

Staunton River State Park

International Dark Sky Park Silver Tier Application

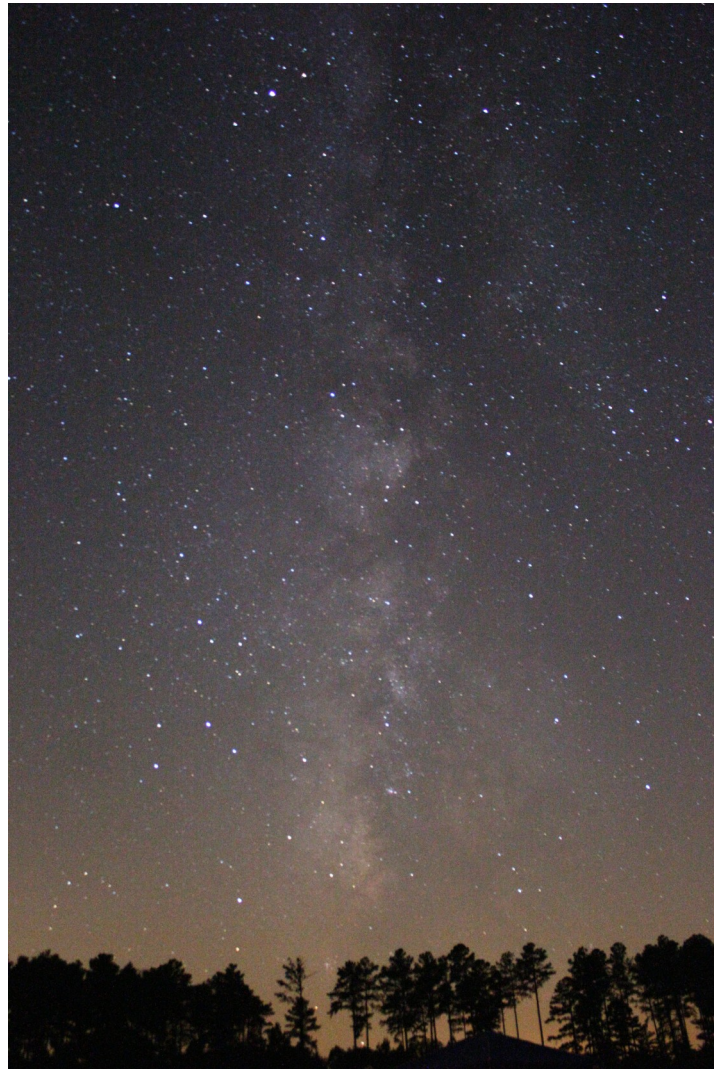


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COMMONWEALTH of VIRGINIA

Office of the Governor

Molly Joseph Ward
Secretary of Natural Resources

October 29, 2014

International Dark Sky Association
3223 N. First Avenue
Tucson, Arizona 85719

Dear International Dark Sky Association Board of Directors:

As Secretary of Natural Resources for the Commonwealth of Virginia, I write you today to express my strong support of Staunton River State Park's efforts to receive Dark Sky Park designation. Staunton River is located within a three-hour drive of major metropolitan areas such as Richmond and the Tidewater area of Virginia, and Raleigh, Durham, Chapel Hill, and Cary in North Carolina, yet is secluded enough to provide an exceptional dark sky experience for amateur and professional stargazers. A resource like this park is a key tool in bringing an appreciation for the night sky and astronomy to citizens, students, and visitors.

As you are well aware, the opportunity to see the night skies in their natural state is decreasing, which is why we must protect the areas where dark sky viewing conditions exist. Staunton River State Park has worked to do that in its region through local government engagement. Presently, the town of Halifax has adopted a light pollution management ordinance, and park staff is currently in productive dialogue with the Halifax County Administrator on passage of a similar ordinance there.

The Virginia General Assembly approved an update in July 2014 to the park's Master Plan which includes upgrades to the observing field to make it more user-friendly for astronomers. The park maintains a strong relationship with the Chapel Hill Astronomical and Observational Society and co-hosts of the Staunton River Star Party. One of park staff's key duties is making sure that the needs of astronomers are met and that quality night sky interpretive programming is offered to park guests.

All of these factors combine to make Staunton River State Park an excellent candidate for Dark Sky Park designation. I respectfully request that Staunton River State Park is given full consideration for designation as a Dark Sky Park.

Sincerely,

A handwritten signature in black ink that reads "Molly Ward".

Molly Joseph Ward

Patrick Henry Building • 1111 East Broad Street • Richmond, Virginia 23219 • (804) 786-0044 • TTY (800) 828-1120

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director



Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration
and Finance

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804)786-6124

February 3, 2015

International Dark Sky Association
3223 N. First Avenue
Tucson, Arizona 85719

Dear Board of Directors,

As Park Manager of Staunton River State Park, I fully endorse the park's bid to become certified as a Dark Sky Park through your organization. Staunton River State Park has become a leader in dark sky preservation in Southern Virginia, and is an excellent candidate for this designation.

Staunton River State Park's efforts in education have introduced discussion by county supervisors, town councils, and Virginia State Park leaders about enacting policies and procedures that ensure future dark sky preservation throughout our region and state. Our commitment to educating our guests on all of the natural resources we protect, including our dark skies, and providing guests numerous opportunities to experience them is the basis of our operations. With our unique location, being centrally located on the east coast with a population of 42,000,000 within a 300 mile radius, we have the opportunity to become an easily accessible and welcoming destination to view and learn about the night sky.

As natural resource managers, we are tasked with preserving and enhancing our natural resources, as well as providing access and educational opportunities for guests to learn about and experience them. The staff of Staunton River State Park is dedicated to doing just that with the most awesome of natural resources, our dark skies, and will continue to set the example for our region, agency, and state on dark sky preservation.

I respectfully ask that you give Staunton River State Park's application for Dark Sky Park certification your full consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Adam W. Layman".

Adam W. Layman
Park Manager, Staunton River State Park

*State Parks • Soil and Water Conservation • Outdoor Recreation Planning
Natural Heritage • Dam Safety and Floodplain Management • Land Conservation*



December 29, 2014

Dear IDA Board of Directors,

As a member of the International Dark-Sky Association, the President of the Chapel Hill Astronomical Observational Society (CHAOS) and the organizer of the Staunton River Star Party held at Staunton River State Park, I would like to nominate Staunton River State Park for Dark Park Status.

Staunton River State Park offers some of the last remaining dark skies on the east coast. Uniquely geographically placed on the western-most point of Kerr Lake bordering Virginia and North Carolina, the park has managed to maintain dark skies. Light domes for surrounding municipalities are minimal on the horizons.

The park's management has attended County and Town Commissioner meetings stressing the effects of light pollution and the need for proper lighting ordinances to protect the parks natural beauty and night skies. County Supervisors have expressed a desire to enact light pollution mitigation ordinances from what they have learned from park staff presentations. The town of South Boston has also expressed the desire to follow suit.

The enthusiasm of the park's management has not been limited to just the region of south central Virginia. Because of their enthusiasm and the high praises given to the staff by the attendees of the Staunton River Star Party, the efforts to preserve the night sky have reached to the capital, Richmond, Virginia. The State's Department of Parks and Recreation is now on board to begin a policy of installing dark sky friendly lighting in new facilities and explore the possibilities of converting existing lighting as funds allow.

As President of CHAOS, it has been a pleasure to work with the staff at Staunton River State Park to establish astronomical observing sessions over the summer and co-hosting the Staunton River Star Party. Working together, we are entering our fifth year of partnership.

The Staunton River Star Party is becoming one the premier star parties on the east coast. This is because of the enthusiasm of the park staff and their commitment to preserve the dark skies.

During the October 2013 star party, average SQM readings of 21.18 and 21.32 were recorded on October 2 and 3 respectively. During the October 2014 event meter reading were as follows; October 22 - 20.98, Oct. 23 - 21.12 and Oct. 25 - 21.16. We have also installed a SQM-LE at the park for continues metering.

Because of Staunton River State Park's commitment to preserve their wonderful night skies I wholeheartedly encourage the International Dark-Sky Association to grant Dark Park Status to Staunton River State Park.

Jayne Hanzak
President of CHAOS

TIM KAINÉ
VIRGINIA

COMMITTEE ON
ARMED SERVICES

COMMITTEE ON
FOREIGN RELATIONS

COMMITTEE ON
THE BUDGET

WASHINGTON OFFICE:

WASHINGTON, DC 20510-4607
(202) 224-4024

United States Senate

WASHINGTON, DC 20510-4607

March 11, 2015

International Dark Sky Association
3223 N 1st Ave
Tucson, AZ 85719-2103

Dear Mr. Dougherty:

I write to support the effort by Staunton River State Park to gain designation as a Dark Sky Park. Staunton River State Park has worked diligently to offer park guests the opportunity to learn about and observe the night sky in its natural state and is quickly becoming a prime destination for astronomers on the east coast. I support protecting this treasure so future generations can enjoy it in its most natural state.

Staunton River has developed a strong relationship with the Chapel Hill Astronomical and Observational Society (CHAOS) to provide quality night sky programming to its guests. Observing sessions are offered throughout the summer season, as well as special opportunities during unique night sky events. CHAOS and the Park host two yearly "Star Parties," and CHAOS has recently donated two telescopes to the Park that can be loaned to park guests so that they may experience the Park's night-time wonders.

The Virginia Department of Conservation and Recreation has actively worked to preserve the exceptionally dark skies at Staunton River. The Park has upgraded to dark sky-friendly lighting at its Visitor Center, rental cabins, and park residences, and will soon install this lighting at its remaining facilities. Park staff has also worked diligently with surrounding communities and local governments to structure policy that preserves dark skies throughout the region.

I am proud that my administration preserved 100,000 acres of open space during each of my four years as Governor of Virginia, as well as created three new state parks, six new state forests, and thirteen natural area preserves. I have long believed open space preservation bolsters quality of life while supporting recreational tourism and local economies.

I applaud the efforts of Staunton River State Park in becoming a Virginia leader in dark sky preservation, as well as your organization's role in protecting our treasured natural resources. I again encourage you to consider Staunton River State Park's application for dark sky status.

Thank you very much for your consideration. If you have any further questions, please feel free to contact Chris Collins at Chris.Collins@kaine.senate.gov.

Sincerely,



Tim Kaine

Laura Greenleaf
7421 Hill Drive, Richmond, VA 23225

February 16, 2015

International Dark-Sky Association
3223N. First Avenue
Tucson, Arizona 85719

Dear IDA Board of Directors:

As co-leader of the Virginia chapter of IDA I am pleased to endorse the application by Staunton River State Park (SRSP) for Dark Sky Park status and I wholeheartedly recommend approval of the park's certification.

As a lifelong Virginian I have witnessed the degradation of the of the commonwealth's night skies over recent decades. Virginia's population has nearly doubled in the past 45 years and the rate of development has far outpaced the rate of population. As in the rest of the United States, light pollution has not just spread in geographical range but also in its intensity. Millions of Virginians as well as out of state visitors depend on our state park system to immerse themselves in the beauty of Virginia's extraordinarily diverse natural resources which should include a natural nighttime environment and dark, starry skies.

The management of SRSP, the Chapel Hill Astronomical Observational Society, and leaders in surrounding localities recognize the park's night skies as the natural resource that they are and have dedicated themselves not just to protecting them, but to sharing them widely. I am not an astronomer and have spent much of the past three and a half years engaged in light pollution education and advocacy with broad audiences beyond the astronomy community. I can attest to the public's growing concern about light pollution and desire for action. Staunton River State Park stands to serve as a role model for the state park system as a whole and those parks that already have an existing relationship with a local astronomy club. Successful collaboration with community neighbors, educational outreach to park visitors, and expansion of 'dark sky tourism' have the potential to influence public awareness and action throughout the commonwealth. I am particularly impressed that their approach to lighting in the park constitutes a fundamental shift that addresses unnecessary lighting and demands credible justification for any use of lighting.

Virginia enshrines its commitment to natural resource conservation in its state constitution, article XI, section 1 of which states: ". . . it shall be the Commonwealth's policy to protect its atmosphere, lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth." Certification of Staunton River State Park as a Dark Sky Park will be a watershed moment in the history of conservation in Virginia when we begin to extend that oath to include our night skies.

Sincerely,

Laura Greenleaf, co-leader
Virginia chapter, International Dark-Sky Association



P.O. Box 10643
Raleigh, NC 27605

International Dark Sky Association (IDA)
3223 N. First Avenue
Tucson, Arizona 85719

February 2, 2015

Dear IDA Dark Sky Places Committee,

The Raleigh Astronomy Club (NC) strongly supports the efforts of Staunton River State Park, a member of the Virginia State Parks system, to obtain an IDA Dark Sky Park designation. Staunton River State Park is located about 80 miles and a 95 minute drive north of the Raleigh-Durham metropolitan area. Sky conditions at Staunton River State Park are among the best for astronomy in the region. In our experience, within a reasonable drive of Raleigh, only Pettigrew State Park (NC) and Grayson Highlands State Park (Va) meet or exceed the quality of the outstanding dark skies at Staunton River.

Apart from the sky quality at Staunton River, as a factor in this recommendation, is the dedication of park staff to conserving and improving the dark skies in their area. The park's staff is very supportive of astronomy activities and is aware of the lighting practices required to protect our night skies. Moreover, park staff and the Chapel Hill Astronomical Observational Society (CHAOS) have been successful in promoting better lighting practices in surrounding communities and raising local awareness of the benefits of dark night skies. Granting a Dark Sky Park designation will provide some recognition and momentum for their efforts at Staunton River.

We hope you will give Staunton River State Park your fullest consideration for an IDA Dark Sky Park designation. We feel that DSP is well deserved at Staunton River and will help the park secure darker night skies for us there both now and into the future.

Yours truly,

Chris Cole
dcoole421@yahoo.com
Co-Chairman
Raleigh Astronomy Club

Michael Keefe
mike@siriusastronomy.org
Co-Chairman
Raleigh Astronomy Club

Brian Reasor
breasor1@nc.rr.com
Co-Chairman
Raleigh Astronomy Club



**Richmond
Astronomical
Society**

International Dark Sky Association
3223 North First Avenue
Tucson, Arizona 85719

March 8, 2015

To whom it may concern:

As president of the Richmond Astronomical Society, located in Richmond, Virginia, I am writing to express the support of our organization for the Staunton River State Park to be designated as a Dark Sky Park.

