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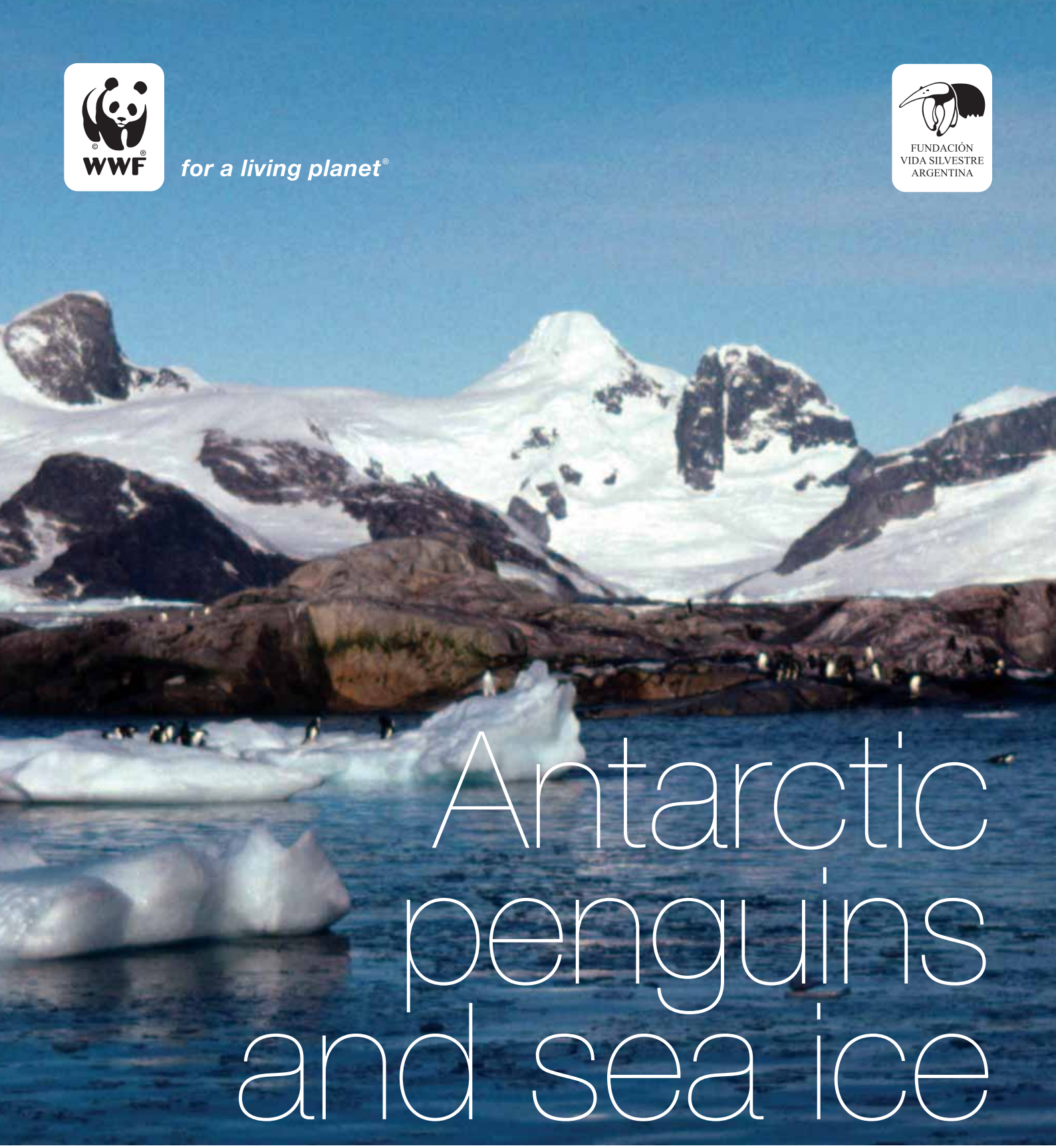
FUNDACIÓN VIDA SILVESTRE ARGENTINA



