Matt Falcy

503-510-9234
mfalcy@gmail.com
https://falcy.weebly.com/
https://www.researchgate.net/profile/Matt_Falcy

Education

Ph.D. Ecology and Evolutionary Biology with minor in Statistics, 2011.   Iowa State University
M.S. Forest Science, 2004.   Universidad de Chile
Master of Environmental Management, 2002.   Portland State University
B.S. Biological Science, 1997.   University of California, Davis

Applied Research Experience

Fish Conservation Biologist, Oregon Department of Fish and Wildlife (ODFW).
   Duration: June 2010 to present
   Duties and accomplishments:
   1) Create complex mathematical, statistical, and ecological simulation models to answer
       natural resource management questions.
   - Developed hierarchical, state-space Bayesian statistical stock-recruitment models to
     estimate magnitude of uncertainty in estimates of fish population trend, productivity,
     carrying capacity, and abundance-habitat relationships.
   - Programmed numerous population viability models that use Bayesian estimates of
     uncertainty.
   - Developed novel model to synthesize the genetic and demographic interactions of
     hatchery and wild fish.
   - Conducted analyses to determine effects of harvest on population viability.
   - Developed salmon forecasting techniques using artificial intelligence.
   - Added a time domain to existing spatial mark-recapture models to model habitat use.
   2) Develop decision support tools.
   - Created Bayesian belief network models to capture the structure of decisions about
     research priorities, tide gates restoration, cold water refugia, and hatchery practices.
   - Developed rule-set guiding the harvest bag limits of coastal fall Chinook.
   - Optimized effort across multi-objective monitoring using calculus and stochastic
     dynamic programming.
   - Created geospatial tool for designing biological reserves on stream networks.
   3) Deliver scientific and technical support to implement conservation and fishery management
       goals.
   - Served on leadership team that developed Coastal Multispecies Conservation Plan.
   - Assembled data, developed appropriate models, and reported metrics of population
     health for the Rogue Fall Chinook Conservation Plan and the Coastal Multispecies
     Conservation Plan, and Coastal Coho Recovery Plan, and the Rogue and South Coast
     Multispecies Plan.
   - Answered questions from staff, stakeholders, and technical reviewers about
     conservation plan analyses.
   - Modeled abundance metrics needed to implement coastal coho fishery.
   - Developed methods to calculate the proportion of hatchery fish spawning naturally.

Applied Research Experience (continued)

4) Provide statistical consulting for staff at ODFW.
- Implemented regression, ANOVA, BACI, generalized linear models, mixed effects models, hierarchical models, meta-analysis, generalized additive models, variograms, kriging, conditional autoregressive spatial analysis, time series analysis, state-space models, PCA, MANOVA, ordination, regression trees, neural networks, LASSO and other shrinkage techniques, model selection with AIC, BIC, WAIC, DIC, Bayes factors, likelihood ratios.
- Frequently addressed questions from staff about power analysis, mark-recapture analysis, monitoring designs, spatially-explicit analyses, analysis of existing data.
- Provided review and recommendations for economic/budget analyses for executive administrators.

5) Represent agency and communicate science to diverse audiences
- Member of the Hatchery Scientific Review Group, established by the U.S. Congress.
- Taught workshops and delivered presentations at professional societies and academic institutions
- Published ideas and original research in prestigious international journals and subject-specific journals.
- Provided peer review to authors submitting articles to leading academic journals.
- Spoke at international and local professional society meetings, university, etc.

Publications

Falcy, M.R. 2018. A cost-optimization framework for planning applied environmental science. BioScience 68:912-922

Falcy, M.R. and Suring, E. 2018. Detecting the effects of management regime shifts in dynamic environments using multi-population state-space models. Biological Conservation 221:34-43.

Falcy, M.R. 2016. Conservation decision making: Integrating the precautionary principle with uncertainty. Frontiers in Ecology and the Environment 14:499-504.

Falcy, M.R., McCormick, J.L., Miller, S.A. 2016. Proxies in practice: Calibration and validation of multiple indices of animal abundance. Journal of Fish and Wildlife Management. 7: 117-128.

McCormick, J.L, and **Falcy**, M.R. 2015. Evaluation of non-traditional modelling techniques for forecasting salmon returns. Fisheries Management and Ecology 22:269-278.

Falcy, M.R. 2015. Righting the resource management ship: a response to Grose. Trends in Ecology and Evolution 30:294-295.

Falcy, M.R. 2015. Density-dependent habitat selection of spawning Chinook salmon: broad scale evidence and implications. Journal of Animal Ecology 84: 545-553.

Falcy, M.R., and Danielson, B.J. 2014. Post-hurricane recovery and long-term viability of the Alabama beach mouse. Biological Conservation 178: 28-36.

