

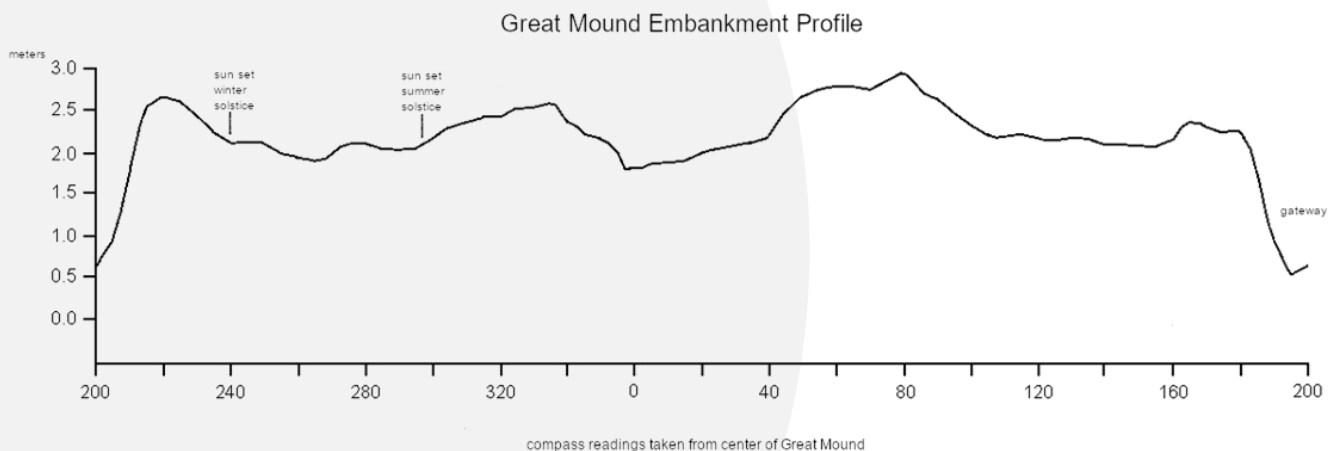
Solar Observations

By Beth McCord, Director
Indiana DNR Division of Historic Preservation and Archaeology



On **April 8, 2024**, a total solar eclipse will cross about half of Indiana. While total solar eclipses are rare and depend on location, there are other solar observations that were and still can be observed in Indiana annually.

