A leatherback turtle stranding at Danger Point, Gansbaai, South Africa

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A dead, mature male leatherback turtle was sighted at Danger Point, Gansbaai on South Africa's south-west coast. Leatherback turtle sightings are rare along this coastline although the site lies between two areas of known aggregation; a tropical breeding area to the east and the highly productive Benguela upwelling ecosystem foraging area to the west.

Key words: *Dermochelys coriacea*, rare sighting, photogrammetry, Agulhas leakage.

Leatherback turtles *Dermochelys coriacea* have a vast range, occurring from sub-polar to tropical waters (Goff & Lien 1988; Paladino *et al.* 1990; Hayes *et al.* 2004; Block *et al.* 2011). Within this range they are rare and consequently classified as critically endangered (Spotila *et al.* 2000). The species exhibits gigantothermy which allows them to maintain elevated body temperatures in cold waters and avoid overheating in warm waters (Paladino *et al.* 1990; Wallace *et al.* 2005). It is thought that this ability allows them to exploit niches outside the range of other turtles which lack similar thermoregulatory adaptations (Block *et al.* 1993; James *et al.* 2006). Within southern Africa, leatherback turtles are most commonly found in two areas; the rich feeding grounds of the Benguela upwelling ecosystem on the west coast (Lambardi *et al.* 2008; Elwen & Leeney 2011) and the coastlines of Mozambique and KwaZulu-Natal, South Africa, where nesting sites are well documented (Hughes 1996; Hughes *et al.* 1998). On the southwest Cape coastline, sightings are infrequent and to date only hatchlings have been recorded when currents bring them from the east on the Agulhas Current (Two Oceans Aquarium, unpubl. data).

The leatherback turtle was sighted on 15 December 2011 at 12:15 at the cliffs of Danger Point 34°37.934′S; 19°17.995′E) (Fig. 1). At the time of discovery, sea conditions were considered rough with winds exceeding 30 knots from the west and swell in excess of four metres; these

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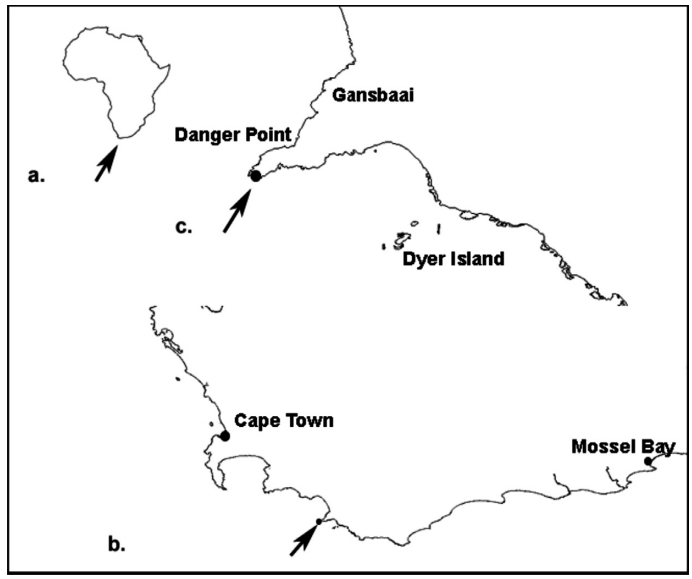

Fig. 1. Location of stranding at Danger Point, Western Cape, South Africa (34°37.934′S 19°37.934′E), (**a**) in relation to the continent of Africa, (**b**) in relation to the Western Cape and Cape Town, and (**c**) in relation to the adjacent town of Gansbaai and nearby Dyer Island. The turtle was found at the base of the cliffs of Danger Point near the low water mark.

Fig. 2. Basic photogammetry used for measuring length of the leatherback turtle (no tape measure was on site); x = length of carapace to be determined in cm, p1 = pixel length of carapace (667.5), y = length of lower leg from patella to ankle (42.5 cm), p2 = pixel of lower leg (228.5).

conditions had been consistent for the past 24 hours. The turtle was lying between rocks not far from the spring tide low water mark. Photographs and video footage were taken and the carcass examined for obvious injuries before it was inundated by the incoming tide. The specimen was identified as a mature male leatherback turtle by its size, the presence of keels rather than scutes on the carapace and the presence of a proportionally long tail (Spotila 2004; James *et al.* 2007). The only obvious wound other than skin lesions, most probably caused by the rocky coast, appeared in the head with the skull opened near the pineal gland window. Carapace length was estimated using basic photogrammetry (Deakos 2010) as we had a brief examination window and lacked a tape measure. Photographs were taken of M.A.W.'s leg at right angles, in the same plane as the turtle and the same distance from the camera. The known length of M.A.W.'s lower leg (Fig. 2) from patella to ankle was applied to the picture using the measuring tool in Photoshop®. The carapace length was then estimated using the measuring tool and the equation; $x = (y/p2)p1$ (where x = length of carapace in cm, y = length of lower leg in cm, $p1$ = length of carapace in pixels and $p2$ = length of leg in pixels). This gave a size estimate of 124.15 cm for the carapace (straight length). Avens *et al.* (2009) found most leatherback turtles of this size were mature, which is further supporting evidence that this was a mature male leatherback. No further observations could be made as the tide reached the specimen within 5 min of examination and the location did not allow for removal.

