three patches. It is useful to have an area to which pullers can be sent if they are able to get through their allocated area quickly and before the end of the session. Patches 5 and 6 were intended for this purpose for eastern and western groups respectively, with the guidance being to focus on the fringes (thus reducing the likelihood of spread). In practice, only that group working in Patch 3 had time to move onto their ‘reserve’ patch (Patch 5).

Each group was equipped with one or two ‘slashers’, which can be useful where there are many newly germinated or recovering plants not yet in seed.

As on the earlier bash, pulling was completed by 13.00. Hospitality was provided by Chris and Sharon Hodgson at their home, which was welcomed with enthusiasm by the volunteers.

2.4.3 Inputs, Outputs and Outcomes

Inputs comprised:

- 16 volunteer pullers;
- 4 group leaders.

Outputs in terms of area subject to control were:

- Patches 1, 2, 3 and 9 – 100% coverage (which means that, although a few plants were left in Patch 2B alongside the river, virtually no plants remained);
- Patch 4 - outliers on the higher parts of the hillside above the main patch were cleared, meaning that what would have been centres for new future infestations were curtailed;
- Patch 5 – as for Patch 4, plus the infestation beyond the dry stone wall on the western edge of this patch was cleared again, meaning that its onward progress across another field will be reined back;
- Patch 7A and most of Patch 7B were cleared, but the latter patch was found to extend above the disused quarry as well as within it.

Appendix 3 contains some photographs of the conditions before and during the 21st August bash.

Final outputs for 2019 are summarised in **Table 2.2** below.

Table 2.2: Extent of control by Patch (up to August 2019)

Patch	Approximate extent of growing plants cleared	Comment
1	All cleared	This area had been worked on last year, so density was low
2	All cleared	Proved to be more extensive than first thought but numbers of pullers about right, so nearly all cleared
3	All cleared	Small but very dense patch cleared despite being a bit 'light' on volunteers. Mop-up successfully removed all remaining plants (including a small infestation in adjoining NT property (Dora's Field))
4	About 90%	Unknown agents had started to clear this patch. Fringes cleared by hand pullers and trimmers cleared most of the central area. Outliers on the upper slope pulled but outliers lower down and on the side of the patch remain. Much re-growth subsequent to 20 th July not tackled
5	About 85%	Trimmers, slashers and hand pullers tackled about 30% of the area on 20 th July. A further 50% (approx.) mown during late July, with further trimming on 31 st July (about a further 5%). Outliers on the upper slope cleared on 21 st August and on a subsequent visit, together with area west of the dry stone wall near the western boundary of the patch.
6	About 95%	The lower and eastern fringes were cleared by hand and some of the central patch cut by trimmers on 20 th July. Balance of area tackled was mown by end of July. Western fringe and most of the garden of White Moss House remained uncleared.
7	Nearly all cleared	All of 7B was cleared but only part of 7A on 20 th July. 7A was cleared on 20 th August and on a subsequent visit. 7B subject to 'mopping up' on 21 st August (but new area above quarry found and not tackled).
8	25%	This area proved to be hugely bigger than originally anticipated. Urgent need of control next year due to proximity to river and lake.
9	All cleared	Not tackled on 20 th July but fully cleared by trimmers on 31 st July. All re-growth and missed plants removed on 21 st August.
10	0	Not discovered until 20 th August
11	0	Not discovered until 20 th August

Outcomes are essentially a reinforcement of those recorded for the first bash. Although it is inevitable that some plants may set seed in Patches 1, 2, 3, 7 and 9, there should not be many (but see below). Even in other Patches tackled (4, 5, and 6), massive inroads have been made into preventing plants setting seed. Patch 8 proved to be much bigger than resources could tackle, so a lot of plants remained to reinforce/extend the infestation into next year. What is certain is that, across the whole Rydal area, there will be vastly fewer seeds in the soil waiting to germinate in 2020 than there would have been without our intervention. This has to be regarded as a great success and a reflection of the massive amount of effort invested by all concerned.

Unfortunately (as regards HB control), autumn 2019 has proved to be warm and wet – ideal for balsam growth. Consequently, germination and recovery continued later than would have normally been expected. The implication is that some of these plants will also set seed. If this weather pattern recurs, then it would be prudent to make contingency plans for a later follow-up bash, too (such as in mid-September).

However, HB seeds are viable for some years. It will be back next year in strength. It is to be expected that the 'footprint' of the infestation will be the same (but hopefully, due to efforts in 2019, no larger), but the density of HB plants will be lower. For planning purposes, we can assume that we will have the same mountain to climb in 2020 as we did in 2019. But, at least we have a better knowledge of what we are tackling.

SCRT has estimated that inputs from all volunteers on the 20th July equated to £4,250 of in-kind contributions and £700 on the 21st August.

3. Proposals for 2020 and Beyond

3.1 Lessons Learnt

Experience in 2018 and 2019 can be summarised as follows:

- there is a HUGE amount of HB at Rydal;
- it will take years to clear but should be able to be brought under control within (say) 3 further years;
- mechanical measures (mowing with agricultural machinery where possible, strimming elsewhere) are the way forward;
- hand pulling will still be needed where mechanical measures are not possible (e.g. along walls, amongst/behind fences, adjacent to roadside, for individual plants/small stands, rocky ground and so on);
- the ‘big bash’ concept works well for recruiting volunteers and can be managed provided there is support from all affected parties.

The Fight the Aliens Day was, in truth, too late in some respects although it was very successful in showcasing the scale of the problem. The implications of the lateness are:

- the bracken was more mature and proved something of an obstacle in some patches, including to strimmers;
- there was little time for follow-up work before seeds were ready to pop;
- some of the plants were sufficiently advanced that they have produced viable seed that will form the basis of next year’s infestation.

Having done the showcasing this year, a phased approach starting earlier and finishing later would be better for next year:

- mowing in the very large patches (4, 5, 6, 8 and 10) with wheeled machinery in mid-June (where tractorable);
- strimming remaining stands wherever possible in late June/early July;
- hand pulling using volunteers in a re-run of ‘Fight the Aliens’ day (in early/mid-July);
- mopping up afterwards (in August and possibly in September, depending on how the earlier phases work and the autumn weather).

