

**ENVIRONMENTAL STATEMENT  
VOLUME 4 - A14.3 FINAL REPORT ON MARINE ECOLOGY SURVEY AT  
RUPERT'S BAY, ST HELENA IN CONJUNCTION WITH THE AIR  
ACCESS PROJECT, JANUARY 2007**



# **Final Report on Marine Ecology Survey at Rupert's Bay, St Helena in conjunction with the Air Access Project**



Prepared by:  
Emma L Bennett  
Marine Scientific Officer  
Fisheries Section  
Agriculture and Natural Resources Department  
St Helena Island  
11<sup>th</sup> January 2007

## **Table of Contents:**

Background .....	5
Methods .....	5
1. Fish survey .....	5
2. Benthic survey.....	5
3. Turtle sightings (and any other marine sightings).....	6
Personnel involved .....	6
Results .....	6
1. Fish survey .....	6
Figure 1.....	7
Figure 2.....	7
Figure 3.....	8
2. Benthic survey.....	8
Figure 4.....	8
Table 1.....	9
3. Turtle sightings (and any other marine sightings).....	9
Limitations .....	9
Conclusion.....	9
Appendices .....	10
Appendix I – Tritan Survey bathymetric map of benthos .....	10
Appendix II – Forms for fish counts – target species .....	11
Appendix III – Forms for fish counts – endemic and common species .....	12
Appendix IV – List of scientific names of fish .....	14
Appendix V – Form for Turtle Sightings .....	15
Appendix VI - Rough guide of transect locations .....	17

## BACKGROUND

The Fisheries Section of the Agriculture and Natural Resources Department (ANRD) was asked to conduct a marine ecology survey at Rupert's Bay, St Helena Island. The extent of the survey was such as to cover the area as detailed in the map opposite (Map projection using SHEIS GIS programme).

Equipment was purchased by Faber Maunsell Ltd and will be kept at the Access Office, having been on loan to ANRD for the duration of the survey and in future for any other relevant surveys.

Due to limited human resources within the Fisheries Section, it was established that help be sought from members of the local St Helena Diving Club (SHDC) and they would be paid by the Access Office.

Methodology was determined by past experience of personnel within the Fisheries Section, personnel from Faber Maunsell Ltd and assistance from Tritan Survey (who had conducted a bathymetric survey in Ruperts Bay).

Surveys were conducted on the 24<sup>th</sup> November and 11<sup>th</sup> December 2006

## METHODS

### 1. Fish survey

#### **Equipment:**

50m weighted transect line  
Underwater boards  
Underwater pencils  
Recording sheets  
GPS

#### **Method:**

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 Tritan Survey.

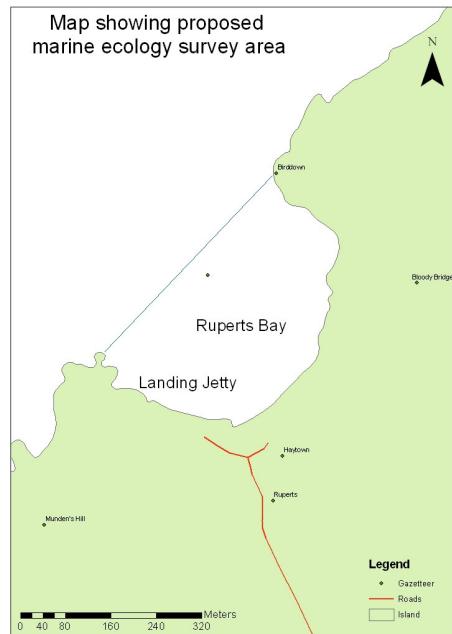
At each transect, the GPS location was recorded, along with depth and environmental parameters including sea temperature, time, sea state, swell height, cloud cover and visibility.

2 divers 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.

### 2. Benthic survey

#### **Equipment:**

2 1m<sup>2</sup> weighted quadrats  
1 underwater video camera and accessories



### **Method**

At each fish transect benthic quadrats were also conducted.

