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Status of two Delphinidae, the Atlantic humpback dolphin, *Sousa teuszii* (Kükenthal) and inshore common bottlenose dolphin *Tursiops truncatus* (Montagu) on Benin's coast: an update

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Abstract

In 2022–2024, we visually surveyed, both slow walking and stationary, the coastal areas near 50 fish landing sites along Benin's shoreline, undertook a few experimental sorties in small canoe and interviewed 251 locals, mostly artisanal fishermen, seeking information on cetaceans. A total of 120 km was covered for an effective search duration of 83 hrs. The study was especially focused on two coastal cetacean species, the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal) and the (inshore ecotype) common bottlenose dolphin *Tursiops truncatus* (Montagu). Although neither species was directly observed during dedicated field research, two sightings of *S. teuszii* and an unusual entanglement in large plastic debris were authenticated by members of the public. Furthermore, a new lethal bycatch was photographed in SE Nigeria by a Beninese fisher. Strandings of 10 large whales were documented in the period 2009–2023, including humpback whales *Megaptera novaeangliae* (Borowski) (n= 5), sperm whales *Physeter macrocephalus* Linnaeus (n= 3) and unidentified species (n= 2). Eight sightings of live humpback whales, one with a small calf, were reported in July–October 2022. Video recorded by a fisherman provided the first likely evidence of melon-headed whale *Peponocephala electra* (Gray) for Benin. A live-stranded Gray's pantropical spotted dolphin *Stenella a. attenuata* (Gray) was also a first record. The beach and small-boat surveys, as well as fishermen's perceptions indicate that nearshore occurrence of dolphins in Benin varies from 'occasional' to 'rare'. Entanglement in fishing gear, particularly in ubiquitous beach seines and set and drift gillnets appear to be the main cause of mortality of inshore dolphins, while large plastic debris is newly identified as potentially lethal. The conservation status of inshore *T. truncatus*, not encountered in Benin for 24 years, may be as dire as that of *S. teuszii*. Citizen science is playing an increasingly important role in marine mammal information collection in the Gulf of Guinea and western Africa.

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Introduction

Limited background information is available on the biology, ecology and status of cetaceans in Benin's coastal waters, due to a lack of resources and specialised expertise and a history of prioritising studies of continental vertebrates (see Neuenschwander et al., 2011). Nonetheless the occurrence of ten cetacean species has been firmly documented, including an overwintering population of humpback whales *Megaptera novaeangliae* (Borowski) (Van Waerebeek et al., 2001; Sohou et al., 2001, 2013; Sohou, 2011; Zwart and Weir, 2014). The coastal distribution and seasonality of humpback whales off Benin was the subject of a pioneering study during 2000–2001 (Van Waerebeek et al., 2001, 2002; Van Waerebeek, 2003; Tchibozo and Van Waerebeek, 2012) which led to a small-scale whale-watching effort that is still operated successfully by NGO Nature Tropicale at the time of writing. Albeit commercial, it contributes with an important educational role within Beninese society, promoting marine conservation using the humpback whale as flagship species (Tchibozo and Van Waerebeek, 2012; Saizonou, 2016).

While the IUCN Red List status of 'Critically Endangered' for the Atlantic humpback dolphin *Sousa teuszii* (Kükenthal) (Collins, 2015; Collins et al., 2017) as a species may be overly pessimistic, it probably applies to certain (sub)populations, e.g., the northern Gulf of Guinea population, the so-called 'Cameroon dolphin' stock(Ayissi et al., 2014; Van Waerebeek et al., 2017) and the Dakhla Bay stock in Western Sahara (K.V.W. and H.-Y.L., unpublished data). Prior to this study, only a single opportunistic sighting had been registered in Benin waters (Zwart and Weir, 2014). When encountered in small numbers in neighbouring Togo, *S. teuszii* was postulated to occur also in Benin because of the contiguous, and similar, coastlines (Segniagbeto et al., 2012; Van Waerebeek et al., 2017). Recently, *S. teuszii* was re-discovered further east in Cameroon (Ayissi et al., 2014) and documented in Nigeria, both from bycatches in artisanal fisheries and a few sightings (Olakunle and Akanbi, 2014; Van Waerebeek et al., 2017; Segniagbeto et al., 2019). The species has yet to be encountered in Liberia, Côte d'Ivoire, Ghana, Equatorial Guinea, the Democratic Republic of the Congo, and (most unlikely) São Tomé and Príncipe (Collins et al., 2019; Mbungu Ndamba et al., 2023). Despite significant port monitoring efforts for dolphin landings in Ghana, zero *S. teuszii* catches were recorded among many hundreds of small cetacean carcasses examined. Therefore, the species is thought to be virtually absent in Ghana and potentially extirpated (e.g. Ofori-Danson et al., 2003; Van Waerebeek et al., 2004, 2009; Ayissi et al., 2014; Amponsah et al., 2023).

Serious concern has been raised also about the status of the inshore ecotype of the common bottlenose dolphin *Tursiops truncatus* (Montagu) in western Africa (Van Waerebeek et al., 2016). The most recent evidence of this taxon in Benin consisted of two adults observed interacting with a small purse-seine vessel in shallow water (18 m depth) near Cotonou port, in September 2001 (Sohou et al., 2013).

