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# South Downs National Park

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## Invasive Non-Native Species Strategy

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## **PREAMBLE**

This draft is an updated version of the Invasive Non-Native Species (INNS) Strategy for the South Downs National Park (SDNP) prepared by Kate Ryland of Dolphin Ecological Surveys and the Sussex Biodiversity Record Centre (SxBRC). The update was commissioned as part of the legacy phase of the Heritage Lottery funded Arun & Rother Connections (ARC) Project.

The report briefly set out the international, national and local context for Invasive Non-Native Species (INNS) work within the South Downs National Park (SDNP). This strategy includes information on recent research legislation and makes reference to some of the work already being carried out in and around the SDNP.

The report summarises data supplied by Hampshire and Sussex Local Record Centres (LRCs) on INNS recorded in and around the SDNP. This data was used to make a preliminary list of priority species for action by SDNP and its partners. It is important to note that control works should not be limited to this list.

The strategy outlined in this document aims to build an initial framework to guide the work of the new partnership (SIT) and the individuals, organisations and groups working to tackle the threats posed by INNS.

The strategy has been prepared at a time when significant changes are underway that may affect its ongoing implementation. In particular, the decision to leave the European Union may affect the national legislation relating to INNS.

This report includes a set of objectives and recommendations. Individuals, groups and organisations working on INNS issues in and around the National Park must be prepared to be flexible in implementing this Strategy to ensure that it makes the greatest possible contribution to the collective effort to address a problem that can only be solved through effective partnership working.

INNS are a problem globally and there is an enormous amount of work going on in the UK within government and non-governmental organisations, in different areas, focused on specific habitats, regions, land designations, river catchments and even taxonomic groups.

There is a real danger that the simultaneous production of numerous INNS research projects, initiatives and strategies is leading to inefficiencies and resulting in the duplication of effort and, worse, wasting limited resources.

It is imperative that partners work together to support each other's efforts and share resources, expertise and experience to fight the threat of INNS effectively. This will help to ensure the best use of available, limited resources.

## **SUMMARY OF PRINCIPLES UNDERLAYING THE STRATEGY**

- INNS have a negative impact on ecosystem services therefore management of INNS is an essential and integral part of the sustainable management of the SDNP natural resources.
- Effective management of INNS has benefits for the environment, the economy, human health and well-being and recreation.
- INNS are a shared responsibility between many different stakeholders and can only be tackled successfully in cooperation with others. All stakeholders need to be clear about their roles.
- The development, implementation, monitoring and review of an INNS strategy must be underpinned by good science.
- A risk management approach should inform the prioritisation and funding of INNS work.
- Prevention and early intervention are the most cost-effective measures.
- Coordination and capacity building are needed between all levels of government, industry, landowners, NGOs and the community regardless of the land tenure/ownership where the INNS occur.
- Adequate resources are needed in the long-term for effective and sustainable action.
- Short-term and small-scale actions against INNS without sufficient funding or follow-up are usually a waste of time, effort and money.
- It should be acknowledged that control of some species is neither possible nor practical (for example the harlequin ladybird) and resources should not be wasted on these.

## **INNS DEFINITION**

**(Source: GB Non-Native Species Information Portal)**

- A non-native species (or alien species) is a species introduced by human action outside its natural past or present distribution; this includes any part, gametes, seeds, eggs or propagules of such species that might survive and subsequently reproduce.
- An invasive non-native species (or alien invasive species) is a non-native species that has the ability to spread causing damage to the environment, the economy, our health or the way we live.

Note: Subspecies or varieties can also be invasive and have an adverse impact on habitats and ecosystems.

## PART I. BACKGROUND

### I.0 INTRODUCTION

#### I.I Why are INNS a problem?

There are nearly 2,000 non-native species established in GB, most of which are terrestrial (c.1,800) with smaller numbers in the marine and freshwater environments (c.80 in each). The number of new arrivals is also increasing with 10-12 new non-native species becoming established every year. This trend is mirrored across Europe and the rest of the world. If it is not addressed, it is expected to continue increasing for the foreseeable future.

About 10-15% of non-native species established in GB cause significant adverse impacts. Aquatic species tend to be more invasive than terrestrial ones and animals more invasive than plants. Impacts include:

- Environmental: Disrupting habitats and ecosystems, preying on or out-competing native species, spreading disease, and interfering with the genetic integrity of native species. The ecological impact of some INNS, such as the American mink, are well known, but many other impacts are less visible;
- Economic: The cost of INNS in GB is at least £1.7 billion per year. Much of this cost is borne by the agriculture and horticulture sector, but many other sectors, including transport, construction, aquaculture, recreation and utilities, are also affected. Japanese knotweed alone is estimated to cost the British economy around £166 million per year;
- Social: Some species, such as Giant hogweed cause problems to human health or are a nuisance to landowners. Invasive plants clog water bodies preventing access for navigation and angling. Some significant threats to human health are posed by species not yet in GB but that could establish in the future. For example, the Asian hornet which has killed at least seven people in France since its introduction, and ragweed which has substantially increased hay fever suffering across many European countries.

The impacts of INNS are not always predictable. It is very easy to underestimate the damage they will cause and in the past many opportunities to take early control or preventative, precautionary actions have been missed.

Climate change is likely to exacerbate the situation as the range of some harmful species may expand in response to changing temperatures, for example recent research suggests that climate change (increasing air temperatures) is facilitating the spread of Harlequin ladybird across the UK. In addition, climate change can lead to formerly low risk species becoming far more problematic, for example where low winter temperatures have restricted overwinter survival of INNS.

Acknowledging the growing threat from non-native species, the Convention on Biological Diversity provides a major driver for international action. One of its guiding principles calls for national strategies on INNS. At the EU level, the Invasive Alien Species Regulation (EC 1143/2014) that came into force on 1 January 2015, in which the UK had a major input, represents a step change in approach and requires Member States to implement a range of measures for the prevention and management of 37 INNS.

## **2.0 NATIONAL CONTEXT**

### **2.1 GB NNSS Strategy**

The Great Britain Invasive Non-Native Species Strategy (2015) follows on from the 2008 GB NNSS Framework Strategy. The 2008 Strategy was drafted in the knowledge that, while the majority of non-native species pose little or no risk, INNS are a significant and growing problem; however, the threat to Great Britain was largely unquantified. The 2015 strategy recognises that we now have considerably more knowledge of the magnitude of the issue we face.

## **3.0 PREVENTION VERSUS CURE**

The most cost-effective and least environmentally damaging way to address the problems caused by INNS is by prevention of introduction, rapid-response and early intervention and this forms the focus of the GB INNS Strategy (2015).

In order to do this it is essential to know which non-native species are most likely to become invasive in natural and semi-natural habitats and how they are most likely to arrive (pathways).

The GB protocol is that a rapid screening process is used to identify high-risk taxa, for which full risk assessments can then be prepared. This work is currently being completed by the GB NNSS for a number of INNS.

### **3.1 Horizon Scanning for Future INNS**

There has been a significant amount of research work on ‘horizon scanning’, which aims to identify the INNS of the future.

Two separate horizon scanning research reports, funded by Natural England (NE), were carried out recently for future invasive flora and fauna in England. Their results have informed the recently completed Defra-funded research report, which comprises a register of non-native species for the GBNNS-IP (see [www.nonnativespecies.org](http://www.nonnativespecies.org) ).

Additionally, a DEFRA and CEH funded research project and report ‘Non-native species in Great Britain; establishment, detection and reporting to inform effective decision making’ (Roy et al 2012)

provides a wealth of INNS information including data on their biology, functional type, habitats occupied, invasion pathways, establishment status and impact. The results are available on the GBNNS-IP,

This work is intended to contribute to a robust, science-based mechanism to allow resources to be directed most effectively towards species of greatest potential future risk. It is essential for those working to control INNS to be familiar with these reports. Summaries of these reports have been included in the Appendices (Appendices 2, 3 and 4).

### **3.2 Online recording of INNS**

On-line reporting of INNS by as many people as possible has been encouraged through a number of initiatives, including RISC (Recording Invasive Species Counts) led by the National Biodiversity Network (NBN) Trust and CEH, the GBNNS-IP online ‘alert’ system and several newly developed smart phone apps, most notably iRecord.

Whilst collecting data about widespread and easily recognised INNS may be assisted by on-line recording and encouraging public awareness of some INNS is an important objective, there are a large number of high risk species, identified in the Species Register, that are only likely to be recognised and found by expert surveyors carrying out methodical and targeted survey work.

The on-line schemes have met with different levels of success and should not be considered as adequate substitutes for active, systematic survey and data gathering for high risk INNS by suitably experienced personnel.

### **3.3 Control of established INNS**

The actions needed to attempt to control or eliminate INNS once they have become established in the wild include a wide range of different techniques and depend on many factors such as the ecology of the species being tackled, the size and distribution of the INNS population, the habitats and landscapes involved, availability of resources, and partnership working.

This strategy does not include details of the conventional control techniques typically used for individual INNS since that information is readily available from other sources including the GBNNS-IP.

The control of INNS should be targeted to where it would really make a difference and it must be accepted that some species are not cost-effective or practical to address with current technology.

