EUROPE / NORTH AMERICA

VOLCANOES AND FORESTS OF MOUNT PELÉE AND THE *PITONS* OF NORTHERN MARTINIQUE

FRANCE

Mont Pelée © IUCN / Wendy Strahm

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

VOLCANOES AND FORESTS OF MOUNT PELÉE AND THE *PITONS* OF NORTHERN MARTINIQUE (FRANCE) – ID N° 1657

IUCN RECOMMENDATION TO WORLD HERITAGE COMMITTEE: To defer the nomination under natural criteria (viii) and (x)

Key paragraphs of Operational Guidelines:
Paragraph 77: Nominated property has potential to meet World Heritage criteria.
Paragraph 78: Nominated property does not meet integrity requirements and protection and management requirements.

1. DOCUMENTATION

a) Date nomination received by IUCN: February 2021

b) Additional information officially requested from and provided by the States Parties: Following the first session of the IUCN World Heritage Panel, a progress report was sent to the State Party on 17 December 2021. This letter advised on the status of the evaluation process and requested supplementary information, including a comparative analysis for criterion (viii), justifications for the boundaries as proposed and the legal protection of the nominated property. The supplementary information provided by the States Parties in response covered all requests by the Panel and included a slight modification to the boundaries to exclude areas subject to forestry.

c) Additional literature consulted: Various sources, including: Acevedo-Rodriguez, P. and M.T. Strong (n.d.). *Flora of the West Indies*. Smithsonian Institute. https://naturalhistory2.si.edu/botany/WestIndies/;
Andru J.-C., Le Roy M., J.-P. Rançon (2015). *Curiosités géologiques de la Martinique.* BRGM Éditions et Éditions Orphie; Biotope (2020). *Parc éolien de GRESS sur la commune de Grand'Rivière (Martinique), Rapport environnemental*. NWEnergy; Boudon, G. and H. Balcone-Boissard (2021). Volcanological evolution of Montagne Pelée (Martinique): A textbook case of alternating Plinian and dome-forming eruptions. *Earth-Science Reviews*, 221, 103754.
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Maréchal, P. (2011). *Araignées des Antilles*. PLB Editions; McKeever, P.J. and G.M. Narbonne (2021). *Geological World Heritage: a revised global framework for the application of criterion (viii) of the World Heritage Convention*. IUCN, Gland, Switzerland; WWF (2002). *Ecoregions. Southern Caribbean: Islands of Martinique, Dominica, Grenada, Saint Lucia, Saint Vincent and the Grenadines*. https://www.worldwildlife.org/ecoregions/nt0179

d) Consultations: 7 desk reviews received. The mission was able to meet with Martiniquais government representatives, including the President and Vice-President of the Martinique Government and mayors of the 19 communes concerned; directors and representatives of the Department of Environment (DEAL); Forestry Department (ONF); Regional Nature Park (PNRM); Volcano Observatory (OVSM); Botanic Garden (CBMQ); Hunting Association; and local enterprises.

e) Field Visit: Wendy Strahm and José Brilha, 18 to 24 October 2021

f) Date of IUCN approval of this report: April 2022

2. SUMMARY OF NATURAL VALUES

The "Volcans et forêts de la Montagne Pelée et des pitons du nord de la Martinique" (Volcanoes and Forests of Mount Pelée and the *Pitons* of Northern Martinique) are nominated under criteria (viii) and (x). Martinique is an island in the southern Lesser Antilles of the Caribbean, approximately 40 km south of Dominica and 34 km north of St Lucia. This serial nomination of two component parts consists of two major geomorphological components of volcanic origin in northern Martinique: the massif of Piton Mount Conil associated with the recent volcanic system of Mount Pelée; and the massif of Morne Jacob and the Pitons du Carbet. A single buffer zone surrounds the two component parts and reaches down to the seashore. The total area of the nominated property and buffer zone combined corresponds to about 38% of the whole area of the island.

Name	Area (ha)	Buffer zone (ha)
Massifs of Mount Pelée and Mount Conil	4,736	28,826
Massifs of Pitons du Carbet and of Morne Jacob	9,244	
Total	**13,980**	**28,826**

Table 1: Areas of the nominated property and buffer zone, following a minor adjustment to the boundaries in supplementary information by the State Party.

