

The New Forest Non-Native Plants Project

**Control of Pitcher Plant *Sarracenia purpurea* in the New Forest
2009 to 2019**



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Summary

The New Forest Non-Native Plants Project was set up in May 2009 to stop the spread of invasive non-native plants in the New Forest area, particularly along river valleys and in wetland habitats. The Project is hosted by Hampshire and Isle of Wight Wildlife Trust and supported by a partnership of organisations.

The Project initially aimed to focus on five invasive non-native plants, namely Himalayan Balsam *Impatiens glandulifera*, Japanese Knotweed *Fallopia japonica*, Giant Hogweed *Heracleum mantegazzianum*, American Skunk Cabbage *Lysichiton americanus* and New Zealand Pygmyweed *Crassula helmsii*.

Since then the number of target species has increased five-fold.

One of the additional species being controlled by the New Forest Non-Native Plants Project is Pitcher Plant *Sarracenia purpurea*.

Pitcher Plants have been introduced to the UK and are popular in cultivation but have been planted into the countryside where they can spread and cause damage to the environment.

Pitcher Plants have been recorded in a number of locations on Crown Land in the New Forest and have spread, causing damage to species-rich wetland habitats which are of national and international ecological importance.

The New Forest Non-Native Plants Project has commissioned research to demonstrate the ecological impact of Pitcher Plants at Holmsley Bog in the New Forest and has co-ordinated volunteers to control Pitcher Plants at Holmsley and other known sites.

This report summarises the research commissioned by the New Forest Non-Native Plants Project and describes the work undertaken to control Pitcher Plants at five locations in the New Forest:

- Holmsley Bog
- Two Bridges Bottom
- Acres Down
- Matley
- Wootton.

The work undertaken by the New Forest Non-Native Plants Project has substantially reduced the population of Pitcher Plants at these locations. Mature Pitcher Plants have been removed and work is now focused on locating and removing seedlings and immature plants.

The report considers the future of the New Forest Non-Native Plants Project. It emphasises that further work is needed to complete the control of Pitcher Plants at these sites and to undertake monitoring in order to be confident that eradication has been achieved. The report highlights the need to secure funding to enable this work to continue.

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1. INTRODUCTION

1.1. Hampshire and Isle of Wight Wildlife Trust

Hampshire and Isle of Wight Wildlife Trust (HIWWT) is the leading nature conservation charity in the counties of Hampshire and the Isle of Wight. With support from over 25,000 members and 1,500 volunteers, HIWWT works to protect wildlife and wild places, managing nature reserves, running education centres and offering advice to landowners and land managers. HIWWT is part of a UK-wide partnership of 46 local Wildlife Trusts, with a collective membership of more than 800,000 people working together to conserve our precious natural heritage.

1.2. The New Forest Non-Native Plants Project

The New Forest Non-Native Plants Project (NFNPP) was officially launched on 22 May 2009 to help stop the spread of invasive non-native plants in the New Forest area, particularly along watercourses and in wetland habitats. The Project is hosted by HIWWT and supported by a partnership of organisations.

Many non-native plants have been introduced to the UK as garden plants, where they have grown quickly, spread rapidly and invaded the countryside, causing damage to the environment and the economy and, in some cases, even posing a risk to human health. Some invasive non-native plants have become established in the countryside due to irresponsible disposal; others have become established in the countryside due to deliberate planting.

Although individual landowners have a legal responsibility to prevent the spread of a number of invasive non-native species, co-ordinated control at the catchment scale is necessary if they are to be eradicated but this will realistically only be achieved if landowners are given encouragement and practical help. The NFNPP performs a pivotal role in co-ordinating control at the catchment scale and giving support and assistance to landowners.

Since 2009 funding for the New Forest Non-Native Plants Project has been secured from a variety of sources including:

- DEFRA
- Environment Agency
- Natural England
- Forestry Commission / Forestry England
- The Heritage Lottery Fund / National Lottery Heritage Fund administered through The New Forest 'Our Past, Our Future' landscape partnership scheme
- New Forest National Park Authority's Sustainable Development Fund
- The New Forest Higher Level Stewardship scheme
- The New Forest Trust
- donations from landowners.

The NFNPP is currently mainly resourced by a combination of funding from the National Lottery Heritage Fund through the New Forest 'Our Past, Our Future' (OPOF) Landscape Partnership Scheme, the New Forest Higher Level Stewardship Scheme and Forestry England.

Catherine Chatters is employed as a full time Project Officer and Joanne Gore is employed as a part-time Project Officer.

The New Forest Non-Native Plants Project aims to:

- identify where invasive non-native plants are a problem, particularly within river valleys and in wetland habitats;
- arrange for control work to be undertaken by volunteers and contractors;
- commission research into control methods;
- raise awareness of the need to control invasive non-native plants and prevent them spreading into the countryside.

A Steering Group is chaired by a representative of the Trust and meets three times a year, usually during January, May and September. Currently, the Steering Group comprises representatives of the Trust, the New Forest National Park Authority, Forestry England, Natural England and the Environment Agency.

A Forum meeting is held once a year, usually during early March. The Forum meeting is an opportunity for information exchange between the Project Officers and a wide range of interest groups including landowners, land managers, volunteers, local naturalists, non-government organisations and statutory bodies.

The Project initially aimed to focus on five invasive non-native plants, namely Himalayan Balsam *Impatiens glandulifera*, Japanese Knotweed *Fallopia japonica*, Giant Hogweed *Heracleum mantegazzianum*, American Skunk Cabbage *Lysichiton americanus* and New Zealand Pygmyweed *Crassula helmsii*.

Since then the list of target species has increased five-fold and includes Pitcher Plant *Sarracenia purpurea*.

Partnership working is fundamental to the success of the Project and effective partnerships have been developed with landowners, volunteers, consultants, contractors and local naturalists. The Project recognises that partnership working, co-operation and co-ordination are essential if invasive non-native plants are to be controlled effectively or eradicated at the catchment scale.

The New Forest Non-Native Plants Project helped to implement, at the local level, The Invasive Non-Native Species Framework Strategy for Great Britain published in 2008 by Department for Environment, Food and Rural Affairs (DEFRA, 2008) which recognised that 'one of the greatest threats to biodiversity across the globe is that posed by invasive non-native species'.

Since the review of the original Strategy, the Project now helps to implement The Great Britain Invasive Non-Native Species Strategy published in 2015 by Department for Environment, Food and Rural Affairs (DEFRA, 2015).

This Strategy recognises that invasive non-native species 'are a significant and growing problem'; it provides a high level framework, recognises the need for control at the catchment scale and acknowledges that effective partnership working by local action groups such as the New Forest Non-Native Plants Project is critical to the successful control and eradication of invasive non-native species.

1.3. Why control invasive non-native plants in the New Forest?

The New Forest (Figure 1) is recognised as being of high landscape importance through its designation as a National Park and of high ecological importance through its national and international nature conservation designations.

The core of the New Forest National Park is the Crown Land managed by Forestry England. The Crown Land partly comprises plantation woodlands known as Inclosures. The Crown Land also includes the Open Forest which is characterised by lowland heathland, acid grassland and ancient woodland habitats which retain their landscape character and wildlife value through the activities of the commoners who exercise their rights to graze their animals (ponies, cattle, donkeys, pigs and sheep) on the Open Forest.

The core area of Open Forest and plantation woodlands is fringed by privately-owned land within the National Park, some of which is managed by commoners to provide 'back-up' land for their animals to graze during the winter when the Open Forest does not provide sufficient food to sustain them. Many of the privately-owned fields surrounding the Crown Land are increasingly being managed as amenity land or are used as grazing for recreational horse-keeping, with the fields fenced to separate the animals from the adjacent watercourse. Such changes in management have implications for the spread of invasive non-native plants.

The high number of statutory nature conservation sites within the New Forest reflects its ecological importance. Much of the land within the National Park has been notified as Sites of Special Scientific Interest in accordance with the Wildlife and Countryside Act 1981 (as amended) and the National Park

contains National Nature Reserves designated under the National Parks and Access to the Countryside Act 1949.

The internationally important extensive areas of lowland heathland, ancient woodland, valley bogs/valley mires, river valleys and coastal marshes support a very high number of nationally rare (and some internationally rare) species.

The majority of the New Forest National Park lies within the Natura 2000 network of European Sites, through designation as a Special Area of Conservation (SAC) under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora and/or through classification as a Special Protection Area (SPA) under the Wild Birds Directive (Council Directive 79/409/EEC). Large areas are also designated as Ramsar Sites (wetlands of international importance) under the terms of the Ramsar Convention held in Iran during 1971.

These ecologically important habitats in the New Forest area are vulnerable to invasion by non-native plants.

The species-rich wetland habitats where the NFNNPP has undertaken work to control Pitcher Plant are all within the New Forest SSSI and are of international nature conservation importance, being within the New Forest SAC, the New Forest SPA and the New Forest Ramsar Site.

The control of invasive non-native plants in the New Forest area is justified by a) the high concentration of ecologically important habitats and b) the potential for habitat restoration.



Figure 1: Location of the New Forest, Hampshire

2. PITCHER PLANT

2.1. Pitcher Plant in the British Isles

Pitcher Plant *Sarracenia purpurea* subsp. *purpurea* (Figure 2) hereinafter referred to as Pitcher Plant is a long-lived, insectivorous perennial herb, forming dense clumps (Booy, Wade and Roy, 2015).

Pitcher Plant is the hardiest and most widespread of the eight pitcher plants native to North America. It has been introduced to the British Isles where it is very popular in cultivation and has been deliberately planted into bog habitats, in some cases to supply private or commercial collections. Although Pitcher Plant was in cultivation at Kew before 1640 it was not recorded in the wild in the British Isles until 1892 when a specimen was collected from a raised bog near Lisduff in the Republic of Ireland. Since then it has been recorded from at least 38 sites across the British Isles. Although there were some early introductions, most notably in the 1960s when Irish material was transplanted to several sites in Ireland and England, most new populations have been discovered since 1980, presumably due to increased availability of carnivorous plants (including seed) from commercial suppliers (Walker, 2014).



Figure 2: Pitcher Plant

The majority of naturalised populations of Pitcher Plant in Britain occur below 100m altitude and its main habitats include lower-lying bog pools on raised and blanket bog and in valley mires where typical associates include Heather *Calluna vulgaris*, Sundew *Drosera rotundifolia*, Cross-leaved Heath *Erica tetralix*, Common Cottongrass *Eriophorum angustifolium*, White-beaked Sedge *Rhynchospora alba* and bog mosses *Sphagnum* spp. (Walker, 2014).

Once established, Pitcher Plant appears to be very persistent, having survived for over 100 years at Termonbarry in County Roscommon in the Republic of Ireland and for over 70 years at Wedholme Flow in Cumbria. In the British Isles Pitcher Plant usually flowers in June and July, setting seed in August and September but with seed retained in the capsules over the winter. There is very little information

available on pollination but honey bees are known to pollinate flowers in Dorset. Seed production can be high, with an average of 1175 seeds per capsule counted in a sample of mature seed heads removed from Lower Hyde Bog in Dorset in 2009. Although Pitcher Plant is not thought to form a seedbank, the emergence of seedlings on sites where seed-heads have been removed suggests that seeds may remain viable in moss or peat for up to five years. It is likely that seed is distributed either along water courses or when water levels rise and inundate bog and mire surfaces during the autumn and winter (Walker, 2014)

The pitchers have been found to contain dead flies, spiders, ants and beetles including species more usually attracted to carrion, such as the necrophagous burying beetle *Nicrophorus vespilloides* (Figure 3).



Figure 3: The necrophagous burying beetle *Nicrophorus vespilloides* which is often found in the pitchers of Pitcher Plant (Photograph: Paul Brock)

Neil Sanderson noted that the valley bogs of the New Forest are of exceptional importance for invertebrates and warned that the Pitcher Plants could have an adverse impact on the invertebrate fauna of Holmsley Bog (Sanderson, 2012). The contents of a pitcher of a Pitcher Plant growing in the New Forest are shown in Figure 4. Although valley bogs and raised mires have very specialised invertebrate assemblages Kevin Walker considers it unlikely that *Sarracenia purpurea* will have a major impact on them as rates of capture are very low when compared to other species (eg *Sarracenia flava*) and the composition of prey items so far investigated have only included species that were common in the surrounding habitats (Walker, 2014).

The impact of Pitcher Plant on the species-rich vegetation of the surrounding habitats can be serious as Pitcher Plant has the potential to displace nationally rare/scarce bryophytes, regionally threatened bryophytes and higher plant assemblages. As a Pitcher Plant population ages, shading and physical restriction of the habitat available leads to the displacement of associated species and ultimately the death of the moss cushion on which it grows (Walker, 2012).