Examples of targeted actions proposed in this strategy are:

- Himalayan balsam (*Impatiens glandulifera*). Control of this species is unrealistic without a viable bio-control option and so control measures should be restricted to pulling at key sites (e.g. head waters or upstream of sites of conservation importance).

Technical feasibility is not the only important factor to be considered when attempting to tackle an INNS population. Public acceptance may also be crucial to the success of a control programme and for obvious reasons there are likely to be significant differences between the public palatability of control proposals for invasive fauna (e.g. Grey Squirrel, Deer sp. and American Mink) rather than invasive flora. High standards of animal welfare and ethics must always be part of the decision on how and when to undertake control of animal INNS populations.

### **3.3 Future potential for the biological control of INNS**

Some INNS are already widespread in the wild in Britain and some have been established for many years. Attempts to control or eliminate these entrenched species by various mechanical or chemical means have taken considerable financial and other resources with little success in many cases.

The risks of poorly regulated or ill-considered bio-control techniques are well known and there are examples from all over the world of the control agent ultimately causing more harm than the original target INNS. However, current EU and UK regulation and licensing procedures are very rigorous and it is to be hoped that lessons have been learnt from the mistakes of the past.

It would be inadvisable to discount the possibility of using bio-control agents to tackle some of the most intractable and harmful INNS that are proven to cause significant environmental, economic and social damage.

CABI International, a research organisation, is undertaking Defra-funded work on five UK entrenched INNS, which are either riparian or aquatic and thus pose particular difficulties for manual or chemical control.

- **Japanese knotweed** *Fallopia japonica* (work ongoing since 2002): A knotweed specific psyllid bug (*Aphalaroida itadori*) is undergoing field trials – more work still needed.
- **Himalyan balsam** *Impatiens glandulifera* (work ongoing since 2006): A rust fungus (*Puccinia komarovii*) has been trialled as a biocontrol option. Field trials have started – more work still needed.

- **New Zealand pigmyweed *Crassula helmsii*:** A new project is starting with Brighton University, CABI and EA to further the biological control of New Zealand pigmyweed on the Pevensey Levels.
- **Floating pennywort *Hydrocotyle ranunculoides*:** The Argentinean weevil (*Listronotus elongatus*) is promising and currently awaits further export and quarantine consents.
- **Water fern *Azolla filiculoides*:** Effective bio-control of water fern is already something of a success story using the weevil *Stenopelmus rufinasus*. The weevil is ordinarily resident in the UK so there are no restrictions on its use as a biological control agent in the wild.

## **4.0 SUMMARY OF RELEVANT LEGISLATION**

Full details of the 14 UK Acts that have some connection to INNS work are given on the GB NNS-IP <http://www.nonnativespecies.org/factsheet/index.cfm>.

The most relevant are:

### **National**

- [The Wildlife and Countryside Act 1981 \(as amended\) Section 14](#)

Schedule 9 of this Act contains a list of those species which it is illegal to release or allow to escape into the wild. Parts of the Wildlife and Countryside Act have been strengthened by the Countryside and Rights of Way Act 2000.

- [The Natural Environment and Rural Communities Act 2006](#) (which amends the Wildlife & Countryside Act) Section 50 of the NERC Act allows the Secretary of State to ban the sale of invasive non-native species known to cause damage in England and Wales.

A ban under Section 50 has been implemented recently (coming into force in 2014) outlawing the sale of five particularly pernicious aquatic INNS species (water fern, parrot's feather, floating pennywort, New Zealand pigmyweed and water primrose).

Section 51 of the NERC Act allows the issue of codes of practice (such as the Horticultural Code of Practice), which set out the measures necessary to prevent damage by the release of non-native species.

## **European**

There are also numerous European conventions and legal instruments that cover different facets of invasive alien species including the Bonn Convention, the Habitats Directive, the Water Framework Directive and the EC wildlife trade regulations.

Under the Bern Convention the European Strategy on Invasive Alien Species has been published (2003) and provides a framework for action. It encourages the development of national strategies across the EU (such as the GB Framework Strategy, which has been in place since 2008).

The EU comprehensive Biodiversity Strategy - *Our life insurance, our natural capital: an EU Biodiversity Strategy to 2020* contains an important target (Target 5) “By 2020 Invasive Alien Species (equivalent to INNS) and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS.”

The EU Biodiversity Strategy proposes an EU-level approach to INNS, aims to strengthen the existing Plant and Animal Health regimes and to develop a dedicated legislative instrument to address non-native species control issues such as prevention, early warning and rapid response for new invaders as well as control and containment of established INNS.

The resultant EU Invasive Alien Species Directive was entered into force on 1 January 2015. The Regulation imposes restrictions on a list of species known as “species of Union concern”. These are species whose potential adverse impacts across the European Union are such that concerted action across Europe is required. This list is drawn up by the European Commission and managed with Member States using risk assessments and scientific evidence. The list of the 37 species can be found here: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R1141&from=EN>.

## **PART 2. THE SOUTH DOWNS NATIONAL PARK INNS STRATEGY**

### **5.0 The need for a SDNP INNS strategy**

The South Downs National Park (SDNP) covers an area of 1,653 km<sup>2</sup> (618 miles<sup>2</sup>) and comprises a diverse and wildlife-rich landscape with a range of different terrestrial, freshwater and coastal habitats. However, the SDNP is also heavily impacted by a wide range of human activities. This includes the introduction and spread of invasive non-native species (INNS) throughout the catchment.

The Vision for the South Downs National Park is contained within the 2012 [State of the Park](#) report. This report, produced by the SDNPA, includes a wealth of information about all aspects of the National Park and is intended as a baseline against which future change can be monitored.

The threat that invasive species pose to biodiversity is highlighted in the State of the Park report, along with the need for more data on INNS and how they affect habitats in the National Park.

The habitats present in the SDNP are broadly categorised within the following groups: farmland, chalk, lowland heath, and woodland, floodplain grazing marsh, rivers and streams, coastal and marine, and urban.

The aim of this strategy is to direct future INNS work within the SDNP. It will help to deliver international and national INNS response strategies at both the regional and local level in the habitats that occur within the National Park.

At an international level the Convention on Biological Diversity (CBD) has adopted and promotes a three-staged hierarchical approach to addressing INNS:

1. Prevention
2. Detection/surveillance
3. Control/eradication

Well-informed, cooperative and coordinated action to combat INNS at local, regional, national and international level is the only way that this serious threat to biodiversity and ecosystem services can be adequately addressed.

The State of the Park report will act as a foundation for the new South Downs National Park Partnership Management Plan (published January 2014 – see [www.southdowns.gov.uk](http://www.southdowns.gov.uk)) and the Local Plan (in preparation). This SDNP INNS Strategy act as a key delivery mechanism for the new SDNP Partnership Management Plan, particularly Policy 8: ‘Focus the prevention, control and eradication of invasive non-native species on those that are most harmful to biodiversity’.

The development of a new INNS partnership will further strengthen the SDNP and its partner’s ability to tackle INNS (at the park and catchment scales).

## **5.1 The South Downs Invasives Taskforce (SIT)**

The South Downs Invasives Taskforce is new a partnership between the SDNPA and a number of NGO’s, Government Agencies and Stakeholders within the SDNP (Full list in Fig. 1).

**Figure 1. South Downs Invasives Taskforce Partners**

- **SDNPA**
- **RSPB**
- **Natural England**
- **West Sussex County Council**
- **National Trust**
- **SxBRC**
- **Deer Initiative**
- **Sussex Wildlife Trust**
- **Environment Agency**
- **Arun and Rother Rivers Trust**
- **Horsham District Council**
- **Forestry Commission**
- **MAVES (Mid Arun Valley Environmental Survey)**

SIT came together to discuss INNS control after the ARC Project, a 2.2 million pound HLF funded project finished in November 2016. As part of the ARC Project's Legacy the RSPB (lead partner) called for a new partnership to be formed to continue tackling INNS within the SDNP.

A priority list of INNS species was developed for the SDNP (Fig. 2). These species are believed to be causing or have the greatest potential to cause significant harm and/or there is a realistic chance of a feasible control mechanism if sufficient resources were to be made available.

It is important to note that INNS control should not be limited to this list. Each partner, stakeholder, NGO, and community will be affected by INNS not listed here and to differing degrees of severity.

SIT emphasises the need to enable staff to recognise INNS, provide good advice to others, to share information and take appropriate action where it is most likely to make an impact.

### **Fig. 2 Key INNS for SIT**

#### **Priority level A**

- 1 Giant hogweed (*Herracleum mantegazzium*)
- 2 New Zealand Pigmy Weed (*Crassula helmsii*)
- 3 Floating pennywort (*Hydrocotyl ranunculoides*)
- 4 Japanese knotweed (*Fallopia japonica*)
- 5 Rhododendron (*Rhododendron ponticum*)
- 6 Cotoneaster (*Cotoneaster spp.*)
- 7 American mink (*Neovison vison*)

#### **Priority level B**

- 8 Himalayan balsam (*Impatiens glandulifera*)
- 9 Water fern (*Azolla filiculoides*)
- 10 American Skunk Cabbage (*Lysichiton americanus*)
- 11 Parrots feather (*Myriophyllum aquaticum*)

## **6.0 SCOPE OF THE STRATEGY**

### **6.1 Biological scope**

This Strategy is concerned with the plant and animal INNS that are already found within the SDNP as well as those which have the potential to become established in the area in the future.

