

## Stage 2 Geography

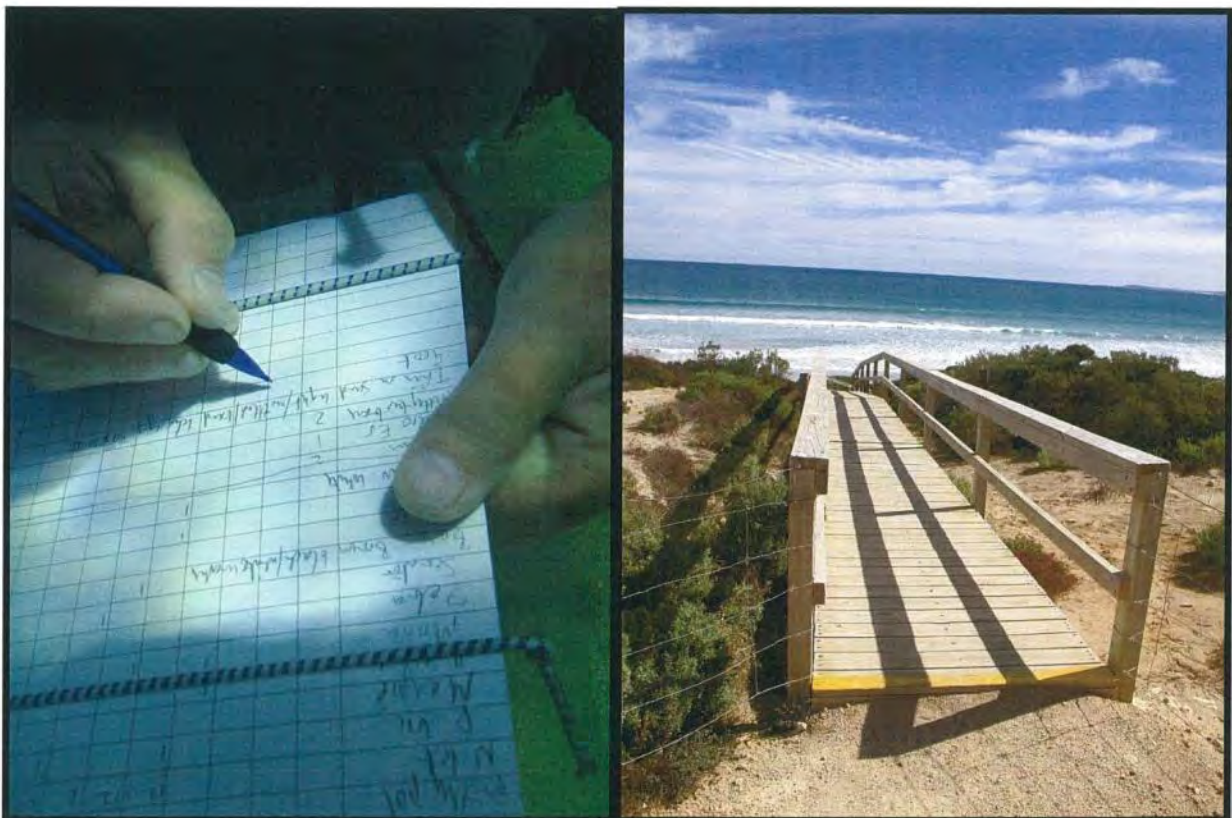
### Option Topic: Coasts

#### Individual Fieldwork Report

“How has the development of Scele Bay affected the  
Marine and coastal environment?”

**Sace No:**

**Word Count: 1755**



Illustrative example of application of the  
SACE Board's word count policy

## **Contents:**

<b>Intro.....</b>	<b>Pge 3</b>
<b>Location.....</b>	<b>Pge4</b>
<b>Location of fieldwork sites.....</b>	<b>Pge 5</b>
<b>Overview and Evaluation of Fieldwork.....</b>	<b>Pge 6</b>
<b>Results and Summary of Fieldwork.....</b>	<b>Pge 7</b>
<b>Recreational activity surveys.....</b>	<b>Pge 7</b>
<b>Marine Environment.....</b>	<b>Pge 8</b>
<b>Sand dunes Vegetative quadrants.....</b>	<b>Pge 12</b>
<b>Management.....</b>	<b>Pge 15</b>
<b>Summary.....</b>	<b>Pge19</b>
<b>Recommendations.....</b>	<b>Pge 19</b>
<b>Managements Recommendations.....</b>	<b>Pge 20</b>
<b>Conclusion.....</b>	<b>Pge 21</b>
<b>References.....</b>	<b>Pge 22</b>
<b>Figure List.....</b>	<b>Pge 23</b>

**Introduction:**

Housing development near coastal regions can have severe impacts on both the marine and terrestrial environment. The purpose of this investigation is to determine how the development of Sceale Bay has affected the marine and coastal environment and evaluate management strategies can be designed to protect it.

The Sceales Bay coastline is composed of sand dunes of approximately 20km, limestone cliffs and a reef 5 meters offshore located on the western side of the bay. These marine and terrestrial habitats are home to endangered species such as the Hooded Plover. The development of Sceale's Bay has attracted a huge influx of tourists during the warmer months (Nov- April) and so increased pressure on the environment and resources. My interest in and local knowledge of the marine environment motivated me to investigate the environment of Sceale Bay.

