

Quagga II, Spring 1985

A PENGUIN



Photo: J.A. Ledger

PUZZLE

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The Jackass Penguin is listed in the South African Red Data Book — Birds (C.S.I.R., 1984) as a "Vulnerable endemic species of southwestern Africa which has lost at least three quarters of its population this century." The Endangered Wildlife Trust is providing funds for a five-year population monitoring programme under the leadership of Dr David Duffy. In this article he discusses how penguins could contribute to the South African economy by increasing tourism to the west coast.

To many, the Jackass, Black-footed, or African Penguin *Spheniscus demersus* is a cute little bird, beloved of cartoonists and refrigerator advertisements. Without the penguin, however, South Africa as we know it would be quite different. In the early days of the establishment of the fort at Cape Town, penguins killed at the Robben Island colony in Table Bay kept the Dutch from starving. Since the settlement was originally founded to provide provisions to passing ships of the Dutch East India Company, the company would probably not have bothered with attempting to re-establish a settlement that could not even feed itself. While the settlement survived, the penguin colony at Robben Island did not, being reduced from perhaps a million penguins to none in only a few decades. Today, I would suggest that the penguin still has an important role to play in South

Africa's future. It represents a "canary in the cage", monitoring the health of the marine environment. If we can understand the ecology of the Jackass penguin and successfully conserve its population, we will be well along the road to conserving the renewable living resources of South Africa's coastal waters.

As recently as 1980, biologists thought they understood the problems facing the penguin in southern Africa. Eggging and direct human exploitation were illegal and minimal; oiling was an occasional problem but rehabilitation efforts were highly successful for penguins that reached cleaning facilities.

The great concern was over commercial fishing. The penguin is dependent on the Cape Anchovy *Engraulis capensis* for over 80% of its prey, yet the commercial fishery was believed to take up to 60% of a total

South African anchovy population of some 600 000 tonnes. It appeared that penguins were suffering from a shortage of food. Penguins at west coast breeding colonies were observed to spend long periods away from their nests, so that their mates were forced to desert. Growth rates of young in the wild were much slower than those of captive birds. Finally, the population was believed to have decreased sharply, based on estimates in 1956 and 1978, from 236 000 to 100 000 birds. Penguins and purse-seiners appeared to be competing for food, with the industry winning. Unless some means could be found to increase the food available for west coast penguins, their population was likely to continue to decrease.

In 1983, Sea Fisheries Research Institute scientists, using sophisticated acoustic sampling devices aboard the new research vessel *Africana*, found a



Photo: J.A. Ledger

large anchovy population on the south coast. The population was at least twice as large as previously thought, therefore, the fishing industry was only taking 25% of the total, instead of 60% as previously believed. Could the industry really be over-exploiting the South African anchovy under such conditions? And, if there were so many anchovy, why were penguins declining?

To answer these questions, we need to review a bit of anchovy biology. The traditional view has been that adult anchovy spawned their eggs on the south coast, to the east of Cape Point, and the eggs and larvae were transported northwards, around the Point, by a fast-moving 'jet' current which eventually deposited them in a "nursery" in the rich and relatively sheltered waters of St Helena Bay. The young grow rapidly in these conditions and, nearly adult size by late winter, they move south to join the spawning population to the south. Until recently, the anchovy on the south coast were believed to range from one to four years old. More recently, scientists have learned that anchovy grow more rapidly than previously believed, so that most anchovy are less than two years old. The population "turns over" much more rapidly with young anchovy representing a much larger part of the total population than previously believed.

This raises another puzzle. If the population is much larger and younger than expected and if most of the young anchovy come down the west coast, past the penguin colonies, why are penguins decreasing, especially if the fishing industry appears to be taking such a small percentage of the total stock?

Penguins may provide the answer. If our interpretation is correct, the answer has important implications for penguin conservation, the commercial fishery, and future west coast tourism.

We studied the diet of penguins on Dyer Island, off Danger Point on the south coast. We were surprised to find many small anchovies, of a size that we would only expect to have found in the St Helena Bay nursery on the west coast. The percentage of such small anchovy was virtually the same as in the diet of penguins on Marcus Island, in Saldanha Bay on the west coast. These data showed that anchovy reproduce on the south coast and that, at least to penguins, the number of young anchovy produced is as large



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on the south coast as on the west coast.

If traditional theory regarded the west coast recruitment as large enough to sustain the population and we discovered a south coast recruitment of apparently equal magnitude, then we need to frame a new theory of anchovy distribution to explain both our findings and the fact that west coast penguins don't have enough food: the south coast population is self-sufficient, sustained by recruitment on the south coast. Since south coast waters are unsuitable for fishing, this would make the anchovy there virtually immune to overfishing. The west coast recruits must be very heavily exploited on their southward movement so that relatively few survive for the penguins, or to maintain the large south coast population. West coast recruitment, although critical to the fishery and to west coast penguins, appears to be almost irrelevant to the survival of the anchovy stock. Conceivably, fishermen could take the entire west coast recruit population each year without affecting the population. Indeed, based on the lack of food for penguins, that may be close to what they are doing at present. Increasing the fishing quota for anchovy on the west coast may not lead to greater anchovy landings: most of the fish may be taken already.

All this is good and bad news for penguins. As long as commercial fishing is not permitted on the south coast, the penguins of Dyer Island

would appear to have an abundant food source. There is some evidence that the penguin population on Dyer Island may be exceeding the available nesting space: new small colonies of penguins have appeared on the mainland of the south coast and penguins have resumed nesting on Robben Island after almost three centuries.

For the west coast penguins, the long-term prognosis is not good. The fishery may be taking too many of the available anchovies. Fishing is a major economic force on the west coast of South Africa. Drought and low prices have made west coast agriculture and most mining of marginal economic value. Cutting back on anchovy quotas merely to preserve penguins is not a serious option if it is going to lead to increasing human misery. In the longer term, however, it may make good economic sense.

Elsewhere in the world, tourism plays a major economic role in many local economies. At present, except for spring flowers, the west coast of South Africa has little tourism. The area could become an important world attraction for those interested in nature-tourism. Penguins, other guano birds of the west coast, and marine mammals contribute significantly to the area's natural attractions. To ensure that these animals will still be present in the impressive numbers seen today, a fishing policy that leaves anchovy for penguins and other marine life will be needed.

The west coast fishery has always taken a variety of species, rather than relying on a single species as have such fisheries elsewhere. A redirection of fishing effort away from the anchovy should be possible. If properly handled after being caught, other fish species can be canned, yielding a much higher market price than does anchovy which is made into fish meal. Canned fish is also an important source of protein for the people of southern Africa. Anchovy does not can well: most of it is made into fishmeal, to serve as chicken feed.

If we can coexist with the penguin, we can manage our marine resources to provide both food and foreign exchange through tourism. If we can't coexist, we are likely to have a lot of chicken-feed, but little future economic growth on the west coast, and the loss of a cheap source of protein for an every-growing and every-hungrier inland human population. 🐾