3.2 Proposals for 2020

It is useful to regard 2019 as a ‘scoping’ exercise, to get a measure or feel of the scale of the challenge. Assuming we now understand the extent of the balsam and how it can best be tackled, then we can start to put together proposals for 2020 and beyond. The main outcome of

this scoping exercise is the paramount importance of placing reliance on mechanical control to take the lead.

3.2.1 Resource requirements

It can be expected that for 2020, 2021 and 2022, the ‘footprint’ of the infestation will stay the same but the density of re-growth each year will decline (this is SCRT’s experience in similar, but smaller, sites elsewhere – e.g. above Elterwater quarries). It follows that similar inputs will be needed, even though they may be working less hard. Drawing on experience of balsam control across a wide range of sites (including Rydal) for over a decade of activity, we have put together an estimate of resources likely to be needed by patch. **Table 3.1** provides details of these estimates. This does not include the resources needed by SCRT and FOLD to organise the campaign.

Table 3.1: Estimates of resources needed by patch for each of the next 3 years

Patch	Mechanical (strimmer days equivalent)	Number of hand pullers (main event + follow up), (not including group leader or boat operator)	
		1st Bash	2nd and any subsequent bashes
1	-	2	1
2	0.5	3	2
3	0.5	4	2
4	3*	6	3
5	5*	6	3
6	2*	6	3
7	0.5	5	3
8	4	10	4
9	1	4	2
10	3.5*	6	3
11	2	6	3
River Rothay	Boat	2	1
Total	23	60	30

Note that the Fight the Aliens day is assumed to represent half a strimmer day

* About 60-70% of this can be provided by mowing using agricultural/wheeled machinery

3.2.2 Sourcing

It is hoped that the resources would continue to be provided from amongst the partners involved in 2019, people directly affected and volunteers from a wider area either in cash or in kind. The

main cost is likely to be machinery (wheeled vehicles and trimmers). Assuming a similar level of willingness to support the campaign as this year (i.e. 2019) and reflecting the extent of infestation within each land-holding (see Table 3.1), then we would hope to source the trimming day equivalents roughly in proportion to the area affected within each landownership.

We are hoping to procure 15 trimmer equivalent days (or cash to acquire trimmer days) in this way, leaving a shortfall of 8 trimmer days equivalent, or about £1,700 in cash terms.

In addition to this, we will need:

- use a boat to tackle the riverside HB (hopefully provided by Lowther);
- incidental costs associated with the event days (gloves, materials, advertising);
- any costs (or trimmer operator hire or incidentals) associated with later bashes.

It is estimated (roughly) that this would be another £500 or £600, giving a total cash requirement for 'direct control' of about £2,250 per annum or £6,750 if we were to consider a 3-year programme. After this time, depending on how successful the control measures proposed are, required inputs should start to reduce.

Resources for this initial 3-year period will be sought from a number of sources (over and above those contributions assumed in the trimmer day equivalents listed above from local land and property owners) such as:

- Grant-giving charities (e.g. Lake District Foundation);
- Local authorities and town councils (South Lakeland District Council have recognised the importance of biodiversity and may be willing to support such a relevant activity);
- Government agencies (Natural England or Environment Agency);
- Donations from other volunteers and those supportive of the cause (e.g. local businesses).

In addition, and very importantly, there will be a continuing need for volunteers to reach those areas not reachable by mechanical means. **Table 3.1** suggests that we will need around 60 people for the Fight the Aliens Day in early/mid-July and a further 30 or so in the subsequent mopping up exercises. These are higher numbers than recruited in 2019. Also, experience elsewhere (e.g. Elterwater) suggests that enthusiasm is high in Year 1 but declines in subsequent years. If we are to hit this target, it will be necessary to:

- Recruit more volunteers from FOLD;
- Widen the source of recruits to include other organisations with a volunteer force (like National Trust and LDNPA);
- Trying to attract from a wider public audience using greater PR;
- Having several 'Fight the Aliens' days so that willing/keen volunteers are able to make inputs more often during the season (e.g. by splitting days into 'East' and 'West' days).

Not included in this are the inputs from the organisers (SCRT and FOLD); there is however a cost to these organisations as well.

4. Acknowledgements

4.1 Appreciation

The progress made this year has been the result of help from many diverse organisations and individuals. With apologies to anyone omitted, and in no particular order of priority, thanks are due to:

