

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the Official Respondent:

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Designation date

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Site Reference Number

Name and address of the compiler of this form:

Updated by UK Overseas Territories Conservation Forum, 102 Broadway, Peterborough,
PE1 4DG, UK

(with assistance from Bermuda Dept. of Conservation Services)

2. Date this sheet was completed/updated:

Designated: 10 May 1999

3. Country:

UK (Bermuda)

4. Name of the Ramsar site:

Spittal Pond

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

It is the most important wetland for wintering waterfowl and transient shorebirds.

Criterion 4

The site is important for common eels *Anguilla anguilla*.

See Sections 21/22 for details of noteworthy species

15. 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 regionalisation system that has been applied.

a) biogeographic region:

Bermuda / mid-North Atlantic Islands

b) biogeographic regionalisation scheme (include reference citation):

16. 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.

Soil & geology	nutrient-rich, mud
Geomorphology and landscape	coastal, lagoon, cliffs
Nutrient status	eutrophic
pH	
Salinity	brackish / mixosaline, fresh
Soil	
Water permanence	usually permanent
Summary of main climatic features	Subtropical; mild, humid; gales, strong winds common in winter.

General description of the Physical Features:

The greatest natural factor affecting the ecological character of Spittal Pond is the impact of strong hurricanes. The pond is located on the exposed south coastline of Bermuda, where the protective reef line is located only 100-200 m offshore, offering little protection from the impact of hurricane waves and tides. In addition, the pond is only separated from the ocean by a thin line of small hills, with three low-lying overwash areas between them where waves can break through directly into the pond during hurricanes. The waves breaking into the pond during Hurricane Fabian in 2003 reached over 12 m in height, sweeping boulders, sediment and scores of large trees, up to 21 m in height, into the pond. Hurricanes appear to affect the pond in three main ways:

- 1) The huge input of sea water (which raised pond levels 4-5 m above normal in Fabian, caused huge disruption to the pond's ecology. Many species of ocean life, including parrot fish, blue tangs and even a green turtle, were swept into the pond and survived for several months, but eventually died as the water slowly returned to the normal brackish state. It appears to take at least 6-12 months for the pond to return to its normal state following a major hurricane flooding event.
- 2) During hurricanes a huge amount of vegetation and organic matter is either swept into the pond by wave and tidal surge action, or is blown into the pond by the extreme winds. This material can vary from tons of *Sargassum* seaweed, to foliage from the surrounding

vegetation, to whole trees complete with root mass. This huge input of organic material causes nutrient enrichment and anaerobic conditions for 6 months or more following hurricane events, as already described.

- 3) The waves and surge of a hurricane can sweep large boulders and tons of sand, soil and sediment into the pond, which can reduce its depth, especially near the overwash areas. The massive amount of erosion that occurs has literally reshaped the landform between the pond and the ocean. For example, the east overwash area (the lowest of the three overwash areas), appears to be developing a permanent tidal channel, while at the western overwash area near the checkerboard, the entire western hillside (and the *Casuarina* forest that covered it) was washed away, doubling the width of the low-lying area here that is subject to overwash.

17. 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).

A permanent shallow brackish lagoon with fringing mudflats and saltmarshes bordering the coast. The water level fluctuates by about 75 cm with rainfall and periodic flooding from the sea, and mudflats are exposed at low water levels. Two small freshwater ponds were excavated in 1966.

18. Hydrological values:

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

No special values known, Other

19. Wetland types:

Human-made wetland, Marine/coastal wetland

Code	Name	% Area
Sp	Saline / brackish marshes: permanent	80
Tp	Freshwater marshes / pools: permanent	10
G	Tidal flats	6
H	Salt marshes	3
D	Rocky shores	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The only Bermudan example of a non-tidal permanent shallow brackish lagoon with fringing mudflats and salt marshes. The land area comprises a natural valley containing a brackish pond of 36.4 ha and some 1.4 km of rugged coastline. The site is subject to periodic sea flooding with mudflats exposed at low water levels. The water level fluctuates by about 75 cm with rainfall and periodic flooding. Two freshwater ponds were excavated in 1966.

