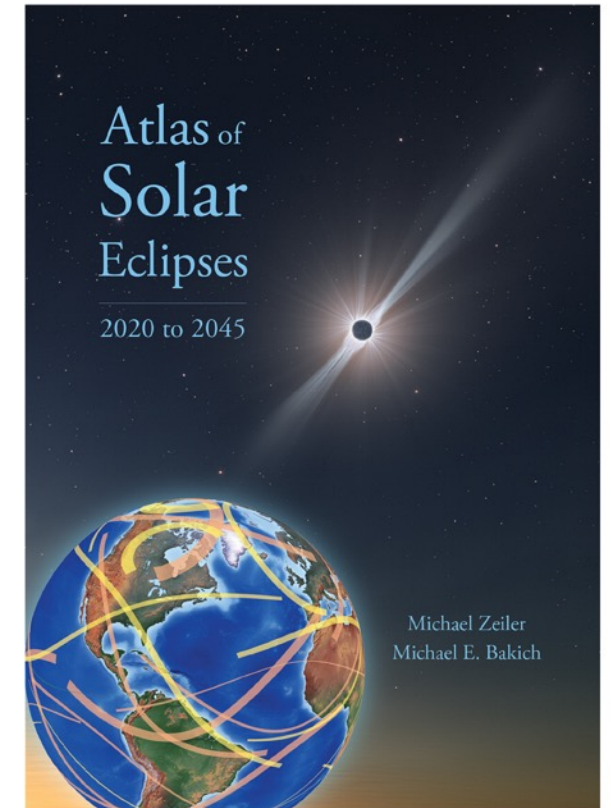
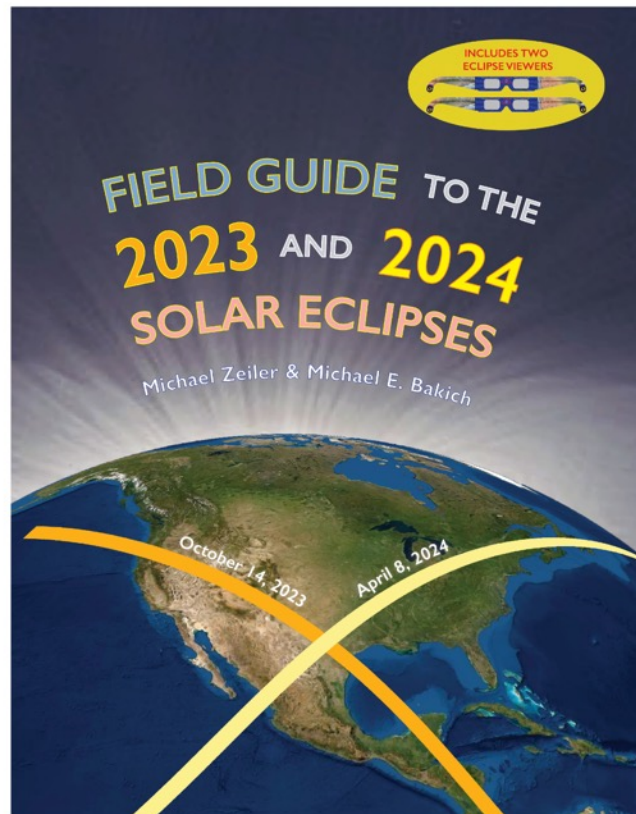




Maps of the 2023 and 2024 Solar Eclipses

Michael Zeiler, GreatAmericanEclipse.com
June 10, 2023 - AAS Solar Eclipse Planning Workshop





126

DAYS TO THE ANNULAR SOLAR ECLIPSE OF OCTOBER 14, 2023

The Eclipse Daily

June 10, 2023



303

DAYS TO THE TOTAL SOLAR ECLIPSE OF APRIL 8, 2024

Shortest Drive Paths to the October 14, 2023 Annular Solar Eclipse

These are the shortest drive paths from throughout the USA to the path of annular solar eclipse. The paths are color-coded by destination state and the yellow circles indicate which areas should receive the greatest concentrations of traffic.

These paths are useful in predicting where the greatest number of people will travel to each state in the path. Clearly, Texas can expect the greatest number of eclipse visitors as the eastern half of the nation is closest to Texas. People in the San Francisco bay area will likely drive to Nevada. Southern Californians probably will go to Utah. Folks in Denver and Phoenix are closest to New Mexico.



Great American Eclipse.com



Two solar eclipses visit Texas in 6 months! This is a rare and exceptional circumstance for any particular spot on Earth. Consequently, Texas will be a magnet for perhaps several million visitors from across the nation and around the world. Millions of people saw the total solar eclipse of August 21, 2017 which crossed the USA from Oregon to South Carolina. Nearly everyone who saw it today in 2017 agrees that it was a peak life experience and the most beautiful sight you can see in the sky. Texas is uniquely situated for a repeat experience.

On October 14, 2023, an annular solar eclipse begins over the Pacific Ocean and reaches the USA in Oregon. After passing through California, Nevada, Utah, Colorado, Arizona, and New Mexico, the path of annular solar eclipse crosses Texas. People near the middle of the path of annular solar eclipse will see the dramatic view of the Sun as a challenge ring for nearly five minutes.

On April 8, 2024, a total solar eclipse first reaches the Pacific coast of Mexico at Mazatlan. After crossing Mexico, the total solar eclipse first reaches Texas at Eagle Pass. People near the middle of the path of the total solar eclipse will enjoy a generous duration of over four minutes, nearly two times the duration of totality as the August 21, 2017 eclipse.

Viewing the eclipses



Annular Solar Eclipse of October 14, 2023

The annular solar eclipse begins in Texas in the late morning. People inside the path of annular solar eclipse will have the opportunity to view the incredible sight of the Sun as a challenge ring with a maximum duration of 4 minutes, 32 seconds.

At all stages of this eclipse, you must wear solar eclipse glasses or other safe solar viewing method. Learn to view an eclipse safely at eclipse.aas.org/eye-safety. While you will never see the sky fully and darkness because only the Sun will not be completely eclipsed. Use approved solar filters correctly fitted on binoculars for a dazzling show of Bailey's Beads and the rolling coronas.