In a renewed attempt, since 1999–2001 (Van Waerebeek et al., 2001, 2002), to locate nearshore dolphins and update their status in Benin after many years without records, the authors visually surveyed the country's shoreline in 2022–2024, as was done i.a. in Guinea (Bamy et al., 2010), Congo, Gabon (Collins et al., 2013) and Cameroon (Ayissi et al., 2014). Moreover, fishermen and other coastal inhabitants were queried for information about dolphins.

Material and Methods

Most of the 125 km Beninese shoreline, located in the Bight of Benin, i.e. from Sémè-Kraké beach (06.37444 N, 02.69578 E) at the Nigerian border, west to Hillacondji beach (06.23750 N, 01.63486 E) at Togo's border (Fig. 1) was visually surveyed, on foot. Many stretches in both directions and some repeatedly, by one person, rarely two. Conducted during two periods, one consisted of occasional effort between 23 July 2022 and 11 October 2023 with a second short period (13 days) of intensive daily effort, from 30 March to 11 April 2024. The latter occurred in western Benin (Grand-Popo), the east coast at Sémè-Okoum (Abobo Beach), and the central coast east of the Port Autonome de Cotonou. Observations were made with naked eye and Nordwald 8x42 and Steiner 10x50 binoculars either by slowly walking along the sandy shoreline or in a stationary position. Beaches were searched also for any stranded cetacean remains, including small bones, among the debris washed ashore. A few records occurred, or were collected, before or after the two main study periods, but the source of information (citizen science) was the same.

While all cetaceans were of interest, the authors specifically focused on the two known inshore occurring Delphinidae in Benin, *S. teuszii* and *T. truncatus* (Van Waerebeek, 2003; Sohou, 2011; Sohou et al., 2001; 2013). Beach survey transect waypoints and distances of search effort were recorded with a handheld GPS Garmin 72. A 70–300 mm (Canon) camera was carried at all times by the authors, however fishermen used miscellaneous cellphone cameras to document sightings and bycatches.

Small-boat sorties were trialled less than 3 km from shore, applying a simple strip transect visual survey protocol (see Buckland et al., 1993) with an estimated 1 km half-strip width. Aims included training and feasibility evaluation to use a dug-out canoe ('pirogue'), powered by a 25–40 hp outboard engine, as a potential platform for future surveys in Benin. Three observers (Séverin Tchibozo, trainee and skipper) scanned for cetaceans.

Locals were briefly queried in informal (ad libitum) interviews seeking information on cetacean sightings,

bycatches and strandings. The individuals showing most interest were also given tips on basic data collection, as to participate in citizen science. We handle a simple role concept where non-scientists ('citizens') voluntarily contribute scientific data, such as amateur birdwatchers providing records (Bonney et al., 2009; Cavalier and Kennedy, 2016). Abundant educational material including photos of dolphins and a basic field guide to the cetaceans of West Africa (Leeney and Ranger, 2008) were distributed among the fisher communities. If needed, diagnostic features were confirmed with selected literature (Perrin, 2001; Best, 2007; Carwardine, 2020). Two Beninese trainees who assisted the first author (see acknowledgements) ceased participation within weeks, claiming the field work was too demanding. A formal authorisation to conduct coastal marine mammal research was obtained from the Beninese Navy. The non-invasive field research adhered to the highest ethical standards (Félix and Van Waerebeek, 2021; Papastavrou and Ryan, 2023).

Results

Effective survey effort

During the first study period, S.T. made visual surveys of the shoreline in the vicinity of 26 fish landing beaches, which covered the eastern, western and central Beninese coast (Table 1). Total observation effort amounted to a distance of 46.38 km for a duration of 1,543 min (25.7 hrs). During the second, intensive, period, K.V.W. surveyed 73.75 km with an effective effort totalling 3,413 min (56.9 hrs), i.e. 2,659 min (walking) and 754 min (stationary). Both modes were applied variably each day, depending on weather and terrain. Visibility ranged from good to excellent at all times. Pooled for 2022–2024, the total shoreline covered (including re-sampling) was 120.13 km, for a duration of 4,956 min, or 82.6 hrs. Despite this substantial effort, no cetacean live sightings were made. Also, no cetacean remains were found stranded by the authors.

Artisanal fishermen, fishmongers and other locals (n= 251) living along the seashore in 50 coastal locations in Benin (Table 2), were informally interviewed about cetaceans in 2022–2023. In 2024, an additional 25 were queried. Time spent with each person was not monitored but typically lasted only a few minutes. These interviews resulted in a number of cetacean records, some supported by photographic or video evidence (see below and Tables 3 and 4).

Table 1: Shore-based visual survey effort for dolphins, measured in transect distance (km) and duration (min) implemented by the first author during 2022–2023 near 25 fish landing beaches. Search effort included both slowly walking and stationary observation. NA= not available.

