Phil Ross PhD Candidate

Department: Biological Sciences

Research Project: Connectivity amongst New Zealand estuaries: Using the common cockle *(Austrovenus stutchburyi*) as a model to examine inter-estuary dispersal and predict larval transport

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Location: Waikato University Campus

Supervision: Conrad Pilditch (link to http://bio.waikato.ac.nz/staff/pilditch/index.shtml)
Ian Hogg (link to http://sci.waikato.ac.nz/staff/biol/hogg)
Carolyn Lundquist (NIWA)

Research Interest

Many benthic marine organisms live in geographically isolated sub-populations and as adults are only capable of localised movement. Often dispersal over large distances is only possible during a pelagic larval phase. The degree to which sub-populations of a species are connected will determine local and meta-population dynamics, community dynamics and structure, genetic diversity and the resilience of a population to human exploitation. Understanding linkages between sub-populations is critical as fisheries management models often require an understanding of population size and boundaries.

Many estuarine species export larvae from their natal estuary to shelf waters where they develop before returning to coastal then estuarine habitats in late larval or early post-larval form. This thesis will examine the connectivity (i.e. migration or gene flow) that occurs between estuaries as well as the physical processes that enhance or inhibit this exchange.

The New Zealand cockle *(Austrovenus stutchburyi*) will be used as a model organism for study as it has a life history and hence dispersal capability similar to many other species of benthic invertebrates endemic to estuarine habitats. *Austrovenus* occurs throughout New Zealand and is an important component in estuarine food webs. In many estuaries, numbers of *Austrovenus* are decreasing due to over-fishing and deteriorating habitat. The genetic structure of *Austrovenus* populations will be examined at several spatial scales from estuaries and harbours around New Zealand using mitochondrial DNA sequencing and nuclear microsatellite markers. This will illustrate patterns of gene flow between estuaries and identify any dispersal bottlenecks.

Publications and conference presentations

Journal Publications:

Ross, P.M., Thrush, S.F., Montgomery, J.C., Walker, J.W. and Parsons, D.M. (2007). Habitat complexity and predation risk determine juvenile snapper (*Pagrus auratus*) and goatfish (*Upeneichthys lineatus*) behaviour and distribution. *Marine and Freshwater Research* 55:1144-1151

Shears, N. and **P. Ross** (in prep). Toxic cascades: facilitation of keystone predation by toxic microalgal blooms.

Conference Presentations:

New Zealand Marine Sciences Society *Invited plenary speaker* (2008) Christchurch, New Zealand: Where are you going, where have you been? What we can learn about population connectivity from cockle DNA. (Oral presentation)

New Zealand Molecular Ecology Meeting (2007) Kaikoura, New Zealand: Predicting among-estuary connectivity based on population genetics of the cockle *Austrovenus stutchburyi.* (Oral presentation)

New Zealand Marine Sciences Society (2007) Hamilton, New Zealand: Predicting among-estuary connectivity based on population genetics of the cockle *Austrovenus stutchburyi.* (Oral presentation)

New Zealand Molecular Ecology Meeting (2006) Wellington, New Zealand: Connectivity amongst New Zealand estuaries: Using the common cockle *(Austrovenus stutchburyi*) as a model to examine inter-estuary dispersal and predict larval transport. (Oral presentation)

Evolution (2007) Christchurch, New Zealand (2006): Connectivity amongst New Zealand estuaries: Using the common cockle *(Austrovenus stutchburyi*) as a model to examine inter-estuary dispersal and predict larval transport. Christchurch. June 2007. (Poster)

New Zealand Marine Sciences Society (2002) Nelson, New Zealand: Habitat associations of juvenile snapper (*Pagrus auratus*). (Oral presentation)

