

# Steinaker State Park

International Dark Sky Park Designation Application Packet

Submitted September 25, 2017



September 1, 2017, Dark Sky Event at Steinaker State Park

Photo by Bettymaya Foott

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Edited by Justina Parsons-Bernstein

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## Foreword



Entrance to Steinaker State Park

Photo by Justina Parsons-Bernstein

Steinaker State Park Manager Mike Murray could have retired in December 2015. His retirement plan was knocked off the rails by his attendance at the Annual Utah State Parks Interpretation Training Workshop in November 2015. The training that year featured two sessions on the topic of Dark Sky Parks by Dead Horse Point State Park Assistant Manager and Night Sky Ranger Crystal White and Goblin Valley State Park Assistant Manager James Wells. These two Utah State Parks staffers were in the process of shepherding their parks to Gold Tier International Dark Sky Park designations. Their presentations were the first Mike had heard about the subject and he decided right then and there to put off his retirement so he could pursue International Dark Sky Park designation for his park.

A year and nine months later, Manager Murray and his staff have achieved the goal of ticking off the requirements needed to make an application for Silver Tier Dark Sky Park designation. Steinaker personnel have reduced the number of outdoor lights in the park from 22 to 17 and is currently 88% full cutoff/LMP compliant. Two floodlights on light poles have been replaced by full cut-off fixtures, directed downward, attached to buildings. Four outdoor lights on the park office/entrance station building were removed and the remaining lights were retrofitted with internal block-outs so they only illuminate downward. Two upward facing spotlights illuminating the park's flag have been replaced by one solar, pole-top, downward-facing partial cutoff light which will be retrofitted to be full cutoff by Fall 2018.



Manager Mike Murray at Steinaker State Park

Photo by Utah State Parks

Three fixtures around the maintenance shop (which has been the target of equipment theft), have been replaced with full cutoff, downward-directed fixtures. Two have been put on motion sensors. One full cutoff exterior fixture at the maintenance shop stays on at night because thieves have been able to elude motion detectors. However, the light from the fixture is blocked from camping areas in the park by the office/entrance station. Lights at the fish cleaning station, which are fully encompassed by a metal canopy,

have been placed on timers with a hard 10:00 p.m. turn-off. Bulbs used in all fixtures are warm white, 2700 K/800 L.

Exterior restroom lights have been replaced with full cutoff, downward-aimed fixtures fitted with warm white, 2700 K/800 L bulbs. Interior restroom lights have been placed on 15 minute motion detector timers. 100% compliance to LMP is expected by 2020.

Throughout 2017, Mr. Murray coordinated with local astronomy aficionados, national monument rangers and the Utah State Parks Dark Sky Team to hold in-park, dark sky educational events for the public. He made an external dark sky leadership presentation to the Uintah County Commission and hosted an external Dark Sky Leadership educational program for area government heads, city planners, tourism officials and business leaders which resulted in community pledges to support dark sky light management efforts.

Mike does plan to retire this coming December 2017. Over the past year and nine months he has become a tireless proponent of dark sky parks and expended considerable funds and staff hours in order to be able to make this application. He has stated that he wants his swan song to be International Dark Sky Park designation for Steinaker State Park. After Mike's retirement, Assistant Manager Josh Hansen will carry on these efforts. Josh has a deep enthusiasm for dark skies and even wrote an undergraduate research paper on Dark Sky Stewardship.

On behalf of Manager Mike Murray and Steinaker State Park, we thank you for your time and consideration of this application. We do hope you help Steinaker go gently into the silver tier dark night.

Justina Parsons-Bernstein, PhD  
Dark Sky Initiative Coordinator  
and Heritage, Interpretation and ADA Resources Manager

Utah State Parks

9/4/2017

## **Dark Sky Park Nomination Letter**



Board of Directors  
International Dark-Sky Association  
3224 North First Avenue  
Tucson, AZ 85719

Re: IDSP Designation of Steinaker State Park

August 25, 2017

To the IDA Board Members:

Our Northern Utah IDA chapter is pleased to nominate Steinaker State Park (Uintah County, Utah) as an International Dark Sky Park.

Located on the famed Flaming Gorge - Uintas National Scenic Byway, Steinaker State Park presents an opportunity, with nearby Dinosaur National Monument and Red Fleet State Park (both also in process of IDSP accreditation), to build "dark sky infrastructure" in a particularly scenic part of Utah near the Colorado border and in the hills that rapidly become the foothills of the Uinta Mountains (largest east-west range in the United States).

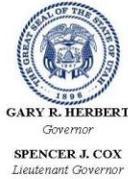
The accreditation of this park will be due, in large part, to the vision and leadership of Justina Parsons-Bernstein, interpretation manager for the Utah State Park system. Dr. Parsons-Bernstein has been an early and active advisor to the Consortium for Dark Sky Studies, based at the University of Utah, and organized not only the dark sky accreditation strategy chosen by many of the state parks to pursue but also significant resources to support the application process.

We would be pleased to answer any questions the Board may have.

Sincerely,

Janet Muir and Zach Thomas

# Manager Dark Sky Support Letter



**State of Utah**  
DEPARTMENT OF NATURAL RESOURCES  
MICHAEL R. STYLER  
*Executive Director*  
Division of Parks and Recreation  
FRED HAYES  
*Division Director*

Date 6-2-2017

To John Barentine and the International Dark Sky Park Application Review Committee:

As the manager of Steinaker State Park, I am committed to the stewardship and enhancement of our park's stunning dark sky through adherence to Utah State Parks Lightscape Management Plan and our Resource Management Plan Dark Sky Addendum. When we next revise and update our park's resource management plan, we will include the management of dark skies in the body of that document. The updated plan will supplant the Addendum.

Currently, our park is at 88% compliance with regard to dark sky lighting requirements. We have already invested thousands of dollars in fixtures, timers, motion detectors, equipment rental and staff hours in undertaking this transition. We recently found out that we will be able to replace our overhead light on the boat ramp with a solar, dark sky friendly light at a cost of \$12,000 to purchase and install. This transition will be undertaken during Fall 2017. Steinaker State Park is slated to undergo renovations in the next three to five years and all lights will continue to be dark sky friendly fixtures after the renovation.

Steinaker State Park interpretive staff and volunteers will hold four programs every year that include dark sky stewardship information about the importance of true dark to animals, humans, and plants, causes of light pollution and the benefits of directional lighting. These offerings include Constellation Tours and Star Parties, Full Moon Hikes, and Scorpion Walks. We are committed to continuing to hold these programs throughout the year and include dark sky educational elements in every event.

Steinaker State Park Assistant Manager Josh Hansen and other park staff are dedicated to continuing helping the public understand, appreciate and enjoy the beauty and importance of dark skies after I retire. I hope you will approve our application for International Dark Sky Park status.

Cordially,  
Mike Murray 

Park Manager, Steinaker State Park

1594 West North Temple, Suite 116, PO Box 146001, Salt Lake City, UT 84114-6001  
telephone (801) 538-7220 • facsimile (801) 538-7378 • TTY (801) 538-7458 • [www.stateparks.utah.gov](http://www.stateparks.utah.gov)



**Utah State Parks Administrative Support of Dark Sky** – The Utah State Board of Parks and Recreation is the governing body for Utah State Parks. The Board unanimously passed a resolution to support all Utah State Parks International Dark Sky designation and stewardship efforts on May 19, 2016, as shown below.



**GARY R. HERBERT**  
*Governor*

**SPENCER J. COX**  
*Lieutenant Governor*

**State of Utah**  
DEPARTMENT OF NATURAL RESOURCES

**MICHAEL R. STYLER**  
*Executive Director*

**Division of Parks and Recreation**  
**FRED HAYES**  
*Division Director*

***Utah Board of Parks and Recreation***

***Resolution to Support Dark Sky Designation***

***for Appropriate Utah State Parks***

***Enacted May 19, 2016***

**WHEREAS** the dark skies at many of Utah's state parks are among the darkest night skies in the United States,

**WHEREAS** natural dark sky areas are decreasing around the country and taking steps to enhance this resource in Utah's state parks provides parks with an additional avenue to draw visitors—including during shoulder seasons,

**WHEREAS** many of the parks within the Utah Division of Parks and Recreation recognize and promote the value of dark skies,

**WHEREAS** visitors to Utah's state parks appreciate the pristine night skies we offer,

**WHEREAS** night sky programs offered at Utah's state parks are among the most popular interpretive programs,

**WHEREAS** many parks are interested in pursuing International Dark Sky Park Designation,

**THEREFORE, BE IT RESOLVED** that the Board of Parks and Recreation supports the efforts of parks within the Utah Division of Parks and Recreation to pursue designation as International Dark Sky Parks and to manage and enhance this resource for the enjoyment and edification of the public.

**Unanimously Approved**  
**by Utah Board of Parks and Recreation on May 19, 2016**

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telephone (801) 538-7220 • facsimile (801) 538-7378 • TTY (801) 538-7458 • [www.stateparks.utah.gov](http://www.stateparks.utah.gov)



**Steinaker State Park Description and Maps** - Steinaker State Park is located in the remote northeastern corner of Utah near the borders of Wyoming to the north and Colorado to the east.



Panoramic View of Steinaker State Park

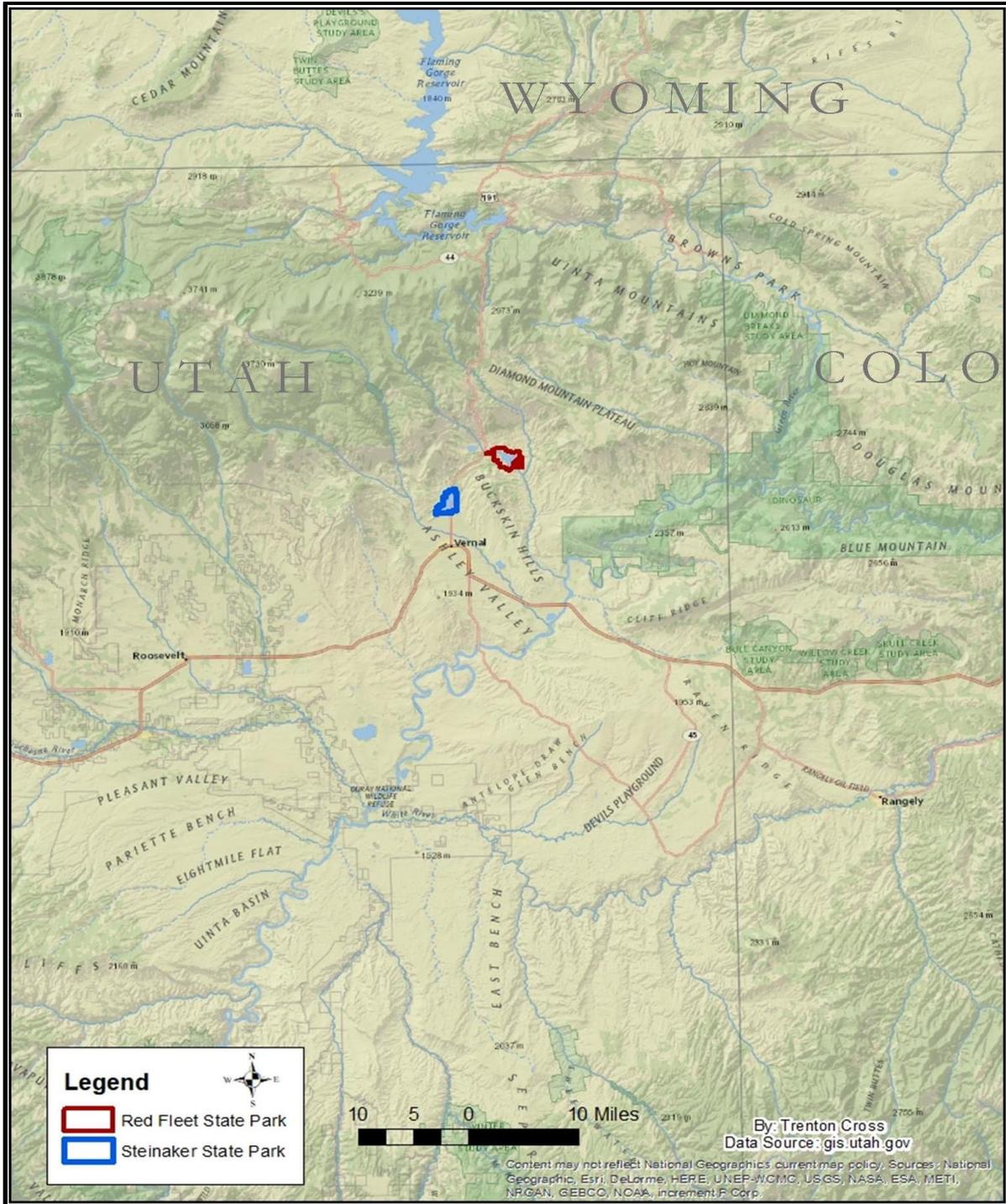
Photo by Justina Parsons-Bernstein

The park is surrounded by sandstone cliffs peppered with fossilized remnants of 200 million year old dinosaurs, mollusks and squid. Although the park is only eight miles north of the city of Vernal, Utah, (population 10,000), the stunning geological formations that encompass the park shield it from major light intrusions. The park harbors clear, dark skies that are enjoyed by locals and visitors from around the world.

Recreationally, the park offers exceptional boating, fishing, camping, canoeing, paddle boarding, wildlife watching, and stargazing opportunities. As travel writer Louis Arevalo put it, "Located in the desert steppes that flow down from the snowy peaks of the high Uinta Mountains, Steinaker State Park is an awesome summer getaway. You can play in the reservoir's warm water, explore the surrounding area, then sleep out under the stars in a secluded campsite."<sup>1</sup> Winter activities include ice fishing, dry camping, cross country skiing and ice skating.

