

A Red Data List for the Falkland Islands vascular flora

D. A. Broughton and J. H. McAdam

Abstract The Falkland Islands are situated in the South Atlantic and have a native flora of 171 vascular plant species. Although a relatively high proportion of the native flora is of conservation concern, this is poorly recognized, both nationally and internationally. Typically, threatened species occur as only a few small, isolated populations, and they are facing increasing pressure from land-use change, particularly agricultural intensification. This paper presents the first national Red Data List for the Falkland Islands, and provides an overview of the

23 threatened plants of the archipelago as well as covering another 16 species of relevance to the national conservation strategy. This Red List provides an important first step towards the recognition and conservation of the threatened native flora of the Falkland Islands at both the national and international level.

Keywords Falkland Islands, flora, Red List, threatened plants.

Introduction

The Falkland Islands are an archipelago of over 700 islands (Fig. 1) situated in the South Atlantic between latitudes 51°–53°S and longitudes 57°–62°W, and covering an area of 12,173 km². They are c. 500 km from the nearest point on mainland South America. The climate is cool temperate oceanic with a mean temperature for January of 9.4°C and a mean for July of 2.2°C (McAdam, 1985). The main vegetation types are acid grasslands dominated by whitegrass *Cortaderia pilosa* (d'Urv.) Hack. and dwarf shrub heathland dominated by diddle-dee *Empetrum rubrum* Vahl ex Willd. The Islands are home to a relatively poor native flora, comprising 171 species of vascular plants, 13 of which are endemic (Broughton & McAdam, 2002). The main agriculture is sheep farming, which is managed on an extensive rangeland system, leaving only a few areas on the larger islands that are free from grazing pressure. Historically many of the smaller islands in the archipelago were also grazed for at least part of the year. Although this is a declining practice, particularly since the 1980s, it has greatly influenced the flora of these islands.

Despite the decline in some practices that are damaging to flora and fauna, other potentially detrimental practices have arisen with change in the economic infrastructure

of the islands. There is now a growing need for up-to-date information on the status of the Falkland Islands wildlife. Red Data Lists can play a crucial role in meeting this need by focusing attention on species most in need of conservation action. The only published Red Data information previously available for the Falkland Islands are the international Red Data Lists (Walter & Gillett, 1998; Hilton-Taylor, 2000). Hilton-Taylor (2000) is now the standard Red List reference, but it does not list any Falkland Islands plant species, and the most recent information available on the threatened flora of the Falkland Islands is in Walter & Gillett (1998). This text, which uses the pre-1994 IUCN threat categories, lists six threatened species: Felton's-flower *Calandrinia feltonii*, hairy daisy *Erigeron incertus*, silvery buttercup *Hamadryas argentea*, fir clubmoss *Huperzia fuegiana*, false-plantain *Nastanthus falklandicus*, and rock-cress *Phlebotobium maclovianum*. Our aim in this paper is to provide the first comprehensive assessment of the conservation status of the Falkland Islands flora and to outline the conservation measures that have been undertaken. This is the first national Red Data List produced for any Falkland Islands taxonomic group.

Methods

We have included only those islands that comprise the Falkland Islands archipelago (including Beauchêne Island). In the past both South Georgia and the South Sandwich Islands have been administered as Dependencies of the Falkland Islands. This is no longer the case. The Falkland Islands are a geographically discrete archipelago closer to the South American mainland than to either South Georgia or the South Sandwich Islands, and represent a related but distinct phytogeographical unit with a flora

D.A. Broughton¹ (Corresponding author) and **J.H. McAdam** Department of Applied Plant Science, The Queen's University of Belfast, Newforge Lane, Belfast, BT9 5PX, Northern Ireland. E-mail: jmcadam@dardni.gov.uk

¹ Present address: Falklands Conservation, PO Box 26, Stanley, Falkland Islands. E-mail: fc.plants@horizon.co.fk

Received 13 June 2001. Revision requested 8 October 2001.

Accepted 1 March 2002.

