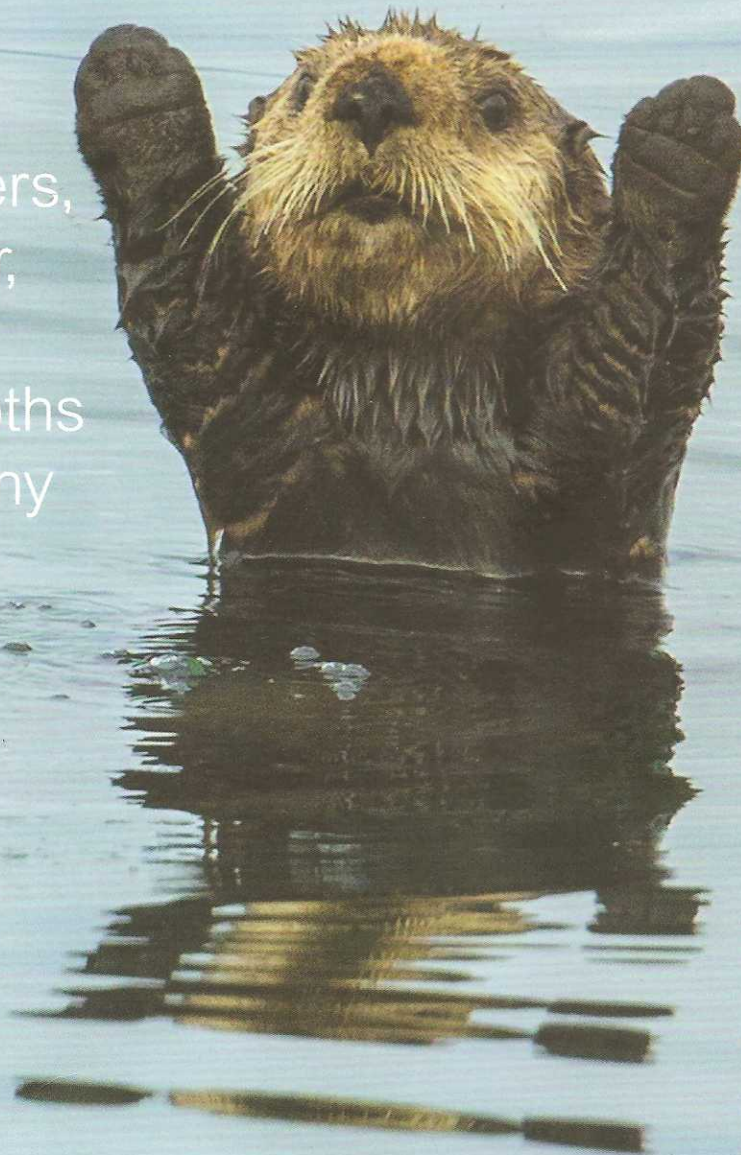


# WAVES

BY NORWEGIAN CRUISE LINE

Sea otters,  
reindeer,  
woolly  
mammoths  
and many  
more ...



HULA!  
TANGO! ICE  
SCULPTING!

