

# The Outside Story

## Marauding the Moon: Total Lunar Eclipse

By Michael J. Caduto

While many are still basking in the afterglow of the total solar eclipse on April 8, 2024, a lunar eclipse is about to have its day in the sun. In the early hours of March 14, 2025, a total lunar eclipse will be visible across North America. The entire eclipse will start just before midnight and last 6 hours. Earth's shadow will take a gradually larger bite out of the reddish-orange Blood Moon, reaching totality between 2:26-3:31am.



In these times, a lunar eclipse is regarded as an extraordinary but explainable astronomical event. That was not always so. More than 5,000 years have passed since the oldest recording of an eclipse was carved into stone at what is now known as the Loughcrew Megalithic Monument in County Meath, Ireland. Over the millennia, it was believed the moon occasionally disappeared because it was attacked by demons or, in the case of the Incas, eaten by a jaguar. As the moon bled, it became a rusty hue, causing what we now call a Blood Moon. In order to prevent the jaguar from falling to earth and pouncing on the people, it was driven away by making noises and brandishing weapons. Some Wabanaki groups of the northeastern United States and eastern Canada mark an eclipse with fasting and celebration to express gratitude for gifts that Grandmother Moon and Grandfather Sun give to the people.

About 2,300 years ago, the ancient Greeks deduced that a lunar eclipse occurred when Earth passed between the sun and moon. The shape of Earth's shadow projected across the face of the moon confirmed that Earth was round, and the duration of the eclipse inspired one Greek astronomer, Aristarchus from Samos, to calculate that the moon's diameter was one-third that of Earth.

When Earth passes between the sun and a full moon, we have a lunar eclipse. During a total eclipse, the moon passes through the umbra, the dark center of Earth's shadow, from which the sun cannot be seen. Earth's umbra, at the distance of the moon (some 240,000 miles), is about 5,600 miles wide, and it can take the moon 1.5 hours or more to pass through it. Because the size of the umbral shadow that Earth casts on the moon during an eclipse is smaller than our planet's actual diameter, Aristarchus was

a bit off: the moon is actually about one-fourth the diameter of Earth. (Comparatively, during a total solar eclipse, the moon's umbral shadow on Earth is about 115 miles wide, so the sun is only blocked out entirely for a few minutes along the path of totality.)

In New England, the most recent total lunar eclipses were visible in September 2015, January 2019, and in both May and November 2022. Following the March 14, 2025 event, the next total eclipse of the moon will be visible from Northern New England on March 3, 2026. It will begin at 6:04am and last until 7:02am, but the moon will fade just before it sets around 6:20am.

The recent runs of springtime astronomical phenomena are not unusual. "Eclipses take place during 'eclipse seasons,' when the alignment between Earth, Moon, and Sun is favorable for eclipses," explained Catherine Miller, observatory specialist at Middlebury College. These happen around every 6 months and are just over a month in duration. Eclipses occur during a new or full moon, when the Earth, moon and sun fall on a straight line, known as a syzygy. "Solar eclipses happen during the new moon, while lunar eclipses happen during the full moon, and these phases occur approximately 15 days apart," said Miller.

If you miss this total lunar eclipse on March 14, you'll have another eclipse opportunity two weeks later: in the early morning of March 29, a partial solar eclipse will cross the Northeast. In the Upper Valley, the sun will rise around 6:35am, just minutes before the eclipse reaches its maximum and nearly half of the sun is obscured.

While solar eclipse viewing varies greatly by location and requires safety precautions to protect the eyes from injury, everyone in the Northeast will be able to view the total lunar eclipse during the wee morning hours on March 14, if the sky is clear, simply by stepping outside and looking up.

*Michael J. Caduto is a writer, ecologist, and storyteller who lives in Reading, Vermont. He is author of Through a Naturalist's Eyes: Exploring the Nature of New England. Illustration by Adelaide Murphy Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine and sponsored by the Wellborn Ecology Fund of New Hampshire Charitable Foundation: nhcf.org.*

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Woodlands**

PO Box 270, Lyme, New Hampshire 03768  
[mail@northernwoodlands.org](mailto:mail@northernwoodlands.org) / 603-795-0660  
[www.northernwoodlands.org](http://www.northernwoodlands.org)

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