A weighted quadrat was placed at 10m intervals along each transect line. An underwater video camera was then used to video each quadrat. On completion of the benthic survey, the video was 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 to this, random sampling of invertebrates and other marine animals actually under boulders, etc was carried out on one transect line.

### **3. Turtle sightings (and any other marine sightings)**

#### **Equipment:**

1 clipboard

1 pencil

Predefined Recording sheets

Binoculars

### **Method**

An observer was 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.

## **PERSONNEL INVOLVED**

Personnel involved in the marine ecological survey included: Graham Sim, Diving Officer of the St Helena Diving Club and Michael Young, Coxwain of St Helena Diving Club boat. From the Agriculture and Natural Resources Department (ANRD), Emma L Bennett, Marine Scientific Officer; Denis Owen, Temporary Marine Assistant; and Dwayne-Eddie Joshua, Youth in Training from Social Security. William Latimer, Associate Director – Environment, Faber Maunsell also assisted in the methodology.

## **RESULTS**

### **1. Fish survey**

There were 4 transects conducted within the Ruperts Bay area. The reason for this was based on benthic composition after being shown maps produced by Tritan Survey who had previously completed a bathymetric survey at Ruperts. It was therefore agreed that there need only be surveys done within a limited area, as the benthos composition was the same on the “scattered reefs” and the composition of the majority of the area of Ruperts Bay is sand.

GPS positions were taken of each transect, however due to time constraints, a map has not been produced. A rough guide of location of transects can be found in appendix VI.

At each transect, depth remained fairly consistent varying from 3-5m. Visibility was quite poor at all transects being only 4-8m. Cloud cover varied from 2 oktas to 8 oktas. 4 transects were conducted over 2 days. On each occasion, one transect was conducted in mid morning,

and one early afternoon. It is not thought that time of day has any effect on fish seen. Sea temperature remained constant throughout with a temperature of 21°C. Sea state remained fairly constant being calm. This was due to personnel having to wait on sea conditions to be calm when there were periods of rough sea. Calm sea was needed due to the shallow working environment.

The graphs below show the species encountered at each site.

Figure 1.

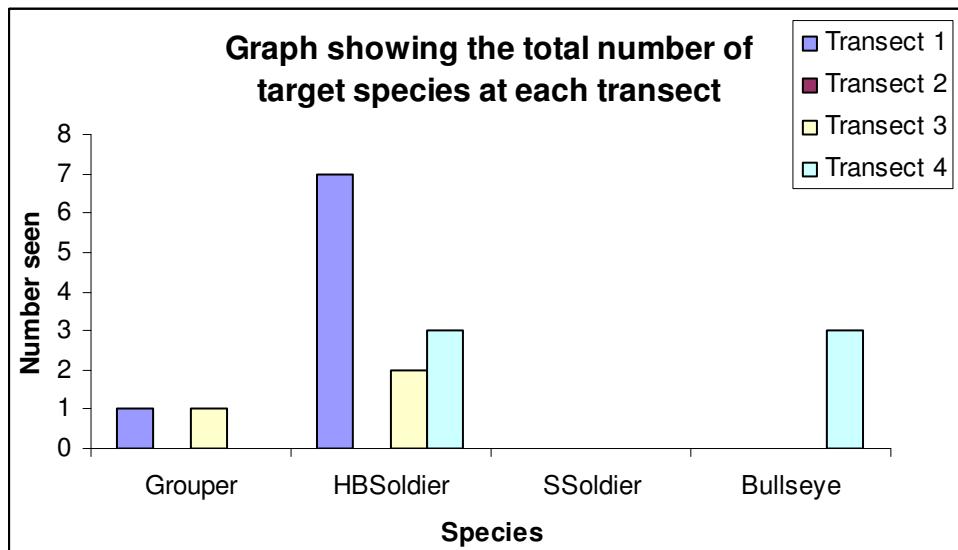


Figure 2.

