

EXECUTIVE SUMMARY: (State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project for California.) Loss of habitat and the resulting isolation of animal populations decreases genetic diversity (via inbreeding). Low genetic diversity in turn greatly increases the risk that a species will go extinct. Because solitary carnivorous mammals require large habitat ranges, they are especially deeply impacted by loss of habitat due to urban sprawl in California and globally. American black bears (*Ursus americanus*) are not currently endangered, but most other bear species (6 of 8) face serious risk of extinction (i.e. polar bear and giant panda). This proposal studies the black bear as a nonendangered model system and has two long term goals: 1) to unravel the mysteries of carnivore reproductive biology, and 2) to innovate biotechnology approaches for increasing genetic diversity in endangered carnivores. The specific aim of the seed project is to investigate how bears are able to increase genetic diversity by giving birth to litters with cubs of the same litter sired by different fathers. If we could determine what makes them do this in the wild, and manipulate the process using biotechnology, it will be possible to help stave off their extinction and perhaps even help recover at-risk wild populations. In addition to its relevance to global conservation of bears, the potential public benefit of the proposed study to California is that the study findings will also be pertinent for developing new approaches towards conservation and wildlife management of 11 additional carnivore species native to California which share reproductive traits in common with bears (mustelids and pinnipeds), 6 of which are listed as threatened, protected or 'species of special concern' by CA Fish and Game (i.e. wolverine, western spotted skunk, northern fur seal).
