

ON THE ECONOMICS OF OCEAN RANCHING AND STOCK ENHANCEMENT

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Several factors including dwindling ocean fish stocks, the high price of wild fish, and the commercial success of enclosed fish farming, have re-kindled interest in enhancing natural stocks by the release of artificially hatched individuals into the ocean environment. This might increase the supply of valuable species in essentially two ways; (i) by increased conventional landings on the basis of larger stocks and (ii) recovery of released individuals as they, in due course, return to the point of release. Although both activities involve the enhancement of at least some ocean stocks, only the first is generally referred to as stock enhancement while the second is usually known as ocean ranching.

Due to ecosystem interrelationships and constraints, enhancement of fish stocks, irrespective of the purpose, generally has far-reaching biological consequences. Therefore, it usually also has economic and social consequences far beyond those of relevance to the stock enhancers themselves. There are, in other words, pervasive external effects associated with ocean stock enhancement. Two implications follow immediately from this observation. First, a rational assessment of the true net benefits of stock enhancement has to take these consequences into account to the extent possible. Second, commercial agents, and quite possibly public agents as well, contemplating ocean stock enhancement, will generally not have an incentive to conduct these calculations or behave according to their outcomes. As a result, they would generally select an inappropriate level of ocean stock enhancement.

This paper is concerned with these problems. It develops a simple theoretical model for investigating the essential economics of ocean stock enhancement. On the basis of this model it demonstrated that a stock enhancement industry will generally not release the correct number of individuals into the ocean. More surprisingly, perhaps, the analysis also shows that if stock enhancement is going on, conventional fishing activity should be modified. The fundamental reason for both results is that both activities are using a common resource, i.e. the ocean ecosystem, whose overall productivity is limited.

The analysis shows that the problem is fundamentally caused by inappropriate social institutions for guiding the stock enhancement activity as well as that of traditional fishing. The paper goes on to discuss institutions and mechanisms which would correct the problem. Theoretically, the appropriate mix of taxes and subsidies would in principle do the job. Another, probably more efficient method, consists of the implementation of individual property in the form of tradable harvesting and fish release quotas or licences. The practical aspects of these theoretical solutions are discussed, both within national boundaries and internationally.