



**Eastern Zone Abalone
Industry Association Inc.**

10th October 2022

To: Committee Secretary
Senate Standing Committees on Environment and Communications
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Submission on Climate-related marine invasive species

This is a joint submission by the Eastern (Victorian) Zone Abalone Industry Association (EZAIA) and the (Eastern) Victorian Sea Urchin Divers Association (VSUDA).

TERMS OF REFERENCE

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.*



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Introduction

The Eastern (fishery management) Zone extends from the NSW/VIC boarder to Lakes Entrance. The abalone and urchin industries are the corner stone of the economy in the small regional towns of Mallacoota and Marlo in which they operate.

Since Scoresby Shepherd first observed and reported urchin barren formation at Gabo Island in the early 1970s, the range expansion of *Centrostephanus rodgersii* (Centro) into eastern Victoria has continued as far as the snowy river. The increasing abundance of Centro and associated denudation of algal communities has severely impacted the health of many reef habitats, not only reducing reef biodiversity but also the productivity of the commercial abalone fishery.

(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;

Centro in the Mallacoota area are a native species, often referred to as an invasive native species and considered both a pest and a part of a commercial fishery. In 2014 the Department of Environment and Primary Industries (DEPI), now the Victorian Fishery Authority (VFA) created the Sea Urchin Fishery Baseline Management Arrangements. These arrangements noted that "*the sea urchin fishery has been operating as a developing fishery under permits since Ministerial Direction in 1998. Prior to this, the fishery operated in various alternative forms of exploratory fishing under permit*".¹

The Baseline Management arrangements in 2014 established a Total Allowable Commercial Catch limits for both white and black urchins as follows:

White urchin (<i>H. erythrogramma</i>)	57t
Black urchin (<i>C. rodgersii</i>)	114t

These TACC limits have not been adjusted since 2014.

¹ Sea Urchin Fishery Baseline Management Arrangements June 2014
https://vfa.vic.gov.au/_data/assets/pdf_file/0020/340661/Sea-Urchin-Fishery-Baseline-Management-Arrangements_FINAL_03072014.pdf



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Since 2011 the EZAIA in partnership with the VSUDA and Victorian Fisheries Authority (VFA) has driven initiatives to reduce the Centro biomass at key locations. EZAIA have been actively attempting to prevent further loss of healthy abalone habitat by culling the long-spined sea urchins on important abalone reefs that have been deemed to be under threat from urchins since at least 2011.²

The “EZAIA (Mallacoota) Kelp Forest Restoration project” has removed more than two million urchins protecting and restoring around 105 ha of kelp forest at an average cost of \$5,285 per ha. The predominately industry funded project uses abalone and urchin industry divers to reduce urchin densities to very low levels at carefully targeted reef locations. The results are dramatic, within 12-18 months an urchin wasteland can be transformed into a flourishing kelp forest and with it comes the return of a multitude of fish species and other marine organisms.

A key to the success of the project has been the use of commercially licensed abalone and urchin industry divers who are experienced, knowledgeable, efficient, motivated, and accountable.

Through formal processes, priority sites are established, management actions, work schedules and budgets are agreed by all parties and supported by appropriate permits.

The harvesting of urchins is the priority control measure to be applied wherever urchins are commercially viable.

Urchin harvest subsidies may be applied to encourage harvesting from remote or marginally viable areas.

Culling is applied where urchins are not commercially viable or when a rapid response is required.

(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 “EZAIA (Mallacoota) Kelp Forest Restoration project” (Attachment A)

² VFA Spatial and temporal trends in the abundance of long-spined sea urchins (*Centrostephanus rodgersii*) in Eastern Victoria using available fishery and fishery independent information. Oct 2019.



