



THE COMING SOLAR ECLIPSE

APRIL 8, 2024

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National Weather Service - Binghamton, NY Office



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APRIL 8, 2024 TOTAL SOLAR ECLIPSE



WHAT IS THIS ALL ABOUT?

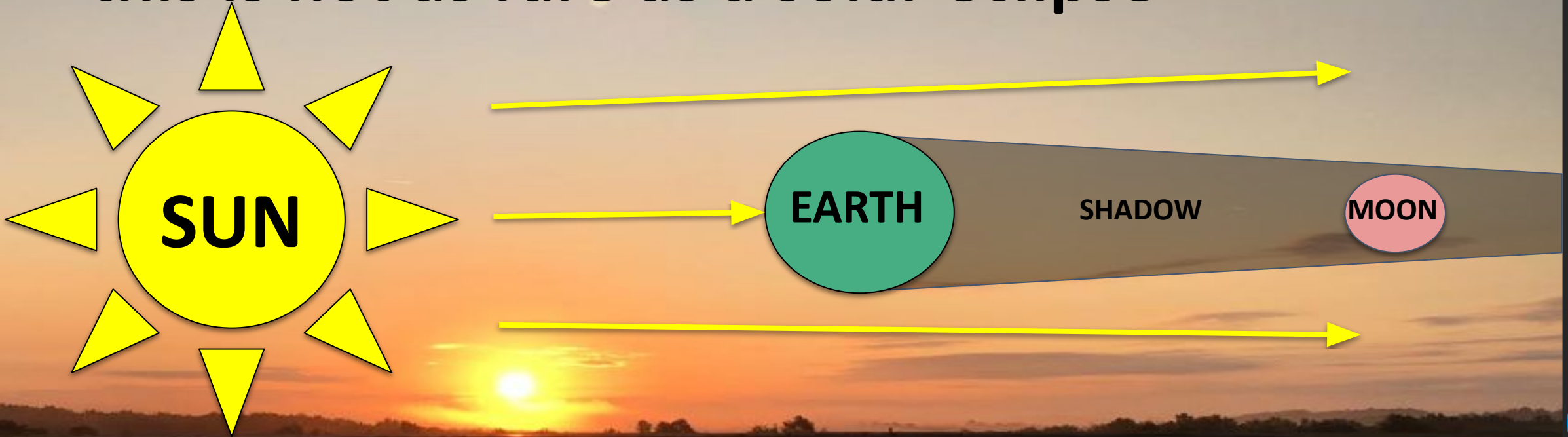
- **ECLIPSE**: Obscuring of light by one celestial object, from the passage of another between it and the observer (or between it, and the source of light)
- **CELESTIAL OBJECT**: A planet, moon, sun, or star

In other words... an Eclipse happens when the Sun, Earth, and Moon line up perfectly - which is rare!



LUNAR ECLIPSE

- Lunar = Moon
- Moon travels through Earth's shadow
- Earth's shadow is bigger than the moon, so this is not as rare as a solar eclipse

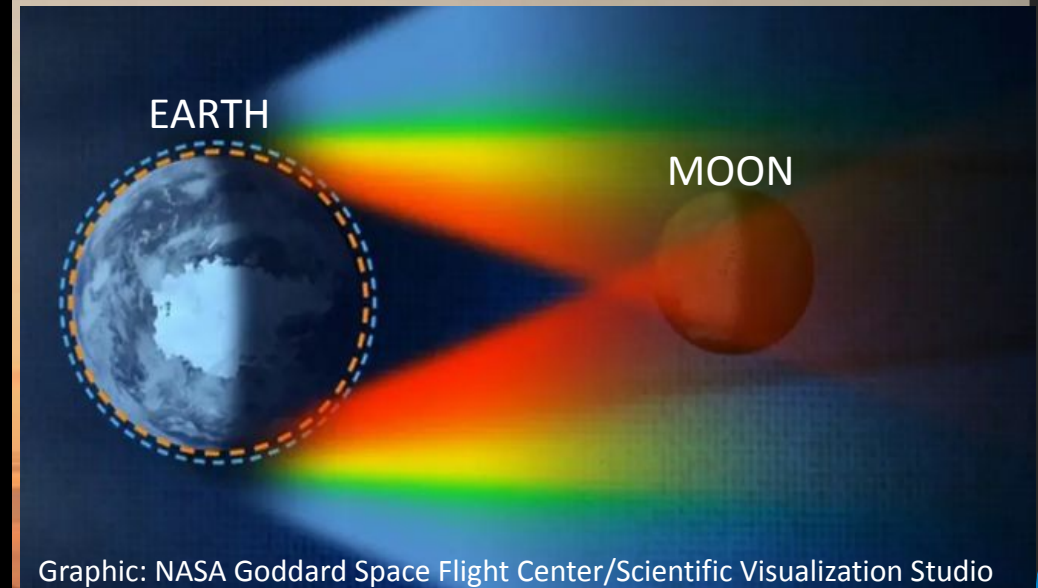


LUNAR ECLIPSE

Different colors behave in different ways (like our sky is usually blue but then turns orange-red at sunrise and sunset). This splitting of sunlight into different colors is called “Rayleigh Scattering”. It’s why the moon turns RED during a Lunar Eclipse instead of just going dark.



