

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

1. Name and address of the compiler of this form:

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2. Date this sheet was completed/updated: Wednesday, January 26, 2005

3. Country: Jamaica

4. Name of the Ramsar Site: Palisadoes- Port Royal

5. Map of site included:

Refer to Annex III of the Explanatory Note and Guidelines, for detailed guidance on provision of suitable maps. See Figure 1

a) hard copy (required for inclusion of site in the Ramsar List): yes

b) digital (electronic) format (optional): yes

In the autumn of 2003, a new datum was introduced to Jamaica. The older datum, JAD69, was no longer suitable with the advent of GPS technology. It was at this time that JAD2001 was introduced the parameters for which are as follows:

Lambert Conformal Conic Projection
Datum: WGS84
False Easting: 750000m
False Northing 650000m
Latitude of 1st Parallel: 18 N
Latitude of 2nd Parallel: 18 N
Longitude of Central Meridian: 77 W
Latitude of origin of projection: 18 N
Spheroid Name: WGS84

6. Geographical coordinates (latitude/longitude): 17°55' North, 76°49' West.

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

The site is located on the southeast coast of Jamaica and is actually the southernmost part of the parish (administrative region) of Kingston, which is also the capital of Jamaica. This city has a population of approximately 652,181. The area covers approximately 7523.08 hectares including the cays, shoals, mangrove lagoons, mangrove islands, coral reefs, seagrass beds and surrounding shallow water, excluding the urban centres on the Tomolo (the town of Port Royal and the Airport complex).

8. Elevation: (average and/or max. & min.)

Minimum – Sea level

Maximum - 10 m

9. Area: (in hectares): 7,523.08

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The historic and cultural value of the area is very high as it includes forts on the dunes and a portion of the city of Port Royal that sank in an earthquake at a time when Port Royal was the largest and wealthiest city in the Western Hemisphere (NRCA 1997). In the earthquake of 1692 more than 90% of the city sunk giving rise to Port Royal's "sunken city", as a consequence the archaeological sites relative to this area are both oceanographic and terrestrial. The site includes three categories of wetlands classified as underrepresented by the seventh Conference of Parties (1999): coral reefs, mangroves and sea-grass beds, all significant in biodiversity and in ecologically sensitive areas which are essential to the maintenance of waterfowl and fish populations. The Tomolo and the associated mangrove areas form the southern boundary of the site and the seaward boundary of the Kingston Harbour, reported to be the seventh largest natural harbour in the world.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	5	6	7	<u>8</u>
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12. Justification for the application of each Criterion listed in 11 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

JUSTIFICATION FOR RAMSAR CRITERION # 1

The Palisadoes and Port Royal area is within ecoregion 236 - Western Tropical Atlantic Greater Antillean Marine (WWF) and contains several wetland types that are representative and near natural for this region. These include the underrepresented categories being mangrove forests, coral reefs and seagrass beds.

JUSTIFICATION FOR RAMSAR CRITERION # 2.

The area is important as it contains several threatened ecological communities including sand dunes, coral reefs, sea grass beds and mangroves (Steel, 1994). Further it functions as a critical habitat for a number of vulnerable and/or endangered animals according to the

IUCN Red List (2004) (VU: Vulnerable, EN: Endangered, CR: Critically endangered), for example, *Crocodylus acutus* (American Crocodile - VU), *Chelonia mydas* (Green turtle - EN), *Eretmochelys imbricata* (Hawksbill turtle - CR), *Trichechus manatus* (West Indian Manatee - VU) and *Tursiops truncatus* (Bottlenose Dolphin – CITES Appendix II).

JUSTIFICATION FOR RAMSAR CRITERION # 3.

The mangrove communities are essential for the maintenance of the overall biodiversity of the area. In fact a large number of species (Goodbody in prep., 2004) have been identified from the area, of which at least 26 are new species and are found only in this locale. Hechtel (1965), found 57 species of sponges in the Port Royal area with 16 new species and 1 new genus, examples include *Darwinella rosacea*, *Haliclona hogarthi* and *Callyspongia pallida*. Further, Goodbody (2003) found 39 ascidians in the Port Royal mangroves and lagoon area with one new species: *Phallusia caguayensis*. This tremendous diversity is exhibited in the kingdoms of living organisms Animalia, Plantae and Protista (Appendix 1).

