
HENRIETTE (YETTA) JAGER, Ph.D.

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Our research seeks to understand environmental trade-offs and complementarities among activities related to energy production and other human activities from an ecosystem services perspective. For hydropower, our models represent responses of riverine fishes to modifications to flow, temperature (climate change), and connectivity. For bioenergy, we develop guidance for placing and managing crops to increase sustainability with respect to yield, water quality & quantity, and biodiversity.

RESEARCH LEADERSHIP

- 2016-2017. Model-guided conservation planning for fall Chinook salmon in the Middle Snake River. Idaho Power Company
- 2014-2017. Model-guided conservation planning for white sturgeon in the Middle Snake River. Idaho Power Company
- 2014-present. SECURE Water Act Section 9505-2 Environmental Focus. DOE Wind and Waterpower (sub-PI)
- 2009-present. Forecasting water quality and biodiversity, DOE Bioenergy Technologies Office
- 2006-2014. Population viability analysis of fall Chinook salmon in the Snake River, Idaho Power Company
- 2008-2011. CDFG San Joaquin River fall-run Chinook salmon production model refinement, California Department of Fish and Game
- 2006-2010. Population viability analysis of the endangered shortnose sturgeon in the Ogeechee River, GA, DOD Strategic Environmental Research and Development Program.
- 2009-2010. Spatial modeling of geographic patterns in biodiversity and biofuel production, Oak Ridge National Laboratory, Lab Directed Research & Development Program
- 2000-2007. Population viability analysis of white sturgeon in the Snake River, Idaho Power Company
- 2005-2006. Testing and improvement of the ORCM Chinook salmon model, California Energy Commission Partnership in Energy Research Program
- 2001-2003. Conceptual population viability model for pallid sturgeon in the Missouri River, ORNL State Partnership Program

PEER-REVIEWED PUBLICATIONS (55 total)

Journal Articles

- Forbes, V. **HI Jager** and 12 coauthors. 2017 accepted. Accepted. A framework for predicting impacts on ecosystem services from (sub)organismal responses to chemicals. *Environmental Toxicology & Chemistry*.
- McManamay RA, Brewer SK, **Jager HI**, Troia MJ (2016) Organizing Environmental Flow Frameworks to Meet Hydropower Mitigation Needs. *Environmental Management*: 1-21
- Jager, HI**, MJ Parsley, JJ Cech, Jr., RL McLaughlin, PS Forsythe, RF Elliott, and BM Pracheill. 2016. Reconnecting fragmented sturgeon populations in North American rivers. *Fisheries* 41(3), 140-148.
- Jager, HI**, RA Efroymsen, JJ Opperman, and MR Kelly. 2015. Spatial design principles for sustainable hydropower development in river basins. *Renewable and Sustainable Energy Reviews* 45: 808-816.
- Jager, HI**, LM Baskaran, PE Schweizer, A Turhollow, CC Brandt, and R Srinivasan. 2015. Forecasting changes in water quality in rivers associated with growing biofuels in the Arkansas-White-Red river drainage, USA. *Global Change Biology: Bioenergy* 7(4): 774-784.
- Jager, HI** and RA McManamay. 2014. Comment on “Cumulative biophysical impact of small and large hydropower development in Nu River, China” by Kelly Kibler and Desiree Tullos. *Water Resources Research* 50, 758–759.
- Jager, HI**. 2014. Thinking outside the channel: Timing pulse flows to benefit salmon via indirect pathways. *Ecological Modelling* 273: 117-127.
- McManamay, RA, DJ Orth, & **HI Jager**. 2014. Accounting for variation in species detection in fish community monitoring. *Fisheries Management and Ecology* 21, 96–112.

