Capitol Reef National Park, Utah. IDA Annual Report, September 2016

Visitation and Dark Night Sky Programs

In calendar year 2015, visitation to Capitol Reef was approximately 960,000. We expect visitation to exceed one million in calendar year 2016.

During fiscal year 2016 (October 1, 2015 and September 30, 2016), Capitol Reef presented 46 stargazing programs with a telescope, 25 illustrated astronomy nighttime presentations at our amphitheater, 40 daytime astronomy porch talks, and 89 daytime Jr. Night Sky Explorer programs for children. Approximately 75 to 80 visitors participated in each of the nighttime programs, 10 in each daytime porch talk, and 15 children in each daytime program. In addition to these regular programs, two guest speakers gave presentations to about 110 people. We estimate a total of approximately 7,400 visitors participated in these astronomy- and dark night sky-related programs.

Sky Quality

Sky quality data were collected the nights of June 3 and 4, 2016 using hand-held Sky Quality Meters. The data are presented below. Nights were cloudless with slight to very low humidity and no moon.

	Hwy 24 West Boundary	Panorama Point	Hwy 24 East Boundary	Visitor Center Parking Lot
Date	June 3	June 3	June 3	June 3
Time	22:29 MDT	22:40 MDT	23:02 MDT	23:20 MDT
SQM #1 Data	21.71	20.77	20.40	21.81
	21.72	20.34	23.33	21.80
	21.74	19.66	23.52	21.81
SQM #2 Data	21.64	21.73	22.02	22.01
	21.78	21.76	21.99	22.00
	21.53	21.83	21.81	21.98
Data Average	21.69	21.02	22.18	21.90

	Campground Parking	Slickrock Divide	Capitol Gorge Parking Lot	Pleasant Creek Trailhead
	June 3	June 3	June 4	June 4
Time	23:33 MDT	23:55 MDT	00:06 MDT	00:32 MDT
SQM #1 Data	21.97	21.90	21.82	21.85
	21.90	21.86	21.83	21.84
	21.92	21.96	21.81	21.83
SQM #2 Data	21.91	21.81	21.86	21.89
	21.89	21.93	22.00	21.82
	22.10	21.92	21.97	21.85
Data Average	21.95	21.90	21.88	21.85

	Halls Creek Overlook	Burr Trail West Park Boundary	Cedar Mesa CG at Notom Road
	June 4	June 4	June 5
Time	22:34 MDT	23:50 MDT	01:00 MDT
SQM #1 Data	21.75	21.82	21.78
	21.79	21.78	21.76
	21.74	21.75	21.70
SQM #2 Data	21.79	21.89	21.88
	21.75	21.89	21.76
	21.75	21.88	21.84
Data Average	21.76	21.84	21.79

Lighting

As of September 2016, Capitol Reef has improved the percentage of dark night sky compliant lights from 36 percent in July 2014 to 91 percent at present. The following tables summarize the data.

September 2016	Total Lights	Dark night sky compliant	Non-compliant
	140	128 (91 percent)	12

Of the remaining 12 non-compliant lights, 10 are rarely used and will be replaced in the future. Two will be replaced with compliant fixtures during a current building rehabilitation project.

January 2015	Total Lights	Dark night sky compliant	Non-compliant
	141	96 (68 percent)	45

July 2014	Total Lights	Dark night sky compliant	Non-compliant
	141	51 (36 percent)	90

Research

Two research projects are currently underway at the Capitol Reef field station. The field station is operated by Utah Valley University in coordination with the park and is located approximately 10 miles south of the park Visitor Center.

Investigation of 630 nm airglow bands over Southern Utah region. This project began in early 2014 and is ongoing. The project studies ionospheric airglow at 630 nanometer wavelength using an all-sky imaging system. The investigation focuses on large scale features that naturally exist in the airglow and propagate over long distances. Understanding their propagation characteristics and source mechanism are active areas of research in ionospheric physics. Studying these features for long durations over various seasons and geophysical conditions will help in understanding the global nature of ionospheric dynamics.

Atmospheric Remote Sensing over the Colorado Plateau. The objective of this study is to establish remote sensing of atmospheric processes over southern Utah. The main project is to monitor wave activity in the nightglow as these waves are main drivers of atmospheric circulation. One objective of the wave study is to establish the importance of the Colorado Plateau as a source of these waves.

Outreach

Capitol Reef and the Entrada Institute partner to present annual Heritage Starfest celebrations each autumn. Heritage Starfest includes star gazing in the park and in the town of Torrey, Utah with local and regional astronomers, a solar telescope and viewing of sun flares, daytime astronomy programs, and evening programs with guest speakers. The 6th Annual Heritage Starfest in October 2015 attracted 244 participants. The 7th annual Starfest is scheduled on September 30 and October 1, 2016. We expect in excess of 200 participants.

The Capitol Reef field station has one 12-inch Dobsonian-style telescope and offers night sky presentations to visiting groups. Between October 2015 and September 2016, the field station hosted 46 groups comprising a total of 578 visitors. The vast majority of visitors to the field station take part in formal night sky viewing opportunities. A specific count of individuals is not kept; therefore, field station staff estimate that approximately 500 individuals took part in the night sky viewing events.

A Capitol Reef park ranger gave two night sky presentations at the local middle school (Wayne Middle School) on September 27, 2016 to a total of 37 students.

After Capitol Reef National Park was designated an International Dark Sky Park in 2015, residents of Torrey, Utah expressed a desire to work toward Dark Sky Community designation. This would make Torrey the only Utah community recognized as such. The Entrada Institute has launched the Dark Skies Over Torrey campaign to (1) replace all of Torrey's city-supported streetlights with fully shielded, dark-sky friendly, LED lights, (2) help Torrey residents replace privately owned lights that are out of compliance with Torrey's new outdoor lighting ordinance, and (3) present an education effort to provide information to local businesses, residents, and tourists about the multiple benefits of dark sky lighting.

Capitol Reef has provided written comments regarding proposed oil and gas lease sales by several Bureau of Land Management offices in southern and central Utah. In our comments we stress that if oil and gas exploration and development occurs, BLM should include effective language protecting dark night skies in the permits it writes for leaseholders. We also have offered to conduct educational outreach regarding dark night skies to one BLM office.