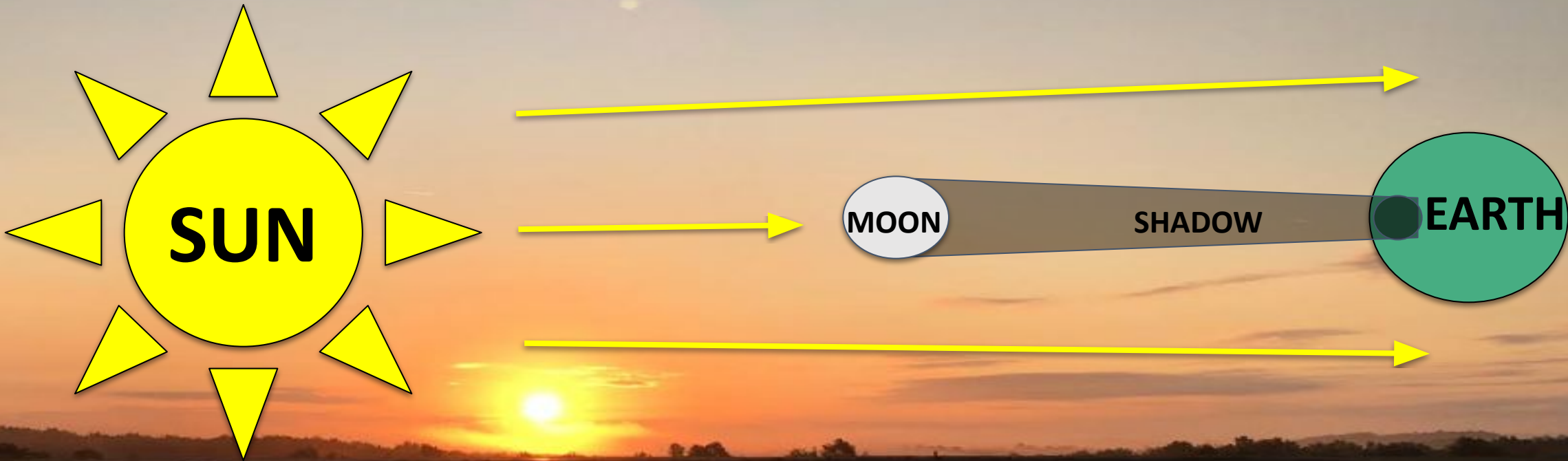
Graphic/Picture: NASA



Graphic: NASA Goddard Space Flight Center/Scientific Visualization Studio

SOLAR ECLIPSE

- Solar = Sun
- Sun is blocked by the moon
- Moon's shadow is cast on Earth



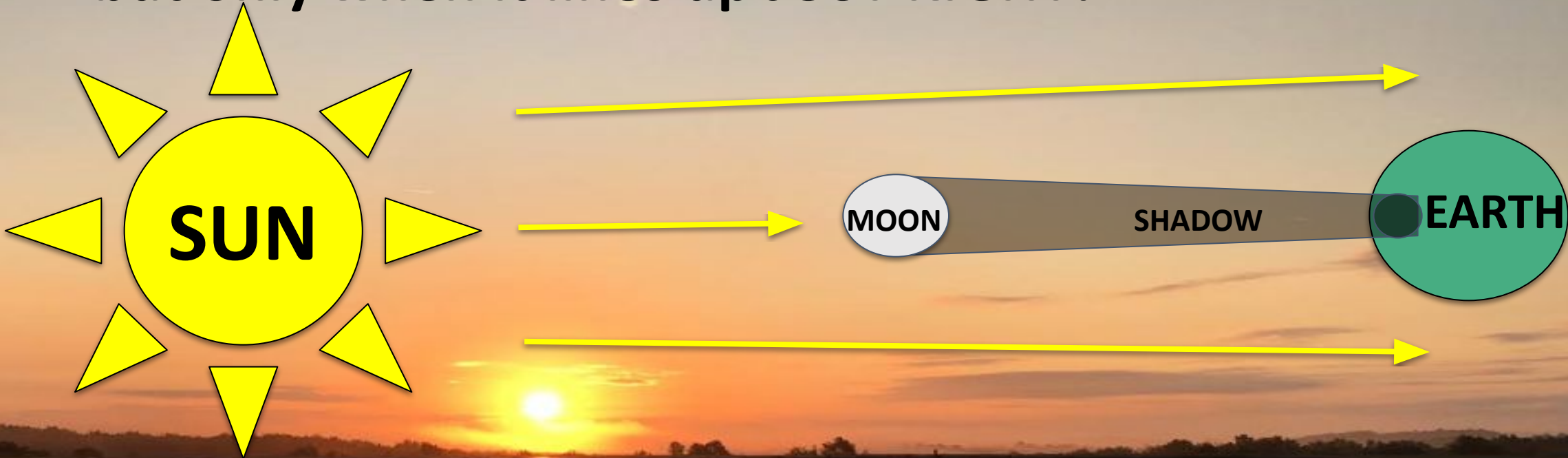
“What is a Solar Eclipse?” 2 min video from NASA - https://youtu.be/hyf5JF_VxwM



IT'S ALL ABOUT ALIGNMENT!

DID YOU KNOW:

- The Moon is about 400 times smaller than the Sun
- The Moon is also about 400 times CLOSER than the Sun
- This means that the Moon can perfectly block the Sun, but only when it lines up JUST RIGHT!



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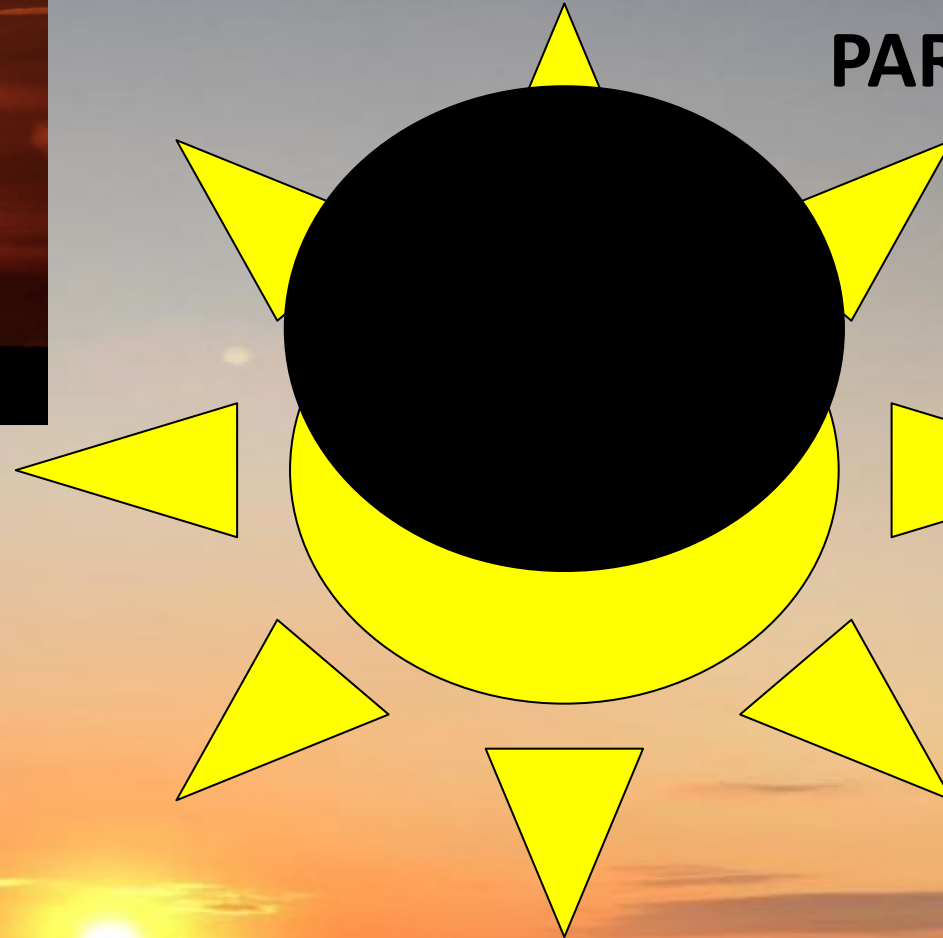
(still not to scale, but more like how it actually looks)



WHAT IT LOOKS LIKE FROM EARTH: Sun-Moon-Earth Usually Do Not Line Up Just Right



US Capitol from Arlington VA
June 10, 2021 NASA/Bill Ingalls
<https://science.nasa.gov/eclipses/>



PARTIAL SOLAR ECLIPSE

Partial means not all of the sun gets blocked. Only a slight dimming of the sun.

In fact, even during a **TOTAL** solar eclipse, most people (not in the path of **TOTALITY**) see something like see this.



PARTIAL SOLAR ECLIPSE



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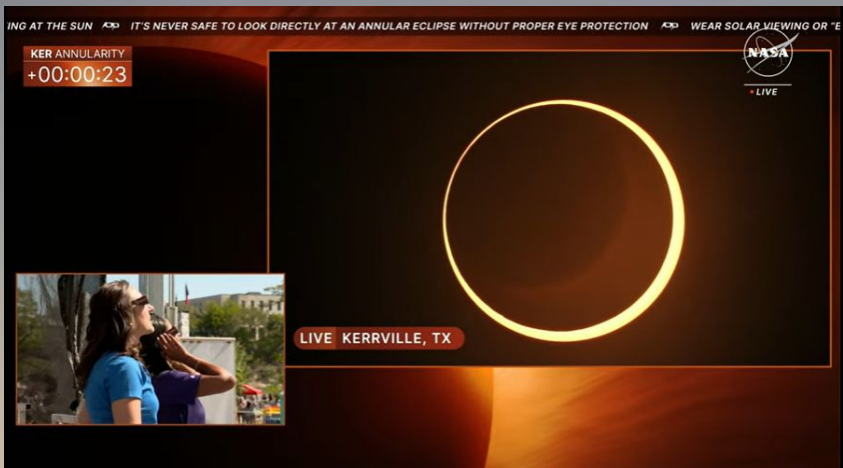
TOTAL SOLAR ECLIPSE



US Capitol from Arlington VA June 10, 2021

NASA/Bill Ingalls <https://science.nasa.gov/eclipses/>

WHAT IT LOOKS LIKE FROM EARTH: Sun-Moon-Earth Usually Do Not Line Up Just Right



Annular Solar Eclipse in Texas
October 14, 2023 - NASA Broadcast

<https://youtu.be/LIY79zjud-Q?t=4886>



ANNULAR SOLAR ECLIPSE

Annular means ring-shaped. Looks neat and it is in the center, but the sun doesn't get totally blocked/dark.