Measures to control Pitcher Plant have included manual removal, herbicide treatment and turf removal (Walker *et al.*, 2016).



Figure 4: The contents of a pitcher (including *Nicrophorus vespilloides*) photographed on 2 November 2015 at Holmsley Bog in the New Forest

Spiders are known to nest in the corollas and hunt in the pitchers of Pitcher Plant and this has been observed in the New Forest (Figure 5).



Figure 5: Spider web found inside pitcher in the New Forest on 20 August 2018

2.2. Pitcher Plant in the New Forest

Pitcher Plant has been recorded in species-rich wetland habitats at a number of locations within the New Forest SSSI/SPA/SAC/Ramsar site:

- Homsley Bog
- Two Bridges Bottom
- Acres Down
- Matley area
- Wootton area.

These locations are indicated on the map at Figure 6.

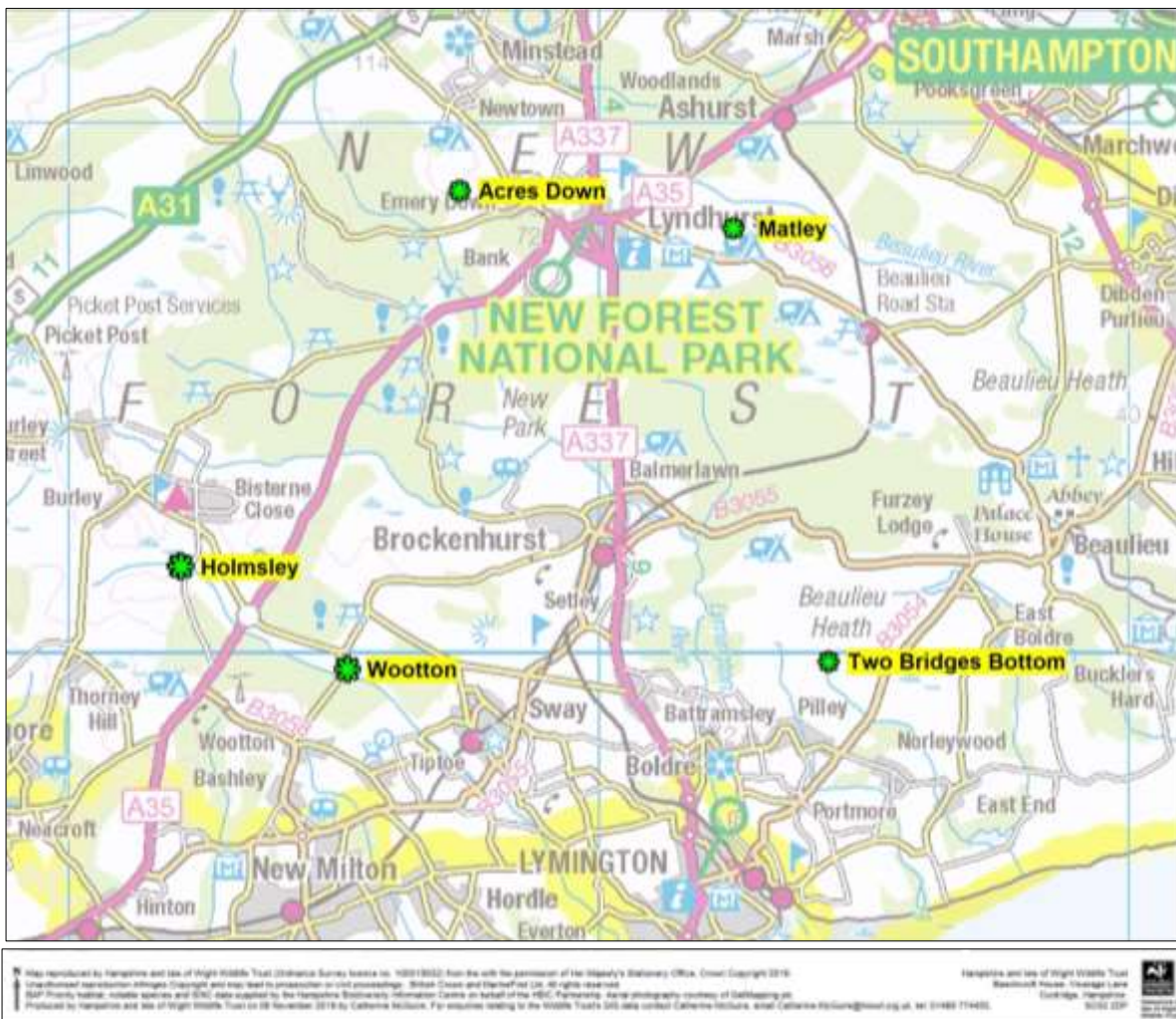


Figure 6: Locations of places where Pitcher Plant has been recorded in the New Forest

At the start of the New Forest Non-Native Plants Project in 2009 Pitcher Plant was known from Holmsley Bog where two 'obviously introduced' plants had been recorded on the Open Forest in 1987 (Brewis *et al.*, 1996).

Since then the New Forest Non-Native Plants Officer became aware of Pitcher Plant growing in other sites on the Open Forest: at Two Bridges Bottom, in various locations at Acres Down, in numerous locations in the Matley Area and at a site near Wootton Bridge. Volunteer work parties arranged by the NFNNPP at all of these wetland sites have resulted in a large decrease in Pitcher Plants in the New Forest.

3. CONTROL OF PITCHER PLANT AT HOLMSLEY BOG

3.1. Holmsley Bog

Holmsley Bog is a valley bog, sometimes referred to as 'valley mire'. This habitat type is an unusual and internationally rare occurrence of bog vegetation. The most extensive and best preserved examples of valley bog in lowland Western Europe occur in the New Forest (Tubbs, 2001).

Holmsley Bog is situated to the south of Burley (Figure 6) and lies within the catchment of the Avon Water (Figure 7). It supports valley bog vegetation dominated by hummocks of Purple Moorgrass *Molinia caerulea* and the bog moss *Sphagnum papillosum*. The hummocks support Cross-leaved Heath *Erica tetralix*, Bog Myrtle *Myrica gale*, Common Cottongrass *Eriophorum angustifolium*, Sharp-flowered Rush *Juncus acutiflorus*, Bog Asphodel *Narthecium ossifragum* and White-beaked Sedge *Rhynchospora alba*. The wet areas between the hummocks support lawns of the bog mosses *Sphagnum auriculatum* and *Sphagnum cuspidatum*. Flowing through the valley bog vegetation is a runnel within which the vegetation is dominated by a mat of the bog moss *S. cuspidatum* and Many-stalked Spike-rush *Eleocharis multicaulis*.

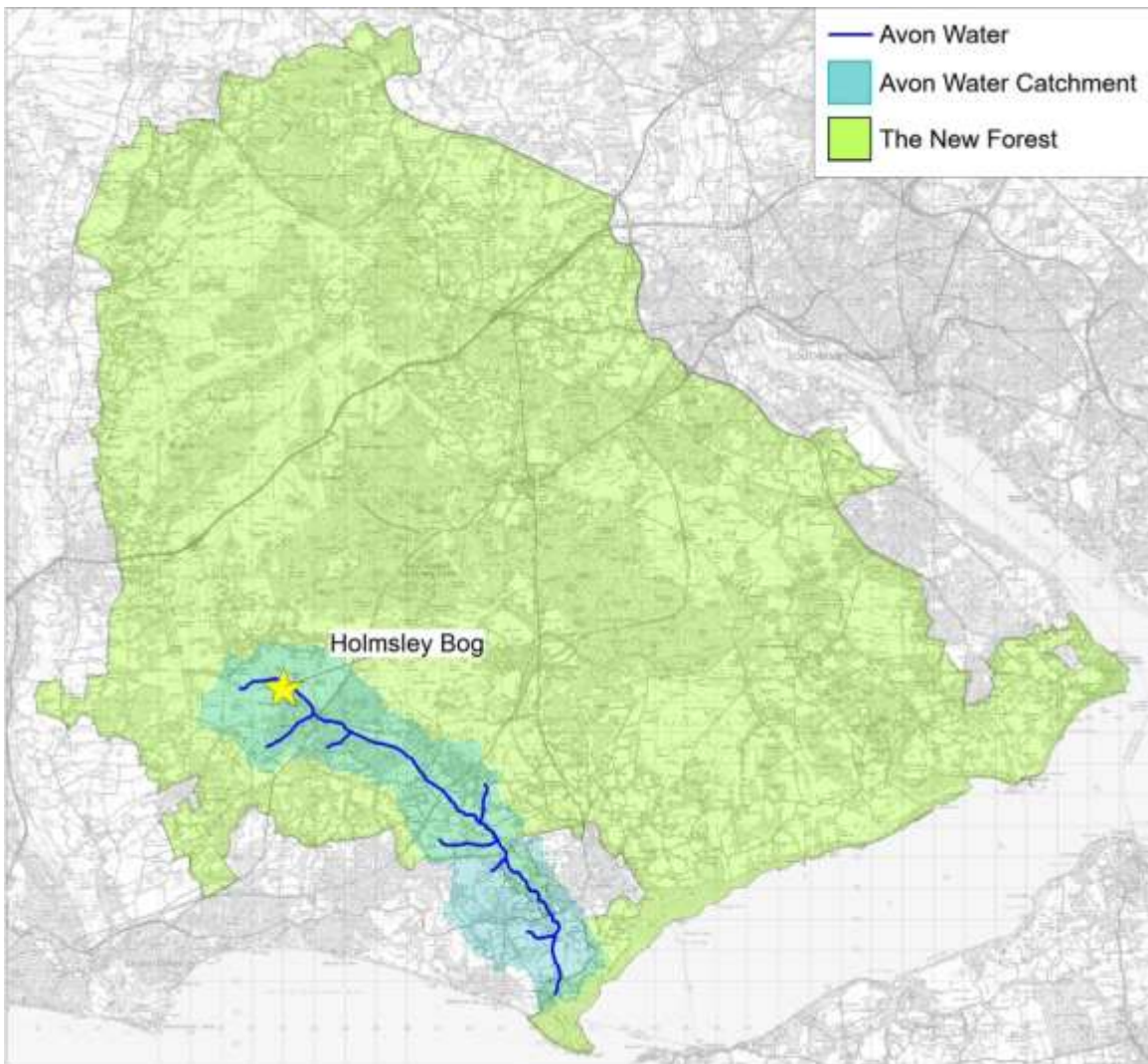


Figure 7: The location of Holmsley Bog within the catchment of the Avon Water

Holmsley Bog has a number of statutory nature conservation designations, forming part of:

- The New Forest Site of Special Scientific Interest
- The New Forest Special Area of Conservation
- The New Forest Special Protection Area
- The New Forest Ramsar Site.

Holmsley Bog and nearby mires were specifically referred to by Derek Ratcliffe as one of the four most important areas within the Grade 1* (internationally important) New Forest Valley Mires Nature Conservation Review (NCR) site (Ratcliffe, 1977). The NCR selected these four mire systems within the New Forest as being the highest in quality and exhibiting the range of variation within the mires. The NCR's approach emphasises the importance of Holmsley Bog within the New Forest mires.

Holmsley Bog has been described by Neil Sanderson (Sanderson, 2012) as 'a major site within the internationally important complex of valley bogs within the New Forest'.

3.1.1. The pitcher plant population at Holmsley Bog

Pitcher Plant was planted on the edge of Holmsley Bog some time prior to 1987 (Brewis *et al.*, 1996). Ashley Basil had been informed by a horticulturist that the planting had been undertaken during the 1970s as a source of plants for his commercial nursery (Ashley Basil, *pers. comm.*). Since then, the original plant had seeded widely, especially downstream within the mire, mainly growing in hummocks in the bog vegetation but also on the soft, wet peat of the runnel which flows through the bog.

Neil Sanderson was commissioned by the NFNNPP to prepare a report highlighting the quality of the habitats affected by Pitcher Plant at Holmsley Bog. The report (Sanderson, 2012) describes the habitats at Holmsley Bog in a national and European context.

Sanderson observed that the largest pitcher plants completely occupied the top of the hummocks within the *Rhynchospora alba* - *Sphagnum auriculatum* sub-community of the type of vegetation referred to by the National Vegetation Classification (Rodwell, 1991) as M21 *Narthecium ossifragum* – *Sphagnum papillosum* valley mire. This is an ecologically rich part of the valley bog vegetation; the tops of the hummocks are dominated by cushions of the bog moss *Sphagnum papillosum* that support a diverse epiphytic liverwort community including the nationally scarce *Cephalozia macrostachya* and the bog specialists *Cladopodiella fluitans*, *Kurzia paucifolia* and *Odontoschisma sphagni*. This liverwort assemblage is threatened and has declined greatly in lowland England.