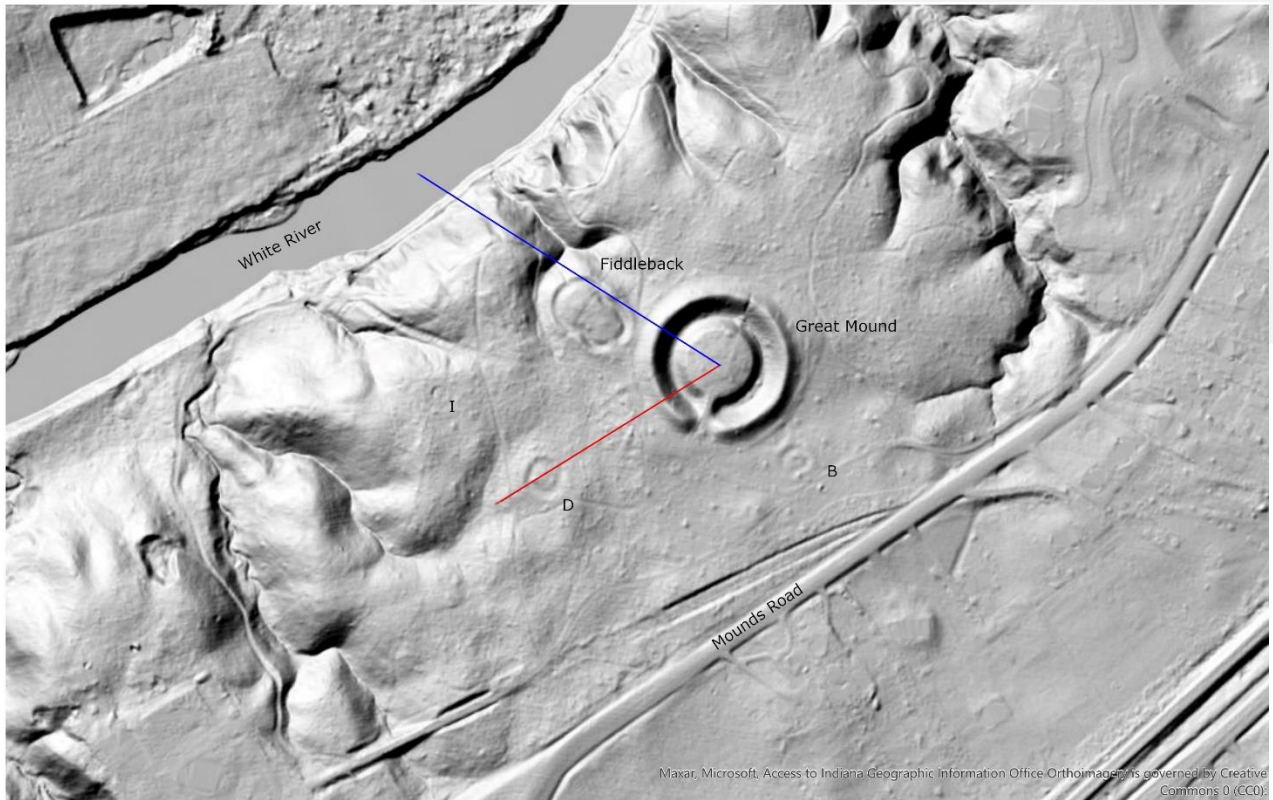
One of the publicly accessible places for viewing the total solar eclipse is at **Mounds State Park** in Anderson (on.IN.gov/mounds) The Native American earthworks from which the park derives its name have a deep history with solar observations. These earthworks were constructed about 2,000 years ago and astronomical alignments were an important part of the site design. In particular, the sunset at Winter Solstice, the sunset at Summer Solstice and the sun rising and setting on the equinoxes are repeated at several of the earthen enclosures within the park (Cochran 1992). At the Great Mound the embankment wall serves as an artificial horizon and a viewer standing near the center of the enclosure will see the sun disappear into a low spot on the enclosure wall over the center of Earthwork D on the evening of December 21, the shortest day of the year. Similarly, at sunset during the summer solstice, the longest day of the year, the sun will disappear into a dip in the enclosure wall and set over the Fiddleback enclosure. (Please note the center of the Great Mound is restricted). Additionally, the Circle Mound is aligned to the equinox sunrise and sunset through the gateway and sunrise and sunset alignments for the summer and winter solstice occur diagonally through the corners of this subrectangular enclosure.



