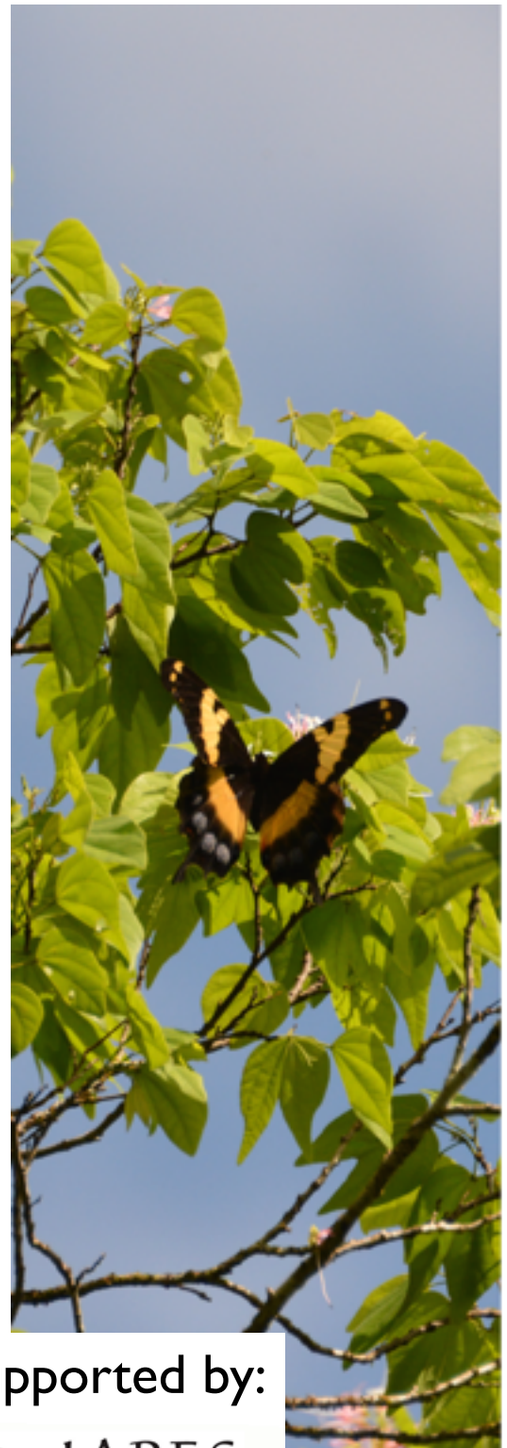
Homerus Conservation in Jamaica's Cockpit Country
IABES, TITAG, and IECC Conference
Tucson, Arizona 2016



OVERVIEW

1. Windsor Research Centre (WRC)
   - A Brief History

2. Cockpit Country Conservation Planning

3. Homerus Conservation
   - An Epic of Landscape Proportions

4 Hot-Off-The-Press News
   - 2016 and Onwards . . .

Supported by:
IABES

Windsor & Cockpit Country Conservation Planning

WRC

- ✓ PhD Ecologist
- ✓ Reformed Contractor
  (i.e., history as local employer)
- ✓ Community-Based
- ✓ Mud-On-Our-Boots

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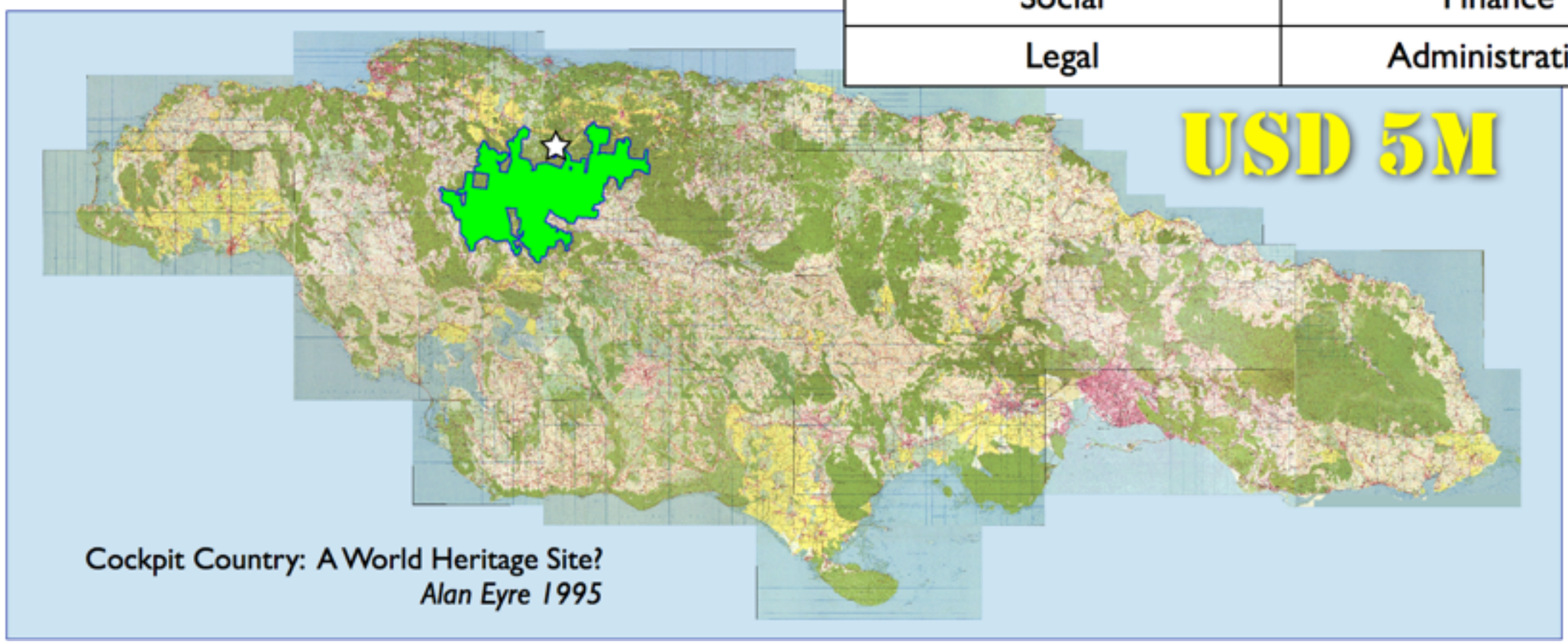
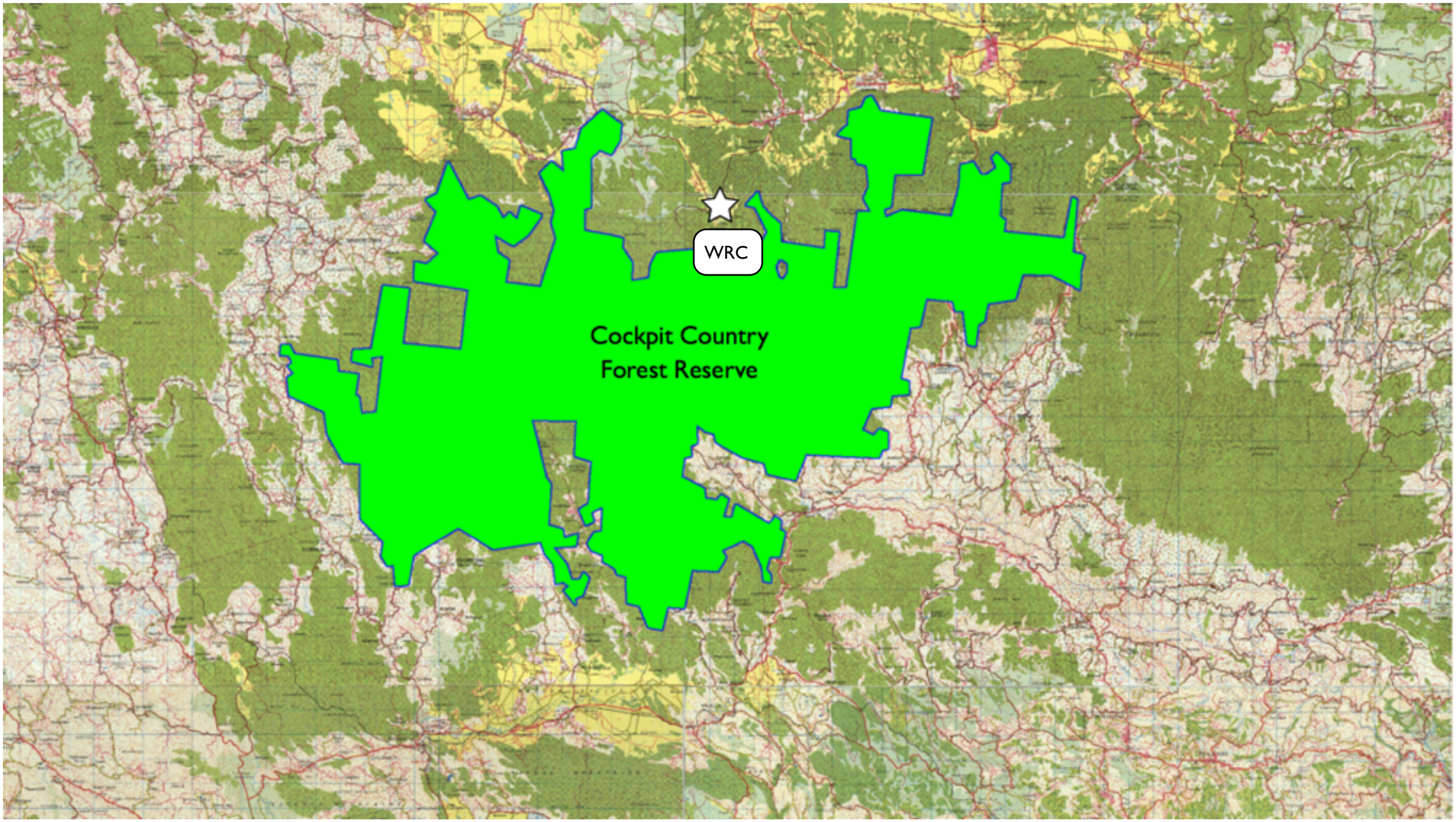
Biodiversity	Indigenous Rights
Social	Finance
Legal	Administration

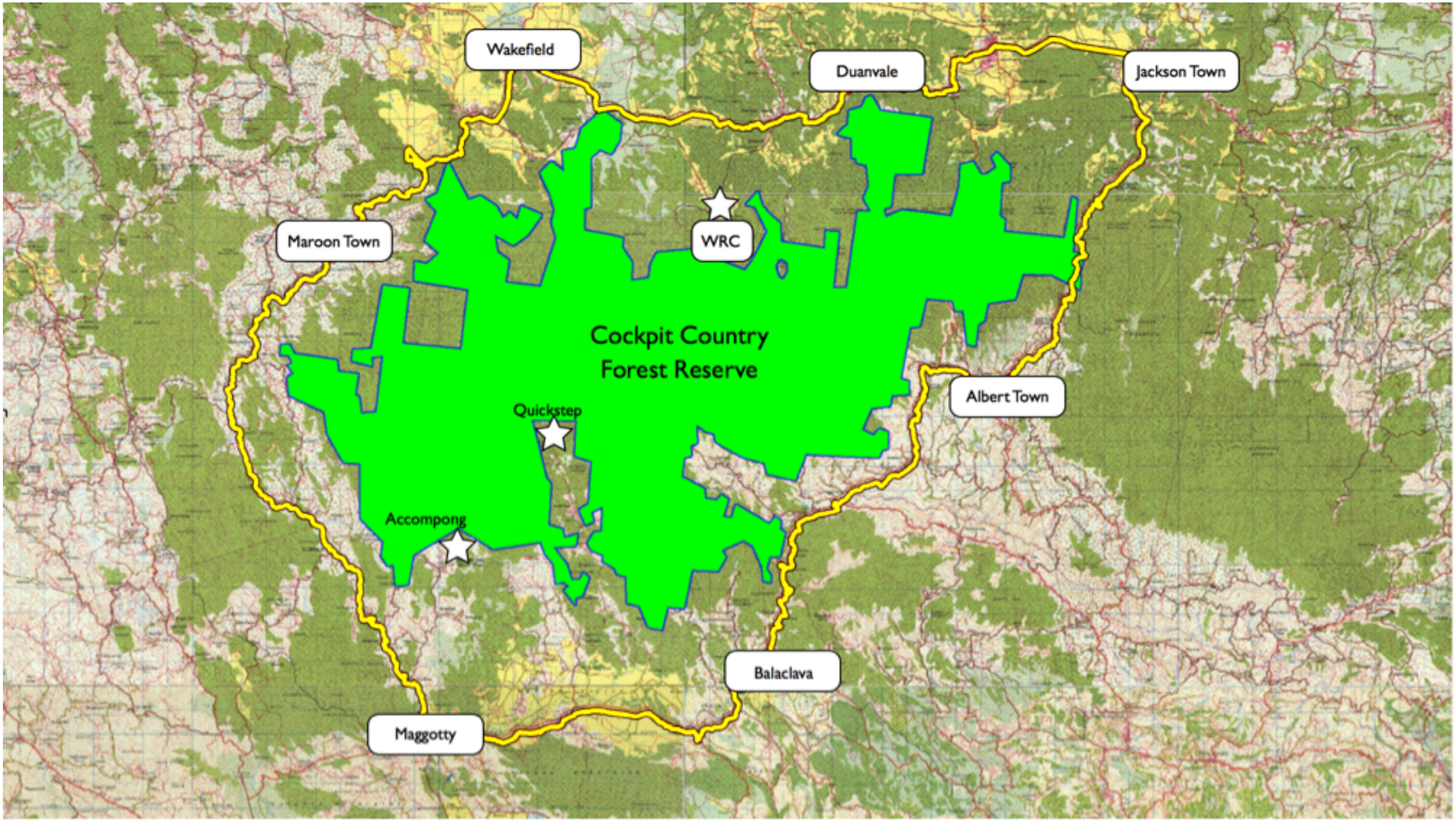
USD 5M



In 2000, Susan had a consultancy with a World Bank GEF-funded team, to assess the potential of improving the conservation status of Cockpit Country, with a goal towards declaration as a World Heritage Site. If feasible, Jamaica would have been eligible for a USD 5 million grant.



