MONTSERRAT

LAND AREA **102 km²** ALTITUDE **0–914 m**
HUMAN POPULATION **4,819** CAPITAL **Plymouth** (defunct due to volcanic eruption)
IMPORTANT BIRD AREAS **3, totalling 16.5 km²**
IMPORTANT BIRD AREA PROTECTION **48%**
BIRD SPECIES **101**
THREATENED BIRDS **2** RESTRICTED-RANGE BIRDS **12**

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The endemic Montserrat Oriole lost 60% of its forest habitat during the eruptions of the Soufriere Hills volcano. (PHOTO: JAMES MORGAN/DWCT)

INTRODUCTION

Montserrat is a UK Overseas Territory in the Leeward Islands towards the northern end of the Lesser Antilles, just 40 km south-west of Antigua and between the islands of Nevis and Guadeloupe. The island is about 16 km long and 11 km wide, and its volcanic origins are reflected in an extremely rugged topography. There are three major volcanic hill ranges—the Soufriere and South Soufriere Hills, the Centre Hills, and the Silver Hills. Prior to the eruption of the Soufriere Hills volcano (1995 to present: see below), Chances Peak was the highest point on the island, rising to 914 m, while the highest point in the Centre Hills—Katy Hill—reaches 741 m. There are also two smaller hills: Garibaldi Hill and St Georges Hill. There are a few, very small offshore islets. The coastline is mostly rocky and rather steep, with low cliffs in a few places in the north. A number of relatively small, sandy beaches are scattered around the island.

Montserrat has a tropical climate with average annual rainfall varying between c.1,100 and 2,100 mm as a result of the mountainous topography. The wet season extends from June to December and coincides with the Atlantic hurricane season. The natural vegetation over the great majority of the island is tropical forest. This ranges from dry deciduous forest in the lowlands, through semi-deciduous and evergreen wet forest in the hills, to montane elfin forest on the highest peaks. There are small areas of littoral woodland, and in the driest areas of the lowlands, the vegetation is xerophytic scrub, with numerous cacti. All but a few small forest patches were apparently cleared during the plantation era, and the bulk of the remaining forest is therefore secondary. In the Centre Hills, the largest remaining forest block, native trees are mixed with numerous large, non-native fruit trees—remnants of earlier agricultural endeavours. Substantial areas in the lowlands are now cleared for agriculture and settlement. In the Silver Hills, forest clearance and over-grazing has resulted in degraded scrub vegetation. The island has very few wetlands. Prior to the eruption, Foxes Bay Bird Sanctuary contained areas of saline lagoon and mangroves: this area was destroyed by heavy silt deposits of eroded volcanic debris. A very small, partly degraded saline lagoon and mangrove area remain at Carr's Bay.

The recent ecological and human history of the island is dominated by the eruption of the Soufriere Hills volcano, 1995–2008 (and ongoing). Explosive eruptions, ash-falls and pyroclastic flows have been frequent and devastating. The southern two thirds of the island have been evacuated, including the capital, Plymouth. The majority of

The ruins of Plymouth, in the shadow of the Soufriere Hills volcano that has dominated the island's recent history. (PHOTO: RICH YOUNG/DWCT)

the human population emigrated, with the population declining from c.12,701 (July 1994) to 2,726 (1998). Economic, administrative and civic life was massively disrupted by the mass emigration and the loss of the capital. The forests of the Soufriere/South Soufriere hills ranges were almost entirely destroyed by pyroclastic flows, leaving only a small remnant in the Roche's area. Most other areas of Montserrat, including the largest surviving forest block in the Centre Hills, were subject to repeated heavy ash-falls and acid rain. The remaining human population is now clustered in the north, around the fringes of the Centre Hills. Prior to the volcanic eruption, tourism (though not mass tourism) and agriculture were the mainstays of the economy. Subsequently, both sectors have been depressed, and reconstruction work has provided the main economic activity for the island's greatly reduced human population.

Conservation

The Department of Environment (DOE) of the Ministry of Agriculture, Lands, Housing and Environment (MALHE) has responsibility for biodiversity conservation. Enabling legislation for conservation is provided by the Forestry, Wildlife, National Parks and Protected Areas Ordinance which makes provision for the designation of protected areas and the protection of wildlife. However, as yet, there are no national parks on Montserrat. However, this legislation does not reflect recent research findings or the obligations of regional and international environmental agreements. With this in mind, a legislative review and revision has recently been conducted to produce modern, relevant, and enforceable environmental legislation. An advance draft of this legislation, which has benefited from broad based stakeholder consultation, is (July 2008) before the Legal Department for final drafting before submission to cabinet for approval.

