

## Original Article

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# Bottlenose dolphins in the Netherlands come from two sides: across the North Sea and through the English Channel

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## Abstract

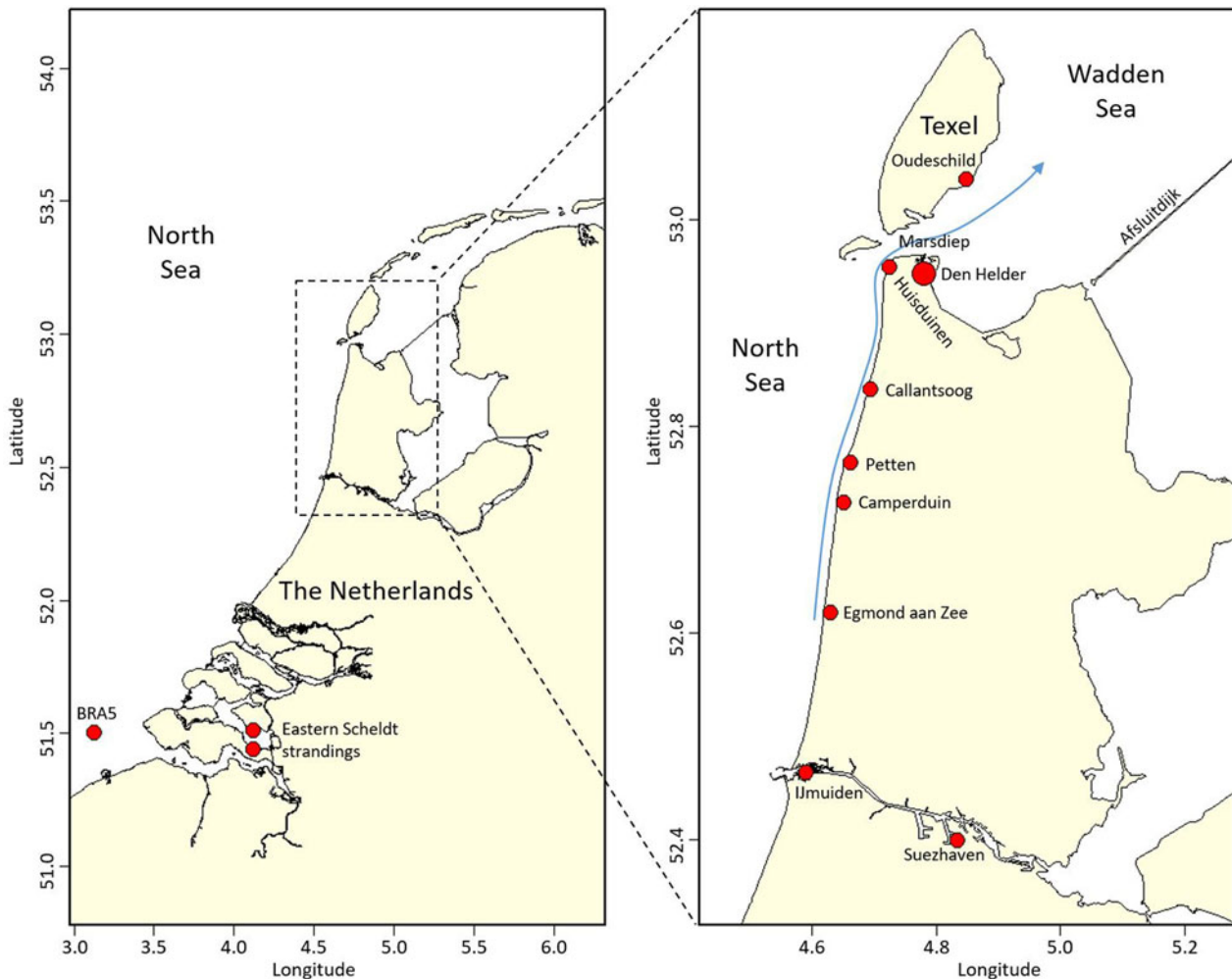
On 19 July 2019 an estimated 20 bottlenose dolphins (*Tursiops truncatus*) were observed in the Marsdiep, a tidal inlet connecting the North Sea and the Dutch Wadden Sea, between Den Helder and the island of Texel. Photographs and video recordings were made and nine individuals were matched with known dolphins from the Moray Firth, NE Scotland. These are the first matches of this east coast of Scotland population outside the UK and Ireland. Subsequent observations of individuals from this group show that at least some of the animals have returned to Scottish waters, while others were photographed in Danish waters. Furthermore, we report on a photo identification match of a solitary bottlenose dolphin between France and the Netherlands. These matches suggest that bottlenose dolphins, in the Netherlands, originate from two different genetically distinct populations: 'Coastal South' and 'Coastal North'. This evidence of previously unknown long-range movements may have important implications for the conservation and management of this species in European waters.