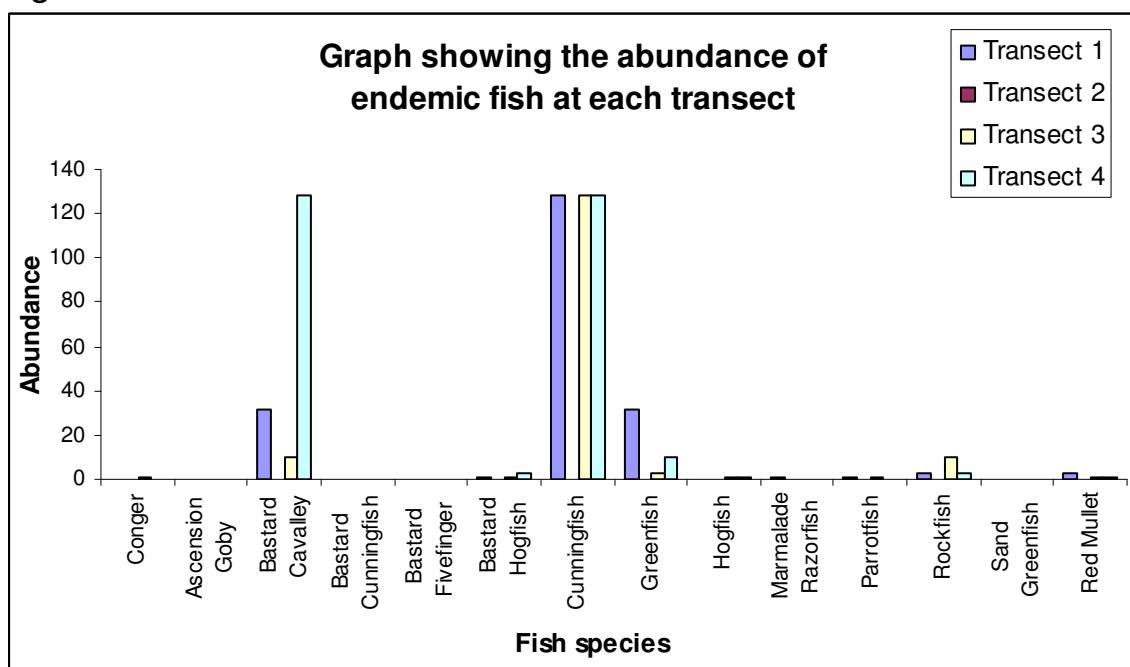
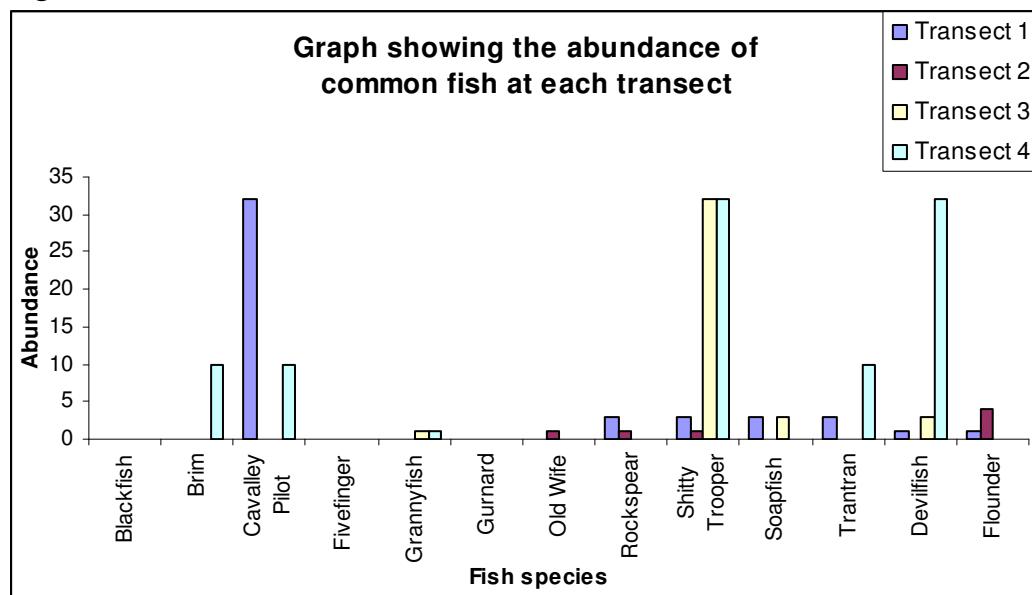


Figure 3.

