Ecosystems are often treated as being well-bounded and self-contained in theory, but the reality tends to be much messier: ecological boundaries are actually quite fluid and allow substantial resource exchange across them. This points to a disjunct between the human definition of ecological boundaries and those actually perceived by the biota inhabiting these ecosystems. The former is generally based on physical parameters (e.g., a stream bank), whereas the latter might be better defined by energy flow and food webs (e.g., how far a mayfly flies before being eaten by a bird). In this seminar, I will describe my attempt to define stream ecosystems based on biological food webs, rather than by physical characteristics. Using data collected through meta-analysis and fieldwork across the globe, I define “stream signature” distances where stream resources continue to play an important role in food webs, in some cases providing a resource subsidy to food webs up to half a kilometer away from the traditional stream boundary at the water’s edge. I will also describe the various biophysical conditions that affect these stream signatures, causing this food web boundary to expand or shrink in space.