

---

## ***CRESTONE COLORADO***

---



photo by Peter Ismert

---

***International Dark Sky Community Application***

---

## Table of Contents

---

DEDICATION.....	3
ABOUT US .....	4
LETTERS OF NOMINATION.....	19
LETTER FROM CRESTONE BOARD OF TRUSTEES.....	21
CRESTONE'S LIGHTING ORDINANCE .....	23
CRESTONE'S COMMITMENT TO DARK SKIES.....	39
COMMUNITY EVENTS.....	49
COMMUNITY INITIATIVES .....	54
LIGHTING INVENTORY .....	65
NIGHT SKY QUALITY MEASUREMENT REPORT .....	72
LIGHTING MANAGEMENT PLAN .....	75
LETTERS OF SUPPORT.....	76
ACKNOWLEDGEMENTS.....	93
APPENDIX A.....	96
APPENDIX B.....	97
APPENDIX C.....	98
APPENDIX D.....	99
APPENDIX E.....	100
APPENDIX F .....	114
APPENDIX G.....	115
APPENDIX H.....	116
APPENDIX I.....	122

## DEDICATION

---

This application is dedicated to the Earth and the Sky.



photo by Lori Nagel

### Giving Voice

Saving the night sky is a giant step toward healing the earth.  
All creatures depend on the cycles of light and dark.  
Yet, no creature has a voice except us.

Crestone acknowledges the Rights of Nature  
Thus we send this application forth  
In our name and in the name  
Of all creation.

## ABOUT US

---

### Crestone's Vision Statement reflects Our commitment to the Environment

*Historic Crestone, Colorado exemplifies small mountain town beauty within a community committed to sustainable living practices and spiritual traditions. The town continues to celebrate its pioneering spirit and unique diversity through contemporary self-reliance. Crestone's goals are to enhance economic viability, environmental preservation, renewable energy use, and social responsibility.*

Crestone's commitment to the environment is embodied in our Vision Statement, and it's reflected in our communities' choices. We have a solar powered Charter School, and the longest running energy fair in the nation. The Crestone Board of Trustees unanimously passed a resolution to recognize The Rights of Nature, and Crestone hosted the Teyuna.

In 1995, two residents began a five-year campaign to preserve our night sky. This campaign is documented in a series of articles published in our local newspaper, The Crestone Eagle.

The initiative resulted in citizens donating enough money to replace all of our standard street lights with Hubble Sky Caps. Many residents and businesses replaced, or retrofitted, bright lights, and Crestone passed—and shortly thereafter updated—its first lighting ordinance.

The Crestone Board of Trustees is fully behind this application. Five of its members make up the Crestone Dark Skies Committee. Many residents eloquently responded to an ad in the newspaper asking for letters of support, and two new residents donated 3 fully shielded IDA approved lights to show their support of this application. A business owner donated a year's worth of advertising to promote the Dark Sky cause.

Our community is more than dedicated to preserving the Dark Sky, it is built into our community DNA. It is naturally part of who we are and what we do. We've been actively protecting our night sky for more than 25 years, and we will continue to preserve, protect and honor it always.

Thank you for considering our application to become an IDA certified Dark Sky Community.



photo by Lori Nagel

**There's a saying in Crestone, "The Journey Begins at the End of the Road."**

Crestone is a diverse community of individuals seeking a vast array of lifestyles.

Pilgrims come for the spiritual centers; mountain climbers and hikers for the trails; artists, environmentalists, alternative builders and hippies come because "their kind" is "our kind" and all are welcome.

There are also old-timers who grew up here and some of their families harken back to the pioneer days. They graciously welcomed us all! Beyond all our differences, we all revere the earth, the air and our dark night sky.

We are all *"Children of the Stars."*



## Our Dark Sky Motto

Patrick Moore's beautiful painting entitled "We are Children of the Stars" has become the Town's motto, and will be used as signage, on coffee mugs, T-shirts, etc. going forward if we become designated as an International Dark Sky Community.

The original painting was entitled "Singing with the Stars". Patrick offered to help the Town create a motto, and he created a different painting entitled "We are Children of the Stars" and then reworked that painting several times to make minor revisions at the Town's request.

Patrick was a successful trial lawyer in Houston. After 25 years as an attorney, he left his profession and worldly goods and headed to the wilderness with a tent, writing and painting journals and beloved canine companions. Inner listening brought Patrick to Crestone. Though he had never heard of the town before, he felt it important to have a look. Crestone has been his home for ten years now and, in addition to his painting, he has beautified the town with his Fellowship of the Flowers project. He is also a Founder of Pet Partners.

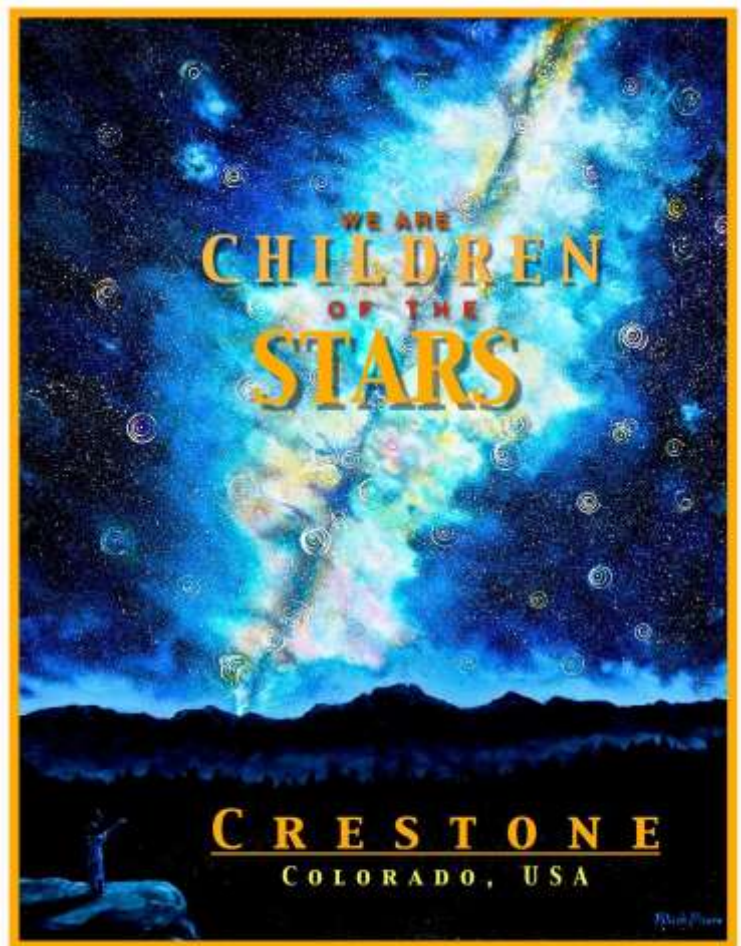


Image by Patrick Moore

His inspired painting has created our community motto which, in turn, has created an enduring legacy for residents and visitors now and in the years to come.

When Carl Sagan was a young boy he went to the 1939 World's Fair and his life was changed forever. From his days star gazing from the bedroom window of his Brooklyn apartment, to his work as an internationally renowned scientist who worked on the Voyager missions, exploring the farthest reaches of space, he never stopped marveling at the universe and seeking to understand it better. He brought the mystery of the cosmos into homes across America to a new generation of dreamers and star gazers.

“The cosmos is within us. We are made of star stuff,” Sagan famously stated. His statement sums up the fact that the carbon, nitrogen and oxygen atoms in our bodies, as well as atoms of all other heavy elements, were created in previous generations of stars over 4.5 billion years ago. His statements have been corroborated many times over by scientists. For that reason, the Town of Crestone has chosen as its motto: “We are Children of the Stars.”

## History

### *The path from Gold to God*

In the 1860s, the United States granted a large section of land south of Crestone to the heirs of Luis Maria Baca. The family deeded the land to their attorney, and eventually it went into tax sale. In 1885, the Luis Maria Baca Land Grant became the property of George Adams. Adams, in 1880 had already platted the town of Crestone, but it was then little more than a mining camp with a Post Office.



However, In 1900 Adams teamed up with some Eastern Investors and ignited a minor gold rush. They reopened one of the more promising mines and built a railroad spur to the town. Almost overnight, a hotel sprung up in Crestone along with an assortment of saloons and general stores. The *Salida Record*, in February of 1901, described the excitement, "The building boom has begun in earnest. Every coach is loaded with people. Many new schemes are set afloat ... All of which is due to the fact that Crestone is known to be a beautiful place in which to live ..."

At its peak, there were around 800 residents and an estimated 2,000 people in the larger district. Unfortunately, lacking good ore, the boom soon fizzled, and by the 1950s, there were only about 40 people living in town.

The Crestones fortunes changed again in the 1970's. The Arizona-Colorado Land and Cattle Company, another land developer, set up shop in the area. They built a welcome center, put in a landing pad, and created infrastructure for a huge development. Sales lagged and by 1979, the land was considered a liability. Maurice Strong, owner of a controlling interest in the company, and his fiancée Hanne Marstrand visited the development and "fell in love with it." The Strong's were inspired to create a world spiritual center and began granting parcels of land to traditional spiritual organizations.

Once "spirituality/god" replaced gold as the guiding principle of the community, the area began to flourish.

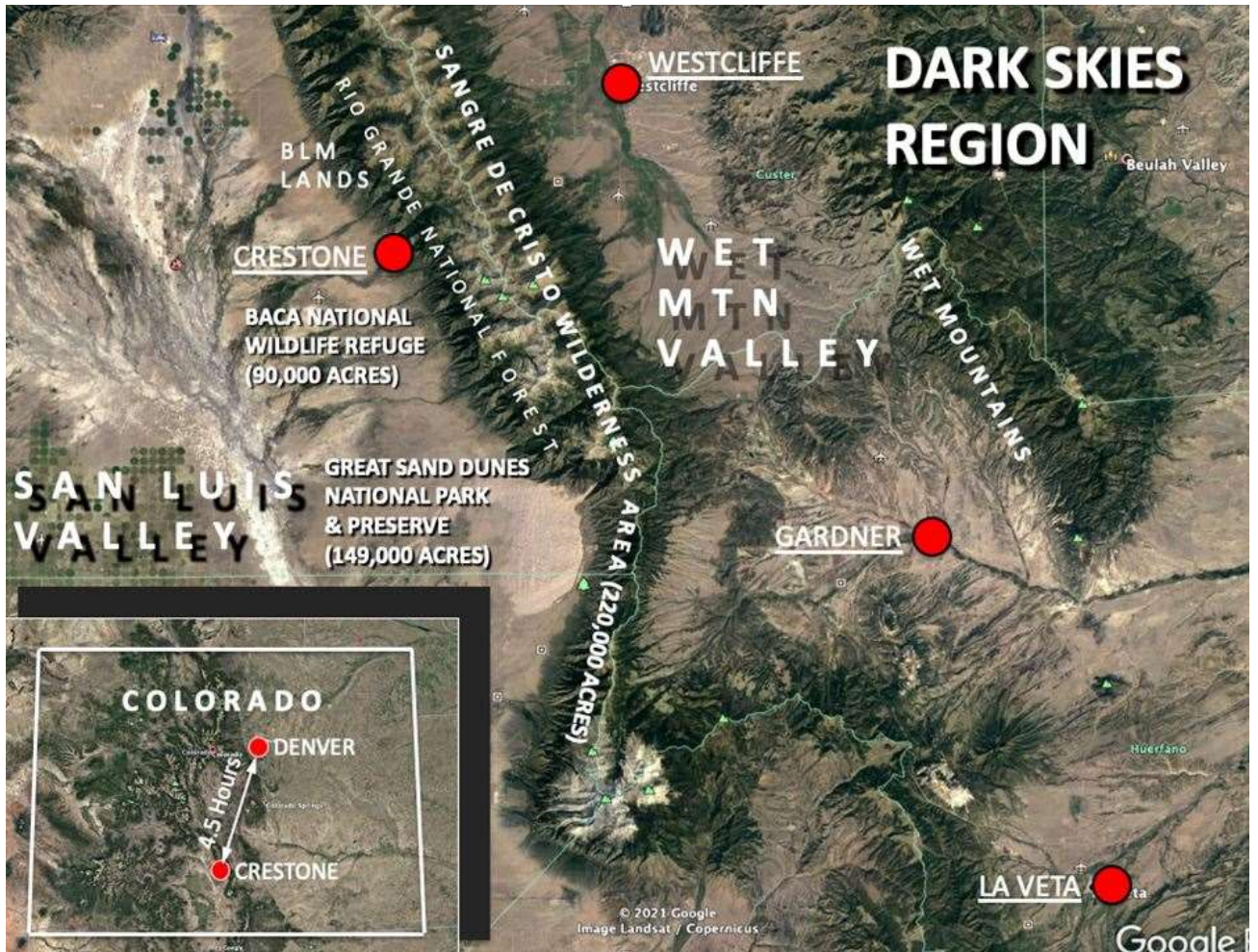


## Crestone Today

The Town of Crestone is blessed with high elevation (8,000 feet) and low humidity. A combination that provides frequently clear night skies, far removed from Colorado's Front Range light pollution.



The Town of Crestone is a legally incorporated statutory community and was incorporated in 1880. Crestone is located near the 38th parallel, in the San Luis Valley in south central Colorado. In more technical terms, Crestone is located at 37°59'45"N 105°41'59"W (37.995792, -105.699757). According to the United States Census Bureau, the town has a total area of 0.42 square miles, all of it land.





## Gardening

Gardening is a major pastime in Crestone. Gardens are everywhere from large scale agriculture to neighborhood community gardens. In 2019, right in the heart of downtown Crestone, a group of gardeners got together to create a community garden to provide fresh produce to the local food bank. The Little Shepherd Episcopal church donated the land and the Crestone Town Counsel Board of Trustees donated the use of the Town Hall Greenhouse for year round production. By 2020 the garden was in full bloom! It is so successful, they are now looking for a place to build a storage unit for all their produce.



photo by Lori Nagel



photo by Lori Nagel

## Sustainability

Miles from any major highway, Crestone is known internationally for its alternative buildings and has approximately 100 sustainable homes in the area. In the 80's Crestone became a leading example of how communities can become green, promoting a better living and built environment for everyone. Those

radical ideas are becoming the “new norm”. Every August Crestone continues to celebrate green energy solutions with its Crestone Energy Fair, the longest consecutively running alternative energy and sustainability fair in the nation.

## The Arts

The arts are an important part of the Crestone community. We are blessed with creativity of every kind, including internationally known visual artists and well recognized poets and potters, photographers, writers, healers, film makers, muralists, performance artists and creatives of all types. The elemental energy and scenic grandeur of the area inspires and nurtures their artistic souls.



photo by Lori Nagel

In 2015, Crestone was awarded the designation of Colorado Creative District thanks to the hard work of Crestone Mayor Kairina Danforth and a group of Crestone creatives. The designation is awarded to towns for their contribution to the state's economy through creativity, culture and the arts.

## Off the Beaten Path

Off the beaten path, Crestone has been slowly evolving into a recreation and tourist destination. While encouraging tourism, especially eco-tourism, Crestone's overarching goal is to keep the unique character that makes Crestone what it is. 20 The "real" Crestone is a lot of things. Mostly it is a close knit community, with real, ready



caring and support for one another – a "real" community most of us feel privileged to be a part of and want never to change. The "real" Crestone is portrayed beautifully in a short (eight minute) film entitled "A Place of the Heart", by Mark Elliott an internationally known filmmaker who lives here. This film seeks to help others understand the unique beauty and creativity and community spirit that is the "real" Crestone. Its clean water and air, vast space, surrounding national forests, wilderness, wildlife refuge, sand dunes, exceptional darkness, deep silence, rich cultural history, synchronicity and unique flavor of community interaction, all of these things draw people to Crestone. The town, adjacent subdivision and retreat centers together comprise the Crestone community. For a small, isolated community, Crestone has an unbelievably diverse international population that understands the unique beauty and creativity and community spirit that is the "real" Crestone.



## Spiritual Centers



photo by Stephen Hume

The area has become a spiritual mecca for different beliefs and spiritual traditions. The Crestone community has more spiritual centers per square foot than any other place in North America, including ashrams, temples, monasteries, retreat centers, labyrinths, and stupas, and is probably the only place in the US where a ziggurat doesn't look out of place.



photo by Peter Ismert



## Outdoor Recreation



photo by Lori Nagel

The mountains attract recreationists who come to experience the extraordinary beauty of the landscape while hiking or climbing in the nearby Sangre de Cristo Wilderness, which offers some of the best climbing opportunities in the State of Colorado. Colorado has 58 mountain peaks exceeding 14,000 feet, (referred to as 14'ers), many of which surround Crestone.

## Downtown

Although our population is small, only 185, our business district serves the 2,000+ residents of the adjacent Baca Grande Subdivision, as well as customers as far away (17 miles) as Moffat. The Baca is also home to many spiritual centers, and in the summer, the retreat centers attract over 30,000 visitors and retreatants annually.

This large customer base, and the unique character of our residents, makes our markets surprising cosmopolitan. We have 2 full-service grocery stores. One, the Elephant Cloud Market is a thriving Health Food Store. The produce is plentiful, varied, organic and fresh, and the store is stocked to cater to any dietary regime. The Crestone Mercantile Grocery has a butcher shop that serves local, organic meats and poultry as well as grass-fed beef. They offer a mixture of conventional and organic products that also reflects the eclectic tastes of our community.