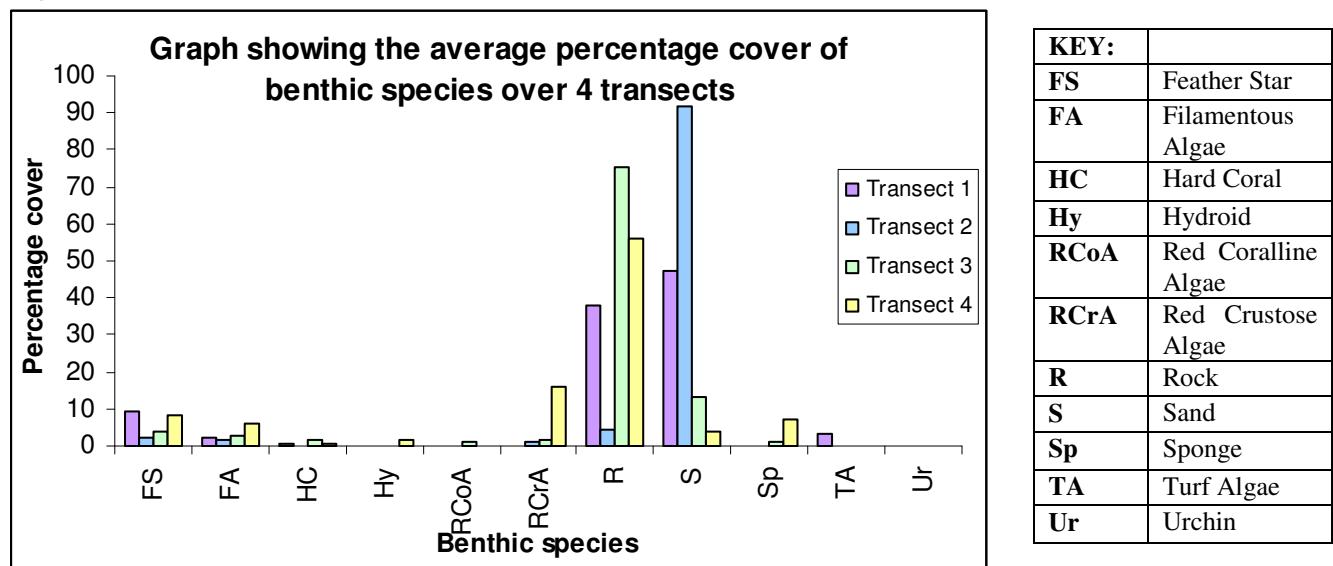


As can be seen from figures 1,2 and 3 above, abundance of fish species is not great per 50m transect. This is to be expected in an area where the benthic habitat is primarily sand and is related to the benthic survey (results below). At transect 4 there were 8 Cavally seen.

## 2. Benthic survey

6 quadrats were done at each transect site – at 10m intervals (inclusive of start and finish).

Figure 4.



As can be seen from the graph above, the majority of benthos cover is sand and bare rock (in this instance, “rock” is determined as bare rock, with a thin layer of sand). It was not possible to identify the benthos to species level.

A Shannon diversity statistic ( $H'$ ) was done to determine the statistical diversity between the 4 transects. The table below shows these results:

**Table 1.**

Table showing the difference in H' for the 4 transects (based on average percentage cover).

