SEMINAIRE AMURE

Mardi 20 janvier 2015

9h30 >12h

Salle B110 – Bât.B - UBO

« Vers une gestion écosystémique des effets de la pêche et du climat sur les récifs tempérés du sud-est de l'Australie »

Par Martin Marzloff, Institute for Marine and Antarctic Studies, University of Tasmania

My talk will be structured into three sections, as follows:

(1) Predicting and managing the ecological impacts of marine species on the move using qualitative network models

Worldwide, a large proportion of species are undergoing sustained climate-driven changes in their distributions. The ecological, social and economic consequences of these range-shifts on regional ecosystems can be large and hard to reverse, but remain challenging to predict and pro-actively manage. Based on qualitative knowledge about regional ecosystem structure and range-shifting species, our generic framework can help identify individual range-shifting species, or groups of species, that can have widespread detrimental effects on ecosystem structure and productivity. Using temperate reef systems in southeastern Australia as a case study, our findings suggest that the negative impacts of simultaneous range-shifts are synergistic, and hence, can only be effectively mitigated by ecosystem-based management strategies that combine multiple management interventions.

(2) Simulation modelling & ecosystem-based management of the Tasmanian rock lobster fishery

Following rapid climate-driven changes in ocean currents, the long-spined sea urchin (*Centrostephanus rodgersii*) has extended its range from Australia's mainland to eastern Tasmania. Due to the depletion by fishing of large rock lobster (*Jasus edwardsii*), its main predator on Tasmanian reef, *C. rodgersii* has demonstrated the ability to form and maintain extensive 'barrens', i.e. bare rocks following the destructive grazing of macroalgal cover. Relative to dense seaweed beds, sea urchin 'barrens' represent a dramatic loss of habitat, biodiversity and productivity for important commercial reef species such a southern rock lobster (*Jasus edwardsii*) and abalone (*Haliotis rubra*). The

TRITON model, specifically developped to realistically captures seaweed bed-sea urchin-rock lobster community dynamics, provide ecosystem-based guidance for the regional management of rocky reef communities. In particular, simulations help define effective interventions and a safe operating space, which recognises the central role of rock lobster to reef dynamics, so as to prevent phase shifts in reef dynamics from (i) dense, species-rich, productive seaweed beds to (ii) impoverished and widespread sea urchin 'barrens'.

(3) Structured Decision-Making process involving stakeholders towards ecosystem-based management of Tasmania reefs and fisheries

Finally, I will present some results from a Structured Decision-Making framework recently developped around the TRITON model to help managers and stakeholders with identifying cost-effective interventions that perform well against conflicting management objectives. A workshop and two succesive surveys involving 12 representatives from key stakeholder groups were run to elicit and rank a suite of performance objectives and management scenarios. By combining stakeholders' preferences, as well as cost and feasibility of available management interventions, we derived alternative cost-effectiveness ranking metrics. Enforcement of a zonal cap on both recreational and commercial catches of rock lobster combined with either, sea urchin harvesting, or lobster biomass translocation overall rank amongst the most cost-effective management scenarios.