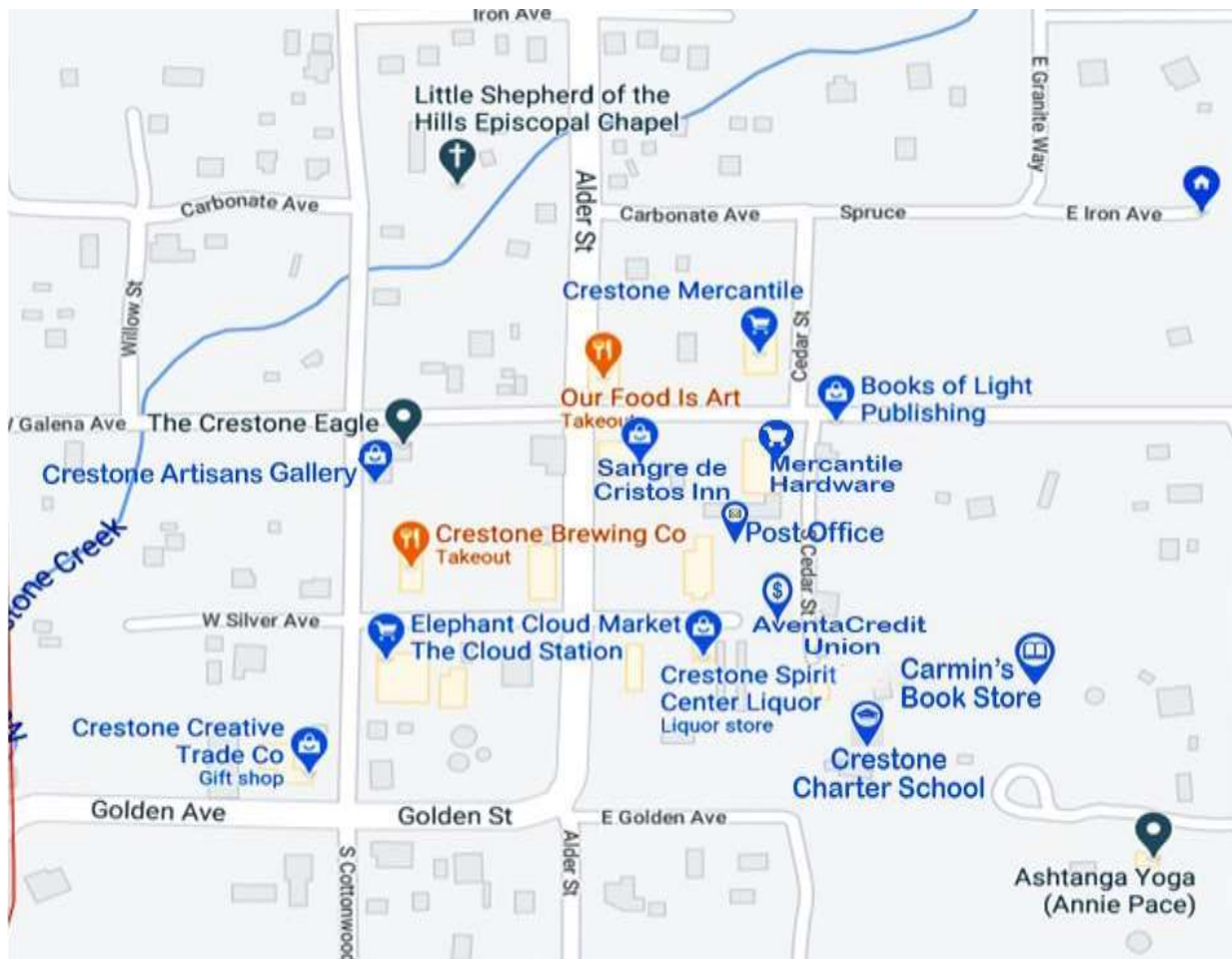
Our businesses are, without exception, locally owned and locally operated. Crestone's vibrant downtown includes the Crestone Brewery, a Pub offering handcrafted beer and a great menu. "Our Food is Art" restaurant serves tacos, burgers and beyond. For breakfast and lunch the Cloud Station coffee shop is the place to be.

Local creatives are represented in the beautiful Crestone Artisans Gallery, and the Crestone Artists annual Open Studio Tour offers access to the work and studios of visionary artists who draw inspiration from the environment and their own wellsprings of creativity.

We have several gift shops, real estate offices and healers offering their services in our downtown buildings.



photo by Lori Nagel



## Crestone Charter School



photo by Lori Nagel

Crestone Charter School serves 90 students, K-12, in multi-age classrooms. It offers innovative educational programming. In 2006, the Crestone Charter School high school program was named one of the top three schools for academic achievement in the state by the Colorado Department of Education. The John Irwin Award for Academic Excellence was twice awarded to the school.

The School runs on 100% solar energy. In addition to academic excellence, the school also strives to broaden students' cultural experience. An Expeditionary Program gives students a leg up into global citizenship through service learning, academic and cultural studies in Japan, Costa Rica, India, and Mexico.

## Charter School formed an Astronomy Club

"As a founding member of Crestone's homeschooling parent alliance, I couldn't be more thrilled to support our town's efforts to become an internationally recognized Dark Sky community. As parents and teachers, we work very hard to give our kids access to rich and engaging educational opportunities. One of these opportunities is in the beautiful night sky above us. This school year, we've established an astronomy club, which gathers weekly to give kids, teenagers, and their families a chance to look upwards and learn together about the stars, planets and constellations. Crestone and the surrounding San Luis Valley of Colorado is especially blessed with an astonishingly clear view of the night sky. As a member of the International Dark Sky Association, we know that our wonderful night sky will be preserved... not only for our own kids, but for generations to come."

**-Daya Scheide, Charter School Teacher and Parent**

## Colorado College

The Baca Campus of Colorado College was established in 1987. Since then, the yearly migration of Colorado College students has become a part of Crestone culture. The students are required to have hands-on experience in their field of study, and just last January 2021 the Town began working with a renewable energy student to research and apply for grants.



### Colorado College plans to build an Observatory and Planetarium at the Baca Campus

Colorado College is planning to build a research observatory and planetarium at its Baca Campus, a part of the Baca Subdivision, adjoining the Town of Crestone. Colorado College students and faculty will use the observatory, but the college also intends for it to be used by the local community and our Charter School kids. An open-air planetarium, similar in design to the one at Chaco Canyon is part of the plan. See [Appendix D](#) for more details.



## The End of Life

We care for each other and offer ready support for our friends, our neighbors, and our community. We also take special care for those who have passed. The Crestone End of Life Project offers the only non-sectarian, community driven open-air cremations In the United States. Open-air cremations are an ancient and inspirational ceremony. The Crestone Cemetery was the first certified Green Burial cemetery in Colorado and is still the only certified Natural Burial Ground in Colorado.



photo by Lori Nagel

## Pristine Environment

Our isolation is one of our greatest strengths. Far from the cities and surrounded by public lands, we can more easily protect our environment. The clean water and air, the vast pristine space surrounding us, and our exceptional dark sky nurtures us and inspires us to “take care!”

Poster on Highway 17, Designed and Paid for by Crestone resident, Paul Kloppenburg.



photo by Lori Nagel



# LETTERS OF NOMINATION

---



United States Department of the Interior

**GREAT SAND DUNES NATIONAL  
PARK AND PRESERVE**

11500 Highway 150  
Mosca, Colorado 81146



Nov. 20, 2020

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

Dear IDA Board of Directors:

As an IDA member in good standing, I am writing this letter to formally nominate the Crestone, Colorado community for certification as a dark sky community. The Crestone community borders Great Sand Dunes National Park and Preserve to the north, and as you are aware, Great Sand Dunes National Park and Preserve was certified as an International Dark Sky Park (Gold Tier) in the spring of 2019. The park and the Crestone community have cooperated many times on preserving and celebrating the dark night sky. During the Great Sand Dunes application process, there were several sky quality readings done with sky quality meter (sqm) on the north boundary of the park. The values of these readings were quite dark.

The Crestone Community and the park have collaborated on several "star parties" and astronomy festivals when National Park Service night sky rangers and volunteers would give night sky presentations and telescope demonstrations to the Crestone Community. In addition, when the National Park Service was working on the dark sky park certification, the Crestone Community, including the Baca Grande Subdivision and the Crestone Charter School, wrote letters in support of the NPS nomination.

Crestone's setting lends itself very well to an excellent candidate for the dark sky status. It is nestled up against the 14,000-foot Sangre De Cristo Mountains which shelter it from much of the skyglow from the cities of Colorado's front range. In addition, there is an effort underway in the greater area to pursue certification as a dark sky reserve. While this effort is in the early stages of development, having the dark sky community certification for Crestone would greatly compliment it.

I am pleased to have this opportunity to serve as a member of IDA and of the National Park Service and nominate the Crestone Community as a dark sky community. I fully believe that it deserves this recognition. Should you have questions please contact me at [fred\\_bunch@nps.gov](mailto:fred_bunch@nps.gov) or (719) 378-6361.

Sincerely,

Fred Bunch

# Letter from Superintendent Of the Great Sand Dunes National Park and Preserve



United States Department of the Interior  
NATIONAL PARK SERVICE  
Great Sand Dunes National Park and Preserve  
11500 State Hwy. 150  
Mosca, CO 81146



February 2, 2021

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

Dear IDA Board of Directors,

On behalf of Great Sand Dunes National Park and Preserve, I wish to express my strong support for the community of Crestone, Colorado, receiving certification as an International Dark Sky Community. Crestone borders Great Sand Dunes to the north and is a critical partner in helping to protect the dark sky over the park and maintain the park's certification as an International Dark Sky Park (gold tier).

The park and the community of Crestone have a history of collaborating on "star parties" and astronomy festivals in which National Park Service night sky rangers and volunteers have given night sky presentations and telescope demonstrations to the Crestone community and visitors. Crestone's setting lends itself very well to an excellent candidate for the dark sky status. It is nestled up against the 14,000-foot Sangre de Cristo Mountains, which shelter it from much of the skyglow from the cities of Colorado's Front Range.

Finally, there is an effort underway in the greater area to pursue certification of the Sangre de Cristo International Dark Sky Reserve. The mayor of Crestone initiated this effort and continues to provide leadership for the process. While this effort is in the early stages of development, having the dark sky community certification for Crestone would greatly compliment it and move the effort in the right direction. Ultimately, the certification of a dark sky reserve will be instrumental in preserving dark skies over Great Sand Dunes for generations to come.

I fully believe that Crestone deserves this recognition and am pleased to offer my support.

Sincerely,

Pamela Rice  
Superintendent

# LETTER FROM CRESTONE BOARD OF TRUSTEES

---



January 2, 2021

Board of Directors  
International Dark Sky Association  
3223 North First Avenue  
Tucson, AZ 85719

Dear Board Members:

Speaking for Crestone's governing Board of Trustees, this letter asks your favorable consideration of our application for accreditation as an international dark sky community.

The Town of Crestone, adjoining Baca Grande Subdivision and the many surrounding spiritual Centers together form a single and unified community. A community that looks up at the same dark night sky. We are a close knit community. Our businesses are, without exception, locally owned and locally operated. We care for each other and offer ready support for our friends, our neighbors, our community, and our dark night sky. Ours was one of the early dark sky protection initiatives in the State of Colorado as we began our community dark sky program, in concert with the adjacent Baca Subdivision, in May of 1995. Though our size is small, our resolve to preserve our dark night sky is unassailable.

The clean water and air, vast surrounding pristine space, exceptional dark sky, deep silence, rich cultural history, world's wisdom traditions, synchronicity and unique flavor of community interaction, all these things draw people to Crestone. The magic of Crestone is the blending together of earth, sky, rock, water, mind and spirit. Located at the nexus of ley lines, Crestone is one of the highest energy centers in the US. Like Mount Shasta and Sedona, Crestone is a sacred land. US News and World Report in its special edition of November 28, 2007 named Crestone as one of the world's thirteen most sacred sites.

The Town of Crestone is blessed with high elevation (8,000 feet) and generally very low humidity. We are far removed from Colorado's Front Range light pollution, and the only known municipality in the United States with external borders surrounded by wilderness, wildlife refuge, national forest and sand dunes. This combination of circumstances provides unusually clear night skies. Our community recognizes and holds dear this exceptional darkness.

The best evidence of Crestone's deep commitment to preserving its naturally dark night sky and to fostering an improved outdoor nighttime quality of life for its residents and visitors is the passage of its pioneering Rights of Nature Resolution. The Rights of Nature movement recognizes that ecosystems and other natural entities have fundamental rights to exist, just as

humans do. It establishes a relationship of respect, rather than exploitation, between humans and nature. The Rights of Nature is now recognized at some level in some twelve countries across the world and in hundreds of cities.

On July 9, 2018, Crestone's Board of Trustees passed a resolution recognizing the Rights of Nature. It stated that "the Town of Crestone does officially recognize that nature, natural ecosystems, communities, and all species possess intrinsic and inalienable rights which must be effectuated to protect life on Earth." The resolution also acknowledged the deep spiritual connection between residents of Crestone and the natural world and embraced the community's role as stewards of nature.

Since its passage, Crestone's Rights of Nature' Resolution has inspired many others. It is included on the U.N. Harmony with Nature Initiative website, where scholars across the world have used it for inspiration for their own Rights of Nature work. It was also featured in the first-ever law school coursebook on the Rights of Nature, entitled "Earth Law: Emerging Ecocentric Law--A Guide for Practitioners" (Wolters Kluwer, 2021). Finally, advocates such as Earth Law Center have used the resolution's text in Rights of Nature legal drafting efforts in other locations.

Though we live in a time of unparalleled tumult and divisiveness, this application reflects a unified will to protect the wonderful gift we receive, every night, when we look up at Crestone's star-filled night sky, often showing off a Milky Way pathway to its "Children of the Stars". It is our hope that you may consider it favorably.

Sincerely,

A handwritten signature in dark ink, appearing to read 'K. Danforth', with a stylized flourish at the end.

Kairina Danforth, Mayor  
Town of Crestone

# CRESTONE'S LIGHTING ORDINANCE

---

## TOWN OF CRESTONE, COLORADO

### ORDINANCE #2021-001

#### **AN ORDINANCE OF THE BOARD OF TRUSTEES OF THE TOWN OF CRESTONE AMENDING ORDINANCE #2020-004 (AN ORDINANCE OF THE TOWN OF CRESTONE REPEALING AND REPLACING ORDINANCE 2019-001 WITH AMENDED PROVISIONS OF LIGHTING ORDINANCES IN THE TOWN OF CRESTONE)**

**WHEREAS**, The Board of Trustees of the Town of Crestone passed Ordinance #2020-004 on December 14, 2020; and

**WHEREAS**, the Town of Crestone in furtherance of its application to the International Dark Sky Association (IDA), wishes to enact lower lumen levels and to give priority to matters of public safety, as determined by the Crestone Town Clerk.

**NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF TRUSTEES OF THE TOWN OF CRESTONE, COLORADO** that Ordinance 2020-004 be amended to read as follows:

## TOWN OF CRESTONE, COLORADO

### ORDINANCE #2020-004

#### **AN ORDINANCE OF THE BOARD OF TRUSTEES OF THE TOWN OF CRESTONE AMENDING THE ZONING REGULATIONS OF THE TOWN OF CRESTONE TO INCLUDE A SECTION RELATING TO ILLUMINATION AND CREATING A "DARK SKY" SECTION OF SAID REGULATIONS FOR THE TOWN.**

**WHEREAS**, The Board of Trustees of the Town of Crestone has received various complaints from citizens concerning unshaded lighting in the Town, which resulted in the passage of Ordinance 2019-01 (which amended previous lighting ordinances in the Town) declaring the failure to shade exterior lighting fixtures to be a nuisance; and

**WHEREAS**, in furtherance of its commitment to preserve and protect the dark skies of our community, the Town of Crestone joins the growing number of communities that have adopted ordinances to protect its dark night skies against pollution by artificial lighting; and

**WHEREAS**, in adopting this ordinance, Crestone seeks to strike a balance between the rights of property owners to make reasonable use of nighttime outdoor lighting for safety and security and the desire of community residents to preserve the exceptional quality of its dark night sky and their ability to view the brilliant nighttime stars; and

**WHEREAS**, scientific understanding of the relationship between dark skies and health is relatively recent, but the evidence of the harmful effects of artificial outdoor lighting on humans and other living things is mounting; and

**WHEREAS**, recent studies show that dark skies promote the health of both humans and wildlife by supporting natural diurnal and nocturnal bio-rhythms and thus promoting adequate sleep and rest; and



WHEREAS, other studies have shown that dark skies help protect food supplies and agricultural interests by facilitating the work of nighttime pollinators, which become disoriented in artificial light; and

WHEREAS, the experience of other communities has shown that adoption of local dark sky ordinances promotes eco-tourism -- particularly if the ordinances meet the standards of the International Dark Skies Association (IDA), which ensure that visitors and residents will be able to enjoy the celestial wonders of the night sky; and

WHEREAS, imposing reasonable shielding limitations on artificial nighttime lighting also eliminates light pollution and protects against "light trespass", which disrupts the nighttime quietude of neighboring property owners; and

WHEREAS, the Board of Trustees of the Town of Crestone has been made aware that the adjacent Great Sand Dunes National Park is being considered for designation of a "Dark Sky Reserve" by the International Dark Sky Association, has received the sentiments and desires of local citizens and has determined that it would be in the best interests of the Town to be classified as a "Dark Sky Community" by the International Dark-Sky Association, in order to protect and preserve the quality of life, health, and safety of the citizens of the Town of Crestone by providing adequate lighting, enacting a street light plan, and mandating outdoor lighting that prevents and reduces unnecessary light pollution, and;

WHEREAS, this ordinance incorporates standards established by the International Dark Skies Association and is intended to qualify Crestone for IDA certification, to secure for the community the benefits of that certification.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF TRUSTEES OF THE TOWN OF CRESTONE, COLORADO that Chapter 15 (Zoning) of the Crestone Municipal Code be amended by addition of the following Article:

Article 14 (Outdoor Lighting/Dark Sky Regulations.)

Sec. 15-14-10. - Title, purpose and scope.

- (a) This article shall be known and cited as the "Outdoor Lighting/Dark Sky Regulations."
- (b) The purpose of this article is:
  - (1) To reduce glare and improve nighttime visibility which contributes to safer, more secure, and attractive outdoor living spaces;
  - (2) To encourage efficient, controlled lighting that conserves energy;
  - (3) To make our community a better place to live and work and a more inviting place for tourist to visit;
  - (4) To protect properties from light trespass;
  - (5) To preserve our heritage of a clear, dark night sky; and
  - (6) To position the Town to apply for a designation as an International Dark Sky Community.
- (c) Scope
  - (1) This article shall apply within the Town limits, hereinafter referred to as "Town".
  - (2) Nothing herein shall be construed as preventing or limiting the Town from applying this article within the surrounding areas where the Town asserts powers of extraterritorial jurisdiction through agreements with property owners, or as a term affixed to a conditional use approval (or a variance).

Sec. 15-14-20. - Definitions.

(a) The following definitions are hereby adopted for the purposes of this article:

*Adaptive controls* mean mechanical or electronic devices, when used in the context of outdoor lighting systems, intended to actively regulate the switching, duration, and/or intensity of light emitted by the outdoor lighting system. Examples of adaptive controls include timers, dimmers and motion-sensing switches.

*Beam of a light fixture* means the spatial distribution of the emitted light.

*Correlated Color Temperature (CCT)* means a measure of the color properties of light emitted by lamps, being equal to the temperature, expressed in Kelvins (K). CCT values are typically provided on lighting manufacturer packaging or data sheets.

*Decorative holiday lighting* means low-intensity string lights, whose luminous output does not exceed fifty (50) lumens per linear foot, and fully shielded floodlights, whose luminous output does not exceed one thousand (1,000) lumens and which are aimed and oriented in such a way as to not create light trespass onto another property nor into the night sky, operated only during prescribed periods of time during the calendar year.

*Electronic Message Display* means any illuminated sign of an informative or advertising nature, whether on-or off-premises, and operable at night, whose content is made visible to the viewer by means of luminous elements under active electronic control and therefore subject to alteration in order to vary the content of the message. Electronic displays may be either static or dynamic in terms of light color and intensity.

*Existing light fixtures* means those outdoor light fixtures already installed at the time this article is adopted.

