

## **Review of the report by Kessels and Associates on the likely effects on avifauna by leaving the Rena hulk on Astrolabe Reef**

**Graeme Taylor**

### **Executive summary**

The avifauna technical report has identified all the potential major risks to seabirds from leaving the Rena hulk and debris field at Astrolabe Reef. I agree with Kessels and Associates that most of the identified risks such as residual oil, anti-fouling agents and toxic cargo pose no serious long-term impacts for seabirds. I consider the science behind this review is sound. The consent applicants intend to remove all remaining containers with plastic beads from the Rena site. Plastic debris in the marine environment has proved fatal to many seabird species, especially when ingested and fed to chicks. High concentrations of plastic can accumulate in the stomach causing dehydration and starvation. Plastic beads pose a potentially significant impact to seabirds in the Bay of Plenty region due to the known significant volume (multiple tonnes) already discharged or lost at sea since October 2011. There is no clear monitoring strategy proposed in the avifauna document or the main report (Volume 1) to assess the ongoing potential impacts of plastic beads from the Rena on regional seabirds. I recommend that a scientific programme be put in place to collect and autopsy dead seabirds found on Bay of Plenty beaches over the next 10 years to assess the nature and extent of plastic beads found in the stomachs of seabirds (numbers of plastic beads found, occurrence by species, changes over time). This information can be used to inform conservation managers of the potential for plastic bead ingestion to affect breeding populations of seabirds in the Bay of Plenty.

### **Assessment**

The same issues I raised in the attached document are still relevant (see appendix 1, for original review). In my opinion there is only one significant risk factor remaining for seabirds from the Rena salvage operation and consent application to leave the Rena wreck and debris field in place on Astrolabe Reef. That is the issue over the ongoing release of plastic beads both from those already present into the wider environment after shipping containers spilled and what remains trapped at the Rena site. Although the applicants are still planning to remove the remaining plastic beads present in one large 40 ft container trapped under structural debris, previous attempts to remove these shipping containers has resulted in large scale (multiple tonnes) of plastic beads entering the environment. In addition there are still plastic beads unaccounted for in missing shipping containers and large numbers have washed up on Bay of Plenty beaches and remain trapped under sand layers. Plastic beads are highly mobile as they float and are likely to be shifted repeatedly when disturbed by storm action. Clear plastic beads present a serious hazard to seabirds that specialize on feeding on tiny plankton and salps (small clear jellyfish like organisms that are abundant in spring and summer months). The at risk groups are storm petrels (including the endangered NZ storm petrel that breeds on Little Barrier Island but has been observed in the Bay of Plenty), fairy prions, and shearwaters (especially Buller's shearwaters, little shearwater and fluttering shearwater). Red-billed gulls also

feed on plankton and krill when using marine ecosystems . Other seabird species may also take plastic beads occasionally but the risk is much lower.

In the draft report Kessels and Associates recommended that seabirds found dead on Bay of Plenty beaches (associated with any plastic bead spillage events) should be handed over to the Department of Conservation. This response is woefully inadequate. What is needed is a sustained scientific programme running throughout the resource consent period for monitoring the potential impact of plastic beads already in the Bay of Plenty environment to see if the bead problem is significant or declining. I suggested in my previous expert review that a sample of seabirds found dead on Bay of Plenty beaches (up to an agreed number per year) be sent to the seabird autopsy programme already being run by the Conservations Services Programme under DOC contract. The aim would be to assess presence and numbers of plastic beads in each seabird species. This would allow us to have a quantitative assessment of whether or not the tonnes of plastic beads known to have entered the Bay of Plenty marine ecosystem are likely to be having an ongoing effect on seabird populations in the region. One option would be to fund a group such as the Ornithological Society of New Zealand to collect the targeted seabirds monthly from the local beaches and to send these to either the national seabird autopsy programme or seabird experts at a museum, for confirmation of seabird identification, analysis of stomach contents and reporting.

Plastic ingestion by albatrosses in the North Pacific Ocean is known to result in the deaths of thousands of albatross chicks each year. This indicates that plastic in the oceans can have serious consequences to seabird populations. The impact of plastic beads on seabirds is more poorly understood as they are normally ingested by small burrowing seabirds who feed the plastic beads along with other food to their chicks. Any serious impact on chick growth rates or higher than expected chick mortality would not be easy to observe inside underground burrows. The Kessels report (Appendix 5) does refer to a white-faced storm petrel found on the Chatham Islands that had its entire stomach contents full of plastic beads. Monitoring breeding success at colonies is probably not necessary in view of the lack of documented evidence that plastic beads cause chick mortality but examining plastic bead levels in adult seabirds found dead on beaches is a useful means of assessing ongoing presence and potential impacts from the Rena disaster on seabirds.