The Richmond Astronomical Society is a non-profit organization that has served the central Virginia area since 1949. Our members support local amateur astronomy and use astronomy as a vehicle to promote science education. We host public observing events where we provide unique views of the night sky to our guests, many of whom have never seen astronomical objects through a telescope. We use these opportunities to provide informal astronomy education and to help our guests understand the importance of maintaining dark skies so that we can continue to experience and learn from these amazing views.

We believe that designating the Staunton River State Park as a Dark Sky Park will represent an important step in preserving our regional dark sky resources and we applaud and appreciate the efforts of the Park staff and management in requesting the designation.

Staunton River State Park has supported local astronomy and astronomy outreach education by hosting the now twice annual Staunton River Star Party. This star party is growing in popularity and has directed attention of local communities to the value of dark skies as a resource that must be preserved in order to make it possible for park visitors to view a clear dark sky with minimal interference from light pollution. Maintaining this local community focus on preserving the dark sky as a resource is, in our opinion, the best way to ensure broad support for preservation of dark skies in the region. The work of the Staunton River State Park leadership is central to maintaining this focus. Designating the park as a Dark Sky Park will support their ongoing efforts and will enhance their ability to secure continuing support from surrounding localities.

The Richmond Astronomical Society requests that the International Dark Sky Association lend its support to this effort by recognizing Staunton River State Park as a Dark Sky Park. Such recognition by the IDA will support our mutual efforts to provide astronomy outreach education and to enhance our collective appreciation of the night sky.

Sincerely,

A handwritten signature in cursive script that reads "J. A. Browder". The signature is written in dark ink on a light-colored background.

J. A. Browder
President, Richmond Astronomical Society

Gilbert F. Moore
Mayor

Carl Espy, IV
Town Manager

Council
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R.E. Duffey
S.J. Dunavant, Jr.
V. K. Johnson
J.B. Powell
D.G. Witt

Town of Halifax
Post Office Box 627
Halifax, Virginia 24558
(434) 476-2343



November 26, 2014

International Dark Sky Association (IDA)
3223 North First Avenue
Tucson, Arizona 85719

To Whom It May Concern:

As Town Manager for the Town of Halifax which has served as the County Seat for over two centuries, it is my pleasure to offer this letter of support for the Staunton River State Park's efforts in achieving recognition as an International Dark Sky Park through the IDA. Successful dark sky certification for the Park will foster active preservation of our night sky as a compatible tool with the development of our built environment while providing recreational and educational opportunities for the general public along with encouraging residents, businesses and visitors in our area to become more attuned to "dark adapting" our society and economy.

In 2006, the Halifax Town Council adopted design guidelines as part of our Zoning Ordinance for signs and lighting in conjunction with our ongoing physical and economic revitalization project efforts. The Town Code was also updated to include an Outdoor Lighting Control Article intended "to control light trespass, minimize the detrimental effect artificial outdoor lighting has on astronomical observations and encourage good lighting practices such that lighting systems are designed to conserve energy and costs, while providing for nighttime safety, utility, security and productivity." Due to the incredible cooperation between State Park staff and various amateur astronomy groups, most notably the Chapel Hill Astronomical and Observational Society (CHAOS), our county elected officials are becoming increasingly aware of how exceptional the dark sky conditions are in our area as the Staunton River Star Party continues to draw hundreds of participants throughout the eastern seaboard. Park staff maintain a dialogue with the town and county to work together on phasing in shielded attachments at public building locations before the Halifax County Board of Supervisors may formally adopt any new codes or ordinances. To date, five new businesses, one church, one industry and six public buildings are dark sky compliant.

By embracing opportunities for a brighter economic future with the preservation of an unimpeded night sky, along with building ecological stewardship, education, natural heritage tourism and low-impact recreation as transformational solutions for our distressed rural communities, this region will be guided by a vision for sustainable development in harmony with our surroundings above and below. Dark Sky certification for the Staunton River State Park will serve as a beacon of this civic foresight.

Respectfully Yours,

Carl Espy, IV
Halifax Town Manager

CE/ce





HALIFAX COUNTY BOARD OF SUPERVISORS

1030 Cowford Rd, Ste. LL1
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JAMES M. HALASZ
County Administrator
jmh@co.halifax.va.us

January 28, 2015

Mr. John Barentine
International Dark Sky Association
3223 North First Avenue
Tucson, AZ 85719

Dear Mr. Barentine:

As Halifax County Administrator I would like to comment on the application from the Staunton River State Park for designation as a Dark Sky site. The work done by the Park and staff to welcome the various astronomy groups and individuals to the Park for the purpose of astronomical observations is both impressive and meaningful. Not only has the Park adapted its operations and staffing to accommodate these visitors to the Park and Halifax County, they have also begun to educate and share with Halifax residents about the tremendous resource we have in our night sky. The Park with the support of the astronomy groups and clubs have begun to reach out to our schools, local governments and businesses in support of the Dark Sky activities and events at the Park; and for support to keep our skies dark at night.

Due to their educational activities, Halifax County is reviewing the steps we can take to retain and improve the low light conditions that make Staunton River State Park such a fine location for viewing the night skies. The County itself has already taken small steps to retrofit several of our facilities and schools to shield many existing fixtures or installed new 100% cut-off fixtures. We are also reviewing the Model Lighting Ordinance provided by the IDA and I anticipate that the County will certainly approve many of the provisions in the model for new and replacement lighting uses in the County.

Halifax County has been blessed with excellent natural conditions for viewing the night skies and with minimal development in the County we also do not have to contend with man-made conditions that obscure viewing of the night skies. Halifax County also has many other outdoor and natural resources that we share with our visitors and these resources too can be better preserved and protected with lighting standards that reduce or mitigate the spread of light pollution. Halifax County; through our Tourism and Zoning Offices, through my office and the Board of Supervisors are committed to protecting and promoting these natural resources; and ultimately sharing them with our visitors and guests. Halifax County strongly supports the application from Staunton River State Park and we are proud to be a partner with the Park and the astronomical community in preserving, promoting and sharing our night skies for generations to come.

If I can be of any assistance now or in the future, please let me know how I can help.

Sincerely,

James M. Halasz
County Administrator



PO Box 399 • 515 Broad Street
South Boston, Virginia 24592
(434) 572-3085
www.halifaxchamber.net

January 27, 2015

International Dark Sky Association
3223 N. First Avenue
Tucson, Arizona 85719

Dear Board Members:

On behalf of the Halifax County Chamber of Commerce, I am writing to express enthusiastic support of Staunton River State Park's efforts to receive Dark Sky Park designation. The Park is in a strategic location and well positioned to attract visitors from a 60 mile radius with 2,300,000 population. At the same time, it is secluded enough to provide exceptional dark sky experiences for amateur and professional stargazers.

Staunton River State Park's Master Plan has been updated in July 2014 to include upgrades to the observation field to make it more user-friendly for astronomers. Park staff has built a strong working relationship with the Chapel Hill Astronomical and Observational Society and welcomes them as partners in co-hosting the Staunton River Star Party. This event has grown and continues to attract support and attendance. The Southern Virginia region embraces the Dark Sky Park Designation and realizes the added value to the Park's mission.

The Halifax County Chamber of Commerce recognizes the immense value Staunton River State Park brings to the local economy as well as the educational opportunities it provides to citizens. The Park's staff not only is supportive but also excited to be considered for this important designation.

I respectfully appeal to you to give serious consideration to Staunton River State Park's request for Dark Sky Park designation. The designation would certainly be a win-win for the Park and the region.

Kindest regards,

A handwritten signature in black ink that reads 'Nancy LaNeave Pool'. The signature is fluid and cursive, with a large loop at the end of the last name.

Nancy LaNeave Pool, President

connect engage prosper

Introduction to Staunton River State Park

Virginia was the first state to open a state park system in one day, opening Staunton River, Seashore (now First Landing), Westmoreland, Fairy Stone, Hungry Mother, and Douthat State Parks on June 15, 1936. These original six state parks were built by the Civilian Conservation Corps, and to this day carry on the CCC tradition by maintaining the historic structures built by CCC camps as well as telling their story during a pivotal time in American history.

The area that now comprises Staunton River State Park was once part of the thriving Fork Plantation owned by HE Coleman in the early 1800's. The cash crop for Southern Virginia was tobacco, and the area that is now the park was prime tobacco-producing land. The Fork Plantation was transferred to Richard Logan in 1839, and upon the conclusion of the Civil War, the plantation fell into ruins. The land was later purchased by JC Zimmerman who established the Christian Social Colony. According to records, nine or ten families made up the colony, which was an attempt at a Utopian communal society. Zimmerman and accompanying families originated from Wisconsin, and due to their lack of knowledge on farming practices for this area and climate, the Christian Social Colony failed after a short time.

The land was purchased in 1933 by the State Commission of Conservation and Development from the Johnson family. The original property consisted of 1196.5 acres bordered by the Staunton River to the North and Dan River to the South. A Civilian Conservation Corps camp was started in early 1935 to begin construction on the park. Original construction consisted of eight rental cabins, two picnic shelters, Visitor Center, swimming pool and bathhouse, and the superintendent's residence, along with several hiking trails.

As part of the Flood Control Act of 1944, the John H. Kerr Dam was authorized to be built in Boydton, Va., approximately 20 miles downstream from Staunton River State Park. Construction began in 1947. This flood controlling dam was built on the Roanoke River (referred to upstream as the Staunton River), and created the 50,000 acre John. H. Kerr Reservoir, also known as Buggs Island Lake. This lake spans the Virginia-North Carolina border, and is the largest lake in Virginia. The formation of the lake flooded several hundred acres of Staunton River State Park, but also provided the park with prime access to the lake. In return, the US Army Corps of Engineers, the agency who manages the reservoir, leased approximately 500 acres of their property to the park to manage.

The next major change to Staunton River State Park took place in 2005, when 1,007 acres of property adjacent to the park were purchased by the Commonwealth of Virginia from James Edmunds. This property includes a log cabin situated on a 23 acre lake and another small pond, and the majority of the property is planted in intensively managed Loblolly Pine.

A major milestone for Staunton River State Park was reached in 2007. It was at this time that the park was designated as both a National Historic Landmark as well as a Virginia Historic Landmark. The commitment to maintaining CCC structures and history played a great deal in these designations.

April 16, 2011 is a date that will forever be linked to Staunton River State Park, as it was on this date that an EF-2 tornado tore through the central part of the park. Over 100 acres of forested land was flattened, the park contact station was destroyed, and significant damage was suffered by the district manager's residence and camping lodge. About 6 miles of multi-use trails that wound through the path of the tornado were completely destroyed as well. This destruction brought opportunity, however. The park was presented with an excellent opportunity to interpret the forces of nature, as well as natural successional habitat as the flattened forests began to grow back. A change in habitat has also increased quail sightings in the park and has provided excellent feeding areas for eastern wild turkey and white-tailed deer.

Current Facilities

- Eight rental cabins—(4) 2-bedroom, (2) 1-bedroom, (2) efficiencies
- Three boat ramps—One on the Staunton River and two on the Dan River
- Five picnic shelters—Two original CCC shelters, three smaller shelters
- 48-site campground—14 standard sites, 34 with water and 30-amp electrical service, central bathhouse and dump station
- Pool complex—Olympic-sized swimming pool with a 70' slide and another smaller slide, themed wading pool with floating play structures, concession stand with bathhouse and changing rooms
- Tennis and volleyball courts located adjacent to pool complex
- Visitor Center that houses Gift Shop, interpretive classroom, conference room, and park offices
- Equestrian Campground—13 sites with water and 20/30/50-amp electrical service, central bathhouse and dump station, and 20 covered horse stalls
- District Office—houses three district staff members
- 18 miles of multi-use trails, and one trail under construction that will be ADA-accessible

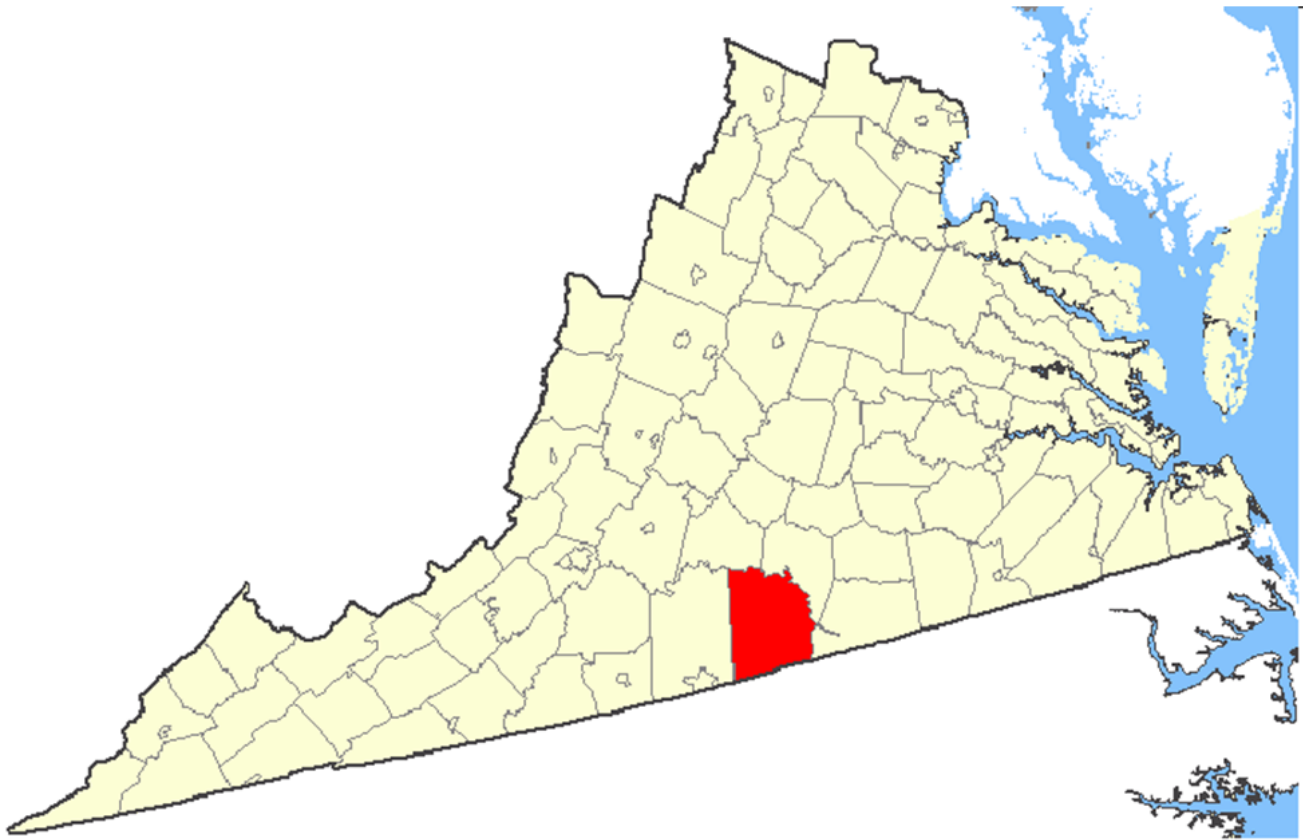
Astronomy at Staunton River State Park

Staunton River State Park was approached by members of the Chapel Hill Astronomical Observational Society (CHAOS) in early 2010. They had found Staunton River State Park on a dark sky map when researching areas to observe and came up from North Carolina to have a look. They found exceptionally dark skies and a large field adjacent to the park Visitor Center with near 360° views of the horizon, making Staunton River an excellent place to observe the night skies. CHAOS members inquired about the possibility of overnight observing in the park, and sensing a tremendous opportunity, park staff offered to allow CHAOS members to camp for free and observe overnight in return for them presenting several astronomy programs to park guests during our summer season. These programs were tremendously successful, both in terms of numbers of participants and guest feedback. In follow-up discussions between park staff and CHAOS, it was decided to continue this program for the 2011 season due to how successful the program was during its first year. During these discussions, CHAOS mentioned that Staunton River would be an excellent facility to