*Floodlight* means a light fixture having a wide beam.

*Fully Shielded* means an outdoor luminaire constructed so that in its installed position, all of the light emitted from the light fixture is projected below the horizontal plane passing through the lowest light-emitting part of the fixture.

*Glare* means visual discomfort or impairment caused by a bright source of light in a direction near one's line of sight.

*Greenhouse* means any building that is constructed of glass, plastic, or other transparent material in which plants are grown under climate-controlled conditions and includes hoop houses and other similar structures.

*Illuminance* means the intensity of light in a specified direction measured at a specific point.

*Light source* means a light emitting portion of the luminaire and any diffusing elements and surfaces intended to reflect or refract light emitted from the lamp individually or collectively, for example, a lamp, bulb, lens, highly reflective surface, or frosted glass.

*Light pollution* means the unintended, adverse and /or obtrusive effect of the use of outdoor light at night.

*Light trespass* means light emitted from fixtures designed or installed in a manner that unreasonably causes light to fall on a property other than the one where the light is installed, in a motor vehicle drivers' eyes, or upwards toward the sky. If the light appears star-like from another property or the public roadway, the light is creating light trespass. It is expected that the illumination produced by a light source may be viewed from other properties but the light source itself should not be visible from other properties. Exhibit 3 of Section 15-14-90 is a sample educational illustration about light trespass.

*Lumen* means the unit of measurement used to quantify the amount of light produced by a bulb or emitted from a light source. Lumen values are typically provided on lighting manufacturer packaging or data sheets. For the purposes of this article, unless otherwise stated, the lumen output values shall be the initial lumen output ratings as defined by the manufacturer, multiplied by the lamp efficiency. Lamp efficiency of 95% shall be used for all solid-state lamps and 80% for all other lamps, unless an alternate efficiency rating is supplied by the manufacturer.

*Lumens per Net Acre* means the total outdoor light output, as defined in this article, divided by the number of acres, or part of an acre with outdoor illumination. Undeveloped, non-illuminated portions of the property may not be included in the net acreage calculation.

*Luminaire* means a complete lighting assembly or lighting fixture, consisting of a lamp, housing, optic(s), and other structural elements, but not including any mounting pole or surface.

*Luminance* is a measure of light emitted by or from a surface.

*Nit* is the standard unit of measure of luminance used for internally illuminated signs, digital signs, or electronic message displays.

*Outdoor Lighting* means temporary or permanent lighting that is installed, located, or used in such a manner to cause light rays to shine outdoors. Nonresidential fixtures that are installed indoors that cause light rays to shine outside are considered outdoor lighting for the intent of this article. See Exhibit 1 of Section 15-14-90 for an illustration of this type of situation. Residential fixtures installed indoors generating more than 3,800 lumens (approximately equal to a 300-watt incandescent bulb) that cause light to shine outside are also considered outdoor lighting for the intent of this article. All of the lighting that illuminates the translucent portion of a greenhouse or solarium, including roofing material, is considered outdoor lighting for the intent of this article.

*Private lighting* means outdoor light fixtures that are owned or leased or operated or maintained or controlled by individual persons, including but not limited to families, partnerships, corporations, and other entities engaged in the conduct of business or other non-governmental activities.

*Public lighting* means outdoor light fixtures that are owned or leased or operated or maintained or controlled by the Town or other governmental entity or entities completely or partly funded by grants obtained by the Town or its agents from federal, State or private sources. The light fixtures are normally located on, but are not limited to, streets, highways, alleys, easements, parking lots, parks or playing fields.

*Sag-lens or drop-lens fixture* means a fixture, typically seen on older streetlights or parking lot lights, where the lens extends below the lowest opaque part of the fixture such that light is scattered above the horizontal plane.

*Searchlight* means a light fixture having a narrow beam intended to be seen in the sky.

*Spotlight* means a light fixture having a narrow beam.

*Temporary lighting* means non-permanent lighting installations installed and operated for a duration not to exceed thirty (30) days.

*Total outdoor light output* means the total amount of light, measured in lumens, from all outdoor light fixtures within the illuminated area of a property. The lumen value to be used in the calculation is the lumen value as defined in this article. To compute the total, add the lumen outputs attributed to each light fixture together.

Sec. 15-14-30. – Nonconforming existing outdoor light fixtures.

(a) All existing outdoor lighting that was legally installed before the enactment of this article, that does not conform with the standards specified by this article shall be considered nonconforming. Nonconforming outdoor lighting is allowed to remain until required to be replaced pursuant to the terms of this article.

(b) If more than fifty percent (50%) of the total appraised value of a structure (as determined from the records of the county's assessor), has been destroyed, the nonconforming status expires and the structure's previously nonconforming outdoor lighting must be removed and may only be replaced in conformity with the standards of this article.

(c) Nonconforming outdoor lighting shall be brought into conformance with this article as follows:

(1) Nonresidential Application. All existing outdoor lighting located on a subject property that is part of an application for a rezoning application, conditional use permit, subdivision approval, or a building permit for a major addition is required to be brought into conformance with this article before final inspection, issuance of a certificate of occupancy, or final plat recordation, when applicable. For the following permits issued by the Town, the applicant shall have a maximum of 90 days from date of permit issuance to bring the lighting into conformance: site development permit, sign permit for an externally or internally illuminated outdoor sign, initial alcoholic beverage permit, initial food establishment permit, and on-site sewage facility permit.

(2) Residential addition or remodel. Nothing herein shall be construed to terminate a residential property's nonconforming status as a result of an addition or remodel. However, all outdoor residential lighting that is affixed to a construction project requiring a building permit is required to conform the standards established by this ordinance.

(3) Abandonment of nonconforming. A nonconforming structure shall be deemed abandoned if the structure remains vacant for a continuous period of six (6) months. In that instance, the nonconforming status expires and the structure's previously nonconforming outdoor lighting must be removed and may only be replaced in conformity with the standards of this article.

(d) It is unlawful to expand, repair or replace outdoor lighting that was previously nonconforming, but for which the prior nonconforming status has expired, been forfeited, or otherwise abandoned.

(e) Outdoor lighting on any property that is not in conformance with this article shall be brought into conformance with this article within five (5) years from the date of adoption of this article. All new construction and/or new luminaires installed (including replacements for existing fixtures) shall comply after the adoption of this article.

(f) Amortization Extension. Residential property owners may request from the Town an amortization extension of up to a maximum of ten (10) years from the date a nonconforming fixture was installed provided that the fixture was compliant with existing Town ordinances at the time it was installed, and that date of installation can be substantiated via documents, date stamped photographs, etc. or, at the prerogative of the Town Clerk, corroborative written statements.

(1) Amortization extensions to the date at which outdoor lighting shall conform with this article shall be on a per fixture basis with the following requirements:

- (i) The light fixture must be documented to cost at least \$100 when originally purchased;
- (ii) The fixture cannot be brought into compliance by changing the bulb or lighting element or installing shielding;
- (iii) If the bulbs or other lighting elements of the fixture require replacement during the amortization period, the replacement bulbs or lighting elements shall not be rated in excess of 2700 Kelvin.

#### Sec. 15-14-40. - General Provisions

(a) Shielding.

- (1) Unless exempted elsewhere in this article, all outdoor lighting shall be fully shielded.
- (2) New streetlights shall be fully shielded fixtures of approved historical design, utilizing a minimum output consistent with the safety of drivers and pedestrians.
- (3) Mounting height or topography or proximity to other properties may cause public or private outdoor light fixtures to require additional shielding to prevent glare or an unsafe condition on properties other than the one on which it is installed.
- (4) All of the lighting that illuminates the translucent portion of a greenhouse or solarium must be shielded so that no direct light shines outside of the structure and no more than 4% of the reflected or refracted illumination is allowed to escape outside the structure.

(b) Light Trespass.

- (1) Light trespass is prohibited. No luminaire installed within the Town limits, except governmental owned streetlights, shall create conditions of light trespass. Governmental owned street lights may only create light trespass below it within one hundred (100) feet of its installed location.
- (2) All outdoor lighting, except governmental owned streetlights, shall be shielded so that the light source shall not be visible from any other property.

(c) Outdoor Sports Facilities.

- (1) Lighting at public and private outdoor sports facilities, including but not limited to playing fields, arenas, tracks, and swimming pools, will be shielded to the greatest practical extent to reduce glare, safety hazards, light trespass, and light pollution;
- (2) Will provide levels of illuminance that are adjustable according to task, allowing for illuminating levels not to exceed nationally recognized Illuminating Engineering Society of North America (IESNA) standards according to the appropriate class of play, as well as for lower output during other times, such as when field maintenance is being actively performed; and
- (3) Shall be provided exclusively for illumination of the surface of play and adjacent viewing stands, and not for any other application, such as lighting a parking lot; and
- (4) Must be extinguished by 11:00 p.m. or within one (1) hour of the end of active play. The outdoor sports facility lighting shall be fitted with mechanical or electronic timers to prevent lights from being left on accidentally overnight.
- (5) Outdoor sports facility lighting will be exempted from the other regulations of this article if its design and installation, as certified by a professional engineer (PE) licensed in the state of Colorado, adheres to the version of the International Dark-Sky Association's Criteria for Community-Friendly



Outdoor Sports Lighting operative at the time when the construction permit is submitted to the Town for review.

(d) Towers. No lighting of towers and associated facilities is allowed, except by permit, and except as required by the Federal Aviation Administration or other federal or state agency. In coordination with the applicable federal or state agency, the applicant shall determine the maximum height of the tower that would not require lighting. If a proposed tower would require lighting, the applicant shall demonstrate that a tower height that requires lighting is necessary. Such justification shall include documentation showing:

- (1) Coverage limitations;
- (2) Type of system (e.g. cellular, radio, television);
- (3) Technical and engineering details of the lighting to be installed; and
- (4) Requirements of federal, state, and local agencies.

If a tower height that requires lighting is justified, slowly blinking red lights must be used at night. White strobe lights at night are prohibited.

(e) Color Temperature.

- (1) The correlated color temperature (CCT) of luminaries shall not exceed 2700 Kelvins.
- (2) Luminaries rated below 2500 Kelvin are encouraged for better nighttime visibility.

(f) Fuel Station Canopies and other building overhangs. All luminaires mounted on or recessed into the lower surface of fuel station canopies or other overhangs shall be fully shielded and utilize only flat lenses or windows. Shielding must be provided by the luminaire itself, and not by surrounding structures such as canopy edges. Light directed on fuel station pumps may be angled to illuminate the pump to the level of federal standards and to shield the light from normal view.

(g) General curfew.

- (1) In all nonresidential zones,

(i) All privately owned exterior lighting not adaptively controlled shall be extinguished by 11:00 p.m. or within one (1) hour of the end of normal business hours, whichever occurs later **unless needed to mitigate a safety hazard as determined by the Town Clerk.**

(ii) Exterior lighting with adaptive controls shall reduce lighting to 25% or less of the total outdoor light output allowed by 11:00 p.m. or within one (1) hour of the end of normal business hours, whichever occurs later. Adaptive controls may be used to activate lights and resume normal light output when motion is detected and be reduced back to 25% or less of total outdoor light output allowed within 5 minutes after activation has ceased, and the light shall not be triggered by activity off property.

(iii) Businesses whose normal operating hours are (24) twenty-four hours per day are exempt from this provision.

(2) All publicly owned lighting not adaptively controlled must be fully extinguished by 11:00 p.m., or within one (1) hour of the end of occupancy of the structure or area to be lit, whichever is later **unless needed for public safety as determined by the Town Clerk.**

(3) All outdoor lighting is encouraged to be turned off when no one is present to use the light.

(h) Lumen Caps. The lumen per net acre values are an upper limit and not a design goal; design goals should be the lowest levels that meet the requirement of the task. Lumen per net acre values exclude governmental owned streetlights used for illumination of public rights-of-way and outdoor recreation facilities.

(1) Nonresidential Property. Total outdoor light output installed on any nonresidential property shall not exceed **15,000** lumens per net acre. **Fixtures shall be limited to 1,600 lumens each.**

(2) Residential Property. Total outdoor light output installed on any residential property shall not exceed **5,000 lumens per net acre. Fixtures shall be limited to 850 lumens each.**

- (i) Adaptive Controls. All new publicly owned light fixtures installed 6 months after adoption of this ordinance, including streetlights, will incorporate adaptive controls (*e.g.*, timers, motion-sensors, and light-sensitive switches) to actively regulate the emission of light from light fixtures such that the lighting of areas is restricted to times, places and amounts required for safe occupancy.

(j) Flagpoles. Property owners are encouraged to not illuminate flagpoles at night, but rather to hoist flags after dawn and lower flags before sunset. If flags are illuminated at night, lighting of up to a total of two (2) flags per property is permitted with the following conditions:

(1) Flagpoles with a height greater than 20 feet above ground level shall be illuminated only from above. This may be achieved by utilizing a luminaire attached to the top of the flagpole or a luminaire mounted above the top of the flagpole on a structure within fifteen (15) feet of the flagpole and must comply with all sections of this article. The total light output from any luminaire mounted on top of or above a flagpole shall not exceed 800 lumens.

(2) Flagpoles with a height equal to or less than twenty (20) feet above ground level may be illuminated from below. If ground-level illumination is used, flagpoles may be illuminated with up to two (2) spotlight type luminaires, utilizing shields or diffusers to reduce glare, whose maximum combined lumen output is 75 lumens per linear foot of pole height, measured from the level of the luminaire above grade to the top of the flagpole. Luminaires are to be mounted so that their lenses are perpendicular to the flagpole and the light output points directly toward the flag(s).

(k) Prohibitions. The use of the follow types of outdoor lighting are prohibited, except as specifically exempted here or elsewhere in this article.

- (1) Sag-lens or drop lens fixtures.
- (2) Any luminaire that uses mercury vapor lamps.
- (3) Searchlights, skybeams, and similar lighting, except as required by response personnel during emergency conditions.
- (4) Any light that dynamically varies its output by intermittently fading, flashing, blinking, or rotating. This type of lighting includes strobe lighting.

(l) Warranting. New installations of outdoor lighting will only be installed on public properties and right-of-way upon determination by the Town Clerk that a public safety hazard exists in the area to be lit, and that the hazard can only be effectively mitigated through the use of outdoor lighting and not through some other passive means, such as reflectorized roadway paint or markers.

#### Sec. 15-14-50. - Plan Submission and Compliance Review.

(a) Any individual applying for a compliance review or building permit under this article intending to install new outdoor lighting or update existing outdoor lighting shall file a lighting plan with the Town Clerk. A lighting plan shall be filed at the same time as any other plans required by the Town. The individual may obtain from Town staff a document that lists all of the items that comprise a proper and complete outdoor lighting submittal. The submittal shall contain, but shall not necessarily be limited to the following:

(1) Plans indicating the number and location on the premises of proposed and existing light fixtures, the type of light fixture (the manufacturer's order number), the lamp type, Kelvin rating, initial lumens produced, the mounting height for each fixture, adaptive controls, building elevations for any

structure whose interior lighting is defined as outdoor lighting per this article and the manufacturer's specification sheet for each light fixture.

(2) The number of acres or part of an acre that is to be illuminated contiguously, the square footage of the footprint for each structure within the area to be illuminated; and

(3) Any other evidence that the proposed installation will comply with this ordinance.

(b) The lighting plan shall be reviewed by the Town Clerk to determine compliance with this article, taking into account all factors, including but not limited to, levels of illuminance, luminance, glare, safety hazards, light trespass, and light pollution. The Town Clerk may seek input from community members knowledgeable about outdoor lighting during the review process. The Town Clerk shall approve or reject the plan within 30 days of submission, returning it to the applicant with an explanation. The applicant shall not move forward with the outdoor lighting project until the lighting plan is approved. After the lighting plan is approved, no substitutions may be made for approved light fixtures without re-submitting the plan for review with the substitutions.

Sec. 15-14-60. - Exemptions, temporary permitting, amendments, enforcement, civil remedies and public nuisance.

(a) This article shall not apply to the following:

(1) Decorative holiday lighting from November 15 through the next January 15 during the hours of 6:00 a.m. to 11:00 p.m. each day, except that flashing holiday lights are prohibited on nonresidential properties. Holiday lights may be illuminated one additional seven (7) day period per calendar year. Holiday flood lighting on nonresidential and residential properties shall be prohibited.

(2) String, festoon, bistro, and similar lighting, provided that the emission of no individual lamp exceeds fifty (50) lumens, and no installation of such lighting exceeds, in the aggregate, six thousand (6,000) lumens. These lights must be rated at or below 2700 Kelvin.

(3) Underwater lighting of swimming pools and similar water features.

(4) Lighting required by law to be installed on surface vehicles and aircraft;

(5) Airport lighting required by law;

(6) Lighting required by federal or state laws or regulations;

(7) Temporary emergency lighting needed by law enforcement, fire and other emergency services as well as building egress lighting whose electric power is provided by either battery or generator;

(8) Lighting employed during emergency repairs of roads and utilities provided such lighting is deployed, positioned and aimed such that the resulting glare is not directed toward any roadway or highway or residence;

(9) Temporary lighting, other than security lighting, at construction projects provided such lighting is deployed, positioned and aimed such that the resulting glare is not directed toward any roadway or highway or residence;

(10) Governmental facilities where compelling needs are demonstrated; and

(11) Temporary lighting, permitted in this article, for theatrical, television, performance areas, or events provided the lights are positioned safely and do not create issues of light trespass.

(b) Temporary Permitting

(1) Lighting such as that needed for theatrical, television, performance areas, or events may be allowed by temporary exemption. Temporary lighting that does not conform to the provisions of this article may be approved at the discretion Town Board of Trustees or the Town Clerk subject to submission of an acceptable Temporary Outdoor Lighting Permit.

(2) Permit term and renewal. Permits issued shall be valid for no more than seven (7) calendar days and subject to no more than one renewal, at the discretion of Town Board of Trustees or the Town Clerk, for an additional seven (7) calendar days.

(3) Conversion to a permanent status. Any lighting allowed by Temporary Outdoor Lighting Permit that remains installed after fourteen (14) calendar days from the issue date of the permit is declared permanent and is immediately subject to all of the provisions of this article.

(4) Permit contents. A request for a Temporary Outdoor Lighting Permit for a temporary exemption to any provision of this article must list the specific exemption requested and the start and end date of the exemption. Search lights, skybeams and similar lighting will not be allowed. The Town Clerk may ask for any additional information which would enable a reasonable evaluation of the request for temporary exemption.

(c) Amendment. This article may be amended from time to time as local conditions change, and as changes occur in the recommendations of nationally recognized organizations such as the Illuminating Engineering Society of North America and the International Dark-Sky Association, if the Town wishes to do so.

(d) Enforcement.

(1) It will be the responsibility of the Town to publish this article in the newspaper of record and to disseminate the ordinance [this article] by other appropriate means; to publish information about the ordinance on the Town website; and, as time permits, to inform owners of noncompliant lighting of these provisions.