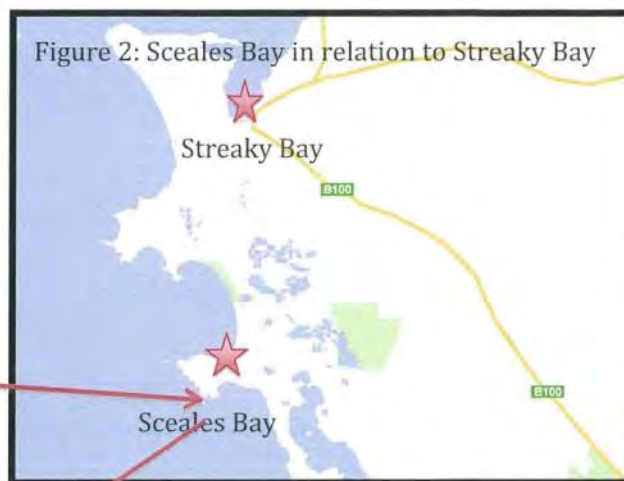
**Hypothesis:**

"Development is causing severe impacts on the marine and terrestrial coastal environment of Sceales Bay."

## Location:

The closest major township to Sceales Bay (see figure one) is Streaky Bay located 30kms directly north (see figure two). In relation to South Australia, Sceales Bay is situated on the Eyre Peninsula about 800km west of Adelaide (see figure three). Sceales Bay has a permanent population of 30 residents, however during the summer months this population increases to approximately 390 (2006 census data.)

“Student provided an image of the township of Sceale Bay.  
Image removed due to copyright.”



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The information in the titles of the maps has already been introduced in the text.

**Figure 2:** [https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir\\_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl](https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl)

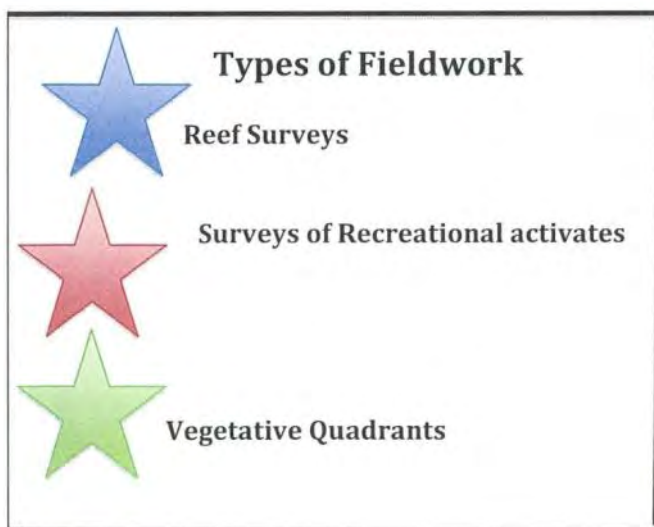
**Figure 3:** [https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir\\_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl](https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl)

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Footnotes are not included in the word count.

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Figure 4: Scales Bay Coastline, showing the location of Fieldwork sites.



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The key illustrates the locations shown on the aerial photograph.

**Table 1: Overview and Evaluation of Fieldwork**

Type of Fieldwork	Purpose	Evaluation
Reef Transect	To gain an insight on the health of fish and algae species. This will be to determine the level of biodiversity.	Useful as it allowed interpretation of the biodiversity and environmental health of area.
Interview <b>Robert Minnican- Friends of Sceales Bay (FOSB) advocate</b>	To gain local viewpoint of environment and the natural processes occurring along the coastline.	Gained an insight on The management Strategies that would best suit the environment.  Expert opinions enabled me to cross reference information provided to me by locals of the area and so verify information.
Surveying of Recreational Activities	To gain an insight on the recreational activities that may have an effect on the environment.	Provided information about what recreational activities are taking place and assessed how these activities were effecting the environment.
Vegetative quadrants of Sand dunes	To gain an insight of the main species of flora that inhabit the sand dunes and how it is distributed throughout the dunes.	Extremely valuable to determine the biodiversity.
Photography	To be able to provide evidence to support concepts and observations of the Sceales bay environment.	These photos can be used to support concepts in the report.

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The table contains new information and evaluation not previously presented in the body of the text.

## Summary of Fieldwork Results:

**Table 2: Surveys of Recreational activities on the 24<sup>th</sup> April**

Recreational Activity	Number or People	Notes
Cars in Boat Ramp	4	
Walking	4	
Swimming	/	
Cars on Beach	3	
Fishing	8	<b>They were fishing off the beach.</b>
Motorbike	/	

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**Table 3: surveys of recreational activities on the 27<sup>th</sup> April.**

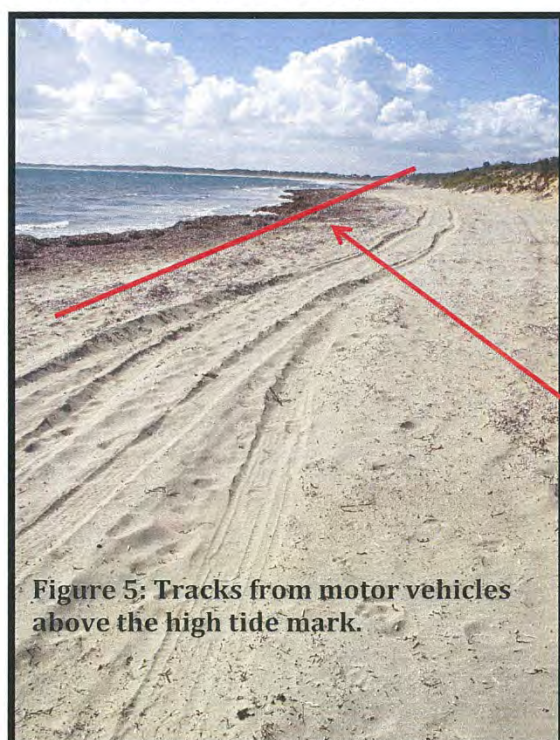
Recreational Activity	Number or People	Notes
Cars in Boat Ramp	6	
Walking	4	
Swimming	/	
Cars on Beach	2	
Surfing	7	<b>There was a surf school</b>
Motorbike	3	