Regarding criterion (viii), the Pitons du Carbet and Mount Pelée are internationally renowned examples of volcanic morphologies and processes related with volcanic islands in a subduction zone context (Lesser Antilles arc). The Pitons du Carbet count 12 peaks and are shaped by lava domes, which are very prominent due to the high viscosity of the magmas from which they originated.

Mount Pelée (which is partly included in the nominated property) is an iconic volcano, remarkable for its eruptive style related to high viscosity lava domes and laterally directed explosions. From 550,000 years ago, Mount Pélée has evolved over four phases of volcanism, with the current phase (13,500 to present) being marked by a high number of eruptions. The most recent eruptions occurred in 1300, 1902-1905 and 1929. The 1902-1905 eruption of mount Pelée is considered the deadliest volcanic event in the 20th century, resulting in a tragic death toll of 28,000 people. This natural disaster triggered the building of one of the first volcanological observatories in the world and the peculiar type of eruption raised a lot of attention all over the world. The impacts of the eruption in the lives and infrastructures of St. Pierre's inhabitants is part of the local cultural heritage. During this eruption, seven successive explosions occurred, and the eruption created a 350 m high rock "needle", the highest known dome eruption structure. This needle collapsed a few weeks later after the eruption, but some remaining fragments are still visible inside the crater of Mount Pelée. This eruption is a world reference in the history of volcanology, having made it possible to describe one of the major types of volcanic eruptions: termed the Peléan type, which is marked by alternating dome-forming and Plinian eruptions, characterized by the formation of convective eruption columns.

Regarding criterion (x), the major biodiversity values relate to the forests of Martinique, said to be the most diverse and least fragmented in the Lesser Antilles, with two impressive strips of contiguous forest extending from the coast to the volcanic summits. Composed of a mixture of primary and secondary forest and dwarf shrubland at higher altitudes, the nomination records 1,058 species of native vascular plants (816 flowering plants and 242 pteridophytes). Of these, 33 species (4% of the flowering plants in the nominated property) are endemic to Martinique. While much of the forest has been severely exploited in the past, it is recovering and is currently relatively unaffected by exotic species apart from patches of bamboo, mahogany plantations and some other species. Other notable biodiversity values include the presence of threatened species, such as an endemic bird (Martinique Oriole, *Icterus bonana*, VU), an endemic bat (Schwartz's Myotis, *Myotis martiniquensis*, NT), an endemic frog (Martinique Volcano Frog, *Allobates chalcopis*, CR), and an endemic snake (Martinique Lancehead, *Bothrops lanceolatus*, EN). Furthermore, there are 14 endemic land snails, 19 endemic Arachnida (with a number of new species awaiting description), and a number of insects only found in the nominated property.

3. COMPARISONS WITH OTHER AREAS

Mount Pelée has been referred to in four IUCN thematic studies. In 1982, it was described as one of the world's greatest natural areas, in 2009 as one of the most iconic volcanoes. In 2019, IUCN noted Mount Pelée as one of several iconic or world-renowned volcanoes that may have potential to demonstrate Outstanding Universal Value (OUV). The 2013 IUCN thematic study on terrestrial biodiversity identified Martinique as a potential candidate as well.

The nomination dossier refers to relevant IUCN studies and provides a detailed comparative analysis in relation to criterion (x), but includes only a brief account for criterion (viii). This analysis of criterion (viii) does not clearly demonstrate the comparison with the Pitons Management Area (Saint Lucia) and the Morne Trois Pitons National Park (Dominica) World Heritage properties. Following the IUCN Panel's request, the State Party provided a detailed comparative analysis for criterion (viii) in supplementary information. However, IUCN notes that this comparative analysis does not clearly identify the attributes constituting the potential OUV under criterion (viii) and that it includes comparisons with various active shield volcanoes based on a hot spot / mantle plume, which are

however fundamentally different from the subduction zone and stratovolcano type found on Martinique. To demonstrate global significance, the analysis would need to include a comparison with Plinian eruptions and similar dome-forming volcanoes. Excellent examples of volcanoes outside of the Lesser Antilles with volcanic domes, but not referred to in the comparative analysis, include Redoubt, Colima, Santiaguito, Lascar and Chaiten volcanoes in the Americas, as well as Mayon, Pinatubo, and Ruapehu volcanoes in Asia-Pacific, including major dome building eruptions, such as Merapi or Anak Ranakah volcanoes. Therefore, IUCN considers that although Mount Pelée is mentioned in the latest 2019 IUCN volcano study, the comparative analysis of the area included in the nomination does not make a convincing case for the global significance of the nominated property. The potential to demonstrate global significance under criterion (viii) is also compromised by major concerns regarding integrity requirements in terms of completeness, as described in section 4.2.