Sanderson noted that within the centre of the site nearly all the surviving liverwort-rich hummocks supported pitcher plant seedlings. He observed that the pitcher plants appeared not to be grazed by commoners' stock and warned that, if uncontrolled, the pitcher plants would have the capacity to occupy most of the bog moss-dominated hummocks within the mire, thereby threatening the nationally scarce *Cephalozia macrostachya* and the general specialised epiphytic liverwort flora.

As stated in section 2.1 of this report, Sanderson noted that the valley bogs of the New Forest are of exceptional importance for invertebrates and warned that the Pitcher Plants could have an adverse impact on the invertebrate fauna of Holmsley Bog.

3.2. Control of Pitcher Plants at Holmsley Bog

On 1 February 2010 the Forestry Commission asked the New Forest Non-Native Plants Officer to remove the Pitcher Plants from Holmsley Bog.

3.2.1. Control of Pitcher Plants at Holmsley Bog in 2010

The Project Officer visited Holmsley Bog with Martin Rand, the Botanical Society of the British Isles (BSBI) Vice County Recorder for South Hampshire, on 3 February 2010 with the intention of mapping the plants and assessing the amount of work required to remove them.

The original Pitcher Plant which had been planted in Holmsley Bog was located at SU 22089 01625, near the edge of the bog, close to a small track leading down to the site. There were a few smaller Pitcher Plants further upstream and a lot more Pitcher Plants growing further downstream.

The population of Pitcher Plants recorded at Holmsley Bog on 3 February 2010 extended for approximately 30 metres from SU 22082 01629 (upstream limit) to SU 22110 01616 (downstream limit on the northern side of the bog) and to SU 22099 01611 (downstream limit on the southern side of the bog). Some of the Pitcher Plants showed evidence of having flowered and seeded.

Just under an hour was spent removing 165 individual plants or clumps of Pitcher Plants, being careful to ensure that any pieces of Sphagnum moss which inadvertently came away with the Pitcher Plants were put back on the bog surface. The plants were collected in an empty compost sack and plastic box which filled up quickly so removal work had to stop before all the plants present could be dug up. It was estimated that at least 50 Pitcher Plants remained *in situ*.

3.2.2. Control of Pitcher Plants at Holmsley Bog in 2012

Following the removal of Pitcher Plants on 3 February 2010, the Forestry Commission informed the Project Officer that the Commission had changed its stance and had decided that the original 'mother plant' must be retained. The Project Officer arranged a volunteer work party on 29 October 2012 to remove the majority of the remaining Pitcher Plants. By Autumn 2012 the 'mother plant' had developed into a large clump of Pitcher Plants measuring 120 cm x 120 cm (Figure 8 and Figure 9).



Figure 8: Photograph taken on 1 November 2012 showing part of the substantial clump which had developed from the original Pitcher Plant planted into Holmsley Bog during the 1970s

On 29 October 2012 the four volunteers (committee members of the Hampshire & Isle of Wight Wildlife Trust's Flora Group), accompanied by Jay Doyle of the Forestry Commission, helped the Project Officer to locate the Pitcher Plants and mark their locations with red flags. Grid references of the locations were recorded using a Garmin hand-held Global Positioning System (GPS) device to enable a map to be created indicating the extent of the population (Figure 10). The red flags helped the volunteers re-locate the plants so that they could be dug up after the GPS readings had been taken. The GPS readings taken on 29 October 2012 are provided in Table 1.



Figure 9: Photograph taken looking downstream on 1 November 2012 showing the original 'mother plant' and general habitat of Holmsley Bog

Table 1: Grid references of the Pitcher Plants recorded at Holmsley Bog on 29 October 2012

'Mother plant' SU 22083 01628			
SU 22085 01628	SU 22090 01630	SU 22094 01622	SU 22112 01616
SU 22084 01629	SU 22090 01627	SU 22094 01621	SU 22070 01633
SU 22082 01627	SU 22091 10626	SU 22096 01622	SU 2074 01637
SU 22087 01630	SU 22091 01627	SU 22096 01623	SU 22097 01615
SU 22088 01631	SU 22094 01625	SU 22097 0162	SU 22088 01627
SU 22087 01631	SU 22095 01624	SU 22095 01620	SU 22088 01638
SU 22088 01632	SU 22094 01624	SU 22096 01618	
SU 22089 01630	SU 22095 01623	SU 22096 01616	
SU 22089 01631	SU 22095 01622	SU 22099 01615	

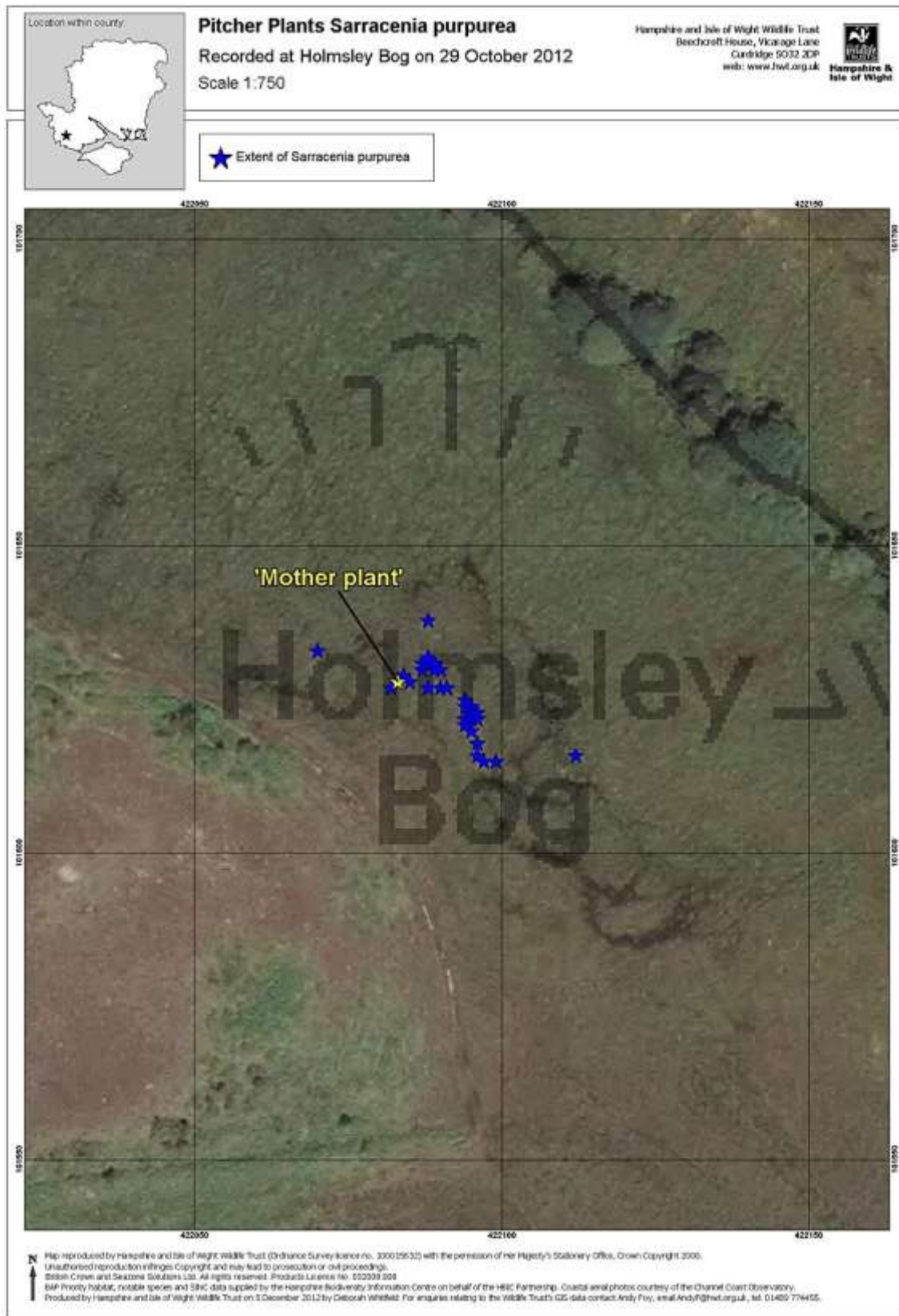


Figure 10: The location of the original 'mother plant' and the distribution of the 313 Pitcher Plants which were dug up from Holmsley Bog on 29 October 2012

The population of Pitcher Plants removed from Holmsley Bog on 29 October 2012 ranged in size from:

- very small seedlings which could easily be picked out of the *Sphagnum* moss using a finger and thumb;
- small plants which could be gouged out by hand;
- small plants which could be dug out using a trowel;
- larger clumps which could be dug out using a spade;
- much larger clumps which were difficult to remove (Figure 11) as their roots were growing amongst Purple Moor Grass *Molinia caerulea* and which required two or three people to remove them by a combination of a) digging them out using a spade, b) chopping them in half with a spade, c) pulling them out of the ground, d) cutting out with a knife.



Figure 11: Digging up a large clump of Pitcher Plant at Holmsley Bog on 29 October 2012

During the New Forest Non-Native Plants Project Steering Group meeting on 27 September 2012, Natural England stressed the importance of removing the original 'mother plant' as the continued presence of a seed source (Figure 12) would require effort *ad infinitum* to remove the resulting seedlings/young plants. The Forestry Commission's representative requested a package of evidence to a) highlight the ecological importance of Holmsley Bog and b) demonstrate the impact of Pitcher Plants.

The NFNPP therefore a) commissioned Neil Sanderson to prepare a report demonstrating the quality of the habitats affected by Pitcher Plant at Holmsley Bog (Sanderson, 2012) and b) provided a note highlighting the spread of Pitcher Plants at this site (Appendix 1).

This evidence was submitted to the Forestry Commission on 21 December 2012. The Forestry Commission responded on 24 January 2013 stating:

'This (sic) data provides strong evidence that leaving the "mother plant" in situ to continue to seed presents an on-going threat to the mire community and indeed the condition of the SSSI. The Forestry Commission has a duty as the landowner to maintain the condition of the SSSI and on the basis of evidence presented we revoke our policy of safeguarding the mother plant and would support its removal. We would welcome any assistance that the New Forest Non-Natives project can provide to progress the eradication of *Sarracenia purpurea*'.



Figure 12: Pitcher Plant seeds photographed at Holmsley Bog on 29 October 2012

3.2.3. Control of Pitcher Plants at Holmsley Bog in 2013

On 28 January 2013 volunteer Martin Rand helped the Project Officer to remove the original 'mother plant' together with 64 seedlings and young plants from Holmsley Bog (Figure 13, Figure 14 and Figure 15) but it was clear that further work would be needed to remove the remaining plants and any which might germinate.

The Project Officer decided that it would be prudent to wait until the winter as a) this would avoid the sensitive ground-nesting bird breeding season and b) it would enable the seedlings to grow larger, therefore making it easier to pull them out without damaging surrounding *Sphagnum*-dominated species-rich vegetation.

A further task was therefore undertaken on 4 November 2013 when 97 plants (comprising seedlings, young plants and remains of the rootstock of the original 'mother plant') were removed (Figure 16 and Table 2). Following the work party on 4 November 2013, it was agreed that further work would be needed during winter 2014 to remove any remaining small plants including plants which might have germinated from the seed bank.



Figure 13: Pitcher Plants dug up from Holmsley Bog on 28 January 2013



Figure 14: One of the Pitcher Plants dug up from Holmsley Bog on 28 January 2013



Figure 15: Some of the Pitcher Plant seedlings removed from Holmsley Bog on 28 January 2013



Figure 16: Some of the small Pitcher Plants removed from Holmsley Bog on 4 November 2013

Table 2: Grid references of the Pitcher Plants recorded at Holmsley Bog on 4 November 2013

SU 22083 01629 (upstream limit)	SU 22085 01633	SU 22091 01627	SU 22112 01619
SU 22083 01628	SU 22086 01633	SU 22094 01624	SU 22084 01633
SU 22084 01630	SU 22087 01632	SU 22096 01622	SU 22093 01620
SU 22084 01631	SU 22087 01631	SU 22106 01621	SU 22092 01618
SU 22085 01631	SU 22093 01627	SU 22111 01619	

3.2.4. Control of Pitcher Plants at Holmsley Bog in 2014

On 3 November 2014 three volunteers helped the Project Officer to mark out and record the extent of the remaining Pitcher Plant population and count the number of Pitcher Plants removed. A total of 38 canes were used to mark out the extent of the remaining Pitcher Plants (Table 3). Photographs were taken and grid references were recorded at each cane using a hand-held Garmin 'etrex' device. It was clear that the population had decreased in extent since 2013. No plants were found upstream of the site of the original 'mother plant' and the downstream extent of the population had contracted. 108 seedlings and small plants were removed by hand or using a trowel on 3 November 2014.

