

Somerset LONG BAY EAST

NATURE RESERVE GUIDE



THE BERMUDA NATIONAL TRUST



ACKNOWLEDGEMENTS

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To protect Bermuda's unique natural & cultural heritage forever

Preface

Ever since Bermuda was first settled 400 years ago, its residents have been making an impact on these islands, for better and for worse. They have crafted and built beautiful things...houses, boats, furniture and silver spoons. They have also changed the landscape, using biodiversity-rich marshes as rubbish dumps, importing invasive plant and animal species that threaten the native species, over-developing this narrow strip of land in the ocean. The threat of losing valuable open spaces and historic treasures sparked the creation of the Bermuda Monuments Trust in 1937 by a group of Bermudians who wanted to ensure that future generations would have the opportunity to understand their past. In 1970 the Bermuda National Trust was founded and took over from the Monuments Trust. Since then it has grown to become one of the island's most respected institutions. It is an independent not-for-profit organization which promotes the preservation of the island's architectural, historic and environmental treasures, and encourages public access to and enjoyment of them. Its members and friends are from all walks of life, having in common a love of Bermuda and the desire that its special aspects should be safeguarded for everyone to enjoy now, and forever.

This guide provides information on the importance, history, geography and biology of this very special Bermuda National Trust property. It highlights individual habitats, the most common flora and fauna and offers images which will help you to identify species found within the reserve. We hope that this guide will enhance your visit to our nature reserve and encourage you to visit other Trust properties soon.

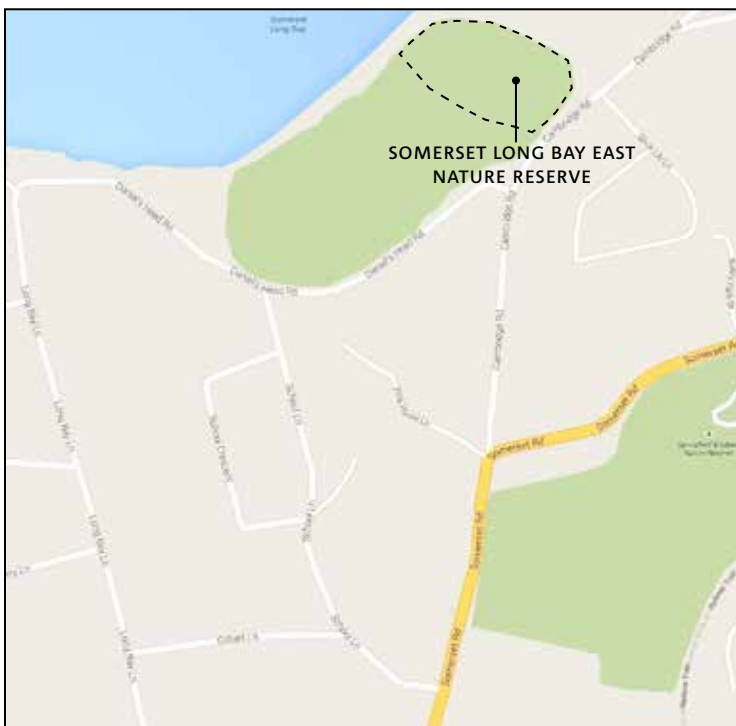
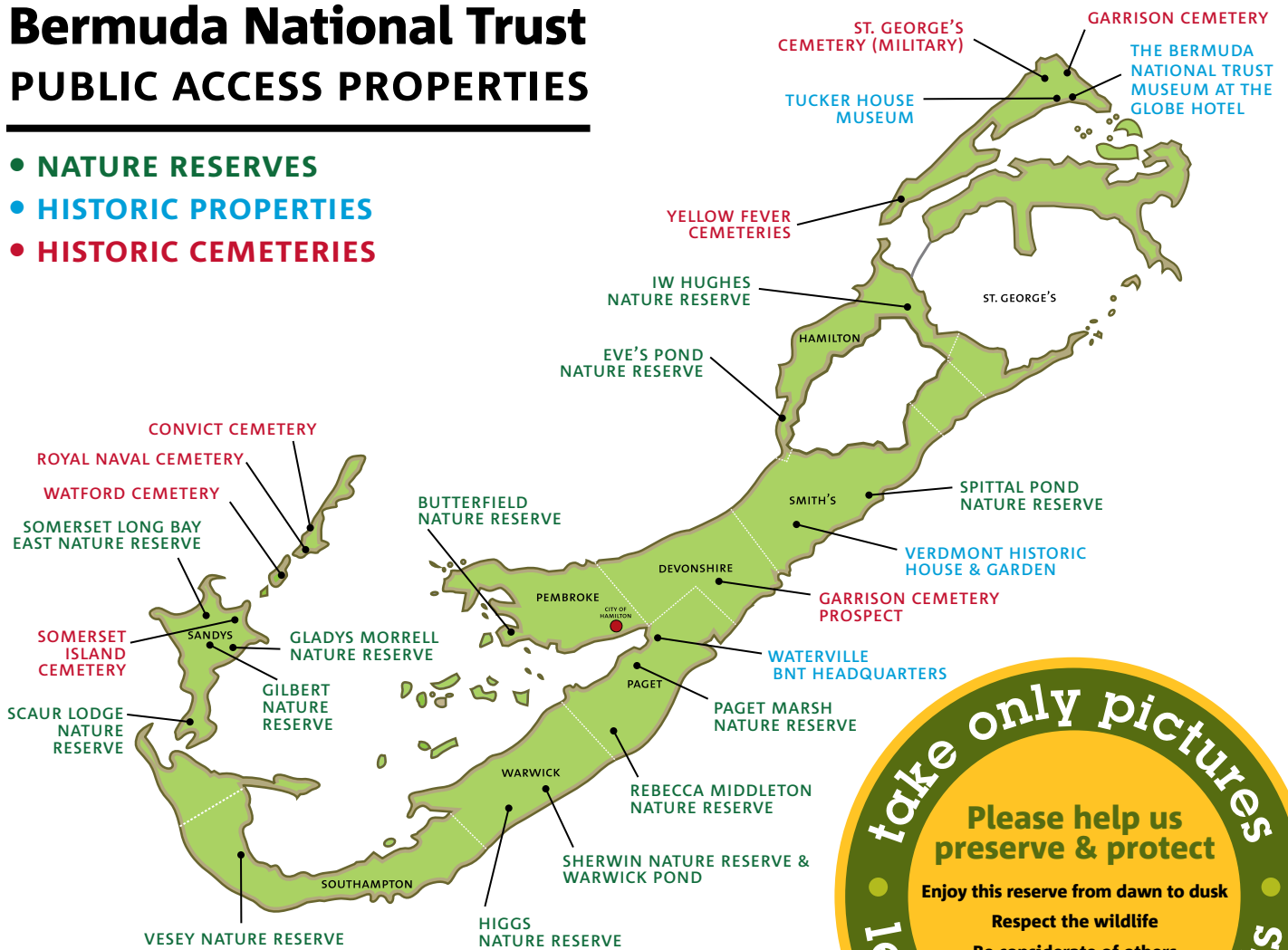
For more information on the Bermuda National Trust, the properties in its care, programmes, events, membership and volunteer opportunities please visit www.bnt.bm or contact us at 441 236 6483.