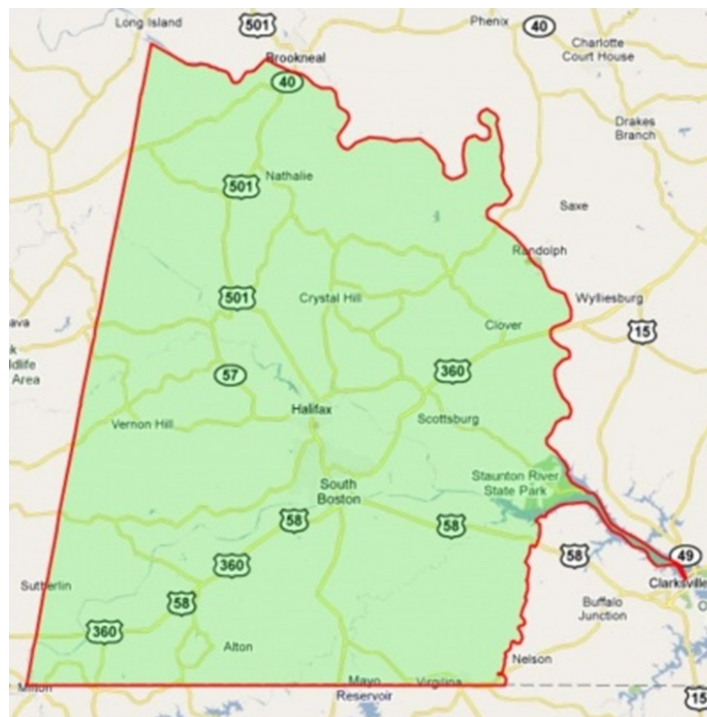
host a star party. Dark skies, heated restrooms, hot showers, internet access, and a large observing field were just the amenities CHAOS was looking for.

The inaugural Staunton River Star Party took place in September 2011 with 20 participants. The Staunton River Star Party is now held over a three-day weekend each March, and for an entire week each October. The October 2014 Star Party had over 140 astronomers attend, and was the most successful Star Party to date. Park staff now operate the concession stand for 22 hours a day during the Star Party, pool bathhouse restrooms are heated and open 24 hours a day with hot showers and clean restrooms, and internet and electrical access has been improved on the observing field. To keep this event aligned with the park's commitment to natural resource interpretation and education, the Saturday night of each Star Party is open free to the public to come and mingle on the observing field with the astronomers and view the skies above. More information about the Staunton River Star Party can be found at: www.stauntonriver-starparty.org.

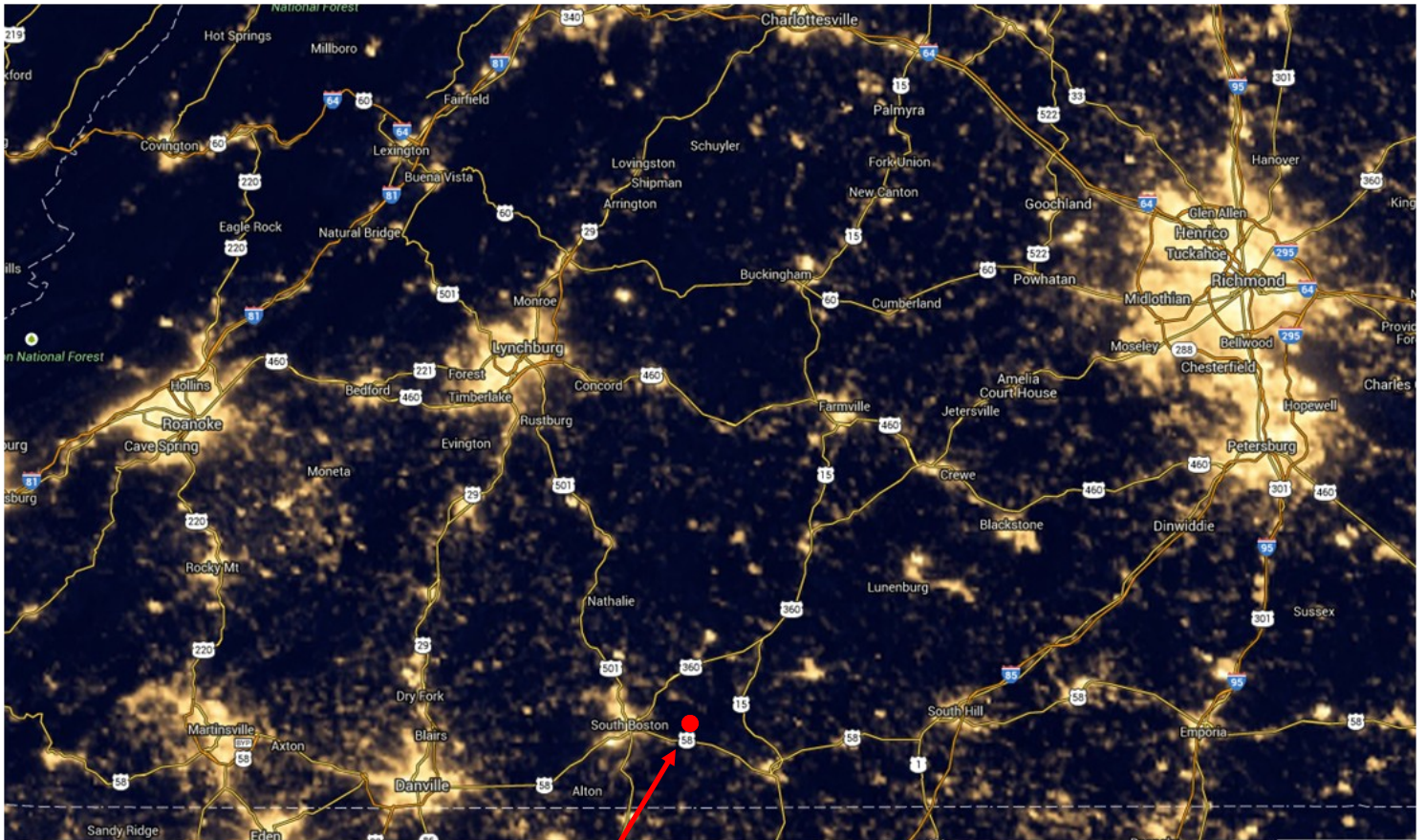




Staunton River State Park is located in Halifax County, Virginia (indicated in red).

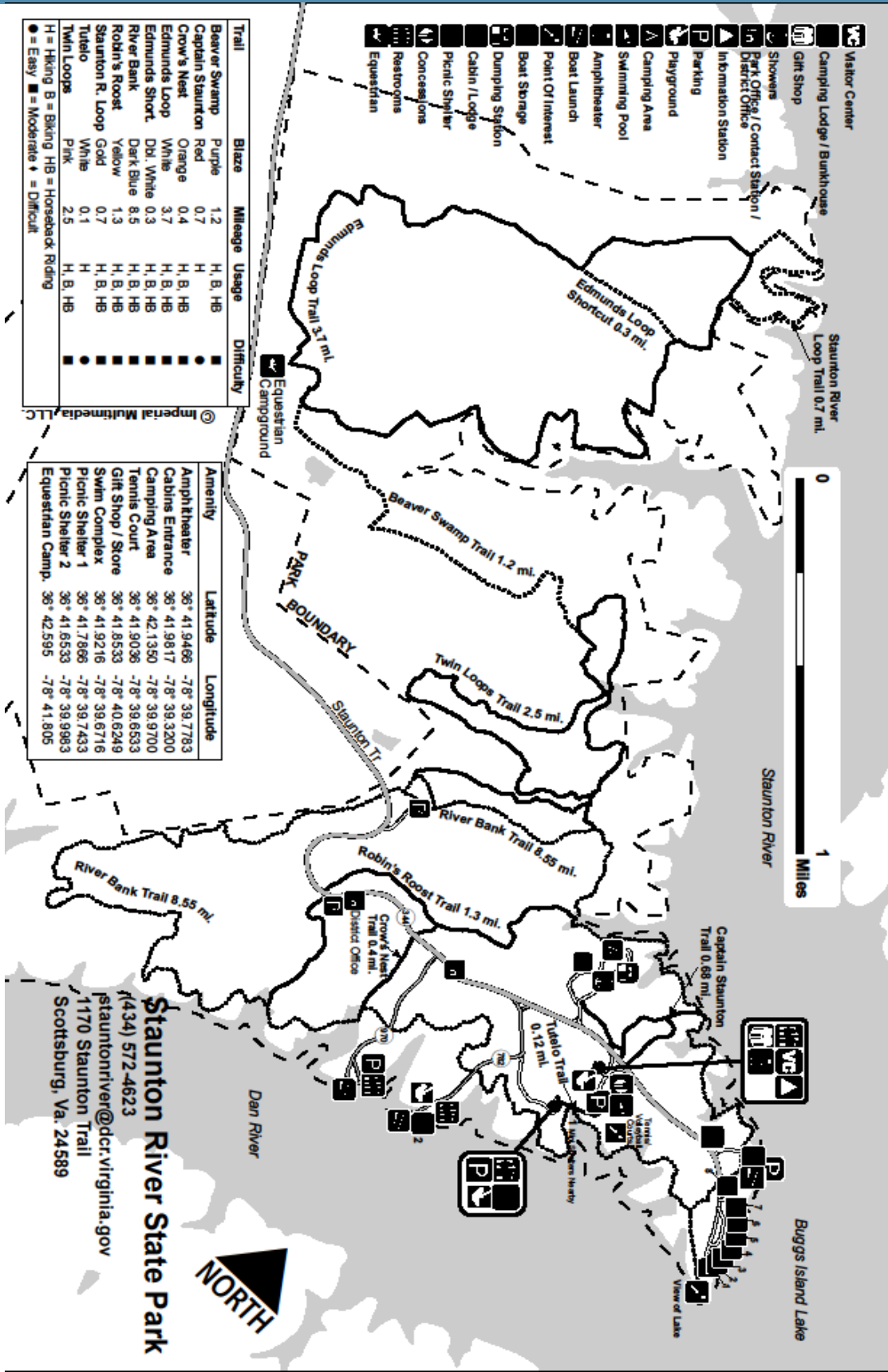


Staunton River State Park Dark Sky Map



Staunton River State Park

(map courtesy of www.blue-marble.de)



International Dark Sky Park Eligibility Criteria

The International Dark Sky Association has set forth the following criteria for Dark Sky Parks:

- 1. All protected public lands, whether managed by national, state, provincial, or local agencies, are eligible. These may include parks, refuges, forests, wilderness areas, monuments, protected rivers, or other categories of protected lands. For this document, they are generically referred to as a “park.”***
 - Staunton River State Park is managed by the Virginia Department of Conservation and Recreation, Division of State Parks. This bid for inclusion as a Dark Sky Park is for the entirety of Staunton River State Park.
- 2. The park must provide the opportunity for public nighttime access, with or without supervision. Regular visitation by the public is essential to meet the goals of the IDSP program. A portion of designated land may meet this requirement, or access must be available for a portion of the night. In some cases, such as when working with areas that protect endangered wildlife, this requirement may be adjusted.***
 - Staunton River State Park offers ample opportunities for public observation of our night skies. Supervised activities include the Staunton River Star Party, astronomy and dark sky-related interpretive programming throughout the summer season, and special observing sessions scheduled around astronomical events.
 - Staunton River State Park also offers a “Share-a-Scope” program. Telescopes with lenses and night sky guides are available for use by overnight guests at no charge to observe our night skies.
 - Staunton River State Park will also allow unsupervised observation on our observing field for those that provide the park with 24 hours notice prior to their arrival.
- 3. The park must provide an exceptional dark sky resource, relative to the communities and cities that surround it. Core night sky quality must fit in one of the three tier qualifications Gold, Silver, or Bronze.***
 - The Sky Quality Survey in the next section will provide data that firmly places Staunton River State Park in the Silver Tier.

Staunton River State Park Sky Quality Survey

In December of 2014, Staunton River State Park staff and Jayme Hanzak, President of the Chapel Hill Astronomical Observational Society installed a permanent sky quality meter. The meter is a Unihedron SQM-LE, and is mounted on the Visitor Center, adjacent to the observing field. The meter is set to record every 10 seconds, and is hard-wired to a dedicated computer to record results.

Sky Quality Meter Data:

Average Sky Quality Meter readings at Staunton River State Park are 21.20. This is from the permanently mounted SQM at the Visitor Center. Testing 12 points in the Park, average reading on the night of December 18, 2014 was 21.16. The highest average reading in the campground was 21.33. Highest reading during a star party was 21.54.