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The survey results indicate that there are cars and often motorbikes on the beach. These have severe effects on the endangered bird species, "Hooded Plover." The Hooded Plover is migratory species and from March till August nests above the high tide mark on the Sceale Bay beach (Hooded Plover, n.d.). On the 27<sup>th</sup> of April there were in total 5 motor vehicles driving along the high tide mark of the beach. Figure 5 displays the tracks left on the beach. It is highly likely that the Hooded Plover nests could have been disturbed. Local, Robert

pointed out that this recreational activity is directly affecting the population of Hooded Plovers along this coastline ( , R 2013, pers. Comm., 24 April) Their declining population suggests the increase in beach vehicles usage along this part of the coastline.



**Figure 5: Tracks from motor vehicles above the high tide mark.**

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Illustration only

High tide mark.

## Reef transect:

To investigate the human impact on the marine environment of Sceales Bay reefs transect were completed in three locations across the bay. The number and size of fish species was recorded on a waterproof chart along a hundred meter line. Figure six and seven demonstrate this procedure. Also recorded on these dives was the range of algae species. From these results the biodiversity level of fauna and flora for each dive site was analyzed, see figure 8.

Figure 6: Diver following the 100 meter line

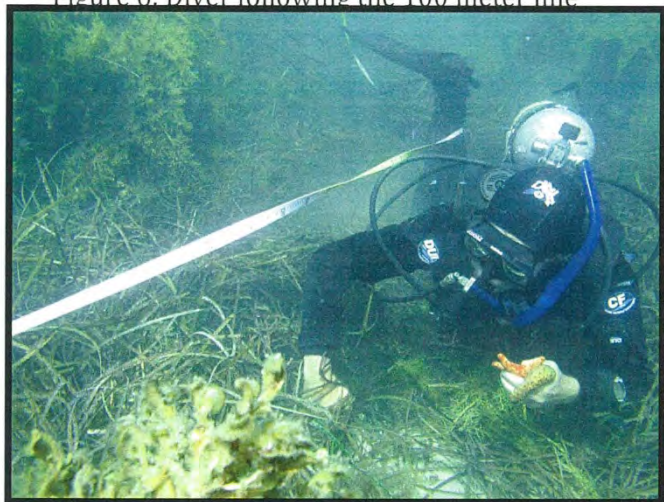


Figure 7: Diver using chart to record fish species.



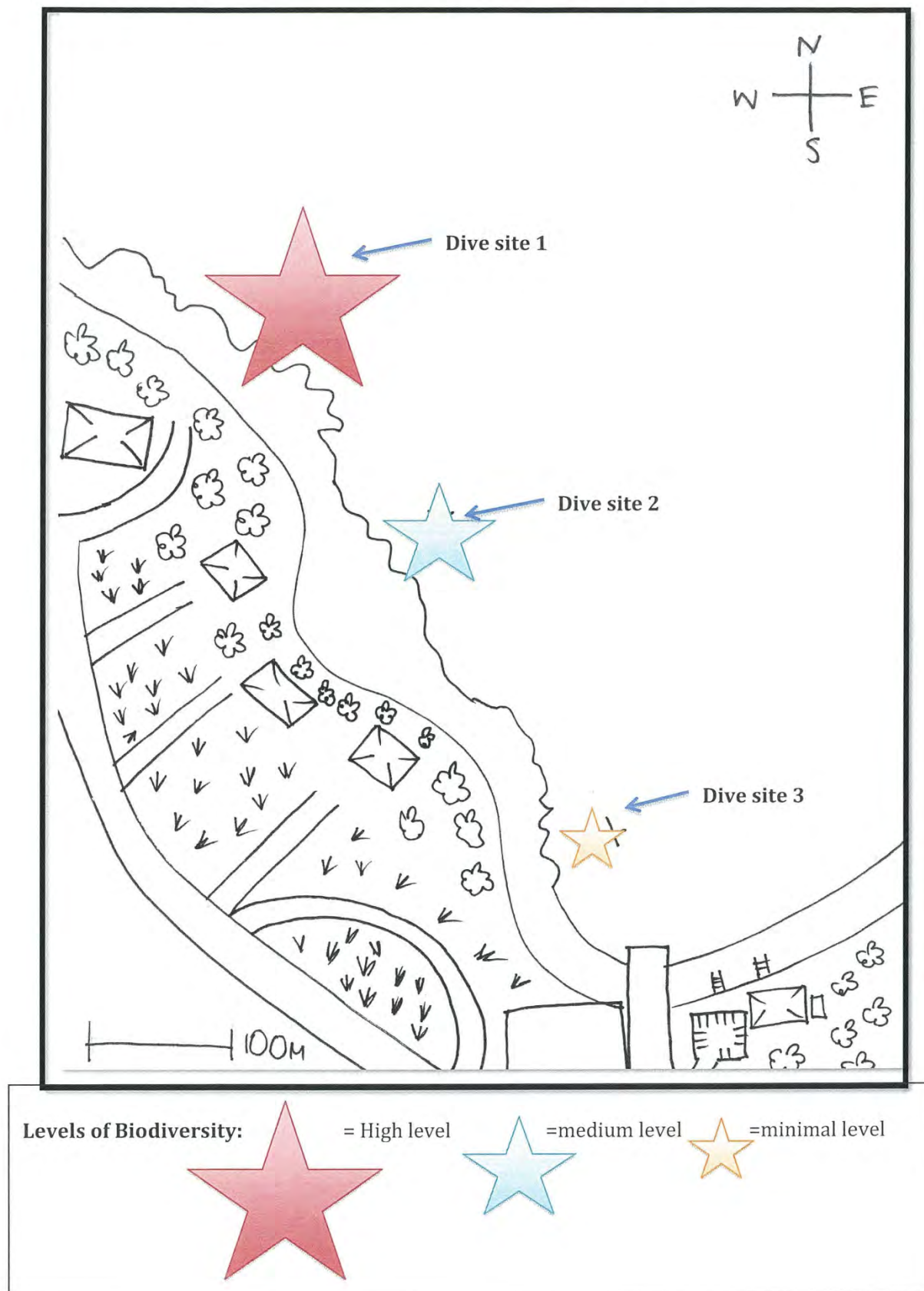
Table 4: Reef transects average results of all dive sites along the Sceales Bay Marine Environment.