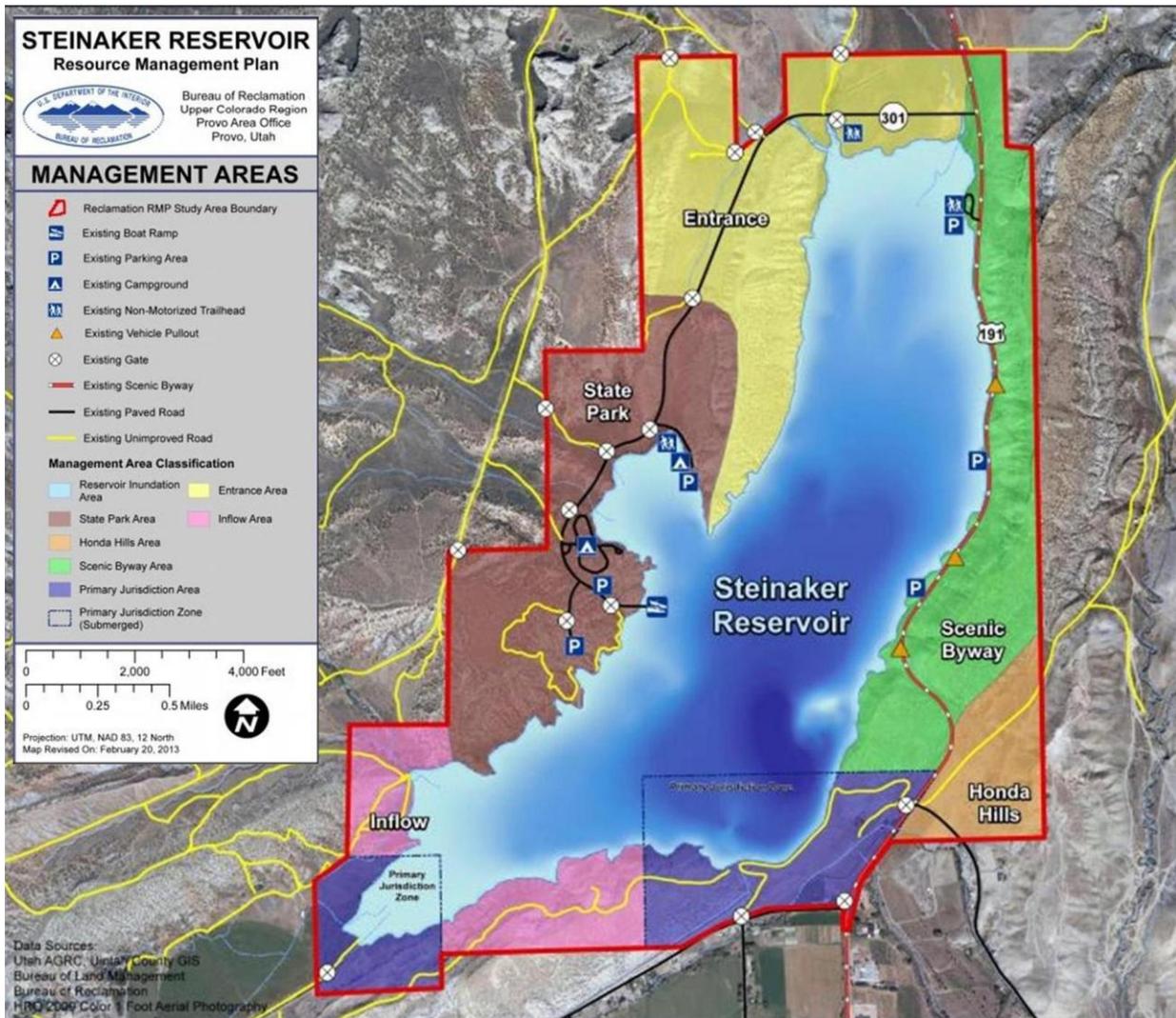
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<sup>1</sup> "A Midsummer's Weekend Getaway: Steinaker State Park," *RootsRated*, February 18, 2016, <https://rootsrated.com/stories/a-midsummers-weekend-getaway-steinaker-state-park>



Map Showing the Remoteness of Steinaker State Park in the Northeast Corner of Utah near the Borders of Colorado and Wyoming.

The Steinaker State Park Management Area is comprised of approximately 1,750 acres, including the 850 surface acre reservoir and 900 acres of beaches, hiking and walking trails and campgrounds. Utah State Parks manages the portions of the map below highlighted in brown, the entrance portion highlighted in yellow, and the reservoir itself.

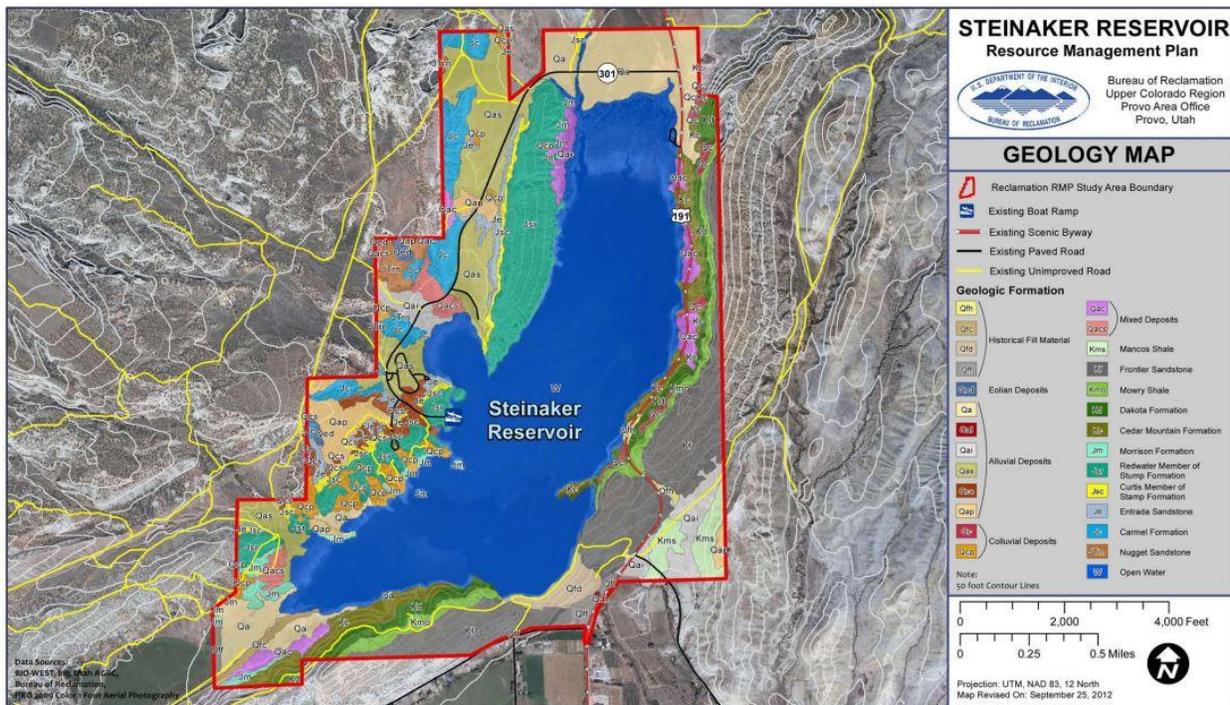


Map showing management areas associated with Steinaker Reservoir.

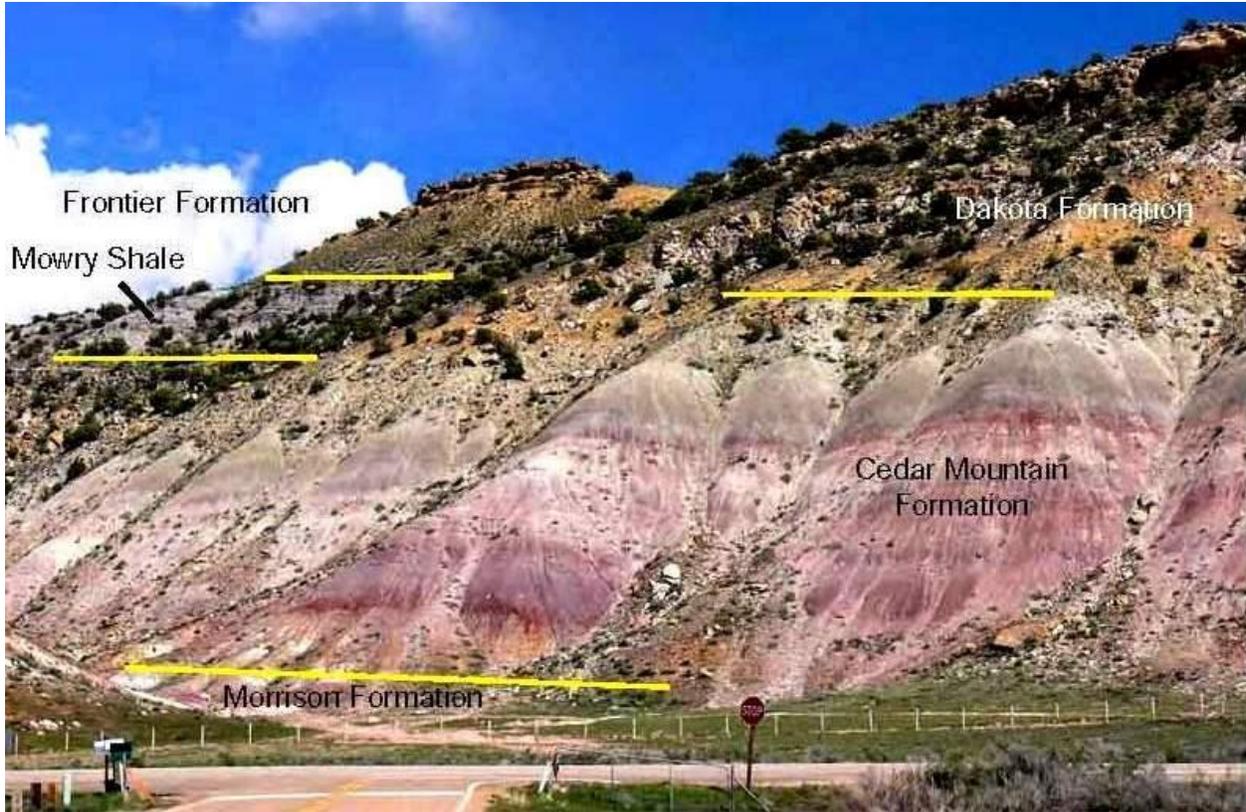
**This application for International Dark Sky Park Designation is for Steinaker State Park’s management areas only.**

**Climate** - Steinaker State Park is situated within a semi-arid climate zone. There are around 238 clear days a year at the park. The annual precipitation averages ten inches a year delivered mostly in the form of snow and augmented by late summer/early fall monsoon rains. Summer temperatures soar well past 100 degrees F and winter temperatures can dip below 0 degrees F for many days at a time.

**Geography and Geology** –Steinaker State Park intrigues anyone interested in geology, geography and paleontology.



There are spectacular views of geologic formations any direction you look in the park. The colorful variegated red, purple, gray and tan soils of the sedimentary formations that make up the east hillsides at the entrance to Steinaker State Park are a great example of the stunning strata laid bare for all to see.



Geological formations looking east from the entrance of Steinaker State Park

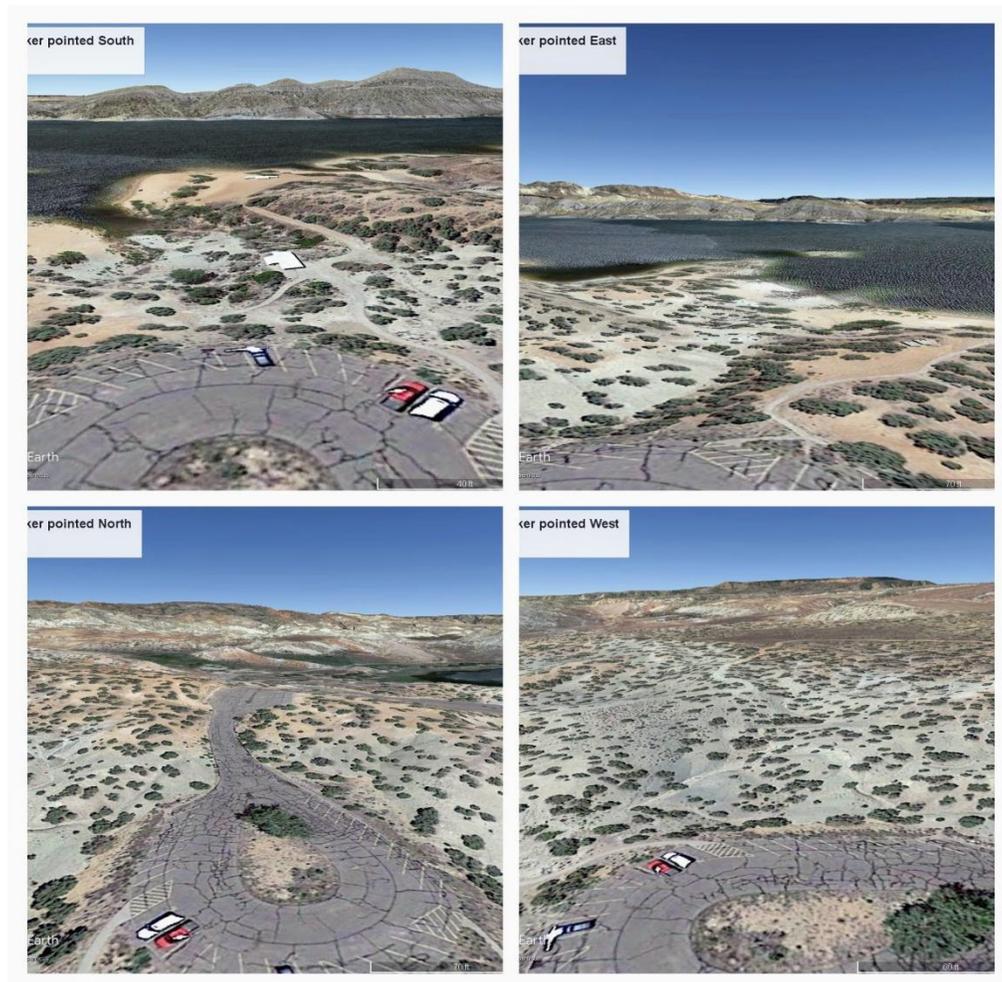
Photo by Utah Geological Survey

In the 150 million year old Morrison Formation that runs along the east shore of Steinaker Reservoir there are fossilized remains of Jurassic era dinosaurs including Allosaurus (Utah's State Fossil), Diplodocus, and Stegosaurus. The area also holds fossilized fish, squid-like creatures called Belemnites, and other mollusks such as oysters and clams. These paleontological specimens are protected by state park staff and state and federal laws.



