

Tasmanian Recreational Dive Clubs

Subtidal Reef Monitoring and Community Awareness Project

A Project supported by the Tasmanian Government's Fishwise Fund.



Photo per SMH

Tasmanian Scuba Diving Club (co-ordinator)

With our partners

Leven Scuba Club
Oceans Divers Plus
Tasmanian Marine Naturalists Association
Tasmanian Sub-Aqua Club
TDA Crabs Dive Club
University of Tasmania Dive Club

OUR PROJECT - WHY WE ARE DOING IT?

Many divers have seen disturbing changes in the oceans over the last few decades including the loss of Giant Kelp beds, declines in some fish species, more invasive marine pests and the effects of climate change warming the East Coast of Tasmania.

These threats indicate a wider problem with the health of our oceans and show that Tasmania's unique underwater wilderness is going through a period of major change.

Local recreational dive clubs have decided that they want to do more to assist scientists in gaining a better understanding of our changing marine environment. Sub-tidal reef monitoring is an area where recreational divers can do vital work to add to this body of knowledge.

A major catalyst for the project has been the appearance of devastating urchin barrens off the East Coast of Tasmania. Monitoring the spread of these barrens has been selected as the priority task for the first stage of this project.

AIMS AND OBJECTIVES – What we hope to achieve from the project

- Monitor the effect of invasive marine species, particularly the long-spined sea urchin *Centrostephanus Rogersii* on representative sites.
- Identify major shifts in biodiversity at representative sites (main focus initially will be on the formation of urchin barrens) and provide an 'early warning system' for threats to that biodiversity.
- Educate divers and the general community about the marine environment.
- Provide other information collected during surveys, such as seaweed samples and photographs of unique animals to scientific bodies for further research.
- Provide reliable data (initially on urchin barrens) that will complement any studies planned to be undertaken by scientific bodies.
- Analyse and refine methods for volunteer participation in volunteer research projects.
- Build up a volunteer skills base for further community research projects.

How we will undertake the project

The project will consult with the local scientific community to create an education and training program. Divers will be invited to a popular coastal location for marine awareness and survey methodology training. Field trips to threatened sites will be undertaken as well as sample surveys.

In consultation with stakeholders, survey sites will be selected. Particular emphasis will be placed in monitoring the advance of urchin barrens along the East Coast.

These surveys count urchin, crayfish, abalone and note general macroalgae density. The dives in new areas will be primarily deeper dives from 15M – 20M. Surveys at this depth have not been undertaken by research bodies due to lack of resources, but this is the depth where threats such as long-spined sea urchin barrens are most prevalent. We will also check the advance of the urchin threat in shallower sites previously visited in the 2000 FRDC urchin survey. This will give us immediate comparative data on the recent advance of the urchin threat.

Because of the urgency of the threat, the majority of survey resources are expected to be committed to urchin surveys in the first round.

Some clubs have expressed an interest in advanced training to conduct broad-scale reef community surveys. It is planned to gradually up-skill the urchin surveyors to measure more with the progress of time.

If funding, time and manpower permits, advanced training will be offered to volunteers based more on improving understanding of reef communities and species identification. These surveys will be organised so that they complement rather than overlap, existing scientific programs.

This project will initially focus on mobilising, training and educating volunteers. It will also provide useful sea urchin density data from initial surveys. Regular monitoring, which it is hoped will flow from this project, will provide hard data on the urchin threat over time. This information will become a valuable management tool in determining the long-term changes in the reef ecosystem. It is hoped that divers will gradually learn to add more complex measurements and be able to participate in a wider variety of scientific surveys in the longer-term.

It is also hoped that the project will encourage ongoing engagement between recreational divers and the scientific community and this will ensure that scientific, educational and training benefits flow on beyond the initial life of the project.

PROJECT MILESTONES

Estimated Project Start Date: 1/2/2008

Project End Date: 30/8/2009

By 31st March 2008

Establish training plans, build survey equipment, organise training, liaise with equipment providers, create educational materials.

Complete initial urchin survey training for 30 divers

By May 2008

Complete initial urchin survey program in 15-20 metres along East Coast.

By May 2009

Ultimate target is to complete urchin- focussed surveys in at least 12-20 areas within the first 18 months

By 30 Aug 2009

Complete collating, interpreting and reporting of data.

Contacts

WEBSITE

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PRIORITY ONE MISSION

Monitor Urchin Barrens

*“The single largest threat to the integrity of the shallow rocky reef systems of Tasmania is the long spined sea urchin (*Centrostephanus rodgersii*)”*

Professor Craig Johnson, University of Tasmania

When we first heard about urchin barrens, we thought that everyone was talking about a few 10 metre by 10 metre bare patches appearing here and there. Then the TSDC went to St Helens. Some of us hadn't been there for ten years and the change was astounding.

We dived from Sloop Rock to St Helens Island and on each dive the area from 15 metres to 40 metres depth had been completely destroyed! We aren't talking about the loss of the best bits of sponge, we are talking bare rock. The pelagic fish life is still good, but the colourful sponges, sea whips, bryzoans, nudibranchs, they are all gone. There were a small number of large crays big enough to eat urchins, but no sign of anything smaller. A few abalone could be found hiding in cracks in the shallows, but nothing like the normal numbers.