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In 2011, a joint (EZAIA/VFA) project "Removing Sea urchins (*Centrostephanus rogersii*) to recover abalone habitat", was conducted at Island Point. The project sought to upscale earlier research conducted in 1993 by Dr. Duncan Worthington et al. to the reef level.³

In 2014 the VFA released "A Review of Rebuilding Options for the Victorian Abalone Fishery" that recommended the priority of investment in habitat rehabilitation through removal of urchins, and the translocation of abalone to recover productive populations, from impacts such as AVG and Theft.

The FRDC 2014-224 "Rebuilding abalone populations to limit impacts of the spread of urchins, abalone viral Ganglioneuritis and theft", provided resources to assist the roll out of urchin biomass reduction and abalone translocation, over several years to many reef locations. The EZAIA continued to provide co-investment and significant in-kind contributions for the duration of the project.

In March 2019, the Victorian Government Department of Environment Land, Water and Planning (DEWLP) in partnership with the VFA and EZAIA provided funding from the Protecting Victoria's Environment Biodiversity, Marine targeted actions, program. The project "Restoring marine habitat and biodiversity in Eastern Victoria (BRMM002)" focused on urchin removal to restore kelp forest habitat at the Gunshot reef.

To assist in the assessment of kelp forest restoration on abalone populations, a collaborative project⁴ with IMAS and FRDC, project 2017/049 installed Abalone Recruitment Modules (ARM's) at 4 sites between Island Point and Petrel Point approximately 60 kilometers southwest of Mallacoota Inlet, Victoria. The EZAIA conducts annual surveys of the ARMS sites. The VFA analyses the data and provides updated reports.⁵

Sea Urchin commercial harvesting

In the late 1980s and early 2000, the Mallacoota Abalone fishermen's co-operative trialed the processing and export of Centro in partnership with Korean and Californian companies. These trials were unsuccessful primarily due to logistical problems that existed at that time.

The urchin fishery continued to operate as a cottage industry under developmental fishery permits for several decades.

The industry operated under developmental fishery permits for several decades.

³ <https://frdc.com.au/Archived-Reports/FRDC%20Projects/1993-102-DLD.pdf>

⁴ <https://frdc.com.au/Archived-Reports/FRDC%20Projects/2017-049-DLD.pdf>

⁵ Abalone Recruitment Monitoring – Preliminary investigation of abalone recruitment modules in the Eastern Abalone Zone, J. D. Bell, September 2020. Victorian Fisheries Authority Science Report Series No. 13.



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In June 2014, the VFA introduced the Sea Urchin Fishery Baseline Management Arrangements.⁶

Supported by urchin processors in NSW, the urchin harvest volume (in Mallacoota) increased steadily from around 20 tons in 2014 to around 80 tons in 2020 when the impact from bushfires and Covid-19 caused major disruptions to fishing operations.

The volume of Centro that can be harvested is mostly constrained by the portion of the resource that produces viable roe yield and quality. Other constraints include domestic market demand, processor capacity, fishery economics, short seasons, exposed coastlines, and weather conditions.

To overcome some of these constraints, urchin processors in NSW typically source supply from multiple regions (including Mallacoota) and species. In this way the urchin fisheries of NSW and Victoria are linked.

Urchin harvesting is likely to be the most viable long term control measure on our near shore reefs. Harvesting generally occurs within kelp forests and at the juncture with urchin barrens, keeping the biomass below the threshold tipping point, providing effective protection against further barren formation.

All measures aimed at supporting commercial urchin harvesting, processing, and marketing ought to be pursued.

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

Without a consistent culling program combined with higher levels of harvesting, urchin encroachment will continue to drive habitat loss, lower biodiversity, and reduced abalone fishery production in Eastern Victoria.

The EZAIA in partnership with the VSUDA and VFA are proposing to set up an Eastern Zone Abalone Industry Reinvestment Fund (EZAIRF) [or Mallacoota Kelp Forest Restoration Fund – MKFRF], based on the successful Tasmanian model, the Abalone Industry Reinvestment Fund (AIRF).