Display of Fossil Fish, a Variety of Mollusks, and Dinosaur Bone from Steinaker State Park Photos by Justina Parsons-Bernstein

The Google Earth images below show the natural barriers that surround the park and provide a buffer from the light pollution produced by nearby Vernal, Utah. Vernal can be glimpsed only if one hikes to the highest portions within the park. These images show the cardinal directions centered from the perspective of the Day Use Beach Parking Lot where park staff hold dark sky events. The park sits at 5,500 feet above sea level. The elevation of Vernal is 5,300 feet above sea level. The elevation of the park's reservation dam wall is about 5,700 feet above sea level. The elevation of the sandstone formations and mountain peaks around the park range from about 6,200 feet above sea level to the south and east, 7,600 feet above sea level to the north and 6,400 feet above sea level to the west.<sup>2</sup>



<sup>2</sup> USGS 7.5-minute image map for Steinaker Reservoir, Utah  
<https://prd-tnm.s3.amazonaws.com/StagedProducts/Maps/USTopo/1/21240/7330266.pdf>

**Human History** – From around A.D. 600 to around A.D. 1200, the area encompassing Steinaker State Park was inhabited by clusters of extended family groups that anthropologists have classified as the Fremont Culture. They were semi-nomadic folks who made distinctive pottery and figurines, used stone-tipped darts in atlatls, and lived in pithouses. Their rock art covers canyon walls and sheltered overhangs throughout the area including the rock outcroppings around Steinaker Reservoir. Gatherer and hunter groups, consisting of both Shoshone and Ute cultures, began inhabiting the area around A.D. 1200. A large Ute population still lives near the state park on their Uintah and Ouray Reservation. Euroamerican settlement of the area did not begin until the late 1870s and is still relatively sparse.

Fremont artifacts, pit houses, rock art and other culturally-affiliated sites have been recorded within the park and are protected by park staff and state and federal law.



Mano and Metate, Projectile Points and Other Stone Tools Found in Steinaker State Park



Photos by Justina Parsons-Bernstein

**Wildlife** – Steinaker Reservoir receives a great deal of use during all seasons of the year by shorebirds, waterfowl, birds of prey and songbirds because of the presence of a complex of open water, riparian-wetland, and upland habitats that provide food sources, resting and nesting areas, and protective cover.



Pelicans, Osprey and Mergansers in Steinaker State Park

Photos by Mike Murray

The park provides habitat for mule deer, elk, moose, black bear, mountain lion, mountain cottontail, white-tailed jackrabbit, beaver, porcupine, long-tailed vole, yellow-bellied marmot, red fox, badger, northern river otter, and bobcat, and many other mammal species.



Mountain cottontail, Black bear cub and Mule deer in Steinaker State Park

Photos by Mike Murray/Justina Parsons-Bernstein

## Steinaker State Park Dark Sky Resource Management

Dark Sky Park guidelines require that "*The Park recognizes dark skies as an important natural, cultural, and/or scientific resource value as demonstrated by inclusion in approved management documents (e.g. General Management Plan, Resource Management Plan, Facility Development Plan).*"

Although some Utah State Parks already include recognition and stewardship of dark sky in their Resource Management Plans (RMP), most do not. The Utah State Parks process for redoing RMPs involves forming a committee comprised of outside cultural, natural resource, recreation and tourism experts, park staff, region managers, Utah State Parks administration representatives, Department of Natural Resources administration representatives, and

concerned citizens to cooperatively create the new RMP. This committee usually meets for a year to discuss resource management issues, hold public comment hearings, and draft and revise the RMP. Overall, it is a time-consuming, staff-intensive, costly process. Therefore, most park managers only revamp their RMPs every decade or so. Some parks go even longer between RMP updates.

To demonstrate each park's recognition of the natural, cultural and scientific significance of dark skies and to mitigate for the lack of inclusion of dark sky in most Utah State Park RMPs, the Utah Board of Parks and Recreation unanimously approved a Resource Management Plan Dark Sky Addendum, shown below, on May 19, 2016.

 GARY R. HERBERT <i>Governor</i> SPENCER J. COX <i>Lieutenant Governor</i>	<b>State of Utah</b> DEPARTMENT OF NATURAL RESOURCES MICHAEL R. STYLER <i>Executive Director</i> Division of Parks and Recreation FRED HAYES <i>Division Director</i>
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**Utah Board of Parks and Recreation  
Resource Management Plan Addendum  
for Dark Skies in Utah State Parks**  
*Enacted May 19, 2016*

**Background**  
Utah's state parks have some of the darkest, most pristine skies in the United States. Many parks are interested in enhancing and promoting this particular natural resource to enrich current visitor experience and attract new patrons. Dark sky management includes regulating outdoor night lighting fixtures to preserve and enhance the park's dark sky while promoting safety, conserving energy, saving money on electricity bills and promoting night sky programming year-round. With a solid dark sky management strategy in place, parks can pursue International Dark Sky Park Designation which is a way to certify their efforts to effectively manage this natural resource.

**Current Status**  
Parks interested in diversifying their visitors' recreational offerings by enhancing the views of their pristine night skies and in pursuing International Dark Sky Park Designation need to add dark sky management to their Resource Management Plans. Redoing an entire Resource Management Plan is a time-consuming and costly undertaking. Therefore, adoption of this Dark Sky Addendum by each park interested in managing their night skies at an internationally-recognized level of quality will suffice until such time as the park has cause to redo their management plan in its entirety. At such time, Dark Sky Management would be expected to be incorporated into the main body of the park's Resource Management Plan.

**Board Action**  
The Board of Parks and Recreation approves this Dark Sky Addendum for parks pursuing International Dark Sky Park Designation as an addition to their current Resource Management Plans.

**Unanimously Approved  
by Utah Board of Parks and Recreation on May 19, 2016**

Adopted by Mike Murray Mike Murray

Park Manager for Steinakee State Park

Date 9/2/2017

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The manager of each park pursuing International Dark Sky Park designation must signify that they recognize the importance of dark sky and will manage it as a valued resource by signing and dating the RMP Dark Sky Addendum. The verbiage also stipulates that by signing the Addendum, park managers agree to incorporate Dark Sky Management into the main body of their RMPs whenever they next undertake the revision of that document.

Mike Murray has demonstrated he recognizes the natural, cultural and scientific values dark sky by his adoption of the RMP Dark Sky Addendum as shown by his signature on the document above and his signature on the Utah State Parks dark sky friendly Lightscape Management Plan, included as Appendix C in this application packed. Mr. Murray also stated outright in his Dark Sky Support letter on page 7 of this application that:

As the manager of Steinaker State Park, I am committed to the stewardship and enhancement of our park's stunning dark sky through adherence to Utah State Park's Lightscape Management Plan and our Resource Management Plan Dark Sky Addendum. When we next revise and update our park's resource management plan, we will include the management of dark skies in the body of that document. The updated plan will supplant the Addendum.

After Mike's retirement, Steinaker State Park Assistant Manager Josh Hansen has promised he will include dark sky in any revision of the park's RMP. Mr. Hansen states in his Dark Sky Support Letter included in the "Future Commitment to Dark Sky Education, Monitoring and Stewardship" section at the end of this application that:

I am the Assistant Park Manager for Steinaker and Red Fleet State Parks. As part of management for Steinaker State Park, I pledge to keep the dark sky program going after the current manager, Mike Murray, retires. Also, whenever the park's resource management plan next comes up for revision, I will make sure we add Dark Sky to it as an important natural, cultural and scientific resource that we will continue to steward.

**General Park Stewardship Practices** – Steinaker State Park staff take seriously their duty to protect the natural and cultural resources within their park's boundaries. The park underwent an environmental assessment during their 2013 RMP revision. The park is slated for renovation in 2020. Under the renovation, the RMP states that campgrounds and other recreation accommodations will be upgraded, with "portions of the State Park Area...managed as a Natural Area to protect natural and cultural

resources....Facilities that improve or protect environmental quality [will] be included, as well as regulation and information systems to increase public awareness.”<sup>3</sup>



Signs Showing Stewardship Ethic at Entrance of Steinaker State Park area

Photo by Justina Parsons-Bernstein

Though not specifically included in the Environmental Assessment, park staff have included enhancing dark skies as part of their environmental quality enhancement efforts. An example of this is staff’s accomplishment of converting the majority of the park’s lightscape to dark sky friendly light fixtures and practices.

**After-Dark Access** – Year-round, Monday through Thursday, Steinaker State Park gates are open all day and all night. Anyone paying the park day-use fee, anytime of the night or day, is welcome to come in and enjoy the night skies. Friday through Sunday, park gates open at 6:00 a.m. and close at 10:00 p.m. Depending on the time of year, day-use fee visitors can enjoy night skies during these hours. Of course, campers can enjoy the dark sky view all night, every night throughout the year.

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<sup>3</sup><https://site.utah.gov/stateparks/wp-content/uploads/sites/13/2016/03/2013-Steinaker-RMP-Final-EA.pdf>  
pp. 39, 42.

**Artificial Light and Sky glow** – As mentioned above, Steinaker State Park is fortunate to be surrounded by sandstone cliffs and mountains. The park is located 180 miles northeast of the major metropolitan area that surrounds Salt Lake City on the Wasatch Front. The largest town in the region is Vernal, Utah, eight miles south, with a population of approximately 10,000. The natural barriers around the park mitigate major artificial light and sky glow intrusions.

**Observable Sky Phenomena** – A complex Milky Way and the Andromeda Galaxy can be seen from the park. Satellites and meteors are also easily observable.

**Nocturnal Environment** – The impact of park lighting on the nocturnal environment is minimal. Since its establishment in 1964, the park has been a haven for creatures of the night. Great horned owls have nested in the park for decades. Long-eared owls also use the park as a nesting and hunting area.



Photos of Great horned owl adult and chicks in nest at Steinaker State Park.

Photos by Mike Murray

Nocturnal Woodhouse's toads bury themselves in the sandy areas of the park during the day and come out to feed at night. Northern scorpions are nocturnal hunters that utilize the sandy and rocky hills within the park as home and hunting ground. Several bat species, such as the Big Brown bat, Little Brown myotis, and Long-eared myotis take advantage of the plentiful insects associated with the reservoir and the riparian-

wetland habitats. Coyotes yip and howl on and off throughout the night and park visitors are always excited to capture photos of them.



Woodhouse's toad and Northern scorpion in Steinaker State Park



Photos by Justina Parsons-Bernstein



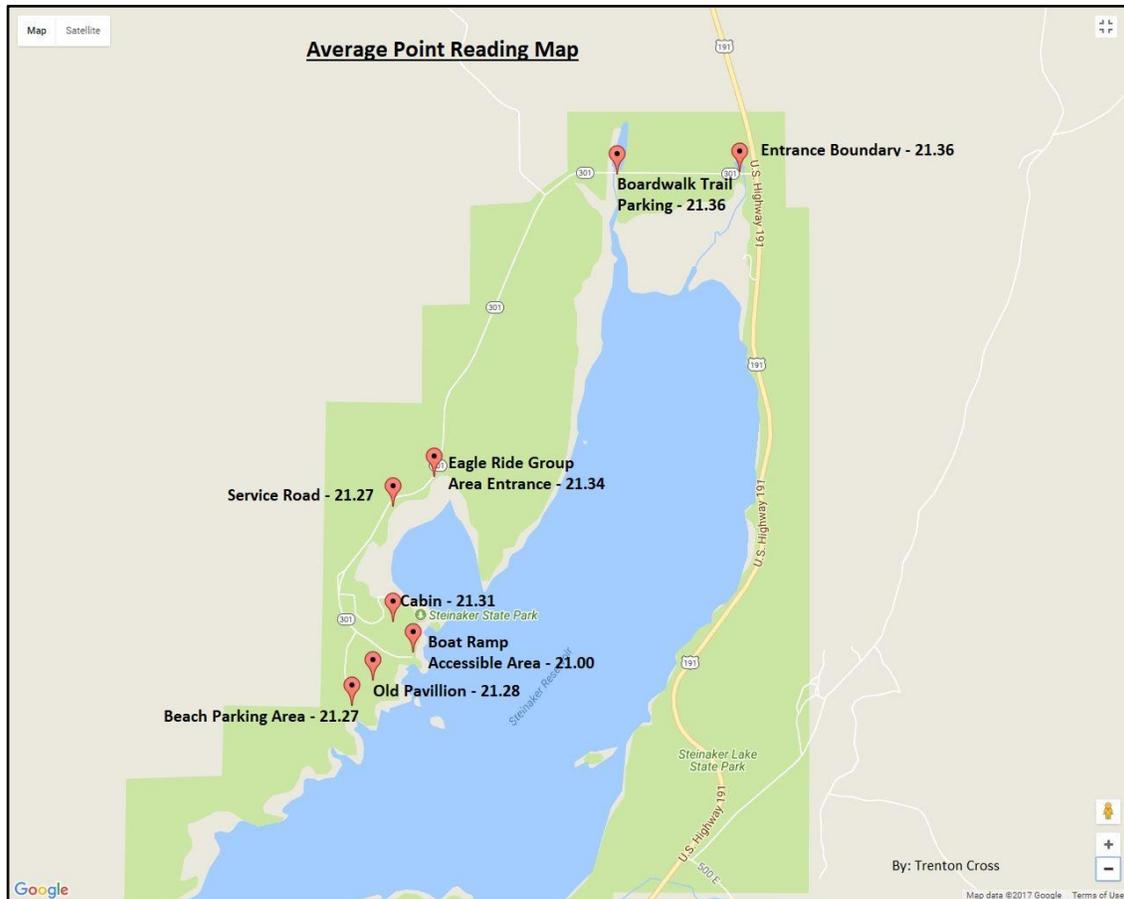
Coyote in Steinaker State Park.