## Introduction

Bottlenose dolphins *Tursiops truncatus* (Montagu, 1821) were once common in the North Sea, but during the last century numbers have declined (Evans, 1980) and they are now rarely observed here (Reid *et al.*, 2006). The exception is a small population of ~195 animals on the east coast of Scotland (Wilson *et al.*, 1997; Cheney *et al.*, 2013). Many historical reports of free-ranging animals, stranded individuals and catches show that bottlenose dolphins also used to inhabit Dutch waters (van Bree, 1977; Kompanje, 2001, 2005; Camphuysen & Peet, 2006). In the first half of the 20th century, groups of bottlenose dolphins were observed yearly in spring in the Marsdiep, a tidal inlet connecting the North Sea and the Dutch Wadden Sea, between Den Helder and the island of Texel. Here they foraged on herring migrating to the Zuiderzee to spawn. After the completion of the dam 'Afsluitdijk' in 1932, the Zuiderzee was closed off from the Wadden Sea and the local herring stock collapsed, with the dolphins disappearing soon after. Since 1965 the sightings of dolphins have also decreased in other parts of the Netherlands and bottlenose dolphins are now considered rare visitors (ter Pelkwijk, 1937; Verwey, 1975; van Bree, 1977; Verwey & Wolff, 1981; Kompanje, 2001, 2005; Camphuysen & Peet, 2006). Most reports since then have been of solitary individuals (Addink & Smeenk, 1990; Addink, 1991; van der Ham *et al.*, 1992; Camphuysen & Peet, 2006). Most notably is a male identified as 'Dony' (also occasionally named 'Randy'), that stayed in the Netherlands for multiple weeks in November/December 2002. This individual yielded the first photo-identification match of a 'foreign' bottlenose dolphin in the Netherlands (Camphuysen & Peet, 2006). He was first observed in Ireland (April 2001), and later in England and Belgium, before entering Dutch waters. Currently (April 2021) he is residing off Brittany, France (Nunny & Simmonds, 2019; Facebook page Dony, 2021). It is suggested that these solitary individuals came as a direct consequence of the decimation of bottlenose dolphins in European waters (Müller & Bossley, 2002), as a dispersing dolphin might not be able to find neighbouring populations and might socialize with people instead (Nunny & Simmonds, 2019).

In contrast, a group of 50–100 bottlenose dolphins was observed in the morning of 12 August 2004, swimming off Huisduinen (Figure 1), along the north-western coastline of the Dutch mainland, until they entered the Marsdiep (Supplementary Figure S1), all the way to the Afsluitdijk (Leopold, 2004; Zeezoogdieren.org, 2004; Camphuysen & Peet, 2006). The animals returned to the North Sea in several smaller groups in the afternoon and evening and disappeared from view. One month later, on 9 September, a group of ~60 animals was seen in the same area (Supplementary Figure S1). Again, the dolphins were first observed in the morning, at 9:30 a.m. further south, off the Dutch mainland coast (Camperduin), by an experienced seawatcher (pers. comm. Nick van der Ham). The animals moved north and were picked up by other seawatchers at Callantsoog and Huisduinen before they entered the Marsdiep at approximately 12:30 p.m. Here they swam eastwards up to the Den Helder-Texel ferry track line, where they turned north and returned to the North Sea, following the coastline of Texel (Camphuysen & Peet, 2006; van Bemmelen, 2009). Unfortunately, none of the photographs taken during these two occasions were suitable for photo-identification.





**Fig. 1.** Maps of the Netherlands showing the locations mentioned in the main text. Left panel: The locations of the two stranded bottlenose dolphins (2007 top and 2013 bottom) in the Eastern Scheldt and the sightings from fishing vessel BRA5 (2014). Right panel: Map of the province North-Holland. The arrow depicts the estimated route of the bottlenose dolphins, sighted on 19 July 2019.

A similarly large group was seen offshore, on 3 October 2014 near the Dutch/Belgium border ( $51^{\circ}30'00''\text{N}$   $03^{\circ}07'48''\text{E}$ , Figure 1), from the fishing vessel BRA5 (Natuurpunt, 2014). Animals accompanying the ship were videoed, but the image quality did not allow matching.

In this study we report on new sightings and photo-identification matches of bottlenose dolphins in Dutch waters (i.e. the Marsdiep and Amsterdam). Additionally, we present images of two bottlenose dolphins that were stranded in the Netherlands that could not be matched with previously known individuals.

