

Seabird surveys in the Sunda Straits, Indonesia

Final Report



Nick Brickle

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Introduction

The Sunda Strait lies between the Indonesian Islands of Sumatra and Java and forms one of the few sea channels that connect the Indian Ocean with the Java Sea the Pacific Ocean beyond. At its northern end the Straits are only 22 km wide, while at the wider southern end the distance increases to around 80 km.

To the north of the strait lies the shallow Java Sea, at around 100m in depth. By the middle of the strait the depth drops rapidly to over 1,000m, before falling away even further as the sea valley that forms the straits joins with the deeper Java Trench. This 2,000 km long sea-canyon runs roughly east-west off the coast of Java and Sumatra, reaching depths of over 7000m (see Figure 1 & 2).

There has been little previous bird survey work in the Sunda Straits, and even less published. However, the migration patterns of several species point to its importance. Matsudaira's Storm-petrel (*Oceanodroma matsudairae*), Streaked Shearwater (*Calonectris leucomelas*) and Swinhoe's Storm-petrel (*Oceanodroma monorhis*) all have sizeable western pacific breeding populations that move to the Indian Ocean via the Indonesian archipelago. Only a small number of sea channels exist to make this journey, including the Sunda Straits, Lombok Straits, and several smaller channels to the east, and the Malacca Straits to west. Of these the Sunda and Lombok straits represent the most direct routes.

The importance of the Sunda Straits for foraging birds is even less well known, as it cannot be inferred from migration patterns alone. The Java trench reaches into the straits and has seasonal upwelling in April-October, corresponding with the peak of the 'Indonesian Through-flow' and the Indian Ocean South-west monsoon. At this time warm waters from the western Pacific flow through the Indonesian archipelago into the Indian Ocean and form the 'Leeuwin Current' that flows down Australia's west coast. The resulting up-welling stimulates high plankton growth, which can be recorded by satellite imagery (Figure 3), which in turn corresponds to the highest pelagic fish catches (Hendiarti *et al.* 2005).

Previous bird records from the Sunda Strait come from a variety of sources, but amongst the commonest sources are those made on an *ad hoc* basis by observers travelling by public ferry between Baukuheni in Sumatra, and Merak on Java. This route does not pass over any of the deep sea canyons of the south-western strait, instead passing only over shallow water more typical of the Java Sea. The most frequently seen seabirds include Bulwer's Petrel (*Bulweria bulwerii*), Swinhoe's Storm-petrel (*Oceanodroma monorhis*), Streaked Shearwater (*Calonectris leucomelas*) and Wedge-tailed Shearwater (*Puffinus pacificus*), occasionally in large numbers, with records published on social media, birdwatching trip reports and mailing lists, rather than published reports.

Bird records from the Sunda Straits published in the scientific literature are sparse. Davidson & Bishop (reported in Marle & Voous) recorded Streaked Shearwater in Aug-Nov 1983-1985 including 'groups of c. 20 flying south, rafts of 80-100 on the water'. Frank Rozendaal noted Wilson Storm Petrel in the Sunda Straits in July 1979 (reported in Marle & Voous). Nearby, Andrew recorded Streaked Shearwater, and also Sabine's Gull off west Sumatra (Andrew 1985 Kukila 2(1):9 while Morzer Bruyns recorded Swinhoe's Petrel in the Bangka Strait (off east Sumatra in September 1954 (reported in Marle & Voous).

Some information about pelagic bird use of the Java Trench was collected by a Dutch marine survey expedition that travelled along the south-west coast of Sumatra, and then passed through the Sunda Strait, in July 1984 and June 1985. This survey noted a high concentration of seabirds around the Indonesian island of Enggano (260 km north-west of the Sunda Strait, 100 km off the coast of Sumatra), recording an average of 164 birds per day of 18 species (Van Den Berg *et al.* 1991). This included important observations of two species new

to the northern Indian Ocean and Indonesian territorial waters: Barau's Petrel (*Pterodroma barau*) and Jouanin's Petrel (*Bulweria fallax*), considered 'Endangered' and 'Near-threatened' respectively by IUCN (2017).