No.	Date of survey	Landing beaches (start position)	Transect distance	Duration
1	03/08/2022	PK18 plage (N 06.36246°, E 002.59152°).	NA	69 min
2	03/08/2022	Nicoue Kondji (N 06.26402°, E 001.76959°)	NA	53 min
3	29/08/2022	Fidjrossè plage (N 06.34684°, E 002.36664°)	2.86 km	NA
4	03/09/2022	Sémè-Kraké beach (N 06.37444°, E 002.69578°)	1.08 km	47 min
5	03/09/2022	Fidjrossè plage (N 06.34684°, E 002.36664°)	3.98 km	45 min
6	05/09/2022	Aïdo plage (N 06.30854°, E 002.01031°)	2.92 km	51 min
7	08/09/2022	Djegbadji plage (N 06.32058°, E 002.07821°)	2.4 km	79 min
8	08/09/2022	Aïdo plage (N 06.30854°, E 002.01031°)	3.19 km	104 min
9	22/09/2022	Adounko plage (N 06.34513°, E 002.27815°)	2.22 km	78 min
10	29/09/2022	Hio plage (N 06.34161°, E 002.23561°)	2.44 km	138 min
11	02/10/2022	Hillacondji beach (N 06.23750°, E 001.63486°)	1.23 km	42 min
12	06/10/2022	Avlekete plage (N 06.34380°, E 002.25645°)	3.12 km	71 min
13	08/10/2022	Akpakpa Dodomè plage (N 06.35281°, E 002.44706°)	1.49 km	41 min
14	08/10/2022	Donatin plage (N 06.36083°, E 002.46793°)	1.46 km	46 min
15	10/10/2022	Djondji plage (N 06.30341°, E 001.97133°)	3.74 km	184 min
16	15/10/2022	Avlo plage (N 06.28980°, E 001.90120°)	2.78 km	40 min
17	17/10/2022	Zossè plage (N 06.36488/ E 002.61912°).	1.98 km	42 min
18	22/10/2022	Kouvènafidé plage (N 06.32514°, E 002.10380°)	1.74 km	39 min
19	23/10/2022	PK10 Plage (N 06.35933°, E 002.52142°) to Seive Plage (N 06.362257°, E 002.537892°) to Ekpe Plage(N 06.36213°, E 002.54660°)	2.72 km	62 min
20	02/11/2022	Fidjrossè plage (N 06.34684°, E 002.36664°)	0.71 km	16 min
21	02/11/2022	Adounko plage (N 06.34513°, E 002.27815°)	0.76 km	18 min
22	22/11/2022	Woue kondji (N 06.27234°, E 001.80082°)	1.67 km	59 min
23	11/10/2023	Hokouè (N 06.29698°, E001.94173°)	1.89 km	49 min
24	15/10/2023	Adounko (0Zone) (N 06.34455°, E002.26733°)	Stationary	103 min
25	15/10/2023	Adounko (Sam Beach) (N 06.34453°, E 002.27103°)	Stationary	67 min
		Total effort	46.38 km	25h 43min

Table 2: Fifty artisanal fisheries landing sites on Benin's coast (from E to W) visited by the first author and two trainees in 2022, seeking information on sightings, strandings and bycatches of cetaceans. Asterisks indicate locations with new records of *Sousa teuszii*: **= Case 2; ***= Case 3; ****= Case 4

No.	Date of visit	Localities	Number of locals interviewed/ interacted with
1	23/07/2022	Sémè-Kraké beach (N 06.37444, E 002.69578°)	11
2	23/07/2022	SAGA-CCP plage (N 06.37320°, E 002.68372°)	None available
3	23/07/2022	Kopeganme plage (N 06.36718°, E 002.63588°)	10
4	23/07/2022	Sèmé-Okoun plage (N 06.36632°, E 002.62796°)	7
5	17/10/2022	Zossè plage (N 06.36488°, E 002.61912°)	8
6	23/07/2022	Pelerinage plage (N 06.36428°, E 002.61444°)	3
7	23/07/2022	PK18 plage (N 06.36246°, E 002.59152°) ***	6
8	23/07/2022	Djeffa plage 2 (N 06.36189°, E 002.57618°)	None available
9	21/07/2022	Djeffa plage 1 (N 06.36155°, E 002.57030°)	6
10	21/07/2022	Ekpe plage (N 06.36213°, E 002.54660°)	None available
11	21/07/2022	PK10 plage (N 06.35933°, E 002.52142°)	3 at beach lodge
12	21/07/2022	Le Bélier plage (N 06.35990°, E 002.49546°)	2 at beach lodge
13	21/07/2022	Donatin plage (N 06.36083°, E 002.46793°)	6
14	21/07/2022	El Dorado plage (N 06.35449°, E 002.46430°)	None available
15	21/07/2022	PLM plage (N 06.35439°, E 002.45955°)	1 at beach lodge
16	08/10/2022	Akpakpa Dodomè plage (N 06.35281°, E 002.44706°)	2
17	17/07/2022	Xwlacodji embouchure (N 06.35414°, E 02.44291°)	3
18	17/07/2022	Wharf Cotonou (N 06.35126°, E 02.43772°)	None available
19	17/07/2022	Jacquot plage (N 06.34731°, E 02.36904°)	8
20	17/07/2022	Fidjrossè plage (N 06.34684°, E 02.36664°)	3
21	07/07/2022	Fignegnon 1 plage (N06.34684°, E 002.36664°)	15 (13 fishers, 2 fishmongers)
22	07/07/2022	Togbin Daho plage (N 06.34660°, E 002.30468°)	2
23	07/07/2022	Akpandji plage (N 06.34483°, E 002.28675°)	3
24	07/07/2022	Adounko plage (N 06.34513°, E 002.27815°) **	6
25	07/07/2022	Avlekete plage (N 06.34380°, E 002.25645°)	7
26	07/07/2022	Hio plage (N 06.34161°, E 002.23561°)	4
27	29/09/2023	Ahlobé plage	2
28	22/09/2022	Ahouangagbe plage	2
29	07/07/2022	Assionpognon-Codji (N 06.33405°, E 002.16981°)	2
30	07/07/2022	Lissassicodji (N 06.32772°, E 002.12006°)	3
31	08/07/2022	Djegbadji plage (N 06.32058°, E 002.07821°)	2
32	22/10/2022	Kouvènafidé plage (N 06.32514°, E 002.10380°)	2
33	08/07/2022	Degoue plage (N 06.31534°, E 002.04800°)	2
34	08/07/2022	Azizakoue plage (N 06.31183°, E 002.03146°)	27
35	08/07/2022	Aïdo plage (N 06.30854°, E 002.01031°)	7 (6 fishers + 1 fishmonger)
36	10/10/2022	Djondji plage (N 06.30341°, E 001.97133°)	6
37	11/10/2023	Dokloboé (N 06.30003°, E 001.95862°)	None
38	11/10/2023	Hokouè (N 06.29698°, E 001.94173°)	4
39	08/07/2022	Avlo plage (N 06.28980°, E 001.90120°)	3
40	08/07/2022	Alongo plage (N 06.28741°, E 001.88550°)	8
41	08/07/2022	Gbecon plage (N 06.28077°, E 001.84090°)	Declared no interest
42	20/11/2022	Hounsoukpe plage°, Dokome (N 06.27541°, E 001.81551°) ****	8
43	14/07/2022	Woue kondji (N 06.27234°, E 001.80082°)	5
44	14/07/2022	Kindjehoue plage (N 06.27206°, E 001.79953°)	13
45	14/07/2022	Robeti plage (N 06.26750°, E 001.78328°)	4
46	14/07/2022	Nicoue Kondji (N 06.26420°, E 001.77000°)	8
47	14/07/2022	Ayiguinnou plage (N 06.26036°, E 001.74627°)	12
48	14/07/2022	Saka plage (N 06.25118°, E 001.70134°)	12
49	14/07/2022	Agoue plage (N 06.24588°, E 001.67772°)	6
50	14/07/2022	Hillacondji beach (N 06.23750°, E 001.63486°)	3
		Total	251 persons