The EZAIRF will be funded by contributions from the abalone industry and the Victorian state government. The EZAIRF will be managed jointly by the VFA, EZAIA & VSUDA. and support coal face projects aimed at protecting and restoring kelp forests in Eastern Victoria including:

⁶ https://vfa.vic.gov.au/_data/assets/pdf_file/0020/340661/Sea-Urchin-Fishery-Baseline-Management-Arrangements_FINAL_03072014.pdf



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- The continuation of the EZAIA (Mallacoota) Kelp Forest Restoration (Culling) program to address urchin barrens at locations not subject to harvesting.
- Subsidies to incubate, accelerate and expand the urchin fishery.
- Research and development to support urchin processors with developing new products and accessing markets.
- Research and development on methods to address urchin barrens on reefs beyond safe diving depths.

Industry voluntary fund contributions

EZAIA Abalone Fishery Access Licence (AFAL) holders pay substantial fees and levies to VFA and are the only fishery in Victoria to pay a royalty. The AFAL or quota owners main concern is for the habitat of the abalone and by supporting urchin culling programs are safeguarding the environment for the abalone they fish. In addition to these fees AFAL holders have voluntarily contributed the following funds to support urchin mitigation activities since 2013/14:

Year	AFAL holders' voluntary contribution
2010/11	\$30,000
2011/12	\$50,000
2012/13	\$50,000
2013/14	\$60,000
2014/15	\$50,000
2015/16	\$50,000
2017/18	\$50,000
2018/19	\$50,000
2019/20	\$5,209
2020/21	\$25,000
2021/22	\$0.000
TOTALS	\$420,209

Evidence of climate change impact on increased urchin spread

Climate change is thought to be the driver for increasing spread of urchins and in a DELWP Natural Environment Climate Change Adaption Action Plan 2022-2026 it was noted that climate change will significantly affect Victoria's marine ecosystems and that many marine species are migrating southwards including urchins.



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"In Victoria, some changes are already being observed including the southern migration of seaweed to cooler waters and a southward extension in a range of 15 per cent of coastal fishes in temperate south-eastern Australia.

*The southern migration of sea urchins from New South Wales has led to a loss of kelp forests, destroying vital habitat for fish and abalone."*⁷

An FRDC project report highlights that climate change is the reason for the urchins spreading along the east coast to Tasmania:

The arrival of urchins in Tasmania has been attributed to marine climate change; the south east Australian region is termed a global "hotspot" with waters warming nearly four times faster than the global average due to the intensification of the East Australian Current (EAC) extension and more frequent large scale eddies 3 extending south along the East Tasmania coastline (Ridgway 2007a, b; Richardson & Poloczanska 2008; Ridgway & Hill 2009; Last et al. 2011; Hughes et al 2013).⁸ (Pg 2)

Parks Victoria in one of its State reports on Marine Parks noted:

*Unlike other species examined in this part of the report, very high densities of both *H. erythrogramma* and *C. rodgersii* are generally considered undesirable, as this can lead to the creation of urchin barren areas and declines in macroalgal cover.⁹(pg 60)*

*ALSO The historical Parks Victoria Technical Series No. 118 - Statewide assessment of Victorian marine protected areas using existing data range of *C. rodgersii* extends into eastern Victoria (Byrne and Andrew, 2020); however, the warming waters off Victoria are extending their distributions further to the west. **This range expansion is likely a consequence of climate change and the strengthening of the East Australian Current (Ling and Johnson, 2009; Ling et al., 2009; Ridgway, 2007), and temperatures have already increased 0.8 °C since the 1960s (Lough, 2009). As waters off the coast continue to warm, it is expected that *C. rodgersii* will continue to expand their range westward (Jalali et al., 2018) as has been seen in eastern Tasmania** (Ling, 2008; Ling and Keane, 2018). Complexity of the reef habitat was also found to be influential, and *C. rodgersii* density increases with increasing reef complexity. These results are consistent with previous studies that have found habitat complexity to be an important driver in the abundance distribution of *C. rodgersii* (Jalali et al., 2015; Ling and Johnson, 2012). PVTS118 (Pg 99)*

⁷ https://www.environment.vic.gov.au/natural-environment-adaptation-action-plan/climate-change-impacts#toc_id_5_key

⁸ <https://www.frdc.com.au/sites/default/files/products/2013-026-DLD.pdf>

⁹ <https://www.parks.vic.gov.au/get-into-nature/conservation-and-science/conserving-our-parks/technical-series,PVTS118>.