(2) The Town Clerk is authorized to promulgate one or more interpretive documents to aid in the administration of, and compliance with, this article. Such interpretive documents, with examples such as Exhibits 2, 3 and 4 of Section 15-14-90, shall be educational only and shall not constitute regulations, amendments, or exceptions.

(3) Violations. It shall be unlawful to install or operate any outdoor lighting luminaire in violation of any provision of this article. Any person violating any provision of this article shall be guilty of an offense punishable by the general penalty provisions found in Section 1-4-10 of the Crestone Municipal Code and may also be subject to suit for injunctive relief. Each and every day during which the illegal erection, maintenance and use of such nonconforming lighting continues shall be considered to constitute a separate offense.

(4) Any owner who fails to comply with these provisions may be issued a warning notice. The owner of the noncompliant lighting must, within 30 days from the issuance of such warning notice, submit a lighting plan as defined in Sec. 15-14-50 to come into compliance with this article. Any owner who further fails to comply after 60 days from the issuance of such warning notice may be subject to penalties as provided in (3) above for each day of noncompliance.

(e) Civil remedies. Nothing in this article shall be construed as limiting the right of any person or entity to pursue legal action against any other person or entity under any applicable law, including the doctrine of light trespass.

(f) Public nuisance. Any violation of this article that results in light trespass or an unreasonable interference with the common and usual use of neighboring property is hereby declared to be a public nuisance as provided in Section 12-1-200 of the Crestone Municipal Code and which is likewise prohibited by this article.

Sec. 15-14-70. - Notification. All building permit applicants will be notified of the Town outdoor lighting ordinance [this article].

Sec. 15-14-80. - Sign illumination.

(a) All permanent signs may be non-illuminated, illuminated by internal, internal indirect (halo), or lit by external indirect illumination, unless otherwise specified. All illuminated signs shall be extinguished at 11:00 p.m. or within one (1) hour of the end of normal business hours, whichever occurs later. All sign illumination must comply with the correlated color temperature (CCT) requirements of this article.

(b) Top-down lighting. Externally illuminated signs shall be lit only from the top of the sign, with fully shielded luminaires designed and installed to prevent light from spilling beyond the physical edges of the sign.

(c) Outdoor internally illuminated signs (whether free standing or building mounted) shall be subject to all the following requirements:

(1) The sign must be constructed with an opaque background and translucent letters and symbols or with a colored background and lighter letters and symbols. (See Exhibit 5 of Section 15-14-90 for examples).

(2) The internally illuminated portion of the sign cannot be white, cream, off-white, light tan, yellow or any light color unless it is part of a registered logo that does not have an alternate version with dark tones. Light tone colors such as white, cream, off-white, light tan, yellow or any light color are permitted in the logo only, provided that such colors in the logo shall represent not more than 33% of the total sign area permitted.

(3) The internal illumination, between sunset and sunrise, is to be the lowest intensity needed to allow the sign to be visible for up to 1/2 mile from its installation and shall not exceed 100 nits.

(4) Size limit. The luminous surface area of an individual sign shall not exceed 200 square feet.

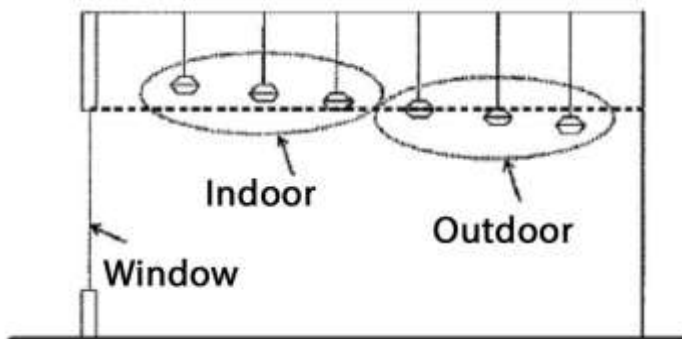
(5) Electronic message displays are discouraged and shall comply with outdoor lighting curfews stipulated in this ordinance. Messages appearing on electronic displays shall not be displayed for less than (30) seconds and shall require no longer than 0.25 seconds to transition from one message to another. Moving and/or flashing text or images are prohibited.

(6) Permitted location. Off-premise signs shall not be placed within one thousand (1,000) feet of another off-premise sign on the same side of an arterial street or highway, regardless of face orientation, or within one thousand (1,000) feet of a residential area.

(d) The provisions in this section concerning sign illumination are to be construed with Section 15-11-50(b) (Sign categories and sign limitations) Illumination, animation, and sign obstruction, Section 15-11-70(c) (Sign location and appearance standards) Illumination, and Section 15-11-80 Table A (Specifications for Permitted Signs) of the Crestone Municipal Code and whichever sections are the most restrictive shall be deemed to apply.

Sec. 15-14-90. -Exhibits.

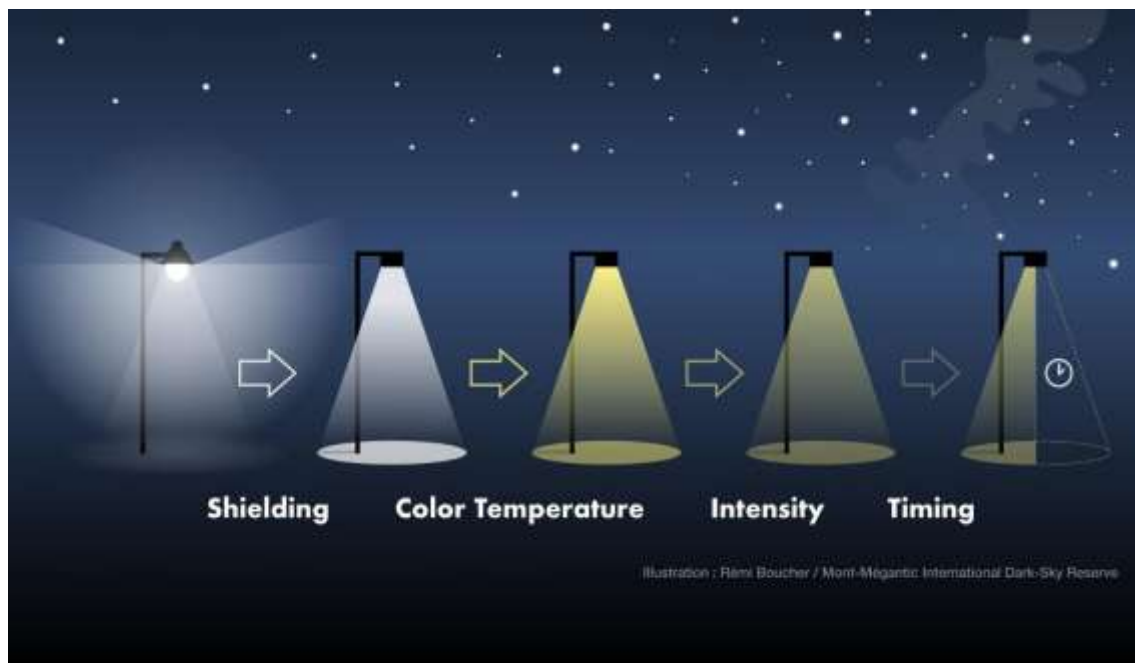
Exhibit 1. Indoor/outdoor lighting.





Elevation view showing an example of a nonresidential application of indoor lighting, labeled “Outdoor”, which is will be subject to this article. The example presumes the structure in question is not elevated such that any of the luminaires labeled “Indoor” may be seen from any other property. If the structure is elevated such that the luminaires labeled “Indoor” are visible from another property then, they are actually “outdoor lighting” and subject to this article. All luminaries under skylights or other translucent roofing materials are subject to this article just as the fixtures behind the window are in this example.

Exhibit 2. An illustration of best outdoor lighting practices.



- (1) Use shielding to reclaim wasted light and direct it to the area to be lit.
- (2) Lower the correlated color temperature (CCT) from “cool” white light to “warm” white.
- (3) Lower the intensity to provide as much light as needed for the application, but no more.
- (4) Use adaptive controls, e.g., timers, half-night photocells, motion sensors, etc., to limit the hours the light is in use.






Exhibit 3. Light Trespass



Exhibit 4. Unacceptable Fixtures and Acceptable Fixtures.



Exhibit 5. Internally Illuminated Signs.


Light Background <input checked="" type="checkbox"/>	Colored Background <input checked="" type="checkbox"/>	Opaque Background <input checked="" type="checkbox"/>
		
		


This Ordinance is intended to provide “dark sky” standards for lighting within all of the zone districts of the Town of Crestone and not to preempt any nuisance provisions of the Town Code which are related to lighting. This Ordinance is also intended to facilitate the designation of the Town of Crestone as a certified “Dark Sky Community” by the International Dark Sky Association.

**INTRODUCED**, read in full, adopted, **APPROVED**, and **SIGNED** this 18 day of February, 2021.

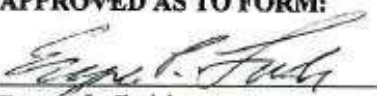
**APPROVED:**

**ATTEST:**

  
Allyson Ransom, Town Clerk

  
Kairina Danforth, Mayor

**APPROVED AS TO FORM:**

  
Eugene L. Farish  
Town Attorney

### CERTIFICATION

I hereby certify that the within Ordinance was introduced, read in full, approved and adopted at the regular meeting of the Board of Trustees of the Town of Crestone, Colorado on the 18 day of February, 2021 and was published by title in the Crestone Eagle, a legal newspaper in the Town of Crestone, on the 1st day of March, 2021.

*and online version of the newspaper on Feb 18, 2021*

Allyson Ransom  
Allyson Ransom, Town Clerk



# CRESTONE'S COMMITMENT TO DARK SKIES

---

## Crestone's Commitment to preserve Our Dark Skies

*Crestone was one of the earliest dark sky preservation initiatives in the State of Colorado.*

*Sample articles follow from 1995 to the Present. See all the articles in [Appendix E](#).*

### The Crestone Eagle



The Crestone Eagle has been a major voice in the Northern San Luis Valley for 32 years.

It reports local, state and national news, and has a circulation as far south as Alamosa and as far north as Salida, and worldwide through subscriptions.

Kizzen Laki, the owner and editor, was Mayor of Crestone for 10 years between 1998 and 2008. She served on the Town Council for a number of years before that and has continued to serve since. She is on the Dark Sky Committee and has been a long time, ardent supporter of Dark Skies. She is also personally responsible for planting 75 to 80 trees in town.

When her partner Janet Woodman designed the new Crestone Eagle office building, Janet's design included recessed lighting and dark sky friendly lights, one of which can be seen on the left side of the photo. Kim Malville, a world renowned astronomer and owner of the building happily complied with this design.

The articles below are a historical record, from 1995 to the present, of Crestone's commitment to preserving our Dark Skies. For brevity, on a few articles are included here, the remainder are in the appendix.



## Commentary by Suzanne Frazier

In 1995, Suzanne Frazier & Neyle Sollee, a resident amateur astronomer, began a 5 year campaign to preserve our Dark Skies. Their progress is chronicled in the articles following this commentary.

The San Luis Valley, nestled in between the Sangre de Cristo Mountains and the San Juan Mountain Range, is a high mountain valley, at 8,000 feet on the valley floor, with exceptional views of the stars and planets that rotate above the Earth.

Crestone, located on the eastern side of the valley, against the foothills of the Sangre de Cristo Mountains, is a perfect and desirable base from which to view the incredible showcase of our human connection to Universes above and beyond.

People have been inspired throughout the centuries while viewing the stars and planets above their heads. With the current modernization of cities and nations around the world, the brilliance and splendor of the light above has been dimmed or totally removed. So many people, especially the children, have lost their privilege to look up and see the stars above their heads. What inspired poets, writers, artists and musicians before their lifetimes has been taken away from them.

Since 1995, I have been a proponent of preserving the Dark Sky above the San Luis Valley. I began my crusade in April, 1995 with the first article published in the Crestone Eagle newspaper in Crestone Colorado. I continued my campaign with articles published over the next four years, promoting ways to reduce light pollution and light trespassing. Many residents responded to suggestions to change their outdoor light. The San Luis Valley Rural Electric Cooperative let me write articles for their monthly newsletter. Myself and others worked with the Saguache County Commissioners on regulations embracing the Dark Sky objectives. I contacted Steve Chaney, Director (at that time) of the Great National Sand Dunes National Monument, who was in charge of making changes to the lighting in the National Park. Since then the National Parks have embraced the idea of preserving the night sky.

With the approval of the application by Crestone Colorado to become a Dark Sky Community, one more spot on Earth will be preserved to allow for inspiration from the 'heavens'. We can't let this opportunity slide by.





## **2019 Crestone Announces in the Crestone Eagle its Intention to apply to the International Dark Sky Association to become a Dark Sky Community**

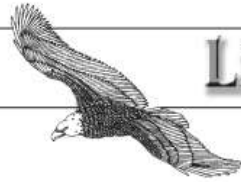
The same month the Great Sand Dunes became an International Dark Sky Park, Mayor Danforth announced the town's intention to apply to become a Dark Sky Community.

In her eloquent article below "Dark Skies Over Crestone," she speaks of the importance of the Night Sky, and introduces the community to the International Dark Sky Association.

Following that, the Crestone Eagle published a Do It Yourself Dark Sky Article, explaining light trespass and giving examples of acceptable light fixtures and giving helpful hints as to how to retrofit existing lights.

Then in January 2021, two articles appeared in the newspaper. One about generous newcomers to our community who donated IDA approved lights fixtures to support our pending application.

The other, an exciting donation by Kim Malville, of an 8" Meade Schmidt Cassegrain telescope with computer guided pointing and tracking world renowned astrophysicist and archaeoastronomer.



# Living on the Earth

## Great Sand Dunes named an International Dark Sky Park

by Bob Bohley, NPS Master  
Astronomy Volunteer at  
Great Sand Dunes NP&P

Great Sand Dunes National Park and Preserve was certified as an International Dark Sky Park in April of this year by the International Dark Sky Association (IDA) of Tucson, AZ. This was the culmination of four years of concerted work and nine months spent on the application process. Great Sand Dunes has long been known for its incredible night sky views, and this certification will ensure that these dark skies will be preserved for generations to come. It joins approximately two dozen other units of the National Park Service to be so named. There are three basic requirements to become a Dark Sky Park:

- Reduce your own artificial light impact
- Measure the darkness of your night skies
- Communicate the importance of dark skies to the public and work with neighboring communities to improve lighting



Poster by Dr. Tyler Nordgren  
used with permission



On a cold and moonless night the Milky Way rises over the San Luis Valley.

photo by Peter Ismert

Why are dark skies important to the people of Colorado in particular and to the people of the world in general? Timothy Ferris, the author of popular books on astronomy, says that "all human cultures no matter how primitive have felt it important to tell stories about the stars and about the nature and the origin of the Universe as a whole. So there's something about astronomy that is deeply ingrained in human culture going as far back as music, dance and poetry." But we are losing this important human connection to our dark skies.

continued on page B-10

## Dark skies over Crestone

by Kairina Danforth

Eighty percent of the people in the world today will never see the Milky Way from their homes.

We are part of the fortunate few who do. Our documented dark sky overhead offers a truly exceptional level of darkness. In fact, the dark sky over the Town of Crestone and the adjacent Baca Grande subdivision is one of the most exceptionally dark skies in the Western US.

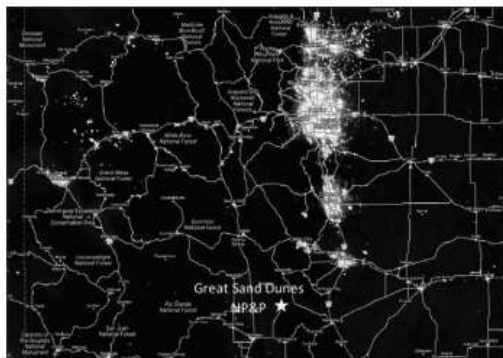
Continuing a journey begun by the Crestone Town Board of Trustees in 2004, the current Crestone Town Trustees are pursuing designation as an International Dark Sky Community.

Currently there are only 22 internationally designated dark sky communities in the world, with 16 of the 22 located in the US. The International Dark Sky Association was founded in 1988 and is dedicated to protecting and preserving exceptionally dark skies from artificial light pollution.

It is the recognized authority for night sky protection and has taken the lead in identifying and publicizing the negative impacts of artificial light at night on human health, wildlife, vegetation and climate change. Its public outreach efforts provide solutions, quality education and programs across the US and throughout the world to educate the public and the policy makers about night sky stewardship. They serve to empower us all with the tools and resources to help protect and preserve our dark sky. Their program offers different kinds of designations, including a community, a park, a place, a sanctuary, and a reserve. The Dark Sky accreditation requires robust community support and also requires an exceptionally high level of documented darkness. International Dark Sky designation follows a rigorous application process. Attesting to the rigorous requirement process is the fact that since 1988 only 22 communities worldwide have received this designation.

Furthering such designation for Crestone is the Colorado College planned creation of a local research observatory and planetarium. Their planning includes a robotic telescope capable of being managed remotely from their Colorado Springs campus as well as their local Baca campus. Their telescope will also enable automated management. The planetarium will be similar in design to that of Chaco Canyon and will provide circular seating to be able to lean back and view our starry sky, a sundial and other fea-

continued on page B-10



A close-up of Central Colorado at night showing light pollution along the Front Range.

## Dark skies over Crestone

continued from page B-1

tures relating to the solstice and equinox. Colorado College currently has two astronomy professors and plans to add an additional astronomer and additional classroom offerings, such as "Cultural Astronomy of the Southwest." They will involve our community in this initiative and are interested in partnering with our Crestone Charter School. Imperative to our successful dark sky designation application is curriculum support from the Crestone Charter School. This support can take any of various forms that will help our young people learn what a precious natural resource is our night sky heritage. Dark Sky designation is based on stringent outdoor lighting standards and innovative community outreach. The continuing ability to experience the dark sky, which is the result, provides young and old alike perspective, inspiration and leads us to reflect on our humanity and place in the universe. Our residents believed in 2004, and continue steadfastly to believe today, that protecting the quality of the night sky and reducing light pollution is an important quality-of-life value.

Night skies are a connection between all humans and all time. Night skies have been relied upon for timekeeping, worship, navigation, landscape recognition, and storytelling, and yet do not enjoy universal protection. The cultural significance of astronomy in myths, legends and science is disappearing as those areas of the world which today enjoy exceptionally dark skies are being lost as more and more people bring with them increasing light pollution. Artificial light at night is not simply a nuisance but a real concern for human health. The dark night communicates something fundamental to our human biology. Circadian rhythm controls 10-15% of our genes. Research shows light pollution affects all of our wildlife and our vegetation as well. Changes have been recorded in feeding and breeding behavior in response to nighttime light pollution. In fact, the biological world is organized largely by light. We are just now beginning to understand the nocturnality of entire ecosystems, from the smallest plant to the largest creature.