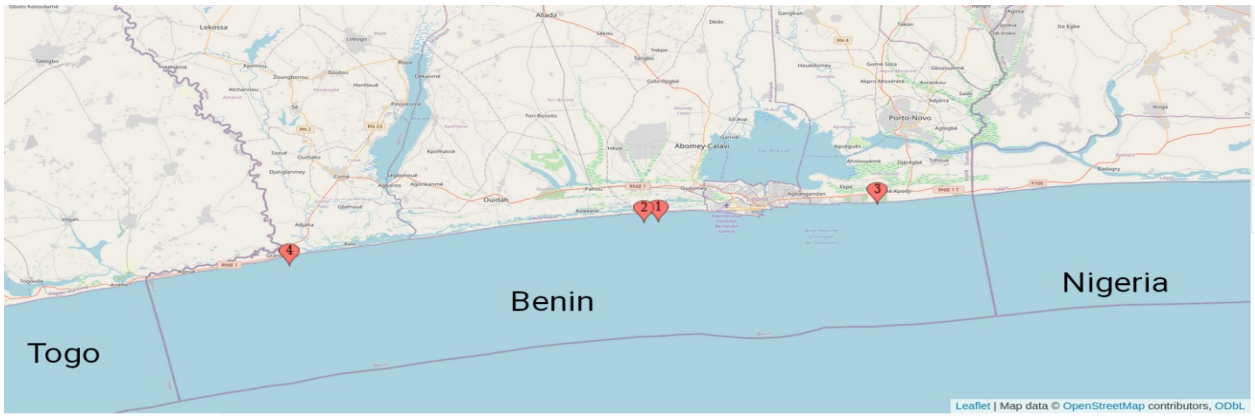

Figure 1: Map of the Beninese coast with the four currently confirmed records of *Sousa teuszii*. The first case is based on Zwart and Weir (2014). Cases nos. 2–4 are newly documented (see text), indicating the species' presence on the eastern, western and central coast. Map modified from OpenStreetMap.

Confirmed records of Atlantic humpback dolphins

Below we list one published (Case 1) and discuss four new, supported, records of *S. teuszii* (Cases 2–5), all revealed through citizen science. Four cases (1–4) originate from Benin (Fig. 1) and one (Case 5) from Nigeria but was recorded by a Beninese fisherman.

Case 1 – The first published record of *S. teuszii* in Benin consisted of four individuals sighted and photographed opportunistically by a tourist nearshore at Kokokodji beach (N 06.345278°, E 02.2975°), 14.5 km west of the Port of Cotonou, on 3 November 2013 (Zwart and Weir, 2014).

