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Isolation by distance among California sea lion populations in Mexico: redefining management stocks

Manuela González-Suárez, R. Flatz, David Auriolés Gamboa, P.W. Hedrick & L.R. Gerber

Understanding a population' spatial structure is critical for its effective assessment and management. Unfortunately, direct observation of spatial dynamics is generally difficult. California sea lions (<I normal">Zalophus californianus) are polygynous pinnipeds distributed along the Pacific coast of North America. The species' range has been subdivided into three management stocks based on differences in mitochondrial DNA, but to date no studies have considered nuclear genetic variation, and thus we lack an understanding of male gene flow patterns among sea lion colonies. In light of recent population declines in the Gulf of California, Mexico, it is critical to gain an inclusive understanding of spatial structure to determine if declining sea lion colonies are genetically isolated from others. To define population subdivision and identify sex biases in gene flow we analyzed a 355bp sequence of the mitochondrial DNA control region and 10 polymorphic microsatellite loci from 355 tissue samples collected from six colonies distributed along Mexican water. Using a novel approach to estimate sex biases in gene flow we found that male sea lions disperse on average 6.75 times as much as females. Analyses of population subdivision strongly suggested a pattern of isolation by distance among colonies and challenged current stock definitions. Therefore, we propose an alternative classification that identifies three Mexican management units: Upper Gulf of California, Southern Baja Peninsula, and Upper Pacific Coast of Baja. This revised classification should be considered in future assessment and management of California sea lion populations in Mexican waters.

Palabras clave: Specialist, zalophus californianus, microsatellites, mitochondrial DNA, pinniped, population structure

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