The Pond holds an extremely nutrient-rich but unstable community with wide fluctuations in salinity. There is low species diversity in the pond but very high productivity in boom-and-bust cycles.

The most important Bermudan wetland for wintering waterfowl and migrant shorebirds.

Spittal Pond features some of the best representation of geological formations in Bermuda.

Ecosystem services

21. 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.*

Higher Plants.

Submerged beds of *Ruppia maritima* and fringing *Paspalum vaginatum*.

Adjacent woodland and pasture.

22. 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.*

Birds

Species Information

Birds.

The pond is a major refuge for passage shorebirds, notably species of *Tringa*, *Limnodromus* and *Calidris*. It is of principal importance as a wintering area for many species of North American heron, egrets, ducks, coot and moorhen. Pied-billed grebe *Podilymbus podiceps*, little blue heron *Egretta caerulea*, Louisiana (tri-colored) heron, *E. tricolor*, snowy egret *E. thula*, great egret, *Casmerodius albus*, American black duck *Anas rubripes*, common teal *A. crecca*, American widgeon *A. americana*, blue-winged teal *A. discors*, ring-necked duck *Aythya collaris*, lesser scaup *A. affinis* and American coot *Fulica americana*. The eel *Anguilla anguilla* is common; *Mugil* sp. occasionally become established. *Gambusia holbrooki* is abundant, serving both as mosquito control and food for herons.

The coastal cliffs support a nesting population of white-tailed tropicbirds *Lepturus catesbyi*.

23. Social and cultural values:

Describe if the site has any general social and/or 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.

Aesthetic

Environmental education/ interpretation

Livestock grazing

Non-consumptive recreation

Tourism

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:

- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
National/Crown Estate		+
Other	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	
Recreation	+	
Grazing (unspecified)	+	+
Permanent pastoral agriculture		+
Urban development		+

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

Explanation of reporting category:

1. Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
2. Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?

Eutrophication	1	<p>Spittal Pond has been adversely affected by nutrient enrichment in the past, most of which can be traced back to the presence of a dairy cattle farm just uphill of the north and north-west edges of the pond. Poor husbandry practices and overgrazing on this farm from the 1950s until the 1990s resulted in the total loss of grass and vegetation cover on large fields directly uphill from the pond, resulting in erosion of soil and cattle manure from the fields directly into the pond. In addition, the cattle themselves were poorly enclosed, and often escaped or were allowed to graze (and defecate) right around the pond edge itself. The result was severe nutrient enrichment of the pond, resulting in eutrophication, algal blooms and anaerobic conditions which killed most life in the pond and led to numerous complaints about strong smells emanating from the pond. There were documented blooms of blue-green and red algae toxic to most pond life every year during the summer season, and confirmed outbreaks of botulism which caused the deaths of numerous waterfowl, including mallards, other wild ducks and possibly herons and egrets. During hurricanes a huge amount of vegetation and organic matter is either swept into the pond by wave and tidal surge action, or is blown into the pond by the extreme winds. This material can vary from tons of <i>Sargassum</i> seaweed, to foliage from the surrounding vegetation, to whole trees complete with root mass. This huge input of organic material causes nutrient enrichment and anaerobic conditions for 6 months or more following hurricane events.</p>	+	+	+
Introduction/invasion of non-native plant species	1	<p>In 1955, following the loss of the dense cedar forest due to scale insect epidemic of the late 1940s, the government reforested the land south of the pond with non-native Australian whistling-pine <i>Casuarina equisetifolia</i>. These trees grow rapidly to a much greater height than the original native forest, and also drop a dense carpet of highly acidic needles or foliage, cutting down species diversity on the forest floor and possibly affecting the pond itself through acidic run-off. The monoculture of <i>Casuarina</i> has attained a dominance and height which is uncharacteristic of Bermuda and is relatively sterile for birds and floral diversity. In particular, the forest is self-seeding and has colonised the coastal zone, blocking scenic views and shading out the native coast flora. The condition has inhibited the recovery or re-establishment of native flora. Elsewhere in the reserve non-native weed trees are blocking scenic views and trails.</p>	+	+	+