St Helens is now so bad that it is like visiting your favourite National Park, only to find that all the trees have been burnt down, and its been ploughed up and turned into a paddock. The great underwater wilderness of St Helens is now in our past, a matter of historical interest for some, and a cherished memory for those who lived to see it.

Why has it Happened?

The culprit is the long-spined sea urchin, *Centrostephanus Rogersii*, a native of NSW. Every Summer we would see some in Tasmania, but the cold Winters finished them off. Now the water temperatures off Maria Island have increased by 2 degrees in the last few decades. It is now warm enough for species like *Centrostephanus* to survive all year round, and breed! Even in NSW the rising sea temperatures have caused them to breed out of control and they have badly damaged NSW's inshore reef. Now they are on the march in Tassy.

The urchins breed until they reach enough density to completely swamp the reef ecosystem. They eat off all the other life to create a 'paddock' where they can graze on the algae that likes the bare rock. Once the barren is created it is very hard to change it back to healthy reef. Even if most of the urchins are removed it only takes a few survivors to keep eating off the regrowth. Just like when farmers clear a forest, it only takes a few sheep to keep eating off the sprouting trees for it to remain a paddock for centuries.

How Bad Will it Get?

We don't see any reason why the urchins will stop at St Helens, conditions are right for them to expand their range all down the East Coast. No area that is influenced by the warm Eastern Australian Current, that is anywhere from Flinders Island to Tasman Island, is safe.

Divers are reporting seeing urchin barrens beginning to form off Georges Rocks in the north, at Bicheno, and also on the Eastern side of Maria Island. Isolated urchins have been found as far away as Port Davey. At Bicheno they are confined to a few sheltered sites and isolated deep gutters, for now. If they build up in numbers they may well swamp those underwater habitats completely.

Can We Fix It?

“...there is unlikely to be a single management ‘panacea’, but that a multifaceted approach to the problem is likely to be most successful.”

Professor Craig Johnson, University of Tasmania

Halting global warming isn't something that is likely to happen soon, but it may be the ultimate answer. In the meantime, one enemy the urchins face in their march down the coast is large crayfish. Only very large crayfish can flip urchins over and break them open. In Maria Island Marine Reserve they have been found to eat up to 40% of the urchins on a reef. Perhaps protection of large crays is something we can do to save the remaining reefs, and further research is being done into the practicalities of this at the moment. Even then, protecting big crays may not be enough.

If there is an answer it lies in understanding more about the complex interactions between global warming, overfishing and perhaps other problems in the reef ecosystem that are causing this normally harmless animal to breed out of control.

What should WE do?

If divers want good diving into the future it won't be enough just to organise a busy program of dive trips. Divers will have to get more involved in attempts to protect dive sites now under real threat from processes like global warming.

An important part of understanding the effect of problems like sea urchin barrens is to identify the places affected and monitor the spread of barrens. We could all go out smashing urchins, but long-spined urchins reproduce so rapidly this would only make us feel better without achieving much.

Monitoring itself isn't a magic pill that solves all problems, but it gives people vital warning about emerging problems and it will feed important information into other programs of scientific research that can come up with the necessary answers.

The Tasmanian Scuba Diving Club has received funding from the FISHWISE program to coordinate a program of surveys to be undertaken by Tasmania's recreational dive clubs. The surveys will monitor the progress of urchin barrens down the East Coast and provide reliable data on the rate of infestation in vulnerable areas. This follows on from important scientific monitoring work already conducted into urchin barrens, that cannot be sustained due to other research and funding commitments.

Professor Craig Johnson has stated,

“Monitoring of *Centrostephanus* populations and the extent of *Centrostephanus* barrens is an important task that selected recreational divers with modest training can perform reliably”.

We need your help to monitor the spread of threats like urchin barrens.



Pictures from St. Helens – Before and After the urchins take over

All photos taken by James Parkinson



More Urchins at Merricks Reef, the only large invertebrate life in the barrens are urchins and some resistant patches of yellow anemones. Merricks Reef and many of the other reefs at St Helens deeper than 15 metres have been almost completely destroyed.



Sea Whips at St Helens Island. Isolated patches of life remain in the deeper areas below 40 metres and give an idea of what it was once like before the urchins arrived.

IDENTIFICATION OF URCHINS

Long-spined Urchins (C.Rogersii)



(Always black or black blue with very long spines. These spines can be shortened in turbulent areas and they can be easily confused with short-spined urchins).

Long-Spined urchins have caused a major environmental problem on the East Coast of Tasmania and appear to be breeding out of control at the present time.

Short-spined Urchin (Heliocidaris Ethryogramma)



(A multitude of colours but rarely black and always relatively short brittle spines)

They have also caused barrens, often in shallower waters. While becoming a problem in some areas, the barrens tend to be smaller and less damaging than the long-spined urchin barrens. They can be very damaging where they affect very sensitive areas, like patches of habitat home to rare species like Spotted Handfish.