
HENRIETTE (YETTA) JAGER, Ph.D.

My research seeks to understand trade-offs and complementarities among ecosystem services associated with renewable energy. For hydropower, we use models to estimate how aquatic biota respond to flow and thermal regimes under future climate. Our bioenergy research models ecosystem service responses to biomass production systems, with the goal of enhancing water quality and biodiversity.

RESEARCH LEADERSHIP (PI)

- 2020-2023. Water Risk for the Bulk Power System: Asset to Grid Impacts, DOE Office of Electricity, & Waterpower Technologies Office (WPTO)
- 2020-present. Geospatial Analysis of Ecosystem Service Portfolio from Biomass Production, DOE Bioenergy Technologies Office (BETO)
- 2020. GHG emissions from hydropower reservoirs (WPTO)(sub-PI)
- 2018-2020 Visualizing Ecosystem Service Portfolios of Agricultural and Forested Biomass Production Systems. (BETO)
- 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
- 2014-2016. SECURE Water Act Section 9505-2 Environmental Focus. DOE Wind and Waterpower (sub-PI)
- 2009-2016. 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, Cal. 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, Cal. Energy Commission Partnership in Energy Research Program
- 2001-2003. Conceptual Population Viability Model for Pallid Sturgeon in the Missouri River, ORNL State Partnership Program

AWARDS

- Elected Fellow of the American Fisheries Society, 2022
- Elected Fellow of the American Association for the Advancement of Science, 2019
- Distinguished Scientific Achievement Award, Environmental Sciences Division, ORNL (2006)
- DOE Outstanding Mentor Award (2006)

August 26, 2022

EDUCATION

- PhD 2000, Ecology and Evolutionary Biology, University of Tennessee
- MS 1984, Ecology University of Tennessee
- BA 1979, Biology Franklin Pierce College, SUNY College of Environmental Science & Forestry

PROFESSIONAL EXPERIENCE

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

PROFESSIONAL AFFILIATIONS

- American Fisheries Society (President-Elect, Water Quality Section 2019-2020; President 2020-2021; Past-President 2022-2023)
- Natn'l Inst. of Mathematical & Biological Synthesis
- Center for Bioenergy Sustainability (ORNL)
- Climate Change Science Institute (ORNL)
- Bredesen Center (University of Tennessee)
- Int. Society of Landscape Ecologists, Intn'l Society for Ecological Economics, Ecological Society of America, AAAS

CONTACT INFORMATION

- Environmental Sciences Division
Oak Ridge National Laboratory
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E-mail: jagerhi at ornl.gov
Twitter: @myjgoo
<https://jager540.wordpress.com>

ORNL Technical Publication Award (2001) for Jager et al. 2000. *Ecosystems* 3: 396-411

PROFESSIONAL SERVICE

Ohio River Restoration, Climate chapter, Healthy and Productive Ecosystems Work Group (2021-present)
Scientific Program Committee for the Joint Aquatic Sciences Meeting (JASM) (2021-2022)
Past-president, Water Quality Section, American Fisheries Society (2022-2023)
President, Water Quality Section, American Fisheries Society (2020-2021)
President-elect, Water Quality Section, American Fisheries Society (2018-2019)
Editorial Board, 'Water' (2021-present)
Editorial Board, 'River Research and Applications' (2018-present)
Editorial Advisory Board, 'Ecological Complexity' (2017-present)
Editorial Board, 'Sustainability of Water Quality and Ecology' (2015-2017)
Co-organized Symposium (2019) 'Fire Resilience Can Fish, Wildlife, and Humans Adapt to Shifts in Wildfire Disturbance?',
Joint meeting of American Fisheries Society & The Wildlife Society, Reno, NV
Co-organized Symposium (2018) Bad Acid: Past and future risk of acidification to aquatic ecosystems that support
fisheries and aquaculture. American Fisheries Society Annual Meeting, Atlantic City, NJ, August.
Program Review, USGS Northeast Climate Science Center. (2017). French et al. Five-Year External Reviews of the Eight
Department of Interior Climate Science Centers.
President-Elect of Water Quality Section, American Fisheries Society (2017)
Co-organized DOE workshop, 'Bioenergy Solutions to Gulf Hypoxia', held in Washington DC (2016)
National Institute of Math. and Biological Synthesis Working group, 'Organisms to Ecosystem Services' (2015-2017)
Organized symposium "Shifting Landscapes: Biomass and Biodiversity II" Intern'l Assoc. Landscape Ecologists, Asheville,
NC (2016)
Mississippi River Basin / Gulf Hypoxia Initiative meeting of the Eastern Tallgrass Prairie and Big Rivers Landscape
Conservation Cooperative, Indianapolis. (2016)
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)
National Institute of Math. And Biological Synthesis Working group, 'Modeling Species Interactions' (2013-2015)
Search committee, Director of National Institute for Mathematical & Biological Sciences (2014)
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)
Peer review of USEPA Conceptual Models for Biofuel Feedstock Production (2011)
Organized symposium "Shifting Landscapes: Biomass and Biodiversity" Intern'l Assoc. Landscape Ecologists, Athens, GA
www.esd.ornl.gov/~zj/IALE_symposium/ (2010)
EPA-DOE Joint workshop "A Watershed Perspective on Bioenergy Sustainability" (2010)
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 Program 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)
Ecological Society of America, Southeast Chapter Secretary-Treasurer (2002-2004)
Associate Editor for the North American Journal of Fisheries Management (2001-2002)

