

Photographic Reidentification of a Bowhead Whale in Davis Strait

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ABSTRACT. An adult bowhead whale photographed at Isabella Bay, Baffin Island, on 28 September 1986 was reidentified from a photograph taken off West Greenland on 10 April 1990. The "recapture" distance was about 460 km across Davis Strait. The recapture is consistent with historical knowledge of the seasonal distribution of bowhead whales and is supportive of the hypothesis that bowheads circulate within the Baffin Bay - Davis Strait area as part of a discrete stock.

Key words: *Balaena mysticetus*, seasonal distribution, stock discreteness, Baffin Bay - Davis Strait, photographic identification

RÉSUMÉ. Grâce à un cliché pris le 10 avril 1990 au large de la côte occidentale du Groenland, on a identifié à nouveau une baleine franche adulte qui avait déjà été photographiée le 28 septembre 1986 dans la baie Isabella (île de Baffin). L'endroit où elle a été à nouveau « capturée » se situait de l'autre côté du détroit de Davis et était distant d'environ 460 km du site du premier cliché. Cette recapture corrobore la documentation historique de la répartition saisonnière des baleines franches et vient étayer l'hypothèse du déplacement des baleines franches dans la zone baie de Baffin-détroit de Davis, en tant que groupe distinct.

Mots clés: *Balaena mysticetus*, répartition saisonnière, différenciation du groupe, baie de Baffin-détroit de Davis, identification par cliché

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The bowhead whales (*Balaena mysticetus*) inhabiting the eastern Canadian Arctic are an endangered species estimated to number in the low hundreds (Davis and Koski, 1980; Finley, 1990). The former centre of abundance of this population was in Baffin Bay and it has been designated tentatively as the Davis Strait stock, based on its known wintering grounds off West Greenland. Much of our understanding of the distribution and migrations of this stock is derived from historical records of the 19th century British whaling industry (Reeves *et al.*, 1983; Ross, 1985; Finley, 1990). This understanding is biased by the fact that whalers' encounters with bowheads were restricted during some seasons by the limited navigability of sailing ships in pack ice. Nonetheless, recent observations of bowhead distribution and movements in Baffin Bay and Davis Strait are generally consistent with the whaling records (Davis and Koski, 1980; Finley, 1990). In general, bowheads undertake a counterclockwise migration in Baffin Bay, moving northward from wintering grounds along the edge of the pack ice off West Greenland and returning southward in autumn along the northeast coast of Baffin Island.

The designation of the Davis Strait bowheads as a discrete stock is tentative, based on inferences about the timing and positions of commercial catches and on geographical features such as land masses and ice distribution (Reeves *et al.*, 1983; Moore and Reeves, in press). However, it is uncertain whether there is (or was) any interchange with the Hudson Bay "stock" of bowheads since the winter range of the two putative stocks may be contiguous off southeastern Baffin Island (Moore and Reeves, in press). Presently, some Hudson Bay whales appear to winter as far east as eastern Hudson Strait (Finley *et al.*, 1982), although most late winter sightings have been made in western Hudson Strait (McLaren and Davis, 1981, 1983). Bowheads still occur in late winter (March-April) near the edge of the pack ice in Davis Strait off West Greenland (McLaren and Davis, 1981, 1983; Born and Heide-Jørgenson, 1983). An effective mark-recapture technique is needed to address the problem of stock definition.

Photographic identification has been widely used in recent years as an effective mark-recapture technique in population studies of large whales. The use of aerial photography to "capture" images of whales has proven to be a useful tool for bowhead research in the western North American Arctic (Davis *et al.*, 1983; Cabbage and Calambokidis, 1984). Aerial photography has also been used to study a late summer concentration of bowheads at Isabella Bay, Baffin Island (Finley, 1990). Aerial photographs taken in 1986 and 1987 were used to identify individual whales, and reidentification of some animals between years indicated a fairly high degree of site fidelity. Additionally, whale lengths were measured from photographs and demonstrated that the population was segregated by size.

