

The carrying capacity of Sungo Bay for culture of Kelp *Laminaria*

Japonica

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Abstract In this paper, two kind of methods were presented for the assessment of carrying capacity for culture of Kelp *Laminaria Japonica* in Sungo Bay. One method is the concept model which was set up at 1996, by budgeting the supply and demand quantity of inorganic nitrogen (DIN). Since 1996, there are lots of varieties at the Sungo bay. Mainly mariculture species shifted from scallop *Chlamys farreri* to oyster *Crassostrea gigas*, because of the high mortality rate of scallop in summer in 1999. The water exchange time became long, for the reason of large scale aquaculture. The aquaculture rafts had moved from inner side of Sungo Bay to the mouth or even to the outside of the bay, which embarrassing the current velocity. With the around town's development, the nutrient flux from river into the Sungo Bay increased nearly 2.5 time. The total amount of inorganic nitrogen available in the bay increased from 1228 MT of 1994 to 1475 MT of 2006, and among which, about 890 MT was available for supporting the growth of aquaculture kelp. The total carrying capacity of Sungo Bay for aquaculture of kelp was about 74 000 MT sun-dried weight, or about 860 kg/1500m² in average for unit area. Another method is the monospecific digital model. The model included the two sub-model: nutrient stock and kelp stock sub-model. Key physical and biological process were researched and the function of light, temperature, seeding of kelp as the forcing function. According to what happens to the production of kelp when you change the seeding, we try different seeding and plot the seeding and production, then define the carrying capacity of aquaculture kelp in Sungo Bay. Responses of nutrients to large-scale kelp culture in the bay are simulated.

Keywords: kelp *Laminaria japonica*; aquaculture carrying capacity; model