

# COCKPIT COUNTRY FLORA & FAUNA

## Global Context

The Caribbean Islands Biodiversity Hotspot is exceptionally important for global biodiversity conservation because of its high levels of species endemism. The Caribbean is home to approximately 11,000 plant species, of which 72% are endemic (i.e., their range is restricted entirely to the insular Caribbean). For native terrestrial wildlife, 100% of 189 amphibian species, 95% of 520 reptile species, 74% of 69 mammal species and 26% of 564 birds are unique to the Caribbean Islands.

The Caribbean Islands rank **third** amongst the World's **34** Biodiversity Hotspots for hosting unique species: we have the 3<sup>rd</sup> highest concentration of endemic genera and species on Earth.

However, because at least 755 endemic plant and vertebrate species are at risk of extinction according to the IUCN, the Caribbean Islands Biodiversity Hotspot also ranks **fifth** amongst the "Hotspots with Extreme Conservation Needs."

## Regional & National Context

With a landmass of 10,829 km<sup>2</sup>, Jamaica is the third largest island in the Caribbean Basin, and thus contributes approximately 22% to the c. 230,000 km<sup>2</sup> of land area of the Caribbean Biodiversity Hotspot. Jamaica is an important contributor to the region's list of island-endemic species: there are currently 923 plants, 514 land snails, 37 butterflies, 35 reptiles, 29 birds, 21 amphibians, 10 freshwater crabs, 5 freshwater fish, and 5 mammals which are found exclusively in Jamaica. Other invertebrates remain to be fully tallied and it is without doubt that more species remain to be discovered and described.

## Cockpit Country

The 1,163 km<sup>2</sup> of Cockpit Country (as delineated by the Cockpit Country Stakeholders Group (CCSG) support an incredible array of terrestrial, freshwater, and subterranean biological diversity. Because of its size and large areas of un-fragmented forest, it is a stronghold for many island-endemic species and it is the only location on Earth for more than 100 plants and animals.

For maps and satellite images of the CCSG boundary, with comparison to the boundary presented by the Prime Minister for a Protected Area within the Cockpit Country landscape, see: <http://www.cockpitcountry.com/CCPAMaps.html>

### **Floral Diversity**

- 907 vascular plant and 160 fern species have been recorded in Cockpit Country (Bramwell and Caujape-Castells 2011); this equates to an astounding 10% of the Caribbean flora in a region that is less than 0.3% of the total Caribbean land area.
- Of Jamaica's 923 endemic vascular plant species (NEPA 2003, 2013), 281 are found in Cockpit Country: 11% of Jamaica's land area supports 30% of the island's endemic plants.
- At least 71 endemic plant species (K. Campbell 2009) occur only in Cockpit Country and nowhere else on Jamaica or anywhere else.

### **Faunal Diversity**

- Over 600 invertebrate and vertebrate species have been recorded in the literature for Cockpit Country: they all encapsulate the history of how the myriad micro- and macro-habitats of an insular cockpit karst landscape shapes the adaptation of unique behaviours, speciation, and the existence of globally-unique faunal communities.
- 142 bird species, including 27 of Jamaica's 28 (96%) endemic species occur in Cockpit Country; an est. 90% of the total population of the endemic, IUCN Vulnerable Black-billed Parrot (*Amazona agilis*) occurs here.
- At least 33 of Jamaica's 37 (86%; Turner and Turland 2017) endemic butterflies occur in Cockpit Country, with two of these 33 restricted entirely to Cockpit Country; the area also is vitally important for the endemic, IUCN Endangered Jamaican Giant Swallowtail (*Pterourus homerus*), the largest butterfly in the New World and the second largest butterfly in the World.
- 20 of Jamaica's 35 (57%) endemic reptiles occur in Cockpit Country; two of these 20 are restricted entirely to Cockpit Country.
- 14 of 21 (67%) endemic frogs occur in Cockpit Country; two are known only from a small area around Quickstep. Another two species, thus far found only in Cockpit Country, are being described (S. Hedges *pers. comm.*; Holmes 2011)
- 10 species of small, freshwater crabs (Sesamidae) have evolved in Jamaica. Their colonization from the sea and their evolutionary adaptations to freshwater is thought to have occurred along the north coast, particularly along the Martha Brae whose headwaters are in Cockpit Country. All 10 species are endemic to Jamaica and five occur in Cockpit Country. Two species have evolved unique maternal care (one species' breeding nurseries are made in "wild pine" bromeliads and the other species uses small, empty snail shells) which has not developed in any other species of freshwater crab anywhere else in the World:

thus, both the species and their unique behaviour are endemic not only to Jamaica but only found in Cockpit Country. A video documentary of these extraordinary behaviours, *A Nest of Water: The Caring Crabs of Jamaica* by Rudolf Diesel, can be seen at <https://www.youtube.com/watch?v=un9jpbKuZi4>

- 16, possibly 17, of Jamaica’s 22 extant native mammals occur in Cockpit Country: 16 of 21 bats and possibly also the endemic Jamaican Hutia (*Geocapromys brownii*). Three of Jamaica’s four endemic bat species occur here, most notably the critically endangered Jamaican Flower Bat (*Phyllonycteris aphylla*), which may now roost in only 2 or 3 caves on the entire island and nowhere else in the World.

**TABLE 1. Cockpit Country: a stronghold of Jamaica’s endemic biodiversity and the only location on Earth for more than 100 species.**

Taxon	# of species resident on Jamaica	# endemic to Jamaica	# Jamaican endemics in Cockpit Country	# endemic to Cockpit Country
Vascular Plants	3,304	923	281 (30%)	71
Ferns	~ 600	82 (14%)	15 (18%)	2
Land Snails	570	514 (90%)	194 (38%)	31
Freshwater Crabs	10	10 (100%)	5 (50%)	5
Butterflies	135	35 (26%)	30 (86%)	3
Amphibians	25	21 (84%)	14 (67%)	2
Reptiles	39	35 (90%)	20 (57%)	2
Birds	67	29 (43%)	28 (97%)	0
Bats	21	4 (19%)	3 (75%)	0
Mosquitoes	72	35 (36%)	?	?
Fireflies (“Blinkies”)	48	45 (94%)	?	?
Velvet Worms	2	2 (100%)	1	0

At least 60 of the endemic species in Cockpit Country already are considered globally threatened by the IUCN.

This number is more than any other Key Biodiversity Area in the insular Caribbean, including Haiti's Massif de la Hotte, which has a 'mere' 42 threatened endemics (Anadón Irizarry *et al* 2012).

Cockpit Country is the "Hottest Hotspot with Extreme Conservation Needs" in the Caribbean.

## **Cockpit Country Hotspot Still Under Threat**

On November 21<sup>st</sup> 2017, Jamaica's Prime Minister, the Most Honourable Andrew Holness, ON MP declared a boundary for a Cockpit Country Protected Area (CCPA). This boundary, however, excluded areas which meet the government's criteria for defining Cockpit Country (i.e., heritage, water resources, biodiversity, and geomorphology). Thus, instead of identifying all of Cockpit Country, as the CCSG Boundary does, the CCPA delineates a smaller subset and, most importantly, fails to fully protect the aquifer, biodiversity and heritage of Cockpit Country. The existence of Special Mining Leases (SMLs) and a Special Exclusive Prospecting License (SEPL) seems to be the best explanation as to why the CCPA visibly excluded the globally-unique features and their associated ecosystem services of Cockpit Country.

<http://www.cockpitcountry.com/CCPAMaps.html>

## **Values of Cockpit Country**

### ***Carbon Storage***

- The approx. 82,300 hectares of forest found within the CCSG boundary store a total of 11 million tonnes of carbon or an equivalent 40 million tonnes of CO<sub>2</sub>.
- The forest continues to absorb nearly a million tonnes of CO<sub>2</sub> every year.

