



To whom it may concern,

Please accept this submission to the Federal Environment and Communications Reference Committee Inquiry into Climate Related Marine Invasive Species.

This is a joint submission between the Tasmanian Seafood Industry Council and the key wild catch fishing Associations in Tasmania – the Tasmanian Commercial Divers Association (TCDA), Tasmanian Abalone Council (TAC) and Tasmanian Rock Lobster Fishermen's Association (TRLFA).

Thank you for the opportunity for the Tasmanian seafood industry to comment on this important topic.

Yours Sincerely,

Julian Harrington

Chief Executive – TSIC

In support of:



The Issue

The long-spined sea urchin (*Centrostephanus rodgersii*) is a range extending, invasive species and has done considerable damage to the marine environment along the East Coast of Tasmania. It has destroyed natural habitat of a variety of species, including abalone, southern rock lobster and kelp. It is threatening the viability of a number of fisheries, and control measures to date have only been partially successful in controlling its spread.

Control measures include the harvesting of the urchin, but those measures are limited by commercial considerations.

This inquiry is of significant relevance and importance to the Tasmanian seafood industry, but of particular relevance to the Tasmanian Seafood Industry Council (TSIC), the Tasmanian Commercial Divers Association (TCDA), the Tasmanian Abalone Council Limited (TACL), and the Tasmanian Rock Lobster Fishermen's Association (TRLFA).

TSIC, in partnership with the TCDA, TAC and TRLFA welcomes the current Senate Inquiry, and looks forward to a finding that will lead to support the long-term control of *Centrostephanus* in the interests of the unique marine habitats found along Tasmania's East Coast and the commercial interests they support.

A Senate Inquiry into Climate-Related Marine Invasive Species

On the 5 September 2022, the Federal Senate referred an inquiry into the spread of climate-related marine invasive species to the Environment and Communications Reference Committee. The terms of reference provided were:

The spread of climate-related marine invasive species, particularly long spined sea urchins (Centrostephanus rodgersii) along the Great Southern Reef, with particular reference to:

- (a) the existing body of research and knowledge on the risks for and damage to marine biodiversity, habitat and fisheries caused by the proliferation and range shifting of non-endemic long spined sea urchins;*
- (b) management options, challenges and opportunities to better mitigate or adapt to these threats, and governance measures that are inclusive of First Nations communities;*
- (c) funding requirements, responsibility, and pathways to better manage and co-ordinate stopping the spread of climate-related marine invasive species;*
- (d) the importance of tackling the spread of invasive urchin 'barrens' to help facilitate marine ecosystem restoration efforts (such as for Tasmanian Giant Kelp *Macrocystis pyrifera*); and*
- (e) any other related matters.*

The Tasmanian Seafood Industry - Overview

Tasmanian seafood has an annual Gross Value of Production of around \$1.2 billion. The key seafood sectors are salmon aquaculture, and oyster aquaculture and wild catch southern rock lobster, and wild catch abalone

Tasmanian seafood provides significant employment opportunities, especially in regional communities. This employment provides significant economic benefit to these regional communities and Tasmania in general. Tasmanian seafood also supports a large number of subsidiary businesses who are fully or partially reliant on seafood operations.

Harvesting of Centro

Over recent years, a market has developed for sea urchin roe, and the harvest of Long-Spined Sea Urchins (*Centrostephanus rodgersii* or Centro for short) has become an important fishery in terms of both value, employment and environmental benefit. The access right to harvest urchins in Tasmania falls under the authority of a Fishing Licence (Commercial Dive) (FLCD). There are currently 49 active FLCD licences in the fishery.

Since the 2018/2019 harvest season, the commercial dive industry has harvested in excess of 2,000 tonnes of urchins from Tasmanian waters. This is a significant effort, which has greatly helped mitigate and minimise the impact of Centro on Tasmania's east coast.

Harvesting of urchins is conducted using surface supplied compressed air, delivered via a hookah system and hose, with urchins being visually harvested by hand. This allows the ability for take all harvests within regions.

The limitations on the effectiveness of this approach are essentially commercial. Divers will be attracted to areas where the urchin is greatest and leave alone those areas where the urchin population is small.

The commercial dive and processing sectors have the capacity and capability to significantly increase production.

Tasmanian Seafood Industry Council

The Tasmanian Seafood Industry Council (TSIC) is recognised under the Living Marine Resources Management Act (1995) as the peak body representing the interests of approximately 480 wild catch fishers, 60 marine farming businesses and 62 seafood processing businesses in Tasmania.

TSIC Policy aims to support the interests and access rights of our fishers, marine farmers and seafood processors. Central to TSIC policy is support for four key seafood industry outcomes, which have a focus on environmental, social and economic outcomes from seafood and Tasmania:

1. Long-term sustainability of the marine environment.
2. Opportunity for long term, full-time employment for Tasmanian's.
3. Direct economic return to Tasmania, particularly into regional communities.
4. Provision of quality sustainable Tasmanian seafood to Tasmanian's, Australian's and the world.