The moon's orbit is not a perfect circle. This is what happens if the moon happens to be just a little bit too far from Earth in its orbit during the eclipse.

ANNULAR SOLAR ECLIPSE

ING AT THE SUN IT'S NEVER SAFE TO LOOK DIRECTLY AT AN ANNULAR ECLIPSE WITHOUT PROPER EYE PROTECTION WEAR SOLAR VIEWING OR "E

KER ANNULARITY
+00:00:23



LIVE KERRVILLE, TX



Annular Solar Eclipse in Texas
October 14, 2023 - NASA Broadcast



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TOTAL SOLAR ECLIPSE



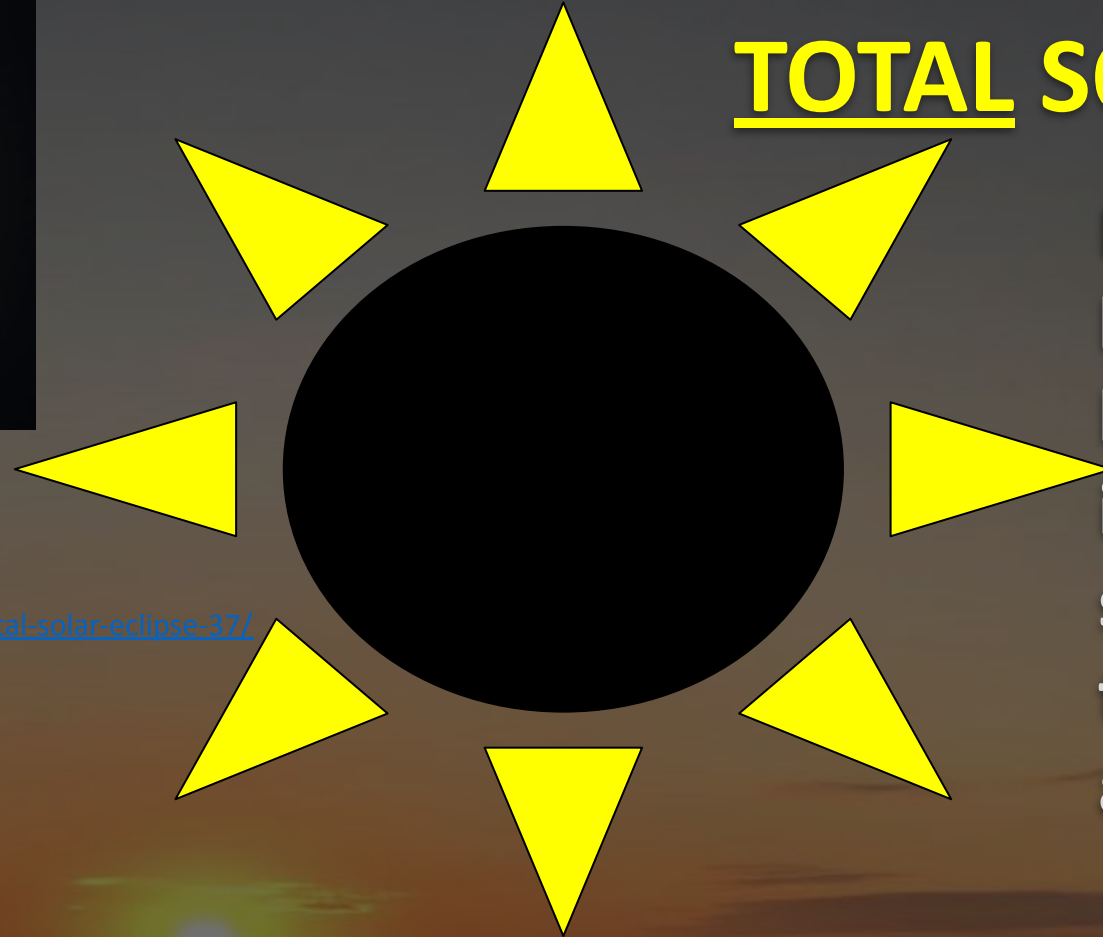
<https://youtu.be/LIY79zjud-Q?t=4886>

WHAT IT LOOKS LIKE FROM EARTH: Total Solar Eclipse Lines Up Perfectly



Total Solar Eclipse
August 21, 2017 Madras, OR
Aubrey Gemignani/NASA

<https://www.nasa.gov/image-article/2017-total-solar-eclipse-37/>



TOTAL SOLAR ECLIPSE

Entire sun gets blocked, but only briefly! Even directly in the middle of the shadow's "path of totality" it only lasts a few minutes.

CORONA: The outermost part of the SUN'S Atmosphere. You can't see it because the sun is too bright... EXCEPT during a total solar eclipse!





Total Solar Eclipse
August 21, 2017 Madras, OR
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<https://www.nasa.gov/image-article/2017-total-solar-eclipse-37/>



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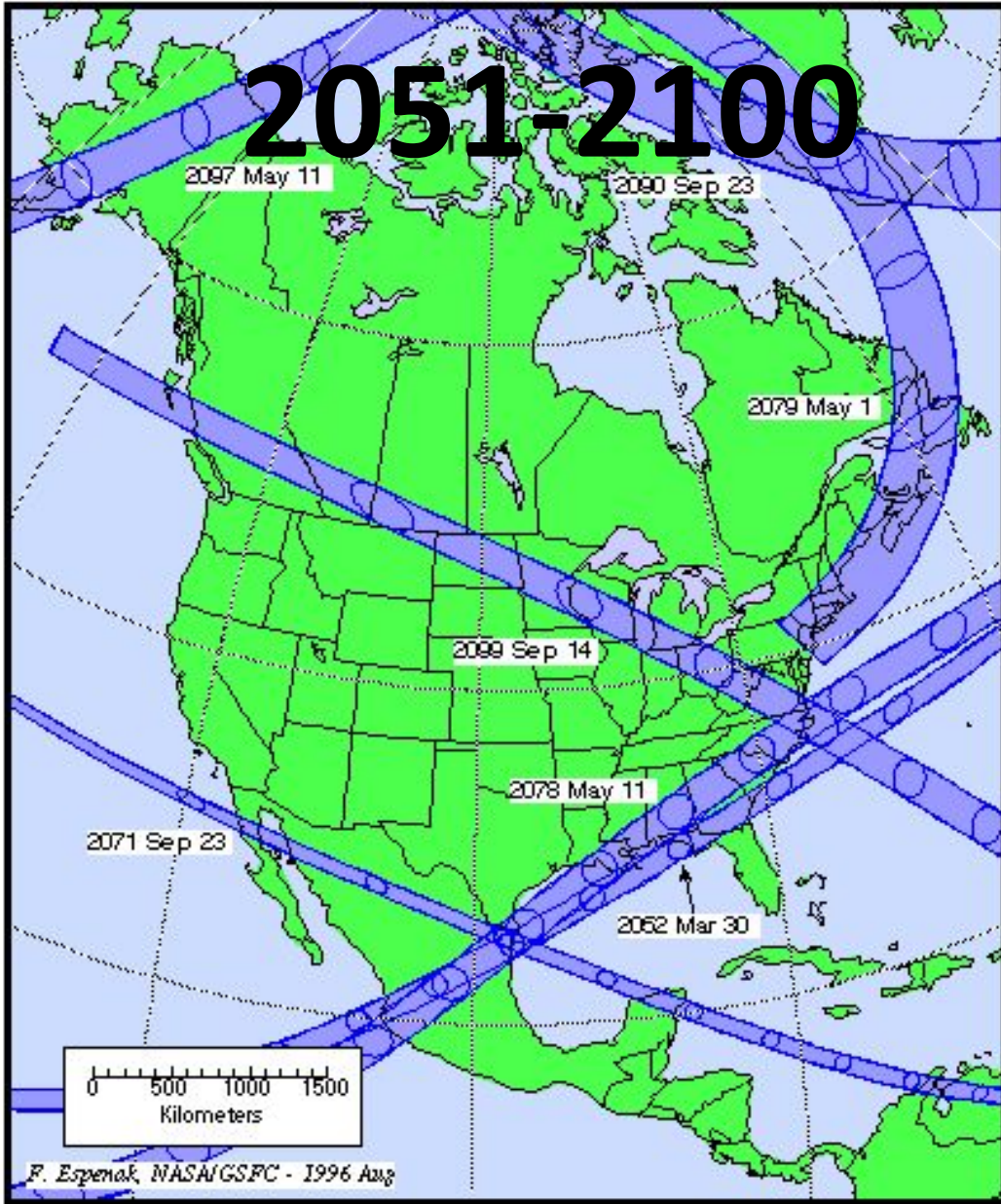
HOW RARE IS THIS?