The Strategy does not evaluate the historic extent of INNS within the SDNP nor does it compare current and historical records to prioritise species that pose the highest risk. This is because there is currently a lack of accurate information on the distribution, density and impact of INNS within the SDNP. Making such assessments based on the current evidence base would be misleading and of limited value to developing and implementing an effective INNS strategy for the SDNP.

Emphasis is placed on the highest risk species, which are most likely to do ecological, economic or cultural harm, and those for which action is technically and ethically feasible.

Some organisms are excluded from the definition of INNS used and the biological scope of the SDNP strategy (see section 6.3 below).

### **6.2 Geographical Scope**

The Strategy is restricted to the South Downs National Park. This includes the littoral zone but not marine habitats since the SDNP boundary is the low water mark.

INNS are having a profound impact on marine habitats as well as on freshwater and terrestrial systems, but marine and coastal issues are not addressed in this document as they deserve separate consideration.

### **6.3 Exclusions**

There are some exclusions from this strategy including: birds, genetically modified organisms, plant and animal diseases, fungi, pathogens, and micro-organisms. The rationale for these exclusions can be found in the Appendices (Appendix. 5).

## **7.0 CHALLENGES TO INNS WORK ACROSS THE NATIONAL PARK**

### **7.1 The varied nature of the SDNP**

The SDNP encompasses a large area of land with varied landscapes and habitats (terrestrial, freshwater, coastal and urban). The boundary of the SDNP cuts across many other boundaries, which are political, ecological and geographical in nature.

The large extent of the SDNP and its diverse nature mean that effective INNS work will always need to be based on partnerships and cooperation. There will also need to be a range of different solutions and approaches to the problems posed by INNS across this varied landscape.

The National Park is neither more nor less vulnerable to the negative impacts of INNS than any other area in the UK and there are already many INNS established in the various semi-natural habitats and urban areas of the Park. The recent establishment of the National Park provides the impetus and opportunity to address this problem across the whole of the National Park in a targeted and coordinated way.

Control of INNS is a priority in the South Downs National Park Partnership Management Plan: ‘Policy 8: Focus the prevention, control and eradication of invasive non-native species on those that are most harmful to biodiversity’

### **7.2 Species Distributions and administrative boundaries**

The SDNP is a designated landscape within the wider region of South East England. Inevitably none of the INNS covered by this strategy are completely restricted to the National Park itself nor will action in the National Park alone be sufficient to address national populations of INNS in a meaningful way (other than any small, isolated populations that lie wholly within SDNP).

Riparian INNS such as Giant Hogweed or American Mink need to be tackled at a catchment scale whilst terrestrial INNS such as muntjac deer occur both inside and outside the National Park boundary and will readily spread into new areas if control is not coordinated across a wide zone, which should be defined by deer population dynamics rather than by administrative areas.

### **7.3 Large numbers of stakeholders**

There are some significant population centres within the SDNP and a plethora of different stakeholders. This presents both an opportunity and a challenge.

The opportunity is to develop and strengthen links with a wide range of landowners, land managers and other partners with the aim of improving INNS coordination and delivery. There is also an opportunity to enlist the support of residents and users of the National Park.

The challenge is that there are many different interest groups associated with the National Park, some of whom may not immediately sympathise with or understand the need to put resources into INNS work.

A communication strategy should be developed to identify how best to engage with the different stakeholders within the park about INNS.

### **7.4 Lack of accurate distribution data**

In common with all those working on INNS in the UK and in Europe, our ability to make evidence-based recommendations for prioritising action on particular species is often hampered by a lack of good data about their distribution and impact.

Since accurate data about the distribution and population size of most INNS known to occur in the SDNP is lacking, it has been necessary to rely on historic records held by SxBRC and HBIC in order to set priorities. However, most of these species records are passively gathered and submitted to the local LRCs rather than being derived from systematic surveys.

It should be noted that the data from both local records centres will not be either current or comprehensive due to a combination of data input lag times and the types of data sources, which are generally not from targeted INNS surveys.

In addition some of the mapped invasive species distribution data presented in Appendix I can be very misleading, depending on the resolution of data available, for example records of species found within a 10km<sup>2</sup> area are not very illuminating. Older records are also of limited use in planning effective INNS control strategies. The currency and precision of INNS distribution data are

displayed in the accompanying maps and it is recommended that they are used for reference only and not for directing effective INNS control strategies.

### **7.5 The need to make evidence based decisions**

The decision on whether action to control or eradicate any INNS is appropriate should be based on sound evidence that the species has, or is likely to have, a significant negative impact (ecological, social or economic).

In addition control measures should only be instigated where success is technically feasible and when the measures are humane and safe for people and wildlife.

The difficulty is that sometimes the evidence needed to support a decision on whether INNS control is appropriate or not is in short supply. Addressing the evidence gap is a national and international priority action that is currently underway.

A considerable amount of information about the ecology of some INNS, and their interactions with their environments, is available from the GBNNS-IP factsheets as well as from several other sources such as the EA and Plantlife.

These sources, and others, also provide exhaustive information about current research on control methods and techniques associated with INNS work.

### **7.6 Rapidly emerging new information**

There is a considerable amount of rapidly emerging INNS information including new research into control techniques and strategies to address INNS. The situation nationally is very fluid especially since the EU Referendum. There is a lot of ambiguity and speculation surrounding European Legislation and how it may be transposed to UK law. There is an opportunity for the SDNPA and SIT to use the EU Referendum as a stepping stone to raise the profile of INNS and to secure protection for our natural environment.

It is important for Land managers and others working with INNS need to keep abreast of many new developments, including national level horizon scanning work. However, it is also important to remember that there is a degree of uncertainty associated with national level work therefore local expert knowledge and opinions should also have a place in developing local invasive species strategies.

The SDNP INNS Strategy must remain flexible and be regularly updated to allow a timely response to new information about the level of risk posed by different INNS and how best to tackle them.

### **7.7 Costs**

A significant challenge is the cost of implementing effective action on INNS. Systematic surveys, communication networks, elimination or control programmes and monitoring their effectiveness are all potentially expensive and require ongoing financial commitment, often over a long timescale. However, the costs of doing nothing often far outweighs the costs of carrying out timely research, prevention and control.

## **8.0 AIMS AND OBJECTIVES FOR THE SDNP INNS STRATEGY**

The main aim of this Strategy is to provide an initial framework (based on current legislation and with regard to national INNS strategies) that will minimise the risk and reduce the negative impacts caused by INNS within the SDNP.

The SDNP INNS Strategy objectives can be summarised under the following broad headings:

1. Supporting existing relevant partnerships and lead the new South Downs Invasives Taskforce (SIT).
2. Promoting targeted research, cooperation and information sharing.
3. Building awareness and understanding through education and engagement.
4. Supporting and delivering work to prevent new incursions of INNS in the SDNP.
5. Enabling early detection and a rapid, appropriate response to new incursions.
6. Undertaking mitigation, control and eradication of established species where appropriate.
7. Supporting and coordinating ongoing surveillance, monitoring and recording of INNS.

## **9.0 IMPLEMENTATION OF THE SDNP INNS STRATEGY**

### **9.1 Guiding Principles**

There is a considerable amount of work and change going on at the national and European level that will have an impact on INNS work in the SDNP. The SDNP INNS Strategy needs to sit within the existing framework of international and national strategies and to be informed by UK priorities.

The South Downs Invasives Taskforce could follow all the guiding principles of the GB INNS Framework Strategy, but to be most effective it should prioritise work and resources to carry out, support and promote INNS work within the SDNP.

There must be a considered and realistic approach to prioritising action on specific INNS within the National Park with a focus on the higher risk species that pose a greater threat to the SDNP, rather than non-natives that show a low level of invasiveness.

SIT is likely to make the greatest contribution in the areas of building awareness and support, coordination, cooperation and capacity building, although it would also have an important role play in prevention, monitoring, early detection and rapid response.

## **9.2 Actions**

### **9.2.1 Partnership Working**

The SIT will be key to successfully tackling INNS in the National Park. The SDNPA is well placed to promote cooperation across many different sectors, organisations and individuals for example wildlife NGOs, local community groups, authorities, statutory agencies, farmers, and landowners.

Many landowners and land managers, for example local farmers, wildlife trusts and the National Trust, are already engaged in work to control INNS in the SDNP, especially key species such as Rhododendron, Cotoneaster and Himalayan Balsam. Appropriate, ongoing coordination and support will help to make the work of others more sustainable in the long term.

The SIT could develop new partnership projects within which INNS management lessons can be learnt, such as with other National Parks in Britain and research bodies such as CEH and British Ecological Society Invasive Species Specialist Groups.

**Action 1a:** Continue to work as part of SIT, the INNS partnership for the SDNP.

**Action 1b:** Coordinate and support existing INNS work, projects and partnerships in the SDNP.

**Action 1c:** Develop new partnerships and projects to improve the effectiveness of INNS work in the SDNP.

### **9.2.2 Promoting targeted research, cooperation and information sharing**

The patchy nature of the evidence base for INNS status and distribution in the SDNP is a key problem that needs to be addressed.

Targeted, active (rather than passive) recording and monitoring for INNS in the SDNP should be a priority for future action. Systematic survey and monitoring is vital to enable targeting and prioritisation of effort within the SDNP. Lack of resources for INNS survey and monitoring work is an ongoing problem which should be tackled by SIT.