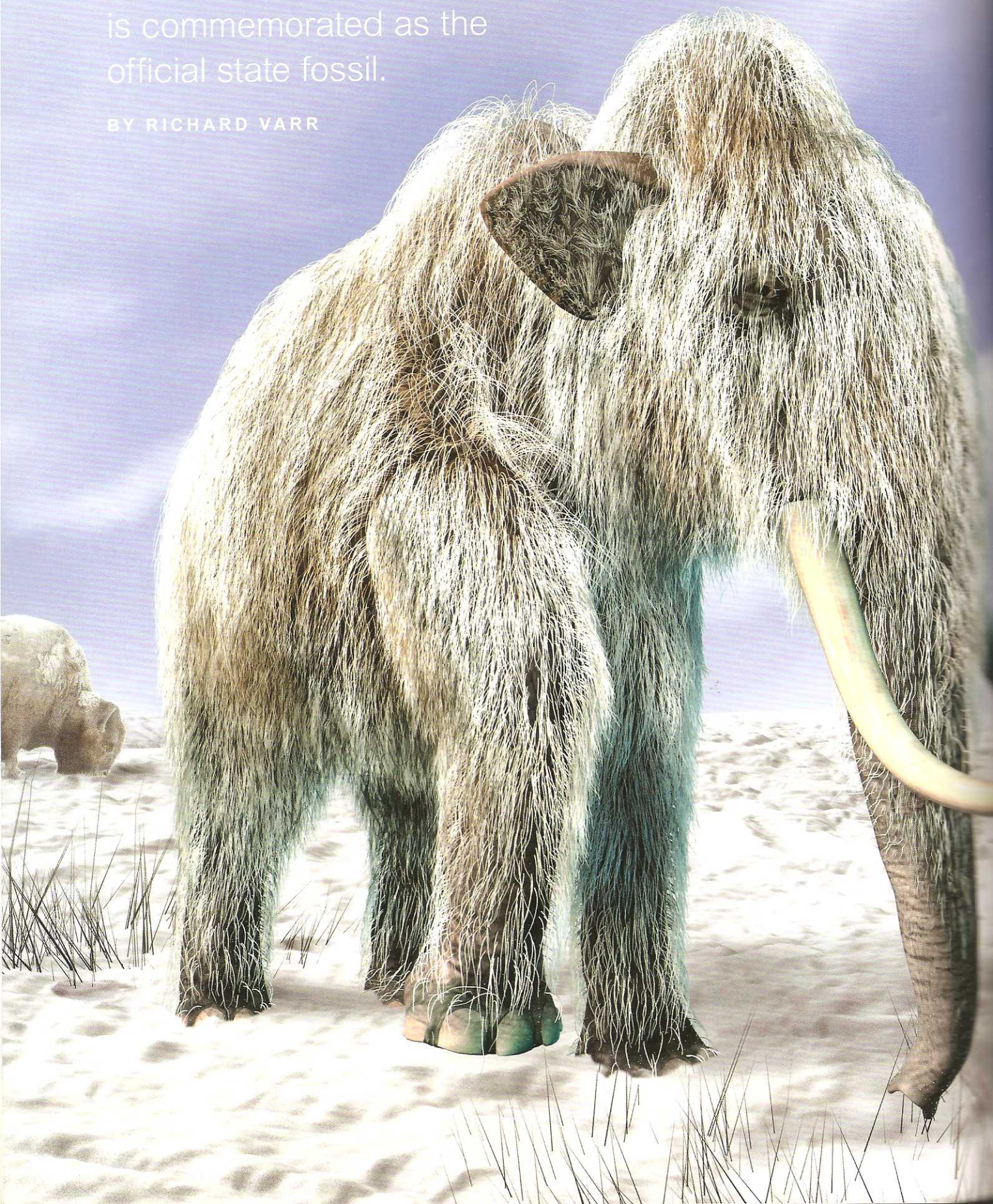
WANDERING  
JUNEAU'S  
WONDROUS  
STREETS



**NORWEGIAN**  
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In Alaska, the woolly mammoth is commemorated as the official state fossil.

BY RICHARD VARR



# ICON OF THE ICE AGE



One can only imagine the thundering processions of woolly mammoths more than 10,000 years ago — herds marching across frozen tundra and ancient grasslands under the dazzling green glow of the Northern Lights. These imposing figures — up to 15 feet high, with powerful trunks and long curving tusks — roamed through present-day northern Europe, Asia and North America during the last Ice Age, while closely related mammoth species also made their way as far south as Central America.





OPPOSITE PAGE: SYLVAIN SONNET/GETTY IMAGES. ABOVE: GABRIELLE THERIN-WEISE/GETTY IMAGES

**W**ith the scientific name *Mammuthus primigenius*, the furry beasts reigned during the Pleistocene era, from 2.6 million to about 11,700 years ago. Most were about the size of today's elephants, ranging from 9 to 11 feet high, weighing about 6 to 8 tons. Yet the larger steppe mammoths grew to 13 to 15 feet, possibly the largest mammoth species, weighing up to 14 tons.

"Among living species, they're most closely related to the modern Asian elephant," explains Patrick Druckenmiller, Ph.D., earth sciences curator with the University of Alaska Museum of the North and an associate professor in the Department of Geosciences. "The two species are broadly similar, but of course differ in adaptations for a colder climate — smaller ears and tails, and larger tusks and fur." Unlike the large, flapping ears of Asian and African elephants living in temperate and equatorial climates, woolly mammoths' ears and tails were short to conserve heat and avoid frostbite in their frigid environments.

During the Ice Age, woolly mammoths roamed throughout the grass-covered regions of Beringia, what is now present day Alaska, the Yukon and far northeastern Russia. With lower sea levels back then, a land bridge connected the Asian and North American continents, thus allowing migrations in the area now separated by the Bering Strait. Many found refuge in drier middle and northern parts of Alaska free from the ice sheets that stretched across the northern half of North America.