Other than this issue I accept the findings in the Kessels and Associates Avifauna report that any residual oil, anti-fouling agents and other metals and chemicals still present in the debris field or trapped in the hulk pose no serious ongoing threat to seabirds. Nor can I see any evidence from the Ecology and Fisheries report that any serious food chain consequences are likely. Note that seabirds are able to metabolise heavy metals and store these in the feather tracts which are replaced annually in the moult. Small loadings of heavy metals and other toxins are therefore able to be shed annually. Dilution of chemical compounds and drift of contaminants in currents should minimize the risks to seabirds from any bioaccumulation issues that might occur in the marine food chain associated with the Rena wreck site.

## **Appendix 1: Original expert review – DOC Graeme Taylor**

### **Review of the report by Kessels and Associates on the likely effects on avifauna by leaving the Rena hulk on Astrolabe Reef**

#### **Executive Summary**

The report has identified the major risks to seabirds still occurring from the Rena hulk. This includes: residual oil, plastic beads, anti-fouling agents and any remaining toxic cargo.

I agree with the authors that the overall risk to seabirds from leaving the Rena in situ is not likely to provide any serious long-term threat to seabirds in this region.

There are a few omissions or errors in the report relating to information on regional seabird colonies, the size of some shorebird roosts and affected seabirds. Some changes to the monitoring programme for beach wrecked seabirds outlined in the report is recommended.

#### **Assessment**

The report identifies a series of likely risk factors that might have effects on seabirds. These include the release of residue oil, plastic beads, anti-fouling agents from paint on the hulk and any toxic cargo still present in the spilled cargo such as acids and metals.

I agree with the authors that the risk of release of any residual oil will be the same whether the Rena is left in situ or raised in salvage. The quantity remaining is considered small and poses limited risks to seabirds compared with the original oil spill.

The information provided about antifoulant paint (TBT compounds) indicates a very slight risk to the adjacent marine environment by gradual release of these compounds. There is unlikely to be any significant effect on local seabirds at the rate of likely release.

The release of plastic beads was earmarked in an earlier version of this report as one issue of concern to seabird biologists. These tiny beads float freely and are ingested by a number of small plankton and krill feeding seabirds. The report identified just one container still known to hold plastic beads and that these will be removed as part of the resource consent process. The release of any beads trapped amongst other ship debris will be the same risk whether the boat gradually corrodes or is salvaged. Therefore I don't see any major risk to seabirds from Rena plastic beads provided the last bead container clearance proceeds as planned.

The remaining materials either trapped within the hulk or present on the adjacent seabed are not known to be a major hazard to seabirds.

Therefore I agree with the authors that the overall risk to seabirds from leaving the Rena in situ is not likely to provide any serious long-term threat to seabirds in this region.

I do have a few criticisms of the report. The Bay of Plenty area is a significant breeding site for a number of seabird species, especially the Mercury and Ohinau Islands, Aldermen Islands, Karewa Island, Motuotau Island, Plate Island, Moutohora Island and White Island. A figure/map similar to the shorebird map pointing out the locations of these regional seabird colonies would have been useful. The Aldermen Islands and Moutohora Island hold more than half of the New Zealand population of grey-faced petrels. Similarly more than half of the New Zealand flesh-footed shearwater population nests on the Mercury, Ohinau and Karewa Islands. The diving petrel colony on Aldermen Islands is regionally significant in the upper North Island. White Island holds one of the five largest gannet colonies in New Zealand. Under section 2.1.1 it would have been useful to mention a few of these significant seabird colonies in the Bay of Plenty region by name. The shorebirds section mentions a number of sites but there is no similar treatment in the seabird section.

In section 2.1.2 it refers to the shorebird sites in Tauranga Harbour holding hundreds of birds at these roost sites. In fact these roosts normally hold thousands of migratory waders, especially bar-tailed godwit. Also Matakana Island has one of the largest breeding populations of the threatened New Zealand dotterel.

Under 2.2 there is a list of affected seabirds. Black petrel should also be present on this list. This threatened species breeds on Great Barrier Island and regularly forages in the Bay of Plenty region.

In the monitoring section 4.2 there is a statement about beach-wrecked seabirds that needs some further comment. It states that any beach-wrecked seabirds found associated with debris on the shoreline will be passed to Department of Conservation for further investigation. A more useful proposal would be to sample freshly dead seabirds found on beaches in the central Bay of Plenty region for any evidence of plastic contaminants and retain tissue samples for evidence of build-up of toxic chemical compounds. The sampling programme could include specific at risk species (fairy prion, diving petrel, storm petrels, local breeding shearwaters – fluttering, flesh-footed and Buller's) up to a set number of birds per species per year. The Conservation Services Programme run by DOC for assessing fisheries impacts on seabirds already has a formal autopsy programme set up for seabirds. It would be relatively straightforward to send batches of seabird corpses to the contractor doing this programme for an agreed autopsy price per bird. They could assess stomach and gut contents for evidence of plastic material and retain biological samples for residual chemical analysis at a later date. Such a programme would allow information about how prevalent plastic debris is in seabirds in the Bay of Plenty and whether plastic beads known from the Rena spill are increasing or decreasing in birds over time. It would be a more scientific appraisal of Rena impacts compared to sampling a few random seabirds found associated with presence of debris on beaches as suggested by the authors.

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