

ENVIRONMENTAL STATEMENT
VOLUME 4 – A14.2 COMPARATIVE ASSESSMENT OF RUPERT’S BAY
AND PROSPEROUS BAY AS POSSIBLE
SITES FOR THE PROPOSED WHARF
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A14.2 COMPARATIVE ASSESSMENT OF RUPERT'S BAY AND PROSPEROUS BAY AS POSSIBLE SITES FOR THE PROPOSED WHARF

14.1 INTRODUCTION

This Appendix provides information on the comparative assessment of the two sites that were originally identified for the development of Marine Facilities in support of the Air Access Project and the more detailed assessment that has been undertaken for the selected option. At the commencement of the feasibility studies, the option to site the construction wharf and/or an in-shore sea rescue facility at Prosperous Bay was being considered. The alternative option for wharf expansion lay at Rupert's Bay.

As the studies progressed, it was clear that the potential impacts that would arise at Prosperous Bay, area of significant ecological and landscape importance, would be considered to be major and adverse. In view of this, and from the conclusion of the regulator that the siting of the in-shore sea rescue lifeboat at James Bay or Rupert's Bay would be satisfactory, further assessment was undertaken at Rupert's Bay as the selected option for development.

14.2 APPROACH TO COMPARATIVE ECOLOGY SURVEYS

Coastal waters at the two proposed sites, Rupert's Bay and Prosperous Bay, were surveyed briefly by snorkelling for around 15 - 20 minutes with notes made on the nature of the shallow-water, sub tidal substrate and the general nature of the plant and animal communities present. Habitats of the adjacent shore were classified according to the nature of the plant communities and substrate types.

Following the identification of Rupert's Bay as the preferred option for development, a more detailed assessment was undertaken of the conditions at Rupert's Bay by means of a bathymetric survey. An ecology study formed part of this assessment and comprised a fish survey, a survey of the benthic (sea-bed) communities and a turtle survey, undertaken in November and December 2006 by staff of the Fisheries Directorate of the SHG's Agriculture and Natural Resources Department.

Selected transects were determined so that a representative sample of the area was covered in the survey. Transects were determined by using the maps produced by the bathymetric scans. At each transect, the GPS location was recorded, along with depth and environmental parameters including sea temperature, time, sea state, swell height, cloud cover and visibility.

Two divers using SCUBA laid a 50m weighted transect line on the seabed. Using underwater boards and prepared recording sheets, divers recorded target species encountered 2m either side of the transect line and common and endemic species. For target species, estimated length of each fish encountered was recorded. For common and endemic species, abundance figures were used to determine the estimated number along each transect line.

For the benthic survey a weighted quadrat was placed at 10m intervals along each transect line. An underwater video camera was then used to video each quadrat and the images subsequently analysed on computer. At each point of the quadrat (which was split up into 10cm intervals), the benthos was recorded i.e. feather star, turf algae, etc and percentage cover was established. In addition, random sampling of invertebrates and other marine animals actually under boulders, etc was carried out along the transect line.

Turtle sightings (and any other marine sightings) were made by surface scans of the area by an observer situated from 1pm to 4pm at Rupert's Jetty. Using binoculars, the observer scanned the area and recorded time, species (if known) and number of turtles seen. Environmental parameters were recorded every fifteen minutes including sea state, swell height, cloud cover and visibility.

14.3 FINDINGS OF THE COMPARATIVE ECOLOGY ASSESSMENT

14.3.1. Background

St Helena's coastline presents a predominance of sheer rocky, sea cliffs, wave-cut rock reefs and shelves with occasional offshore stacks inhabited by nesting seabirds. There are very few beaches and these are largely formed from cobble deposits. The island, particularly on the south and eastern shores is subject to a heavy sea swell from the prevailing winds though there are records of occasional high wave action from the north, considered to result from intense storms in the north Atlantic (Ashmole & Ashmole 2000). The tidal range is a little over one metre between mean water levels for high and low spring tides.

The waters of the neritic zone (i.e. over the relatively narrow inshore shelf around St Helena) are less than 300 metres deep but beyond this the seabed descends sharply to depths well in excess of 4000 metres. The coastal waters of St Helena therefore present an isolated marine habitat similar to the terrestrial habitats and a number of marine animals and plants are similarly found nowhere else or are limited to St Helena and Ascension Islands. Of the 10 species of endemic fish, four are typical of shallow inshore waters and are considered common around the coastal rock and boulder shore habitats of St Helena. These species are the St Helena Gregory, the St Helena damselfish, the St Helena wrasse, or greenfish, all found from the shores down to 35 metres depth, and Springer's blenny often found in rock pools. The remaining endemic species are found in deeper waters of the neritic, below 35 metres and some may now be rare, known from recent historical observations or single specimens.