Table 3: Grid references of the Pitcher Plants recorded at Holmsley Bog on 3 November 2014

SU 22084 01627	SU 22086 01629	SU 22091 01624	SU 22092 01620
SU 22084 01627	SU 22087 01630	SU 22094 01620	SU 22085 01627
SU 22084 01628	SU 22088 01631	SU 22095 01621	SU 22094 01616
SU 22085 01628	SU 22093 01624	SU 22094 01618	
SU 22085 01629	SU 22092 01624	SU 22095 01618	

3.2.5. Control of Pitcher Plants at Holmsley Bog in 2015

On 2 November 2015 three volunteers helped the Project Officer to mark out and record the extent of the remaining Pitcher Plant population and count the number of Pitcher Plants removed.

Yellow flags on wires were inserted to mark the location of individual pitcher plants or groups of pitcher plants. GPS readings were taken using a hand-held Garmin 'etrex' device at 4 metres accuracy and the number of Pitcher Plants was counted.

None of the Pitcher Plants recorded on 2 November 2015 showed evidence of having produced flowers so they were categorised as seedlings, small juvenile plants, medium juvenile plants or large juvenile plants. Plants were described as 'large juvenile' plants if their pitchers were large enough to be capable of catching invertebrates.

A total of 140 juvenile and seedling pitcher plants (49 Pitcher Plant seedlings, 46 small juvenile plants, 28 medium sized juvenile plants and 17 large juvenile plants) were removed on 2 November 2015 (Table 4 and Figure 17).

Table 4: Grid references of the Pitcher Plants recorded at Holmsley Bog on 2 November 2015

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Comments
SU 22083 01618		2			
SU 22083 01626	6	6	1		
SU 22082 01616	3				
SU 22083 01627	6				
SU 22084 01626			2		
SU 22085 01627			1		
SU 22084 01627			1		
SU 22085 01627				1	
SU 22084 01628		2		2	
SU 22084 01629				1	
SU 22085 01630			1		
SU 22086 01630	2		4	1	
SU 22086 01629	1	5	2		
SU 22086 01630		1	1		
SU 22087 01629				1	
SU 22086 01628	1			4	
SU 22087 01628	3	1			
SU 22086 01629				1	
SU 22087 01629	3	4	2	1	
SU 22086 01627	2				
SU 22034 01628		1			
SU 22037 01627	1				
SU 22090 01624	1	2			
SU 22093 01624	2	3	2		
SU 22093 01623	1	1			
SU 22092 01623		1		1	
SU 22094 01625		1		1	
SU 22093 01622	2	2			
SU 22094 01621	2		2		
SU 22093 01618			1		
SU 22093 01619	4				
SU 22091 01620			1		
SU 22094 01620		1	2	1	
SU 22093 01619		1			
SU 22095 01619	2	1	2		
SU 22094 01618		1			
SU 22094 01617	1	1	1		
SU 22096 01617	2	3	1		
SU 22096 01616		1			
SU 22095 01614				1	
SU 22094 01616	2	1	1		
SU 22094 01615	1				
SU 22092 01616		2			
SU 22095 01615	1	2		1	
TOTALS	49	46	28	17	Total of 140 seedlings and juvenile plants



Figure 17: Removal of a juvenile Pitcher Plant by hand on 2 November 2015

3.2.6. Control of Pitcher Plants at Holmsley Bog in 2016

On 7 November 2016 five volunteers helped the Project Officer to locate and record the Pitcher Plants. A total of 43 plants (7 seedlings, 14 small juvenile plants, 14 medium juvenile plants, 7 large juvenile plants and 1 mature plant) were removed (Figure 18, Figure 19 and Table 5).



Figure 18: Photograph taken at Holmsley Bog on 7 November 2016 looking east. Yellow flags mark the extent of the Pitcher Plant population



Figure 19: Volunteers removing Pitcher Plants at Holmsley on 7 November 2016

Table 5: Grid references of the Pitcher Plants recorded at Holmsley Bog on 7 November 2016

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SU 22083 01629		4			
SU 22082 01628	1	1	1		
SU 22082 01627	1				
SU 22084 01628	2				
SU 22083 01630				1	
SU 22084 01629			1		
SU 22084 01630			1		
SU 22085 01629			1		
SU 22086 01629		1			
SU 22087 01629			1		
SU 22088 01628	2	2			
SU 22087 01629	1		1		
SU 22089 01628				1	
SU 22088 01628				2	
SU 22086 01631		1	1		
SU 22087 01632			1		
SU 22093 01625			2		
SU 22094 01623					1
SU 22094 01623		1			
SU 22093 01624		1			
SU 22093 01626				2	
SU 22095 01622		1			
SU 22095 01617			1		
SU 22098 01616		1			
SU 22109 01614			1		
SU 22110 01614		1	2	1	
TOTALS	7	14	14	7	1

3.2.7. Control of Pitcher Plants at Holmsley Bog in 2017

On 6 November 2017 seven volunteers helped the Project Officer to find, record and remove a total of 32 seedlings and young plants (Table 6 and Figure 20). No mature plants were found on that occasion.

Table 6: Grid references of the Pitcher Plants recorded at Holmsley Bog on 6 November 2017

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SU 22083 01627				1	
SU 22087 01632				1	
SU 22088 01631				1	
SU 22089 01631			1		
SU 22088 01631				1	
SU 22089 01629				1	
SU 22091 01629		1			
SU 22093 01624				1	
SU 22092 01624				1	
SU 22093 01624				1	
SU 22095 01622		1		2	
SU 22094 01622	1	1			
SU 22095 01621				1	
SU 22094 01620				1	
SU 22096 01622				1	
SU 22096 01621	3	1		3	
SU 22096 01620			2		
SU 22095 01618				1	
SU 22094 01619		1			
SU 22097 01622				1	
SU 22096 01616			1		
SU 22097 01615				1	This is the most downstream plant recorded on 6 November 2017
TOTALS	4	5	4	19	



Figure 20: Some of the Pitcher Plants removed from Holmsley Bog on 6 November 2017

3.2.8. Control of Pitcher Plants at Holmsley Bog in 2018

On 5 November 2018 six volunteers helped the Project Officer to mark out, record and remove a total of 12 Pitcher Plants (1 seedling, 6 small juvenile plants and 5 medium juvenile plants) (Table 7 and Figure 21).

Table 7: Grid references of the Pitcher Plants recorded at Holmsley Bog on 5 November 2018

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SU 22086 01629		1			
SU 22088 01633			1		
SU 22087 01631		1			
SU 22088 01630		1			
SU 22093 01622			1		
SU 22094 01619			1		
SU 22095 01616			1		
SU 22095 01617		1			
SU 22098 01616		1			
SU 22098 01616			1		
SU 22098 01614	1	1			These are the most downstream plants recorded on 5 November 2018
TOTALS	1	6	5		



Figure 21: Pitcher Plants recorded at Holmsley Bog on 5 November 2018 at (left) SU 22092 01623 and (right) SU 22088 01633

3.2.9. Control of Pitcher Plants at Holmsley Bog in 2019

On 4 November 2019 Bridget Leyden of Natural England together with 3 volunteers helped the Project Officer to find, record and remove a total of 14 Pitcher Plants (1 seedling, 2 small juvenile plants, 7 medium juvenile plants and 4 large juvenile plants) (Table 8, Figure 22, and Figure 23).

Table 8: Grid references of the Pitcher Plants recorded at Holmsley Bog on 4 November 2019

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SU 22085 01627			1		
SU 22085 01629			1		
SU 22086 10628			1		
SU 22086 01630				1	
SU 22093 01627				1	
SU 22094 01625				1	
SU 22095 01623			1		
SU 22096 01622			1		
SU 22097 01622				1	
SU 22096 01622		1			
SU 22096 01623			1		
SU 22096 01622		1			
SU 22109 01621			1		
SU 22110 01620	1				
TOTALS	1	2	7	4	



Figure 22: Pitcher Plant removed from Holmsley Bog on 4 November 2019

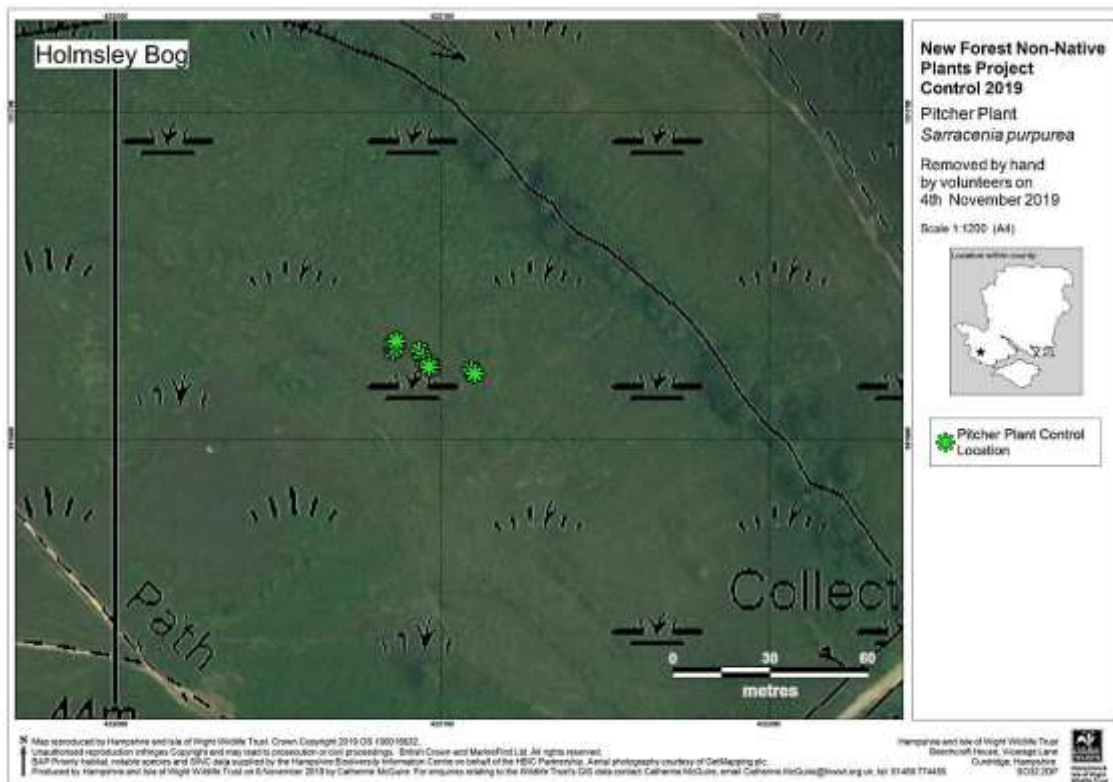


Figure 23: Location of the 14 Pitcher Plants removed from Holmsley Bog on 4 November 2019

The results of the volunteer work parties led by the NFNPP at Holmsley Bog between 2010 and 2019 are shown in Table 9.

Table 9: Number of Pitcher Plants removed from Holmsley Bog during volunteer work parties arranged by the New Forest Non-Native Plants Project

Date	Number of 'plants' removed
3 February 2010	165
29 October 2012	313
28 January 2013	'Mother plant' plus 64 seedlings & young plants
4 November 2013	97 plants (ie seedlings, young plants and remains of the rootstock of the original 'mother plant')
3 November 2014	108
2 November 2015	140 seedlings and juvenile plants
7 November 2016	43 seedlings, juvenile and mature plants
6 November 2017	32 seedlings and juvenile plants
5 November 2018	12 seedlings and juvenile plants
4 November 2019	14 seedlings and juvenile plants
Total	988

NB: It is important to note that the total number given above is an under-representation of the actual number of individual plants removed from Holmsley Bog as some of these 'plants' were large clumps comprising a number of individual plants. This is particularly relevant to the original 'mother plant' which, at the time of its removal in January 2013, comprised a large clump of plants covering approximately 120 cm x 120 cm. (However the figures relating to the number of plants removed on 2 November 2015, 7 November 2016, 6 November 2017, 5 November 2018 and 4 November 2019 are accurate).

By November 2019, following a thorough search, only 14 pitcher plants could be found at Holmsley Bog and none of these showed evidence of having flowered and produced seeds. The volunteer work parties since 2010 have depleted the seed bank and it is hoped that within a few years the pitcher plant population will be eradicated from this site.

Further monitoring and removal, as necessary, is scheduled to be undertaken in November 2020.

The Project Officer is very grateful to the volunteers and staff from the Forestry Commission and Natural England who have helped to monitor and remove the Pitcher Plants at Holmsley Bog since 2010.