The main conservation NGO is the Montserrat National Trust. It is mandated to preserve and protect the natural, historical and cultural heritage of Montserrat. To date, most funding for conservation work is received from international donor agencies and UK government funds such as the Overseas Territories Environment Project (OTEP) and The Darwin Initiative. Several UK-based NGOs (e.g. Royal Society for the Protection of Birds, RSPB, Durrell Wildlife Conservation Trust, DWCT, and Royal Botanic Gardens Kew) as well as the U.S. International Institute of Tropical Forestry have a long history of involvement in Montserrat's conservation, working in partnership with the Forestry Division of DOE and the National Trust. Academic researchers have also been active in recent years, perhaps most notably entomologists from Montana State University, bat

The Centre Hills support the island's largest remaining forest block. (PHOTO: GEOFF HILTON/RSPB)

experts from South Dakota State University and marine turtle experts from University of Exeter and ecologists from University of East Anglia.

Conservation actions have focused on the Centre Hills and the globally threatened species therein. In June 2005, the Darwin Centre Hills Project was launched with a primary goal to enable the people of Montserrat to effectively manage the Centre Hills and associated resources. Under the umbrella of this project, NGO-assisted efforts (working in collaboration with MALHE) have included detailed socio-economic assessments, in-depth biodiversity assessments, and area management planning (for a proposed national park). The Centre Hills Project concluded in March 2008 with the integration of pending and planned activities into the workplans of each of the project partners (which included Ministry of Agriculture, Lands, Housing, and Environment, Montserrat National Trust, Montserrat Tourist Board, RSPB, Royal Botanic Gardens, Kew and DWCT). The release of the Centre Hills Management Plan has amplified the need for more funding to be directed to Biodiversity conservation and use of environmental goods and services to ensure effective management. Additionally species action plans have been developed for the Montserrat Oriole *Icterus oberi* and mountain chicken *Leptodactylus fallax*, and other such plans are being developed for additional key species in the Centre Hills.

Montserrat's ecology has been radically altered by human activity since the arrival of Europeans. Massive forest clearance during the plantation era left only a tiny remnant of primary forest. Subsequently, much of the area of the main hill ranges reverted to secondary forest. Parts of the Silver Hills are heavily degraded by soil exhaustion and erosion. Much of the lowland and coastal areas of Montserrat have been converted to agriculture and settlement. Lowland forest is now relatively rare, and occurs primarily as narrow riparian strips. The devastating Hurricane Hugo hit the island in 1989 and caused massive tree fall and almost complete defoliation. This was followed six years later by the start of the volcanic eruptions, which have had a massive impact on the native wildlife. The impacts of these natural catastrophes have been exacerbated by the human habitat degradation that preceded them. Ash-fall is known to have had pronounced effects on the arthropod fauna, with knock-on effects on the food chain, although the direct impacts on birds are not well known. As a result of the volcanic eruptions, the human population is now entirely in the north of the island. There is much pressure to provide new housing and infrastructure to accommodate the relocation, and the return of emigrants. However, there is clearly a need to ensure that this development is environmentally sustainable, despite its urgency. Non-native species of mammal are widespread on Montserrat. Recent research on *Icterus oberi* and *Leptodactylus fallax* indicates that rats *Rattus* spp. are major predators of the native biota, and probably also affect vegetation dynamics. Feral cats, goats and pigs are also significant conservation problems. Invasive alien plants have not been well studied, but may also have significant impacts.

Birds

Of Montserrat's 101 recorded bird species, 47 are resident breeding land birds and 54 are Neotropical migrants (either passage migrants or winter visitors). However, the migrant landbirds are very scarce relative to the resident birds. Twelve of the resident land birds (see Table 1) are Lesser Antilles EBA restricted-range birds (of the 38 that define the EBA). The Lesser Antillean Flycatcher *Myiarchus oberi* is also a Lesser Antilles EBA restricted-range bird, but it is very rare on Montserrat and thought to be a non-breeding vagrant so has not been considered in the IBA analysis. Of the restricted-range birds, Lesser Antillean Bullfinch *Loxigilla noctis* is most abundant in the dry lowland forest areas (and is rather rare in the wetter forests of the Centre Hills), while the Bridled

Critically Endangered Montserrat Oriole—one of the focal species for conservation research and action in the Centre Hills. (PHOTO: CHRIS BOWDEN/RSPB)

The Vulnerable Forest Thrush is an elusive species, but is relatively common in the Centre Hills. (PHOTO: ALLAN SANDER)

Table 1. Key bird species at Important Bird Areas in Montserrat.

