参考译文

This is Scientific American's 60-second Science, I'm Annie Sneed.

这里是科学美国人——60秒科学系列，我是安妮·斯尼德。

The Arctic's permafrost is melting—and fast. That's bad news, because these frozen soils store billions of tons of carbon, just waiting to be unleashed. So is there a way to save the permafrost? One team of researchers thinks it may have found a possible solution: big animals, herbivores—animals that eat only plants.

北极的永久冻土正在融化，而且是快速融化。这是个坏消息，因为这些冻土储存了数十亿吨的等待释放的碳。那有办法拯救永久冻土吗?一个研究小组认为，他们也许已经找到了可能的解决办法：求助大型动物，食草动物，即只吃植物的动物。

Back in 1996 researchers started an experiment called Pleistocene Park. They fenced in about eight square miles of land in northeast Siberia. And then they introduced different types of herbivores: reindeer, horses, moose, bison, sheep and other large critters.

早在1996年，研究人员就开始了名为“更新世公园”的实验。他们在西伯利亚东北部围起了约8平方英里的土地。然后他们引进了不同种类的食草动物：驯鹿、马、驼鹿、野牛、绵羊和其他大型生物。

Since then, scientists have studied these animals' effects on the ecosystem. One outcome is that these large herbivores help keep the ground very cold—cooler than it would otherwise be.

此后，科学家开始研究这些动物对生态系统的影响。其中一项研究结果是，这些大型食草动物会让地面变得非常冷，比原本要冷得多。

"The snow in winter is important for soil temperature, because it acts as an insulating layer. So the air in winter, at the high latitudes, is much colder than the soil."

“冬天的雪对土壤温度非常重要，因为雪起到了保温层的作用。因此，在高纬度地区，冬天的空气比土壤冷得多。”

Philipp Porada, a vegetation ecologist at the University of Hamburg.

汉堡大学的植被生态学家菲利普·波拉达说到。

"So the idea of this experiment was to introduce large herbivores—and to quantify their effects on soil temperature to see if they can actually protect permafrost soils against thawing. And this works because the animals' trampling, and this leads to less insulation of the soil against cold air temperatures and results in a cooling effect."

“这项实验的目的是引进大型食草动物，量化它们对土壤温度的影响，观察它们是否真的能保护永久冻土不被融化。它们确实可以保护，因为这些动物会踩踏地面，这导致土壤对抗寒冷气温的保温性降低，从而产生冷却效应。”

Freezing air reaches the soil more easily. Porada and his colleagues realized the significance of this effect, so they pulled data from Pleistocene Park, as well as from Sweden, to model what effect herbivores could have on permafrost if they lived in large numbers in the Arctic. The researchers found that even in a worst-case scenario, some four degrees Celsius of global warming:

冷空气更容易到达土壤。波拉达及其同事意识到这种效应的重要性，因此他们提取了“更新世公园”实验以及瑞典的数据，来模拟大量食草动物生活在北极时会对永久冻土产生的影响。研究人员发现，即使在最坏的情况下，即全球变暖4摄氏度左右时：

"These herbivores in the model reduce soil temperature substantially, by 1.7 degrees on average. And this leads to a preservation of around 80 percent of the original—today's permafrost area. And without the herbivore effect in the model—so in the control run—we found that only 50 percent of the permafrost area would remain by the year 2100. So we can say that the effect of the herbivores in the model leads to a substantial preservation of permafrost soil."

“模拟中的这些食草动物能显著降低土壤温度，平均降温1.7度。这可以保存目前80%的原始永久冻土区。如果模拟中没有食草动物的影响，即在对照实验组中，我们发现到2100年，只有50%的永久冻土区能保留下来。因此，我们可以说，模拟实验中食草动物的影响，可以使永久冻土大量保存。”

The study is in the journal Scientific Reports.

这项研究发表在《科学报告》期刊上。

It may seem strange to have herds of horses and cold-adapted sheep grazing the Arctic tundra. But then again, we're living in strange times.

让一大群马和适应寒冷的绵羊在北极冻原上吃草，这似乎有点奇怪。但话说回来，我们本来就生活在一个奇怪的时代。

Thanks for listening for Scientific American — 60-Second Science. I'm Annie Sneed.

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听力原文

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