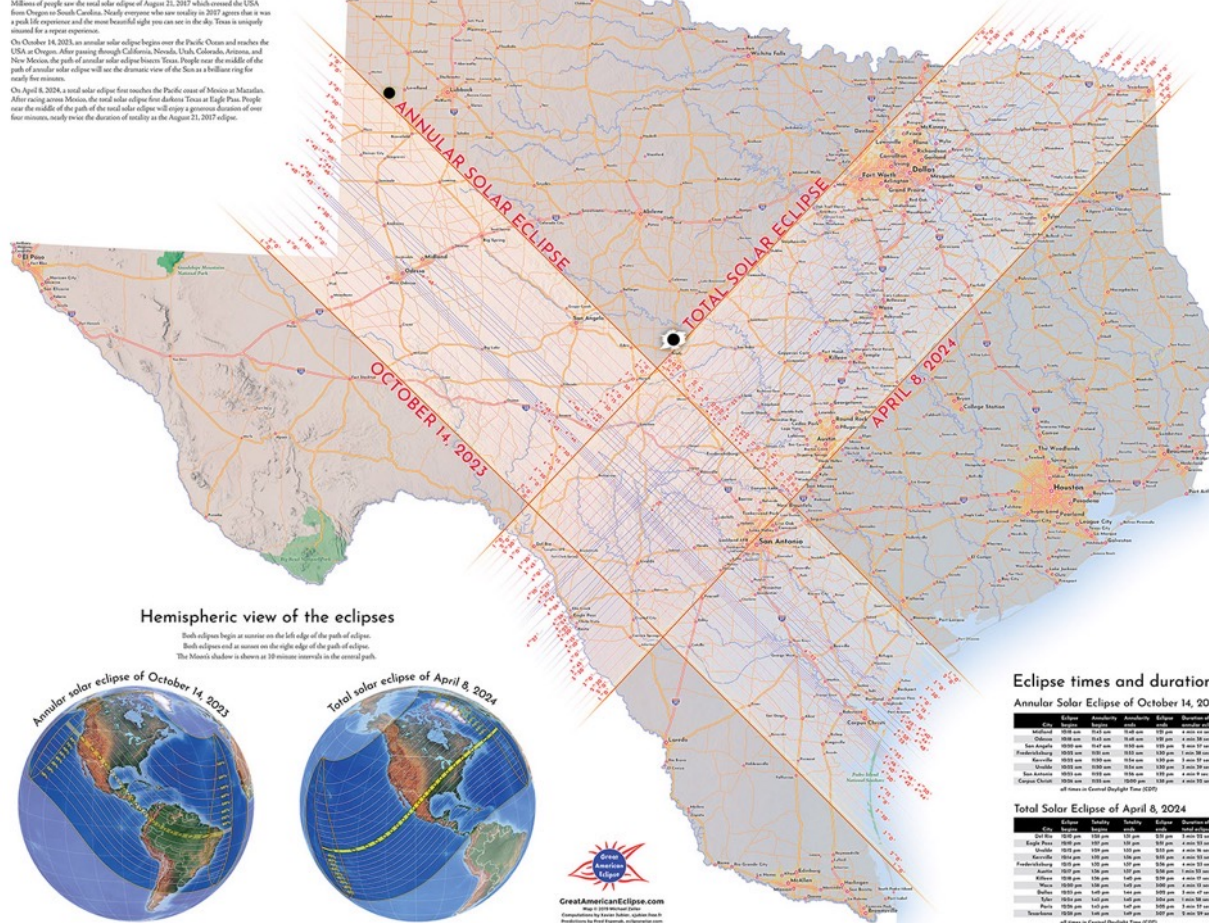


Total Solar Eclipse of April 8, 2024

The total solar eclipse of April 8, 2024 in Texas occurs in the early afternoon. People inside the path of total solar eclipse will see the sky suddenly darken and the remaining view of the Sun occur for up to 4 minutes, 28 seconds. This is nearly twice the duration of the total solar eclipse of August 21, 2017.

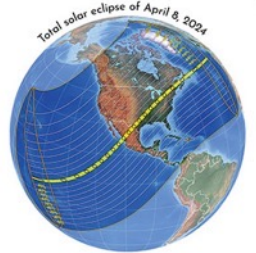
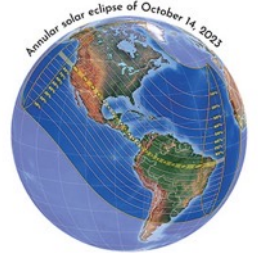
Whenever any part of the Sun is visible, you must wear solar eclipse glasses or other safe solar viewing method. You can find these at greatamericaneclipse.com. If you are inside the path of total solar eclipse, you may directly observe the corona with your eyes during the several minutes of totality.

A result of the Moon's orbit on the Sun is the way of eclipse. The partial stage of eclipse will last about 1 hour and 20 minutes. The annular stage of eclipse in Texas will last up to 4 minutes and 32 seconds, as indicated on the map. After the annular stage of eclipse, the closing partial stage of eclipse will last about one hour and 20 minutes.



Hemispheric view of the eclipses

Both eclipses begin at sunrise on the left edge of the path of eclipse. Both eclipses end at sunset on the right edge of the path of eclipse. The Moon's shadow is shown as 10-minute intervals in the central path.