Falcy, M.R., and Danielson, B.J. 2013. A complex relationship between moonlight and temperature on the foraging behavior of the Alabama beach mouse. Ecology 94: 2632-2637.

Publications (continued)

Falcy, M.R., and Danielson, B.J. 2013. Assessment of competitive release of endangered beach mouse (*Peromyscus polionotus ammobates*). Journal of Mammalogy 94: 584-590.

Duthie, A.B., and **Falcy**, M.R. 2013. The influence of habitat autocorrelation on plants and their seed-eating pollinators. Ecological Modelling 251:260-270.

Bangs, B., **Falcy**, M.R., Scheerer, P.D., and Clements, S. 2013. Comparison of three methods for marking a small floodplain minnow. Animal Biotelemetry 1:18.

Falcy, M.R., and Danielson, B.J. 2011. When sinks rescue sources in dynamic environments. In Liu, J., Hull, V., Morzillo, A., and Weins, J. (Eds.). Sources, Sinks, and Sustainability. Cambridge Studies in Landscape Ecology.

Chilcote, M.W., Goodson, K.W., and **Falcy**, M.R. 2011. Reduced recruitment performance in natural populations of anadromous salmonids associated with hatchery-reared fish. Canadian Journal of Fisheries and Aquatic Sciences 68:511-522.

Deitloff, J., **Falcy**, M.R., Krenz, J.D., and McMillan, B.R. 2010. Correlating small mammal abundance to climatic variation over twenty years. Journal of Mammalogy 91(1):193-199.

Falcy, M.R. 2009. Theoretical perspectives on habitat destruction. In Kudrow, N.J. (Ed.). Conservation of Natural Resources. Nova Sciences Publishers. ISBN: 978-1-60741-178-9

Falcy, M.R., and Estades, C.F. 2007. Effectiveness of corridors relative to enlargement of habitat patches. Conservation Biology 21(5):1341-1346.

Oral Presentations at Conferences and Universities

Science as Bayesian model averaging, with applications to density dependence. 2020. Oregon Chapter of the American Fisheries Society. Bend, OR.

Middle Fork John Day Spring Chinook life cycle PVA. 2019. AMIP LCM Meeting. Hood River, OR.

Detecting management regime shifts in dynamic environments. 2019. North Pacific Anadromous Fish Commission Meeting. Portland, OR.

SNO BiRD: Stream network optimizer for biological reserve design. 2019. Fisheries Department, Oregon State University. Corvallis, OR.

Designing biological reserves on stream networks. 2019. Oregon Chapter of American Fisheries Society. Bend, OR.

Effects of sea lions on Willamette River winter steelhead viability. 2018. Fisheries Department, Oregon State University. Corvallis, OR.

Effects of sea lion predation on Willamette River winter steelhead viability. 2018. Salmon Ocean Ecology Meeting. Newport, OR.

Effects of sea lions on Willamette River winter steelhead viability. 2018. U.S. Army Corps of Engineers Willamette River Science Review. Corvallis, OR.

Population viability of Willamette River winter steelhead: An assessment of the effects of sea lions at Willamette Falls. 2018. Pacific Coast Steelhead Management Meeting. WallaWalla, Wa.

Oral Presentations at Conferences and Universities (continued)

Detecting the effects of management regime shifts in dynamic environments using multi-population state-space models. 2017. National Meeting of the Ecological Society of America. Portland, OR.

Bayesian Analysis for Beginners. 2017. Two day workshop at the Oregon Chapter of the American Fisheries Society. Bend, OR.

Conservation decision making: Integrating the precautionary principle with uncertainty. 2017. Oregon State University. Corvallis, OR.

Conservation decision making: Integrating the precautionary principle with uncertainty. 2016. Oregon Chapter of the American Fisheries Society. Seaside, OR.

Combining genetics and demographics in a viability model of hatchery-wild systems subject to environmental change. 2015. National Meeting of the American Fisheries Society. Portland, OR.

Estimating spawner population abundance of coastal Fall Chinook: is non-random sampling optimal? 2014. Oregon Chapter of the American Fisheries Society. Eugene, OR.

Exploring patterns in coastal coho abundance and productivity. 2014. Oregon Chapter of the American Fisheries Society. Eugene, OR.

Population viability analysis with Bayesian state-space parameter estimation. 2013. The International Environmetrics Society. Anchorage, AK.

A Bayesian meta-analytic assessment of the effect of watershed geomorphology and lithology on chinook salmon recruitment. 2013. Oregon Chapter American Fisheries Society. Bend, OR.

Artificial neural networks: finding complex environmental signals or just fitting noise? 2012. Oregon Chapter of the American Fisheries Society- Forecasting Symposium. Portland, OR.