Case 2 – On 25 October 2022, German Erik Iwan-Rescheleit, reported to S.T. an observation of two Atlantic humpback dolphins, moving west, at Adounko beach (N 06.34513°, E 02.27815°), on 29 August 2022 (Fig. 1). Despite low light (at 18:31), a low-resolution video demonstrates the diagnostic dorsal fin shape of *S. teuszii.* Their behavior, moving slowly side-by-side in very shallow water just beyond the surf zone, without displaying aerial activity, was also consistent with that species. In fact, circumstances were greatly reminiscent of the 2013 sighting.

Case 3 – Fisherman William Kokou Assou contacted S.T. with information on a dolphin stranding at beach PK 18 (N 06.36246°, E 02.59152°), i.e. 18 km east of Cotonou port (Fig. 1) on 8 October 2022. The fisherman and two other residents confirmed the live-stranding of 'a kind of dolphin they had not seen before'. The Atlantic humpback dolphin (Fig. 2) was encountered at about 22:00 entangled in large-sized heavy-duty plastic sheeting (polyethylene), commonly used by Benin's fishermen as an improvised sail for canoes, and which are regularly discarded or lost.

The fishermen removed the plastic and pushed the struggling dolphin back to sea. Later, on 28 October 2022, one of us (S. Tchibozo) visited the site and confirmed the presence at that particular beach of a damaged and abandoned small canoe, faintly visible in the upper left corner of one photo. This appears to be the first documented incident of large plastic sheeting leading to a life-threatening entanglement.

Figure 2: Entanglement of an Atlantic humpback dolphin *Sousa teuszii* (Kükenthal) in large-sized plastic debris (sheeting used as sails) and live-stranded at PK 18 Plage, Benin (see Fig. 1) on 26 October 2022. The dolphin reportedly was successfully refloated.

Case 4 – Fisherman Boris Amoussou sighted ca. seven humpback dolphins at 08:00 AM on 27 November 2024 at some 300 m from shore at Hounsoukpe Plage/Dokome (N 06.27541°, E 001.81551°), Grand-Popo. Three short videos positively support the identification. This is the fourth, and most recent, confirmed case of *S. teuszii* for Benin.

Case 5 (Nigeria) – A Beninese fisherman reported a dolphin landed as bycatch, in fresh condition, at Ibeno Beach (N 04.5582666°, E 7.9606°5), Akwa Ibom State in southeastern Nigeria, on 29 October 2022. It is supported by photographs and a video of a juvenile humpback dolphin (Fig. 3). The type of fishing gear involved in the bycatch event is unknown. The dolphin was cut up for marine bushmeat.

In summary, four records of *S. teuszii*, all provided by citizen science, are presently confirmed for Benin: three sightings and one live stranding, in total accounting for 14 individuals. Group size ranged from 2 to 7 (mean= 4.33; median= 4; n= 3).

Figure 3: A juvenile Atlantic humpback dolphin landed at Ibeno Beach, southeastern Nigeria, as reported by a visiting Beninese fisherman. Note the rope around the tailstock. It demonstrates bycatch problems of humpback dolphins to be similar in Nigeria as in Benin. The dolphin was cut up for marine bushmeat.

Other delphinids

Fisherman Boris Amoussou filmed a group of >100 blackfish, i.e. dark-colored, large-sized Delphinidae without visible beaks on 8 December 2024 (time 14:15). The cetaceans were sighted from an artisanal fishing boat some 30 km offshore Grand-popo (N 06.28942°, E 01.90222°), heading west. We tentatively identified them as melon-headed whales *Peponocephala electra* (Gray) as all individuals showed a tall, broad-based, falcate dorsal fin mid-dorsum (excluding pilot whales *Globicephala* spp.), a pointed tip of dorsal fin (excluding false killer whale *Pseudorca crassidens* (Owen), which has rounded tip); and there were no pale colored individuals (excluding Risso's dolphin *Grampus griseus* G. Cuvier). Their behavior, including large group formation, energetic surface activity and fast swimming, was fully consistent with *P. electra* and contra-indicative for pygmy killer whale *Feresa atttenuata* Gray.

Boris Amoussou reported the live stranding of a dolphin at Grand-Popo beach on 2 March 2025 (Fig. 4), which we identified as a Gray's pantropical spotted dolphin S*tenella attenuata attenuata* (Gray). The animal was refloated and pushed out to sea. It is the first confirmed record of this species for Benin. Independently another observer (Arnaud Allowodo) also provided two low-resolution photos of most likely the same dolphin at Grand-Popo. Observed diagnostic features include a dark dorsal cape (without noticeable spotting) sweeping very low on side just ahead of the dorsal fin, white-tipped beak and pale lips (indicative for adult), dark grey eye patch and long slender rostrum (Fig. 4).

On 26 March 2025, a juvenile short-finned pilot whale *Globicephala macrorhynchus* Gray allegedly live-stranded at Avlékété, Ouidah community (Fig. 5). To avert it would be killed for bushmeat, local police ordered it to be pushed back to sea. However, the animal later washed ashore again, dead (Maixent Ogou, ONG Action Plus, pers. comm. to S. Tchibozo, 29 March 2025). No external injuries or evidence of gear entanglement were visible (Fig. 5).

Large whales

Remains of at least 10 large whales stranded on Benin's coast between 2009–2023 (Table 3), including five confirmed, and one probable, humpback whales and three sperm whales *Physeter macrocephalus* Linnaeus (e.g. Fig. 6). Cause of death remains unknown as no necropsies were performed nor samples collected, however we suspect that several whales may have been killed by collisions with ships, including at least one sperm whale (Fig. 6).