Eclipse times and durations

Annular Solar Eclipse of October 14, 2023

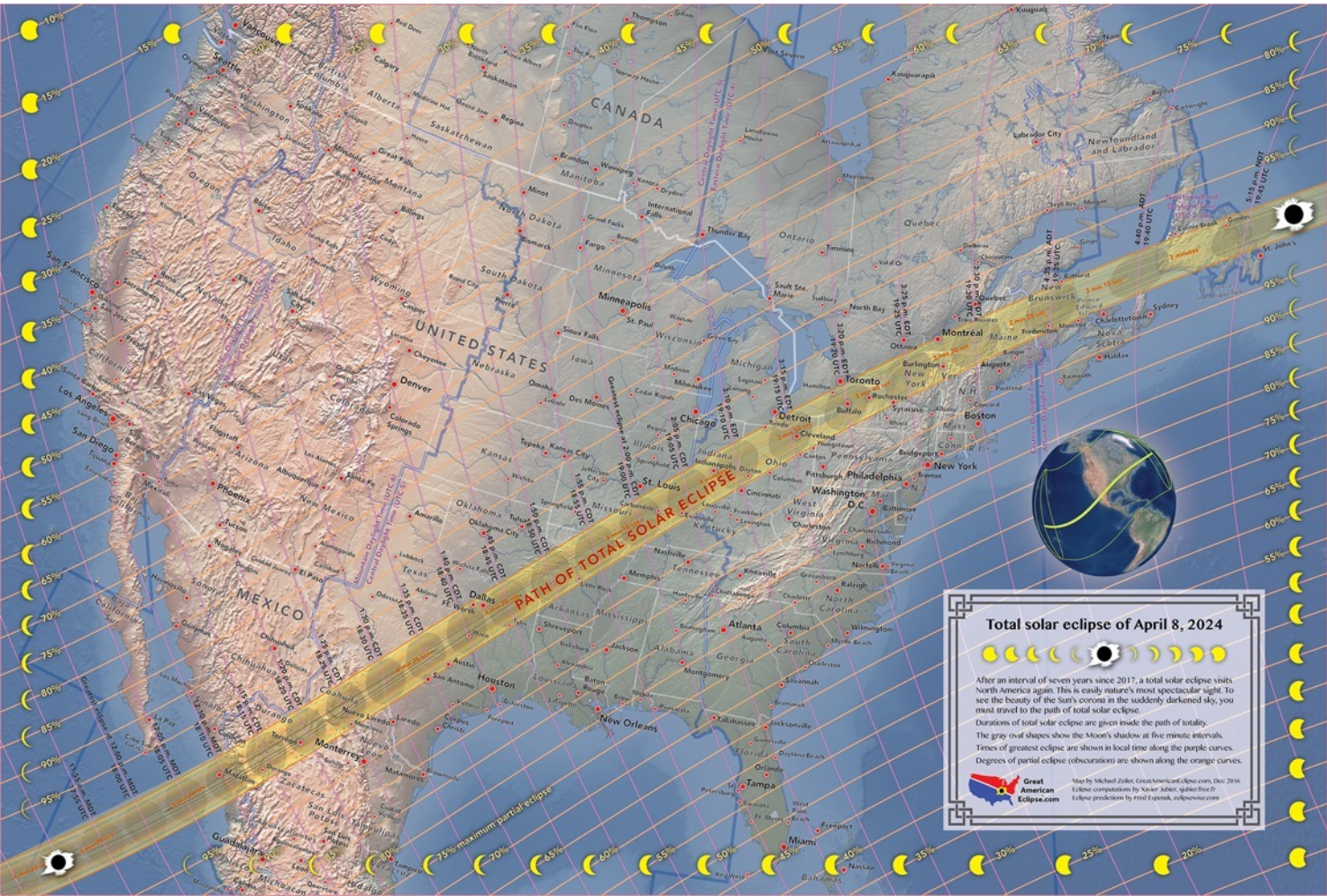
City	Eclipse Begins	Annularity Begins	Annularity Ends	Eclipse Ends	Duration of Annularity
Midland	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
Del Rio	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
San Angelo	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
Franklin	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
Del Rio	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
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Del Rio	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec
Del Rio	08:00 am	08:24 am	08:28 am	08:30 am	4 min 32 sec

Total Solar Eclipse of April 8, 2024

City	Eclipse Begins	Partial Begins	Partial Ends	Eclipse Ends	Duration of Totality
Eagle Pass	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Franklin	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec
Del Rio	01:00 pm	01:00 pm	01:00 pm	01:00 pm	4 min 28 sec