Individual and population–level responses of the Alabama beach mouse (*Peromyscus polionotus ammobates*) to environmental variation in space and time. 2011. Biannual beach mouse conference. Daphne, AL.

Post-hurricane recovery and viability of the Alabama beach mouse. 2010. American Society of Mammalogists. Laramie, WY.

Optimal habitat selection of predator and prey in explicit space. 2009. Iowa State University Ecology and Evolutionary Biology Spring Symposium. Ames, IA.

Teaching Experience

Invited Instructor, Oregon State University, Department of Fisheries and Wildlife.
   Duration: October 20 to December 22, 2018. 8 hours total.
      Co-taught Quantitative and Computational Ecology seminar. Created and delivered lectures; created and lead computer exercises.

Guest Lecture, Oregon State University, Department of Fisheries and Wildlife.
   Duration: February 15, 2018 and January 17, 2019. 2 hours total.
      Presented a case study for a senior capstone course.

Invited Instructor, Oregon Chapter American Fisheries Society.
   Duration: February 28 to March 1, 2017. 8 hours total.
      Delivered workshop on *Bayesian Analysis for Beginners* for fisheries professionals. Workshop emphasized underlying theory and computational implementation.

Teaching Experience (continued)

Instructor, Oregon State University, Department of Integrative Biology (formerly Zoology).
   Duration: September 2009 to March 2010. 30 hours/week.
     Taught evolution to 110 upper-division undergraduates and graduate students. Responsible
     for all aspects of this course, including development of lecture material, homework
     assignments, exercises, exams, and final grades.
Instructor, Mt. Hood Community College.
   Duration: January 2008 to April 2008. 30 hours/week.
     Taught cell biology to 20 non-major students. Responsible for all aspects of this course,
     including development of lecture material, homework assignments, exercises, exams, and
     final grades.
Graduate Mentor, Portland State University.
   Duration: September 2001 to December 2002. 20 hours/week.
     Assisted, advised, and taught undergraduates in the University Studies Program - a general
     education curriculum at Portland State University. Led discussion groups, assigned and
     evaluated assignments, and occasionally presented lectures.
Volunteer, Unites States Peace Corps, Nicaragua.
   Duration: March 1998 to March 2000. 20 hours/week.
     Taught English as a second language at a high school in Nindirí, Nicaragua.

International Experience

Fellow, Organization of American States, Chile.
   Duration: January 2003 - January 2005. 40 hours/week.
     Collaborated with researchers at University of Chile. Developed individual-based,
     spatially-explicit, and object-oriented simulation models using Visual Basic. Address
     social tradeoff between forest harvest practices and wildlife viability. Modeled animal
     population dynamics to address management uncertainty about the effect of spatial
     configuration of habitat on population persistence.

Volunteer, Unites States Peace Corps, Nicaragua
   Duration: March 1998 to March 2000. 40 hours/week.
     Developed environmental awareness projects with administrators of a national park.
     Taught English as a second language.

Foreign Language

I lived and worked in Nicaragua for two years as a Peace Corps Volunteer. I then enrolled in the
University of Chile as a foreign student and completed a master's degree entirely in Spanish.

Computing

I am highly proficient with R and MATLAB. I have worked extensively in these platforms for
15 years. I frequently use BUGS, JAGS, and NIMBLE for Bayesian analysis.

Professional Society

Ecological Society of America
American Fisheries Society

Recognitions

- Oregon Department of Fish and Wildlife *Team Pride Award,* 2014.
- Oregon Department of Fish and Wildlife *Award of Excellence*, 2015.
- Oregon Department of Fish and Wildlife *Individual Pride Award*, 2016.

Professional References

Dr. Jim Peterson | Work Associate
Professor and USGS Unit Leader
Department of Fisheries and Wildlife 104 Nash Hall
Oregon State University Corvallis, OR. 97331
Phone: 1-541-737-1963
E-mail: jt.peterson@oregonstate.ed

Dr. Brent Danielson | Ph.D. Advisor
Professor, Department of Ecology, Evolution, and Organismal Biology
253 Bessey Hall Iowa State University Ames, IA. 50011
Phone: 515-294-5248
E-mail: brentd@iastate.edu

Dr. Johnathan Armstrong | Co-PI
Assistant Professor, Department of Fisheries and Wildlife
Nash Hall 34, Oregon State University, Corvallis, OR. 97331
Phone: 541-737-1080
E-mail: jonny5armstrong@gmail.com

Tom Stahl | Supervisor
Conservation and Recovery Program Manager
Oregon Department of Fish and Wildlife
4034 Fairview Industrial Dr SE, Salem OR. 97302
Phone: 503-947-6219
E-mail: Thomas.Stahl@state.or.us