How many people did it take to colonize Australia?

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A new study suggests that the first humans to move into Australia and New Guinea came in larger numbers—and perhaps with more of a plan—than some researchers previously thought.

People have lived in Australia and New Guinea since at least 60,000 years ago, when sea levels were about 100 meters (300 feet) lower than today. Due to lower sea levels, a land bridge across the Torres Strait linked Australia and New Guinea into a single landmass (termed Sahul). The first humans to set foot on Sahul probably arrived via closely spaced islands that stretched like stepping-stones across the 1,800km (1,100 miles) of ocean from the exposed continental shelf of Southeast Asia. And a new study suggests that it would have taken at least 1,300 people crossing these islands to give us a lasting foothold.

Playing on hard mode

Trying to colonize a new, uninhabited land is a challenge. If you bring too many people at once, the sudden influx could put too much strain on local resources, and everyone would die. But if you don’t bring enough people to reproduce and maintain genetic diversity, each generation gets smaller until the group eventually runs out of people and everyone dies.

Flinders University ecologist Corey Bradshaw and his colleagues wanted to figure out how many people needed to settle in Sahul to make sure humans didn’t end up going locally extinct.

Archaeologists usually assume that people who made their living hunting, gathering, and fishing in the past probably lived similar lifestyles to modern hunter-gatherers. That means their life expectancy, fertility rate, and the length of their generations should be pretty similar. Bradshaw and his colleagues used what we know about modern hunter-gatherers to build a computer model of the first people to move into Sahul.

They tested several scenarios to figure out how many people needed to arrive in the first few centuries in order to minimize the odds of the population dying out. The answer turned out to be somewhere between 1,300 and 1,550 people, assuming about half of them were women. That left just a 10% chance of extinction after 100 generations—still a risky venture, but not an implausible one.

An organized effort

The first people who reached Australia probably did so accidentally, perhaps blown across the ocean by a chance storm from one of the islands of the region called Wallacea—maybe Sulawesi, Timor, Flores, or one of dozens of smaller islands that mostly belong to modern Indonesia. But at some point, someone must have returned to tell the tale, and people must have started making the trip on purpose. The model suggests “probably deliberate migration, given the numbers of people involved,” Bradshaw and his colleagues wrote.

That doesn’t necessarily mean that more than a thousand people piled into a single massive fleet of boats and set sail to colonize a new land all at once. According to the model, if a new group of about 130 people arrived every 70 to 90 years, that would be enough to maintain the colony’s chances of

survival. Of course, the chances of extinction increased with longer gaps between new arrivals.

Even so, sending off groups of 130 settlers at a time suggests that the islands of Wallacea were home to more people, or at least denser groups of people, during the Pleistocene than archaeologists have previously assumed. The effort would have taken a group of around the size that modern hunter-gatherers in Australia and New Guinea usually only pull together for large ceremonial gatherings, which implies some impressive organizing. We currently have no way of knowing whether some kind of central leadership or agreement drove the effort or whether several small groups banded together to share an adventure.

More evidence needed

Of course, it’s always technically possible that a much smaller group of settlers arrived, facing much greater odds of eventual extinction, and somehow came out on top. It’s just much less likely. But any model requires hard evidence to test it, which means we need more archaeological finds and ancient DNA samples.

Ancient DNA evidence in this case is sparse, thanks to the region’s combination of heat and moisture. But previous studies on samples of indigenous Australian DNA suggest that a founding group of just 36 to 50 women could have produced all the mitochondrial DNA groups found in today’s indigenous Australians (as a quick review, mitochondrial DNA is passed directly from mother to child, so it’s a great way to trace a specific maternal lineage).

That’s a much smaller group of people than Bradshaw and his colleagues’ model calls for. But it also assumes that the maternal lineages of modern indigenous Australians were the only ones present when the first humans arrived. And given the continent’s history, that’s not necessarily a likely

assumption.

So far, the oldest known evidence of human presence in Australia is at Madjedbebe Rock Shelter, which dates to 60,000 to 70,000 years ago. Archaeologists have found several other sites at least 47,000 years old, but much of the archaeological record from the days of the first humans to arrive—if it's still preserved anywhere—remains undiscovered.

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