



THINKING SUSTAINABILITY PRIZE

Author's Perspective

Steven Chown

Jewels of the South

Original Version

The Southern Ocean is daunting. Mountainous seas, fierce winds and driving cold challenge every traveller. The entire sweep of the world's largest ocean can seem set against success. Yet in places, in the summer, riots of birds suggest something else. Flitting prions, soaring petrels, and porpoising penguins hint not only at an abundance of food. They signal a deeper secret. The places they raise their young.

Encircling Antarctica, midway between its shores and the closest continents, lie eleven archipelagos. Sometimes verdant, sometimes icy, often basalt black, they resemble jade, sapphire and onyx, perfectly stationed around the world's loneliest continent. The Jewels of the South.

These sub-Antarctic islands share similar positions on either side of the Antarctic Polar Front and are alive with seabirds, seals and the Southern Ocean's most exceptional birds, the albatrosses. Every approach to these islands tests resolve – surrounded by so many species, displaying such grace, speed and ease – it's impossible to know what to stay attuned to. Single Wandering Albatrosses are the most enticing: wave-soaring, gliding, and turning with a single wingtip. They displace imagination.

A Wandering Albatross close to Possession Island, Crozet Archipelago. Image: Steven Chown.

Until the land itself intrudes into the background. Little prepares one for the sheer extraordinariness of sub-Antarctic landscapes. They're incomparable. Some are mountains in the sea with lush green tussock hems. Others rise from tussocks, to bogs, to the deep russet of scoria, to peaks of white.

The approach to South Georgia, in the Scotia Arc. Image: Steven Chown.

Aerial view of the vistas of Marion Island, Prince Edward Island archipelago. Image: Steven Chown.

And yet others are encapsulated by glaciers from what looks like shore to summit. Heard Island, lying south of the Antarctic Polar Front, is the epitome of such an island. Every vista is one of a land governed by ice.

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Heard Island, of the Heard and McDonald Islands, with its active volcano. Image: Steven Chown.

Yet the view is beguiling. Heard Island is home to a rich biodiversity of flowering plants, insects, and birds. Its shores teeming with King, Macaroni and Rockhopper penguins, with Antarctic Fur Seals, Southern Elephant Seals and the occasional Leopard Seal, and multitudes of Brown Skuas, Black-faced Sheathbills and Southern Giant Petrels.

Away from the shore, the birds find themselves in thick *Poa cookii* tussock, named for the polar explorer. Among the tussock are Kerguelen cabbages, a brassica famed for its Vitamin C by early visitors to the islands, hence named *Pringlea antiscorbutica*. At times these cabbages form dense fields of their own. As the slope rises, the tussock gives way to cushion plants and mosses, becoming less common until only lichens eke out a living, in turn displaced by the glaciers that have descended from Mawson Peak at 2745 m.

From the shoreline to the edges of the ice, the habitats are home to a rich variety of insects. Flies, weevils and a tiny moth species specialising on the tussock. Unlike almost all insects elsewhere, none of these species are able to fly: all have reduced wings. Charles Darwin, looking at specimens from the early Challenger expedition to the sub-Antarctic, put this down to evolution in the extremely windy environment. His friend and correspondent Joseph Hooker disagreed, but time and extensive work have proven Darwin right. The weevils are special not only for their inability to fly, but also because most of them feed on algae, lichens and mosses. Lichens and mosses are notoriously difficult for animals to digest, yet the weevils have evolved to do so.

The higher elevations are not only home to mosses, lichens and weevils. Many small soil invertebrates are abundant here, adapted to the cold. In summer, they share their home with petrels that come ashore and burrow into the loose gravel and soils. Diving petrels, which fly straight through waves with consummate ease, are especially abundant. So too are their smaller relatives, the storm petrels, that pitter-patter their way over the waves when feeding.

Kerguelen cabbages among tussock on Heard Island, with the glaciers of Big Ben in the background. Image: Naomi Monk.

The weevil, Canonopsis sericea (left) and the fly, Calycopteryx moseleyi (right) on Heard Island. Note the tiny vestigial wings on the fly. Images: Naomi Monk.