Fish Species	5-15	16-25	26-35	36-45	46-55	TOTAL
Western Blue Gropper	22	6	4	1	1	34
Brown Spotted Wrasse	18	9				27
Banded Sweep	30	7	3			40
Blue throated Wrasse	14	6	2			22
Dusky Morwong		1	2	1		4
Luderick/Blackfish	10	22	4			36
Banded Morwong	2	1				3
Greenlip Abalone	5					5
Black Lip Abalone	6					6

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Figure 8: Biodiversity level for fauna and flora of each three dive sites.



9

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### Reef Transect:

There was a strong correlation between the biodiversity of fish species and distribution of different types of algae. In dive site one where there was a high level of biodiversity (figure 8,9) there was a range of different algae species, see figure 8. Compared to dive site three where there was minimal diversity in algae species there was also minimal diversity in fish species.

The reef transect fieldwork indicated that there was a strong correlation with levels of biodiversity and where most recreation activities take place. Dive site three, which is closest to the boat ramp and beach where most recreational activities take place have the lowest level of biodiversity compared to dive site one, which is furthest away from these activities. The flora and fauna of dive site three is in the direct path of where the boats are launched from the boat ramp. Sandy patches, see figure 12, in dive site one indicate that the seaweed has been damaged, potentially by propellers or the hull of the boats.

It was clearly observed that, the further west from the boat ramp towards the limestone cliffs where there is limited beach access, the denser in marine flora and fauna, thus there is a higher biodiversity.

### Dive site 1, see figure 8 for location:

At this particular dive site there was a high level of biodiversity in both animal and algae species.

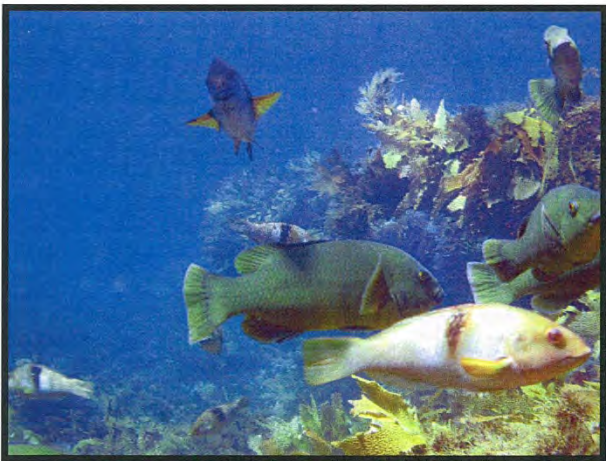


Figure 9: Fish species Western Blue Gropper (*Achoerodus Gouldii*) and Brown Spotted Wrasse at dive site 1 amongst dense marine flora.



Figure 10: Algae species including, Green Algae, *Halophila australis*, *Amphibolis*, *Macrocyti* (Brown Kelp) and *Cystophora*.

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[Figure] titles of the photographs provide illustration to support the text.

Dive site 2, see figure 8 for location:

This dive site had a reasonable level of biodiversity.



Figure 11: School of Luderick Black Fish.

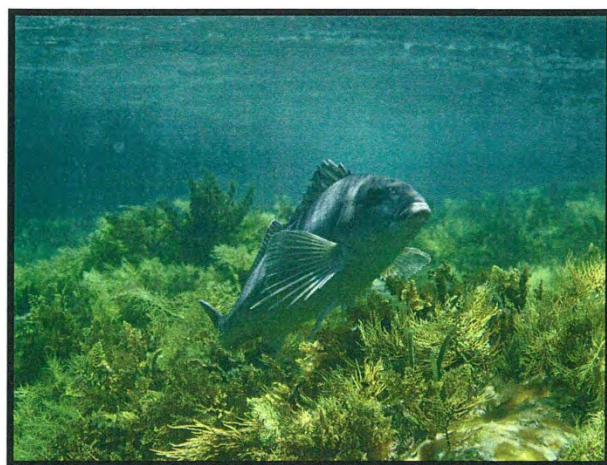


Figure 12: Dusky Morwong at dive site 2. Amongst

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Dive site 3, see figure 8 for location:



Figure 13: Sandy white patches as a result from the algae being damaged by boat propellers.



Figure 14: Common Seagrass (Zostera marina Linnaeus).

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## Sand Dunes:

The sand dunes at Scales bay are directly affected by human impact as they are located where most recreational activities take place see figure 17. Situated directly next to, if not on, the dunes is a shelter shed with bbq and toilet facilities. Locals and tourists access the shelter shed readily over the summer months. This is attracting more people to the fragile dune environment especially young children who play in the dunes (Graph 1). The result of this is that the vegetation, such as Spinifex Sericeus, that is holding the fore dune (see quadrant one) together is being trampled (see figure 15) and damaged making the whole dune system unstable. Furthermore this is causing the dunes to become more susceptible to erosion caused by the harsh weather conditions that this coastline experiences during the winter months. Human impact along with natural erosion may be the cause of the low biodiversity of plant species in the frontal dunes along the coast. Quad bikes are also damaging the dune environment by harming the vegetation. Local, Bob , stated that the quad bikes are directly and indirectly damaging the coastal fauna that stabilizes the dune system along the coast ( , R 2013, pers. comm., 24 April.