Tasmanian Commercial Dive Association

The Tasmanian Commercial Divers Association (TCDA) is recognised under the Living Marine Resources Management Act (1995) as the sector peak body representing the interests of the 49 active Fishing Licence (Commercial Dive) (FLCD) holders in Tasmania, and the supervisors of these licences (i.e., those people who are granted authority to use someone else's FLCD). The TCDA also has a strong connect with the Seafood Processors who buy, process, market and sell the urchin roe and other commercial dive species.

A FLCD licence gives the authority to commercially harvest periwinkles, native short-spined urchins, range extending long-spined urchins, some invasive seaweed species, native angasi oysters and wild introduced pacific oysters, depending on specific licence endorsements.

Tasmanian Abalone Council

The Tasmanian Abalone Council Limited (TACL) is recognised under the Living Marine Resources Management Act (1995) as the sector peak body representing the interests of abalone divers, non-diving quota-holders, processors and exporters.

Urchin barrens have a significant negative impact on abalone stocks. In 2022, the Tasmanian East Coast abalone fishery TAC was 224T, down from a historic high of 896T. The impact of Centro urchins, in combination with marine heatwaves and overfishing, has contributed significantly to this decline.

The TACL has invested significantly in analysing the Centro urchin problem and supporting measures to control the spread of the species, through the Abalone Industry Reinvestment Fund and the Abalone Industry Development Fund, both partnerships with the Tasmanian government. Both of these funding programs are presently under review by the Tasmanian government.

The Tasmanian Abalone Council is committed to continue to support and invest in initiatives that control the Centro urchin problem, promote the rehabilitation of urchin barrens to a natural state and in turn support the survival and sustainability of the abalone population on Tasmania's East Coast.

Tasmanian Rock Lobster Fishermen's Association

The Tasmanian Rock Lobster Fishermen's Association (TRLFA) is recognised under the Living Marine Resources Management Act (1995) as the sector peak body representing the interests of rock lobster entitlement holders and the broader rock lobster fishery in Tasmania.

Urchin barrens have had a significant impact on product rock lobster habitat along Tasmania's East Coast, and the TRLFA is committed to support activities that promote a health East Coast environment. The TRLFA has supported rock lobster stock rebuilding on the East Coast, which in the past was believed to be a benefit for controlling urchin populations (see section (a) *the existing body of research and knowledge on the risks for and damage to marine biodiversity, habitat and fisheries caused by the proliferation and range shifting of non-endemic long spined sea urchins* for more detail.

Structure of this submission

This joint submission will address the 5 Terms of Reference of the inquiry.

A Coordinated Strategic Harvest Plan for Centro Urchins:

An Overview of the Only Feasible Centro Control Strategy

All marine resource users in Tasmania agree there is an urgent need to better control abundances of the range extending Long-Spined Sea Urchin, *Centrostephanus rodgersii* to protect Tasmania's unique cool temperate marine ecosystem – the Great Southern Reef.

Over recent years, there has been much research, discussion, and debate over the control of Centro urchins in Tasmanian waters. A variety of potential solutions have been tabled; however, the vast majority remain either untested and unproven, or if tested, there is a need for further significant money and time investment to further engineer suitable technologies (see Attachment 1 for more detail).

Throughout the Centro debate, the commercial harvest, processing and sale of urchins and their roe has been the only proven, cost-effective strategy that has made an actual difference to the Tasmanian urchin population. The evidence is in the harvest, with some 2,000 tonnes, being harvested over the last 5 years. It has been suggested that this rate of harvest is higher than the predicted 170 tonnes average increase in urchins per annum¹, although spatial considerations also need to be taken into account.

Appropriate Government investment into a coordinated and researched commercial urchin harvest strategy is the safest, most cost effective and realistic medium to long term solution for controlling the urchin problem in Tasmania. However, to do that, financial incentives will be required to ensure all spatial areas are covered.

The role of the commercial dive and processing industry

Through industry investment in boats, tow vehicles and nitrox diving equipment, the commercial dive sector can harvest Centro urchins from all areas of their population to a depth of around 30 metres.

Capacity is one thing, but obtaining a commercial return is another. Divers are reticent to go to areas of low urchin populations without being provided with an incentive to do so.

The dive sector is strongly supported by the processing sector, which through significant investment, careful market exploration and marketing has created worldwide demand for high quality Tasmanian Centro roe. Furthermore, investment by the processing sector and Tasmanian government has developed technology to turn urchin waste into fertiliser, with preliminary trials on agricultural crops showing great promise.