Regarding criterion (x), the nomination dossier compares the nominated property with the other islands in the Lesser Antilles, Puerto Rico and Jamaica in the Greater Antilles, and two protected areas in Cuba and Puerto Rico, in terms of numbers of plants endemic to each island, plants endemic to the Lesser Antilles, and the number of tree species on each island. It appears that Martinique has the longest continuous stretch of forest from the seashore to the volcanic summits, a feature which no longer exists on the other islands of the Lesser Antilles. Situated within the Caribbean biodiversity hotspot, Martinique is part of the Lesser Antillean Endemic Bird Area as well as the Lesser Antilles Islands, one of WWF's Global 200 priority ecoregions for global conservation.

IUCN, in collaboration with UNEP WCMC, has undertaken supplementary comparative analysis on the biodiversity values, concluding that the biodiversity that characterises the nominated property appears to be of global significance, based on spatial analyses and literature review. Criterion (x) is supported by a high number of endemic plant and animal species present in the nominated property, with some of them being strictly endemic to Martinique, such as the Aralie, *Sciodaphyllum urbanianum* (VU). Herpetofauna endemism is high as well and includes the Critically Endangered Lacépède's Ground Snake, *Erythrolamprus cursor* (CR), and Martinique Volcano Frog, *Allobates chalcopis* (CR). The nominated property overlaps with two Important Bird Areas and Key Biodiversity Areas, which are not currently represented on the World Heritage List, and with three protected areas considered to be amongst the most irreplaceable in the world for mammal, bird and amphibian conservation.

In conclusion, IUCN considers that the nominated property appears to demonstrate global significance under criterion (x). However, while IUCN's thematic studies confirm also potential under criterion (viii) for Mount Pelée, the analysis of the specific area included in the nomination dossier does not clearly identify the attributes under this criterion and the comparative analysis is incomplete.

4. INTEGRITY, PROTECTION AND MANAGEMENT

4.1. Protection

The area of the nominated property is covered by a matrix of eleven different (and to a large extent overlapping) protected area designations and local zonation schemes. One fifth of the nominated area is privately owned. A regional protection designation, the Parc naturel regional de Martinique (Martinique Regional Nature Park) (PNRM) covers almost all of the nominated property and the majority of the buffer zone. However, the future of the PNRM depends on the renewal of the Regional Nature Park status every 15 years, and this is next due in 2027 with the current charter expiring in 2024. Given this complexity, IUCN requested supplementary information and maps showing all protected areas and protection regimes, including detailed information on the values that shall be protected.

Regarding criterion (viii), the maps provided by the State Party confirm that the current protection regime of the nominated property does not allow for mineral extraction, mining or constructions, which IUCN considers appropriate. However, the supplementary information provided also indicates that important geo-sites are located outside the nominated property (see section 4.2).

Regarding criterion (x), IUCN notes that the values of the nominated property are fragile given the high number of endemic and threatened species. In addition, the island setting limits the possible size of the nominated property. This reinforces the need for an effective and unambiguous protection regime focused on the limited natural areas remaining in a highly developed setting (see section 4.5). The supplementary information provided by the State Party clearly notes that the nominated property requires strict protection of these values. It further notes that most parts of the nominated area are subject to strict protection through the management plans for the RBIs and a Site Classé ("classified site"). However, there are notable areas which are not subject to an appropriately rigorous protection regime located inside the nominated property, as also confirmed in the maps provided in the nomination dossier and the supplementary information. The supplementary information further notes examples of important biodiversity values found in these areas that are not subject to a strict protection regime, such as the largest group of hygrophilous forests (forests adapted for growth in a wet or damp environment), which is both very rare on Martinique and which boasts the highest biomass and number of species. However, many of the relevant areas within the nominated property are only protected via references in urban panning regulations and risk prevention document. IUCN considers that these urban plans and risk prevention documents do not constitute an effective protected area status, capable of ensuring the

preservation of biodiversity. It therefore considers that the protection regime inside the nominated property is insufficient in relation to the application of criterion (x).