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Bermuda National Trust PUBLIC ACCESS PROPERTIES

- NATURE RESERVES
- HISTORIC PROPERTIES
- HISTORIC CEMETERIES



Directions

This map shows the location of Somerset Long Bay East Nature Reserve. There are two entrances to the reserve which is located on Daniel's Head Road as it connects with Cambridge Road in Somerset. One entrance is located within Somerset Long Bay Park; coming from the parking lot and walking towards the beach, an entrance is located on the right side of the park. Another entrance is directly off of Cambridge Road. Signs for the reserve are posted at each

Somerset Long Bay EAST NATURE RESERVE



THE SOMERSET LONG BAY AREA WAS ORIGINALLY A TEN-ACRE MARSH and mangrove forest protected by a sand bar beach. An 1899 map shows that an extensive swampy area extended to the eastern side of Daniel’s Head Road deep into Somerset. It would have periodically flooded with seawater in winter storms and hurricanes.

In the 1930s and '40s the Government initiated a policy of filling in the marshes for mosquito control by using them as public dumpsites. This continued until the 1950s, by which time most of the marshland had become a wasteland of bottles covered by heaps of debris.

The 1960s saw the growth of tourism and the need for more public beaches. Government acquired the central three acres from the Astwood family in 1968 for a public beach park, and a few years later the Bermuda Audubon Society purchased the western three acres from F.W. Yearwood and restored it to a functioning wetland and pond.

In the 1980s Joffre Pitman, a Somerset resident and conservationist, purchased the eastern three acres and set out to replicate the Audubon’s reserve, excavating a pond and contouring the old fill areas.

In 2004 this property, like so much of Bermuda’s dwindling open space, was earmarked for development. (Sadly, it is a fact that over 1,200 acres of open space have been built on over the last 30 years.) Fortunately, thanks to determined public action, this site has now been saved and preserved forever.

The Audubon Society and the Bermuda National Trust – the only two charitable bodies with legal powers to hold land in trust as nature reserves – pooled resources and launched the “Buy Back Bermuda” campaign and through contributions from almost 500 people raised the \$1.7 million needed to purchase, enhance and maintain the land.

Today, with approximately 30% of Bermuda’s land mass (1,293 acres) protected as National Parks or nature reserves, the opening of this reserve to public access is a significant gift to the people of Bermuda, and helps to preserve the island’s natural heritage and biodiversity while enhancing the charm of Somerset Long Bay.

