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El Niño : effects of environmental stress on pinniped populations.

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Abstract

The 1982/83 El Niño event in the eastern Pacific, is one of the best documented events where severe environmental stress affected a whole ecosystem. El Niño is a meteorological and oceanographic phenomenon which occurs at irregular intervals. The 1982/83 event was particularly drastic, but smaller events seem to occur quite regularly, though unpredictably. Such events are part of the environmental variance to which most animals are exposed during their lifetime and they may have significant consequences for social and population processes or structure. El Niños can also serve as models of the potential reaction of top pedators to human induced global changes.

During the 1982/83 El Niño, social patterns changed in response to reduced space and food competition in the declining pinniped populations. Mother-yong interactions and interactions among both females and males were altered, and animals redistributed over the available habitat. Dispersal, mortality, and fertility changed in the impacted populations. The magnitude of the effects on sexes, cohorts, and (sub-) populations depended on the timing of the event relative to the annual life cycle of the animals.

Rare events may influence differentiation among populations and reduce the longterm mean carrying capacity of the environment and/or the probability of reaching the carrying capacity. They also may create bottlenecks thereby reducing population heterozygosity. The split-up of populations into more or less separated sub-populations decreases the probability of extinction. Density-dependent factors are known to influence pinniped population dynamics, but environmental stress as a density-independent, stochastic process influences the population dynamics of mammals as large as pinnipeds far more than is generally appreciated.

Relevant Literature:

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