The migration patterns of male leatherback turtles are difficult to quantify because after hatching the turtles spend the rest of their lives at sea (Lombardi *et al.* 2008). It is possible that the turtle came from the Agulhas current to the east of the stranding following previously documented migration routes, which follow eddies of warm water breaking from the Agulhas known as the 'Agulhas Rings' (Fig. 3; Hughes *et al.* 1998; Sale *et al.* 2006; Lombardi *et al.* 2008). 'Agulhas leakage', which is caused by an increase in the flow of the Agulhas current and results in higher coastal sea-surface temperatures to the west of Cape Agulhas, has increased in previous years (Biastoch *et al.* 2009). Leatherback turtles have tolerance for cold water (James *et al.* 2006) although it is thought that changes in water currents and temperatures as a result of global warming will increase the range of the species (McMahon & Hayes 2006). Documenting sightings of rare and endangered animals

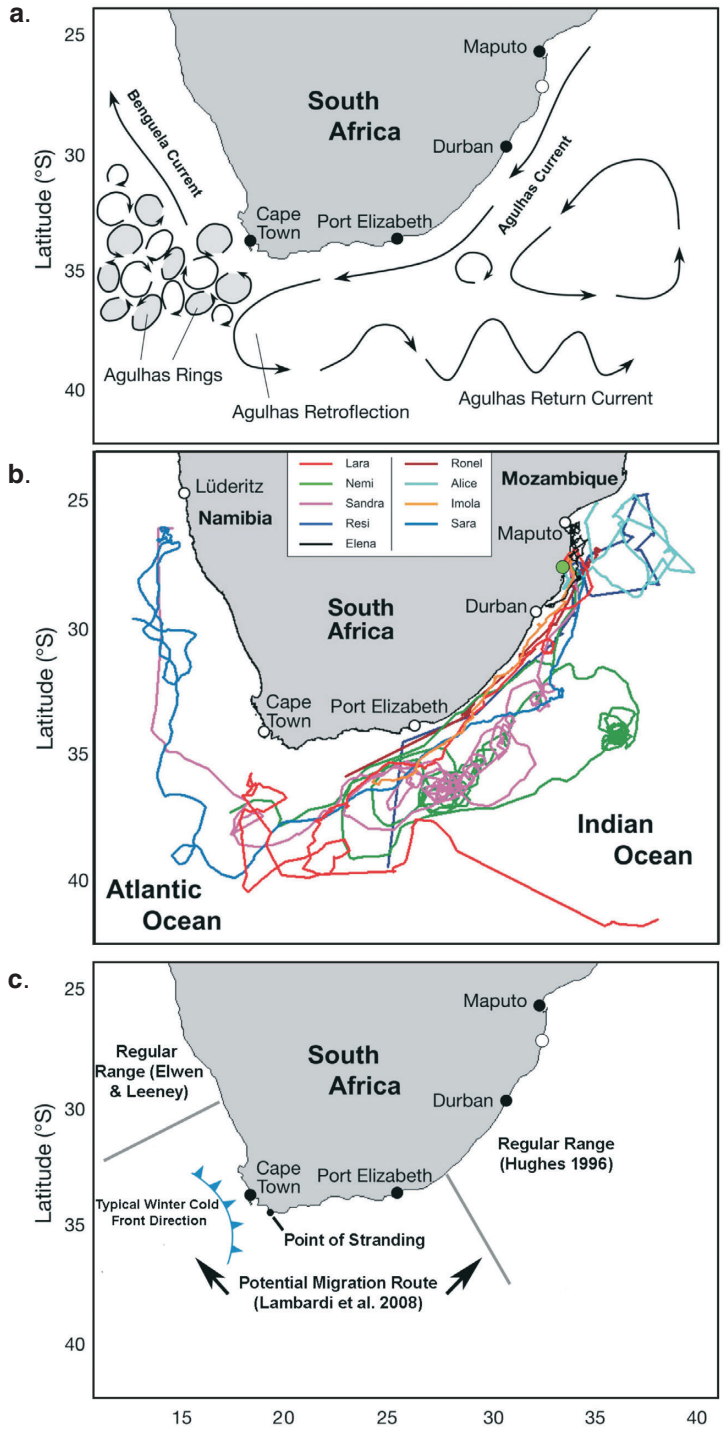

Fig. 3. **a**, Regular flow of the Agulhas and Benguela currents along the southern coastline of Africa (Lambardi *et al.* 2008). **b**, Previously documented migration routes of leatherback turtles from KwaZulu-Natal (KZN) to southern Namibia (Lambardi *et al.* 2008). **c**, Potential route taken by leatherback turtle from KZN to Benguela (or *vice versa*) showing point of stranding and typical route of a Southern Ocean cold front approaching the Western Cape.

like leatherback turtles are valuable because they can be indicators to global change and range expansion that can inform conservation practice, e.g. setting of protected areas (McMahon & Hayes 2006). Given that Agulhas leakage is expected to continue to increase (Biastoch *et al*. 2009) the potential to sight more leatherback turtles in the area may increase and some form of protection may be needed to ensure safe passage of this endangered species in these high-use waters.