March 1, 2017

EDUCATION

- PhD 2000, Ecology and Evolutionary Biology, University of Tennessee
- MS 1984, Ecology University of Tennessee
- BA 1979, Biology Franklin Pierce College, SUNY ESF

PROFESSIONAL EXPERIENCE

- 1988-2015 Staff scientist
Environmental Sciences Division,
Oak Ridge National Laboratory
- 2015-Present Senior scientist
- 2003-Present Joint Faculty Associate, Ecology &
Evolutionary Biology, University
of Tennessee @ Knoxville

PROFESSIONAL AFFILIATIONS

- Nat'l Inst. of Mathematical & Biological Synthesis
- Center for Bioenergy Sustainability (ORNL)
- Climate Change Science Institute (ORNL)
- Bredesen Center (University of Tennessee)
- Amer. Fisheries Society, Int. Society of Landscape Ecologists, Ecological Society of America

CONTACT INFORMATION

- Environmental Sciences Division
- Oak Ridge National Laboratory
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- E-mail: jagerhi at ornlgov

- Ridley, CE, **HI Jager**, RA. Efroymsen, C Kwit, DA. Landis, ZH Leggett, DA Miller, CM Clark. 2013. Debate: Can bioenergy be produced in a sustainable manner that protects biodiversity and avoids the risk of invaders? *Ecological Society of America Bulletin* 94(3): 277-290.
- Jager, HI**, DL Peterson, D Farrae, & MS Bevelhimer. 2013. A population model to assess influences on the viability of the shortnose sturgeon (*Acipenser brevirostrum*) population in the Ogeechee River, Georgia. *Transactions of the American Fisheries Society* 142(3): 731-746.
- Schweizer P & **HI Jager**. 2011. Modeling fish diversity in the Arkansas-Red-White River Basin. *Transactions of the American Fisheries Society* 140(5): 1227-1239. (<http://dx.doi.org/10.1080/00028487.2011.618354>)
- Jager, HI**, MS Bevelhimer, RL King, & KA Smith. 2011. Landscape influences on headwater streams on Fort Stewart, Georgia, USA. *Environmental Management* 47:795-807 (<http://dx.doi.org/10.1007/s00267-011-9722-4>)
- Perkins TA & **HI Jager**. 2011. A conditional strategy model accounts for spatiotemporal life history variation in Snake River fall Chinook salmon. *Transactions of the American Fisheries Society* 140(4): 959-972.
- McBride AC, VH Dale, LM Baskaran, ME Downing, LM Eaton, RA Efroymsen, CT Garten Jr, KL Kline, **HI Jager**, PJ Mulholland, ES Parish, PE Schweizer, & J.M. Storey. 2011. Indicators to support environmental sustainability of bioenergy systems. *Ecological Indicators* 11(5): 1277-1289.
- Jager HI**, KB Lepla, W Van Winkle, BA James, & SO McAdams. 2010. The elusive minimum viable population size for white sturgeon. *Transactions of the American Fisheries Society* 139: 1551-1565.
- Baskaran, LM, **HI Jager**, PE Schweizer & R Srinivasan. 2010. Progress toward evaluating the sustainability of switchgrass production at a regional scale. *American Society of Agricultural and Biological Engineers* 53(5): 1547-1556.
- Jager HI**, LM Baskaran, CC Brandt, EB Davis, CA Gunderson & SD Wullschleger. 2010. Empirical geographic modeling of switchgrass yields in the United States. *Global Change Biology: Bioenergy* 2(5): 248-257.
- Efroymsen RA, **HI Jager**, VH Dale, J Westerveld. 2009. A framework for developing management goals for species at risk and application to military installations in the United States. *Environmental Management* 44(6): 1163-1179.
- McCullough, DA, JM Bartholow, **HI Jager** and others. 2009. Research in thermal biology: Burning questions for coldwater stream fishes. *Reviews in Fisheries Science* 17(1): 90-115.
- Jager HI**, KA Rose, & A Vila-Gispert. 2008. Life history correlates and extinction risk of capital-breeding fishes. *Hydrobiologia* 602: 15-25.
- Jager HI** & BT Smith. 2008. Sustainable Reservoir Operation: Can we generate hydropower and preserve ecosystem values? *River Research and Applications* 24: 340-352.
- Jager HI** & MS Bevelhimer. 2007. How run-of-river operation affects hydropower generation. *Journal of Environmental Management* 40: 1004-1015.
- Jager HI** 2006. Chutes and ladders and other games we play with rivers: I. Simulated effects of upstream passage on white sturgeon. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 165-175.
- Jager HI** 2006. Chutes and ladders and other games we play with rivers: II. Simulated effects of translocation on white sturgeon. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 176-184.
- Jager HI**, EA Carr & RA Efroymsen. 2006. Simulated effects of habitat loss and fragmentation on a solitary, mustelid predator. *Ecological Modelling* 91: 416-430.
- Jager HI**. 2005. Genetic and demographic implications of aquaculture on white sturgeon (*Acipenser transmontanus*) conservation. *Canadian Journal of Fisheries and Aquatic Sciences*. 62(8): 1733-1745 Management, and Protection of Sturgeon, American Fisheries Society Symposium 28, American Fisheries Society, Bethesda, MD.
- Jager HI**, RA Efroymsen, K. Sublette & T.A. Ashwood. 2005. Unnatural landscapes in ecology: Generating the spatial distribution of brine spills. *Environmetrics* 16: 687-698.
- Jager HI**, AW King, NH Schumaker, TL Ashwood & BL Jackson. 2005. Spatial uncertainty analysis of population models. *Ecological Modelling* 185(1): 13-27.
- Jager HI** & AW King. 2004. Spatial uncertainty and ecological models. *Ecosystems* 7: 1-7.
- Sullivan, AB, **Jager HI** & R Myers. 2003. Modeling white sturgeon movement in a reservoir: The effect of water quality. *Ecological Modelling* 167(1-2): 97-114.
- Jager HI** & KA Rose. 2003. Designing optimal flow patterns for fall Chinook salmon recruitment in a Central Valley, California river. *North American Journal of Fisheries Management* 23: 1-21.
- Jager HI**, W Van Winkle, KA Lepla, JB Chandler, P Bates, & TD Counihan. 2002. Factors controlling white sturgeon recruitment in the Snake River. Pages 127--150 IN: W Van Winkle, PJ Anders, DH Secor, & DA Dixon, eds., *Biology*
- Jager HI**. 2001. Individual variation in life history characteristics can influence population extinction risk. *Ecological Modelling* 144(1): 59-74.
- Jager HI** & JA Tyler. 2001. Letter to the editor concerning Railsback et al. 1999. Movement rules for individual-based models of stream fish. *Ecological Modelling* 144(3): 245-248.
- Jager HI**, W Van Winkle, K Lepla, & J Chandler. 2001. A theoretical study of river fragmentation by dams and its effects on white sturgeon populations. *Environmental Biology of Fishes* 60: 347-361.
- Jager HI**, W Van Winkle, K Lepla, J Chandler, and P Bates. 2000. Population viability analysis of riverine fishes. Special issue of the *Journal of Environmental Science and Policy* 3: S483-489.

