Exponent®
Engineering & Scientific Consulting

Andy Deines, Ph.D.

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Professional Profile

Dr. Deines is a quantitative ecosystem and fishery scientist with more than 20 years of experience. He uses multiple data analytic techniques to glean environmental insights for clients in litigation, regulatory, and sustainability realms.

Dr. Deines specializes in data-limited problems requiring integration of disparate data sets to address knowledge gaps common to environmental impact and risk assessment. Dr. Deines has particular expertise in determining the relationship between populations and drivers of environmental changes such as river flow alterations, temperature change, oil spills, emerging chemicals of interest such as 6PPD-quinone, pharmaceuticals, and invasive species.

Dr. Deines' experience includes environmental economic dimensions that consider the value of ecosystem goods and services, as well as ecosystem service function models and metrics used in ecosystem accounting. In particular, he has developed a bio-economic framework to assess the potential environmental and economic benefits, or drawbacks, of harvesting invasive species for food and other uses.

Dr. Deines' expertise also includes the application of environmental DNA (eDNA) techniques for the detection of supply chain contamination and identification of target species and communities such as rare or invasive species in aquatic systems. He has specifically used DNA analyses to examine the genetic impact of invasive species to native populations and the potential impact to commercially important fisheries and collaborates closely with Exponent’s team of population and landscape genetic experts.

He has conducted international field work in the US, Africa, and Australia, working on multidisciplinary research teams of geneticists, social scientists, economists, and natural resource managers.

Academic Credentials & Professional Honors

Ph.D., Biology, University of Notre Dame, 2013

B.S., Environmental Science, Western Washington University, 2003

Professional Affiliations

American Fisheries Society, member since 2013

Ecological Society of America, member since 2011

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Publications

Reiss, R., Loccisano, A., Deines, A., Kim, M., Nallani, G., Chandrasekaran, A., Whatling, P. (2023) A physiologically-based pharmacokinetic/pharmacodynamic (PBPK/PD) model for the insecticide dimethoate, Xenobiotica, 53:5, 382-395.

O'Reilly, K., Lahvis, M.A., DeVaull, G.E. and Deines, A.M. (2021), A Comparative Plume Study of DRO, GRO, Benzene, and MTBE: Implications for Risk Management. Groundwater Monitoring, 41: 58-64.

Staveley J, Green JW , Nusz J, Edwards D, Henry K, Kern M, Deines AM, Brain R, Glenn B, Ehresman N, Kung T, Ralston-Hooper K, Kee F, McMaster S. 2018. Variability in Non-Target Terrestrial Plant Studies Should Inform Endpoint Selection. Integrated Environmental Assessment and Management. 14(5):639-648

Deines AM, Bunnell DB, Rogers MW, Bennion D, Woelmer W, Sayers MJ, Grimm AG, Shuchman RA, Raymer ZB, Brooks CN, Mychek-Londer JG, Taylor W, Beard Jr TD. The contribution of lakes to global inland fisheries harvest. Frontiers in Ecology and the Environment. 2017; 15(6):293-298.

Deines AM, Wittmann ME, Deines JM, Lodge DM. Tradeoffs among ecosystem services associated with global tilapia introductions. Reviews in Fisheries Science & Aquaculture 2016; 24(2):178-191.

Woelmer WM, Kao Y,Bunnell DB, Deines AM, Bennion DH, Mark W, Brooks CN, Sayers MJ, Banach DM, Grimm AG, Robert A. Assessing the influence of watershed characteristics on chlorophyll a in waterbodies at global and regional scales. Inland Waters 2016; 6:379-392.

Lynch AJ, Cooke SJ, Deines A, Bower S, Bunnell DB, Cowx IG, Nguyen VM, Nonher J, Phouthavong K, Riley B, Rogers MW, Taylor WW, Woelmer WM, Youn S, Beard JTD. The social, economic, and ecological importance of inland fishes and fisheries. Environmental Reviews 2016; 24(2):115-121.

Deines AM, Bunnell DB, Rogers MW, Beard TD, Taylor WW. A review of the global relationship among freshwater fish, autotrophic activity, and regional climate. Reviews in Fish Biology and Fisheries 2015; 25(2):323-336.

Sayers MJ, Grimm AG, Shuchman RA, Deines AM, Bunnell DB, Raymer ZB, Rogers MW, Woelmer W, Bennion DH, Brooks CN, Whitley MA, Warner DM, Mychek-Londer J. A new method to generate a high-resolution global distribution map of lake chlorophyll. International Journal of Remote Sensing 2015; 36(7):1942-1964.

Deines AM, Bbole I, Katongo C, Feder JL, Lodge DM. Hybridization of native Oreochromis species (cichlidae) and the introduced Nile tilapia (O. niloticus) in the Kafue River, Zambia. African Journal of Aquatic Science 2014; 39(1):23-34.

Wittmann, ME, Jerde CL, Howeth JG, Maher SP, Deines AM, Jenkins JA, Whitledge GW, Burbank SR, Chadderton WL, Mahon AR, Tyson JT, Gantz CA, Keller RP, Drake JM, Lodge DM. Carp in the Great Lakes Region: Establishment potential, expert perceptions and re-evaluation of experimental evidence of ecological impact. Canadian Journal of Fisheries and Aquatic Sciences 2014; 71(7):992-999.