In summary, IUCN considers that:

a) while the legal protection of the nominated property may currently be sufficient for criterion (viii), there are important attributes that would need to be protected but are located outside the nominated property (see section 4.2) and
b) The level of legal protection is currently not adequate for criterion (x) as attributes of importance for biodiversity conservation are located in zones which do not have sufficient protection to assure their conservation. IUCN recommends that the protection status of the biodiversity attributes is reviewed, and strengthened where it is currently insufficient, possibly through the extension of the existing RBIs.

IUCN considers that the protection status of the nominated property does not meet the requirements of the *Operational Guidelines*.

4.2 Boundaries

The nominated property consists of two component parts encompassed by one overall buffer zone. The buffer zone of the nominated property links both component parts playing a connectivity function, and covers the slopes from the boundaries of the nominated property down to the coast.

Regarding criterion (viii), IUCN finds that the representation of geological attributes is clearly not complete. Recalling paragraph 93 of the *Operational Guidelines*, according to which properties nominated under criterion (viii) *"should contain all or most of the key interrelated and interdependent elements in their natural relationships"* and *"in the case of volcanoes, the magmatic series should be complete and all or most of the varieties of effusive rocks and types of eruptions be represented"*, IUCN notes that 13 out of 20 geo-sites identified as significant in the supplementary information are located in the buffer zone (and thus not included in the nominated property). Significant geo-sites providing evidence of the 1902-1905 eruption and previous eruptions in the last 13,500 years are not within the nominated property and only four identified geo-sites include formations from the most recent eruptions 1902-1905 and 1929. While high viscosity lava domes and the remains of the highest known dome eruption are found inside the nominated property, sites recording laterally directed explosions and dome-collapse pyroclastic flows as well as coastal sites are only partially covered. Coastal geo-sites exhibit outcrops that are particularly important as many evidences of the 1902-1905 eruption are hidden under dense vegetation and forest, which is typical of geo-sites in a tropical warm and humid climate. Conversely, the supplementary information refers to geo-sites located inside the nominated property that are not necessarily relevant to the dome-forming and Plinian eruptions.

Regarding criterion (x), it was reported to the field evaluation mission that some valuable natural areas have not been included in the nominated property. In response, the State Party provided detailed information on species composition and abundance within the nominated property compared to the PNRM and the entire island indicating that the biodiversity values are represented in the revised boundaries, with the exception of bird biodiversity. In conclusion, IUCN considers that the revised boundaries appear to be adequate for the representation of criterion (x).

IUCN concludes that while the boundaries of the nominated property can be considered appropriate in respect of criterion (x), the nominated property is clearly incomplete in relation to integrity requirements under criterion (viii). The boundaries of the nominated property would need to be significantly revised through an extension and/or additional component part(s) to cover the key geo-sites that have, taken together, the potential to demonstrate global significance under criterion (viii).

IUCN considers that the boundaries of the nominated property and buffer zones meet the requirements of the *Operational Guidelines* for criterion (x), but clearly not for criterion (viii).

4.3 Management

The nominated property has a management plan covering both component parts and the surrounding buffer zone. The plan covers five broad themes: conserving OUV; developing knowledge; raising awareness using cultural values; developing the buffer zone harmonious with the nominated property; and promoting international cooperation with other nearby islands. However, IUCN notes that the management plan focusses mainly on biodiversity values and with inadequate content on geological values.

The management plan of the nominated property foresees a reinforcement of protection measures in the areas that are not covered by protected areas yet. This will involve the acquisition of private lands, and the extension of the RBI by 2,000 ha is also considered. Nevertheless, IUCN notes that these measures have not been implemented at the time of this evaluation. IUCN concurs with these aspirations of the management plan and considers that these objectives should be achieved before the nominated property is inscribed on the World Heritage List, so as to ensure a sufficient and coherent protection regime in respect of criterion (x), prior to inscription.

