The Prince Edward Islands: Southern Ocean Oasis†

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INTRODUCTION

In the austral summer of 1947–1948, South Africa annexed the sub-Antarctic islands, Marion and Prince Edward, mostly for strategic reasons that had been the topic of considerable discussion between General J.C. Smuts and the U.K. government. With the stroke of a pen, some formidable logistics, and a great deal of initial secrecy, Operation Snoektown effectively added a whole series of ecosystems to South Africa’s already rich natural heritage. South African scientists and their colleagues abroad immediately recognized the opportunities for research into the functioning of Southern Ocean marine and terrestrial systems, and scientific work followed soon after the establishment of the weather station on the east coast of Marion Island.

Since that time, an immense fund of knowledge concerning the islands and the surrounding oceanic ecosystems has accrued. However, as with all human endeavours, this knowledge has come at some cost to the natural heritage of the islands, mostly as a consequence of the introduction of several destructive alien species. Although sealers interested in both oil and fur contributed several exotic species early on, including house mice and the grass, Poa annua, the list of introduced species has grown substantially since the annexation of the islands. Many of these species have also spread widely around Marion, and in some cases Prince Edward Island. These species, and

†Editors’ Note.—The authors wish to note that this synthesis is based on the long-term research efforts of many South African and international researchers, too numerous to name, who have worked and are working on and around the Prince Edward Islands and have made considerable contributions. The South African Department of Environmental Affairs and Tourism (DEA&T) and several South African universities provided logistic and financial support for research undertaken on the islands. The authors gratefully acknowledge many fruitful years of cooperation with the Directorate Antarctica and Islands of the DEA&T. The authors wish to especially thank William Froneman, who inspired the title of this synthesis.
the likelihood of other biological invasions, especially given the rapid climate change (warming and drying) at the islands, continue to constitute significant conservation threats. In consequence, over the last decade there have been increasing efforts to better manage both research and conservation at the islands.

Here we provide an overview of the outcome of the research that has been undertaken since the Prince Edward Islands were annexed, highlighting some of the more important ecological lessons that have emerged from this work. We also explore conservation threats to the islands, associated especially with climate change and invasive species, and how research at the islands has to be managed to minimize these threats while maximising the scientific returns. We pay specific attention to the Management Plan that has been adopted for the conservation management of these IUCN Category I Special Nature Reserves, and the kinds of research that this plan calls for. In addition, we draw attention to research information that has also been essential for ongoing management of the islands. We conclude by pointing out that while the Prince Edward Islands present significant opportunities for understanding marine-terrestrial interactions, the effects of global climate change on these interactions, and on the outcomes of biological invasions, we emphasize the fact that this work will have to be carefully managed in the context of the conservation of the marine and terrestrial systems.

ENVIRONMENTAL AND HISTORICAL BACKGROUND

The Prince Edward Archipelago, including Marion and Prince Edward Islands, is situated halfway between the continents of Africa and Antarctica, approximately 2000 km southeast of South Africa (fig. 1). The nearest landfall to the archipelago, the Crozet Islands, is ca. 950 km to the east. Marion Island is the larger island at approximately 250 km² in extent, while Prince Edward Island, which is 22 km northeast, is only about 45 km² in area. Rising steeply from depths of >3000 m, the islands are separated by a shallow saddle, which varies between 45 and 260 m in depth. The Prince Edward Islands (PEI) are relatively young, ca. 450,000 years old, thin soiled volcanic islands with many terrestrial communities deeply subsidized by the