## Materials and methods

Photographs and videos of bottlenose dolphins in Dutch waters were opportunistically collected, both of stranded (dead) and free ranging individuals. We compared these images manually (i.e. by eye) with photo-identification catalogues and pictures taken by the public, available on the internet, to examine the origins of these Dutch sightings.

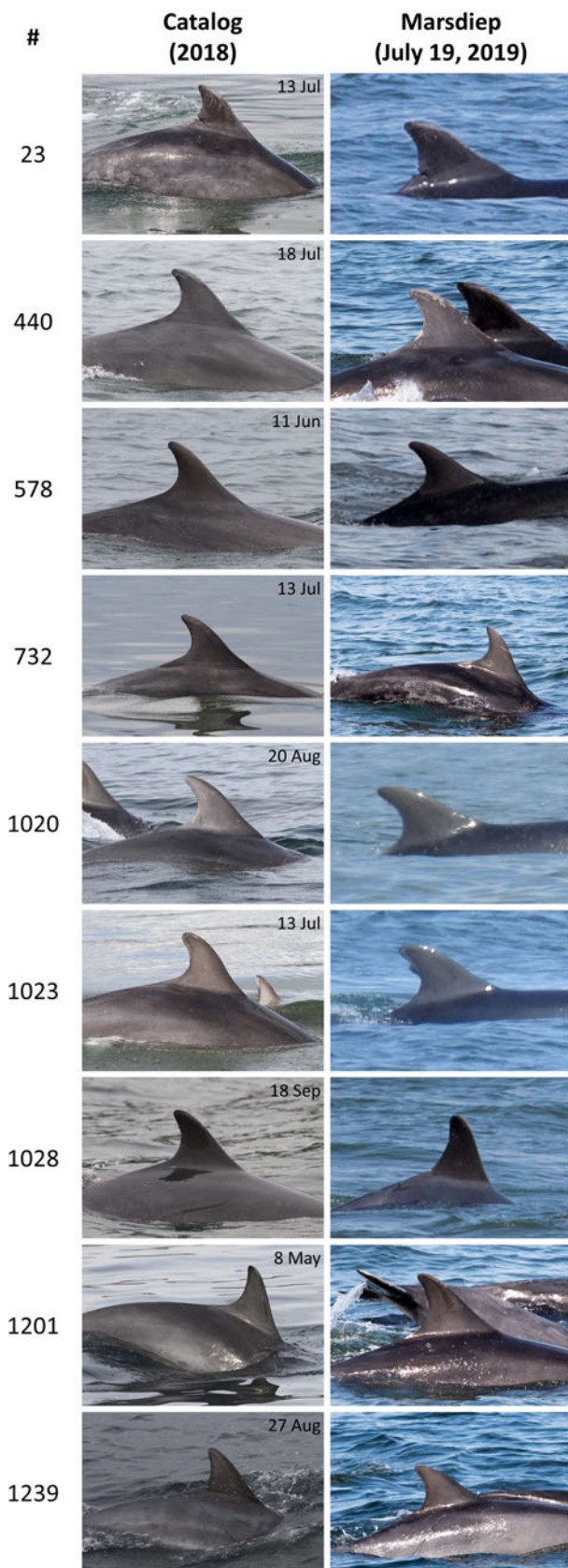
## Results

### Bottlenose dolphins in the Marsdiep

On 19 July 2019, at 5:30 a.m., a group of bottlenose dolphins was spotted off Egmond aan Zee (Dutch mainland coast) (Figure 1) (pers. comm. Jasper Rautenberg). The group travelled north

and was observed off Camperduin (pers. comm. Bert de Haan and Nick van der Ham) and then photographed off Petten (pers.-comm. Nils van Duivendijk) later that morning. At 10:32 a.m. the group swam past Huisduinen (pers. obs. JH), 30 km north of the first sighting location. At this point two groups were observed. Within each group, the animals were swimming closely together and both adults and juveniles were present. The first group swam northwards parallel to shore at 500–1000 m and consisted of ~10 individuals. The second group was swimming in the same direction, but closer to shore (50–100 m) and consisted of nine individuals. Whenever a boat passed close by, the animals dived longer and appeared to increase their swimming speed. Occasionally the dolphins were lobtailing. The first group continued to move northwards towards Texel, crossing the Marsdiep, and soon disappeared from sight, while the second group followed the coastline eastwards, deeper into the Marsdiep towards the Wadden Sea, where the animals were continuously seen until noon by multiple observers (pers. obs. ML). The last sighting was made from the vessel TX 10 at 15:27 p.m. in the Wadden Sea east of Texel, close to Oudeschild (Figure 1).

