



Cape Cod at Night: the Moon, Milky Way & More


John Tunney
www.jtunney.com



How to Find the Milky Way



Milky Way arches north to south
Galactic core appears in the southeast, south & southwest

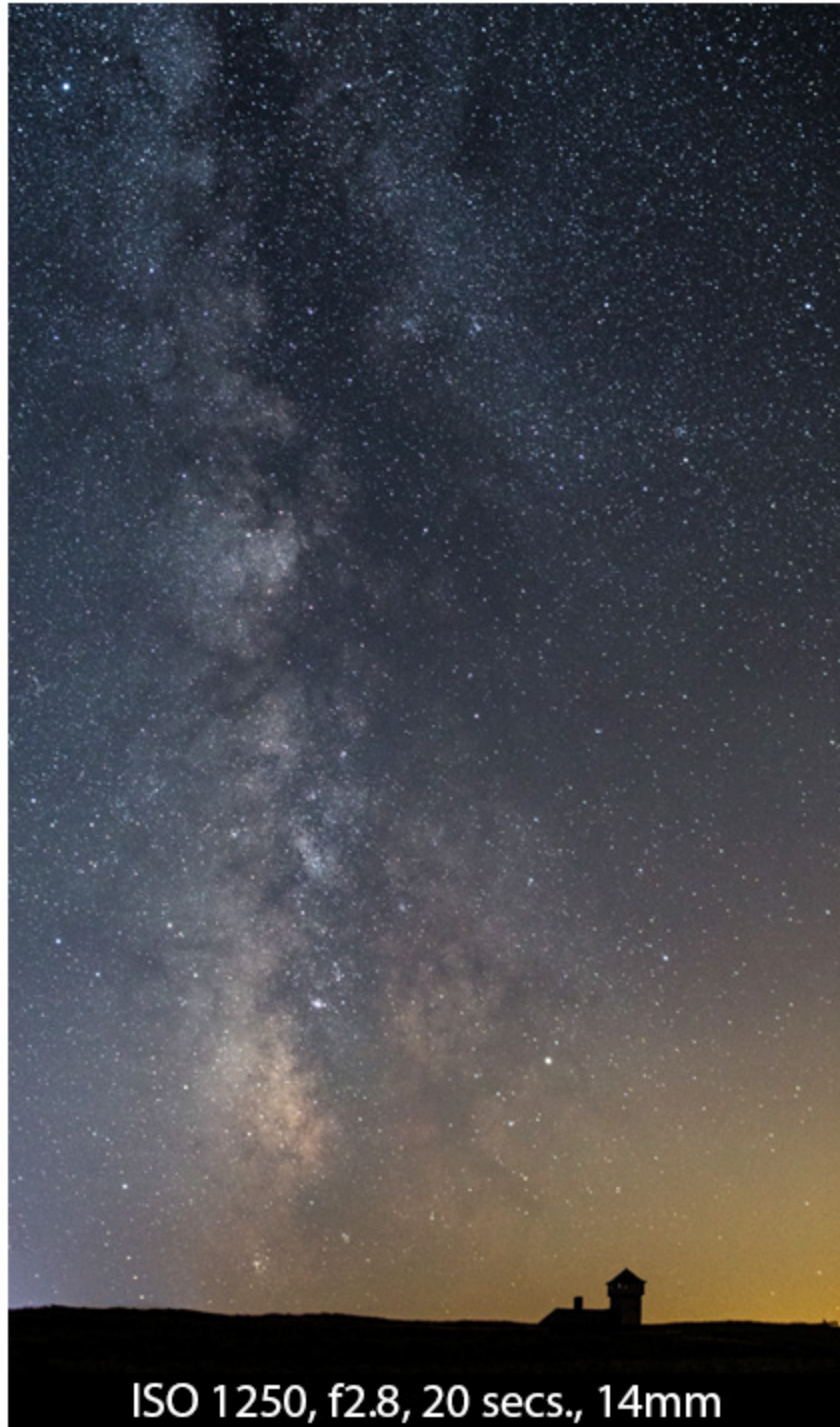


Milky Way "season" is May-October
(Northern Hemisphere)

