

Management of evolving fish stocks

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Today, fishing is the major source of mortality in many harvested fish stocks. The new high fishing mortality regime may induce evolutionary change in the harvested population, because the currently observed life-history patterns in fish stocks presumably reflect adaptation to past mortality regimes. Changes in these life-history patterns are likely to have an influence on, for example, the sustainable yield, the variability in annual catches, and the quality of the catch. This feedback adds a new dimension to the management of fish stocks: should the possibility of evolutionary change be taken into account in the management? If yes, what kind of changes are expected in life-history patterns and in sustainable yield? Could harvesting strategies be adjusted to minimize detrimental changes or maximize beneficial ones? I have studied these questions in the context of a model parameterized for the Arcto-Norwegian cod. The preliminary results indicate that the influence of evolutionary change on yield depends very much on the harvesting pattern used. If harvesting does not distinguish between immature and mature fish, fishing selects for early maturation and the sustainable yield decreases or remains unchanged. If, on the other hand, harvesting is limited to mature individuals, fishing may select for late maturity and the sustainable yield may increase.