Beyond these, records become very anecdotal, and mainly relate to onshore records that only serve to give small clues as to what might be offshore. Such records include things like Flesh-footed Shearwater *Ardenna carneipes* (Records from N. of Aceh, reported in Marle & Voous) and White-faced Storm-petrel *Pelagodroma marina* (Record from Bantam, east Sumatra and Aceh, north Sumatra; reported in Marle & Voous).

Records from outside of the immediate region also serve to give some indication of what might be possible. For example, records from Australian territorial waters, most notably from Christmas Island (around 430 km south of the Sunda Strait), and from the Ashmore Reef (around 2,000 km to the east). Christmas Island is the breeding home of several important seabird species including Christmas Island Frigatebird (*Fregata andrewsi*), that has regularly been recorded foraging off the north and south coasts of Java, and in the Sunda Strait, and Abbotts Booby (*Sula abbotti*), that has only rarely been recorded from Indonesian waters and is suspected to mainly forage south of Christmas Island. Records from the Ashmore Reef include several pelagic species that have rarely or never been recorded in Indonesian waters, including Hutton's Shearwater (*Puffinus huttoni*, 'Endangered', breeding in New Zealand and suspected of circumnavigating Australia in the non-breeding season), Tahiti Petrel (*Pterodroma rostrata*, 'Near-threatened', breeding on Pacific Ocean islands), and also further records of Jouanin's Petrel.

In addition to those threatened species listed above, there is also potential for the area to be used by the endangered Mascarene Petrel (*Pterodroma aterrima*), whose non-breeding habits are largely unknown but may include the northern Indian Ocean, possibly as far north as the Java Trench.

In this report we present the results of a small project to conduct seabird surveys in the Sunda Straits. This included a review of old records, the results from two surveys trips conducted in 2009 and 2010. The report also presents a summary of the seabird conservation activities that were catalysed by this project in subsequent years.