When galactic core is most visible

Fades in winter

June 6, 11:30pm, Nauset Beach



ISO 1250, f2.8, 20 secs., 14mm

How to Find the Milky Way

May - October

- Summer is prime

Look east to south

Get away from light

- let eyes adjust

Moonless nights

- New moon

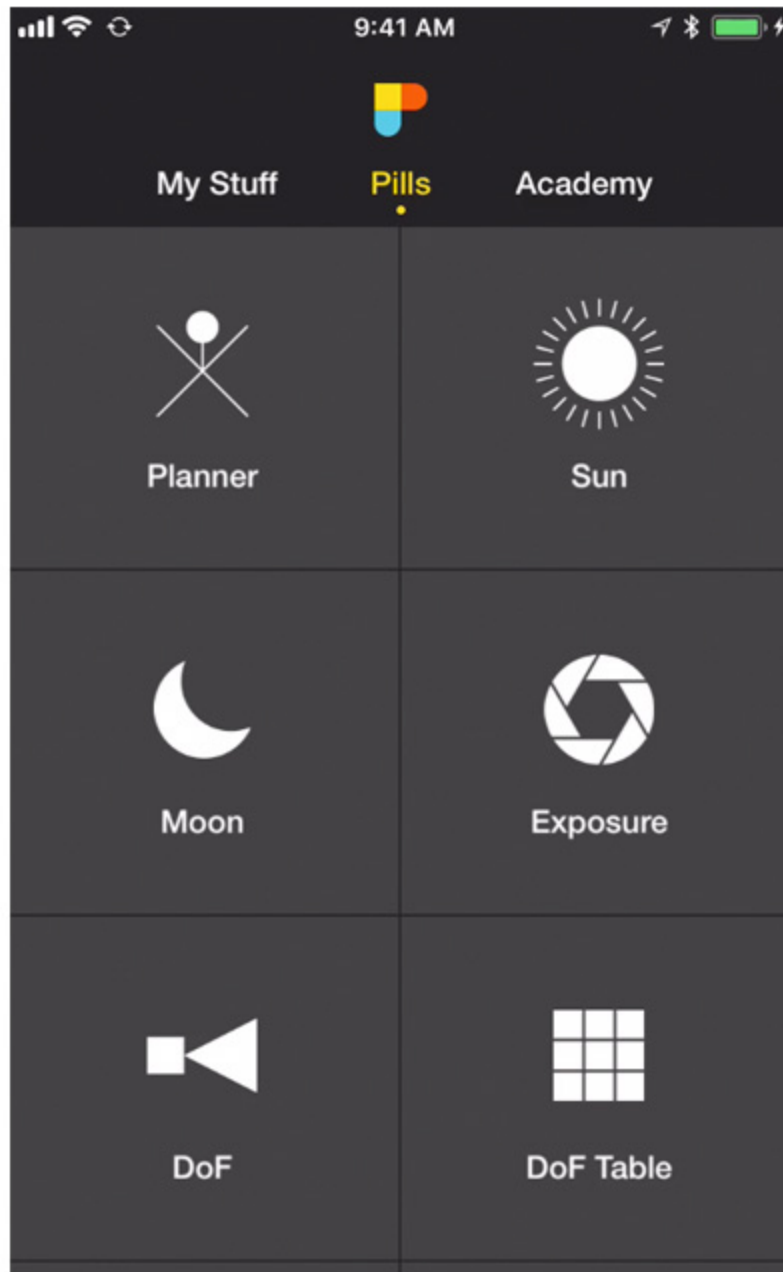
- Check moonrise and moonset times

Helpful Apps

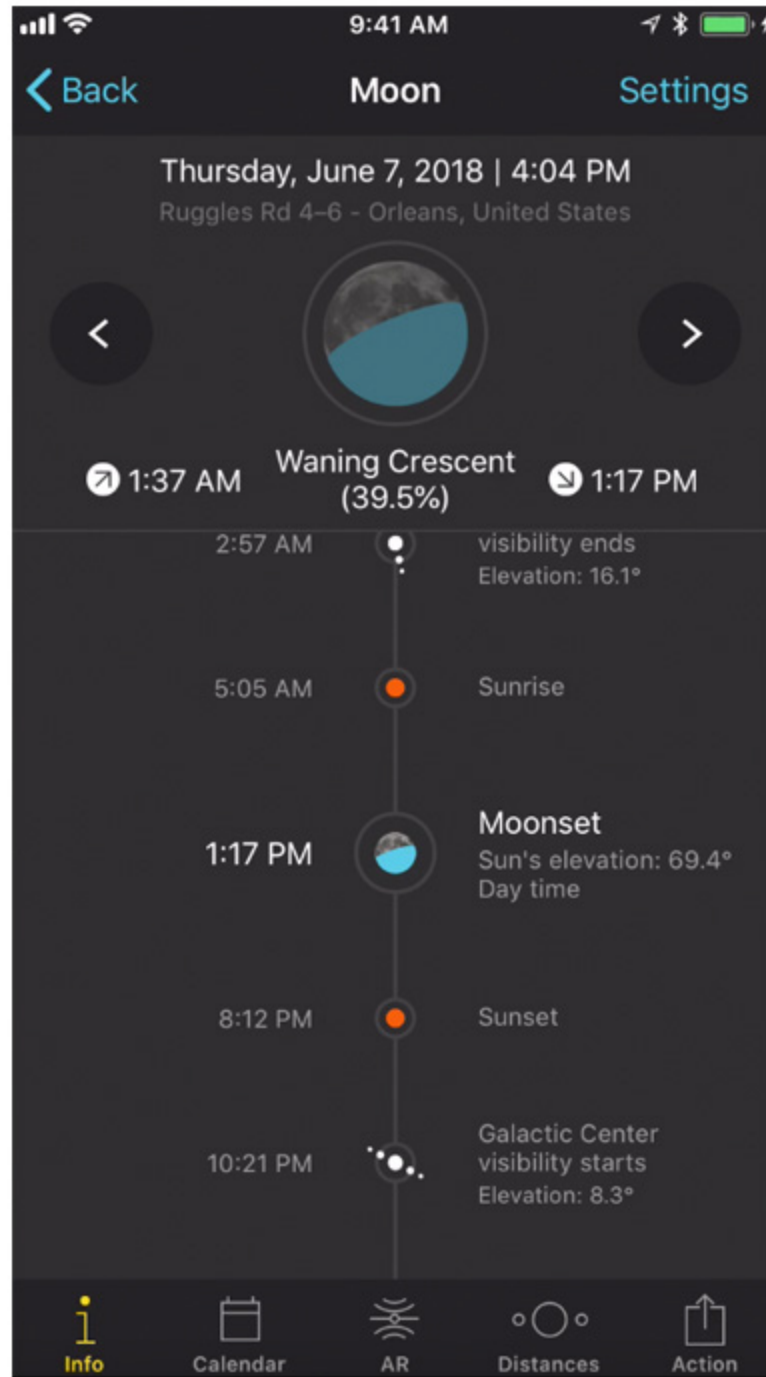
- PhotoPills

- Sky Safari

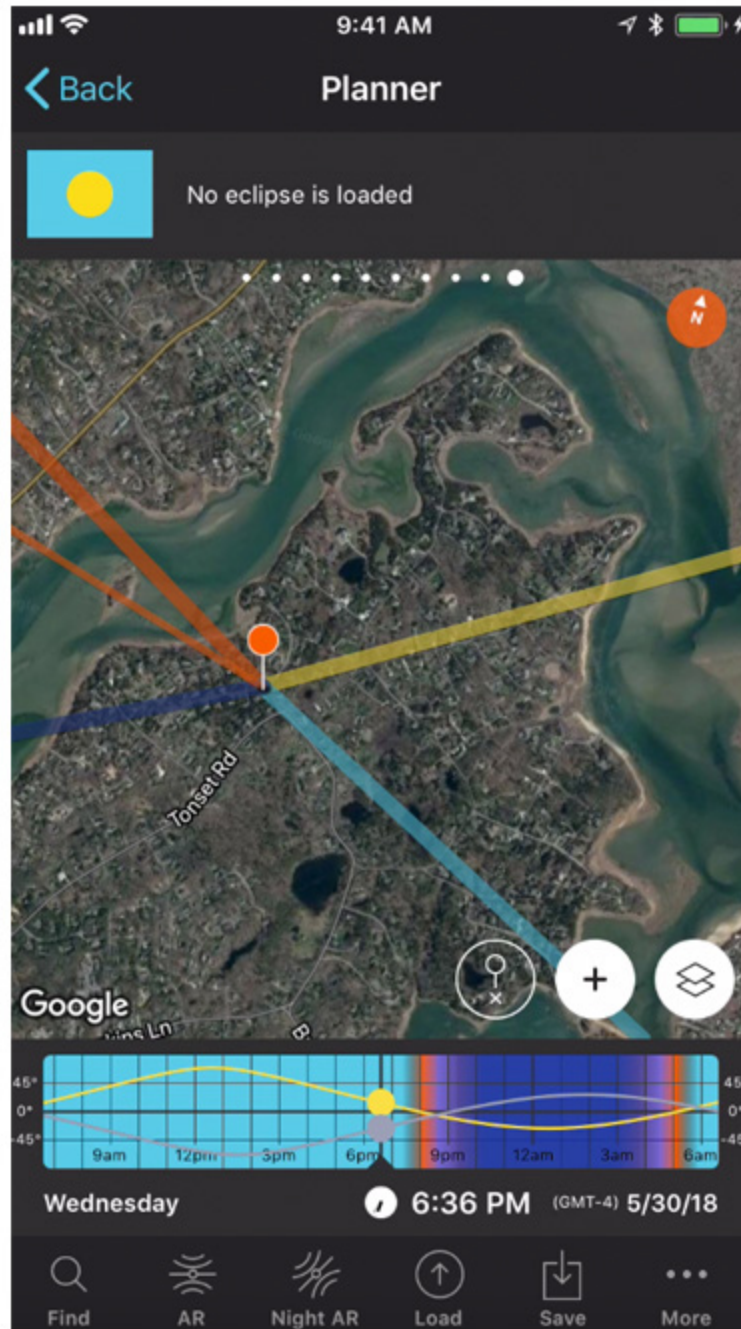
- Weather: NOAA Radar, Dark Sky, Clear Outside



PhotoPills



PhotoPills/Moon & Milky Way Planning



PhotoPills Planner/Map, track sunrise/moonrise & set



ISO 2000, f2.5, 20 secs., 14mm

Milky Way Settings

Shoot in manual mode