- Jager HI**, WH Hargrove, CC Brandt, AW King, RJ Olsen, JMO. Scurlock, & KA Rose. 2000. Constructive contrasts between modeled and measured climate responses over a regional scale. *Ecosystems* 3: 396-411.
- Jager HI**, W Van Winkle, & BD Holcomb. 1999. Would hydrologic climate changes in Sierra-Nevada streams influence trout persistence? *Transactions of the American Fisheries Society* 128: 222-240.
- Suter, GW II, LW Barnthouse, RA Efroymsen, & **HI Jager**. 1999. Ecological risk assessment in a large river-reservoir: 2. fish community. *Environmental Toxicology and Chemistry* 18(4): 589-598.
- Van Winkle W, **HI Jager**, SF Railsback, BD Holcomb, TK Studley, & JE Baldrige. 1998. Individual-based model of sympatric populations of brown and rainbow trout for instream flow assessment: model description and calibration. *Ecological Modelling* 110: 175-207.
- Van Winkle W, KA Rose, BJ Shuter, **HI Jager**, & BD Holcomb. 1997. Effects of climatic temperature change on growth, survival, and reproduction of rainbow trout: predictions from a simulation model. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 2526-2542.
- Van Winkle W, CC Coutant, **HI Jager**, and others. 1997. Uncertainty and instream flow standards: perspectives based on research and assessment experience. *Fisheries* 21: 21-22.
- Jager HI**, HE Cardwell, MJ Sale, MJ Bevelhimer, CC Coutant, & W Van Winkle. 1997. Modelling the linkages between flow management and salmon recruitment in streams. *Ecological Modelling* 103: 171-191.
- Cardwell H, **HI Jager**, & MJ Sale. 1996. Designing instream flows to satisfy fish and human water needs. *ASCE Journal of Water Resources Planning and Management* 122(5): 356-363.
- Jager HI**, DL DeAngelis, MJ Sale, W VanWinkle, DD Schmoyer, MJ Sabo, DJ Orth, & JA Lukas. 1993. An individual-based model of smallmouth bass reproduction and young-of-year dynamics in streams. *Rivers* 4: 91-113.
- Jager HI**, MJ Sale, & RL Schmoyer. 1990. Regional assessment of water quality in the Southern Blue Ridge Province using cokriging. *Water Resources Research* 26(7):1401-1412.
- Dale, VH, **HI Jager**, RH Gardner, & AE Rosen. 1988. Using sensitivity and uncertainty analysis to improve predictions of broad-scale forest development. *Ecological Modelling* 42:165-178.
- Jager HI** & RH Gardner. 1988. A simulation experiment to investigate food web polarization. *Ecological Modelling* 41: 101-116.