One option for consideration could be for partners to contribute to an INNS Officer post for the SDNP (similar to the New Forest NNS Officer). A dedicated officer would help support and bring together many of the disparate INNS work and projects that are either active or planned in the area (see partnership text box).

A dedicated INNS project officer would provide a valuable focus for the SDNP INNSP, data collation and cooperative working as well as a mechanism to implement many of the recommendations in this strategy.

The amount of attention and the increased resources being made available for INNS work across the region is positive, however there is a danger of duplication of effort and gaps in coverage. SDNPA should be responsible for maintaining an overview of the different projects going on within the SDNP and monitoring their effectiveness.

**Action 2a:** SIT to assess the need for a dedicated INNS project officer for the SDNP, and secure resources for this post if the partners agree this is a priority.

**ACTION 2b:** SIT to promote cooperation amongst SDNP stakeholders to support INNS work.

**ACTION 2c:** SDNPA to maintain an overview of INNS work and projects in the National Park, identify gaps and seek to plug these.

### **9.2.3 Building awareness and understanding through stakeholder engagement**

The SDNPA is in a unique position to engage effectively with many different types of people, all of whom have a role to play in preventing and controlling INNS in the National Park. Key stakeholders include farmers, large estates, individuals and groups concerned with land management, government bodies, NGOs, local communities, the horticultural trade and the tourism industry.

Effective communication about INNS to the many different types of people who live in and visit the National Park offers an important mechanism for partners to increase awareness of, and support for, INNS work carried out locally and regionally.

Members of SIT could provide INNS training and raise awareness of INNS problems and solutions across multiple sectors, including landowners, businesses and conservation organisations working within the National Park.

The SDNPA has responsibility for planning matters within the SDNP, though some of this work is devolved to local authorities. There is potential to engage and inform planning officers across the SDNP about INNS and to ensure that planning requirements and conditions support the guiding principles of this INNS Strategy.

In particular biodiversity survey requirements set out by planning authorities should include an emphasis on the need to detect and report INNS at proposed development sites.

**ACTION 3a:** SIT to develop a communication strategy and produce a suite of INNS communication materials for the National Park (for example information leaflets).

**ACTION 3b:** SIT to provide INNS training for key stakeholders for example landowners and land managers.

**ACTION 3c:** SDNPA to integrate appropriate INNS survey work, reporting and control into the planning system for the SDNP.

#### **9.2.4 Supporting work to prevent and rapidly respond to new incursions**

In the past a lot of INNS control effort and resources have focused on the widely distributed and established INNS, especially wetland and aquatic invasive species. Some of this work has been successful and sustainable, but a lot of resources have been wasted through poorly conceived, short-term schemes.

The potential for safe and effective bio-controls for some species (such as water fern) in the short term and the acceptance that some species (such as New Zealand pigmyweed and the harlequin ladybird) may currently be impossible to control or eradicate with existing technology, suggests that in future far more resources should be directed towards using every method available to prevent potentially harmful species becoming established rather than attempting to “put the genie back into the bottle”.

Preventing new incursions requires a combination of good surveillance, effective data sharing and fast action.

**ACTION 4a:** SIT to regularly monitor spread of new INNS, assess which new INNS species are likely to come into the SDNP in the near future, and take any appropriate action to prevent new incursions.

HBIC and SxBRC have a vital role to play in the early detection of INNS in the SDNP. New records submitted to them must be processed quickly and there needs to be an effective system of alerting landowners and managers to the presence of potentially harmful new INNS.

**ACTION 4b:** SxBRC and HBIC to provide regular data updates to SIT on new records of high risk and “Alert” species found within the SDNP. This would allow the Partnership to plan and deliver appropriate preventative action and control.

**ACTION 4c:** SxBRC and HBIC to work together to produce a single, comprehensive, up-to-date list of INNS for the SDNP (this list should be regularly updated).

**ACTION 4d:** SDNPA to work with SxBRC and HBIC to ensure timely and targeted INNS data sharing.

**ACTION 4e:** SxBRC and HBIC to provide regular INNS data updates and reports to the SDNP INNSP.

The SDNP INNS lists held by LRCs should include “Alert” species and should be drawn up in consultation with SIT. These lists should also be informed by guided by relevant NE research reports and the Species Register on the GBNNS-IP with input from local experts.

#### **9.2.5 Mitigation, control and eradication of established INNS**

Many individuals, organisations, partnerships and projects already carry out control work on INNS in the SDNP, such as clearing rhododendron and cherry laurel from woodland and heathland sites, clearing Himalayan balsam along watercourses, and controlling American mink in and around riparian habitats.

There is an immediate need to target the worst problem species that are actually causing harm to native biodiversity rather than spreading effort and resources too thinly. Species with populations that are static or which do not appear to pose a threat or intractable species to which there may be a novel solution in the near future should be considered as a lower priority for action (see tables in Part 3).

Himalayan Balsam is a particularly good example of a very harmful species for which bio-control may be the only realistic, sustainable control method. This species is now so widespread and well established in all the SDNP river catchments that its control is only really feasible or economically viable on selected, high conservation-value sites. Yet its impacts reach beyond its riparian habitat, through destabilising riverbanks, adding to soil erosion in floodplains and increasing silt burdens in rivers, affecting fish spawning habitat and farmland soil fertility.

**ACTION 5a:** Stakeholders to continue to carry out appropriate, targeted control work on priority species (informed and coordinated by SIT).

#### **9.2.6 Supporting ongoing surveillance and monitoring**

Relevant stakeholders, for example landowners and SDNPA rangers, should receive training in survey, reporting and monitoring INNS as well as in control techniques.

There is currently limited robust baseline data specifically for the SDNP, which means that comprehensive monitoring cannot of INNS cannot yet be implemented at the landscape scale. Identifying gaps in the data and working in partnership to plug these gaps should be a high priority.

Site level monitoring where INNS work is already underway is important and will contribute to long-term datasets. For example, the Arun and Rother Connections (ARC) Conservation Officer has collected relevant aquatic INNS data and coordinated control within the Arun and Rother catchment.

It is important to ensure that sufficient resources are put into monitoring the impacts of any practical INNS control work undertaken.

INNS work carried out in the SDNP should include at least basic photographic monitoring of sites.

Long-term monitoring of INNS work on the ground should be for a period of at least five years so that the initial work is not wasted if a species returns following control work.

**Action 6a:** Train relevant stakeholders in INNS survey, recognition, monitoring, and control techniques.

**Action 6b:** Identify gaps in baseline data about INNS populations in the SDNP and work with partners to plug these gaps.

**Action 6c:** Implement site level monitoring of INNS control work in the SDNP, highlighting successes and failures.

**Action 6d:** SIT to seek ongoing funding for INNS monitoring work in the SDNP in order to ensure that monitoring is funded for sufficiently long periods of time to yield valid data.

## **10. OPPORTUNITIES FOR REGIONAL COOPERATION AND PARTNERSHIP WORKING**

There are many opportunities in the SDNP to work with others to survey, monitor and control INNS. Indeed, there are already numerous partnerships and cooperative projects underway across the region that are well positioned to help implement some of the objectives of this Strategy.

The following examples illustrate the types of biodiversity-focused partnerships and projects that are in development (or have already commenced) within the SDNP, and which could deliver INNS work as part of their remit:

- Heathlands Reunited (lead partner: SDNPA).

- The South Downs Forestry Partnership (lead partner: SDNPA).
- Water Framework Directive (WFD) projects (lead partner: EA). The requirements of the WFD have prompted a variety of catchment-focused projects across the region. The Adur and Ouse was a pilot catchment. Arun, Rother and Cuckmere partnerships are being developed.
- Local Rivers Trusts (various lead partners). These are partnerships that largely consist of landowners and local stakeholders. They include the Arun and Rother Rivers Trust (ARRT), The Ouse and Adur Rivers Trust (OART). There is also a newly created SE Rivers Trust, set up as a strategic body.
- The Southern Chalk Streams Project (lead partner: Hampshire and Isle of Wight Wildlife Trust). One focus of this project is the threat posed by the North American signal crayfish to the native fauna of chalk rivers.
- The Meon Valley Partnership (lead partner: SDNPA). This partnership has carried out work to map the extent of invasive riparian species in the Meon catchment, part of which is within the SDNP.
- Brighton, Hove and Lewes Downs Biosphere Project (lead partner: Brighton and Hove City Council).
- The South East Deer Initiative (led by a dedicated project officer, funded by project partners). This covers all species of deer, not just INNS.
- Local Nature Partnerships for Sussex and Hampshire (lead partners: Sussex and Hampshire Wildlife Trusts respectively). Both Hampshire and Sussex LNP s are themed around ecosystem services.
- Local Wildlife Sites Partnerships. These focus on non-statutory designated sites of wildlife value in West, East Sussex and Hampshire. Such sites are in varied ownership but may represent important foci for INNS control work.
- Control of INNS within the SDNP is also carried out by a wide range of landowners and land managers working individually or in small local groups. The South Downs Land Managers Group could be a useful mechanism to promote INNS work among landowners and land managers.

These examples are just some of the many partnerships, projects and schemes that are potential vehicles for INNS work in the SDNP. There are many other partnerships that have a different focus through which members of the SDNP INNSP could engage.