Eight sightings of humpback whales were reported from shore-based vantage points, between 10 July and 22 October 2022 (Table 4), all falling within the expected seasonality for an austral population. One volunteer reported 75% of these, underscoring the great potential for citizen science, with sustained encouragement.

Citizen science

During the first study period, 251 fishermen, fishmongers and other coastal inhabitants were queried about cetacean sightings, strandings and bycatches in the recent past (Table 2). Photographs of coastal dolphins facilitated communication. Insights gained were homogeneous and can be summarized as follows.

(i) Fishermen's reports of 'occasional' encounters with dolphins and whales at sea (offshore) and inshore were consistent along the entire Benin's coastline, suggesting reliability. While a few persons indicated beach-based dolphin sightings with some regularity, the majority rated these as 'unusual' or 'very unusual', i.e. concordant with our lack of scientific sightings.

(ii) Fishermen acknowledged that they had difficulty distinguishing between Atlantic humpback and common bottlenose dolphins. Therefore, confirmation of reported records through photographs or videos of sufficient quality is indispensable.

(iii) Beninese fishermen hardly admitted to dolphin captures, even accidental catches. Suspicion exists that some reported 'live-strandings' may in fact represent undeclared captures.

(iv) The four new Atlantic humpback dolphin records and most information on stranded whales were provided by artisanal fishermen whom reside along the coast. Citizen science channels, via direct contacts or social media, can substantially increase opportunistic observer effort. To compensate for poor descriptive information, graphic evidence is essential. With low dolphin abundance, stochastic factors largely determine encounters, and search effort should be as high as feasible.

Figure 4: Adult pantropical spotted dolphin *Stenella attenuata attenuata* (Gray) live-stranded at Grand-Popo, west coast of Benin, on 2 March 2025. For diagnostics see text. Reportedly the animal survived and was refloated. Photo © Boris Amoussou. Reproduced with permission.

Figure 5: Juvenile short-finned pilot whale *Globicephala macrorhynchus* Gray allegedly live-stranded at Avlékété, Ouidah Community on 26 March 2025 (Photo © Maixent Ogou and ONG Action Plus, Benin. Reproduced with permission).

Figure 6: Decomposed carcass (condition 4) of sperm whale *Physeter macrocephalus* (Linnaeus) stranded at embouchure de Grand-Popo beach, Benin, on 24 March 2023. A large incisive trauma on the head is thought due to a propeller strike from a large vessel (but may be post-mortem). Total scale length is 150 inches (381 cm).

Table 3: Large whale remains (n= 10) found stranded on Benin's coast in 2009–2023. Specimens when photographed were in advanced decomposition (code 4) or bones (code 5). Their condition at the time of stranding is unknown.

No.	Date	Locality	Species	Observers and comments
1	2009	Border between Benin and Nigeria	Unidentified large whale	Houetchou D. Félix Cranial fragment (squamosal)
2	12/08/2013	Grand-popo	*Megaptera novaeangliae*	Koaci.com and ReseauCétacés https://www.reseaucetaces.fr/2013/08/22/benin-une-baleine-morte-echoue-sur-la-plage-de-grand-popo/
3	?/ ?/2014	Sémè-Kraké beach (N 06.37444°, E 002.69578°)	Large whale, possibly *Megaptera novaeangliae*	Kouadi, M.
4	11/09/2018	Réserve La Bouche du Roy, Grand-popo	*Physeter macrocephalus*	Daniel Aboki, Eco-Bénin. See https://www.ecobenin.org/une-baleine-morte-echoue-a-l-embouchure-de-la-reserve-la-bouche-du-roy/
5	?/02/2019	Alongo plage (N 06.28741°, E 001.88550°)	*Physeter macrocephalus*	Gbedevi, A.
6	17/04/2022	Near Benin Golf premises (N 06.34382°, E 002.39356°)	*Megaptera novaeangliae*	Locals at beach lodge
7	22/08/2022	Agoue plage (N 06.24588°, E 001.67772°)	*Megaptera novaeangliae*	Agbonor, K. and Tchibozo, S.
8	29/08/2022	Fidjrossè plage (N 06.34684°, E 002.36664°)	*Megaptera novaeangliae*	Tchibozo, S. Photo of lung parenchym
9	24/03/2023	Kindjehoue plage (N 06.27206°, E 001.79953°) at Grand-popo, first reported 18/03/2023. 2nd stranding at Embouchure de Grand-popo (N 06.29114°, E 001.91347°)	*Physeter macrocephalus*	Arnaud, Allowodo, N., Amoussou, B. and Tchibozo, S. See Figure 4.
10	26/09/2023	Avlekete plage (N 06.34380°, E 002.25645°)	*Megaptera novaeangliae*	Officers at Avlekete police station

Table 4: Shore-based sightings of humpback whales reported by fishermen on Benin's coast, as part of a citizen science initiative, in austral winter (July-November) 2022.

