REPUBLIC OF THE MARSHALL ISLANDS PROJECT REPORT

Summer 2001: James Rennie Bequest Report

The Marshall Islands are made up of 29 coral atolls and five islands and stretches over 826 miles of the central Pacific Ocean. Its capital, Majuro is situated 2273 miles south west of Honolulu, Hawaii. The population of the Marshall Islands was recently estimated as 44,000, with over half this number located on Majuro Atoll. The total area of ocean covered by the Marshall Islands is 750,000 square miles, contrasting with a total area of land of 70 square miles.

My time in the Marshall Islands was spent on the atolls of Majuro and Likiep (the latter is situated north west of the capital). I was involved in three projects over the three months I spent there, and they are explained below. During my time there, I was closely linked with the College of the Marshall Islands' Marine Science department.

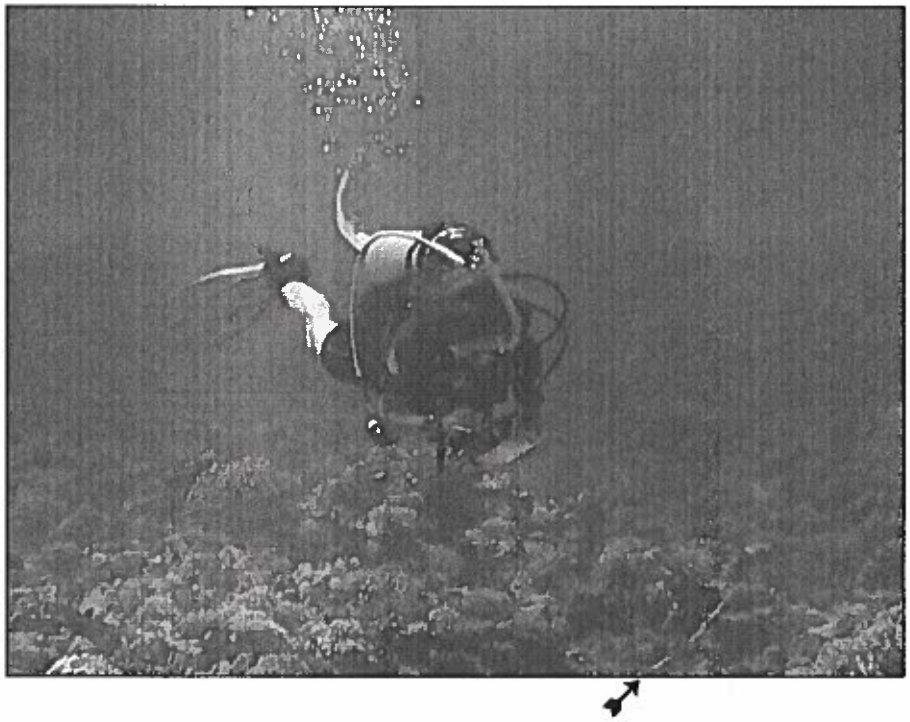
1. Likiep Atoll Marine Research Survey

A marine survey was carried out in August, 2001 on Likiep Atoll headed by Dr S. Pinca, the Marine Science Instructor at the College of the Marshall Islands (CMI). A team composed of Dr Pinca, two CMI students and myself conducted underwater assessments on 6 islands on the atoll. Local environmental authorities supported the project by providing financial backing. Surveys and assessment of resources were run to evaluate the diversity and abundance of organisms and correlate these to the environment conditions, as well as to determine the impacts of pollution and other stress factors on the biological community.

The project had the main aim of trying to demonstrate to both the government and the people of the Marshall Islands the importance and urgency of preserving and protecting coastal reefs and lagoon resources for both nutritional needs and sustainable income earning opportunities for the community and its children. Over the four weeks, we:

- mapped and classified the coral reef ecosystems of Likiep Atoll in order to evaluate the area in terms of resources and ecosystem services to humans,
- determined the habitats that are at risk from local and global anthropogenic impacts,
- conducted an awareness program with local people about the importance of protecting marine areas.

Over the next few months, the funding authorities will give the government advice (based on our results) on how to protect the resources of Likiep Atoll, and manage their use. This project served as a pilot study for future comparable programmes in other atolls of the Marshall Islands, and interest has already been shown for a similar project on Bikini Atoll (located in the north of the country).