With the commercial dive sector having the capacity and capability to increase the annual urchin harvest; and the processing sector predicting an increase in Centro urchin roe demand, it is predicted that the annual harvest of urchins could increase to a level that supports the long-term control of Centro urchins, which in turn will support the long-term maintenance of Tasmania's unique cool temperate reef. This viable control solution has the added benefits of employment and economic return to community.

¹ <https://www.imas.utas.edu.au/news/news-items/survey-reveals-invasive-sea-urchin-population-changes-in-eastern-tasmania>

The Tasmanian Commercial Dive Association and urchin processing sector is ready and willing to increase their capacity and capability to harvest urchins. A coordinated and strategic harvest of urchins, which maximises environmental, employment and economic return benefits (directly and indirectly through maintenance of ecosystem services) could easily be achieved with appropriate government funding to support harvest / processing subsidies, an industry coordinator and scientific monitoring.

Dive and processing subsidies would support the harvest of urchins in areas of low urchin return or from more inaccessible areas with higher value to other marine users. For example, should Centro urchin populations be observed to be increasing in areas of thick weed growth, where harvest rates would be low but the benefits of removing urchins high, an appropriate subsidy needs to be applied.

Industry, through the leadership of TSIC, TCDA, TACL and TRLFA are ready to take this next progression to an industry coordinated harvest strategy. But time is of the essence.

This is the only realistic control strategy ready to be enacted now, and with medium to long term cost-effective capacity.

It is vital that the government act, and appropriately fund this harvest strategy as a matter of urgency.

The role of scientific monitoring

A Centro Harvest Strategy would be driven by scientific monitoring of Tasmania's East Coast environment. This monitoring would identify areas for future harvest (i.e., areas where urchin biomass was concerning) and evaluate the success of different harvest strategies in maintaining a natural ecosystem and support the recovery of endemic species and species of commercial interest, such as abalone, southern rock lobster and kelp.

IMAS has been researching Centro urchins for the last 17 years and are well positioned to achieve this task in partnership with industry and management.

The negative impact of alternative Centro control strategies

A strategic harvest by commercial divers, inclusive of scientific monitoring, is the only long term, cost effective and realistic control strategy for the Centro urchin problem on Tasmania's East Coast. Fundamental to the current and future success of a commercially focused harvest strategy is the long-term maintenance of the commercial dive and processing capacity and capability. Maintenance of diver and processing capacity and capability can only be achieved with certainty of harvestable product. A scientifically driven harvest strategy has the potential to control the urchin population, provide long term support to divers and the processing sector and achieve the environmental outcomes needed to preserve our East Coast.

A further requirement of a successful urchin harvest strategy is the need to further build and protect the Tasmanian seafood brand and reputation within domestic and international markets.

Of specific vulnerability is abalone. There have been so many places around the world where a depletion in abalone stocks has led to a takeover by urchin populations, with abalone being essentially wiped out. We cannot let that happen here. As such, we have

embarked on a campaign to ensure the continuing viability of the abalone stock, supported by IMAS research.

Many key international urchin markets are volatile. They are increasingly aware of and interested in environmental sustainability issues and other political issues of the fish they purchase and the fisheries they are sourced from.

There are fears that what may be perceived locally as relatively minor issues or occurrence could have a significant detrimental impact on the Tasmanian brand market reputation and market demand for all fish and fish products.

More detail on an industry proposed commercial harvest strategy, including an analysis of alternative control options can be found in Attachment 1.

Industry Responses to the Inquiry Terms of Reference

- (a) the existing body of research and knowledge on the risks for and damage to marine biodiversity, habitat and fisheries caused by the proliferation and range shifting of non-endemic long spined sea urchins;

Research by IMAS

The Institute for Marine and Antarctic Studies (IMAS), a part of the University of Tasmania, has conducted research on *Centrostephanus* and associated barrens along the Tasmanian coast for more than 17 years. This research has shown that Centro can have devastating impacts on reefs due to the overgrazing of seaweeds. At its extreme, the consequences of urchin grazing is the creation of urchin barrens, where nothing else exists. This outcome leads to negative impacts on kelp beds and reef dependent species, including commercially harvested species such as abalone, rock lobster and fish (i.e., negative impact on biodiversity).

IMAS research aims to improve the understanding of urchin ecology and urchin impacts. Research includes surveying urchin populations and barren extent, trials of control measures such as culling and enhanced natural predation (by rock lobsters), and assessment of the wild harvest fishery and increasing profitability of urchin fisheries.

More information about the diverse range of research conducted by IMAS can be found [here](#).

TSIC recommends that the Committee refer to the submission made by IMAS to better understand the existing contemporary body of research and knowledge on the risks for and damage to marine biodiversity, habitat and fisheries caused by the proliferation and range shifting of Centro.

Large rock lobsters as the key urchin control – truth or fiction?