### **Case Study: The New Forest Non-Native Plants Project (NNPP)**

This partnership project was set up in 2009 to control the spread of invasive non-native species of plants in the New Forest National Park, particularly along watercourses. The main partners are the Forestry Commission, Natural England, Defra, the New Forest National Park Authority, the Verderers of the New Forest, and Hampshire and Isle of Wight Wildlife Trust.

Project priorities are:

- **Research** into the impacts of non-native plant species on habitats in the New Forest.
- **Testing new methods of control** on non-native plant populations in the New Forest, to assess effectiveness and value for money.
- **Coordinating and carrying out control of INNS** by partner staff and volunteers.
- **Advising landowners and land managers** on appropriate INNS control methods.
- **Awareness raising** with landowners, land managers, and members of the public (to improve prevention and control of INNS).

Funding for this project is contributed by project partners, and the project has also secured some funding through Interreg (an EU funding stream). Some of this funding has been used to employ a dedicated Project Officer, who is an expert in non-native plant species and appropriate control methods.

Staff and volunteers from the project partners support the project by direct involvement with invasive species control work and by attending training courses to learn more about the problems caused by INNS. This knowledge helps them to promote the project to people with whom they come into contact.

Partner outreach staff take mobile displays around the National Park and talk to many visitors about issues affecting the Park, including the problem of INNS. They give out INNS leaflets and encourage people to get involved with the Project.

The New Forest NNPP Project Officer is just beginning to work with local planning staff to find out how together they can use the planning system help to tackle INNS.

## **II. OPPORTUNITIES FOR TARGETED INNS CONTROL WITH VOLUNTEERS**

Volunteers are a hugely valuable resource in the ongoing work to tackle INNS. The ARC project has shown how a coordinated volunteer effort can make a significant impact at the landscape scale. The project recruited 429 volunteers who collectively delivered 492 days of work tackling invasive species (over two seasons). As part of the ARC project a Volunteer Strategy and Training Plan (2016

- 2021) was developed for the catchment. This can be downloaded at [www.arunwesternstreams.org.uk/resources](http://www.arunwesternstreams.org.uk/resources).

### **PART 3. THE CURRENT STATE OF KNOWLEDGE OF INNS IN THE SDNP, SUGGESTED PRIORITY SPECIES AND DRAFT OBJECTIVES FOR HIGH PRIORITY SPECIES**

#### **Summary of INNS data for the SDNP supplied by LRC's**

A combined list of INNS (excluding birds and marine species) from in and around the SDNP was provided by SxBRC and HBIC and includes records from river catchments surrounding the SDNP. The SIT will assess that data provided by SxBRC and HBIC and make informed decisions inform prioritisation of INNS projects.

The following tables give a very approximate division of the SDNP INNS by habitat and make preliminary recommendations for the priority they should be accorded for action within the Strategy.

Objectives for high priority species are provided (see table 4 overleaf) and are based on current evidence base and are in line with national action plans where available. It is advised that detailed action plans for each species are developed to incorporate all INNS actions outlined in this document and that input from a range of partner bodies are obtained for both the generation and implementation of each plan to ensure the objectives for each species are met.

#### **Table I. High priority INNS for the SDNP**

Species are suggested as being of higher priority for control or action because:

- They are already believed to be causing significant harm

or

- They have greatest potential to cause harm in SDNP

and/or

- There is a realistic chance of a feasible control mechanism if sufficient resources were to be made available

<b>Habitat type</b>	<b>High priority INNS</b>
Chalk grassland	<u>Higher plants</u> Cotoneasters <i>Cotoneaster spp.</i> *
Lowland heath	<u>Higher plants</u> Rhododendron <i>Rhododendron ponticum</i> * Shallon <i>Gaultheria shallon</i> Yellow azalea <i>Rhododendron luteum</i>
Woodland (including acid woodland and wet woodland)	<u>Higher plants</u> American skunk cabbage <i>Lysichiton americanus</i> * Rhododendron <i>Rhododendron ponticum</i> * Shallon <i>Gaultheria shallon</i> Variegated yellow archangel <i>Lamiastrum galeobdolon ssp. argentatum</i> Yellow azalea <i>Rhododendron luteum</i> False acacia <i>Robinia pseudoacacia</i> Cherry laurel <i>Prunus laurocerasus</i> <u>Mammals</u> Muntjac <i>Muntiacus reevesi</i>
Wetland (including lakes and ponds), grazing marsh, rivers and streams (including riparian habitat)	<u>Higher plants</u> New Zealand pigmyweed <i>Crassula helmsii</i> * (new infestations on high value sites only) Giant hogweed <i>Heracleum mantegazzianum</i> * Floating pennywort <i>Hydrocotyle ranunculoides</i> * Indian balsam <i>Impatiens glandulifera</i> * (on high value sites only) Curly waterweed <i>Lagarosiphon major</i> American skunk cabbage <i>Lysichiton americanus</i> * Parrots feather <i>Myriophyllum aquaticum</i> * Giant rhubarb <i>Gunnera tinctoria</i> <u>Mammals</u> American mink <i>Neovison vison</i> * <u>Reptiles</u> Red-eared terrapin <i>Trachemys scripta ssp. Elegans</i>

Please note: Species with \* are the SIT priority species

Urban habitats	<p><b>Higher plants</b></p> <p>Knotweeds <i>Fallopia spp.</i> *</p> <p>Virginia creeper <i>Parthenocissus quinquefolia</i></p> <p>False Virginia creeper <i>Parthenocissus inserta</i></p>
Non-habitat specific or multiple habitats	<p><b>Higher plants</b></p> <p>Knotweeds <i>Fallopia spp.</i> *</p> <p>Pampas grass <i>Cortaderia selloana</i></p> <p>Evergreen oak <i>Quercus cerris</i> (a threat in non-urban habitats)</p> <p><b>Invertebrates</b></p> <p>Gypsy moth <i>Lymantria dispar</i></p>

**Table 2. Lower priority INNS in the SDNP**

Species are suggested as being of lower priority for control or action because:

- They are already established beyond the point of feasible control at present
- and/or
- They are less likely to pose an immediate threat in SDNP
- or
- They are species for which there may be alternative, more effective control techniques in the near future

Habitat type	Lower priority INNS
Farmland	<p><b>Higher plants</b></p> <p>Common fiddleneck <i>Amsinckia micrantha</i></p> <p>Winter heliotrope <i>Petasites fragrans</i></p> <p>Japanese rose <i>Rosa rugosa</i></p>
Chalk grassland	<p><b>Higher plants</b></p> <p>Red valerian <i>Centranthus ruber</i></p>
Lowland heath	<p><b>Lower plants</b></p> <p>Heath star moss <i>Campylopus introflexus</i></p>
Woodland and woodland edges	<p><b>Higher plants</b></p> <p><i>Montbretia Crocosmia x crocosmiiflora</i></p> <p>Spanish and hybrid bluebell <i>Hyacinthoides hispanica</i> (<i>Hyacinthoides x</i>)</p> <p>Winter heliotrope <i>Petasites fragrans</i></p>

Habitat type	Lower priority INNS
	<p><b>Mammals</b></p> <p>Grey squirrel <i>Sciurus carolinensis</i></p> <p>Wild boar <i>Sus scrofa</i></p>
Wetland (including lakes and ponds), grazing marsh, rivers and streams (including riparian habitat)	<p><b>Higher plants</b></p> <p>Water fern <i>Azolla filiculoides</i> *</p> <p>New Zealand pigmyweed <i>Crassula Helmsii</i> *</p> <p>Waterweeds <i>Elodea spp.</i></p> <p>Indian balsam <i>Impatiens glandulifera</i></p> <p>Least duckweed <i>Lemna minor</i></p> <p>Duck-potato <i>Sagittaria latifolia</i></p> <p><b>Invertebrates (Crustacea)</b></p> <p>Signal crayfish <i>Pacifastacus leniusculus</i></p>
Coastal (marine excluded)	<p><b>Higher plants</b></p> <p>Red valerian <i>Centranthus ruber</i></p> <p>Japanese rose <i>Rosa rugosa</i></p>

Please note: Species with \* are the SIT priority species

**Table 4. Objectives for high priority INNS within the SDNP**

Scientific Name	Common Name	Objectives
<b>KINGDOM: PLANTAE</b>		
<i>Cortaderia selloana</i>	Pampas grass	<ol style="list-style-type: none"> <li>1. Gather accurate baseline data on the extent of this species within the SDNP and adjoining river catchments.</li> <li>2. Determine the impacts this species has on biodiversity.</li> <li>3. Control/eradicate this plant where it is having a detrimental impact on biodiversity and at adjacent/up-stream sites to prevent further spread.</li> <li>4. Prevent the spread of this plant and any new infestations by: <ol style="list-style-type: none"> <li>a) Increasing public awareness of the threats this plant poses to biodiversity.</li> </ol> </li> </ol>

