



# Fishing for the first Americans

*Archaeology is moving underwater and along riverbanks to find clues left by the people who colonized the New World.*

BY EMMA MARRIS

**O**n 17 September, a catamaran will set off into the Pacific Ocean on a week-long cruise back to the Pleistocene. Laden with sonar instruments, the research vessel *Shearwater* will probe the ocean bottom to find places that were beaches and dry land more than 13,000 years ago, when the sea level was around 100 metres lower. The researchers are hunting for evidence that ancient people lived along this now-sunken coastline as they colonized the New World.

Meanwhile, other archaeologists are digging in the intertidal zone on a remote island off the shore of British Columbia in Canada, where the sea level has barely changed since the ice-age glaciers began to retreat. Since late last year, that team has found footprints and a tool that date back 13,200 years, making them some of the oldest human marks on

## Evidence of ancient Americans has turned up on Calvert Island in Canada.

the continent. Whoever left them had to have reached the island by boat.

Welcome to the newest wave of American archaeology: the idea that the first residents of the Americas came by sea, hugging the Pacific coast as they went south. This theory marks a sharp departure from the once-dominant hypothesis that Pleistocene hunters from Siberia migrated by foot across a land bridge to Alaska and then south into the heart of North America. This route opened up only when the vast sheets of ice covering the continent had melted enough to permit passage. It was thought that these first migrants made the distinctive stone spear tips called Clovis points, which began appearing at sites in the interior of North America around 13,000 years ago.

There has long been evidence that others reached the New World at least 1,000 years earlier. But only in the past decade have archaeologists accumulated enough evidence to abandon the Clovis-first model (see *Nature* 485, 30–32; 2012). Some of the earliest human sites in the Americas date to well before a corridor opened up between the ice sheets, which is forcing researchers to explore the idea that New World colonizers skirted the coastline. Travelling by boat, these early people could have hopped south of the ice sheets, subsisting on the rich marine resources of the ice-free strip along the shore.

The search for these sea-going settlers will not be easy. Much of the evidence that archaeologists seek is deep underwater — or was smashed long ago by the Pacific's legendary waves. But momentum is building to find those earliest settlers. "People are just more optimistic," says Quentin Mackie, an archaeologist at the University of Victoria in Canada. Amanda Evans, a marine archaeologist at the ocean-survey company Tesla Offshore in Prairieville, Louisiana, says that prehistoric underwater archaeology in general is having a moment. "This year just seems to be the year that everybody was pushing the ball uphill and it finally crested."

### TOOLS OF THE TRADE

Loren Davis, an archaeologist at Oregon State University in Corvallis, is searching for the ancient seafarers in an unusual spot — at a site in Idaho called Cooper's Ferry, which is on a bank of the Salmon River, hundreds of kilometres away from the coast. At the dig site in August, Davis examines a piece of rock brought to him by one of his field crew. He turns it over to see whether it was shaped by human hands, perhaps by early toolmakers who littered the ground with flakes of rock as they worked.

Although Cooper's Ferry is far inland, Davis suggests that it is part of the coastal story. The Salmon is a tributary of the mighty Columbia River, which would have been the first large



Archaeologists search for signs of early inhabitants near a riverbank at Cooper's Ferry, Idaho.

waterway encountered by people who made it south of the ice sheets during the last glacial epoch. At that time, valleys farther north would have been covered by glaciers. For a water-adapted culture, he says, "the first off-ramp south of the ice is the Columbia River".

Having considered the stone, Davis hands it back to his colleague and says, "I think it is a flake." His archaeological pits, which the crew has shaped into a series of neat holes, are full of flakes and finished 'western stemmed' points up to 13,200 years old<sup>1</sup>. Whereas the Clovis points are shaped like miniature surfboards, the western stemmed points from Cooper's Ferry are smaller and look like Christmas trees. Points resembling the western stemmed variety have been found throughout the western United States and in Siberia — a connection that suggests they were brought over to the New World by early hunters.

first Americans carried these points there by sea and river. "You get a gambler's mentality," Davis says. The hunt obsesses the crew, who spend weeks here, camped out and digging for hours each day. Sarah Skinner, an Oregon State student who supervises pit B, says that she wakes up clenching her fists around dream trowels. "When I close my eyes, I see artefacts," she says.