JUSTIFICATION FOR RAMSAR CRITERION # 4.

The site serves as a refuge for many animals at many stages in their lifecycle and during adverse weather conditions. In addition, it also provides habitat for juvenile birds and marine organisms, especially commercially important species including fish (e.g. Atlantic thread herring *Opisthonema oglinum* and Redear herring *Harengula humeralis*), oysters (Mangrove Oyster *Crassostrea rhizophorae* and Flat Tree-oyster *Isognomon alatus*), shrimp and lobster (Harvey, 1986)

JUSTIFICATION FOR RAMSAR CRITERION # 8.

The site is an important source of food for fishes, spawning ground and nursery for several species (eg. Atlantic thread herring *Opisthonema oglinum* and Redear herring *Harengula humeralis* upon which stocks both within this specific area and other areas of Jamaican waters including the wider area of Kingston Harbour depend. The area also serves as a significant source of marine derived protein as food for the Jamaican population.

13. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic rationalization system that has been applied.

a) biogeographic region: Jamaica falls in the Neotropical Biogeographical Region as defined by the global biogeographic regionalisation system, specifically, ecoregion 236 - Western Tropical Atlantic Greater Antillean Marine (WWF)

b) biogeographic regionalisation scheme (include reference citation): Scheme used for the Island is from Hedges (1999).

Olson, D. et al. *The Global 200: A Representation Approach to Conserving the Earth's Distinctive Ecoregions*. 2000. Conservation Science Program, World Wildlife Fund-US.
http://www.panda.org/about_wwf/where_we_work/ecoregions/global200/pages/home.htm

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

This site includes the wetland areas associated with a 13.3 km long Tombolo, the offshore coralline cays, coral reefs, seagrass beds and the shallow near shore waters. This Tombolo also forms the southern boundary of an extensive natural harbour.

- **Origins:** The geological origin of the Palisadoes Tombolo and the cays is believed to have been as a consequence of several changes in sea level rise and the deposition of sediment as a result of long shore drift from a large river in the area. The cays vary in composition from sand to coralline rubble and are stabilized by the existence of several well-developed reef structures in the area (Robinson, 1974).
- **Water depth:** The depth of water ranges from less than 1 m in the mangrove areas to as much as 35 m deep in areas adjacent to the Port Royal Cays.
- **Tidal variations:** There are mixed semidiurnal tides that vary between 20 – 30 cm.
- **Water quality:** Water quality ranges from eutrophic at sites influenced by Kingston Harbour to mesotrophic/oligotrophic, pristine at the extreme southern edge of the proposed site (South Cays).
- **General climate:** The climate is typically dry (mean annual rainfall <700 mm) and hot (30° – 32° C).

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The area has no rivers and no hydrological catchment relationships to any freshwater drainage. There are however several fresh water upwellings within the marine area of this site associated with nearby riverine systems.

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

While the wetlands in this area do not function in the recharge of groundwater, they act as a hydrodynamic barrier for the reduction of wave energy from offshore. Additionally, the mangrove areas associated with the Tombolo serve to contain and reduce sediment and fresh water incident from the outfalls in the Harbour, thereby protecting the marine areas especially the coral reefs and sea grass beds. This function is particularly evident during flood events when sediment-laden plumes from the Hunts Bay area have been observed to flow directly to the Port Royal mangroves where settlement is facilitated. The Port Royal mangroves and the sand dune vegetation further contribute to the stabilization of the shoreline and hence coastal protection of the city of Kingston.

17. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal:

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	F	<u>G</u>	H	<u>I</u>	<u>J</u>	K	Zk(a)
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Inland:

L	M	N	O	P	Q	R	Sp	Ss	Tp	Ts	U	Va	Vt	W	Xf	Xp	Y	Zg	Zk(b)
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Human-made:

1	2	3	4	5	6	7	8	9	Zk(c)
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b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

B – C – I – A – F – E – G – D – J

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The major habitats in the area are associated with the Port Royal Mangroves, the Port Royal Cays and the sand dunes of the Palisadoes Tombolo.