RAW

Auto White Balance

ISO: 1250-3200. Experiment. Use the lowest possible.

Aperture: Lowest f-stop
(if really fast lens - f1.4, 1.8, 2 - try increasing one or two stops)

Shutter speed:
20-30 secs. for full frame*
15-20 secs. for aps-c*

* See rule of 500



17mm, iso 320, F5, 20 secs.

Stars and the 500 Rule

For sharp star points
Divide 500 by focal length*
Results equals max shutter speed

*Crop sensors multiply focal length by crop factor

Full frame: $500/24\text{mm} = 21 \text{ sec. exposure}$

1.5 Crop Sensor w/24mm lens: $500/36 (24 \times 1.5) = 14 \text{ sec. exposure}$

To get really technical...the NPF rule

$(35 \times \text{aperture} + 30 \times \text{pixel pitch}) \div \text{focal length} = \text{shutter speed in seconds}$

Basically, subtract 5-10 seconds from 500 rule
to get really sharp stars.

Here's the article:

petapixel.com/2017/04/07/npf-rule-formula-sharp-star-photos-every-time/

**Results will vary depending
on camera and lens**



ISO 1250, f2, 20 secs., 20mm



ISO 1250, f2, 20 secs., 4 image pano stitch



ISO 3200, f3.2, 20 secs.



ISO 1600, F2, 20 secs., 24mm



Composition

Think about framing, foreground & lines



ISO 1250, f2, 20 secs., 20mm



ISO 1250, f2, 20 secs., 4 image pano stitch



ISO 3200, f3.2, 20 secs.



ISO 1600, F2, 20 secs., 24mm



FOCUSING FOR MILKY WAY

Autofocus or manual focus, depending...

