

Improving food web descriptions of use in dynamic simulations

Daniel Pauly
Fisheries Centre, UBC

Use of food webs as a key input for time- and space-structured simulations imposes more constraints on their quality than their use in the context of Ecopath proper, which does not consider their stability in a dynamic context, and only requires them to be mass-balanced.

Following discussions with various colleagues, notably Stuart Pimm, of the University of Tennessee, I would like to suggest that food webs prepared for use in Ecosim and Ecospace should have the following properties:

1. at least 20 'boxes' (i.e., 'pools', or state variables) representing all major groups and trophic levels;
2. cannibalism should be avoided, or at least not contribute more than 1-2 % of a group's diet. This can be achieved by disaggregating groups into split pools (i.e., juveniles and predators, see Walters, this vol.), or into separate functional groups, of which one is the predator, the other the prey;
3. cycles must be avoided wherein group i feeds mainly on group j, and group j mainly on group i (use the 'Cycles' routine of Ecopath to identify such groups);
4. the base of the food web (primary producers, e.g. phytoplankton or seagrass, etc., and herbivores, e.g., zooplankton) should be separated by habitat within the ecosystem that is being modeled, e.g., inshore vs. offshore, or rocky bottom vs. mud bottom (Fig. 13).

Consideration of these four points will not resolve all problems that may be generated by a questionable food web; however, some pathological behaviors will be avoided, and the models, when run with Ecosim and Ecospace, will not self-simplify as readily as when these suggestions are not implemented.

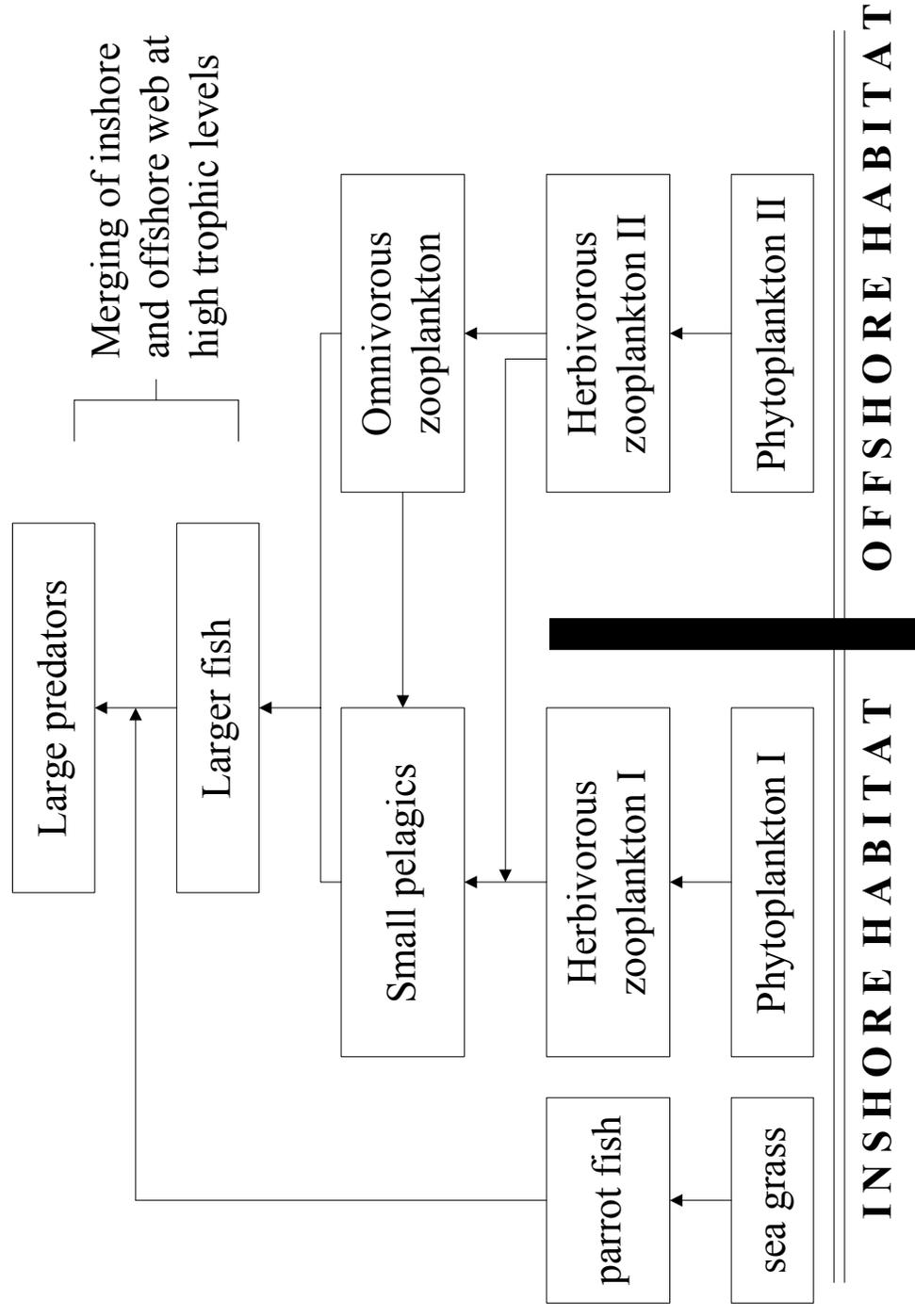


Fig. 13 Example of a food web incorporating subsystems at lower trophic levels, i.e., inshore and offshore subsystems. Such separation leads to more realistic predictions by Ecosim, and facilitates the assignments of different groups to habitats, as required by Ecospace