### HINGE-POINT HUNT

Signs of early inhabitants are also starting to appear along the coast, particularly in spots where the swelling seas have not covered ancient shorelines since the end of the last glacial period. The western coast of Canada, for example, was pressed down by the Pleistocene ice and has been rebounding upwards since the glaciers melted. In some spots — hinge points — that post-glaciation rebound almost exactly cancels out the rising sea level<sup>2</sup>. One of

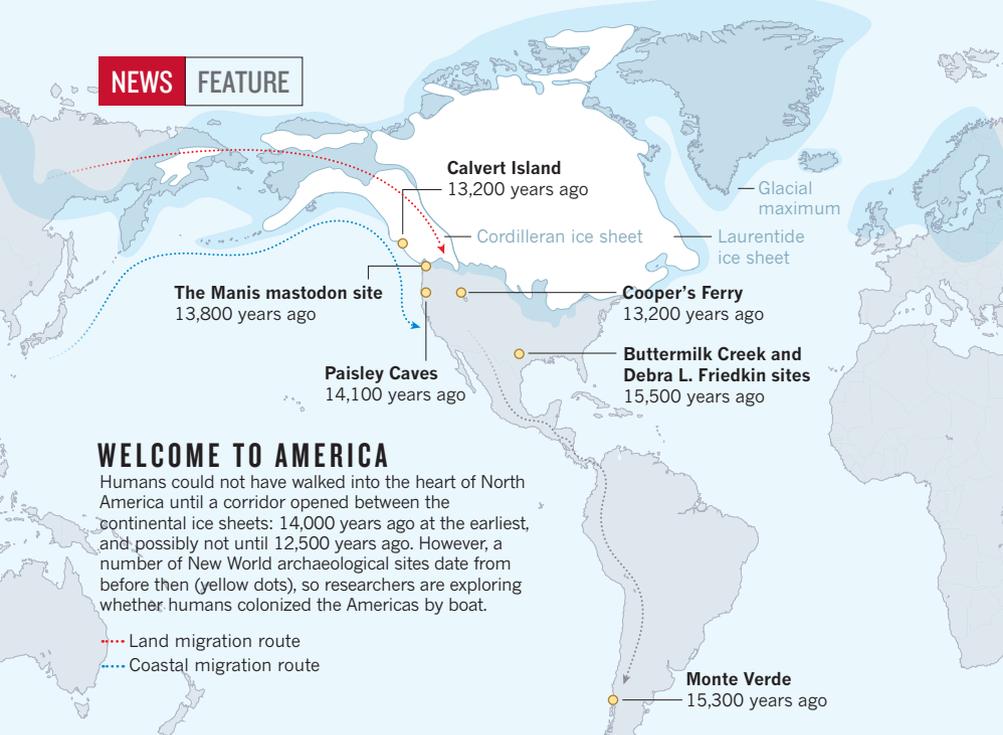
*"This is probably the biggest effort to identify submerged sites along the Pacific coast."*

Davis's crew is quietly intent, and the air is filled with the gentle sound of trowels scraping earth, along with a rock wren's distinctive call. The peace is occasionally broken by shouts between diggers and data recorders: "Bone!", "Fire-cracked rock!" or "Debl!" (short for debitage, or flakes). The position of each artefact is precisely recorded, then it is bagged up and stored in one of many boxes that are piling up in a nearby trailer. Precise dates will be assigned later, in the laboratory.

A sense of expectation hangs over the dig. If the team uncovers particularly old western stemmed points that definitively pre-date the Clovis era, that would strongly suggest that the

those hinge points is Calvert Island, where a 13,200-year-old footprint was found late last year and another was discovered this summer. Daryl Fedje and Duncan McLaren, both archaeologists at the University of Victoria in British Columbia, plan to continue working the site to look for signs of the earliest Americans (see 'Welcome to America').

The Hakai Institute on Calvert Island, founded by Canadian entrepreneur Eric Peterson, is supporting that work. "As a fourth-generation British Columbian," Peterson says, "I am intensely interested in the rich history of humans on our coastline, which we now realize goes way, way back. How far back? Thirteen



## WELCOME TO AMERICA

Humans could not have walked into the heart of North America until a corridor opened between the continental ice sheets: 14,000 years ago at the earliest, and possibly not until 12,500 years ago. However, a number of New World archaeological sites date from before then (yellow dots), so researchers are exploring whether humans colonized the Americas by boat.

--- Land migration route  
 --- Coastal migration route

thousand years? Fifteen thousand years? That's what we want to find out."

Mackie thinks that Calvert Island and similar hinge points will produce results much faster than underwater work, which is technically challenging and expensive. "You might as well just stand on your boat and burn \$100 bills," he says.