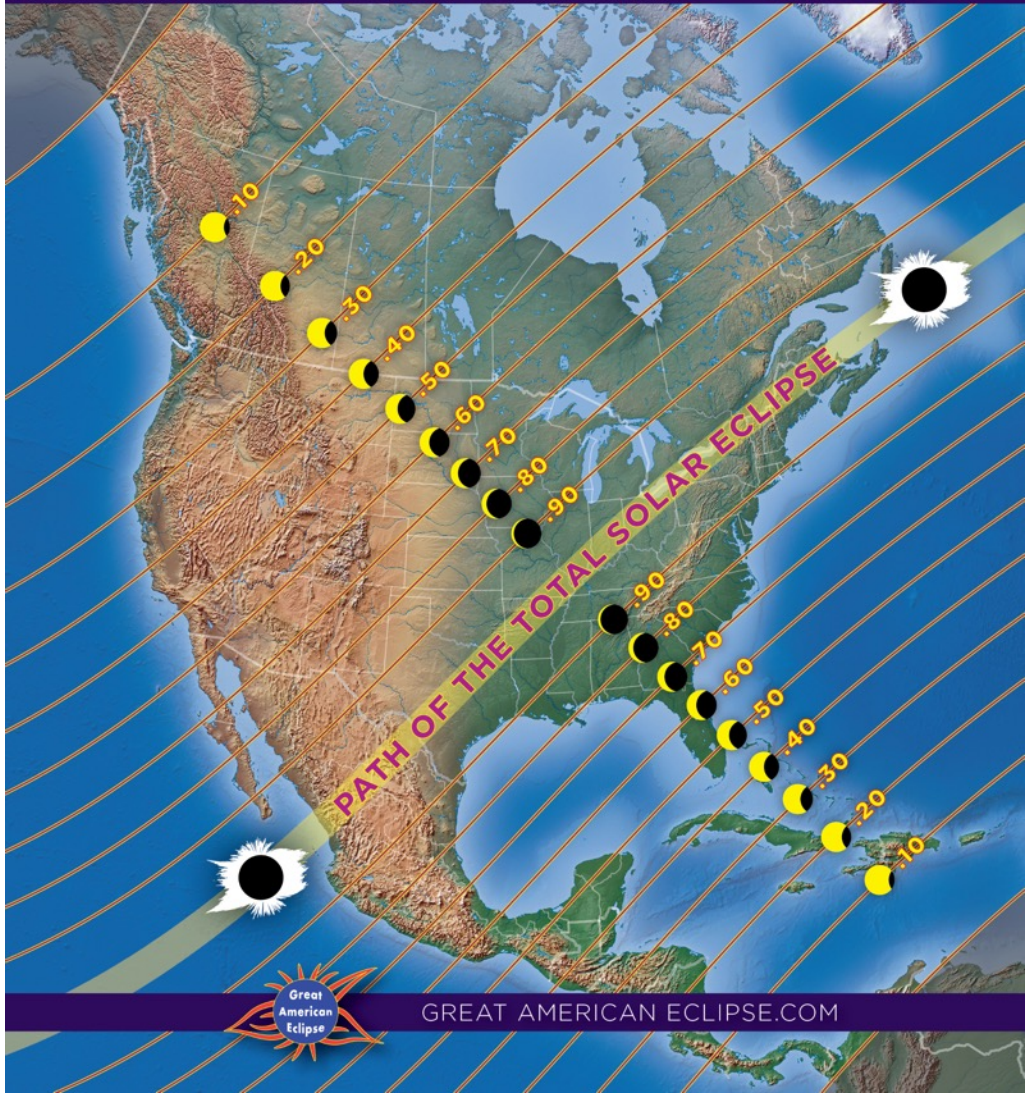


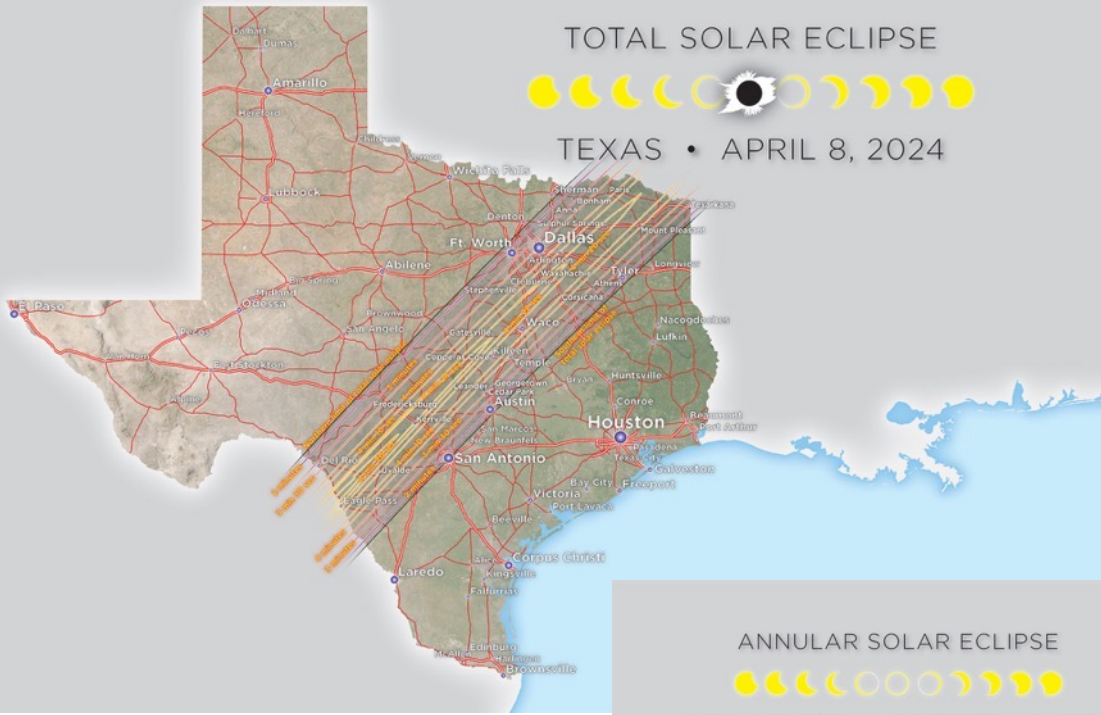
GreatAmericanEclipse.com



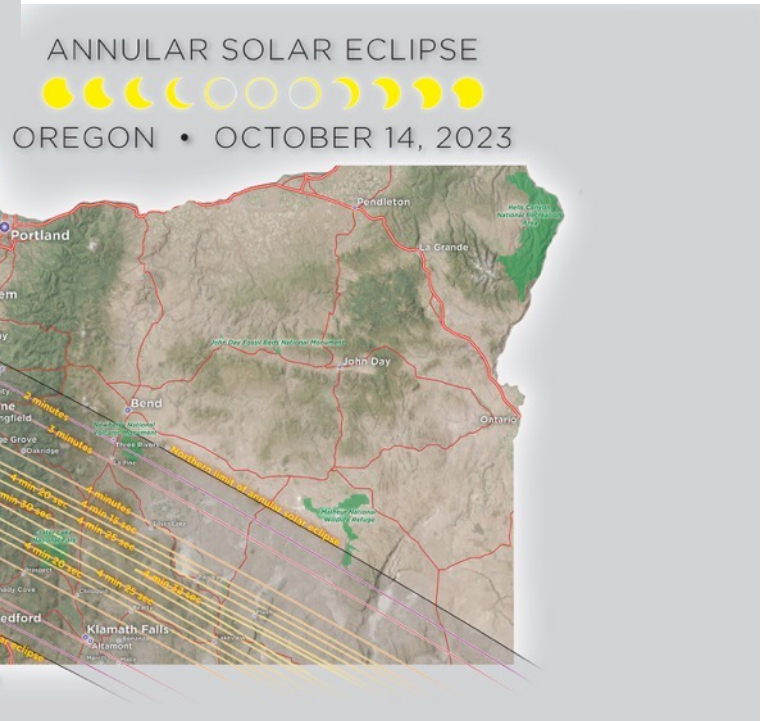
TOTAL SOLAR ECLIPSE

APRIL 8, 2024





GREAT AMERICAN ECLIPSE.COM
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 Eclipse calculations by Xavier Jubier, xjubier.free.fr
 Eclipse predictions by Fred Espenak, esp@umw.edu



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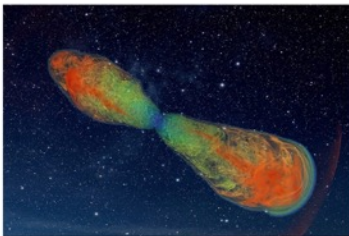
ASTRONOMY & OBSERVING NEWS

PEOPLE, PLACES, AND EVENTS
Owen Jay Gingerich, 1930–2023

BY: DANIEL W. E. GREEN | JUNE 7, 2023


GALAXIES
**James Webb Space Telescope
Uncovers Hundreds of Galaxies in
Early Universe**

BY: MONICA YOUNG | JUNE 7, 2023


STELLAR SCIENCE
**We Could Soon “Hear” the
Gravitational Waves of Dying Stars**

BY: MONICA YOUNG | JUNE 6, 2023


PEOPLE, PLACES, AND EVENTS
**WHERE TO SEE THE TWO GREAT
NORTH AMERICAN ECLIPSES**

BY: MICHAEL ZEILER | JUNE 8, 2023

The October 2023 and April 2024 solar eclipses will thrill millions of North Americans. These maps will enlighten and inspire viewers for the events to come.

[CONTINUE READING](#)

SPACECRAFT AND SPACE MISSIONS
**Psyche on Track for October Launch to
Metal-rich Asteroid**

BY: EMILY LAKDAWALLA | JUNE 6, 2023

THIS WEEK'S SKY AT A GLANCE
**This Week's Sky at a Glance, June 2
– 11**

BY: ALAN MACROBERT | JUNE 2, 2023

MOON
**Find a Horizon and Savor the
Bending of Light**

BY: BOB KING | JUNE 1, 2023

ASTRONOMY AND SOCIETY
**NASA Panel Talks Unidentified
Anomalous Phenomena**

BY: COLIN STUART | JUNE 1, 2023



The 25 Most Populous Cities in the Path of the April 8, 2024 Total Solar Eclipse

The most populous city in the path is **Montréal**, followed by **San Antonio** and **Dallas**