Substrate survey being taken. Transect line on the seabed is shown by the arrow.

The results showed a significant difference in the amount and species diversity of fish, coral and invertebrates found in and out of the lagoon, but this was mainly attributed to the differences in the environments of the lagoon and ocean. Wider species diversity of fish and coral was seen in the ocean compared to the lagoon as expected, however the numbers of edible fish species were much lower around populated islands of Likiep lagoon. This result was expected, as questionnaires given out to the local fishermen on how many fish they caught now compared to five yeas ago, suggested to us that there had been a decrease in catch number over the last five years.

With these results, a number of fishing restrictions will be put into place over the next few months in order to successfully maintain the numbers of fish (and invertebrates) eaten by the locals. This will not limit the amount of fish they catch, as this would decrease their income and also the amount of food available to each family. It will limit fishing off certain beaches at particular times of the year so that the populations will be able to recover and sustain numbers.

The results showed that the coral life was not under threat in the lagoon, attributed to the very small population size living on Likiep Atoll. However, during the next 50 years, tourism many increase in this part of the world, and this will have serious implications for the coral life. In this situation, eco-tourism should be encouraged in order to maintain this region of the Marshall Islands as a non-threatened marine area.

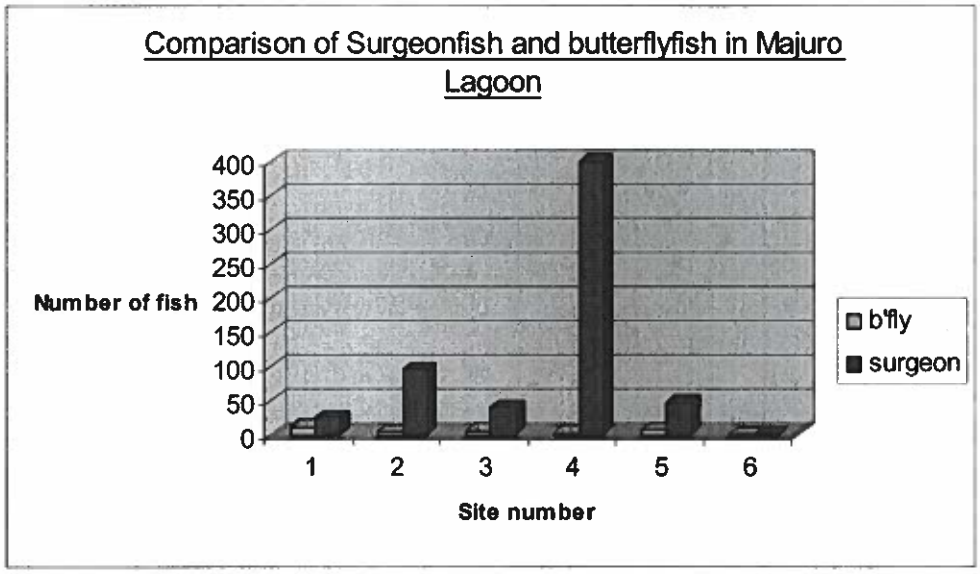
2. Majuro Atoll Lagoon Survey

With the support and backing from the College of the Marshall Islands, I carried out a series of measurements and survey dives to ascertain whether water quality and marine life varied at different points around the Majuro lagoon. I took boat-based measurements to start with, to compare (1) the turbidity, (2) dissolved oxygen content and (3) temperature of the water in the lagoon. Following this, I dived at as many measurement points as possible to carry out a simple survey at 10m depth, over a length of 50m. I described the seabed at 10m as being

either dead coral, dead coral with algae, live coral, or rubble (each was given an appropriate percentage). I then counted the numbers of coralivorous fish (butterflyfish) and herbivorous fish (surgeonfish) along the 50m line to see whether there were any significant differences in the numbers of these two families.