INVITED PRESENTATIONS

Bringing ecosystem services into the equation, Invited presentation, BETO BioRestore Workshop, Argonne (2019)
Hydropower and Marine Hydrokinetic energy, Symposium on Renewable Energy and Wildlife at the Wildlife Society,
Albuquerque (2017)
'An ecosystem services perspective on climate resilience at the terrestrial-aquatic interface,' (2021) ORNL Gulf Coast
Terrestrial-Aquatic Interfaces Workshop: Climate Change and Disturbance Impact,
'Bayesian network models explore how forest treatments can reduce wildfire risk and increase connected habitat for
ESA-listed salmonids.' Symposium on Advances in Understanding Landscape Influences on Stream Habitats and
Biological Assemblages (2018) American Fisheries Society meeting.

Roundtable on Spatial ecology and big data, ‘Emerging risks, measured responses’. NIMBIOS, U. Tennessee, (2017)
 Symposium, ‘Inland drivers of Gulf Hypoxia’ American Fisheries Society meeting, Kansas City, (2016)
 Southern Grassroots Biofuels Project Workshop, Tennessee Technical University, Cookeville, (2016)
 National Working Forum: Managing Poplar and Willow for Environmental Benefits and the Renewable Fuels Industry, Portland, April, (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)
 ‘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)
 NSF Scholars, "Preparation of Data Driven Mathematical Scientists for the Workforce", East Tenn. State University (2015)
 Designing Bioenergy Landscapes for Wildlife, Center for Bioenergy Sustainability, ORNL (2014).
 NSF National Institute of Mathematical and Biological Synthesis (2014).
 Symposium, Model Complexity, American Fisheries Society meeting, September (2013).
 Keynote presentation Spring Runoff Conference, Utah State U. April (2013)
 Columbia Basin Sturgeon Workshop on sturgeon passage, Northwest Power Planning Council (2012)
 Society for Industrial & Applied Mathematics, ‘Shaping seasonal flows for salmon and energy’ Knoxville (2012)
 Center for BioEnergy Sustainability Workshop “Billion Ton Study Sustainability” (2011)
 AGU Water Management Workshop, UC Davis, (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)
 Gulf Sturgeon Modeling Review Panel, NOAA, Cedar Key, Florida (2009)
 “Fish and Diadromy in Europe,” Conference, Bordeaux, France (2005)
 ASILOMAR 2000: Bay-Delta Modeling Forum and Interagency Ecological Program Annual Meeting, Pacific Grove, CA, (2000).
 Panel discussion, ‘Hydropower Relicensing and the Environment,’ WaterPower, Orlando, FL (1998)

MENTORING

Sebastian Espinoza (PhD Committee, UTK-EEB, 2022-present)
 Hyun Seok Koon (PhD Committee, UTK-EEB, 2021-present)
 Jasmine Kreig (Chair, PhD, Bredesen Center, 2015-2021)
 Lauren Lyon (PhD Committee, UTK-EEB, 2019-2021)
 Diliya Murtzina (PhD Committee, UTK-Bredesen Center, 2018-2021)