<b>H'</b> values			
Transect 1	Transect 2	Transect 3	Transect 4
<b>-1.1665</b>	<b>-0.3948</b>	<b>-0.9263</b>	<b>-1.4205</b>

This table shows that transect 4 had the highest diversity in comparison to transect 2. This agrees with the hypothesis that there is a much lower diversity in areas of sand than areas of “scattered reef”. This also correlates with fish abundance as described above. Elsewhere along the coast, turf algae is usually seen, however the majority of the rocks observed during the transect in Ruperts Bay were naked of anything other than a thin coat of sand.

In addition to the above mentioned benthic species, other species were also encountered along two of the transects namely, starfish (species unknown), sea worms (species unknown), sea cucumbers (species unknown), feather stars (species unknown) and sea crabs (species unknown).

### 3. Turtle sightings (and any other marine sightings)

There were 2 dedicated afternoons where observations were made. During this time Hawksbill Turtles *Eretmochelys imbricata* were encountered on one afternoon periodically. Occurrence of hawksbill turtles in Ruperts Bay could be related to offloading of fishing boats, as this is when the turtles are seen most frequently.

### LIMITATIONS

The main limitation of this survey was the unpredictable sea conditions. The area surveyed was in very shallow depths, close to shore and hence there needed to be almost no swell in order to conduct the surveys.

### CONCLUSION

As can be seen from the results above, both the fish and benthic surveys found that there is a low diversity in Ruperts Bay. The areas of scattered reef that were surveyed showed that there was some benthic life, however it was not substantial. In the survey that was conducted in the sand, this had hardly any marine life at all. It can therefore be assumed that due to the movement of the sea in the Ruperts Bay area, there is not much chance for organisms to establish themselves. This would account for the lack of turf algae growth on the rocks and the low diversity of fish species in relation to this.

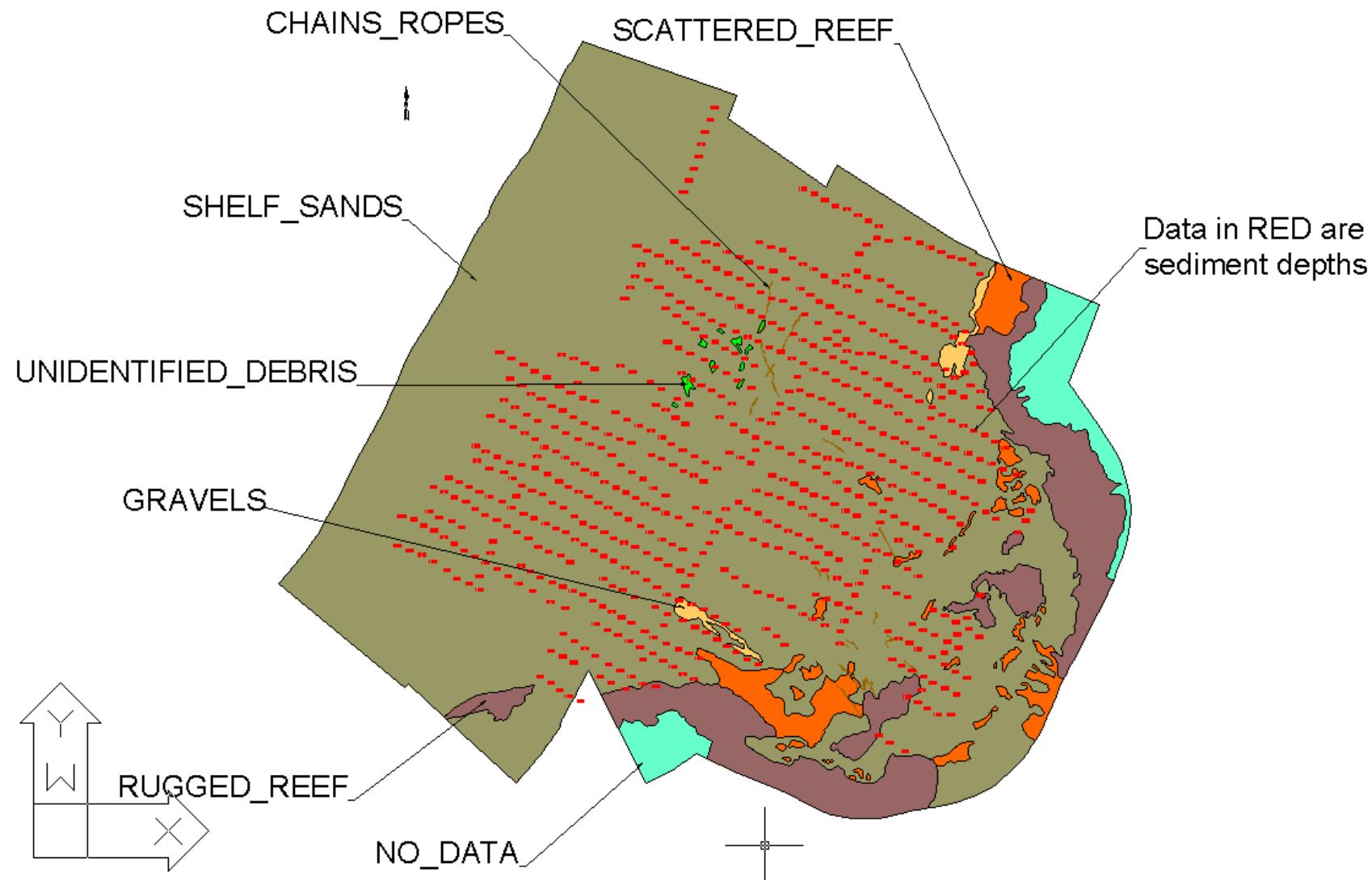
The change in substrate of the benthos had already been conducted by Tritan Survey.

