

New species of extinct river dolphin discovered in Smithsonian collection

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Artistic reconstruction of a pod of *Arktocara yakataga*, swimming offshore of Alaska during the Oligocene, about 25 million years ago, with early mountains of Southeast Alaska in the background. The authors speculate that *Arktocara* may have socialized in pods, like today's oceanic dolphins, while possessing a much longer snout, like its closest living relative in the freshwater rivers of South Asia. Credit: Linocut print art by Alexandra Boersma

A fossil that has been in the collection of the Smithsonian's National Museum of Natural History since it was discovered in 1951 is today helping scientists piece together the evolutionary history of whales and dolphins, including the origins of the endangered South Asian river dolphin.

According to Nicholas D. Pyenson, the museum's curator of fossil marine mammals, and Alexandra Boersma, a researcher in his lab, the fossil belonged to a dolphin that swam in subarctic marine waters around 25 million years ago. It represents a new genus and species, which Pyenson and Boersma have named *Arktocara yakataga*.

The researchers reported their findings Aug. 16 in the journal *PeerJ*. They have also produced a digital three-dimensional model of the fossil that can be explored at <http://3d.si.edu/model/usnm214830>.

The fossil, a partial skull about 9 inches long, was discovered in southeastern Alaska by Donald J. Miller, a geologist with the United States Geological Survey. It then spent decades in the Smithsonian's collection. With more than 40 million specimens in the museum's Department of Paleobiology, "We are always learning new things about the vast legacy built by our predecessors at the museum," Pyenson said. But earlier this year, he and Boersma were captivated by and focused their attention on what Boersma calls "this beautiful little skull from Alaska."



The skull of *Arktocara yakataga* on an 1875 ethnographic map of Alaska drawn by William Healey Dall, a broadly trained naturalist who worked for several US government agencies, including the Smithsonian, and honored with several species of living mammals, including Dall's porpoise (*Phocoenoides dalli*). Near the skull of *Arktocara* is a cetacean tooth, likely belonging to a killer whale (*Orcinus orca*), collected by Aleš Hrdlička, a Smithsonian anthropologist who worked extensively in Alaska, and an Oligocene whale tooth collected by Donald Miller, a geologist who worked for the US Geological Survey, and collected the type specimen of *Arktocara*. Donald Orth's dictionary of Alaskan place names, published by the USGS, bookends the image. Credit: James Di Loreto, Smithsonian

By studying the skull and comparing it to those of other dolphins, both living and extinct, Boersma determined that *A. yakataga* is a relative of the South Asian river dolphin *Platanista*, which is the sole surviving species of a once large and diverse group of dolphins. The skull, which is among the oldest fossils ever found from that group, called *Platanistoidea*, confirms that *Platanista* belongs to one of the oldest lineages of toothed whales still alive today.

The South Asian river dolphin—a species that includes both the Ganges river dolphin and the Indus river dolphin—is of great interest to scientists. It is an unusual creature that swims on its side, cannot see and uses echolocation to navigate murky rivers in Nepal, India, Bangladesh and Pakistan. Unlike its known ancestors, it lives only in fresh water. But human activities, including the use of fishing nets, pollution and disruption of its habitat, have decimated the species to only a few thousand remaining individuals. The group's endangered status makes the dolphins difficult to study.

"One of the most useful ways we can study *Platanista* is by studying its [evolutionary history](#), by looking at fossils that are related to it to try to get a better sense of where it's coming from," Boersma said. "Exactly how that once diverse and globally widespread group dwindled down to a single species in Southeast Asia is still somewhat a mystery, but every little piece that we can slot into the story helps."

Based on the age of nearby rocks, the scientists estimate that the *Arktocara* fossil comes from the late Oligocene epoch, around the time ancient whales diversified into two groups—baleen whales (mysticetes) and toothed whales (odontocetes).



The skull of *Arktocara yakataga* rests on an 1875 ethnographic map of Alaska drawn by William Healey Dall, a broadly trained naturalist who worked for several US government agencies, including the Smithsonian, and honored with several species of living mammals, including Dall's porpoise (*Phocoenoides dalli*). Near the skull of *Arktocara* is a cetacean tooth, likely belonging to a killer whale (*Orcinus orca*), collected by Aleš Hrdlička, a Smithsonian anthropologist who worked extensively in Alaska, and an Oligocene whale tooth collected by Donald Miller, a geologist who worked for the US Geological Survey, and collected the type specimen of *Arktocara*. Donald Orth's dictionary of Alaskan place names, published by the USGS, bookends the image. Credit: James Di Loreto, Smithsonian

"It's the beginning of the lineages that lead toward the whales that we see today," Boersma said. "Knowing more about this fossil means that we know more about how that divergence happened."

Fossils from *Platanista*'s now extinct relatives have been found in marine deposits around the world, but the *Arktocara* fossil is the northernmost find to date. The name of the new species highlights its northern habitat: *Arktocara* is derived from the Latin for "the face of the north," while yakataga is the indigenous Tlingit people's name for the region where the [fossil](#) was found.

"Considering the only living dolphin in this group is restricted to freshwater systems in Southeast Asia, to find a relative that was all the way up in Alaska 25 million years ago was kind of mind-boggling," Boersma said.

Pyenson notes that some conservation biologists argue that the South Asian river dolphin should be prioritized for protection to preserve its evolutionary heritage. "Some species are literally the last of a very long lineage," he said. "If you care about evolution, that is one basis for saying we ought to care more about the fate of *Platanista*."

Chesapeake Testing provided X-ray scanning and support for digital-image processing. Materialise provided technical support with 3-D model rendering.

More information: Boersma and Pyenson (2016). *Arktocara yakataga*, a new fossil odontocete (Mammalia, Cetacea) from the Oligocene of Alaska and the antiquity of Platanistoidea. *PeerJ*. 4:e2321; [DOI: 10.7717/peerj.2321](https://doi.org/10.7717/peerj.2321)

Provided by Smithsonian

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