

Roadmap for filling the gaps in forest pollinator research

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Actively managed conifer forests may also provide important habitat for the pollinators that aid the reproduction of food crops and other flowering plants around the globe. An international collaboration, led by Jim Rivers of Oregon State University, has established a roadmap for future research aimed at better understanding the role that managed conifer forests in temperate zones play for the conservation of pollinators such as bees, wasps, flies, beetles and butterflies. "Temperate forests comprise a large portion of the world's land base and to date we haven't really thought about them much in terms of habitat for pollinators," Rivers said. It's important to do so because insect pollinators have an estimated \$100 billion global economic impact each year, enhancing the reproduction of nearly 90 percent of Earth's flowering plants, including many food crops. Insect pollinators are also ecologically critical as promoters of biodiversity. Bees are the standard bearer because they're usually present in the greatest numbers and because they're the only pollinator group that feeds exclusively on nectar and pollen throughout their life cycle. Many vertebrates such as birds and mammals also serve as pollinators, and worldwide, more than 100,000 animal species contribute to pollination. "We know some managed conifer forests support wild pollinator populations," said Rivers, an animal ecologist with the OSU College of Forestry. "But there's a lot we don't know regarding pollinator diversity and the extent to which management practices affect pollinators and the ecosystem services they provide." Rivers' team included researchers from OSU, the USDA-ARS Pollinating Insect Research Lab at Utah State, Washington State-Vancouver, the Forest Service's Southern Research Station in Athens, Georgia, and Switzerland's Bern University of Applied Sciences. The scientists took a two-pronged approach to developing an agenda for filling in those pollinator knowledge gaps in temperate forests. They used input gathered from a daylong pollinator conference hosted by Oregon State University that brought together a range of scientists and land managers, and they also took a full inventory of the existing published research. "The agenda we've come up with is for scientists, forest managers, conservation practitioners, and policymakers trying to balance production with pollinator conservation," Rivers said. "Our starting point is the Pacific Northwest, but the global footprint of managed conifer forests makes the agenda relevant worldwide." The roadmap is built around three themes: Establish baseline patterns, assess the direct and indirect influences of forest management activities, and quantify the effects of management practices that follow natural disturbances like insect outbreaks or wildfire. "There's a strong interest across the board, state and federal, as well as private industry and small landowners, in undertaking pollinator studies now," Rivers said. "And there's a compelling need for pollinator work -- there's lots of information out there about other systems and we're just beginning to consider managed conifer systems. We don't have the answers yet but we're moving in that direction." The research review and agenda was published in the peer-reviewed journal *Journal of Forestry*.

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