There appears to be frequent turtle sightings in the Ruperts Bay area, both as a result of this survey and two years worth of a marine sightings scheme.

It can therefore be concluded that the surveyed area, which is a fair proportion of the area of Ruperts Bay, does not contain any marine life that cannot be found elsewhere along the coast of St Helena. It would however seem appropriate to put in some mitigation measure to take the turtle sightings into account.

## APPENDICES

### Appendix I – Tritan Survey bathymetric map of benthos



Appendix II – Forms for fish counts – target species

**Marine Ecological Survey at Ruperts Bay - Target Species Form**

**Site name:** ..... **Date:** .....

**GPS:** ..... **Depth:** ..... **Time:** .....

**Visibility:**..... **Cloud Cover:**..... **Sea Temp:**..... **Sea State:**.....

<b>Target species/ Estimated length</b>	<b>Grouper/Jack</b>	<b>Hardback Soldier</b>	<b>Softback/Bastard Soldier</b>	<b>Rock Bullseye</b>	<b>Conger (no. seen)</b>	<b>Crayfish (no. seen)</b>
1-10						
11-15						
16-20						
21-25						
26-30						
31-35						
36-40						
41-45						
45-50						

Appendix III – Forms for fish counts – endemic and common species

**Site name:**.....

**Date:**.....

**GPS:**.....

**Depth:**..... **Time:**.....

**Visibility:**..... **Cloud Cover:**.....

**Sea Temp:**..... **Sea State:**.....

<b>Endemic species Abundance Counts</b>	<b>1</b>	<b>2-4</b>	<b>5-16</b>	<b>17-64</b>	<b>65-256</b>
Ascension Goby					
Bastard Cavalley Pilot					
Bastard Cunningfish					
Bastard Fivefinger					
Bastard Hogfish					
Cunningfish					
Greenfish					
Hogfish					
Marmalade Razorfish					
Parrotfish/Canaryfish					
Rockfish					
Sand Greenfish					

**Marine Ecological Survey at Rupert's Bay - Abundance Species Form**

<b>Common species Abundance Counts</b>	<b>1</b>	<b>2-4</b>	<b>5-16</b>	<b>17-64</b>	<b>65-256</b>
Blackfish					
Brim					
Cavalley Pilot					
Fivefinger					
Grannyfish					
Gurnard					
Old Wife					
Rocksppear					
Shitty Trooper					
Soapfish					
Trantran					
Devilfish					