Key bird species	Criteria	National population	Criteria	Montserrat IBAs MS001	MS002	MS003
Bridled Quail-dove *Geotrygon mystacea*				✓	100–1,000	✓
Purple-throated Carib *Eulampis jugularis*				✓	12,000–42,000	
Green-throated Carib *Eulampis holosericeus*				✓	100–1,000	✓
Antillean Crested Hummingbird *Orthorhyncus cristatus*				✓	32,000–127,000	✓
Caribbean Elaenia *Elaenia martinica*				✓	✓	✓
Scaly-breasted Thrasher *Margarops fuscus*				✓	3,800–12,800	✓
Pearly-eyed Thrasher *Margarops fuscatus*				✓	20,000–36,000	✓
Brown Trembler *Cinclocerthia ruficauda*				✓	500–2,000	✓
Forest Thrush *Cichlherminia lherminieri*	VU	3,100		✓	1,800–5,200	✓
Montserrat Oriole *Icterus oberi*	CR	5,000			930–3,000	150–300
Lesser Antillean Bullfinch *Loxigilla noctis*				✓	✓	✓
Antillean Euphonia *Euphonia musica*				✓		

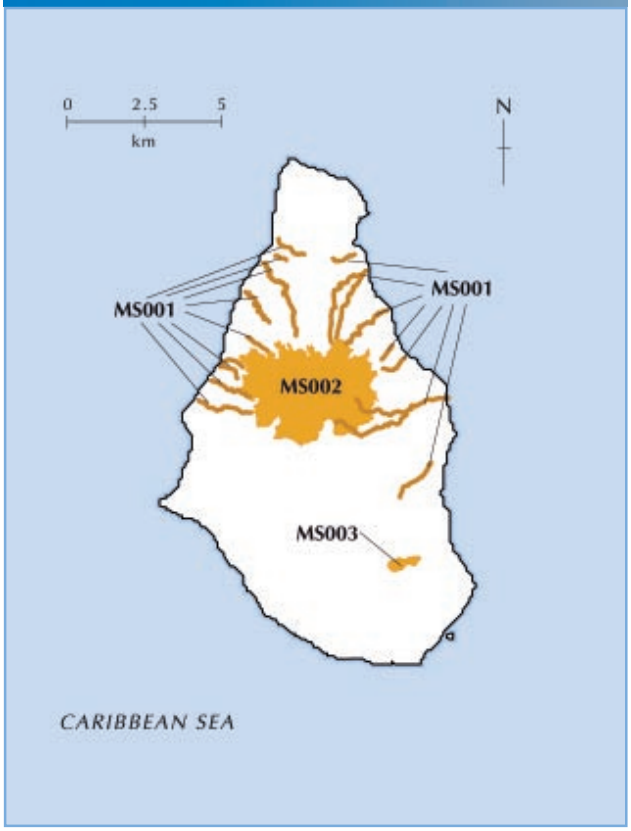
All population figures = numbers of individuals.
Threatened birds: Critically Endangered ■; Vulnerable ■. **Restricted-range birds** ■.

Quail-dove *Geotrygon mystacea*, Purple-throated Carib *Eulampis jugularis* and Brown Trembler *Cinclocerthia ruficauda* all occur on occasion in lowland dry forest but are much more abundant in the mesic and wet forest of the Centre Hills/South Soufriere Hills. The Montserrat Oriole *Icterus oberi* only occurs in mesic and wet forest. Antillean Euphonia *Euphonia musica* is very scarce and is primarily found in the lower fringes of the Centre Hills during the winter months and is thought to breed only in very small numbers. The Forest Thrush *Cichlherminia lherminieri* is commonest in dry forest (see below).