4. CONTROL OF PITCHER PLANT AT TWO BRIDGES BOTTOM

4.1. Two Bridges Bottom

Two Bridges Bottom is the name given to a complex of species-rich wetland habitats including open water and base-enriched bog vegetation in the headwaters of the Crockford Stream within Beaulieu Heath. Its location is indicated on the map at Figure 6. Two Bridges Bottom forms part of the New Forest SSSI, SAC, SPA and Ramsar Site.

4.1.1. *The Pitcher Plant population at Two Bridges Bottom*

Pitcher Plant was recorded at Two Bridges Bottom by local botanist Mike Rowe on 20 September 2009 when he reported approximately '15 plants obviously planted (in circle c. 2m diameter) in bog' at SZ 3432 9983. On 21 October 2009 Martin Rand alerted the New Forest Non-Native Plants Officer to this report.

On 1 February 2010 the Forestry Commission asked the New Forest Non-Native Plants Officer to remove the Pitcher Plants from Two Bridges Bottom. However later that day the Project Officer was in correspondence with a local botanist who informed her that she understood the Pitcher Plants at this location had already been removed.

On 3 February 2010 the Forestry Commission asked the Project Officer to delay taking any action to remove the Pitcher Plants at this site pending resolution to an 'internal debate within FC about the removal' of this species.

On 16 February 2010 the Project Officer contacted Mike Rowe and asked him to check whether or not the Pitcher Plants he had seen at Two Bridges Bottom had already been removed.

On 6 January 2017 a local botanist contacted the Project Officer to say 'Visiting Two Bridges Bottom a week ago I noticed two more clumps of Pitcher Plant near the original circle already known from these marl pits. Unfortunately they are more inaccessible and will require waders or a boat being on the edge of the flight pond. I think they were probably outliers near the remains of the original circle but it was too wet to explore'.

Catherine Chatters, accompanied by volunteer Clive Chatters, visited Two Bridges Bottom (Figure 24 and Figure 25) on Saturday 13 August 2016 and observed Pitcher Plants growing in the following locations:

- SZ 34333 99778 one clump - one flower with developing seed pod and one flower stalk;
- SZ 34332 99780 two clumps covering an area approximately 50cm x 20cm - one flower with developing seed pod;
- SZ 34326 99784 one clump covering an area approximately 20cm x 20cm (no flowers);
- SZ 34314 99774 one clump with one seed pod;
- SZ 34318 99822 one clump (no flowers or seed pods);
- SZ 34323 99829 numerous plants (not counted) and seedlings in vicinity of this grid reference.



Figure 24: General view of habitat at Two Bridges Bottom with flowering Pitcher Plant at SZ 34332 99780 on 13 August 2016 (Photograph: Clive Chatters)



Figure 25: Flowering Pitcher Plant at SZ 34332 99780 on 13 August 2016 (Photograph: Clive Chatters)

4.2. Control of Pitcher Plants at Two Bridges Bottom

4.2.1. Control of Pitcher Plants at Two Bridges Bottom in 2016

On 13 August 2016 the Project Officer and volunteer Clive Chatters dug up Pitcher Plants from:-

- SZ 34333 99778
- SZ 34332 99780
- SZ 34326 99784 (Figure 26)
- SZ 34314 99774

The clump at SZ 34314 99774 could not be reached in wellingtons but was accessible in shorts and sandals.

The plants at SZ 34318 99822 and in the vicinity of SZ 34323 99829 were too numerous to remove on 13 August so another task was arranged for Tuesday 16 August 2016.



Figure 26: Pitcher Plant dug up from SZ 34326 99784 on 13 August 2016

On Tuesday 16 August 2016 volunteer John Moore helped the Project Officer to locate and dig up the remaining Pitcher Plants from Two Bridges Bottom. Grid references were noted of the main groups of Pitcher Plants or isolated individual Pitcher Plants using a hand-held GPS device and plants were categorised as seedlings, small plants, medium plants or large plants (Table 10). A total of 126 seedlings, small plants and medium plants were dug up on 16 August 2016 (Figure 27).

Table 10: Pitcher Plants dug up from Two Bridges Bottom on 16 August 2016

Grid reference	Seedlings	Small plants	Medium plants	Large plants
SZ 34320 99829	6	25	11	0
SZ 34323 99828	0	0	1	0
SZ 34321 99812	0	0	1	0
SZ 34317 99822	0	1 (with flower bud)	0	0
SZ 34319 99832	9	11	0	0
SZ 34320 99831	27	13	1 (with flower bud)	0
SZ 34317 99827	7	4	4	0
SZ 34323 99823	0	1	0	0
SZ 34319 99827	1	1	0	0
SZ 34320 99828	0	1	0	0
SZ 34322 99831	0	1	0	0
Totals	50	58	18	0



Figure 27: A total of 126 Pitcher Plants were dug up at Two Bridges Bottom on 16 August 2016

4.2.2. Control of Pitcher Plants at Two Bridges Bottom in 2017

The Project Officer and volunteer John Moore searched the area thoroughly on 14 August 2017 for approximately one hour and found a total of 17 Pitcher Plants comprising 8 seedlings, 8 small plants and 1 medium sized plant (Table 11 and Figure 28). The plants were found in the vicinity of the following GPS readings:

- SZ 32321 99832
- SZ 3432299828
- SZ 34320 99828

Table 11: Pitcher Plants removed from Two Bridges Bottom on 14 August 2017

Seedlings	8
Small plants	8
Medium plants	1
Large plants	0
TOTAL	17



Figure 28: Medium sized Pitcher Plant (left) and seedling Pitcher Plant (right) dug up from Two Bridges Bottom on 14 August 2017

4.2.3. Control of Pitcher Plants at Two Bridges Bottom in 2018

The Project Officer returned to Two Bridges Bottom on 13 August 2018 with volunteer Jane Smith and searched the area thoroughly for approximately one hour. A total of 16 plants were found (Table 12 and Figure 29) in the vicinity of the following GPS readings:

- SZ 34322 99830
- SZ 34322 99829
- SZ 34321 99830
- SZ 34320 99831

Table 12: Pitcher Plants removed from Two Bridges Bottom on 13 August 2018

Seedlings	3
Small plants	9
Medium plants	4
Large plants	0
TOTAL	16



Figure 29: One of the 'medium' sized Pitcher Plants dug up from Two Bridges Bottom on 13 August 2018

4.2.4. Control of Pitcher Plants at Two Bridges Bottom in 2019

On 12 August 2019 the Project Officer and two volunteers thoroughly searched the area for less than an hour. Only a single small Pitcher Plant was found, growing at SZ 34320 99831 (Figure 30 and Figure 31).



Figure 30: Pitcher Plant dug up at SZ 34320 99831 from Two Bridges Bottom on 12 August 2019

Further monitoring, and removal if necessary, is scheduled to be undertaken during August 2020.

The Project Officer is very grateful to the volunteers who have helped to monitor and remove the Pitcher Plants at Two Bridges Bottom since 2016.

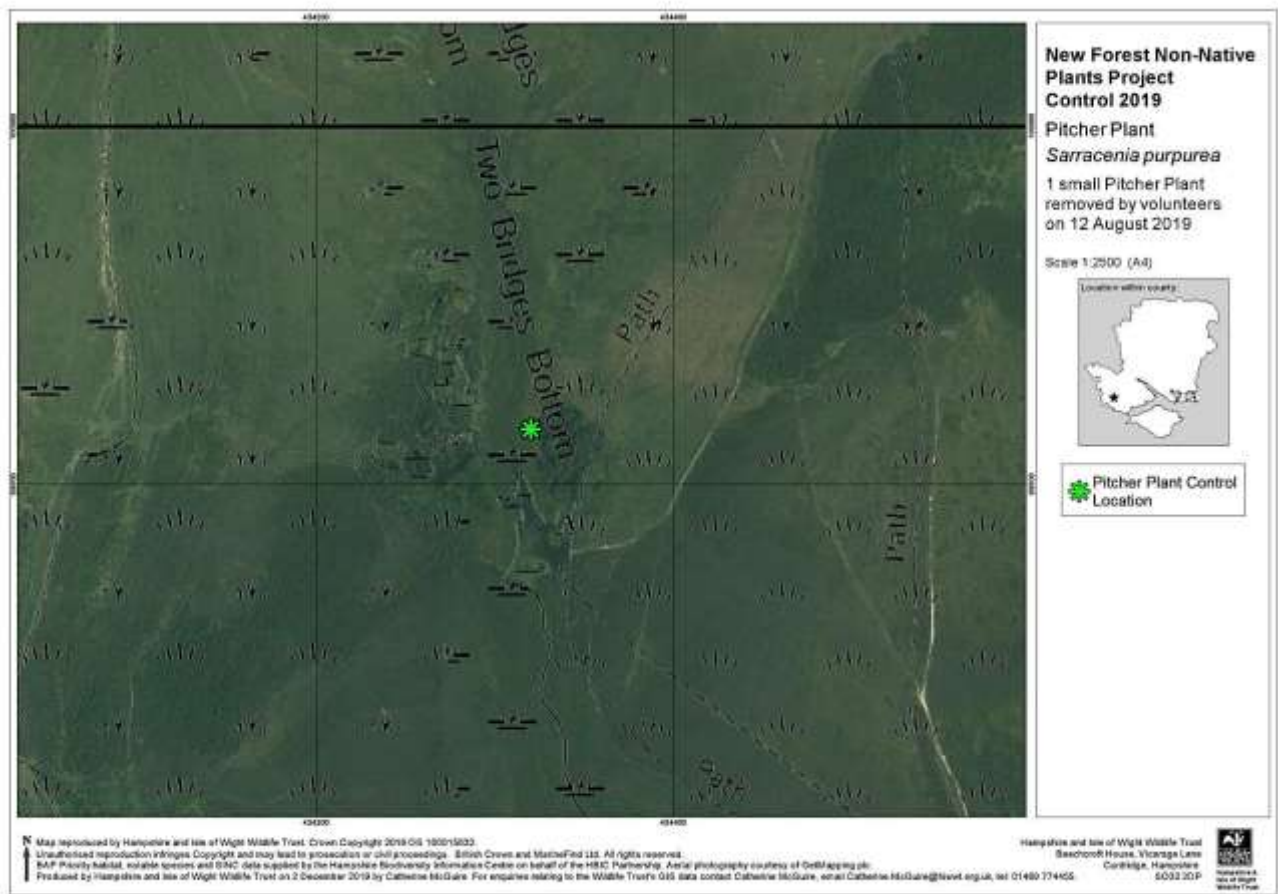


Figure 31: Location of the single Pitcher Plant removed from Two Bridges Bottom on 12 August 2019

5. CONTROL OF PITCHER PLANT AT ACRES DOWN

5.1. Acres Down

Acres Down is indicated on the map at Figure 6 and is a species-rich area of heathland and base-enriched seepage mires. Acres Down forms part of the New Forest SSSI, SAC, SPA and Ramsar Site. The wetland habitat at Acres Down supports the only known New Forest population of Common Butterwort *Pinguicula vulgaris* which is decreasing in lowland Britain.

5.1.1. The Pitcher Plant population at Acres Down

During 2012 Martin Rand alerted the Project Officer to a Pitcher Plant growing at Acres Down at SU 27094 08824..

On 16 November 2017 a local resident who is a New Forest commoner alerted the Project Officer to three clumps of Pitcher Plants growing in another part of Acres Down, fed by a different spring into a tract of bog at SU 27356 08704, SU 27373 08732 and SU 27371 08732. Two of these clumps had flowered and seeded.

During July 2019 the Project Officer was alerted by a colleague to a Pitcher Plant clump discovered at Acres Down by Tom Selby (during entomological survey work) on 10 July 2019 at SU 27038 08574.

5.2. Control of Pitcher Plants at Acres Down

5.2.1. Control of Pitcher Plants at Acres Down in 2012

On 4 December 2012 Martin Rand helped the Project Officer to remove a single Pitcher Plant from SU 27094 08824 at Acres Down (Figure 32).



Figure 32: The single Pitcher Plant removed from Acres Down at SU 27094 08824 on 4 December 2012

5.2.2. Control of Pitcher Plants at Acres Down in 2015

On 2 November 2015 Martin Rand emailed the Project Officer to say he had monitored the mire at Acres Down where the Pitcher Plant had been removed in December 2012 and could find no more.

5.2.3. Control of Pitcher Plants at Acres Down in 2017

On 4 December 2017 two volunteers helped the Project Officer to search the area in the vicinity of the Pitcher Plants that had been pointed out to her by the commoner a few weeks previously. The bog was searched for 40 minutes during which time two more clumps of Pitcher Plants were found; GPS readings were taken of these clumps at SU 27358 08707 and SU 27360 08706.