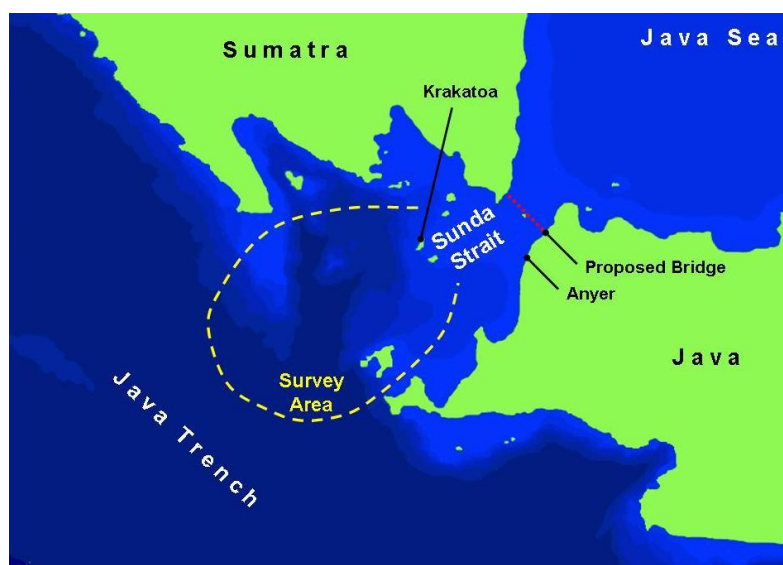


Figure 1: Showing the Sunda Straits and the location of the survey area

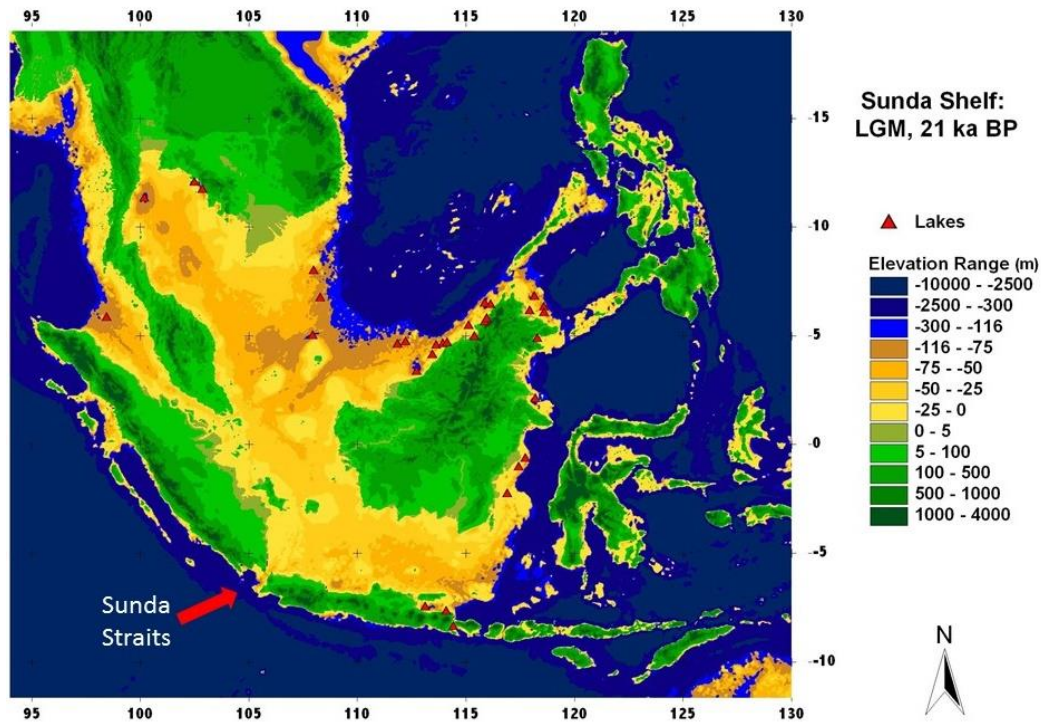


Figure 2: Sea depths around the Sunda Shelf. Reproduced from Sathiamurthy & Voris 2006.

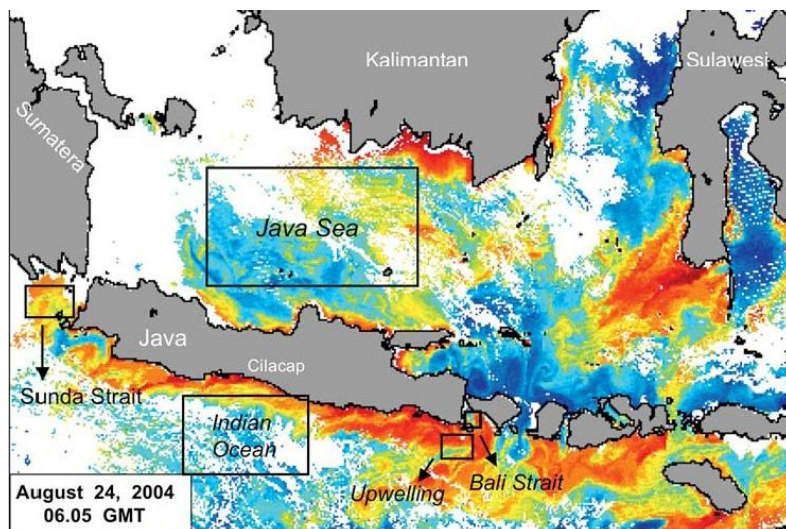


Figure 3: Showing areas of oceanic upwelling (in red). The Sunda Straits are labelled to the left of the map. Reproduced from Hendiarti *et al.* 2005.

Survey Methods

Literature review

We searched both the published literature and the 'grey literature' of birdwatching trip reports, mailing list and social media posts. We also directly contacted people whom we were aware had made pelagic records in the area. Our search for information extended from Indonesia waters to adjacent territories where relevant, most notably Singapore, Malaysia and Australia.

Field survey

We conducted two, 2-day ship-borne trips into the Sunda Straits; in September 2009 and August 2010. In each case the boat used was a 15m sport fishing boat, equipped with a marine GPS and depth finder.

Survey routes taken on both surveys are shown in Figure 4, based on the GPS track log. In each case the boat left and returned to Ujung Genting, and was moored overnight in the shelter of the east coast of Panaitan Island.

Systematic survey methods were considered, but due to the exploratory nature of these initial trips they were abandoned as unpractical. Instead the surveys focused on assessing the general abundance and diversity of birds present, to identify areas of potential concentrations of seabirds which might be targeted in subsequent surveys, and to assess the general logistical challenged of conducting pelagic surveys in the Sunda Straits.