The management structure of the nominated property will be led by the National Forest Office (ONF), responsible for 80% of the nominated area. The joint association of the management of the PNRM will be responsible for the buffer zone. IUCN notes that the overall management structure for the nominated property appears to be complex, and that the two main

management bodies cover both much broader areas than the nominated property. The separate designation as UNESCO Biosphere Reserve with a zoning not matching the boundaries of the nominated property adds to this complexity.

In terms of funding, the PNRM and ONF appear to be sufficiently financed within its current term of operation. The financing of the Management Plan is foreseen at over EUR 17.5 million for five years (2021-2026). 34% of the budget will be used for the acquisition of private land inside the nominated property. Notwithstanding the notable capacity in terms of biodiversity expertise, IUCN notes that the coverage of geological expertise appears to be underrepresented in the management of the nominated property as there is only one full-time geologist on the management team, with other geologists only brought in "upon request", according to supplementary information.

The buffer zone of the nominated property includes a number of villages and towns inhabited by a total of 159,100 people, which is 42% of the total population of Martinique. The area also includes an electric power station, a wind farm with (currently) seven wind turbines. The buffer zone also contains several active quarries, farmlands, including a large area of intensive banana production, and it overlaps in the south with the development zone of the newly designated Biosphere Reserve.

The rationale for including a large but highly used buffer zone is to have more control over the area surrounding the nominated property is explained in the supplementary information. The 2012-2027 charter of the PNRM includes a zoning system for the buffer zone, but this is not guaranteed in the long term as it depends on the charter going forward from 2027. The Schéma d'Aménagement régional ("Regional Development Scheme") includes areas for future urban development adjacent to the southern component part of the nominated property. In addition, IUCN notes that there is a small part of the proposed buffer zone that does not fall within the PNRM boundaries. Based on this, IUCN considers that the buffer zone does not appear to provide an *"added layer of protection"* to the nominated property, in line with paragraph 104 of the *Operational Guidelines*.

In conclusion, IUCN considers that an increased management capacity for the protection and management of geological values would be needed for the nominated property, along with a buffer zone management regime that demonstrates threats to the potential OUV of the nominated property are addressed.

IUCN considers that the management of the nominated property does not meet the requirements of the *Operational Guidelines*.

4.4 Community

The nominated property and its buffer zone are almost entirely located within the boundaries of the PNRM, which has a 15-year charter developed in consultation with all of the 19 communes. The local population appears to be well-informed and representatives met by the field evaluation mission strongly support the nomination project, though the consultations for the potential World Heritage site all take place in the context of the PNRM. The field evaluation mission observed no sign of local people being against the nomination with the exception of sport hunters, and a quarry owner, expressing their concern about no longer being able to continue with their activities as a result of World Heritage listing. While the nominated property is not inhabited, the buffer zone hosts a significant population of 159,100 people on an area of 28,826 ha.

4.5 Threats

Natural processes can impact geological values. The tropical climate accelerates weathering and erosion, including through landslides and rockfalls that may locally affect important geological features. Vegetation can also affect geological sites by destroying or obscuring fragile features. Thus urgent and continued recording of geo-sites that still exist today and protect and manage them following the best practices of geoconservation.

In the buffer zone, urban developments, infrastructure and quarrying affect geo-sites. Many of these geo-sites have the potential to support the case for criterion (viii), but are at risk of being impacted as land use has clearly increased over the last decades, according to the nomination dossier. Some of the vulnerable geo-sites are located in areas of the buffer zone where high-intensity use is present. A case in point is a geo-site in an active quarry on private land, which is important for the tephrochronology and the eruption history of the nominated property because it includes pyroclastic formations reflecting the past 25.000 years.

In relation to threats to biodiversity values, IUCN notes that the following threats require particular attention: deforestation and forestry operations; hunting; windfarms; invasive species; and tourism.