It'll be more than 20 years before anyone in the Continental U.S. sees a total solar eclipse again... and that will only be a tiny part of the map!



Total Solar Eclipses: 2051 - 2100

2051-2100



HOW RARE THIS IS!

In 55 Years, sunrise of May 1st will be the next Total Solar Eclipse within the Northeast U.S.

For a single location on Earth, it takes an average of more than 350 years between total solar eclipses!



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HOW IT LOOKS FROM SPACE!



NOAA GOES-16 Satellite of Moon's Shadow during August 2017 Total Solar Eclipse

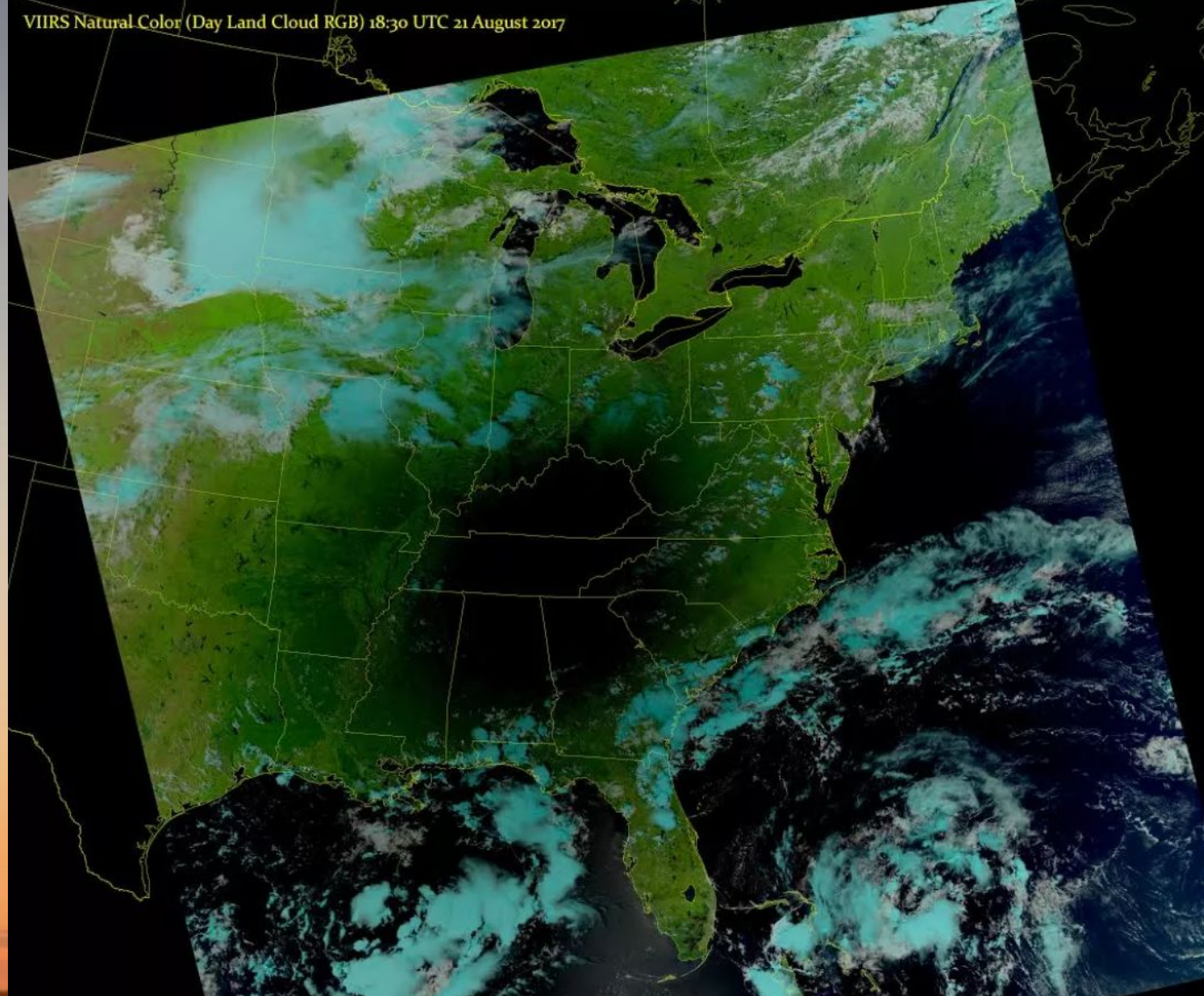
(see video clip at https://nesdis-prod.s3.amazonaws.com/migrated/northern_hemisphere.mp4?_ga=2.196866796.1355814562.1709402441-977215343.1704218322)



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HOW IT LOOKS FROM SPACE!



