

# Sean Charles Anderson

Simon Fraser University, Biological Sciences  
Burnaby, BC, Canada, V5A 1S6  
sean@seananderson.ca

## Education

- 2011–13 Ph.D. Candidate, Simon Fraser University, Burnaby, Canada Supervisors:  
Dr. Nicholas K. Dulvy and Dr. Andrew B. Cooper  
Canadian Fulbright Scholar to the University of Washington in 2012–13
- 2010 M.Sc. Biology, Dalhousie University, Halifax, Canada  
Thesis title: Trends, drivers, and ecosystem effects of expanding global invertebrate fisheries. Supervisor: Dr. Heike K. Lotze. ([PDF](#))  
Canadian [Governor General's Academic Gold Medal](#) for the top-ranked Master's Natural Sciences and Engineering thesis at Dalhousie University in 2010
- 2004–07 B.Sc. (Hons.) Environmental Science, Dalhousie University, Halifax, Canada  
Thesis title: How sustainable are emerging low-trophic level fisheries on the Scotian Shelf? Supervisors: Dr. Heike K. Lotze and Dr. Ransom A. Myers. ([PDF](#))  
First Class Honours & Environmental Programmes Honour Society Medal
- 2001–03 B.Sc. Candidate (Hons.) Kinesiology, University of Waterloo, Waterloo, Canada Transferred to Dalhousie University in 2004.

## Publications

- 2014 **Anderson, S.C.**, C.C. Monnahan, K.F. Johnson, K. Ono, J.L. Valero. ss3sim: An R package for fisheries stock assessment simulation with Stock Synthesis. arXiv:1312.6450. Accepted at PLOS ONE. ([preprint](#), [vignette](#), [R package](#), [code](#))
- 2014 Farmer, R.G., M.L. Leonard, J.E. Mills Flemming, **S.C. Anderson**. Observer aging and long-term avian survey data quality. Accepted at Ecology and Evolution.
- 2014 Ono, K., R. Licandeo, M. Muradian, C. Cunningham. **S.C. Anderson**, F. Hurtado-Ferro, K.F. Johnson, C. McGilliard, C.C. Monnahan, C. Szuwalski, J. Valero, K. Vert-pre, A. Whitten, A. Punt. The importance of length and age composition data in statistical age-structured models for marine species. In press at ICES Journal of Marine Science.

- 2013 O'Regan, S.M., W.J. Palen, **S.C. Anderson**. Climate warming mediates negative impacts of rapid pond drying for three amphibian species. In press at Ecology. <http://doi.org/10.1890/13-0916.1>.
- 2013 Artelle K.A., **S.C. Anderson**, A.B. Cooper, Paul C. Paquet, J.D. Reynolds, C.T. Darimont. Confronting uncertainty in wildlife management: performance of grizzly bear management in British Columbia, Canada. PLOS ONE. 8(11): e78041. <http://doi.org/10.1371/journal.pone.0078041>
- 2013 Favaro, B., D.C. Braun, **Earth2Ocean Research Derby**. The 'Research Derby': A pressure cooker for creative collaborative science. Ideas in Ecology and Evolution. 6: 40-46. <http://doi.org/10.4033/iee.2013.6.9.n>
- 2013 **Anderson, S.C.**, A.B. Cooper, N.K. Dulvy. Ecological prophets: Quantifying metapopulation portfolio effects. Methods in Ecology and Evolution. 4(10): 971-981. <http://doi.org/10.1111/2041-210X.12093>. (PDF, [ecofolio R package](#), [Supporting Information](#))
- 2013 Phillis, C.C.\*, S.M. O'Regan\*, S.J. Green\*, J.E.B. Bruce\*, **S.C. Anderson**, J.N. Linton, Earth2Ocean Research Derby, B. Favaro. Multiple pathways to conservation success. Conservation Letters. 6(2): 98-106. <http://doi.org/10.1111/j.1755-263X.2012.00294.x>. (PDF) (\*Authors contributed equally, listed in reverse alphabetical order)
- 2012 Harnik, P.G., H.K. Lotze, **S.C. Anderson**, Z.V. Finkel, S. Finnegan, D.R. Lindberg, L.H. Liow, R. Lockwood, C.R. McClain, J.L. McGuire, A. O'Dea, J.M. Pandolfi, C. Simpson, D.P. Tittensor. Extinctions in ancient and modern seas. Trends in Ecology and Evolution. 27(11): 608-617. <http://doi.org/10.1016/j.tree.2012.07.010>. (PDF)
- 2012 **Anderson, S.C.**, T.A. Branch, D. Ricard, H.K. Lotze. Assessing global marine fishery status with a revised dynamic catch-based method and stock-assessment reference points. ICES Journal of Marine Science. 69(8): 1491-1500. <http://doi.org/10.1093/icesjms/fss105>. (PDF)
- 2011 **Anderson, S.C.**, B.G. Farmer, F. Ferretti, A.L.S. Houde, J.A. Hutchings. Correlates of vertebrate extinction risk in Canada. BioScience. 61(7): 538-549. <http://doi.org/10.1525/bio.2011.61.7.8>. (PDF)
- 2011 **Anderson, S.C.**, J. Mills Flemming, R. Watson, H.K. Lotze. Serial exploitation of global sea cucumber fisheries. Fish and Fisheries. 12(3): 317-339. <http://doi.org/10.1111/j.1467-2979.2010.00397.x>. (PDF) [Featured in Science](#) on January 14 2011.