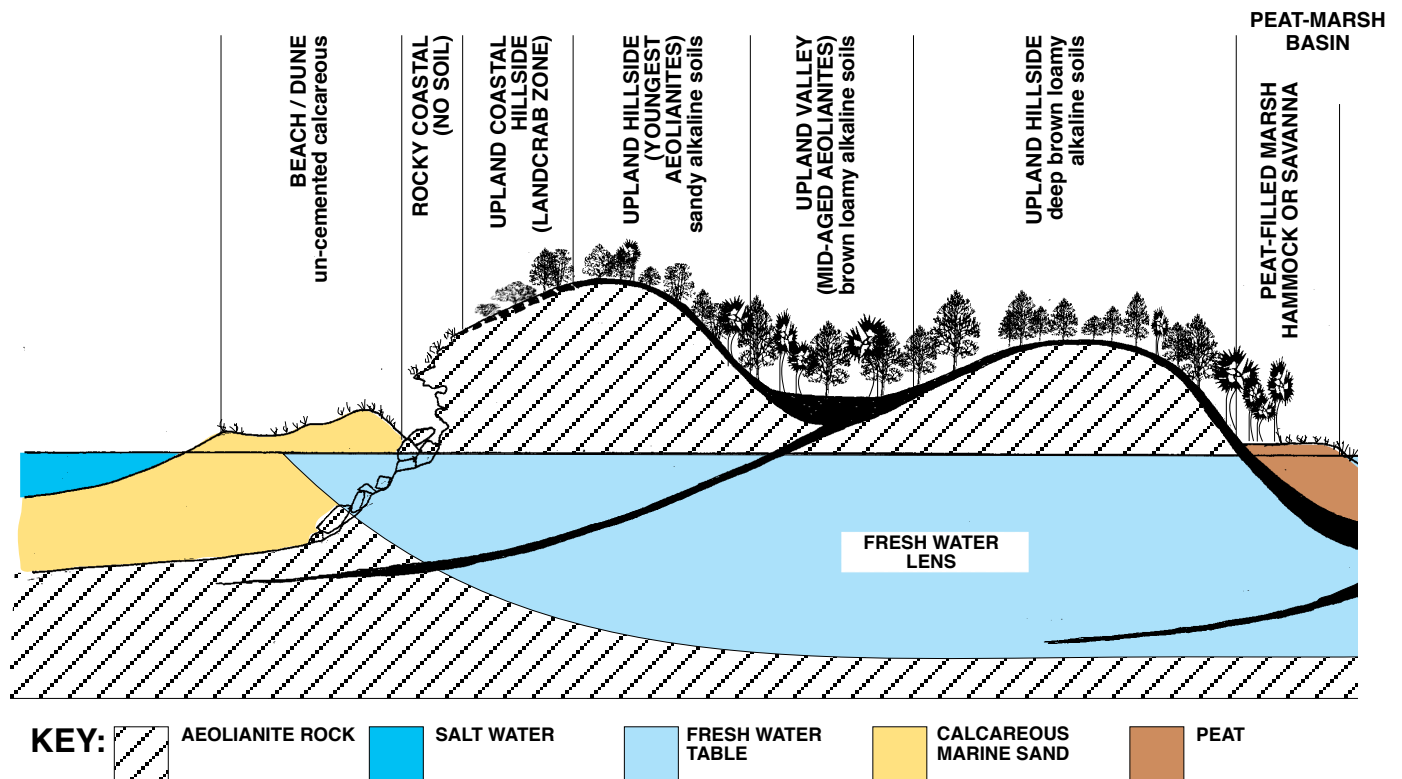


Somerset Long Bay



The aerial view on the far right shows three parcels of land which make up nearly 10 acres of protected open space. Somerset Long Bay West is owned by the Bermuda Audubon Society, the central National Park is owned by Government and Somerset Long Bay East is jointly owned by the Bermuda Audubon Society and the Bermuda National Trust.