Photo by Mike Murray

**Bortle Sky Class** – Steinaker falls on the Bortle Scale in class 4 and is considered a rural/suburban transition area moving toward rural on the north end of the park.

**Visual Limiting Magnitude** – According to the Bortle Scale, the ZELM of a rural to suburban transition area, such as Steinaker State Park, is between a 6.1 and 6.5, before accounting for latitude. The Dark Sky Team noted the 6.2 star on 6/3/16 in the night sky at 11:55 PM. With the allowed .3 added for our latitude, the Visual Limiting Magnitude of Steinaker State Park is 6.5.

**Unihedron Sky Quality Meter Readings Summary**– Utah State Park's Dark Sky Team took four sets of SQM-L measurements from June 2016 through the end of July 2017 at eight sites around Steinaker State Park. Steinaker's overall combined SQM-L readings averaged **21.26**. The map below shows combined readings averages taken over the 13 month period at the eight dark sky measurement sites around the park. The details of all SQM-L readings are contained in Appendix A.



**Light Pollution** - As stated above, Vernal, Utah, with a population near 10,000, is the largest populated area close to Steinaker State Park. It is approximately eight miles south of the park. The town and park are separated by rural areas dedicated to farming and public lands that feature expansive sandstone formations. Though there is a small light dome visible on the southeastern horizon emanating from Dinosaur, Colorado, and some diffuse light on the southern horizon that originates from Vernal, these features do

not greatly depreciate the quality of the night sky. As mentioned above, astronomical phenomena, such as satellites, meteors, the Milky Way and the Andromeda Galaxy can still be clearly observed with the naked eye.

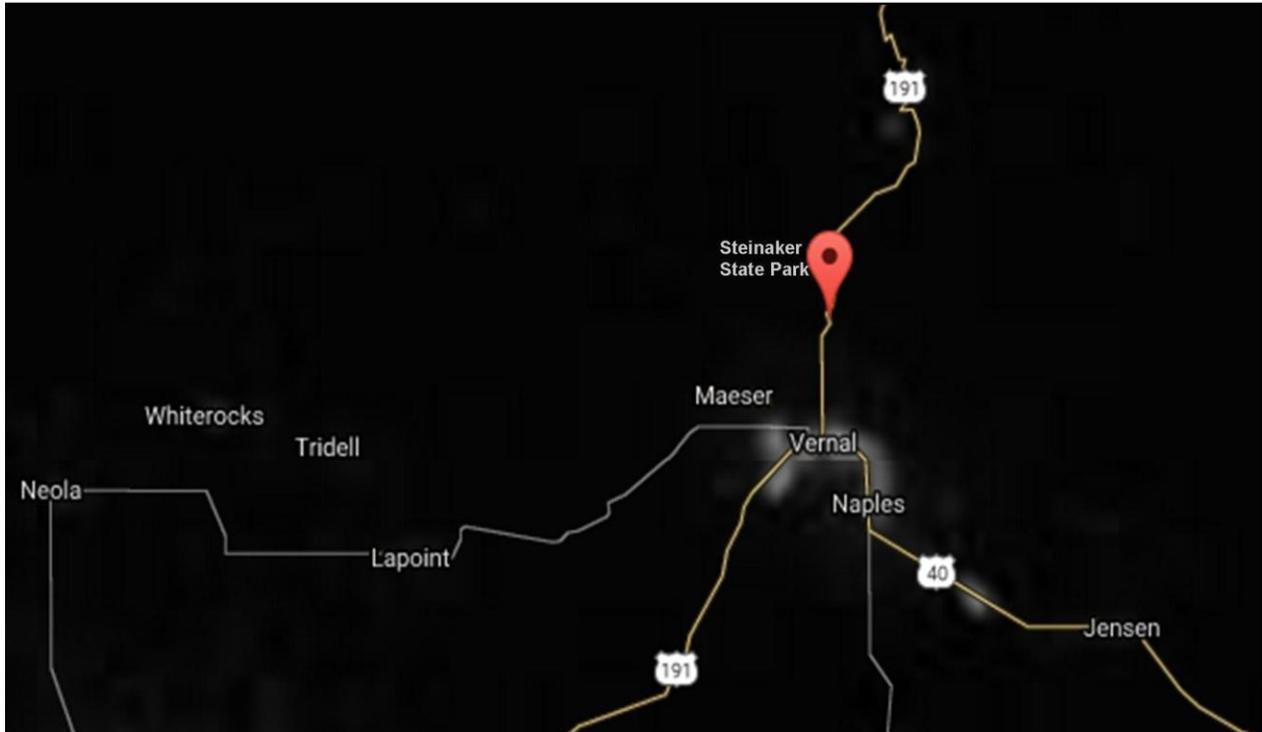
Internally, to help enhance the park's dark sky, staff have reduced outdoor light fixtures from 22 to 17 in number. There are many areas of the park that have no outdoor lights. The effects of the park's 17 outdoor fixtures on nocturnal ecological processes are nominal. For example, the Woodhouse's toad featured in the photo on page 11 of this application was taken at the shop entrance door underneath the motion-activated full cutoff fixture and around the corner from the full cutoff anti-theft light that stays on at night. There were other toads in the same area. Great horned owls nest in the large trees between the Group Camping area and the park office/entrance station and shop area. The park expects to achieve 100% compliance by Fall 2018.

### Light Pollution Maps of Steinaker State Park and Surrounding Area



LightPollutionMap.Info--Arrow shows position of Steinaker State Park. Thumbtack shows position of Vernal, Utah.

<https://www.lightpollutionmap.info/#zoom=11&lat=4945116&lon=-12191224&layers=0BTFFFFFFF>



Blue Marble Light Pollution Map of Steinaker State Park and Surrounding Area

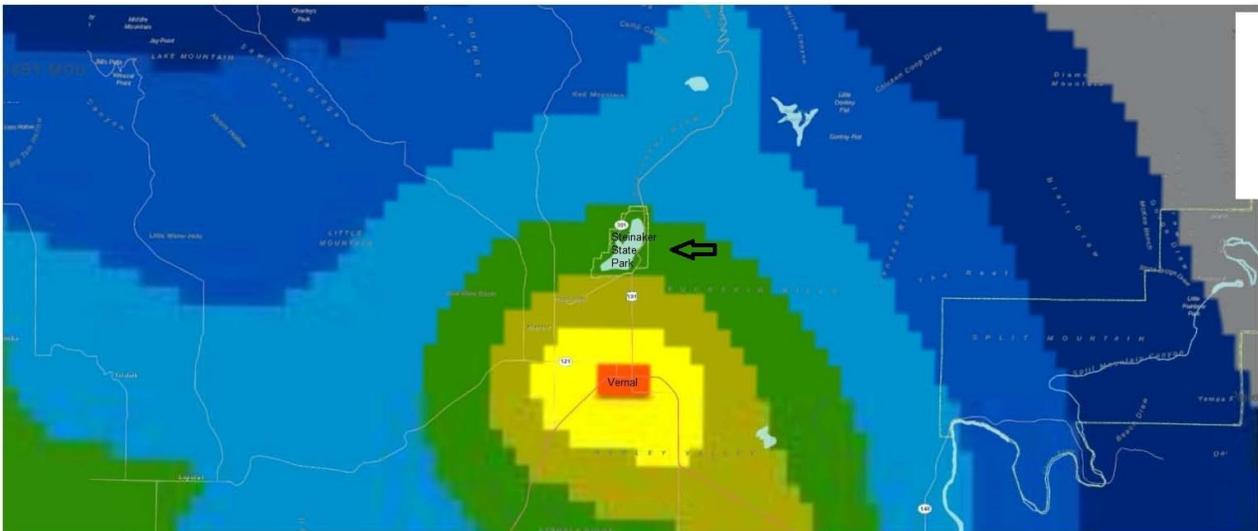
<https://blue-marble.de/nightlights/2015>

9/8/2017

ArcGIS - Artificial Sky 3d

ArcGIS Artificial Sky 3d

New Scene Sign In



World Atlas of Artificial Night Sky Brightness--Arrow points to Steinaker State Park Location.

<https://www.arcgis.com/home/webscene/viewer.html?webscene=f80c755f77f24dcbbc9c68db4070c16b>

**Colors correspond to ratios between the artificial sky brightness and the natural sky brightness of: <0.11 (black), 0.11-0.33 (blue), 0.33-1 (green), 1-3 (yellow), 3-9 (orange), >9 (red)**

**Steinaker Horizon Photos - Light Dome Monitoring** - All of the light dome monitoring photos included below were taken with a Galaxy S7 cellphone camera. Exposures were short and meant to replicate, as closely as we could discern, what is actually seen by the human eye at night at this lightless Beach Parking Area of Steinaker State Park.



South/Southeastern Horizon from Beach Parking Lot

Photo by Justina Parsons-Bernstein

The photo above was taken facing south/southeast around 11:00 p.m. from the Beach Parking Lot during the Steinaker State Park Dark Sky Event and Star Party held June 23, 2017, the night of the New Moon. There is no park lighting whatsoever in this area. Surprisingly, the small light dome that can be perceived on the southeast horizon (the very left side of the photo) is not from Vernal, Utah. The visiting Night Sky Rangers from nearby Dinosaur National Monument informed us that it is from Dinosaur, Colorado, some 40 miles to the southeast of the park. You can also detect diffuse light emanating from Vernal on the southern horizon. The two small lights mid-photo are folks using their cell phone Stargazer apps.



Southern Horizon from Day Use/Beach Parking Lot

Photo by Justina Parsons-Bernstein

The photo above was taken facing south, toward Vernal, from the Day Use/Beach Parking Lot after the Steinaker State Park Dark Sky Event and Star Party held July 26, 2017. New Moon had been July 23, 2017. There is no artificial park lighting in this area and there were no other artificial lights in the area at the time. The two lights on the horizon are stars. The photo was taken around midnight. The sliver of the Moon that had been up earlier that night had set at 11:05 p.m. You can detect diffuse light emanating from Vernal on the southern horizon.

The two photos below were also taken around midnight from the Day Use/Beach Parking Lot facing west on July 26, 2017. The lights on the horizon and in the sky are stars. As these photos show, the west view is very dark,



