Carrying capacity model for finfish mariculture and explanation of Parameters: a case study on responses of environmental factors in Ailian Bay

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Abstract:

One $N-P-D$ model for finfish culture in Ailian Bay is presented. The model includes key physical, biological processes and nutrients release from the bottom. The physical processes are the transports of matters through the system boundary. The main biological process is the primary production and the fish metabolism. By the bay-scale ecosystem model, responses of phytoplankton, nutrients, DO and POC to large-scale fish culture in the virtual culture systems are simulated. Based these numerical simulations, the total environmental carrying capacity or the ecological carrying capacity of the virtual farm is estimated. According to the second water quality standard of the People's Republic of China, the total environmental carrying capacity expressed by density of cultured fish in the virtual farm is 0.08ind.m^{-3}. Based on the ecohealth critical state in the present work, the total ecological carrying capacity is 0.27ind.m^{-3}.

Keywords: Virtual farm; Finfish culture; Environmental carrying capacity; Ecological carrying capacity