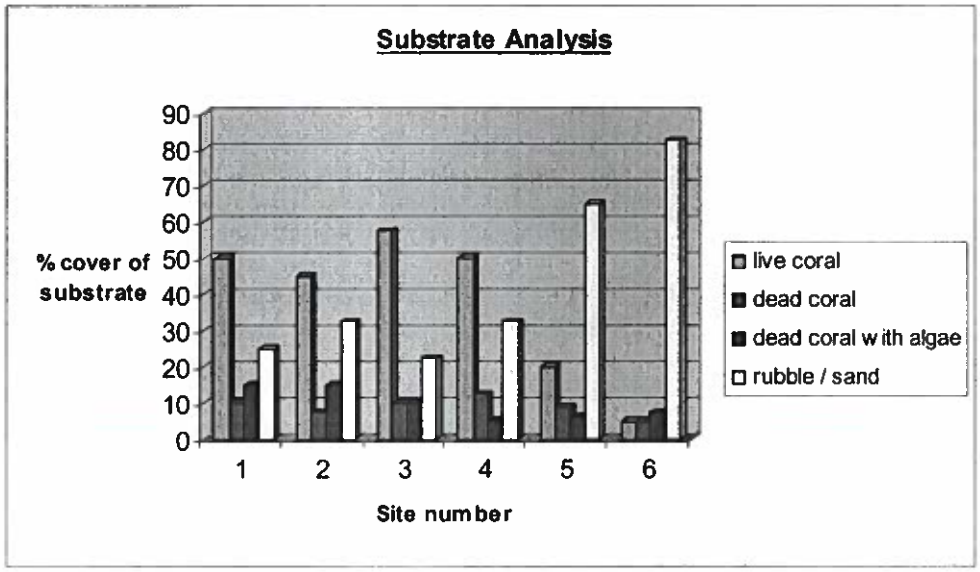
The presence of pollution in the lagoon caused by factors such as sewage and household waste would cause an increase in nutrients, which in turn causes a rise in the amount of algae in the water. This increase in algae means that the corals do not obtain enough light to survive, and so die. Therefore if pollution is high, a lower number of coralivorous fish, and a higher number of herbivorous fish will be expected.

The following graph shows the numbers of each family of fish counted:



Site 4 was next to a sewage outlet into the lagoon, and so the high number of surgeonfish was expected. The other sites showed significant differences as well between butterflyfish and surgeonfish. This may be accounted for by the amount of algae in the lagoon, produced by the high amount of pollution present around the lagoon.

From the substrate analysis, the majority of the sites had more live coral than dead coral or rubble, and this was encouraging:



The results and data analyses were passed on to the Marshall Islands Marine Resource Authority, and also the Environmental Protection Agency. Hopefully the measurements will be carried out at regular intervals in the future, in order to have a record of the water and coral quality over time.

Appendix 1 shows a map of Majuro Atoll.

3. College of the Marshall Islands Questionnaire

The College of the Marshall Islands also supported this project. During the academic year, the CMI educates students from many atolls of the country. A questionnaire was given out to the summer school students in Majuro, who are made up of teachers both from Majuro (the capital) and also the outer islands. Many of these teachers have at least a basic knowledge of English, and all those who participated were able to answer the survey in English.

The aim of this questionnaire was to gauge what the students at CMI summer school think of Majuro, and its environment. The questionnaires were given to as many students as possible, and were filled in during class time. 121 replies were collected, roughly 60% of the students. Every student filled in an English version, however some Marshallese translated copies were available if needed. A copy of the questions (in *italics*) is provided in appendix 2, with the total average of all answers entered.

It was expected that students would, on the whole feel concerned that their environment is polluted and would have practical suggestions as to what can be done locally to help these problems.

RESULTS

From looking at the 121 replies, it is clear that the majority of students are very concerned about protecting of the coral reefs around Majuro. It is evident that even thought there are advantages of living on the capital of Majuro, such as better resources, more jobs, and more entertainment, those students living on the outer islands would not live on the capital if given the choice. Of those not permanent residents of Majuro, 70% would not want to live in Majuro due to the main problems of overcrowding, pollution and traffic.

An article explaining these results was published in the Journal of the Marshall Islands (the only newspaper in the country) to make people aware of the problems facing their country. Also, a full report on the questionnaire will be submitted for possible publishing to the Micronesian Educator – a Journal of Research and Practice on Education in Guam and Micronesia.