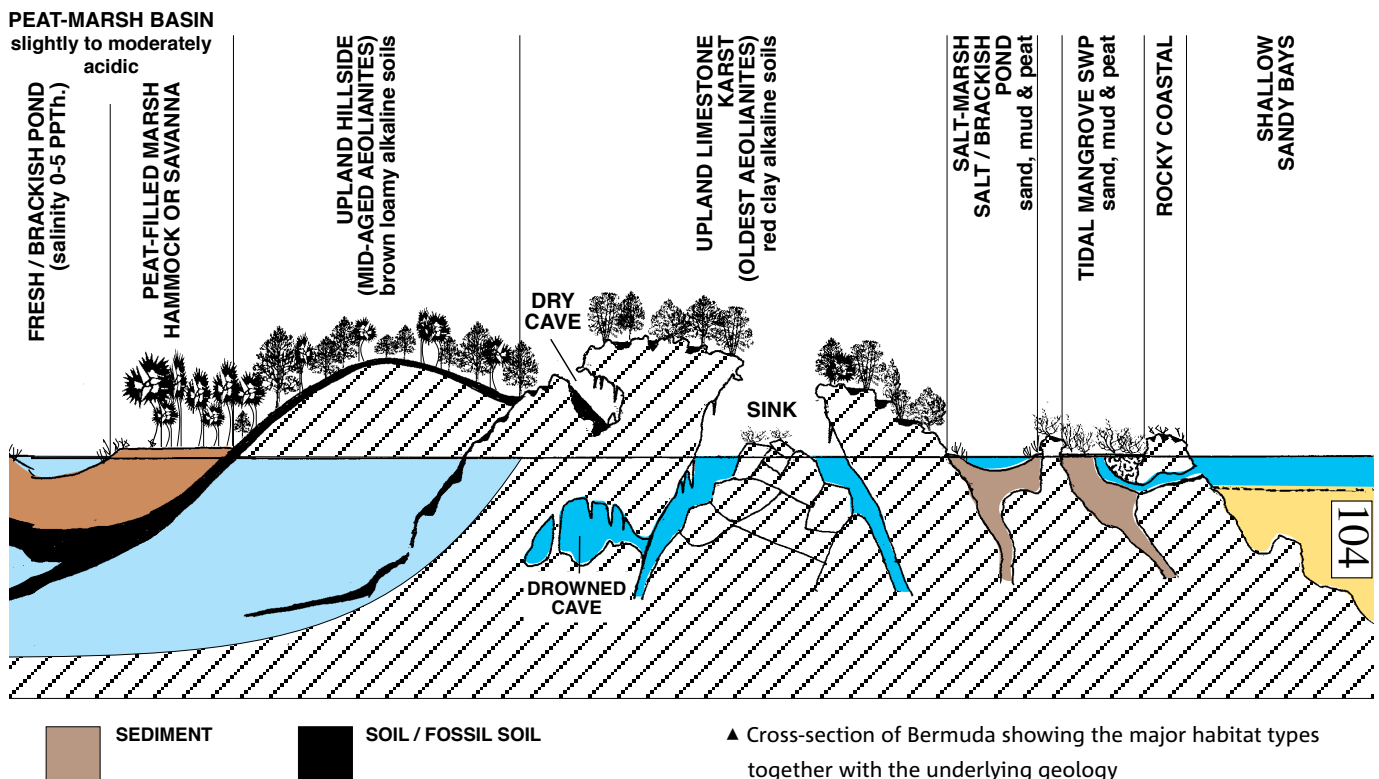
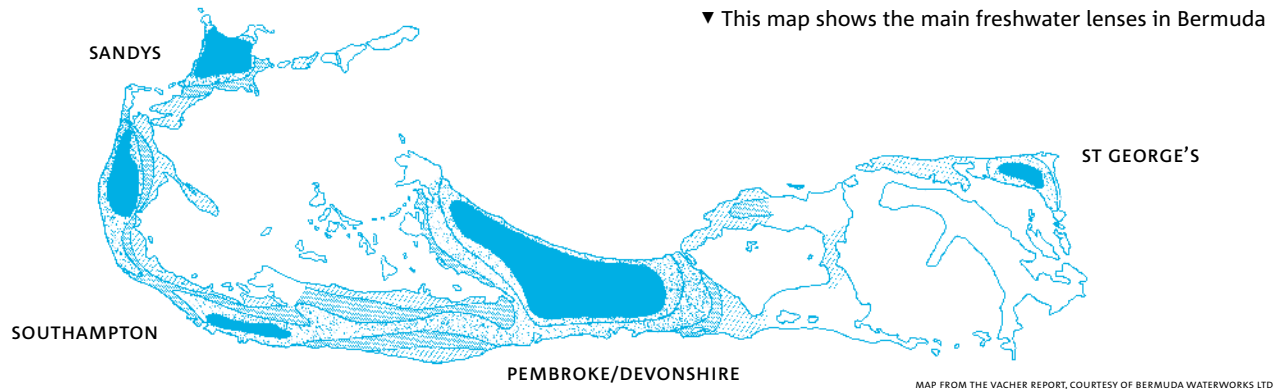
TOP PHOTO: © BERMDA ZOOLOGICAL SOCIETY
 BOTTOM PHOTOS: COURTESY OF THE MINISTRY OF WORKS & ENGINEERING, SURVEY SECTION



The Importance of this Reserve

Somerset Long Bay East Nature Reserve is a very valuable part of Bermuda's natural heritage.

1. The reserve provides valuable open amenity space for the health and well-being of the local community. Studies have shown that people who regularly interact with nature show lower stress levels, are less violent and heal faster from illness.
2. A unique feature of the pond in the reserve is that it lies within the area of the Somerset freshwater lens, and so, despite proximity to the sea, it supports an essentially freshwater pond community, including resident and migratory water birds.
3. Another feature is that there are now small nesting islands in the pond which have been colonised by five species of breeding waterfowl – a record for Bermuda marshes and ponds.
4. As the pond is near the extreme northwestern tip of Bermuda it is an important first landing site for migratory birds searching for freshwater. Many unusual sightings have been made including a Whistling Swan and a Siberian Flycatcher.



Definition of Terms

Native: A species which colonised Bermuda naturally without human help. Most arrived long before human settlement and are found in other countries too

Endemic: A native species which has been isolated in Bermuda long enough to have evolved into a unique species

Introduced: A species which is not found naturally in Bermuda, but has been brought here either accidentally or intentionally by humans

Invasive: An introduced self-propagating species which has a tendency to spread rapidly, overwhelming the native and endemic species and/or causing economic damage

Resident: A bird that nests in Bermuda and does not make seasonal journeys off-island

Migrant: A bird that makes regular seasonal journeys to Bermuda from elsewhere for the purpose of feeding or breeding

Vagrant: A bird very rarely seen in Bermuda, probably blown off course

Abiotic Factors: are the non-living factors in an ecosystem that affect the population growth of a species. Such factors include:

- Water (e.g. salinity, oxygen content, level, pollution)
- Soil (e.g. pH, humus content, moisture, depth)
- Sunlight (e.g. light intensity)
- Wind exposure
- Temperature

Biotic Factors: are the living components in an ecosystem. These include members from all five kingdoms – plants, animals, bacteria, fungi and protists. The members of an ecosystem live in dynamic interaction with each other and with their environment. Hence, one species may affect the population growth of another species through:

- Competition with other species
- Predation
- Grazing by herbivores
- Food supply
- Population density
- Symbiotic relationships (e.g. where several organisms depend on each other)
 - Symbiotic relationships include:
 - Mutualism:** in which each organism benefits
 - Parasitism:** in which one organism benefits and the other is generally harmed
 - Commensalism:** in which one organism benefits whilst causing little or no harm to the other

Appreciating Our Open Spaces

In order to appreciate and take care of our open space, we need to understand what space is available, how it is being used, why it is important to maintain open space and what threats impact the environment.

Land usage in Bermuda as of 2008

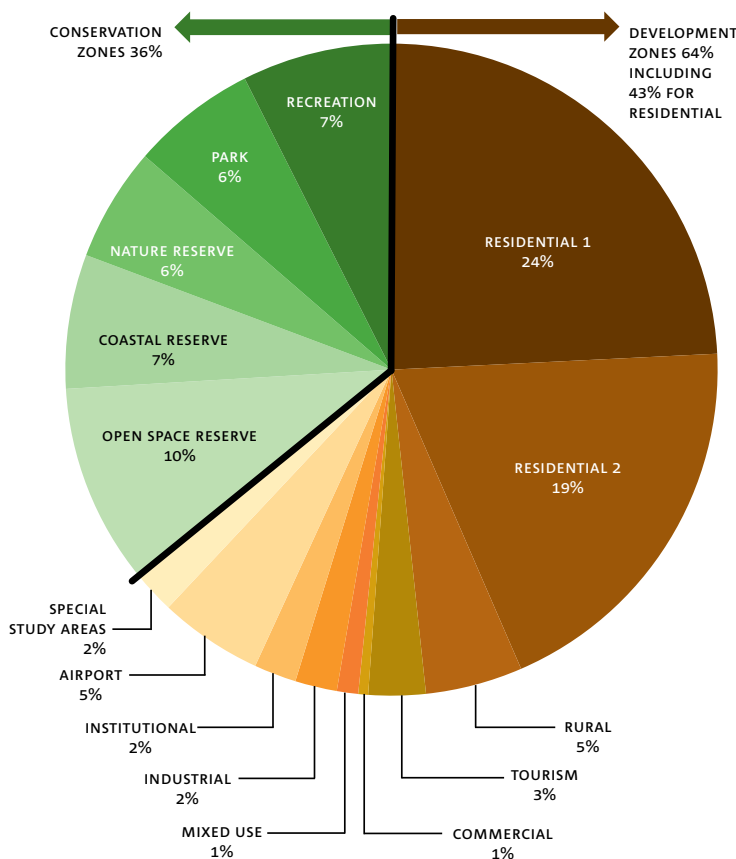
The chart below shows a breakdown of how Bermuda's land is used.

Conservation Zones totalled = 36%

- 10% Open space reserve
- 6% Parks
- 7% Reserves - coastal
- 6% Reserves - nature
- 7% Recreation

Development Zones totalled = 64%

- | | |
|------------------|--------------------|
| 5% Airport | 5% Rural |
| 1% Commercial | 2% Special studies |
| 2% Industrial | 1% Mixed use |
| 2% Institutional | 3% Tourism |
| 43% Residential | |



Open Space is Important Because

- Natural beauty attracts visitors and encourages tourism
- It provides recreational areas such as sports and playgrounds
- As amenity space, it enhances our psychological well-being
- It maintains our unique biodiversity

Threats to Terrestrial Habitats

The key threats to terrestrial habitats in Bermuda are:

- Domination of existing open space by invasive species
- Loss of open space through development

The reasons for development include:

- Economic growth
- Housing
- Other individual requests – pools, large houses, upscale condos, driveways

Other threats to the environment include:

- Pollution
- Littering
- Vandalism
- Natural causes such as erosion and storm damage

It is every citizen's responsibility to protect the natural environment wherever we are in the world so that future generations will have clean air to breathe, unpolluted and abundant food, and water and energy sources

Sources: The Bermuda Zoological Society and the Bermuda Aquarium, Museum and Zoo, *Bermuda Biodiversity Country Study*, Bermuda, 2001, Bermuda Department of Planning – Forward Planning Branch, 2008

Pond Life

Bermuda has no natural surface fresh water streams or lakes and a limited number of small ponds. The majority of these are brackish or fully marine. Natural fresh water ponds are very uncommon. The marshy area of Somerset Long Bay is unusual in that despite close proximity to the sea it lies within the Somerset freshwater lens. This makes Pitman's Pond an important freshwater habitat for a variety of aquatic plants, insects, snails and migratory birds, some of which are very rare.