We were instructed to focus on the Cockpit Country Forest Reserve.



Using topographic maps and old aerial photographs, it was easy to notice how few communities there were in the interior of the Forest Reserve, while there is a distinctive “ring road” of communities around the Forest Reserve.
We decided that this “Ring Road” could serve as a recognizable feature which also afforded a buffer zone to the Forest Reserve. This began our usage of the concept of the “Cockpit Country Ring Road”.

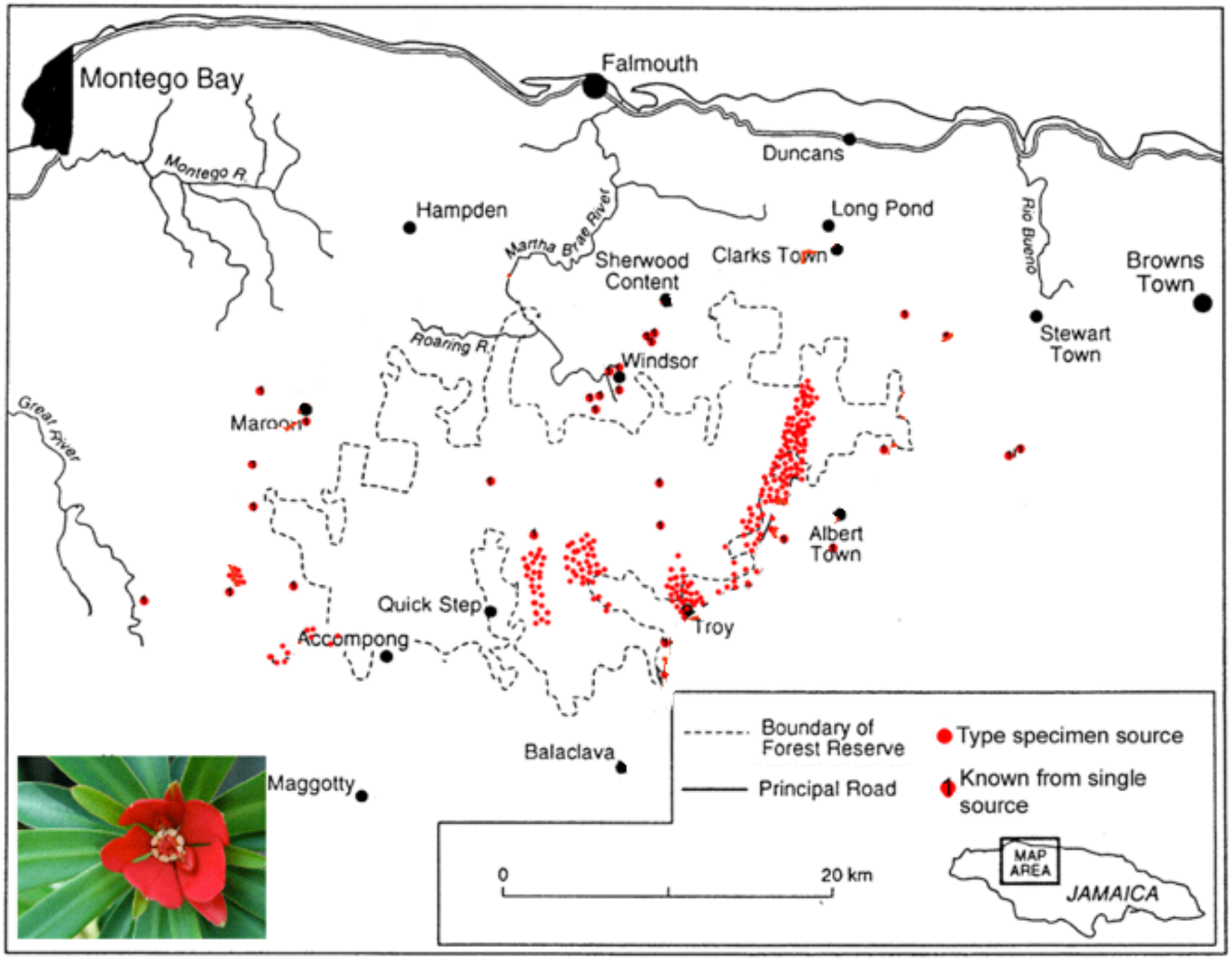


Figure 3.9. Presently-known distributions of plants endemic to the Cockpit Country.

With Jamaican colleagues, Susan mapped the flora and fauna found within the “Cockpit Country Ring Road”. They focused on species endemic to Jamaica or those historically described as endemic to Cockpit Country. All mapping was done by-hand on 1:50,000 topographic maps.

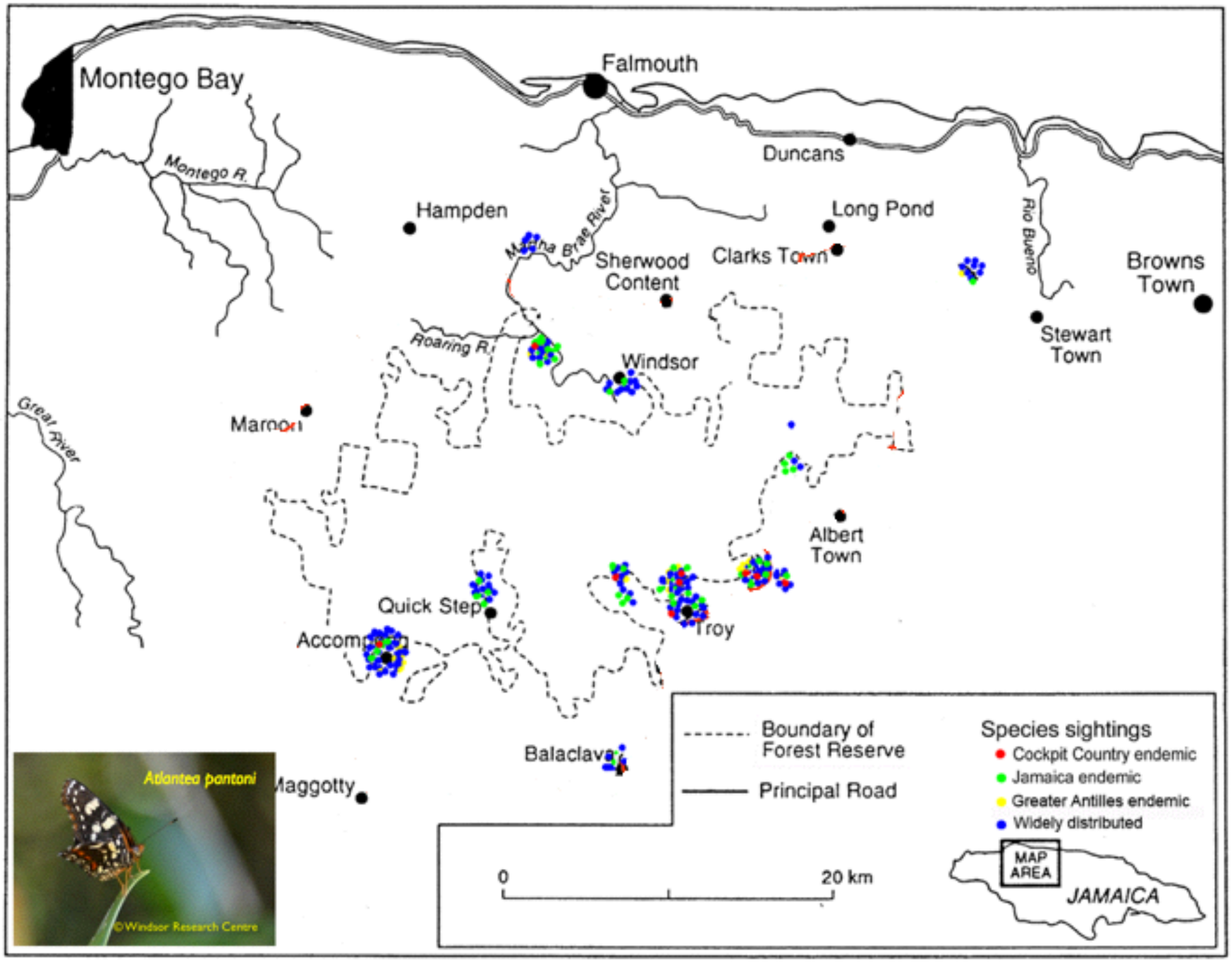


Figure 3.10. Reported butterfly localities

When all floral and faunal layers (amphibians, reptiles, birds, butterflies and bat roosting caves), were mapped, it was strikingly obvious that Cockpit Country supported an extraordinary number of plants and animals which were either restricted entirely to Cockpit Country or for which the area served as an important refugium from deforestation elsewhere on Jamaica. It was also obvious that we mapped “researcher distributions”: the interior was barely explored.
Our message to World Bank-GEF: Let’s Protect CC!

Two Pre-Conditions

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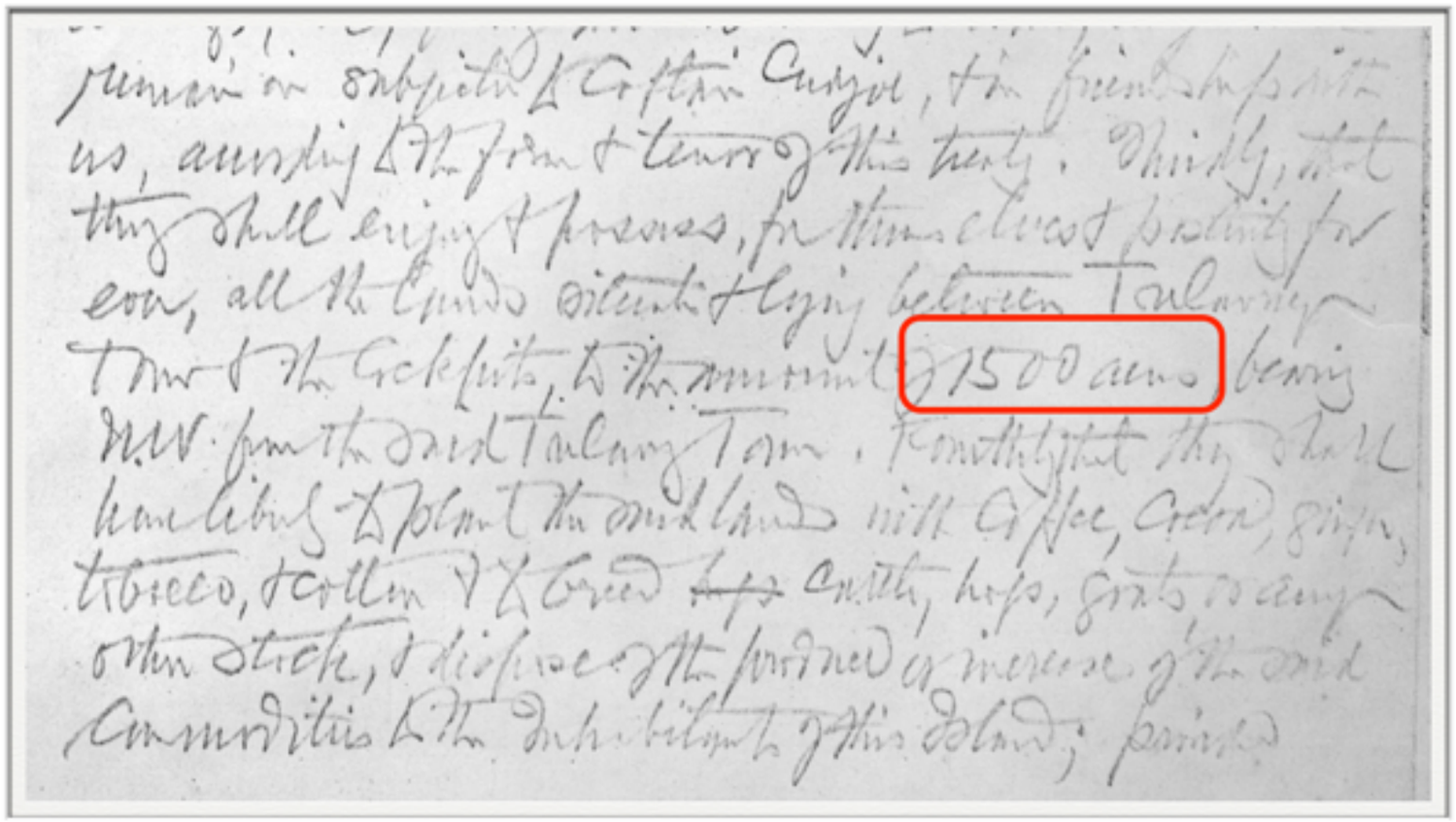
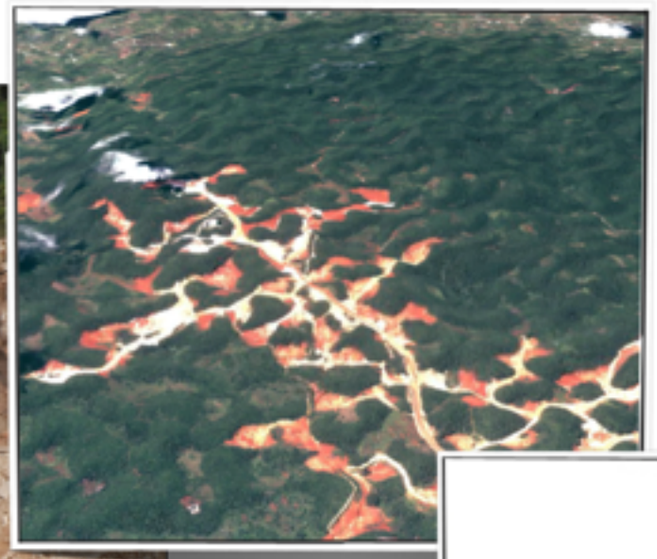
USD 5M



World Bank-GEF said "Great!" . . . and we only have two conditions for the Government of Jamaica:

1. Resolve the boundary dispute with the Accompong Maroons.

Two Pre-Conditions



2. Promise that mining of bauxite (the ore used for aluminum) will be prohibited in Cockpit Country.

(Note: This sounded eminently reasonable to us. After all, USD 5 million is a lot of money to give for conservation, so turning around and gouging-out the landscape certainly didn't seem compatible!)