Appendix 2 is a copy of the questionnaire given out to the students.
Appendix 3 is the article appearing in the Journal of the Marshall Islands (31-08-01).

List of suggestions made by the students for protecting the environment and the coral reef.

- Recycling programs.
- Less construction.
- Less dredging.
- Less styrofoam usage for packaging and drinks cups.
- Use of renewable energy.
- Setting up of protected areas of the reef which cannot be entered without a permit.
- Less fishing vessels in the lagoon.
- Less cars in Majuro and being imported into Majuro.

- More education on eco-tourism, perhaps from EPA.
- More education to control the population size.
- More trash cans around Majuro.
- Television or radio broadcasts to help promote environmentally friendly practices, such as re-use of plastic bottles, or efforts for clean-up drives.
- Better usage of patrol boats in the lagoon.

Acknowledgements

I am very grateful for the funding I received, and would like to thank the following for financial assistance towards travel costs to and from the Marshall Islands. The cumulative amount received from all five sources exactly matched the travel costs, and f this, I am very grateful:

1) The Barnston Bequest and Weir Fund for Field Studies.
2) TheJames Rennie Bequest,
3) The Challanger Society for Marine Science.
4) Bromsgrove School.
5) Burton-upon-Trent Rotary Club.

I would also like to thank Dr S. Pinca for the academic and personal assistance given to me throughout my time in Micronesia.

Itinerary

UK departure:	26 June 2001.
Marshall Islands arrival:	28 June.
Questionnaire project:	1 July – 27 July.
Likiep Survey:	28 July – 28 August.
Majuro atoll project:	29 August – 15 September.
UK arrival:	21 September 2001.

Appendix 1 – Map of the Marshall Islands.

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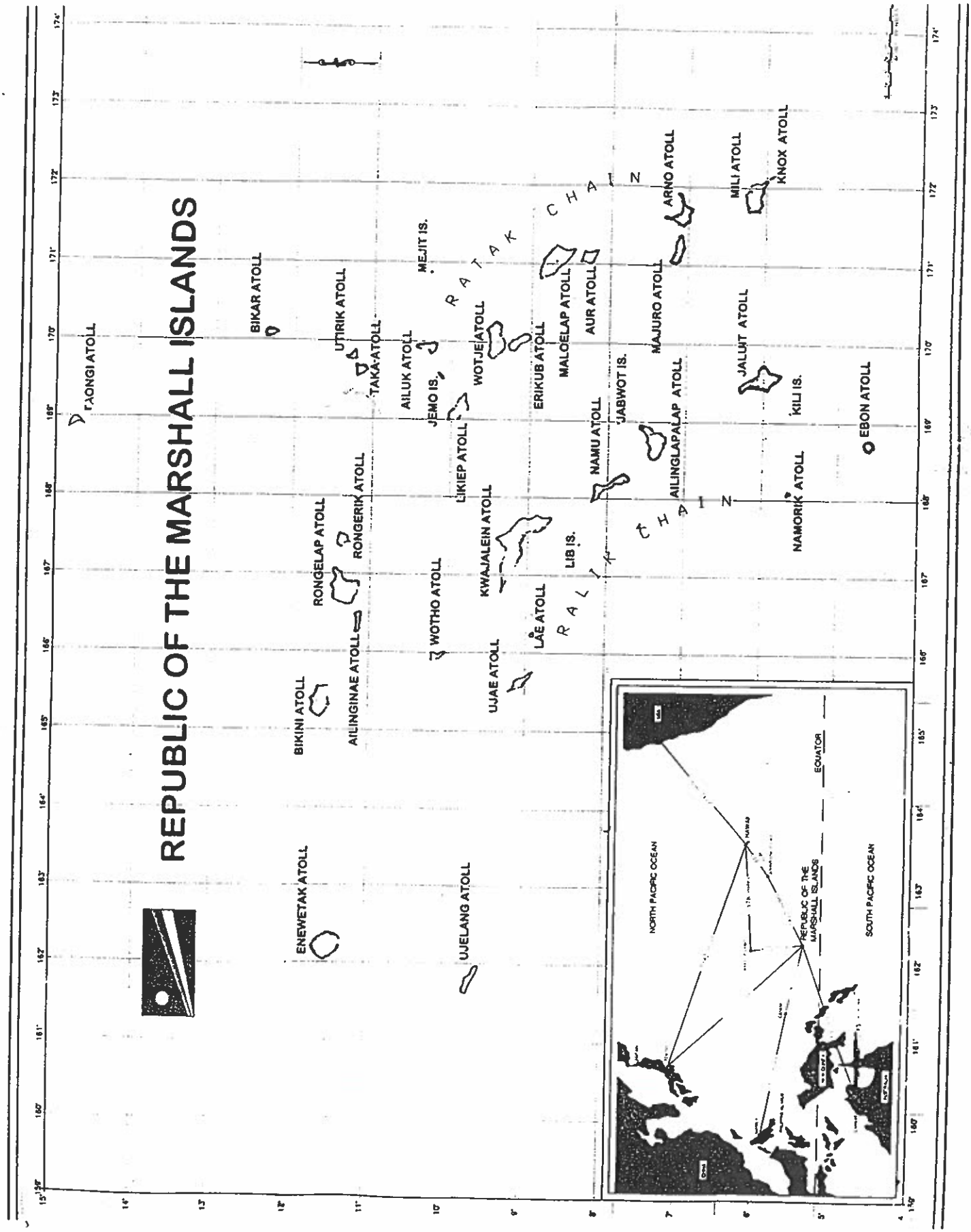

