Written evidence submitted by the St Helena Government,
National Trust and St Helena Research Institute

Introduction

Invasive species (IS) are a growing threat causing severe ecological and economic damage globally. Indeed, biological invasions are one of the biggest contributors to biodiversity loss through altering ecosystem functionality, structure and composition. Islands like St Helena, with their uniquely evolved biodiversity, are particularly vulnerable to the impacts of IS.

St Helena’s native plants and animals evolved in total isolation over 14 million years into unique species. The first visitors described it as a lush forested paradise with waterfalls streaming over the cliffs. Human exploitation over the last 520 years, has left its mark and with it a multitude of animal and plant introductions that has transformed the island. None of the islands’ native endemic species evolved to cope with aggressive invasive species. The disappearing forests of old have left the soils bare and eroded. This desertification has significantly reduced the productivity of the land.

All is not lost. A few isolated pockets of remaining native forest, where goats and marauding sailors couldn’t reach has survived on high cliffs where they sustained themselves by intercepting mist. From these small remnants, the conservation successes have demonstrated that there are cost effective ways to rehabilitate degraded land and expand valuable habitat fragments. As impressive as these successes are, it is small scale. The invasive pressures are ever increasing and could compromise the sustainability of conservation effort and threaten livelihoods. Through promoting well-coordinated programmes we can further improve on our proven best practices and capitalise on the inherent rewards to our economy and globally important biodiversity.

Impact of Invasive Species Present in St Helena

Most of the invasive species have negative impacts affecting a range of areas. The Indian Mynah bird for example damages agricultural crops; poses human health risks; predate on seabird eggs; spread invasive species into native habitat pockets; pose an air strike risk around the airport; compete with the endemic wirebird for food and disturb their nest sites.

Biodiversity impacts

St Helena holds a third of the total endemic diversity of the UK and its OT’s and is of significant international importance (Churchyard et al., 2014).

From a total of 431 wild-growing higher plant species recorded, over 80% have been introduced, with an estimated 99% of non-native flora composing the total island biomass. Native habitat is restricted to less than 1% of the island’s land mass, comprising small areas of highly diverse and fragmented habitat. The invertebrates of St Helena (over 430 endemic species) contribute immensely to its biodiversity value (and consequently the UK). Conserving these habitat fragments is undoubtedly crucial to ensure the survival of the remaining endemic species. The cloud forest is the only vegetation type that can be considered predominantly native and has been identified as a key priority area for better targeted invasive plant species (IP) control (Invasive Plant Management Project DPLUS059). Further habitat loss could result in extinction for many of these unique species.
The island’s endemics are significantly threatened by non-native vertebrates and the impacts are highly visible. Grazing species have substantially reduced the natural regeneration of endemic plants, through seed consumption and direct grazing of seedlings (rodents), and damage to established habitats (e.g. ring-barking on endemic *Commidendrum species*), and fauna are threatened through predation and competition.

Fencing, a vital but costly option, is utilised to protect valuable conservation areas against rabbits and feral livestock but requires substantial on-going maintenance.

Regular rabbit trapping is undertaken but is labour, time and resource intensive and, challenging if other food sources are available. Alternative methods have been investigated but met with community resistance. In order to reduce the significant ecological impact imposed by rabbits, further exploration of other control options is urgently required.

Ongoing rodent baiting is also necessary throughout the island, enabling knock back in priority areas and helping reduce major impacts; it requires consistent and sustained effort but does not solve the problem.

The endemic Wirebird (*Charadrius sanctaehelenae*) is the island’s National Bird and only surviving land bird. A 43% population decline in the early 2000s resulted in an IUCN Red List of Threatened Species™ assessment of Critically Endangered. Threats include habitat loss and decline, particularly through the spread of IS (exacerbated by changes to land management practices). Active collaboration between land managers and conservationists improves the effectiveness of implemented actions, including IS control benefitting livestock and the Wirebird. A dedicated predator control project was undertaken in 2011-2014 by the St Helena National Trust (SHNT), with St Helena Government, UK Government and RSPB. Cat control reduced predator activity by around 20%, significantly improving nest survival in some areas, but required upkeep, and simultaneous rodent baiting. The control of cats was found to affect the presence of other pest species differently across habitat types showing species interactions should be considered.

Predator control is still undertaken, but is limited by resources and man-power, therefore three key Wirebird areas are currently prioritised. The Wirebird was downgraded to Vulnerable in 2016. However, ongoing management is required to avoid a likely future decline.

Habitat change and decline, and predation and competition from IS (plant, vertebrate and invertebrate) also impacts the island’s diverse invertebrate fauna. Predation by IS such as the Grass Frog (*Strongylopus grayii*) is the likely cause for decline of aquatic invertebrates. The St Helena Darter dragonfly (*Sympetrum dilatatum*) is thought to be extinct, likely due to major changes to its habitat and predation by the tadpoles.