The Tasmanian seafood industry would like to highlight one line of research conducted by IMAS² which suggested that large southern rock lobster is the only effective natural predator of Centro urchins, but that overfishing of rock lobster on Tasmania's East Coast had led to them being ineffective at controlling urchin populations. Research trials, where large lobsters were translocated into two research areas, found that in extensive barrens, seaweed did not recover because urchin densities were not reduced far enough, but on incipient barrens, the rock lobsters were able to control urchin numbers enough to allow for the seaweed's recovery.

The conclusion of the research was that lobsters were a critical component to saving existing kelp beds.

More recent research has shown that southern rock lobsters prefer native prey over range-extending Centro urchins³. The feeding trials showed that range-extending Long-Spined Sea Urchins are the least preferred prey choice for Southern rock lobsters (3.8% predation

² <https://www.utas.edu.au/about/news-and-stories/articles/2018/765-why-lobsters-are-the-best-thing-to-hit-tassies-urchin-encrusted-reefs>

³ <https://academic.oup.com/icesjms/article/79/4/1353/6565266>

events), when compared to three local species abalone, urchins and snails (36.6%, 32.6% and 27%). Interestingly, habitat origin and naivete of lobsters to urchins affected urchin consumption, with 85% being consumed by lobsters originating from urchin barrens. Low predation rates on Long-spined Centro urchins suggest that resident lobsters are unlikely to control further barren expansion unless a behavioural shift occurs.

These results imply that potential control of Long-spined urchins by Southern rock lobsters has previously been over-estimated. The authors concluded that additional control methods are needed to safeguard ecological communities and important commercial stocks from this range extending species,

Industry and Government investment into Centro research and knowledge

Understanding our East Coast marine ecosystem and the impacts of the range-expanding long-spined urchin is important to the commercial fishing sector, and both the industry and the Tasmanian government has invested significantly into the issue.

Abalone Industry Reinvestment Fund (AIRF)

The Abalone Industry Reinvestment Fund (AIRF) was instigated by the Tasmanian abalone industry and supported by the Tasmanian government through the Government's *Taking Seafood to the Next Level* initiative.

The AIRF is a government allocation of \$5.1 million to be paid in equal instalments over 5 years to support and increase the sustainability and productivity of the abalone fishery both biologically and economically while also addressing the impacts of the long spined sea urchin to the marine environment.

The fund aims to

- support projects to increase abalone stock rates, including larval seeding; and
- support projects to reduce the long spined sea urchin population on the East Coast of Tasmania.

AIRF projects that support urchin fishery understanding, including links to more information and final reports if available, can be found in Table 1⁴.

The fund is now in its last year.

Investment by the Processing Sector

The Tasmanian urchin processing sector, with support from the Tasmanian government, has also made a significant investment into the processing of urchin roe and waste material.

TSIC recommends that the Committee refer to the submission made by True South Seafoods to better understand this investment.

⁴ <https://fishing.tas.gov.au/community/long-spined-sea-urchin-management/abalone-industry-reinvestment-fund>

Table 1: AIRF Funded Projects involving Centro urchin populations in Tasmania.

Project Title	Lead agency	Stats	Funding Year
Social-economic analysis for the Tasmanian dive sector	IMAS	Current	2022
Undertake a feasibility study into a long-spined sea urchin removal by volunteers	NRM South	Completed	2021
Tasmanian Commercial Dive Industry - Centrostephanus industry short film	TCDA	Current	2020
Understanding Centrostephanus - Age, Growth and Size of Maturity	IMAS	Current	2020
Babel Island take-all research support	IMAS	Completed	2020
Mapping abalone habitat impacted by Centrostephanus on the east coast of Tasmania	IMAS	Completed	2020
Risk profile for the paralytic shellfish toxins (PST) from Alexandrium cantenella in Tasmanian Sea Urchins	IMAS	Current	2020
Hit Them While They're Down 2020 Centro Cull	J Huddlestone	Completed	2019
Centrostephanus Exhibition	IMAS	Completed	2019
Resetting urchin barrens: liming as a rapid widespread urchin removal tool	IMAS	Completed	2019
Commercial upscaling of urchin fertiliser	IMAS	Current	2019
Modelling the fine-scale dispersal of Centrostephanus rogersii larvae	IMAS	Current	2019
Centrostephanus Response Strategy	CSIRO	Current	2019
Effects of Urchin fishing on Urchin population and kelp recovery	IMAS	Current	2019
Babel Island Group (including Babel, Cat, Stonehouse Island)	TCDA	Completed	2020
Decadal re-survey of long-term lobster experimental sites to inform Centrostephanus control	IMAS	Completed	2019
Centro Cull The Southern Front	J Huddlestone	Completed	2019

(b) management options, challenges and opportunities to better mitigate or adapt to these threats, and governance measures that are inclusive of First Nations communities

The Tasmanian Government's Long-Spine Sea Urchin Strategy⁵

The Tasmanian Government is developing a management strategy to mitigate the impact of long spined sea urchins. This strategy is being co-developed with the CSIRO to provide a framework to apply controls in a targeted and measurable way for the benefit of community, environment and fisheries.