Autofocus if there's enough light

Focus on a bright light at least 50 feet away

Use backbutton focusing

Then recompose

Re-focus once in a while

If not...Manual Focus

Use Live View

Find bright light at least 50 feet away or bright star. Magnify Live View to focus as best you can.

Quality of LCD screens varies,
and may never look tack sharp



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FOCUSING: OTHER OPTIONS

Using Hyperfocal Distance

Switch lens to manual focus.

Use hyperfocal distance to determine focus distance for maximum depth of field.

Turn the focus ring until the distance scale is set to the correct distance (or just estimate the distance to your primary subject).



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FOCUSING: OTHER OPTIONS

Focus on Infinity

During daytime, use autofocus to focus on infinity

Note position of focus ring when focused on infinity (it may not be all the way over)

Mark position to use at night

Shine a Light

Shine bright light on object 30-50 ft. away

Focus on light



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How to Process Milky Way Photographs



Before

ISO 1250
F1.8
20 secs.



After

How to Process Milky Way Photographs



Before

ISO 1250
F1.8
20 secs.



After

Lightroom/Adobe Camera Raw Workflow

Global Adjustments

- Over brighten image with Exposure slider to check quality
- Return Exposure to neutral and then increase as needed
- Adjust White Balance (temp slider in the 3200-4200 +/- range)
- Brighten Shadows as much as (+50 to start)
- Increase Whites and Clarity to taste
- Increase Dehaze (maybe reduce Saturation afterward)
- Increase Noise Reduction as needed
(+10 Luminance, +25 Color to start)

Local Adjustments

- Select Adjustment Brush and Auto Mask
- Increase Whites and Clarity to max
- "Paint" sky
- Adjust Whites, Clarity and Dehaze to taste

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Lightroom/Adobe Camera Raw Workflow

Refinement Options

- Darken Blacks globally or locally to add contrast, reduce noise
- Use Adjustment Brush for local noise reduction
- Add a new Adjustment Brush to sky and increase Clarity
- Add a new Adjustment Brush to sky and Dehaze
- Transfer to Photoshop for re-touching



Star Trails

30 30-sec. exposures, f2.8, ISO 100, 16mm



22 minute exposure, f4, ISO 1000

1. Single long exposure 20 mins. or more (use Bulb setting). Or ...
 2. Multiple short exposures stacked in Photoshop
 - Change blend mode to lighten
 - Flatten image (depending on file size) or create composite layer
(PC - CMD + ALT + SHFT + E)
(MAC - CTRL + OPT + SHFT + E)
 - Edit as needed
- Use intervalometer to program number of shots, or shoot manually
 - From Lightroom or Bridge, load images into Photoshop as layers in single image
 - Select all but bottom layer



16 two-minute exposures,
f4.5, ISO 640



34 30-second exposures,
f2.8, ISO 400

Longer individual exposures create longer trails



Photographing the Moon



Exposure

The moon reflects sunlight/daylight

When sky and moon are same brightness
(late afternoon/early morning)

Auto exposure/metering will work (more or less)



Exposure

When moon is brighter than sky

Auto exposure...*not so much*



ISO 100, f5.6, 1/80 sec.

Exposing for the Full Moon at Night

Since moon reflects sunlight/daylight

Start with Sunny 16 Rule

(At F16, shutter speed should match ISO)

Then adjust as necessary

Doing the Exposure Math

Aperture, Shutter Speed and ISO:

If one setting goes up,
one of the other settings has to go down

Sunny 16 Rule: If F16 and ISO 100...then shutter speed = 100

Change f-stop to F8 (down three stops)

Then shutter speed has to go up three stops

OR...

Try this to start:

ISO 100, F8, 1/500th sec.

Adjust as needed

Atmospherics can prevent sharp images



Other ways

to

photograph the moon



ISO 400, F11*, 30 secs.

