**Statement of Significance**

Freshwater fishery systems do do not always respond in linear, predictable ways to management. One reason for this non-linearity is not accounting for interspecific interactions in active management. Here, we developed a theoretical model of a recreational fishery in which the initially dominant focal species can be influenced by another harvested species in the system. This fishery model exhibits alternative stable states, driven primarily through cultivation-depensation mechanisms. We then use this fishery model to explore the impacts of management interventions in an effort to demonstrate how decision makers can leverage these species interactions in order to maintain the stable state of a system. Our work demonstrates the necessity of managing fisheries with an ecosystem-based framework in light of ecological and social interactions that may result in unexpected outcomes. This study is the first of its kind to explore the mechanistic levers decisions makers can use to maintain stable regimes in systems that do not respond to linearly to management action.

**Author contributions**

All authors have approved the submitted manuscript and agreed to be listed as such. C.D. and C.L.N. formulated the theoretical framework. S.J., C.T.S., and G.S. helped C.D. and C.L.N. to develop the model and the manuscript.