Although these landscapes seem free now from human influence, we have touched them deeply in two ways. The early history of Heard Island was one of sealing. Discovered in 1853, sealers soon went ashore at Heard Island to hunt individuals of the Southern Elephant Seal for blubber to render into oil. By 1859 the seals were decimated. The populations recovered over the next ~150 years, but they are now threatened by high pathogenicity avian influenza (HPAI or H5N1 bird flu). A survey earlier this year revealed a mortality rate of 76% for elephant seal pups on the island. Owing to such high mortality elsewhere, the IUCN has recently revised its red list classification of the Southern Elephant Seal from Least Concern to Vulnerable. The high mortality rates at Heard Island suggest that they may be in even more trouble.

The second impact is through global climate change. As a result of warming, Heard Island's glaciers are in rapid retreat. A combination of early sealers images, historical photographs and satellite remote sensing show this retreat to be fast and ongoing.

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Glacial retreat on Heard Island from 1947 until 2019 derived from satellite image analysis. Image from Levan Tielidze et al. 2025 *The Cryosphere* <https://doi.org/10.5194/tc-19-2677-2025>, CC-BY 4.0.

Fortunately, Heard Island has not been significantly affected by one of the other major impacts of humans on the sub-Antarctic islands: the introduction, establishment and impact of species not indigenous to the islands. Largely, the island's extreme climate, and few human visitors in recent times, have rendered introduction and establishment unlikely. Exceptional biosecurity protocols by the Australian government have kept it largely free of such pests in recent times. Elsewhere in the sub-Antarctic, the effects of invasive alien species have been devastating. Such effects include mice on Marion Island feeding on live juvenile and adult albatrosses, causing much distress and significant mortality. Though biosecurity across the region is now good, these early introductions are having large impacts, exacerbated by climate change.

The human impacts raise a critical question of the future of the sub-Antarctic islands and why their futures should be in our thoughts and mobilise our efforts.

The sub-Antarctic islands, though remote, deserve attention because they are so highly unusual by global standards. They have an exceptional proportion of species found there and nowhere else. They're also the breeding grounds for some of the world's most iconic animals. Almost half of the world's population of Wandering Albatross breeds on just two islands – Marion and Prince Edward of the Prince Edward Islands archipelago. The sub-Antarctic islands' strange megaherbs, like the Kerguelen cabbage, along with odd insects that eat mosses and don't fly, make for environments that are simply not replicated on our planet, or anywhere else that we know of. These are some of the strangest places the sum of our human experience has encountered.

And despite a history of human influence, we know the management plans and actions to conserve the islands are working. In the case of biological invasions, big data and new computational approaches have revealed that biosecurity is working to slow down the rates of establishment new arrivals. On many islands, alien predators and herbivores (like rabbits, cats, rats and mice) have now been removed too, leaving landscapes that are intact or recovering to their former beauty and functioning. Where the aliens have not been removed, such as on Marion Island, large programs are underway to do so.

Almost nowhere else globally can one find so small an imprint of direct human impact. Some islands, like the Heard and McDonald Islands, have the smallest number of non-indigenous species of any places on Earth. There are no cities, agriculture, cars, bicycles. Where people are resident, they're researchers and their colleagues. And on many islands, such as Heard Island, for most of the time nobody is there. Just think of the closest place you know without our human presence. The sub-Antarctic islands are in many cases as close to pristine as one could get, recalling that climate change is making statements about pristine environments anywhere less defensible.

So, what of the islands' futures?

In short, they will be sound if we continue to support conservation management, such as biosecurity, and removal actions such of mice on Marion Island. And, most critically, *for wherever you live*, if we decarbonise the economy. Doing so will slow climate change, and, if we are smart about the future and have the political endurance, begin to reverse its effects. This will not only be good for our futures – our lives will be less frequently disrupted by

heatwaves, wildfires, floods and droughts. It will also be good for the futures of these islands and their remarkable plants and animals.

If we do so, if we persevere and apply our spectacular human talents to resolving the climate crisis, we will have secured the Jewels of the South. If we don't, we will have pawned off our most precious gifts. For nothing tangible, inspiring, or breathtaking.