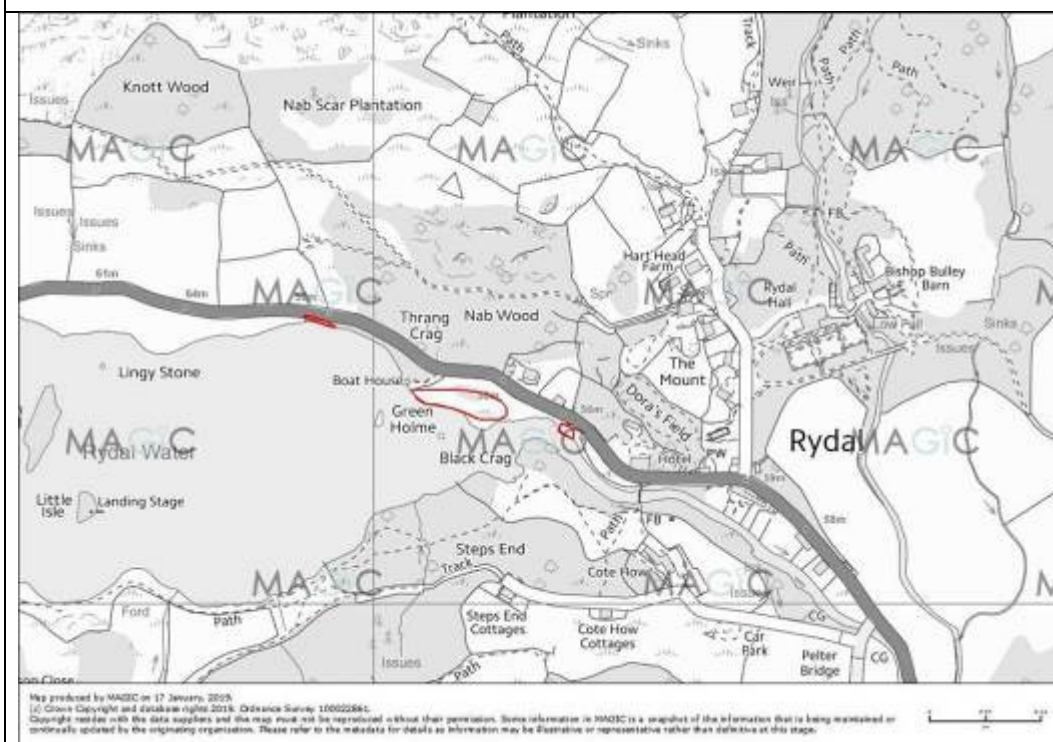
Who	Affiliation	What
Volunteers	Recruited by FOLD	Pulling balsam!!!
Ken and Ros Taylor	SCRT volunteers	Organising the events and co-ordination of all parties
Jayne Wilkinson	SCRT	Management of events from SCRT perspective
Ruth Kirk and colleagues	FOLD	Management of events from FOLD perspective
Bruna Remesso and Rydal Hall	Rydal Hall	Provision of parking, free use of The Barn
Julian Lambton	Rydal Estates	Financial and moral support, provision of access
Andy Whitworth and his team	Lowther Estates	Provision of contract workers, access to sites, free car parking
Chris and Sharon Hodgson	Rydal Farm	Financial and moral support, provision of access, free car parking, hosting the post-event refreshments on 21 st August, mowing of balsam
Judith Furniss	Glen Rothay Lodge	Use of storage, access to sites, offers of parking
Caroline Langham	Cote Howe	Access to sites, offers of parking
Mr and Mrs Walker	Rydal Holme	Access to site, offers of parking
Peter and Sue Dixon	White Moss House	Access to site, pulling balsam
Dave Bell and Ant Brown	Lake District NPA	Leading groups and strimming
Pete Stevens and Roland Wicksteed	National Trust	Leading group and strimming respectively
Yvonne Cannon	Freelance garden consultant	Strimming for free
Andrew Sherwin	Freelance garden consultant	Strimming for free
Phil Clayton	Lakeland Canoe Club	Survey of lake shore by canoe
Richard Langthorp, Judith Wallen, Nigel Riley	SCRT Volunteers	Acting as group leaders on 20 th July
Paul	Badger Bar	Access to site
Helen Green	Rydal Mount	Pulling balsam in Rydal Mount grounds

Appendix 1

Known extent of balsam patches (as per autumn 2019)*

11 Pages

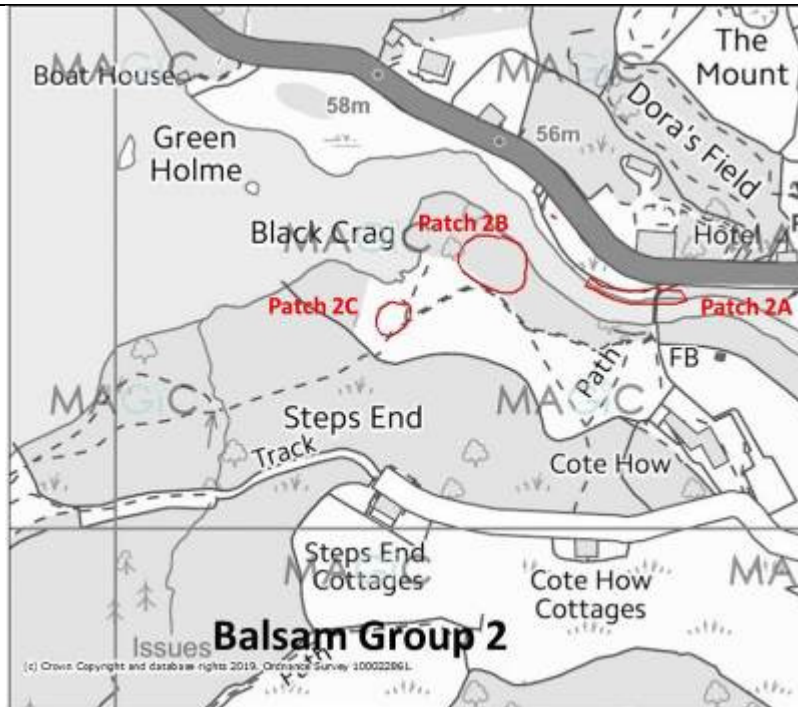
Patch 1 (from left to right – 1C, 1B and 1A)



Note: no attempts have been made to assess or control balsam downstream of the footbridge adjacent to the Glen Rothay Hotel.