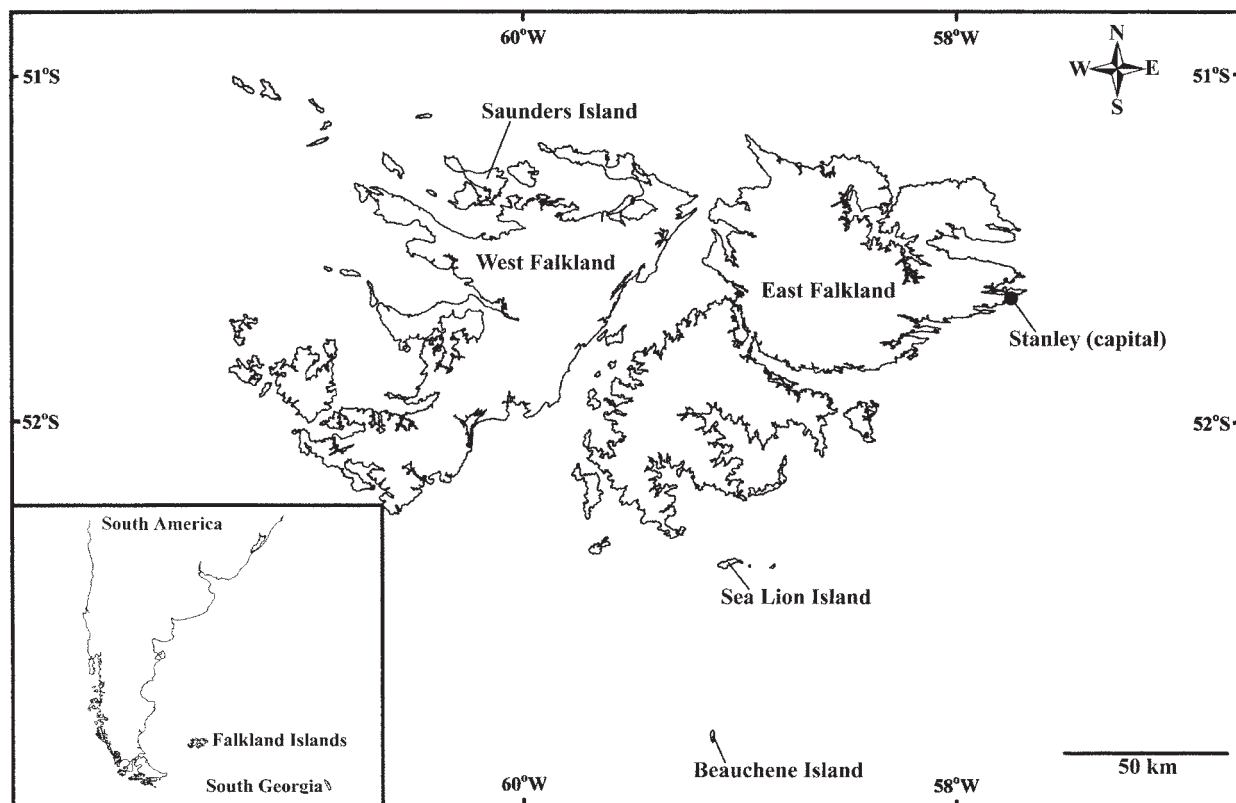


Fig. 1 The Falkland Islands archipelago, with locations mentioned in the text. Inset shows location of the Falkland Islands in relation to mainland southern South America and South Georgia.

considerably richer than that of either of these other two island groups. In consequence South Georgia and the South Sandwich Islands are outside the scope of this work.

We collected the data between September 1999 and April 2001 as part of a Darwin Initiative project to determine the status and distribution of the flora of the Falkland Islands (Broughton & McAdam, 2002). The project involved 12 months of fieldwork spread over two field seasons. During survey work we aimed to cover as many of the Falkland Islands 10 km land squares (UTM Zone 21) as possible and to ensure representative geographical coverage. As a result almost 60% of grid squares were visited. Whilst we aimed to provide representative cover of 10 km grid squares, survey work was actually conducted by 1 km grid squares. We surveyed 650 1 km grid squares and visited all the habitat types present in each square. We recorded which species were present in a particular grid square, together with information on status and ecology. Records of all plant species were deemed of equal value so that there was no intentional bias towards any particular group. Data was also obtained from previous surveys (Broughton *et al.*, 2000), herbarium specimens and the literature (Skottsberg, 1913; Moore, 1968, 1973). The

compiled information was entered into a database and comprises 26,121 individual records; it was these data that were used to produce the Red List. Further details on survey methodology and the database are available from the authors.