Two Pre-Conditions

THE MINING ACT

[13th October, 1947.]

Cap. 253. Laws 38 of 1957, 39 of 1958, 21 of 1959, 43 of 1960. Acts 20 of 1974, 30 of 1974, 29 of 1977, 33 of 1979, 16 of 1983 2nd Sch., 33 of 1991 S. 22, 36 of 1995 3rd Sch.

PART I. *General*

Short title.

1. This Act may be cited as the Mining Act.

Interpretation.

2. In this Act—

"this Act" includes regulations made under this Act;

"alluvial" includes all forms of mineral deposits which do not fall within the definition of lode, and for the purposes of this Act bauxite and laterite deposits shall be regarded as alluvial deposits;

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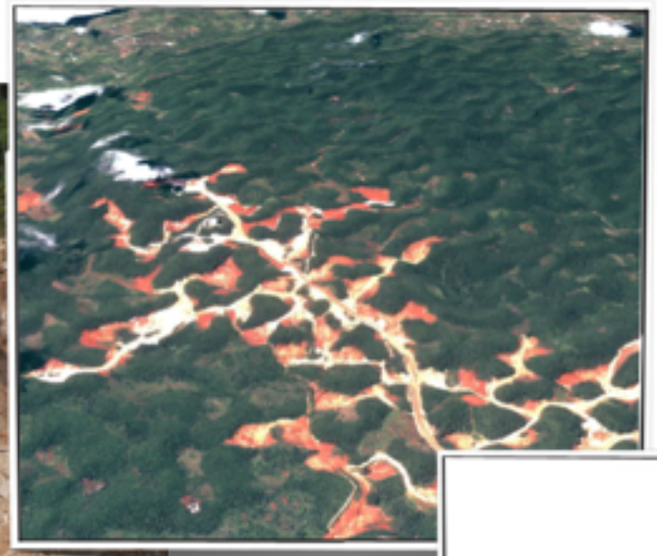
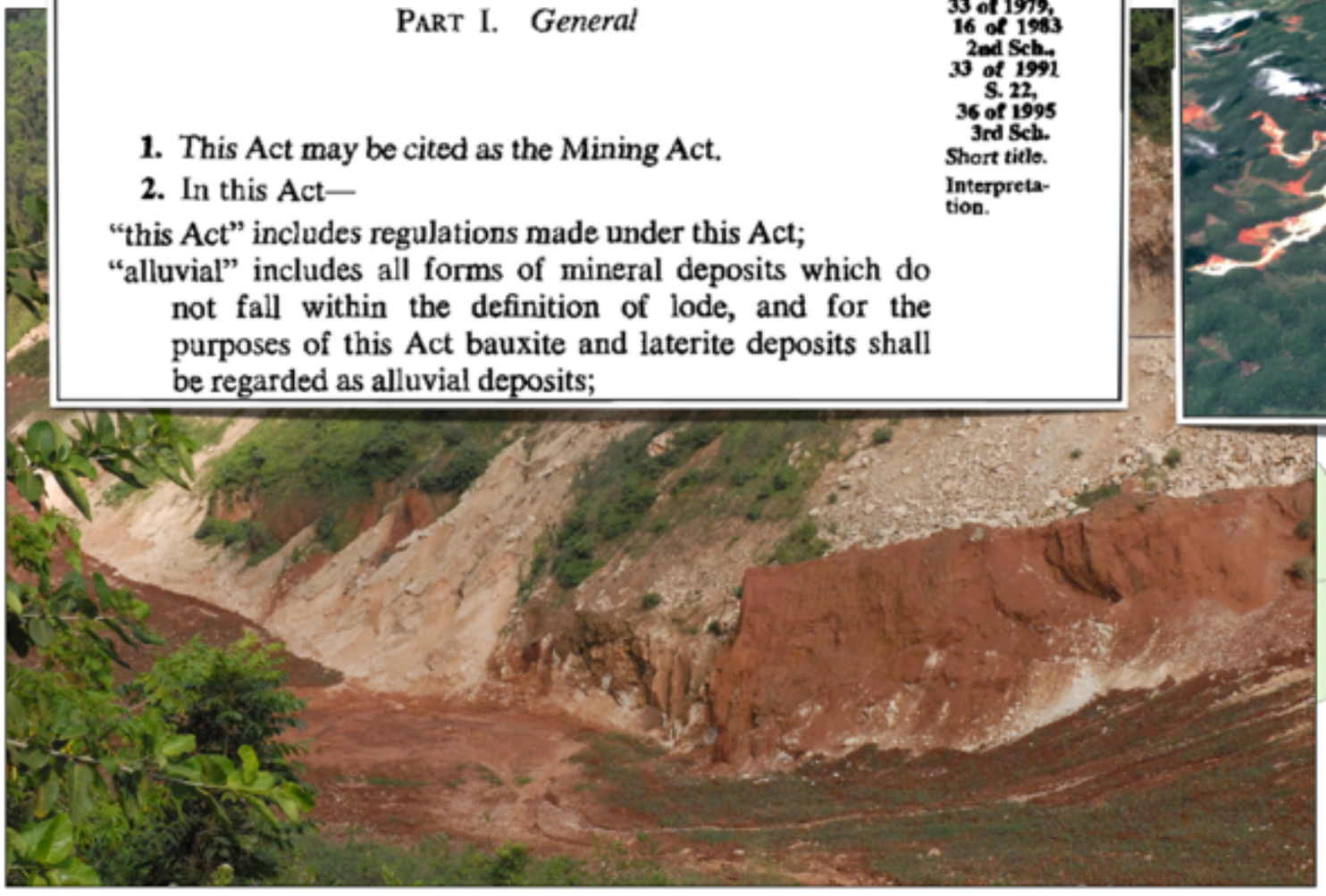
USD 5M

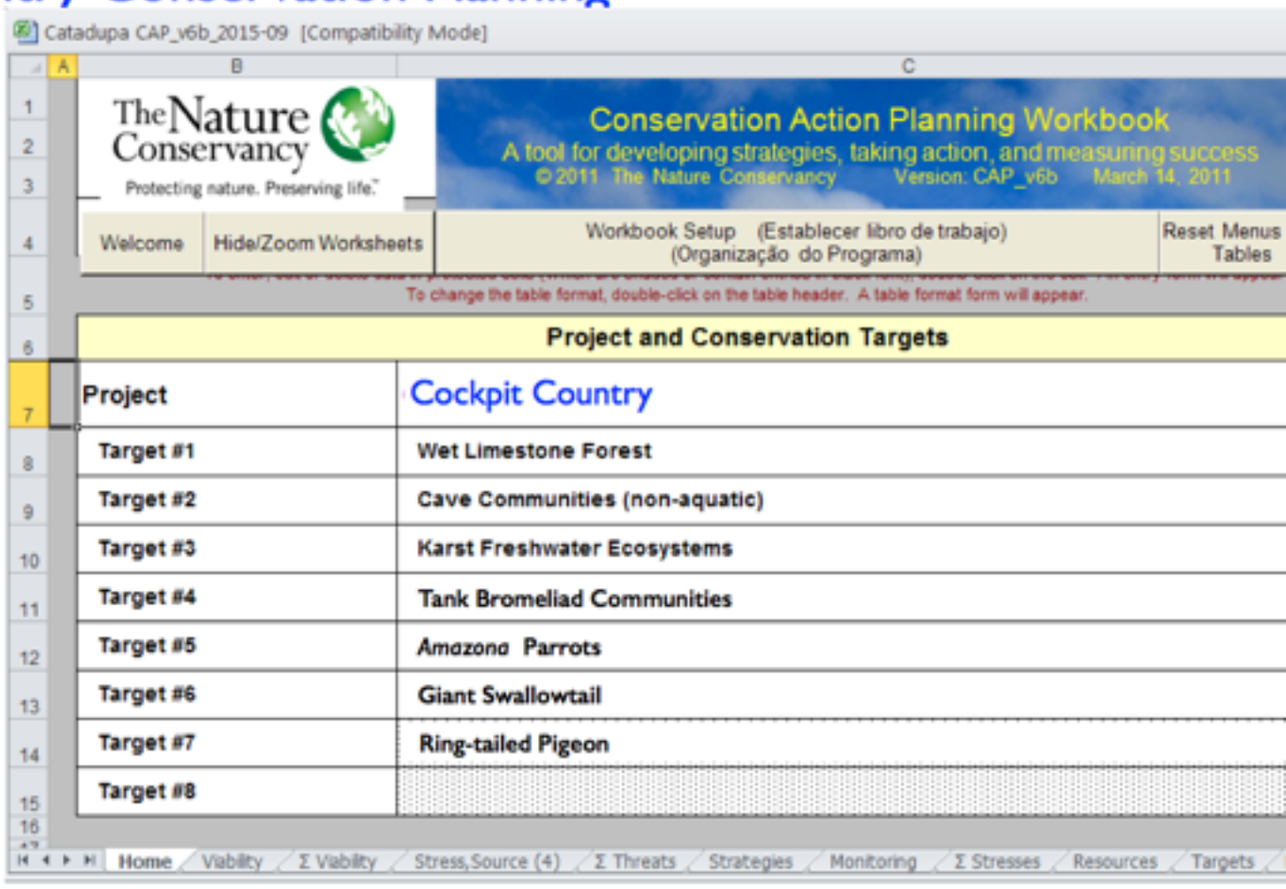




Unfortunately, Government not only said "no way will we deny ourselves the opportunity to mine the bauxite", but it was pointed out repeatedly by the Mines & Geology Division and by the Jamaica Bauxite Institute that the Mining Act (1947) pre-dated all other environmental legislation: "there is nothing you can do to stop us from mining."

And with that, the World Bank-GEF walked away. We don't blame them.

