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Yu Jin* (yjjin6@unl.edu). *Population Dynamics in River Networks.*

Natural rivers connect to each other to form river networks. The geometric structure of a river network can significantly influence spatial dynamics of populations in the system. We consider a process-oriented model to describe population dynamics in river networks of trees, establish the fundamental theories of the corresponding parabolic problems and elliptic problems, derive the persistence threshold by using the principal eigenvalue of the corresponding eigenvalue problem, and define the net reproductive rate to describe population persistence or extinction. By virtue of numerical simulations, we investigate the effects of hydraulic, physical, and biological factors, especially the structure of the river network, on population persistence. (Received September 13, 2019)