Deines AM, Bee CA, Jensen R, Lodge DM. 2013. The potential tradeoff between artisanal fisheries production and hydroelectricity generation on the Kafue River, Zambia. Freshwater Biology 2013; 58(4):640-654.

Deines AM, Mahon AR, Chadderton WL, Jerde CJ, Russell J, Small F, Norris A, Thuesen P, Mysorekar S, Lodge DM Detection of feral tilapia populations using a novel environmental DNA surveillance method. Final Report. Australian Government Invasive Animals Cooperative Research Centre, 2013.

Lodge DM, Deines AM, Gherardi F, Yeo DCJ, Arcella T, Baldridge AK, et al. Global Introductions of

Crayfishes: Evaluating the Impact of Species Invasions on Ecosystem Services. Annual Reviews in Ecology Evolution and Systematics. 2012 43: 449-472

Deines AM, Chen VC, Landis WG. Modeling the risks of nonindigenous species introductions using a patch-dynamics approach incorporating contaminant effects as a disturbance. Risk Analysis 2005; 25(6):1637-1651.

Select Presentations

Menzie, Morrison AM, Kleven M, Deines A, Yu Q, Duncan B, Ryan S. 2023. An Integrated Approach to Cumulative Impact Assessment in Support of Projects and Actions within Delineated Environmental Justice Areas. Presented at SETAC North America 44th Annual Meeting. 12-16 November 2023. Louisville, KY

Deines AM, Kashuba R, Morrison AM, Newcomer-Johnson T. Questions remaining in the quest to quantify ecosystem services. Society of Environmental Toxicology and Chemistry, North America 42nd Annual Meeting (SciCon4), November 14–18, 2021.

Deines AM, Staveley J, Huggett D, Terneus M. Non-target dung fauna population model to evaluate environmental impacts following use of an active pharmaceutical ingredient (API) in cattle. Society of Environmental Toxicology and Chemistry, North America 40th Annual Meeting, Toronto, Ontario, Canada November 2019

Deines AM, Goodfellow WL. The Salton Sea: A real-life experiment of extreme freshwater salinization. Society of Environmental Toxicology and Chemistry, North America 39th Annual Meeting. Sacramento, CA. 4-8 November 2018.

Deines AM, Palmquist K, Morrison AM. Global Status and Risk of Non-Native Fish Aquaculture. American Fisheries Society 148th Annual Meeting, Atlantic City, NJ. August 19-23, 2018

Deines AM, Morrison AM, Menzie CA. Environmental Flows: Evaluating Long-Term Baselines for Hydrological Regime Change in the Southern United States. American Geophysical Union Fall Meeting, San Francisco, CA. December 12-16, 2016.

Deines AM, Bunnell DB, Rogers MW, Bennion DH, Woelmer W, Brooks CN, Grimm AG, Raymer Z, Sachs MJ, Schuchman RA, Beard TD. New estimation method for global freshwater fish production. Global Conference on Inland Fisheries, FAO Headquarters, Rome, Italy, January 26-28, 2015.

Deines AM, Bunnell DB, Rogers MW, Beard TD, Jr., Taylor WW. Global patterns of inland fisheries and primary production using meta-analysis. American Fisheries Society, Little Rock, AK, September 8-13.

Deines AM, Bee CA, Jensen R, Lodge DM. Influence of fishery effort and damming on Kafue River, Zambia fishery production. Ecological Society of America Annual Meeting, Austin TX, August 7-12, 2011.

Project Experience

Risk Assessments and Natural Resource Assessments

Provided scientific support concerning net environmental benefits from coal ash closure alternatives at coal ash plants in North Carolina.

Provided analysis and technical support in Florida v. Georgia United States Supreme Court case that considered alleged adverse ecological changes in freshwater and marine fish and invertebrate populations associated with hydrological changes and consumptive water usages.

Provided analysis and technical support concerning potential impacts to California fishery populations from the Refugio oil spill. Andrews et al. v. Plains All American Pipeline, L.P. et al. United States District Court, Central District of California, Western Division, Case No. 2:15-cv-04113-PSG-JEM.

Provided scientific support for the Deepwater Horizon NRDA in the Gulf of Mexico and impacts to fish and fisheries.

Developed a matrix population simulation model for evaluating the environmental risk of excreted active pharmacological ingredient effects on dung fauna in pastures.

Expert consultation to the City of Chicago Department of Environment on risk and impacts of harmful fish invasions associated with increased water temperatures.

Environmental Genetics

Expert witness concerning cultivar intellectual property. Conducted data analysis using SNP Microarray data to determine if the parentage of disputed fruit varieties included patented genotypes.

Provided analysis of organic agricultural supply chain contamination by genetically engineered (“GMO”) constructs including soy, cotton, and corn.

Provided vertebrate (mammal, fish, birds) species identification using next-generation sequencing and meta-barcoding analyses.