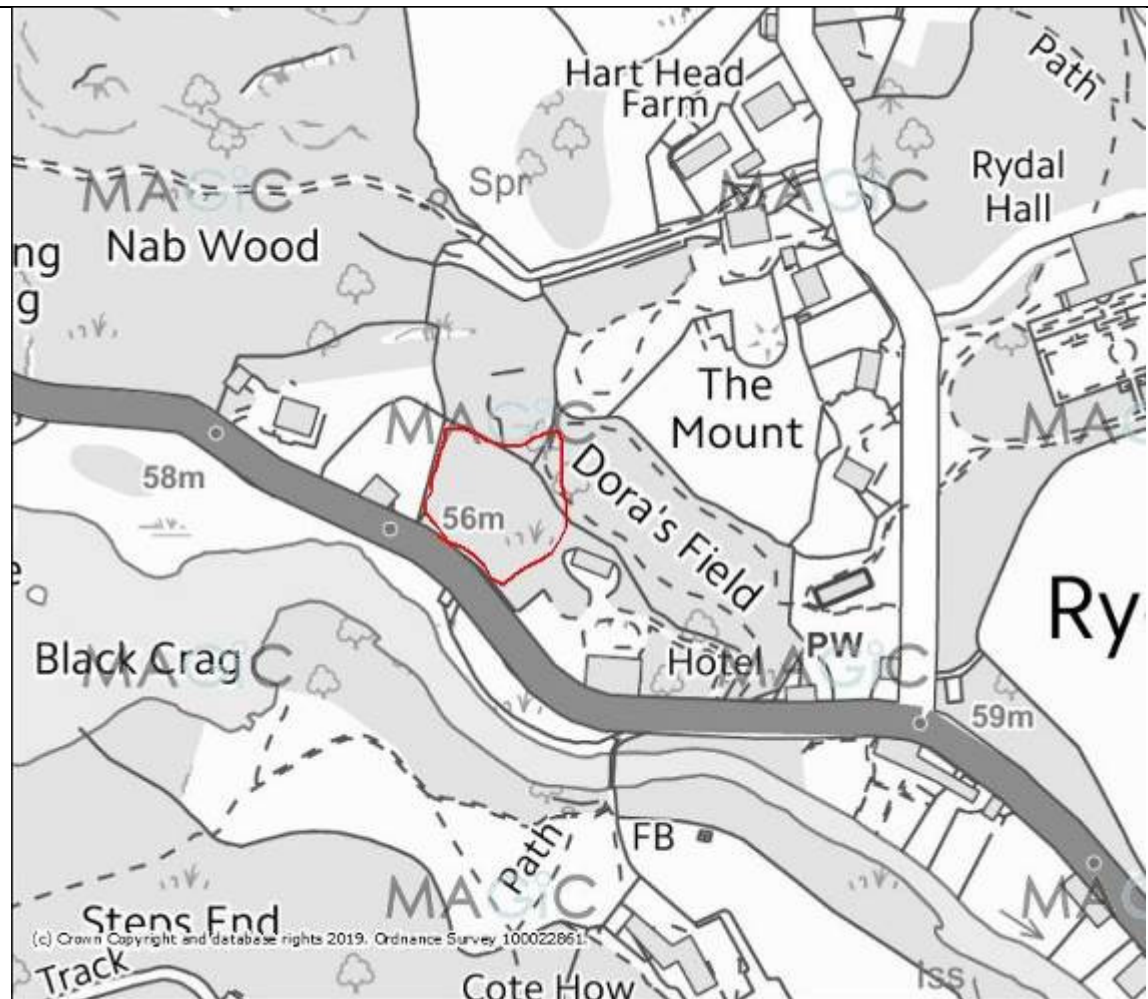
*Note that all boundaries are approximations based on visual observation; no GPS tracking was used. Extent of infestation may be greater than shown due to 'outliers'. Scale of maps vary.