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REFERENCES

AVENS, L. TAYLOR, J.C., GOSHEL, L.R., JONES, T.T. & HASTINGS, M. 2009. Use of skeletochronological analysis to estimate the age of leatherback sea turtles *Dermochelys coriacea* in the western North Atlantic. *Endang. Species Res.* 8: 165–177.

BIASTOCH, A., BÖNING C.W., SCHWARTZKOPF, F.U. & LUTJEJARMS, J.R.E. 2009. Increase in Agulhas leakage due to poleward shift of Southern Hemisphere westerlies *Nature* 462: 495–498.

BLOCK, B.A., FINNERTY, J.R., STEWART, A.F.R. & KIDD, J. 1993. Evolution of endothermy in fish: mapping physiological traits on a molecular phylogeny. *Science* 260: 210–213.

BLOCK, B.A. JONSEN, I.D., JORGENSEN, S.J., WINSHIP, A.J., SHAFFER, S.A., BOGRAD, S.J.,. HAZEN, E.L, FOLEY, D.G., BREED, G.A., HARRISON, A-L., GANONG, J.E., SWITHENBANK, A., CASTLETON, M., DEWAR, H., MATE, B.R., SHILLINGER, G.L., SCHAEFER, K.M., BENSON, S.R., WEISE, M.J., HENRY, R.W. & COSTA, D.P. 2011. Tracking apex marine predators in a dynamic ocean. *Nature* 475: 86–19.

DEAKOS, M.H. 2010. Paired-laser photogrammetry as a simple and accurate system for measuring the body size of free-ranging manta rays *Manta alfredi. Aquat. Biol.*10: 1–10.

ELWEN, S. & LEENEY, R. 2011. Interactions between leatherback turtles and killer whales in Namibian waters, including possible predation. *S. Afr. J. Wild. Res.* 41: 205–209.

GOFF, G.P. & LIEN, J. 1988. Atlantic leatherback turtles, *Dermochelys coriacea*, in cold water off Newfoundland and Labrador. *Can. Field Nat.* 102: 1–5.

HAYS, G.C., HOUGHTON, J.D.R. & MYERS, A.E. 2004. Pan-Atlantic leatherback turtle movements. *Nature* 429: 522.

HUGHES, G.R. 1996. Nesting of the leatherback turtle in Tongaland, KwaZulu-Natal, South Africa, 1963–1995. *Chelonian Conserv. Biol.* 2: 153–158.

HUGHES, G.R., LUSCHI, P., MENCACCI, R. & PAPI, F. 1998. The 7000 km oceanic journey of a leatherback turtle tracked by satellite. *J. Exp. Mar. Biol. Ecol.* 229: 209–217.

JAMES, M.C., DAVENPORT, J. & HAYS, G.C. 2006. Expanded thermal niche for a diving vertebrate: a leatherback turtle diving into near-freezing water. *J. Exp. Mar. Biol. Ecol.* 335: 221–226.

JAMES, M.C., SHERRILL-MIX, S.A. & MYERS, R.A. 2007. Population characteristics and seasonal migrations of leatherback sea turtles at high latitudes. *Mar. Ecol. Prog. Ser.* 337: 245–254.

LAMBARDI, P., LUTJEHARMS, J.R.E., MENCACCI, R., HAYS, G.C. & LUSCHI, P. 2008. Influence of ocean currents on long-distance movement of leatherback sea turtles in the Southwest Indian Ocean. *Mar. Ecol. Prog. Ser.* 353: 289–301.

McMAHON, C.R. & HAYES, G.C. 2006. Thermal niche, large-scale movements and implications of climate change for a critically endangered marine vertebrate. *Glob. Change Biol.* 12: 1330–1338.

PALADINO, F.V., O'CONNOR, M.P. & SPOTILA, J.R. 1990. Metabolism of leatherback turtles, gigantothermy, and thermoregulation of dinosaurs. *Nature* 344: 858–860.

SALE, A., LUSCHI, P., MENCACCI, R., LAMBARDI, P., HUGHES, G.R., HAYS, G.C., BENVENUTI, S. & PAPI, F. 2006. Long-term monitoring of leatherback turtle diving behaviour during oceanic movements. *J. Exp. Mar. Biol. Ecol.* 328: 197–210

SPOTILA, J.R., REINA, R.D., STEYERMARK, A.C., PLOTKIN, P.T. & PALADINO, F.V. 2000. Pacific leatherback turtles face extinction. *Nature* 405: 529–530.

SPOTILA, J.R. 2004. Sea Turtles: a complete guide to their biology, behavior, and conservation. Johns Hopkins University Press, Baltimore.

WALLACE, B.P., WILLIAMS, C.L., PALADINO, F.V., MORREALES, S.J., LINDSTROM, R.T. & SPOTILA, J.R. 2005. Bioenergetics and diving activity of internesting leatherback turtles *Dermochelys coriacea* at Parque Nacional Marino Las Baulas, Costa Rica. *J. Exp. Biol.* 208: 3873–3884

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