Cole C. Monnahan

Contact Information

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Research Interests

Marine resource management, quantitative fisheries science, simulation testing, Bayesian statistics, population dynamics.

Education

University of Washington (UW), Seattle, Washington, USA

Ph.D., Quantitative Ecology and Resource Management, 2017

- Thesis Topic: *Advancing Bayesian methods for fisheries stock assessment*
- Advisor: Dr. Trevor Branch

M.S., Quantitative Ecology and Resource Management, 2013

- Thesis Topic: *Population trends of the eastern North Pacific blue bhale*
- Advisor: Dr. Trevor Branch

Western Washington University, Bellingham, Washington, USA

B.S., Mathematics, 2006
B.A., German Language, 2006
AHA Study Abroad Program, Cologne, Germany, 2004

Computer Skills

Software: R, ADMB, TMB, Stan, JAGS, Stock Synthesis, LaTeX, git, MS Office.
Data Analysis: Developing, fitting, and diagnosing linear, non-linear, GLM, GAM and hierarchical models in frequentist and Bayesian paradigms.
R Packages: `ss3sim` (developer), `r4ss` (contributor), `TMB` (contributor).

Scholarships and Awards

- 2013 National Marine Fisheries Service/Washington Sea Grant Fellowship in Population Dynamics: *Optimizing Bayesian analysis in data-rich stock assessments and management resources in data-limited fisheries.*
- 2010 Graduate School Fund for Excellence and Innovation Top Scholar Award, University of Washington.

Professional Experience

U.S. Department of Agriculture, Bothell, Washington, USA

Agricultural Statistician **August, 2006 – June, 2010**
Mathematical/statistical analysis and advice, improvement of current instrumentation procedures in dairy science. Supervisor: Dr. John Priest.

Teaching Experience

Guest Lectures

Mixed effects models
- StatR 201: Data Modeling and Analysis with R. **2015**

Nonlinear function minimization.
- FISH 458: Modeling and Estimation in Conservation & Resource Management **2015**

Object-oriented programming in R: S3, S4, and reference classes.
- FISH 512: Super-Advanced R Programming. **2014**

Non-parametric, additive, and generalized additive models.
- QERM 514: Analysis of Ecological and Environmental Data **2013 & 2014**

Teacher's Assistant

Converted computer labs in Excel to R, helped run labs, and graded homework.
- FISH 458: Modeling and Estimation in Conservation & Resource Management **2012**

Prepared and led weekly R computer labs.

- QERM 514: Analysis of Ecological and Environmental Data **2012 & 2014**

Presentations

UW School of Aquatic and Fisheries Science: Quantitative Seminar

- *Advantages of gradient-based MCMC algorithms for difficult-to-fit Bayesian models in fisheries and ecology.* December, 2015
- *Splitting historical blue whale catches using spatial GAMs.* November, 2012

Scientific Committee of the International Whaling Commission

- Invited speaker. *Sensitivity analyses for the eastern North Pacific blue whale assessment* (SC/66a/IA/15). May, 2015.

CAPAM Workshop on Growth, La Jolla, CA, USA

- *An evaluation of alternative binning approaches for composition data in integrated stock assessments.* November, 2014.

National Marine Mammal Laboratory (NOAA), Seattle, WA, USA

- *Do ship strikes threaten the recovery of endangered eastern North Pacific blue whales?* October, 2014.

UW School of Aquatic and Fisheries Science: Fisheries Think Tank

- `ss3sim`: *An R package for stock assessment simulation with SS3.* March, 2014.
- *Next-generation MCMC: theory, options, and practice for Bayesian inference in ADMB.* February, 2013. With Drs. Jim Thorson and Ian Taylor.

Publications

[1] **Monnahan, C.C.**, T.A. Branch, and A.E. Punt. Do ship strikes threaten the recovery of endangered eastern North Pacific blue whales? *Marine Mammal Science*, 31:279–297, 2015.

[2] **Monnahan, C.C.**, Kotaro O, S.C. Anderson, M.B. Rudd, A.C. Hicks, F. Hurtado-Ferro, K.F. Johnson, P.T. Kuriyama, R.R. Licandeo, C.C. Stawitz, I.G. Taylor, and J.L. Valero. The effect of length bin width on growth estimation in integrated age-structured stock assessments. *Fisheries Research*, 10.1016/j.fishres.2015.11.002, 2015.

[3] I.J. Stewart, **Monnahan, C.C.**, and S. Martell. Assessment of the Pacific halibut stock at the end of 2015. *International Pacific Halibut Commission*, 2015.

[4] **Monnahan, C.C.**, M.L. Muradian, and P.T. Kuriyama. A guide for bayesian analysis in AD Model Builder. 2014. http://www.admb-project.org/developers/mcmc/mcmc-guide-for-admb/view.

[5] J.T. Thorson, **Monnahan, C.C.**, and J.M. Cope. The potential impact of time-variation in vital rates on fisheries management targets for marine fishes. *Fisheries Research*, 169(0):8–17, 2015.

[6] P.T. Kuriyama, K. Ono, F. Hurtado-Ferro, A.C. Hicks, I.G. Taylor, R.R. Licandeo, K.F. Johnson, S.C. Anderson, **Monnahan, C.C.**, M.B. Rudd, C.C. Stawitz, and J.L. Valero. An empirical weight-at-age approach reduces estimation bias compared to modeling parametric growth in integrated, statistical stock assessment models when growth is time varying. *Fisheries Research*, 10.1016/j.fishres.2015.09.007, 2015.

[7] **Monnahan, C.C.**, T.A. Branch, K.M. Stafford, Y.V. Ivashchenko, and E.M. Oleson. Estimating historical eastern North Pacific blue whale catches using spatial calling patterns. *PLoS One*, 9(6):e98974, 2014.

[8] S.C. Anderson, **Monnahan, C.C.**, K.F. Johnson, K. Ono, and J.L. Valero. `ss3sim`: An R package for fisheries stock assessment simulation with Stock Synthesis. *PLoS One*, 9(4):e92725, 2014.

[9] K.F Johnson, **Monnahan, C.C.**, C.R. McGilliard, K.A. Vert-pre, S.C. Anderson, C.J. Cunningham, F. Hurtado-Ferro, R.R. Licandeo, M.L. Muradian, K. Ono, C.S. Szuwalski, J.L. Valero, A.R. Whitten, and A.E. Punt. Time-varying natural mortality in fisheries

stock assessment models: identifying a default approach. *ICES Journal of Marine Science*, 72(1):137–150, 2014.

[10] F. Hurtado-Ferro, C.S. Szuwalski, J.L. Valero, S.C. Anderson, C.J. Cunningham, K.F. Johnson, R. Licandeo, C.R. McGilliard, **Monnahan, C.C.**, M.L. Muradian, K. Ono, K.A. Vert-Pre, A.R. Whitten, and A.E. Punt. Looking in the rear-view mirror: bias and retrospective patterns in integrated, age-structured stock assessment models. *ICES Journal of Marine Science*, 72(1):99–110, 2014.

[11] K. Ono, R.R. Licandeo, M.L. Muradian, C.J. Cunningham, S.C. Anderson, F. Hurtado-Ferro, K.F. Johnson, C.R. McGilliard, **Monnahan, C.C.**, C.S Szuwalski, J.L. Valero, K.A. Vert-Pre, A.R. Whitten, and A.E. Punt. The importance of length and age composition data in statistical age-structured models for marine species. *ICES Journal of Marine Science*, 72(1):31–43, 2014.