Post-docs

James Nance (Postdoc Fellow 2016), Jake Ferguson (NIMBIOS Postdoc Fellow 2015-2016); Angela Peace (NIMBIOS Postdoc Fellow 2015); Matthew Fuller (DOE Hydropower Fellow 2014-2017); Annett Sullivan (ORNL Wigner Postdoc Fellow, 2000-2002)

Post-masters and PhD student interns

Nathan Sutton, post-MS (2014-2016); 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); Eric Carr, post-MS (2005)

Undergraduate and Post-BS interns

Jasmine Krieg, post-BS (2014-2015); Angelina Haines, post-BS (2014-2015); David Gorelick, BS (2014, 2015); Darryl Hoy (Dartmouth, summer 2005); Alexandre Lockhart (2008); Emanuel Isang, ETSU (2008), Kendall Ernst, Stanford U. (summer 2007) Liliya Hartman (2003); Brian Maskarinek (2000-2001).

PhD Thesis Examinations

Zeb Tonklin, Griffith University, Australia (2019)

PUBLICATIONS

Journal Articles

1. **Jager, H.I.**, T. DeSilva, R. Uria-Martinez, B. Pracheil & J. Macknick. 2022. Shifts in hydropower operation to balance wind and solar will modify impacts on biodiversity. *Water Biology and Security* 100060.
2. **Jager, HI**, M Hilliard, M. Langholtz, RA Efroymson, CC Brandt, SS Nair, JAF Kreig. 2022. Ecosystem service benefits from perennial biomass production. *Science of the Total Environment*. 155255. 10.1016/j.scitotenv.2022.155255
3. **Jager, HI**, N.A. Griffiths, C.H. Hansen, A.W. King, P.G. Matson, R. Pilla, D. Singh. 2022. Getting lost tracking the carbon footprint of hydropower. *Renewable & Sustainable Energy Reviews* 162, 112408.
4. Vera, Ivan Concha, ... **HI Jager**, et al. 2022. Land use for bioenergy: synergies and trade-offs between Sustainable Development Goals. *Renewable & Sustainable Energy Reviews* 161, 112409.
5. **Jager, HI**, RA Efroymson, RA McManamay. 2021. Renewable Energy and Biological Conservation in a Changing World. *Biological Conservation* 263, 109354.
6. **Jager, HI**, JW Long, RL Malison, BP Murphy, A Rust, LGM Silva, R Sollmann, ZL Steel, MD Bowen, JB Dunham, JL Ebersole, RL Flitcroft. 2021. Resilience of terrestrial and aquatic fauna to historical and future wildfire regimes in western North America. *Ecology and Evolution*, 11(18), 12259-12284, doi.org/10.1002/ece3.8026.
7. Kreig, JAF, E Parish, **HI Jager**. 2021. Growing grasses in unprofitable areas of US Midwest croplands could increase species richness. *Biological Conservation* 260, 109289.
8. McManamay, RA, CR Vernon, **HI Jager**. 2021. Global biodiversity implications of land requirements for alternative electrification strategies under the shared socioeconomic pathways. *Biological Conservation*, 260, 109234. 10.1016/j.biocon.2021.109234
9. Efroymson, RA, **HI Jager**, S Mandal, ES Parish, TJ Mathews. 2021. Better management practices for environmentally sustainable production of microalgae and algal biofuels. *Journal of Cleaner Production* 289, 125150.
10. Langholtz, L, BH Davison, **HI Jager**, L Eaton, LM Baskaran, M Davis, CC Brandt. 2021. Energy and water quality implications of growing switchgrass with reduced nitrogen use efficiency. *Science of the Total Environment* 758, 143602
11. **Jager, HI** & CC Coutant. 2020. Knitting while Australia burns. *Nature Climate Change* 170. 10.1038/s41558-020-0710-7
12. **Jager, HI**, ES Parish, MH Langholtz AW King. 2020. Perennials in flood-prone areas of agricultural landscapes: A climate adaptation strategy. *BioScience* 170(4): 278-280.
13. Kusnierz, P, A Todd, **Jager, HI**. 2020. A Call for Collaboration among water quality and fisheries professionals. *Fisheries* 45(3): 157-162.
14. McManamay, RA **HI Jager**. 2019. Stream Biomes of the World. *Encyclopedia of the Worlds Biomes*. Lowell Suring, Elsevier. www.sciencedirect.com/science/article/pii/B9780124095489120470.
15. Gorelick, D, LM Baskaran, **Jager, HI**. 2019. Visualizing feedstock siting in biomass production: tradeoffs between economic and water quality objectives. *Land Use Policy* 104201.
16. Kreig, JAF, I Chaubey, H Ssesane, CM Negri, **HI Jager**. 2019. Designing Bioenergy Landscapes to Protect Water Quality. *Biomass Bioenergy* 128 105327.
17. Galic, N, CJ Salice, B Birnir, RJF Bruins, V Ducrot, **HI Jager**, A Kanarek, R Pastorok, R Rebarber, P Thorbek VE Forbes. 2019. Predicting impacts of chemicals from organisms to ecosystem service delivery: A case study of insecticide impacts on a freshwater lake *Science and the Total Environment* 682: 426-436.
18. **Jager, HI**, RA Efroymson, LM Baskaran. 2019. Avoiding conflicts between future freshwater algae production and water scarcity in the United States at the energy-water nexus. *Special Issue: Energy- Water Nexus, Water* 11(4): 836-851.
19. Chen, H, Z Daib, **HI Jager**, SD Wullschleger, X Jianming CW Schadt. 2019. Influences of nitrogen fertilization and climate regime on the above-ground biomass yields of miscanthus and switchgrass: A meta-analysis. *Renewable and Sustainable Energy Reviews* 108: 303-311.
20. McManamay, R., JS Perkin, and **HI Jager**. 2019. Finding convergence among divergent conservation objectives in prioritizing barrier removal in streams. *Ecosphere* 10(2) <http://dx.doi.org/10.1002/ecs2.2596>.
21. **Jager, HI** and JF Kreig. 2018. Designing landscapes for biomass production and wildlife. *Global Ecology and Conservation* 16 <http://doi.org/10.1016/j.gecco.2018.e00490>
22. Forbes, V, S. Railsback, C. Accolla, B. Birnir, R. Bruins, V. Ducrot, N. Galic, K. Garber, B. Harvey, **H. Jager**, A. Kanarek, R. Pastorok, R. Rebarber, P. Thorbek, C. Salice. 2019. Predicting impacts of chemicals from organisms to ecosystem service delivery: A case study of endocrine disruptor effects on trout. *Science and the Total Environment* 649: 949-959. doi.org/10.1016/j.scitotenv.2018.08.344