The seabed of the inshore neritic zone have been surveyed by the Directorate of Fisheries by remote sensing to determine the nature of the habitats present. Habitats range from solid bedrock, to boulder deposits, to sandy substrates with intergrades between and mosaics formed from these substrates. In contrast, there is little survey information on the inshore fish species around the coastal waters of St Helena though a species list of such fish has been compiled for the waters around James and Rupert's Bay. Commercial fisheries records give an indication of the pelagic species in the open waters. This group will not come under any direct influence from the airport development and are not considered further in this section.

14.3.2. Prosperous Bay

14.3.2.1 The Beach and Landward Habitats

The bay consists of an arc-shaped shore with a storm ridge of large cobbles. Wave-cut rocky reefs are present on either side of the bay with abundant crabs, small “winkle” snails, encrusting red coralline algae and small corals. The cobbles on the shore become progressively smaller to the west of the bay forming shore deposits of coarse gravel. Sea conditions appear to be less sheltered than at Rupert’s Bay and there is appreciable wave action upon the shore. The cobble deposits are also suggestive of occasional intense wave action.

Prosperous Bay Beach is where the main watercourse following Fisher’s Valley (and several smaller ancillary water channels) flows into the sea. Much of the streambed in Fisher’s Valley is dominated by thatching grass (*Pennisetum macrourum*) which extends up the valley gorge in a narrow sward. The occasional creeper is also present. The beach area is a combination of the steep cobble foreshore with a sandy hinterland dominated in various sections by samphire with patches of babies’ toes.

The sandy substrate is considered to be suitable for nesting turtles although no evidence for turtles breeding at this site was found to confirm this. Under the OTEP funded STH001R Seabird and turtle monitoring project information is being collated on turtle sightings. Turtles are frequently seen in St Helena waters and mating has been observed but no contemporary turtle nest sites have been found (turtles frequently nested on Sandy Bay up to about 45 years ago and elsewhere before that). Prosperous Bay’s remote location means that there are limited opportunities for sightings and most sightings of turtles have been recorded in James and Rupert’s Bays (Emma Bennett, pers. com).

Eroded terraces of fine dirt and silt extend from the bottom of Prosperous Bay Beach valley towards the beach. These are the most productive sites for bird remains and so represent an important palaeontological site.

The slopes of the Prosperous Bay Beach/Fisher’s Valley are steep to sheer with significant and spectacular geological features. The haul road option extends south-east up a lateral valley. In many areas the valley walls are highly mobile with extensive erosion features. As with Dry Gut, there is limited vegetation present with samphire being the most prevalent species and French grass rare. Other species include wild tobacco and saltbush. In the uppermost section of this steep valley, the Ashmole & Ashmole (2004) found a small whorl snail, *Nesopupa turtoni*, a species only recorded from previous fossil records on St Helena.

In addition, sampling for invertebrates at Prosperous Bay Beach has recorded a new species of bristletail (Ashmole & Ashmole 2004).

14.3.2.2 Marine Habitats

There are no previous survey records of marine wildlife available for this location. The seabed habitat survey by the Directorate of Fisheries has recorded bedrock boulders with sand, coarse sand in ripples and sand with short algal turf in the area of Prosperous Bay.

Sub-tidal substrates are, like the shore, dominated by deposits of large cobbles covered with a fine red/brown algal turf and often, in the clear-water conditions, numerous patches of *Favia* corals. Crinoids (the feather star, *Tropiometra carinata*) are common. Fish appear particularly numerous and varied. The voids between the large rounded cobbles provide shelter and refuge for young fish and the bay probably provides a good nursery area for a number of fish species. Species noted during the initial surveys in November 2005 are listed in the Table below. Two skeletons of large triggerfish, probably *Canthidermis sufflamen*, were found on the shore. Octopus and a shark species, probably a mako shark, had also recently been seen in the bay.