1. The mangrove habitats of importance are as follows:
 - a. **The forest** (trees and forest floor). Dominant organisms are crabs, amphipods, insects, birds and mammals.
 - b. ***Rhizophora mangle* roots**. These red mangrove prop roots hang into the adjacent water column and provide an important habitat for a wide range of sessile animals such as sponges, ascidians, bryozoans, barnacles and bivalve molluscs; these in turn provide habitat and substrate for errant forms such as annelid worms, flatworms, gastropods and crabs, as well as crevice dwellers such as copepods and amphipods. These root communities are undoubtedly one of the richest and most diverse communities occurring anywhere in the protected area.
 - c. **Lagoons**. This is the water column in large open bodies of water within mangrove swamps and is dominated by a variety of zooplankton, phytoplankton, fish and crocodiles. Alleng (1998) lists eleven species of commercially important fish species taken from these lagoons.
2. **Seagrass beds**. There are several beds of mixed seagrass throughout the area; *Thalassia* is however known to be the dominant type in the area (Green *et al.*, 2003). The roots of the sea grasses, especially *Thalassia testudinum* (Turtle grass) provide stability for bottom sediments while at the same time providing habitat and substrate for a number of other organisms. Abundant growths of sea grass can be found down to depths of 2 metres and are usually associated with sandy bottoms. They provide habitat for a variety of echinoids, the solitary coral *Manacina* sp. and a variety of sessile organisms, which use blade space for settlement and growth. Where long-bladed plants occur juveniles of reef fishes find shelter from predators.
3. **Salinas**. These are small open areas within the mangrove forest/swamp, which are flooded at high tide. The shallow water suffers extremes of salinity and temperature when exposed to daytime heating. As a consequence, it is habitat only for stress

resistant species including branchiopods and fiddler crabs. Migrant wading birds as well as resident ibis and herons regularly visit these areas suggesting that there is a viable invertebrate fauna population serving as food supply for these birds.

4. **Coral Reefs.** There is extensive coral growth marked by a ridges or crests of coral rock mostly dead as a result of low tide exposure and storm damage, but with occasional small living colonies. The next zone of the reef is a slope with, *Acopora cervicornis* at depths between 2 and 12 metres followed by a zone of massive corals (e.g. *Montastrea annularis*, *Porites spp.*) mixed with sponges and gorgonians down to a depth of 15 metres, below which is a rubble zone of broken coral. The reef slope flattens out at about 20-30 metres where it meets a smooth soft bottom with occasional rocky outcrops. All coral formations provide shelter and living space for fishes and a variety of invertebrate animals especially sessile forms (Bryozoa, Porifera, Ascidiacea) which settle on the under surface of plate corals or beneath old slabs of dead coral broken down by storms or bioerosion. Broken coral rock also provides habitat for a variety of boring and excavating species of animal; notable among these are species of barnacle, sponge and bivalve molluscs.
5. **Sand Beaches** On the leeward side of most cays there is a sand beach composed of the skeletal remains of carbonate skeletons of marine organisms notably the alga *Halimeda sp.*, echinoids, molluscs etc. These beaches provide shelter and habitat for a number of burrowing organisms such as the Mole Crab (*Hippa cubensis*) and the Ghost Crab *Ocypode quadrata*. Where sediments at the upper level of the beach are sufficiently deep there are available nesting sites for turtles.
6. **Sand flats** Sand flats at depths of 2 to 4 metres may contain colonies of the corals *Acropora cervicornis* and *A. palmata* as well as heads of *Diploria strigosa* and *Montastrea annularis*. Larger sand flats are often occupied by dense forests of gorgonians, the basal stems of which provide habitat for sessile organisms.
7. **Water Column.** The water column between and around the various coral cays provides habitat for many species of planktonic organisms especially Copepoda and Siphonophora as well as larger organisms such as fish and dolphins.
8. **Sand dunes.** These are found on the exposed side of the Palisadoes Tombolo as well on the larger of the Port Royal Cays. They support xerophytic vegetation arranged in three zones progressing from sea to land: strand, beach-strand dune and strand thorn scrub and provides habitats for various species.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. **Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.**

