



# Parashant International Night Sky Province 2016 Annual Report



International Dark Sky Association

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## 2016 Annual Report

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Figure 1. Red Pockets Sandstone features located in Grand Canyon-Parashant National Monument.

### **Status**

The night skies of Parashant International Night Sky Province (located within Grand Canyon-Parashant National Monument (Parashant NM)) remain intact as they did the previous year. No new lighting has been added to the 24 current light sources of three facilities located on the monument, which are all currently shielded, have appropriate spectrum, and are on a 10pm curfew. The adjacent small unincorporated community, Mt Trumbull, AZ, with 12 structures, and 22 permanent residents, recently celebrated their centennial in September 2016. They constructed several temporary structures for the event which have already been disassembled, adding no new light sources to the boundary.

The largest urban center nearest to Parashant NM, is St George Utah, located 22 miles north, which has been identified as the 5<sup>th</sup> fastest growing area in the nation, growing 147,800 in 2013 to 151,948 in 2014 – a 2.9 percent increase. This growth is largely parallel to the rebounding economy since the 2008 recession. However, construction of new homes and commercial zones in this urban vicinity are largely confined by surrounding federal and state lands, reducing urban sprawl. To the benefit of dark skies, Ivins UT, a neighbor city next to St George UT, maintains a dark sky lighting ordinance.



Directly east of Parashant is the Grand Canyon NP which has recently been accepted as a provisional DSP. Parashant DSP continues to partner with Grand Canyon NP by maintaining a 24/7 Unihedron SQM data logging device at the Tuweep Valley site, located along the North Rim near the Toroweep ranger Station.

Annual visitation to the monument remains steady at ~11,890 people; resulting with 18,208 visitor days indicating two-thirds of the visitations consist of day visits only, with a third being overnight camping. No other nighttime activities have been observed.

### **Ongoing Efforts with Neighboring Partners**

Parashant DSP was alerted in early 2016, with proposed AZ State legislation which would introduce digital billboards along the I-15 corridor and state highways south of its boundaries, potentially impacting the quality of night sky and wildlife resources, given the light intensity and rapidly changing light characteristics. Efforts by Monument staff and with the assistance of IDA, quickly mobilized an NPS national level response opposing the AZ legislation, resulting in legislation that did not allow expansion of these digital billboards within the Parashant DSP vicinity.

Efforts are underway to support a Dark Sky Sanctuary at Grand Staircase-Escalante National Monument, located 58 miles northeast of PARA. Staff has provided consultation on three meetings along with providing templates and content for their nomination package. Their current status is awaiting approval from their Monument Manager, and State Director. With Parashant staff assistance, nomination submission is expected February 2017.



Figure 2. Grand Gultch mine out-building located in Grand Canyon-Parashant National Monument.

## Dark Sky Metrics

Remote monitoring of light levels, within Parashant DSP has been ongoing with SQM stations and solar power, with periodic site visits to off-load the data. This set-up is being developed and consists of a Unihedron sky quality meter focused centrally on the sky apex, paired up with a microprocessor (Raspberry PI) which runs a script to capture light levels every minute. In addition, a separate time-keeping component provides a time stamp with an accuracy of only 50-60+/- seconds a year.

Currently 4 SQM stations have been deployed with the Unihedron SQM sensor orientated towards the apex of the sky. A fifth station has recently been deployed along the Twin Point area with the sensor orientated towards the horizon, focusing on light levels emitting from the tourist attraction across the Grand Canyon, the Grand Canyon Skywalk. The Skywalk, managed by the Hualapai Tribe and located on tribal lands has seen further expansion of its operations and is a source of light in one of the darkest portions of Parashant DSP. Future efforts may include partnering with the Hualapai Tribe as the Skywalk would be a good candidate for dark sky efforts.



Figure 3 & 4. Twin Point Dark Sky Station located along the northern rim of the Grand Canyon-Parashant National Monument.

In addition to Unihedron SQM metrics, an All Sky Camera (SBIG Allsky-340C) was installed in a remote location powered by solar, and is currently providing a 360, horizon-to-horizon monitoring of light levels, allowing for management of identify sources of sky glow. Settings have been set at max 60 second exposure, with one minute intervals, allowing for dramatic timelapses -helpful for interpretation as well. Considering the success of this camera setup, next year Parashant DSP anticipates adding a mobile, higher resolution camera, which will be deployed for short durations (3-4 weeks) at various locations allowing for a greater scope of monitoring.