Key invertebrate hotspots are typically confined to very small areas, isolated in a ‘sea’ of invasive species. Around 127 species are thought to be confined to the Central Peaks totally dependent on unique cloud forest fragments, 16Ha in total.

There are over 600 invertebrate IS which can outcompete or predate endemics. These are impacting rare endemics on important sites (Central Peaks). There are less established methods for controlling invasive invertebrates than other IS.
St Helena is fortunate in having disease free bees, now a rarity worldwide. American Foulbrood recently swept through sub-Saharan Africa to the Cape (2009). As a result, honey, bee products and used bee equipment is prohibited for import as this is an ongoing threat. Colonies of the common wasp (Vespula vulgaris) present a significant risk to native invertebrates and bees. While colonies disturbing people are treated, wasp nests away from human habitation thrive unhindered. To reduce the ecological impacts to our native fauna, and the economic impact to our honey industry wider control programmes should be prioritised.

There are also a range of agricultural and horticultural pests, including around 59 aphid and scale insects (Key, 2014). Treatments are costly and reduce profit margins. If untreated, total failures of harvests are common. Some introduced moths negatively impact agriculture through crop damage and loss of grazing, but few effective control methods are known.

Some invertebrates are controversial, such as the harlequin ladybird which brings benefit to farmers by reducing agricultural pest loads, but negatively in conservation areas where endemic species are likely to be impacted. Others like the lesser brown scorpion (Isometrus maculatus); brown widow spider (Latrodectus geometricus) and red-headed centipede (Scolopendra morsitans) are poisonous and pose human health concerns.

St Helena’s territorial waters are under threat from unwanted foreign marine organisms, carried on flotsam, the hulls of vessels and in ballast and bilge water. During beach surveys, 94% of debris found was plastics which can carry IS. These can potentially pose a threat to natural marine communities either through predation or by outcompeting native species for food or habitat. Additionally, these organisms threaten our fishing and tourism industry, our environment and the well-being and livelihood of our people.

Knowledge of St Helena’s marine IS is lacking. The CSSF project ‘Tackling Invasive Non-Native Species in the OT’s has provided monitoring techniques but the potential for implementation is limited due to lack of resources. The CSSF Blue Belt programme, is reviewing techniques to create best practice guidelines for St Helena. Bi-annual benthic dive surveys provide a tool for monitoring species change, but analysis of this data is limited.

Of the nine species of seabird that breed at St Helena, five are known to be impacted by predation pressure whilst breeding. Notably Red-billed tropicbirds whom on predator free offshore islets can achieve an overall breeding success averaging 39%, on the mainland where invasive predators (feral cats, dogs and rats) negatively affect breeding, average success is 12%. Most nesting attempts for this species fail at the early stages of chick rearing with a fledging survival (eggs to fledging) averaging 27% compared to the predator free offshore islets 72% fledging survival.

Water security impacts

The Water Security and Sustainable Cloud Forest Restoration on St. Helena project (DPLUS051) have shown that over 60% of the islands water comes from mist. It further showed that the endemic cloud forest canopy structure captures significantly more mist than IS. The cloud forest ecosystem produce deep peat soils which act as a water reservoir, storing and regulating the release water. Regular recharge through mist interception and the
water storing capacity of the cloud forest soils demonstrate the importance to St Helena for protecting and further expanding this valuable ‘water factory’.

The control of IS on the Peaks will increase the quality and area of native cloud forest canopy, thereby increasing mist capture and water retention, providing more of this essential resource to St. Helena.

As part of DPLUS051, estimated costs of new reservoir construction and IS removal (followed by cloud forest planting) for equivalent water capture were compared. While building a new reservoir was cheaper (£313,872 compared to £713,400), a new reservoir will not solve the problem if the islands watershed cannot keep up with demand, particularly if tourist numbers increase as predicted. The most permanent way to increase water supply from the Peaks is to secure cloud forest habitats by controlling IS and rehabilitate cloud forest vegetation. The above mentioned comparison would suggest that it is cheaper in the long run to follow the IS removal model due to the increased consistent recharge to the current reservoirs, making the need for increased storage obsolete. This is primarily because the running and maintenance costs of a new reservoir increase with time, and the lifespan is calculated at about 25 years. The IS removal model on the other had ensure an improvement to the water security of the island over time, as the rehabilitated forests mature.

**Other impacts resulting from invasive plants**

Invasive plant species are a huge challenge on St Helena with impacts also extending to agriculture and forestry which play a large part in the economy and culture of St Helena. Several key IS severely impact pastures by reducing available grazing, productivity and quality of grazing. Similarly, IS like pheasant-tail fern (*Nephrolepis cordifolia*) invade large forest areas where control is especially challenging. SHG and SHNT together spend approximately £250,000 annually on frequently inefficient IP management activities. Climate change will exacerbate the problem, as new IP establish and existing plant species change range or populations explode. DPLUS059 has trialled control methods and is working towards a National Invasive Plant framework, but to be effective, especially at a larger scale, this requires funding and resources beyond the life of a short-term project.