On 10 April 1990, during aerial surveys for white whales (*Delphinapterus leucas*) off West Greenland, a bowhead was observed and photographed among pack ice at 68°30'N, 54°10'W (Fig. 1). The bowhead was photographed with a medium-format camera (Leica R4) from a fixed-wing aircraft (Partenavia Observer) flown at an altitude of about 180 m. The image (Fig. 2) was compared with the collection of 91 good-quality images of bowheads taken at Isabella Bay (69°30'N, 67°00'W). The image conclusively matches that of a whale photographed twice on 28 September 1986 (Fig. 2). This whale, estimated to be 17 m long, has a distinctive configuration of scars on its back, along with typical patterns of white on its chin and tail stock. Even the smallest scars have remained unchanged over the 43-month interval between photographs, indicating the slow rate at which scars are acquired and their indelibility as a recapture mark. The recapture distance was about 460 km, a relatively short distance across Davis Strait. Undoubtedly this whale travelled more widely during the intervening years, but the fact that it crossed Davis Strait between a known late-summer (maximum open water) concentration area and a known late-winter (maximum ice cover) area is supportive of the hypothesis that bowheads circulate within the Baffin Bay-Davis Strait area as part of a discrete stock.

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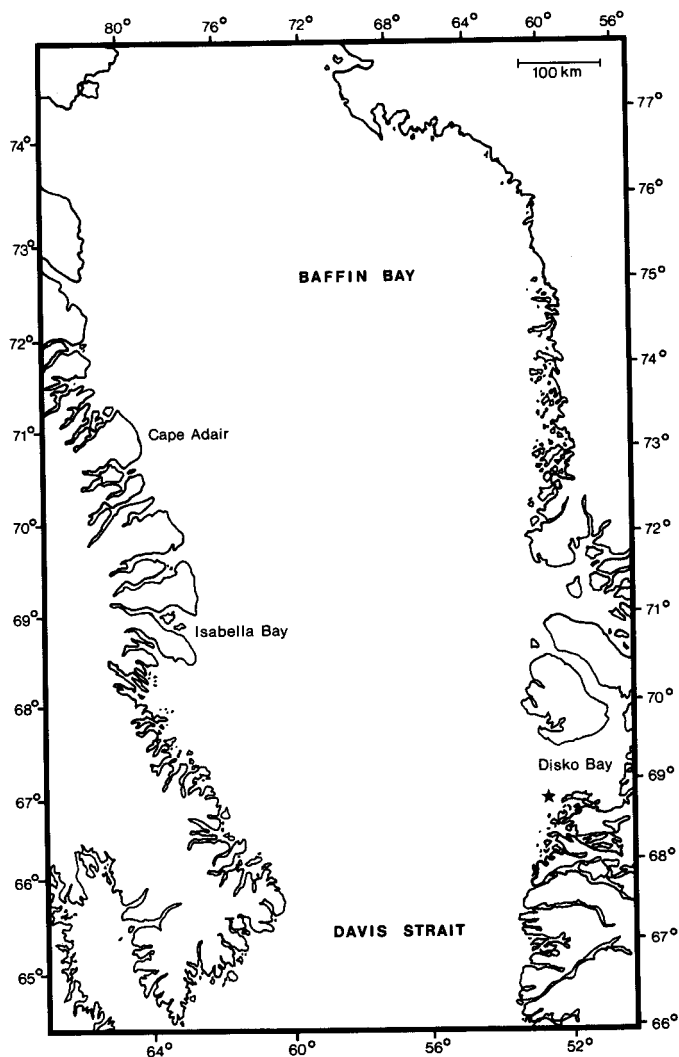


FIG. 1. The Baffin Bay region showing situation of Isabella Bay and position (star) of reidentified bowhead in Disko Bay.

Seasonal migrations of the bowhead in Baffin Bay often appear to be segregated by different age and reproductive components of the population (Reeves *et al.*, 1983; Finley, 1990). At Isabella Bay, our subject was part of a segregated component of the population consisting primarily of large adults, possibly mostly males (Finley, 1990). The whale was without a calf on both occasions that it was photographed. Reeves *et al.* (1983) found no evidence from the whaling literature of sexual segregation of bowheads off West Greenland in early spring but noted that small whales were rarely encountered there. We may speculate that our subject was a male and that when it was photographed in West Greenland it was on its breeding grounds, since the breeding season of the bowhead is believed to occur in late winter-early spring (Eschricht and Reinhardt, 1866; Nerini *et al.*, 1984).