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ALSO Finally, the effects of urchins on macroalgae are likely to increase in the future with the expansion of urchin populations along the coast. Therefore, understanding the thresholds in urchin abundance that are associated with decreasing macroalgae percentage cover can help managers determine if management action, such as the culling of sea urchins within (and outside) MPAs, is needed. PVTS118 (Pg 104)

There is enough evidence to suggest that climate change and warming oceans are contributing to the sea urchins expanding along the East Coast of Australia into Tasmania.

(e) any other related matters.

Removing *Centrostephanus rodgersii* through harvesting and culling by diver, has been one of the only practical methods for protecting and restoring Kelp Forests and abalone habitat in Eastern Victoria. The directly affected abalone and urchin fisheries in partnership with relevant state government departments are best placed to implement appropriate intervention projects.

Victoria's Fisheries Act 1995, Section 3 (b) states that an objective of this Act are to "*protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity*".¹⁰

In the VFA's Abalone Management Plan, it is noted:
*DEDJTR and EZAIA co-invested in a project that trialled the development of a cost-effective method to enable abalone divers to cull urchins. This project has shown potential benefits in restoring abalone habitat and serves as a model for future co-investment to address emerging issues.*¹¹ (Pg 9)

And summarises - *Research undertaken to assess the effectiveness of removing sea urchins from selected reefs has demonstrated its potential for habitat restoration. The extent the restored habitat will support improved abalone and urchin commercial productivity remains to be seen and will likely require periodical removal of sea urchins to maintain the habitat. (pg 19)*

The Mallacoota area is part of the Great Southern Reef and unlike its northern counterpart the Great Barrier Reef Marine Park (GBRMP) rarely gets any recognition or funding support for programs to support the environment.

¹⁰ <https://content.legislation.vic.gov.au/sites/default/files/2020-05/95-92aa097%20authorised.pdf>

¹¹ <https://vfa.vic.gov.au/operational-policy/fisheries-management-plans/abalone-management-plan-summary>



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The EZAIA and VSUDA welcome this enquiry, we are keen to participate in any future projects.

In addition, we would welcome any funding contributions and ongoing support to the EZAIRF [or MKFRF] from the federal government. At present it has mostly been the abalone industry in Eastern Victoria who have been funding programs to mitigate the spread of urchins on a small scale for the important abalone wild fishery and to restore biodiversity and habitat loss from the voracious urchins.

The EZAIA and VSUDA would also welcome an opportunity to provide evidence should this be required.

Yours sincerely

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ABBREVIATIONS

ARM	Abalone Recruitment Modules
AVG	Abalone Viral Ganglioneuritis
AIRF	Abalone Industry Reinvestment Fund (Tasmania)
Centro	Centrostephanus rodgersii
DELWP	Department Environment Land, Water and Planning
EZAIA	Eastern Zone Abalone Industry Association
EZAIRF	Eastern Zone Abalone Industry Reinvestment Fund
IMAS	Institute for Marine & Antarctic Studies
FRDC	Fisheries Research Development Corporation
GBRMP	Great Barrier Reef Marine Park
GSR	Great Southern Reef
MKFRF	Mallacoota Kelp Forest Restoration Fund
VFA	Victorian Fisheries Authority
VSUDA	Victorian Sea Urchin Divers Association

ATTACHMENTS

- A EZAIA (Mallacoota) Kelp Forest Restoration project**

- B Spatial and temporal trends in the abundance of long-spined sea urchins in Eastern Victorian using available fishery and fishery independent information. VFA Science Report Series No. 10. October 2019**