All 171 species native to the Falkland Islands were assessed for inclusion in the Red List using the most recent (version 3.1) IUCN Red List categories and criteria (IUCN, 2001) and with reference to Gärdenfors *et al.* (2001). The national Red Data List includes all vascular plant species that are nationally threatened and, for completeness, it also includes Near Threatened and Data Deficient taxa. The species listed range from those that are endemic to the Falkland Islands to those that are globally more widespread and common.

Results

This first National Red List for the Falkland Islands flora contains 33 plant species (Table 1). This is 19% of the native species, of which 23 species (13%) are nationally threatened (Table 2). The remainder consists of three Near Threatened species (2%) and seven Data Deficient species (4%). Six Least Concern species are also included in Table 1 because they are endemic to the Falkland Islands.

Table 1 A listing of all nationally threatened (Critically Endangered, Endangered and Vulnerable), Near Threatened, Data Deficient and Least Concern (endemic taxa only) Falkland Islands vascular plants. Details of distribution, any legal protection, international Red List status, endemism, and important comments are also provided.

Species	Common Name	Family	Distribution ²	Endemic ³	Legal Protection ³	National Category (with threat criteria) ¹	International Category ¹	Comments
<i>Calandrinia feltonii</i> Skottsb.	Felton's-flower	Portulacaceae	WF	+	+	CR (B2c(i, ii,iv), C2a(i))	CR	Livestock believed to have caused decline in this species. Remaining wild populations are now known to be of a closely related taxon. An expedition in 2001 failed to find any populations; further survey work is required.
<i>Calceolaria biflora</i> Lam.	yellow lady's slipper	Scrophulariaceae	WF	+	+	CR (B1a + 2a)	LC	Only one extant population currently known. A possible new record awaits confirmation. Although probably always scarce it is believed to have declined further as a result of grazing pressure.
<i>Draba magellanica</i> Lam.	Fuegian whitlowgrass	Brassicaceae	WF			CR (B1a + 2a)	LC	Only recorded 3 times and last seen in 1914. An expedition in 2001 failed to find any populations; further survey work is required.
<i>Saxifraga magellanica</i> Poir	saxifrage	Saxifragaceae	EF		+	CR (B1a + 2a)	LC	Recorded only once, in 1909. Urgent survey work is required to determine whether the species is extant.
<i>Scutellaria nummulariaefolia</i> Hook. f.	skullcap	Lamiaceae	WF			CR (B1a + 2a)	LC	Recorded only once, in 1916. Urgent survey work is required to determine whether the plant is extant.
<i>Suaeda argentinensis</i> Soriano	shrubby seablite	Chenopodiaceae	WF		+	CR (B1a + 2a, D)	LC	Only a few individuals have ever been recorded from a few small islands near Saunders Island. Grazing likely to be a major factor limiting distribution.
<i>Adiantum chilense</i> Kaulf.	maidenhair-fern	Adiantaceae	WF		+	EN (B1a + 2a, D)	LC	Only one extant population currently known but historic sites need to be revisited. Potentially at risk from natural and/or man-made coastal erosion.
<i>Gnaphalium antarctica</i> (Hook. f.) Cabrera	Antarctic cudweed	Asteraceae	FI	+		EN (A4cd, B1a + 2ab(iii))	EN	Recorded only 5 times since the type was collected in 1842. Likely to be at risk from over-grazing, burning and agricultural improvement of its heathland habitat.
<i>Hieracium patagonicum</i> Hook. f.	Patagonian hawkweed	Asteraceae	WF			EN (A4cd, B1a + 2a)	LC	Recorded only rarely in recent years. Likely to be threatened as a result of agricultural activity in its coastal habitats.
<i>Huperzia fuegiana</i> (Roiv.) Holub	fir clubmoss	Lycopodiaceae	FI		+	EN (B1a + 2ab(iii))	LC	Only known from small isolated populations. Current agricultural practices may threaten this species.

