

PROPOSAL TO EXPLORE FOR NATURAL GAS IN NURSERY AREAS OF THE SOUTHERN RIGHT WHALE OFF SOUTH AFRICA

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Abstract

A recent proposal to explore for natural gas on the southern coast of South Africa is reviewed in the context of the intended prospect districts that coincide with major nursery areas for the recovering population of southern right whales.

Introduction

In May 2010 a “Background Information Document” (BID) and general invitation to participate in an “environmental management programme for exploration of natural gas in various areas in the Western Cape” was circulated by the consultants, Golder Associates Africa, on behalf of Advasol (Pty) Ltd. Drilling operations, using rotary core drill rigs capable of penetrating to depths of up to 2000 metres, are scheduled for the end of 2010 and a borehole will take from 4-6 months to complete. Neither the numbers of boreholes to be drilled nor the exact locations of proposed boreholes are specified in the BID. Although no descriptions of the drilling rigs are provided, the BID states that rigs to be used are “routinely used in the petroleum exploration environment”. Of the eight districts for which exploration rights were sought, three (Offshore West, Offshore De Hoop and Offshore East) include waters within 5-15 km of the coast (Fig. 1). As will be shown below, this stretch of coast includes the most important nursery areas for southern right whales in South Africa.

Right whale distribution

Aerial surveys of the south coast of South Africa for right whales have been flown annually since 1971, firstly by fixed-wing (until 1987) and (from 1979) by helicopter. The extent of these surveys differed, with fixed-wing surveys extending from Muizenberg (18° 30'E) in the west to Woody Cape (26° 30'E) in the east and helicopter surveys from Muizenberg to Nature's Valley (24° E). Methodology used in the surveys has been described previously but all fixed-wing surveys were flown in late September/early October and helicopter surveys in mid-October. Groups containing calves were classified as cow-calf pairs or cow-calf pair plus adult(s), while all other groups were recorded as unaccompanied adults.

In the fixed-wing surveys of 1971-87 the stretch of coast under consideration in the application contained 76.3% of all the groups containing calves seen between Muizenberg and Woody Cape, while in the helicopter surveys of 1988-2004 the region contained 74.8% of all cow-calf groups encountered between Muizenberg and Nature's Valley (cf 79.5% in the fixed-wing surveys of 1971-1987). This indicates the overall importance of the three proposed concession areas. As an indication of the numbers of animals involved, during the most recent survey (October 2009) a total of 386 right whales was recorded in the region, including 162 cow-calf pairs. Their distribution is shown in Fig. 2.

Right whale seasonality and coastal residence time

Shore-based observations at De Hoop Nature Reserve between September 1984 and January 1993 revealed that the first right whales arrived in June and reached peak numbers in September, with the

last animals being seen in December (Best and Scott, 1993). Cow-calf pairs were among the last to leave. Right whales are therefore present in the coastal waters of the region for 7 months of the year.

Monthly aerial photographic surveys off De Hoop in 1988 and 1989 showed that individual cow-calf pairs were re-sighted over periods of 12 to 105 days, with an average of 59 days (Best 2000). These are approximations in that the exact arrival and departure dates are unknown and/or interpolated, but they are of the same order as residence times described for right whales off Australia.

Right whale coastal movements

Coastal movement patterns were determined for four right whales with calves to which satellite tags were attached in St Sebastian Bay (extreme westward end of Offshore East) in September 2001. One was still in St Sebastian Bay 25 days after tagging while a second had moved to off De Hoop 27 days after tagging, with both transmitters failing thereafter. The other two rounded Cape Agulhas (just to the west of Offshore West) 23 and 43 days after tagging, and moved into the Walker Bay area (Mate et al., in press). These tracks demonstrate a general tendency to shift to the west during the season, despite pauses of several days in some favoured areas, and indicate the interconnectedness of nursery areas on the south coast of South Africa.

Discussion

It is clear that the 250 km section of the South African coast for which concessions for gas exploration are being sought includes areas of major importance to the South African right whale population. About $\frac{3}{4}$ of the cow-calf pairs on the coast in spring can be found in this region, some of which are resident for up to 3 months, while the westward coastal movement means that an even larger proportion of the population almost certainly uses the region.

Although details of the proposed activities that have been revealed to date are minimal, and completely lacking so far as any longer term extraction or production process is concerned, we have concerns that the exploration could prove detrimental to the long-term health of this right whale population which is still recovering from the effects of over-exploitation by the whaling industry. These concerns centre on the drilling operations proposed for the exploration and include:

a) Acoustic avoidance of the drilling platforms and associated infrastructure.

Drilling can generally be carried out from semi-submersibles, drill-ships, or other platforms, with the hull area of drill-ships resulting in higher transmission of noise levels to the underwater environment than from semi-submersible vessels. Avoidance of drilling operations by cetaceans has been noted elsewhere in the world. For example, Schick and Urban (2000) found avoidance of operating drilling platforms by migrating bowhead whales (*Balaena mysticetus*) in the Alaskan Beaufort Sea. Although these authors made no measurements of noise produced by drilling, they note that drilling activities resulted in habitat loss for the species. Richardson *et al.* (1985) report that some bowhead whales showed avoidance of drill ship noise in playback experiments, although they noted that differential response may arise through habituation. Furthermore, Richardson *et al.* (1995) noted responses of bowhead whales to drilling noise at distances of up to 20 km with migrating bowheads showing greater response than summering animals. Migrating gray whales have been shown to respond to simulated drilling noise (though in most cases avoidance was limited), and Jones *et al.* (1994, in Richardson *et al.*, 1995) suggested drilling noise playbacks resulted in low abundance of gray whales in breeding lagoons in Mexico.

Furthermore, localised disturbance of fauna could result from increased helicopter and vessel support operations in the vicinity of drilling platforms. Disturbance of cetaceans by helicopters could depend on the distance and altitude of the aircraft from the animals (particularly the angle of incidence of helicopter noise to the water surface) and the prevailing sea conditions.

b) The disposal of drilling wastes (drilling muds and drill cuttings)

Both the acute and chronic toxicity of drilling muds is highly dependent on their chemical constituents. The composition of drilling muds is highly variable between sites and dependent on the local drilling requirements. Although the disposal of drilling wastes has the potential to impact the marine environment through the release of chemical drilling additives into the marine environment (water column and seafloor), the direct impacts of such disposal on cetaceans are likely to be minimal. The potential for the development of turbid plumes in surface and mid-water column remains unknown, and is likely to be dependent on the size fraction of the released material and the prevailing sea conditions. Associated with the release of cutting and fines is a possible re-suspension of nutrients and particulate organic matter into the marine environment, leading to both local organic enrichment and consequent oxygen depletion through decomposition. Such turbid plumes may result in direct avoidance by right whales.

c) Light pollution

The impacts of light pollution on right whale distribution remains largely unknown, although may well be overridden by noise related effects.

Although the actual impacts of the proposed exploration activities on the South African population of southern right whales are impossible to predict given the limited information provide by the project proponents, the overlap of the extreme nearshore exploration environment with the distribution of right whale breeding habitat is of major concern. It is strongly recommended that mitigation of operations be instituted through seasonal restrictions of drilling operations during the exploration phase to outside of the annual right whale “season” of June to December. However, the longer-term production activities that could arise from exploration remain a major concern.

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