Despite CSIRO being commissioned by the Tasmanian Government in November 2019, it is disappointing that a report has still not been produced. As such, TSIC unable to provide any further commentary on the proposed control options and broader strategy of this government strategy.

It is important to note that since this report was commissioned (November 2019), the only meaningful control of urchin populations has been through the commercial harvest and take-all harvest of urchins by the commercial dive and processing sector.

Understanding the Centro problem

It is important to fully understand the Centro problem to develop realistic control strategies.

The Long-Spined Sea Urchin is a climate-driven, range-extending species in Tasmania. The species has been able to 'naturally' extend its range because of an increase in average water temperatures off Tasmania's East Coast.

The current scientific understanding of Centro recruitment is that new recruits are sourced from populations in Vic or NSW, travelling on warm currents to Tasmania rather than self-recruiting from Tasmanian populations. This means there are significant benefits for Tasmania from the establishment of a regional Centro coordination approach.

Centro is well and truly established in Tasmania waters, and unless we can reverse the impacts of warming waters, it is here to stay. This means that eradication is not a viable option.

Therefore, a long-term, cost-effective control strategy is the only practical consideration for Centro urchins in Tasmania.

A commercially driven harvest strategy for urchins

A coordinated and strategic harvest is the only cost effective and long-term realistic control mechanism for Centro in Tasmanian waters. However, areas with low urchin populations will require a financial incentive for divers to go into those areas.

Given the significant delay in the development and delivery of a Government Centro strategy, the Tasmanian Commercial Divers Association, with the support of the Tasmanian Seafood Industry Council, has developed a high-level strategic framework for the control of urchins in Tasmania. This framework revolves around the development of a harvest strategy that relies on the commercial dive fishery to control long-spined urchin populations in a strategic and coordinated manner.

⁵ <https://fishing.tas.gov.au/community/long-spined-sea-urchin-management/long-spined-sea-urchin-strategy>

The objective of the industry framework parallels the Tasmanian Governments control objectives⁶:

- 1) To stop new urchin barrens forming.
- 2) To reduce growth of existing urchin barrens.
- 3) To reverse and rehabilitate existing urchin barrens.

The industry strategy is reliant on appropriate funding to support the employment of an industry coordinator, to support urchin subsidies to ensure diving effort is directed to where it needs to be and to support appropriate scientific monitoring of urchin populations and the effectiveness of different harvesting strategies.

The removal of urchins by commercial divers is the only realistic, cost-effective and Workplace Health and Safety compliant strategy to control urchins in Tasmania.

The draft TCDA commercial harvest framework is included in Attachment 1.

⁶ <https://fishing.tas.gov.au/community/long-spined-sea-urchin-management/long-spined-sea-urchin-strategy>

(c) funding requirements, responsibility, and pathways to better manage and coordinate stopping the spread of climate-related marine invasive species;

To date, the Tasmanian commercial dive and processing sector has achieved significant positive outcomes for Tasmania's East Coast on very limited harvest subsidy and coordination.

An increase in investment to support a coordinated and strategic harvest of urchins and the scientific monitoring of urchin populations in Tasmania (see attachment 1) would achieve far greater benefits and long-term protection of Tasmania's unique cool temperature Great Southern Coast marine environment.

Central to this coordinated harvest strategy is

- The provision of a financial incentive for targeted and take all harvests
- appropriate funding for ongoing scientific monitoring and assessment of urchin populations.
- Funding for an industry coordinator role

To do the job properly will take considerable investment, but as explained in the following section, taking no action will cost Tasmania more.

TSIC has requested consideration for federal funds to support appropriate action on Centro as part of their 2019 and 2022 Federal Election Policy Statements.

What value do you put on preserving Tasmania's unique cool temperate reefs?

(d) the importance of tackling the spread of invasive urchin 'barrens' to help facilitate marine ecosystem restoration efforts (such as for Tasmanian Giant Kelp *Macrocystis pyrifera*)

The only cost-effective viable medium to long term control of Centro urchins is the coordinated strategic harvest and scientific monitoring of the urchin population in Tasmania. This control strategy has the side benefit of providing important employment, an economic return to Tasmania and provision of quality Tasmanian seafood to domestic and export markets.

Given a commercial fishery generates financial return, there is potential for the commercial dive urchin control solution to become a self-sustaining control solution, that maintains urchin populations to levels that support a harvest and maintains a health East Coast reef system.

