



## ASSESSING THE DESIGN AND MANAGEMENT OF PROTECTED AREAS: LANDSCAPE GEOGRAPHY IN LOMAS AND TILLANDSIALES OF SOUTHWESTERN PERU

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**ABSTRACT.** Coastal desert ecosystems, such as the Lomas and Tillandsiales, are essential for the well-being of local populations, providing vital ecosystem goods and services, including climate regulation and water supply. These ecosystems are nationally recognized as important conservation targets. However, the Lomas and Tillandsiales in Tacna have been adversely affected and ecologically degraded due to uncontrolled population growth and inadequate regulation of human activities, such as agriculture, mining, and livestock grazing. Therefore, it is crucial to implement effective conservation strategies. Despite this need, when governmental entities delineate territories for potential protected areas, existing land use is often prioritized, leading to the exclusion of areas under current use rather than considering geographical criteria or ecological attributes of these vital ecosystems. This practice raises questions about the effectiveness of conservation efforts. To assess the proposed polygons for new protected areas by regional authorities, we compared these with natural ecosystem boundaries using various geographical tools. This comparison revealed substantial differences in geographical, ecological, and landscape metrics, indicating a decrease in ecological similarity and potentially lower effectiveness for conservation. We identified variations in geomorphological and morphometric diversity, with extreme cases showing coefficients of variability of 56% for the Gravelius index, 52% for the altitude index, and 43% for the morphometric protection index. These factors are critical as they strongly correlate with biodiversity, ecological processes, and the provision of ecosystem services, which are the main goals of conservation. Given these discrepancies, the newly proposed conservation area may inadequately fulfill its objectives. Once designated, the authorities should design and implement a management model that prioritizes expanding the protected areas to their natural limits, promoting restoration, and conducting ongoing monitoring of the metrics outlined in this research. Conservation should not merely involve declaring a spatial area as a reserve; it also requires defining these spaces based on tools and geographical knowledge to ensure the adequate protection and conservation of the Lomas and Tillandsiales ecosystems.