Effects of climate change on California's inland fishes: tools for adaptation

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California's native fishes are mostly endemic, with no place to go as climate change increases water temperatures and alters stream flows. Many of the alien fishes, however, are likely to benefit from the effects of climate change. The goal of this project is to synthesize life history traits, population trends, status, and threats, including climate change, for all fishes in the state. We have found that 25% of the endemic fishes are now in danger of extinction. Climate change in conjunction with alien species, agriculture, and dams pose the greatest threat to native fishes. Preliminary results from two regional analyses suggest that native fishes in the Sierra Nevada are slightly less (74%) vulnerable to climate change than native fishes in the Klamath Basin (94%), perhaps reflecting prevailing life histories. Due to the regional differences in alien-native interactions, managers may expect that mechanisms expanding the range of alien fishes will differ between regions. Alien fishes may move into "empty" habitats in the Klamath Basin but expand their range in the Sierra Nevada by directly displacing native fishes. Because climate change effects and threats to fishes differ by zoogeographic region, we propose adaptation strategies specific to each region.