Western Horizon from Day Use/Beach Parking Lot

Photo by Justina Parsons-Bernstein



West/Slightly Northwestern Horizon from Day Use/Beach Parking Lot

Photo by Justina Parsons-Bernstein

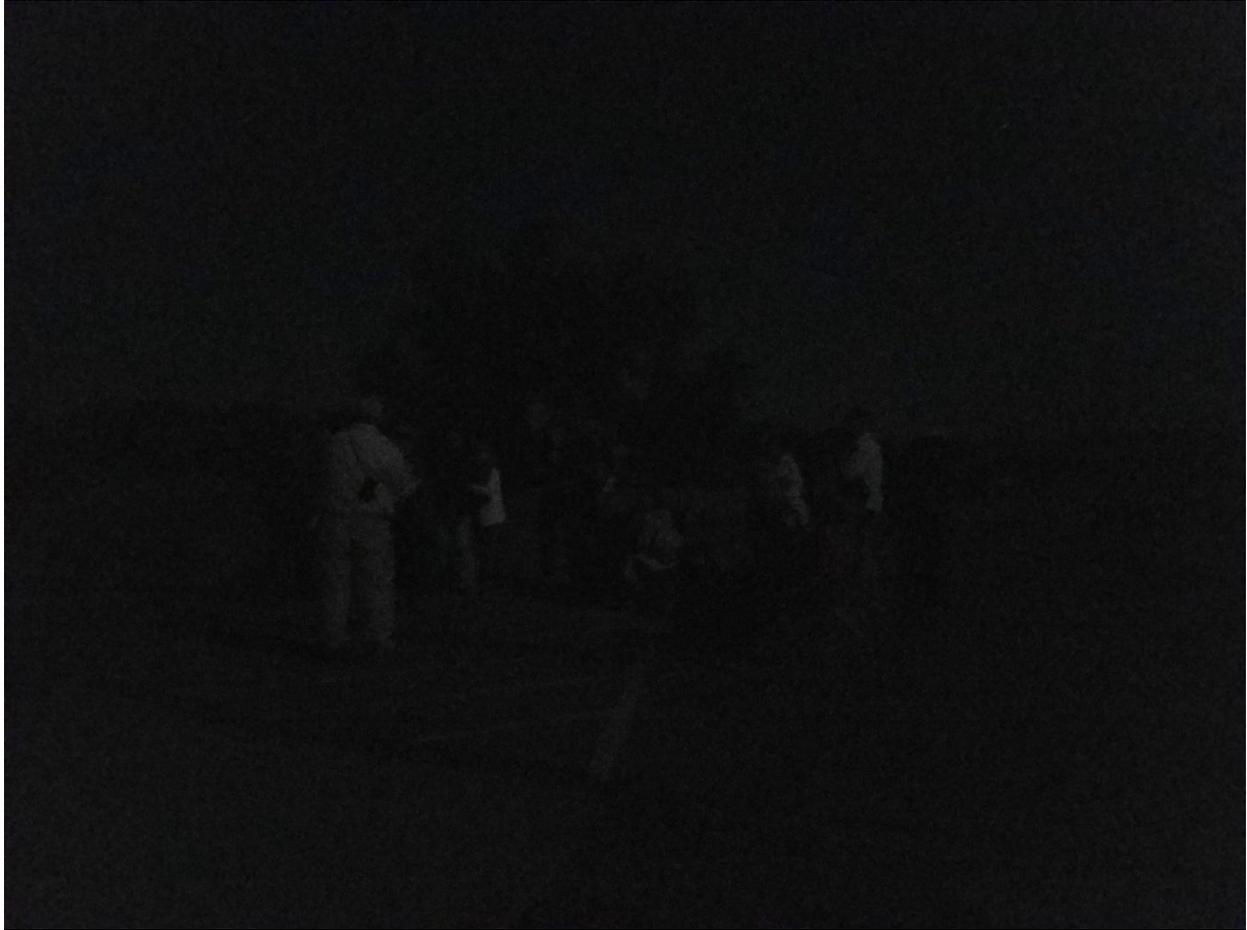


Photo by Justina Parsons-Bernstein

The photo above was taken facing north/northeast from the Beach Parking Lot during the Steinaker State Park Dark Sky Event and Star Party held September 1, 2017. There was quite a bit of smoke in the air that had drifted in from Montana and Utah wildfires. The moon was shining brightly from the south at 83.5% illumination and did not set until 3:16 a.m. You can see the individual moonlight-cast shadows to the left of the people in the picture. This photo was taken around 11:00 p.m. There are no park lights in the area and no other artificial lights were on during this photo.



Photo by Justina Parsons-Bernstein

The photo above was taken facing east from the Day Use/Beach Parking Lot during the Steinaker State Park Dark Sky Event and Star Party held September 1, 2017. There was quite a bit of wildfire smoke in the air. The moon was shining brightly from the south at 83.5% illumination and did not set until 3:16 a.m. You can see the individual moon shadows behind people in the picture. This photo was taken between 10:30 and 11:00 p.m. There are no park artificial lights in the area. You can see the red lights of the Dinosaur National Monument Night Sky Rangers who were adjusting their telescopes.

## Dark Sky Education and Community Outreach

Steinaker State Park staff, in conjunction with the Utah State Park Dark Sky Team, local astronomy enthusiasts, and interpretive rangers from Dinosaur National Monument, have hosted star parties to promote dark sky education and understanding. In order to clarify and unify dark sky messaging, the Dark Sky Team designed a 20 foot dark sky education banner that is unfurled and discussed at every park dark sky event. The presentation takes about half an hour.



Utah State Parks 20 foot Dark Sky Education Banner Being Unfurled and Discussed

Photo by Kerrie Abbott

The banner contains global and United States light pollution maps and panels explaining best dark sky lighting practices, ecological and environmental consequences of light pollution, dark sky friendly campsite etiquette, dark sky lighting versus safety concerns, and how to practice dark sky friendly lighting at home. During the presentation the banner is directionally lit with a flashlight as a further demonstration of dark sky friendly lighting.

The Dark Sky Banner Presentation has been very well received by program participants. Feedback from audiences shows that the light pollution maps and the way

misdirected lights can interfere with safety are the panels that make the biggest impact on them.

The Dark Sky Education Banner is also used at out-of-park outreach and media events such as county commission, city council and Chamber of Commerce meetings and in-studio television segments featuring on Utah State Parks' Dark Sky Initiative.

Steinaker State Park is an easily accessible site for local stargazers and telescope enthusiasts and has long been used by Vernal's Uintah High School physics teachers as their astronomy class outdoor observation site.

The park held four public dark sky educational events during the summer of 2017. The first was on Friday, June 23rd. The second was Wednesday, July 26th. The third was Friday, August 11th. And the fourth was held Friday, September 1st.



Poster for June 23, 2017, Dark Sky Event at Steinaker State Park distributed at park campgrounds and Vernal-area tourist attractions and information centers.

Utah State Parks Media and Public Relations section helped spread the word about Steinaker's dark sky events on Parks' website, blog and main Facebook page.

→ ↻ Secure | https://stateparks.utah.gov/2016/08/25/check-out-these-upcoming-dark-sky-programs/

Utah.gov Services Agencies

UTAH DNR STATE PARKS

PARKS ACTIVITIES RESOURCES



## Utah State Parks Blog

### CHECK OUT THESE UPCOMING DARK SKY PROGRAMS

Utah State Parks have some of the darkest night skies in North America. An ever-increasing number of our visitors appreciate and seek out the pristine night skies and after-dark programming we offer. Our parks employees want to responsibly manage and enhance this resource.

To keep you all engaged, check out the list below for our Dark Sky Programs or events!

#### Steinaker State Park

- July 26 – Star Party at 9 p.m.
- August 11 – Star Party
- August 26 – Star Party
- September 1 – Star Party

#### Wasatch Mountain State Park

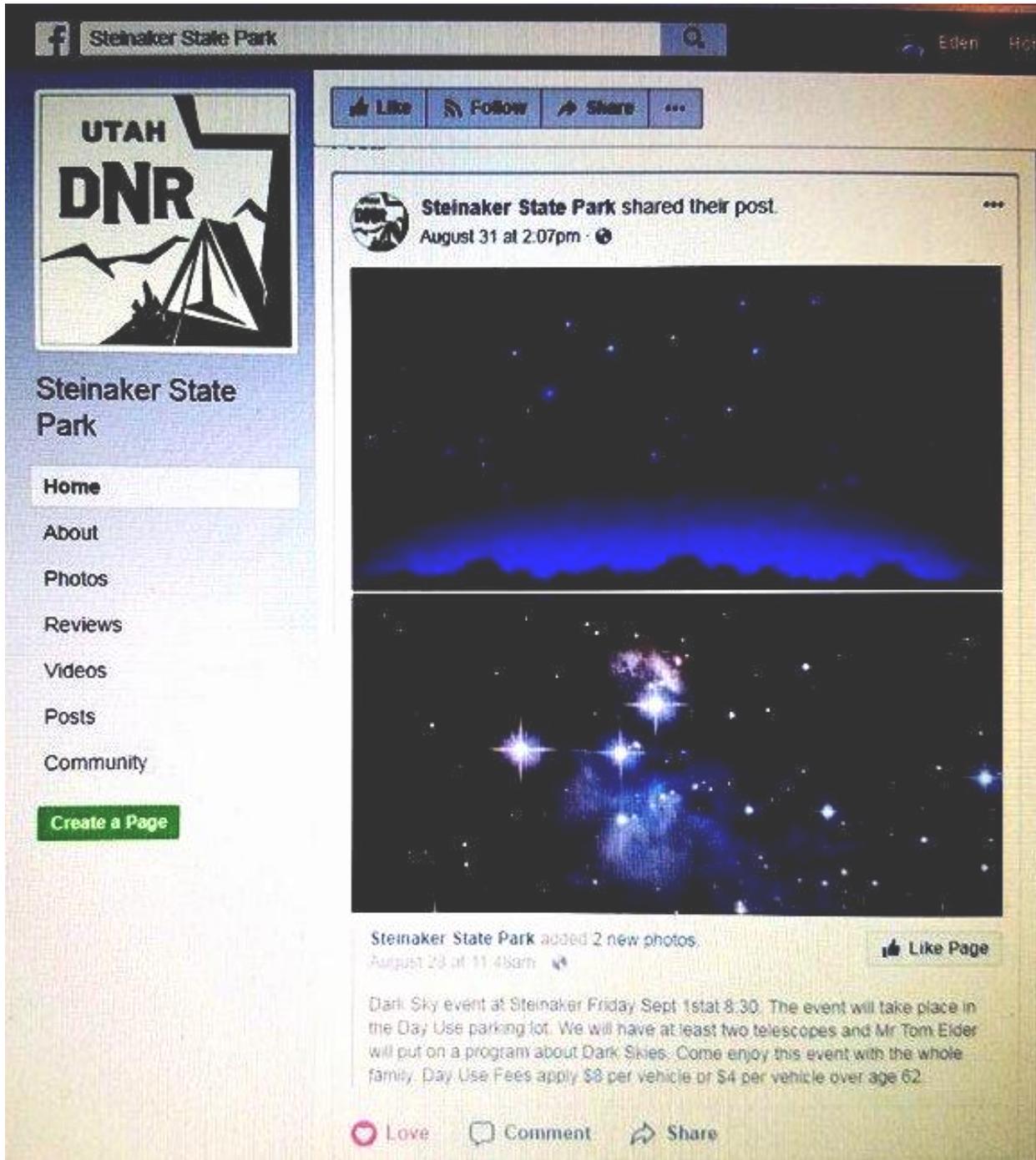
- July 22 – Dark Sky Nocturnal Birds of Prey Evening program in campground
- Aug 5 – Dark Sky Night Animals Evening program in campground

If you found this blog entry interesting, please consider sharing it through your social network.



A Utah State Parks Web Posting about Steinaker's Summer 2017 Dark Sky Events. There was a June 23rd event before this page was posted and the August 26th event was cancelled because of its closeness to the September 1st event.

Steinaker staff also posted their dark sky events on their own Facebook page.



Steinaker Facebook post publicizing September 1, 2017, Dark Sky Event.

Partner organizations publicized Steinaker State Park's dark sky events. For example, Steinaker was the dark sky education event site for the Utah Symphony's road show concert series when it traveled to the Vernal area.

The screenshot shows the top navigation bar of the Utah Symphony | Utah Opera website. The header is dark red with the text "UTAH SYMPHONY | UTAH OPERA" in white. To the right, it says "POWERED BY arlix". Below the header, there are links for "FIND TICKETS", "BUY SUBSCRIPTIONS", "MAKE A DONATION", and "PURCHASE GIFT CERTIFICATES". A secondary navigation bar contains "LOGIN · PERFORMANCE CALENDAR", a "Promo Code" input field, and a "Submit" button. The main content area features a large heading "STEINAKER STAR PARTY" with the date and time "FRIDAY, SEPTEMBER 1, 2017 9:30PM" below it. A "Share" button is visible on the right. On the left, there is a photograph of a concert performance on a stage. To the right of the photo, the event details are listed: "Friday, September 1, 2017 9:30 p.m. | Steinaker State Park - 40° 30'55.3\"N 109° 32'31.7\"W". Below this, a paragraph of text describes the event: "Star parties will introduce the importance of limiting light pollution and reveal the magnificent night skies of rural Utah. These educational star-gazing events are presented by local astronomy groups in partnership with the University of Utah's Consortium for Dark Sky Studies and the Colorado Plateau Dark Sky Cooperative. At each party, the National Parks Service and Utah State Parks will help people explore the night sky through lectures provided by parks rangers and local astronomers, as well as viewing opportunities on high-powered telescopes."

Utah Symphony/Utah Opera's Website Posting about the Steinaker State Park Partner Event

Attendance at the four summer 2017 dark sky events ranged from 35 to well over 100 folks.



Group Learning Astronomy by Eye at the Steinaker State Park June 23, 2017, Event

Photo by Justina Parsons-Bernstein



Folks lined up to look through the telescope at the July 26, 2017 Event

Photo by Justina Parsons-Bernstein



Looking at the Near-Full Moon at the September 1, 2017, Event Photo by Bettymaya Foott

**Internal Dark Sky Restoration Education Project** - Steinaker State Park has produced an informational panel about dark sky restoration at the park for visitors as their internal dark sky restoration interpretive product. This panel has been mounted on the outside entry wall of the Day Use/Beach Parking Area restroom between the Men's and Women's rooms. The panel explains that the outdoor lights of the restroom were changed to full cutoff fixtures with warm white, 2700 K/800 L bulbs and the indoor lights were put on motion detector 15 minute timers. The panel also elucidates kelvins and lumens, the dark sky benefits of full cutoff fixtures, courteous dark sky friendly camping light practices and how people can practice dark sky friendly lighting at home.

# Friendly Lights for Starry Nights

In order to enhance night sky views and nocturnal habitats, Steinaker State Park has adopted dark sky friendly lighting that features full cutoff fixtures fitted with soft light, 800-lumen bulbs.

Many fixtures also have timers and motion detectors to further cut down on unnecessary light. This lightscape management will allow you to better see the Milky Way and other celestial phenomena during your stay at the park.

**Before:**  
Photo of park restroom before dark sky friendly fixtures were installed.

Upward and outward lighting causes light pollution and glare.

**After:**  
Photo of park restroom after dark sky friendly fixtures were installed.

Directing light downward illuminates where light is needed and keeps light from brightening the sky.

Timers shut off interior lights after 15 minutes.

Warm amber light protects your night vision. Red headlamps protect your night vision as well.

