

# Diving into whale biology

Last July, a 10.6m-long carcass of an adult female sperm whale was found in Singapore waters. It was later dubbed Jubi Lee, in a reference to the fact that it was found in the nation's Golden Jubilee year. Its skeleton will be displayed at the Lee Kong Chian Natural History Museum, and visitors can view the exhibit from Tuesday.

## Sperm whale facts

**Scientific name:**  
*Physeter macrocephalus*

**Status:** Vulnerable to extinction

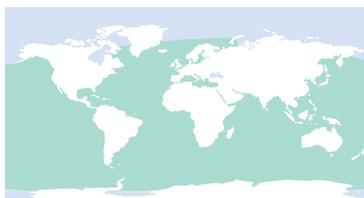
**Estimated sperm whale population:** 360,000

**Length:** 15m-18m

**Weight:** 35-45 tonnes

**Lifespan:** 50-70 years

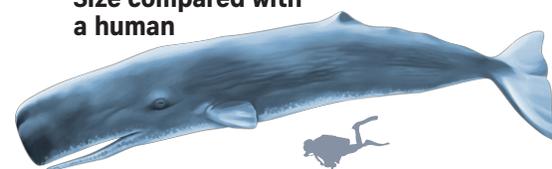
## Sperm whale range



## Echo-location

- Like dolphins, the sperm whale uses echo-location to navigate and hunt. Its skull is equipped with a dish-like structure which reflects sound waves.
- Its skull is also asymmetrical. This helps the whale perceive direction, since sound waves coming from different angles are not received the same way.
- The Singapore whale's skull measures 2.2m long.
- A sperm whale's head is huge, and can comprise up to a third of its body length.
- It contains special melon and spermaceti organs, which contain tissue that scientists believe could help with echo-location.
- The spermaceti organ can be found only in sperm whales, which is how the marine mammal got its name.

## Size compared with a human



A WHALE OF OUR OWN

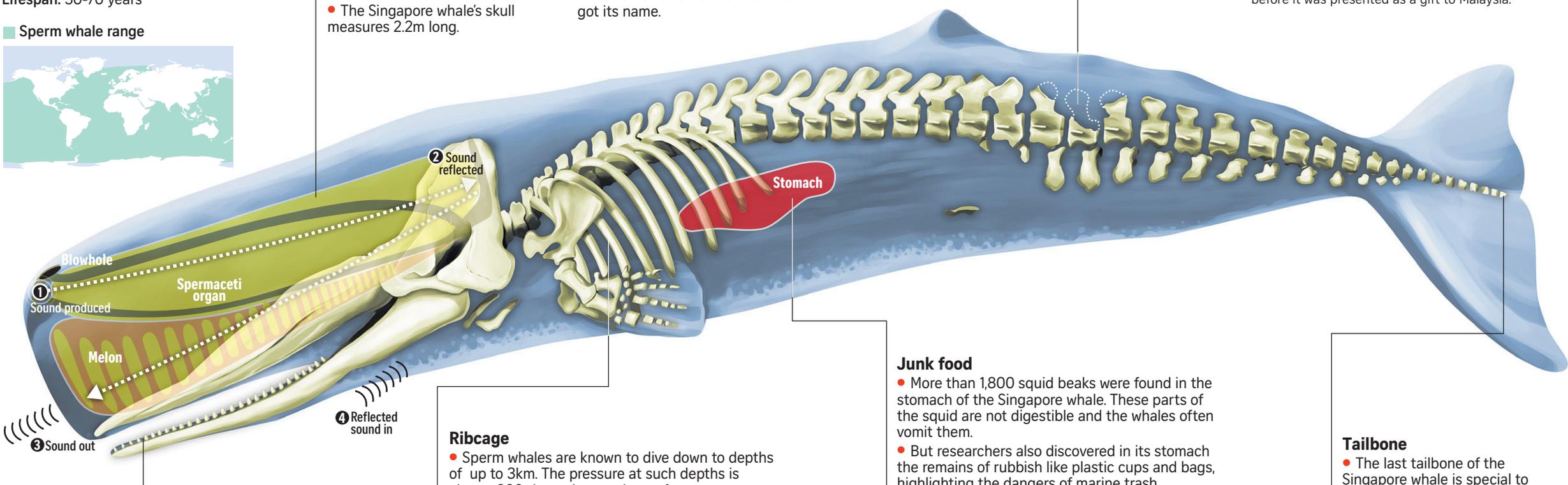
Jubi Lee is even better than the whale we gave away because it was found in our waters, because it belongs to a species seldom found in our waters, and because the skeleton is in perfect order.



**AMBASSADOR-AT-LARGE TOMMY KOH**, on the return of the Singapore whale. The skeleton of a 13m-long Indian fin whale had been displayed at the old National Museum from 1907 to 1974 before it was presented as a gift to Malaysia.

## Shattered vertebrae

- The Singapore whale is likely to have died after being hit by a ship. Museum scientists discovered a large wound on its dorsal hindquarters, and broken backbones below the injury.



## Teeth

- Sperm whales are the largest toothed carnivores in the world, but they do not chew with their teeth.
- Sperm whales swallow their prey, which includes giant squid, whole. Scientists believe sperm whales use their teeth to fight, as they are often discovered with teeth marks on their body.
- For the Singapore whale, the largest tooth is about 7.5cm long.



Tooth (actual size)

## Ribcage

- Sperm whales are known to dive down to depths of up to 3km. The pressure at such depths is almost 300 times that on the surface.
- To help it survive, its mammalian dive reflex kicks in. Its heart rate slows and blood vessels constrict, causing increased pressure on the arteries.
- These combined reflexes conserve oxygen and redirect blood to the brain and heart to protect key organs from oxygen starvation and collapse.
- Sperm whales also have flexible ribcages and, under pressure, they collapse instead of breaking.



Collapsible ribcage

## Junk food

- More than 1,800 squid beaks were found in the stomach of the Singapore whale. These parts of the squid are not digestible and the whales often vomit them.
- But researchers also discovered in its stomach the remains of rubbish like plastic cups and bags, highlighting the dangers of marine trash.



On exhibit: Squid beaks (left), plastic cups and bags found inside whale

## Tailbone

- The last tailbone of the Singapore whale is special to museum conservator Kate Pocklington. It is about the size of a 10-cent coin, and could easily have been lost if the whale skeleton had been naturally preserved by burying it underground for natural decomposition, she said.
- Due to space and time constraints, researchers dissected and degreased it manually with the help of industrial cookers and chemicals.



Tailbone (actual size)