Windsor & Cockpit Country Conservation Planning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Conservation Action Planning Workbook
A tool for developing strategies, taking action, and measuring success
© 2011 The Nature Conservancy Version: CAP_v6b March 14, 2011

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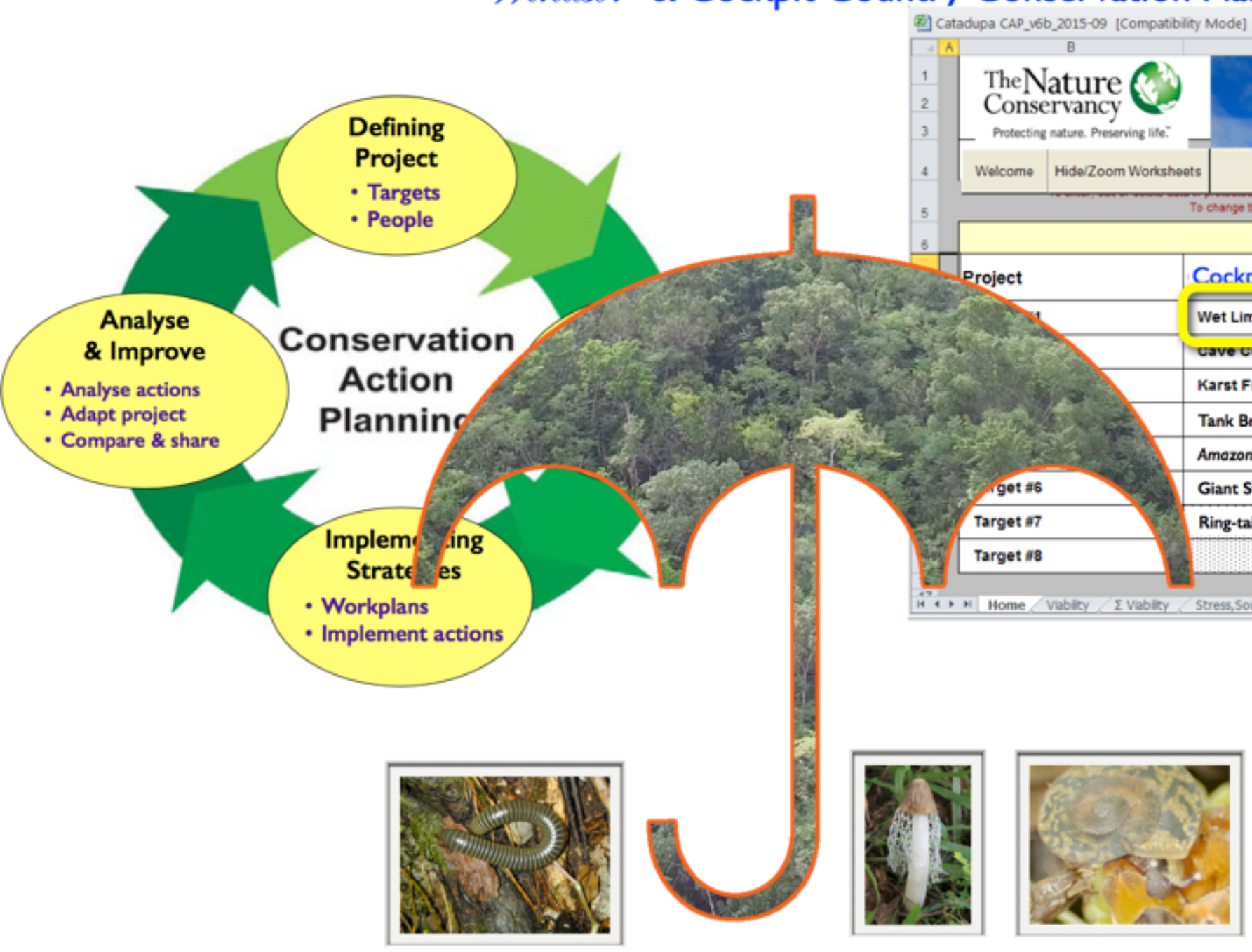
Project and Conservation Targets

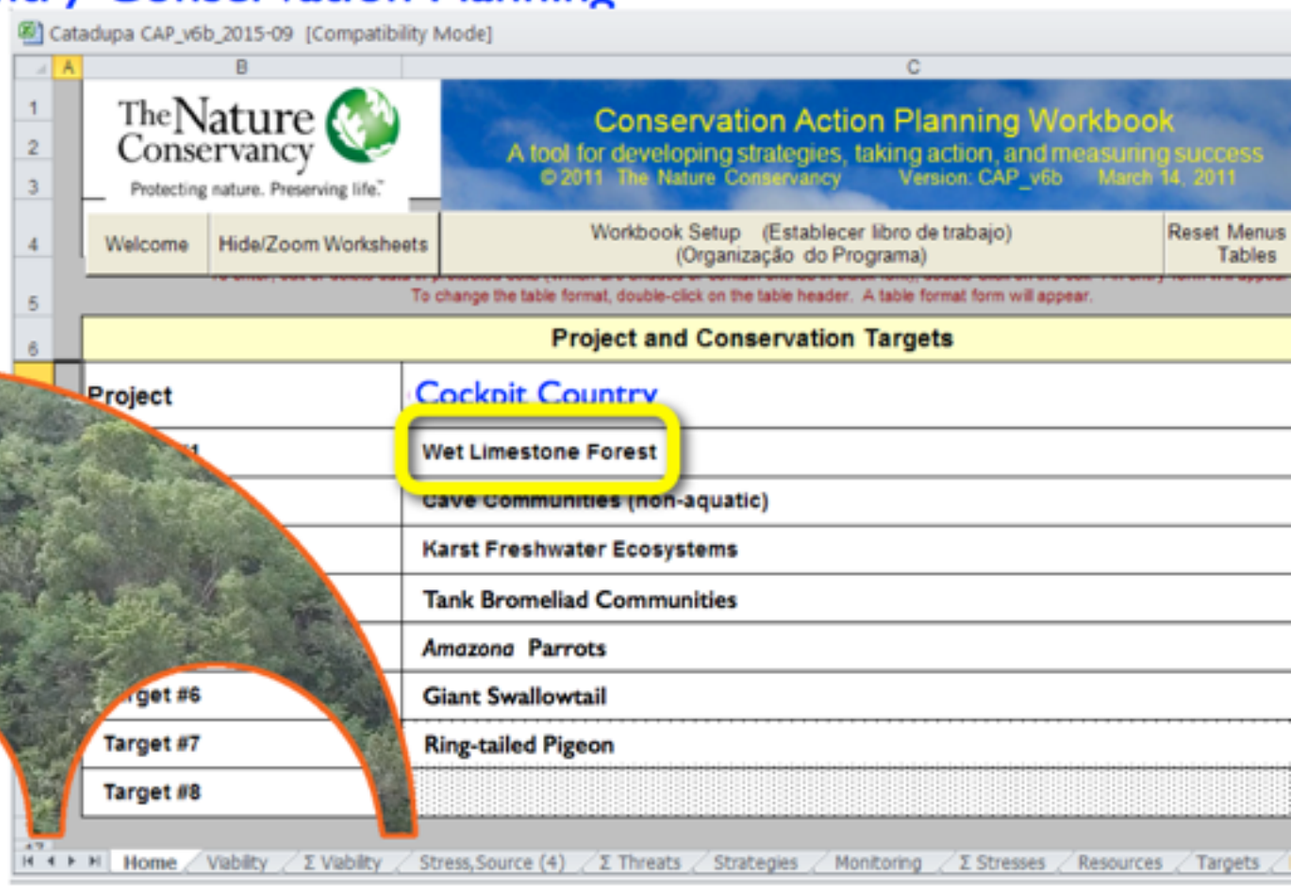
Project	Cockpit Country
Target #1	Wet Limestone Forest
Target #2	Cave Communities (non-aquatic)
Target #3	Karst Freshwater Ecosystems
Target #4	Tank Bromeliad Communities
Target #5	*Amazona* Parrots
Target #6	Giant Swallowtail
Target #7	Ring-tailed Pigeon
Target #8	

Home | Viability | Σ Viability | Stress,Source (4) | Σ Threats | Strategies | Monitoring | Σ Stresses | Resources | Targets

Fortunately, The Nature Conservancy (a partner to the World Bank-GEF team) didn't walk away.
They introduced us to Conservation Action Planning (CAP), their Excel-based planning tool which transformed how we thought about protecting biodiversity: we now had a logical framework which allowed us to discuss with decision-makers that conservation is about maintaining ecological processes and eliminating threats which compromise ecosystem functions and services, it's not "single species bean counting" and "putting points on a map which mining companies should try to avoid if they can".
Together with Jamaica's Forestry Department, the National Environment and Planning Agency and many other relevant stakeholders (esp. communities), we worked with TNC to develop the first CAP for Cockpit Country.

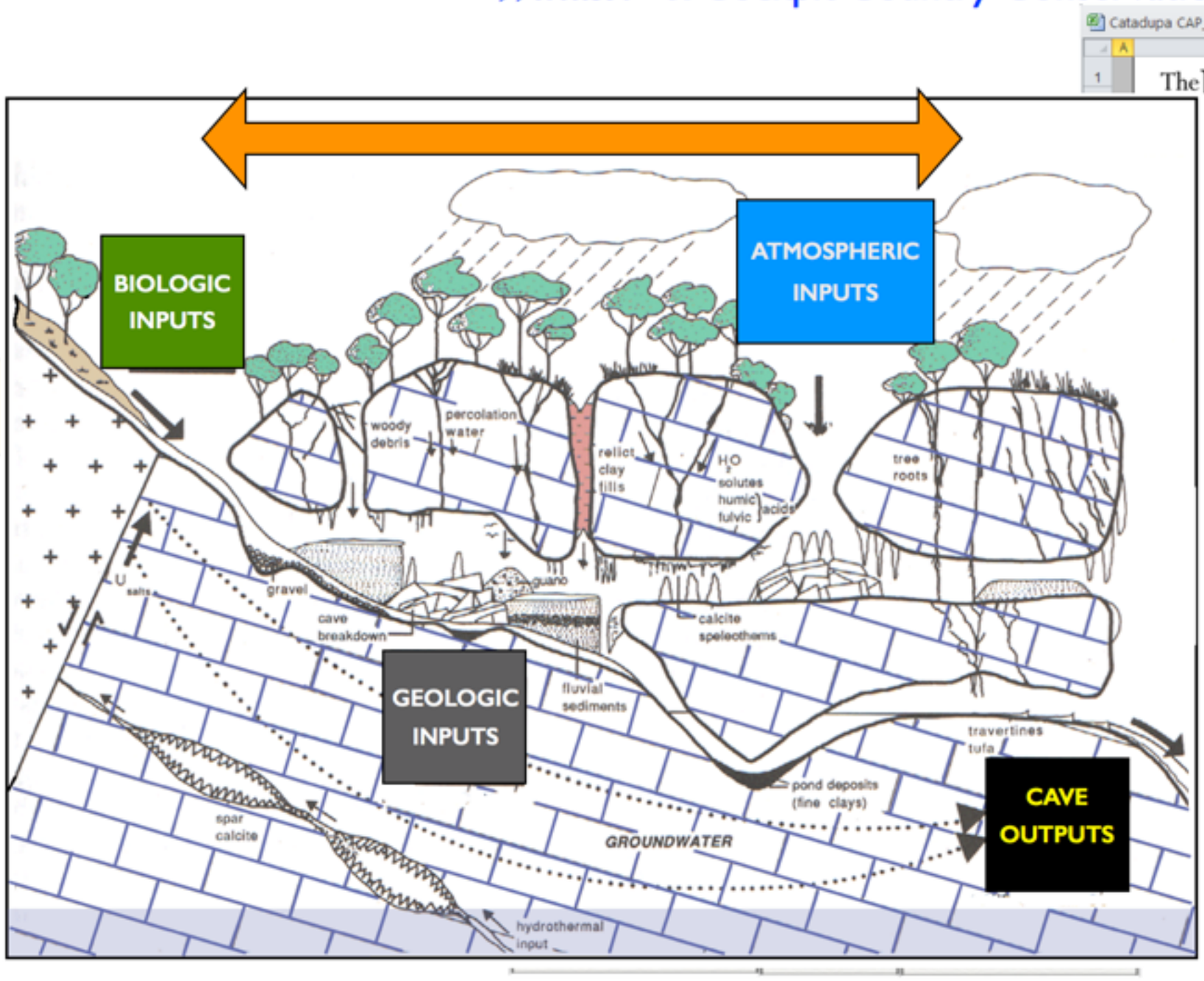
Windsor & Cockpit Country Conservation Planning





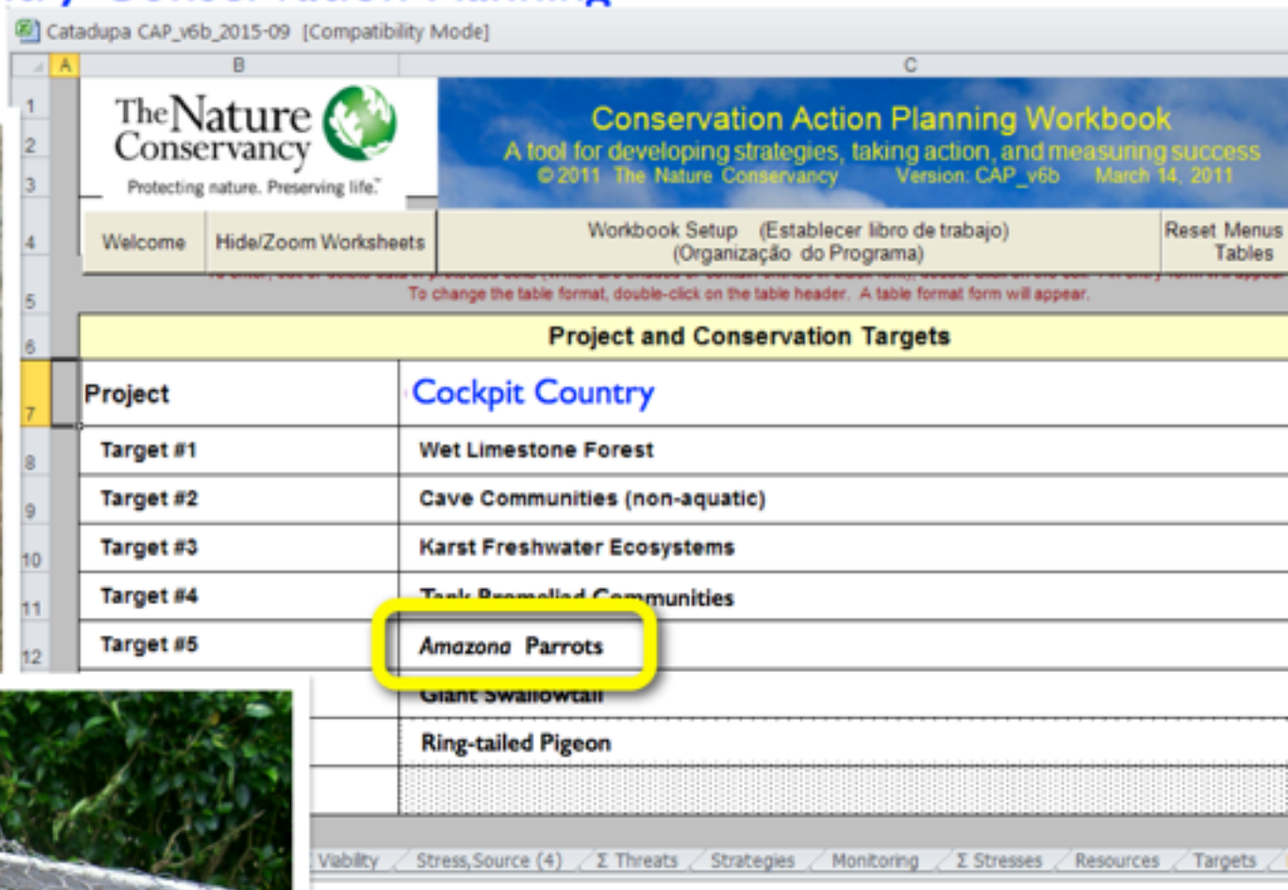
CAP starts by defining Conservation Targets - the biodiversity which encapsulates the area of concern.
We typically start by defining major habitat types: if we protect the forest, then all the forest-dependent species (esp. all the non-charismatic invertebrates, soil organisms, etc.) are *de-facto* protected.