		<p>b) Where feasible eradicate this plant within public gardens where it is known to be a source of spread.</p> <p>c) Discourage the planting of this species in horticulture and encourage the appropriate disposal of this plant.</p>
* <i>Cotoneaster spp.</i>	Cotoneasters	<p>1. Gather accurate baseline data on the distribution of this species within the SDNP and establish suitable methods of control.</p> <p>2. Guide the control/eradication of this species from sites where it is known to be having a detrimental impact on biodiversity.</p> <p>3. Prevent further spread and new infestations by:</p> <p>a) Increasing public and stakeholder awareness of the threat this species poses to biodiversity, with particular focus on domestic and public gardens on urban fringe and in rural areas.</p> <p>b) Encouraging the removal and appropriate disposal of this species in public/domestic gardens.</p>
* <i>Azolla Filiculoides</i>	Water Fern	<p>4. Gather accurate baseline data on the distribution of this species within the SDNP and establish suitable methods of control.</p> <p>5. Guide the control/eradication of this species from sites where it is known to be having a detrimental impact on biodiversity.</p> <p>6. Prevent further spread and new infestations by:</p> <p>c) Increasing public and stakeholder awareness of the threat this species poses to biodiversity, with particular focus on domestic and public gardens on urban fringe and in rural areas.</p> <p>d) Encouraging the removal and appropriate disposal</p>

		of this species in public/domestic gardens.
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Scientific Name	Common Name	Objectives
* <i>Crassula helmsii</i>	New Zealand pigmyweed	<ol style="list-style-type: none"> <li>1. Gather accurate baseline distribution data for this species and determine threat from this species in the SDNP and adjoining counties/river catchments.</li> <li>2. Guide the control/eradication of this species where it has recently established and where it occurs on sites with high conservation value. Particular efforts should focus on source populations.</li> <li>3. Prevent new infestations by:             <ol style="list-style-type: none"> <li>a) Raising public and stakeholder awareness of the threat this species has on biodiversity, with particular focus on groups linked to the spread of this species (fishermen, boating groups, dog walkers)</li> <li>b) Where feasible eradicating plants grown in public gardens.</li> <li>c) Determining priority areas 'at risk' to new infestations by mapping vectors and pathways of spread and proximity to known populations.</li> </ol> </li> <li>4. Keep abreast of progress with biological control methods.</li> </ol>
* <i>Fallopia spp.</i>	Knotweeds	<ol style="list-style-type: none"> <li>1. Gather accurate baseline data on the distribution of these species within the SDNP and adjoining river catchments.</li> <li>2. Guide the eradication/control of this plant at known localities, with focus on high conservation sites, upper reaches of rivers,</li> </ol>

		<p>individual/isolated plants prior to them becoming a source.</p> <p>3. Prevent new infestations and further spread by:</p> <ul style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the economic and ecological threat this species poses.</li> <li>b) Help to guide the appropriate removal and disposal of this species.</li> <li>c) Where feasible control/eradicate plants from public gardens.</li> </ul>
<i>Gaultheria shallon</i>	Shallon	<p>1. Gather accurate baseline data on the distribution of this species within the SDNP.</p> <p>2. Establish suitable methods of control and eradicate/control at sites, particularly heathland, where it is known to be having a detrimental impact on biodiversity.</p> <p>3. Prevent further spread and new infestations by:</p> <ul style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the environmental threats of this species.</li> <li>b) Controlling the movement of grazing cattle at sites where it is known to occur.</li> </ul>
<i>Gunnera tinctoria</i>	Giant rhubarb	<p>1. Gather accurate baseline distribution data for this species.</p> <p>2. Guide the control/eradication of this species at all sites where it is known to be having a detrimental impact on biodiversity. Particular efforts should be focussed on source populations along river catchments.</p> <p>3. Prevent the further spread of this species by:</p> <ul style="list-style-type: none"> <li>a) Raising public and stakeholder awareness of the economic and environmental impacts of <i>G. Tinctoria</i> with particular effort placed towards groups linked to the import and spread of this plant.</li> <li>b) Encouraging the removal and suitable disposal of</li> </ul>

		<p>domestic plantings</p> <p>c) Restricting the sale of this species where feasible.</p>
* <i>Heracleum mantegazzianum</i>	Giant hogweed	<ol style="list-style-type: none"> <li>1. Gather accurate baseline distribution data within the SDNP and adjoining river catchments.</li> <li>2. Guide the control/eradication of this species, notably at sites where it poses a risk to human health.</li> <li>3. Eradicate source populations along river catchments once identified.</li> <li>4. Prevent new infestations by: <ol style="list-style-type: none"> <li>a) Raising public and stakeholder awareness of the threat this species poses to human health.</li> <li>b) Eradicating individual/isolated plants prior to them becoming a source for larger infestations.</li> <li>c) Encouraging 'best practise' for river users to prevent the spread of seeds across river catchments.</li> </ol> </li> </ol>
* <i>Hydrocotyle ranunculoides</i>	Floating pennywort	<ol style="list-style-type: none"> <li>1. Gather accurate baseline data on the distribution of this species.</li> <li>2. Guide the control/eradication of this plant where it is having a detrimental impact on biodiversity, where it is likely to be attributing to the spread of this species within river catchments and where it is likely to be transported by human means to other sites.</li> <li>3. Prevent new infestations by: <ol style="list-style-type: none"> <li>a) Raising public and stakeholder awareness of the threat this species has on biodiversity, wither particular focus on groups linked to the spread of this species.</li> </ol> </li> </ol>

		<p>b) Where feasible, eradicating plants from ponds located within public gardens.</p> <p>c) Encouraging the removal and suitable disposal of domestic plantings.</p> <p>4. Keep abreast of progress with biological control methods.</p>
Scientific Name	Common Name	Objectives
* <i>Impatiens glandulifera</i>	Indian/Himalayan balsam	<p>1. Gather accurate baseline data on the distribution of this species within the SDNP and adjoining river catchments.</p> <p>2. Control/eradicate at high value sites only and where feasible control/eradicate populations upstream of site to prevent re-infestation.</p> <p>3. Prevent further spread by:</p> <ul style="list-style-type: none"> <li>a. Raising public and stakeholder awareness of the threat this plant has on wetland and woodland habitats, with particular focus on river users.</li> <li>b. Determine priority areas 'at risk' to new infestations by mapping vectors and pathways of spread and proximity to known populations.</li> </ul> <p>4. Keep abreast of progress with biological control methods.</p>
<i>Lagarosiphon major</i>	Curly waterweed	<p>1. Gather accurate baseline data on the distribution of this plant within the SDNP and adjoining river catchments.</p> <p>2. Eradicate/control this plant where it is known to be having a detrimental impact on biodiversity or is potentially a source that is facilitating further spread.</p> <p>3. Prevent new infestations and further spread by:</p> <ul style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the</li> </ul>

		<p>threats this species poses environmentally.</p> <ul style="list-style-type: none"> <li>b) Encourage the removal and appropriate disposal of plantings from domestic plants.</li> <li>c) Where feasible eradicating the species from public garden sites.</li> <li>d) Where feasible, restricting the sale of this species.</li> </ul>
<i>Lamiastrum galeobdolon ssp. Argentatum</i>	Variegated yellow archangel	<ul style="list-style-type: none"> <li>1. Gather accurate baseline distribution data for this species and determine the impact this plant has on biodiversity within the SDNP.</li> <li>2. Control/eradicate at sites where it is known to be having a detrimental impact on biodiversity, notably high value woodlands and along rivers.</li> <li>3. Prevent further spread of this species by: <ul style="list-style-type: none"> <li>a) Raising public awareness of the environmental impacts the species may have on woodlands/rivers in the SDNP.</li> <li>b) Where feasible, eradicating this plant from public gardens where it has the potential to spread to new sites.</li> <li>c) Encouraging the removal and suitable disposal of domestic plantings.</li> </ul> </li> </ul>

* <i>Lysichiton americanus</i>	American skunk cabbage	<ul style="list-style-type: none"> <li>1. Gather accurate baseline data on the distribution of this species within river catchments within and adjoining the SDNP.</li> <li>2. Eradicate/control all known population with particular focus on source populations in upper reaches of rivers catchments.</li> </ul>
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		<p>3. Prevent further spread and new infestations of this plant by:</p> <ul style="list-style-type: none"> <li>a) Increasing public awareness of the environmental and economical threats posed by this species.</li> <li>b) Where feasible preventing the sale/distribution of this species at retail outlets.</li> <li>c) Where feasible eradicate known populations from public gardens linked to river networks.</li> </ul>
* <i>Myriophyllum aquaticum</i>	Parrots feather	<p>1. Gather accurate baseline data on the distribution of this species.</p> <p>2. Control/eradicate at sites where this species is known to be having a detrimental impact on biodiversity and where it is likely to be 'at risk' of spreading to new sites.</p> <p>3. Prevent new infestations of this species by:</p> <ul style="list-style-type: none"> <li>a) Raising public and stakeholder awareness of the environmental and economic impacts of this species, with particular focus on wetland user groups.</li> <li>b) Encouraging the removal and appropriate disposal of plantings in domestic plants.</li> <li>c) Where feasible eradicating plants from public garden sites where it is known to occur.</li> <li>d) Where feasible, restricting the sale of this species.</li> </ul>
<i>Parthenocissus quinquefolia</i> / <i>Parthenocissus inserta</i>	Virginia creeper / False Virginia creeper	<ul style="list-style-type: none"> <li>a) Gather accurate baseline data on the extent of these species within the SDNP.</li> <li>b) Establish the impact of these species on biodiversity at infested sites across the SDNP</li> <li>c) Control/eradicate this species where it is known to be having a detrimental impact on biodiversity.</li> </ul>