All other proposed Centro control measures are either untested and / or require significant time and financial support to develop and trial (more information in Attachment 1).

Implementing a harvest strategy that supports the ongoing coordinated harvest of urchins to support the medium- to long-term future health of Tasmania's East Coast cool temperate reef environment is important to the Tasmanian seafood industry and broader Tasmanian community.

Protecting our East Coast Biodiversity

The coordinated strategic harvest of Centro urchins can keep urchin numbers below threshold abundances to:

- Stop new urchin barrens forming.
- Reduce growth of existing urchin barrens.
- Reverse and rehabilitate existing urchin barrens.

Observations show that in achieving this we will preserve seaweed habitat and promote the growth of seaweed in urchin barrens. This will have a significant positive impact on biodiversity, which will have benefits for commercial, recreational and environmental values.

Supporting Ecosystem Services

Maintaining a healthy, natural East Coast marine environment has significant benefits for the commercial seafood industry. For example, seaweed and coralline algae provides important habitat, protection and food for a number of commercially targeted species, including abalone, southern rock lobster and a number of Scalefish species. It also provides important triggers for recruitment.

The destruction of these habitats by urchins negatively impacts these ecosystem services and will have a significant and negative flow-on impact on Tasmania's economy, employment and provision of food services currently provided by the Tasmanian East Coast.

The Economic cost of doing nothing vs doing something!

The Crown of Thorns control program⁷ and other comparable terrestrial pest management programs have demonstrated that the costs of a pest species, if unchecked, can have significantly higher economic impacts on local and regional communities compared to the costs of effective control⁸.

Therefore, the investment in a commercial harvest strategy control solution to the Centro problem will provide a significant positive return to Tasmania.

A strategic harvest by commercial divers – the only solution

A coordinated harvest strategy for Centro urchins, with an appropriate level of subsidy and scientific monitoring funding, represents a cost-effective tactic of maintaining our East Coast environment, and create improved economic return for fisheries, tourism, and related coastal industries and their dependent communities. The positive outcomes of this solution will build long-term resilience of marine habitats in the face of climate change and other negative inputs.

The harvest of urchins has the potential to be a significant economic opportunity – its edible roe now being a highly valued Tasmanian seafood product and its waste products (cast and entrails) showing great promise as an agricultural fertiliser.

With a current harvest of 500+ tonnes per annum, and potential to upscale this harvest with further diver subsidy, this relatively new fishery has the potential to create a partially self-funded mechanism for management of Centro and in turn support a healthy East Coast marine habitat and positively support ecosystem services a healthy habitat sustains.

⁷ [GBRMPA - Crown-of-thorns starfish control program](#)

⁸ <https://blog.csiro.au/pest-plants-and-animals-cost-australia-around-25-billion-a-year/>

Attachment 1



Maintaining a healthy East Coast marine ecosystem through the coordinated strategic commercial harvest of Long Spine Urchins (*Centrostephanus rodgersii*)

Need

It has been more than 40 years since the first Long-spined Sea Urchin (*Centrostephanu rodgersii* or Centro for short) was identified in Tasmanian waters. Thanks to a warming marine environment around Tasmania, numbers of Centro urchins have significantly increased. Although Centro populations are in large confined to Tasmania's East Coast, they are also abundant in Victoria and NSW, and it is these populations that are a source of new recruits in Tasmania, meaning the problem is here to stay unless we can reverse the impacts of climate change.

This unwelcome, range expanding visitor has progressively destroyed large areas of shallow reef habitat, leaving bare urchin barrens where there was once an abundance of sea life. This problem impacts all key seafood sectors in Tasmania, notable the Tasmanian abalone and rock lobster fisheries, and has caused significant damage to Tasmania's unique East Coast cool temperate marine ecosystem.

To protect Tasmania's East Coast, we must control urchin numbers to below the critical abundances that promote the formation of urchin barrens; and reduce densities in urchin barrens to below the critical point to support the reestablishment of seaweeds.

But how can this be achieved in a time efficient and cost effective manner?

Non-harvest Control Options – what we already know

Through numerous urchin workshops and other industry/government/science discussions, many potential long-spine urchin control options have been discussed, with some also being tested.

Large Southern Rock Lobster

Early research suggested that large southern rock lobster is a key predator of Centro urchins, and that rebuilding a higher density population of large lobsters is the most effective control strategy for the urchin problem¹.

More recently peer reviewed published research² looking at rock lobster experimental feed trials has shown:

- Southern rock lobsters prefer other native species, such as abalone and short spined urchins, over Centro. In fact, southern rock lobster generally ignored Centro. This suggests that rebuilding large rock lobster biomass may have a detrimental effect on other native species. This is supported by results of the long-term monitoring of the Maria Island Marine Reserve, which shows that as lobster biomass increased, abalone and native Short-Spined Urchin populations significantly reduced to near zero numbers (IMAS presentations at the Crustacean Fisheries Advisory Committee).
- Low predation rates of Centro by southern rock lobster suggest that resident lobsters are unlikely to control further barren expansion unless a behavioural shift occurs.
- Results imply that potential control of Centro by southern rock lobsters has previously been overestimated.
- Additional control methods are needed to safeguard ecological communities and important commercial stocks from this climate change-induced, range-extending pest species.