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TOTAL SOLAR ECLIPSE



Another Satellite Image of Moon's Shadow during August 2017 Total Solar Eclipse

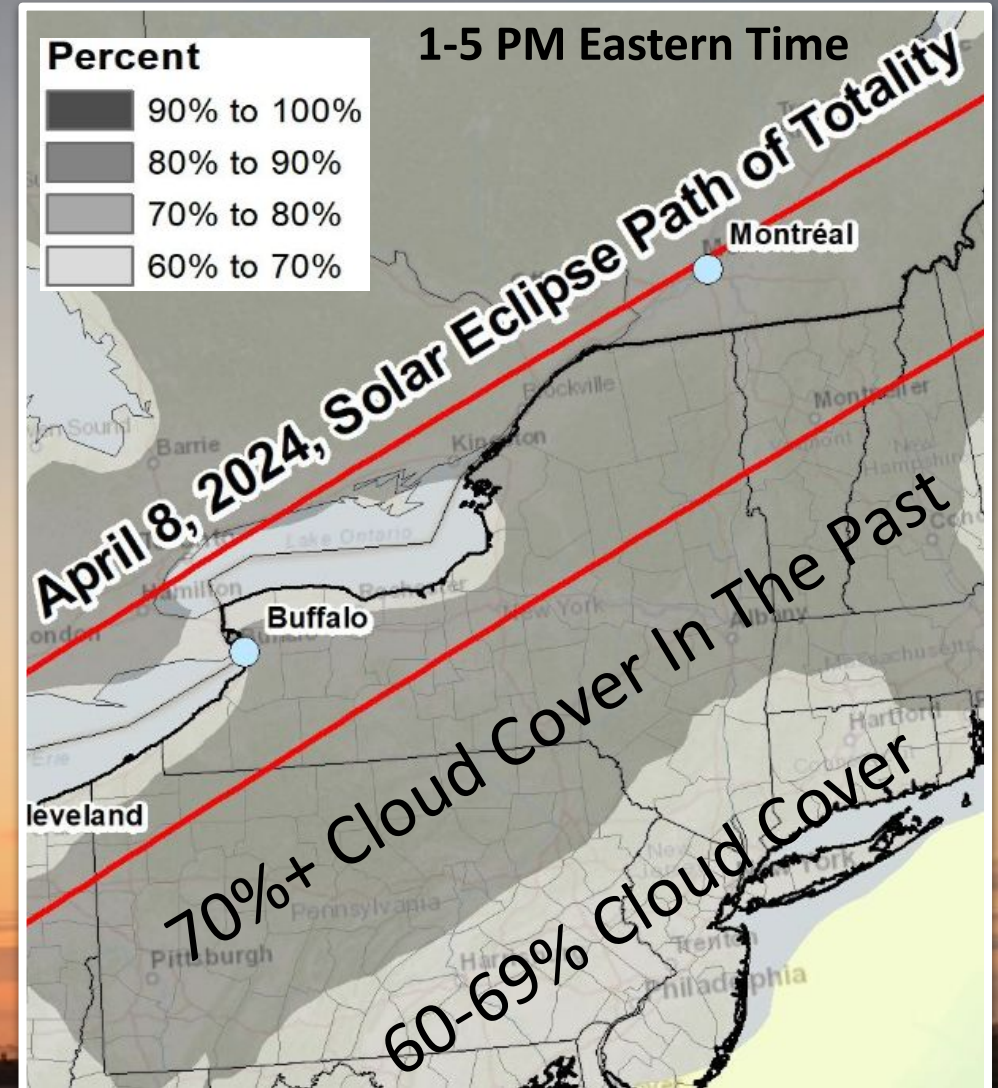
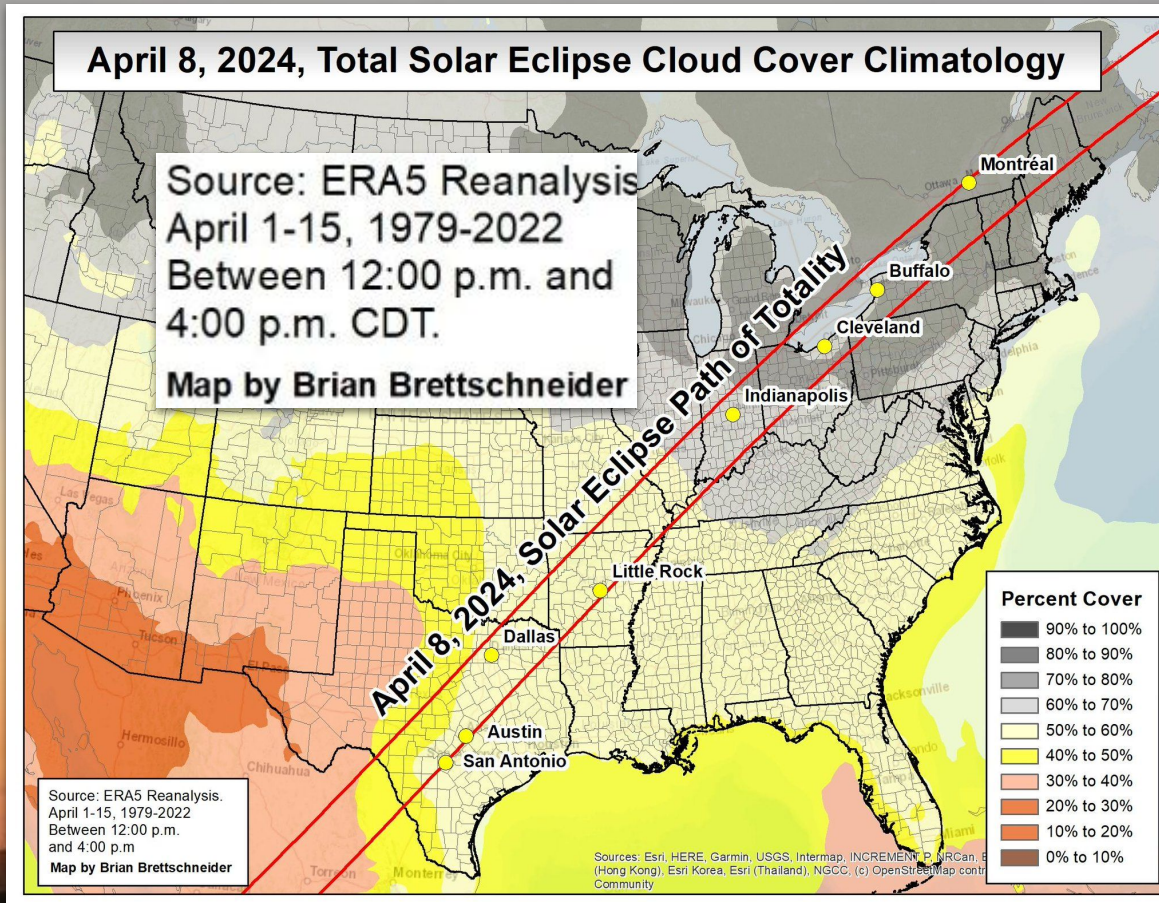
HOW THINGS LOOK FOR US



WE'RE GOING TO
NEED SOME LUCK



CLOUD COVER APRIL 1 to 15, 1979-2022



HOW THINGS LOOK FOR US



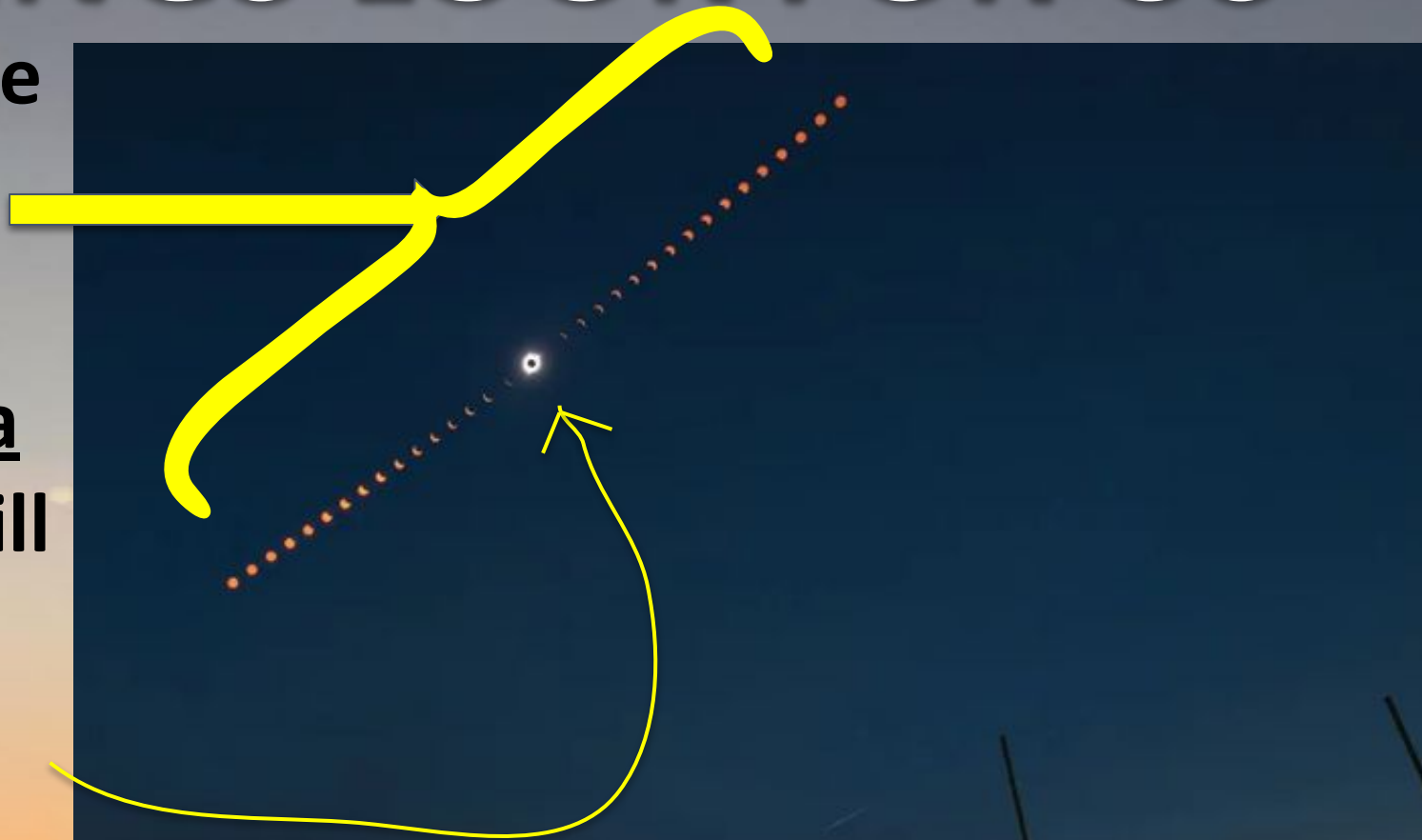
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From start to finish, the Solar Eclipse will take about 2 ½ hours.