- 2011 Boudreau, S.A., **S.C. Anderson**, B. Worm. Top-down interactions and temperature control of snow crab abundance in the northwest Atlantic. *Marine Ecology Progress Series*. 429: 169-183. <http://doi.org/10.3354/meps09081>.
- 2011 **Anderson, S.C.**, J. Mills Flemming, R. Watson, H.K. Lotze. Rapid global expansion of invertebrate fisheries: trends, drivers, and ecosystem effects. *PLOS ONE*. 6(3): e14735. <http://doi.org/10.1371/journal.pone.0014735>
- 2008 **Anderson, S.C.**, H.K. Lotze, N.L. Shackell. Evaluating the knowledge base for expanding low-trophic-level fisheries in Atlantic Canada. *Canadian Journal of Fisheries and Aquatic Sciences*. 65(12): 2553–2571. <http://doi.org/10.1139/F08-156>. (PDF) Eighth most-read CJFAS article in 2008.

## Manuscripts in review

- 2014 **Anderson, S.C.**, J.W. Moore, M.M. McClure, N.K. Dulvy, A.B. Cooper. Portfolio conservation of metapopulations under climate change. In review.
- 2014 Johnson, K.F., C.C. Monnahan, C. McGilliard, K. Vert-pre, A. Whitten, **S.C. Anderson**, K. Ono, R. Licandeo, F. Hurtado-Ferro, J. Valero, M. Muradian, C. Szuwalski, C. Cunningham, A. Punt. Time-varying natural mortality in fisheries stock assessment models: identifying a default approach. In review.

## Awards and scholarships

- 2014 Garfield Weston Foundation / BC Packers Ltd. Graduate Fellowship in Marine Sciences
- 2014 Graduate Fellowship, Simon Fraser University
- 2012–13 [Canadian Fulbright Scholar award](#) to the University of Washington in 2012–13
- 2011 Canadian [Governor General's Academic Gold Medal](#) for the top-ranked Master's Natural Sciences and Engineering thesis at Dalhousie University in 2010
- 2011–14 Provost Prize of Distinction, Simon Fraser University
- 2011–14 Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship (Doctoral)
- 2007–10 Faculty Research Grant Scholarship, Dalhousie University

2007–09 Graduate Studies Scholarship, Dalhousie University

2007 Environmental Programmes Honour Society Medal, Dalhousie University

2001–03 Academic All-Canadian, University of Waterloo

2001–02 Dean's Entrance Scholarship, University of Waterloo

## Invited talks and conference presentations

- 2013 **Anderson, S.C.**, A.B. Cooper, N.K. Dulvy. False prophets: The challenges of quantifying ecological portfolios ([slides](#)), Quantitative Seminar, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, United States.
- 2012 **Anderson, S.C.**, A.B. Cooper, N.K. Dulvy. False prophets: The ecological portfolio effect overestimates the benefit of diversity. Branch Lab, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, United States.
- 2012 **Anderson, S.C.**, A.B. Cooper, N.K. Dulvy. Metapopulation dynamics and the generality of the ecological portfolio effect. Les Ecologistes Departmental Seminar, Simon Fraser University, Burnaby, BC, Canada.
- 2010 **Anderson, S.C.** The rise of invertebrates, the fall of sea cucumbers, and the risk of maturing late. Earth2Ocean Research Group, Simon Fraser University, Burnaby, BC, Canada.
- 2009 **Anderson, S.C.**, J. Mills Flemming, R. Watson, H.K. Lotze. Ecosystem impacts of the global expansion of invertebrate fisheries. International Oceans Past II Conference *Multidisciplinary Perspectives on the History and Future of Marine Animal Populations*. Vancouver, BC, Canada.
- 2009 **Anderson, S.C.**, J. Mills Flemming, R. Watson, H.K. Lotze. Global invertebrate fisheries: trends and consequences. NCEAS (National Center for Ecological Analysis and Synthesis) Working Group *Finding Common Ground in Marine Conservation and Management*. Santa Barbara, CA, USA.
- 2009 **Anderson, S.C.**, H.K. Lotze, N.L. Shackell. Evaluating the knowledge base for expanding low-trophic level fisheries in Atlantic Canada. Harvest Fisheries Seminar Series. Bedford Institute of Oceanography, Fisheries and Oceans, Dartmouth, NS, Canada.
- 2008 **Anderson, S.C.**, H.K. Lotze, N.L. Shackell. Evaluating the knowledge base for expanding low-trophic level fisheries in Atlantic Canada. Departmental Seminar, Biology Department, Dalhousie University, Canada.