Book Chapters

- Efroymsen RA, **HI Jager**, & W Hargrove. 2010. Valuing wildlands. Pages 157-185 In *Environmental Risk Assessment and Management from a Landscape Perspective*, L Kapustka, W Landis, and A Johnson (editors). John Wiley & Sons.
- Efroymsen, RA, Carlsen TM, **Jager, HI**, et al. 2004. Pages 261-285 *In* *Toward a Framework for Assessing Risk to Vertebrate Populations from Brine and Petroleum Spills at Exploration and Production Sites*, Landscape Ecology and Wildlife Habitat Evaluation, ASTM STP 1458, L. Kapustka et al. (eds.), ASTM International, West Conshohocken, PA.
- Jager HI**, KA. Rose & A Vila-Gispert. 2008. Life history correlates and extinction risk of capital breeding fishes. Pages 15-25 In *Fish and Diadromy in Europe*. Proceedings of the symposium held 29 March-1 April, 2005, Bordeaux, France, Dufour, Prevost, Rochard, and Williot (eds.). Springer, Amsterdam.
- Jager HI**, MS Bevelhimer, KA Lepla, JB Chandler, & W Van Winkle. 2007. Evaluation of Reconnection Options for White Sturgeon in the Snake River Using a Population Viability Model. Pages 319-335 In *Proceedings of the Symposium on Anadromous Sturgeons*. J.F. Munro et al., ed., American Fisheries Society Symposium 56, American Fisheries Society, Bethesda, MD.
- Van Winkle W, BD Holcomb, **HI Jager**, JA Tyler, SY Whitaker & BJ Shuter. 1995. Regulation of energy acquisition and allocation to respiration, growth, and reproduction: simulation model and example using rainbow trout. *IN* RC Chambers and EA Trippel, (eds.), *Early Life History and Recruitment in Fish Populations*, Chapman and Hall.
- Jager HI** & WS Overton. 1993. Explanatory models for ecological response surfaces. Chapter 42, pp. 422 - 437 *IN* Goodchild, M.F., B.O. Parks, and L.T. Steyaert (eds.), *Environmental Modeling with GIS*. Oxford University Press, NY.
- Cook, RB & **HI Jager**. 1991. Upper Midwest: The effects of hydrologic lake type and acidic deposition on lakewater chemistry. Chapter 13 *IN* D.F. Charles (ed.). *Acidic Deposition and Aquatic Ecosystems: Regional Case Studies*. Springer-Verlag, New York.