		<p>d) Prevent new infestations of this plant by:</p> <ul style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the economic and environmental threats.</li> <li>b) Discourage the planting of this species in horticulture.</li> <li>c) Work with partners to help prevent this species being available to purchase from retail outlets.</li> </ul>
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<i>Prunus laurocerasus</i>	Cherry laurel	<ol style="list-style-type: none"> <li>1. Control/eradicate this species at sites where it is known to be having a detrimental impact on biodiversity. Particular focus should be given to high value woodlands. Eradication efforts should additionally focus on adjacent land/hedgerows to prevent re-infestation.</li> <li>2. Prevent further spread and new infestations by raising public and stakeholder awareness of the environmental and economic threat of these species and by undertaking promotional work to discourage the planting of these species in horticulture.</li> </ol>
<i>Quercus cerris</i>	Evergreen oak	<ol style="list-style-type: none"> <li>1. Gather accurate baseline data on the distribution of this species outside of urban areas.</li> <li>2. Control/eradicate this species where it is known to be having or has the potential to have a detrimental impact on biodiversity.</li> <li>3. Prevent new areas becoming colonised by: <ul style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the threats this plant has/will have on biodiversity.</li> <li>b) Where feasible eradicate the plant from public garden sites where it has the potential to spread into</li> </ul> </li> </ol>

		<p>semi-natural habitats.</p> <p>c) Discourage the planting of this species in horticulture.</p>
* <i>Rhododendron ponticum</i> / <i>Rhododendron luteum</i>	Rhododendron / Yellow azalea	<p>I. Continue to control/eradicate and prevent the spread of these species at known sites, especially high value woodlands and heathlands. Eradicate both species from adjacent land to prevent re-infestation.</p> <p>2. Prevent further spread and new infestations by raising public and stakeholder awareness of the environmental and economic threat of these species and by undertaking promotional work to discourage the planting of these species in horticulture.</p>

<i>Robinia pseudoacacia</i>	False acacia	<p>I. Gather accurate baseline data on the true distribution and impact on biodiversity of this species in semi-natural and development sites.</p> <p>2. Control/eradicate from all known sites, with particular focus on sites where it has the potential to/or is having a detrimental impact on biodiversity.</p> <p>3. Prevent further spread of this species by:</p> <p>a) Increasing public and stakeholder awareness of the ecological and economical threats of this species.</p> <p>b) Where feasible eradicate known plants from public garden sites.</p> <p>c) Encouraging the appropriate disposal of this species, with particular focus on gardeners.</p>
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## KINGDOM: ANIMALIA

<i>Lymantria dispar</i>	Gypsy moth	<ol style="list-style-type: none"> <li>1. Identify suitable methods for species detection and gather accurate baseline data on the distribution of this species within the SDNP.</li> <li>2. Determine the effect this species has on woodland habitats within the SDNP.</li> <li>3. Investigate suitable methods for predicting the spread of this species to allow the identification of 'at risk' sites so precautionary action can be taken.</li> <li>4. Prevent further infestations and spread by:             <ol style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the current and future threat this species poses on woodland biodiversity and ecosystem services.</li> <li>b) Work with stakeholder groups to develop suitable ways to prevent the spread of this species locally, regionally and nationally.</li> </ol> </li> </ol>
<i>Muntiacus reevesi</i>	Muntjac	<ol style="list-style-type: none"> <li>1. Investigate suitable methods for species detection to gather accurate baseline data on distribution across SDNP and adjoining counties.</li> <li>2. Develop and implement a Muntjac control programme in response to population monitoring.</li> </ol>
* <i>Neovison vison</i>	American mink	<ol style="list-style-type: none"> <li>1. Plan and deliver a comprehensive survey for the SDNP to gather good baseline data.</li> <li>2. Plan and deliver a monitoring programme for the SDNP.</li> <li>3. Identify and implement targeted control where conservation objectives for priority species require urgent action.</li> <li>4. Develop, coordinate and deliver a landscape scale eradication programme informed by the baseline survey and subsequent</li> </ol>

		monitoring work. Engagement with stakeholders is essential for successful elimination within river catchments.
<i>Trachemys scripta ssp. Elegans</i>	Red-eared terrapin	<ol style="list-style-type: none"> <li>1. Gather accurate baseline data on the distribution of this species within SDNP water bodies and adjoining river catchments.</li> <li>2. Control/eradicate species from all localities to prevent future spread and re-infestation of water bodies.</li> <li>3. Prevent further infestations by:             <ol style="list-style-type: none"> <li>a) Increasing public and stakeholder awareness of the current and future threat this species poses on biodiversity.</li> <li>b) Promoting a ban on imports of this species for the pet trade.</li> <li>c) Working with anglers and public gardens/park managers to help determine distribution and identify new infestations to allow a rapid response.</li> </ol> </li> </ol>
<i>Leucaspius delineatus</i>	Sunbleak	<ol style="list-style-type: none"> <li>1. Establish funding sources for Sunbleak removal in still waters in the National Park.</li> <li>2. Ascertain the true distribution the species by preparing fact sheet for landowners with ponds and fisheries managers and distribute throughout SDNPA.</li> <li>3. When Sunbleak populations are located, identify risks to wildlife and if pond is a priority for species removal.</li> <li>4. Work with the Environment Agency, landowners and others to remove species if location is considered a priority.</li> <li>5. The ability to prevent further infestations is limited due to the ecology of the species.</li> </ol>

## **12. REFERENCES**

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- South Downs Joint Committee (2008) *The South Downs Management Plan 2008 – 2013*. SDJC Arundel
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### **List of Abbreviations**

CEH = Centre for Ecology and Hydrology

Defra = Department of the Environment, Food and Rural Affairs

EA = Environment Agency

GBNNS = GB Non-Native Species

GBNNS-IP = GB Non-Native Species Information Portal

GBNNSS = Great Britain Non-Native Species Secretariat

HBIC = Hampshire Biodiversity Information Centre

HIWWT = Hampshire and Isle of Wight Wildlife Trust

INNS = Invasive Non-Native Species

LRC = Local Record Centre

NE = Natural England

RINSE = Reducing the Impact of Non-native Species in Europe (an EU-funded via Interreg IVA 2 Seas Programme of which Hampshire and Isle of Wight Wildlife Trust is a partner)

SDNP = South Downs National Park

SDNPA = South Downs National Park Authority

SWT= Sussex Wildlife Trust

SxBRC = Sussex Biodiversity Record Centre

### **Web links of relevance to the SDNP INNS Strategy**

CABI [www.cabi.org](http://www.cabi.org)

CEH [www.ceh.ac.uk](http://www.ceh.ac.uk)

DAISIE [www.europe-aliens.org](http://www.europe-aliens.org)

Environment Agency [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

GBNNSS-IP [www.nonnativespecies.org](http://www.nonnativespecies.org)

HBIC [www.hants.gov.uk/biodiversity/hbic](http://www.hants.gov.uk/biodiversity/hbic)

HWWT [www.H&IOW WT.org.uk](http://www.H&IOW WT.org.uk)

National Trust [www.nationaltrust.org.uk](http://www.nationaltrust.org.uk)

Natural England [www.naturalengland.org.uk](http://www.naturalengland.org.uk)

NOBANIS [www.nobanis.org](http://www.nobanis.org)

RINSE [www.ringse-europe.eu](http://www.ringse-europe.eu)

SWT [www.sussexwt.org.uk](http://www.sussexwt.org.uk)

SxBRC [www.sxbrc.org.uk](http://www.sxbrc.org.uk)

## Consultees

Organisations consulted during preparation of this draft strategy were:

South Downs National Park Authority, Sussex Biodiversity Records Centre, Hampshire Biodiversity Information Centre, Sussex Wildlife Trust, Hampshire and Isle of Wight Wildlife Trust, New Forest Non-Native Species Project, Environment Agency, Natural England, National Trust, and the Woodland Trust.

## APPENDICES

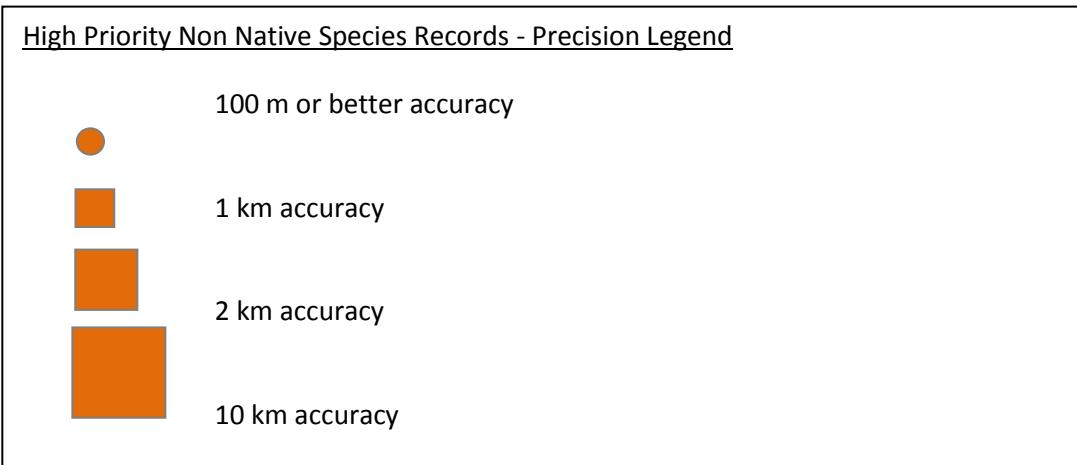
### APPENDIX I HIGH PRIORITY INNS DISTRIBUTION MAPS

The following maps show distributions within the SDNP for the high priority species identified within this Strategy. Maps are in alphabetical order of common name and categorised by taxonomic group (higher plants, mammals, reptiles, invertebrates). No records are held at the Sussex Biodiversity Record Centre for Sunbleak, so no map is provided.