Windsor & Cockpit Country Conservation Planning



For Cockpit Country, which is a karst limestone landscape, we needed to think not only in the horizontal surface plane (i.e., terrestrial forest cover), but we also had to think vertically: cave ecosystems and subterranean aquifers are critical components in karst landscapes and maintaining connectivity amongst these components is paramount.

Windsor & Cockpit Country Conservation Planning



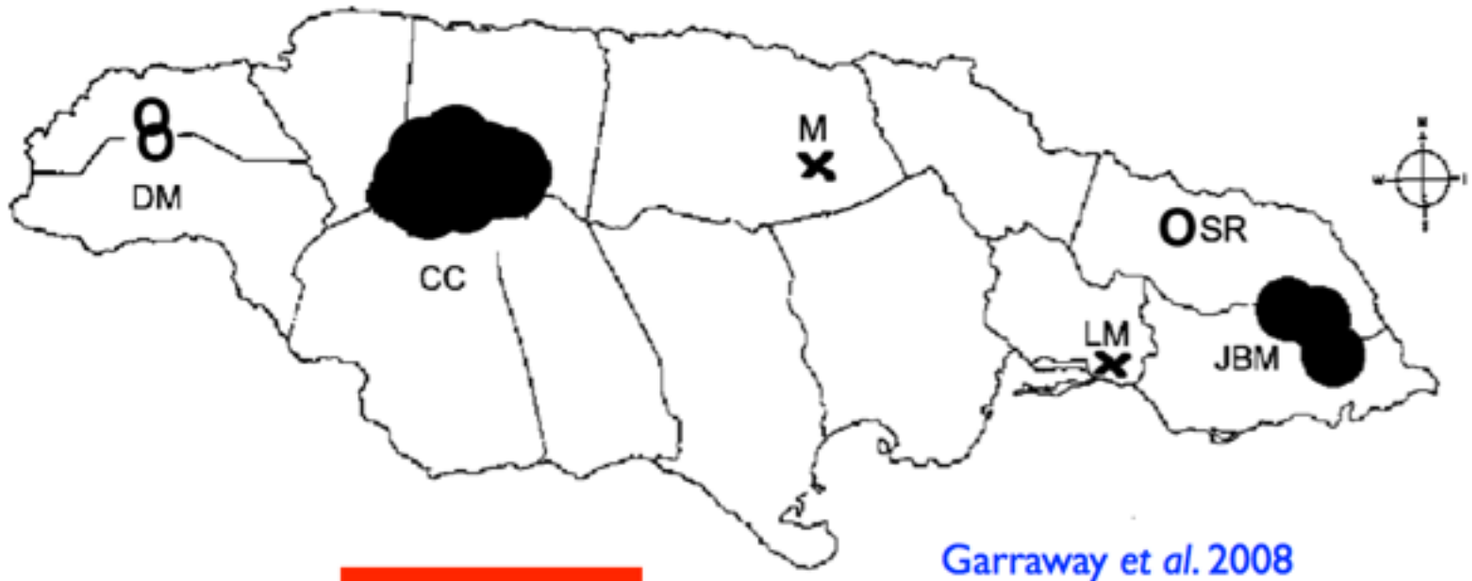
CAP does recognize that for some species, protecting habitat is necessary-but-not-sufficient for protecting the species. For example, because of illegal poaching, Jamaica's endemic *Amazona* parrots are vulnerable: management interventions above-and-beyond forest protection need to be defined; thus the parrots are listed as a separate conservation target so we can be sure to identify anti-poaching actions.

Analyse
& Improve

• Analyse actions

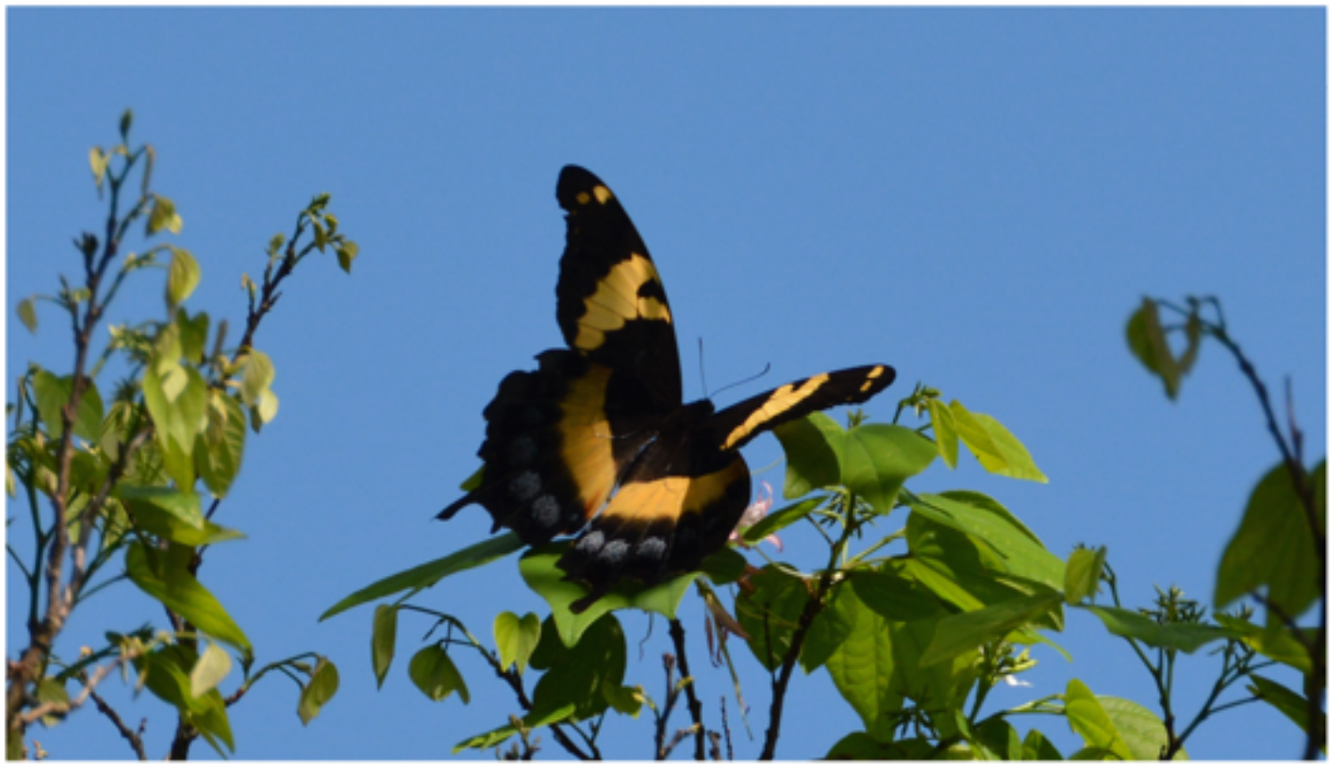
Co

Fig. 1 Map of Jamaica showing study areas. DM, Dolphin Head Mountain; CC, Cockpit Country; M, Mt Diablo; SR, Spanish River; LM, Long Mountain; JBM, John Crow and Blue Mountains; ●, Breeding populations; ○, larval food plant only; ✘, adult sighting only from previous studies



Garraway *et al.* 2008
Blue Mtns = parasitic wasp

IUCN EN

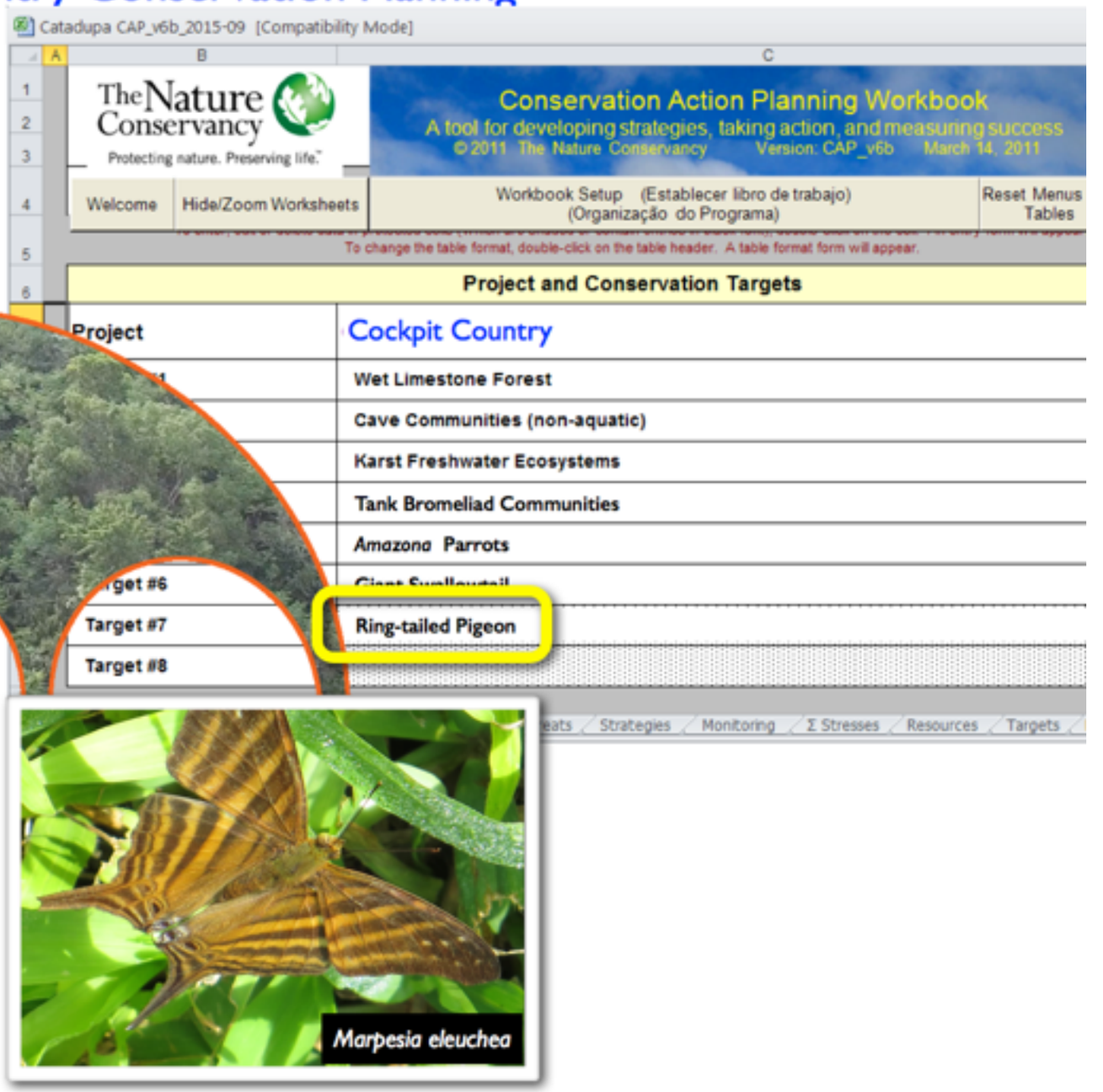


Target #6	Giant Swallowtail
Target #7	Ring-tailed Pigeon
Target #8	

Home | Viability | Σ Viability | Stress,Source (4) | Σ Threats | Strategies | Monitoring | Σ Stresses | Resources | Targets

Similarly, because of the importance of Cockpit Country to the survival of Jamaica's endemic Homerus (Giant) Swallowtail and the ever-present concern for illegal poaching, this butterfly also was identified as a Conservation Target in the CAP.

Windsor & Cockpit Country Conservation Planning



Another potential CAP target for Cockpit Country was Jamaica's endemic Ring-tailed Pigeon. Aside from needing protection from illegal hunting, this species represents an important landscape-level process which must be protected, namely the seasonal movement of species between interior (i.e.,Cockpit Country) breeding and coastal non-breeding habitats: the species suffers if we don't protect ALL necessary habitats AND connectivity between them.
This well-recognized pigeon also serves as a proxy for all Cockpit Country-dependent species which make seasonal, intra-island migrations, including those butterflies which shift their habitat usage between wet and dry seasons.