Ours is a pristine part of Colorado, a place of majestic beauty by day and, by night, one of the darkest places in the west, also a place which is going to experience a dramatic increase in growth in the next few years. If we fail to protect our valley communities and surrounding protected lands with their exceptional dark skies now, it may be too late as the future brings more and more people and more and more light pollution with them. As a result of increasing urbanization and population growth, our valley is one of the last remaining sanctuaries of nearly pristine dark night sky, particularly in its large areas of federally protected public lands. Preserving the darkness of this remarkable sanctuary is essential to support these natural ecosystems and wilderness areas. Protecting our dark night sky helps preserve the natural scenic, historic, fish and wildlife, recreational value of our valley. Not protecting the night sky will destroy the habitat of many animals and, with that, the ability of the intricate web of nature to sustain itself.

Arising from the Town's initiative to become designated as a dark sky community, the Town is partnering with the Great Sand Dunes National Park and Preserve, the Baca National Wildlife Refuge, the Bureau of Land Management, the surrounding Rio Grande National Forest and other surrounding, nearly pristine dark sky areas including the Orient Land Trust, the Westcliffe Dark Sky Community, surrounding West Mountain National Forest and part of the surrounding Custer County area, a large portion of Huerfano County and the San Isabel National Forest and John Milton's Way of Nature sanctuary. The resulting coalition, dedicated to habitat stewardship, is preparing an application to become an accredited International Dark Sky Reserve. It is centered around the Sangre de Cristo Wilderness Area and has accordingly named itself the Sangre de Cristo International Dark Sky Reserve. San Luis Valley Great Outdoors (SLVGO) is coordinating the activity of the emerging Sangre de Cristo Reserve. The Reserve designation is the highest and most coveted award bestowed by the International Dark Sky Association. There are currently only thirteen designated Dark Sky Reserves in the world: one in the US (the Central Idaho Dark Sky Reserve), one in Canada, one in Africa and ten in Europe.

On July 25 at 8pm, the Baca National Wildlife Refuge, Great Sand Dunes National Park and Preserve, and the Town of Crestone will present a program which will interpret the area's brilliant and incredibly dark Summer sky. Included will be information about the Great Sand Dunes National Park and Preserve's recent designation as an International Dark Sky Park. Town of Crestone personnel will describe the Town's commitment to control the growth of artificial light pollution and the preservation of its equally dark nighttime environment as it continues its journey to become designated as an International Dark Sky Community. The collaborative efforts to establish a Sangre de Cristo International Dark Sky Reserve will also be included in the program. The event will take place at the Baca National Wildlife Refuge Headquarters. Light refreshments will be provided by the Town of Crestone. Crestone-Baca residents are urged to attend and to learn how each may join in the preservation of their community's incredibly dark skies.

It seems that, perhaps by chance, our small gateway community is being offered an opportunity to become a wayshower for our valley to recognize, protect and preserve its exceptional dark skies, and also to communicate that awe and wonder to our young people through local school curriculum and nighttime experiences. A rising tide lifts all boats as our local valley communities begin to support dark sky preservation and as individuals we can no longer take for granted something each of us is being blessed with—every night—when we look up at our starry sky.



The Great Sand Dunes with the Milky Way overhead.

photo by Patrick Myers

## Sand Dunes

continued from page B-1

According to Barbara Kingsolver, a science writer, novelist and poet, "in the summer of 1996, a subtle, unheralded transition took place—the majority of the Earth's population was now urban rather than rural. Consequently, the environment most of us live in now is one of concrete, steel, brick, glass and artificial light. Our celestial views are vanishing. I wonder how people will imagine the infinite when they have never seen how the stars fill a dark night sky." It is estimated that by 2050, two thirds of the world's population will live in cities. NASA estimates that only 17% of Americans have ever seen the Milky Way—our home galaxy.

Our National Parks, particularly in the west, provide places of refuge from urban life where visitors can reconnect to their cultural and historical ties to celestial wonders above. Here at Great Sand Dunes National Park and Preserve, we greet roughly half a million visitors annually from all over the United States and the world and invite them to share our recuperative night skies.

Thomas Edison patented the first commercially viable incandescent light bulb in 1879, a mere 140 years ago. Sure, it's thrilling to see a thousand stars in a dark night sky, but artificial light has been a tremendous boon to mankind. Unfortunately, 140 years of artificial light isn't even a blink of an eye in evolutionary time. All life, whether it be plant, insect, animal or human, evolved hundreds of thousands to millions of years before the light bulb changed our world. We're all struggling to adapt to this new world of light. We have developed a Circadian Rhythm, our day-night cycle. We live in a world of light now, and our rhythms have been disrupted. Our human brains are hard-wired to acquire information during our waking hours and process that information while we sleep. What information should be kept and what can be discarded? Our brains are trying to link what we learned during the day to memories we already have.

So what can we do about this disruption to our Circadian Rhythm? First, manage your sleep cycle. The Center for Disease Control says that adults should get at least seven to eight hours of sleep a night; teenagers should get nine hours of sleep; and it goes down to

toddlers needing ten to twelve hours of sleep in a 24-hour period including naps. Put down your devices or set them to go to a softer light two hours before you plan to retire for the night.

### Outdoor lighting

The night sky is a completely recoverable natural resource with properly designed and installed outdoor lighting. The IDA has six outdoor lighting principles that have been adopted by the National Park Service.

- Light only if you need it
- Light only when you need it
- Aim the light where it is needed
- Use appropriate color spectra lighting (<3000°K)
- Use the minimum amount of light necessary
- Use energy-efficient lamps and fixtures

Great Sand Dunes has written these principles into our Lighting Management Plan. Over the past four years, our Facilities Management Team has been replacing outdoor lighting fixtures with fully shielded, downward facing, programmable, energy efficient (LED) fixtures. IDA requires that outdoor park lighting must be at least 67% IDA compliant at the time of application. We are 81% IDA compliant today and are committed to be 95% compliant in five years and 100% compliant within ten years.

The second requirement to become a Dark Sky Park is to measure the quality of our night skies with a special photometer that measures darkness. Our Resources Management Team has taken three years of data on our sky quality, and these measurements put us in the Gold Tier (darkest) park designation. The Sangre de Cristo Mountains effectively shield us from the light domes of the Front Range population centers making Great Sand Dunes one of the darkest places in the nation. Finally, we continue to communicate the importance of dark skies through our Ranger-led Moonlight Walks and our Evening Ranger Programs. We are also working with Alamosa and Saguache Counties on lighting issues that could impact the park.

Research has shown that camping two to three nights under the stars can completely reset a person's Circadian Rhythm. Great Sand Dunes National Park and Preserve is one of the best places in the country to do just that. We invite you to join us and gaze in awe at the celestial wonders above. Remember "Half the Park is after Dark."

## Do-it-yourself dark skies

by Karen Caddis

Last month's *Eagle* introduced the International Dark Sky Community and Reserve designation initiatives to our community. To carry forward on that theme, here are some inexpensive ways that you personally can help maintain our local precious dark sky resource, reduce and control your outside lighting, and save as much as 40% to 60% of your lighting energy costs.

1. Inspect the lighting around your home. Poor use of lighting not only creates glare and light pollution but also wastes energy and money. Take a few moments to inspect your property for inefficient, poorly installed, and unnecessary outdoor lighting.

2. Use only the lighting you really need. Too much light wastes energy, impairs vision, affects wildlife, and does not necessarily improve safety or security. Use the lowest illumination level possible on just the area that needs it. There is no clear scientific evidence that increased outdoor lighting deters crime and increases safety (International Dark Sky Association 2019).

3. Use fully shielded, dark-sky-friendly fixtures. A dark sky does not necessarily mean a dark ground. Shine lights down, not up, and don't create glare and contrasts. Install timers and dimmer switches and turn off lights when not in use or overnight. Close your window blinds at night. If you must have security lighting, use motion sensors. Look for the International Dark-Sky Association (IDA) Fixture Seal of Approval on any outdoor lighting you purchase. IDA maintains a searchable database of lighting products certified to minimize glare, light trespass, and sky-glow at [www.darksky.org/our-work/lighting/lighting-for-industry/fsa/fsa-products](http://www.darksky.org/our-work/lighting/lighting-for-industry/fsa/fsa-products).

4. Use the right light. Be aware that not all light bulbs are good for dark skies—though energy efficient, both LED and metal halide fixtures may emit very intense white light and contain large amounts of blue light in their spectrums that can brighten the night sky more than any other color. Exposure to blue light at night has been shown to harm human health and endanger wildlife. Consider replacing outside lights with incandescent (including Halogen) and Compact Fluorescent (CFL) lamp types or use red or yellow

light bulbs (bug lights or similar) such as a yellow compact fluorescent CF-yellow or amber LED. Use "warm-white" or filtered LEDs (CCT <3000 K; S/P ratio <1.2) to minimize blue emission.

5. Retro-fit existing fixtures. You can create your own inexpensive shielding on existing lights by using tin flashing or other non-flammable materials to fashion cones around existing fixtures to direct light downward. For example—cut the lids off a large coffee can or bean can and place over bulbs in carriage or period style fixtures to direct the light down.

6. Talk to your friends, family, and neighbors and know your local lighting ordinances. You can be a powerful dark sky advocate for your neighborhood, your community, and even your state and country. Spread the word online, too, via social media. Both Crestone and the Baca Grande have dark sky lighting ordinances; know and understand these requirements.

7. Become a citizen scientist. There are multiple citizen-scientist campaigns available to participate in to help researchers better assess light pollution across the globe. Most just require reporting via your smart phone, a tablet, or a computer. Globe at Night is just one of these programs—more information on these programs is available at [www.darksky.org/light-pollution/measuring-light-pollution](http://www.darksky.org/light-pollution/measuring-light-pollution).

A plethora of additional information on protective lighting and other ways to contribute to maintaining dark skies, including becoming a member of the IDA, is available at the IDA website, [www.darksky.org](http://www.darksky.org).

Karen Caddis is a local environmental consultant with over 30 years in the profession. She is a member of the Crestone-Baca Resiliency's Energy Group, who sponsored this article as part of the Group's mission to promote energy resiliency and energy education in the Crestone/Baca area.

### Protecting the night sky starts with YOU!

- 1 Light only what you need
- 2 Use energy efficient bulbs and only as bright as you need
- 3 Shield lights and direct them down
- 4 Only use light when you need it
- 5 Choose warm white light bulbs
- 6 Join IDA! [DARKSKY.ORG](http://DARKSKY.ORG)

### Examples of Acceptable / Unacceptable Lighting Fixtures



**SUBCULTURECYCLERY.COM**

**PARTS  
RENTALS  
SERVICE  
SALES  
SHOWERS**

**SUB  
CULTURE  
CYCLERY**

719-539-5329  
129 NORTH G STREET

**RECREATIONAL SMALL BATCH CRAFT CANNABIS**

**ONE:ELEVEN**  
one love, one planet, one unity

17034 Highway 17  
Moffat, CO 81143  
719-937-7716

**STORE HOURS**  
MON.-SUN. 10-8pm

1-eleven.com  
max@1-eleven.com  
@oneelevenfarms





Pictured here are Loretta Hares and Crestone Mayor Kairina Danforth standing below one of the three residential International Dark Sky-approved light fixtures that Loretta and her husband, Larry, have recently donated to support the Town of Crestone's application to become designated as an International Dark Sky Community. photo by Lori Nagel

## Light fixture donation in support of Crestone's dark skies

by Karina Danforth

Larry and Loretta Hares recently sold their home in Littleton and are living in town while their new home is being built in the Baca. After living in the Front Range for most of their adult lives, they have adapted amazingly well to life in our small community and have grown to love and support our town. Their generous support has included purchasing a turkey for the NHN community Thanksgiving potluck, purchasing a new computer from the local computer store, supporting local restaurants and grocery stores, and now the donation of three beautiful, IDA-compliant residential light fixtures to support the pending application of Crestone to become an internationally designated Dark Sky Community.

The Town of Crestone's Dark Sky Committee, with approval from the Town Board of Trustees, has recently completed the purchase of 46 of the same IDA-approved residential light fixtures for distribution to full-time town residents.

Choose only one master—Nature.  
—Rembrandt

## News from the Crestone Artisans Gallery: 'Keeping on Truckin'

by David Lee

The Gallery has been open Thursdays-Mondays throughout December, from 11am to 4pm. Although visitation has been light, our sales have been solid. Typically, one or two customers have arrived shortly after opening and made their planned holiday purchases. So, we're on course to meet our monthly income requirements to pay for rent and utilities and other minor expenses. In addition to rules on masking and hand cleaning, and frequent disinfection of contact surfaces, we have added an air purifier to recycle and clean the air in the gallery. It includes an activated charcoal pre-filter, a high efficiency HEPA filter that can even remove viral particles, and a UV-C lamp and Titanium dioxide catalyst that actively destroy viral particles that pass through the filters. We run it during opening hours, and for a couple of hours after closing.

We plan to stay open in January, at reduced hours (Friday-Monday, 12-4pm). However, we expect the cases of COVID-19 to increase even more after the holiday season, from contacts during social gatherings. So, members will meet (either virtually or physically-distanced) early in the month to figure out what to do next. Several members are at particular risk (or spouses/partners are), and fewer members may be available to keep the gallery open. We'll just have to wait and see.

With the purchasing going

on for the holiday season, gallery members are continually bringing in new work to fill the empty spaces. So, it is interesting to see changes and new developments in their artistic expression. This is true in my own work of hand papermaking. With advice from fellow member Jeanette Amle, a truly awesome papermaker forced to change her artistic work from the toll that the craft took on her shoulders, I began working with creating free paper shapes that can be assembled as collages in larger works, and also constructing and employing deckle boxes that allow me to create thick



Paper landscape cast in a deckle box using dyed pulps, with added pressed flowers.

paper works with dyed pulp to add colors and shapes into the completed creation. A couple of these are now on display in the gallery, along with marbled paper creations—all of these including pressed native wildflowers in the designs.

## Crestone Artisans Gallery



"The finest artists  
owned and operated art  
gallery in the State!"



## Kim Malville donates telescope to view dark skies over Crestone

by *Kairius Danforth*  
On December 13 Kim Malville donated a telescope to the Town of Crestone, an 8-inch Meade Schmidt Cassegrain with computer-guided pointing and tracking.

The telescope is portable, perfect for community star parties, and reflects Kim's wish to support the upcoming Crestone application to become recognized as an inter-

national dark sky community. Indeed, the Town of Crestone, and its neighboring Baca Grande subdivision, are blessed with an exceptionally dark sky overhead and its attendant starry brilliance.

On December 18, Malville, an internationally known astrophysicist, solar physicist, auroral physicist, and one of only several hundred arch-astronomers in the world, gave a Zoom presentation, again in support of the Crestone application for international dark sky designation. The presentation was titled "Myths from the Heavens" and was a Town of Crestone event. Zoom hosting by SUV Guest Outdoors was arranged by the Crestone Dark Skies Committee. The Malville presentation included a commentary on the importance of education and local involvement to protect Crestone's dark sky and to inspire future generations of residents and visitors alike to become stewards of dark sky conservation and lifelong lovers of a dark night sky.

Who, then, is J. McGin Malville and



Dark sky and Crestone lovers, Kim and Nancy Malville.

what is his connection with Crestone? He is Professor Emeritus, Department of Astrophysical and Planetary Sciences, at the University of Colorado, a tutor, University of Wales, former professor at Universities of Oslo, San Paulo, James Cook University, Northern Queensland, and a long list of additional professional positions.

Some of the books he has authored or co-authored include *Prehistoric Astronomy of the Southwest*, *Canyon Spirits*, *Chimney Rock, the Ultimate Challenge*, most recently, *Machos Pichu's Sacred Sides*, in addition to many published papers on auroral physics, astrophysics, solar physics and arch-astronomy.

Astronomically, this same Kim Malville has written a monthly astronomy column in the *Eagle* for


the past 19 years, often discussing the beauties of our dark sky. That commitment on his part has created over 220 articles on astronomy and reflects his continuing interest in the skies over Crestone. He never missed even once in 220 months describing the events taking place that month in the skies over Crestone. Kim has also held a number of star parties at his home in the Baca, setting up his telescope and inviting the community.

Though Kim and his wife Nancy have now moved to Boulder, his interest in the dark skies over Crestone has never waned. His help with our application is beyond extraordinary. And let us all, in our own way, express our gratitude to our benefactor in so many ways, our former neighbor and our friend—Kim Malville.



Kim Malville pictured with the telescope he donated before having it up and sending it off to Crestone.

For Over  
25 years,  
the  
Crestone  
Eagle has  
kept the  
Dark Sky  
Movement  
in front of  
the public  
by regularly  
running  
these filler  
ads in the  
paper.



**ELEPHANT  
CLOUD  
MARKET**

The Elephant Cloud Market & The Cloud Station support the Town of Crestone local business & community and....  
**Dark Skies!**

**TURN OFF YOUR  
LIGHTS, ENJOY  
THE NIGHT SKY**



**HELP  
WANTED**

Star gazers, UFO watchers  
ecologists and all those  
who cherish seeing a  
dark night sky.

Crestone Dark Sky Initiative  
**NEEDS YOUR HELP**  
to become an  
International Dark Sky Reserve!

Please send letters of support to  
[crestonedarkskies@gmail.com](mailto:crestonedarkskies@gmail.com)

**TURN OFF  
YOUR LIGHTS**

**ENJOY THE  
NIGHT SKY**

**TURN OFF YOUR  
LIGHTS, ENJOY  
THE NIGHT SKY**



## COMMUNITY EVENTS

---

### Rights of Nature Event

#### *The Teyuna*



photo by Douglas Beechwood

The Teyuna call their home in the Sierra Nevada of Santa Marta, Colombia “The Heart of the World.” If there’s paradise at the end of the rainbow, they live in it. Nature responds to them. They’re coming to the US because time is running out for denizens of this land to take a more active role in nurturing and caring for Planet Earth. The Teyuna plan to inspire them to do so. In the US, those born to earth stewardship, specifically the indigenous nations of the US, comprise less than 2% of the population. The Teyuna plan to support the indigenous nations in the selfless service they’ve been providing for thousands of years, said Mary Gaetjens, Teyuna Foundation President before the 2018 Teyuna tour of the US.

The four tribes of the Teyuna peoples of the Sierra Nevada of Santa Marta region of Colombia, the Arhuaco, Kankuamo, Kogi, and Wiwa, number approximately 40,000 in unbroken lineage for over a millennia. For hundreds of generations spiritual healers From “The Heart of the World” have existed to care for Earth. This is an opportunity to gather and experience “Aluna”, universal consciousness with them. Their Mamos and Zagas, masculine and feminine priests, belong to the planet’s last pre-Colombian people, and have undergone life-long training in Earth stewardship. They are one of the few remaining fully intact indigenous peoples in the world. Living high in the mountains in dispersed communities, the Teyuna Nation considers its four families, or tribes, as the four legs of a table. Their separate missions align to form a strong

base of support for their service to Mother Nature, a service they believe is the sole reason they exist. “

After their secretary general, the highest authority of the Teyuna families, known as the Concejo Territorial de Cabildos called and voiced an urgent request, “Earth’s energy is going dormant (dying) in several locations in North America” – planning for the tour

began. Though the Teyuna have seen devastation in their homeland, North Americans, they say, “are walking the world’s most critical precipice.”