Patch 2



SCRT and FOLD

Patch 3



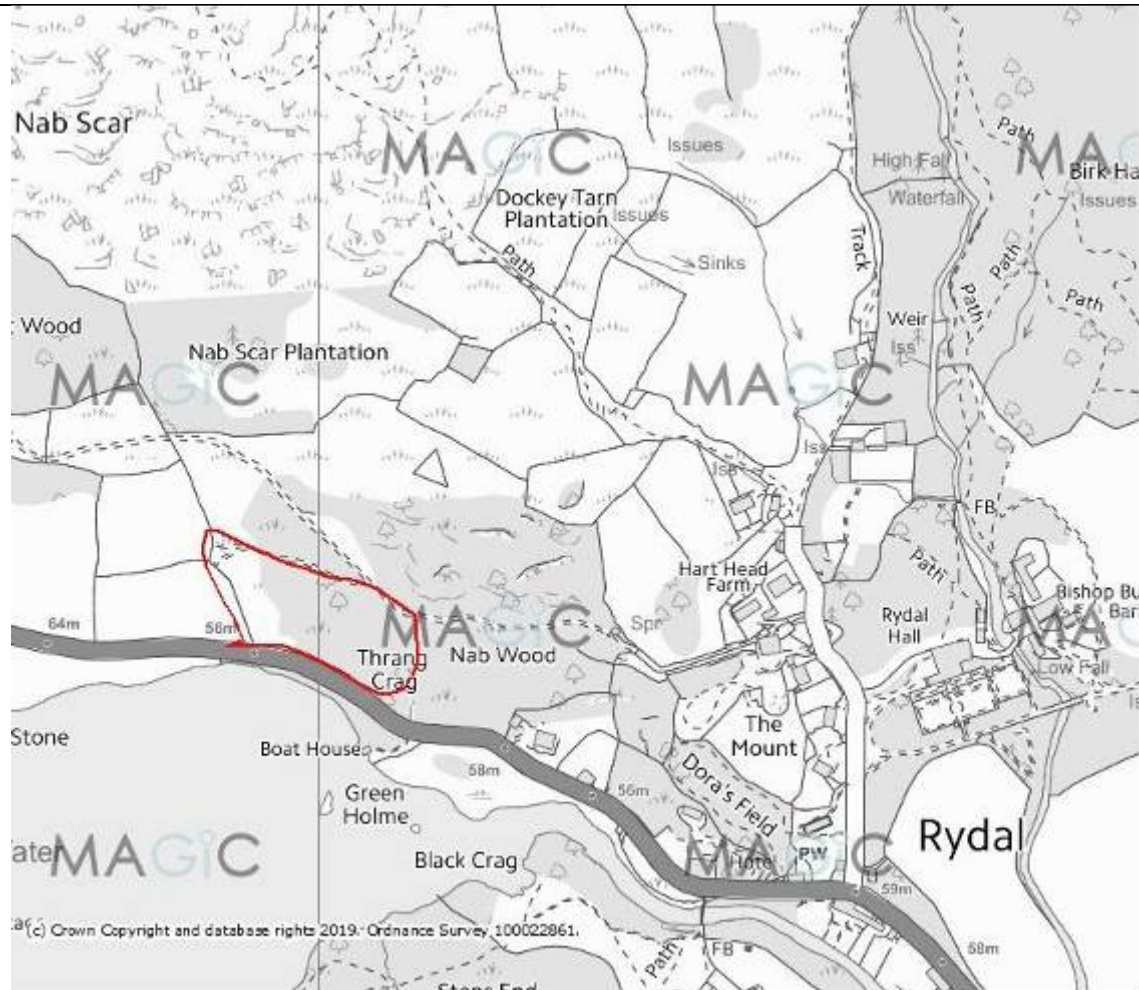
SCRT and FOLD

Patch 4



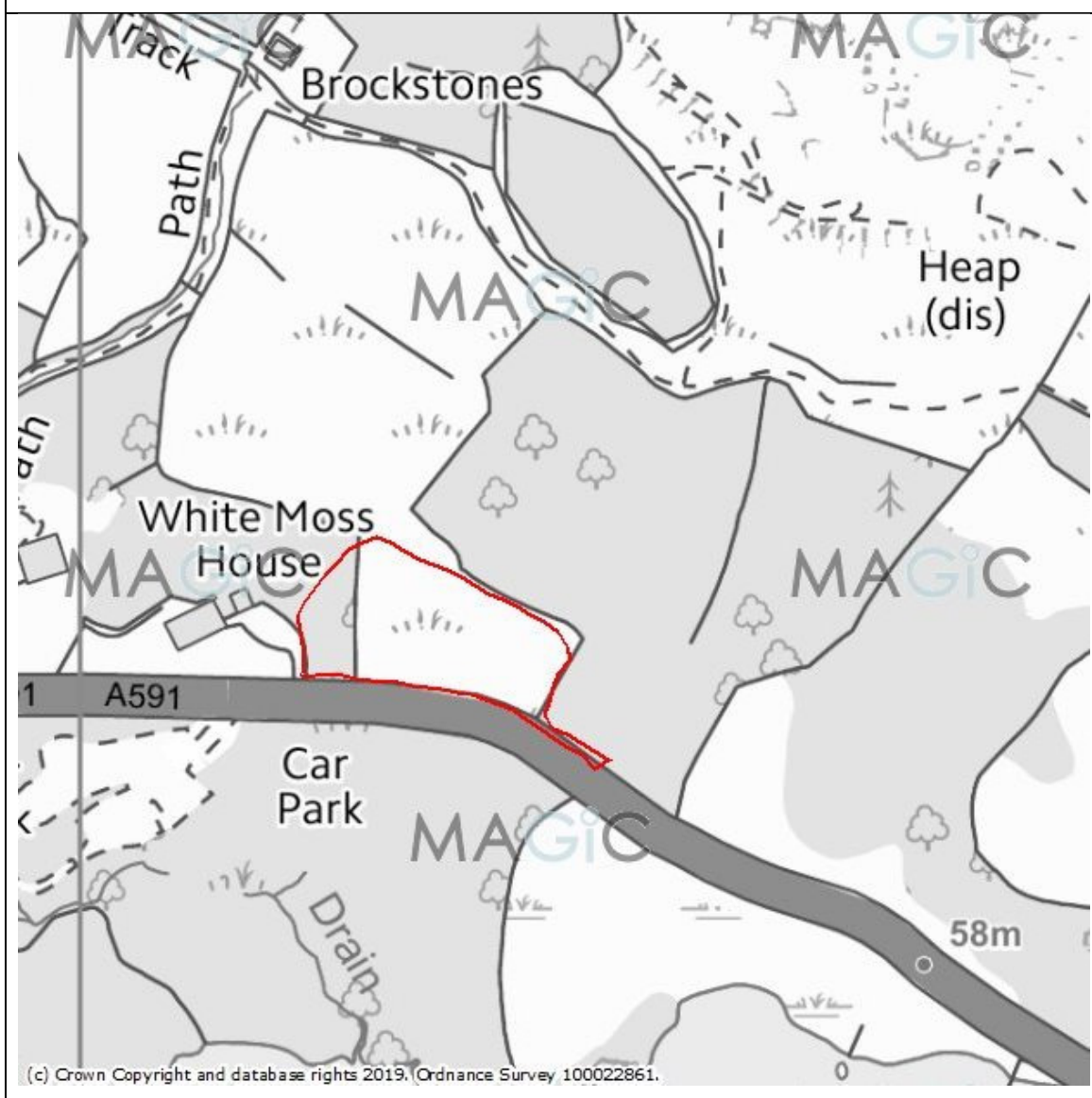
SCRT and FOLD