The first group was too far from shore to collect any images that could be used for photo-identification. The second group, however, swam closer to shore and photos (Figure 2, Supplementary Figure S2) and video recordings (Supplementary Video S3) were made, both from shore and from seal watching boat 'Het Sop'. These images were compared with the East



**Fig. 2.** Photo identification of the Dutch bottlenose dolphins, sighted on 19 July 2019. Pictures on the left are from the East Coast Scotland Bottlenose Dolphin Photo-ID Catalogue, pictures on the right are taken in the Marsdiep (by Tobias Brüggling, JH and ML). High resolution versions and additional photos and video that were used to identify individuals can be found in Supplementary Figure S2 and Supplementary Video S3.

Coast Scotland Bottlenose Dolphin Photo-Identification Catalogue (Cheney *et al.*, 2014), curated by the University of Aberdeen and the University of St Andrews. Eight individuals were positively identified, while one other individual was highly likely a match to the same population (Figure 2, Supplementary Figure S2, Table 1). Matches were made using multiple photographs from the Netherlands (see Supplementary information) to individuals observed almost annually by the University of Aberdeen since at least 2006. The adult dolphins were matched using nicks (three dolphins) and/or tooth rakes and skin lesions (six dolphins), and the two juveniles were matched on observed association with their mothers and dorsal fin shape (Table 1). The group consisted of an adult and a juvenile male, six adult females and one juvenile of unknown sex (Table 1). None of these dolphins was observed by the University of Aberdeen in the Moray Firth Special Area of Conservation during their approximately weekly photo-identification surveys between May and September 2019, although all the adults had previously been photographed in this area every year since at least 2009.

In June 2020, two of these individuals (#1028 and #440) were observed and photographed in the Moray Firth, providing proof of the animals' return to their normal range after their excursion across the North Sea. However, three other individuals (#23, #578 and #732) were photographed in autumn 2020 on the west coast of Denmark (pers. comm. Carl Kinze). Whether this means that these three individuals stayed in the eastern part of North Sea, or returned to Scotland before traveling to Denmark remains unclear. However, in January 2020 one of these dolphins (#23) was sighted in the Moray Firth by a regular seawatcher familiar with this individual (pers. comm. Alan Airey). Unfortunately, this animal was not photographed, and the identification could not be confirmed.

#### Solitary bottlenose dolphin in Amsterdam

A solitary bottlenose dolphin was observed on 2 May 2020, swimming with the sailing vessel 'Tres Hombres'. The crew first observed the dolphin off France 3 days earlier. The animal followed the ship to the Netherlands, into the Noordzeekanaal (North Sea Canal), passing the sluices in IJmuiden (Figure 1), up to the Suezhaven in Amsterdam where the ship docked. The dolphin appeared to be healthy, and was observed defecating. The dolphin stayed with the ship, and detailed photographs could be made. Comparison of the dorsal fin and facial features (Genov *et al.*, 2018) with images of known individuals from the French coast showed that this individual is known as 'Zafar' (Figure 3, Supplementary Figure S2), a male solitary-social dolphin that shows atypical behaviour in seeking out human company (Nunny & Simmonds, 2019). This individual might have been observed as early as 2002, but the first confirmed sighting dates back to 2017, when he was seen off Lomener, Brittany, France (Zafar le dauphin blogspot, 2018). Since then, he was repeatedly observed off Brittany, mostly off Brest, until mid-February 2020. On 3 May the dolphin was escorted back through the sluices, after which he resided in the Seaport of IJmuiden for two days. Here he interacted with various small boats, buoys and people, but was also observed foraging. The last confirmed sighting was from a fishing vessel off Callantsoog on 5 May, which he followed for multiple hours (Observation.org, 2020). Unfortunately, the dolphin was found dead with its tail amputated on 12 May, probably after a ship strike (Ijsseldijk *et al.*, 2020).

#### Recent strandings

Bottlenose dolphin strandings in the Netherlands over the last two decades were examined to look for other potential matches with

**Table 1.** Overview of bottlenose dolphins photographed in the Marsdiep (the Netherlands) that are matched with the East Coast Scotland Bottlenose Dolphin Photo-ID Catalogue

#	Name	Sex	Age class	Confidence	First seen	Matched using
23	Mischief	Male	Adult	Certain	1989	Multiple nicks
440	Sickle	Female	Adult	Certain	1994	Tooth rake and skin lesions
578	Chewbacca	Female	Adult	Certain	1996	Multiple nicks and skin lesions on body
732	Tall Fin	Female	Adult	Certain	1998	Fin shape and tooth rakes
1023	Sparkle	Female	Adult	Certain	2007	Skin lesions
1028	Lilith	Female	Adult	Certain	2006	Large nick
1020	Idris	Female	Adult	Probable	2007	Fin shape and association with known individuals
1201	Skywalker	Male	Juvenile	Certain	2015	Fin shape and association with mother (#578)
1239	Ruby	Unknown	Juvenile	Certain	2017	Fin shape and association with mother (#1028)