Bortle Sky Scale:

Based on the Bortle Chart Scale and experiences of Staunton River Star Party attendees, the rating is between 4 and 4.5. The Zodiacal light is easily seen in the west reaching high above the horizon. During October, the Milky Way is easy to make out shortly after sunset. M33 is seen using averted vision during optimal nights but only near zenith. Limiting magnitude is about 6.2 on clear dry nights.

Report by:
Jayme Hanzak
President of Chapel Hill Astronomical Observational Society

Sky Quality Meter Readings											
December 18, 2014											
Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
21.15	21.17	21.16	21.19	21.2	21.16	21.18	21.15	21.26	21.12	21.12	21.1
21.12	21.23	21.16	21.18	21.22	21.13	21.13	21.22	21.34	21.11	21.11	21.08
21.16	21.18	21.16	21.17	21.18	21.13	21.13	21.12	21.38	21.07	21.13	21.1
21.17	21.2	21.17	21.18	21.2	21.14	21.13	21.14	21.35	21.11	21.13	21.07
21.16	21.18	21.15	21.18	21.15	21.15	21.11	21.11	21.31	21.08	21.1	21.11
21.18	21.19	21.37	21.22	21.2	21.15	21.16	21.17	21.34	21.05	21.13	21.07
21.15	21.13	21.13	21.21	21.2	21.14	21.16	21.12	21.25	21.07	21.11	21.08
21.08	21.22	21.1	21.4	21.17	21.12	21.12	21.09	21.4	21.2	21.14	21.09
21.16	21.2	21.12	21.17	21.16	21.15	21.1	21.11	21.27	21.12	21.13	21.08
21.16	21.18	21.1	21.16	21.18	21.14	21.18	21.16	21.36	21.1	21.12	21.06
Averages:											
21.15	21.19	21.16	21.21	21.19	21.14	21.14	21.14	21.33	21.10	21.12	21.08

Overall park average: 21.16

Most readings were taken during mostly clear skies, but thin clouds rolled through during the last several readings at each location.

The above readings were taken between 11:00pm and 1:00am on December 18, 2014. One meter reading was taken and recorded beginning at Site 1, then taken and recorded at Site 2, and so on. Once one reading was taken and recorded at all 12 sites, the second set, beginning back at site 1 was taken and recorded, until 10 readings had been taken at all 12 sites in successive order.

Sky Quality Meter Readings											
February 12, 2015											
Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10	Site 11	Site 12
21.4	21.41	21.32	21.41	21.34	21.26	21.33	21.43	21.44	21.44	21.49	21.5
21.38	21.42	21.42	21.32	21.39	21.43	21.4	21.47	21.49	21.45	21.48	21.52
21.5	21.49	21.37	21.31	21.34	21.39	21.38	21.4	21.44	21.45	21.45	21.46
21.43	21.49	21.4	21.37	21.24	21.38	21.41	21.44	21.42	21.54	21.47	21.47
21.46	21.46	21.34	21.39	21.43	21.26	21.44	21.43	21.46	21.43	21.44	21.56
21.41	21.45	21.41	21.29	21.24	21.38	21.4	21.47	21.39	21.54	21.52	21.55
21.35	21.45	21.39	21.44	21.35	21.42	21.4	21.44	21.48	21.51	21.55	21.49
21.4	21.47	21.41	21.41	21.35	21.46	21.4	21.44	21.47	21.44	21.57	21.51
21.42	21.48	21.36	21.32	21.24	21.43	21.42	21.52	21.44	21.49	21.61	21.49
21.46	21.47	21.34	21.34	21.27	21.37	21.47	21.5	21.45	21.48	21.59	21.52
Averages:											
21.42	21.46	21.38	21.36	21.32	21.38	21.41	21.45	21.45	21.48	21.52	21.51

Overall park average: 21.43

All readings were taken under completely clear skies.

The above readings were taken between 10:00pm and 12:00am on February 12, 2015. One meter reading was taken and recorded beginning at Site 1, then taken and recorded at Site 2, and so on. Once one reading was taken and recorded at all 12 sites, the second set, beginning back at site 1 was taken and recorded, until 10 readings had been taken at all 12 sites in successive order.

Staunton River State Park staff will continuously monitor and evaluate sky quality meter readings to ensure that our skies remain dark. Readings from our meter will be downloaded and compiled into a master spreadsheet for comparison and tracking purposes.

Members of Chapel Hill Astronomical Observation Society will perform sky quality testing at the 12 sites outlined in this section on a quarterly basis. Results from this will be compiled and given to park staff for inclusion in sky quality meter records.

Results of this continuous monitoring will be included in an annual report to the IDA.

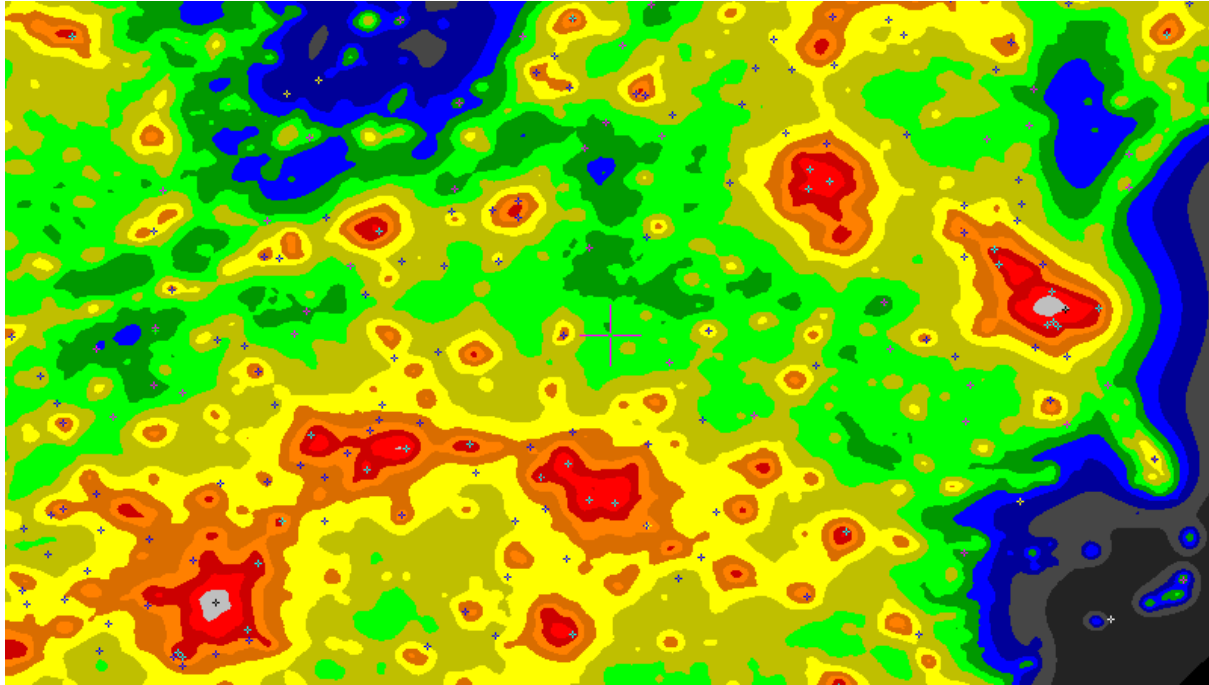
Sky Quality Measurement Locations



Site	Location	Site	Location
1	Point	7	Observing Field
2	Cabin Field	8	Campground Entrance
3	Boat Storage Shed	9	Campground
4	Staunton River Boat Ramp	10	Picnic Area 2
5	Pool Parking Lot	11	Picnic Area 1
6	Tennis Courts	12	Below District Office

Light Pollution and Bortle Scale

The following image and text are used courtesy of www.cleardarksky.com. Information from this site was used in the development of the Staunton River State Park Sky Quality Survey. The location of Staunton River State Park is marked by the crosshairs in the center of the image.



Conditions at Zenith				Description (Descriptions are approximate. Your sky may vary.)
Color	Artificial Normal Sky Brightness	Sky Brightness mag ^s / sq arcsec V Band	Bortle Scale approx	
Black	< 0.01	22.00 to 21.99	1	Theoretically darkest sky limited by airglow and starlight
Dark Grey	0.01 to 0.06	21.99 to 21.93	2	Gegenschein visible. Zodiacal light annoyingly bright. Rising milkyway confuses some into thinking it's dawn. Limiting magnitude 7.6 to 8.0 for people with exceptional vision. Users of large dobsonian telescopes are very happy. [-ad]
Medium Grey	0.06 to 0.11	21.93 to 21.89	2	Faint shadows cast by milkyway visible on white objects. Clouds are black holes in the sky. No light domes. The milky way has faint extensions making it 50 degrees thick. Limiting magnitude 7.1 to 7.5. [-ad]
Dark Blue	0.11 to 0.19	21.89 to 21.81	3	
Blue	0.19 to 0.33	21.81 to 21.69	3	The sky is crowded with stars, extending to the horizon in all directions. In the absence of haze the M.W. can be seen to the horizon. Clouds appear as black silhouettes against the sky. Stars look large and close. [-Richard Berry] Low light domes (10 to 15 degrees) on horizon. M33 easy with averted vision. M15 is naked eye. Milky way shows bulge into Ophiuchus. Limiting magnitude 6.6 to 7.0. [-ad]
Green	0.33 to 0.58	21.69 to 21.51	4	21.6: ... a glow in the direction of one or more cities is seen on the horizon. Clouds are bright near the city glow. [-Richard Berry]
Light Green	0.58 to 1.00	21.51 to 21.25	4	Zodiacal light seen on best nights. Milkyway shows much dark lane structure with beginnings of faint bulge into Ophiuchus. M33 difficult even when above 50 degrees. Limiting magnitude about 6.2 to 6.5. [-ad]

Staunton River State Park Interpretive Programming and Outreach

Part of providing a quality experience to our guests is educating them on their surroundings and on why the conservation and preservation of the land that makes up SRSP is important. Education of the dark skies at SRSP and the importance of preserving them falls into this mission. SRSP hosts several dark sky programs throughout the year, and schedules special observing sessions based around significant astronomical events. The lists below outline our dark sky interpretive programming for 2014 and 2015.

2014

- March 27—30: Staunton River Star Party
 - March 29: Star Party Public Night—observing session with Star Party participants, open to the public for free
- June 6: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- July 11: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- August 18: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- October 20—26: Staunton River Star Party
 - October 25: Star Party Public Night—observing session with Star Party participants, open to the public for free
- December 13: Geminid Meteor Shower Observing—open to all park guests and the public

2015

- March 19—22: Staunton River Star Party
 - March 21: Star Party Public Night—observing session with Star Party participants, open to the public for free
- April 25: Town of Halifax Earth Day Extravaganza—Park display will be themed around dark sky preservation and will highlight observing in SRSP
- June 19: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- July 17: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- August 21: Astronomy Night—Hosted by members of CHAOS, open to all park guests and the public
- October 12—18: Staunton River Star Party
 - October 17: Star Party Public Night—observing session with Star Party participants, open to the public for free
- Additional public observing sessions will be scheduled around astronomical events (e.g., meteor showers).
- Self-guided programming: Share-a-Scope Program—Thanks to a donation of 2 Newtonian-reflector telescopes, park guests will be able to check out telescopes from the park Visitor Center (including eyepieces, night sky charts, and a monthly sky chart) and view the skies on their own after an instruction session with park staff.

Educational outreach during the Staunton River Star Party has grown to include programming in local communities. During the Spring 2015 Staunton River Star Party, the Town of Halifax will be assisting in promotion of the event and dark sky preservation by holding several unique opportunities on the day of the Star Party Public Observing Night. A planet walk is being setup throughout the historic downtown of Halifax to teach participants about our solar system, and the Halifax Public Library will be reading astronomy-related stories on the same day. These events are made possible by collaboration with CHAOS, Morehead Planetarium, and town leaders. This is just an example of how our educational outreach is expanding.



Star Party Public Viewing 8pm-11pm

Staunton River State Park
1170 Staunton Trail, Scottsburg, VA 24589
For more information, contact SRSP at 434-572-4623.

Self-Guided Planet Walk

9:30am-3:30pm

Town of Halifax

Pick up your guide at the Town of Halifax Public Library.

Star Themed Story Time for Kids

Town of Halifax Public Library



Staunton River State Park Lightscape Management Plan

1. Introduction

Staunton River State Park (SRSP) understands the importance of protecting views of the night sky. The night sky, like our forests, wildlife, soils, and water, is a natural resource that should be protected for future generations to experience and enjoy. Implementation of the correct dark sky friendly facility lighting will allow Staunton River State Park to provide a quality night sky viewing experience to our guests, as well as lessen the impacts of artificial lighting to the wildlife that calls SRSP home, reduce electrical consumption and operating costs, and continue to provide adequate lighting where needed to provide safety for our facilities and guests.

This document will serve as the guideline for current and future outdoor lighting management practices in SRSP. It will be used to maintain compliance for current lighting fixtures as well as to guide outdoor lighting choices for future expansions in the park. This document will also serve as a template for Virginia State Parks for appropriate lighting in our state parks, as there are currently no departmental policies in place—our efforts have persuaded management to begin protecting our dark skies as the natural resource they are from this point forward. The SRSP Lightscape Management Plan has adopted the “Guidelines for Outdoor Lighting in RASC Dark-sky Preserves and IDA Dark Sky Places (RASC-DSP-GOL, IDA-DSP-GOL)” and applies these guidelines to our specific site.

2. Sources

Sources used in the creation of this document:

Guidelines for Outdoor Lighting in RASC Dark-Sky Preserves and IDA Dark Sky Places
(RASC-DSP-GOL, IDA-DSP-GOL)

Copper Breaks State Park—Outdoor Lighting Management Plan

3. Rationale

“Most people take nighttime lighting for granted” (RASC-IDA). This statement is indeed true, as humans have become accustomed to having areas they frequent at night illuminated. Proper nighttime lighting, if guided by a strong lightscape management plan that defines purpose, acceptable lighting conditions, and proper light selection and placement, will allow for proper security and facility use while helping maintain views of our night skies. The following sections are taken from the RASC-IDA document that is noted in the previous section.

3.1 Crime

The most prevalent reason given for nighttime lighting is to reduce crime in cities. This is generally based on the notion that more light improves visibility, and that this visibility discourages criminals. Based on before and after studies of crime statistics, there is no clear evidence that outdoor lighting reduces crime¹. Although there are no anecdotal reports that “improved lighting” (i.e. improved visibility) reduces crime², there is no evidence that crime is reduced with “more or better lighting”³. In some cases crime was simply displaced, or the altered lighting was prompted by or caused a change in use of the streets by “...strengthening informal social control and community cohesion”⁴ and this may have affected the pattern of crime.