Moonlit Landscapes

Watch for lens flare when shooting into moon

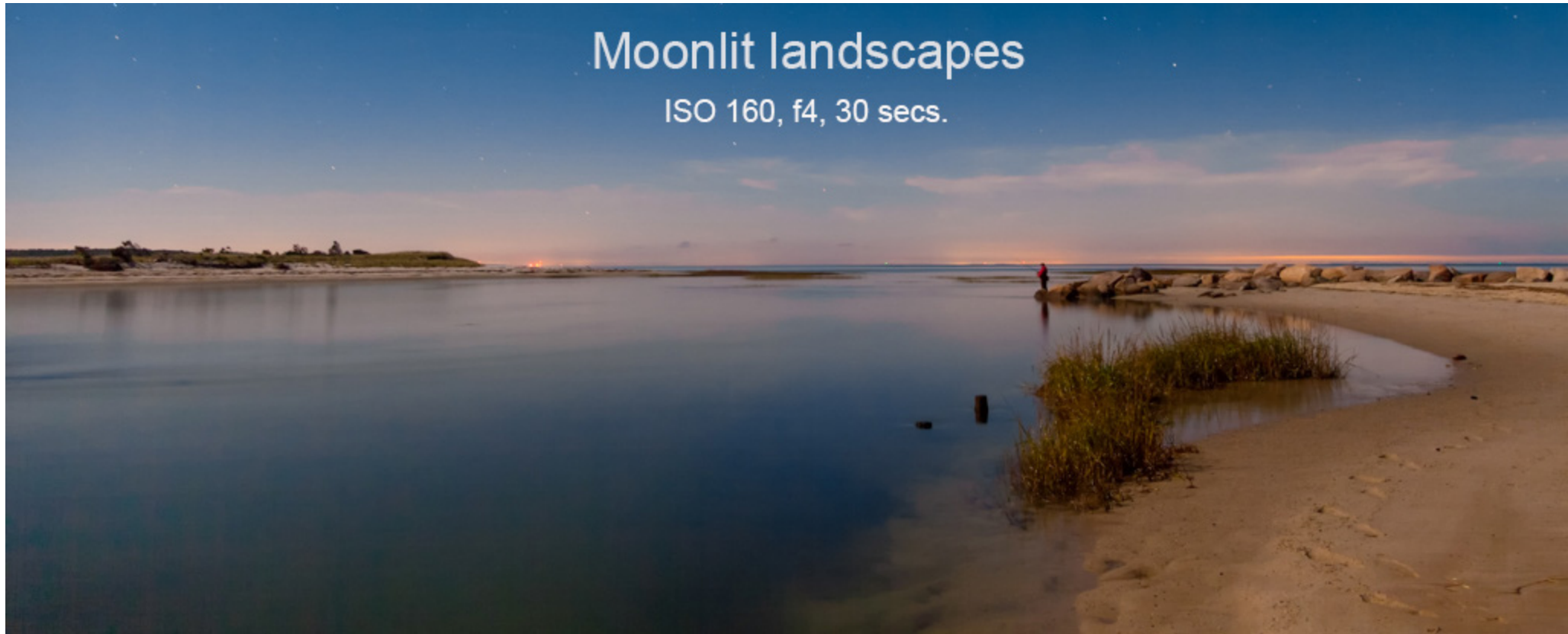
Use lens hood

Remove filters

* High f-stop creates starburst

Moonlit landscapes

ISO 160, f4, 30 secs.







Moon as design element







Reflections



ISO 400, F2.8, 10 secs.

Not just moon and stars



ISO 1600, F4, 10 secs.



ISO 800, F8, 20 secs.



ISO 2000, F2.8, 30 secs.



ISO 640, F8, 30 secs.





Wagon Wheel Effect

- Set camera to Continuous shoot mode
- ISO around 6400 or higher to get shutter speed of 1/2 second or faster to capture single beam
- Shoot continuously until light has gone all the way around
- From Lightroom or Bridge
 - Open as layers in Photoshop
 - Select all layers except bottom layer
 - Change layer blend mode to Lighten



Light Painting



ISO 400, F4, 30 secs.

Soften the light by using the edge of the light from a flashlight



Light Painting

A little light can go a long way

Try illuminating foreground
with just light from phone screen
or phone flashlight

Use edge of light circle from flashlight
instead of center

Use dimmable light

Left: Boat illuminated by short “burst”
of light from flashlight to “freeze”
motion of boat floating in water
during 20 sec. exposure.



Light Painting

Use soft light from flashlight or phone
to illuminate foreground



Foreground illuminated by light from phone's home screen