All of Bermuda's ponds are threatened by invasive species as well as with run-off pollution from roads and neighbouring farmland, groundwater enrichment through sewage seepage and trash debris from continued illegal dumping. Reducing pollutants in the pond is an ongoing and long-term process.

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Pond Facts

The pond was excavated by backhoe in 1986 by the then owner Joffre Pitman. It was previously a mangrove and marsh area that had been filled with garbage in an attempt to control mosquitoes.

- Average depth – 1 m (3 ft)
- Deepest point – 139 cm (4ft 7in)
- The pond bottom is flat and consists of fine black anoxic (lacking oxygen) mud, overlying fine, calcareous sand that contains remains of Plateweeds and Scaleweeds (sand-producing marine algae)
- The water has an average salinity of about 2.5 percent, 7 percent seawater and 93 percent freshwater, so it is slightly brackish
- At times there has been a Cyanobacteria (blue-green algae) bloom in the pond. This reduces visibility to an inch or so
- There is a small variability in water levels throughout any one day, which is believed to be due to the relationship between the Somerset freshwater lens and the ocean tides



Know Your Terms

Pictures of many of the plants and animals mentioned on the following pages can be found in this publication as well as on the information boards at the reserve.

Animal Life

Adapted in unique ways for survival, animals of a wetland may live in, on or above the water. Some of the common species seen year-round in this pond include **Eastern Mosquito Fish** (*Gambusia holbrooki*) introduced for mosquito control, dragonflies and birds. Tadpoles from the large **Marine/Cane Toad** (*Bufo marinus*) can also be seen in the pond during the spring and summer months and **Red-eared Sliders** (*Trachemys scripta elegans*) can be spotted throughout the year. This introduced and very invasive reptile is a popular pet but, because of illegal abandonment, has managed to find its way into virtually every fresh water pond in Bermuda.



Predacious Diving Beetle
Thermonectus ornaticollis

NATIVE



Blue Dasher Dragonfly
Pachydiplax longipennis

NATIVE



Marine/Cane Toad
Bufo marinus

INTRODUCED



Eastern Mosquito Fish
Gambusia holbrooki

INTRODUCED

The Red-eared Slider



Red-eared Slider
Trachemys scripta elegans

INTRODUCED
INVASIVE

The **Red-eared Slider** (*Trachemys scripta elegans*), also known as the Red-eared terrapin, a fresh water terrapin is abundant in the pond and in a full range of sizes attesting to local breeding. Red-eared Sliders have devastating impacts on pond ecosystems because they eat almost anything including water plants, molluscs, insects and small fish. In Bermuda they eat the **Killifish** (*Fundulus bermudae*) and the **Mosquito Fish** (*Gambusia holbrooki*) which keep the mosquito numbers down. This has serious implications for human health because of mosquito-borne disease and general wellbeing. Like all reptiles, Red-eared Sliders are cold blooded, so they must pull themselves out of the ponds and bask in the sun to warm up their bodies so they can properly digest their food. Unfortunately one of the Sliders preferred basking places is on top of the

water level nests of wetland birds such as the **American Coot** (*Fulica americana*) and **Common Moorhen** (*Gallinula chloropus*). Sliders are known to crush bird eggs in this way; they also have been known to eat the chicks. It is clear that with no predators to keep the population in check, the Red-eared Sliders are significantly upsetting the ecology of Bermuda's ponds.

Most of the Red-eared Sliders in Bermuda's parks and nature reserves were released there by pet owners who no longer wanted them. A total of 523 Red-eared Sliders were removed from the pond at Somerset Long Bay East and West Nature Reserve from 2006-2010. If you no longer want your terrapin, make the responsible choice and have it put down by your veterinarian or take it to the Department of Conservation Services at 'Shorelands' located adjacent to the Bermuda Aquarium Museum and Zoo parking area.

The Pond Edge

Plants on the pond edge provide critical habitats for the animals and often help filter run-off pollutants in the pond.



Umbrella Sedge
Cyperus alternifolius **INTRODUCED**



Sheathed Paspalum Grass
Paspalum vaginatum **NATIVE**



Morning Glory
Ipomoea indica **INTRODUCED INVASIVE**



Capeweed
Lippia nodiflora **NATIVE**

Pond Edge Plant Life

- The **Sheathed Paspalum** (*Paspalum vaginatum*) occurs in patches, the **Umbrella Sedge** (*Cyperus alternifolius*) is common in clumps around the edges and the **Seaside Daisy** (*Wedelia trilobata*), and **Capeweed** (*Arctotheca calendula*) form fringing mats around the pond.
- **Cattail** (*Typha angustifolia*), **Great Bulrush** (*Scirpus validus*), **Hedge Hyssop** (*Gratiola officinalis*), **Water Hyssop** (*Bacopa monnieri*) and a **Cypress** have colonised the pond since it was restored by excavation. The Cattail had to be culled out because it is so aggressive in freshwater marshes that it would quickly fill all the open water.
- The **Morning Glory** (*Ipomoea indica*), another invasive, is challenging to control.

BLACK Black Mangrove, *Avicennia germinans* **NATIVE**



Seed



Leaf & flower



Pneumatophores

RED Red Mangrove, *Rhizophora mangle* **NATIVE**



Propagule



Leaf & flower



Prop roots

MANGROVES

Mangroves are important worldwide as sheltered habitats for invertebrates, as nurseries for young fish and in the prevention of coastal erosion. The two types seen here are Red Mangrove and Black Mangrove.