Because of its rarity and its huge range, the eastern arctic bowhead has usually been considered too sparsely distributed to warrant dedicated field studies. Our recapture suggests that the Davis Strait stock is a small population that can effectively be sampled at a few locations where a significant portion of the population predictably congregates (e.g., Isabella Bay and Disko Bay) or passes by (Cape Adair, Baffin Island). On a long-term basis, reidentifications can provide a population estimate through mark-recapture techniques,

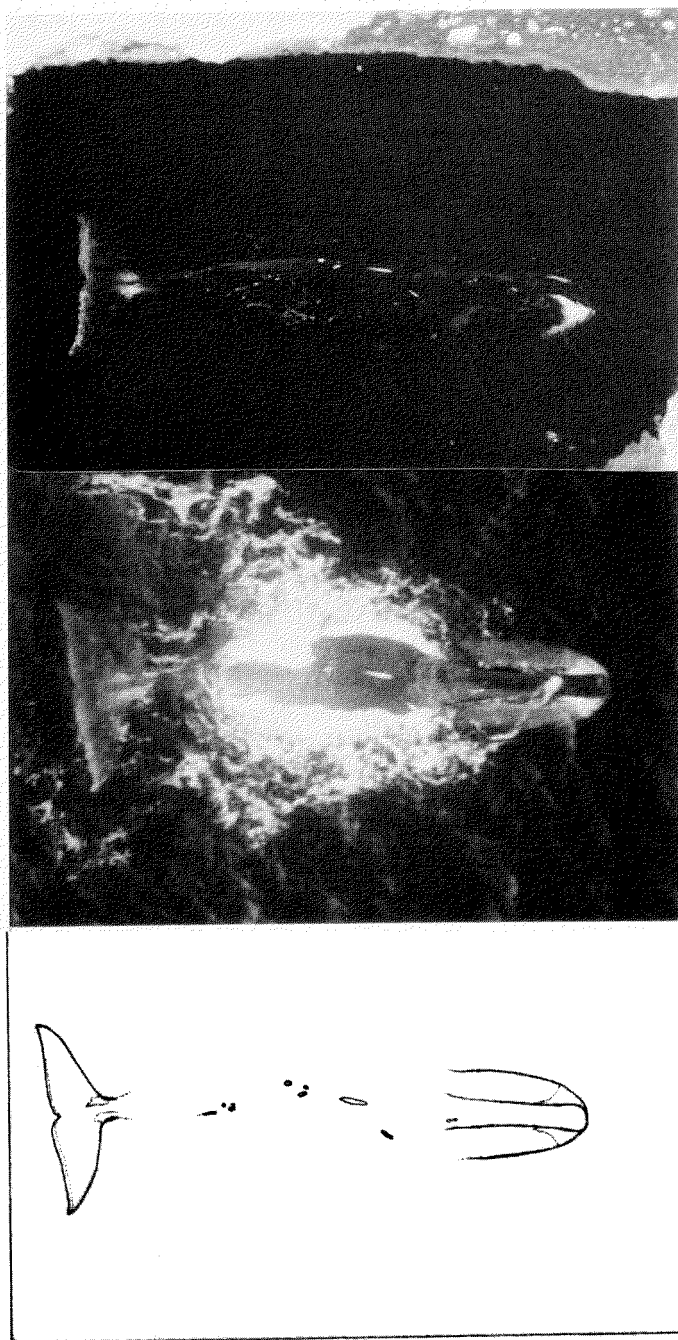


FIG. 2. Photographs of a bowhead whale taken at Disko Bay on 10 April 1990 (top) and at Isabella Bay on 28 September 1986 (middle). The 1990 photograph shows the whale from a slightly oblique view; the whale was resting in calm water in a lead in the pack ice. The 1986 photograph was taken from a vertical position; due to high sea states, wave wash obscures the sides of the whale. The bottom illustration shows the diagnostic configuration of scars evident on both animals.

provided that certain critical assumptions are met (Gazey and Staley, 1986). Finally, our recapture demonstrates the importance of international cooperation in the study and management of migratory marine mammals such as the bowhead.

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