Leading up to their 2018 tour, the Teyuna people and their leaders sought fiscal sponsorship from a US organization whose principles matched their own world views. The Earth Law Center was chosen for its commitment to establishing legal rights for nature. “Earth Law Center is honored to sponsor the Teyuna Foundation and support its quest to share the teachings of the Teyuna people in the United States, said Darlene Lee, Executive Director of the Earth Law Center as final arrangements for the tour were taking place. “Indigenous groups have much to teach us about living in harmony with nature so we can resolve the ecological challenges of our time.”

The tour aimed to unite the Teyuna with indigenous leaders from North America to share knowledge and develop new initiatives that highlight the urgency of restoring the planet to health. Crestone was selected because of its pioneering work to support the Rights of Nature. The Teyuna are pictured here with the organizers of the Art Auction held by resident artists to help support the Teyuna.



photo by Lori Nagel



# Summer Dark Sky Event

## *Our Disappearing Darkness*



*Baca National Wildlife Refuge  
2019 Summer Tour/Talk Series  
July 25, 2019, 8:30 pm  
Refuge Headquarters  
(69812 Saguache County Road T)*



## Our Disappearing Darkness

*Presented by Robert Bohley; National Park Service, Master Astronomy Volunteer Ranger*



As Part of the Baca National Wildlife Refuge's Summer Tour/Talk Series, Robert Bohley, a National Park Service Master Astronomy Volunteer Ranger from Great Sand Dunes National Park and Preserve, will offer a presentation at the *Baca Wildlife Refuge on Thursday July 25th at 8:30pm*. In his presentation, Mr. Bohley will talk about how beautiful night skies are disappearing across the world, where you can still find them, and what we can do to protect them. Weather permitting Bob and his wife, Carol Bohley, will also offer an interpretive viewing tour of the night sky using telescope and laser.

In addition, Crestone Mayor, Kairina Danforth, will discuss the *Sangre de Cristo Night Sky Reserve* potential. Night Sky Reserve is an *International Dark Sky Association* designation, designed primarily to promote protection of nocturnal habitats, public enjoyment of the night sky and its heritage, and to honor public or private lands and their surrounding communities for exceptional commitment to dark sky preservation.

**For more information contact the Baca Refuge Office at (719) 256-5527**

*\*For your enjoyment consider bringing a blanket or a chair, flashlights with red light, and insect repellent. This program will begin at 8:30pm*

On July 25, 2019, the Town of Crestone partnered with the Baca National Wildlife Refuge and the Great Sand Dunes International Park and Preserve to sponsor "Our Disappearing Darkness". The event was held at the Baca National Wildlife Refuge Visitor Center. Also included in the educational awareness portion was a PowerPoint presentation showing current artificial light pollution nationwide and its harmful effects on all living things. Gourmet refreshments were provided compliments of the Crestone Town Clerk.

## Winter Dark Sky Event

Myths from the Heavens

December 18, 2020

By Kim Malville

Our second community event was held over Zoom due to Covid-19 restrictions. The program, *Myths from the Heavens* by Kim Malville, was a compilation of Greek mythology and Native American star stories, and tales of the origin of the Pleiades.

Kim began his presentation with a call to Protect the Night Sky. He talked about shielding outdoor lights and encouraged listeners to become Dark Sky Advocates. A detailed account of the talk can be found in the appendices.

Kim has a decades-long connection with Crestone. A few years ago, he donated land to increase the size of our Town Hall Park. His column, "Skies over Crestone," is one of the most popular features of our local paper, The Crestone Eagle.

Early in his career, in 1959, he spent a year in the Antarctic studying the aurora australis as part of the International Geophysical Year. Sixty-seven countries participated in this event that celebrated the reopening of scientific interchange after the end of the Cold War.

One of only 200 archaeoastronomers worldwide, Kim has pursued his passion into deserts and rainforests. In 1997 he was a member of the team that revealed the world's oldest known megalithic astronomy at Nabta Playa near Abu Simbel in southern Egypt. In 2003 he was involved in the rediscovery of the Inca ceremonial center of Llactapata, previously lost in a cloud forest near Machu Picchu.

Currently, he is Professor Emeritus in the Department of Astrophysical and Planetary Sciences at the University of Colorado and Tutor at the University of Wales, UK. Besides teaching large introductory courses in astronomy at the University of Colorado, he directs the Honors Program of the College of Arts and Sciences. He is the author or co-author of "Prehistoric Astronomy of the Southwest," "Canyon Spirits" "Chimney Rock: the Ultimate Outlier," and most recently "Machu Picchu's Sacred Sisters."





## Looking Forward

Several dark sky community events are already being planned for 2021.

The first annual Kim and Nancy Malville Annual Starry Sky Event will take place in 2021, hosted by our benefactor and extraordinary archaeoastronomer, Kim Malville

The second major Community event is tentatively planned to take place jointly with Colorado College at its satellite Baca Campus. It is possible that some part of the Colorado College planned observatory will be in place in time for the event. Prior to the pandemic, planning was underway for Colorado College to install a state-of-the-art, remotely operated observatory at the Baca Campus, together with a planetarium similar to the planetarium at Chaco Canyon in New Mexico. At this point some funding is in place for the observatory, with the remainder on hold as a result of the worldwide pandemic. Both events will take place digitally if required.

In addition to the above events, smaller, educational and experiential events will take place, either live or by zoom depending again on pandemic restrictions.



photo by Stephen Hume

# COMMUNITY INITIATIVES

---

## Crestone residents adopt Hubble Skycaps eventually replacing all the street lights in town

The very successful campaign by Suzanne Frazier and Neyle Sollee to save our Dark Sky resulted in the citizens of the town of Crestone donating enough money to replace all the street lights in town with Hubble Skycaps!

This campaign is chronicled in articles published by the Crestone Eagle Newspaper between the years 1995 and 2000 in the "History of Crestone's Commitment to Dark Skies" section of this document.

One Hubble Skycap can be seen above the town park light and another can be seen in the distance on the right.

In 2019 Crestone completed a multi-year project to revitalize our downtown. The dark sky friendly light in the foreground was part of the revitalization and shows our ongoing commitment to preserve the night sky.



## Save the Night Sky, Adopt-a-Light catching on

*by Suzanne Frazier*

Everyone now can participate in reducing the light pollution in the Crestone/Baca area. Programs are in place for both the town of Crestone and the Baca to 'adopt a light.' 'adopting a light' means paying for a skycap to be installed over the trespassing light by the San Luis Rural Electric Cooperative.

As to the number of lights that can be adopted, the town of Crestone has 14 lights.

In the Baca, there are six lights located at: the entrance to Casita Park, the entrance to the POA, the POA parking lot, the entrance to Camper Village, inside

Camper Village and the Stables.

In the town of Crestone, anyone wanting to adopt a light can make arrangements by calling the SLVEC at 1-800-332-7634. The cost is \$35.00 for the skycap and between \$13-\$25 for installation. The SLVEC will install the skycap on their next available trip in the area. When you call, just tell the operator you want to make a service change. Before you call it is best to have either the number off the pole, or the location of the light.

In the Baca, Petie Lipscomb at the POA is handling the arrangements for adopting lights. By calling Petie at 256-4171 you can

## Grocery Store/Gas Station Shields Light

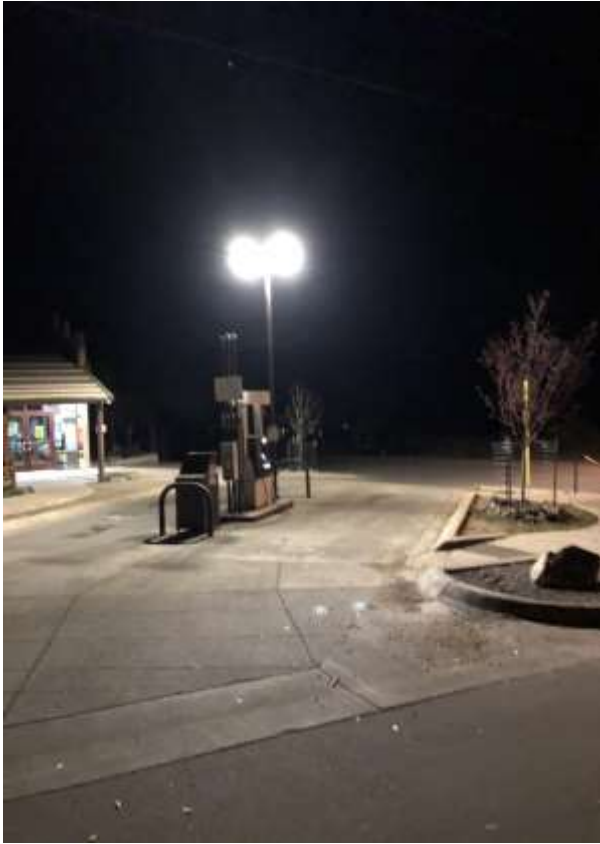
Crestone's only light pump, a part of the Elephant Cloud Market, has had extremely non-compliant and extremely pricey overhead lighting. The Town of Crestone worked with the owners, Benjamin and his wife Michelle Byer, to create shielding which focused the lighting downward, minimizing light pollution on surrounding trees and focusing lighting downward where it is needed. The result is a successful example of the Town working with local business owners to bring their exterior lighting into compliance with the International Dark Sky Association requirements and, at the same time, bringing local business recognition that light pollution harms the environment, the wildlife habitat and our quality of life.

**To the right** is a daytime photo looking upward from the ground, Benjamin Byer describes his modification below.

*"Isn't super professional, but it works. At 20 feet off the ground, it was difficult to get it to look good and still be safe. My friend has a bucket truck and will help fix it up at some point. Screen taped on with airplane tape. Cuts the sharpness and dims it."*



Before: (left), after (right): Lighting of the only gas pump in the Town of Crestone with the introduction of downward facing shielding, minimizing light pollution and bringing the lighting into IDA compliance.





## Crestone Mayor Facilitates Local Photo of the Great Conjunction of Jupiter and Saturn

A Great Conjunction of Jupiter and Saturn took place on December 21, 2020.

Serendipitously, as these two worlds became visibly closer in our sky than they've been since medieval times, the final touches were being given to the Town of Crestone's preparation of an application to the International Dark Sky Association for designation as an International Dark Sky Community.

An errant thought insistently occurred to the Town Mayor. "What if a photo of this spectacular event, with some recognizable community landmark included, could become part of the application?" An email to Peter Ismert resulted, incredibly, in this beautiful photo of the approaching great conjunction of Jupiter – Saturn with the crescent moon all shining down on our iconic Ziggurat. The photo was provided by Peter Ismert as a donation to the Crestone dark sky awareness initiative.



photo by Peter Ismert

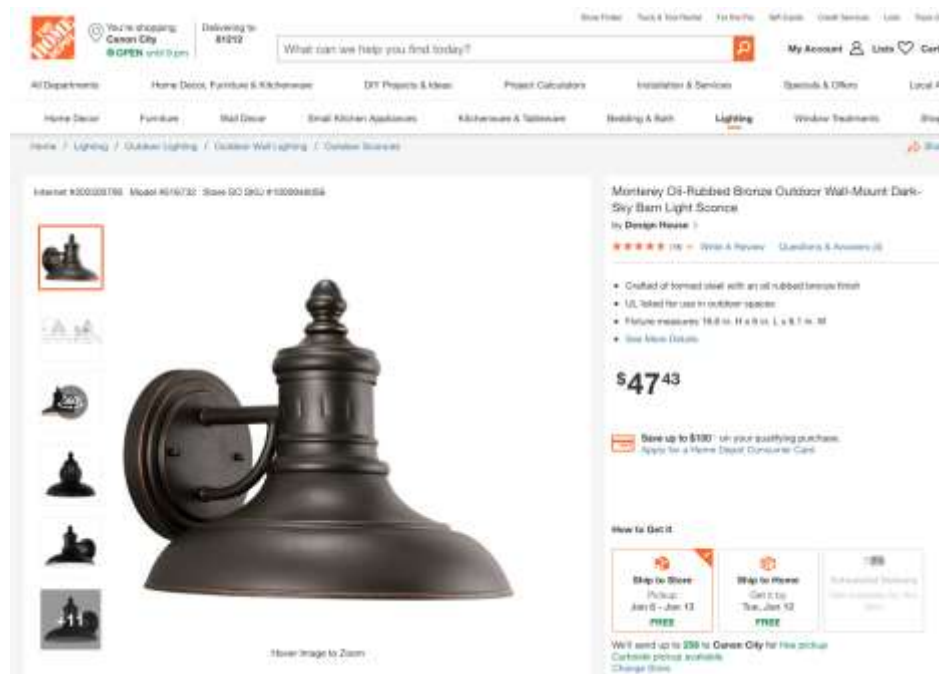


# Crestone Purchases IDA-Approved Residential Light Fixtures for Each Town Resident

The purchase of one International -Dark- Sky residential light fixture for each full-time Crestone resident is a Dark Sky Initiative guided by the Crestone Dark Sky Committee. With the approval of the Crestone Board of Trustees, a wholesale account was established with Home Depot and 44 IDA-approved Design House Monterey Outdoor Dark Sky Barn Light Sconces were purchased for a total of \$1,996.16.

With this purchase, each full-time residential property owner or renter will receive one of the above exterior residential light fixtures. Installation of the light fixture will be the responsibility of the property owner or renter. The Crestone Dark Sky Committee will work with the residents to implement the project both to achieve residential IDA-outdoor lighting compliance sooner than the time allotted by the Crestone Lighting Ordinance but also to provide increased and increasing protection of Crestone's remarkable dark night sky. All business owners, including Airbnb's, will be responsible for their own exterior lighting in compliance with the Crestone Lighting Ordinance.

No residential street lighting is provided by the Town of Crestone, nor is any planned.



## Local Merchant Donates a Year of Dark Sky Ads

Elephant Cloud Market owners, Benjamin and Michelle Byer donated approximately \$2,000 to create a quarter page ad in the Crestone Eagle for 12 consecutive months. Their advertising donation is to support the Town's dark sky awareness initiative and its quest to become designated as an International Dark Sky Community.



### Thanks go out to the community members below who responded to our ad.

Deborah Michalak, Roy Harvey, Zaylah Pearson Good, B.A.Beal, Dennis Posluszny, Dale Halley, Loretta Hares, Larry Hares, Peggy Schulze, Gary Schulze, Timothy F. Allen, Don Tullos, Karrie Ring, Konchog Norbu, Nancy Telos, Danny Scott.

## Acclaimed Astronomer Donates Telescope to Crestone

Kim Malville's donation of the Meade 8" telescope marks the beginning of a Crestone future filled with opportunities to look upward at our celestial wonders, with the combined assistance of Benjamin Byer, amateur astronomer, and Steve Hume, professional photographer. This combination of astronomy and photography is called astrophotography. Benjamin and Steve hope to begin regular monthly astrophotography and viewing sessions in early spring, pandemic restrictions permitting.

The Meade 7", 8", 10" and 12" telescopes are described as perhaps the most sophisticated and precisely manufactured telescopes ever made available to the serious amateur astronomer or viewer. Our new Meade telescope enables all of us, with some professional help, to reach out for detailed observations of the Solar System (the planets: Jupiter, Saturn, Mars, etc.) and beyond to distant nebulae, star clusters, and galaxies. With help, our residents and visitors alike will find a virtually limitless range of possibilities to view our community's celestial wonders, and our astrophotography students will find the same virtually limitless range of photographic possibilities since, with the precision, long exposure guidance from the Meade telescope, astrophotography becomes not a distant goal, but an achievable reality.



Specific details for community access to the new community telescope will be provided in the Crestone Eagle as they become available.

## Crestone Participates in “Colorado Stargazing” Grant To Preserve and Promote Dark Skies



photo by Peter Ismert

"Colorado Stargazing – Experience the Night" was a grant born via a collaboration between numerous entities, specifically: Westcliffe, CO, Crestone, CO, La Veta, CO, Cuchara, CO, Creede, CO, Lake City, CO, Great Sand Dunes National Park, and the San Luis Valley Museum, Association. The idea was to bring together areas of Colorado that had incredibly dark skies and believed in education, conservation, and preservation of the night sky. Relatively speaking, few people have seen the night sky as we see it. As a result of the "Colorado Stargazing" grant promotion, dark sky destination travelers almost always included an overnight stay. This was a perfect opportunity to create a tourism campaign that would promote dark skies preservation and tourism at the same time. We applied for a Marketing Matching grant from the Colorado Tourism Office and received a full \$25,000 in matching funds. The Crestone \$5,000 matching grant was paid for with \$2,500 from the San Luis Valley Museum Trail Association and a \$2,500 grant from Saguache County. These funds were used to promote preservation of dark skies along with ancillary offerings during the day as well: cultural, heritage, attractions, activities, etc. Encouraging longer stays in our areas meant a much bigger economic impact and the target audience was “low impact”, something all of the partners agreed was important.

There was great participation from all partners, interest from neighboring communities and regions, and the overwhelming requests for information from journalists, media, and publications. Even with the significant impact from the pandemic, the Colorado Stargazing project ended its 12-month grant period on a high note as it became the recipient of the Colorado Tourism Office's Outstanding 2020 Marketing Program, which was announced at the annual Governor's Tourism Conference. The towns of Westcliffe, Crestone, La Veta, Creede and Lake City have set aside funding in their 2021 budgets to continue to work together to promote tourism and awareness of the importance of dark sky preservation.



## Crestone Board of Trustees Recognize the Rights of Nature



photo by Douglas Beechwood

### Mother Earth News Reports on Crestone's Recognition of the Rights of Nature

The Rights of Nature is a movement to recognize that ecosystems and other natural entities have fundamental rights, just as humans do. It seeks to give nature a voice and legal standing under the law, and it establishes a relationship of respect, rather than exploitation, between humans and nature. The Rights of Nature is now recognized at some level in some 12 counties across the world.

On July 9, 2018, Crestone's Board of Trustees passed a resolution unanimously recognizing the Rights of Nature. It stated that "the Town of Crestone does officially recognize that nature, natural ecosystems, communities, and all species possess intrinsic and inalienable rights which must be effectuated to protect life on Earth." The resolution also acknowledged the deep spiritual connection between residents of Crestone and the natural world and embraced the community's role as stewards of nature.