Prior to digging up the plants on 4 December 2017 GPS readings were taken:

Clump of Pitcher Plants at SU 27357 08705

This is the clump which was recorded at SU 27356 08704 on 16 November 2017. It had 26 pitchers and the remains of two seed pods.

Pitcher Plant at SU 27358 08707

This clump was not recorded on 16 November 2017. When dug up it was seen to be a single plant with 6 pitchers. There were no flowers or seed pods.

Clump of Pitcher Plants at SU 27360 08706

This clump was not recorded on 16 November 2017. It had 20 pitchers and the remains of one seed pod.

Clump of 3 Pitcher Plants with pitchers plus 2 seedlings at SU 27370 08732

When this clump was dug up, it became clear that the clump consisted of 3 separate Pitcher Plants with pitchers, plus 2 seedlings (Figure 33). One of the Pitcher Plants had 15 pitchers; one of the Pitcher Plants had 10 pitchers; one of the Pitcher Plants had 9 pitchers. There were no seed pods.

Clump of Pitcher Plants at SU 27370 08734

When this clump was dug up it became clear that the clump consisted of 11 separate Pitcher Plants. The clump supported 35 pitchers and the remains of 9 seed pods.



Figure 33: Two seedlings removed from clump of Pitcher Plants at SU 27370 08732 on 4 December 2017

On 4 December 2017, the volunteers helped the Project Officer to monitor the area where the single Pitcher Plant had been dug up from Acres Down at SU 27094 08824; no Pitcher Plants were found here on 4 December 2017.

5.2.4. Control of Pitcher Plants at Acres Down in 2018

On 27 November 2018 two volunteers helped the Project Officer to check for Pitcher Plants growing at Acres Down.

The locations where Pitcher Plants had been removed in 2017 were re-visited:

- SU 27357 08705
- SU 27358 08707
- SU 27360 08706
- SU 27370 08732
- SU 27370 08734

A total of 12 Pitcher Plants were found on 27 November 2018 (Table 13 and Figure 34). This total comprised 11 seedlings and one small plant. They were all growing on the margins of the holes where Pitcher Plants had been dug up on 4 December 2017.

Table 13: Pitcher Plants removed from Acres Down on 27 November 2018

GPS reading	Number of plants removed	Description
SU 27370 08734	2	2 seedlings
SU 27369 08735	1	1 seedling
SU 27371 08733	1	1 seedling
SU 27371 08732	6	5 seedlings & 1 small plant
SU 27371 08734	2	2 seedlings



Figure 34: Small Pitcher Plant and some of the seedlings dug up at Acres Down on 27 November 2018

On 27 November 2018, the volunteers helped the Project Officer to monitor the area where the single Pitcher Plant had been dug up from Acres Down at SU 27094 08824; no Pitcher Plants were found here on 27 November 2018.

5.2.5. Control of Pitcher Plants at Acres Down in 2019

On 12 August 2019 two volunteers helped the Project Officer locate and dig up the Pitcher Plant that had been discovered by Tom Selby during July 2019 (Figure 35).



Figure 35: Pitcher Plant dug up from Acres Down at SU 27039 08573 on 12 August 2019

On 9 December 2019 the Project Officer returned to Acres Down with two volunteers to check for Pitcher Plants growing in the area where the commoner had pointed out Pitcher Plants to her during November 2017. The following locations were re-visited where Pitcher Plants had been removed in 2017 and 2018:

- SU 27357 08705
- SU 27358 08707
- SU 27360 08706
- SU 27370 08732
- SU 27370 08734
- SU 27369 08735
- SU 27371 08733
- SU 27370 08734
- SU 27371 08732
- SU 27371 08734

Only one Pitcher Plant seedling was found on 9 December 2019 (Table 14 and Figure 36).

Table 14: Pitcher Plant removed from Acres Down on 9 December 2019

GPS reading	Number of plants removed	Description
SU 27370 08734	1	seedling



Figure 36: The single Pitcher Plant seedling found at SU 27371 08731 on 9 December 2019

On 9 December 2019, the volunteers helped the Project Officer to monitor the area where the single Pitcher Plant had been dug up from Acres Down at SU 27094 08824; no Pitcher Plants were found here on 9 December 2019.

The locations of Pitcher Plants removed from Acres Down during 2019 are shown on the map at Figure 37.

Further monitoring, and removal if necessary, is scheduled to be undertaken at Acres Down in 2020. The Project Officer is very grateful to the volunteers who have helped to monitor and remove the Pitcher Plants at Acres Down since 2012.

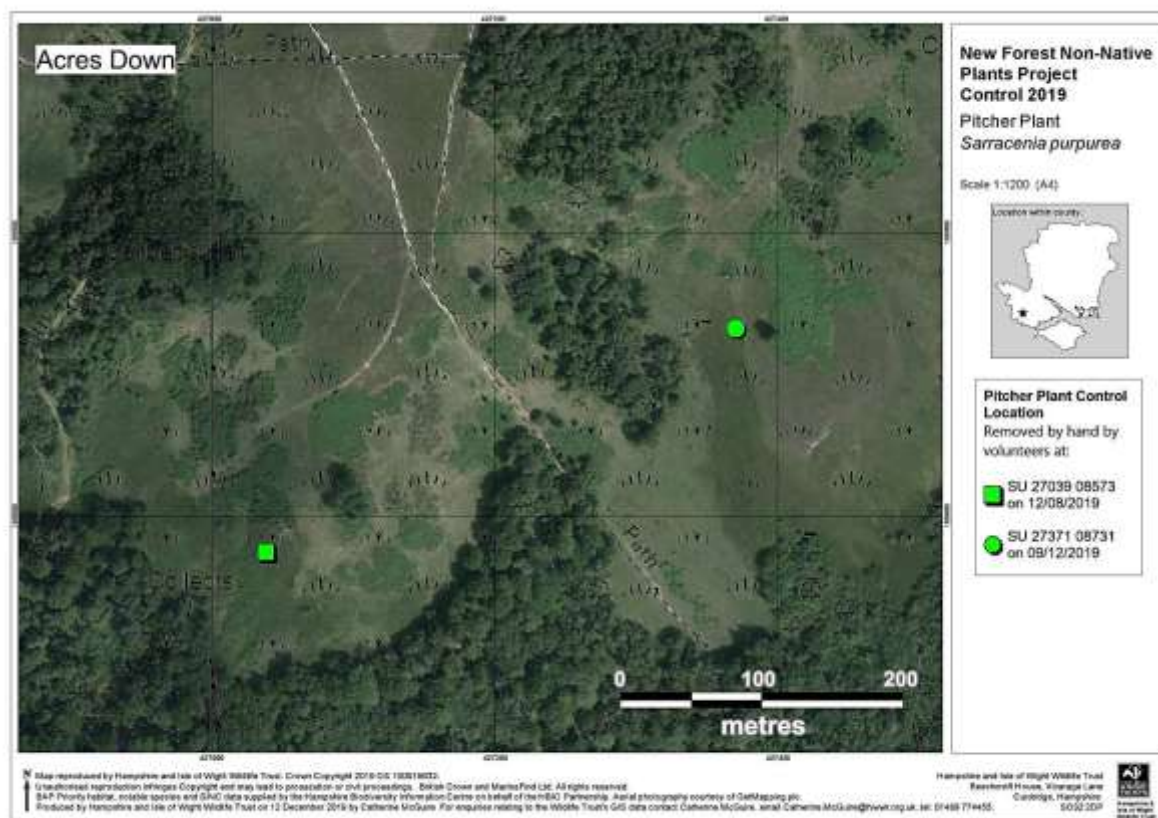


Figure 37: Location of the Pitcher Plants removed from Acres Down during 2019

6. CONTROL OF PITCHER PLANT IN THE MATLEY AREA

6.1. The Matley area

The area referred to in this report as the Matley area is a series of species-rich, base-enriched valley mires in the headwaters of the Beaulieu River between White Moor and Longwater Lawn. The Matley area forms part of the New Forest SSSI, SAC, SPA and Ramsar Site. The location of 'Matley' is shown on the map at Figure 6 and lies between the settlements of Lyndhurst and Ashurst.

6.1.1. The Pitcher Plant population in the Matley area

On Sunday 1 June 2014 whilst searching for Slender Cottongrass *Eriphorum gracile* in wetland habitats between Ashurst and Lyndhurst, the Project Officer and Clive Chatters discovered Pitcher Plants growing in four locations.

The first of these locations was at grid reference SU 32530 08002 where one large clump of Pitcher Plant with thirteen flowers covered an area approximately 1 metre x 50 cm (Figure 38 and Figure 39). The flowers were pulled off by the Project Officer on 1 June 2014 to prevent them seeding. No seedlings appeared to be present.



Figure 38: Pitcher Plant flowers at SU 32530 08002 photographed on 1 June 2014

The second location was at SU 32251 08409 where two clumps of Pitcher Plant were growing. The larger clump had two flowers, one of which had been nipped off already and the other was pulled off on 1 June 2014 to prevent it seeding. No seedlings appeared to be present. The Pitcher Plants were growing amongst Bog Asphodel *Narthecium ossifragum*, Bob Pimpernel *Anagallis tenella*, pondweeds *Potamogeton* spp, Bottle Sedge *Carex rostrata*, Star Sedge *Carex echinata*, Common Reed *Phragmites communis*, Sundew *Drosera* spp, Bog Bean *Menyanthes trifoliata*, Bog St John's-wort *Hypericum elodes*, rushes *Juncus* spp, Bog Myrtle *Myrica gale*, Early Marsh Orchid *Dactylorhiza praetermissa*, Cross-leaved Heath *Erica tetralix* and Spike-rush *Eleocharis* spp.



Figure 39: Pitcher Plant flower photographed on 1 June 2014 at SU 32530 08002 (Photograph: Clive Chatters)

The third location was at SU 32218 08365 where a single clump of Pitcher Plant supported 18 flowers. These were all pulled off on 1 June 2014. No seedlings appeared to be present. The Pitcher Plant clump was growing amongst Meadow Thistle *Cirsium dissectum*, Bog Myrtle, Bottle Sedge, Star Sedge, bog mosses *Sphagnum* spp and Cross-leaved Heath.

The fourth location was at SU 32213 08364 where the Pitcher Plant clump supported two flowers. The flowers were pulled off on 1 June 2014 to prevent them seedling. No seedlings appeared to be present. The Pitcher Plant clump was growing amongst Bog Bean, Meadow Thistle, Cross-leaved Heath, bog mosses *Sphagnum* spp, Bog Myrtle, Star Sedge and Bottle Sedge.

6.2. Control of Pitcher Plants in the Matley area

6.2.1. Control of Pitcher Plants in the Matley area in 2014

The Project Officer arranged for two volunteers to help dig up the Pitcher Plants from the four locations in the Matley area on 13 August 2014 (Figure 40):

- SU 32530 08002
- SU 32251 08409
- SU 32218 08365
- SU 32213 08364

The plants filled ten plastic sacks.

Sexton Beetles were found in the pitchers and samples were sent to entomological expert Paul Brock (Scientific Associate, Department of Life Sciences - Insects, Natural History Museum, London) who confirmed two species:

- *Nicrophorus investigator*
- *Nicrophorus vespilloides*.



Figure 40: Volunteer digging up Pitcher Plant clump at SU 32530 08002 on 13 August 2014

6.2.2. Control of Pitcher Plants in the Matley area in 2015

The Project Officer led a volunteer work party on 9 November 2015. No Pitcher Plants were found at the following locations:

- SU 32251 08409
- SU 32218 08365
- SU 32213 08364

Three Pitcher Plant seedlings were found at SU 32531 08000 (in the vicinity of the Pitcher Plant clump which had been recorded in 2014 at SU 32530 08002). One Pitcher Plant seedling was found nearby at SU 32532 08001 (Figure 41, Figure 42, Figure 43).



Figure 41: Volunteers searching for Pitcher Plants on 9 November 2015 in vicinity of the clump of Pitcher Plants which had been removed on 13 August 2014 from SU 32530 08002



Figure 42: The 3 Pitcher Plant seedlings removed from SU 32531 08000 on 9 November 2015



Figure 43: The total of 4 Pitcher Plant seedlings removed on 9 November 2015 (3 seedlings from SU 32531 08000 and 1 seedling from SU 32532 08001)

6.2.3. Control of Pitcher Plants in the Matley area in 2016

On Monday 15 August 2016 the Project Officer led three volunteers to check the Matley area. No seedlings were found at the following locations:

- SU 32251 08409
- SU 32218 08365
- SU 32213 08364

A total of six Pitcher Plant seedlings (Figure 44) were found at SU 32531 08002 on the edge of the hole where the mature Pitcher Plants had been dug up on 13 August 2014 at SU 32530 08002.