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Appendix B. Target Viability

Target and Site Viability Table

Conservation Target	Landscape Context	Condition	Size	Overall Viability Rank
1 Limestone Forest	Fair	Good	Fair	Fair
2 Karst Freshwater Ecosystems	Fair	Fair		Fair
3 Cave Communities (Terrestrial)	Fair	Poor		Fair
4 Black-billed and Yellow-billed Parrots	Good	Good	Very Good	Good
5 Giant Swallowtail Butterfly	Good	Fair		Good
Site Biodiversity Health Rank				Fair

The Overall Viability Ranks are defined as:

Very Good: The target is functioning at an ecologically desirable state, requiring little human intervention for maintenance within the natural range of variation (i.e., is as close to "natural" as possible and has little chance of being degraded by some random event).

Good: The target is functioning within its range of acceptable variation, although it may require some human intervention for maintenance.

Fair: The target's status lies outside of its range of acceptable variation and requires human intervention for maintenance. If unchecked, the target will be vulnerable to serious degradation.

Poor: Allowing the target to remain in this condition for an extended period will make restoration or prevention of extirpation practically impossible (e.g., it will be too complicated, costly, and/or uncertain to reverse the alteration).

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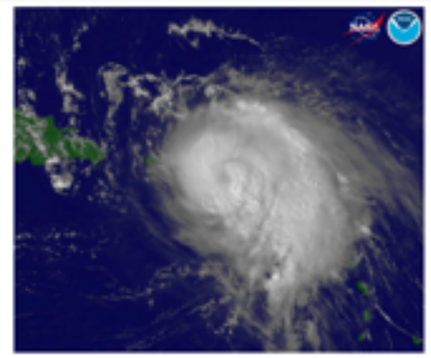
Project and Conservation Targets

Project	Cockpit Country

SCENARIO:

Normal environmental regime



VERY GOOD	Recover without human intervention
GOOD	Some interventation may be needed
FAIR	Without intervention, will degrade
POOR	Even without hurricane, it needs help!

After CAP Conservation Targets were identified, we evaluated the current condition of all targets: this provides the baseline which we either want to maintain or, more likely, seek to improve with conservation / management actions.
For Cockpit Country, we asked experts to think about the targets under normal conditions: because this is an ecosystem which evolved with hurricanes, let's think how resilient the targets are if they got hit by hurricanes twice in one year or by single hurricanes over two consecutive years.

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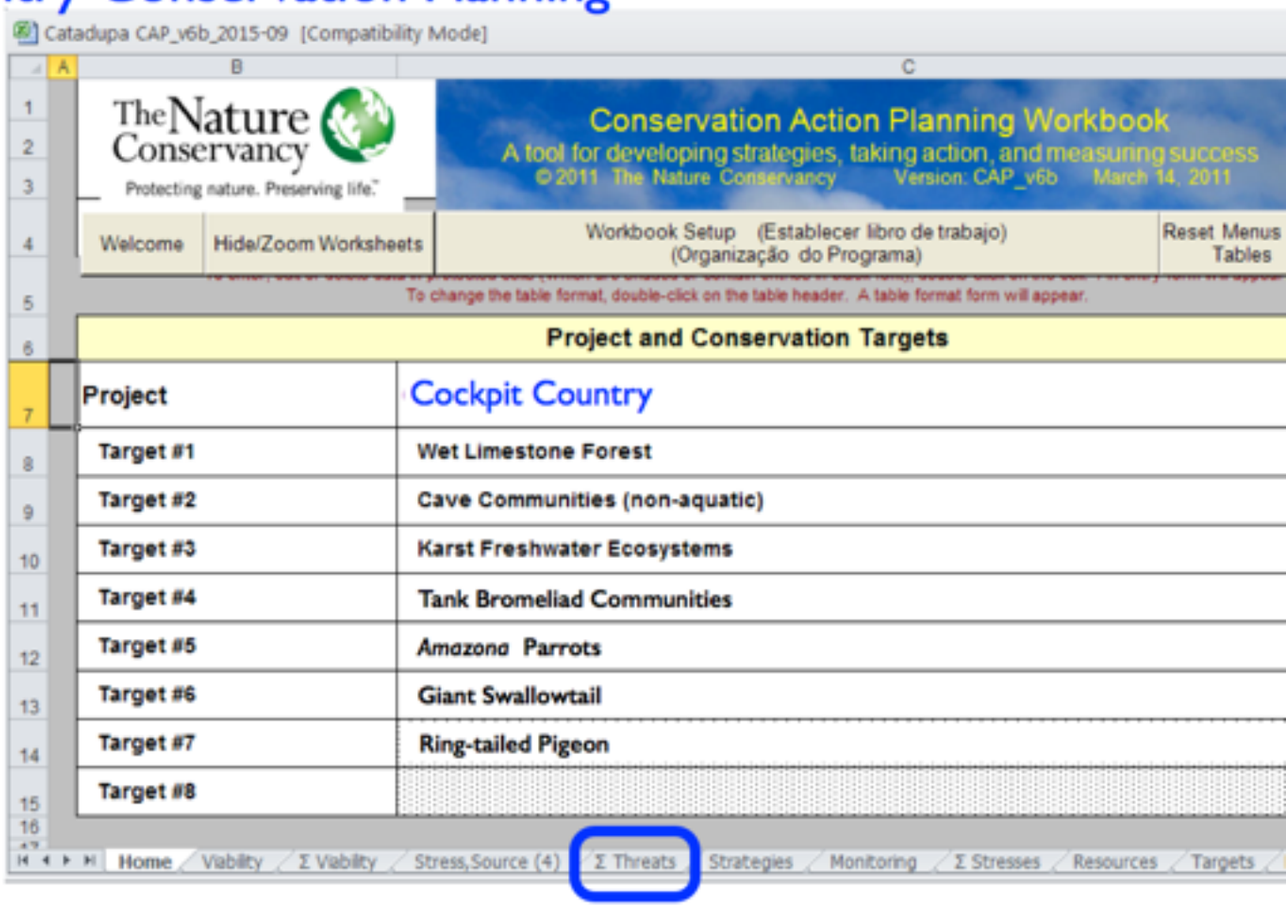
Appendix C. Summary of Threats across Targets

Threat Summary Table

	Threats Across Systems	Limestone Forest	Karst Freshwater Ecosystems	Cave Communities (Terrestrial)	Black-billed and Yellow-billed Parrots	Giant Swallowtail Butterfly	Overall Viability Rank
1	Mining/quarrying (potential)	High	High	Very High	High	High	Very High
2	Conversion of forest	High	Medium	Very High	Low	Medium	High
3	Non-native invasive species	High	Medium	Very High			High
4	Inappropriate garbage disposal		Medium	Very High			High
5	Incompatible agriculture practices	High	High	High			High
6	Amateur/scientific collecting and hunting (food, pet trade, sport)	Medium		High	Medium	High	High
7	Inappropriate septic systems		High	Medium			Medium
8	Timber extraction	High			Low		Medium
9	Non-dynamic gaps (trails, tracks & roads)	High					Medium
10	Recreational Tourism			High			Medium
11	Guano Extraction			High			Medium
12	Human-caused fire	Medium					Low
13	Dams		Medium				Low
14	Yam stick harvesting	Medium					Low
15	Over-pumping of groundwater		Low				Low
16	Introduced Diseases				Low		Low
	Threat Status for Targets and Site	Very High	High	Very High	Low	High	Very High



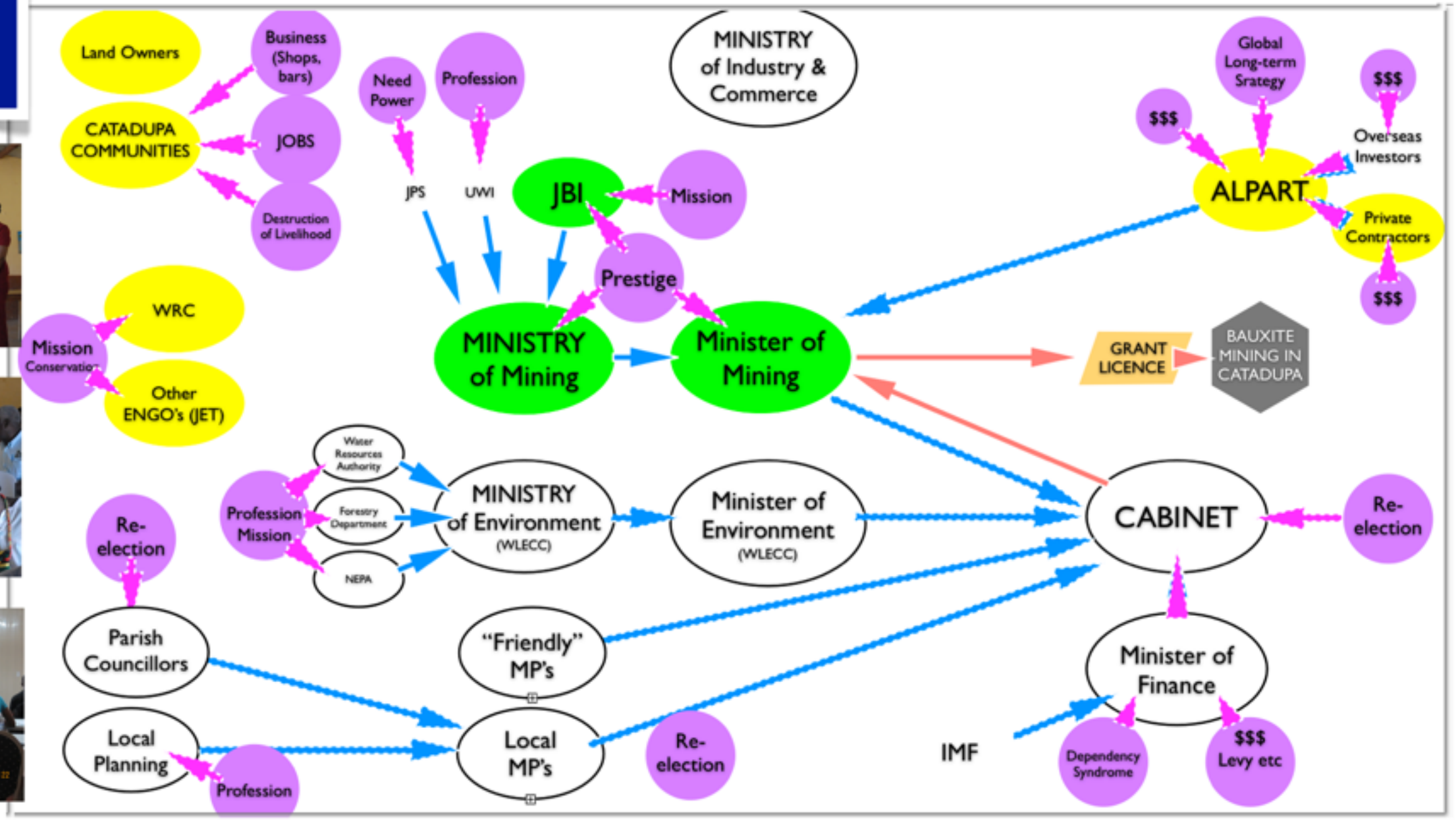
Threats:

- Scope
- Magnitude
- Irreversibility

The next step in CAP is to identify all of the human activities which affect the conservation targets.
Each target is assessed for how much each threat affects the individual target's viability.
Then, with a neat roll-up algorithm, the CAP workbook reveals how much each threat contributes to the degradation of targets: we can easily see how some threats might be highly localized to an individual target while other threats are widespread and affect everything. Now we can start to see which threats need immediate attention.

Who? Why?

Before Strategies . . . Stakeholder Situation Diagrams



In the Cockpit Country CAP, the potential threat of bauxite mining was identified as the Very Highest threat to the viability of all conservation targets. So, what strategies should we develop? Should we boycott aluminum products? Should we print “No Mining” bumper stickers? Should we meet with politicians? What will be the most effective use of our time and donor resources to stop this threat?

The CAP has the ability to integrate Stakeholder Situation Diagrams (SSD), where we define the stakeholders - — those involved either directly or indirectly, positively or negatively — and identify their connections and motivations. Strategies developed during brainstorming sessions can then be filtered through the SSD to determine whether they are feasible and can be prioritized using cost-benefit analysis.