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
 Eutrophication - This problem was largely addressed through recommendations set down in the management plan

for Spittal Pond, which included the following management actions:

- 1) reduction in the number of cattle kept at the dairy farm;
- 2) moving the cattle off the bottom fields closest to the pond and only allowing these to be used for growing fodder crops; this provides a vegetative barrier that water run-off has to filter through before reaching the pond;
- 3) the digging of 3 sump or overflow ditches that intercept rain run-off from the farm before it reaches the pond;
- 4) the construction of a drainage channel through the east basin of the pond, leading to a drainage pipe with a sluice-gate valve which connected directly to the ocean through an outcrop of rock. If water quality in the pond decreased to dangerous levels, then the valve could be opened at low tide to allow the anaerobic water to flush out to sea; the valve would be opened again at high tide to allow the pond to be recharged with unpolluted salt water. This process, if repeated, could flush much of the excess nutrient load out of the pond;
- 5) All cattle to be properly enclosed with fencing, to prevent access by the animals to areas near or around the edge of the pond.

These actions actually were somewhat effective in reducing the nutrient load in the pond, provided that the dairy farmer followed the terms that were laid down in the management plan. The most effective actions proved to be the reduction of the number of animals allowed to be kept on the farm (thus reducing the amount of manure produced, and the amount of erosion and rain run-off), and confining the cattle to areas as far away from the pond as the site allowed. The result has been that Spittal Pond has actually exhibited generally greater health in recent years, with only the growth of mainly green algae and widgeon-grass which are a normal component of a healthy brackish/salt lagoon, and which provide food for waterfowl and pond life. There has been some infringement of the lower fields since the late 1990s by the dairy farmer for grazing, raising once again the risk of manure run-off reaching the pond and pointing to a need for greater enforcement, but the pond still seems to be in generally better health than was the case in the 1960s to 1980s. Blooms of the more toxic blue-green and red algae, once common and long-lasting, are now rare and brief, except following major catastrophic events such as hurricanes.

Introduction/invasion of non-native plant species - Following extensive damage to *Casuarina* forest during hurricane 'Emily' in 1987, some clearing of invasive, introduced plants undertaken and reforestation with endemic and native tree and shrub species.

Is the site subject to adverse ecological change? NO

27. 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.

Conservation measure	On-site	Off-site
National Nature Reserve (NNR)	+	+
Land owned by a non-governmental organisation for nature conservation	+	
Site management statement/plan implemented	+	
Other	+	

b) Describe any other current management practices:

Introduction/invasion of non-native animal species - • trapping and culling of pigeons near the farm [Underway, flock of pigeons reduced by 30% in 2003/2004]

National Nature Reserve (NNR) - The site has been notified for its nature conservation interest under several pieces of National Legislation. Part of the site was declared as a nature reserve under the Bermudan National Trust Act. It was designated as a nature reserve under the Protection of Birds Act 1975 along with the surrounding areas and scheduled as a nature reserve by the Bermudan National Parks Act, 1986.

Part of a larger National Park
Nature reserve = 36.4 ha

Land owned by a non-governmental organisation for nature conservation - Owned by Bermuda National Trust since 1954.

28. Conservation measures proposed but not yet implemented:

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

Introduction/invasion of non-native plant species - The present and future management strategy will involve the removal of felled trees and replanting with mainly hardy native and endemic species, and the gradual phasing out of remaining areas of *Casuarina* forest and reforestation with native, endemic and selected non-invasive ornamentals where appropriate.