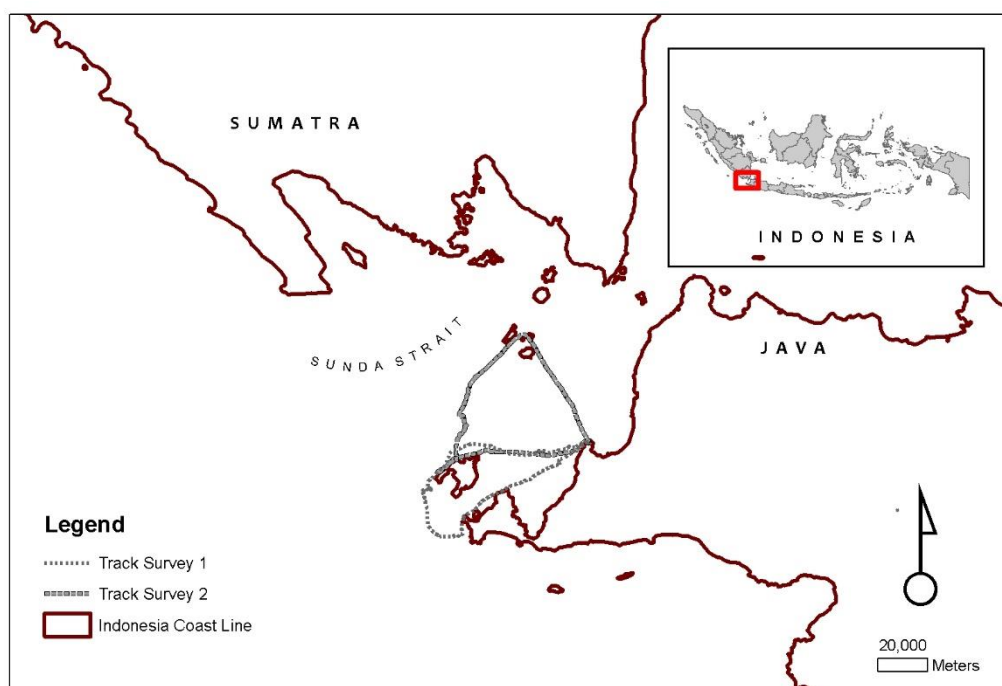


Figure 4: Survey routes taken in Sept 2009 ('Survey 1') and Aug 2010 ('Survey 2').

Results

Literature review

Results of the literature review are reported in the introduction, and summarised below in Table 1, which lists all species known to, or likely to occur in the Sunda Straits, together with notes on their status and the likely timing of their occurrence.

Those species known to occur are highlighted, while for the remained their occurrence is considered possible, due to the existence of records from neighbouring areas, or by inference from their distribution and/or behaviour.

Red-billed Tropicbird	Poss vagrant to Sumatra.	Gulf, Arabian sea.	
Abbot's Booby	Prob present year-round but birds suspected to forage S, not N.	Xmas Is.	
Masked Booby	Poss year round. Breeds in E. Indo, W. Aus, and Indian O.	Pacific, Aus	
Red-footed Booby	Poss year round. Breeds in all surrounding seas.	Pacific, Aus	
Brown Booby	Poss year round. Breeds in E. Indo, W. Aus, and Indian O.	Pacific, Aus	
Christmas Island Frigatebird	Prob year round as forage to Indo coast.	Xmas Is.	
Great Frigatebird	Prob year round	Pacific, Aus, Xmas Is.	
Lesser Frigatebird	Prob year round	Pacific, Aus	
Red-necked Phalarope	N. Winter wanderers	Arctic	
Grey Phalarope	N. Winter wanderers	Arctic	
South Polar Skua	S. Winter wanderers	Antarctic	
Pomarine Skua	N. Winter wanderers	Arctic	
Arctic Skua	N. Winter wanderers	Arctic	
Long-tailed Skua	N. Winter wanderers	Arctic	
Bridled Tern	Poss present year round	Indonesia	
Sooty Tern	Poss present year round	Pacific, Aus	
Brown Noddy	Year round?	Pacific, Aus	
Black Noddy	Poss year-round?	Pacific, Aus	
White Tern	Poss year-round?	Pacific	
Audubon's [Tropical] Shearwater	Poss vagrant from Pacific	Pacific	
Leach's Storm-Petrel	Poss vagrant from Pacific in N. winter	N. Pacific	

Field survey

Birds recorded during the surveys are shown below in Table 2 (below). Sample sizes were insufficient to attempt any kind of quantitative analysis of the data.