Two globally threatened birds are present in Montserrat: the Critically Endangered *Icterus oberi* and Vulnerable *Cichlherminia lherminieri* (see Table 1). The oriole—Montserrat's endemic national bird—was formerly found throughout the island's hill forests (at altitudes greater than c.150 m). However, c.60% of the forest it occupied (primarily the southern hills) was destroyed in the eruption of the Soufriere Hills volcano (1995–present). The main remaining population, in the Centre Hills (and in Roaches forest in the South Soufriere Hills), suffered a further decline of c.50% between 1997 and 2002. The population has been estimated at c.5,000 individuals, equating to a breeding population of c.1,000 pairs (based on breeding success and estimates of the number of immatures and floaters in the population). However, territory mapping work done in 2005 suggests a population of several hundred pairs, but certainly well under 1,000. Durrell Wildlife Conservation Trust has a captive breeding program (in Jersey) to safeguard the species from the risk of extinction in the wild and to provide birds for reintroduction should that become necessary in the future. *Cichlherminia lherminieri* is an elusive species that frequents dry hill forest (favouring the least disturbed forest which occurs on the higher slopes). Unlike the populations on Dominica, Guadeloupe and St Lucia the species is relatively common in the Centre Hills with numbers estimated to be in the thousands (it apparently recovered from the most severe period of volcanic ash-fall in 1996–1997). The Centre Hills probably represent the species' global centre of abundance. The Near Threatened Caribbean Coot *Fulica caribaea* survives in a pond at Brimm's Ghaut, but appears to have been extirpated by the volcanic eruption from the Foxes Bay wetland and other small ponds in the north of the island.

There are some seabird nesting colonies around the island, with White-tailed Tropicbird *Phaethon lepturus*, Brown Pelican *Pelecanus occidentalis* and Brown Booby *Sula leucogaster* thought to nest. Establishing the size of the populations at these colonies would be a valuable exercise and should perhaps be built into the broader biodiversity monitoring program for the island. Forest birds have been assessed and monitored in some detail (by members of the Forestry Division, the National Trust and RSPB) since the eruption in 1995. The Forest Bird Monitoring Programme started in 1997 (building on data gathered by Wayne Arendt in 1984 and 1990) and was supplemented by information gathered in the context of the Montserrat Oriole Emergency Conservation Programme (2001–2004). Density estimates for the more abundant forest birds have been made using point-data from a full census of the Centre Hills in 2004, and monitoring is on-going so that the effect of management actions (or further volcanic activity) can be accurately assessed.

Figure 1. Location of Important Bird Areas in Montserrat.



IMPORTANT BIRD AREAS

Montserrat's three IBAs—the island's international site priorities for bird conservation—cover 16.5 km², about 16% of Montserrat's land area. Only the Centre Hills IBA (MS002) is currently protected (as a forest reserve/protected forest, albeit mostly privately owned), and there are plans to designate this area as a national park. The other two IBAs are privately owned and unprotected although the Forestry, Wildlife, National Parks and Protected Arrears Act make provisions for their protection. The South Soufriere Hills IBA (MS003) is deep inside the volcanic exclusion zone and thus is no longer directly impacted by any human activity (although it is still heavily affected by invasive species introduced by humans).

The IBAs have been identified on the basis of 12 key bird species (listed in Table 1) that variously trigger the IBA criteria. These 12 species are all restricted-range birds, but include two that are globally threatened. For 11 of these species there are substantial populations in the Centre Hills IBA (the exception being Antillean Euphonia *Euphonia musica*: see above), and for Bridled Quail-dove *Geotrygon mystacea*, Purple-throated Carib *Eulampis jugularis*, Forest Thrush *Cichlherminia lherminieri*, Brown Trembler *Cinclocerthia ruficauda* and Montserrat Oriole *Icterus oberi* the majority of the Montserratian population occurs in the Centre Hills. The remaining species have substantial populations elsewhere in Montserrat (see above). The two remaining IBAs on Montserrat are the Northern Forested Ghauts (MS001) and the South Soufriere Hills (MS003). The former comprises discrete, small patches of lowland riparian and dry forest, mostly fringing the Centre Hills. The latter is a patch of wet and mesic forest in the exclusion zone of the south of the island, which is surrounded by pyroclastic flows. Both sites support most of the key bird species that the Centre Hills holds. However, the Northern Forested Ghauts IBA does not have *I. oberi*, and other key species such as *G. mystacea*, *Cichlherminia lherminieri* and *Cinclocerthia ruficauda* are extremely scarce there. Both sites are much smaller than the Centre Hills (only c.200 ha compared to 1,400 ha for the Centre Hills) emphasizing how critical the Centre Hills IBA for the maintenance of viable populations of Montserrat's key bird species. The Centre Hills and South Soufriere Hills IBAs between them embrace almost all of the remaining hill forest and along with it the entire population of the Critically Endangered oriole and the vast majority of the population of the Vulnerable *Cichlherminia lherminieri*. Based on current knowledge, no seabird or wetland sites on Montserrat qualify as IBAs.

