

Adam N. H. Smith

PhD Student

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Research Interests/Experience:

I have been actively involved in research on the interface between ecology, conservation, and statistics since 2002. I have worked as an ecological statistician in the science group at the Department of Conservation (DOC) in Christchurch, and then in the fisheries modelling group at the National Institute of Water and Atmospheric Research (NIWA) in Wellington. In 2009, I moved to Auckland to undertake a PhD under the supervision of Marti Anderson. I am interested in all aspects of applied statistics, but particularly in studies of marine ecology, fisheries, and conservation. In particular, as part of my PhD, I have recently worked on a new approach to zero inflation for count data, applied in a Bayesian context to evaluate the effects of marine reserves on snapper *Pagrus auratus*. I am also examining the effects of marine reserves and habitat features on crypto-benthic fishes, especially triplefins. In the past, I have worked on a diverse array of projects, including species distribution modelling of Antarctic plankton and New Zealand fishes using boosted regression trees, fisheries stock assessments of paua and crayfish, ecological restoration of Californian freshwater communities, and the biological evaluation of a Marine Environment Classification. I was co-author on the paper that recognised Maui's dolphin, a subspecies of Hector's dolphin.

Thesis Title:

Effects of marine reserves on reef fishes in north-eastern New Zealand

Supervision:

Prof. Marti Anderson (Massey University, Albany)
Dr Matthew Pawley (Massey University, Albany)
Prof. David Raubenheimer (University of Sydney)
Assoc. Prof. Russell Millar (University of Auckland)

Study Aims:

- ❖ Develop Bayesian hierarchical statistical models to quantify the effects of marine reserves on snapper in the context of underlying spatial and temporal variation
- ❖ Examine the effects of the (a) increased abundance of large snapper in marine reserves and (b) features of the reef habitat on the density, diversity, and community structure of crypto-benthic reef fishes (especially triplefins).

Funding:

- ❖ Massey University (NZIAS, INMS)
- ❖ Department of Conservation

Publications/Reports:

Smith ANH, Anderson MJ & Millar RB. 2012. Incorporating the intraspecific occupancy–abundance relationship into zero-inflated models. *Ecology* 93(12): 2526-2532.

Marchetti. MP, Esteban E, **Smith ANH**, Pickard D, Richards AB & Slusark J. 2011. Measuring the ecological impact of long-term flow disturbance on the macroinvertebrate community in a large Mediterranean climate river. *Journal of Freshwater Ecology* 26(4): 459-480.

Smith ANH, Duffy CAJ & Leathwick JR. In press. Predicting the distribution and relative abundance of fishes on shallow subtidal reefs around New Zealand. *Science for Conservation*. Department of Conservation, Wellington.

Raymond B, Shaffer SA, Sokolov S, Woehler EJ, Costa DP, Einoder L, Hindell M, Hosie G, Pinkerton M, Sagar PM, Scott D, **Smith ANH**, Thompson DR, Vertigan C & Weimerskirch H. 2010. Shearwater foraging in the Southern Ocean: the roles of prey availability and winds. *PLoS ONE* 5(6): e10960.

Pinkerton MH, **Smith ANH**, Raymond B, Hosie GW, Sharp B, Leathwick JR & Bradford-Grieve JM. 2010. Spatial and seasonal distribution of adult *Oithona similis* in the Southern Ocean: Predictions using boosted regression trees. *Deep Sea Research Part I: Oceanographic Research Papers* 57: 469-485.

Garr M, Marchetti MP & **Smith ANH**. 2010. Evaluating wetland restoration success using aquatic macroinvertebrate assemblages in the Sacramento Valley CA. *Restoration Ecology* 18(4): 457–466.

Pinkerton MH, **Smith ANH**, Raymond B, Hosie G & Sharp B. 2008. Extrapolating continuous plankton recorder data through the Southern Ocean using Boosted Regression Trees. *Working paper submitted to the CCAMLR workshop*, July 2008, Russia.