Significant Reports

- Kao, S.C, M. Ashfaq, BS. Naz, R Uría-Martínez, D Rastogi, R Mei, H Jager, NM. Samu, and MJ. Sale. 2016. The Second Assessment of the Effect of Climate Change on Federal Hydropower. ORNL/SR-2015/357. September, 2016.
- Jager, HI** and **Jager, HI** and four coauthors. 2017. Chapter 5 Water Quality Responses to Simulated Management Practices on Agricultural Lands Producing Biomass Feedstocks in Two Tributary Basins of the Mississippi River. 2016 Billion-Ton Report (BT16), Volume 2: Environmental Sustainability Effects of Select Scenarios from Volume 1. Department of Energy and Oak Ridge National Laboratory.

Jager, HI and four coauthors. 2017. Chapter 10 Simulated Response of Avian Biodiversity to Biomass Production. 2016 Billion-Ton Report (BT16), Volume 2: Environmental Sustainability Effects of Select Scenarios from Volume 1. Department of Energy and Oak Ridge National Laboratory.

PROFESSIONAL ACTIVITIES, INVITED PRESENTATIONS*, AND SERVICE

- *Roundtable on 'Emerging risks, measured responses. University of Tennessee, March, 2017
- Co-organized DOE workshop, 'Bioenergy Solutions to Gulf Hypoxia', held in Washington DC, August 30-31, 2016.
- *Presentation to Symposium, 'Inland drivers of Gulf Hypoxia' American Fisheries Society meeting, Kansas City, 2016
- *Presentation, Southern Grassroots Biofuels Project Workshop, Tennessee Technical University, Cookeville, 2016
- Organized symposium "Shifting Landscapes: Biomass and Biodiversity II" Intern'l Assoc. Landscape Ecologists, Asheville, NC (2016)
- *Watershed modeling for the Mississippi River Basin, Federal multi-agency modeling workgroup. (2016)
- *Watershed modeling for the Mississippi River Basin, EPA Gulf of Mexico Hypoxia Taskforce (2016)
- National Institute of Math. and Biological Synthesis Working group, 'Organisms to Ecosystem Services' (2015-2017)
- Mississippi River Basin / Gulf Hypoxia Initiative meeting of the Eastern Tallgrass Prairie and Big Rivers Landscape Conservation Cooperative, Indianapolis. (2016)
- *National Working Forum: Managing Poplar and Willow for Environmental Benefits and the Renewable Fuels Industry, Portland, April, (2016)
- *Individual-based sturgeon contaminant modeling. EPA Office of Pesticide Programs, DC (2015)
- *Symposium "Using Science to Promote Sustainable Biofuels Production in the Southeast," National Bioenergy Day webinar, Southeastern Partnership for Integrated Biomass Supply Systems (2015)
- Search committee, University of Tennessee EEB Faculty search (Spatial Ecologist) (2015-2017)
- Career panel (Non-academic careers in Statistical Ecology), National Institute for Mathematical & Biological Sciences, University of Tennessee, Knoxville (2015)
- *NSF Scholars, "Preparation of Data Driven Mathematical Scientists for the Workforce", East Tennessee State Univ.(2015)
- National Institute of Math. And Biological Synthesis Working group, 'Modeling Species Interactions' (2013-2015)
- *Designing Bioenergy Landscapes for Wildlife, Center for Bioenergy Sustainability, ORNL (2014).
- *NSF National Institute of Mathematical and Biological Synthesis (2014).
- Search committee, Director of National Institute for Mathematical & Biological Sciences (2014)
- *Symposium, Model Complexity, American Fisheries Society meeting, September (2013).
- Keynote presentation Spring Runoff Conference, Utah State U. April (2013)
- Co-organizer, debate on the Sustainability of Biomass Production for Energy. Annual Ecological Society of America (2012)
- Local organizing committee, Annual Meeting of the Society of Mathematical Biology, Knoxville, TN. (2012)
- *Columbia Basin Sturgeon Workshop on sturgeon passage, Northwest Power Planning Council (2012)
- Scientific review Alternative San Joaquin River Flow Objectives for Protection of Fish & Wildlife for California EPA (2011)
- Peer review of USEPA Conceptual Models for Biofuel Feedstock Production (2011)
- *Center for BioEnergy Sustainability Workshop "Billion Ton Study Sustainability" (2011)
- *Great Lakes Fishery Trust Workshop, "Enhancing Lake Sturgeon Passage at Hydroelectric Facilities," (2011)
- *NMFS Sturgeon workshop - Recovery measures for Atlantic and shortnose sturgeon in Alexandria, VA (2011)
- Organized symposium "Shifting Landscapes: Biomass and Biodiversity" Intern'l Assoc. Landscape Ecologists, Athens, GA www.esd.ornl.gov/~zjz/IALE_symposium/ (2010)
- EPA-DOE Joint workshop "A Watershed Perspective on Bioenergy Sustainability" (2010)
- *Gulf Sturgeon Modeling Review Panel, NOAA, Cedar Key, Florida (2009)
- NSF Workshop "Computational Science for Natural Resource Managers," Keynote presentation (2007)
- San Joaquin River Fall Chinook Salmon Modeling Review (2006), California Dept of Fish & Game.
- Scientific Committee, "Fish and Diadromy in Europe," Conference, Bordeaux, France (2005)
- Pallid Sturgeon Review Panel for the US Army Corps of Engineers (2004-2005)
- Everglades Model Review Team for the US Geologic Service, Miami, FL (2002-2003)
- Panel discussion, Hydropower Relicensing and the Environment, WaterPower, Orlando, FL (1998)