There are different types of crime. Theft is more prevalent during daytime hours, violent crime occurs more often in the evening and after midnight⁵. Anecdotal studies report that most property crime occurs during the day and violent crime is usually between persons that know each other. The public’s belief in the prevalence of random violence is not proven by the research.

There was an unconfirmed report that the brightly lit City of Manila found violent crime was more prevalent after dark and the presence of police was effective at reducing nighttime crime. The city lights were not the deterrent to crime. In a lengthy Report to Congress, by the National Institute of Justice⁶ it is stated that there is no evidence that artificial lighting deters crime. It reports that most studies are poorly designed, without controls, which undermines any conclusions to the contrary. They state that: “We can have very little confidence that improved lighting prevents crime”. It further reports that lighting can assist in the crime by putting the victim on display. The feeling of safety provided by the light may have the opposite effect.

Vandalism provides an example of the opposite effect of securing lighting than is generally believed. Studies conclude that lighted areas are more subject to vandalism and graffiti. Anecdotal evidence⁷ and more focused studies⁸ support the policy of turning lights off when security staff is not around. Apparently, vandals want to see the results of damage and for others to see it. When lights are off, there is less gratification in vandalizing an area or painting graffiti.

1 The Influence of Street Lighting on Crime and Fear of Crime, Prevention Unit Paper No. 28, Stephen Atkins, Sohail Husain, and Angele Storey, 1991, ISBN 0 86252 668 X

2 Effects of Improved Street Lighting on Crime: A Systematic Review, Home Office Research Study 251, by David P. Farrington and Brandon C. Welsh, August 2002

3 The Indiana Council on Outdoor Lighting Education (ICOLE), P.O. Box 17351, Indianapolis, IN 46217

4 *ibid*, page 2

5 www.bpap.org/bpap/research/DCA_briefing_dtd.pdf

6 National Institute of Justice Grant Number 96MUMU0019 (www.ncjrs.gov/works/)

7 “Darkened Streetlights Fail to Raise Crime Rate”, Des Moines Register, T. Alex and T. Paluch, May 6, 2004 www.dmregister.com

8 Effects of improved street lighting on crime: a systematic review, Home Office Research Study 251, August 2002

3.2 Human Lighting Needs

Humans are predominantly a daytime species. Although we can see at night, our vision is significantly reduced compared to the daytime. In the past, starlight provided sufficient levels of illumination for most activities. However our modern fast paced and mechanized activity requires better visual acuity for driving cars, bicycles and avoiding urban hazards.

Some artificial lighting may be required for nighttime activities, but this lighting must be designed to increase visibility. Paradoxically, more light can sometimes reduce visibility, especially for persons over 40 years of age⁹.

The average age of our population is increasing. Sensitivity to glare also increases with age, as does our chance of developing cataracts. In the face of a bright light, our iris constricts, letting light into the eye only through the centre of our lens. Since cataracts begin in the centre of the lens, the vision of adults can be severely degraded by glare. With the aging of our population, it is becoming increasingly important to reduce glare in the urban environment.

3.3 Human Health

This proliferation of outdoor lighting has a significant impact on the health and behavior of humans¹⁰. “Biological clocks control our sleep patterns, alertness, mood, physical strength, blood pressure, and other aspects of our physiology”¹¹. The dominant mechanism for synchronizing this biological clock to our activity (the circadian rhythm) is the daynight contrast and the timely release of the hormone melatonin. This hormone regulates the ebb and flow of other hormones in our bodies. These “repair the damage” we do to our bodies each day. Without the proper release of these hormones, healing takes longer and our bodies are less able to fend off disease¹².

The timing of the circadian rhythm also affects our behaviour. For example, Seasonal Affective Disorder (SAD) is an emotional condition experienced by travellers and others. The symptoms can be reduced with exposure to bright light¹³ as it shifts (or entrains) and resets our biological clock. If this entrainment occurs during the late evening or at night due to artificial outdoor lighting, the biochemistry that controls our physiological well-being will also be shifted away from the proper daytime hours.

⁹ Work, Aging, and Vision: Report of a Conference, ISBN-10: 0-309-07793-1

¹⁰ Light Research Organization, Electric Power Research Institute, (www.epri.com/LRO/index.html)

¹¹ WebMD, March 06, 2007, www.webmd.com/cancer/news/20040908/light-at-night-may-be-linked-tocancer

¹² “Light at night and cancer risk”, Schernhammer E, et.al., *Photochem Photobiol.* 2004 Apr;79(4):316-8.

¹³ “Shutting Off the Night”, H. Marano, *Psychology Today*, Sep/Oct 2002

3.4 Environmental Health

Although many people are familiar with the activity of the natural world during the day (i.e., photobiology), few people are as familiar with similar activity at night. Humans are not the only species whose biological clock is controlled by day-night contrasts and the release of melatonin. It is found in plants and animals wherein it plays a similar role¹⁴. Wildlife depends on the darkness of the night, and the study of this dependence is called “scotobiology”.

Research into the nocturnal environment is relatively recent compared to research into the daytime environment. Consequently there is far less published literature documenting the sensitivity of the general nighttime ecology to artificial lighting. Most of the research is on specific species in the wild or laboratory studies. However, mounting scientific evidence is documenting the profound impact of artificial light on the ecology of the night.

Plants are affected by the colour and duration of lighting. Whether the effects are considered beneficial or not depends on the desired outcome. Generally, artificial lighting will change the natural growth patterns and may affect the resistance of plants to infestations and disease. Many plants respond to the length of the day and normally recognize it as an indication of the season. By extending light past the evening, may slow the plant’s biochemistry from changing to prepare for winter¹⁵. The various effects of color, duration, type of plant, etc. make sweeping conclusions impossible however, they indicate that changing the lighting environment will change the natural ecology of the area.

¹⁴ “Lighting for the Human Circadian Clock”, S. M. Pauley, Medical Hypotheses (2004) 63,588–596

¹⁵ Ecological Consequences of Artificial Night Lighting, C. Rich, T. Longcore, Island Press, 2006, Pg. 405

3.5 Animal Behavior

Artificial sky glow extends well beyond the city boundaries. Therefore in considering urban outdoor lighting, we must also consider its impact on rural areas in the region.

Exposure to short periods of bright illumination (less than a minute) does not seem to affect the biological rhythm in animals¹⁶. However, longer exposures to light can shift (or entrain) their circadian rhythm and modify their behavioural patterns. Minimizing the duration of exposure to artificial light is necessary to limit its impact.

Seasonal variations will shift the time of sunset by over four hours (from roughly 16:30 in winter to 21:00 in summer). During the peak of Park activities in summer, the time of sunset can vary by two hours. In addition to this, dusk can extend the daylight by as much as an hour.

Artificial lighting changes the nighttime behavior of species¹⁷. Over a month, the changing phases of the Moon affect the ground illumination at night. Nocturnal mammals adapt their behavior over the month in response to moonlight to avoid predators. This behavior includes, in part, limiting the foraging area and carrying food back to their shelters instead of eating it in the field. This latter adaptation limits how much they can eat¹⁸.

Predator and prey behaviour depends on the darkness of the night¹⁹. Illumination levels that significantly affect wildlife are believed to be at the level of the full Moon, although the effect begins to be evident at lower light levels²⁰. To put this in context, it is generally recommended by the IESNA that an urban parking lot be lighted to more than 100 times this level.

It is well documented that some insects are drawn towards light sources. This interrupts their normal mating and foraging activities and it concentrates them within a small area thus enhancing predation²¹. They may swarm the light fixture until they are exhausted. The resulting pile of insects must then be cleaned up²². Animals separated from their normal foraging grounds by an illuminated road cannot see the area beyond the lights. They can be temporarily blinded by headlights from passing cars. Their natural instinct is to wait until they can see where they are going. This can leave them in the open and vulnerable to predation. They may abandon their established foraging patterns for new ones, which will impact other species as they compete for resources²³.

16 Ecological Consequences of Artificial Night Lighting, C. Rich, T. Longcore, Island Press, 2006, Pg. 24

17 The Urban Wildlands Group (www.urbanwildlands.org/abstracts.html)

18 Ecological Consequences of Artificial Night Lighting, C. Rich, T. Longcore, Island Press, 2006, Pg. 28

19 *ibid.*, Chapter 2

20 *ibid.*, Chapter 11

21 *ibid.*, Chapter 13

22 Communication with Parks Canada, 2008

23 Ecological Consequences of Artificial Night Lighting, C. Rich, T. Longcore, Island Press, 2006

3.6 Shorelines

Historically, waterways have been used for transportation and recreation. However, they are also important ecosystems that support wildlife in the water and on the lands adjacent to the shoreline. Shoreline property is valued by our society and this is causing human developments along rivers and around lakes. An increasing number of properties have shoreline lighting that illuminates the waterway. This impacts the river and lakes in two ways.

From the human stand point; bright lights along the shoreline make it very difficult to navigate the channel. Glare from unshielded shoreline lighting prevents our eyes from becoming adapted to the darkness. At night, a boater will only be able to see the points of light along the shore rendering the channel markers and out-of-channel hazards very difficult to see. Clearly, glare along the shoreline results in a safety hazard that should be corrected.

The second impact is on the fish and aquatic plants²⁴. The effect of light on fish is not clear. Fish are attracted to the light from their natural feeding depths. The increase in the concentration of fish changes the hunting efficiency of predators. Although the behavior of the nocturnal predator may not be compromised by artificial light, the ability of its prey to recognize the danger and to escape will affect their survival²⁵.

²⁴ Ecological Consequences of Artificial Night Lighting, C. Rich, T. Longcore, Island Press, 2006, Part V

²⁵ Skyglow and Zooplanktin, eg. Moore et al, 2001

3.7 Cultural Impact

There is a cultural imperative to protect the darkness of the night sky. Throughout recorded history (about 6,000 years) astronomy has been a focus of stories and mythologies. Those who have seen a dark sky are impressed by the serene majesty of the celestial sphere. It comes as no surprise that all civilizations have the constellations and asterisms woven into their culture.

After stepping outside from a lighted room and under a dark rural sky, our initial count of a few stars with photopic vision increases a hundred fold after only 10 minutes. This may increase by another order of magnitude after less than an hour as our eyes become fully dark-adapted. However, urban sky glow overwhelms the faint stars, and the glare from discrete light fixtures prevents our eyes from becoming dark-adapted. These limit the number of stars we can see from many thousands to only a few hundred. Our current generation is the first for whom much less than half the population has seen a star-filled night sky. Most children have never seen the Milky Way.

3.8 Summary

Generally there is limited research on the environmental benefits and costs of artificial lighting. In the absence of clear conclusions, the best policy is to minimize its effects on the ecosystem.

Studies have been published that present conflicting conclusions about outdoor lighting and the reduction of crime. The fact that these studies cannot reach a consensus undermines the argument that more light makes a safer environment. It has not been shown that the cost of lamping, or re-lamping, large areas of a city will result in reduced crime. Yet, the cost of lighting an area may cause funds to be redirected away from other more effective measures.

There is growing medical evidence for the degradation of human health with the illumination of the night. The reduction in day-night contrast can uncouple the circadian rhythm from our normal daytime activities that may cause an increase in chronic diseases.

It is clearly shown in published research, that artificial outdoor lighting affects ecology by disrupting food webs. Although the actual mechanism for this disruption is not always clear, this does not weaken the evidence for the damaging impact of artificial light on the ecosystem and the need to minimize it.

Education is the key to correcting this degradation of the nocturnal environment by our nighttime culture. As the main source of light pollution, cities are key components in education and solving this problem. Establishing Dark-sky Preserves and Dark Sky Places are an obvious way to help inform the public about the virtues of a dark night.

Artificial lighting that is installed for human activity is altering the natural environment. This environmental degradation continues without resistance, and is indeed supported by human nighttime culture. Primarily due to ignorance, our civic policies and the legal system are strongly biased in favour of human demands. New research is revealing how artificial lighting degrades both human health and the health of wildlife within and well outside our cities. Wildlife has no voice in law and cannot control their environment. We must act on their behalf. Cities must take action and advocate against change in their environment.

4. Guidelines for Outdoor Lighting

There are several facilities that may be within a DSP. The illumination levels for these facilities are summarized in tables for each area and application. The rationales for the limits in these tables are provided in Section 3.

Before determining what type of lighting should be installed or retrofitted, it is important to ask the basic question "Is the lighting necessary?". If no valid reason for lighting can be found, it is better to remove the current lighting than replacing it with better technology. Don't assume that the mere fact that lighting is currently installed means that there was or currently is a valid reason to light the area.

This section provides guidelines that should be followed to minimize light pollution within a Park. Similar fixture hardware is recommended to minimize the inventory for repairs or replacement.

Where necessary for basic safety and navigation:

1. Illumination should be to the minimum practical level,
2. The affected area of illumination should be as small as practical,
3. The duration of the illumination should be as short as practical, and
4. Illumination should minimize the amount of short wavelength spectral content including UV and blue light (avoid cool or wide spectrum white light).

What is "practical" depends upon the specific facilities in the area and the technology available at that time.

Illumination levels specified in this document are lower than urban areas for which most luminaires have been designed. This restricts the type of light sources that may be used. Although High Intensity Discharge (HID) lamps are very efficient, they may emit more light than is recommended in these guidelines. To address this, relatively inefficient, incandescent lights may be used for short periods of time or more advanced Light Emitting Diode (LED) lamps may be installed.

These guidelines address the use of the facility and expected pedestrian and vehicle traffic. Eleven specific facilities and areas are identified with a range of lighting conditions that reflect their varied use. Priority is given to respecting and protecting the natural environment.

Park managers have the discretion to assess what levels are most appropriate for each facility within the limits outlined in Section 3 of this document. Lighting is limited to provide only what is required for navigation in built up areas. The artificial lighting is restricted to these areas and for the periods of human activity unless otherwise noted.

“Dark Time” is a term used in some parks to identify the end of significant activity within an area. This term is used herein to identify when light should be discouraged. In this document Dark Time is further assumed as being 2-hours after sunset.

The following tenets have been used in developing these specifications.