Appendix 2 – College of the Marshall Islands Questionnaire.

QUESTION 1

Do you live in Majuro? ***Yes*** 74% ***No*** 26%

*(a) If **yes**, do you enjoy living here? Why?*

The top 4 reasons why students enjoy living here are better education opportunities, being close to their friends and family, better resource availability, and having fun.

*(b) If **no**, would you like to live here? Why?*

26% do not live in Majuro. Of those, 70% are glad that they do not live here permanently. The top 4 reasons why students would not enjoy living here are overcrowding, too much pollution, living is too expensive and the water and land is too dirty.

QUESTION 2

Do you and/or your family rely on the sea or reef for money to live?
Yes 82% ***No*** 18%

QUESTION 3

Which do you think is better, (a) or (b)?
(a) Dredging coral so more construction is possible? 19%
(b) Having less construction/building and not dredging coral? 81%

The large percentage of students believe that less dredging should occur even if this means having less construction. Indeed, many students suggest both less dredging and less construction in question 10 (see below).

QUESTION 4

Do you think protecting coral reefs is important?
Yes 99% ***No*** 1%

Why, or why not?

The top 4 reasons why protecting why coral reefs is so important are because food fish can therefore be preserved, marine life and marine habitats can be protected, the structure of the atoll can be safeguarded so that beaches do not reduce in size, and finally so that the natural defense from wave action via the coral reefs can be maintained.

Because 82% of the students and their families need the reef to live, i.e. for fishing, making of handicrafts etc, it is not suprising that 99% feel that the reef should be protected. The reasons why the students think this protection is important (above) are precisely why the reef needs to be preserved around Majuro. Without the reef, fish supplies are depleted, the beaches and land are reduced in size, and the atoll is less protected against wave action and high tides.

QUESTION 5

If the coral reefs around Majuro, or where you live, decrease in size due to environmental factors, do you think the following will be affected? (Tick as many as you want):

(a) employment	*Rise*	52%	*Fall*	48%
(b) crime	*Rise*	49%	*Fall*	51%
(c) family structure	*Rise*	53%	*Fall*	47%
(d) suicide	*Rise*	40%	*Fall*	60%

Unfortunately, it was apparent that question 7 was misunderstood, because many students either did not answer the question, or ticks were entered, with no 'rise' or 'fall' explanation. Therefore the results of this question can be regarded as inaccurate.

QUESTION 6

Do you think there is a problem in Majuro with the following?

(a) not enough recycling, e.g. of plastics	*Yes*	78%	*No*	22%
(b) too much sewage being put into the sea	*Yes*	79%	*No*	21%
(c) too much trash	*Yes*	87%	*No*	13%
(d) too many cars?	*Yes*	85%	*No*	15%

The large majority of students answered as expected to this question. Almost exclusively all are concerned with not enough recycling, too much sewage being put into the ocean, too much trash and too many cars. Likewise, suggestions reflecting these subjects are voiced in question 10 below.

