

# Conservation Implications of Migration Routes of Pink-footed Shearwaters

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After more than three months of provisioning their single, slow-growing chick, pink-footed shearwaters, a species of seabird endemic to Chile, depart the breeding colonies to begin their migration. For shearwaters, this migratory journey is merely a continuation of an inherently wide-ranging lifestyle. During the chick-rearing period, satellite-tracked breeding shearwaters from the Juan Fernández Islands extensively used continental shelf waters south of Concepción, Chile. These trips to provision their chick, impressive journeys in their own right, commonly exceeded 1500 km roundtrip and ranged from 5-12 days in length.



Adult pink-footed shearwater on the surface of the colony at night, Isla Santa Clara, Juan Fernández Islands.

In late April to early May, shearwater chicks fledged from the colonies, and breeding adults, no longer constrained to return to the colony, migrate out of the region. During the northern summer, large numbers of pink-footed shearwaters are seen in the continental shelf waters of the west coast of the U.S. and British Columbia, a distance of at least 12,000 km from the breeding islands in Chile. Although these northern wintering grounds have been well documented by at-sea surveys, the migratory routes to these areas from the breeding colonies remained undescribed. In late April 2006, we attached five Microwave 12g solar satellite transmitters to post-breeding pink-footed shearwaters to obtain preliminary information on the migratory routes and habitat use patterns of the species.

Following their departure from the breeding colony on Isla Santa Clara, Juan Fernández Islands, all five birds traveled to the continental shelf/shelf-break area of Chile and rapidly headed north. Four of the tags transmitted long enough to track the birds along the shelf/shelf-break to the central Peruvian coast, in the Bahía de Salinas region. The birds covered approximately 2500-3000 km along this route, moving quickly through zones of relatively low productivity. All four birds spent significant time in the central Peru region, presumably exploiting its highly productive upwelling system. In fact, only one of the four birds left Peruvian waters, the rest remaining in the same area for several



Pink-footed shearwater with satellite tag being returned to its breeding burrow, where it had a near-fledgling chick.

weeks to nearly two months. These tracking data, although limited, suggest that the area may be an important wintering hotspot for the species.

The lone bird that continued northward traveled rapidly and consistently through the low-productivity offshore waters off Central America to arrive at the southern tip of Baja California. It then slowed

considerably, moving gradually up the Pacific coast of Baja and remaining in shallow shelf waters until it reached the Bahía Magdalena region. Upon reaching this area, the bird remained for several weeks, apparently utilizing a consistent local upwelling zone. To reach this zone, the bird traveled at least 10,000 km.

A fundamental challenge to any seabird is to find food in a patchy environment. Given that seabird prey resources can frequently be unpredictable both spatially and temporally, it can be advantageous to exploit areas of consistent productivity, such as coastal upwelling areas, where they exist. Our results suggest that pink-footed shearwaters

frequently utilize such areas of highly productive coastal upwelling both in Chile during the breeding season and during migration. Not coincidentally, these regions are also heavily exploited by fisheries, thus leading to potential interactions with shearwaters. Such interactions may be negative, including competition for prey and/or mortality as bycatch in net or hook fisheries, or positive, primarily food subsidies in the form of fisheries discards tossed overboard.

Additional challenges to shearwaters using shelf and shelf-break waters have to do with other uses of these waters by humans. These waters frequently have heavy shipping traffic and are also sites for oil exploration and extraction. Both of these activities increase the risk of oil spills, which can obviously have significant impacts on seabird populations in the affected regions.

This apparently consistent use of shelf and shelf-break waters by pink-footed shearwaters and their consequent overlap with fisheries and other human activities is potentially a concern, as the species is globally listed as Vulnerable by the IUCN and is designated as a Species of Common Conservation Concern by the tri-national Commission for Environmental Cooperation (CEC). Future work, under the auspices of the CEC, will focus on describing habitat usage patterns within North American wintering grounds and will replicate the migration tracking study described here to provide a more robust understanding of pink-footed shearwater migration.

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Movements of five post-breeding pink-footed shearwaters (*Puffinus creatopus*) satellite-tracked from Isla Santa Clara, Juan Fernández Islands (JFI). Tracking began on April 21 – 22, 2006. The Argos data were filtered to remove low quality fixes (class B) and locations requiring unrealistic flight speeds (> 60 km hr<sup>-1</sup>). The track of each bird is color-coded and the extent of the continental shelf (200m depth) is highlighted by the light blue shading.