Figure 44: The 6 Pitcher Plant seedlings removed from the Matley area on 15 August 2016

The Project Officer decided to arrange another monitoring visit during Summer 2018. It was agreed there would be no need to check these sites in Summer 2017 as a) there was no risk that seedlings would grow to maturity, flower and produce seed and b) any seedlings would have a chance to grow and be easier to locate in Summer 2018.

6.2.4. Control of Pitcher Plants in the Matley area in 2018

On 20 August 2018 the Project Officer and a volunteer visited the locations in the Matley area where Pitcher Plants had been discovered in 2014.

On 20 August 2018 no pitcher plants were found at the following grid references:

- SU 32251 08409
- SU 32218 08365
- SU 32213 08364

One small pitcher plant was found at SU 32532 08001 and one small pitcher plant was found at SU 32533 08001 (Figure 45).



Figure 45: Small Pitcher Plant dug up at SU 32532 08001 from Matley area on 20 August 2018

6.2.5. Control of Pitcher Plants in the Matley area in 2019

On 12 August 2019 the Project Officer and two volunteers visited the Matley area. No Pitcher Plants were found at the following locations:

- SU 32251 08409
- SU 32218 08365
- SU 32213 08364.

One small Pitcher Plant was found at SU 32531 08000 (Figure 46 and Figure 47).



Figure 46: Pitcher Plant dug up at SU 32531 08000 on 12 August 2019

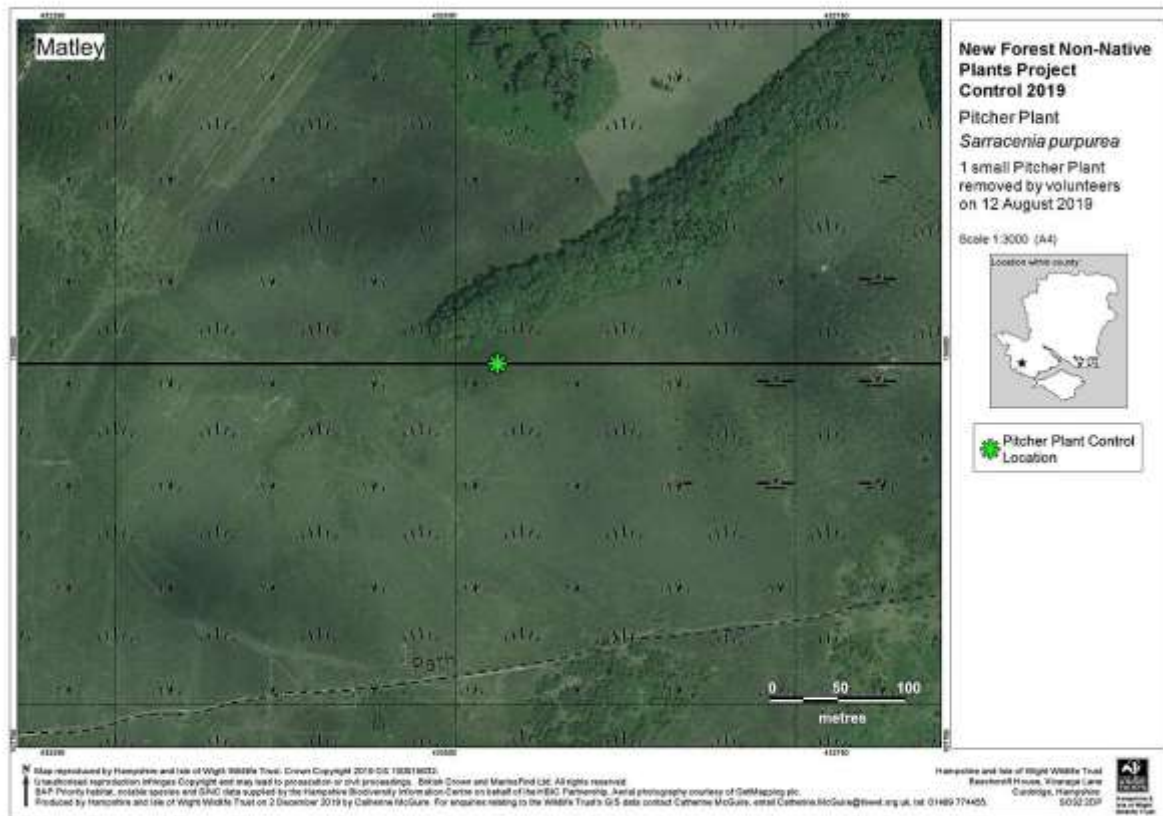


Figure 47: Location of the Pitcher Plant removed from the Matley area on 12 August 2019

Further monitoring and removal, if necessary, is scheduled to be undertaken during August 2020.

The Project Officer is very grateful to the volunteers who have helped to monitor and remove the Pitcher Plants in the Matley area since 2014.

7. CONTROL OF PITCHER PLANT NEAR WOOTTON BRIDGE

7.1. Wootton Bridge

The area where Pitcher Plant has been found here is an area of species-rich wet heath to the east of Wootton Bridge in the catchment of the Avon Water, as indicated on the map at Figure 6. It lies within the New Forest SSSI, SAC, SPA and Ramsar Site.

7.1.1. *The Pitcher Plant population near Wootton Bridge*

In September 2014 Tim Bailey, the Chairman of The Carnivorous Plant Society contacted the Project Officer and mentioned that he had discovered Pitcher Plants growing near Wootton Bridge at SZ 25253 99687 during 2013. He had removed most of the plants but a larger plant remained which could not be pulled out by hand.

7.2. Control of Pitcher Plants near Wootton Bridge

7.2.1. *Control of Pitcher Plants near Wootton Bridge in 2014*

On 19 September 2014 volunteer John Moore helped the Project Officer dig up the remaining clump of Pitcher Plants which was approximately 45cm x 30cm and had approximately 60 pitchers (Figure 48).



Figure 48: Volunteer John Moore with clump of Pitcher Plants dug up from the site near Wootton Bridge on 19 September 2014

7.2.2. Control of Pitcher Plants near Wootton Bridge in 2015

Volunteer John Moore returned to the site on 12 October 2015 to check for seedlings but did not find any Pitcher Plants.

7.2.3. Control of Pitcher Plants near Wootton Bridge in 2016

On 7 November 2016 volunteers helped the Project Officer to check the site for seedlings but did not find any.

7.2.4. Control of Pitcher Plants near Wootton Bridge in 2017

On 6 November 2017 three volunteers visited the site with the Project Officer and thoroughly searched the area in the vicinity of SZ 25253 99687. Ten juvenile plants were found quite close to the place where the large clump had been dug up in 2014. In addition, a mature plant (with a seed head) and a large juvenile plant were discovered a little further away whilst walking back to the cars. The mature plant was found at SZ 25251 99694 and the large juvenile plant was found at SZ 25252 99693 (Table 15).

Table 15: Location of Pitcher Plants recorded at site near Wootton Bridge on 6 November 2017

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SZ 25254 99687		1			
SZ 25254 99686			1		
SZ 25252 99688		1			
SZ 25252 99688		1			
SZ 25252 99687				1	
SZ 25252 99687		1			
SZ 25252 99686				1	
SZ 25252 99685		1			
SZ 25252 99685			2		
SZ 25251 99694					1 (mature plant with seed pod)
SZ 25252 99693				1	
TOTALS	0	5	3	3	1

7.2.5. Control of Pitcher Plants near Wootton Bridge in 2018

On 5 November 2018 four volunteers helped the Project Officer check the area where Pitcher Plants had been found in previous years. A wider area in the vicinity was also searched that day. A total of 13 Pitcher Plants was discovered. The majority of the plants were juveniles. Two seedlings were found. One Pitcher Plant was a mature plant with a seed head. Two other plants were large and, although they did not have evidence of a flower or a seed head, they have been categorised as 'mature' plants in the table below (Table 16).

Table 16: Location of Pitcher Plants recorded at site near Wootton Bridge on 5 November 2018

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SZ 25253 99689					2 (large plants; although no

					evidence of flower or seed head)
SZ 25253 99688					1 (mature plant with seed head)
SZ 2525399687	2		1		
SZ 25252 99686		1			
SZ 25251 99685		1			
SZ 25251 99689				1	
SZ 25251 99687			1		
SZ 25252 99685			1		
SZ 25250 99686		1	1		
TOTALS	2	3	4	1	3

7.2.6. Control of Pitcher Plants near Wootton Bridge in 2019

On 4 November 2019 two volunteers helped the Project Officer check for Pitcher Plants (Figure 49). A total of 3 Pitcher Plants were discovered and removed by trowel or by hand; they were all juvenile plants and there was no evidence of flowers or seed pods (Table 17 and Figure 50).

Table 17: Location of Pitcher Plants recorded at site near Wootton Bridge on 4 November 2019

GPS reading	Seedlings	Small juvenile plants	Medium juvenile plants	Large juvenile plants	Mature plants
SZ 25252 99689		1	1		
SZ 25251 99685				1	
TOTALS		1	1	1	



Figure 49: Volunteers searching for Pitcher Plants at site near Wootton Bridge on 4 November 2019

Further monitoring and removal, if necessary, is scheduled to be undertaken during November 2020.

The Project Officer is very grateful to the volunteers who have helped to monitor and remove the Pitcher Plants in the area near Wootton Bridge since 2014.

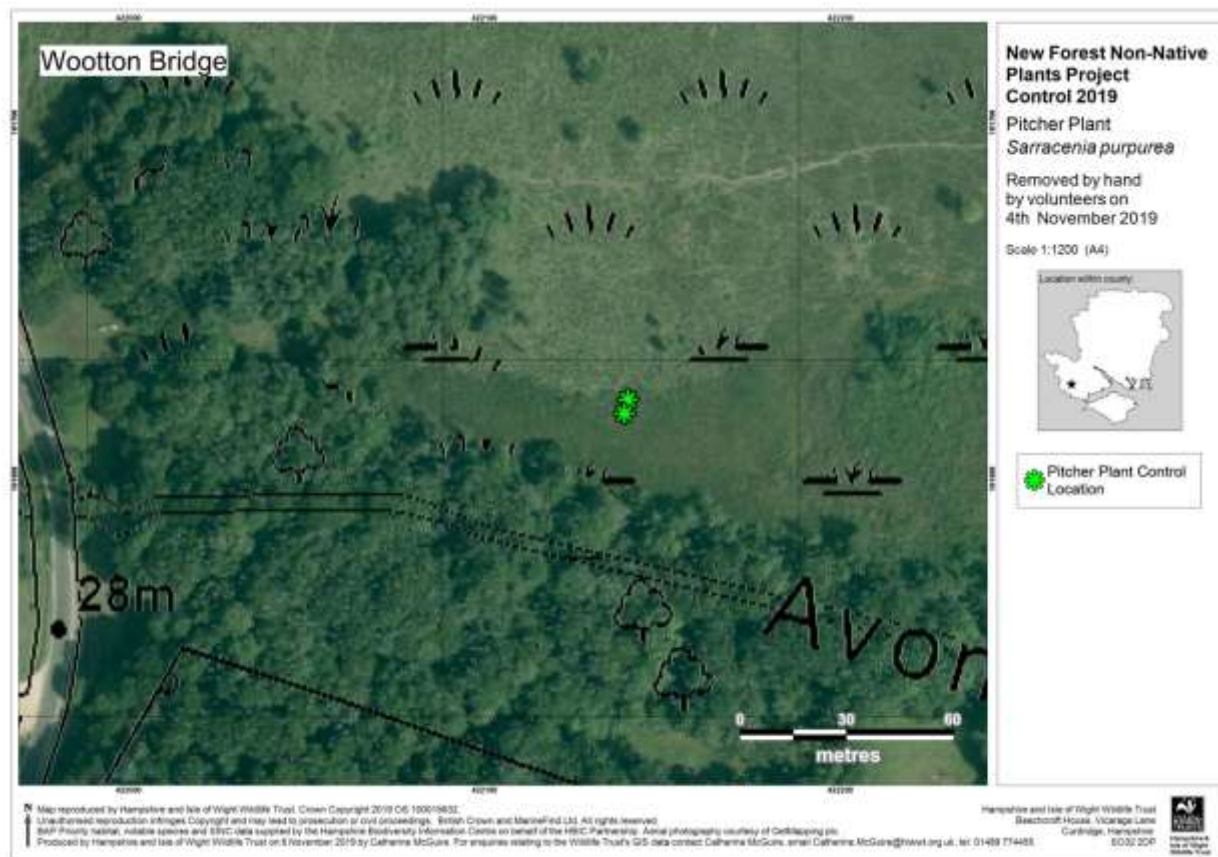


Figure 50: Location of the Pitcher Plant removed from the site near Wootton Bridge on 4 November 2019

8. CONCLUSIONS

8.1. Results of the work undertaken by the NFNNPP to control Pitcher Plants

8.1.1. *Work undertaken at Holmsley Bog*

When the NFNNPP started work to control Pitcher Plants at Holmsley Bog, the population comprised the original 'mother plant' (which had formed a substantial clump of Pitcher Plants measuring approximately 120 cm x 120 cm), mature plants, juvenile plants and seedlings extending for approximately 30 metres downstream from SU 22082 01629.