Table 1 (Continued)

Species	Common Name	Family	Distribution ²	Endemic ³	Legal Protection ³	National Category (with threat criteria) ¹	International Category ¹	Comments
<i>Rumohra adiantiformis</i> (Forst. f.) Ching	leathery shield-fern	Dryopteridaceae	WF	+	+	EN (B1a + 2ab(iii))	LC	Restricted to the north-west of West Falkland and only one extant population is currently known. Historic sites need to be revisited. Likely to be threatened by current agricultural practice.
<i>Arachnitis questruiensis</i> Dimitri	spider-flower	Corsiaceae	EF			VU (B2ab(iii)c(iv), D1 + 2)	LC	Only one population is known but it is extensive and occurs within a protected area. Potential threats arise from close proximity to the capital, heavy recreational land-use, and continuing mineral extraction.
<i>Blechnum cordatum</i> (Desv.) Hieron	Chilean tall-fern	Blechnaceae	WF			VU (B2ab(iii), D1)	LC	Threatened by agricultural activity because its distribution is limited, and by close similarity to <i>Blechnum magellanicum</i> (Desv.) Mett., which is often burnt to reduce its cover.
<i>Botrychium dusenii</i> (Christ) Alston	moonwort	Ophioglossaceae	EF	+	+	VU (B2ac(iv), D1 + 2)	LC	A major population occurs in a protected area. Proximity to a vehicle-track and the importance of the site for recreational land-use mean this population is not secure.
<i>Erigeron incertus</i> (d'Urv.) Skottsb.	hairy daisy	Asteraceae	FI	+	+	VU (B2c(i,ii))	VU	Although relatively widespread, populations are never large and may be vulnerable to grazing and habitat degradation.
<i>Gazilea australis</i> (Skottsb.) Correa	pale yellow orchid	Orchidaceae	FI	+	+	VU (B2ac(iv))	LC	Of very restricted range. A major population occurs in a protected area. Proximity to a vehicle-track and the importance of the site for recreational land-use mean the population is not secure.
<i>Limosella australis</i> R. Br.	mudwort	Scrophulariaceae	FI			VU (B2a)	LC	Recorded only rarely and just 3 populations are known. The isolation of all populations make it unlikely that recolonisation could occur if a population was lost.
<i>Nastanthus falklandicus</i> D.M. Moore	false-plantain	Calyceraceae	WF	+	+	VU (B2a, D2)	VU	Restricted to the south-west of West Falkland where it is only known from 2 farms. This currently favours the species but also leaves it vulnerable should there be a change in land ownership.
<i>Ophioglossum croatalaphoroides</i> Walt.	Adder's-tongue	Ophioglossaceae	FI	+	+	VU (B2ac(iv))	LC	Few recent records exist and known populations generally consist of only a few individuals. The effect of agricultural practice on this species, particularly burning, needs further investigation.

Table 1 (Continued)

Species	Common Name	Family	Distribution ²	Endemic ³	Legal Protection ³	National Category (with threat criteria) ¹	International Category ¹	Comments
<i>Phlebotium maclovinum</i> (d'Urv.) O.E. Schultz	rock-cross	Brassicaceae	FI	+	+	VU (B2c(i,ii))	VU	Not as threatened as previously believed but it still provides cause for concern. There is evidence that grazing has caused a contraction in range and most extant populations are small and restricted to areas free of livestock.
<i>Plantago moorei</i> Rahn	Moore's plantain	Plantaginaceae	WF	+		VU (B2a, D1+2)	VU	Restricted to the south-west of West Falkland where it is only known from a very small area of one farm. It is vulnerable to any change in land ownership or management, but there is no immediate cause for concern.
<i>Ruppia filifolia</i> (Phil.) Skottsb.	tasselweed	Ruppiaceae	FI			VU (B2a, D2)	LC	Only known from 4 saline lakes. One population would be threatened by any increase in the erosion rate occurring in the vicinity. Future threats may include eutrophication as a result of agricultural intensification.
<i>Viola magellanica</i> Forster f.	Fuegian violet	Violaceae	EF			VU (B2a, D1+2)	LC	The only population is restricted to a small area of Sea Lion Island. The island is managed for wildlife tourism and the national importance of the population is recognized.
<i>Hamadryas argentea</i> Hook. f.	silvery buttercup	Ranunculaceae	FI	+		NT	NT	Widespread but generally scarce with most populations consisting of only a few individuals.
<i>Potamogeton linguatus</i> Hagstr.	pondweed	Potamogetonaceae	FI		+	NT	LC	Restricted to the larger islands of West Falkland and one location on East Falkland. Most populations are small and isolated but this is believed to be the natural status of the species.
<i>Schoenoplectus californicus</i> (C.A. Mey.) Soják	California club-rush	Cyperaceae	FI			NT	LC	Only 9 populations of this naturally scarce aquatic plant are known. Stands have been grazed in the past but currently they are all in a healthy state and their value is appreciated by landowners.
<i>Acaena antarctica</i> Hook. f.	Antarctic prickly-burr	Rosaceae	FI			DD	LC	With 3 recent records and 3 historic collections this upland species appears scarce. However, upland areas are not well surveyed and more survey work is required.
<i>Alopecurus magellanicus</i> Lam.	Fuegian foxtail	Poaceae	FI			DD	LC	Only one extant population is known, in an island nature reserve. It has always been regarded as rare but more survey work on small offshore islands is required.