Graph 1: Percentage of locals who access the shelter shed.

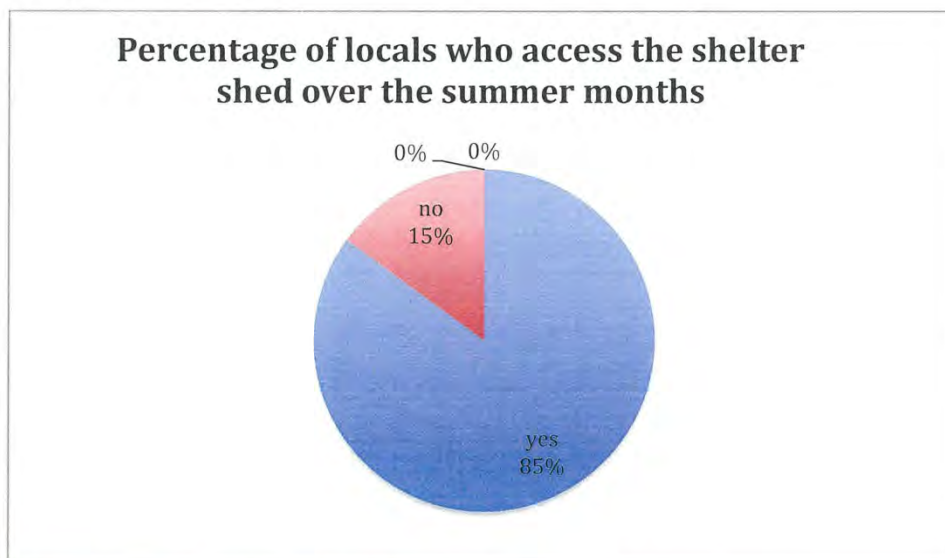


Figure 15: Foredune vegetation that has been trampled.



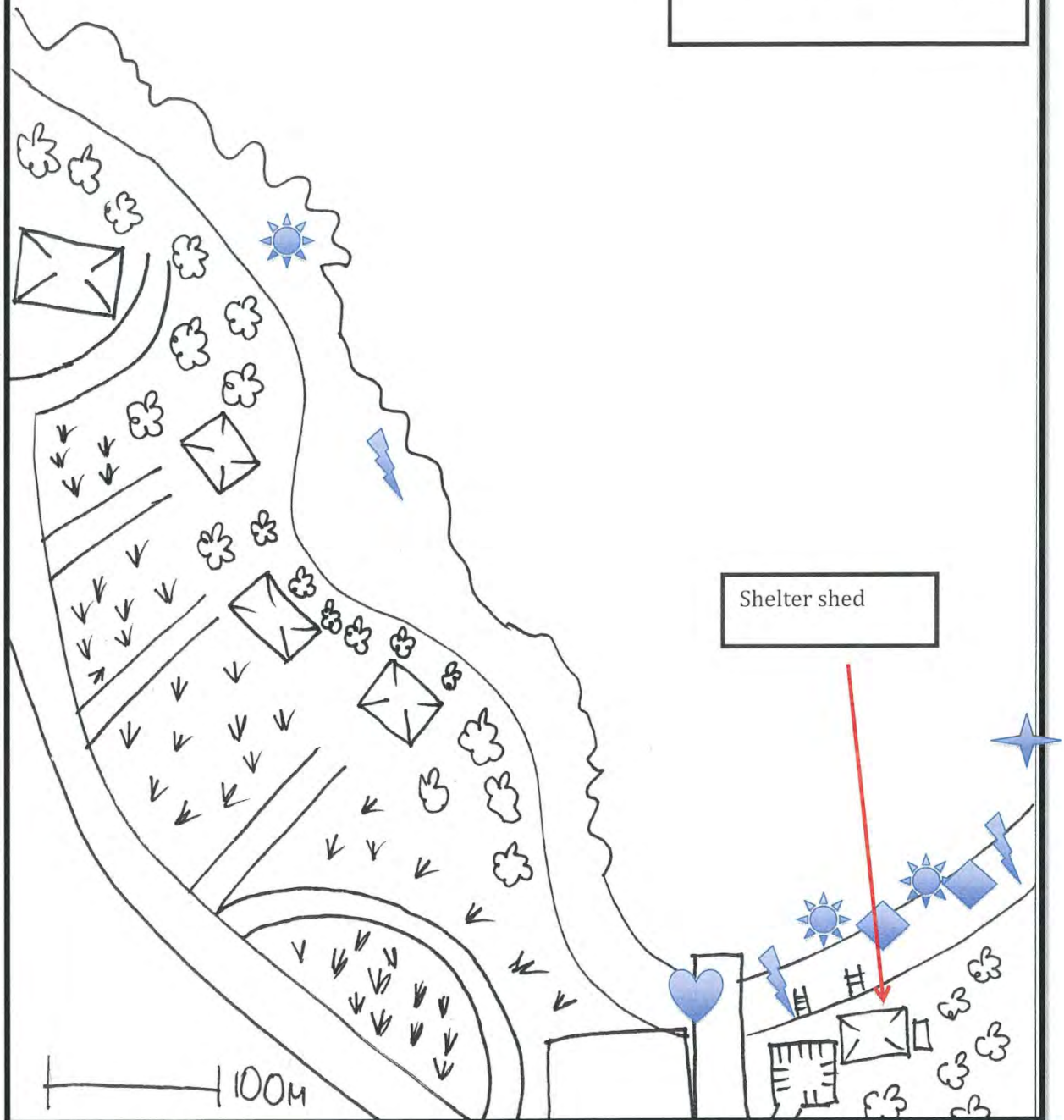
Figure 16: Blowouts resulting from vegetation trampling

