How abundance is distributed over the range of body sizes present in a community (the individual size distribution, ISD) can provide valuable insight on how a community is structured and how the community-level properties of species richness, total abundance, and total energy use are related to each other. To the extent that body size is a reasonable proxy for functional traits, the ISD is a reflection of the functional structure of a community. Variation in the ISD may reflect unevenness in how ecological opportunities are available to species of particular sizes, potentially sharing particular traits. These opportunities may derive from fundamental biological constraints, correspond to characteristics of the environment – e.g. pockets of resources most readily exploited by species of the appropriate size (Holling) – or emerge from species interactions – e.g. competitive dynamics allowing species to coexist only if they are either extremely similar or extremely dissimilar (Scheffer and van Nes) – or come about via a combination of such factors. The ISD is also the key link that relates community-level abundance and species composition to total energy use. Total energy use reflects the capacity of an assemblage to exploit available resources, and offers a much more direct measure of some dimensions of ecological function than the total number of individuals or species richness.

From a macroecological perspective, the ISD is especially valuable because it can be used to make functional comparisons between communities that vary in their species composition, total abundance, or other aspects. Comparing over two communities, if the distribution of opportunities is conserved – e.g. if the habitat structure is similar for both communities - the ISD may be relatively consistent even when the *species* composition differs considerably due to functional replacement. Similarly, divergence between two ISDs may reflect substantive differences in communities’ landscapes of species interactions and/or environmental contexts, or random drift operating without regulatory processes that maintain a certain distribution. At the whole-community scale, the ISD modulates the relationship between total energy use and total abundance. Although energy use and total abundance are sometimes assumed to be interchangeable or to vary in proportion to each other, differences in the relativeabundances of various body sizes can generate dynamics in total energy use not wholly apparent from those for total abundance.

Studying the ISDs for the same communities over time offers a uniue perspective on how, or if, the size and trait structure of communities changes over time, and how changes at the level of species or size classes manifest at the scale of assemblage-level properties. The ISD may be comparatively stable over time, either because it reflects fundamental biological or evolutionary constraints that transcend local details, or because the local factors defining the ISD do not change rapidly. Most broad-scale empirical work, especially for terrestrial animal systems, has either aggregated observations over an extended time period or focused on observations from a restricted snapshot in time. However, case studies of particular communities have demonstrated that changes in the habitat and species composition of a community can correspond to profound shifts in the ISD () and that these shifts can decouple the trajectories of total abundance and total energy use (). It is presently unknown whether this is a common phenomenon, or if most ISDs are in fact stable over time.

Understanding changes in ISDs over time and their conseuences for the relationship between abundance and energy use has particular salience in the current era of rapid ecological change. If the factors that define the ISD do indeed endure, the ISD may not change despite considerable changes in other aspects of a community, corresponding to a dominating dynamic of *replacement* where declines in the relative abundance of some species are offset by gains from similarly-sized, and potentially functionally-similar, species. In this scenario, changes in community-wide abundance do not disproportionately impact one size class over another, and the relationship between total energy use and total abundance is conserved. However, changes to the amount or types of resources available, transformations to habitat uality or structure, the advent of novel species assemblages, or other factors may result in shifts in which traits and sizes can thrive in a community. Strong ecological changes may therefore manifest as changes in the ISD. Moreover, if changing conditions systematically advantage species at one end of the size spectrum – for example, in a scenario of size-selective overexploitation – this will result in a directional shift in the ISD and a decoupling of the dynamics of total abundance and total energy use. If this is common, it means that trends we detect in total abundance (e.g. ) do not reflect the broader dimensions of function captured via total energy use, complicating efforts to capture biodiversity trends using abundance data alone.

To date, there has not been a broad-scale empirical evaluation of how the ISDs for terrestrial animal communities behave over time or how these changes modulate the relationship between abundance and function. For obvious logistical reasons, most community abundance surveys – especially those conducted repeatedly over time – record counts, but not the individual size measurements necessary to construct the ISD. In the absence of such, we can leverage allometric scaling to estimate individual size measurements for well-studied species (Thibault et al 2011). Although these estimates cannot fully substitute for field measurements, they open new avenues for broad-scale empirical work with ISDs and the dynamics of energy use and abundance.

We generated estimated ISDs from the community abundance records from the North American Breeding Bird Survey. This yields approximate ISDs for 2700 communities, estimated annually for from X to 40 years. For each community, we compared the ISD, total abundance, and total energy use at the beginning of monitoring to the end. Synthesizing across communities, we ask: 1) have ISDs remained stable over the monitoring period, or are the more recent ISDs detectable different from the beginning ones? 2) if and where ISDs have changed, do the changes usually result in a directional shift favoring larger or smaller species, thereby decoupling energy use from total abundance – or are such directional shifts relatively rare, meaning energy and abundance have generally changed proportionate to each other? 3) coupled or not, what are the general trends in total abundance and total energy use for these communities from the beginning to the end of monitoring?