Today, mammoth fossils lay scattered across the state. So common are they, in fact, they were designated Alaska's official state fossil in 1986. "Many Alaskans have odd Ice Age mammal fossils such as a tooth or bone of a mammoth, steppe bison or horse — the Big Three of Alaska's Ice Age fauna," notes Druckenmiller. "Being big, charismatic megafauna, it's easy to see how they became the state fossil."

**T**hanks to Alaska's mostly Arctic climate and year-round permafrost, fossils remain well preserved and have been recovered over the years. Gold miners get much of the credit for unearthing fossils as they brought in equipment to melt the permafrost and to dig deep for gold deposits. During this process, they helped recover ancient animal bones as layers of earth were cleared.

"Literally thousands and thousands of bones and teeth were found, so they are well known to Alaskans," continues Druckenmiller. "Most are not so much dug up as historically they've been found accidentally by gold mining, or found today by floating down rivers where the bones weather out of the bluffs."

Most of the mammoth populations across Europe, Asia and the Americas became extinct about 10,000 to 12,000 years ago. Scientists believe this was possibly a result of several factors, including a warming trend that melted glaciers, forests replacing the grasslands used as a food source, diminishing fresh water, and improved hunting techniques by humans.

**Y**et two known clusters of woolly mammoths survived longer. On Alaska's St. Paul Island, about 300 miles from the mainland in the Bering Sea, a small community lived until around 3,700 B.C. (give or take 100 years). In fact, scientists have dated their extinction to about 5,600 years ago, the longest the animals survived in North America.

And even more astounding is how another group of up to 1,000 woolly mammoths lived on mountainous Wrangel Island — considered their final holdout — located north of Siberia and above the Arctic Circle. They survived until 3,600 to 4,000 years ago, roughly more than 500 years after



## Alaska Christmas Store



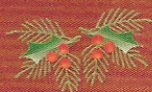
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Christmas  
Alaska Style!

Santas  
Ornaments  
Nativities  
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the building of Egypt's Giza pyramids and England's Stonehenge monument. Both St. Paul and Wrangel Islands were once part of Beringia before rising sea levels reduced the shoreline and formed the Bering Strait. Thus the woolly mammoths' last strongholds were higher land areas that became islands.

Recent research indicates that lack of water was the reason woolly mammoths died off on St. Paul Island, as encroaching sea levels reduced land mass and water supplies. On Wrangel Island, however, they became extinct possibly for a different reason. By analyzing and comparing fossils' genetic samples from Siberia's mainland and Wrangel, scientists have concluded the island colony had only a few hundred woolly mammoths. Their reduced genetic diversity led to mutations, changes that possibly affected their ability to mate and reduced hair for warmth — both likely factors in their demise.



**M**ammoths are sometimes confused with mastodons, a very distant cousin that probably shared a common ancestor more than 30 million years ago, according to Druckenmiller. “The differences between mammoths and mastodons are best reflected in their diet and teeth,” he says. “Mammoths were grass eaters with low-crowned, but massive teeth that looked like old fashioned washing boards. Mastodons were leaf- and twig-eaters with high-crowned teeth that resembled hills.” In addition, mammoths had sloping backs and more curvy tusks.

A peek into the relationship between prehistoric humans and woolly mammoths comes to life through cave art. Many depictions are just simple outlines of the creatures with their tusks, though some show hunters throwing spears. Known as the “Cave of the Hundred Mammoths,” France’s Rouffignac Cave in the Dordogne region has more than 250 engravings and cave paintings with 158 of them mammoth images. Now a UNESCO World Heritage site, the cave also has art of other Ice Age animals, including woolly rhinoceroses, horses and bison.

Many excavations of frozen woolly mammoth carcasses within the last century or so have proven valuable for research. Some specimens have well-preserved organs and muscular tissue intact, while others still have their stomach contents so scientists can learn more about their diet. One excavation in 2013 involved a 50- to 60-year-old female woolly mammoth



Mammoths are sometimes confused with mastodons, a very distant cousin that probably shared a common ancestor more than 30 million years ago.

on Russia’s Maly Lyakhovsky Island in the Arctic Sea. It was the first time a well-preserved mammoth was found with flowing blood. The animal dates back about 40,000 years.

These whole fossils also have well-preserved DNA, which has spawned the idea of recreating the species through cloning within modern-day elephants. One method would involve replacing genes in elephant cells with mammoth genes to create a mammoth-elephant hybrid.

“This technologically is still a long way off,” says Druckenmiller. “Personally, I don’t like the idea. I think recreating extinct species is playing a bit high-handed. We should leave well enough alone.” ■