Figure 17: Location of recreational activities

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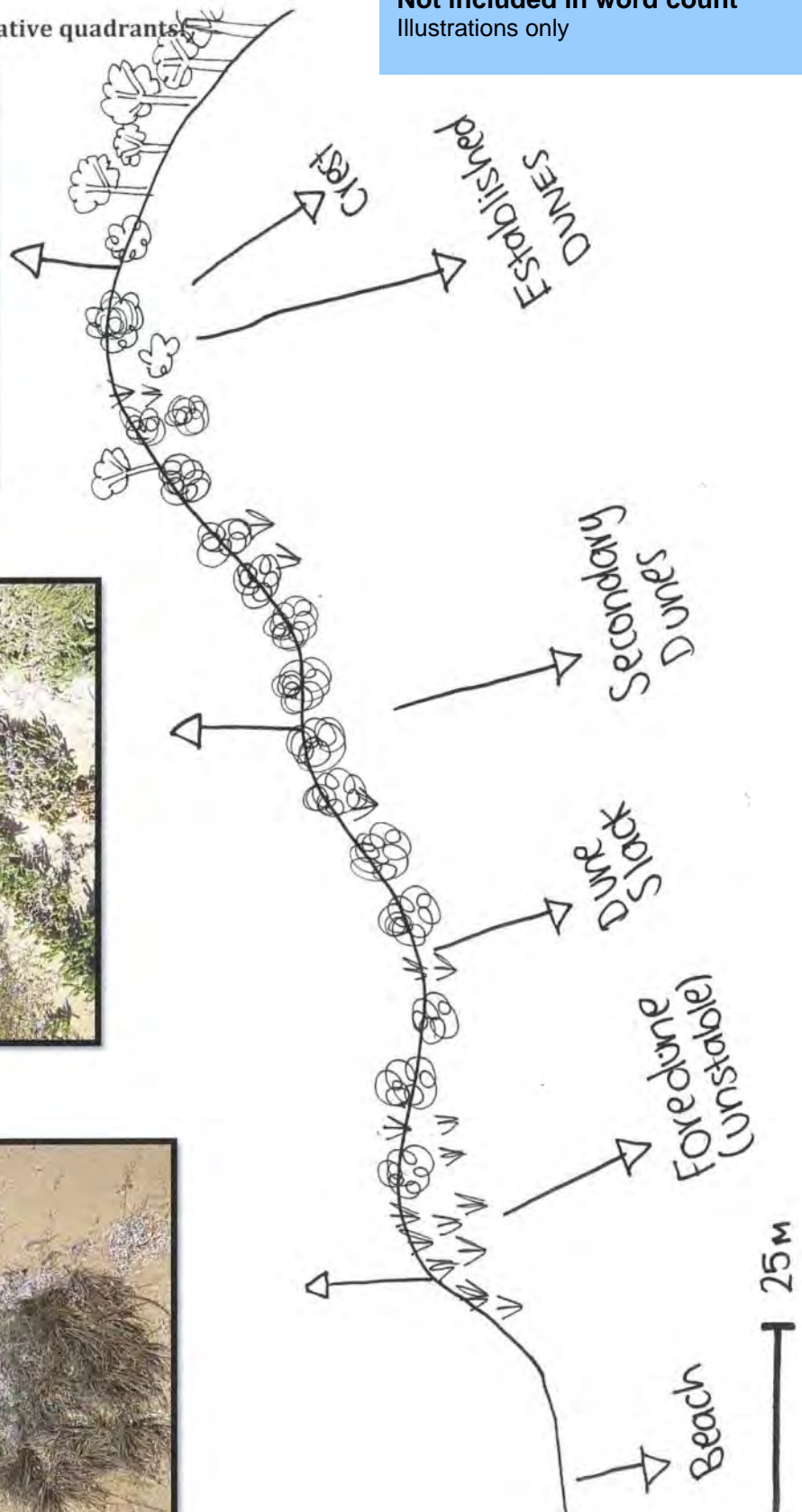
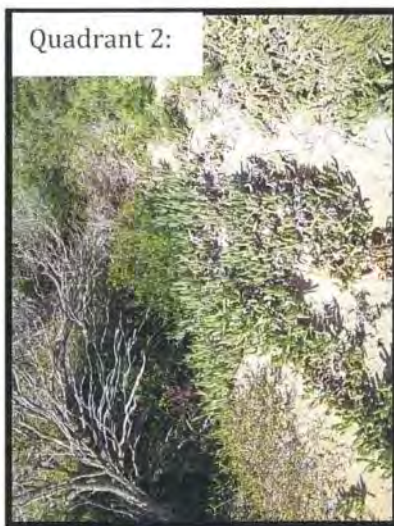
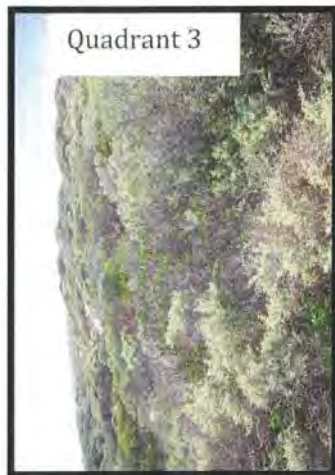
Recreational Activities:

-  Fishing off the beach
-  Motorbikes and cars
-  Boat ramp and car park
-  Surfing
-  Walking and swimming



