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004 EPA STAR Graduate Fellowship Conference *Next Generation Scientists—Next Opportunities*

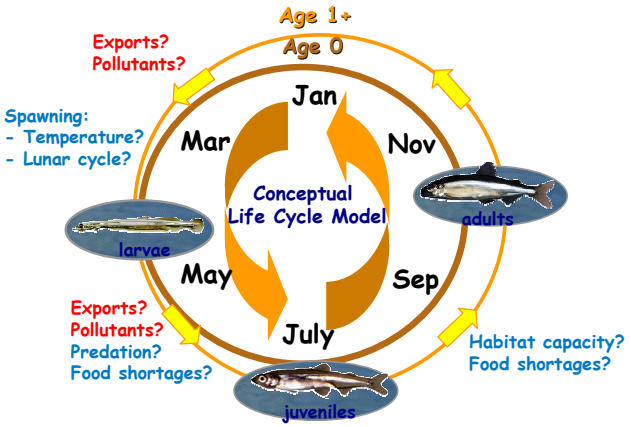
Managing with uncertainty: California's threatened delta smelt

Environmental Issue

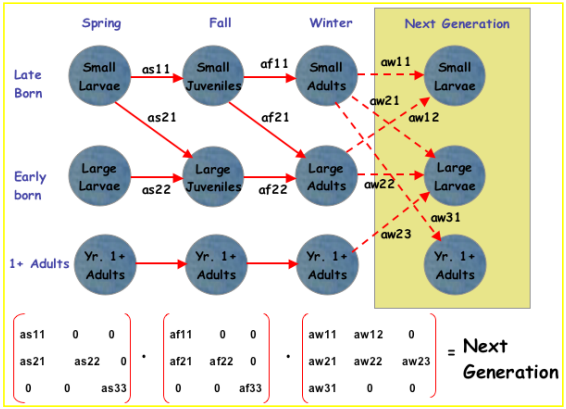
After exhibiting a population decline in the 1980s, California's delta smelt (*Hypomesus transpacificus*) was listed as threatened under the State and Federal Endangered Species Acts (ESA). This tiny fish exerts a major influence upon state water management. Delta smelt habitat overlaps with Delta pumping facilities that transfer California water. Therefore, the ESA status of this species can shut down water operations and create conflict between water management for environmental protection and human supply. Such a "smeltdown" impacts California's economies, ecosystems, and 23 million water users that depend on the Delta for freshwater.

Research Highlights

To understand various natural and human influences on the population—especially potential mortality due to water export operations—it is necessary to develop quantitative models of the delta smelt life cycle.



I have been developing stage-structured population models to bring a variety of data sources into a common context. Comparing the results of models with and without mortality due to water exports suggest that juvenile-to-adult survival is a key life stage that significantly influences population levels. Future work will identify the mechanisms underlying these life history dynamics to help guide conservation efforts.



Implications

These research findings will provide information on delta smelt life history and may offer transferable lessons for the restoration of other fish populations, particularly ESA species and anadromous fish (such as salmon). The goal of this approach is to develop innovative tools to facilitate flexible water management strategies to simultaneously save fish and provide water for California's growing population.

This fellow is sponsored by EPA's STAR or Greater Research Opportunities (GRO) Program.
Additional thanks to: Bill Bennett (UC Davis), Marc Mangel, the Mangel Lab group, and Dan Doak (UCSC).