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Vegetation of Bosque Fray Jorge National Park and its surrounding matrix in the Coastal Desert of north-central Chile

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ABSTRACT

Within its almost 9000 ha, Bosque Fray Jorge National Park (BFJNP) possesses a natural mosaic of vegetation formations dominated by thorn scrub (63.3% of the park) and scrub with cacti and other succulents (34.1%); these formations, whose plant covers are above 40%, are representative of the Coastal Desert vegetation. Additionally, BFJNP has 230 ha (2.6%) of a relict fog forest. This unique combination of vegetation formations, partly explains the high plant species richness of the park. We discuss the climatic and topo-edaphic factors associated with each type of vegetation formation.

Compared to BFJNP, the surrounding vegetation matrix shows evidence of changes in both the dominant vegetation and their plant covers; moreover, it is floristically depauperate relative to the park. This territory also includes agricultural land and plantations of non-native shrubs, as well as goat herding and small, inter-dispersed human settlements. Its main land cover types are: scrub (50%), scrub with succulents (34%), agricultural land (8%), secondary prairies (3.5%), and plantations of non-native shrubs (1.6%). Approximately 22% of this area presents high levels of anthropization. Additionally, two wind farms (217 wind turbines) have begun operating within the vicinity of BFJNP within the past two years.

BFJNP provides more than a mere representative sample of the current vegetation; it constitutes a remnant of the natural vegetation that once dominated the Coastal Desert before European colonization. Whereas the relict fog forest has been historically isolated, the desert vegetation is increasingly losing connectivity outside the park. We discuss the consequences of this isolation in terms of long-term maintenance of biodiversity. We argue that plant communities at BFJNP are the best available model for ecological restoration projects in this region of Chile.

1. Introduction

Bosque Fray Jorge National Park (BFJNP) is located on the coast of the Coquimbo Region, Chile, just south of the Atacama Desert. It was declared a National Park in 1941 and a World Biosphere Reserve in 1977. In 1981, three National Parks (Bosque Fray Jorge, Punta del Viento and Talinay) merged to create what is currently BFJNP (CONAF, 1998). The official area of BFJNP reported by CONAF (1998) is 9959 ha; however, the most recent spatial data reveals a current size of approximately 8994 ha (CONAF, 2004). This discrepancy can be attributed to changes in the boundaries of neighboring human communities and/or from different cartography originally used to delimit the park. BFJNP is divided into two unequal subsections (Fig. 1): the main area (8880 ha, Fray Jorge hereafter) is located to the north of the Limarí River, whereas the second area (114 ha, Talinay henceforth) is located on the hilltop of Cerro Talinay, south of the Limarí River.

During the late Miocene, BFJNP was completely underwater and presently contains a series of marine terraces that reflect tectonic blocks of recent geologic origin, and which have sustained torrential erosion dynamics (Novoa-Jerez et al., 2004a). There are three distinct geomorphological units in BFJNP (from west to east): 1) the coastal terrace (uplifted during the Pliocene–Pleistocene); 2) the coastal massif of Altos de Talinay (reaching heights of up to 660 m a.s.l.) and; 3) tilted blocks forming hills and dry ravines that include Quebrada de Las Vacas (formed during the Pliocene). Altos de Talinay started uplifting during the Pliocene and reached its maximum height in the Pleistocene (Paskoff, 1993; Novoa-Jerez et al., 2004a). A submarine trench of 1000 m is located

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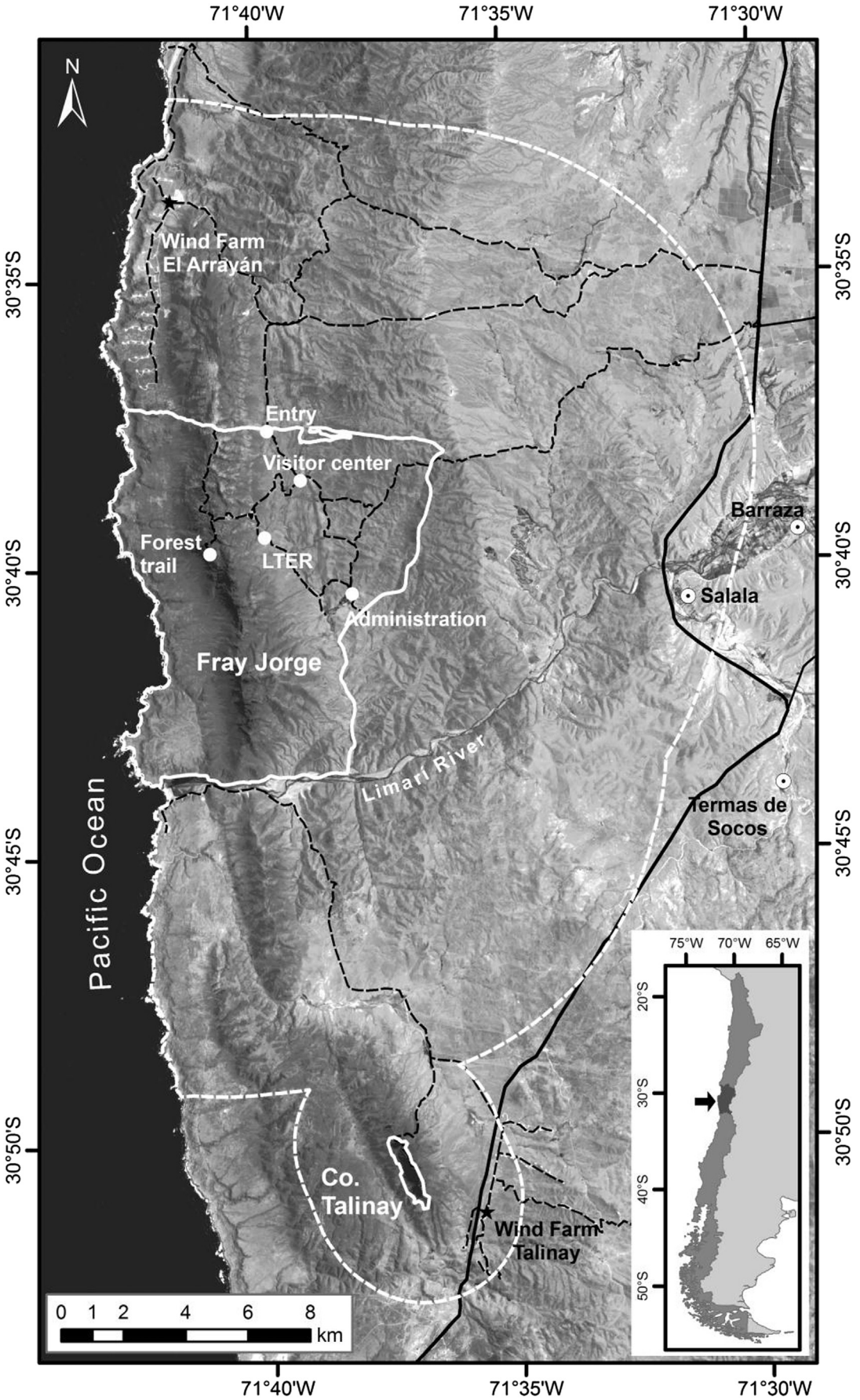

Fig. 1. Location of Bosque Fray Jorge National Park (BFJNP). The official boundary is shown as a continuous white line, roads are shows as black (paved) or thin black dashed (dirt or gravel) lines, and the 10 and 3 km buffers around Fray Jorge and Talinay, respectively, are shown as white dashed lines.