AWARDS & EDITORIAL POSITIONS

Editorial Board, 'Sustainability of Water Quality and Ecology' (2015-2017)

Distinguished Scientific Achievement (Auerbach) Award, Environmental Sciences Division, ORNL (2006)

DOE Outstanding Mentor Award (2006)
ORNL Technical Publication Award (2001) for Jager et al. 2000. *Ecosystems* 3: 396-411
Ecological Society of America, Southeast Chapter Secretary-Treasurer (2002-2004)
Associate Editor for the *North American Journal of Fisheries Management* (2001-2002)

MENTORING

Rebecca Novello (2016-2017), Jasmine Kreig (Bredesen Center Fellow, 2015-present), James Nance (Postdoc Fellow 2016), Jake Ferguson (NIMBIOS Postdoc Fellow 2015-2016); Angie Peace (NIMBIOS Postdoc Fellow 2015); Matthew Fuller, DOE Hydropower Fellow (2014-2017); Nate Sutton, post-MS (2014-2016); Jasmine Krieg, post-BS (2014-2015); Angelina Haines, post-BS (2014-2015); David Gorelick, BS (2014, 2015); Michael Kelly, PhD student (2013); Jamie Smedsmo, DOE Krell Institute Computational Fellow (2013); Peter Schweizer, postdoc (2008-2010); Mathew Rice (2011); Alex Perkins, PhD student, DOE Krell Institute Computational Fellow (2010); Lin Shi (2010); Alexandre Lockhart (2008); Emanuel Isang, ETSU (2008), Kendall Ernst, Stanford U. (summer 2007); Darryl Hoy, Dartmouth College (2005); Eric Carr, post-MS (2005), Liliya Hartman (2003); Annett Sullivan, Wigner Postdoc Fellow (2000-2002); Brian Maskarinek (2000-2001).