Table 1 (Continued)

Species	Common Name	Family	Distribution ²	Endemic ³	Legal Protection ³	National Category (with threat criteria) ¹	International Category ¹	Comments
<i>Carex aematorrhyncha</i> Desv.	blood-beak sedge	Cyperaceae	FI			DD	LC	This large sedge is probably vulnerable to grazing pressure. More data is required before reaching a conclusion on its status.
<i>Carex barrosii</i> Nelmes	Barros sedge	Cyperaceae	WF			DD	LC	Recorded only once. Whether the lack of records is a reflection of genuine rarity or of a lack of adequate recording is not known. Recent survey work has not found this species.
<i>Carex magellanica</i> Lam.	Fuegian sedge	Cyperaceae	FI			DD	LC	More information is required before reaching any conclusion on this species but it may be rare.
<i>Grammitis poeppigiana</i> (Mett.) Pic. Serm.	strap-fern	Grammitaceae	FI			DD	LC	Rarely recorded but more survey work is required in upland areas. It is unlikely to be under any immediate threat.
<i>Koeleria permollis</i> Nees ex Steud.	Berg's hair-grass	Poaceae	EF			DD	LC	Only recorded twice and not recently. More survey work is required. Currently assumed to be native but the possibility that it was introduced requires investigation.
<i>Chevreulia lycopodioides</i> (d'Urv.) DC.	Clubmoss cudweed	Asteraceae	FI	+		LC	LC	Widespread and common wherever suitable habitat exists.
<i>Leucheria suarcorensis</i> (d'Urv.) Spag.	vanilla daisy	Asteraceae	FI	+		LC	LC	Still common and widespread but grazing can reduce population density and plant size.
<i>Nassauvia gaudichaudii</i> (Cass.) Cass. ex Gaudich.	coastal nassauvia	Asteraceae	FI	+		LC	LC	Widespread and common around coasts.
<i>Nassauvia serpens</i> d'Urv.	snakeplant	Asteraceae	FI	+		LC	LC	Frequent in rocky places in the uplands. There is growing evidence that this is a retreat habitat and that it was more abundant in the lowlands before livestock were introduced.
<i>Senecio littoralis</i> Gaudich.	woolly ragwort	Asteraceae	FI	+		LC	LC	Widespread and common, although populations occur at a lower density wherever grazing is present.
<i>Senecio vaginatus</i> Hook. & Arn.	smooth ragwort	Asteraceae	FI	+		LC	LC	Widespread and common, although populations occur at a lower density wherever grazing is present.

¹CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, DD = Data Deficient, LC = Least Concern

²WF = restricted to islands of West Falkland, EF = restricted to islands of East Falkland, FI = not restricted to a particular island group

³ + = yes

Table 2 Summary of the nationally and internationally Extinct, threatened (Critically Endangered, Endangered and Vulnerable), Near Threatened, Data Deficient and Least Concern flora of the Falkland Islands, expressed in terms of total number of species and as a percentage of the native flora.