**Other fish species encountered:**

**Species name:**.....

**Species name:**.....

**Species name:**.....

**Species name:**.....

**Number seen:**.....

**Number seen:**.....

**Number seen:**.....

**Number seen:**.....

Red Mullet

--	--	--	--	--	--	--	--	--	--	--	--

## Appendix IV – List of scientific names of fish

Local common name	Scientific name
Ascension Goby	<i>Priolepis ascensionis</i>
Bastard Cavalley Pilot	<i>Stegastes sanctaeheleneae</i>
Bastard Cunningfish	<i>Chaetodon dichrous</i>
Bastard Fivefinger	<i>Chromis sanctaeheleneae</i>
Bastard Hogfish	<i>Canthigaster sanctaeheleneae</i>
Blackfish	<i>Melichthys niger</i>
Brim	<i>Kyphosus sectatrix</i>
Cavalley	<i>Pseudocaranx dentex</i>
Cavalley Pilot	<i>Chromis multilineata</i>
Conger	<i>Gymnothorax (Lycodontis) moringa</i>
Cunningfish	<i>Chaetodon sanctaeheleneae</i>
Devilfish	<i>Ophioblennius atlanticus atlanticus</i>
Fivefinger	<i>Abudefduf saxatilis</i>
Flounder	<i>Bothus mellissi</i>
Grannyfish	<i>Amblycirrhitus pinos</i>
Greenfish	<i>Thalassoma sanctaeheleneae</i>
Grouper/Jack	<i>Epinephelus adscensionis</i>
Gurnard	<i>Scorpaena plumieri</i>
Hardback Soldier	<i>Holocentrus adscensionis</i>
Hogfish	<i>Acanthostracion notacanthus</i>
Marmalade Razorfish	<i>Xyrichtys blanchardi</i>
Old Wife	<i>Diplodus sargus helenae</i>
Parrotfish/Canaryfish	<i>Bodianus insularis</i>
Red Mullet	<i>Apogon axillaries</i>
Rock Bullseye	<i>Heteropriacanthus cruentatus</i>
Rockfish	<i>Sparisoma strigatum</i>
Rocksppear	<i>Synodus synodus</i>
Sand Greenfish	<i>Xyrichtys sanctaeheleneae</i>
Shitty Trooper	<i>Acanthurus bahaianus</i>
Soapfish	<i>Rypticus saponaceus</i>
Softback/Bastard Soldier	<i>Myripristis jacobus</i>
Trantran	<i>Aulostomus strigosus</i>

## Appendix V – Form for Turtle Sightings

Marine Ecological Survey at Ruperts Bay - Turtle sightings form

## Turtle Effort sheet

Date: \_\_\_\_\_ Location: \_\_\_\_\_ GPSPosition: \_\_\_\_\_

Observer/s: \_\_\_\_\_ Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

Page Number: \_\_\_\_\_ Binoculars Used: \_\_\_\_\_

Data to be recorded every 15 minutes:

## Turtle Sightings sheet

Date: \_\_\_\_\_ Location: \_\_\_\_\_ GPSPosition: \_\_\_\_\_

Observer/s: \_\_\_\_\_ Start Time: \_\_\_\_\_ End Time: \_\_\_\_\_

Page Number: \_\_\_\_\_ Binoculars Used: \_\_\_\_\_

Data to be recorded whenever sighting a turtle:

## Appendix VI - Rough guide of transect locations

<b>Transect No.</b>	<b>GPS position</b>	<b>Rough location</b>
1	15°55.095'S 005°42.834'W	Near existing Jetty
2	15°55.014'S 005°42.684'W	East side on sand
3	15°54.836'S 005°43.077'W	From existing Jetty towards “beach area”
4	15°54.744'S 005°42.965'W	East side on rocks