**Health impacts**

The greatest risks to both human and animal health come from disease vectors. The previous necessity of a six day sea voyage acted in part as a short quarantine. In addition, the arrival of humans by plain from all over the world poses a new risk.

St Helena has several potential vectors and disease reservoirs, and it is vitally important therefore that the disease organism, whether viral, bacterial or parasitic, is not introduced to complete the life cycle.

Of the three pathogenic groups of mosquitoes (*Culex, Aedes and Anopheles*) St Helena has *Culex*; the vector for heartworm (*Dirofilaria immitis*) in dogs (tested pre-border); and fowl pox virus so all commercially reared pullets are vaccinated. More importantly, the prolific disease carrier *Aedes aegypti* was documented in Jamestown in the late 1800s, but there is no evidence of *Aedes* being present. It and tiger mosquito (*A. albopictus*) thrive worldwide, and are the vectors for yellow fever, zika, chikungunya, dengue, and Rift Valley fever, among others. It could be readily re-established here. *Anopheles*, the vector for malaria
(Plasmodium species), would also do well; two cases of malaria recently have shown that if Anopheles were present malaria may have become established.

Introduced ticks abound in grasslands and are efficient disease carriers. The tick-borne parasite Anaplasma marginale, cause of much cattle mortality in Africa, has been confirmed by the laboratory. The potential for introducing other parasites of major economic significance such as Babesia spp and rickettsiae is huge, well demonstrated by the recent establishment of Babesia canis in the UK.

**Mitigating the Risks of New Non-Native Species Arriving Through Trade and Future Trading Relationships – the Role of Biosecurity**

Once established, IS are difficult to remove. The most cost-effective approach is to prevent further introductions and establishment. The key challenge is predicting possible future invaders and to have measures in place to prevent and address this threat through continual risk assessment and horizon scanning procedures.

When it was announced an airport was to be built on St Helena, the need to control importation of further non-native species was recognised, and a national framework for Biosecurity endorsed in 2013. The framework led to critical biosecurity work, including establishing a dedicated Section within SHG to co-ordinate biosecurity, which still continues today.

St Helena operates a white list which has associated import health standards and protocols based on international standards for all risk goods. Testing and certification are simple pre-border requirements that reduce potential introductions for livestock and pets. Arrivals of goods and passengers are inspected and monitoring and surveillance in and around port areas (airport/wharf) are operated to mitigate the impacts of new non-native species arrivals, including those driven by climate change.

Legislation is also being strengthened to provide an appropriate legal basis and powers for our biosecurity system, staff and services.

Although St Helena is making steady progress with its biosecurity measures, the sharing of information by the UK on new biosecurity problems and solutions affecting the OT’s should be improved.

**Working with the UK and Internationally to Reduce the Risk of Invasive Species**

Within or without the EU, the OT’s have much IS experience to contribute to IS management and the UK should work closely with them. Island-wide approaches and regional OT cooperation to IS management is needed. St Helena needs help to provide the tools to encourage shared responsibility and action against national threats and to grow our understanding and knowledge of the impacts of IS and their management.

Substantial areas of IS invaded land in the uplands are typically seen as a sink for finances. With minor management changes, economic value could be demonstrated and its potential for significant social, environmental and economic impact realised through a higher potential income state. Where invasive problems are managed because there is a financial incentive
to do so it directly contributes to the wider local sustainable environmental development initiatives.

Action to build on the DPLUS059 IP work includes establishing a dedicated Invasive Species Section within SHG. This will be a centre of expertise responsible for the development, coordination and monitoring of national strategies and policies for the control and management of IS according to species and sector.

Applied research is needed to increase our understanding of the autecology of IS and their ecological, social and environmental impacts (including climate control effects) and further refine practical control and eradication programmes based on prioritised need. Ecological communities are never static over time. St Helena has no natural ecologies or habitats remaining bar the 1% which is itself highly disturbed.

Action is required to establish a marine invasive risk matrix and conduct long term monitoring for marine IS, and new resources will be required to conduct this work.

Climate change combined with increased movement of people, animals and animal products (legal and illegal), along with the current evident worldwide spread of pests and diseases, and having to guard against weak biosecurity measures in the region, means that high standards of biosecurity a must continue to be promoted and implemented to hold back an ever increasing threat. Early identification of IS arrival and timely commitment to resources to tackle their threat as they arise, will avoid their costly control in the future. Biosecurity capacity building improvements is being achieved through horizon scanning & pest risk assessment training across the biosecurity continuum (supported by Darwin Plus, GBNNSS, CEH, FERA and CABI). However, we lack the resources to execute or apply these measures with consistency.

We are not able to fund large costly IS project ourselves due to the resource levels required to manage the threats of IS. Brexit will potentially reduce access to significant sources of funding (LIFE, BEST) and St Helena has been successful in the past with EU EDF funding for IS. We need alternative support from the UK to manage IS together as a community (public, government and NGO’s) through long term ‘on the ground actions’ which will also help contribute to the UK’s biodiversity obligations and targets.

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