Plant Life

The vast majority of flora on the island is comprised of species introduced by humans and which have become naturalised or invasive. This nature reserve has been restored to emphasise the original native and endemic flora which characterised Bermuda before human settlement. Native species are those which colonise an area without human aid, arriving by natural dispersal from birds, wind and sea currents long before human settlement. Native species which have been reproductively isolated long enough to have evolved into a unique species with unique characteristics are distinguished as endemic. Both natives and endemics have played important roles in Bermuda's natural environment as well as its social and economic history.

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**Know
Your
Terms**

Bermuda's Trees



Bermuda Cedar
Juniperus bermudiana **ENDEMIC**



Palmetto
Sabal bermudana **ENDEMIC**



Olivewood
Cassine laneana **ENDEMIC**

Coastal Plants

The native plants have adapted unique features to survive harsh coastal conditions – poor soil and exposure to sun, winds and salt spray. **Spanish Bayonet** and **Briar Bush** also serve as effective barrier hedges. The **Tamarisk** was introduced as a windbreak and is common along the North Shore.



Buttonwood
Conocarpus erectus NATIVE



Tassel Plant
Suriana maritima NATIVE



Coast Sophora
Sophora tomentosa NATIVE

Woody Shrubs

These are still common in some areas and where present are an indication of land that has remained relatively undisturbed by man over the centuries.



Jamaica Dogwood
Dodonaea viscosa NATIVE



White Stopper
Eugenia axillaris NATIVE



Forestiera
Forestiera segregata NATIVE

Shrubs · Grasses & Sedges

These low-growing plants include the spring-flowering endemics, **Bermudiana**, **Darrell's Fleabane** and **Bermuda Sedge**, and the native **Sheathed Paspalum Grass**.



Bermudiana
Sisyrinchium bermudiana ENDEMIC



Darrell's Fleabane
Erigeron darrellianus ENDEMIC



Sheathed Paspalum Grass
Paspalum vaginatum NATIVE

Bird Life

The freshwater pond with its muddy margins and vegetated edges provides a habitat for many species of birds associated with water. The surrounding trees and bushes provide habitat for a variety of perching birds. Freshwater is a scarce and declining habitat in Bermuda and so the pond acts as a magnet for birds. Because of its northwestern location and inviting features, the open spaces bordering Somerset Long Bay provide the first landing for migrant birds. This reserve is crucial to their survival.

RESIDENT: A bird that nests in Bermuda and does not make seasonal journeys off-island

MIGRANT: A bird that makes regular seasonal journeys to Bermuda from elsewhere for the purpose of feeding or breeding

VAGRANT: A bird rarely seen in Bermuda, probably blown off course

ENDEMIC: A native species which has been isolated in Bermuda long enough to have evolved into a unique species.

Know Your Terms

Winter

In the winter, the resident **Mallards** are joined by other wildfowl including **Blue-winged Teal** and **Ring-necked Ducks**. All of the **Heron** and **Egret** species are regular visitors. **Least Bittern** and **American Bittern** are not uncommon and, along with **Sora** and **Wilson's Snipe**, are easily disturbed and so tend to hide. The **Northern Waterthrush** and **Common Yellowthroat** are found on the pond's edge while **Indigo Buntings** are frequent visitors to the longer grasses.



Mallard **RESIDENT**
Anas platyrhynchos



Blue-winged Teal **MIGRANT**
Anas discors



Least Bittern **MIGRANT**
Ixobrychus exilis



Sora **MIGRANT**
Porzana carolina



Indigo Bunting **MIGRANT**
Passerina cyanea



Great Blue Heron **MIGRANT**
Ardea herodias

Spring

Few spring migrants are recorded, but you may be lucky enough to see a **Purple Gallinule**. **Pied-billed Grebes** sometimes breed in the early spring, while **Mallards**, **American Coot** and **Common Moorhen** also breed in the spring and early summer.



Purple Gallinule **MIGRANT**
Porphyryla martinica



Pied-billed Grebe **RESIDENT**
Podilymbus podiceps



Common Moorhen **RESIDENT**
Gallinula chloropus

Fall

The greatest number of species can be recorded during the fall months when migrants such as **Shorebirds**, **Cuckoos**, **Flycatchers**, **Vireos** and **Warblers** are passing through. This is the best time of the year to observe shorebirds around the edge of the pond. As many as 20 shorebird species may be recorded in any year, including **Yellowlegs** and a variety of **Sandpipers**. This is one of the best places to see a **Louisiana Waterthrush**, a very scarce warbler which visits in August.



Yellow-billed Cuckoo **MIGRANT**
Coccyzus americanus



Wilson's Snipe **MIGRANT**
Gallinago delicata



Solitary Sandpiper **MIGRANT**
Tringa solitaria



Common Yellowthroat **MIGRANT**
Geothlypis trichas



Greater Yellowlegs **MIGRANT**
Tringa melanoleuca



Louisiana Waterthrush **MIGRANT**
Seiurus motacilla

Breeders & Rarities

This nature reserve also supports resident breeding birds such as the **Grey Catbird**, **Northern Cardinal** and **European Goldfinch** as well as Bermuda's only endemic land bird, the **White-eyed Vireo** or **Chick-of-the-village**. Recent rarities to the pond have included **Little Egret**, **Tufted Duck**, **Hudsonian Godwit** and **Ruff**.