1. Buildings require illumination only when open or available to people. After the office is closed to the public, all lighting visible from the outside should be turned off or covered.
2. To save energy and minimize the duration and extent of light pollution, lighted pathways should be illuminated only when pedestrians are in transit. All reasonable effort should be made to turn off lighting when pedestrian traffic is low or is no longer expected.
3. To minimize the impact of artificial lighting on the ecosystem, the areas covered by this specification should only provide a safe transition between lighted structures and the surrounding unlighted area and to assist in navigation.
4. To minimize the extent of light pollution, the area of illumination should be strictly limited.
5. To limit the duration of light exposure on the ecosystem and to save energy, light activated timing circuits should turn off outdoor lighting. The time delay should begin at sunset and should extend to an appropriate time into the evening to permit scheduled activity to end.
6. Where vehicle and pedestrian traffic is at a low speed or infrequent, retro-reflective signage should be used instead of installed lighting fixtures.

4.1 Buildings

This section identifies six types of structures that may require illumination within a park. In all cases, full cut-off (FCO) luminaires should be used and illumination should be controlled to prevent light scattering beyond the immediate area of the light fixture. Further, the color of this light should have minimal UV and blue (short wavelength) content and dark time lighting curfews should apply.

Interior and exterior lighting that remains on for extended periods after operating hours not only wastes energy but can also be a nuisance. Insects are attracted to exterior building lights and interior lighting that shines through windows. In addition to the need for cleaning up dead flies before the building opens in the morning for the public, the light distracts insects from their normal activity. Outdoor illumination from indoor lighting is approximately equivalent to the natural illumination 30-minutes after sunset (Ref. Measurements by author). After this time effort should be made to shield indoor lighting.

This document uses five classifications for buildings:

- Administration Buildings,
- Public Buildings,
- Retail Outlets,
- Vending Machine Enclosures, and
- Toilet and Washroom Facilities

4.1.1 Administration Buildings

Park administration buildings are defined as those with private offices and will generally be closed after dark. Illumination of the main doorway and especially any steps leading to the main door may be required after sunset in the early spring, late autumn and winter. After hours, either all interior lighting should be turned off, or window and door blinds should be used to prevent interior light from shining outside. Light activated timing circuits should turn off all outdoor lighting within 30 minutes of the office being closed. Manual reset switches may be used to extend this period for late-working staff.

4.1.2 Public Buildings

Public buildings are defined as those open to the public during business hours and may also contain private offices. Due to the public nature of these buildings with high pedestrian traffic, exterior illumination may be higher than for park administration buildings. After hours, either all interior lighting should be turned off, or window and door blinds should be used to prevent interior light from shining outside. All outdoor lighting should be turned off within 30 minutes of the office being closed. Exterior lighting should be limited to the main door area and steps (if any). Light activated timing circuits should turn the lighting on after sunset and off after a period of time specified by Park manager and subject to the building use. Manual reset switches or motion detectors may be used to extend this period by a pre-programmed duration.

4.1.3 Retail Outlets

It is assumed retail stores will have higher pedestrian traffic than most other areas while they remain open for business after dark.

Window coverings should be used so that interior lighting will not shine outside 30 minutes after sunset. Exterior light is permitted, and restricted to, the area around the door using Full Cut-off (FCO) fixtures. All exterior lighting should be turned off within 30 minutes after business hours.

4.1.4 Vending Machines

Vending machines should be located in an enclosed space and their lights should not shine directly outside through doorways or windows. Where practical, these machines should be enclosed in existing public buildings. Figure 4.1.4 shows an example of a dedicated vending machine enclosure. Only FCO fixtures should be used to illuminate the area outside the entrances. The extent of this outside illuminated ground area is restricted to less than 5 meters from the entrance.

Light from vending machines is usually from a number of fluorescent tubes behind the translucent display and may emit significant amounts of UV and blue light. This light undermines dark adaptation and attracts flying insects. Therefore, the illumination levels outside these enclosures may be higher than for other buildings to allow the transition for visitors from the bright interior to the dark surroundings.

Doorway lighting should be turned off within two hours after sunset. Interior lighting may remain on at the owner’s discretion.

Table 4.1 Building Illumination Guidelines (Maximum Values)

4.1 Area	Type	Lamp*	Illumination** Level lux (fc)	Height m (ft)	Curfew
4.1.1 Administrative Bldgs.	FCO	Incandescent, Yellow CFL or Amber LED	~2 (0.2)	2.5 (8)	Yes
4.1.2 Public Bldgs.	FCO	Incandescent, Yellow CFL or Amber LED	~2 (0.2)	2.5 (8)	Yes
4.1.3 Retail Stores	FCO	Incandescent, Yellow CFL or Amber LED	~2 (0.2)	2.5 (8)	Yes
4.1.4 Vending Machine	FCO	Incandescent, Yellow CFL or Amber LED	~2 (0.2)	2.5 (8)	Yes
4.1.5 Toilet & Washroom Facilities	Marker (FCO)	Incandescent, Yellow CFL or Amber LED	~2 (0.2)	2 (6.5)	No

*The wattage for individual lamp types are not specified due to differences in efficacy, Park Managers should consult Appendix C for guidance in meeting the recommended illumination level in all tables in Section 4.

**Note: 2 Lux (0.2 fc) = illumination of dusk about 20 minutes after sunset

4.1.5 Toilet and Washroom Facilities

Toilet and washroom facilities should be available throughout the night. If illuminated, Full Cut-off (FCO) fixtures should be used to illuminate the entrance and any steps leading to the doorway. If deemed necessary by Park managers, these structures may have a non-cutoff marker light by the door. This marker light should be the lowest practical wattage. For example, a small 15-watt incandescent lamp can be easily seen for 200 metres. Alternatively, a 1w red or amber LED fixture may be used.

Interior lighting in these facilities must also be considered. Excessive interior lighting levels can produce serious glare that impairs exterior visibility if windows are present. Interior lighting should use bug light or yellow color whenever possible and lighting levels as measured horizontally at the floor should not exceed 10 lux (1 fc).

4.2 Parking Lots

Generally, parking lots have less traffic at night than during the day. Parking lots may require lighting due to scheduled after-dusk activities. This lighting will be necessary until gate closure or Dark Time, whichever occurs first.

Where required, pole mounted Full Cut-off (FCO) luminaires should be placed one pole height from the extreme corners of the parking lot and distributed evenly along the perimeter with an approximate pole spacing of no less than 4-times the luminaire height. Their light distribution pattern should be “full forward” and aimed into the lot. This is symbolically shown in Figure 4.2. If necessary, poles may be located within the parking lot area. Retro reflective markers should be fixed to the poles extending from ground level up to approximately one metre (3.3 feet) to increase visibility for motorists while backing up.

4.2.1 Administration Parking Lots

Administrative personnel will generally leave when offices close. Luminaires in administration parking lots should be turned off within 30 minutes of the office closure. A timing circuit should control the lights with a manual reset for employees working late.

4.2.2 Visitor Parking Lots (Small)

Generally small lots (less than 10 cars) experience little traffic and should not be illuminated.

4.2.3 Visitor Parking Lots (Large)

Larger parking lots (spaces for approximately more than 10 cars) may require better visibility than smaller lots. These lots may be illuminated at the discretion of the Park manager. However illumination levels should not exceed the limits listed in Table 4.2.

Table 4.2 Parking Lot Illumination Guidelines (Maximum Values)

4.2 Parking Area	Type	Lamp	Illumination Level Lux (fc)	Height m (ft)	Curfew
4.2.1 Administration Lot	FCO	LPS, HPS or Amber LED	~3 (0.3)	6 (20)	Yes
4.2.2 Visitor Lot < 10 cars	N/A	None	N/A	N/A	N/A
4.2.3 Visitor Lot > 10 cars	FCO	LPS, HPS or Amber LED	~3 (0.3)	6 (20)	Yes

N/A – not applicable

4.3 Roadways

Intersections are some of the most dangerous areas for drivers. Drivers of high-speed vehicles require sufficient time to react when they approach an intersection. Therefore, major intersections should be marked with signage or luminaires. Illumination of adjacent areas should be minimized.

Due to a park-wide speed limit of 25mph, and relatively low volume of traffic through the park after dark, roadways will not be illuminated. No roadway signage will be illuminated unless state highway regulations call for such.

4.4 Pathways

Pathways and sidewalks provide a relatively level surface for pedestrian traffic, and aid in site navigation. Visibility is necessary for navigation but excessive illumination will prevent pedestrians from seeing off the path. Although visitors use flashlights, additional pathway lighting may be required to guide visitors to public facilities.

Paths are also used by wildlife. Therefore, pathway lighting should be restricted to only those paths near buildings, parking lots and campgrounds, and only those paths that the Park Manager considers appropriate should be illuminated.

Since overhead FCO luminaires will illuminate areas much wider than the path, low wattage bollard lighting should be used such that the bollard-mounted lights are directed down and along the path. The fixture should be FCO and shielded or lensed such that the illumination pattern is approximately limited to the path width.

Pathways should use white or light colored crushed stone (limestone) instead of asphalt to help reflect ambient light. Retro reflective or passive fluorescent markers may also be used to mark the extent and direction of the pathway. These may be mounted on bollards or in the pathway surface.

Generally, individuals walking along a pathway will have left the area after a minute or so (a distance of 30 metres) unless they remain for an activity. To minimize unnecessary light exposure, switches with timing circuits may be used manually to activate the lighting and to automatically turn them off after a few minutes. Proximity detectors should be installed at the entrances to pathways.

The closeness of the luminaires to the ground necessitates very low intensity lights. This limits the current products available to low wattage incandescent lamps and LEDs. These guidelines for pathway lighting can be reduced to four points.

1. Whenever possible pathways in the DSP should not be illuminated. If deemed absolutely necessary by the Park manager, specific pathways may be illuminated or lined with fluorescent markers.
2. Illuminated pathways should have full cut-off bollard mounted lighting fixtures.
3. Pathway lighting should be turned off at the Dark Time lighting curfew. Retroreflective markers on the bollards may assist pedestrians after Dark Time.
4. Main pathways leading to night facilities may be illuminated throughout the night at the discretion of the Park manager.

RASC and IDA DSP PROGRAMS

Table 4.4 Pathway Illumination Guidelines (Maximum Values)

4.4 Pathways	Type	Lamp	Illumination Lux (fc)	Height m (ft)	Curfew
4.4.1 Pathways	None	None	N/A	N/A	N/A
4.4.2 Illuminated Paths	FCO	Incandescent, Yellow CFL or Amber LED	~1 (0.1)	1 (3.3)	Yes
4.4.3 Main Pathways	FCO	Incandescent, Yellow CFL or Amber LED	~1 (0.1)	1 (3.3)	No

N/A – not applicable

The only pathway that will be illuminated will be the pathway from the main entrance of the Visitor Center to the parking lot. Bollard lights are used that direct the light down onto a white concrete sidewalk. These lights will shut off along with the Visitor Center parking lot pole lights at dark time.

4.5 Shoreline Areas

Shoreline areas consist of docks, jetties, lock facilities, boat launching areas, beaches, homes, cottages and undeveloped lands. The direct illumination of the shallow water near shore alters the behavior of aquatic species and the foraging patterns of landed species and insects.

This document provides guidance to Park managers for reducing the impact of lighting along a waterway. These guidelines are relatively general due to the limited authority of Park managers over some of these properties.

1. Park personnel should inform the owners and users of shoreline property of the impact artificial light has on the ecology of the water and adjacent lands.
2. The public should be advised to shield all outdoor lighting to comply with Full Cut-off (FCO) requirements and to turn off this lighting when they go to bed.
3. Shoreline lighting should consist of amber or red light with no UV and blue spectral content. Blue and white lights should not be permitted.
4. Light fixtures should be prohibited within ten metres (33 feet) of a shoreline unless they are deemed necessary by the Park manager. Overhead luminaires that shine into the water should not be permitted.
5. Where shoreline lighting is permitted, it should have Full Cut-off (FCO) fixtures with low wattage amber or red light. Shielded bollard lighting with incandescent or LEDs should be used where dock managers have identified their need. High traffic areas and near machinery (lock facilities) may require higher levels of illumination at the discretion of the Park manager if machinery is operated after dark.

RASC and IDA DSP PROGRAMS

Table 4.5 Shoreline Illumination Guidelines (Maximum Values)

4.5 Waterways	Type	Lamp	Illumination Lux (fc)	Height m (ft)	Curfew
4.5.1 General Areas	N/A	None	N/A	N/A	N/A
4.5.2 Dock Bollards	FCO	Incandescent, Yellow CFL or Amber LED	~1 (0.1)	1 (3.3)	No
4.5.3 Lock Facilities	FCO	Incandescent, Yellow CFL or Amber LED	~1 (0.1)	6 (20)	Yes

N/A – not applicable

4.6 Signage

Signs within a Park are essential to the efficient navigation of the site. They may display three forms of information: names for sites or buildings (usually mounted in proximity to buildings or other structures), directions (located along roadways or pathways and their intersections) and those meant to convey other information (located to the side of roadways and pathways).

Illuminated signs should be prohibited in a DSP. These include, but are not limited to, internally illuminated signs, signs illuminated from below and above the sign, and in front of the sign. To improve the visibility of signs after dark, their location, colour scheme, and material should permit reading the sign with flashlights or existing lighting.

Retro-reflective signage should be used to ensure signs are visible only when necessary. Signs may be mounted on or near buildings such that exterior building lighting may provide some illumination, and they should use colours consistent with retro-reflective materials and illumination with flashlights.

Signs should be located so pedestrians can easily see them. Elevated signs are less likely to be illuminated by Full Cut-off (FCO) luminaires. Pathway and information signs should be located less than one metre above the grade of the path so that they may be found and read by pedestrians with flashlights after dark. Signs mounted at a higher elevation may be missed as flashlights are aimed at the ground. All bollards should be marked with retroreflective material so they may be visible to pedestrians after Dark Time. Roadway signs should be mounted in accordance with standard roadway practice.

4.7 Light Pollution Abatement Beyond Park Boundaries

As with air and water pollution, light pollution has no boundaries. It is only reduced by increasing the distance to the source. Some cities are actively promoting the replacement of luminaires that contribute to sky glow but these policies are not wide spread. Parks may influence the producers of air and water pollution that passes through Parks. This influence should be extended to include light pollution.