	IUCN Red List category							Total
	EX	CR	EN	VU	NT	DD	LC	
National totals	0	6	5	12	3	7	139	171
(% of native flora)	(0%)	(3%)	(3%)	(7%)	(2%)	(4%)	(81%)	
International totals	0	1	1	4	1	0	164	171
(% of native flora)	(0%)	(0.6%)	(0.6%)	(2%)	(0.6%)	(0%)	(96%)	

Of the threatened taxa, six are Critically Endangered (26% of threatened plants), five are Endangered (22%) and 12 are Vulnerable (52%). Eleven threatened plant species (48%) are restricted to the islands of West Falkland and four (17%) to the islands of East Falkland. The remaining 8 threatened species (35%) are more generally distributed across the archipelago. Six nationally threatened species (26%) are endemic to the Falkland Islands. Only six of the Falkland Island species (26% of nationally threatened taxa) have been categorized as threatened internationally, all of them Falkland Islands' endemics.

Discussion

In comparison with other South American countries, the Falkland Islands have an extremely impoverished flora, comprising 171 native species (Broughton & McAdam, 2002). Many species are at the eastern and southern limits of their range in the Falkland Islands, and thus many of the rare taxa occur more abundantly in other parts of South America and the world. This does not detract from their value in the Falkland Islands nor internationally. Species at or near the limit of their geographical range are close to their tolerance for environmental factors and they develop locally adapted populations (ecotypes), which may be genetically or physiologically distinct from populations elsewhere (Wigginton, 1999). There is a need to conserve such diversity, and the importance of conserving the full extent of a species natural range is reflected in the IUCN threat criteria and should be a key objective in conserving Falkland Islands biodiversity.

Some of the taxa categorized as threatened have probably always been relatively rare, such as a component of the flora that is restricted to the north-west of West Falkland. However, since the introduction of livestock these taxa have decreased in frequency of occurrence and distribution, along with other species that would have been more abundant and widespread in the past (McAdam, 1996). No Falkland Islands species

has yet been proven, beyond reasonable doubt, to be extinct. But there are no recent records for four species: Fuegian whitlowgrass *Draba magellanica*, Felton's-flower *Calandrinia feltonii*, saxifrage *Saxifraga magellanica*, and skullcap *Scutellaria nummulariaefolia*. Survey work is urgently required to determine whether they are Critically Endangered, as categorized in this paper, or nationally extinct. Recent surveys for the Felton's-flower and the Fuegian whitlowgrass did not identify any populations, but more survey work is required.

For many of the other threatened taxa the situation, up until recently, has been less urgent. Although they are often extremely rare, and although agricultural activity has probably been the main cause of the decline in these species, long-term conformity in agricultural practice has allowed small remnant populations to persist. This is no longer the case. There is a pressing need to diversify the rural and national economies, and since the early 1980s agricultural practice, and the economic infrastructure of the Falkland Islands, has been undergoing rapid change. The flora is now under ever increasing pressure from agricultural diversification and intensification, including widespread pasture improvement programmes, and to a lesser extent from the current road-building programme. Other important threats include a general ignorance about the native flora, including the rare and threatened species, within the Falkland Islands, a lack of detailed data on which to base development and land-management decisions, and an inadequate Environmental Impact Assessment process for proposed developments.

Internationally the conservation of endemic Falkland Islands taxa is perhaps of greatest importance, and should be the focus of priority action. Thirteen species (8% of the native flora) are endemic to the Falkland Islands archipelago (Table 1). Six of these (46% of endemics) are threatened (26% of threatened plants) and one is Near Threatened. Of the threatened endemic plants, the Felton's-flower is Critically Endangered, the Antarctic cudweed *Gamochaeta antarctica* is Endangered, and the other four species are Vulnerable.

Conservation programmes should also include those taxa for which the Falkland Islands have an international responsibility because a high proportion of the world population occurs there. Two such taxa are near-endemic, the Falkland cudweed *Gamochaeta malvinensis* (H. Koyama) T. R. Dudley and the shield-fern *Polystichum mohrioides* (Bory) C. Presl. (Broughton & McAdam, 2002). Populations of the tussac-grass *Poa flabellata* (Lam.) Hook. f. are also important because this species is restricted to the southern tip of South America, the Falkland Islands and some subantarctic Islands. Although the Falkland Islands populations of these taxa are important, none qualify for inclusion in the present Red Data List. However, the populations should be monitored and their status assessed from time to time.

