FROM *THE AMERICAN BEAVER AND HIS WORKS*, BY LEWIS HENRY MORGAN, PUBLISHED 1868.

A map commissioned by Lewis Henry Morgan in 1868 shows the locations of beaver dams and ponds near Ishpeming, Michigan.

150-year-old map reveals that beaver dams can last centuries

By David Malakoff (/author/david-malakoff) | 4 December 2015 8:00 am | Comments (/plants-animals/2015/12/150-year-old-map-reveals-beaver-dams-can-last-centuries#disqus_thread)

In the mid-1800s, a railroad director, entrepreneur, and politician named Lewis Henry Morgan began visiting a largely undeveloped swath of land dotted with beaver ponds in Michigan's Upper Peninsula. What he saw amazed him: "[A] beaver district, more remarkable, perhaps, than any other of equal extent to be found in any part of North America," he wrote. "A rare opportunity was thus

offered to examine the works of the beaver, and to see him in his native wilds."

Morgan wasn't your typical nature buff. His pioneering anthropological studies of Native American tribes (https://en.wikipedia.org/wiki/Lewis_H._Morgan) had already begun to make him an enormously influential figure in 19th century science. In 1880, he would be elected president of AAAS (http://archives.aaas.org/people.php?p_id=80) (publisher of *Science*), and Charles Darwin, Sigmund Freud, and Karl Marx would come to cite his work. But as Morgan helped his railroad company lay tracks across the Michigan wilderness in the 1850s and 1860s, the target of his scientific curiosity was the North American beaver (*Castor canadensis*).

For years, he carefully documented how the beavers behaved and where they built their dams and ponds. Then, in 1868, Morgan published his 396-page beaver bible: *The American Beaver and His Works* (https://archive.org/details/americanbeaverhi68morg). Folded into each copy was a map, carefully drawn by his railroad's engineers, which detailed the locations of 64 beaver dams and ponds spread over some 125 square kilometers near the community of Ishpeming.

Now, that rare map is giving researchers some new insight into just how busy beavers can be. A new survey shows that many of the dams and ponds that Morgan saw nearly 150 years ago are still there (http://link.springer.com/article/10.1007/s13157-015-0688-5)—testament to the resilience of the rodents and their ability to maintain structures over many generations.

"We haven't known much about the long-term resilience of beaver populations, but this map allowed us to look back in time in a pretty unique way," says ecologist Carol Johnston of South Dakota State University in Brookings, the author of the *Wetlands* study.

Johnston learned of Lewis's map while doing her postdoctoral work. She realized it was far older and more detailed than other records of beaver engineering; aerial photographs, for example, go back just about 75 years. And she wondered how Morgan's dams and ponds had fared over the years, as trappers had wiped out many beaver populations, and people had built mines, roads, and homes.

To find out, Johnston used an array of aerial imagery to create an up-to-date version of Morgan's map, and then compared it with the original. She was surprised to see that, overall, 46, or 75%, of the original dams and ponds were still visible, although some appeared abandoned. And Johnston notes that although the animals, which live just a decade or so, may not have continuously occupied every dam for all of that time, "the remarkable consistency in … pond placement over the last 150 years is evidence of the beaver's resilience."

"We've suspected that some beaver features can persist a very long time, but this is a very cool … way of quantifying it," says wildlife biologist Christopher Pearl of the U.S. Geological Survey's Forest and Rangeland Ecosystem Science Center in Corvallis, Oregon. Other studies, he notes, have suggested that beaver colonies can occupy an area for 1000 years (http://oaec.org/wp-content/uploads/2014/12/novel-physical-evidence-beaver-sierra-nevada-James-Lanman-2012.pdf) .

Morgan reached a similar conclusion nearly 150 years ago, without the benefit of historical maps and aerial photos. In *The American Beaver*, he mused on the origins of some of the more impressive dams he saw, concluding that they must have been erected by generations of workers. "These dams have existed in the same places for hundreds and thousands of years," he wrote, and "have been maintained by a system of continuous repairs."

Today, Johnston marvels at Morgan's keen eye. "The guy," she says, "was just a wonderful, wonderful observer."

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