The existing monitoring programs for the land birds are critical to maintain (and could be expanded to include seabirds) to determine the impact of management activities or future threats. The monitoring results should be used to inform the annual assessment of state, pressure and response variables at each of the territory's IBAs to provide an objective status assessment and highlight additional management interventions that might be required to maintain these internationally important biodiversity sites.

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MS001 Northern Forested Ghauts

Unprotected

COORDINATES 16°47′N 62°12′W
ADMIN REGION —
AREA 498 ha
ALTITUDE 0–300 m
HABITAT Tropical deciduous and semi-deciduous forest

THREATENED BIRDS 1
RESTRICTED-RANGE BIRDS 11
BIOME-RESTRICTED BIRDS
CONGREGATORY BIRDS

Site description

The Northern Forested Ghauts IBA comprises a discontinuous series of steep, forested streams (known locally as ghauts) that originate in the Centre Hills IBA (MS002). The ghauts sustain a more or less continuous riparian fringe of native forest (c.50–150 m across) as they run through the open agricultural and residential lowlands of northern Montserrat. Several ghauts are still contiguous with the forest of the Centre Hills IBA. The watercourses of each ghaut are very small and there is no associated wetland habitat.

Birds

This IBA is important for the Vulnerable Forest Thrush *Cichlherminia lherminieri* and 11 (of the 12) Lesser Antilles EBA restricted-range birds. *Cichlherminia lherminieri* reaches densities comparable with those of the Centre Hills IBA in some of the wetter ghauts, and those with forest that is contiguous with the Centre Hills. Green-throated Carib *Eulampis holosericeus* occurs at densities twice as high as those in the Centre Hills, reflecting its preference for lower-altitude and forest-edge sites. The Critically Endangered Montserrat Oriole *Icterus oberi* is absent.

Other biodiversity

The endemic Montserrat anole *Anolis lividus* is thought to be common, and a number of other reptiles exist as endemic subspecies. The bat fauna is thought to be similar to the Centre Hills IBA (MS002), but the bats, like the reptiles and also the insects are poorly recorded.

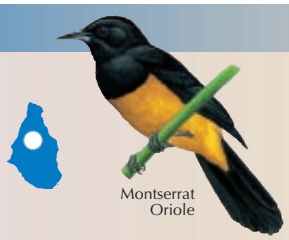
Conservation

The ghauts are privately owned and unprotected. Rapid expansion of built areas in northern Montserrat, as a result of the abandonment of the south, has affected some ghauts, and is impacting the forest, both through direct habitat destruction and the increased presence of dogs, cats,goats, pigs and rodents. The small forest patches in the ghauts are frequently considered to be "wasteland", and there is some dumping of rubbish. Invasive alien species present in the IBA include the widespread feral goats (impacting plant communities), abundant rats (*Rattus* spp., likely having a significant ecological impact) and, being close to human habitation, pet dogs and cats, while feral cats are also fairly common (and may be important predators of some species). Domestic fowl are a rapidly increasing presence, and may be having strong ecological effects. Invasive alien plants may also be a threat, but have not been studied.

MS002 Centre Hills

Forest Reserve

COORDINATES 16°45′N 62°12′W
ADMIN REGION —
AREA 1,112 ha
ALTITUDE 150–741 m
HABITAT Successional deciduous, semi-evergreen and evergreen tropical forest



THREATENED BIRDS 2
RESTRICTED-RANGE BIRDS 12
BIOME-RESTRICTED BIRDS
CONGREGATORY BIRDS

Site description

Centre Hills IBA represents the largest forest area on Montserrat and the main water catchment for the inhabited north. It is an almost continuous block of steep, pathless hill forest in the centre of the island. A series of small, steep streams radiate from central ridges, some of which form the Northern Forested Ghauts IBA (MS001). Tropical deciduous forest in the drier lowlands develops with altitude into semi-deciduous, then tropical evergreen and eventually elfin forest on the summit of Katy Hill. The forest is mostly secondary and in a range of successional stages as a result of clearance for agriculture and the frequent passage of hurricanes.

