We reviewed the various mechanisms reported to produce directly density-dependent mortality (per capita mortality increasing with prey density) and inversely density-dependent mortality (per capita mortality decreasing with prey density) in well-studied reef fish systems. Interestingly, recent years have seen several apparently conflicting reports of both directly and inversely density-dependent mortality in the same species. We proposed a conceptual synthesis explaining how prey behavior, reef habitat configuration, the spatial scale of predator foraging decisions, and the spatial scale of human observations all interact to determine patterns of prey mortality and population dynamics. While conceived with reef fishes in mind, this model could apply to other systems, such as insect predators and prey.
Photo 2. Juvenile damselfish (*Chromis viridis*) sheltering within coral (*Pocillopora* sp.) in Moorea, French Polynesia. Some reef fish species avoid predation by taking refuge in complex habitats. There is a limited number of crevices for hiding, so per capita predation mortality increases with prey density at the spatial scale of the prey group. Photo credit: Adrian C. Stier.

Photo 4. Blacktip reef shark (*Carcharhinus melanopterus*) foraging over a reef on Flint Island, Kiribati. The spatial scale at which predators such as the grouper and shark shown above define a “patch” of prey and make foraging decisions may determine whether prey mortality increases or decreases with group size. Photo credit: Stuart A. Sandin.
Photo 5. A diver (A. C. Stier) hovers over an array of artificial reefs used in experiments on Moorea, French Polynesia. The spacing of arrays such as this may constrain predators’ foraging behavior, and the spatial scale at which researchers observe mortality (individual corals vs. the entire array) may influence the type of density dependence that is detected. Photo credit: Shelby Boyer.

FUTURE ESA
ANNUAL MEETINGS

95th ANNUAL MEETING
Sunday, August 1–Friday, August 6, 2010
The David L. Lawrence Convention Center
Pittsburgh, Pennsylvania

96th ANNUAL MEETING
Sunday, August 7–Friday, August 12, 2011
Austin Convention Center
Austin, Texas

97th ANNUAL MEETING
Sunday, August 5–Friday, August 10, 2012
Oregon Convention Center
Portland, Oregon

98th ANNUAL MEETING
Sunday, August 4–Friday, August 9, 2013
Minneapolis Convention Center
Minneapolis, Minnesota

99th ANNUAL MEETING
Sunday, August 10–Friday, August 15, 2014
Sacramento, California

100th ANNUAL MEETING
Sunday, August 9–Friday, August 14, 2015
Baltimore Convention Center
Baltimore, Maryland