But despite the enormous cost and technical challenges, he and others agree that underwater locations may hold tremendous potential and that the time has finally come for archaeologists of American prehistory to explore the Pacific Ocean. There have been a few projects over the years. In the late 1990s, Mackie and Fedje did some sea-floor mapping around Haida Gwaii, an island off the British Columbia coast<sup>3</sup>. They took samples of sea-floor sediment and hauled up a barnacle-encrusted flake tool that they suggest dates from 10,000 years ago, when the sea floor on which it was found was dry land. More recently, the duo used an autonomous underwater vehicle to explore and found what they suggest could be a fishing weir — a trap made from rocks — that dates back 13,800 years.

Archaeologist James Dixon of the University of New Mexico in Albuquerque has done marine surveys of the now-submerged land that once connected Asia and North America. And Jon Erlandson, an archaeologist at the University of Oregon in Eugene, has worked for years on the Channel Islands off Southern California, piecing together evidence for his theory that people followed a 'kelp highway' down the coast. This route would have offered abundant food — fish, shellfish and marine mammals — supported by the kelp forest ecosystems.

But the offshore studies so far have been limited, and most of the discoveries have not been reliably dated. "There's very few of us, and we are spread over vast, vast areas," says Dixon. There has been a hesitation to join — or fund — the chancy and expensive underwater search. "You can go out there and be totally skunked by the

weather," he says. "It is a tough thing."

That has led many researchers to discount the coastal hypothesis in the past, notes Mackie. "People thought 'well, all the information is deep underwater and we'll never find it,'" he says. And so far, nothing older than the Clovis era has been found along the Pacific Coast — either on the sea floor or on land.

## SPARK OF INTEREST

What snapped the field out of its funk was not a charismatic leader or a spectacular find — it was federal bureaucracy.

The US Bureau of Ocean Energy Management (BOEM) was formed in 2010 to regulate energy development on the continental shelf. The bureau is bound by the National Historic Preservation Act, which requires it to make sure that valuable archaeological sites will not be destroyed by any development that requires a federal permit. As interest in offshore renewable-energy projects has increased in recent years, BOEM has scrambled to improve methods for identifying prehistoric sites.

In 2011, it commissioned a sweeping study of possible archaeological sites on the Pacific outer continental shelf. Davis and a colleague at Oregon State, archaeologist Alex Nyers, worked on the report, using existing ocean-depth data and estimates of sea-level rise to decipher where previous shorelines would have been<sup>4</sup>. They then modelled where prehistoric sites might be clustered: presumably on gentle, south-facing (and thus warmer) slopes and near lakes, rivers, bays and islands, all now submerged.

That report came out in 2013, and led directly to a US\$600,000 grant from BOEM to seek out evidence for the predictions about prehistoric environments. On a series of cruises off California and Oregon over the next three years, researchers will use a variety of sonar instruments to survey the ocean floor and sediments below. If they identify a possible estuary, beach or other ancient shoreline

feature, they will take core samples and carbon date biological material from the various layers of sediment to confirm the find.

Principal investigator Todd Braje, an anthropologist at San Diego State University in California, is trying to expand the project by encouraging the US National Oceanic and Atmospheric Administration and other potential funders to add more cruises. But even at its current size, he says, "This is probably the biggest effort to identify submerged sites along the Pacific coast."

The investment may be big, but Braje is trying to keep expectations modest. He insists that the goal is to learn how to identify environments in which humans might have camped or settled up to 20,000 years ago; the team is not expecting to find the remains of any settlements, and certainly not ones older than those of the Clovis settlers. "The idea that we are going to hit on a 15,000-year-old site that is underwater is probably unrealistic in the near future," says Braje. "You get to those first migrants into the New World and the archaeological footprint they left is very small."

The project will build on Davis's model of submerged environments, using coring and imaging to test whether his projections actually lead them to the right sorts of sites. Davis is a co-principal investigator and will join the Oregon cruises next year.

In the meantime, he is digging in Idaho. It is near the end of the field season, and he and his crew are working on their day off to finish as much as possible. He has bribed them with gourmet cheese, and he lays it out with no fewer than five cheese knives. Combined with the trowels, brushes, scrapers and spoons used by the crew, the site is bristling with tools.

Given all the difficulties of this work, those involved in investigating the ocean-migration hypothesis stress that expectations should remain modest for many years as researchers improve their search methods. If the theory is correct, the first definitive older-than-Clovis find along the coast — the green light for the theory that everyone seems to be hoping for — could still be far off. "It could happen this summer, next summer, it could be ten years," says Erlandson.

Or it could happen right now in the sweltering pit at Cooper's Ferry, with the very next scrape of a trowel. ■

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