QUESTION 7

*Would you like to see more tourists visiting the Marshall Islands so that more people learn about your country and more money comes into the country, **or** do you think that more tourists would make problems for your country (like increasing the numbers of cars, or increasing pollution)?*

(a) more tourists is good 79%
(b) more tourists is not good 21%

The many students who would like to see more tourists visiting Majuro is suprising as many of the suggestions made in question 10 (e.g. less construction, less cars) would not be compatible with an increase in tourists. Those that do not want an increase in tourism provide reasons such as more cars will be used, and trash will increase, which is detrimental to the island.

QUESTION 8

What do you think should be done about helping to protect your environment, including the reef?

Many important suggestions are made as to what could be done to protect the coral reef. The main theme to come out of the suggestions is the management of rubbish. Litter should not be thrown into the lagoon, or around the island. The suggestion is made for more litter containers, and also more smaller trash cans around Majuro.

There is a strong feeling towards making new legislation for the protection of the reef and the waters around. As well as this, to enforce the existing laws more strongly, for example more rigorous policing of the lagoon by patrol boats to curb the dumping of oil into the lagoon.

Many other suggestions were added, and these are listed below. One such suggestion, controlling the population size, is a core issue with respect to coral reef protection. Many of the problems in Majuro stem from too many people in too small a place. If the population size can be controlled successfully, much less strain will be put on the resources in Majuro and the whole environment generally.

Appendix 3 – Article written for The Marshall Islands Journal.

Outer island students: Majuro too polluted

By Lucy Horton, Marine Science volunteer, CMI. *Friday August 31, 2001*

70 percent of outer island CMI summer school students say they don't want to live here

The CMI summer school teaches students from Majuro and the outer islands during June and July, many of whom are teachers in various schools throughout the country.

A questionnaire was given to over 120 students about Majuro and its environment. Questions such as 'Do you think coral reefs are important?' and 'Why do you enjoy living in Majuro? were asked to find out the views of these students, who represent many atolls of the Marshall Islands.

Of the 26 percent of students from the outer islands staying in Majuro for the summer, 70 percent would not want to live in Majuro permanently. Why? They think that despite all the advantages the capital can offer Majuro is too crowded and the lagoon too dirty for them to want to live here all the time.

But what do the students from Majuro think of their island? The majority (65 percent) enjoy living here for the main reason that educational opportunities are widely available here, but also because there are many different resources available to them in Majuro (different foods, Internet, transportation). As well as its fun!'

However, 99 percent of all the students say that the reef should be protected. Because if not, how would their families eat? No coral reef means no marine life, and this means no food. So it follows that 81 percent believe less dredging of coral should occur around Majuro, at the expense of construction on the island.

Dredging coral to produce building materials severely affects the health of a coral reef. When coral is removed, a myriad of factors is affected. Fish populations decrease (less food), natural protection from the reef is removed (leaving Majuro open to bombardment from high tides and large waves), and also beautiful ecosystems are lost to make way for 'essential construction'.

But how do the students suggest solving these problems? 85 percent realise there are far too many cars on the island, and would like to see a reduction of imported vehicles into Majuro. 87 percent believe

Many suggestions were put forward for how to protect the coral reefs around Majuro and one fundamental theme came out people must work together. Why not have clean-up drives? Or at least more trash cans. Why not have more legislation (which is enforced) fining those people (or groups of people) who pollute the environment? Why not police the lagoon more rigorously so that the oil from fishing boats, and also household wastes are not dumped in the water? If steps such as these are taken, perhaps Majuro's water, air and land would not suffer so much from the pollution it is facing now.

But what are the simple steps each person can do to help, starting from today?

1. Make sure trash is put into the bins provided, NOT in the lagoon or the ocean.
2. Recycle your drinks cans with the CMI recycling program.
3. Try to re-use materials such as plastic bags and plastic bottles, instead of throwing them away and buying more.
4. Why not put your views into writing? A letter to the local government or to EPA concerning this is

issue will only help the situation.

The CMI summer school students from many islands of the Marshall Islands realise the problems the environment of Majuro is facing and want their voice to be heard. Are you listening?