Some of the threatened flora is of interest because it is restricted to a particular part of the archipelago. These species have small native ranges and so are often of greatest conservation concern and make up the greatest proportion of threatened species. West Falkland exhibits this most noticeably; it has 11 threatened plant species (48% of the threatened flora) that are found nowhere else in the archipelago, including the false-plantain *Nastanthus falklandicus* and Moore's plantain *Plantago moorei*, both 'narrow' endemics. Four threatened plants (17%) are restricted to East Falkland, and the remaining eight threatened taxa (35%) are not restricted to a particular island group.

The first legislation affording significant protection to certain wild plant species was enacted in 1999 (FIG, 1999). This legislation gave protection to 18 taxa that were assessed to be most threatened (Table 1). One other species, the common violet *Viola maculata* Cav., was also protected, as it is believed to be the larval food-plant of a nationally threatened butterfly species (*Issoria cytheris* Drury). At the time of designation few quantitative data were available on the status and distribution of species and, as a consequence, several threatened taxa were not protected. At the same time, other species that are not threatened, such as Gaudichaud's orchid *Chloraea gaudichaudii* Brongn., yellow orchid *Gavilea littoralis* (Phil.) M. N. Correa and the yellow maiden *Sisyrinchium chilense* Hook, were given legal protection. The comb-fern *Schizaea fistulosa* Labill., a species no longer believed to have occurred in the Falkland Islands (Skottsberg, 1913; Broughton, 2000), was also given unnecessary protection. These four protected species are therefore not included on the Red List presented here.

Under the legislation (FIG, 1999) it is an offence to intentionally pick, collect, cut, uproot or destroy a protected wild plant. It is also an offence to trade any live or dead plant, and its derivatives. Threatened plants, protected or otherwise, also benefit from provisions in the legislation relating to the designation of National

Nature Reserves and the making of regulations to prohibit the picking or uprooting of any plant growing within a designated reserve. Instead of being designated as statutory reserves, private land may also be declared a wildlife reserve by the owner. A number of such private reserves exist, but because the sensitivity with which they are managed lies entirely in the hands of the relevant landowners they are not all of equal conservation value. As a consequence private reserves may not be managed to provide the maximum benefit to threatened plant species. The only international Convention currently relevant to the Falkland Islands flora is CITES and the Convention is only applicable to the four Falkland Islands members of the Orchidaceae, only one of which is threatened. All orchids are covered by Appendix II of the Convention, which lists those taxa whose international trade is subject to control.

The conservation of wild flora in the Falkland Islands is still in its early stages and has advanced little beyond initiatives to purchase nature reserves. However, with an increase in public awareness and interest in conservation issues, fuelled to some degree by land reform and the increased role of tourism in the economy, there are signs of a shift in focus from protecting sites of high wildlife value to direct action to address conservation problems, such as a trial reintroduction of the Felton's-flower. In particular, there is a slowly growing awareness of the need to protect and manage threatened plants outside nature reserves and protected sites. This will be vital because most of the species on the Red List are not well represented in the current framework of protected areas. Thus, land-managers whose prime concern is other than with nature conservation may have a significant responsibility in ensuring the continued survival of threatened plant species.

The slow start in addressing plant conservation should not just be attributed to limited resources or lack of political willpower. A major hindrance has previously been the lack of detailed baseline data and a lack of botanical expertise within the Falkland Islands. This need has now begun to be addressed with a Darwin Initiative funded project (Broughton & McAdam, 2002), the establishment of a national herbarium, and the production of a new field guide (Woods, 2000), and it is to be hoped that further progress will follow.

In conclusion, whilst agriculture and development have been identified as major factors in the decline of some elements of the native flora, it is also possible to implicate a general ignorance of the native Falkland Islands flora and its importance. Given the small size of the Falkland Islands human population, there is scope for halting and reversing the decline of threatened flora. However, this will be dependent on the provision of sufficient resources. Steps have already been taken with

the aid of Darwin Initiative funding, but increased public awareness is still required. In addition, regular monitoring of threatened plant populations is required along with investigations of their biology and the reasons for their decline, and all threatened taxa not currently protected need to be afforded full legal protection. Also, given the importance of conserving genetic diversity (Wigginton, 1999; Lesica & Allendorf, 1995), the genetic aspects of rare plant conservation require greater attention. This will only be achievable when the commitment of the under-resourced NGO sector is matched by a greater commitment of the Falkland Islands Government to meet its statutory obligations in terms of plant research and conservation.