No.	Date	Location	Comments	Observers
1	10/07/2022	Around Port de Pêche de Cotonou (N 06.35075°, E 002.43294°)	1 whale	Anonymous fisherman
2	07/08/2022	PK18 (N 06.36246°, E 002.59152°)	1 adult whale	Assou, W. K.
3	08/08/2022	PK18 (N 06.36246°, E 002.59152°)	1 adult whale	Assou, W. K.
4	27/08/2022	PK18 (N 06.36246°, E 002.59152°)	2 whales (adult/calf pair)	Assou, W. K.
5	09/09/2022	PK18 (N 06.36246°, E 002.59152°)	2 adult whales	Assou, W. K.
6	16/09/2022	PK18 (N 06.36246°, E 002.59152°)	1 adult whale	Assou, W. K.
7	25/09/2022	PK18 (N 06.36246°, E 002.59152°)	1 adult whale	Assou, W. K.
8	22/10/2022	Agoué (N 06.24588°, E 001.67772°)	1 adult whale	Agbonor, K.

Table 5: Experimental small-boat visual survey effort searching inshore dolphins in Benin coastal waters in July-August 2022. At Nicoue Kondji both eastbound and westbound sorties were implemented the same day.

No.	Date	Start and stop locations	Duration	Observers
1	10/07/2022	Port de Pêche de Cotonou (N 06.35075, E 002.43294) - Togbin (N 02.33189, E 002.35122), return to Port de Pêche de Cotonou	2h 19 min	Kokoro, R. and Tchibozo, S.
2	27/07/2022	Kopeganme (N 06.32619, E 002.66940) - Sèmé-Okoun (N 06.36399, E 002.64633) - Kopeganme	2h 27 min	Tchibozo, S. and Noël.
3	05/08/2022	Nicoue Kondji (N 06.26193, E 001.77110) - Nicoue Kondji (N 06.27388, E 001.82218)	1h 38 min	Tchibozo, S. and Zianleko, C.
4	?	Nicoue Kondji (N 06.27388, E 001.82218) - Nicoue Kondji (N 06.25431, E 001.73036)	1h 19 min	Tchibozo, S. and Zianleko, C.

Experimental small-boat surveys

Four near-shore (< 3 km) sorties in small boats, powered by a 25–40 hp outboard engine were made, with total duration of 7h and 43 min (463 min), applying a standard strip transect visual survey protocol (Table 5). Aims included also practical training and evaluation of a medium-sized, dug-out canoe as platform for future visual surveys. Three observers (S.T., trainee and skipper) searched for cetaceans with naked eye and 7x50 binoculars. None were seen. Logistical challenges included unsatisfactory trainee selection, low eye-height of observers (*ca.* 150–200 cm), deficient platform stability compromising use of binoculars, difficulties to (dis)embark with equipment during shore-launches and poor adherence by fishermen to agreed protocol including schedules (timing and routes), leading to significant downtime.

Discussion

Despite appreciable survey effort, no scientific sightings of cetaceans were made, which is explainable by the scarcity of *S. teuszii* and inshore *T. truncatus*, as suggested also by earlier field research in coastal Benin and Togo (Van Waerebeek et al., 2009; Sohou et al., 2013; Segniagbeto et al., 2019).

Nonetheless, four citizen science records of *S. teuszii* (of which three are new) are presently confirmed for Benin, including three sightings and one live stranding, accounting for 14 individuals. This is encouraging evidence that the threatened Gulf of Guinea population of *S. teuszii* (Ayissi et al., 2014) still occurs in Benin's and Nigeria's coastal waters as of 2024, although evidently in very low numbers. Indeed, the lack of scientific sightings during >82 hours of dedicated observer effort and 120 km of shoreline coverage along the eastern, central and western parts of Benin's coast, underscores the low abundance of both this delphinid and inshore *T. truncatus*.

Considering that most walking and all stationary observation activity was done along the high tide zone, with above-sea level eye height fluctuating 4–8 m (measured by GPS), we estimated that dolphins could potentially be spotted at least 1 km from the shore (see also Collins et al., 2013). Stationary mode allowed considerably more binocular scanning time while, conversely, walking mode ensured greater shoreline coverage. Due to persistent SW winds and relatively high Beaufort Sea states (median= 3 Bf, range= 2–5 Bf) during the second period, some dolphins may have been missed.

A number of logistical challenges of surveys with fishing canoes were identified, and will need to be addressed before further boat surveys are attempted.

We here document a second case of a live-stranding of *S. teuszii*, after one stranded specimen was reported rescued in Gabon in 2021 (J.R. Kema Kema, unpublished data; see: https://www.sousateuszii.org/2021/12/29/local-community-members-play-crucial-role-in-the-rescue-and-release-of-atlantic-humpback-dolphins-in-gabon/). The same Benin record is also the first account of a *S. teuszii* entanglement in large-sized plastic debris. It demonstrates that discarded, or lost at sea, plastic sheets are an unrecognized, potentially fatal, threat to dolphins. Fortunately, this entangled dolphin was encountered in time and could be refloated.

A new record of *S. teuszii* in neighboring Nigeria consisted of a fatal net entanglement which adds to earlier evidence of fisheries-linked impacts on coastal dolphins. In Nigeria, as in Ghana, bycaught and hunted dolphins are typically processed as marine bushmeat, destined for human consumption (Ofori-Danson et al., 2003; Uwagbae and Van Waerebeek, 2010; Olakunle et al., 2014; Ambrose and Obienu, 2016; Van Waerebeek et al., 2016, 2017; Segniagbeto et al., 2019). Dolphins ('Takpé', 'Atui' and 'Anoufo') were traditionally considered 'sacred' in southern Benin's predominant Ewé culture (Sohou et al., 2013), much as in coastal Togo and southeastern Ghana (Ofori-Danson et al., 2003; Van Waerebeek et al., 2009; Segniagbeto et al., 2019;), however this is rapidly changing due to the need for proteins.