14.3.3. Rupert's Bay

14.3.3.1 Rupert's Bay

Rupert's Bay in the north of the island provides a sheltered anchorage to the east of James Bay. It has developed as the island's industrial area with a jetty serving a fish factory and a seawall and boom associated with the oil storage facility for the island's power station. The shore is reinforced by rock-fill breakwaters though a small cobble and pebble beach remains with a very small area of exposed sand which provides one of the few safe locations for swimming in the sea on the island. There has been a rapid shoreline colonisation of periwinkles, limpets, crabs, and leafy green algae on the rock-fill breakwater which was completed in June 2004.

Sea-bed habitats below mean low water out to around 5 metres depth are boulders in a sandy matrix. In shallower water under the influence of wave action closer to the shore, sands and silts are mobilised into the water column. Beyond, in slightly deeper water are areas of rippled sandy shoals. Rock ledges are locally present by the shore. The permanently submerged rocks and boulders are covered with a turf of fine brown algae, with patches of red coralline algae. A species of leafy green alga occupies the zone around mean water and is exposed at lower tide levels. On the rocks in deeper water, beyond the zone where wave action readily suspends sand particles, are small colonies of an encrusting colonial coral *Favia fragrum*.

During the preliminary comparative surveys of Prosperous and Rupert's Bays, the following fish species were noted

Table 1 Fish species noted during preliminary surveys at Prosperous and Rupert's Bay

Species	English name	Prosperous Bay	Rupert's Bay
<i>Acanthurus bahianus</i>	Ocean surgeon	Numerous	Numerous over rocks/boulders
<i>Chaetodon sanctaehelenae</i>	St. Helena butterfly fish	Numerous to abundant shoals. Endemic to St Helena & Ascension	Numerous shoals over rocks/boulders. Endemic to St Helena & Ascension
<i>Thalassoma sanctaehelenae</i>	St Helena wrasse	Numerous. Endemic to St. Helena	Frequent over rocks. Endemic to St. Helena
<i>Sparisoma strigatum</i>	Strigate parrotfish	Frequent	Occasional over rocks

Species	English name	Prosperous Bay	Rupert's Bay
<i>Canthigaster sanctaehelenae</i>	St Helena pufferfish	One or two fish seen.	One or two fish seen over rocks
<i>Aulostomus strigosus</i>	Trumpet fish	A few fish seen	One or two fish seen over rocks
<i>Diplodus sargus</i>	Seabream	Frequent	Small numbers over rocks
<i>Stegastes sanctaehelenae</i>	St Helena Gregory	Frequent. Endemic to St Helena	
<i>Trachenotus ovatus</i>	Silverfish	Occasional	
<i>Epinephelus adcionis</i>	Rock Hind	Occasional, young fish frequent in cavities between boulders	
<i>Holocentrus adcionis</i>	Squirrelfish	Occasional	
<i>Abudefduf saxatilis</i>	Sergeant major	Frequent	
<i>Acanthostracion notaca</i>	Cowfish	Occasional	
<i>Scorpaena plumieri</i>	Gurnard	Occasional	
<i>Bothus sp.</i>	Flounder		One fish noted partially hidden in sandy shoals
<i>Mulloidichthys martinicus</i>	Yellow goatfish		A few fish over the sandy shoals
Total Species Noted		14	9

The Directorate of Fisheries holds records for the fish species seen in the shallow waters of James Bay and Rupert's Bay. Around 25 species are commonly recorded from these areas.

Following the results of the comparative habitat appraisal at Prosperous and Rupert's Bays, further survey was undertaken at Rupert's Bay, being the favoured location for the development of the port. The SCUBA habitat survey of transects across the bay has shown the dominant habitat type to be sand sediments with the second most abundant substrate type being bare rock often with a fine coating of sand. These habitats showed a very low diversity of marine life. Together these substrates accounted for between 80-90% of the habitat types present along most transects with very few areas of scattered reef with some slight increase in the diversity of benthic organisms.

During one afternoon of the two dedicated to the turtle survey, hawksbill turtles (*Eretmochelys imbricata*) were encountered periodically. Occurrence of hawksbill turtles in Rupert's Bay could be related to offloading of fishing boats, as this is when the turtles are seen most frequently. From this limited sampling period and the results of two years of data from a marine sightings scheme, there appear to be frequent turtle sightings in the Rupert's Bay area.

Full details of the survey results are given in the appended report: Final Report on Marine Ecology Survey at Rupert's Bay (Bennett, ANRD, 2007), Volume 4, Appendix 14.3.