- Park managers should introduce and encourage programs of light pollution abatement in municipalities around the Park facilities with the goal of reducing glare across Park boundaries and sky glow from artificial lighting.
- Park managers should approach individuals whose lights shine onto Park facilities. The goal of these contacts is to have those lights shielded, reduced in brightness or removed.

5. SRSP Lighting Guidelines

This section will highlight the implementation of this plan to current facilities within Staunton River State Park, and describes any deviations from the general plan, if any. This section applies to only the current facilities located in the park. All future facilities will be built in compliance with all guidelines set forth in Section 4. In addition to all guidelines, all facility lighting in Staunton River State Park that exceeds 600 lumens is required to be fully shielded.

5.1 Buildings

5.1.1 Administration Buildings

District Office

- Upon the closing of this office, all interior lights will be shut off. A Full Cut-Off doorway light will remain on at the main entrance to this building (law-enforcement activity may require entry into this building, therefore the doorway light will remain on to assist with entry). Parking lot lights will be discussed later in section 5.2.

Maintenance Shop

- Exterior parking lot flood lights are shielded with PARShield deflectors and are motion sensor controlled.
- One switch-controlled recessed light fixture is located under the roof above shop entrance door. It is only used when after-dark activities are occurring at the shop and is turned off after hours.

Park Staff Residences

- All exterior lights are shielded or Full Cut-Off fixtures. Lights are only used when necessary to provide entryway illumination and are otherwise off. Park staff understand the importance of dark sky preser-

5.1.2 Public Buildings

Visitor Center

- Typical operating hours for the Visitor Center are 8am-10:00pm Memorial Day—Labor Day, and 8am-4:30pm the remainder of the year. The Visitor Center houses park offices, Interpretive Classroom, conference room, Gift Shop, and is where overnight guests register for cabins and campsites.
- Current lighting includes wall sconces at entry doors, bollard lights along sidewalk to parking lot, and pole mounted Full Cut-Off parking lot lights. Sidewalk lights and parking lot lights are discussed later in section 5.2.
- After business hours, all interior lights will be turned off. The public restroom access, which remains accessible 24 hours a day, will have the foyer light on, with window blinds closed on the foyer window to reduce the amount of light emanating from this fixture. Bathroom lights are motion activated and turn off after 5 minutes of last detected movement.
- Wall sconces are Full Cut-Off fixtures utilizing 18-watt, 2700K compact fluorescent bulbs. These lights are triggered by a dusk-to-dawn photoelectric cell. These lights, due to their low temperature and being Full Cut-Off as well as to facilitate after-hours overnight guest check-in, will remain on. No other exterior lighting will remain on overnight.

Rental Cabins

- All exterior lighting fixtures on rental cabins are Full Cut-Off fixtures that use 13-watt compact fluorescent bug lights (yellow in color). These lights are located at the entrance doors to the cabins. Literature in cabin information books discusses the importance of dark sky preservation, as well as the efforts the park has undertaken to preserve our dark skies, and encourages park guests to only use the lights when absolutely necessary.

Swimming Pool Complex

- Two fully-shielded wallpack security lights are located on the pool building, which houses the concession stand and bathhouse. These lights are on a dusk-to-dawn photoelectric sensor, and are operated during the Memorial Day—Labor Day season during which the swimming pool is operated. Outside of this season, lighting will be turned off.

5.1.3 Toilet and Washroom Facilities

Campground

- All interior lighting is motion-sensor controlled and shuts off after 5 minutes of no detected movement.
- Full Cut-Off ceiling-mounted lights are located above each restroom door to illuminate the entrance.

Picnic Area Restrooms

- All interior lighting is motion-sensor controlled and shuts off after 5 minutes of no detected movement.
- Full Cut-Off wallpack lights are placed above the entrance doors to the restroom facilities. These lights are controlled by a dusk-to-dawn sensor to illuminate restroom entrances.

Equestrian Campground

- All interior lighting is motion-sensor controlled and shuts off after 5 minutes of no detected movement.
- Full Cut-Off lighting is used to illuminate the entrance doors to the restrooms and showers. These lights are controlled by a dusk-to-dawn photoelectric sensor.

5.2 Parking Lots

Swimming Pool Complex

- Pole-mounted flood lights are located around the pool complex parking lot. The pool complex, during the operating season, is open from 10am—6pm, so these lights are not needed. While these lights still exist, they have been disconnected and are not operational. Should major operational changes occur to where these lights are again needed, fixtures will be upgraded to become compliant with this plan prior to the lights going back into service.

District Office

- Historically, this building housed the park office, which included the gift shop and guest registration area. Since the usage has changed, so has the need for exterior lighting. Four cobra-head pole-mounted lights are located around the perimeter of the parking lot. Since this building is only used during day-light, these lights have been disconnected. Should the need arise to use these lights in the future, fixtures will be upgraded to become compliant with this plan prior to the lights going back into service.

Visitor Center (12 parking spaces)

- Full Cut-Off, full forward, pole-mounted lights are located around the Visitor Center parking lot perimeter. These are used to illuminate the parking lot for guests coming to the Visitor Center after dark. These lights are controlled by a photoelectric sensor, as well as a timer. They are set to come on at dusk and turn off at closing hours during the Memorial Day—Labor Day season, and set to turn off at 9:00pm the remainder of the year. The decision to leave these lights on until this time was made for guest safety. During the “off-season” SRSP has more after-hours overnight guest check-ins than during the “main-season,” and to facilitate guests with finding their check-in packet, parking lot lights will be left on until 9:00pm.

Dan River Boat Ramp

- Cobra-head lights are placed in the parking lot of the Dan River Boat Ramp, at the fee self-payment station, and at the top of the boat ramp. Throughout the year this facility has a large amount of use after dark, to include night-time fishing and boating, pre-dawn launch of duck hunters, overnight fishing tournaments, etc. Due to the amount of use and the illumination needed for the safe launching and take-out of boats, as well as to make necessary tie-down and securing of boats to trailers prior to departure, these lights will remain on a dusk-to-dawn photoelectric sensor. Low wattage bulbs and shielded fixtures will be used to provide no more light than is necessary and direct it downward.

5.3 Roadways

A Full Cut-Off pole-mounted light will be illuminated at the park contact station. This light is needed to illuminate the self-payment system for parking and park rules for those entering the park after dark. Any special notices to park guests will also be placed at this location, so having enough light for these purposes is required.

No other roadway illumination will be installed in Staunton River State Park.

5.4 Pathways

The sidewalk from the Visitor Center to the parking lot is the only illuminated pathway in Staunton River State Park. Shielded bollards are installed alongside this pathway. Due to the bollards being wired on the same circuit as the Visitor Center parking lot lights, they will follow the same schedule.

Should additional pathway lighting become a necessity, it will be installed in accordance with guidelines listed in section 4.4 of the Lightscape Management Plan.

5.5 Shoreline Areas

Two lights exist near shorelines at Staunton River State Park. These lights are placed so that light does not shine on the nearby bodies of water.

- Staunton River Area—A shielded globe light is located near the Staunton River Picnic Shelter. This area is a popular night-fishing area, and the light was installed to assist park rangers in surveillance of the area. This light has been shielded so as to direct light straight down, and does not shine on the water.
- Dan River Boat Ramp—A shielded cobra-head style pole mount light is located on the uphill end of the boat dock. This light was installed to assist boaters when launching or removing boats after dark. This light is fully shielded to direct all light straight down and not onto the water.

5.6 Signage

No park signage is illuminated, nor is there a need for illuminated signage in the park. Road signs are retro-reflective to assist motorists/pedestrians after dark. Placement of park signage is regulated and adheres to the Virginia State Parks Sign Manual.

Staunton River State Park Lighting Inventory

Cabin Area					
Location	Fixture	Application	Fully Shielded	Special Purpose <600 Lumens	Conformity with LMP
Cabin 1 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 1 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 2 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 2 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 3 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 3 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 4 - Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 5 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 5 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 6 - Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 7 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 7 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 8 - Front Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Cabin 8 - Back Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes



All cabin exterior lighting was upgraded to the fixtures illustrated on the left in December 2014. Fixtures are shielded and downward-facing, and are mounted either above or directly beside entry doors to provide light to cabin doors with the minimal amount of light necessary.

Administration Buildings					
Location	Fixture	Application	Fully Shielded	Special Purpose <600 Lumens	Conformity with LMP
Visitor Center - Exterior Wall Sconces (5 Fixtures)	18W 2700K CFL - Wall Mount	Entryway Lighting	Yes	No	Yes
Visitor Center - Sidewalk Bollards (5 Fixtures)	50W HID	Sidewalk Lighting	Yes	No	Yes
Visitor Center - Parking Lot Pole Lights (5 Fixtures)	Pole-Mounted FCO HPS	Parking Area Lighting	Yes	No	Yes
District Office - Front and Back Entry Doors (4 Fixtures)	HPS Wall Pack—Shielded	Entryway Lighting	Yes	No	Yes
District Office - Parking Lot Pole Lights (4 Fixtures)	Pole-Mounted Cobra-Head HPS	Parking Area Lighting	No	No	No**
Maintenance Shop (2 Fixtures)	PAR 38 CFL with PAR-Shield	Parking Area Lighting	Yes	No	Yes
Contact Station	Pole-Mounted FCO LED	Payment Area Lighting	Yes	No	Yes

** - These lights do not conform to the SRSP Lightscape Management Plan, however, they have been disconnected due to change of use for this building and they are no longer needed. Should these lights be needed in the future, fixtures will be upgraded for LMP conformity.

Park Staff Residences

Location	Fixture	Application	Fully Shielded	Special Purpose <600 Lumens	Conformity with LMP
District Manager Residence - Kitchen Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
District Manager Residence - Living Room Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Park Manager Residence - Front Entry Door (2 Fixtures)	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Park Manager Residence - Back Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Park Manager Residence - Exterior Flood Light 1	PAR 38 CFL with PAR-Shield	Parking Area Lighting	Yes	No	Yes
Park Manager Residence - Exterior Flood Light 2	PAR 38 CFL with PAR-Shield	Yard Area Lighting	Yes	No	Yes
Assistant Manager Residence - Back Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Assistant Manager Residence - Front Entry Door	13W CFL Wall Mount	Entryway Lighting	Yes	No	Yes
Assistant Manager Residence - Exterior Flood Lights	PAR 38 CFL with PAR-Shield	Parking Area Lighting	Yes	No	Yes

Day-Use Areas					
Location	Fixture	Application	Fully Shielded	Special Purpose <600 Lumens	Conformity with LMP
Staunton River Boat Ramp	Cobra-head HPS	Security Lighting	No	No	No
Staunton River Picnic Shelter	Recessed Ceiling Mount under roof	Facility Lighting	Yes	No	Yes
Swimming Complex (2 Fixtures)	Wall-pack Exterior Lights	Security Lighting	Yes	No	Yes
Swimming Complex Parking Lot Lights (4 fixtures)	Pole-Mounted Globe Fixture	Parking Lot Lighting	No	No	No**
Picnic Area 1	Pole-Mounted FCO LED Fixture	Security Lighting	Yes	No	Yes
Picnic Area 1 Bathhouse (2 fixtures)	FCO Wall Mount	Entryway Lighting	Yes	No	Yes
Picnic Area 2	Pole-Mounted FCO LED Fixture	Security Lighting	Yes	No	Yes
Picnic Area 2 Bathhouse (2 fixtures)	FCO Wall Mount	Entryway Lighting	Yes	No	Yes
Dan River Boat Ramp (6 fixtures)	Cobra-Head Fluorescent	Parking Lot Lighting	No	No	No

**These lights do not conform to the SRSP Lightscape Management Plan, however, they have been disconnected due to non-use. Should these lights be needed in the future, they will be upgraded with fixtures that conform to the LMP.

Campgrounds					
Location	Fixture	Application	Fully Shielded	Special Purpose <600 Lumens	Conformity with LMP
Campground Bathhouse Restroom Entries (2 fixtures)	Shielded Fluorescent	Entryway Lighting	Yes	No	Yes
Campground Bathhouse Storage Entry	Shielded Fluorescent	Entryway Lighting	Yes	No	Yes
Camping Lodge Porch Light	13W CFL FCO Wall Mount	Entryway Lighting	Yes	No	Yes
Equestrian Campground Bathhouse (6 fixtures)	Fully Shielded Wall Mount CFL	Entryway Lighting	Yes	No	Yes
Equestrian Stalls (4 fixtures)	Solar Roof-Mounted LED	Stall Area Lighting	No	No	No

Staunton River State Park Light Fixtures	
Conform with LMP	Do Not Conform with LMP
65	16
Percent Compliant:	80%

Staunton River State Park's Commitment to Dark Sky Preservation and Education

The preservation of the dark skies at Staunton River State Park is of utmost importance. Staunton River State Park commits to using the Lightscape Management Plan set forth in this document to guide future development and improvements to the park and its facilities. All existing light fixtures that are not currently compliant with the Lightscape Management Plan will be replaced or retro-fitted to bring them into compliance per the following timetable:

- Dan River Boat Ramp—Spring of 2016
- Staunton River Boat Ramp—Spring of 2016
- Equestrian Stalls—Spring 2016
- District Office Parking Lot—Spring of 2017
- Swimming Complex Parking Lot—Spring of 2018

Conversions of these lights are spaced out over the next 3 years to spread costs across separate budget cycles.

Education on all of the park's natural resources, including its dark skies, will remain a driving force behind our operations. Park staff are expanding our dark sky education programming each year, and will continue to do so. Outreach into our surrounding communities will increase as well. Dark sky presentations will continue to be given to community leaders in hopes of improving town and county ordinances, and having the governmental bodies set the example of appropriate nighttime lighting and dark sky preservation for their jurisdictions. Park staff and volunteers have begun inventorying local businesses and will begin an educational push with them to reduce light pollution in nearby towns. Park staff, members of the Chapel Hill Astronomical Observation Society, and local government leaders have had preliminary discussions on developing a recognition program for area businesses whose facility lighting is compliant with IDA recommendations, and foresee this program encouraging more businesses to become dark sky friendly. We anticipate the start of this program later in 2015. Education not only to park guests, but to our community at large, will continue to be an important role of Staunton River State Park.