However: Only up to a few minutes of that will be TOTALITY.

Totality means 100% coverage of the sun.



Progression of Total Solar Eclipse
August 21, 2017 Madras, OR

Images above and left are from Aubrey Gemignani/NASA

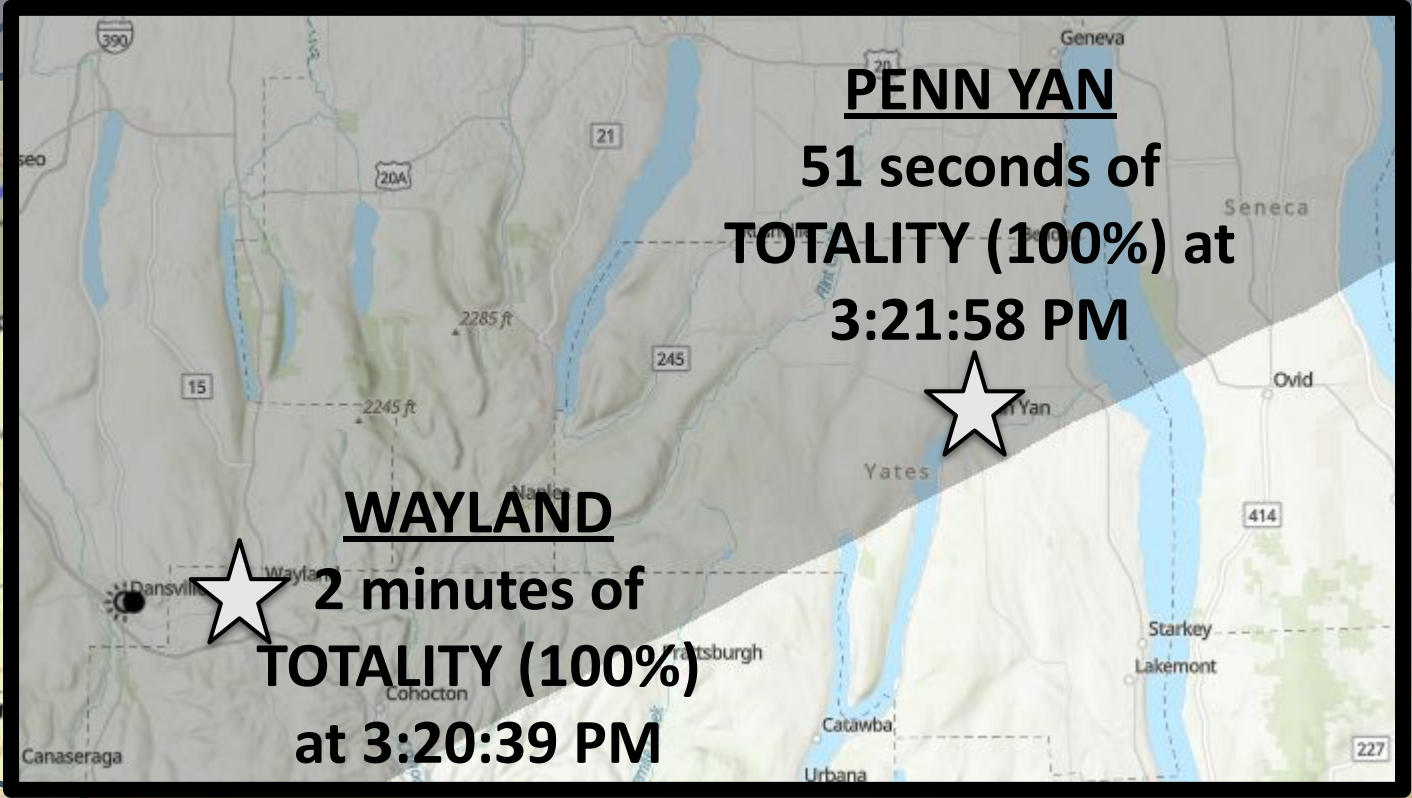
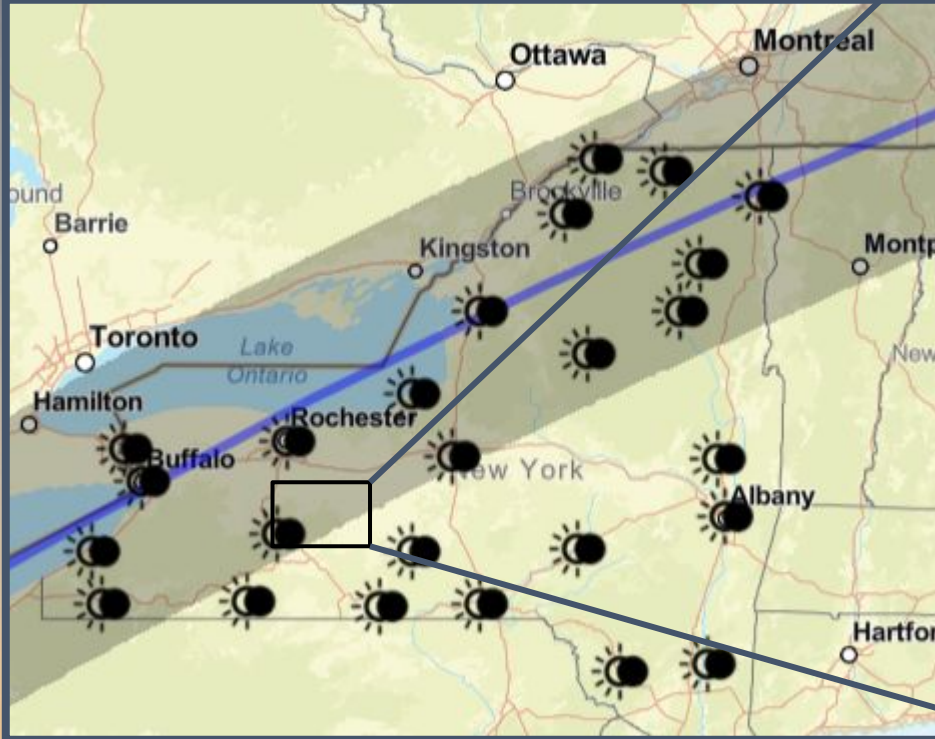
<https://science.nasa.gov/resource/total-solar-eclipse-over-madras-oregon/?category=eclipse>