**Shielded lights help bring out the stars.**

Exposed Light    Exposed Light    Partial Shield    Full Shield

**Simple steps preserve dark skies:**

- Light only where you need it.
- Light only when you need it.
- Shield light fixtures to direct light downward.
- Use the minimum amount of light necessary.
- Use light bulbs with an amber color temperature of 3000-Kelvin or lower.
- Keep indoor light inside. Close blinds and curtains when lights are on at night.

**LED is not always dark sky friendly.**  
LED lights can be overly bright and blue white. Dark sky friendly lights have lower lumens (less bright) and lower Kelvins (warm in color).

**Lumens = brightness of the light.**

Low							Bright
450 L	600 L	800 L	1100 L	1800 L	2000 L	2800 L	

← Lower lumens light is dark sky friendly →

**Kelvin = color spectrum of the light.**

Warm white			Pure white			Cool white
1000 K	2000 K	3000 K	4000 K	5000 K	6000 K	7000 K

← Warm light is dark sky friendly →

**Light courtesy in the park.**

Steinaker State Park

Panel Explaining Dark Sky Restoration Efforts at Steinaker State Park.



Panel Mounted on Day Use/Beach Parking Area Restroom Entry Wall

**External Dark Sky Leadership Project** - On July 27, 2017, Steinaker State Park Manager Mike Murray made a dark sky presentation to the Uintah County Commission in December 2016. Then, in July 2017, he hosted a Dark Sky Presentation and Open House for local mayors, city planners, county commissioners, Chamber of Commerce leaders and tourism officials in the auditorium at Utah Field House of Natural History State Park.



Park Manager Mike Murray Making Dark Sky Presentation to Community Leaders

Photo by Justina Parsons-Bernstein

Utah State Park's Dark Sky Initiative Coordinator Justina Parsons-Bernstein gave a presentation about local to global dark sky stewardship and astrotourism. Mr. Murray talked about his dark sky-enhancing efforts at the park and why he thought it was beneficial for the area. He asked for support from those attending.



Display at the Post-Presentation Reception for Community Leaders Photo by Justina Parsons-Bernstein

During the post-presentation reception discussion, the Mayor and City Planner for Vernal City, a Uintah County Commissioner, the Director of the area Chamber of Commerce, a Night Sky Ranger from Dinosaur National Monument and two representatives from the county tourism office engaged parks staff in a lively conversation about several issues attached to dark sky including safety, signage and regulation concerns.



Post-Presentation Discussion with Community Leaders

Photo by Justina Parsons-Bernstein

Uintah County's lighting code does contain some dark sky friendly stipulations pertaining to light trespass and upward lighting:

[https://library.municode.com/ut/uintah\\_county/codes/code\\_of\\_ordinances?nodet=TIT17ZO\\_CH17.128COINAPBUDERE](https://library.municode.com/ut/uintah_county/codes/code_of_ordinances?nodet=TIT17ZO_CH17.128COINAPBUDERE)

## **UINTAH COUNTY CODE 2005**

### **A Codification of the General Ordinances of Uintah County, Utah**

**Beginning with Supp. No. 12,  
Supplemented by Municipal Code Corporation  
Version: Sep 5, 2017 (Current)**

#### **Chapter 17.128 - COMMERCIAL, INDUSTRIAL, AND APARTMENT BUILDING DESIGN REGULATIONS**

##### **Sections:**

##### **17.128.040 - Lighting plan.**

All applications shall include a lighting plan. The lighting plan shall be designed to:

1. Discourage crime;
2. Enhance the safety of the project;
3. Prevent glare onto adjacent properties and into the sky;
4. Enhance the appearance and design of the project.

(Ord. No. 06-03-2013, O-2, 6-3-2013)

Uintah County Commissioner Duane Shepherd talked about his efforts to get ahead of and head-off any federal dark sky regulations by already researching dark sky friendly fixtures. He told the group that, because of cost, he was opting for dark sky-friendlier bulbs in lieu of replacing fixtures at this time. Utah State Parks staff and Dinosaur National Monument staff advised the Commissioner to look closely at the kelvins and lumens of the bulbs he was choosing so he could choose the least impactful bulbs possible.

Utah State Park's Dark Sky Initiative Coordinator Justina Parsons-Bernstein followed up on this discussion by sending Commissioner Shepherd an email with information on dark sky friendly lighting. See their email exchange below.





374 East Main  
Vernal, Utah 84078  
Phone: (435) 789-2255  
Fax: (435) 789-2256  
[www.vernalcity.org](http://www.vernalcity.org)

August 30, 2017

Board of Directors  
International Dark-Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719-2103

**RE: Accreditation Application for Steinaker State Park.**

Dear Committee Members:

Vernal City is happy to support the application of Steinaker State Park to receive accreditation as an International Dark-Sky Park. Steinaker State Park is known for daytime recreational activities for the residents of our community, and is now hosting star gazing parties to attract night visitors to the Park so they can enjoy the natural beauty of the night sky.

I recently had the opportunity to attend the Utah State Parks Dark Sky Presentation on July 27, 2017 where the importance of dark sky fixtures were explained in more detail and brought to the City's attention the need to review development requirements and change policies to mitigate light pollution while still providing a safe environment for our residents. The City Planner has been directed to begin research to create a new lighting standard for our City in this effort. Natural dark skies are decreasing rapidly and the City is very appreciative of the Utah State Parks employee's efforts to educate everyone so they understand the benefits of dark skies as well as enjoy the wonderment of the night sky.

Again, Vernal City is fully supportive of Steinaker State Park becoming an accredited Dark Sky Park. This designation will help promote our area for tourism which helps our local economy. Vernal City has been diligently working on encouraging visitors to see what Vernal has to offer as well as making our community more active and healthy. The night sky designation will greatly enhance the City's ability to promote our area as a tourist destination and bring visitors to enjoy the Dinosaurland State Parks.

Sincerely,

  
Mayor Sonja Norton

## **Future Commitment to Dark Sky Education, Monitoring and**

**Stewardship** - Steinaker has already decreased the park's minimal nocturnal environment impact by removing, shielding and putting motion sensors and timers on their external lights. Steinaker State Park staff have worked together as a team in this effort. Assistant Manager Josh Hansen and maintenance foreman Tom Hightower helped Manager Mike Murray install the dark sky-enhancing bulbs and fixtures at Steinaker. When Mike retires at the end of December, these team members will continue the park's dark sky friendly practices and education programs.



Assistant Manager Josh Hansen Helps Visitors Enjoy a Steinaker State Park Dark Sky Event

Photo by Bettymaya Foott

Assistant Manager Josh Hansen wrote his undergraduate natural resources special projects research paper on dark sky stewardship. Josh is excited to carry on the dark sky-enhancing practices at the park and stay in communication with the IDA by submitting an annual report detailing the park's continued monitoring of night sky quality and any further efforts made to reduce impact on the area's nocturnal environment. See below Mr. Hansen's letter attesting to his commitment to dark sky efforts at the park.



GARY R. HERBERT  
Governor  
Spencer J. Cox  
Lieutenant Governor

## State of Utah

### DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER  
Executive Director

#### Division of State Parks and Recreation

FRED HAYES  
Division Director

October 21, 2017

To John Barentine and the International Dark Sky Park Review Committee:

I am the Assistant Park Manager for Steinaker and Red Fleet State Parks. As part of management for Steinaker State Park, I pledge to keep the dark sky program going after the current manager, Mike Murray, retires. Also, whenever the park's resource management plan next comes up for revision, I will make sure we add Dark Sky to it as an important natural, cultural and scientific resource that we will continue to steward.

I have a Bachelor's Degree in Recreation Resource Management. One of my degree requirements was to write a research paper about the effects that seeking International Dark Sky Park designation has on a park going through the application process. Through my research, I gained a greater understanding of dark skies benefits to human health and environmental well-being. I was also impressed by the visitation increases and financial benefits brought about by astrotourists who seek out truly dark skies.

On a personal note, I grew up in rural Utah area where truly dark and incredible star-filled skies were a normal part of life. Although I enjoyed looking at the stars, I never understood that these dark skies also contributed to my health.

Approximately three years ago, I moved to a bedroom community of Salt Lake City, Utah. I did not give much thought to not having access to dark skies. While I was completing my research paper on dark sky designation, I started to notice the many negative effects the urban light pollution was having in my own life—including my moods and sleeping patterns.

I am happy that I now live in a rural area again where my children can enjoy dark and starry skies just like I did when I was a kid. They love getting to see planets, falling stars, and constellations and have learned a lot about the importance of dark skies by attending Steinaker State Park's Dark Sky events. The park has purchased an 8" Dobsonian telescope and I am enjoying learning how to find celestial objects with it so I can share that experience with our visitors.

Again, I want to assure you that I will continue monitoring the quality of Steinaker's dark sky and continue educating the public about the importance dark skies as long as I am part of management at the park.

Respectfully,

Josh Hansen  
Assistant Park Manager Steinaker/Red Fleet State Park

Steinaker State Park, 4335 North Highway 191, Vernal, UT 84078-7800



Steinaker State Park is supervised by Southeast Region Manager Tim Smith. Mr. Smith is confident that dark sky monitoring, stewardship and education will continue after Mike Murray departs. See Mr. Smith's letter affirming this sentiment below.



GARY R. HERBERT  
Governor  
SPENCER J. COX  
Lieutenant Governor

**State of Utah**  
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER  
Executive Director

Division of Parks and Recreation

October 23, 2017

To John Barentine and Whom Else It May Concern:

Steinaker Manager Mike Murray contacted me to communicate a concern that had been raised by IDA personnel about whether there would be continued staff support of dark sky stewardship and programming at Steinaker State Park after Mike's retirement at the end of this year.

While Mike has carried out lighting changes and education and programming requirements needed for fulfillment of Steinaker's requested dark sky status, it needs to be noted that this is an agency-driven initiative. Professional and seasonal staff time and a dark sky intern program have been initiated at the Division level to support and promote dark sky designation and programming. Steinaker State Park is in the Southeast Region of the Utah State Park system and SE Region resources have been allocated to purchase and install proper lighting and fixtures.

Given the Region and Division-wide support of the initiative and the appreciative (and financially beneficial) response from visitors at our existing dark sky parks, I am confident we will promote a new manager who will continue dark sky stewardship and programming at Steinaker State Park.

Please feel free to contact me with any further concerns or issues about this matter.

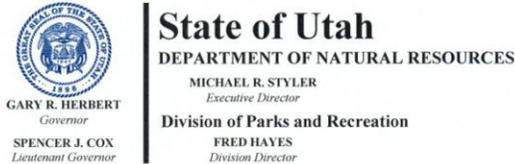
Thank you.

Sincerely,

Tim Smith  
Southeast Region Manager  
Utah State Parks



As stated previously in this application, Utah State Park's leadership enthusiastically supports parks' dark sky efforts. The administration has the expectation that whoever takes over as manager at Steinaker State Park will continue with dark sky monitoring, stewardship and educational programs. See Deputy Director Jeff Rasmussen's letter pertaining to this expectation below.



October 23, 2017

To the Members of the International Dark Sky Park Designation Committee:

Utah State Parks is proud to have three of our parks already designated as International Dark Sky Parks. We are also excited that around a dozen more of our parks are pursuing that designation. We appreciate that our nightscapes attract people from all over the world, many of whom have never before seen the Milky Way or truly dark skies.

Over the last couple of years, Steinaker State Park Manager Mike Murray has worked hard to enhance his park's dark skies through changing his lighting, putting on dark sky education programs, and talking with the public and local civic leaders to gain support for his efforts. We were excited to hear he had actually submitted his Dark Sky Application in September.

Although Mike is retiring in December, it should be known that Utah State Parks staff and Administration and the Board of Utah Parks and Recreation strongly support our parks dark sky stewardship and education efforts. We can assure the IDA certification committee that the person who takes Mike's place as manager of Steinaker State Park will be expected to uphold the park's International Dark Sky Park Designation status by monitoring and stewarding its quality dark skies, maintaining its dark sky friendly lighting and by continuing to host dark sky educational events.

Thank you for your time and consideration of Steinaker State Park's International Dark Sky Park Application. We do hope you find the park worthy of International Dark Sky Park designation.

Sincerely,

Jeff Rasmussen  
Deputy Director  
Utah State Parks



**In Conclusion** - Utah was the first state to have a park designated as an IDA International Dark Sky Park and now has the largest total and greatest variety of parks (national, state and county) with that distinction. Steinaker State Park is strengthening this impressive showing for the state by partnering with Red Fleet State Park and Dinosaur National Monument to create a dark sky stewardship network within the Uintah Basin.

Given Steinaker State Park's natural dark skies, park management's on-going commitment to help preserve and manage its night skies as a valuable natural resource, and the park's ability to help local populations and visitors from around the world learn about the value of dark sky, we ask for, and hope you will grant, the park International Dark Sky Park Silver Tier designation.

