

Intro - a macroecological approach

segue |

Thanks, Morgan, for that introduction. Okay. So... -

comm
ecol

I'm a community ecologist and macroecologist. In my work, I'm fundamentally curious about the processes that determine how abundance and resource use are distributed among species in ecological communities, and how the ^{small-scale dynamics} ~~details~~ of species and functional composition scale up to modulate ~~the~~ whole-community properties. ~~the whole community is a complex system that is highly context dependent and difficult to understand or predict.~~

macroeco
vision

When I say I'm a macroecologist, what I mean is that I am especially interesting in synthesizing findings across numerous systems and contexts to identify common themes that may reflect ^{widespread} ~~general~~ processes that operate on ~~ecological communities~~ in general. Community ecology is, famously, a bit of a "mess," in that ~~different systems~~ ^{different systems} ~~exhibit very different dynamics and the degree of consistency across~~ community dynamics are extremely context dependent and difficult to understand or predict, ^{especially in great detail, like the} ~~in terms of general mechanisms.~~ exact abundances * identities of those we expect to find at our study site 6 months from now. In macroecology, we embrace this context dependence about specific species or systems, and ~~search instead~~ ^{search} ~~for what has been described~~ ^{for what has been described} ~~in terms of community structure~~ ^{in terms of community structure} ~~that~~ ^{that} search instead for what Lawton described as "fuzzy generalities," or, consistent phenomena that crop up repeatedly in systems that differ in species composition, geography, history, etc. These phenomena can provide leverage for identifying strong processes that operate consistently despite context; or highlight how strong structuring forces may vary along broad axes of biological context.

illustrate
 field + data + C.S.?
 Portal
 HPG, GHA
 SABS plot?
 METE book?

Comm. ecol.
 relate to
 macroeco
 broad

Toy SAD, illustrate
 ISD, ENI, MI, GI, etc
 CADs, S.V.S

Emerg + map?
 200
 chapters
 outline
 200
 200
 200

In a macroecological approach, we're not not interested in the nuanced stories that play out in specific systems at particular moments in time; in fact all of my work builds from specific findings and broader inspiration drawn from my adaptive field site near Portal, AZ. However, we take a slightly different perspective on system-specific natural history ~~as~~ ~~experimentally~~ ~~data~~ narratives, and we complement them with ~~data~~ ~~that~~ ~~draws~~ ~~on~~ ~~modern~~ ~~comp. inf~~ ~~data streams~~, a broader, synthesis-oriented work. When I look at a system, I look at ~~and~~ ~~th. fr.~~ which particular species, etc. are present, but I ~~then~~ ~~distill~~ ~~this~~ ~~level~~ of detail into quantities or distributions that ~~allow~~ ~~me~~ ~~to~~ ~~make~~ ~~comparisons~~ ~~across~~ ~~among~~ ~~systems~~ ~~that~~ ~~differ~~ ~~in~~ ~~the~~ ~~species~~ ~~/taxonomic~~ ~~groups~~ ~~present~~ / etc present. In this talk, we'll be talking a lot about community-wide S, N, E, M, and distributions that describe how these quantities are partitioned ~~among~~ ~~species~~ ~~across~~ ~~different~~ ~~size~~ ~~classes~~ within the community. Specifically, seeds, which describe N into S, and ISDs (or size spectra), which describe N (or E, M) ~~among~~ ~~different~~ ~~size~~ ~~classes~~ across gradients of body size.

In chapter 1, we'll focus on these properties in the specific context of the desert rodent community at our field site near Portal, AZ. Then we'll take advantage of the general ~~applicability~~ ~~of~~ ~~these~~ properties to take a broad-scale synthesis oriented approach, where we use data from ^{hundreds or} thousands of communities to look for general phenomena in how these quantities behave. In chapter 2, we'll use data from the Breeding Bird Survey to examine how changes in community size structure modulate long term trends in total abundance and community function. In chapter 3, we'll widen the focus ^{ecological, geographic, + tax. focus} beyond ~~structure~~ ~~function~~ ecology to explore how ^{understanding} ~~the~~ mathematical constraints on the emergent behavior of complex systems can help us interpret ecological "laws", focusing on the species abundance distributions for 720k communities of different taxa.

prelim
ack -
logos of
portal;
usasi;
p.hpg

And before going further, I'd just like to ~~em~~ emphasize that all of this work draws extensively on the hard work and good ideas of scientists working in very different ~~more~~ traditions. In particular this includes the folks who have, over the years, collected all of the data I ultimately draw on:

Portal, BBS, larger compilations of FIA, Genby, other data;
the scientific programmes who create & maintain the tools I use;
and the other folks who have laid the groundwork for a macroecological and complex systems approach to community ecology; this goes back to Lawton, Brown, Maurer and has threads running through to my committee, lab, and current and future collaborators & mentors. This is a really integrative and promising space to work in, and I'm grateful that I've gotten to do this work.

Ok, so, onward! Chapter 1.