Species	Survey		Notes
	1	2	
Swinhoe's Storm Petrel <i>Oceanodroma monorhis</i>	18		All as ones or twos, all heading South.
Matsudaira's Storm Petrel <i>Oceanodroma matsudairae</i>	2		May have been more, only these were conclusively identified. All heading South.
Unknown dark petrels <i>Oceanodroma spp.</i>	21	1	Probably mostly Swinhoe's, all heading South.
Bulwer's Petrel <i>Bulweria bulwerii</i>	1	2	Single bird, briefly attracted to bait in the Sunda Straits (Survey 1) and seen off Ujong Kulon heading north (Survey 2)
Wilson's Storm Petrel <i>Oceanites oceanicus</i>	8	4	Several feeding and foraging in the Sunda Straits (Survey 1) and flying north off Ujong Kulon (Survey 2)
Streaked Shearwater <i>Calonectris leucomelas</i>	6	50	Seen close inshore in Sunda Straits during the first survey, more numerous throughout during the second survey.
Wedge-tailed Shearwater <i>Puffinus pacificus</i>	0	5	All as singles off Tanjung Cina point in Indian Ocean. All dark phase.
Brown Booby <i>Sula leucogaster</i>	0	6	All seen near small breeding island off Ujong Kulon
Bridled Tern <i>Sterna anaethetus</i>	45	0	Very common during the first survey, especially off rocky points.
Sooty Tern <i>Sterna fuscata</i>	1	0	One sub-adult/juvenile perched on a floating log near Krakatoa
Common Tern <i>Sterna hirundo</i>	50	2	Common in the Sunda Straits during the first survey, far less so during the second. All appeared to be the <i>longipennis</i> ssp.
Lesser Crested Tern <i>Sterna bengalensis</i>	6	40	Common, especially off rocky points
Aleutian Tern <i>Onychoprion aleutica</i>	1	0	Single bird confirmed, near Krakatoa. Several more may have been present
Black Noddy <i>Anous minutus</i>	1	1	Single bird with Bridled Terns near Tanjung Cina
Christmas Island Frigatebird <i>Fregata andrewsi</i>	36	35	Lots in straits, less in open sea
Lesser Frigatebird <i>Fregata ariel</i>	2	1	Several present, usually together with Christmas Islands Frigatebird.
Unknown frigatebirds <i>Fregata spp.</i>	14	35	Distant sightings, probably mostly Christmas Island Frigatebird.
Long-tailed Skua <i>Stercorarius longicaudus</i>	2	0	Seemingly attracted to tern flocks

Discussion

Bird Survey results

The results of the survey served to highlight the ongoing importance of the Sunda Straits as a seabird passage and foraging area. Despite the limited coverage, a wide range of species were recorded, including some of the key migratory species considered to use the straits as a transit route, such as Swinhoe's Petrel, Matsudaira's Petrel (the first confirmed records from the Sunda Straits), Streaked Shearwater and Wedge-tailed Shearwater.

A number of other species which were apparently using the straits as a foraging area were also found, of these perhaps the most notable were Christmas Island Frigatebird, which was present in large numbers, Bulwer's Petrel, Wilson's Storm Petrel, Long-tailed Skua and Aleutian Tern. In the case of the tern only a single conclusive record was made, but more may have been present. Very few records exist of wintering Aleutian Tern, but the breeding population is believed to use Indonesian waters. Perhaps the most interesting record was that of Black Noddy, which was the first confirmed record for Indonesia.

A number of rarer species that have been recorded elsewhere, such as Barau's Petrel, Jouanin's Petrel and White-faced Storm-petrel, were not recorded on either survey. For these species it may be necessary to travel further into open waters in the Indian Ocean.

Conservation results

The results of this project have gone far beyond the simple survey results. Its most important result has been its role as a catalyst for further work, primarily being led by young and enthusiastic Indonesian seabird enthusiasts. This includes, but is not limited to, the following:

Further surveys in the Sunda Straits:

Inspired by the surveys undertaken by this project, a number of further surveys have taken place in the Sunda Straits, and the area is increasingly becoming of interest to visiting birdwatchers, with some of the original team members from this project acting as guides.

