



Montana Invasive Species Council Science Advisory Panel

Topic: Woody Invasives Environmental and Economic Impacts

Purpose: The Science Advisory Panel is intended to address topics of impacts (both environmental and economic in nature) for the focal species, common buckthorn (*Rhamnus cathartica*), Russian olive (*Elaeagnus angustifolia*), and saltcedar (*Tamarix chinensis*, *T. ramosissima*, and any hybrids thereof). Specifically, the goal is to seek expertise on potential and realized impacts to Montana's natural resources and economy through lessons learned from other invaded areas. Panelist experts are to provide information on the state of the science and emerging research in relation to each of their topics.

Expected Panel Outcomes:

- Gain a comprehensive understanding of the potential impacts of focal species on Montana's natural resources and economy.
- Identify knowledge and research gaps that will impact Montana's managers.
- Collaborate on and discuss challenges experienced in impacts from woody invasive species and their management within and outside the state's borders.
- Compile information from technical experts for use in the statewide management plan, particularly in prioritization.

Panelists:

Dr. Cameron Douglass, Agronomist/Weed Scientist, U.S. Department of Agriculture Office of Pest Management Policy

Cameron Douglass is a Weed Scientist and Agronomist in USDA's Office of Pest Management Policy, and primarily handles policy issues involving registration reviews of herbicides and herbicide resistance management. Dr. Douglass's portfolio also includes invasive species-related matters and serving on USDA's Invasive Species Working Group, as well as working on inter-agency policy issues for the biological control of invasive plants. Dr. Douglass previously worked as a biologist in the Environmental Fate and Effects Division of the U.S. Environmental Protection Agency's (USEPA) Office of Pesticide Programs from 2016 through 2020. Prior to working at USEPA, he was the Thomas McKenna Meredith Postdoctoral Scholar in Environmental Sciences at Trinity College (Hartford, CT). Cameron received his Ph.D. in Bio-agricultural Sciences and Pest Management from Colorado State University, where he studied the environmental impacts of tamarisk (saltcedar) management strategies in Colorado's Arkansas River watershed.

Dr. Becky Epanchin-Niell, Associate Professor, University of Maryland Department of Agricultural and Resource Economics

Becky Epanchin-Niell is a resource economist in the Department of Agricultural and Resource Economics at University of Maryland, College Park, and a Senior Fellow at Resources for the Future. Dr. Epanchin-Niell's research integrates economics and ecology to inform cost-effective ecosystem management, with particular focus on invasive species. She applies quantitative, integrative models and emphasizes collaborations with natural and social scientists, working closely with government, NGO, and the private sector stakeholders. Her research tackles management of invasive species across stages, spanning prevention, early detection and rapid response, slowing-the-spread, and damage mitigation efforts. She has developed bioeconomic models that have been used to guide invasive species management domestically and internationally. She has served in a variety of advisory capacities, including as a member of the New York Invasive Species Research Institute's Advisory Board and the U.S. National Park Service's Invasive Animal Species Independent Science Panel.

Dr. Sunny Jardine, Associate Professor/Shimada Faculty Fellow, University of Washington School of Marine and Environmental Affairs

Sunny Jardine is trained as a resource and environmental economist. Her research is broadly focused on the economics of conservation and management in marine and coastal systems. Current research topics include recreational fisheries management, salmon conservation planning, the economics of harmful algal blooms, and seafood markets. Dr. Jardine uses economic theory and econometric and numerical methods in her research. Jardine received her Ph.D. in agricultural and resource economics from the University of California at Davis in 2013.

Jennifer Muscha, Rangeland Management Specialist, U.S. Department of Agriculture-Agricultural Research Service Fort Keogh Livestock and Range Research Laboratory

Jennifer Muscha is a support Scientist with the USDA-Agriculture Research Service, Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana. She completed her master's degree in Rangeland Ecology and Management at the University of Wyoming in Laramie. She is scientific support for the Research Leader and has been working at Fort Keogh since 2003. In 2011, Fort Keogh, with partners from the Sidney USDA ARS office, Miles City Natural Resources Conservation Service (NRCS) office and Bridger Plant Materials Center implemented a Russian olive removal and restoration project along the Yellowstone River. Approximately 8 miles of the Yellowstone River flows through Fort Keogh. Fort Keogh has continued to conduct research, monitor the removal sites, and control Russian olives.

Dr. Pamela Nagler, Research Physical Scientist, U.S. Geological Survey Southwest Biological Science Center

Pamela Nagler is a Research Physical Scientist specializing in spatial ecohydrology with the U.S. Geological Survey's Southwest Biological Science Center in Tucson, Arizona. She earned a Masters from University of Maryland in Physical Geography and Remote Sensing and a PhD in Soil, Water and Environmental Science from the University of Arizona. Dr. Nagler has published over 250 journal papers on topics ranging widely in the use of remote sensing for measuring landscape metrics by scaling biophysical and spectral data to larger spatial scales. She developed methods for measuring plant water use (evapotranspiration) which has been applied successfully in both agricultural and uncultivated landcover, including urban green spaces, and

for native and non-native species. Her work has been recognized with the U.S. Presidential Early Career Award for Science and Engineering (PECASE), the U.S.- Chinese Academy of Sciences, and the Commonwealth Science Industry Research Organization (CSIRO) Office of the Chief Executive Award in Australia. Pamela has been chairing sessions on Remote Sensing of Evapotranspiration at the European and American Geophysical Unions for over a decade each.

Dr. Mark Renz, Professor/Extension Weed Specialist, University of Wisconsin-Madison College of Agricultural and Life Sciences

Mark Renz is a professor and extension weed specialist with the University of Wisconsin-Madison. Dr. Renz researches and extends information about the biology and management of invasive plants. Research goals in Dr. Renz's lab are centered on developing information that will improve management by improving the knowledge and understanding of invasive plant biology. Dr. Renz has over 20 years of experience with management of invasive plants throughout the United States in a wide range of habitats including riparian zones, roadsides, floodplains, prairies, wetlands, and forests. Education efforts focus on providing technical information and educational opportunities for agency staff, consultants, companies, and citizens concerned about invasive plants. Dr. Renz also is the president of the Midwest Invasive Plant Network whose mission is to reduce the impact of invasive plants in the Midwestern United States.

Questions for Panelists: Questions were compiled from input provided by members of the Woody Invasives Working Group and its Core Planning Group.

- What data would be needed to quantify (via model or other tool) the cost of woody invasions and their management in Montana?
- How does water consumption compare in riparian zones between woody invasives and natives? How much water intake is occurring?
- How do researchers evaluate economic impacts?
- Related to common buckthorn: What are the impacts from soybean aphids, alfalfa mosaic virus, crown fungus, and oat rust disease?
- What are our knowledge gaps in ecologic/economic impacts?
- What can we learn from the economic impacts realized in other states with dense infestations of these species?
- What are the environmental impact differences of infestations between small ponds or reservoirs in rangeland settings vs. riparian, river corridors?
- What changes in soil health (including microbial, macroorganisms) are caused by these species?

One additional question was tabled for focus in a future Working Group Meeting: What are lessons learned from listing Russian olive, including effective communication with emphasis on social and cultural views (e.g., Wyoming at state level, Missoula at county level)?