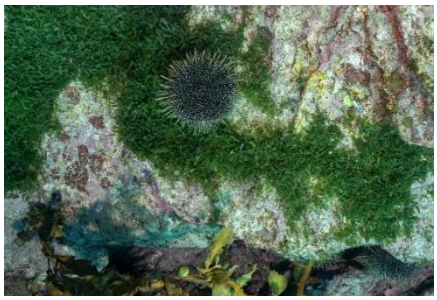
## *Understanding the ecology and impacts of exotic Caulerpa on Aotearoa's reefs*

**Positions available: PhD with the Institute of Marine Science, University of Auckland**
**Supervisors: Drs Richard Taylor & Caitlin Blain, Arie Spyksma**
**Position location: UoA's Leigh Marine Laboratory**
**Application deadline: 16 February 2025**

The recent incursions of exotic Caulerpa (*C. brachypus* and *C. parvifolia*) in northeastern Aotearoa New Zealand represent a significant biosecurity threat with the impacts on marine ecosystems entirely unknown. Economic forecasts have suggested costs to New Zealand could reach upwards of $150 million annually. However, this estimate stems almost entirely from the devasting impacts incurred overseas from similar exotic species including *C. taxifolia* and *C. racemosa*. Little-to-no evaluation has been conducted on the impacts of exotic Caulerpa on Aotearoa's coastal ecosystems or whether alternate management strategies can be used to tackle expanding Caulerpa populations while mitigating economic costs.

We are looking for a PhD student that will advance our understanding of exotic Caulerpa in Aotearoa, by addressing the following topics (not an exhaustive):



1. ***Drivers of exotic Caulerpa establishment and growth***
   To date, no studies have directly assessed how the growth of the two exotic Caulerpa species in Aotearoa vary in relation to environmental parameters. This topic will combine previously collected data on the extent and growth of exotic Caulerpa with long-term monitoring to assess growth across a range of habitats and substratum.
2. ***Impacts on benthic biodiversity and habitat functioning***
   This topic will assess the impacts of exotic Caulerpa on benthic biodiversity and functioning across a range of habitat types (e.g. soft sediments and rocky reefs) by comparing fauna and flora associated with exotic Caulerpa patches and unoccupied adjacent ('control') areas and with other native Caulerpa species commonly found in northeastern Aotearoa (*C. flexilis* and *C. geminata*).
3. ***The influence of grazers on exotic Caulerpa incursions***
   The influence of native grazers (e.g. *Evechinus chloroticus* and *Centrostephanus rodgersii*) on exotic Caulerpa growth and persistence has been relatively unexplored. This topic will explore the chemical composition of exotic Caulerpa and its palatability to herbivorous grazers in comparison to native Caulerpa species.
4. ***Impact of ecosystem health for mitigating exotic Caulerpa incursions***
   Complete eradication of an invasive marine species is rare and a more holistic approach to management may be required. The influence of ecosystem state has been unexplored but may have implications for the resilience of ecosystems to exotic Caulerpa incursions and impacts. The value of ecosystem health (assessed using a multi-indicator approach) for mediating exotic Caulerpa incursions on rocky reefs will be assessed by comparing spread and growth of exotic Caulerpa on degraded reefs (e.g. sea urchin barrens) with healthy reefs (e.g. kelp forest).

This PhD project can have a combination of laboratory and *in situ* subtidal experiments. Candidates should have a BSc Honours, Master's Degree or equivalent, with excellent grades, and appropriate research experience. Experience operating small boats, SCUBA diving, and using spatial (GIS) and statistical software is an asset.

The Leigh Marine Lab is situated on the beautiful coastline of northeastern New Zealand, approximately one hour north of Auckland. The lab provides easy access to boats, vehicles and equipment for fieldwork, along with flow-through seawater facilities and laboratories for running experiments and analyses (https://www.auckland.ac.nz/en/science/about-the-faculty/university-reserves/leigh-marine-laboratory.html).

The scholarship will cover tuition fees and an annual stipend of ~$35,000 NZD per annum for 3 years. The successful applicant will enrol and begin research as soon as possible.

**To apply please send a cover letter, CV and academic transcript to Caitlin Blain** (c.blain@auckland.ac.nz) **and Richard Taylor** (rb.taylor@auckland.ac.nz).