The nomination dossier notes deforestation and habitat degradation as significant threats in the c.20% of the nominated property that is under private ownership, though these threats are considered to be reducing. The IUCN evaluation mission noted that the boundaries as initially submitted contained areas subject to active hunting and forestry. In response to the IUCN Panel requesting a justification for this, the State Party has confirmed hunting is not permitted in the nominated property and moved areas subject to forestry from the nominated property into the buffer zone, by slightly revising the boundaries of the nominated property. IUCN welcomes the avoidance of hunting and logging inside the nominated property, whilst noting that even though they take place only within the buffer zone, the impacts may still indirectly affect the remaining nominated area. This is for instance the case for birds which are not confined to

the nominated area and may well be hunted in the buffer zone. Birds on the "near threatened" list presented in the nomination dossier figure also on the list of birds allowed to be hunted. Research on Mount Pelée has also noted hunting as a stress factor for birds.

The buffer zone also currently contains a windfarm with seven wind turbines affecting viewsheds, with feasibility studies to expand this wind farm underway. An impact study of the existing development shows that while bird loss was low, 5 of the 10 bat species in the nominated property were affected. This has resulted in a ban on operating wind turbines by night.

Invasive alien species include, *inter alia*, black rats, cats, mice, mongoose, racoons, opossum, and possibly the colonisation of the Shiny Cowbird, *Molothrus bonariensis* (LC), which predates the nest of Martinique's only endemic bird on the island, the Martinique Oriole, *Icterus bonana* (VU). Most invasive plant control effort currently seems to be made on Bush Currant, *Miconia calvescens* (LC), in the buffer zone, which could cause severe problems if it moved into the nominated property. There is much awareness about the threats by invasive species and every organisation involved in this nomination have staff attributed to tackling this threat.

Tourism includes sporting activities such as canyoning in ravines and a major annual trail run crossing the nominated property. Tourism is intended to be increased on the northern part of Martinique as a result of World Heritage status. A steep increase in tourism would likely strain the protection and management of the nominated property as it would likely increase pressure on already eroded trails and exacerbate already existing issues related to trash.

IUCN considers that threats to the nominated property are understood and being managed, but there is a need for impacts stemming from the buffer zone need to be more thoroughly mitigated.

In summary, IUCN considers that the integrity requirements and protection and management requirements of the *Operational Guidelines* are not met.

5. ADDITIONAL COMMENTS

5.1 Consideration in relation to serial properties

a) What is the justification for the serial approach?

The nominated property consists of two component parts located at approximately c.2.5 km from each other. Both component parts correspond to the higher altitude forest areas of Martinique (above 400 m). The serial approach is justified as the values are present in distinct areas, separated by areas where the intensity of land-use does not currently support attributes of OUV. In addition, IUCN also notes existing efforts to develop a corridor between both component parts (see section 5.1b). Subject to the success of these efforts, both component parts could potentially be joined in a revised nomination, at some point in the future.

b) Are the separate component parts of the nominated property functionally linked in relation to the requirements of the *Operational Guidelines*?

From a geological point of view, the two component parts represent two different stages of island building, with linked volcanic characteristics. From a biological point of view, the older Pitons du Carbet served in the past as a source of species for the younger component part of Mount Pelée, and it is essential that genetic transfer between the two component parts can continue. It is therefore welcome that a plan on how corridors between the two component parts can be developed has been launched.

c) Is there an effective overall management framework for all the component parts of the nominated property?

The governance and management regime covers both component parts of the nominated property through the PNRM. DEAL and ONF have also responsibilities in each of the component parts. Both component parts are also inside a new Biosphere Reserve. While there is an overall management framework for both component parts, IUCN notes possibilities to improve their effectiveness (see section 4.3).

6. APPLICATION OF CRITERIA

The **Volcanoes and Forests of Mount Pelée and the *Pitons* of Northern Martinique (France)** has been nominated under natural criteria (viii) and (x).

Criterion (viii): Earth's history and geological features

The global significance of Mount Pelée and Pitons du Carbet is based on its representation of volcanic features, materials and processes, involving repetitive lateral explosions with the projection of pyroclastic flows, and the growth of domes due to high viscosity magmas that characterize Peléean volcanism. The 1902-1905 eruption is considered a key event for the history of volcanology causing a dramatic impact on St. Pierre town, resulting in a tragic loss of life, and a legacy that remains part of the culture of Martinique. The significance of Mount Pelée is also indicated in the last update of the IUCN Volcano Thematic Study, and in past thematic studies.

