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02115. *Quantifying the contribution of habitats and pathways to spatially structured populations.*

Environmental disturbance and management differentially affect populations. Such consequences are difficult to quantify for spatially structured populations because changes in one location carry through to other areas due to species movement. Yet the ability to assess the importance of habitats and pathways is an essential part of making management decisions. By modeling spatial structure as a network and population dynamics with a discrete-time matrix model, we develop two metrics that measure the contribution of habitats and pathways. Both approaches allow for any number of classes, unlimited number of seasons within the annual cycle, and for density-dependent parameters. The first is a generalized per-capita contribution metric, the *C*-metric, for classifying habitats and pathways as sources or sinks. The second, the *G*-metric, estimates the demographic contribution of a habitat or pathway to network-wide population growth in the face of environmental change. The *G*-metric quantifies effects of modifying vital rates in perturbation experiments, which may range from small perturbations to complete habitat or pathway removal. We demonstrate the metrics using case studies of eastern monarch butterflies and elk of the Greater Yellowstone Ecosystem. (Received January 12, 2020)