Powlesland RG, Sharp SE & **Smith ANH**. 2008. Aspects of the breeding biology of the pied shag (*Phalacrocorax varius*) at Makara Beach, Wellington. *Notornis* 55: 69-76.

Leathwick, J, Julian K & **Smith ANH**. In review. Use of reserve planning software to identify priority sites for protection in New Zealand's inshore waters. *Science for Conservation*. Department of Conservation, Wellington.

Smith ANH. 2008. Maui's dolphin: uncovering a new subspecies. Presentation published on an educational DVD. University of Otago and Ministry of Education.

Breen PA & **Smith ANH**. 2008. The 2007 assessment for paua (*Haliotis iris*) stock PAU 5B (Stewart Island). *New Zealand Fisheries Assessment Report* 2008/2. 64 p. Ministry of Fisheries.

Breen PA & **Smith ANH**. 2008. Data used in the 2007 assessment for paua (*Haliotis iris*) stock PAU 5B (Stewart Island). *New Zealand Fisheries Assessment Report* 2008/6. 45 p. Ministry of Fisheries.

Pinkerton MH, Sharp B, **Smith ANH** & Leathwick J. 2007. Use of biological data to inform bioregionalisation of the Southern Ocean. WS-BSO-07/7. *Working paper submitted to the CCAMLR workshop*, August 2007, Brussels.

Smith ANH. 2006. Evaluation of the Marine Environment Classification for the management of shallow coastal reef fish assemblages. *Report to the Department of Conservation*.

Brown JA, **Smith ANH**, Robinson TJ. 2008. The response of rare herbaceous plants to the removal of weeds in an unproductive environment. *Community Ecology* 9(1): 49-54.

Smith ANH. 2006. Evaluation of the New Zealand Marine Environment Classification for shallow coastal rocky reef fish communities. *MSc Thesis*. University of Auckland.

Duffy CAJ, **Smith ANH**, Cook S, Briden K & Davidson R. In prep. Shallow subtidal habitats of the Marlborough Sounds. *Report to the Department of Conservation*.

Smith ANH, Westbrooke I. 2004. Changes in bird conspicuousness at Pureora Forest. *Notornis* 51: 21-25.

Baker AN, **Smith ANH** & Pichler FB. 2002. Geographical variation in Hector's dolphin: recognition of new subspecies of *Cephalorhynchus hectori*. *Journal of the Royal Society of New Zealand* 32: 713-727.

Conference presentations:

Smith ANH & Anderson MJ. 2012. Let it be and glorious things will happen. *Hauraki Gulf Marine Park Forum, Auckland Museum, Auckland*.

Smith ANH & Anderson MJ. 2011. Linking the zeros to the mean in zero-inflated models of abundance. *The New Zealand Statistical Association (NZSA) conference, Auckland University, Auckland*.

Smith ANH & Anderson MJ. 2011. The effect of a marine reserve on legally sized snapper in northern New Zealand: An analysis Bayesian hierarchical mixed models. *International Temperate Reefs Symposium, University of Plymouth, Plymouth, U.K.*

Smith ANH. 2008. Modelling distributions of 72 species of fish on rocky reefs using Boosted Regression Trees. *Joint conference of the New Zealand Marine Sciences Society (NZMSS) and the Australian Marine Science Association, Canterbury University, Christchurch*.

Smith ANH & Westbrooke I. 2007. Maui's dolphin: uncovering a new subspecies. *NZSA conference, Canterbury University, Christchurch*.

Smith ANH & Anderson MJ. 2006. Evaluating the Marine Environment Classification for coastal reef fish communities. *NZMSS conference, Victoria University, Wellington*.

Smith ANH. 2005. Challenges in ecological classification. *NZSA conference, University of Otago, Dunedin.*

Smith ANH & Westbrooke I. 2003. Comparing historical and recent bird counts in Pureora Forest. *New Zealand Ecological Society conference, University of Auckland, Auckland.*

Smith ANH & Westbrooke I. 2003. Discovering Maui's dolphin. *NZSA conference, Massey University, Palmerston North.*