Liming

An Abalone Industry Reinvestment Fund (AIRF) project looked at the effectiveness and feasibility of using quicklime (calcium oxide – CaO) as a rapid, widespread urchin removal tool³.

The study showed that fine quicklime was most effective at killing Centro, but could also kill Blacklip Abalone and Feather Stars, amongst other unknown impacts. Furthermore, there are no examples worldwide of successful liming at depth or in the environmental conditions of Tasmania. With 70% of urchin barrens in Tasmania being in depths > 20m, an engineering solution is still required to disperse quicklime at this depth, whilst minimising its impacts on other species.

¹ <https://www.imas.utas.edu.au/research/fisheries-and-aquaculture/fisheries/Long-spined-sea-urchin-Centrostephanus-Rodgersii>

² <https://academic.oup.com/icesjms/article/79/4/1353/6565266?guestAccessKey=9b30bf17-0a9d-4cbd-bdf0-cd2589b142c5>

³ <https://nre.tas.gov.au/sea-fishing-aquaculture/community-resources/grants/abalone-industry-reinvestment-fund>

Industry questions whether the environmental risk to other species – namely abalone; time and cost needed to develop and trial the technology to support quicklime dispersal at depth; and significant cost of quicklime application in the marine environment outweigh the currently unknown and unproven benefits of liming?

As such, the commercial dive industry does not support the use of lime as a Centro control tool.

Automated culling using robotic technology

Automated culling using robotic technology has been suggested as another potential Centro control solution. There is currently no technological solution available to achieve this outcome, and instead, significant time and considerable cost would be required to develop, trial and commercialise any technology.

Furthermore, a key habitat where urchin control is required is in thick seaweed habitat. It is highly unlikely that an automated robot would be effective, let alone operational, in this dynamic seaweed habitat. Furthermore, many urchins live in deep rock crevices, where divers can effectively remove urchins, but the abilities of a robot remain unknown.

Culling by recreational diver volunteers

Another AIRF funded project looked at the viability of volunteers to participate in the **eradication** of long-spined sea urchins. Science and government have previously acknowledged that eradication is not possible, so is therefore not an objective for urchin control in Tasmania.

Although the study found that a volunteer urchin management program (vump) in Tasmania is feasible, it would require adequate measures to ensure the program is safe, minimises overlap with the commercial sector and has manageable and realistic goals.

Fundamental questions to ask are who has the duty of care for a program that supports and directs potentially unqualified and inexperienced recreational divers to work outside their abilities, training and medical certifications? Does the liability sit with the Government or science, who may direct divers to specific areas, the recreational dive club or the individual recreational diver?

The Tasmanian Commercial Dive Association also has concerns over the impact that a VUMP culling program would have on the Tasmanian urchin brand and markets. Any adverse impact would affect invaluable employment and economic return to Tasmania from this important commercial industry and in turn compromise the effective control of urchins by commercial divers, the only effective and realistic control strategy currently in place.

Culling by commercial divers

There have been several trials of culling by commercial divers, with the conclusion of the TCDA that a take all harvest can have the same impact as a cull, while also providing some urchin roe for markets, with waste being transformed into a fertiliser product. These outcomes support employment and economic return across the dive and processing sectors.

It is also the view of the TCDA that culling attracts a negative perception of Centro urchins and the urchin industry, which in turn will impact the Tasmanian urchin brand and markets. The TCDA is not prepared to accept these potential risks.

Commercial Harvest of urchins - a proven solution with significant benefit for Tas

The commercial dive and processing sector has the proven capacity and capability, as well as the proven track record, to be the sole control solution to the Centro problem in Tasmania. The commercial dive sector is now Tasmania's third largest and most valuable fishery, harvesting between 400 and 500 tonnes, or over 1 million individual urchins per year.

With growing market demand and ongoing promotion of Tasmanian urchin product, there is capacity to grow this harvest.

There is evidence that the commercial harvest of urchins is having a positive influence on urchin populations. There are several indicators of the Urchin population being under stress, including a reduction in the average size of sea urchins, fishers having to move greater distances from port to get their catch, needing to fish deeper and research is showing the abundance of urchins is coming down in heavily fished areas (John Keane – IMAS, pers comms).

The end outcome is the observed reestablishment of kelp in the most heavily fished areas.

This outcome has significant benefit for abalone, rock lobster and Scalefish fisheries in Tasmania, as well as general habitat preservation values.