Rank	City	Population
1	Montréal	1,785,000
2	San Antonio	1,479,000
3	Dallas	1,259,000
4	Austin	966,000
5	Fort Worth	964,000
6	Indianapolis	871,000
7	Durango	713,000
8	Hamilton	587,000
9	Torreón	577,000
10	Mazatlán	515,000
11	Arlington	393,000
12	Mondova	376,000
13	Cleveland	360,000
14	Gómez Palacio	305,000
15	Plano	288,000
16	Toledo	269,000
17	Buffalo	268,000
18	Longueuil	252,000
19	Garland	242,000
20	Frisco	228,000
21	Ciudad Acuña	216,000
22	McKinney	214,000
23	Rochester	211,000
24	Grand Prairie	197,000
25	Little Rock	194,000



Population numbers from worldpopulationreview.com



The 25 Most Populous Cities in the Path of the October 14, 2023 Annular Solar Eclipse

The most populous city in the path is **San Antonio**, followed by **Albuquerque** and **Corpus Christi**



Rank	City	Population
1	San Antonio	1,479,000
2	Albuquerque	559,000
3	Corpus Christi	318,000
4	Eugene	176,000
5	Midland	129,000
6	New Braunfels	116,000
7	Odessa	108,000
8	San Angelo	99,000
9	Santa Fe	89,000
10	Medford	87,000
11	Springfield	62,000
12	Corvallis	60,000
13	Elko	55,000
14	Roswell	47,000
15	Farmington	46,000
16	Hobbs	38,000
17	Carlsbad	31,000
18	Kingsville	25,000
19	Big Spring	25,000
20	Roseburg	24,000
21	Klamath Falls	22,000
22	Gallup	21,000
23	Los Alamos	20,000
24	Alice	18,000
25	Coos Bay	16,000

Population numbers from worldpopulationreview.com



Crewed Spacecraft inside the Path of Total Solar Eclipse of April 8, 2024

Skylab 3 capsule

Launched July 28, 1973
Second crewed mission to Skylab
Commander Alan Bean
Science Pilot Owen Garriott
Pilot Jack Lousma



Public Domain - NASA

Skylab 3
Great Lakes Science Museum
Cleveland, Ohio

Gemini 8 capsule

Launched March 16, 1966
First docking of two crewed spacecraft
Command Pilot Neil Armstrong
Pilot David Scott



Public Domain - credit HrAtsuo

Gemini 8
Neil Armstrong Air and Space Museum
Wapakoneta, Ohio

Gemini 3
Grissom Memorial
Mitchell, Indiana

Apollo 15
USAF Museum
Dayton, Ohio

Apollo 15 capsule

Launched July 26, 1971
Fourth crewed Moon landing
Commander David Scott
Command Module Pilot Alfred Worden
Lunar Module Pilot James Irwin



Public Domain - NASA

Gemini 3 capsule

Launched March 23, 1965
First crewed Gemini mission
Command Pilot, Virgil "Gus" Grissom
Pilot, John Young



Public Domain - Credit HrAtsuo

Apollo 7 capsule

Launched October 11, 1968
First crewed Apollo mission
Thomas Stafford, Commander
Eugene Cernan, Lunar Module Pilot
John Young, Command Module Pilot



Public Domain - NASA

Apollo 7
Frontiers of Science Museum
Dallas, Texas



GreatAmericanEclipse.com



Wikimedia Commons, Sportsandweatherfreak

Stadiums and Speedways

Inside the paths of the 2023 Annular Solar Eclipse and the 2024 Total Solar Eclipse

Saluki Stadium in southern Illinois hosted an eclipse viewing event in 2017 and will do so again in 2024.



GreatAmericanEclipse.com

The partial phase of a solar eclipse is a great simulation of sunshine received by an outer planet of the solar system.

This map shows the calculated curves of dimmed sunshine levels (called eclipse obscuration). If you are along one of these curves, then at the moment of local greatest eclipse you will experience the simulated sunshine received by that planet (or dwarf planet).



Mars is 142 million miles from the Sun and receives about 43% of Earth's sunshine



Ceres is 257 million miles from the Sun and receives about 13% of Earth's sunshine



Jupiter is 483 million miles from the Sun and receives about 3.7% of Earth's sunshine



Saturn is 890 million miles from the Sun and receives about 1% of Earth's sunshine



Uranus is 1.78 billion miles from the Sun and receives about 0.27% of Earth's sunshine



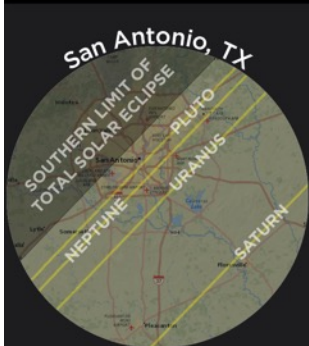
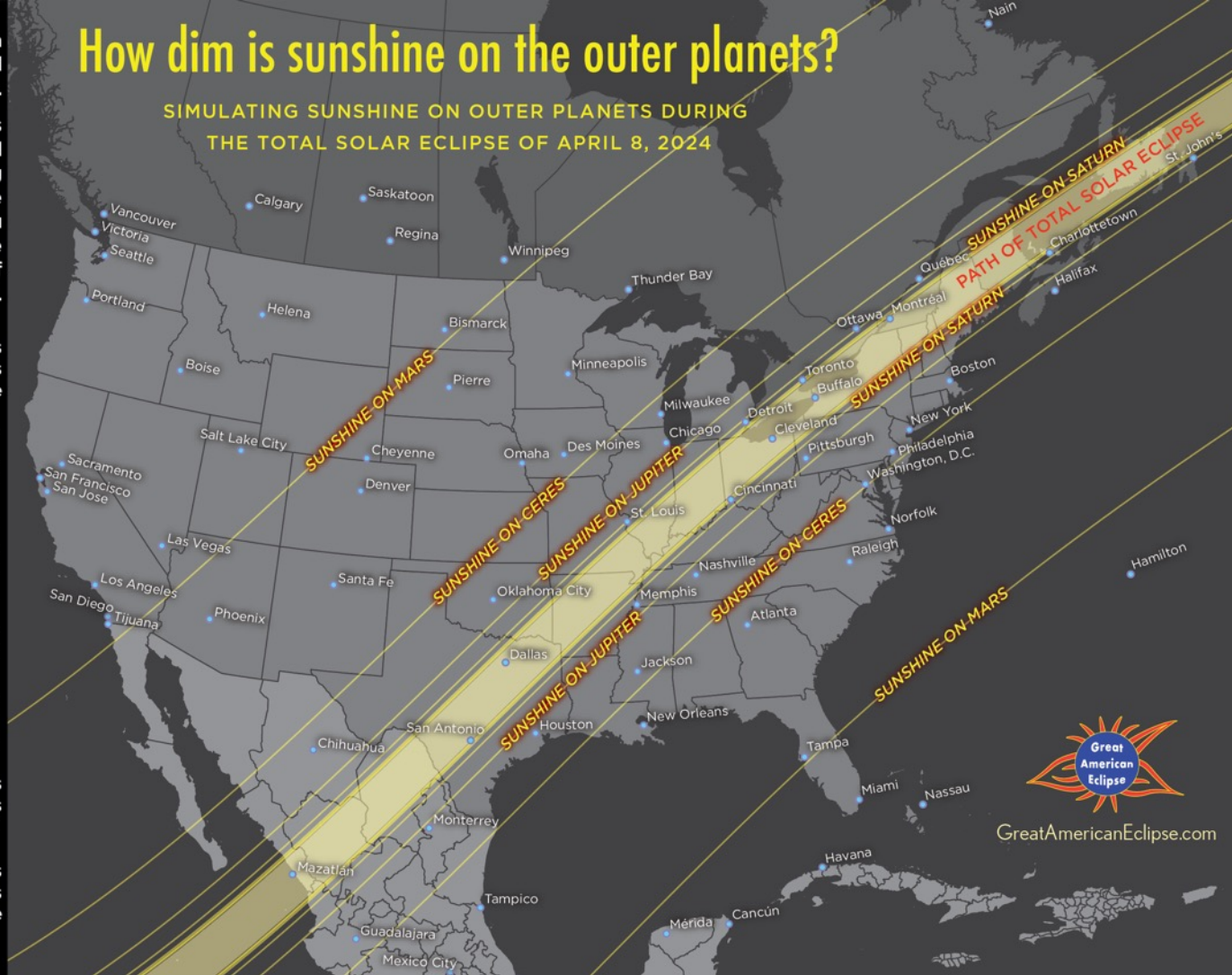
Neptune is 2.79 billion miles from the Sun and receives about 0.11% of Earth's sunshine