Since its passage, Crestone's 'Rights of Nature' resolution has inspired many others. It is included on the U.N. Harmony with Nature Initiative website, where scholars across the world have used it for inspiration for their own Rights of Nature work. It was also featured in the first-ever law school coursebook on the Rights of Nature, entitled "Earth Law: Emerging Ecocentric Law--A Guide for Practitioners" (Wolters Kluwer, 2021). Finally, advocates such as Earth Law Center have used the resolution's text in Rights of Nature legal drafting efforts in other locations.

Today, Crestone's commitment to the Rights of Nature is further reflected in its strong commitment to protect its natural dark night sky from the ravages of artificial light pollution, which seems to the Town of Crestone no different than other forms of environmental pollution.





-Advertisement-

## Town of Crestone, Colorado, Takes Bold Step by Recognizing the Inherent Rights of Nature

Reader Contribution By Darlene May Lee, Earth Law Center | 8/8/2018 9:11:00 AM

Tags: [Earth Law Center](#), [advocacy](#), [rights of nature](#), [Town of Crestone, Colorado](#), [Darlene Lee](#),



Town of Crestone, Colorado Takes Bold Step by Recognizing the Inherent Rights of Nature



Photo by [Fredtyfish4](#) Wikimedia Commons

The Town of Crestone's Board of Trustees unanimously approved a resolution last month recognizing the rights of nature. [Crestone](#), Colorado now joins dozens of communities, cities, and nations around the world that recognize nature's *inherent rights*.

"We humans can no longer fail to acknowledge, to protect, and to preserve the rights of nature," said Crestone's Mayor, Kairina Danforth. "Our community is humbled to join in this clarion call to recognize officially that nature, natural ecosystems, communities, and all species possess intrinsic and inalienable rights which must be effectuated to protect life on Earth."

-Advertisement-

### EVENTS



### MOTHER EARTH NEWS FAIR ONLINE

**All-Access**

Learn from Home!

Survival Skills, Garden Planning, Seed Saving, Food Preservation, Natural Health – Dozens of courses, 100+ workshops, and interactive Q&As.

**LEARN MORE**

# Rights of Nature Takes Hold in Crestone, Colorado

Posted October 11, 2018 by [VJEL](#) & filed under [EcoPerspectives Blog](#).

**By Darlene Lee and Grant Wilson, Earth Law Center**

In advance of Vermont Law School's October 19, 2018 Symposium on "Rights of Nature: Shifting Paradigms and Grounding in the Law," case studies provide useful context for how the Rights of Nature movement is developing at the grassroots level. The case of Crestone, Colorado is a recent and exciting example.



San Luis Valley, Photo by David Herrera (<https://www.flickr.com/photos/dph1110/16611120748/>)

[CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>)], via Wikimedia Commons

On July 9, 2018, the Town of Crestone's Board of Trustees unanimously approved a resolution recognizing the Rights of Nature. With this bold decision, Crestone joined the dozens of communities, cities, nations, and indigenous peoples across the world who recognize nature's inherent rights.

Crestone's Rights of Nature movement began with initial conversations in July 2017 between Crestone's Mayor, Kairina Danforth, and Myra L. Jackson, a decades-long Crestone visitor who is also Senior Advisor on Whole Earth Civics for the Geoversiv Foundation and a Rights of Nature expert.

## LIGHTING INVENTORY

---

In 2004 there were 14 public street lights in Crestone. Tourists did not come to Crestone. Sales tax revenue began to decrease markedly as local businesses failed to survive the long, cold winter months. By 2010 our Trustees had not been paid their \$50 monthly stipend in almost a year and the monthly bills were increasingly burdensome. The electric bill was a primary offender as the SLVREC rates had increased. To mitigate the electric bill increase, one trustee suggested simply taking out half of the streetlights, which would then eliminate all residential street lighting. The Board agreed. And so there were seven. Afterwards, many remarked on the resulting darkness, saying that they liked it. Others agreed saying, "Let's not put them back."







If the Town of Crestone becomes accredited, it may be the first, maybe only, International Dark Sky Community with so few street lights just because it couldn't pay its electric bill. One errant street light appeared between then and now. As the inventory indicated, it was way out of compliance, brought in to illuminate the Public Works Building, and placed in the residential area. Today, it is being eliminated and a security camera and motion sensor lighting installed.

The Town lacked equipment to do the lighting inventory as well as the technical expertise. Fred Bunch from the Sand Dunes National Park gave us the name and contact information for Randy Stanley, who was a part of the National Park Service in Denver and also active in the Colorado Chapter of the International Dark Sky Association. Randy was wonderful. He came to Crestone and completed the entire lighting inventory with equipment he brought and also some he borrowed from the Sand Dunes National Park. The results of his lighting inventory appear on the following 3 pages.

### Town of Crestone Light Inventory

Location	Type of Bulb	Watts	Photo	Lumens	Color	Notes	Illuminance	Compliance	Comments and Recommendations
Museum / Community Building (SW-Pole Light)	Mercury Vapor (MV)				White	5000 K	12.3 lux	No	Lamp is bright white, with too much blue content
Museum / Community Building (West-Porch Light)	Flourescent (CFL)	23 W		600	Warm White	2700 K	10.0 lux	No	CFL bulb is too large and extends below bottom of fixture, defeating the shielding. Recommend a smaller bulb, then take daytime picture
Water Plant (West Door)	Incandescent	100 W		1600	Warm White	2500 K	109 lux	No	Light is misdirected/wasted. Both fixture shrouds should be reoriented and pointed straight down. After reorienting, take daytime picture.
Water Plant (East Door)	Incandescent	100 W		1600	White	(replace)		No	This open wire cage fixture should be replaced with an IDA-compliant, downward directed, shielded fixture
Little Pearl Park Plaza (2)	Flourescent (CFL)				Frosted White			?	



Town Hall (Front Entrance)	Flourescent (CFL)			520	Warm White	2500 K	27.9 lux	No	Jelly jar fixture is unshielded. Recommend replacing with an IDA-compliant, fully shielded fixture.
Town Hall (Board Room Entrance)	N/A	N/A		N/A	N/A	N/A	N/A	Yes	Both sockets have a screw-in 120V outlets inserted. Both fixtures shrouds were directed downward. Recommend a small bulb.
Rental Apartment	Incandescent	75 W		1150	White			Yes	sensor for on duration < 5 minutes; recommend directing light downward to reduce wasted light and
SLVREC Streetlight (Birch St. x Golden Ave.)	HPS	400 W			Yellow	2000 K	9.1 lux	Yes	Very warm, fully shielded light.
SLVREC Streetlight (Cottonwood St. x Silver Ave.)	HPS	400 W			Yellow	2000 K	20.7 lux	Yes	Very warm, fully shielded light; a little brighter than other similar HPS lights.
SLVREC Streetlight (halfway between Cottonwood St. and Alder St., north side of Silver Ave.)	HPS	400 W			Yellow	2000 K	(9-12 lux)	Yes	Very warm, fully shielded light.
SLVREC Streetlight (towards Alder St., south side of Silver Ave.)	HPS	400 W			Yellow	2000 K	(9-12 lux)	Yes	Very warm, fully shielded light.

SLVREC Streetlight (Cottonwood St. x Galena Ave.)	HPS	400 W		Yellow	2000 K	(9-12 lux)	Yes	Very warm, fully shielded light.
SLVREC Streetlight (Alder St. x Galena Ave.)	HPS	400 W		Yellow	2000 K	9.5 lux	Yes	Very warm, fully shielded light
SLVREC Streetlight (Alder St. x Carbonate Ave.)	LED			Cool White	4000 K	12.0 lux	No	Lamp is bright white, with too much blue content.
SLVREC Streetlight (Cottonwood St. x Granite St.)	HPS	400 W		Yellow	2000 K	(9-12 lux)	Yes	Very warm, fully shielded light.
Old Town Hall (Public Works Building; 199 N Alder St.)	Incandescent	60 W		Warm 800 White	2700 K	14.6 lux	No	Incandescent bulb is too large and extends below bottom of fixture, defeating the shielding. Recommend a smaller bulb.

Automatically tabulates Yes and  
No compliance above

Yes	9	52.9%
No	7	41.2%
?	1	5.9%

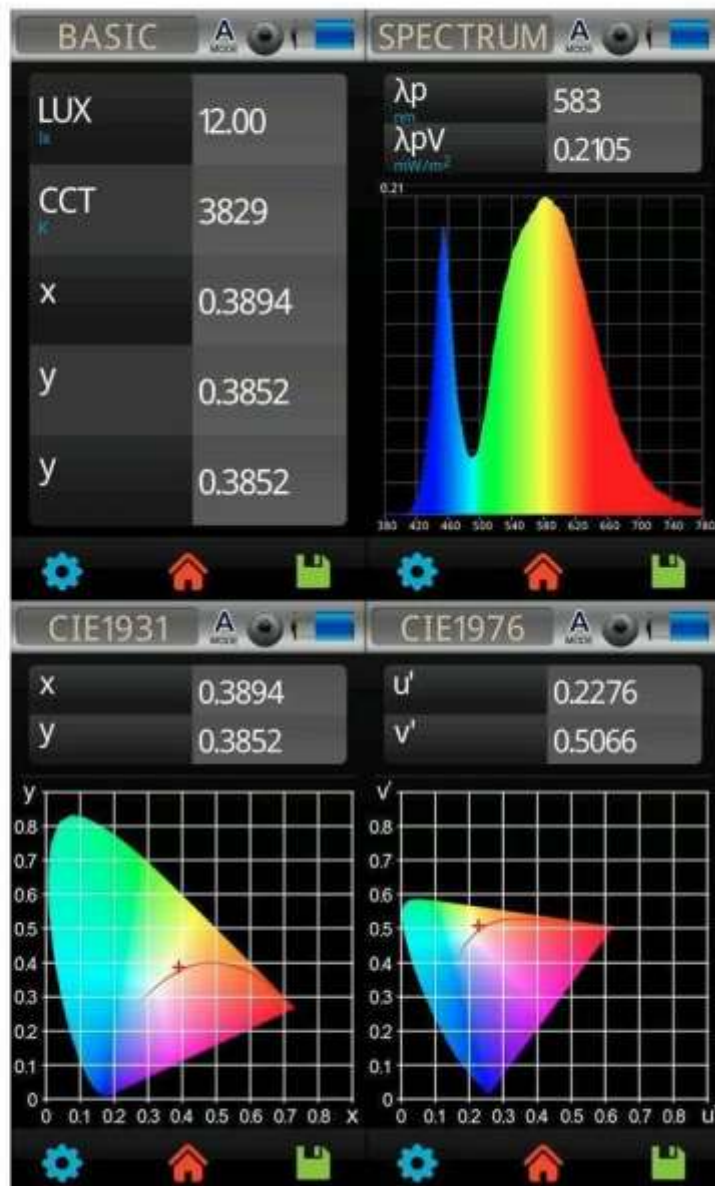
# LIGHTING INVENTORY OF NON-COMPLIANT STREET LIGHTING

All street lighting in the Town of Crestone is owned by San Luis Valley Rural Electric Cooperative, the local electric utility. The Town of Crestone has eight street lights presently, seven of which are in compliance with IDA 2018 DSIC requirements. The eighth street light is not in compliance. We wish to note that the Town has only limited jurisdiction over SLVREC-owned street lighting as it moves forward to bring all of the existing street lighting in the Town of Crestone into full IDA 2018 compliance.

**Product Name: LED streetlight at Alder St. & Carbondale Ave.**

Manufacturer: unknown

Parameter	Value
CCT	3829 K
Illuminance	12.0 lux
Foot Candle	1.1 fc
$\lambda_p$	583 nm



## POTENTIAL RETROFIT FOR LIGHTING INVENTORY

For any switched (non-motion sensor) lighting at the front and rear of the Water Plant, we are considering the IDA-certified Glare Buster, which is fully shielded and lower than 3000K.

<http://www.luminessencelighting.com/the-glare-buster.php>  
<https://www.energyearth.com/product/glarebuster-wall-fixtures-bronze>

Below are small bulb options below for our Old Town Hall, now the Public Works Building, at 199 N. Alder St. We are considering the same small bulb options for the porch light at the Museum, the former Community Building, doorway. These are low profile bulbs that will not extend below our fixtures -- defeating the shielding.

These bulb options are listed below in order of brightness from top to bottom. The 2000K is amber in color, most like our Hubbel Skycap streetlights.

<https://www.suncolighting.com/products/a15-led-bulbs> (2700K – 800 lm)  
<https://www.amazon.com/SANSI-Equivalent-Listed-900-1000lm-Daylight/dp/B07ZPMSZPK/>  
(2700K – 650 lm)  
<https://www.suncolighting.com/products/a15-led-bulb-yellow-bug-light> (2000K – 600 lm)  
<https://www.amazon.com/Sunlite-G16-LED-E26-DIM/dp/B01HMFALRW/> (2700K – 500 lm)

The PAR20 options listed below might be better for the overhead light at our Town Hall. They are a little brighter and more focused (only 24 degrees or so) and may be better since the shield is too flat to help direct the light other than downward.

<https://www.amazon.com/Bonlux-Narrow-Spotlight-Halogen-Equivalent/dp/B07WC26TMF/>  
(warm white 3000K option – 24 degree beam – 1200 lumen)

More options for the Town Hall overhead [www.1000bulbs.com/category/led-par20-lights-2700K/](http://www.1000bulbs.com/category/led-par20-lights-2700K/)

**SUMMARY:** The Town of Crestone is committed to be in full, 2018 Guideline, International Dark Sky Association compliance within the five-year prescribed requirement. We will, however, be considering all retrofit options immediately and expect that all public lighting will become fully compliant within the next twelve months.



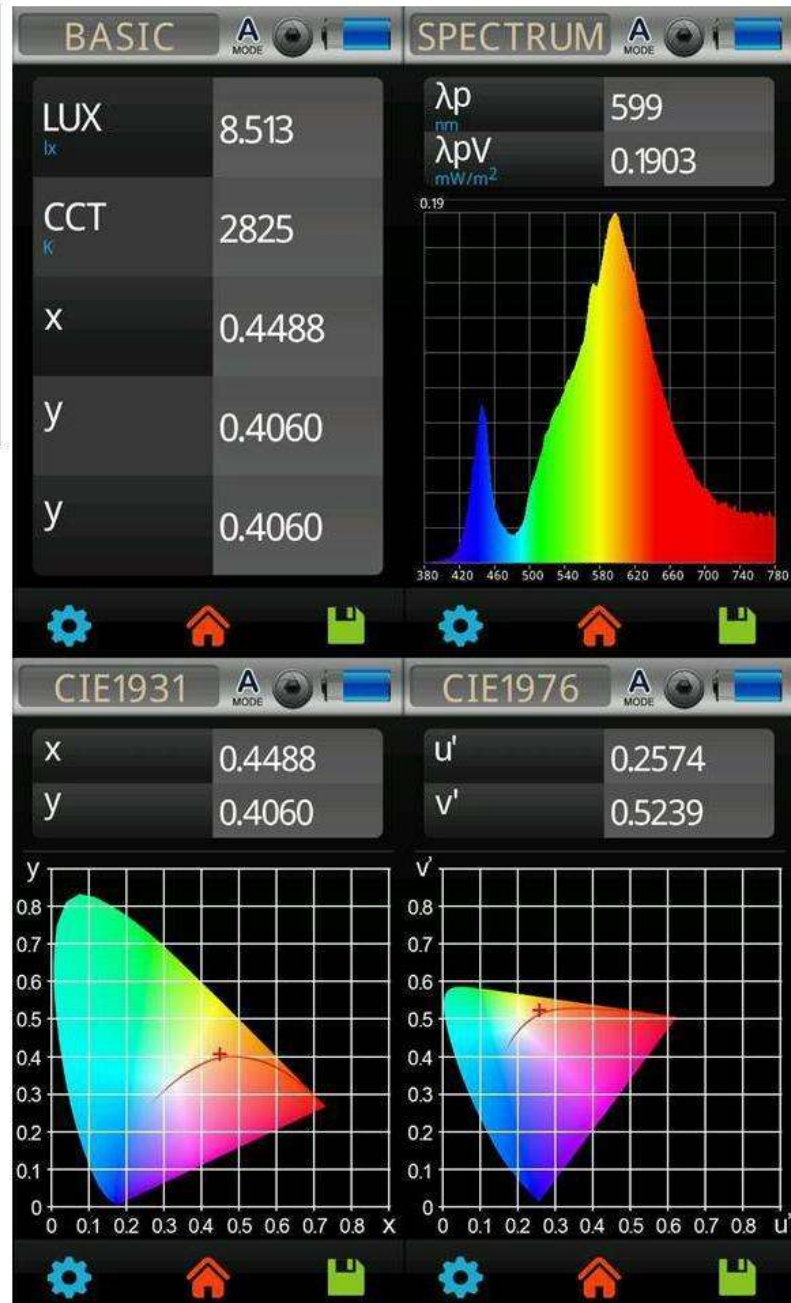
## ADDITIONAL LIGHTING DATA FOR LOCAL BUSINESS BRINGING GAS PUMP LIGHTING INTO IDA COMPLIANCE:

Now the gas pump lights are not too bright. (8.5 lux) / 0.79 fc and have a correlated color temperature (CCT) classified at 2700 K, which is IDA compliant. Confirming data follows.

**Product Name:** gas pump light

**Manufacturer:** unknown

Parameter	Value
CCT	2825 K
Illuminance	8.5 lux
Foot Candle	0.79 fc
$\lambda_p$	599 nm



## NIGHT SKY QUALITY MEASUREMENT REPORT

---

A map of the exact Crestone night sky quality measurement area is shown below.



Documented measurements of its dark sky are an integral part of the Town of Crestone's dark sky awareness initiative. It has developed a Night Sky Quality Measurement Report that requires no less than quarterly dark sky lighting measurements to be taken within the Town of Crestone boundaries using a Town-owned Unihedron SQM-L device. A "sky quality meter" (SQM) is an instrument used to quantify the skyglow aspect of light pollution, and uses units of "magnitudes per square arcsecond" favored by astronomers. Monthly Town of Crestone readings may also be taken. Municipal lighting measurements are being taken by Benjamin Byer, Town Trustee, local business owner and amateur astronomer.

Three Crestone measurements using the SQM-L are presented in the spreadsheet below. All three were taken recently, one in December 2020, one in January 2021, and one in February 2021. Subsequent readings will be added to this spreadsheet. The data includes the date, municipal participant name, the observing location, the six SQM measurements taken, the average SQM measurement and accompanying comments. All measurements will be taken within the 0.2 mile Crestone town boundaries. With the advent of the pandemic, no measurements were taken by the town as emergency needs and challenges took priority.

