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Seabirds offer insight into the health of both marine and terrestrial ecosystems.

## Seabirds: Sentinels beyond the oceans

In their Perspective “Seabird clues to ecosystem health” (12 July, p. 116), E. Velarde *et al.* rightly point out that seabirds provide crucial information about the state of marine ecosystems. However, they do not mention the role of seabirds on land and shorelines. Seabirds that forage at sea and breed on land play an essential role in cross-ecosystem transport of energy and nutrients, shaping terrestrial (1) as well as marine (2) ecosystems. Seabird colonies can provide insight into coastal and island environments worldwide (3).

In terrestrial (4) and adjacent reef ecosystems, nutrients from seabird guano (such as nitrogen and phosphorus) have been shown to enhance productivity, growth rate, and functioning of coral reef communities (5–9). In addition, because seabirds are highly sensitive to invasive species, visitor disturbance, noise, and light (3), they rely on the tranquility and seclusion of breeding sites to reproduce. Their distribution and the demography are therefore valuable and integrative proxies of anthropogenic pressures at shore (10, 11). In an era of profound and worrying changes that affect both marine and terrestrial environments, seabird populations are barometers of the health of a large variety of oceanic, coastal, and insular ecosystems. Up to 47% of all seabird species are currently declining, with 37% already threatened (12), which will undoubtedly

reduce the monitoring opportunities offered by these sentinel organisms.

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