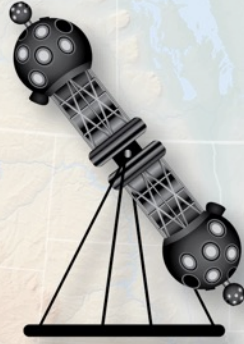
Pluto is 3.67 billion miles from the Sun and receives about 0.06% of Earth's sunshine

How dim is sunshine on the outer planets?

SIMULATING SUNSHINE ON OUTER PLANETS DURING THE TOTAL SOLAR ECLIPSE OF APRIL 8, 2024



Planetariums inside the paths of the 2023 & 2024 solar eclipses



Data source: www.aplf-planetariums.org



The Science Factory

Annular Solar Eclipse
October 14, 2023

San Juan College
Los Alamos Nature Center
Santa Fe Community College
New Mexico Museum of Natural History and Science

Roswell Museum and Art Center
Fort Worth Museum of Science and History
Tarleton State University
Museum of the Southwest
Angelo State University
Central Texas College
Texas Museum of Science & Technology
San Antonio College

Planetarium Torreon
Escuela Nautica Mercante
Cap. Alh. Antonio Gamez Maqueo

Charles W. Brown Planetarium - Ball State University
Butler University

Evansville Museum
University of Central Arkansas
Henderson State University

Texas A&M University
University of Texas at Arlington
Tyler Junior College
Navarro College

San Antonio College



GreatAmericanEclipse.com

Francis Malcolm Science Center

Rio Tinto Alcan Planetarium
SUNY Plattsburgh
Fairbanks Museum & Planetarium
SUNY Potsdam

SUNY Oswego
William J. McCallion Planetarium
Williamsville Space Lab Planetarium
SUNY Geneseo
Penn State Behrend
Allegheny College
Cleveland Museum of Natural History

Bowling Green State University
Kent State University
Armstrong Air & Space Museum
Boonshoft Museum of Discovery
East Central Educational Service Center

Evansville Museum

Total Solar Eclipse
April 8, 2024



Peaks and High Points Inside the Paths of the 2023 and 2024 Solar Eclipses

The highest peak in the 2023
path is Wheeler Peak in Nevada.
The highest peak in the 2024
path is Cerro Gordo in Mexico.



- ▲ Marys Peak, 4095 feet
- ▲ Mount Bachelor, 9055 feet
- ▲ Mount Thielsen, 9149 feet
- ▲ Mount McLoughlin, 9499 feet
- ▲ Steens Mountain, 9748 feet
- ▲ Eagle Peak, 9894 feet
- ▲ Big Mountain, 8580 feet
- ▲ Granite Peak, 9748 feet
- ▲ McAfee Peak, 10453 feet
- ▲ Ruby Dome, 11395 feet

- ▲ Ibapah Peak, 12047 feet
- ▲ Mount Moriah, 12064 feet
- ▲ Wheeler Peak, 13061 feet
- ▲ Delano Peak, 12171 feet
- ▲ Thousand Lake Mountain, 11291 feet
- ▲ Mount Ellen Peak, 11528 feet
- ▲ Abajo Peak, 11360 feet

- ▲ Chicoma Mountain, 11572 feet
- ▲ Lake Peak, 12412 feet
- ▲ Sandia Peak, 10671 feet
- ▲ Mount Taylor, 11313 feet
- ▲ Manzano Peak, 10103 feet
- ▲ Capitan Mountain, 10185 feet

- ▲ Taum Sauk Mountain, 1772 feet
- ▲ Williams Hill, 1069 feet
- ▲ Big Middle Ride, 2212 feet
- ▲ Mount Magazine, 2749 feet
- ▲ Rich Mountain, 2686 feet
- ▲ Buck Knob, 2284 feet
- ▲ Raspberry Mountain, 2276 feet

- ▲ Long Point, 1362 feet
- ▲ Turkey Knob, 2043 feet

- ▲ Ocampo, 9973 feet
- ▲ El Picacho, 10321 feet
- ▲ La Piramide, 9186 feet
- ▲ Cerro Gordo, 11007 feet

- ▲ The Cabox, 2664 feet
- ▲ Traveler Mountain, 3548 feet
- ▲ Mount Katahdin, 5260 feet
- ▲ Sugarloaf Mountain, 4239 feet
- ▲ Monts Sutteon, 3129 feet
- ▲ Lyon Mountain, 3832 feet
- ▲ Mount Mansfield, 4124 feet
- ▲ Mount Marcy, 5333 feet
- ▲ Snowy Mountain, 3908 feet
- ▲ Frost Hill, 2285 feet
- ▲ Mount Onondaga, 2170 feet

- ▲ Robin Hill, 2234 feet
- ▲ Campbell Hill, 1549 feet
- ▲ Weed Patch Hill, 1056 feet