Grey Catbird **RESIDENT**
Dumetella carolinensis



Bermuda White-eyed Vireo **ENDEMIC**
Vireo griseus bermudianus



Hudsonian Godwit **VAGRANT**
Limosa haemastica

Shorebirds



14" TALL

Greater Yellowlegs **MIGRANT**
Tringa melanoleuca



10-11" TALL

Lesser Yellowlegs **MIGRANT**
Tringa flavipes



Solitary Sandpiper **MIGRANT**
Tringa solitaria



Spotted Sandpiper **MIGRANT**
Actitis macularia



Semipalmated Sandpiper **MIGRANT**
Calidris pusilla



Least Sandpiper **MIGRANT**
Calidris minutilla



Pectoral Sandpiper **MIGRANT**
Calidris melanotos



Short-billed Dowitcher **MIGRANT**
Limnodromus griseus



Wilson's Snipe **MIGRANT**
Gallinago delicata

Waders



Pied-billed Grebe **MIGRANT**
Podilymbus podiceps



American Bittern **MIGRANT**
Botaurus lentiginosus



Least Bittern **MIGRANT**
Ixobrychus exilis



Great Blue Heron **MIGRANT**
Ardea herodias



Great Egret **MIGRANT**
Ardea albus



Snowy Egret **MIGRANT**
Egretta thula



Little Blue Heron **MIGRANT**
Egretta caerulea



Tricolored Heron **MIGRANT**
Egretta tricolor



Cattle Egret **MIGRANT**
Bubulcus ibis



Green Heron **RESIDENT**
Butorides virescens



Yellow-crowned Night-Heron **RESIDENT**
Nyctanassa violacea



Sora **MIGRANT**
Porzana carolina

Water Birds



Mallard RESIDENT
Anas platyrhynchos



Blue-winged Teal MIGRANT
Anas discors



Green-winged Teal MIGRANT
Anas carolinensis



Hooded Merganser MIGRANT
Lophodytes cucullatus



Ring-necked Duck MIGRANT
Aythya collaris



Sora MIGRANT
Porzana carolina



Purple Gallinule MIGRANT
Porphyrio martinica



Common Moorhen MIGRANT
Gallinula chloropus



American Coot MIGRANT
Fulica americana



Lesser Scaup MIGRANT
Aythya affinis



Pied-billed Grebe RESIDENT
Podilymbus podiceps



Red-breasted Merganser MIGRANT
Mergus serrator

Glossary

Abundant: present in great quantity; more than adequate; oversufficient

Acquired: to come into possession or ownership

Anoxic: lacking oxygen

Biodiversity: the number of different species present at a location

Brackish: a mix of fresh and salt water

Calcareous: containing or composed of calcium

Campaign: a systematic course of aggressive activities for a specific purpose

Colonise: The spreading of species into new areas

Community: a naturally occurring group of organisms

Conservationist: a person who advocates or strongly promotes preservation and careful management of natural resources and the environment

Development: the act or process of growing or progressing

Dominant: the most important organism in a community. Usually taken as the one contributing the greatest biomass

Domination: the act of ruling or taking over, controlling

Dwindle: to become smaller and smaller; to waste away; shrink

Earmarked: set aside for a specific purpose, use or recipient

Ecology: the external surroundings in which a plant or animal lives which tend to influence its development and behaviour

Ecosystem: a system involving the interactions between a community and its non-living environment

Endangered: threatened with extinction

Endemic species: a native species which has been isolated long enough to have evolved into a unique species

Erosion: the process by which the surface is worn away by the action of water, wind, waves etc.

Excavate: to make a hole or cavity by removing material

Freshwater lens: layer of fresh groundwater that floats on top of denser saltwater. It arises when rainwater seeps down through a soil surface and then gathers over a layer of seawater at or down to about five feet below sealevel

Habitat: a small area of environment where animals live

Introduced species: a species transferred to a new location by man, either accidentally or on purpose

Invasive: spreads aggressively by itself

Migratory/Migration: going from one country, region, or place to another

Native species: a species which arrived in a new area by natural means and subsequently reproduced and survived

Policy: a course of action or procedure adopted and pursued by an organisation, usually Government

Pooled resources: to put into a common stock for a common interest

Predator: any organism that exists by preying upon other organisms

Replicate: to repeat, duplicate, or reproduce

Reproduction: the process by which new 'offspring' individual organisms are produced by their 'parents'

Restore: to bring back into existence or use, to a former or original condition; to bring back to a state of health or vigour

Salinity: the total dissolved salt content of sea water

Susceptible: capable of being affected by some influence or agency

Threat: an indication of warning or probable trouble

Windbreak: a structure, wall or growth of trees serving as a shelter from the wind

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- For more information on educational tours and activities see the full Teacher Resource Guide at www.bnt.bm