**Fig. 3.** Photo identification of the Amsterdam bottlenose dolphin. The top images (A and B) were taken in Amsterdam (2 May 2020, by JH), the bottom images (C and D) were taken in France (Facebook page Zafar, 2019).

the east coast of Scotland. An extensive overview of strandings and catches of bottlenose dolphins in the North Sea between 1534 and 2000 can be found in Kompanje (2001, 2005), but these do not show photographs of recent cases that might be matched with dolphins from other regions. Since 2000, 10 new strandings have been reported (Table 2). These records mostly concerned single bones, but there were two individuals found dead and photographed in the Eastern Scheldt, both of which were first observed alive in the same area.

The first of these two dolphins was a female (262 cm, 221 kg), found on 12 September 2007 (Figure 4), floating in the Eastern Scheldt, between buoys LG10 and LG12 (Figure 1). This animal had been observed alive days before stranding in this semi-enclosed tidal bay. A necropsy, performed by Dr Thierry Jauniaux, indicated the cause of death was an infectious disease, specifically lung oedema associated with pyaemia/septicaemia. Stomach content analysis found remains of (amongst others) 12 Atlantic cod *Gadus morhua*, six saithes *Pollachius virens* and two black gobies *Gobius niger*, a locally abundant goby species, indicating that the animal had been feeding locally, until shortly before her death.

A second female (266 cm, 196.5 kg) was found dead in the Eastern Scheldt near Krabbendijke (Figure 1) on 27 June 2013 (Figure 5), after she had been observed alive in the area since 18 June 2013. The stranded animal had died very recently (the body was still warm) and was necropsied the same day at Utrecht University. The stomach was empty, except for some tiny fish eye lenses and jaws of marine worms, both probably from small secondary prey, suggesting this dolphin had not eaten recently. Parasitic nematodes *Anisakis simplex* found in the fore stomach were still alive. All these findings suggest the animal live stranded following starvation and subsequently died (van Beurden *et al.*, 2015).

Neither of these dolphins from the Eastern Scheldt could be matched to the NE Scotland population, nor with solitary individuals documented online.

## Discussion

The photo-identification matches presented here show that bottlenose dolphins in the Netherlands originate from different locations. The Marsdiep group of 2019 comprised the first photo-

**Table 2.** Summary of stranded bottlenose dolphins in the Netherlands since 2000 (Walvisstrandingen, 2020)

Date	Location	Description
12 September 2007	Eastern Scheldt	Complete animal, see text
26 November 2008	Wadden Sea, near Ameland	(Sub)fossil skull
14 April 2012	Vliehors, Vlieland	Left lower jawbone
20 April 2013	Hors, Texel	Vertebra
27 June 2013	Krabbendijke (Eastern Scheldt)	Complete animal, see text
August 2014	Terschelling	Right lower jawbone, 42.5 cm
4 January 2015	Terschelling	Right lower jawbone
13 May 2015	Noordwijk	Left lower jawbone, ~40 cm
18 December 2015	Schiermonnikoog	(Sub)fossil vertebra

**Fig. 4.** Bottlenose dolphin, retrieved from the Eastern Scheldt, south-west Netherlands, 12 September 2007. Photo by Alfons Wijdeveld, provided by EHBZ Zuidwest (Walvisstrandingen, 2020).

identification match of bottlenose dolphins in the Netherlands with the NE Scotland population. Furthermore, this sighting provided the first matches of bottlenose dolphins from the east coast of Scotland population outside the UK and Ireland. The sightings of two individuals (#1028 and #440) from this group in 2020 back

**Fig. 5.** Bottlenose dolphin stranded near Krabbendijke, Eastern Scheldt, south-west Netherlands, 27 June 2013. Photos by Liliane Solé (Walvisstrandingen, 2020).

in the Moray Firth show that these dolphins made a round trip. Individual #23 may have returned to the Moray Firth before he was re-sighted in Danish waters, although without photographs or video footage this could not be confirmed. It is unknown whether individuals #578 and #732 also returned to the Moray Firth or stayed in eastern parts of the North Sea, before they were re-sighted with #23 in Danish waters. The fate of the other identified individuals is not presently known. Unfortunately, there is no high-resolution imagery available of the bottlenose dolphins sighted in 2004 in the Marsdiep, so their origin remains unknown.