Appendix D: Prioritized list of Strategic Actions

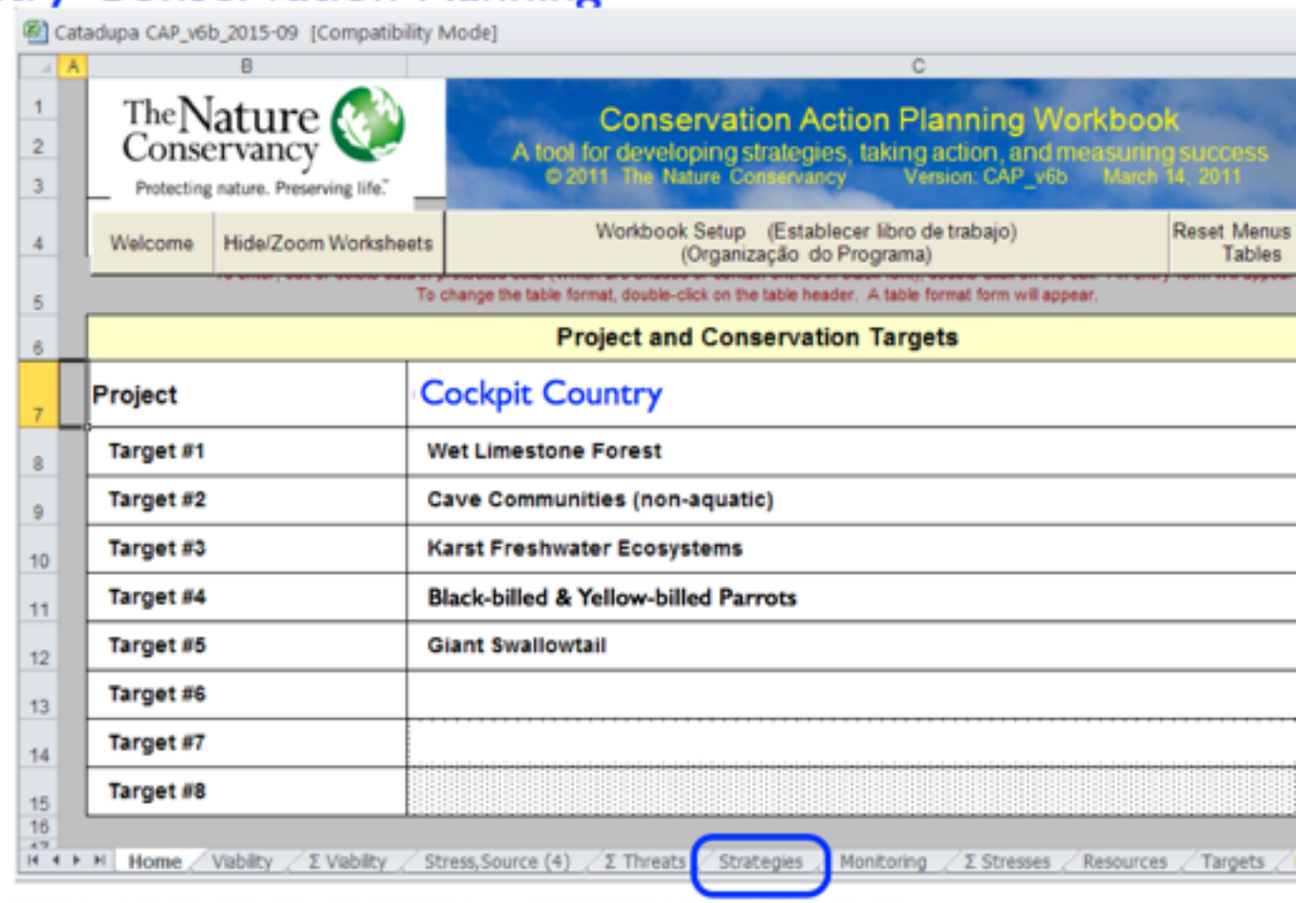
Strategic actions are ranked on nine criteria related to :

1) Benefits (contribution, threat abatement, viability enhancement, duration, leverage),
2) Feasibility (lead individual/institution, ease of implementation, ability to motivate), and
3) Cost.

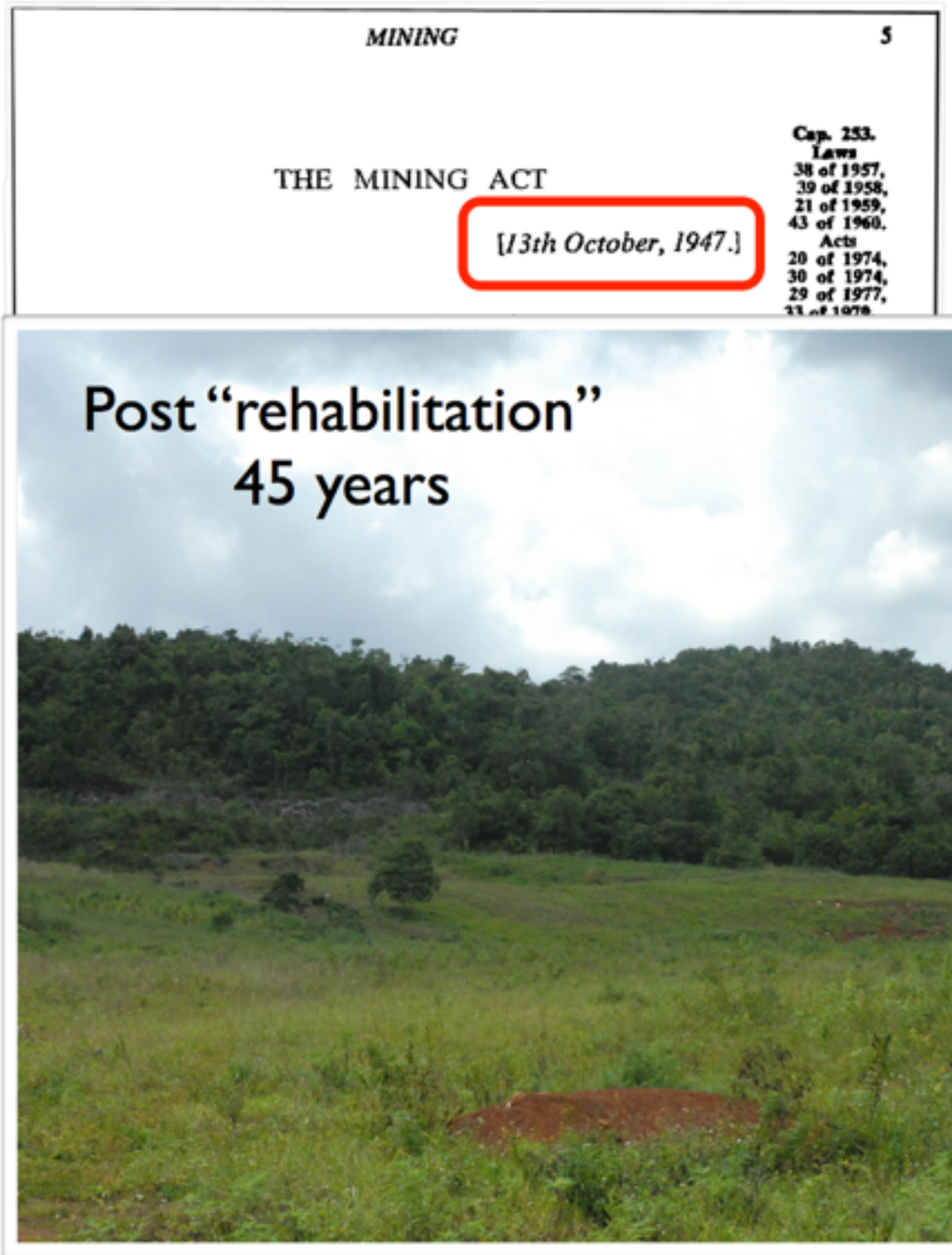
Table showing ranking detail of conservation strategies

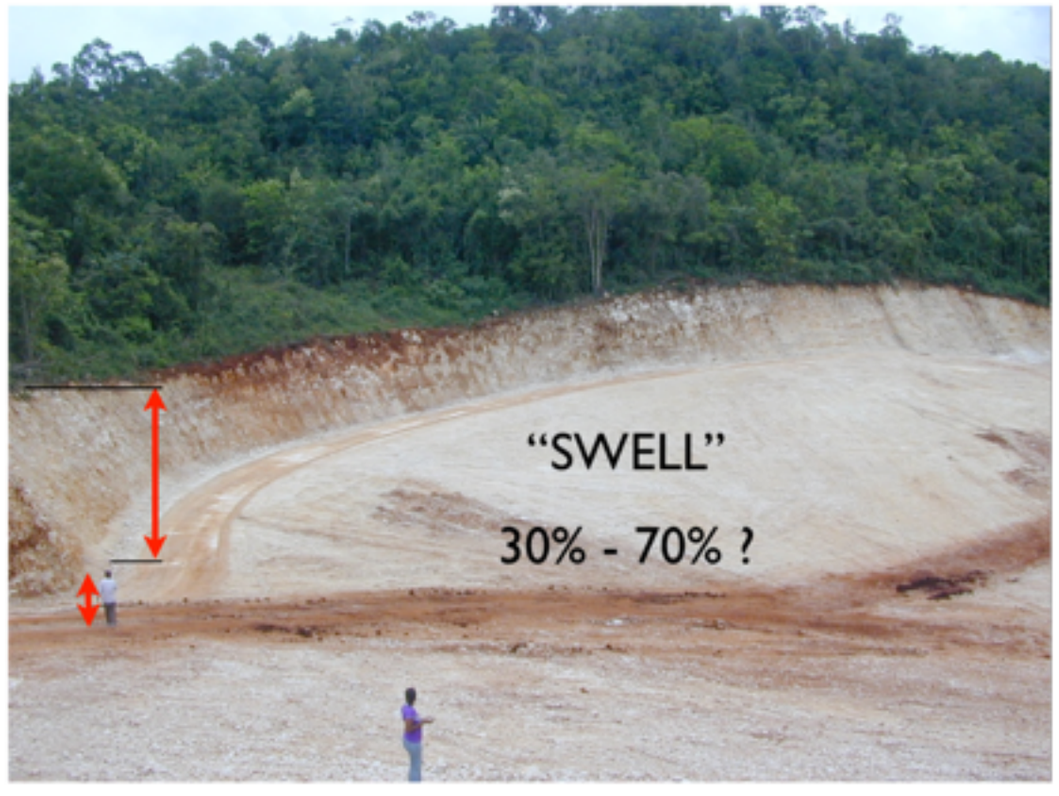
	Strategic Actions	Overal Rank	Benifites	Feasibility	Cost	Overall Rank
1	Collaboratively develop and implement a long term funding strategy for conservation in the Cockpit Country .	Very High	Very High	Very High	Medium	Very High
2	Develop an atlas of Cockpit Country targets and threats to quantify them, and to guide and refine conservation actions and land use zoning.	Very High	Very High	Medium	Medium	Very High
3	Develop an economic case for the conservation of the Cockpit Country by conducting an economic valuation of the ecological services particularly water resources, provided by the Cockpit Country.	Very High	Very High	High	Medium	Very High
4	Develop and disseminate appropriate best management practices for small-scale commercial and subsistence farming to at least 50 farmers working in close proximity to Cockpit Country primary forest	Very High	Very High	High	Medium	Very High
5	Develop and implement an effective mechanism for co-management of the Cockpit Country conservation area in FY06.	Very High	Very High	Medium	Medium	Very High
6	Develop detailed data on the distribution and impacts of major invasive species (bamboo, Asian fern, American cockroach, shiny cowbird, etc) on Cockpit Country biodiversity and develop priorities for control and/or eradication.	Very High	Very High	High	Medium	Very High
7	Develop techniques and implement projects to restore forest in critical areas such as abandoned agricultural lands, river banks and cave entrances using early succession native species.	Very High	Very High	Medium	High	Very High
8	Facilitate and promote the declaration of private land holdings under forest as Forest Management Areas	Very High	Very High	Medium	Medium	Very High
9	Improve the enforcement of the Forest Act (1996) by increasing the number and mobility of forest officers	Very High	Very High	High	Medium	Very High
10	Work with Cockpit Country communities and the relevant solid waste management authority to institute or upgrade appropriate garbage collection and sanitation practices.	Very High	Very High	Very High	Medium	Very High
11	Work with NEPA and other agencies to enforce existing laws and regulations protecting Cockpit Country biodiversity (orchids and bromeliads, parrots, butterflies, and research specimens) from collection pressure.	Very High	Very High	High	Medium	Very High

ountry Conservation Planning



But to our surprise (horror), in the finalized CAP there were no strategies directed towards actually **preventing** mining (the highest ranked threat) in Cockpit Country.





Instead, because TNC was told that the 1947 colonial Mining Act was "King", they opted for strategies to improve post-mining reclamation and rehabilitation practices instead of trying to prevent bauxite mining in Cockpit Country.

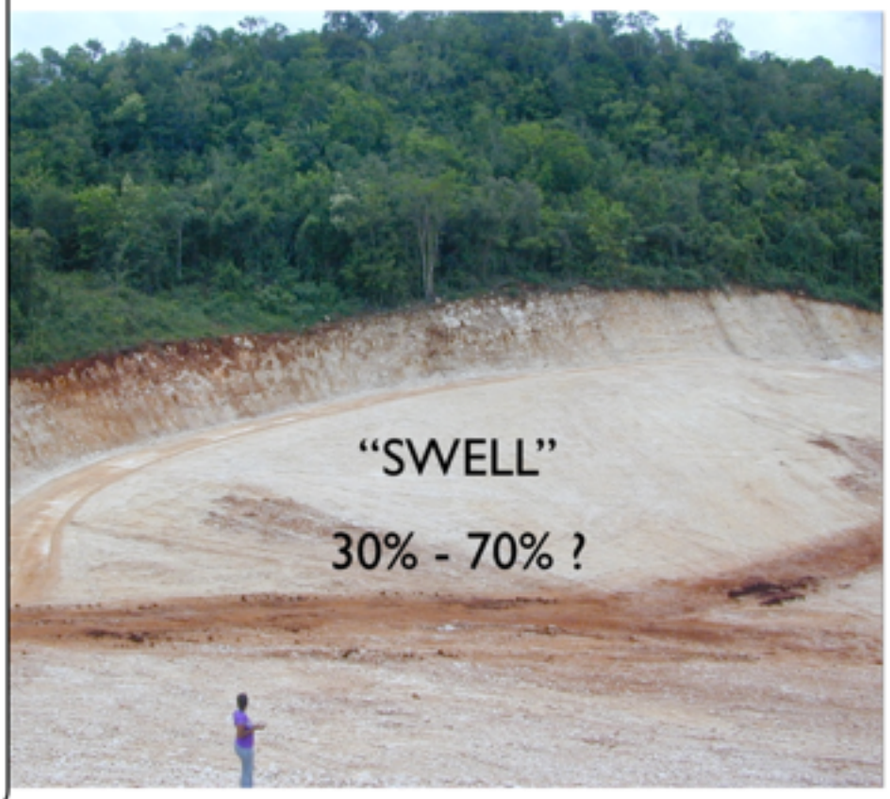
Earth Surface Processes and Landforms
Earth Surf. Process. Landforms (in press)
Published online in Wiley InterScience
(www.interscience.wiley.com) **DOI:** 10.1002/esp.1399

The use of GIS-based digital morphometric techniques in the study of cockpit karst

P. Lyew-Ayee,[1]* H. A. Viles[2] and G. E. Tucker[3]
[1] *Mona GeoInformatics Limited, University of the West Indies, Mona, Jamaica*
[2] *Oxford University Centre for the Environment, University of Oxford, UK*
[3] *Cooperative Institute for Research in Environmental Sciences and Department of Geological Sciences, University of Colorado at Boulder, USA*

Dr. Lyew-Ayee, Jr.