## Teaching

- 2013 Two-part workshop on data manipulation for Stats Beerz and Earth to Oceans groups at Simon Fraser University with approximately 25 participants. An introduction to plyr, advanced concepts with plyr and function debugging, and a brief introduction to dplyr. <https://github.com/seananderson/plyr-statsbeerz>
- 2013 Instructor for BISC-888-1: Data Wrangling and Visualization in R, a graduate-level course at Simon Fraser University, Burnaby, BC, Canada with approximately 20 participants. Co-developed curriculum and developed lectures, exercises, notes, and assignments for three of six two-hour classes. <https://github.com/seananderson/datawranglR> (see classes 03, 04, 05)
- 2012 Introduction to ggplot2. ([notes](#), [slides](#)) Lecture for FISH 507H: Beautiful Graphics in R, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, United States
- 2012 Workshop on the R package plyr. ([notes](#), [slides](#), [examples](#)) Branch Lab, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, United States
- 2011 Multipanel plotting in R with base graphics. ([notes](#), [slides](#)). Earth2Ocean Research Group, Simon Fraser University, Burnaby, BC, Canada.
- 2011 A brief introduction to R. ([notes](#), [workshop code](#)). Earth2Ocean Research Group, Simon Fraser University, Burnaby, BC, Canada.
- 2011 Workshop on the R package plyr ([notes](#), [slides](#)). Earth2Ocean Research Group, Simon Fraser University, Burnaby, BC, Canada.
- 2007–08 Teaching Assistant, Organismal Biology and Ecology, Dalhousie University, two semesters (BIOL 1021).
- 2007–08 Teaching Assistant, Marine Mammology, Dalhousie University (BIOL 4060).

## Contract employment

- 2013 Co-developed a set of global fisheries-status maps based on the RAM Legacy Stock Assessment Database for Dr. Ray Hilborn. ([URL](#))
- 2011–13 Database management, data analysis, and visualization for the project *Global Shark Abundance Baselines* (Hopkins Marine Station, Stanford University, CA, United States) with F. Micheli, F. Ferretti, N.K. Dulvy, H.K. Lotze, and B. Worm.

- 2010      Assessment of Arctic surfclam on Banquereau Bank using industry collected data for Clearwater Seafoods, Bedford, NS, Canada.
- 2010      Modelling length-frequency distribution changes of Atlantic halibut for NAFO Divisions 4VWX5Z and 3NOP for Dr. K. Trzcinski, Population Ecology Division, Bedford Institute of Oceanography, Fisheries and Oceans, Dartmouth, NS, Canada.

## Working groups and workshops

- 2011–13   NESCen (National Evolutionary Synthesis Center, Durham, NC) Working Group *Determinants of Extinction in Ancient and Modern Seas* led by Paul Harnik, Seth Finnegan, and Rowan Lockwood. ([URL](#))
- 2010      Atlantic Halibut Assessment Science Peer Review Meeting, Fisheries and Oceans, Dartmouth, NS, Canada.
- 2007–09   NCEAS (National Center for Ecological Analysis and Synthesis, Santa Barbara, CA) Distributed Graduate Seminar, in association with the Working Group *Finding Common Ground in Marine Conservation and Management* led by Ray Hilborn and Boris Worm. ([URL](#))
- 2008      Workshop on Canadian Science and Management Strategies for Sea Cucumber (*Cucumaria frondosa*), Fisheries and Oceans, Dartmouth, NS, Canada (work presented *in absentia*).
- 2007      Workshop on Canadian Science and Management Strategies for Atlantic Hagfish, Fisheries and Oceans, Dartmouth, NS, Canada. ([URL](#))

## Selected courses and training

- Present   Proficient in statistical analyses and data management using R, Sweave, knitr, LaTeX, Git. Working knowledge of C++, Rcpp, ADMB, JAGS, Stan, and PostgreSQL.
- 2013      Quantitative Modelling in Ecosystem Based Management. R. Hilborn, School of Aquatic and Fishery Sciences, University of Washington (audited).
- 2013      Applied Time Series Analysis. E. Holmes, M. Scheuerell, and E. Ward; School of Aquatic and Fishery Sciences, University of Washington (audited).
- 2012      Numerical Computing for the Natural Resources. Dr. A.E. Punt, School of Aquatic and Fishery Sciences, University of Washington (audited).
- 2012      Risk Assessment and Decision Analysis for Management of Natural Resources. Dr. R.M. Peterman, School of Resource and Environmental Management, Simon Fraser University.

- 2011     Presenting Data and Information. Edward Tufte, Seattle, WA, United States.
- 2009     Technical Expertise in Stock Assessment: Model Fitting and Interpretation. Dr. C. Needle, chair of the International Council for the Exploration of the Sea working group on methods of fish stock assessment, Dalhousie University.
- 2008     Data Analysis. Dr. J. Mills Flemming, Department of Mathematics & Statistics, Dalhousie University (audited).

## **Reviews**

Reviewer for Ecology, Conservation Biology, Fish and Fisheries, International Journal of Tropical Biology and Conservation, Journal of Environmental Management, Aquatic Conservation