Kennedy, T.A., 2002, The causes and consequences of plant invasions: University of Minnesota, Ph.D. Dissertation, 146 p.

Abstract
I investigated both the causes and consequences of plant invasions using experiments that were conducted in two different systems, a Minnesota grassland and a desert stream in Nevada. In Minnesota, I focused on the causes of invasions by testing the diversity-resistance hypothesis, which postulates that diverse plant communities resist invasion. I found that plant species diversity enhanced invasion resistance, reducing both the establishment and success of invading plants, by increasing crowding and species richness in localized plant neighbourhoods. In Nevada, I focused on the consequences of saltcedar (*Tamarix ramosissima*) invasion along Jackrabbit Spring. I found that saltcedar heavily shaded Jackrabbit Spring and shifted the dominant organic matter inputs from high quality autochthonous production to low quality allochthonous saltcedar leaf litter. Stable isotope analysis revealed that this change in organic inputs promoted the persistence of exotic aquatic consumers and negatively impacted two species of endangered fish, likely via reductions in the algal-based food on which they are dependent. Wholestream metabolism measurements revealed strong downstream gradients in Gross Primary Production and Respiration along Jackrabbit Spring that were driven by a downstream decrease in water temperature. The downstream decrease in GPP also affected the distribution of aquatic consumers; the two consumers that isotopic analysis indicated were most dependent on algal-based carbon were totally absent from the downstream reaches where GPP was near zero.

Collectively, these results should be of interest to both ecologists and land managers. My research in Minnesota indicates that diverse plant communities exclude invaders because they more effectively fill the available space. Thus, restoration efforts would benefit from establishing high diversity plant communities that are more effective at excluding undesirable invaders. My research in Nevada represents one of the first quantitative assessments of longitudinal and seasonal patterns in community and ecosystem processes for a stream in the Ash Meadows groundwater basin. Stream dynamics and consumer abundance are influenced by both the presence of saltcedar in the riparian zone and downstream declines in water temperature. This research provides compelling evidence that removal of saltcedar from springs in Ash Meadows will increase the amount of suitable habitat for endangered species.