Patch 5



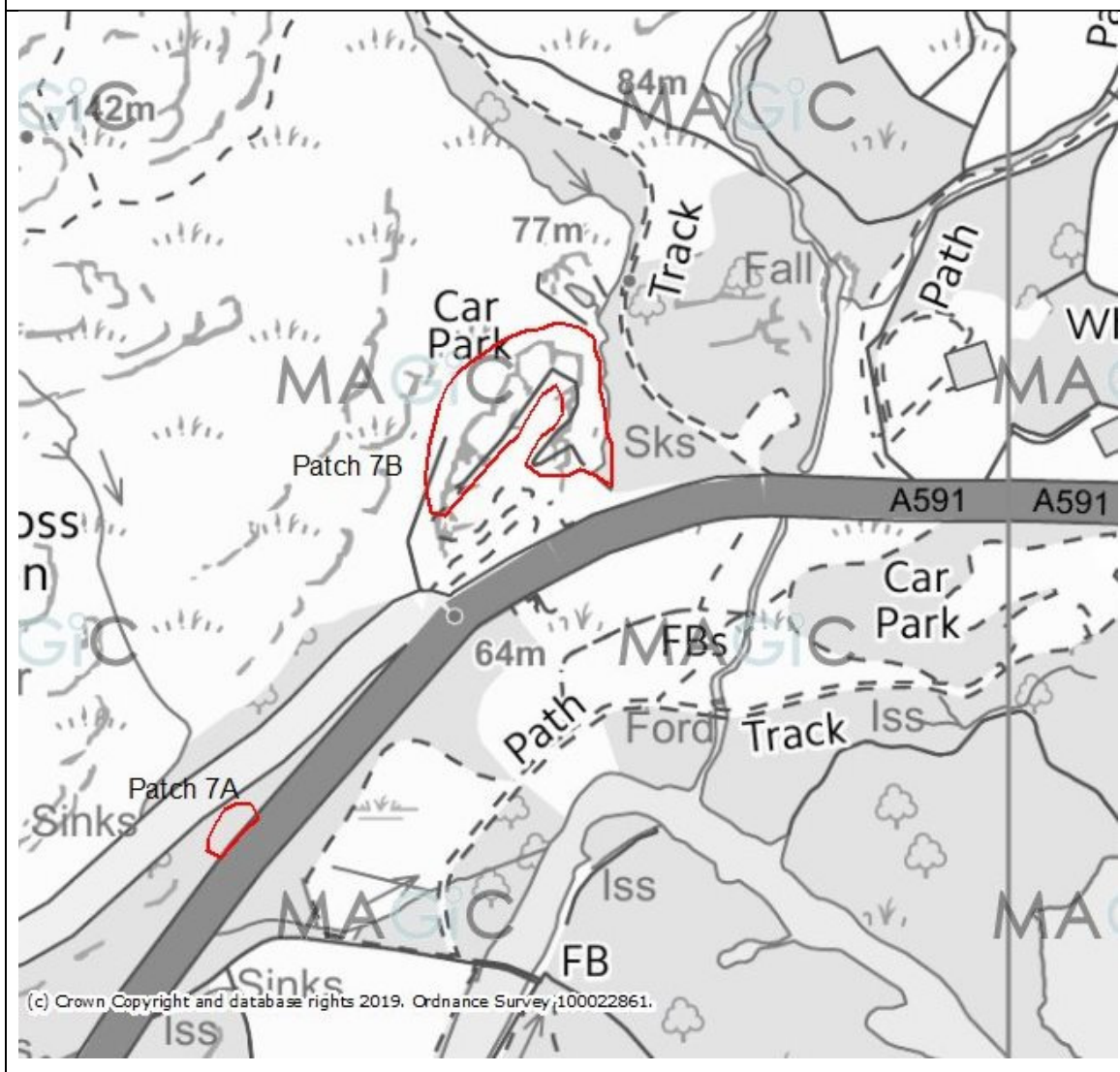
SCRT and FOLD

Patch 6



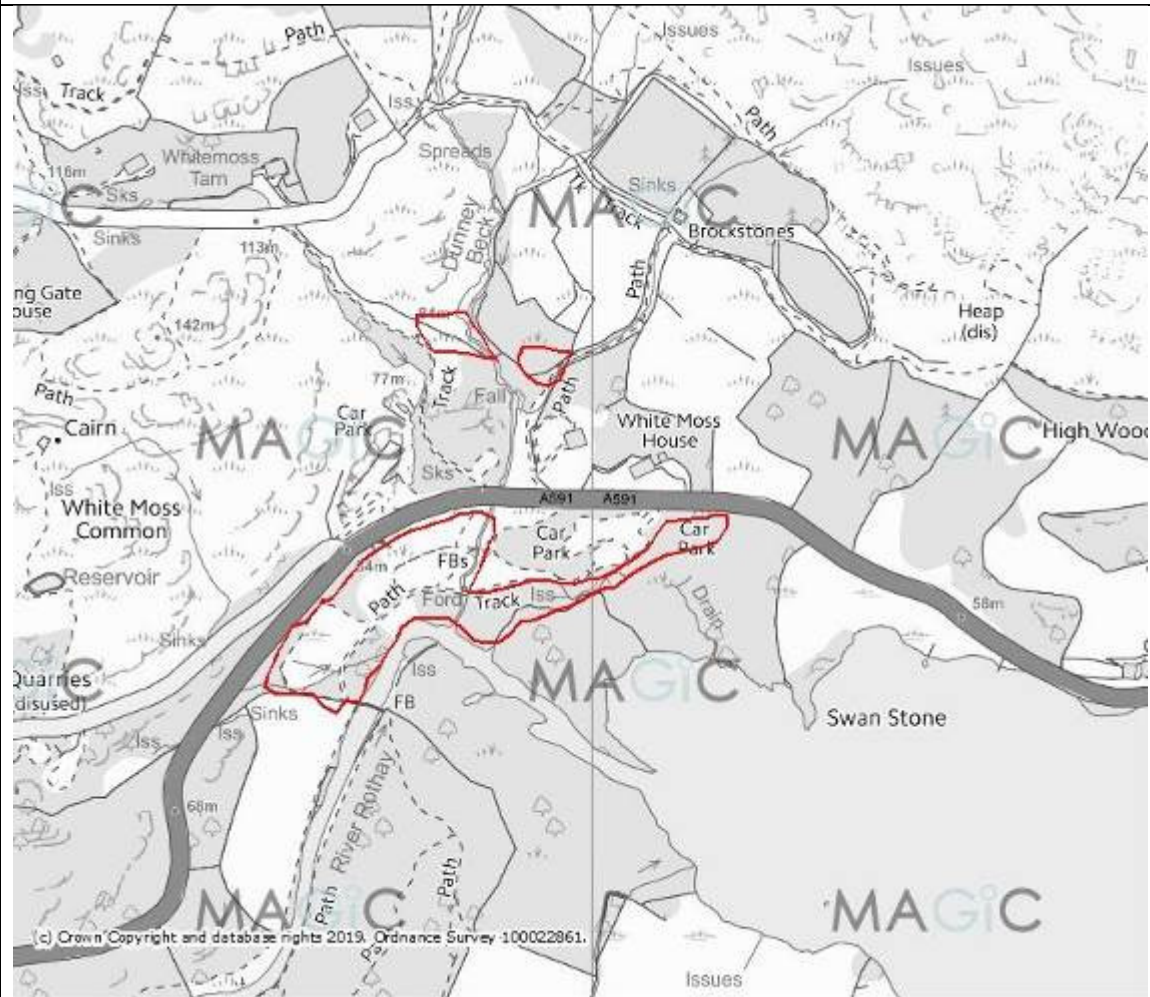
SCRT and FOLD

Patch 7 (7A to SW, 7B to NE)



