Does cleaning oiled seabirds have conservation value? Insights from the South African experience with African Penguins

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November 2007

ITOPF provided Anton Wolfaardt, a PhD student, with funding from its Thor Heyerdahl Award to attend the 6th International Penguin Conference in Tasmania where he presented some of his key findings on the successful rehabilitation of Jackass Penguins during the TREASURE oil spill in South Africa, 2000. Anton is a former Chief Ranger at Dassen Island Penguin Sanctuary. A short article based on his research is provided below.

Globally, millions of seabirds have been killed by oil pollution. Although oil pollution was recognised as a potential threat to seabirds in the early 20th century, the scientific literature on the subject remained sparse until after World War II. The wreck of the *Torrey Canyon* off the coast of England in 1967 stimulated worldwide interest in the subject of oil pollution and especially the potential impacts on marine resources and their conservation.

Not all seabirds are equally vulnerable to oil pollution. In the northern hemisphere, diving birds such as alcids and pelacaniformes are the primary victims of oil spills because they usually occur in large concentrations, spend much of their time in or under the water, and are often concentrated in busy shipping lanes. For similar reasons, penguins are the most numerous birds affected in the southern hemisphere. Impacts on seabirds also depend on the nature of the oil spill, which may differ in the type of oil spilt, and in relation to currents and weather conditions.

Although there is general consensus among investigators that large numbers of seabirds are killed as a result of oil spills, there is disagreement, mostly in the northern hemisphere, about the extent to which oil mortality is biologically significant to local, regional and global populations.

De-oiling contaminated seabirds has generally been viewed as an animal welfare issue, with little conservation value. Proponents of this view argue that de-oiling has little if any

impact at the population level due to: 1) the low proportion of oiled birds that are caught alive in a condition that allows them to enter the de-oiling process; 2) limited success of the de-oiling and treatment process resulting in poor release rates from the rehabilitation centre; 3) low survival rates of de-oiled birds after their return to the wild; 4) little evidence of meaningful numbers of de-oiled birds surviving to reproduction; and 5) impaired reproductive performance compared with un-oiled birds (for those birds that do breed).

At the time of the *Apollo Sea* oil spill off Cape Town, South Africa in June 1994 little was known about the efficacy and conservation value of de-oiling African Penguins. Some opportunistic monitoring in the 1970s and early 1980s suggested that de-oiling African Penguins could be justified on conservation grounds, but this work was of a short-term nature. Moreover, the interpretation of the results as justifying the conservation value of de-oiling contaminated African Penguins *Spheniscus demersus* was questioned by other researchers. The main concern expressed by these workers was the relatively low proportion of de-oiled birds that had been recorded breeding subsequent to their release.

The sinking of the *Apollo Sea,* a bulk iron-ore carrier near Dassen Island off Cape Town, in June 1994 provided an opportunity to determine the population-level benefits of de-oiling African Penguins. A long-term research and monitoring programme was thus initiated to understand better the impact of oil pollution on African Penguins, and the conservation value of de-oiling contaminated birds. This information was considered vital by the conservation authorities to inform policy and action plans on how to prepare for and respond to future oil spill events. Six years later, another iron-ore carrier, the *MV Treasure*, sank between Robben and Dassen Islands, spilling approximately 1 400 tonnes of oil. From an operational perspective, the authorities were able to implement lessons learnt from the *Apollo Sea* spill. The *Treasure* spill also provided an opportunity to broaden our understanding of the impacts of oil spills on African Penguins, including the population-level benefits of de-oiling contaminated birds.

Since its establishment in 1968, the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB) has treated in excess of 50 000 oiled African Penguins. Although larger numbers of other species, such as the Magellanic Penguin *Spheniscus*

magellanicus, have been oiled, based on the proportion of the global population which has been affected by oil spills, the African Penguin can be considered the bird species most impacted by oil pollution globally. Consequently there is no doubt about the severity of the impacts of oil pollution on the conservation status of African Penguins. Indeed, oil pollution is listed as one of the critical threats faced by the species.