## Appendix A

### Steinaker State Park SQM-L Measurements

Locations:	GPS	6-3-16	7-5-16	8-28-16	6-21-17
	<b>Start Time:</b>	<i>10:40 PM</i>	<i>11:50 PM</i>	<i>12:00 AM</i>	<i>12:20</i>
<b>Entrance Boundary</b>	N 40° 32.025' W 109° 31.393'	21.35	21.37	21.25	21.49
		21.35	21.42	21.17	21.54
		21.43	21.37	21.12	21.51
		21.48	21.39	21.13	21.53
	<b>Average Reading:</b>	<b>21.40</b>	<b>21.39</b>	<b>21.14</b>	<b>21.51</b>
<b>Boardwalk Trail Parking</b>	N 40° 32.019' W 109° 31.738'	21.50	21.35	21.09	21.52
		21.36	21.45	21.02	21.54
		21.40	21.34	21.14	21.51
		21.42	21.39	21.22	21.56
	<b>Average Reading:</b>	<b>21.42</b>	<b>21.38</b>	<b>21.12</b>	<b>21.53</b>
<b>Eagle Ride Group Area Entrance</b>	N 40° 31.342' W 109° 32.274'	21.22	21.34	21.19	21.53
		21.41	21.36	21.25	21.54
		21.31	21.28	21.13	21.54
		21.36	21.29	21.14	21.50
	<b>Average Reading:</b>	<b>21.33</b>	<b>21.32</b>	<b>21.18</b>	<b>21.52</b>
<b>Service Road</b>	N 40° 31.277' W 109° 32.420'	21.20	21.31	21.06	21.43
		21.30	21.32	21.09	21.43
		21.33	21.25	21.06	21.47
		21.32	21.27	21.01	21.45

	<b>Average Reading:</b>	<b>21.29</b>	<b>21.29</b>	<b>21.06</b>	<b>21.44</b>
<b>Beach Parking Area</b>	N 40° 30.830' W 109° 32.534'	21.33	21.27	21.05	21.42
		21.32	21.29	21.14	21.44
		21.27	21.38	21.05	21.44
		21.20	21.28	21.13	21.44
	<b>Average Reading:</b>	<b>21.28</b>	<b>21.31</b>	<b>21.09</b>	<b>21.43</b>
<b>Old Pavilion</b>	N 40° 30.887' W 109° 32.482'	21.34	21.60	21.01	21.44
		21.32	21.30	21.10	21.42
		21.29	21.17	21.03	21.43
		21.32	21.23	21.00	21.41
	<b>Average Reading:</b>	<b>21.32</b>	<b>21.33</b>	<b>21.04</b>	<b>21.42</b>
<b>Boat Ramp Accessible Area</b>	N 40° 30.949' W 109° 32.334'	20.68	20.83	20.79	21.35
		20.50	21.06	20.91	21.35
		20.20	20.90	20.94	21.35
		20.66	21.02	20.83	21.39
	<b>Average Reading:</b>	<b>20.51</b>	<b>21.20</b>	<b>20.87</b>	<b>21.36</b>
<b>Cabin</b>	N 40° 31.017' W 109° 32.420'	21.34	21.32	21.12	21.42
		21.36	21.34	21.11	21.40
		21.47	21.27	21.13	21.40
		21.39	21.28	21.11	21.42
	<b>Average Reading:</b>	<b>21.39</b>	<b>21.30</b>	<b>21.12</b>	<b>21.41</b>
	<b>Average Overall Reading:</b>	<b>21.24</b>	<b>21.25</b>	<b>21.08</b>	<b>21.45</b>

	<b>End Time:</b>	12:57 AM	12:19 AM	12:26 AM	1:30 AM
	<b>Lowest Reading:</b>	20.20 @ Boat Ramp Accessible Area	20.83 @ Boat Ramp Accessible Area	20.79 @ Boat Ramp Accessible Area	21.35 @ Boat Ramp Accessible Area
	<b>Highest Reading:</b>	21.50 @ Boardwalk Trail Parking	21.60 @ Old Pavilion	21.25 @ Eagle Ride Group Entrance Area, Entrance Boundary	21.56 @ Boardwalk Trail Parking
	<b>Weather Conditions:</b>	84°/ 70° F Clear	81°/ 72° F Partly Cloudy	70°/ 63° F Passing Clouds	73°/ 64° F Clear after rain
	<b>OVERALL PARK SQM-L Reading Average = 21.26</b>				

## Appendix B

### Letters of Support for Steinaker State Park International Dark Sky Park Designation



United States Department of the Interior

NATIONAL PARK SERVICE  
Dinosaur National Monument  
4545 Hwy 40  
Dinosaur, CO 81610



7.C

April 28, 2017

International Dark-Sky Association  
3223 North First Avenue  
Tucson, AZ 85719

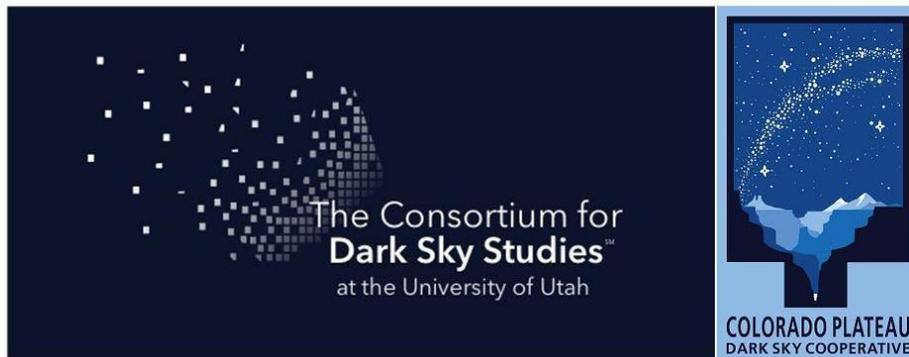
Dear International Dark Sky Association:

I am happy to support Red Fleet State Park near Vernal, Utah for designation as a Dark Sky Park. As the Superintendent of nearby Dinosaur National Monument, the designation of one of our neighboring Utah State Parks helps to not only protect the night sky resources of Dinosaur and the area, but continues the education of our local communities in the importance and protection of this resource.

Recognition and protection of naturally dark skies in northeastern Utah complements efforts in communities around the state to highlight the ecologic, economic and tourism benefits of darkness. Dark Sky Park designation of Red Fleet State Park will help the community and visitors see Dinosaurland as a unique destination for viewing both fossil-filled rocks and star-studded skies.

Sincerely,

Mark A. Foust  
Superintendent



September 5, 2017

Board of Directors- International Dark Sky Association  
3223 North First Avenue  
Tucson, Arizona 85710-2103

To the International Dark Sky Association (IDA) Board of Directors:  
The Colorado Plateau Dark Sky Cooperative and Consortium for Dark Sky Studies are pleased to announce their support to designate Steinaker State Park as an International Dark Sky Park. Steinaker State Park's dazzling starry skies provide excellent opportunities for dark sky education for boaters, hikers, campers, and the surrounding community. Natural darkness is disappearing quickly, with 99% of the population of the USA and Europe living under light polluted skies. Because of this astonishing figure, it's imperative that Steinaker State Park officials act to protect the rare dark skies protected in its boundaries, as they host one of the last remaining areas of natural darkness in the developed world. Steinaker State Park hosts multiple night sky themed events throughout the year, at least 4! And they have a great group of local volunteers to help them out. They also can draw on support from Red Fleet State Park and Dinosaur National Monument officials, also working on their own respective dark sky park applications. The hub for dark skies around Steinaker is growing, and Steinaker's efforts are a large part of dark sky conservation in the area. The Colorado Plateau Dark Sky Cooperative fully supports Steinaker State Park's Dark Sky Park application to the International Dark-Sky Association - for its pristine night skies and contributions to dark sky education and protection.

Sincerely,  
Bettymaya Foott  
Coordinator, Colorado Plateau Dark Sky Cooperative  
darkskycooperative@gmail.com  
c. 435-260-9540  
cpdarkskies.org  
darkskystudies.org



**Uintah County Travel & Tourism**  
**152 East 100 North Vernal, Utah 84078**  
**435-789-6765 or 800-477-5558**  
**www.dinoland.com**

Board of Directors  
International Dark-Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719-2103

Re: Accreditation Application – Steinaker State Park

To the IDSP Accreditation Committee Members:

The Uintah County Travel and Tourism Office supports Steinaker State Park's application for accreditation as an International Dark-Sky Park. We believe that this designation will help inform people of the inspiring night skies that can be enjoyed in Uintah County. This will attract more national and international visitors and have a positive effect on the economy.

Steinaker State Park is a reservoir and campground surrounded by scenic desert steppe landscape. Steinaker State Park is ideal for water sports but night visitors are rewarded with magical starry skies once the sun goes down. Park visitors are able to enjoy undisturbed views of the Milky Way in a secluded campground. Park staff is committed to protecting the natural night sky and has created a monthly night sky education program for the public. We hope that with an International Dark-Sky Park designation Steinaker State Park will continue to cultivate a program that will bring awareness to our night sky heritage and attract visitors that can enjoy the many daytime activities and the stars at night.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read 'Lesha Colthorp', is written over a light blue horizontal line.

Lesha Colthorp  
Director of Uintah County Travel and Tourism

**Vernal Area Chamber of Commerce**

134 West Main \* Vernal, Utah 84078



(435)789-1352  
Fax (435)789-1355

November 4, 2016

Board of Directors  
International Dark-Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719-2103

Re: Accreditation Application – Steinaker State Park

To: The IDSP Accreditation Committee

The Vernal Area Chamber of Commerce would like to support Steinaker State Park's application for accreditation as an International Dark-Sky Park. We believe through this accreditation people will become better informed about the beautiful night skies that can be enjoyed in Uintah County. This will attract more visitors nationally and international to this area and have a positive impact on the economy.

Visitors to Steinaker State Park currently enjoy a reservoir and campground surrounded by impressive red sandstone hills and canyons. Daytime activities attract many visitors but once the sun sets visitors are privileged to view a spectacular panorama of night time starry skies including the Milky Way, which is not seen in many parts of the world today. Park staff is committed to helping visitors enjoy the wonders of the night sky and currently provide a monthly night sky education program to assist the public to better appreciate the beauty of the night. We hope this designation will help the Park continue to promote the wonders of the night and encourage visitors to not only enjoy the day time activities but the beauty of the night also.

Thank you for your consideration.

Sincerely yours,

  
Joel V. Brown  
Executive Director  
Vernal Area Chamber of Commerce  
134 West Main Street  
Vernal, Utah 84078  
435-789-1352

[www.vernalchamber.com](http://www.vernalchamber.com) \* [vchambermgr@easilink.com](mailto:vchambermgr@easilink.com)

***"Good for Business, Good for the Community"***



# UINTAH COUNTY

STATE OF UTAH

*Our Past is The Nation's Future*

COMMISSIONERS:

Michael J. McKee  
William C. Stringer  
Brad G. Horrocks

ASSESSOR - Barbara Simpar  
ATTORNEY - G. Mark Thomas  
CLERK-AUDITOR - Michael W. Wilkins  
RECORDER - Brenda McDonald  
TREASURER - Wendi Long  
SHERIFF - Vance Norton  
SURVEYOR - John Slaugh

Board of Directors  
International Dark-Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719-2103

Re: Accreditation Application – Steinaker State Park

To the IDSP Accreditation Committee Members:

The Uintah County Commission Office is pleased to support Steinaker State Park's application for accreditation as an International Dark-Sky Park. In Uintah County, pristine views of the Milky Way are not difficult to find and Steinaker State Park's night skies are a must see that will not disappoint. Steinaker State Park is a reservoir/campground that attracts many day visitors but nighttime visitors are rewarded with spectacular vistas of the night sky. Steinaker State Park is also conveniently located close to Vernal City and magical starry skies are readily accessible to residents and tourists. We believe this designation will provide many economic, conservation and education opportunities for Uintah County.

Classifying Steinaker State Park as a dark sky park will promote local ecotourism by attracting nature tourists who bring money to spend, money that will help create jobs and incomes for residents of Uintah County. In addition to stimulating the economy, a dark sky designation will help locals and tourists foster awareness and deeper connections to the wild night sky. The park staff is committed to protecting the nocturnal beauty at Steinaker and has created a night sky education program for the public. This program will encourage visitors to recognize natural darkness as a valuable natural resource and increase public stewardship of the night sky. Individuals will begin to choose lighting that mitigates light pollution and as a community we have already installed lights that reduce skyglow. Steinaker State Park has also changed all lighting in the park so visitors can enjoy an uninhibited view of the stars. As a commission office we value the night skies in Uintah County and we are supportive of this prestigious recognition.

Thank you for your consideration.

Sincerely,

Bill Stringer  
Uintah County Commissioner



GARY R. HERBERT  
*Governor*  
SPENCER J. COX  
*Lieutenant Governor*

**State of Utah**  
DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER  
*Executive Director*

**Division of State Parks and Recreation**

FRED HAYES  
*Division Director*

22 March 2017

Board of Directors  
International Dark-Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719-2103

Dear Accreditation Committee:

I am writing this letter in support of Steinaker State Park's application for accreditation as an International Dark-Sky Park. Growing up in the city of Chicago very few stars were visible to me and other than those individuals who visited the planetarium, hardly anyone even mentioned the stars. As an adult who now lives and works in an area that has dark skies, I greatly appreciate the ability to go a few miles out of town and view the heavens.

My family and I have attended educational star programs at Steinaker State Park and I can attest to the beauty of a dark sky and the opportunity to learn about it. The park staff continues to make improves to protect the night skies and is dedicated to continuing the educational programs.

As Park Manager of the local natural history museum and the official Vernal Information Center, I know that both United States and International Visitors marvel at the openness and dark skies out of town. With your help of designating Steinaker State Park as an International Dark-Sky Park we can not only enhance the visitors experience, but also educate them and local officials about the value of dark skies. I am also willing to promote any programs the Park Staff provides.

Sincerely,

Dr. Steven D. Sroka  
Park Manager



## Friends of Utah State Parks Resolution of Support



## Friends of Utah State Parks

### Resolution to Support Utah State Parks International Dark Sky Parks Designations

**WHEREAS** Utah is leading the world in the Dark Sky Designation Initiative,

**WHEREAS** Many of Utah's state parks have the darkest skies in the United States,

**WHEREAS** Many parks are interested in pursuing International Dark Sky Park Designation,

**WHEREAS** Several of Utah's State Parks recognize and promote the importance of dark skies,

**WHEREAS** Many of Utah State Parks desire to provide visitors educational programs that will enhance their appreciation of dark skies,

**THEREFORE, BE IT RESOLVED** The Friends of Utah State Parks supports the efforts of appropriate state parks in pursuing International Dark Sky Designation and to manage and enhance this resource for the enjoyment and education of park visitors.

