

MEDIA RELEASE

NEWS FROM THE UNIVERSITY OF TASMANIA

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Cascade of climate change

A new paper has revealed the consequences of the elevated rate of ocean warming in Eastern Tasmania.

Climate Change Cascades: Shifts in oceanography, species' ranges and subtidal marine community dynamics in eastern Tasmania, shows evidence that ocean warming off the east coast of Tasmania at 3-4 times the global average is the result of intensification of the East Australian Current.

Increases in the strength, duration and frequency of southward incursions of warm, nutrient-poor water transports heat and organisms to eastern Tasmania with dramatic effects on the ecology of the region.

This shift in large-scale oceanography is reflected by changes in the structure of zooplankton communities close to the shore and in other important elements of the marine system, including:

- A dramatic regional decline in the extent of dense beds of giant kelp over several decades;
- Marked changes in the distribution of nearshore fishes;
- Range expansions of other northern warmer-water species to colonise Tasmanian coastal waters.

Lead author Professor Craig Johnson, from the Institute for Marine and Antarctic Studies at the University, said population-level changes in commercially important invertebrate species such as abalone and rock lobster may also be associated with the warming trend.

The paper also records the establishment of the long spined sea urchin in Bass Strait and Tasmania. "Over-grazing of seaweed beds by this animal is causing a fundamental shift in the structure and dynamics of Tasmanian rocky reef systems by the formation sea urchins "barrens" habitat," Prof Johnson said.

Barrens are caused by destructive overgrazing of kelp by sea urchins.

"Formation of barrens represents an interaction between effects of climate change and reduction in large predatory rock lobsters due to fishing, and is

the single largest biologically mediated threat to the integrity of important shallow water rocky reef communities in eastern Tasmania.”

“Changes in ocean climate have precipitated a knock-on or ‘domino’ effect of cascading ecological change in rocky reef and water column systems,” Prof Johnson said.

“But it is possible that some of the changes we see that seem to be *correlated* with changes in temperature might not be *caused* by temperature shifts but by other mechanisms.”

Prof Johnson said the while the paper is the most complete synthesis of new and existing information on impacts of climate change on marine systems off eastern Tasmania, it also identifies important knowledge gaps that need to be addressed to adequately understand, anticipate and adapt to future climate-driven changes in marine systems in the region.

The paper, which appeared in a special issue of the *Journal of Experimental Marine Biology and Ecology*, is a result of collaboration between the Institute for Marine and Antarctic Studies at UTAS, the UTAS Schools of Zoology and Geography and Environmental Studies, CSIRO, Australian Antarctic Division, the Australian National University and SARDI Aquatic Sciences.

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