Abstract: Every fish species is part of a complex ecosystem which competes with other species for resources. Likewise, the harvesting of fish species often involves technological interactions which results in catching multiple species as well as temporal interactions between species as fishermen allocate their effort across multiple fisheries over the course of a year. Ecosystem-based approaches to fisheries management should address both the interactions that occur in the biological ecosystem as well as the larger economic system in which the harvesters operate. Single species management of multispecies fisheries ignores these interactions often to the detriment of the health of the ecosystem, the stocks of fish species, and fishery profits. This paper solves a dynamic optimization problem of maximizing the value from a three species fishery and determines the optimal harvest quota of each species given the biological, technological, and temporal interactions. Using this framework, a multispecies Euler equation, a modified multispecies golden rule, and a multispecies version of the fundamental equation of renewable resources are derived. The model is then applied to the pollock, Pacific cod, and arrowtooth flounder fisheries in Alaska to determine the optimal harvesting quota for each species over time. The population of each species is then simulated into the future with and without each set of interactions to isolate the impact of each type of species interactions on the sustainability and profitability of the fishery. The results highlight the need for including biological, technological, and temporal interactions when determining quota in a multispecies fishery.