In our study, we defined a **de-oiled** bird as an oil-contaminated bird which has been caught, cleaned and released into the wild from the cleaning centre (SANCCOB). A **rehabilitated** bird is one which is known to have survived in the wild for at least one month after its release, and a **restored** bird is one which has been recorded breeding subsequent to its release from SANCCOB. We have been able to measure these parameters because almost all of the de-oiled penguins were fitted with individually marked flipper bands before their release. Moreover, the long-term nature of our study period (greater than 10 years) has allowed us to quantify and assess these parameters in a rigorous manner.

There were marked differences between the *Apollo Sea* and *Treasure* spills in the number of birds that were successfully de-oiled. Almost 50% of the oiled penguins from the *Apollo Sea* spill died, most within 48 hours of their initial capture. The main reasons for this high mortality rate related to the lack of preparedness by authorities for a spill of this magnitude, and inappropriate transport methods (birds were packed into trucks with little ventilation, and it is thought that many of the birds died of asphyxia). Fortunately, these lessons were quickly heeded, and comprehensive contingency plans were developed, and a special penguin transport box was designed. The implementation of these measures during the *Treasure* spill, which contaminated twice the number of penguins that were oiled in the *Apollo Sea* spill, resulted in a significantly lower mortality rate during the early phases of the rescue operation. This in turn translated into a greater proportion of admitted birds being released from SANCCOB than was the case in the *Apollo Sea* spill.

Our research has shown that almost all penguins which survive the de-oiling process to be released are successfully rehabilitated (i.e. survive in the wild for at least one month). Survival rates of de-oiled penguins are similar to never-oiled birds, in the short, medium and long term. On the basis of these rehabilitation results, it has been estimated that the

present African Penguin population is 19% larger than it would have been had de-oiling not taken place since the establishment of SANCCOB in 1968.

Our study has also demonstrated that about 74% of the de-oiled penguins are successfully restored into the breeding population. This represents the highest restoration figures anywhere in the world. Although the majority of rehabilitated birds were successfully restored, the remainder (26%) appear to have been unable to breed. Non-breeding in this context is permanent and so is distinct from temporary non-breeding or intermittent breeding. We are confident that oiling has inhibited breeding in these birds, but are not certain of the mechanism involved. Oiling has been found to damage key organs such as the liver and kidney, compromise the immune system of affected birds and inhibit and reduce breeding in several other seabirds. This is an area that clearly requires further research.

We also found differences in breeding success between de-oiled and never-oiled birds, which were most severe when feeding conditions were poor. On average the breeding success of de-oiled birds was 11% lower than never-oiled birds. Incubation success (the hatching rate of laid eggs) was similar for both study groups, but there were significant differences in the growth rates of chicks from the two groups and the overall fledging success. We suggest that the reduced growth rates and fledging success of de-oiled birds relative to un-oiled controls relates to a reduced ability of de-oiled adults to meet the energy demands of their chicks, especially when these peak mid-way through the fledging period. It seems likely that the energetic demands placed on the adults during this period precipitate costs of reproduction for de-oiled birds.

Our results from the monitoring of *Treasure* oil spill survivors are consistent with those from the *Apollo Sea* spill. During the *Treasure* oil spill approximately 19 500 un-oiled penguins were evacuated to Cape Recife in the Eastern Cape (c. 800km from their breeding colonies). This was the first time that such an intervention had been implemented for African Penguins. The aim and hope was that the return swim by the penguins to their breeding colonies would provide sufficient time to clean the oil-contaminated waters around these colonies. Satellite tracking of some of these birds showed that this was the case. The first birds started arriving in the vicinity of the colonies a day or two after the final oil slicks had been cleaned. Further monitoring

showed that the un-oiled evacuees returned to their colonies and resumed breeding in greater numbers and more rapidly than the de-oiled birds, highlighting the conservation value of evacuating clean penguins during large oil spill events.

In conclusion, our results show that de-oiling contaminated African Penguins certainly has an impact at the population-level and can be justified on conservation grounds. However, it is also clear that a de-oiled penguin is not as good as new, and we need to re-double our efforts to prevent oil from entering the ocean in the first place.

Acknowledgements

The International Tanker Owners Pollution Federation (ITOPF) provided funds that enabled the author to attend the 6th International Penguin Conference in Hobart, Tasmania, in September 2007 to present some of the key findings of this work.