Introduction/invasion of non-native animal species - • reducing attractiveness of the farm buildings to pigeons; or

• reducing food supplies for pigeons through modifying cattle feeding regimes so that spilt food is not readily available for the birds to exploit.

Eutrophication - A catchment management approach is essential to the long-term conservation of this wetland.

Tourism - Spittal Ponds receives extremely high levels of recreation use, both birdwatching and also for walking, jogging and other forms of quiet recreation. Accordingly, the site has a very significant potential for environmental education and public awareness. Whilst there is some signage near footpaths, this is limited and, for example, makes no reference to the status of the sites as a designated wetland of international importance.

It would be appropriate to present information to the public on other conservation management being undertaken on or near the site, for example measures to improve water quality.

Other possibilities include targeting decision-makers and improved nature-trails, as well as ranger work to undertake and oversee work suggested.

29. Current scientific research and facilities:

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

No facilities. There has been a limnological study of the pond. Migrating and wintering birds have been monitored and recorded since 1950.

Studies of tropicbird population/breeding success in 2001-2003.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

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

There are regular field trips by conservation groups and schools.

31. Current recreation and tourism:

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

Activities, Facilities provided and Seasonality.

The site is used for bird watching and walking by locals and tourists.

32. Jurisdiction:

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

Ministry of the Environment

Government of Bermuda, Government House,

Hamilton, Bermuda

33. 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.

Dept. of Conservation Services, P.O. Box FL588, Flatts FLBX, Bermuda
Dept. of Parks, Botanical Gardens, 169 South Shore Rd, Paget DV04, Bermuda
Bermuda National Trust, 'Waterville', Paget, PG 05, Bermuda

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

- Becker, CJ, Shosa, JD & Rueger, BF (2001) A geochemical comparison of Spittal Pond and Warwick Pond, Bermuda. In: *Geological Society of America Abstracts with Program*, 33(6):A181
- Hayward, SJ, Gomez, FH & Sterrer, W (eds.) (1981) *Bermuda's delicate balance: people and environment*. Bermuda National Trust, Paget
- Hepburn, I, Oldfield, S & Thompson, K (1992) *UK Dependent Territories Ramsar study: Stage 1*. Unpublished report to Department of the Environment, European and International Habitat Protection Branch, Bristol, from International Waterfowl and Wetlands Research Bureau/ NGO Forum for Nature Conservation in UK Dependent Territories, Slimbridge/ Sandy (Research contract, No. 7/2/126)
- Pienkowski, M (ed.) (2003) *A sense of direction: a conference on conservation in UK Overseas Territories and other small island communities, Bermuda 22nd–27th March 2003*. UK Overseas Territories Conservation Forum, Peterborough. www.ukotcf.org
- Pienkowski, MW (ed.) (2005) *Review of existing and potential Ramsar sites in UK Overseas Territories and Crown Dependencies*. (Contractor: UK Overseas Territories Conservation Forum, Peterborough.) Final report on Contract CR0294 to the UK Department for Environment, Food and Rural Affairs, Bristol. www.ukotcf.org
- Proctor, D & Fleming, LV (eds.) (1999) *Biodiversity: the UK Overseas Territories*. Joint Nature Conservation Committee, Peterborough
- Sanders, S, Dobson, A & Stroud, D (2003) Spittal Pond. In: *A sense of direction: a conference on conservation in UK Overseas Territories and other small island communities*, ed. by M. Pienkowski, 217-222. UK Overseas Territories Conservation Forum, Peterborough. www.ukotcf.org
- Scott, DA & Carbonell, M (eds.) (1986) *A directory of neotropical wetlands*. IUCN/IWRB, Cambridge/Slimbridge
- Wingate, DB (1984) *Taking stock of Bermuda's wetland heritage*. Department of Agriculture and Fisheries, Hamilton
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