23. Wang G, **Jager HI**, Baskaran LM, Brandt CC. 2018. Hydrologic and water quality responses to biomass production in the Tennessee river basin. *GCB Bioenergy* 10: 877–893. <https://doi.org/10.1111/gcbb.12537>
24. **Jager, HI**, AW King, S. Gangrade, A Haines, C DeRolph, BS Naz, M Ashfaq. 2018. Will future climate change increase the risk of violating minimum flow and maximum temperature thresholds below dams in the Pacific Northwest? *Climate Risk Management* 21: 69-84. doi.org/10.1016/j.crm.2018.07.001
25. **Jager, HI**, RA Novello, VH Dale, A Villnas, and KA Rose. 2018. Unnatural hypoxic regimes. *Ecosphere* 9(9) DOI 10.1002/ecs2.2408
26. Coutant, CC and **HI Jager**. 2018. In Memoriam Webster Van Winkle, Jr. *Fish Population Modeler*. *Fisheries* 43(6): 294-295.
27. **Jager, HI** and DL DeAngelis. 2018. The confluences of ideas leading to and the flow of ideas emerging from individual-based modeling of riverine fishes. *Ecological Modelling* 384: 341-352.
28. Dale, VD, **HI Jager**, AK Wolfe, and RA Efroymson. 2018. Risk and resilience in an uncertain world. *Frontiers in Ecology and the Environment* (Guest editorial). 16(1): 3-3.
29. **Jager, HI** and RA Efroymson. 2018. Can biomass production increase the flow of downstream ecosystem goods and services? Special Issue. *Biomass and Bioenergy* 114: 125-131. <https://doi.org/10.1016/j.biombioe.2017.08.027>
30. Ferguson, J, R Fletcher, BE Reichert, and **HI Jager**. 2017. Detecting population-environmental interactions with mismatched time series data. *Ecology* 98(11): 2813–2822
31. Forbes, V. **HI Jager** and 12 coauthors. 2017. A framework for predicting impacts on ecosystem services from (sub)organismal responses to chemicals. *Environmental Toxicology & Chemistry* 36(4). 845-859.
32. McManamay RA, Brewer SK, **Jager HI**, Troia MJ. 2016. Organizing environmental flow frameworks to meet hydropower mitigation needs. *Environmental Management*: 1-21.
33. **Jager, HI**, MJ Parsley, JJ Cech, Jr., RL McLaughlin, PS Forsythe, RF Elliott, and BM Pracheil. 2016. Reconnecting fragmented sturgeon populations in North American rivers. *Fisheries* 41(3), 140-148.
34. **Jager, HI**, RA Efroymson, JJ Opperman, and MR Kelly. 2015. Spatial design principles for sustainable hydropower development in river basins. *Renewable and Sustainable Energy Reviews* 45: 808-816.
35. **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.
36. **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.
37. **Jager, HI**. 2014. Thinking outside the channel: Timing pulse flows to benefit salmon via indirect pathways. *Ecological Modelling* 273: 117-127.
38. McManamay, RA, DJ Orth, & **HI Jager**. 2014. Accounting for variation in species detection in fish community monitoring. *Fisheries Management and Ecology* 21, 96–112.
39. Ridley, CE, **HI Jager**, RA. Efroymson, 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.
40. **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.
41. 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>)
42. **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>
43. 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.
44. McBride AC, VH Dale, LM Baskaran, ME Downing, LM Eaton, RA Efroymson, 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.
45. **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.
46. 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.