In contrast to the group of dolphins photographed in the Marsdiep in 2019, two solitary bottlenose dolphins may have entered the North Sea from the south. The Amsterdam dolphin of 2020 ('Zafar') was matched with previous sightings off Brittany, which is close to a nearby population residing off Normandy, France, consisting of ~420 individuals (Louis *et al.*, 2015). The behaviour of 'Zafar' allowed for confirmation that this dolphin entered the North Sea from the south via the English Channel, as he was seen by the crew of the 'Tres Hommes' for three consecutive days as they sailed through the Channel. The dolphin that resided in the south-west of the Netherlands in 2002 ('Dony') was first observed in Ireland (Camphuysen & Peet, 2006), close to a genetically distinct population residing in the Shannon Estuary (Mirimin *et al.*, 2011). It is likely that 'Dony' entered the North Sea via the English Channel as well. The two other solitary dolphins, observed and later found dead in the south-west of the Netherlands in 2007 and 2013, did not match with any individuals from the east coast of Scotland population. Comparisons were also made with pictures of solitary individuals and groups sighted along the Belgium coast (Haelters & Kerckhof, 2010; Haelters *et al.*, 2018), but no match could be established.

Based on the genetic population structure, the North-East Atlantic coastal bottlenose dolphin ecotype can be divided into two populations, a 'Coastal South' (comprising the English Channel, Arcachon Estuary and South Galicia resident groups) and a 'Coastal North' population (comprising the UK and Ireland resident or mobile coastal groups) (Louis *et al.*, 2014). It is currently unclear to which populations 'Zafar', 'Dony' and the two stranded individuals belong, but this can potentially be resolved by future genetic analysis.

The results presented here could only be collected due to the (opportunistic) collaboration between land-based 'seawatchers', observers at sea and marine scientists, augmented by public outreach in (social) media. This is indicative of the importance of long-term research and photo-identification catalogues such as the East Coast Scotland Bottlenose Dolphin Photo-Identification Catalogue, and also of publicly available platforms such as Observation.org (2020).

Small coastal populations that are relatively isolated are vulnerable to extinction (Louis *et al.*, 2014). Already a population of North Sea bottlenose dolphins became extinct, namely the genetically distinct population in the Humber Estuary, East England (Nichols *et al.*, 2007). The bottlenose dolphins that visited the Marsdiep/Zuiderzee seasonally have disappeared from that area as well. As it remains unclear whether these animals were genetically differentiated from neighbouring populations, it is unknown whether they changed their distribution or that this population became extinct as well.

In Europe there are two key conservation measures for bottlenose dolphins. Firstly, the designation of Special Areas of Conservation (SAC) under Annex II of the EU Habitats Directive (92/43/EEC), although the use of these static protection measures for mobile species has been debated (Hooker *et al.*, 2011; Wilson, 2016). Secondly, bottlenose dolphins are European Protected Species under Annex IV which is dynamic and protects bottlenose dolphins 'across their entire natural range' within the EU, although unlike Annex II, this does not provide habitat protection. In Scotland, following the EU exit, the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) continues to deliver these two conservation measures for territorial waters and provides that the population of bottlenose dolphins that uses the Moray Firth SAC are protected across their known Scottish range. However, whether this same level of protection extends internationally is debatable, especially in areas this population was not known to frequent. The dolphins in Normandy live in an 'Area of Special Interest' that is being upgraded into a marine protected area, under the IUCN (category V: 'protected seascape') (Louis *et al.*, 2015) and is being listed under Annex II of the Habitats Directive.

While movements of individual or groups of bottlenose dolphins outside their known range may facilitate gene flow between isolated populations, there is also the risk that individuals from these already small, vulnerable populations (Louis *et al.*, 2014) move into areas with different levels of protection. Evidence of long-range movements and/or confirmed presence in an area is required to ensure the correct implementation of existing EU conservation and management initiatives by member states to protect both individuals and their habitats. This previously unobserved connectivity of bottlenose dolphins between territorial waters exposes these individuals to widespread and persistent threats such as bycatch and anthropogenic noise (Nelms *et al.*, 2021), highlighting the need for adaptive and integrated conservation and management of these mobile cetaceans.

**Supplementary material.** The supplementary material for this article can be found at <https://doi.org/10.1017/S0025315421000679>.

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## References

Addink M (1991) Tuimelaar van de Brouwersdam dood. *Zoogdier* 2(3), 32.