However, much of the important evidence of this volcanic evolution are located in the buffer zone and not inside the nominated property. The comparative analysis within the nomination has notable deficiencies, and significant analysis was only presented in the supplementary information. The analysis lacks a clear definition of attributes and a more complete comparison with Plinian eruptions and similar dome-forming volcanoes at global scale is required. The comparative analysis in a revised

nomination will have to demonstrate that the evidence in North Martinique, and in particular the geo-sites included in a revised nomination, provide a convincing basis to represent the potential OUV.

IUCN considers that the nominated property has the potential to meet this criterion, but that the boundaries of the nominated property need to be significantly revised through extension and/or the addition of component part(s) to include all geo-sites needed to convey the potential OUV in order to meet this criterion, and that a revised and complete comparative analysis is required.

Criterion (x): Biodiversity and threatened species

The nominated property hosts 1,058 species of native vascular plants out of which 33 species are reported as endemic to Martinique. Various globally threatened species are home to the nominated property, including the Martinique Volcano Frog, *Allobates chalcopis* (CR), the Lacépède's Ground Snake, *Erythrolamprus cursor* (CR), the Martinique Lancehead, *Bothrops lanceolatus* (EN), and the endemic Martinique Oriole, *Icterus bonana* (VU) and Schwartz's Myotis, *Myotis martiniquensis* (NT). The nominated property overlaps with two Important Bird Areas and Key Biodiversity Areas and with protected areas considered to be amongst the most irreplaceable in the world for mammal, bird and amphibian conservation. The two stretches of native forest, from the coast up to the high volcanic summits, is exceptional for the Lesser Antilles as native lowland forest has been mostly lost elsewhere. The number of plants endemic to the island and the representation of plants endemic to the Lesser Antilles, is probably also richer than on other islands in the chain. Situated within the Caribbean biodiversity hotspot, Martinique is part of the Lesser Antillean Endemic Bird Area as well as the Lesser Antilles Islands, and is one of WWF's Global 200 priority ecoregions for global conservation.

However, IUCN considers that the protection regime is not adequate to ensure the effective protection and management of these biodiversity values, and needs to be consolidated to provide a more rigorous and consistent level of protection, aligned with the boundaries of the nominated property. Furthermore the buffer zone's function as an added layer of protection needs to be strengthened.

IUCN considers that the nominated property has the potential to meet this criterion, but that the protection and management arrangements require strengthening to meet requirements for the conservation of the potential OUV for biodiversity.

7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee adopts the following draft decision:

The World Heritage Committee,

1. Having examined Documents WHC/22/45.COM/8B and WHC/22/45.COM/INF.8B2,

2. Defers the nomination of **Volcanoes and Forests of Mount Pelée and the *Pitons* of Northern Martinique, France**, taking note of the potential of a revised proposal to demonstrate Outstanding Universal Value (OUV) under criteria (viii) and (x), in order to allow the State Party to prepare a revised nomination taking account of the need to:

a) revise the nominated property to demonstrate Outstanding Universal Value under criterion (viii) in terms of values, integrity and protection and management requirements, including:
    1) a revision of boundaries to include within the property all geo-sites that are relevant to the potential Outstanding Universal Value under criterion (viii), possibly through an extension of the current boundaries and/or additional component parts,
    2) a clear identification of attributes of Outstanding Universal Value supported by a thorough global comparative analysis, including a comparison of Plinian eruptions and dome-forming volcanoes at global level,
    3) a consistent and effective protection regime specific to all the significant geo-sites and an increased on-site management capacity for the protection and management of geological values;

b) revise the nomination to ensure the protection of potential Outstanding Universal Value under criterion (x), by strengthening protection and management arrangements, including:
    1) a rigorous and consistent protection status for the entire nominated property, possibly through an extension of the *Reserves Biologiques Intégrales* inside the nominated property,
    2) threats to the nominated property stemming from the buffer zone, in order to ensure that the buffer zone serves as an effective additional layer of protection, in line with the *Operational Guidelines*;

4. Recommends the State Party to establish a centralized approach to site management that includes strengthened geological expertise, and which can ensure the conservation of the entire nominated property and buffer zone.

Map 1: Location of the nominated property