Noteworthy flora associated with this area includes an endemic and rare terrestrial species *Opuntia jamacensis* (Prickly pear cactus) that is found in the sand dune communities of the Palisadoes. There are also marine species of interest, for example, a few red algal species in the genera *Gracilaria* is harvested and used as a source of natural supplements and is believed to have restorative and aphrodisiac properties.

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data.

Do not include here taxonomic lists of species present - these may be supplied as supplementary information to the RIS.

The faunal types in the area are very diverse and as such there are many that are noteworthy by virtue of their rarity, threatened status or their potential medicinal applications. *Ecteinascidia turbinata*, an orange-coloured colonial ascidian common in the mangroves, was discovered to contain a compound, now known as *Ecteinascidin*, which may alleviate certain childhood cancers and leukemia and may also be used in treatment of inflammatory conditions.

Port Royal is recognized as the *type locality* for ~ 26 animals. This designation means that the species was first discovered at Port Royal and the original description of the species was compiled from a specimen collected at Port Royal. There are also several endangered species found in the area including the Brown Pelican, American Crocodile, Green Turtle, Hawksbill Turtle, West Indian Manatee and Bottlenose Dolphin. In recent years, studies have identified as an invasive species of bivalve native to the Pacific the Green Mussel (*Perna viridis*) thriving in the mangroves of the area (Buddo, *et al.* 2004). While it is clear that this species has significant potential as a mariculture prospect, the overall effects of this species are still being studied.

21. Social and cultural values:

e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

The major social and cultural values associated with this area surrounds the historical value of the city of Port Royal which is said to have been the most important place in the Island in the 17th Century. It was a rich merchant city and home to the infamous Buccaneers, for example, Sir Henry Morgan and as such also came to be known as “the wickedest city on earth.” During an earthquake in 1692 a significant portion of the city sank beneath the waters of the Harbour, creating what is today the “sunken city” the only archaeological site of this type in the Western hemisphere.

22. Land tenure/ownership:

(a) within the Ramsar site:

The area earmarked as the Ramsar site is the property of the State (the Government of Jamaica); one of the cays (Lime Cay) has been leased to a private company but is still required to conform to the existing regulations and guidelines relevant to the area as a protected area.

(b) in the surrounding area:

The urbanized areas of the Tombolo not designated as a part of the Ramsar site are predominantly State controlled but there are few areas that are in the control of private companies or citizens.

23. Current land (including water) use:

(a) within the Ramsar site:

The cays and dunes are important recreational areas for the population of Kingston including SCUBA diving, boating, sunbathing, swimming, fishing and other water sports. The marine areas and in particular the areas close to reefs are extensively fished by local communities. There is also a shipping channel that passes through the site and connects the port of Kingston to the Caribbean Sea.

(b) in the surroundings/catchment:

The Norman Manley International Airport is located along the Tombolo and the town of Port Royal is also used as the Jamaica Defence Force Coast Guard base, residential area, private and public open spaces.

24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

(a) within the Ramsar site:

The major adverse factor affecting the ecology of the area is the increased recreational activity that could exceed the carrying capacity specifically anchoring on the cays by boats. The fishing pressure incident in the area also poses some concern as it is generally accepted that the fisheries of Jamaica are degraded. Commercial activity and shipping has led to recent modifications involving the widening of the Southeast ship channel by the removal of a section of Rackham's Cay and the relocation of the associated coral reefs. In addition, mangrove areas have previously come under threat from road improvement projects and housing developments. This area of Jamaica is the most persistent approach for hurricanes that have made landfall in Jamaica; as a consequence, the reefs of the area have been adversely affected in the past. The effects of the most recent system affecting Jamaica (Hurricane Ivan, September 2004) are still being studied and as such are currently unknown.