Christmas Island Frigatebird surveys in the Jakarta Bay:

Inspired by this project, several of the original team members sought, and obtained, funding to conduct intensive surveys of Christmas Island Frigatebird in the Jakarta Bay. This in turn has led to a number of publications, including:

- Tirtaningtyas, F.N. 2012. Conservation of Christmas Island Frigatebird *Fregata andrewsi* in West Java, Indonesia—mid-term report. *BirdingAsia* 17 (2012):101-103
- Tirtaningtyas, F.N. 2014. Kleptoparasitic behaviour of Christmas Island Frigatebirds *Fregata andrewsi* in Jakarta Bay, Indonesia. *BirdingASIA* 21 (2014): 66–67
- Tirtaningtyas, F.N & Henniscke, J. 2015. Threats to The Critically Endangered Christmas Island Frigatebird *Fregata andrewsi* in Jakarta Bay, Indonesia, And Implications For Reconsidering Conservation Priorities. *Marine Ornithology* 43:137-140. <http://www.marineornithology.org/PD...>



Aleutian Tern Surveys in the Sunda Straits:

Publicity around records of Aleutian Tern, originally made during this survey, and repeated by further surveys subsequently, led to communication with a research team from the Alaska Maritime National Wildlife Refuge and the US Forest Service. This in turn led to field surveys in 2016, joined by members of the original survey team from this project. This work is continuing and it is hoped further surveys will be undertaken in 2017.

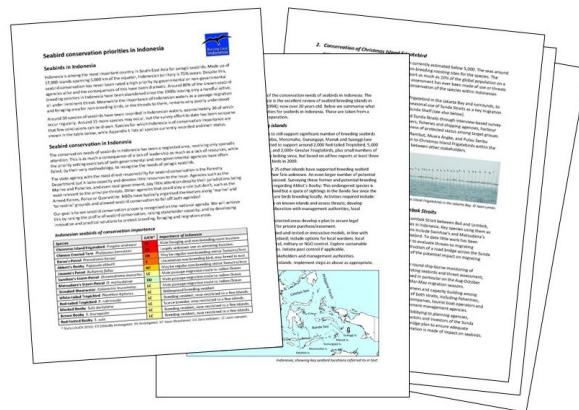


The formation of 'Burung Laut Indonesia' (Seabird Indonesia):

The team behind these original surveys decided to form its own group, dedicated to seabird conservation!

The group developed a strategic plan for seabird conservation and now continues to go from strength to strength promoting the cause and developing new projects

<http://burung-nusantara.org/network/burung-laut-indonesia/>



Publicity and publications:

The number of new publications, in the scientific literature, the popular birdwatching literature and the media has increased dramatically (the only way was up, given the lack of any publicity before this project started!

Scientific publications include:

- Poole, C., Brickle, N. & Bakewell, D. 2011. South-East Asia's final frontier? *BirdingASIA* 16.
- Brickle, N. 2009. Investigating pelagic seabird foraging and passage in the Sunda Strait, Indonesia. *Pacific Seabirds* 36 (1): 23.
- Tirtaningtyas, F.N. & Yordan, K. 2017. Updating the seabird fauna of Jakarta Bay, Indonesia. *Marine Ornithology* 45: 11–16.



Popular media articles (mainly in Indonesian) include:

- Koran Tempo. Mencegat Burung Migran di Tengah Laut. Minggu, 21 November 2010:A12-A13.
- <http://nationalgeographic.co.id/berita/2011/08/burung-langka-temukan-habitat-kedua-di-jakarta>
- <http://sains.kompas.com/read/2011/08/11/05090466/Burung.Langka.Mencari.Rumah.di.Jakarta>
- <http://www.tribunnews.com/nasional/2011/08/11/burung-langka-tempati-rumah-baru-di-teluk-jakarta>
- » [Serunya Mengintip Burung Laut di Selat Sunda](#)
- <http://readersblog.mongabay.co.id/rb/2016/12/15/serunya-mengintip-burung-laut-di-selat-sunda/>
- [Burung-Burung Laut di Selat Sunda](http://regional.liputan6.com/read/2682780/burung-burung-laut-di-selat-sunda) <http://regional.liputan6.com/read/2682780/burung-burung-laut-di-selat-sunda>

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