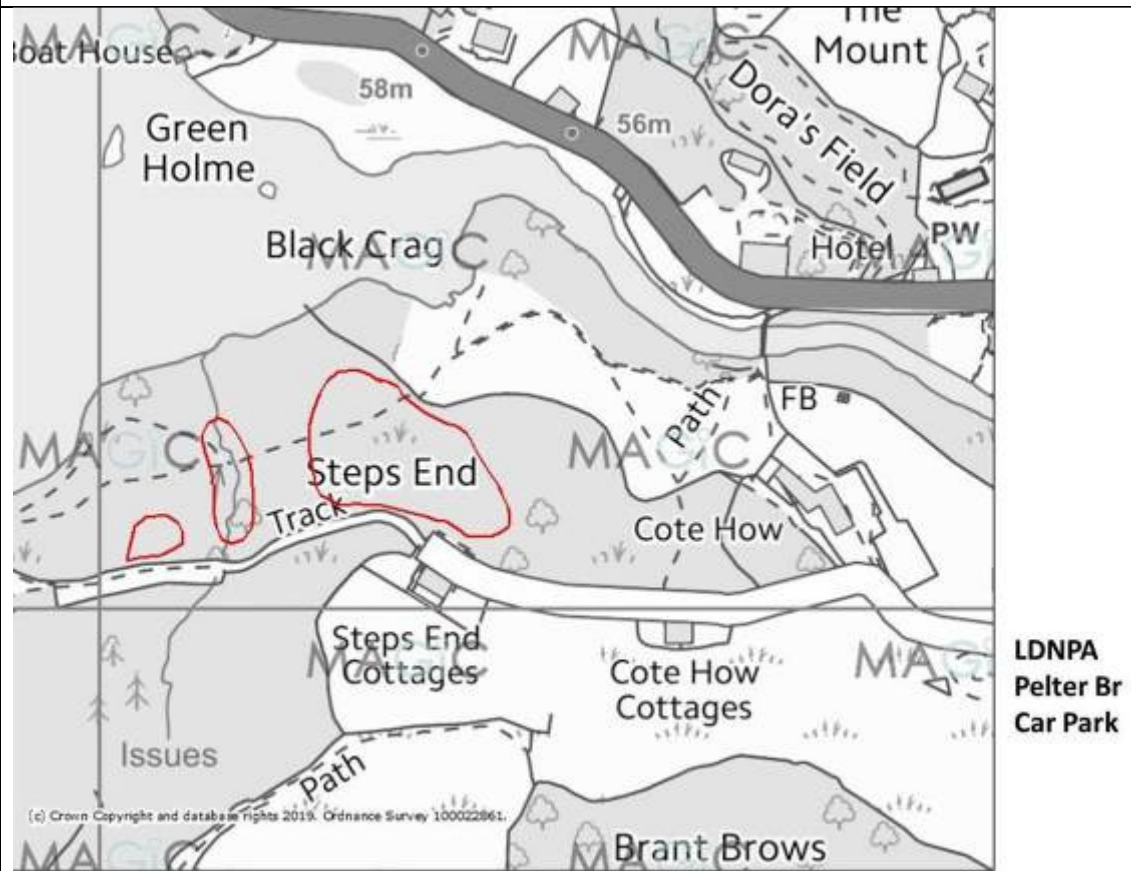
SCRT and FOLD

Patch 8 (8A to NW, 8B to NE and 8C to south)



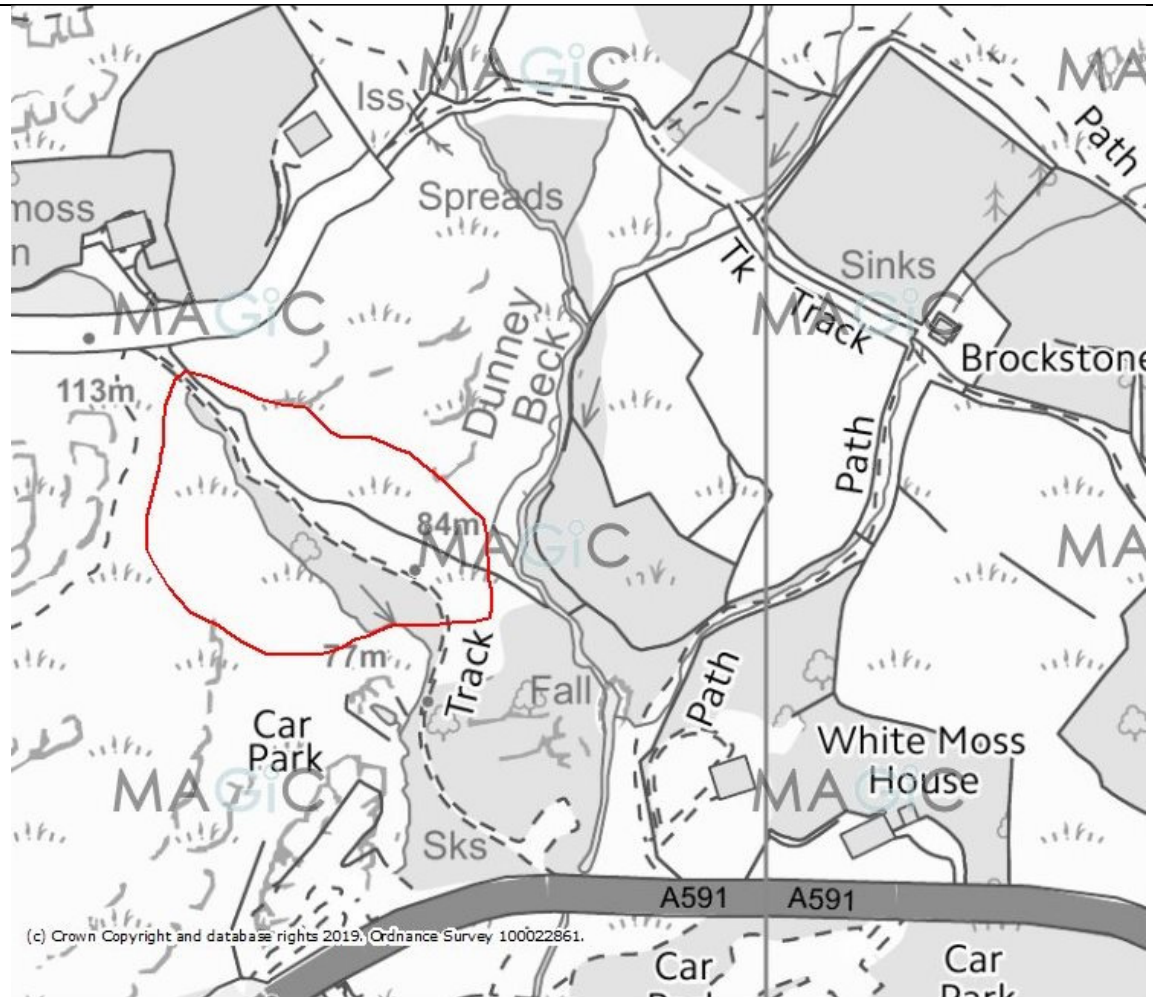
SCRT and FOLD

Patch 9 (9A to right, 9B in centre and 9C to left)



