

On the reliability, uncertainty, scaling and transferability of ecological production functions in ecological periodic tables

Steven P. Ferraro

Abstract

Ecological periodic tables are an information organizing system. Their elements are categorical habitat types. Their attributes are quantitative, predictably recurring (periodic) properties of a target biotic community. Since they translate habitats as inputs into measures of natural capital and ecosystem goods and services as outputs, ecological periodic tables are also repositories of ecological production functions. Their foundational principle is the ecological tenet that the biophysical environment, that is, habitats structure biotic communities. They are a durable, open and flexible system that accommodates all operationally defined habitat types and biotic communities for which the periodicity of habitat usage patterns by a biotic community have been empirically substantiated. Their reliability is ensured when, in the discovery of quantitative, periodic natural patterns, data quality requirements with respect to the spatial and temporal scale, sampling design, sampling method and statistical power are met. Uncertainties in measurement variables are reported as statistics of dispersion. Rows and columns of elements (“blocks”) differentiate quantitative, periodic habitat–community patterns that differ in different temporal (e.g., seasonal) or spatial (e.g., bioregions) domains. Ecological production functions are scale invariant in the time-space domains represented by each block and are not transferable between blocks.