# Sand dune transects and Vegetative quadrants

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**Sand dunes:**

**Table 5 :Dominant plant species in vegetative quadrants from page 14.**

Plant species quadrant 1	Plant Species quadrant 2	Plant Species quadrant 3
Beach Spinifex (Spinifex Sericeus)	Pig Face (Carpobrotus glaucescens)	Cup Wattle (Acacia cupularis)
Dune Thistle (Actites megalocarpa)	Common Correa (Correa reflexa)	Pig face (Carpobrotus glaucescens)
	Coast Bone fruit (Threlkeldia diffusa)	Coast everlasting (Ozothamnus turbinatus)
	Austral Seablite	Austral Seablite (Suaeda australis)
		Downy doffer laurel (Cassytha pubescens)
		Cushion Fanflower (Scaevola crassifolia)

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Illustration only

## Management:

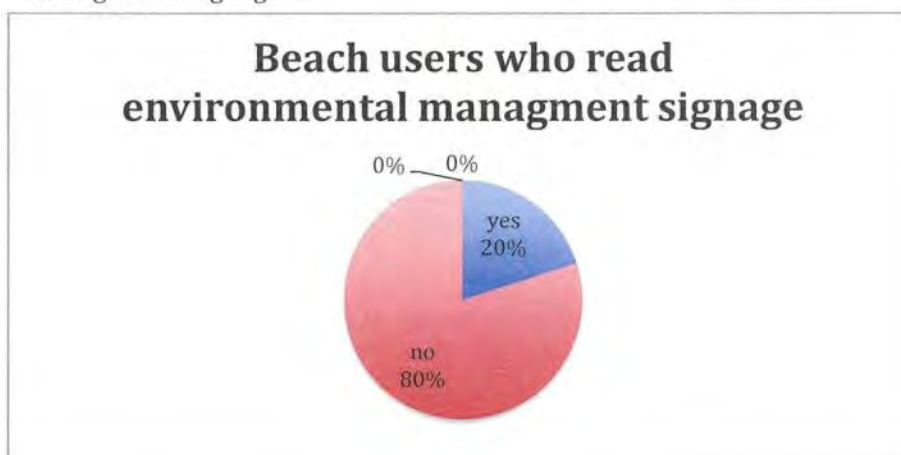
There are minimal management strategies (table four) currently in place to protect the Scales Bay coastline from development.

Table 6: Current Management strategies in place at Scales Bay

Current Management Strategies:	Positive and Negative Aspects:
<b>Educational Signage. Figure 13, 14</b>	<ul style="list-style-type: none"><li>- Hardly anyone takes note of these</li><li>- Signage doesn't appeal to a wide demographic</li><li>- Encourages readers to protect the environment</li></ul>
<b>Bag limit on fish</b>	<ul style="list-style-type: none"><li>- There are no local fisheries to manage or check boats.</li><li>- Limits public access to a resource</li><li>- Important measuring tool for research purposes</li></ul>
<b>Fencing and Rock walls: Figure 15</b>	<ul style="list-style-type: none"><li>- Broken fencing</li><li>- Poorly kept</li><li>- Stops people from venturing off designated paths</li><li>- Protects vegetation and slows erosions</li></ul>
<b>Boardwalks: Figure 16</b>	<ul style="list-style-type: none"><li>- -Reduces erosion of dunes</li><li>- -Reduces damage of vegetation</li><li>- -Many People use them.</li></ul>
<b>Re-Vegetation: Figure 17</b>	<ul style="list-style-type: none"><li>- Stops erosion</li><li>- Stabilizes cliffs</li><li>- Lack of irrigation to provide water for the plants</li></ul>

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New information introduced in the table and not referred to elsewhere.

Graph 2: Percentage of beach users who read the environmental management signage.



16

## Management:

Figure 18: Signage for the protection of the hooded plover



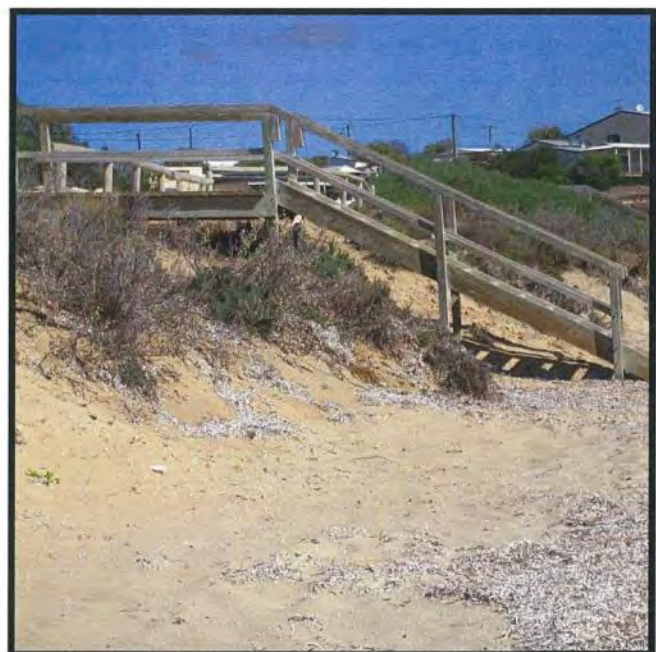
Figure 20: Fencing protecting fragile sand dunes and re-vegetation.



Figure 19: Signage for the Nicolas Baudin Island Conservation Park



Figure 21: Boardwalks to the beach are protecting the fragile front dunes



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[Figure] titles illustrate information provided in table 6.

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Annotations introduce new information and analysis.

**Re vegetation:**

Here there has been successful vegetation due to the plants position as it receives the run off from the levels above.