The conservation status of the inshore ecotype of *T. truncatus* in Benin appears comparatively as dire as that of the sympatric *S. teuszii*. No *T. truncatus* were encountered during this survey nor incidentally over the past 24 years. Admittedly, some of the small dolphin groups opportunistically reported from beaches by citizen science actors may belong to this species. The observation of two dolphins depredating inside an artisanal purse-seine on the central coast in September 2001 is still the only confirmed sighting record of this taxon in Benin's coastal waters. A single specimen is represented by a set of mandibles (Sohou et al., 2013; Van Waerebeek et al., 2016). The most recent case of *T. truncatus* in Togo, a stranding of unknown cause, dates from September 2010 (Segniagbeto et al., 2012), while in Nigeria a sighting was reported off Lagos as recent as 2014 (Olakunle and Akanbi, 2014). Common bottlenose dolphins of unknown ecotype are confirmed to be captured and landed in Nigeria and Ghana, both from bycatch and hunting (Ofori-Danson et al., 2003; Uwagbae and Van Waerebeek, 2010; Olakunle and Akanbi, 2014; Van Waerebeek et al., 2016; Segniagbeto et al., 2019).

The stranding of a specimen of *Stenella a. attenuata* is the first documented record of that species for Benin. Predictably, since *S. a. attenuata* is one of the more common delphinids in Ghana waters (Ofori-Danson et al., 2003; Van Waerebeek et al., 2009; de Boer et al., 2016), while also reported for Togo (Segniagbeto et al., 2014) and Nigeria (Olakunle and Akanbi, 2014). Moreover, in Benin, Atlantic spotted dolphin *Stenella frontalis* (G. Cuvier) and unidentified spotted dolphins *Stenella* sp. had been sighted before (Sohou, 2011; Sohou et al., 2013). *Peponocephala electra* is commonly by-caught in Ghana and sighted off Côte d'Ivoire thus its presence off Benin was expected (e.g. Ofori-Danson et al., 2003; Van Waerebeek et al., 2009; de Boer et al., 2016).

The stranding of a juvenile *Globicephala macrorhynchus* is the second (published) case of this species for Benin (see Sohou et al., 2013).

During the surveys we observed the intensive deployment of beach seines, artisanal monofilament gillnets (both drift and bottom-set), as well as small-mesh multifilament drift nets in often shallow waters along the entire Beninese coast, similarly as reported from Togo (Segniagbeto et al., 2014, 2019). Although insufficient documented cases are at hand for Benin, guided by insights from wider West and Central Africa (Van Waerebeek et al., 2016; Collins et al., 2019; Segniagbeto et al., 2019) we suggest that entanglement in fishing gear may be the most important source of anthropogenic mortality among Benin's inshore dolphins, which in turn may explain the observed scarcity, including small group sizes, of *S. teuszii* and lack of recent records of *T. truncatus.*

No scientific sightings of humpback whales were documented by the authors during their systematic surveys. However, most effort occurred outside the expected season, while citizen science actors reported eight sightings in 2022, apart from (at least) five stranded specimens, all during the austral winter. A mother-calf pair observed on 27 August 2022 is consistent with the calving seasonality of the IWC-

denominated B1 stock (or a substock) which overwinters off western Africa, from Dakar, central Senegal, southeast to Angola (Van Waerebeek et al., 2001, 2002; Collins et al., 2008; Rosenbaum et al., 2004; Bamy et al., 2010; Tchibozo and Van Waerebeek, 2012; Djiba et al., 2015).The present conservation status and population abundance trend of humpback whales in the Bight of Benin remain unknown, due to a lack of dedicated surveys since Van Waerebeek et al. (2001, 2002). A comparative analysis of commercial whale-watching data could provide useful insights.

Conclusion

The amplification of citizen science observer effort on Benin's coast is highly recommended. The vast numbers of coastal inhabitants provide good opportunities to obtain opportunistic cetacean encounters. Coastal demographics (high densities) may partly compensate for the scarceness of dolphins and the few trained marine mammalogists, if casual but alert observers can be encouraged to record and report cases.

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Author contributions

Conceptualization of the present study and the seeking of funding was equally contributed to by the three authors. The extensive reliance on citizen science was spearheaded by S.T. and H.-Y.L. Field work and preparation of first drafts were implemented by K.V.W. and S.T. Editing of an advanced manuscript and addressing reviewers' comments was done by S.T., K.V.W. and H.-Y.L. Briefing of fishermen-observers and two trainees, small-boat survey trials as well as the large majority of interviews with locals were conducted by S.T. Frame-by-frame analysis of videos, to ascertain species identification, was done by K.V.W., supported by S.T. All authors approved the final version of the manuscript. Financial aspects and legal authorizations were administrated by S.T. and H.-Y.L., between the Cotonou-based NGO CRGB and the sponsors.

Conflict of interest

The authors declare that there are no conflicting issues related to this research article.

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