Framework for functional diversity

Functional diversity <–> environmental heterogeneity (Naiman Decamps Pollock 1993)

* *Hydrologic heterogeneity* <-> vegetation heterogeneity <-> geomorphic heterogeneity
  + “Complexity in the riparian patch mosaic results from a highly contingent interplay between hydrology, ecology and geomorphology over diverse spatial and temporal scales.” “A framework for interdisciplinary understanding of rivers as ecosystems”, Corenblit, Gurnell
  + Vegetation heterogeneity = population structure diversity \* functional / taxonomic diversity
  + We know these relationships hold for taxonomic diversity, right?
    - Hydrology - Riparian plant species richness along lateral and longitudinal gradients of water stress and flood disturbance, San Pedro River, Arizona, USA; Landscape structure and diversity in riparian plant communities: a longitudinal comparative study ; The role of riparian corridors in maintaining regional biodiversity ; Huston, M. 1979. A general hypothesis on species diversity. | Biological (species richness), landscape (hab- itat mosaic) and functional (nutrient flux) diversity in the high flood-frequency zone can be maintained or even increased by flood disturbances (Barnes, 1997; Naiman and Décamps, 1997; Hughes et al., 2001;Ward and Tockner, 2001). – from Corenblit 2007
    - Geomorph - Jess paper digging deep for diversity – geomorphic implications for species richness, also see her references in intro re: species richness & geomorphy
* So what happens to functional diversity in post-disturbance terrestrial systems?
  + What about systems that are just exposed to strong abiotic constraints?
  + Intermediate disturbance hypothesis? (can cite Jess)
* Are riparian systems more resilient than terrestrial systems?
  + To individual disturbances and/or dry periods, yes, due to the nature of rivers as dispersal corridors, and intrinsic ecological heterogeneity providing refugia and a diverse patch mosaic a template for recovery (Naiman decamps Pollock 1993). However, riparian communities can be finely tuned to patterns of disturbance / low flows.
    - See dams literature
* How to investigate relationships between hydrology and plant functional ecology??
  + Hydrology = independent variable, vegetation = dependent variable, geomorphology = kept constant, but geomorphic heterogenity should influence vegetation heterogeneity at the reach scale by setting the patch mosaic. So make the assumption that hydrologic heterogeneity also influences geomorphic heterogeneity.