Figure 1. Classic cockpit karst landscape of the Cockpit Country, Jamaica.



But given that Cockpit Country is the *type locality* for cockpit karst and that people have earned PhDs describing the natural landscape . . .

Earth Surface Processes and Landforms
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Dr. Lyew-Ayee, Jr.

Mr. Lyew-Ayee, Snr.
(GM-Jamaica Bauxite Institute)

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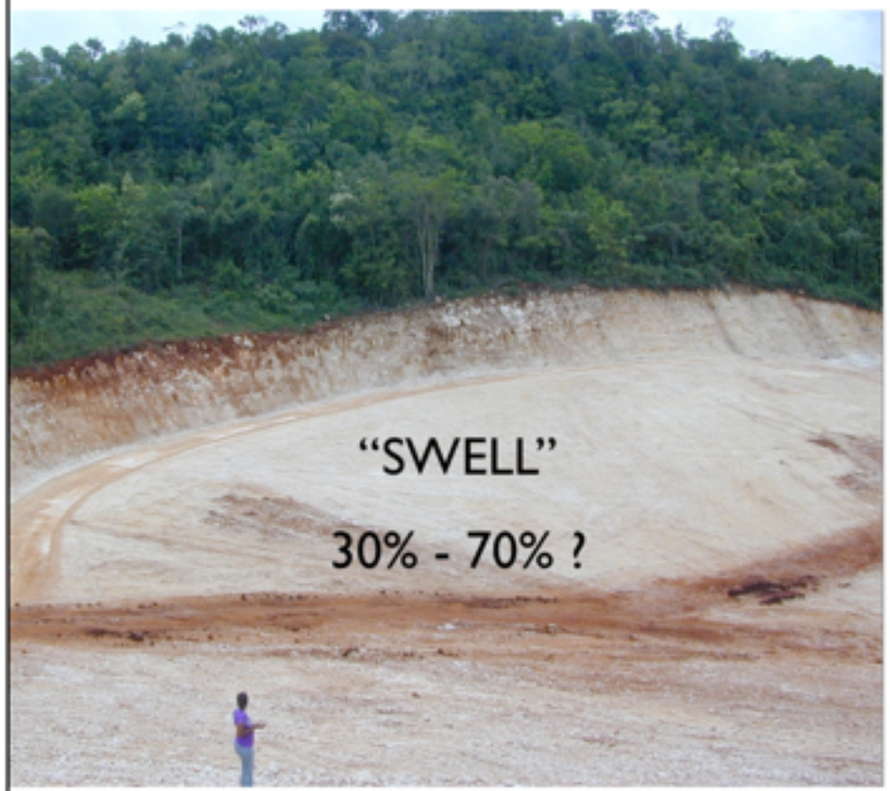
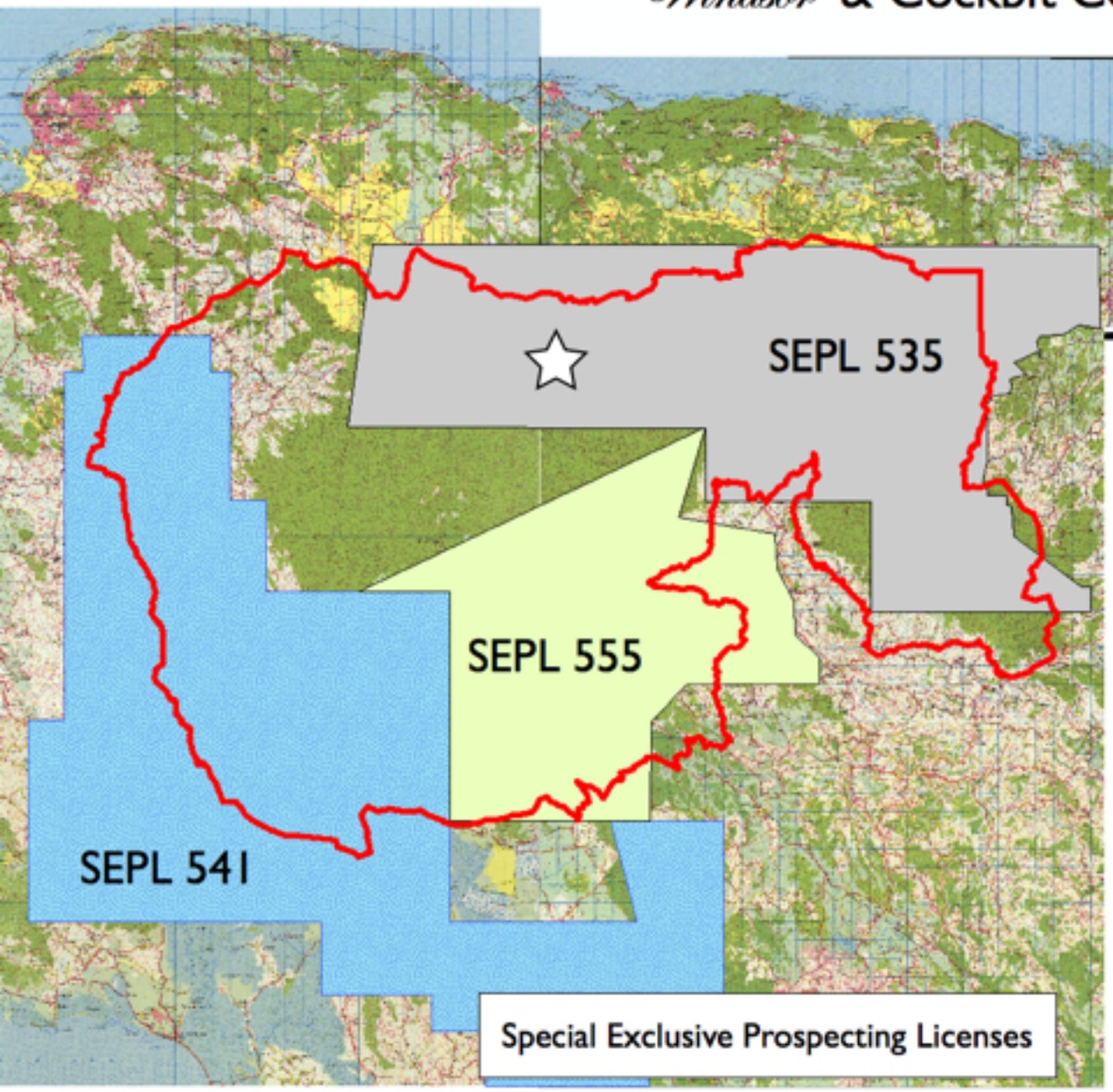


. . . we found it reprehensible that this same opportunity would be denied to anyone else if plans to irreversibly alter Cockpit Country by mining were approved.

Windsor & Cockpit Country Conservation Planning



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UNIVERSAL NUMBER- 2006-07-007-SA-00014

PARISH COUNCIL OF TRELAWNY

TOWN AND COUNTRY PLANNING (TRELAWNY PROVISIONAL DEVELOPMENT ORDER 1989)

Date of Refusal 2006 December 14

The Local Planning Authority hereby refused the subdivision of .....Land Part of New Forest, Trelawny..... for the following reason(s) :-

1. the property is located on or in proximity to bauxite reserves. The granting of approval for the subdivision would greatly affect the future viability of such bauxite reserves.

ADVISORY

N.B. The appeal should be made to: The Honourable Dean Peart
Minister of Local Government and Environment
16 A Half Way Tree Road

This letter should include copy of the Refusal and subdivision plan.

And seeing first-hand the consequences of bauxite mining (e.g. families and entire communities relocated; 30-m deep pits with vertical walls dug to within 100 meters of someone's house, etc.), we decided it was best to part ways with TNC's strategy of improving post-mining rehabilitation practices and focus all our efforts on preventing mining from happening in the first place. That is, we continue to be guided by the principles of CAP, but instead of strategies to mitigate (ha ha) the destruction of Cockpit Country, we use CAP to develop strategies to **prevent** irreversible destruction of the landscape.

JAMAICA'S #1 MORNING DAILY *

Daily OBSERVER

www.jamaicaobserver.com

Vol 13 No 5 FRIDAY, DECEMBER 15, 2006

Inside : Your 96-page Observer Christmas Cookbook

Jamaica Environment Trust (JET) head Diana McCaulay displays a map of the Cockpit Country at yesterday's press conference called by environmentalists to object to the Government's granting of an exclusive prospecting licence to Alcoa and Clarendon Alumina Production to search for bauxite deposits in the Cockpit Country. Beside her is scientist and anti-mining activist Mike Schwartz. (Photo: Bryan Cummings)

Cockpit row boils

Environmentalists eye court action after Gov't grants prospecting licence to bauxite firms

BY KARYL WALKER
Observer staff reporter

ENVIRONMENTALISTS, angered by the Government's granting of an exclusive licence to Alcoa and Clarendon Alumina Production to search for bauxite deposits in the Cockpit Country, yesterday said they were prepared to take their objection to court, and as far as the United Kingdom-based Privy Council if necessary.

At the same time, the environmentalists have called on Prime Minister Portia Simpson Miller to intervene in the growing dispute and have vowed to engage in civil disobedience to protest the decision.

"The prime minister needs to get involved. We are outraged," head of the Jamaica Environment Trust (JET), Diana McCaulay, said at a press conference at the JET headquarters on Waterloo Road in St Andrew yesterday. "Have we gone out of our minds that we would go and destroy the repository of biodiversity?"

The environmentalists had earlier stormed out of a National Minerals Policy consultancy meeting at the Jamaica Conference Centre in downtown Kingston after permanent secretary in the Ministry of Agriculture and Lands, Donovan Blackburn, announced that the prospecting licence had been granted.

The irate group, among them, members of the

Turn to CRICKET on Page 3

Our dogged efforts to prevent bauxite mining started gaining traction in 2006…

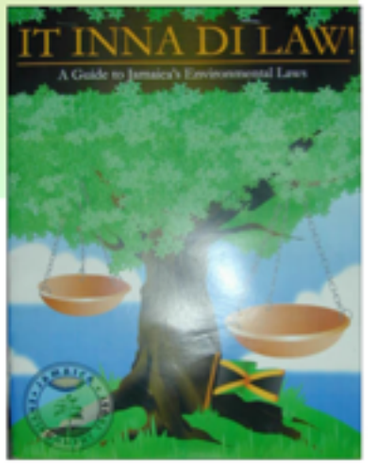
COCKPIT COUNTRY

Can the law protect Cockpit Country from the threat of prospecting/mining?

Limited Protection (s. 9 of Mining Act):
The Minister has the power to declare an area closed to prospecting / mining.

However:
- This does not apply to an area for which prospecting licence or mining lease was granted **and** is subsisting
- Minister also has power to re-open the area to mining

(c) Danielle Andrade
Legal Officer, JET
2007



Jamaica

Office of the Prime Minister

Jamaica House
Kingston

24th September 2007

Dear Ms. McCaulay,

I have for acknowledgement, your letter of 11th September 2007 regarding the boundary study of the Cockpit Country.

report of the study. In the meanwhile, you can be assured that the government will not allow any mining activity in what has generally become known as the Cockpit Country.

I am anxious for us to establish geographically "what has generally become known as the Cockpit Country".

At the same time we want to explore the possibilities of making the Cockpit Country accessible for adventure tourism (hikes, horseback riding, bike trail, etc.) and possibly even cable cars.

I would want to have your views on these possibilities.

Yours sincerely,

Bruce Golding
Prime Minister

Ms. Diana McCaulay
Jamaica Environmental Advocacy Network
On Behalf of the Cockpit Country Stakeholders Troup

…and in 2007 paid their first dividend.
Thanks to the tenacity of Danielle Andrade, Legal Officer for the Jamaica Environment Trust, we learned that the Mining Act (1947) doesn't give an absolute guarantee of power.
Since 2007, with the then-Prime Minister Hon. Bruce Golding expressing a commitment to "no mining", our efforts have been directed towards identifying the true boundary of Cockpit Country. In the next section, we show how the Homerus Swallowtail has aided in this effort.