- Addink M and Smeenk C (1990) De tuimelaar van de Brouwersdam. *Zoogdier* 1, 23–25.
- Camphuysen CJ and Peet G (2006) *Walvissen en dolfijnen in de Noordzee*. Kortenhoef: Fontaine Uitgevers.
- Cheney BJ, Thompson PM, Ingram SN, Hammond PS, Stevick PT, Durban JW, Culloch RM, Elwen SH, Mandelberg L, Janik VM, Quick NJ, Islas-Villanueva V, Robinson KP, Costa M, Einfeld SM, Walters A, Philips C, Weir CR, Evans PGH, Anderwald P, Reid RJ, Reid JB and Wilson B (2013) Integrating multiple data sources to assess the distribution and abundance of bottlenose dolphins *Tursiops truncatus* in Scottish waters. *Mammal Review* 43, 71–88.
- Cheney B, Corkrey R, Durban JW, Grellier K, Hammond PS, Islas-Villanueva V, Janik VM, Lusseau SM, Parsons KM, Quick NJ, Wilson B and Thompson PM (2014) Long-term trends in the use of a protected area by small cetaceans in relation to changes in population status. *Global Ecology and Conservation* 2, 118–128.
- Evans PGH (1980) Cetaceans in British waters. *Mammal Review* 10, 1–52.
- Facebook page Dony (2021) Facebook page dedicated to bottlenose dolphin 'Dony'. Available at <https://www.facebook.com/Randy-Dony-le-dauphin-1672284889658475/>. Accessed 9 April 2021.
- Facebook page Zafar (2019) Facebook page dedicated to bottlenose dolphin 'Zafar'. Available at [www.facebook.com/permalink.php?story\\_fbid=105506404185493&id=105327020870098](http://www.facebook.com/permalink.php?story_fbid=105506404185493&id=105327020870098). Accessed 31 August 2020.
- Genov T, Centrih T, Wright AJ and Wu GM (2018) Novel method for identifying individual cetaceans using facial features and symmetry: a test case using dolphins. *Marine Mammal Science* 34, 514–528.
- Haelters J and Kerckhof F (2010) Belgische kust en Schelde in de ban van een Tuimelaar tijdens zomer en najaar van 2010. *Natuur.Focus* 9, 174–175.
- Haelters J, Kerckhof F, Moreau K, Rumes B, Potin M, Jauniaux T and Vercayie D (2018) Strandings en waarnemingen van zeezoogdieren en opmerkelijke andere soorten in België in 2018. *Koninklijk Belgisch Instituut voor Natuurwetenschappen (KBIN), Brussels, Belgium*. 34 pp.
- Hooker SK, Cañadas A, Hyrenbach KD, Corrigan C, Polovina JJ and Reeves RR (2011) Making protected area networks effective for marine top predators. *Endangered Species Research* 13, 203–218.
- Ijsseldijk LL, van Schalkwijk L, van den Berg A, ten Doeschate MTI, Everaarts E, Keijl GO, Kuijpers N, Bravo Rebolledo EL, Veraa S, Kik MJL and Leopold MF (2020) Fatal attraction: the death of a solitary-social bottlenose dolphin due to anthropogenic trauma in the Netherlands. *Lutra* 63(1–2), 17–32.
- Kompanje EJO (2001) Review of strandings and catches of *Tursiops truncatus* (Mammalia: Cetacea, Odontoceti) in the Netherlands between 1754 and 2000. *Deinsea* 8, 169–224.
- Kompanje EJO (2005) Additions to the 'Review of strandings and catches of *Tursiops truncatus* (Mammalia: Cetacea, Odontoceti) in the Netherlands between 1754 and 2000'. *Deinsea* 11, 175–178.
- Leopold MF (2004) Grote groepen tuimelaars voor de kust van Noord-Holland en in de westelijke Waddenzee. *Newsletter Dutch Seabird Group* 5, 6–7. Available at <http://natuurtijdschriften.nl/record/557449>, Accessed online 31 August 2020.
- Louis M, Vircel A, Lucas T, Peltier H, Alfonsi E, Berrow S, Brownlow A, Covelo P, Dabin W, Deaville R, de Stephanis R, Gally F, Gauffier P, Penrose R, Silva MA, Guinet C and Simon-Bouhet B (2014) Habitat-driven population structure of bottlenose dolphins, *Tursiops truncatus*, in the North-East Atlantic. *Molecular Ecology* 23, 857–874.
- Louis M, Gally F, Barbraud C, Béseau J, Tixier P, Simon-Bouhet B, Le Rest K and Guinet C (2015) Social structure and abundance of coastal bottlenose dolphins, *Tursiops truncatus*, in the Normano-Breton Gulf, English channel. *Journal of Mammalogy* 96, 481–493.
- Mirimin L, Miller R, Dillane E, Berrow SD, Ingram S, Cross TF and Rogan E (2011) Fine-scale population genetic structuring of bottlenose dolphins in Irish coastal waters. *Animal Conservation* 14, 342–353.
- Müller M and Bossley M (2002) Solitary bottlenose dolphins in comparative perspective. *Aquatic Mammals* 28, 298–307.
- Natuurpunt (2014) Reuzegroep Tuimelaars gespot voor Belgische kust. Available at [www.natuurpunt.be/nieuws/reuzegroep-tuimelaars-gespot-voor-belgische-kust-20141009](http://www.natuurpunt.be/nieuws/reuzegroep-tuimelaars-gespot-voor-belgische-kust-20141009). Accessed 31 August 2020.
- Nelms SE, Alfaro-Shigueto J, Arnould JPY, Avila IC, Bengtson Nash S, Campbell E, Carter MID, Collins T, Currey RJC, Domit C, Franco-Trecu V, Fuentes M, Gilman E, Harcourt RG, Hines EM, Hoelzel AR, Hooker SK, Johnston DW, Kelkar N, Kiszka JJ,