HOW THINGS LOOK FOR US



<https://www.weather.gov/aly/NYS2024TotalSolarEclipse>



**CLOUDS OR NO CLOUDS,
IT WILL GET QUITE DARK!**

Stats from US Navy - <https://aa.usno.navy.mil/data/SolarEclipses>

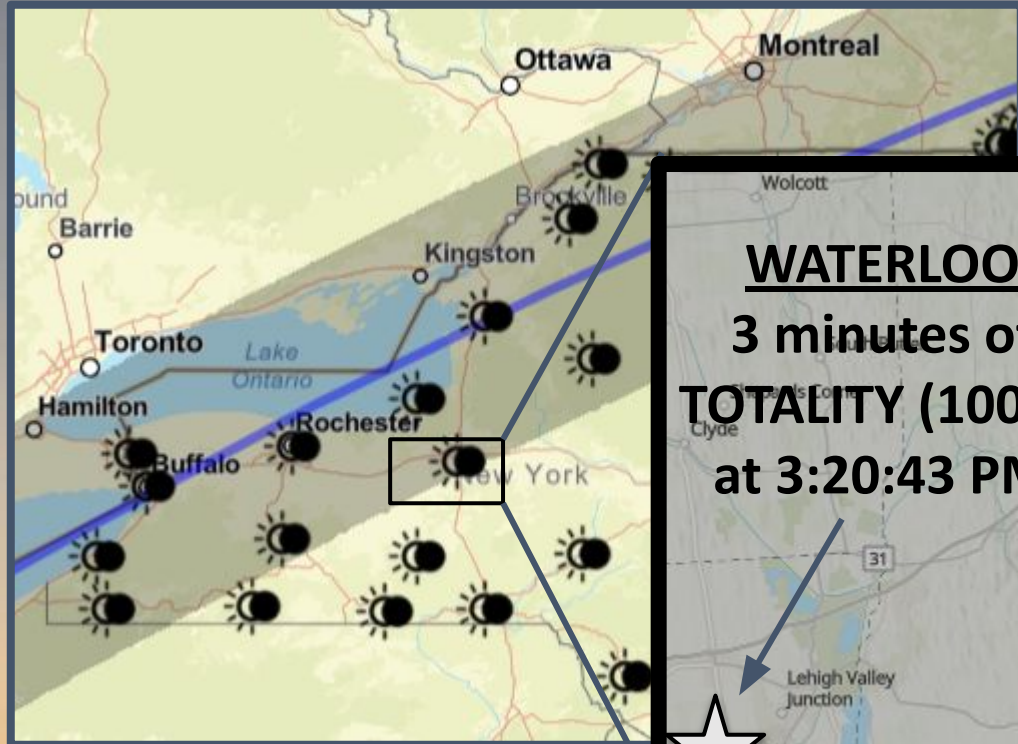
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HOW THINGS LOOK FOR US



<https://www.weather.gov/aly/NYS2024TotalSolarEclipse>



BALDWINSVILLE
2 minutes 37 seconds
of TOTALITY (100%)

at 3:22:13 PM

WATERLOO
3 minutes of
TOTALITY (100%)
at 3:20:43 PM

SYRACUSE
1 minute 27 seconds
of TOTALITY (100%) at
3:22:59 PM

AUBURN
1 minute 49 seconds
of TOTALITY (100%)
at 3:22:14 PM

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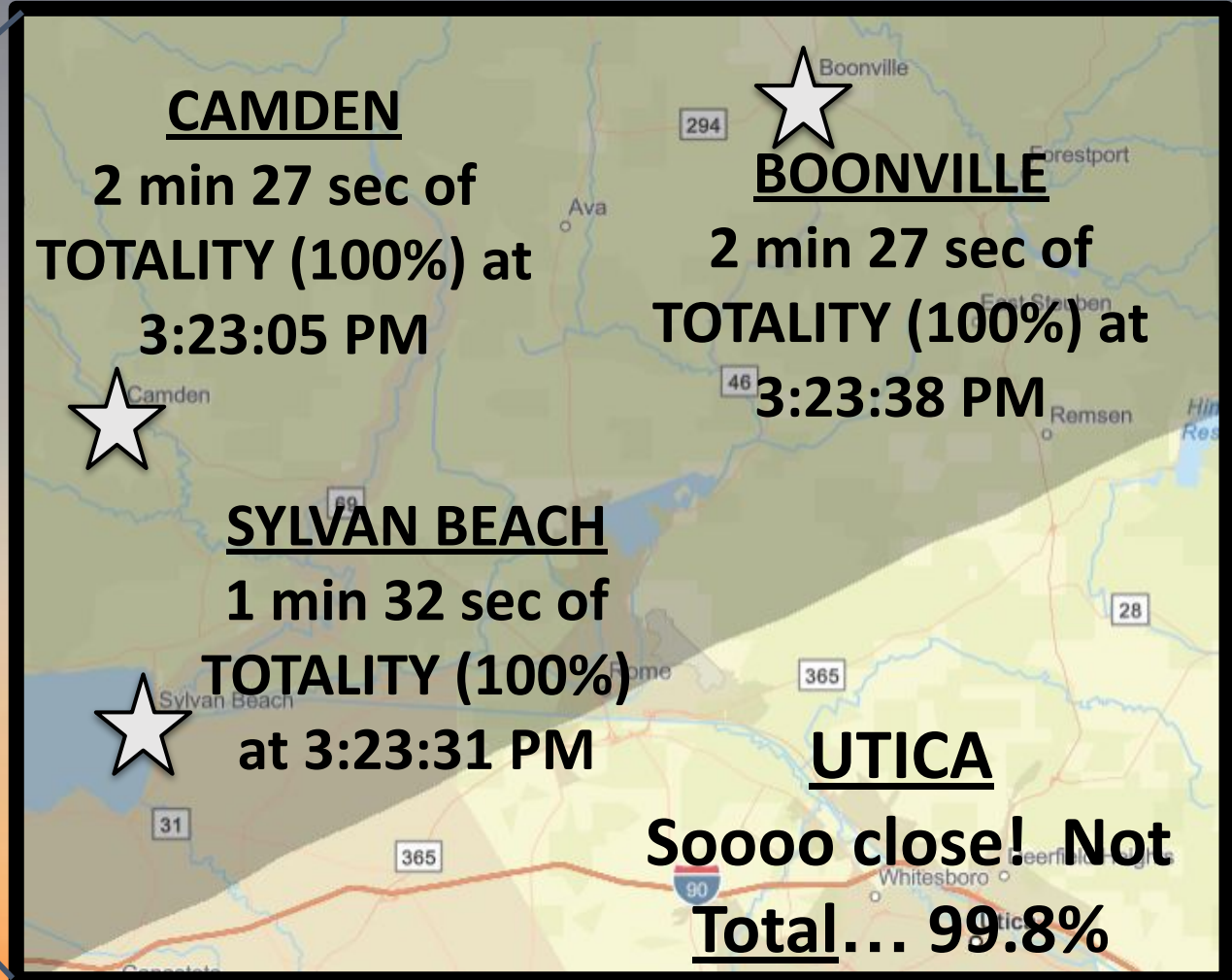
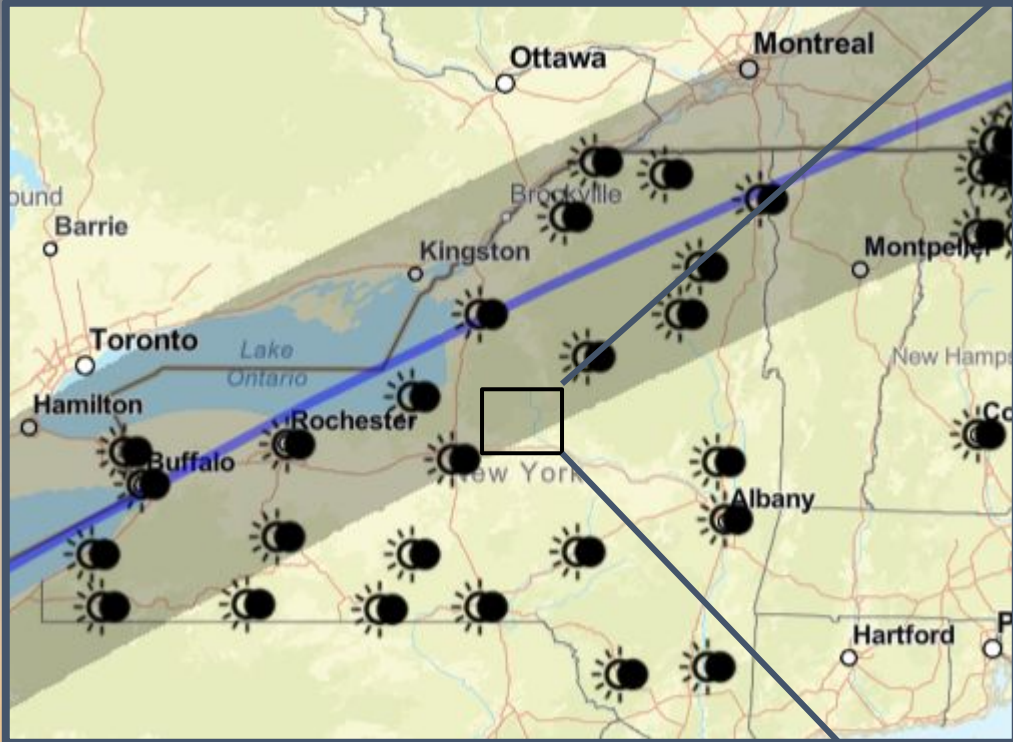
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FUN FACT: The Sun is ~400,000 times brighter than a Full Moon. This means Utica (even though 99.8% sounds like a LOT) will still have the brightness of a few hundred Full Moons at peak of eclipse. 100% totality matters!!