Great Mound Embankment Profile



Photo of Sunset at Winter Solstice

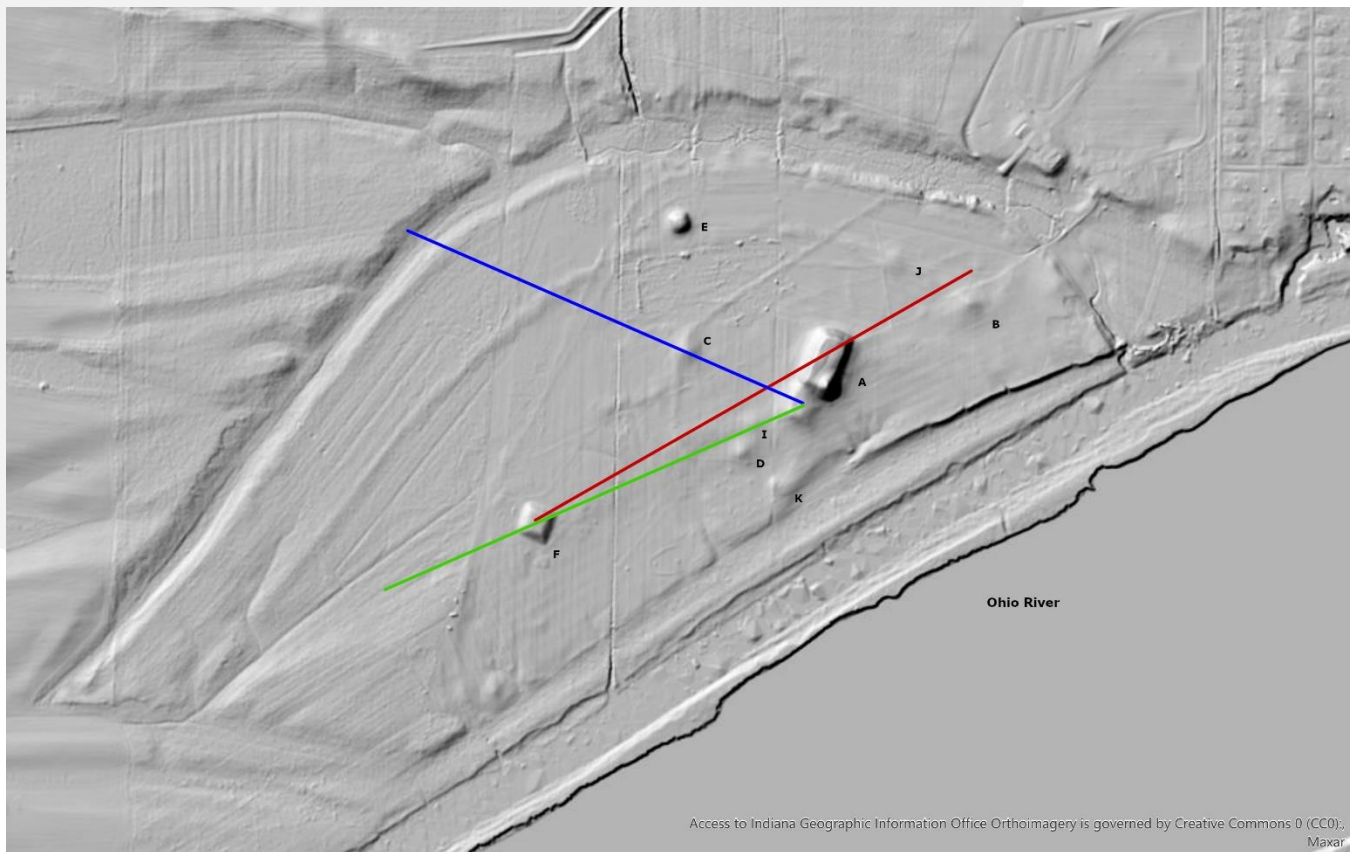


Red line indicates the Winter Solstice alignment. Blue line indicates the Summer Solstice alignment.

Another publicly accessible site is **Angel Mounds State Historic Site** in Evansville, Indiana (indianamuseum.org/historic-sites/angel-mounds). The Angel Mounds site was inhabited between AD 1050 and 1450. Notable alignments include a view of the sun rising at summer solstice through the center of Mound A when viewing from Mound F. Additionally, when viewed from the lower platform of Mound A, Mound C is located at lunar minimum north set and Mound F marks the lunar minimum south set. More recently it has been recognized that the entire site is organized to the orientation of the Milky Way during the time frame of the summer solstice (Romain and Herrmann 2022).



View of Mound A from Mound F.



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*Red line indicates the Summer Solstice alignment. Blue line indicates lunar minimum north set.
Green line indicates lunar minimum south set.*

The pattern of celestial observations built into these earthen cultural landscapes is repeated at numerous sites in Indiana, though most are not publicly accessible. More sites than are currently documented likely contain solar and other celestial alignments, but one of the most difficult factors of recording alignments in earthwork sites relates to site preservation. Almost all earthwork sites have been damaged to a greater or lesser extent by cultivation, erosion, urban development or looting. For those with poor preservation, we

have forever lost this cultural landscape and the connection to the builders' advanced understanding of the cosmos, mathematics and engineering.

This article provides a very basic summary and a few examples of earthwork sites and a few of the celestial alignments that can be observed every year. Most of these earthen landscapes have not been intensively studied but those that have reveal a remarkable body of Native American astronomical knowledge is contained in the archaeological record. Enjoy the total solar eclipse, the next one to cover a large section of Indiana will not occur until 2099, but keep in mind there are other events that can be observed annually. Additional information on viewing locations for the total eclipse can be found at on.IN.gov/eclipse.

References

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