Acknowledgements

This work would not have been possible without funding from the UK Government through the Darwin Initiative (Department for Environment, Food and Rural Affairs), and the involvement of the projects local partners, Falklands Conservation. The support of Tom Eggeling (Environmental Planning Officer, Falkland Islands Government) is also gratefully acknowledged.

References

- Broughton, D.A. (2000) A note on the status of Comb-fern in the Falkland Islands. *The Falkland Islands Journal*, **7**, 1–2.
- Broughton, D.A. & McAdam, J.H. (2002) *The Vascular Flora of the Falkland Islands: An Annotated Checklist and Atlas*. Unpublished report to Falklands Conservation.
- Broughton, D.A., McAdam, J.H. & Brännström, R. (2000) A combined checklist and ecogeographic conspectus for the vascular flora of Saunders Island, Falkland (Malvinas) Islands. *Anales del Instituto de la Patagonia, Serie Ciencias Naturales*, **28**, 57–88.
- FIG (1999) Conservation of wildlife and nature ordinance 1999. *The Falkland Islands Gazette Supplement*, **10**, 2–18.
- Gärdenfors, U., Hilton-Taylor, C., Mace, G. & Rodríguez, J.P. (2001) The application of IUCN Red List criteria at regional levels. *Conservation Biology*, **15**, 1206–1212.
- Hilton-Taylor, C. (2000) *2000 IUCN Red List of Threatened Species*. IUCN, Gland, Switzerland and Cambridge, UK.
- IUCN (2001) *IUCN Red List Categories and Criteria: Version 3.1*. IUCN, Gland, Switzerland and Cambridge, UK.
- Lesica, P. & Allendorf, F.W. (1995) When are peripheral populations valuable for conservation? *Conservation Biology*, **9**, 753–760.
- McAdam, J.H. (1985) The effect of climate on plant growth and agriculture in the Falkland Islands. *Progress in Biometeorology*, **2**, 155–176.
- McAdam, J.H. (1996) The current status, threats to and conservation of the flora of the Falkland Islands. *Aspects of Applied Biology*, **44**, 419–424.
- Moore, D.M. (1968) The vascular flora of the Falkland Islands. *British Antarctic Survey Scientific Reports*, **60**, 1–202.
- Moore, D.M. (1973) Additions and amendments to the vascular flora of the Falkland Islands. *British Antarctic Survey Bulletin*, **32**, 85–88.
- Skottsberg, C. (1913) A botanical survey of the Falkland Islands. *Kungliga Svenska Vetenskapsakademiens Handlingar*, **50**, 1–129.
- Walter, K.S. & Gillett, H.J. (eds) (1998) *1997 IUCN Red List of Threatened Plants*. IUCN, Gland, Switzerland and Cambridge, UK.
- Wigginton, M.J. (1999) *British Red Data Books 1. Vascular plants*. JNCC, Peterborough, UK.
- Woods, R.W. (2000) *Flowering plants of the Falkland Islands*. Falklands Conservation, London.

Biographical sketches

David Broughton began his involvement with the Falkland Islands as a postgraduate at Queen's University, researching their dwarf shrubs and shrub heathlands. He then spent two summers in the Islands running a Darwin Initiative project investigating the status and distribution of the wild flora. In October 2001 he began work as Conservation Botanist at Falklands Conservation and is the first botanist employed by the organisation.

Jim McAdam began his involvement with the Falklands in 1976 as Agronomy Officer in the Grassland Trials Unit. He currently works in the Science Service of the Department of Agriculture and Rural Development, Northern Ireland and lectures at Queen's University. He maintains an active involvement in Falklands research, is a consultant to the UK Falkland Islands Trust, and acts as advisor to the Falklands Department of Agriculture. His other research interests include agroforestry, rural development, and the ecology and management of heathland and cool-temperate grasslands.