Total Solar Eclipse
April 8, 2024

Annular Solar Eclipse
October 14, 2023



GreatAmericanEclipse.com

National Parks inside the paths of the 2023 & 2024 solar eclipses



Prince Edward Island National Park
Kouchibouguac National Park

Thousand Islands National Park

Fort Stanwix National Monument
Women's Rights National Historic Park

Point Pelee National Park

Perry's Victory & International Peace Monument

James A. Garfield National Historic Site
Cuyahoga Valley National Park

Crater Lake National Park

Lava Beds National Monument

Capitol Reef National Park

Glen Canyon National Recreational Area

Canyonlands National Park

Natural Bridges National Monument

Hovenweep National Monument

Canyons of the Ancients National Monument

Yucca House National Monument

Mesa Verde National Park

Great Basin National Park

Bryce Canyon National Park

Rainbow Bridge National Monument

Navajo National Monument

Canyon De Chelly National Monument

Chaco Culture National Historic Park

El Malpais National Monument

Salinas Pueblo Missions National Monument

Aztec Ruins National Monument

Bandelier National Monument

Pecos National Historic Park

Petroglyph National Monument

George Rogers Clark National Historic Park
Lincoln Boyhood National Memorial

Ozark National Scenic Riverway

Buffalo National River

Holla Bend National Wildlife Refuge

Hot Springs National Park

Amistad National Recreational Area
Parque Nacional Los Novillos

Lyndon B Johnson National Historic Park

Padre Island National Seashore

Total Solar Eclipse
April 8, 2024

Annular Solar Eclipse
October 14, 2023



GreatAmericanEclipse.com

Parque Nacional Arrecifes de Xcalak



Last and Next Total Solar Eclipses for each of the United States

Excluding the Total Solar Eclipse of April 8, 2024



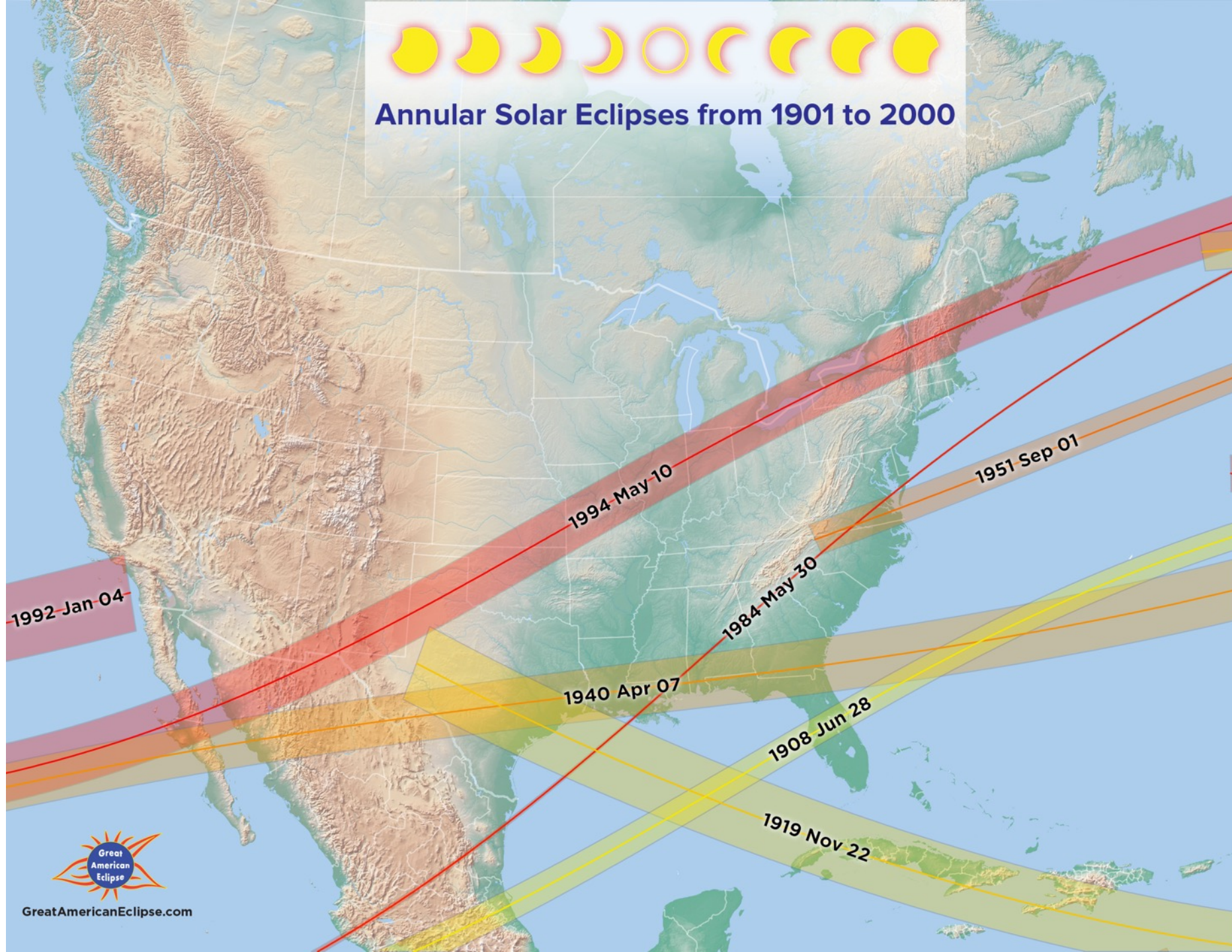
Total Solar Eclipse
April 8, 2024



GreatAmericanEclipse.com



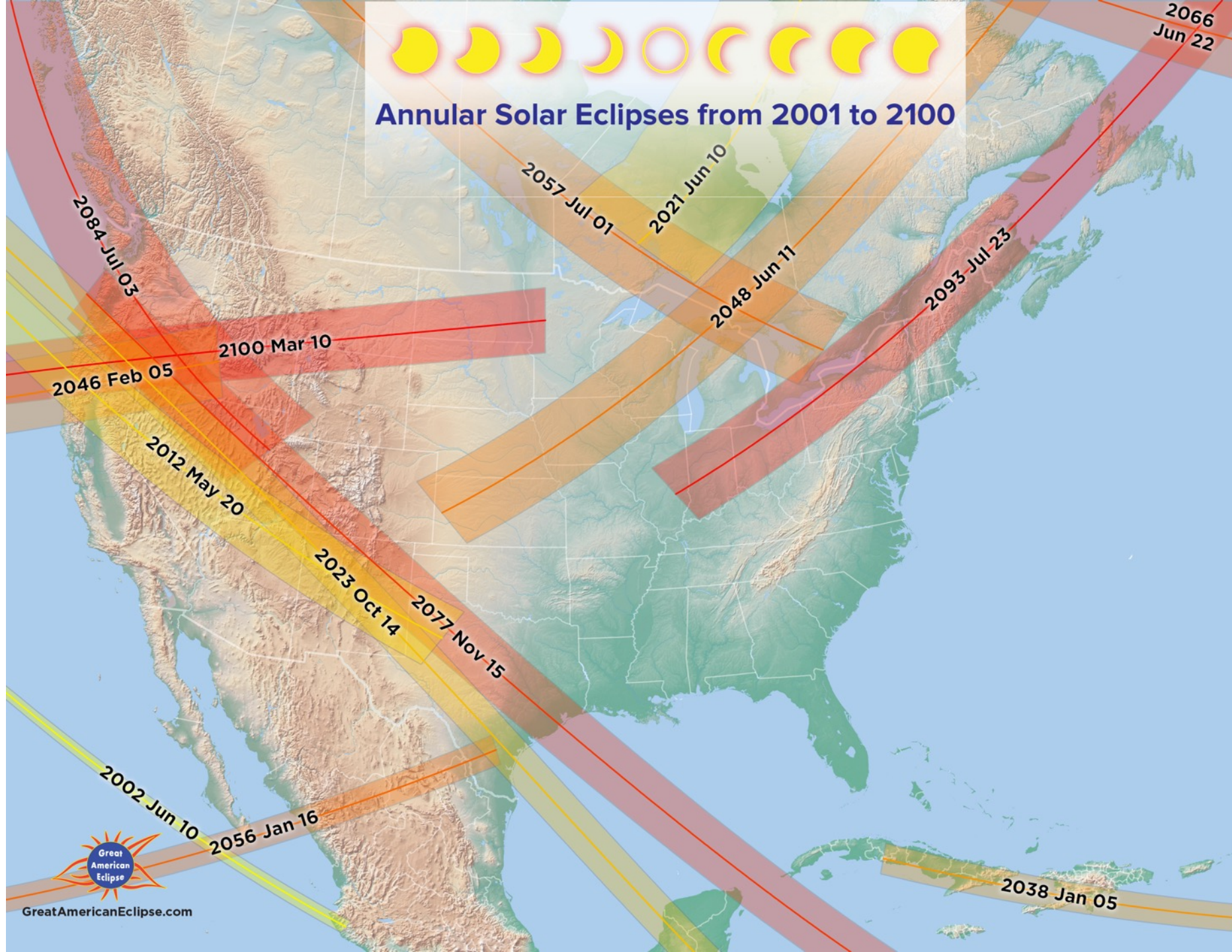
Annular Solar Eclipses from 1901 to 2000



GreatAmericanEclipse.com

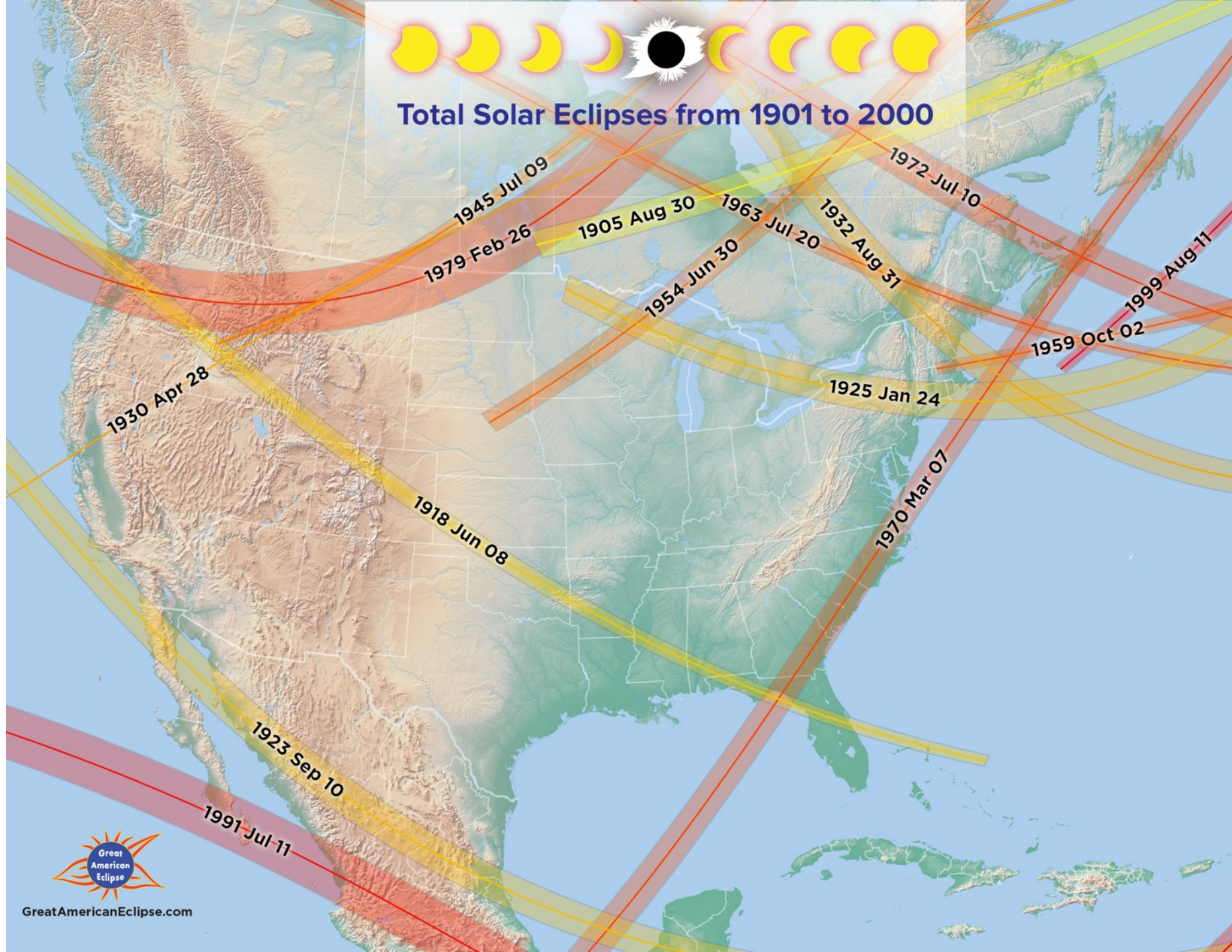


Annular Solar Eclipses from 2001 to 2100





Total Solar Eclipses from 1901 to 2000





Total Solar Eclipses from 2001 to 2100