Staunton River State Park began a night sky friendly lighting project in the fall of 2014. Park staff replaced the exterior light fixtures on the rental cabins with full-cutoff, wall-mounted, low wattage fixtures near the entry doors. Park staff residences were upgraded to include new full-cut off fixtures adjacent to entry doors, and all exterior floodlights were realigned downwards and retro-fitted with dark sky-friendly PARShields. The district office, swimming complex, and equestrian campground bathhouse fixtures were fitted with full cut-off shields so that they adhere to our Lightscape Management Plan. Having several types of conversions (replacement fixtures, PARShields, retro-fitting old fixtures with shields) gives us a unique opportunity for interpretation. We are using this project in our astronomy-related interpretive programming to teach park guests how they can become good stewards of our night skies. Park guests are being taught the importance of dark sky preservation, and during their stay at Staunton River State Park, they are able to see different methods we have used to ensure that our lighting needs are met without

intrusion on the beautiful night sky. Our goal with this project was not only to enhance our night skies, but give our guests ideas for the enhancement of dark sky preservation that they can take home and easily implement themselves. This project has also become a model for our community and agency. As our agency begins moving forward with dark sky friendly policies, our lighting project will serve as the basis for guidelines and recommendations on how to effectively retrofit a park. We are also able to show “real life” examples of dark sky friendly lighting as we continue our outreach and education efforts in our community.

Our sky quality monitoring program has also provided more unique interpretive opportunities. The results of this monitoring are shared with park guests and our community to give them an understanding of how dark our skies really are. We can compare this data with readings from urban areas so that guests can really grasp the scale of darkness, and understand the importance of keeping Staunton River State Park dark.

Staunton River State Park’s dark skies have been recognized as an important natural resource, and one that we are charged with protecting. The Resource Management Plan that guides the protection and preservation of all resources found within Staunton River State Park includes the following language that mandates the protection of our dark skies:

E. Dark Sky Resource

*Staunton River State Park has a unique resource in its extremely dark skies. Due to the degradation of this resource across the US, all efforts should be made to protect and enhance the dark sky at Staunton River State Park. All future development and facility operations must use facility lighting fixtures that conform to and light only areas specified by the Staunton River State Park Lightscape Management Plan, found in **Appendix EE**. A timetable for converting any existing facility lighting so that it conforms to the Lightscape Management Plan is included in **Appendix EE**. This timetable shall be referenced during annual budget development to ensure its completion. Baseline sky quality measurements are also included in **Appendix EE**, and every effort should be taken to maintain, if not enhance, these conditions. Sky quality measurements will be taken continuously through the sky quality meter located at the park Visitor Center and quarterly throughout the park. Results will be compiled and examined by park staff to ensure the quality of the park’s dark skies.*

Note: All files referenced in “Appendix EE” in the Resource Management Plan are included in this application document.

An effort is currently underway to continue to enhance the dark skies found in our region. While these projects are underway and have not yet yielded results that would currently satisfy Dark Sky Park requirements, the results they will yield in the future should be extremely beneficial. Park staff, members of the Chapel Hill Astronomical Observation Society, and local community leaders have agreed to develop a recognition plan for local businesses whose facility lighting is compliant with dark sky friendly guidelines.

Press releases will be distributed for maximum exposure as each business is recognized, with hopes that this will encourage more businesses to come on-board. Meetings will take place over the coming months to fully develop this program, which we hope to have up and running later this year. Park staff will also begin inventorying local businesses that emit the highest amounts of light pollution, and will continue the education efforts with the owners and managers of these businesses to convince them of the importance of dark sky preservation. Steps will be outlined on how they can convert their facility lighting to reduce light pollution, as well as the benefits in security and utility fees this will bring them. Educational efforts are ongoing, using the park's facility lighting conversions as well as data from sky quality measurements in presentations to local tourism boards, town councils and boards of supervisors in adjacent counties, and local businesses in hopes of making dark sky preservation not just a Staunton River State Park effort, but an entire Southern Virginia effort.

In addition to this, there are currently no state or county guidelines governing dark sky preservation. While the town of Halifax has adopted an ordinance requiring all new or replacement facility lighting to be fully shielded, the county itself has no such ordinance (SRSP is located about 17 miles from town limits). We will continue to work not only with local businesses in the recognition program, but with county leaders and state representatives to expand our efforts even further.

Staunton River State Park is dedicated to maintaining and enhancing the dark skies it has been blessed with having. All requirements of Dark Sky Parks will be maintained should it be so designated. All of the staff of Staunton River State Park thank you for consideration of this application for Dark Sky Park status.



Adam W. Layman
Park Manager
Staunton River State Park

Printed in *The Gazette-Virginian*, October 10, 2014.

2/3/2015

Star Party returns Oct. 20-26 at Staunton River State Park - YourGV.com: Celebrations

Star Party returns Oct. 20-26 at Staunton River State Park

From staff reports | Posted: Friday, October 10, 2014 2:47 pm

The Staunton River Star Party will be held at Staunton River State Park Oct 20-26, for registered participants. A public viewing night will be offered on Saturday, Oct. 25, from 8 to 11 p.m.

The public is invited to join members of the Chapel Hill Astronomical and Observational Society for the fall Star Party. Astronomers from across the country converge on the park each spring and fall to peruse vendors' offerings, learn from guest speakers and presentations, and take advantage of the area's exceptionally dark night skies.

Check-in begins at noon on Oct. 20, and the Star Party continues until noon on Oct. 26. Registration fees are required.

For more information and to register, visit <http://www.stauntonriver-starparty.org>.

Registration deadline is Oct. 10.

The free public viewing event is Oct. 25 from 8 to 11 p.m. weather permitting. Mingle with amateur astronomers to learn about and view planets, stars, nebulae and galaxies. Stargazers should dress for the weather and bring a flashlight, preferably one with a red lens. (Red cellophane will be provided for those who don't have a red lens.)

Staunton River State Park is located in Halifax County at 1170 Staunton Trail in Scottsburg.

For specific information about the park, call 434-572-4623 or email stauntonriver@dcr.virginia.gov.

For general information or to make overnight reservations at Staunton River or any of Virginia's 36 award-winning state parks go to www.virginiastateparks.gov or call toll-free 800-933-7275.



Star Party returns to Staunton River State Park Oct. 20-26

The free public viewing event is Oct. 25 from 8 to 11 p.m. weather permitting. Mingle with amateur astronomers to learn about and view planets, stars, nebulae and galaxies. Stargazers should dress for the weather and bring a flashlight, preferably one with a red lens.

http://www.yourgv.com/lifestyles/celebrations/article_deb92ad6-50ad-11e4-b436-a72194527487.html?mode=print

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Printed in *The Gazette-Virginian*, October 22, 2014.

2/3/2015

Staunton River State Park Star Party this weekend - YourGV.com: County Life

Staunton River State Park Star Party this weekend

Special to The Gazette | Posted: Thursday, October 23, 2014 12:39 pm

The Staunton River Star Party will be at the park Sunday, and the park's activities will begin Friday when Tyler Nordgren, professor of Physics and Astronomy at the University of Redlands and author of "Stars Above, Earth Below: A Guide to Astronomy in the National Parks," visits.

He will be giving a presentation at 2 p.m. entitled "Half the Park is After Dark" focusing on the fact the scenic beauty of parks that has drawn visitors for decades doesn't end when the sun sets.

"A star-filled sky is as much of a draw as mountains and waterfalls," said Park Manager Adam Layman.

Following this presentation, the parks' employees will hold a round-table discussion during which they will update Star Party attendees on the status of Staunton River's Dark Sky Park Certification application and what the community is doing to combat light pollution and preserve the dark skies as well as brainstorm ways to further this mission in the community.

For more information on the Star Party, visit their website, www.stauntonriver-starparty.org.

http://www.yourgv.com/lifestyles/county_life/article_3983458e-5ad3-11e4-9c5e-c388a37b1a0b.html?mode=print

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Printed in *The Gazette-Virginian*, November 17, 2014.

2/3/2015

Staunton River State Park receives donated telescopes - YourGV.com: Local News

Staunton River State Park receives donated telescopes

Special to The Gazette | Posted: Monday, November 17, 2014 8:48 am

Even though the Fall Staunton River Star Party has concluded, the opportunity to observe the exceptionally dark skies at Staunton River State Park is not gone.

On Sunday, Nov. 9, the Chapel Hill Astronomical and Observational Society (CHAOS), co-hosts of the Staunton River Star Party, donated two Newtonian reflector telescopes to the park to loan out to park guests.

The telescopes were purchased from Astronomers Without Borders, an organization that works to develop science and astronomy-related programming in developing countries, as well as to those with disabilities that may not allow them the opportunity to view the night sky.

Proceeds from telescope sales go toward furthering their mission.

Park staff members have been trained in the operation of the new telescopes and are excited about the opportunity to teach park guests how to use the telescopes as well as how to navigate the night sky.

“These telescopes are very user-friendly and can be easily used to view Saturn’s rings, Jupiter’s moons, the Andromeda galaxy and Orion’s Nebula, just to name a few, by beginners and experts alike,” remarked Park Manager Adam Layman. “This generous donation will allow our guests to experience all that Staunton River State Park has to offer by not limiting these experiences to just the daylight hours. Seeing Saturn’s rings or a distant galaxy is just as meaningful of an experience as watching an eagle soar over the Staunton River or watching the sun rise over Buggs Island Lake,” he continued.

Telescopes will be available for loan from the Visitor Center, which is open daily from 8 a.m. to 4:30 p.m.



Staunton River Star Party

The Chapel Hill Astronomical and Observational Society, co-hosts of the Staunton River Star Party, donated two Newtonian reflector telescopes to the park to loan out to park guests. Participating in the presentation are Jayme Hanzak (CHAOS), Heather Griles, Park Manager Adam Layman, Grey Henderson, Colin Freitas and Robert Nielsen (CHAOS).

http://www.yourgv.com/news/local_news/article_fde8f1b4-6e57-11e4-a36d-431c1b509b1c.html?mode=print

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Staunton River State Park receives donated telescopes - YourGV.com: Local News

Park staff and CHAOS also announced a public observation session on Dec. 13 from 8 p.m. until 11 p.m. to view the Geminid meteor shower. The meteor shower will appear to originate from the constellation Gemini (from where the meteor shower gets its name), and at the peak the possibility exists to see up to 120 meteors per hour.

The public is invited and encouraged to dress warmly. Bring a flashlight, preferably with a red lens. If one doesn't have a red lens, park staff will cover the flashlight with red cellophane to help preserve night-adjusted vision.

Telescopes will be set up to view other objects in the night sky as well.

For more information or to make reservations, contact the Virginia State Parks Customer Care Center at 800-933-PARK or visit www.virginiastateparks.gov.

For specific information about Staunton River State Park, contact the park office at 434-572-4623 or email stauntonriver@dcr.virginia.gov.

http://www.yourgv.com/news/local_news/article_fde8f1b4-6e57-11e4-a36d-431c1b509b1c.html?mode=print

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Printed in *The Gazette-Virginian*, February 2, 2015.

2/3/2015

State park seeks dark sky certification - YourGV.com: County Life

State park seeks dark sky certification

Special to The Gazette | Posted: Monday, February 2, 2015 12:14 pm

Living in a rural area, residents are blessed with wonderful views of the night sky. Most residents of the U.S., however, are not so lucky. Urban lights intrude on the night sky (referred to as light pollution), and there are many who have never seen the stars at all.

Staunton River State Park is working to ensure that their night sky is protected for all to view and enjoy.

Staunton River State Park is in the process of applying for Dark Sky Park certification through the International Dark Sky Association (IDA). The IDA, based in Tucson, Arizona, is the only non-profit organization fighting to preserve the night.

Their mission is “to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting.”

The IDA defines Dark Sky Parks as those that are locations of exceptional nighttime beauty, dark skies education and preservation of the nighttime environment.

Staunton River State Park is working to join this exclusive list, as there are currently 20 parks worldwide certified as Dark Sky Parks. There are currently only two such parks on the East Coast.

Park Manager Adam Layman explains that there are numerous benefits to preserving the night sky.

“Just 100 years ago, everyone had a view of the Milky Way, but now most Americans can’t see it at all. Artificial light also disrupts nocturnal habits of animals, and plants and animals both depend on the light and dark cycle for natural rhythms and behaviors, which unnecessary nighttime lighting can affect. Limiting our nighttime lighting only to areas where it is needed, and only at a level that is needed, saves money on the electricity bill as well. There is also no scientific evidence that increased nighttime lighting deters crime, as extremely bright lighting emits glare that actually decreases nighttime vision, and crimes such as vandalism thrive on nighttime lighting.”

This certification also will be beneficial to the community in other ways, he continued.

“The Staunton River Star Party that we co-host with the Chapel Hill Astronomical Observational Society is growing each time it is held. We had over 150 astronomers come to Halifax County just to view our dark skies, drawing folks from up and down the east coast as well as from Canada just for this event. By earning this certification, those numbers will only increase. You can’t view the dark skies during the day, so these folks are venturing out to local restaurants, businesses and attractions during the daytime so there is a huge tourism benefit as well.”

http://www.yourgv.com/lifestyles/county_lifefarticle_062b5d20-aadd-11e4-91cc-07513e3a2d0b.html?mode=print

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State park seeks dark sky certification - YourGV.com: County Life

Layman added that the final application for Dark Sky Park certification should be submitted to the IDA in mid-March. The application packet includes a Lightscape Management Plan which sets guidelines for how the park lights its facilities, a lighting inventory to ensure that outdoor lighting is dark sky friendly, sky quality measurements and letters of support from agency and community leaders.

Park staff and volunteers have been working on the application for about a year and are excited about the potential this project holds.

“If all goes well, we should know whether or not we achieved certification sometime this summer,” said Layman.

http://www.yourgv.com/lifestyles/county_life/article_662b5d20-aadd-11e4-81cc-07513e3a2d0b.html?mode=print

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Acknowledgements

The staff of Staunton River State Park would like to express our sincere gratitude to the following individuals and organizations for their assistance in this project and continued support of Staunton River State Park and its dark skies:

- The Chapel Hill Astronomical Observational Society, and especially, Jayme Hanzak, President, CHAOS
- Leadership of Virginia State Parks, to include Craig Seaver, Director; Dave Collett, Interim Field Operations Manager; Tim Vest, District 5 Manager
- Molly Joseph Ward, Secretary of Natural Resources, Commonwealth of Virginia
- Tim Kaine, US Senate
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- Nancy Pool and Mitzi Riddle, Halifax County Chamber of Commerce
- Carl Espy, Town Manager, Town of Halifax
- Rebecca Ramey, Events Coordinator, Town of Halifax
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- BJ Seamans, Mecklenburg Electric Cooperative
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