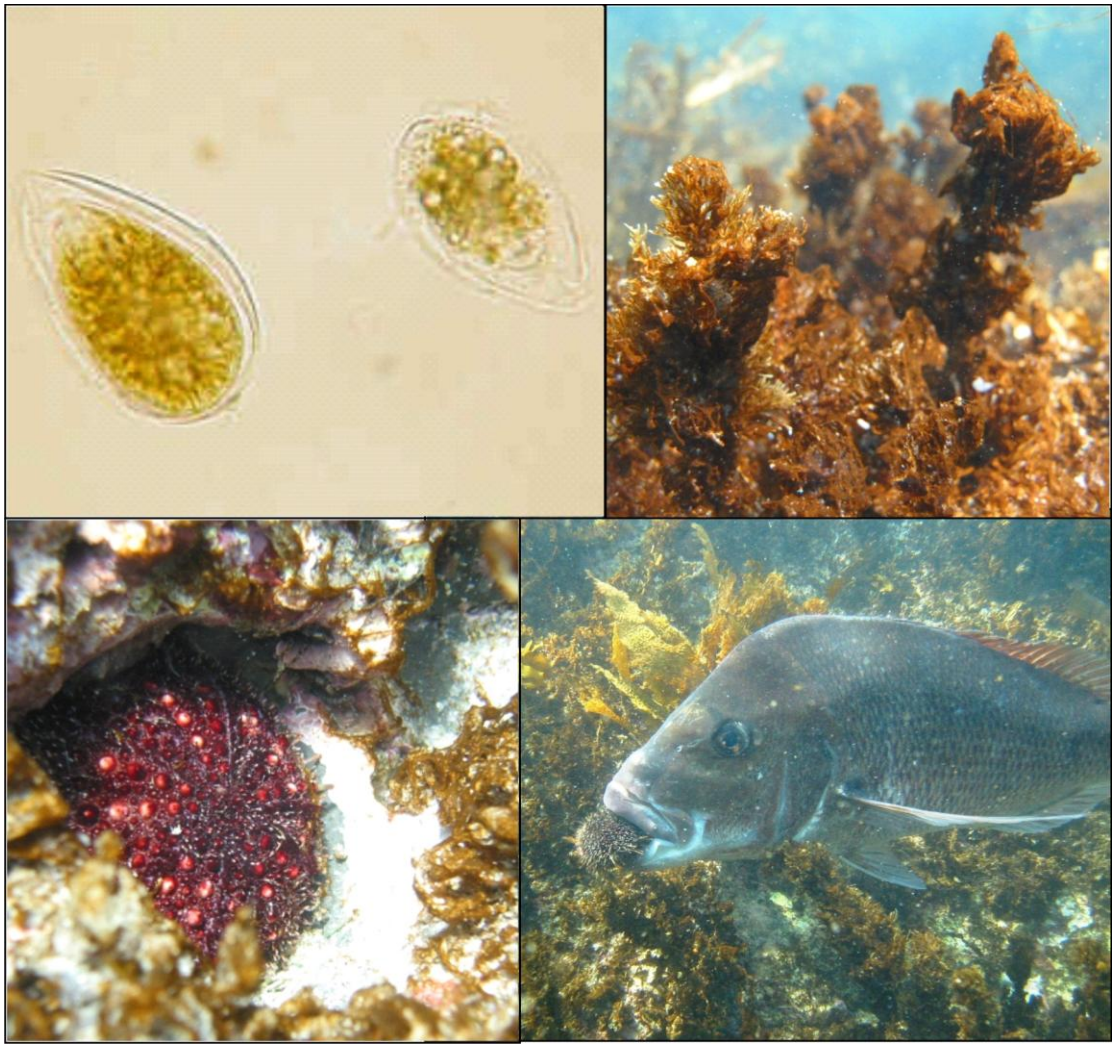
About me

I was born in Auckland and then some time later completed a BSc and MSc at the University of Auckland and Leigh Marine Laboratory. After several years of work and play around the globe I have returned to New Zealand for my PhD. When not hard at work sucking the DNA out of cockles I keep myself busy surfing, kayaking, mountain biking, sailing and swimming with the fishes.

Tongaporoutu Estuary, North Taranaki, New Zealand

Cockle bed in Raglan Harbour, Waikato, New Zealand

Preparing for field work onboard the U.S. Antarctic Program icebreaker the Nathaniel B. Palmer in Stanley Harbour, Falkland Islands.



Blooms of the epibenthic dinoflagellate *Ostreopsis siamensis* on shallow reefs in northeastern New Zealand. (A) *O. siamensis* cells, (B) the seaweed *Carpophyllum maschalocarpum* covered in *O. siamensis* (C) the sea urchin *Evechinus chloroticus* at a bloom site (Note: almost complete loss of primary spines and *O. siamensis* on the surrounding reef, and (D) a bloom affected urchin being preyed on by a large snapper *Pagrus auratus*.