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## A Rescue Plan for the Threatened Tree Fern Thicket of Diana's Peak National Park, St Helena

### BGCNews

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St Helena is a small isolated island (6 by 10 miles) in the South Atlantic Ocean (latitude 15°56'S, longitude 5°42'W) and remains a Dependent Territory of the UK. St Helena arose from volcanic activity to the east of the mid-Atlantic rift over 14 million years ago. The geographic position of St Helena and the timing of its emergence have given rise to an endemic flora and fauna of exceptional taxonomic isolation and scientific interest.

Almost all of St Helena's indigenous flowering plants are endemic to the island: the 36 endemics include species of Compositae, Campanulaceae, Rubiaceae and Rhamnaceae. Ten of the flowering plant genera are endemic to the island which indicates the evolutionary isolation of the flora. Eight of these endemic genera are monospecific. St Helena's plant species were described by Hooker as "fragments from the wreck of an ancient world". Recently E.O. Wilson described St Helena's biosphere as only "one step removed from a satellite colony in space".

Quentin Cronk explains the unusual flora of St Helena with a 'relict theory': species colonised St Helena from a humid Miocene Africa; they evolved relatively little on the stable humid climate of St Helena while their African cousins became extinct or limited to mountainous areas (for instance *Dendrosenecio*) as the continent became drier.

### The Tree Fern Thicket

One of St Helena's 14 endemic species of ferns (out of 24 indigenous ferns) is the tree fern *Dicksonia arborescens*. Tangled endemic tree ferns form the thickets covering St Helena's highest peaks, reaching up to 823 metres above sea level at Diana's Peak. Since the tree fern thicket covers some of the wettest and most humid parts of the island it is the home of the most taxonomically isolated of the endemics ie. those which descend from the earliest arrivals from Africa more than ten million years ago. Six of the ten endemic genera remain in the thicket: for example, the black cabbage tree *Melanodendron integrifolium*, the seedlings of which germinate on the 'trunks' of the tree ferns. In fact most of the remaining endemic tree species have found refuge in the dense thickets.

### The Decline of St Helena's Indigenous Vegetation

The destruction of St Helena's indigenous vegetation has been thoroughly researched and documented. Cronk summarises this destruction as occurring in two phases: firstly the impact of introduced mammalian grazers following the discovery and exploration of the island from 1502 to 1659; and secondly by settlers' demands for timber, fuelwood and other forest products following settlement of the island between 1659 and about 1750.

Although the island's gumwood forests had been destroyed by the 1750s, most of the tree fern thicket and a zone of vegetation labelled 'cabbage tree woodland' remained intact at altitudes above 600 m until the 1850s. Since then a further two phases of destruction have occurred:

1. Following the introduction of New Zealand flax *Phormium tenax* in the 1860s (ironically upon the recommendation of Hooker), a flax industry was established: cabbage trees and tree ferns were removed and replaced by flax plantations until the 1930s.
2. Flax and other invasive exotics, including *Buddleia madagascariensis* and *Fuchsia coccinea*, have spread into, and overrun, the remaining areas of tree fern thicket. Simultaneously, the

endemic species remaining in the thicket have declined in abundance, due to the combined effects of habitat fragmentation, invasive plants and pests. Three endemic species that remained in the thicket in the 1800s are now completely extinct: stringwood *Acalypha rubra*, Roxburgh's bellflower *Wahlenbergia roxburghii* and Burchell's bellflower *W. burchellii*. The St Helena olive *Nesiota elliptica* remains only in cultivation; a further three species are restricted to tiny inbred patches: the large bellflower *Wahlenbergia linifolia*, the dwarf jellico *Sium burchellii* and the she cabbage tree *Lachanodes arborea*.

Thus our endemic 'fragments from an ancient world' now live on the verge of extinction, in real fragments of tree fern thicket from the wreck of St Helena's demolished forests. Almost all of the remaining endemic vegetation is in patches of tree fern thicket around Diana's Peak, totalling approximately 15.7 ha. There is also a tiny patch (less than 0.25 ha) around High Peak, 3-4 km to the west.

## The Rescue Plan

The Environmental Conservation Section, better known as the Endemic Section, of the St Helena Agriculture and Forestry Department began work in April 1995 to rescue the tree fern thicket. The Section has recently finalised a management plan for the tree fern thicket that details the actions planned for the years 1996-2001 (Diana's Peak National Park of St Helena: The Management Plan for 1996-2001).

The plan identifies a number of interacting problems. The remaining area of the tree fern thicket is too small and fragmented to support self-sustaining populations of the trees. For example, the effectively dioecious St Helena dogwood *Nesohedyotis arborea* is reduced to 147 individuals scattered into isolated patches throughout the remaining thicket. The accelerating invasion of flax is further fragmenting the thicket and is also preventing the growth of endemic seedlings. For example in 'Purgatory', a section of tree fern thicket only 0.9ha in area remains isolated from the main area of thicket around Diana's Peak and is itself surrounded by flax and other exotic species.

Species in decline or which have disappeared are no longer playing their important roles in the community. For example it is thought that three endemic trees, the whitewood *Petrobium arboreum*, the dogwood and the black cabbage tree, provide a sequence of flowering which supports a specific endemic dipteran pollinator *Loveridgeana beattiei*.

The management plan defines the ultimate goal of the work, sets out specific aims for 1996-2001, including a detailed timetable based upon the experience gained during 1995-96. The goal of the rescue plan for the tree fern thicket is to create a new balance in which the tree fern thicket and its plants and animals will be self-sustaining. Management will ultimately be reduced to a minimum.

The aims of the plan include: securing all remaining fragments of tree fern thicket by eradicating flax from within them, establishing seedlings of endemic trees throughout the remaining tree fern thicket and running a restoration trial to investigate the optimum means of converting flax plantation to tree fern thicket. The plan divides the area into over 60 management compartments, and work will be prompted and recorded by the use of a computerised database of the compartments.

The implementation of the plan will be overseen by a small multidisciplinary team of islanders. The team will comprise representatives of the private sector, the local St Helena Nature Conservation Group, the education sector and the Agriculture and Forestry Department.

## Diana's Peak National Park

In March 1996, in recognition of the extraordinary biological interest of the tree fern thicket (and of its value for botanical tourism and water catchment management), the St Helena Government proclaimed the area around Diana's Peak as St Helena's first National Park. This recognition and the establishment of the five-year management plan have been matched by the provision of improved public pathways (with waymarkers) into Diana's Peak National Park and new interpretation, in the form of coloured National Park leaflets for public sale. It is hoped that the designation will attract more botanical tourists to the island and increase the island's chances of attracting donor funding to enable its conservation work to be sustained. The successful conservation actions of the Endemic Section during 1995-96 mark the beginning of an immense task: after years of hard work, St Helena's tree fern thicket will be able to continue its long and historic existence.

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