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QUICK WORD ABOUT SAFETY!

Informational Video from NASA



You'll need a pair of
eclipse glasses
to safely observe the sun.

Short video, 1 min 20 sec - <https://youtu.be/ExonFXrnHKE>



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QUICK WORD ABOUT SAFETY!



As eclipse starts (partial block of the sun) YOU NEED ECLIPSE GLASSES to look at the sun; otherwise you can cause permanent damage to your eyes/cornea.

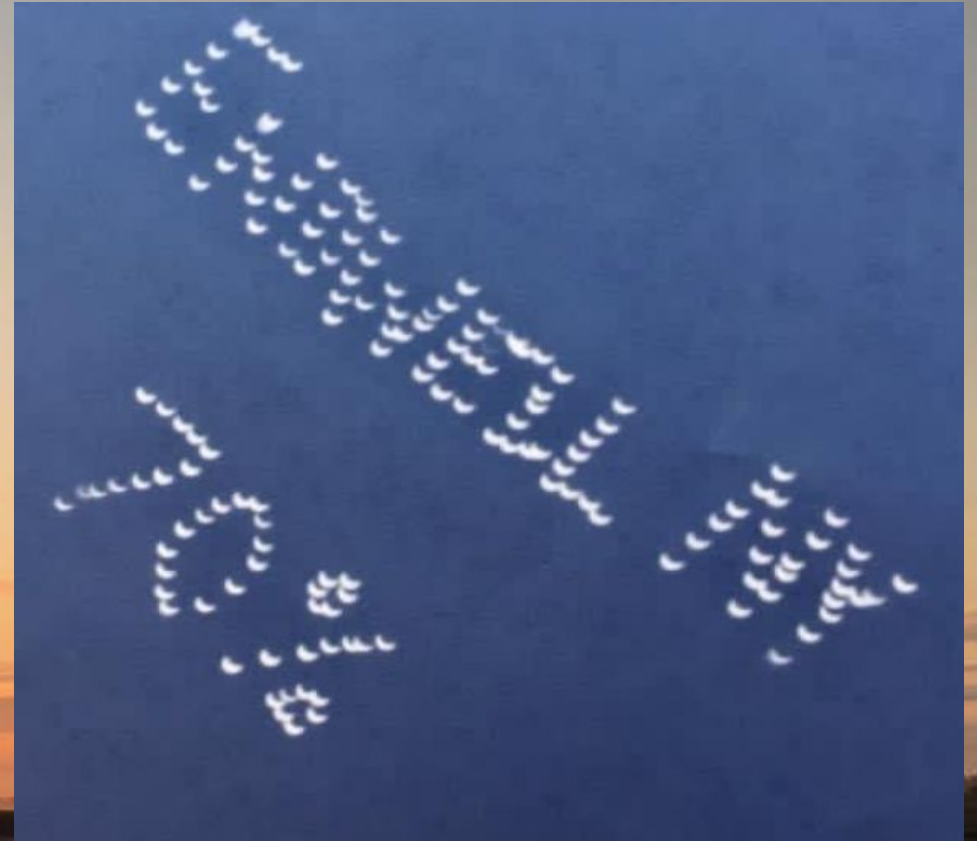
Only during the few minutes of totality: Eclipse glasses not needed. Enjoy, this is extremely rare!

The moment totality is over/sun is no longer 100% blocked, YOU AGAIN NEED ECLIPSE GLASSES to look at the sun.



ECLIPSE FROM 2017

One way to safely view it: Poke holes in aluminum foil with a toothpick. Projections of the eclipse will shine through. Here's the daughter of a NWS Meteorologist during the last one!

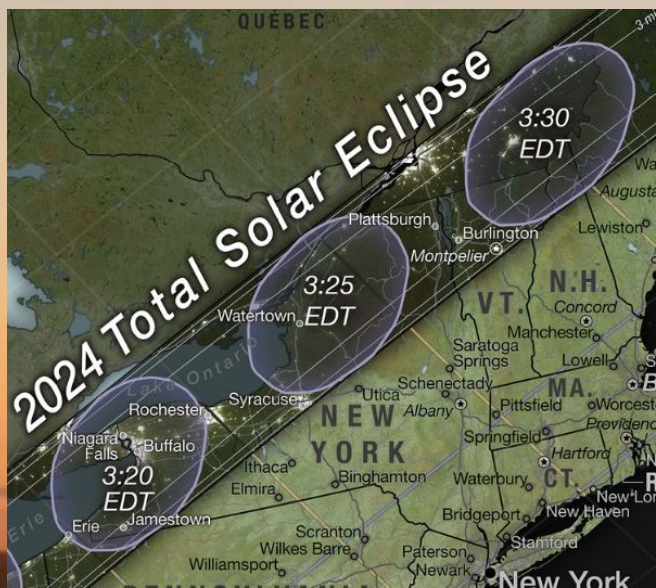




THANK YOU!

HAVE FUN AND BE SAFE DURING THIS LESS-THAN-ONCE-IN-A-LIFETIME EVENT

TOTAL SOLAR ECLIPSE - MONDAY APRIL 8, 2024 TOTALITY AROUND 3:20-3:25 PM IN CENTRAL NY!



QUESTIONS: mark.pellerito@noaa.gov