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Michael G. Neubert¹, Lara Gulmann², Christine Hunter³, Tin Klanjscek⁴, Petra Klepac⁵ and Claudia Augusto Martins⁶.

Analysis of a simple, spatially-explicit, generalization of the Schaefer harvesting model using methods from optimal control theory shows that no-take marine reserves are an integral component of a harvest designed to maximize yield. The nature of the optimal harvest is sensitive to the habitat size, the population growth rate, and the dispersal ability of the fish. In some cases, it is a “chattering control” with infinite sequences of reserves alternating with areas of intense fishing. The optimal harvest generates a spatial source-sink structure, and source populations are always placed in reserves. When the optimal harvest is difficult to implement, an approximate yet practicable policy can be constructed.

¹Biology Department, MS #34, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: mneubert@whoi.edu).

²Biology Department, MS #34, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: lgulmann@whoi.edu).

³Biology Department, MS #34, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: cmhunter@whoi.edu).

⁴Biology Department, MS #34, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: tklanjscek@whoi.edu).

⁵Biology Department, MS #34, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: pklepac@whoi.edu).

⁶Biology Department, MS #32, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543-1049 (e-mail: cmartins@whoi.edu).