The currency of each record is displayed in each map and can be identified using the legend. Where applicable, the most current record is displayed above older records obtained from the same area. The precision of each record is displayed as representative grid squares. Larger squares refer to lower precision records and smaller, point data refer to more precise species records with 100 m or better accuracy (see legend below).

Please note that when accounting for record precision and currency in the distribution maps presentation, older more precise records may be concealed by newer records that have been recorded with less accuracy. Priority of species record currency over precision was given for the purpose of this report.

It should also be noted that the maps featured in this appendices are based on data that was available at the time of publication and do not represent data collected from systematic surveys. These maps will need to be updated at regular intervals as accurate base line data resulting from the implementation of this strategy, is obtained.



## **UPDATED INNS DISTRIBUTION MAPS TO BE LOCATED HERE**

### **APPENDIX 2. FUTURE INVASIVE FAUNA**

In 2009 a NE research report (NECR009) carried out horizon scanning for potentially invasive fauna. Known, established INNS, such as grey squirrel and harlequin ladybird were excluded from the analysis.

The report used a rapid screening methodology based on one developed by the Belgian Forum on Invasive Species. This places species in a two dimensional listing system based on environmental impact (high, medium, low) and invasion stage (absent, enclosed/isolated population, locally established).

Using this methodology, animal species were assigned to one of the following categories:

- Black List (high risk species either present in isolated populations or locally established in the wild)
- Alert List (high risk species currently absent from the wild or present in England but contained in enclosed environments)

- Watch List (medium risk species either present, enclosed or absent).

A further list of species to watch as the climate changes is also likely to be valuable (the ‘Climate List’).

161 non-native fauna species were evaluated and resulted in:

- 12 Black List species
- 19 Alert List species
- 46 Watch List species
- 7 species on the Climate List

Pathways of likely invasion were also identified in the report.

The resulting lists allow prioritisation for the production of full risk assessments as well as containment/eradication action and other resources including preparation of contingency plans.

Species information sheets for high and medium risk species and a detailed risk assessment spreadsheet have been produced as part of this report.

### **APPENDIX 3. FUTURE INVASIVE FLORA**

In 2010 a NE research report (NECR053) carried out horizon scanning work for potentially invasive terrestrial and freshwater plant taxa using a rapid screening process (adapted from the Australian Weed Risk Assessment). This simplified version of the UK-adapted Full Risk Assessment protocol was based on 22 questions to assess current status in UK, status in other countries, invasive traits, reproduction, dispersal mechanisms and persistence attributes. The report is available on Natural England’s website – see [publications.naturalengland.org.uk/file/81003](http://publications.naturalengland.org.uk/file/81003)

Predicting whether a plant species will become invasive is not an exact science. The ‘invasiveness’ of a species is subject to variable influences, for example changing climate, differences in nutrient availability and land use change. Any of these factors may cause established but formerly harmless species to become more invasive. The horizon scanning research therefore incorporated a precautionary principle into the screening process.

In total 599 non-native plants of potential invasive concern were identified:

- 92 were ranked Critical for more detailed risk assessment as a matter of priority
- 55 ranked Urgent for more detailed risk assessment

Identifying which of the already established non-native species are high risk and carrying out a full risk assessment on these species will help to decide when offensive strategies (i.e. eradication) should be adopted rather than following defensive strategies (i.e. management or control). The different approaches potentially have very different long-term cost implications.

## **APPENDIX 4. THE GB NNS REGISTER**

With funding from Defra, the Centre for Ecology and Hydrology (CEH) coordinated a collaborative research project and published the report ‘Non-native Species in Great Britain: establishment, detection and reporting to inform effective decision making’ (Roy et al 2012). A copy of this report is available on the website [www.nonnativespecies.org](http://www.nonnativespecies.org)

It builds on the NE-funded horizon scanning work carried out in 2009-2010 for potentially invasive, non-native fauna and flora. The report contains a wealth of information about non-native species in Britain including data on their biology, functional type, habitats occupied, invasion pathways, establishment status and impact.

The results are accessible through the Great Britain Non-Native Species Information Portal (GBNNS-IP). This Information Portal hosts a database (the Species Register) that includes distribution data for more than 3000 UK non-native species. In addition detailed factsheets have been prepared for almost 300 of the “worst” INNS.

Excluded from the Species Register are pests of stored crops, human parasites and pests of human habitation (unless likely to be found in the wild) and most micro-organisms (except a few marine phyto-plankton).

Some headline figures from the report are:

There are 1875 established non-native species (those in self-sustaining populations) in GB:

- 1377 higher plants
- 278 insect species
- 141 non-insect invertebrates
- 50 vertebrates
- 25 lower plants
- 4 other species

(Data is incomplete for 26 established non-native species so the report summaries only cover the 1849 species for which data is complete)

Of the documented established non-natives in the CEH register:

- 1684 are terrestrial species (of which 1350 are higher plants)
- Freshwater species are dominated by 23 higher plants and 23 non-insect invertebrates
- Marine species are dominated by 50 non-insect invertebrates

Preliminary analysis suggests that of the 1849 established non-native species in GB:

- 147 (8%) have a negative ecological impact
- 188 (10.2%) have a negative human impact
- 53 (2.9%) have a negative ecological and human impact

The species considered to have negative impacts comprise 108 plants and 173 animals (and one species of marine alga).

There has been a dramatic increase in the number of non-native species arriving and becoming established in the UK over time, though not all new arrivals have caused problems. This is likely to be a consequence of increased human travel.

- 250 NNS became established between 1850-1899
- 417 in the years from 1900-1949
- 528 in the period from 1950-1999
- 125 new arrivals are known of since 2000 (only 40 are known to have become established so far, though others may still do so)

Most of the UK's existing NNS originate from mainland Europe, but more recently the number of species arriving from temperate Asia and North America has increased. This is likely to be a consequence of increased human travel to and from these continents.

Most terrestrial species arrive as ornamental introductions whilst freshwater arrivals are almost equally split between ornamental and aquaculture arrival pathways.

Marine species invasion pathways are not all known but stowaways and aquaculture are believed to be particularly significant for marine invertebrates and lower plants.

Seven non-native species have been eliminated from the wild in the UK (i.e. they are contained in quarantine or other contained facilities or have been exterminated):

- Hodgson's porcupine *Hystrix brachyura*
- Colorado beetle *Leptinotarsa decemlineata*
- Golden hamster *Mesocricetus auritus*
- Chinese weatherfish *Misgurnus mizolepsis*
- Coypu *Myocastor coypus*
- Musk rat *Ondatra zibethicus*
- Tobacco whitefly *Bemisia tabaci*

The report's recommendations include that:

- The Species Register should be kept up to date and birds added to it.
- New factsheets should be developed.
- On-line reporting of INNS should be maintained.
- The flow of data about the distribution of non-native species from the many data providers should be enhanced.

The Species Register was used to inform the SDNP INNS recommended priorities (see Tables x and y).

## **APPENDIX 5. EXCLUSIONS**

Birds are excluded from this Strategy on the basis that control of invasive non-native bird species would be extremely difficult and costly. There are some non-native bird species resident in the SDNP; however, there is currently considerable debate over whether the impact of many non-native bird species warrants control of their populations and exactly how such control measures should be implemented if they are deemed necessary.

There are a few non-native bird species whose adverse ecological impact is clear; a good example is the ruddy duck (which hybridises with the closely related white-headed duck). This species has been the subject of an eradication programme in Europe and its population in the UK was reduced by 95%

between 2005 and 2011. The case for control or eradication of other non-native bird species is not so clear-cut and management action is likely to be highly controversial.

Genetically modified organisms, plant and animal diseases, fungi, pathogens and micro-organisms are excluded from the Strategy. The current actions for the prevention, control and eradication of these are currently well covered within related national strategies, namely Defra's Plant Health Strategy and Wildlife Health Strategy. It is however acknowledged that there are important linkages between related strategies, notably the introduction of pathogens into the environment by non-native flora and fauna. Plant diseases affecting native trees, such as Dutch elm disease and ash dieback, are very serious threats to biodiversity, landscape, cultural heritage and economy within the SDNP. The procedures for intervention of wildlife pests and diseases however will be notably different from those presented here and within the National INNS Framework Strategy and as such are beyond the scope of this report. The implementation of both the Plant Health and Wildlife Health strategies within the SDNP will however contribute to the overall aims presented herein. More effective and more rigorously enforced bio-security measures to reduce the arrival of harmful micro-organisms into the UK and improvements to plant disease reporting and control measures are urgently needed but are outside the scope of this document.