Birds

This IBA is important as its mesic and wet forest supports the majority of the Critically Endangered *Icterus oberi* population. The Vulnerable Forest Thrush *Cichlherminia lherminieri* also occurs at relatively high densities, and with an estimated 900–2,600 pairs this IBA may well be the world stronghold for the species. All 12 Lesser Antilles EBA restricted-range species occur. Pearly-eyed Thrasher *Margarops fuscatus* densities are among the highest in its range.

Other biodiversity

The Critically Endangered (CR) Montserrat galliwasp *Diploglossus montisserrati* is known only from this IBA. Mountain chicken *Leptodactylus fallax* (also CR)—the world's second largest frog—occurs in this IBA and on Dominica. About 10% of all insect species are endemic to the IBA. The Endangered lignum vitae *Guaiacum officinale* and mahogany *Swietenia mahagoni*, and Vulnerable *S. macrophylla* and red cedar *Cedrela odorata* occur.

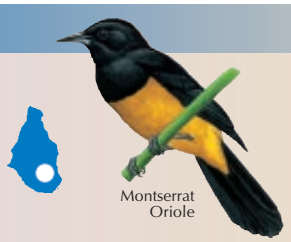
Conservation

The Centre Hills IBA, although largely privately owned, incorporates a forest reserve. The IBA extends beyond the forest reserve boundary to include the core range of *I. oberi*. A proposal to declare the IBA a national park is being prepared. Rats *Rattus* spp. and *M. fuscatus* predate nests of *I. oberi* and *C. lherminieri*, and feral pigs destroy stands of the oriole's preferred nest plant *Heliconia caribea*. Alien invasive animals are impacting the general ecology of the IBA. Ash falls from the volcano may continue to affect the ecology, and physically destroy *I. oberi* nests. Capping springs to supply water to the north of the island has reduced some stream flows and may have resulted in some loss of wet valley-bottom habitat. Small-scale encroachment around the fringes, both for housing and agricultural development, appears to be increasing.

MS003 South Soufriere Hills

Unprotected

COORDINATES 16°42′N 62°10′W
ADMIN REGION —
AREA 35 ha
ALTITUDE 200–750 m
HABITAT Evergreen and semi-deciduous forest



THREATENED BIRDS 2
RESTRICTED-RANGE BIRDS 10
BIOME-RESTRICTED BIRDS
CONGREGATORY BIRDS

Site description

The South Soufriere Hills IBA is in the south of the island. It comprises one small, isolated patch—Roche's Estate—of the original forests that once cloaked the slopes of the Soufriere and South Soufriere Hills. Despite being no more than 1.5 km from the Chances Peak volcano, this area of forest (on the eastern slope of the South Soufriere Hills) remained intact in spite of the pyroclastic flows from the volcano. The IBA is in the volcanic exclusion zone and has been little explored since 1997, but brief field visits in 2001 and 2002 confirmed the apparent good condition of the (albeit secondary) forest.

Birds

This IBA is important for the Critically Endangered Montserrat Oriole *Icterus oberi*, with densities apparently similar to those in the best parts of the Centre Hills IBA (MS002). Visits in 2001 and 2002 resulted in estimates of 50–100 pairs and records of fledglings. The Vulnerable Forest Thrush *Cichlherminia lherminieri* is also present in this IBA along with a total of 10 (of the 12) Lesser Antilles EBA restricted-range birds. Lesser Antillean Bullfinches *Loxigilla noctis* were recorded in exceptional numbers during 2001 and 2002.

Other biodiversity

Data on taxa other than birds are almost completely lacking from the post-eruption period, although many of the Centre Hills IBA forest species probably occur. An undescribed endemic long-horned grasshopper, an undescribed, endemic soldier beetle (*Cantharidae*) and two undescribed, endemic darkling ground beetle species (*Tenebrionidae*) have been found, suggesting that endemism is high.

Conservation

The South Soufriere Hills IBA is privately owned and deep inside the volcanic exclusion zone. As a result, human activity in the area has been minimal since 1997, and consequently little is known about the ecological or conservation status of this isolated forest. Rats *Rattus spp.* are present, and were abundant in 2002, and it is likely that feral livestock (possibly pigs and goats) also occur and may be at high and/or increasing densities. The area has presumably been impacted by ash falls since 1997. There are many non-native fruit trees and small, abandoned agricultural plots which favours the rats and the predatory Pearly-eyed Thrasher *Margarops fuscatus*. It is separated from other forest areas by pyroclastic flows which, if volcanic activity remains low, will likely be recolonised by vegetation rapidly enough to avert the threat of ecological and genetic isolation.