Figure 5. All Sky Camera mounted on tripod in the foreground, with soundscape equipment mounted on the tripod near the solar panels.



Figure 6. Captured images from All Sky Camera on September 7<sup>th</sup>, 2016.



## Interpretation

The Parashant DSP, has welcomed a new Chief of Interpretation, Jeff Axel, who has continued the public outreach message with an emphasis on night skies. He made changes to the official NPS Parashant National Monument brochure, by promoting night skies and adding photos, highlighting some spectacular scenes.



Figure 7. New 2016 brochure front cover image, Waring Ranch historical building with night skies, Grand Canyon-Parashant National Monument.

Dark skies remain a priority for interpretation as nearly all events hosted by Grand Canyon-Parashant National Monument have a night sky component discussing light pollution, nocturnal ecology, astronomy, and cultural connections. Below are the numerous events that have taken place for 2016.

**Interpretation Events:** *(Date, # of participants, and short synopsis)*

Date	Attendees	Event
3/3/2016	105	Day in the Desert, youth program, highlighting visitor experiences to include soundscapes and night skies.
5/9/2016	85	Transit of Mercury, Sidewalk Telescope demonstration
5/12/2016	32	Astronomy Workshop, Overnight Telescope guided tour on Moon topography, presentation on lunar facts and interpretation
5/17/2016	8	World Rangers Event, 2 overnight outings, highlighting dark sky resources and how to interpret them. Attendees included participants from UK, Switzerland, and Australia.
6/11/2016	169	National Get Outdoors Day, Solar Telescope demo, interpretation on light pollution
8/5/2016	6	Ongoing meetings with Grand Staircase-Escalante NM, offering consultation as they pursue a DSS.
8/11/2016	280	Washington County Fair, Parashant hosted a booth highlighting recreation and dark skies.
8/20/2016	2500	Parks in the Pines, Flagstaff AZ, Symposium, Solar Telescope presentation
9/12/2016	30	Paiute Youth Camp, youth program with overnight telescope, interpretation on cultural aspects of night skies
9/22/2016	75	Concrete to Canyon, youth program with overnight telescope guided tours

(Overall: ~3,260 attendees)

## Conclusion:

Parashant DSP continues to monitor the night skies, adhering to the light management plan, monitoring, and interpretive events. The addition of Grand Canyon DSP to our east was very welcomed news. Interpretation events, while roughly the same number as the previous year, had larger pools of participants. Future efforts will include additional astrophotography, expanding back-country All Sky monitoring, interpretive events, and facilitating a Dark Sky Sanctuary on with nearby Grand Staircase-Escalante National Monument.

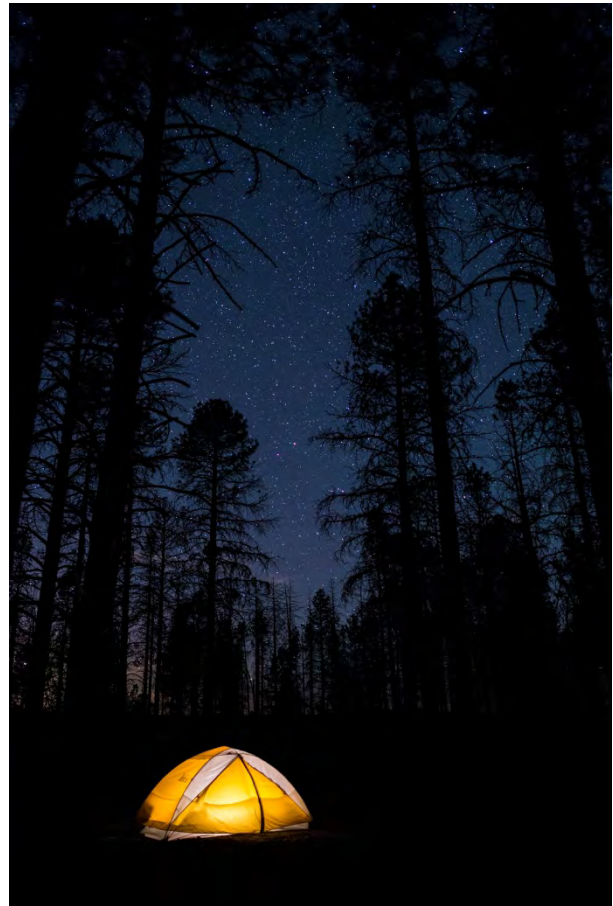


Figure 8 & 9. Dark Skies along Mt. Dellenbaugh and night time outdoor recreation in Parashant.