<http://www.cockpitcountry.com/carbonValNews.html>

<http://www.cockpitcountry.com/CarbonVal.html>

### ***Climate Regulation***

Trees intercept 70% of rainfall and put moisture back into the atmosphere through transpiration. During the process of evapo-transpiration, latent heat is transferred high in the atmosphere, resulting in cooling at the canopy. The cooling of Cockpit Country forest is akin to running a 20MW air conditioner, 24/7, with no maintenance costs.

### ***Ecosystem Service Valuation***

- Based on a island-wide survey, the national value of maintaining the Cockpit Country in its current state is approximately **US \$29.8 million per annum**.

[http://www.cockpitcountry.com/pdfs/Edwards\\_PolicyBrief\\_CCVal.pdf](http://www.cockpitcountry.com/pdfs/Edwards_PolicyBrief_CCVal.pdf)

### ***Water is Life***

The quantity and quality of water provided by the Cockpit Country aquifer was not included in Dr. Edwards' evaluation; however:

- Cockpit Country spans 5 watersheds, corresponding to the major rivers of: Black River, Great River, Montego River, Martha Brae, and Rio Bueno;
- Cockpit Country provides 40% of Jamaica's fresh water

<http://www.cockpitcountry.com/Media/water.gif>

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## References

Anadón Irizarry, V., D.C. Wege, A. Upgren, R. Young, B. Boom, Y.M. León, Y. Arias, K. Koenig, A.L. Morales, W. Burke, A. Perez-Leroux, C. Levy, S. Koenig, L. Gape, and P. Moore. 2012. Sites for priority biodiversity conservation hotspots in the Caribbean Islands Biodiversity Hotspot. *J. Threat. Taxa* 4: 2806-2844.

Bramwell, D. and J. Caujape-Castells. 2011. *The biology of island floras*. Cambridge University Press, Cambridge, UK. 536pp.

Campbell, K. 2009. *Botanic expeditions in Cockpit Country*. Powerpoint Presentation given at the Institute of Jamaica.

Caribbean Herpetofauna: website of amphibian and reptile checklists; (c) S. Blair Hedges; last updated 3-December-2013. <[www.caribherp.org](http://www.caribherp.org)>

FishBase 2004: a global information system on fishes. WorldFish Center - Philippine Office, Los Banos, Philippines. <[www.fishbase.org](http://www.fishbase.org)>

Holmes, I. 2011. Checking in with Jamaica's endangered frogs. *Froglog* 98: 38.

National Environment and Planning Agency. 2003. *National Strategy and Action Plan on Biological Diversity in Jamaica*. Kingston, Jamaica. 101pp

National Environment and Planning Agency. 2013. *Plant Conservation Strategy for Jamaica*. Kingston, Jamaica. 81pp

Peck, S.B. 1992. A synopsis of the invertebrate cave fauna of Jamaica. *NSS Bull.* 54: 37-60.

Proctor, G.R. 1985. *Ferns of Jamaica*. British Museum (Natural History), London, UK.

Rosenberg, G. and I.V. Muratov. 2005. Status report on the terrestrial mollusca of Jamaica. *Proc. Acad. Nat. Sci.* 155: 117-161.

Schubart, C.D. and P. Koller. 2005. Genetic diversity of freshwater crabs (Brachyura: Sesamidae) from central Jamaica with description of a new species. *J. Nat. History* 39: 469-481.

Wilson, D.E. and D.M. Reeder (eds.) 2005. *Mammal species of the World: A taxonomic and geographic reference, 3rd Edition*. The Johns Hopkins University Press, Baltimore.

Turland, V.A., A.D. Warren, and D.S. Lewis. 2012. A new genus and species of Moncini from Jamaica, West Indies (Lepidoptera, Herperiidae, Hesperinae). *Trop. Lepid. Res.* 22:66-73.

Turner, T. and V.A. Turland. 2017. Discovering Jamaican Butterflies and Their Relationships around the Caribbean. Caribbean Wildlife Publications, Safety Harbour, FL.