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TASMANIA



IMAS  
INSTITUTE FOR MARINE & ANTARCTIC STUDIES

**NEWS FROM THE UNIVERSITY OF TASMANIA, AUSTRALIA**

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## Media Release

Chiefs of Staff, News Directors

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### Tasmanian kelp forests highlight tough lessons on ecological restoration

Lessons learned following the catastrophic loss of some of Tasmania's kelp forests could help to inform global efforts to restore ecosystems impacted by human activity.

In a study [published in the international journal \*Restoration Ecology\*](#), IMAS researchers have highlighted the challenges communities and environmental managers face when deciding whether to attempt restoring ecological systems.

Lead author Professor Craig Johnson said restoration efforts were increasing worldwide but important lessons needed to be learned from examples such as the destruction of Tasmanian kelp forests by sea urchins.

"Too often the efforts of concerned communities around the world to reverse the damage that humans have caused end in expensive and disappointing failure", Prof Johnson said.

"We suggest that before undertaking restoration, environmental managers should answer two key questions.

"First, is the ecosystem 'decline' they're addressing a natural fluctuation in an otherwise 'healthy' ecosystem that may correct itself over time without human intervention, or a more fundamental shift that requires action? Second, will restoration efforts be successful given the resources available?"

"Our research showed that the first question can be answered by studying the characteristic length scale (CLS) of ecological systems. If there is a fundamental shift in ecosystem dynamics then this will be reflected in a change in the CLS, and in this case management intervention may well be warranted.

"But in marine systems in which large fluctuations in species abundances are part of the normal dynamic, the CLS doesn't change even though species composition may change significantly. What is really neat is that the CLS for an entire community of interacting species can be determined by observing just one species."

Prof Johnson said the second question could be answered using lessons learned from Tasmania's experience with kelp forests, which were devastated by invasive sea urchins to form sea urchin

'barrens' devoid of kelp and other seaweed, the result of ecological overfishing of lobsters which are the key urchin predator in Tasmania.

"We developed a model which showed that restoration efforts were unlikely to succeed because the most direct opportunity for intervention – by reducing lobster fishing – would not increase the likelihood of seaweed recovery even though greater numbers of lobsters were eating large numbers of urchins.

"This is because of a massive hysteresis in the dynamics, reflecting that far fewer urchins are needed to maintain an urchin barren than to create one in the first place by destructively grazing kelp.

"Informed by our study, management efforts instead focused on protecting Tasmania's remaining kelp beds from urchins by better managing the lobster fishery.

"Our research suggests that ecological restoration efforts worldwide could benefit from the use of CLS measures to enable interpretation of ecological change, and from the development of dynamic, locally-relevant and well-validated models that objectively assess the likelihood of any proposed intervention succeeding," Prof Johnson said.

**IMAS Media Contact:** Andrew Rhodes (03) 6226 6683 or 0417 239 537, email: [ajrhodes@utas.edu.au](mailto:ajrhodes@utas.edu.au)

**Information released by:**

Communications and Media Office, University of Tasmania

Phone: 61 3 6226 2124

Email: [Media.Office@utas.edu.au](mailto:Media.Office@utas.edu.au)