47. **Jager HI**, LM Baskaran, CC Brandt, EB Davis, CA Gunderson & SD Wullschlegler. 2010. Empirical geographic modeling of switchgrass yields in the United States. *Global Change Biology: Bioenergy* 2(5): 248-257.
48. Efroymson 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.
49. 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.
50. **Jager HI**, KA Rose, & A Vila-Gispert. 2008. Life history correlates and extinction risk of capital-breeding fishes. *Hydrobiologia* 602: 15-25.
51. **Jager HI** & BT Smith. 2008. Sustainable Reservoir Operation: Can we generate hydropower and preserve ecosystem values? *River Research and Applications* 24: 340-352.
52. **Jager HI** & MS Bevelhimer. 2007. How run-of-river operation affects hydropower generation. *Journal of Environmental Management* 40: 1004-1015.
53. **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.
54. **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.
55. **Jager HI**, EA Carr & RA Efroymson. 2006. Simulated effects of habitat loss and fragmentation on a solitary, mustelid predator. *Ecological Modelling* 91: 416-430.
56. **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.
57. **Jager HI**, RA Efroymson, K. Sublette & T.A. Ashwood. 2005. Unnatural landscapes in ecology: Generating the spatial distribution of brine spills. *Environmetrics* 16: 687-698.
58. **Jager HI**, AW King, NH Schumaker, TL Ashwood & BL Jackson. 2005. Spatial uncertainty analysis of population models. *Ecological Modelling* 185(1): 13-27.
59. **Jager HI** & AW King. 2004. Spatial uncertainty and ecological models. *Ecosystems* 7: 1-7.
60. 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.
61. **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.
62. **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*
63. **Jager HI**. 2001. Individual variation in life history characteristics can influence population extinction risk. *Ecological Modelling* 144(1): 59-74.
64. **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.
65. **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.
66. **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.
67. **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.
68. **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.
69. Suter, GW II, LW Barnhouse, RA Efroymson, & **HI Jager**. 1999. Ecological risk assessment in a large river-reservoir: 2. fish community. *Environmental Toxicology and Chemistry* 18(4): 589-598.
70. 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.
71. 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.
72. 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.

73. **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.
74. 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.
75. **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.
76. **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.
77. 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.
78. **Jager HI** & RH Gardner. 1988. A simulation experiment to investigate food web polarization. *Ecological Modelling* 41: 101-116.

Book Chapters

79. Parish E, Dale V, Davis M, Efroymson R, Hilliard M, Kline K, **Jager HI**, Xie F. 2021. An Indicator-based Approach to Sustainable Management of Natural Resources. Chapter 14 of “Data Science Applied to Sustainability Analysis 2020”. Co-edited by Jennifer Dunn and Prasanna Balaprakash for Elsevier.
80. **Jager, HI**, L Wickman. 2019. Waterpower: Hydropower Marine Hydrokinetic. IN *Renewable Energy Wildlife Conservation*. Mooreman, Grodsky, Rupp, eds. Johns Hopkins University Press. 280 pp.
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