Antarctic penguins and sea ice

The Emperor (*Aptenodytes forsteri*) and Adélie (*Pygocelis adeliae*) penguins are the only two true Antarctic penguin species that breed on the Antarctic continent. Their natural habitat is in waters that are covered for a significant part of the year by sea ice (ice that forms on polar oceans and is derived from sea water). Too much sea ice however is as detrimental as too little. Emperor and Adélie populations reach an optimum when there is sufficient but not too much sea ice. Between the two species, Emperor penguins are far more capable of dealing with high sea ice coverage than the Adélie. Other penguins, such as King (*A. patagonica*), Macaroni (*Eudyptes chrysolophus*), Gentoo (*P. papua*) and Chinstrap (*Pygocelis antarctica*) may venture southward into the sea ice zone but nevertheless, mostly avoid sea ice. If sea ice disappears these open-water species move in. The Chinstrap out-competes Adélie penguins for nesting space, while the King penguin could easily displace the Emperor penguin.

Emperor penguins

Fast ice (sea ice that is connected to and held fast by land) provides a nice flat surface for Emperor penguins - whom are too large and bulky to climb over high jumbles of rocks or broken sea ice - to raise their young. Their breeding season begins in austral fall (April), once fast ice has formed and thickened, and continues through to the following mid-summer (December). Many Emperor colonies are located many kilometers from open water and hence, food. Males fast for 4 months while incubating the newly- laid egg and waiting for their mate to return from feeding. Parents take turns to feed among the pack ice where sea ice is broken into pieces and where there are stretches of open water in between ice floes. After breeding, adults go out into the pack ice or open waters to feed and fatten themselves, ready for the next winter. At the time when they molt - shed their old feathers and grow new ones – Emperors need to stay on fast ice or very large pieces of sea ice that remain stable for at least four weeks because during this time there feathers are not waterproof and they would sink and die if they had to swim.

The Emperor penguin breeds in ~40 colonies around the Antarctic continent. Among the four colonies where long-term population data are available, the two northernmost populations at Pointe Géologie, East Antarctica, and Dion Island, Antarctic Peninsula have declined over recent decades. At Pointe Géologie, the population has declined by 50% over the past 50 years. High mortality occurred during the late 1970s and the population has not recovered since. **At Dion Island, the population of emperor penguins has declined from about 250 pairs in the 1960s to just 10 pairs in 2001**, most likely as a result of the large-scale disappearance of sea ice in that region.

Adélie penguins

Adélie penguins do not nest on sea ice but rather on ice- and snow-free land that are within a few hours from open water or persistent areas of open water within the pack ice. The Adélie is exceedingly agile out of the water and can even scale relatively steep cliffs. They use small stones from the moraines of retreating glaciers to make nests. The stones keep eggs and small chicks out of puddles and mud formed during the breeding season and above most rivulets of water from melting glaciers or rain. If the Adélie penguin is faced with a walk of more than a couple of kilometers on a regular basis, its colonies will disappear. Adélies spend their winters at the northernmost edge of the pack ice where there is enough open water and light to forage effectively. Like the Emperor penguin before winter, it seeks areas where pack ice still remains in order to molt while staying on a large ice floe for 3-4 weeks.

Adélie penguins breed in ~160 colonies around the continent. Along the ice-bound east coast of the Peninsula, as well as on the coast of the Antarctic continent, populations of Adélie penguins have been growing where stronger winds have sustained larger stretches of open water within the pack ice, making it easier for the Adélie penguins to find food. In the northwestern coast of the Antarctic Peninsula, populations of Adélie penguins have dropped by 65% over the past 25 years. **Here, winters have become warmer by 5°-6°C over the past 50 years, five times faster than the average rate of Earth's overall warming.** Consequently, seas have become completely free of sea ice during an increasing frequency of years. Fossil records show that, in this region, Adélie penguin colonies were found when sea ice was more persistent and the colonies became extinct when sea ice disappeared.

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