**Passed Unanimously 5/25/2016**

## **Appendix C**

Utah State Parks Lightscape Management Plan

# **Utah State Parks Lightscape Management Plan for Parks Seeking, or Having Obtained, International Dark Sky Park Designation**

Contributors Bettymaya Foott and Justina Parsons-Bernstein

Edited by Justina Parsons-Bernstein

## **Introduction**

Dark Skies are becoming increasingly rare. Utah State Parks contain some of the darkest night skies in the United States and are in a unique position to help the public learn about, enjoy and help steward this natural resource. Therefore, many of our parks have decided they want to attain International Dark Sky Park designation and are committed to effective lighting management, dark sky programming and public outreach. This Lightscape Management Plan (LMP) has been adopted by Utah State Parks that are pursuing, or have obtained, International Dark Sky Park designation. This plan emphasizes beneficial lighting practices that will optimize these parks' naturally dark nighttime environments without compromising safety. This responsive lightscape management will enhance visitor enjoyment and night sky programming.

## **Philosophy**

Light will be used where and when needed to keep visitors and staff safe, but tempered, timed and directed so as to not unduly disturb the natural darkness of the park.

## **Guidelines**

All Utah State Parks' construction and remodeling projects must adhere to Utah Division of Facilities Construction and Management (DFCM) guidelines. These guidelines can be viewed in their entirety at this link:

[https://dfcm.utah.gov/wp-content/uploads/design\\_requirements.pdf](https://dfcm.utah.gov/wp-content/uploads/design_requirements.pdf)

The DFCM electrical guidelines are amenable to dark sky-friendly lighting practices. Specifically, pertaining to lighting, the guidelines state:

#### A. Lighting

(2) Light Pollution Reduction: Use full cut-off outdoor lighting fixtures for luminaries with more than 3,000 lumens and locate so that the maximum candela value falls within the property. Provide shielding or controlled distribution for any luminaries within a distance of 2.25 times its mounting height from the property boundary so that minimal light from the luminaire illuminates past the property boundary. Interior lighting shall be positioned so that the maximum candela value does not fall outside the interior space, such as out through a window). [1]

#### E. Light Pollution Reduction

- 1) Use fixtures that as low in height as feasible, to ensure light is at the appropriate location for pedestrian safety and functionality.
- 2) All exterior lamps shall be LED.
- 3) Lighting values greater than 0.01 fc shall not extend beyond twenty feet over the defined site boundary, except as required by the municipality for pedestrian safety.
- 4) Exterior lighting shall be controlled by a photocell sensor.
- 5) All interior lighting systems shall be designed and controlled to shield interior light from the exterior of the building, or include a 50% reduction in lighting output between the hours of 11:00 pm and 5:00 am. [2]

The DFCM energy guidelines also require all facilities to save energy wherever possible:

#### A. Energy Performance

- 1) All state agencies and institutions shall design new construction and major renovation, commercial and multi-family high-rise buildings (Proposed design) to achieve, if lifecycle cost-effective, an energy cost performance 20% below the energy cost performance of the corresponding Baseline design as determined by a DFCM hired Energy Engineer. [3]

The dark sky-enhancing lighting emphasized in this plan will save energy and reduce park operation costs over time by removing and replacing redundant and inefficient light fixtures.

## **Practical Applications**

### **A. Meeting IDA Dark Sky Compliant Light Fixture Percentages**

1. Maintenance staff at Utah State Parks that are pursuing International Dark Sky Park designation will help parks attain their original 67% dark sky compliant lighting fixture goal at time of application.
2. Maintenance staff will continue to convert park bulbs and fixtures to reach 90% dark sky lighting guide compliance within five years of International Dark Sky Park designation.
3. Maintenance staff will continue to convert park bulbs and fixtures to reach 100% compliance within 10 years of designation.

### **B. Park Evaluation of Whether, Where and When Lighting Is Needed**

1. When undertaking a lighting project, staff at parks that are seeking or have obtained International Dark Sky Park designation should consider the following:
  - a. Is this light truly needed? If the light is not needed, take it down. If the light is needed, and if safety considerations allow, consider putting the light on a timer, dimmer or motion sensor to minimize lighting impact.
2. Park lighting after 10 pm, or other appropriate post-curfew hour, should be restricted to low-intensity lighting needed to direct people.
3. Egress lighting on buildings should be on motion sensors, or otherwise shut off by 10:00 p.m. or after other appropriate lighting curfew hour.
4. Parking lots should only be illuminated during hours that they are expected to be used, such as business hours for office building parking lots. If night programming requires parking lots to be illuminated after normal business hours, the lights should be turned off after programming ends. Parking lots should not be lit all night long.
5. Roadways within the park under the control of park staff should conform to lighting curfew hours where possible. Exceptions to this standard include intersections, crosswalks and other conflict zones and safety considerations. After buildings are closed to the public, they should have all lights turned off until operations begin the next day.
6. If park staff are working later hours, please close window shades to minimize light trespass from indoor offices, and ensure all lights are off after last employee leaves.

7. Make sure the amount of light used is appropriately matched to the task.
8. Use the minimum level of lumens necessary to properly address safety concerns.

### **C. Evaluating if a Light Should Be Shielded**

1. For lights above 500 lumens, fully shielded fixtures should be standard. No light should issue from any portion of a fixture above a plane running through the lowest part of the fixture to the ground, inclusive of any reflecting or refracting optics. Be aware of shielded lights brightening a wall and causing glare or light trespass.
2. Unshielded lights should be used in conjunction with timers or dimmers. (IDA may request more photos of light and an explanation as to why a light need to be unshielded. For instance, a jurisdiction that supersedes Utah State Parks jurisdiction may have different lighting requirements that must be enforced.)
3. Shielding of all lights is recommended, irrespective of the number of lumens, in every case where it is practically possible.

### **D. Evaluating Light Bulb Color/Temperature**

1. Artificial lighting with high correlated color temperatures (CCTs) is known to cause adverse effects to human health and ecology. It is best to use lighting with the lowest CCT possible to enhance natural night skies and minimize harmful effects.
2. The CCT of permanently-installed lighting should not exceed 3000 Kelvins unless specific requirements dictate otherwise.
3. The preferred lighting technology to minimize ecological harm in parks is low-pressure sodium vapor or narrowband amber LEDs. Other types of lighting should only be used where specific circumstances warrant.
4. “Energy efficient” does not mean always mean “dark sky friendly.” Use the best lamp for the task, inclusive of such characteristics as energy efficiency.

## Illumination References

Illumination guidelines tables, from IDA Guidelines for Outdoor Lighting (GOL) link for most current version of GOL: <http://www.rasc.ca/dark-sky-site-guidelines>

## Endnotes

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[1] [https://dfcm.utah.gov/wp-content/uploads/design\\_requirements.pdf](https://dfcm.utah.gov/wp-content/uploads/design_requirements.pdf), p. 12.

[2] *Ibid.*, p. 51.

[3] *Ibid.*

### Adoption of Lightscape Management Plan by

Steinaker State Park

Park Manager Name Mike Murray

Park Manager Signature Mike Murray

Date 9/2/2017

Maintenance Lead Name Tom Hightower

Maintenance Lead Signature [Signature]

Date 9-2-17

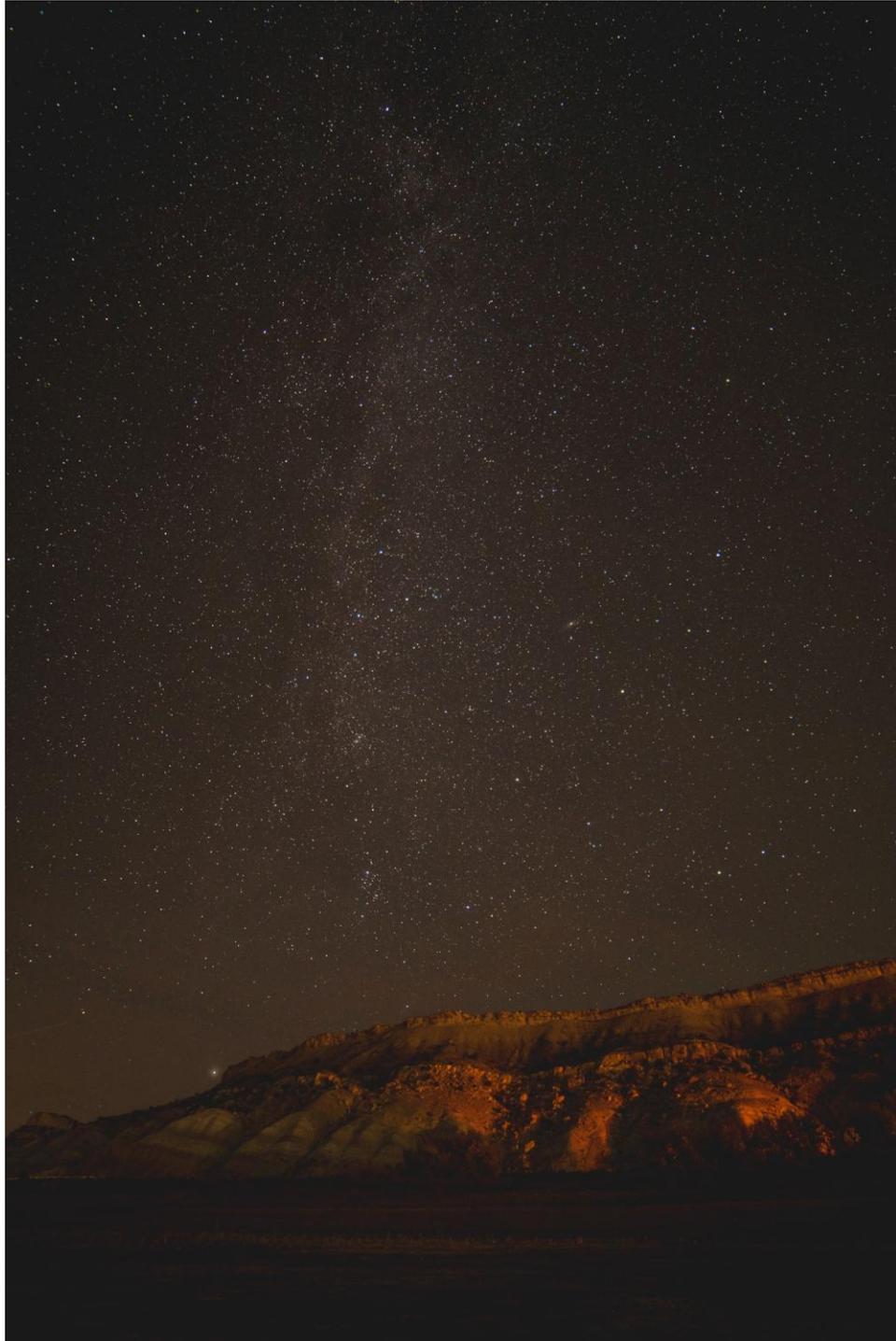
# Appendix D

## Steinaker State Park Lighting Inventory

STEINAKER LIGHTING INVENTORY							
Building Name	Type of Light	Photos	# of Lights	Purpose	Conforms to LMP	Full Cutoff	Anticipated Date Slated for Change to LMP Compliance
Main Camp-ground Bathroom	Full Cutoff Fixtures Under Eaves with Warm White 2700 K/800 L Bulbs		2	Lights bathroom egress	Yes	Yes	
Cabin, Site #10	Porch light within porch covering with Warm White 2700 K/800 L Bulb		1	Lights cabin egress	Yes	Yes	
Boat Ramp Parking Area Bathroom	Full Cutoff Fixtures Under Eaves with Warm White 2700 K/800 L Bulbs		2	Lights bathroom egress	Yes	Yes	
Fish Cleaning Station	Warm White 2700 K/800 L Bulbs under full canopy on timer with hard turn off at 10:00 p.m.		4	Safety at Fish Cleaning Station	Yes	Yes	

Office/ Entrance Station	Lights under building eaves retrofitted with blockouts to direct light downward. Bulbs are warm white 2700 K/800 L bulbs		3	Lights at front of building, entrance and ice machine to protect from theft	Yes	Yes	
Shop Lights	Full Cutoff with Warm White 2700 K/800 L Bulbs		3	Security Lights for Shop Equipment	Yes	Yes	
Flag at Entrance Station	Solar Flagpole Poletop Partial Cutoff Downward light		1	Lights Flag	No	No	In September 2017 this top down partial cutoff light replaced two ground level upward spotlights. Staff will retrofit a full cutoff fixture extension by Fall 2018.
Boat Ramp Light	Lamp Post Light		1	Public Safety in Boating Ramp Area	No	No	Light Pole Will Be Removed and Light Changed to Solar Full Cutoff in Fall 2017.
		<b>Total Outdoor Light Fixtures</b>	<b>17</b>				
		<b>Total Full-Cutoff Fixtures</b>	<b>15</b>				
		<b>Total Non-Full Cutoff Fixtures</b>	<b>2</b>				
		<b>% of Outdoor Lights that are Do Not Conform to LMP</b>	<b>12%</b>				
		<b>% of Outdoor Lights that Conform to LMP</b>	<b>88%</b>				

## Parting Shot – Milky Way Over Steinaker State Park



Milky Way Over Steinaker State Park, October 23, 2017 by Dark Sky Program Volunteer Tom Howells