The CSIRO 'Centro' strategy

In 2019, the Department of Primary Industries, Parks, Water and Environment (now NRE Tas) contracted the CSIRO to develop an overarching strategy for the Tasmanian Centro problem⁴. After nearly 3 years of painstakingly slow development, the Tasmanian seafood industry is still awaiting the delivery of this strategy. During the Abalone Futures Workshop held in April 2022, industry was provided a small insight into the strategy, with the commercial harvest of urchins by the commercial dive sector appearing to be a key component of the overarching strategy.

Conclusions

The science shows that simply removing urchins will not solve the urchin problem because they are going to keep recruiting to our waters from populations in Victoria and NSW. Long-Spined Urchins are therefore here to stay, and any control measure must be cost-effective through a timeframe of years and decades (John Keane pers comms).

The commercial harvest of urchins by the commercial dive sector is the only solution that can stand the test of time, is cost effective, and provides significant economic and employment benefit to Tasmania.

⁴ <https://nre.tas.gov.au/sea-fishing-aquaculture/community-resources/grants/abalone-industry-reinvestment-fund>

A Commercial Harvest Strategy that supports the coordinated and strategic commercial overfishing of Centro

Introduction

The commercial dive sector has shown it has the capacity and capability to control long-spined urchin populations across Tasmania's East Coast.

To date, an urchin subsidy, provided by the AIDF / AIRF, has implemented different subsidy rates in different areas in an attempt to direct urchin harvest effort into specific zones. This has been achieved with varying degrees of success.

Furthermore, there have been successful take all harvest trials at Babel and the Tasman Peninsula, with divers taking all size classes of urchins in a concerted effort to control urchin populations in areas identified as high value areas.

The coordinated strategic harvest of urchins from Tasmania's East Coast is the only urchin control strategy that can be implemented right now, at the scale of the entire urchin population and in a cost effective manner.

Development of an urchin harvest strategy

Harvest Strategy principles and objectives

The Tasmanian Commercial Dive Association supports the development of a Long-Spined Urchin Harvest Strategy that specifies pre-determined management actions to support the ecological control of Centro on Tasmania's East Coast, and in turn supports the economic and social objectives and benefits of the Centro fishery.

The key principle of the Centro Harvest Strategy would be to 'sustainably overfish' Centro populations in a spatially strategic and coordinated way.

The key objectives of the Centro Harvest Strategy would be to:

- Stop new urchin barrens forming;
- Reduce growth of existing urchin barrens; and.
- Reverse and rehabilitate existing urchin barrens.

Given the science says that the Centro problem is here to stay, it is important that the Centro Harvest Strategy ensures long term harvest and processing capacity and capability, because if this capacity is removed by other potential control solutions it will be impossible to rebuild when the urchin problem reoccurs.

Harvest Strategy reference points

It is anticipated that the Harvest Strategy reference points would be a measure of % urchin barren within each assessment zone. Each zone would have a maximum % barren that cannot be exceeded. If exceeded, then more commercial dive effort would need to be forced into that zone and/or other control options considered, such as take all harvest.

Scientific Monitoring

A robust scientific monitoring regime would be required to support the Centro Harvest Strategy and in turn the effective control of Centro on Tasmania's East Coast. The University of Tasmania, Institute of Marine and Antarctic Studies have the proven capacity and capabilities to design and implement this monitoring regime.

Scientific monitoring would:

- Assess the percentage barrens in each fishery zone at very least annually or more frequently if required.
- Monitor the success of different harvest and subsidy strategies to control urchin abundance and to restore urchin barrens to a healthy ecosystem.
- Develop a knowledge bank of urchin abundance, recruitment and other ecological drivers of the Tasmanian Centro population to support the ongoing understanding and management of Centro in Tasmania.

Over time, scientific monitoring of each Centro assessment zone will provide detailed spatial abundance and recruitment information to support a long term, sustainable Centro harvest that delivers the objectives detailed above.

Centro subsidy

An coordinated strategic harvest of Centro will require an ongoing subsidy to support the harvest of urchins from areas / harvest strategies that are not economically viable.

For example, any observed increase in abundance of Centro in thick seaweed habitat would require action, however, harvest rates would be slow, hence a subsidy would be required to support targeted take all harvest effort in such habitat.

Strategic Co-ordination of Centro harvest

To maximise Centro harvest opportunity and in turn create positive outcomes for Tasmania's East Coast marine environment a dedicated industry coordinator would need to be employed. This person would liaise with Government, science and industry to ensure that Centro harvesting effort and any available subsidy was directed in such a way to maximise positive outcomes for industry and Tasmania's East Coast marine environment.

This position is best situated within industry. The TCDA, with the support of the Tasmanian Seafood Industry Council, is in a position to manage this position.