

Ecological Rules for Managing Complexity

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Two assumptions have simplified earlier JGOFS and GLOBEC models. (1) Physical processes determine population responses, (2) slow and fast time scales are separable. These assumptions encouraged the development of independent research programs. Attention now focuses on decadal regime shifts involving (3) longer time scales (eg. twilight zone) for biogeochemical processes, and (4) lower trophic level constraints on fisheries yield. The increased trophic linkages and expanded range of time and space scales would add significantly to model structure and complexity. I will suggest that the traditional mathematical simplification into either, (5) many variables/small perturbations; or (6) few variables/large amplitude changes; can reflect corresponding temporal separation in the underlying ecological processes – a form of punctuated equilibrium.