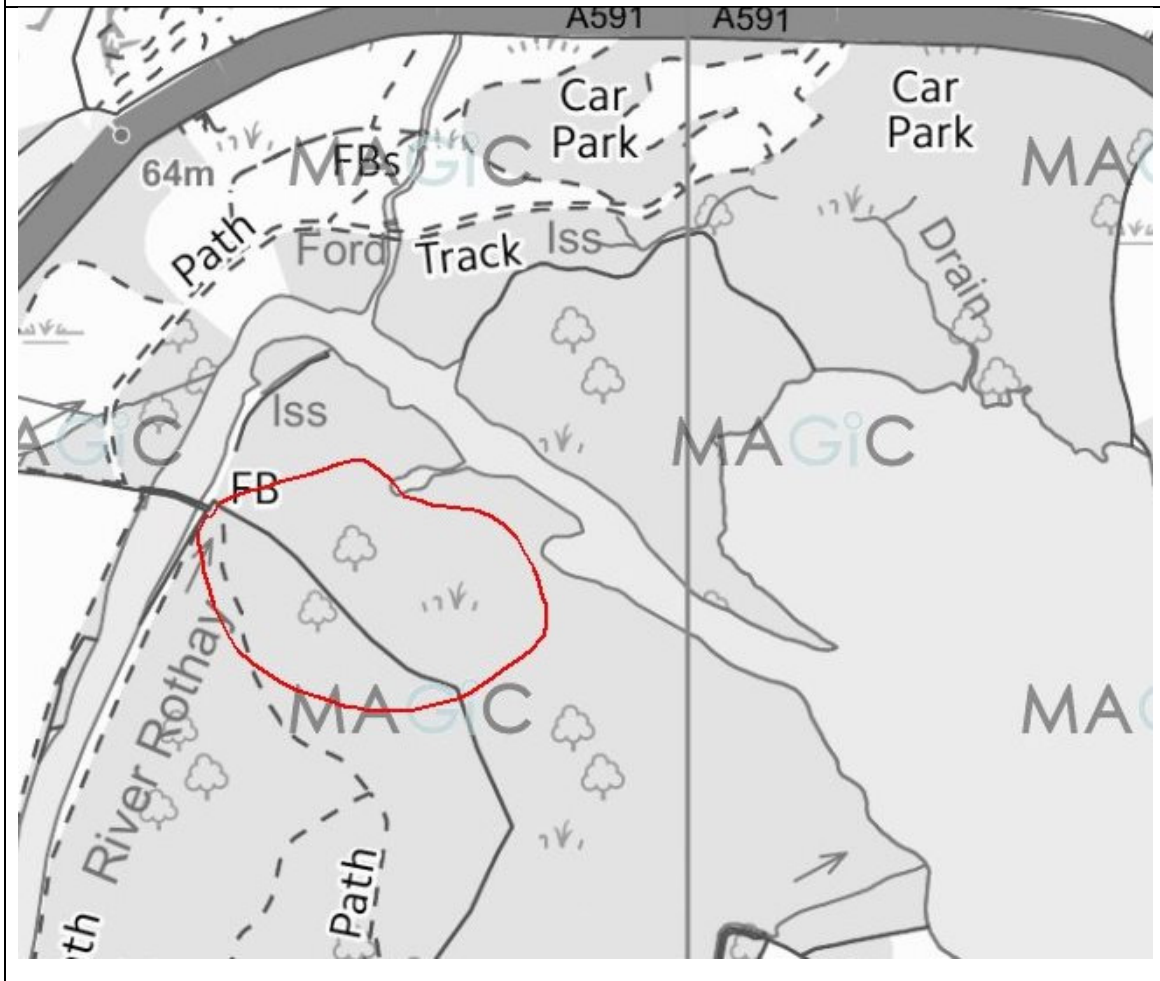
SCRT and FOLD

Patch 10



SCRT and FOLD

Patch 11





SCRT and FOLD

Appendix 2

Before and After photographs

6 Pages

Before	After
	 Patch 3
	 Patch 7
	 Patch 6

	
Patch 9	
	Patch 11 (no 'after' pictures)

SCRT and FOLD

Appendix 3

Photographs of volunteers in action on Fight the Aliens Day

6 Pages



SCRT and FOLD



SCRT and FOLD



SCRT and FOLD



SCRT and FOLD



SCRT and FOLD



SCRT and FOLD

Appendix 4

Photographs from 20th and 21st August

4 Pages



Patch 1B
(on 21st
August,
volunteers
mixing it
with the
dense native
vegetation
which is
thriving
without
competition
from HB)



Patch 2A
(volunteers
pulling
remnant
plants by the
river)

	<p>Patch 2B (the area in the centre of the picture was densely covered by balsam prior to 20th July)</p>
	<p>Patch 3 (before the mopping up)</p>
	<p>Patch 3 (taking a break from the mopping up in Patch 3)</p>

	<p>Patch 4 (sheep grazing where little grass grew before – apart from the outliers high up the slope, this area was not touched on 21st August)</p>
	<p>Patch 5 (the infestation beyond the wall on the right was cleared again on 21st August)</p>
	<p>Patch 6 (taken on 20th August, it was pulled by volunteers and strimmed on 20th July, then mown by Chris Hodgson)</p>

	Patch 7B (taken on 20 th August)
	Patch 9A (mopping up after the trimmers)



Patch 7b/10
(a new area
of
infestation
found above
the car parks
– too much
to tackle on
21st August)