Wooden Pillars suggest to people to walk around and not through the re-vegetation site.

Figure 22: Re-vegetation site.



Due to poor irrigation most of the water runs off from the road flows in the direction of the blue arrow into the boat ramp car park.

Run off has moved topsoil from the garden bed to the boat ramp car park.

### Summary:

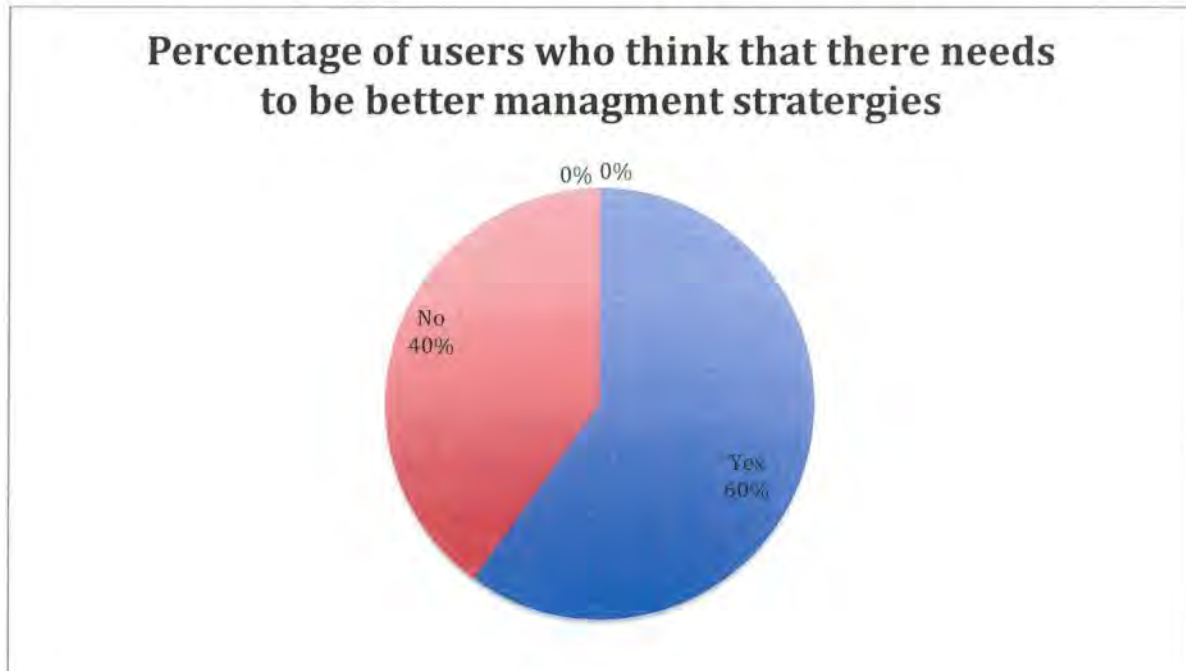
From fieldwork it is evident that:

- Recreational activities resulting from the development of Scales Bay are impacting on the environment.
- Quad bikes and vehicles are damaging the nesting habitat of Hooded Plover.
- Vehicles are destroying the vegetation that holds together the fragile dune systems.
- Frontal dune vegetation is being trampled and damaged, resulting in an unstable dune system.
- Blowouts have resulted due to vegetation trampling in the dunes.
- Re-vegetation of these dune areas has been unsuccessful.
- There is a high correlation between the biodiversity level of algae and fish species.
- The traffic of boats on boat ramp is damaging marine algae impacting on a wide variety of fish species.

### Recommendations:

The current management strategies in place to protect the Scales Bay marine environment are not adequate in ensuring its' sustainability. This view has been supported by beach users at Scales Bay (graph 3). Further management strategies (table 7) will enhance biodiversity in both the marine and terrestrial environments, improve the knowledge of locals about the environment in which they live in and protect the fragile dune environment from quad bikes and vehicles.

**Graph 3: Beach users who believe that there should be better management strategies in Scales Bay.**



**Conclusion:**

The Scales Bay marine and terrestrial environment has been affected and damaged by the development of Scales Bay. The increasing number of tourists and visitors to Scales bay will cause an increased pressure on the coastal resources and environment. To prevent further destruction of this coastline and to preserve its pristine condition for future generations, comprehensive conservation strategies need to be put in place and suitably managed.

## References:

### Fieldwork:

AR . Personal observations. April 20<sup>th</sup>- April 29<sup>th</sup> 2013

AR . Fieldwork (Vegetation Quadrants, recreation activates survey, fish and algae counts). April 20<sup>th</sup>- April 29<sup>th</sup> 2013

AR . Photography. April 20<sup>th</sup>- April 29<sup>th</sup> 2013

### Images:

**Figure 2:** [https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir\\_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl](https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl)

**Figure 3:** [https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir\\_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl](https://maps.google.com.au/maps?client=safari&rls=en&q=sceales%20bay&oe=UTF-8&redir_esc=&um=1&ie=UTF-8&hl=en&sa=N&tab=wl)

### Primary Resources:

, R 2013, pers. comm., 24 April.

AR . Surveying. April 20<sup>th</sup>- April 29<sup>th</sup> 2013

### Secondary resources:

Hooded Plover, n.d. Bird Life Australia, accessed 31 May 2013, <<http://www.birdlife.org.au/bird-profile/hooded-plover>>.

Baldock, R 2010 Identification Factsheets of the Marine Benthic Flora (Algae) of Southern Australia, Electronic Flora of South Australia, accessed 4 June 2013, <[http://www.flora.sa.gov.au/algae\\_revealed/index.shtml](http://www.flora.sa.gov.au/algae_revealed/index.shtml)>.

### Reference List

Not included in the word count