(b) in the surrounding area:

Solid waste, organic and oil pollution from Kingston Harbour through the discharge of rivers and gullies which empty into the harbour and have deleterious effects on the coastal and marine ecosystems of the area especially the mangrove communities.

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

The main conservation measures taken thus far include the declaration in 1998 of the Palisadoes-Port Royal Protected Area (PPRPA) under the Natural Resources Conservation Authority Act (1991). Activities towards declaration included educating and sensitizing the people within the area about the vulnerability and value of the areas being used.

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

A management plan was drafted when the area was declared a protected area to ensure wise use of the resources (NRCA, 1999). The Palisadoes-Port Royal Protected Area Management Plan is currently being updated with a view towards implementation.

27. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

The University of the West Indies enjoys a 99-year lease on an area that has functioned as the Port Royal Marine Laboratory since 1955. It provides wet and dry laboratory space for local and foreign research scientists and accommodates courses from the University of the West Indies (Mona Campus). There is also a modern aquaculture facility that is engaged in research on various fish species.

28. Current conservation education:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

The Government, through the National Environment and Planning Agency (NEPA) facilitates presentations, exhibitions and tours within the area aimed at enhancing public awareness and education. Non-governmental organisations through their activities for example beach clean up also educate persons living within the PPRPA and the wider public about wetland conservation.

The Caribbean Maritime Institute (formerly the Jamaica Maritime Institute) provides tertiary maritime education, training, research and consultancy to students from the region. The Fort Charles Maritime museum and visitors centre in Port Royal provides information dedicated to the seamen and ships that visited Port Royal. The Port Royal Marine Laboratory accommodates groups of naturalists wishing to take tours into the surrounding mangrove and coral areas.

There is also presently a project funded by the Environmental Foundation of Jamaica (EFJ) aimed at developing field guides and information booklets about the biodiversity associated with the mangrove areas, along with aquarium exhibits showing the mangrove organisms associated with the *Rhizophora* roots.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Recreational use in the area is centered primarily around the use of the beaches on the Cays, the town of Port Royal, along the Palisadoes Tombolo, the Yacht Club and the go-kart racing track adjacent to the Norman Manley International Airport. The beaches of Port Royal and the Cays are used everyday with maximum numbers being recorded on the weekends. The exact numbers utilizing these areas is currently the subject of studies to determine carrying capacities.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Ministry of Land and Environment, Ministry of Education, Youth and Culture and the Ministry of Local Government

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

The primary management authority of the area is the National Environment and Planning Agency (NEPA) and in matters related to development and the use of heritage resources the local government/parish council (the Kingston and St. Andrew Corporation) in conjunction with the Jamaica National Heritage Trust must also be consulted for approval.

32. Bibliographical references:

scientific/technical references only. If biogeographic rationalization scheme applied (see 13 above), list full reference citation for the scheme.

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Seagrass/Mangroves/Sand dune flora

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APPENDICES:

APPENDIX I. Lists with numbers of species as per justification for Ramsar criterion # 3

KINGDOM:

(A) PLANTAE

- (1) Macrophytic Algae
- (2) Sea grasses
- (3) Mangroves
- (4) Sand dune vegetation

(B) ANIMALIA

- (5) Porifera
- Cnidaria:
- (6) Corals,
- (7) Anemones,
- (8) Jellyfish (Hydrozoa and scyphozoa)
- (9) Ctenophora
- (10) Platyhelminthes
- (11) Annelida
- Crustacea:
- (12) Zooplankton
- (13) Cirripedia
- (14) Malacostraca
- (15) Mollusca
- (16) Echinodermata
- (17) Chaetognatha
- (18) Bryozoa

(C) PROTISTA

- (25) Phytoplankton algae
- (26) Planktonic ciliates

Chordata:

- (19) Hemichordates & Cephalochordates
- (20) Urochordate - Larvacea
- (21) Urochordate - Ascidiacea

Vertebrata:

- (22) Fish
- (23) Reptiles
- (24) Birds
- (25) Mammals

Note: The major groups of organisms are arranged under their respective kingdoms. The numbers in brackets correspond to the number on the list of species of each group.