- Laidre KL, Mangel JC, Marsh H, Maxwell SM, Onoufriou AB, Palacios DM, Pierce GJ, Ponnampalam LS, Porter LJ, Russell DJF, Stockin KA, Sutaria D, Wambiji N, Weir CR, Wilson B and Godley BJ (2021) Marine mammal conservation: over the horizon. *Endangered Species Research* **44**, 291–325.
- Nichols C, Herman J, Gaggiotti OE, Dobney KM, Parson K and Hoelzel AR (2007) Genetic isolation of a now extinct population of bottlenose dolphins (*Tursiops truncatus*). *Proceedings of the Royal Society B* **274**, 1611–1616.
- Nunny L and Simmonds MP (2019) A global reassessment of solitary-sociable dolphins. *Frontiers in Veterinary Science* **5**, 331.
- Observation.org (2020) Free online tool for sharing and recording plant and animal sightings [www.observation.org](http://www.observation.org). Accessed 31 August 2020.
- Reid JB, Evans PGH and Northridge SP (2006) *Atlas of Cetacean Distribution in North-West European Waters*. Peterborough: Joint Nature Conservation Committee. 76 pp.
- ter Pelkwijk JJ (1937) Dartele tuimelaars. *Amoeba* **16**, 65–66.
- van Bemmelen R (2009) Online sighting report at public database. Available at <https://waarneming.nl/observation/105310026/>. Accessed 31 August 2020.
- van Beurden SJ, IJsseldijk LL, Cremers HJWM, Gröne A, Verheije MH and Begeman L (2015) *Anisakis* spp. induced granulomatous dermatitis in a harbour porpoise *Phocoena phocoena* and a bottlenose dolphin *Tursiops truncatus*. *Diseases of Aquatic Organisms* **112**, 257–263.
- van Bree PJH (1977) On former and recent strandings of cetaceans on the coast of the Netherlands. *Zeitschrift für Saugetierkunde* **42**, 101–107.
- van der Ham NF, Platteeuw M and Camphuysen CJ (1992) Tuimelaar *Tursiops truncatus* bij Camperduin. *Sula* **6**, 106–108.
- Verwey J (1975) The cetaceans *Phocoena phocoena* and *Tursiops truncatus* in the Marsdiep area (Dutch Wadden Sea) in the years 1931–1973. *Publicaties & Verslagen Nederlands Instituut Onderzoek der Zee*, 17a+b, 153 pp.
- Verwey J and Wolff WJ (1981) The bottlenose dolphin (*Tursiops truncatus*). In Reijnders P and Wolff WJ (eds), *Marine Mammals of the Wadden Sea: Final Report of the Section 'Marine Mammals' of the Wadden Sea Working Group*. Reports of the Wadden Sea Working Group, 7. Leiden: Stichting Veth tot Steun aan Waddenonderzoek. ISBN 90-6191-057-9. pp. 64.
- Walvisstrandingen (2020) Dutch cetacean strandings database, managed by Naturalis (national Museum of Natural History). Available at [www.walvisstrandingen.nl](http://www.walvisstrandingen.nl) Accessed online 31 August 2020.
- Wilson B (2016) Might marine protected areas for mobile megafauna suit their proponents more than the animals? *Aquatic Conservation: Marine and Freshwater Ecosystems* **26**, 3–8.
- Wilson B, Thompson PM and Hammond PS (1997) Habitat use by bottlenose dolphins: seasonal distribution and stratified movement patterns in the Moray Firth, Scotland. *Journal of Applied Ecology* **34**, 1365–1374.
- Zafar le dauphin blogspot (2018) Blog about dolphin 'Zafar'. Available at [www.zafarledauphin.blogspot.com](http://www.zafarledauphin.blogspot.com). Accessed 31 August 2020.
- Zeezoogdieren.org (2004) Grote groep tuimelaars in het Marsdiep. Available at [www.zeezoogdieren.org/wordpress/2004/08/12/grote-groep-tuimelaars-in-het-marsdiep/#more-11735](http://www.zeezoogdieren.org/wordpress/2004/08/12/grote-groep-tuimelaars-in-het-marsdiep/#more-11735) Accessed 31 August 2020.