Between February 2010 and November 2019 at least 988 'plants' had been removed, although it is important to note that this figure is an under-estimate as some of these 'plants' were large clumps comprising a number of individual Pitcher Plants.

By November 2019 only 14 seedlings and juvenile Pitcher Plants were found at Holmsley Bog.

Further monitoring is scheduled to be undertaken at this site during November 2020.

8.1.2. *Work undertaken at Two Bridges Bottom*

The NFNNPP started work to control Pitcher Plants at Two Bridges Bottom during August 2016 when over 126 plants were removed. Further work was undertaken during the following three years and by August 2019 only one small Pitcher Plant was found here.

Further monitoring is scheduled to be undertaken at this site during August 2020.

8.1.3. *Work undertaken at Acres Down*

The monitoring undertaken by the NFNNPP indicates that the Pitcher Plant population has been eradicated at SU 27094 08824 since its removal in December 2012. Further monitoring is scheduled to be undertaken here in 2020.

Monitoring is scheduled to be undertaken in 2020 to ascertain whether any seedlings have germinated at SU 27039 08573 where the Pitcher Plant was dug up in August 2019.

Only one seedling Pitcher Plant was found during 2019 in the part of Acres Down where the commoner had alerted the Project Officer to the Pitcher Plant population during November 2017. Further monitoring is scheduled to be undertaken here in 2020.

8.1.4. *Work undertaken in the Matley area*

The work arranged by the Project Officer has resulted in the eradication of Pitcher Plant at three of the locations where it had been discovered by the NFNNPP in the Matley area.

Further monitoring is scheduled to be undertaken at these three locations during Summer 2020 to check whether any seedlings have germinated.

By August 2019 only one small Pitcher Plant was found at the fourth location where Pitcher Plant had been discovered by the NFNNPP in the Matley area.

Further monitoring is scheduled to be undertaken at this location during Summer 2020.

8.1.5. *Work undertaken near Wootton Bridge*

Following the removal of Pitcher Plants from the site near Wootton Bridge by Tim Bailey in 2013, the NFNNPP removed a substantial clump of Pitcher Plants during 2014. Since then the NFNNPP has removed a further 28 plants. By November 2019 only three Pitcher Plants were found at the site and they were all juvenile plants.

Further monitoring is scheduled to be undertaken at this site during November 2020.

8.2. Influence of the NFNNPP in relation to control of Pitcher Plants

8.2.1. Influence of the practical work undertaken at Holmsley Bog

The work undertaken by the NFNNPP to control Pitcher Plants at Holmsley Bog is referred to in the New Journal of Botany as an example of successful manual removal of plants where numbers of mature and juvenile plants were relatively small, in comparison with larger populations such as at Wedholme Flow in Cumbria where over 6 tonnes of material have been removed since 2000 with no apparent effect on the overall size of the population (Walker, 2014).

Walker considers that the work carried out at Holmsley Bog highlights a) the importance of controlling pitcher plant populations during the relatively early stages of establishment and b) the need for careful monitoring of regeneration. Walker concludes that 'by comparison, the eradication of large, well-established populations has been much less successful and indeed the experience at Wedholme Flow suggests that the removal of such populations will be costly and almost impossible without causing significant damage to sensitive sites'.

8.2.2. Influence of the research commissioned by NFNNPP at Holmsley Bog

The research at Holmsley Bog by Neil Sanderson which was commissioned by the NFNNPP in 2012 has helped to demonstrate the potential impact of Pitcher Plant on ecologically important wetland habitats.

Sanderson's report (Sanderson, 2012) is cited by Walker (Walker, 2012) who highlights the potential for Pitcher Plant to displace bryophyte communities on moss cushions and hummocks which often comprise localised bog moss *Sphagnum* species (eg *S. magellanicum* and *S. tenellum*) that support rich epiphytic liverwort communities including bog specialists that are nationally rare/scarce or regionally threatened.

The research by Sanderson has contributed to Walker's advice that although some botanists and conservationists have been reluctant to remove populations of Pitcher Plant, 'its invasive behaviour should warn against complacency, especially given the threatened nature of the habitats into which it has been introduced' (Walker, 2014).

9. THE FUTURE

9.1. The need for funding

Further work is needed to complete the control of Pitcher Plants at Holmsley Bog, Two Bridges Bottom, Acres Down, Matley and Wootton Bridge and to monitor these sites in order to be confident that eradication has been achieved.

9.2. Financial Year 2020/21

The NFNNPP will continue during the 2020/21 financial year but at a reduced capacity. A programme of volunteer work parties has been arranged to undertake practical control and monitoring at the sites which are subject to this report.

9.3. Beyond 2020/21

The funding for work on the Crown Land provided by the New Forest Higher Level Stewardship Scheme will expire at the end of February 2021 and although it is hoped that this Scheme may be 'rolled on' for another year, there is currently no certainty about future sources of funding for the Crown Land on the Open Forest.

The important role of Local Action Groups (LAGs) such as the New Forest Non-Native Plants Project is recognised by government. The Great Britain Invasive Non-native Species Strategy recognises that LAGs are critical to the successful control and eradication of invasive non-native species and acknowledges that LAGs have 'controlled common species.....put in place prevention and early detection mechanisms, instigated training and supported awareness raising...' (DEFRA, 2015).

During July 2019 the House of Commons Environmental Audit Committee's Invasive Species Inquiry considered the role of LAGs. Lord Gardiner of Kimble (Parliamentary Under-Secretary of State for Rural Affairs and Biosecurity) and Dr Niall Moore (Chief Non-Native Species Officer, DEFRA) gave evidence at the inquiry and both specifically referred to the New Forest Non-Native Plants Project. Lord Gardiner referred to the day he spent pulling Himalayan balsam with the NFNNPP and Dr Moore referred to the NFNNPP as one of the most active LAGs.

The Environmental Audit Committee's report which was published on 25 October 2019 (House of Commons, 2019) recommended that 'the Government should take a more strategic, coordinated and resourced approach' to LAGs and 'The Government should fund Local Action Groups on a long term (five yearly basis) and coordinate them through the Non Native Species Secretariat.'

This report relating to some of the successful control work undertaken by the New Forest Non-Native Plants Project between 2009 and 2019 has demonstrated the important role of the Project as a Local Action Group in responding rapidly to new reports of invasive non-native plants, mobilising volunteers to undertake practical control, ensuring that sites are monitored and implementing The Great Britain Invasive Non-native Species Strategy at a local level through effective partnership working.

It is crucial that funding is secured to ensure the continuation of the New Forest Non-Native Plants Project.

10. ACKNOWLEDGEMENTS

Hampshire and Isle of Wight Wildlife Trust is very grateful for support from the following organisations involved with the control of Pitcher Plants in the New Forest



The New Forest Non-Native Plants Project wishes to acknowledge the co-operation of Natural England and the Forestry Commission / Forestry England.

The New Forest Non-Native Plants Officer acknowledges the help given by the volunteers who have generously given their time and worked enthusiastically to control Pitcher Plant in the New Forest and who have undertaken monitoring visits on behalf of The New Forest Non-Native Plants Project:

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- Patsy Baverstock
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- Dr Richard Hughes
- Nigel Javan
- Barry Lockyer
- Lisa Malter
- Tony Mundell
- John Moore
- Martin Rand
- Neil Sanderson
- Dr David Smart
- Jane Smith

The New Forest Non-Native Plants Officer acknowledges the help given by Jay Doyle of the Forestry Commission and Bridget Leyden of Natural England who have helped to monitor and control Pitcher Plant on behalf of The New Forest Non-Native Plants Project.

Grateful thanks to those people who have agreed to their photographs being reproduced in this report. The name of the relevant photographer or the source of the photograph is acknowledged beneath each picture. All other photographs have been taken by Catherine Chatters (New Forest Non-Native Plants Officer).

Thanks to Paul Brock for help with identifying the invertebrates found within pitchers at Holmsley Bog.

Thanks to Clive Chatters (Hampshire and Isle of Wight Wildlife Trust) for proof-reading this report and thanks to Catherine McGuire and her colleagues (Hampshire & Isle of Wight Wildlife Trust) for preparing the maps used in this report.

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12. APPENDICES

12.1. Appendix 1 – Note dated 21 December 2012 submitted to Forestry Commission

NEW FOREST NON-NATIVE PLANTS PROJECT Pitcher plant *Sarracenia purpurea* – a note on its spread and colonisation at Holmsley Bog in The New Forest

Holmsley Bog is within:-

- The New Forest Site of Special Scientific Interest (SSSI) notified in accordance with the Wildlife and Countryside Act 1981 (as amended)
- The New Forest Special Area of Conservation (SAC) designated in accordance with Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
- The New Forest Special Protection Area (SPA) classified in accordance with Directive 79/409/EEC on the Conservation of Wild Birds
- The New Forest Ramsar Site, an international designation denoting wetlands of international importance
- The New Forest National Park

A population of the non-native pitcher plant *Sarracenia purpurea* became established at Holmsley Bog in the New Forest following unauthorised planting on 'Crown Land' managed by the Forestry Commission.

According to 'The Flora of Hampshire' published in 1996 *Sarracenia purpurea* was known to occur at Holmsley Bog when two plants were recorded here by Martin Noble and Alison Bolton during 1987 and which were 'obviously introduced'.

Since 1987 when these two plants were recorded, the population of *Sarracenia purpurea* had increased significantly. By February 2010 (when the New Forest Non-Native Plants Officer visited the site and took GPS readings) the population extended from SU 22082 01629 (upstream limit) to SU 22110 01616 (downstream limit on the northern side of the bog) and to SU 22099 01611 (downstream limit on the southern side of the bog).

At the New Forest Non-Native Plants Project Steering Group meeting in September 2012 the New Forest Non-Native Plants Officer agreed to provide the Forestry Commission with information regarding the numbers of *Sarracenia purpurea* plants removed from Holmsley Bog by the New Forest Non-Native Plants Project during 2010 and 2012. Refer to table below.

Table 1: Number of *Sarracenia purpurea* 'plants' removed from Holmsley Bog during volunteer work parties since the start of the New Forest Non-Native Plants Project

Date	Number of 'plants' removed
3 February 2010	165
29 October 2012	313
Total	478

On 3 February 2010 a volunteer helped the Project Officer to remove 165 *Sarracenia purpurea* 'plants'. However it is important to note that some of these 'plants' were actually large clumps comprised of a number of individual plants. The remaining plants were left un-dug due to the limited capacity of the containers to take the plants away.

A volunteer work party was held on 29 October 2012 to remove the majority of the remaining *Sarracenia purpurea* plants, but to retain the 'mother plant' as stipulated by the Forestry Commission.

The extent of the pitcher plant colony on the morning of 29 October 2012 (prior to the removal of the majority of the plants by the volunteer work party that day) is indicated on the attached map prepared by Hampshire and Isle of Wight Wildlife Trust on behalf of The New Forest Non-Native Plants Project.

On 29 October 2012 volunteers helped the Project Officer to remove a total of 313 pitcher 'plants'. Again, it is important to note that some of these 'plants' were actually large clumps comprised of a number of individual plants.

By the end of the work party on 29 October 2012 only the 'mother plant' (at SU 22083 01628) remained.

The population of *Sarracenia purpurea* at Holmsley Bog had therefore spread from two plants recorded in 1987 to at least 479 'plants' by autumn 2012.

However, the Project Officer has heard anecdotal information about local naturalists 'unofficially' removing *Sarracenia purpurea* plants from Holmsley Bog over a number of years as they were concerned about the impact of the spread of *Sarracenia purpurea* on the ecologically highly important wetland habitat within Holmsley Bog.

Therefore the figures given above (and the map which accompanies this report) are highly likely to under-represent the actual spread of *Sarracenia purpurea* since the two plants were recorded in 1987.

The remaining 'mother plant' is approximately 120 cm x 120 cm and is a source of seed which will result in further colonisation of Holmsley Bog if it is not removed.

The New Forest Non-Native Plants Project therefore strongly recommends that the Forestry Commission give authorisation for the 'mother plant' to be removed as soon as possible, to prevent further damage to this ecologically important wetland site within the New Forest SSSI, SAC, SPA and Ramsar Site.

Report prepared on 21 December 2012 by
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