Shane Burns, a Physics professor and an astrophysicist at Colorado College, maintains a database of SQM-L measurements taken by the partnering organization or agency in the prospective Sangre de Cristo Dark Sky Reserve in the San Luis Valley. Data is entered via a web form from either a computer or smartphone. The data is stored in a database that includes the date, the Reserve partner's name, the observing location, the six SQM measurements taken at each site, the average SQM-L measurement and accompanying comments. All of the Crestone measurements to date are presented in the table below, were contemporaneously submitted to Shane Burns, and are a part of the prospective Sangre de Cristo Reserve database (copy included in the Appendix). As western boundaries of the Reserve were being established, measurement points were being set up and measurements submitted for inclusion in the database. Unfortunately, at this early stage the COVID-19 pandemic prevented most ongoing measurements. Reserve meetings are now proceeding and measurements along the points established by Ron Garcia, NWR Manager, are being taken. Additional measurement points are being added along the prospective eastern boundary.

As a partnering local government member of the prospective Sangre de Cristo Reserve, Crestone is committed to participating in the Reserve database submission requirements. As noted above, all of the Reserve database required measurements are now being forwarded contemporaneously to the Sangre de Cristo Reserve database as recorded for inclusion in our Night Sky Quality Measurement Report.

<b>Model:</b>	SQM-L					
<b>Serial:</b>	(enter here)					
<b>Date</b>	<b>Local time</b>	<b>Observer Initials</b>	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Temp (°C, SQM)</b>
12/20/2020	1:48 AM	BJB	Above Crestone, but in town	37.59.52	105.41.31	4
1/12/2021	9:45 PM	BJB	NE Corner of Crestone on Her	37.59.55	105.41.42	13
2/11/2021	9:00 PM	BJB	Pinon & Mica	37.59.56	105.41.35	30

Note in comments: moonrise or set timing, milky way position, clouds, light domes, smoke or other atmospheric aerosols

<b>SQM 1</b>	<b>SQM 2</b>	<b>SQM 3</b>	<b>SQM 4</b>	<b>SQM 5</b>	<b>SQM 6</b>	<b>SQM Average</b>	<b>Comments &amp; Sky conditions</b>
21.62	21.82	21.67	21.67	21.71	21.76	<b>21.73</b>	moon set, Cold night, snow on ground, dark and full milky way
21.55	21.56	21.71	21.65	21.60	21.78	<b>21.66</b>	near to new moon, some snow, closer to downtown, on town street
21.54	21.50	21.69	21.64	21.60	21.68	<b>21.62</b>	snow on the ground

\*Please see the highlighted section of Appendix G for more local participation



# LIGHTING MANAGEMENT PLAN

---

The Town of Crestone is committed to and does commit to bringing all public-owned lighting into full compliance with all International Dark Sky Community mandates, including its 2018 Guidelines within the prescribed five-year period. The Lighting Ordinance passed, with full conformance with IDA 2018 guidelines, has been included previously. In addition, the Town of Crestone will implement a vigorous and ongoing program to encourage and create Increasing dark sky community dedication to the protection and preservation of our precious dark, star-filled, night sky.

## Residential and Commercial Lighting

1. Light only if you need it
2. Light only when you need it.
3. All outdoor lighting must be fully shielded and focused downward.
4. All residential outside porch lighting should be either turned off at night or placed on a motion sensor to minimize community ambient lighting and protect dark night sky.
5. All commercial lighting must adhere to the requirements mandated by Crestone Ordinance 004-2020.

## Residential and Commercial Construction

1. All new building or remodel of existing structure must adhere to the requirements mandated by Crestone Ordinance 004-2020.
2. All existing nonconforming use, including nonconforming existing outdoor light fixtures, shall expire upon execution of any deed transferring property ownership.

## Ongoing Educational and Experiential Events

1. Continuing educational and experiential events are planned and encouraged.
2. Added attention will be given to teaching our young people using tools such as the “Quality Lighting Teaching Kit” developed by the National Optical Astronomy Observatory in Tucson, and the “Bird Migration Game”. Local astronomy club activity is strongly encouraged.
3. Extend collaborative efforts with the Crestone Charter School and the Colorado College Baca Campus.
4. Continue working with the prospective Sangre de Cristo Reserve.
5. Continue our dedication to the principles of the Rights of Nature.

# LETTERS OF SUPPORT



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
69812 Co. Rd. T / P.O. Box 247  
Crestone, Colorado 81131



In Reply Refer to  
FWS/IR05/IR07

December 21, 2020

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

Dear IDA Board Members,

I am writing this letter on behalf of the U.S. Fish and Wildlife Service (USFWS) and the Baca National Wildlife Refuge (Refuge) in support of the Town of Crestone's (Crestone) application for designation as an International Dark Sky Community.

The USFWS's Baca National Wildlife Refuge is a 92,500 acre open landscape set aside specifically for the needs of wildlife. This large Refuge is adjacent to the Town of Crestone. The purpose of the Refuge is to restore, enhance and maintain suitable habitat for wildlife native to the San Luis Valley of southern Colorado. As such, striving to maintain dark night skies is a critical component in providing for the lifecycle needs of many of the wild creatures that rely on the Refuge. Most lands of the refuge maintain the primitive character of the landscape which is largely absent evidence of the hand of man. A strong commitment by our neighbors, such as the Great Sand Dunes National Park and Preserve (GSDNPP) and the Town of Crestone, to protect the nocturnal environment of the overall Region helps to maintain that primeval character of this magnificent landscape.

The Greater Sand Dunes area of the San Luis Valley, which contains the Refuge, GSDNPP and the Town of Crestone, currently enjoys an incredibly dark night sky. This in itself has resulted in the area becoming a destination for those wishing for that dark sky experience. The Town of Crestone's desire and continued work to protect and promote dark night skies, by taking steps to reduce contributions to light pollution and to become an International Dark Sky Community, greatly support larger group efforts to protect the dark skies in the Greater Sand Dunes area.

The U.S. Fish and Wildlife Service and The Baca National Wildlife Refuge applaud the efforts of the Town of Crestone to protect the environment including the dark night sky in this incredible area, and ask that you look favorably upon their request for an International Dark Sky Community designation. Please feel free to contact me if you would like more information regarding the Service's Plans for the Baca National Wildlife Refuge and thank you for considering the important request being made.

Sincerely,

Ronald J. Garcia  
Refuge Manager  
Baca National Wildlife Refuge

INTERIOR REGION 5  
MISSOURI BASIN

KANSAS, MONTANA\*, NEBRASKA, NORTH DAKOTA,  
SOUTH DAKOTA

\*PARTIAL

INTERIOR REGION 7  
UPPER COLORADO RIVER BASIN

COLORADO, NEW MEXICO, UTAH, WYOMING



United States  
Department of  
Agriculture

Forest  
Service

Saguache Ranger District

46525 State Highway 114  
Saguache, CO 81149  
719-655-2547  
TDD: 719-655-6135  
Fax: 719-655-2502

**File Code:** 1560  
**Date:** January 5, 2021

International Dark Sky Association  
Board of Directors  
3223 North First Avenue  
Tucson, AZ 85719

Dear Board Members,

The Rio Grande National Forest extends its support to the Town of Crestone's application for International Dark Sky certification as an International Dark Sky Community. The Forest has worked with the Town of Crestone residents and visitors to the North Crestone Campground and adjacent National Forest system lands to help preserve the natural dark sky Eastern San Luis Valley experience.

The Rio Grande National Forest manages one of the few sizeable areas in the United States that retain exceptionally dark night skies and is readily accessible for public stargazing enjoyment in the Crestone-Great Sand Dunes area. The efforts by these partners to protect the quality of the night sky also support the preservation and protection of the natural, fish, wildlife, scenic, historic, and recreational values for which the Rio Grande National Forest was established.

It is of the utmost importance to protect this heritage as a part of the values recognized in the Rio Grande National Forest's enabling legislation and to preserve the character of the associated, majestic Sangre de Cristo Wilderness Area. A paramount mission of the Forest Service is the responsibility to protect the natural conditions, primeval character and influence of designated wilderness. Preserving natural dark skies is an integral part of accomplishing this mandate.

Accreditation of Crestone as an International Dark Sky Community will strengthen our combined efforts to achieve our comprehensive land management goals for the Rio Grande National Forest. The designation of Crestone as an International Dark Sky Community will help protect and preserve ecosystem integrity and will enhance educational and interpretive opportunities and recreation as well as benefit local tourism economy.

We commend the International Dark Sky Association for sponsoring this program and look forward to joining our efforts to preserve the extraordinary dark sky resource in our area.

Sincerely,

TRISTRAM S. POST  
District Ranger



Caring for the Land and Serving People

Printed on Recycled Paper





## United States Department of the Interior



BUREAU OF LAND MANAGEMENT  
San Luis Valley Field Office  
1313 Highway 160 East  
Monte Vista, CO 81144

In Reply Refer To:  
8300 (COF03-SLVFO)

Date: 6Jan21

Board of Directors  
International Dark Sky Association  
3223 North First Avenue  
Tucson, AZ 85719

Dear Board Members,

On behalf of the Bureau of Land Management's San Luis Valley Field Office, I would like to express our support for IDA designation of the Town of Crestone as an International Dark Sky Community. The Bureau of Land Management has a longstanding and successful partnership with the Town of Crestone as a stakeholder and member of the Eastern San Luis Valley Trails Coalition and, prospectively, the Sangre de Cristo International Dark Sky Reserve.

The Wilderness Act of 1964 defines the term wilderness as "an area where the earth and community of life are untrammeled by man, where man himself is a visitor who does not remain" and "an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, so as to preserve its natural conditions." This landmark conservation bill created a way for Americans to protect their most pristine wildlands for future generations which is protected and managed.

The Sangre de Cristo Wilderness Area extends 70 linear miles, from Poncha Springs to Mount Blanca. At 221,000 acres, it represents the state's third largest wilderness area, and when abutting public lands are included – Forest Service, BLM, the Baca National Wildlife Refuge and the Great Sand Dunes National Park and Preserve – it becomes one of the largest contiguous open spaces in the continental U.S. The Town of Crestone is positioned at the very head of this vast treasury of protected, pristine, public lands, with their extraordinary dark night skies overhead.

Our stewardship mandate, directs us to manage public land for multiple uses while conserving natural, historical, and cultural resources and also to work with other Federal agencies to ensure that Americans will be able to access, use and protect their public lands both now and in the generations to come. As part of our stewardship program, we offer our strong support for Crestone's application for international dark sky community status and we look forward to joining our efforts to preserve its extraordinary dark sky resources.

INTERIOR REGION 7 • UPPER COLORADO BASIN  
COLORADO NEW MEXICO UTAH WYOMING

Sincerely,

Melissa Garcia  
Field Manager  
San Luis Valley Field Office  
Field Manager



International Dark Skies Association  
3223 N 1st Ave.  
Tucson, AZ 85711



December 15, 2020

Board of Directors:

This letter is written in support of the town of Crestone, Colorado's dark sky application.

For the SLVMA, Crestone's efforts will help to preserve the dark skies of the San Luis Valley in Southern Colorado is a commendable and a highly anticipated endeavor that we are in full support of. While we are an organization focused on the preservation of the history, heritage and culture of the San Luis Valley our museum members are also a big draw for tourists. Crestone's dark sky designation will also have a great positive impact on tourism in the San Luis Valley.

We were honored and delighted when Mayor Danforth and the Association chatted and with like minds came together in understanding the importance of not just saving the dark skies for the preservation of our night sky history/culture, and human enjoyment but also our well-being and the well-being of all living things. Mayor Danforth and several other dark sky enthusiasts attended a Colorado Tourism Office (CTO) CRAFT Workshop hosted by the SLVMA in January 2019. It was from that workshop that the Colorado Stargazing group was established. Later that same year at the San Luis Valley Annual Tourism Conference Mayor Danforth, Fred Bunch with the Great Sand Dunes National Park and Preserve and Charley Ellison with the Dark Skies of the Wet Mountain Valley were featured the opportunity to speak at the conference about the importance of protecting and preserving the dark skies of the San Luis Valley and doing their part in preserving the dark skies of our planet.

Members of the communities of Westcliffe, La Veta, Cuchara, Creede, Lake City and Crestone came together, raised funding, selected a logo and worked to develop a grant that was submitted to CTO. That grant was awarded and subsequently had the creation of a CTO micro-page. Each individual community featured the other group members' dark sky events, information about each group's community, posted and shared social media postings. Basically supporting each other in a collaborative effort with mutual goals.

Crestone's festival (a traditional in-person multi-day festival) had to be canceled due to COVID-19. Despite the town of Crestone also having to reprioritize during COVID toward basic functioning and health care needs they still continued to pursue their application to become a Dark Sky Community. This is a very dedicated group of individuals who worked to ensure the present health, well-being and prosperity of their community while at the same time continued to look to the future in saving their dark sky.

The SLVMA strongly supports this effort to preserve the skies over Crestone in the San Luis Valley.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Kat Olance', with a long, sweeping horizontal line extending to the right.

Kat Olance, president  
San Luis Valley Museum Association



## COLORADO COLLEGE

Department of Physics  
(719) 389-6581

14 E. Cache La Poudre St.  
Colorado Springs, CO 80903

December 21, 2020

Board of Directors  
International Dark Sky Association (IDA)  
3223 North First Avenue  
Tucson, AZ 85719

Dear Board Members:

As a representative of Colorado College, I enthusiastically support the town of Crestone's proposal to become an International Dark Sky Community.

Colorado College's Baca Campus is within a mile of the center of Crestone. The site is an adjunct to our campus in Colorado Springs and consists of a classroom/conference center, three condominium units, and a 7,000 square foot lodge. Over 30,000 have stayed at this facility for classes and field trips since the campus was established in 1987. The campus is used by faculty and students from all of the College's departments, but a major focus is astronomy courses. Courses in introductory astronomy, cultural astronomy, and advanced observing all use the campus because of the excellent dark sky at the site. I estimated the sky's darkness at the Baca campus is typically 2 on the Bortle scale, and it isn't rare to see nights that are Bortle 1. Keeping the sky dark at the Baca campus is essential to our program.

In the future, we plan to expand our observing facilities to include a dedicated observing platform, an open-air planetarium, and finally, an automated 0.7-m telescope to be used for faculty-student research. These facilities will be open to the community of Crestone for astronomy-related events. Crestone community leaders and I have also discussed plans to host some events jointly. These exciting new projects will all spread awareness of the importance of protecting our night skies.

Sincerely,

M. Shane Burns  
Professor of Physics

[www.coloradocollege.edu](http://www.coloradocollege.edu)



PO Box 800  
185 Line Ave.  
Crestone, CO 81311  
Phone: 719.294.4907  
Fax: 719.294.4906  
web: crestone-charter-school.org

Crestone December 11, 2020

International Dark Sky Association

Dear Board of Directors,

It is with enthusiasm that I am writing this letter of support of the Town of Crestone becoming internationally recognized for our extraordinary vibrant night skies.

Pre-COVID, the Crestone Charter School regularly hosted sleep overs at the school to provide real-life astronomy explorations with the school's telescopes. Every astronomic event is also diligently followed with the students. Astronomy is also part of our science curriculum.

The school actively supports the Town's dark sky ordinance. All lighting of our new, nearly carbon-neutral school building protects the night sky. This aligns with our school values to protect and care for our natural environment. Post-COVID, we are looking forward to co-host educational dark-sky-events with the Town and to integrate a dark skies curriculum more intentionally.

Please support the Town of Crestone's effort to become a Dark-Skies-Community to build more awareness for the beauty and preciousness of our night skies.

Sincerely,

A handwritten signature in cursive script that reads 'Marie-Louise Baker'.

Marie-Louise Baker

Director, Crestone Charter School

Suzanne Frazier  
P.O. Box 331  
Longmont, CO 80502-0331  
Phone: 303-502-0751  
[suzannefrazierartist@gmail.com](mailto:suzannefrazierartist@gmail.com)

January 2, 2021

The Board of Directors  
International Dark Skies Association  
3223 N 1st Ave.  
Tucson, AZ 85711

RE: Town of Crestone – Dark Sky Community

I am writing in support of the Town of Crestone's application to become a Dark Sky Community.

In 1995, I wrote a series of articles in the Town of Crestone's local newspaper, Crestone Eagle, encouraging the community to embrace the idea of dark skies.

Throughout 1995, I followed up with a series of newspaper articles, published in the Crestone Eagle, informing the town residents on various ways to reduce light pollution and light trespassing. Many community members responded by changing their outdoor lighting.

I continued to write articles for the next four years encouraging more community members to embrace Dark Skies. In my efforts to preserve the San Luis Valley Night Sky, I worked with the local energy company, San Luis Valley Rural Electric Cooperative, and shared information with Steve Chaney, then the Administrator of the Great National Sand Dunes National Monument. Both organizations embraced the idea of Dark Skies and consequently took action to initiate and maintain programs reducing light pollution and light trespassing.

I would like to see what I started in 1995 continue with the designation as a "Dark Sky Community" for the Town of Crestone.

Suzanne Frazier



Board of Directors  
International Dark Sky Association

Jan. 27, 2021

This letter is in regards to my support for the Dark Sky Project and application. As a child of the 60's I remember my folks driving to Crestone in our VW Bug. My mother fell in love with the trees, no painted lines on road T, 12 active Post Office boxes, and only two phones on a party line. They scraped up \$1,000 to purchase a small cabin; actually a camper sided with wood. Later we were able to purchase the now existing Town Hall. The cabin eventually turned into my chicken coop. The family joke was that we paid more for the coop than our home.

My father was a Navy man and at night we would do our walk-a-bout. He would point out the North Star, Big and Little Dipper, Milky Way, and the Orion Belt. Later we tried to find the Zodiacs. I will never forget those times with him and knowing I could never get lost if I could see the stars.

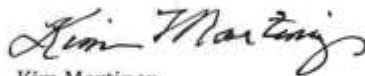
Times change, people come and go. The Baca Development moved in and I grew up. Being a country kid, I couldn't wait to move to the big city. Two things I missed, the taste of well water and the stars.

I later married a career Navy man and when he was deployed we pledge to find the Big Dipper every night. It was our way to say connected thousands of miles away.

To this day, I see my dark sky and feel I can reach out and touch those beautiful diamonds. I pray future generation will have the benefit of observing and using their imaginations. Like looking at the clouds and seeing elephants and ducks. Once while camping I saw a baseball diamond and sure as heck a shooting star made a home run.

It makes one wonder the vastness of our universe and how very small we are. This is a good and important project. It was vital to the past, is to the present and undoubtedly for the future. I pray with the inevitable population growth we don't take this gift for granted. Support the Dark Sky Project for the planet and all the creatures that inhabit.

Sincerely,

  
Kim Martinez

# The CRESTONE EAGLE



Box 101 • Crestone, CO 81131 • Ph: 719-256-4956 • Fax: 719-256-4954 • [info@crestoneeagle.com](mailto:info@crestoneeagle.com)

Board of Directors  
International Dark Sky Association (IDA)  
3223 North First Avenue  
Tucson, AZ 85719

Dear IDA Board Members,

*The Crestone Eagle* is a monthly newspaper/magazine that provides news and information for the Northern San Luis Valley. It was founded in 1989 by me, publisher Kizzen Laki. We are now into our 32nd year.

I first learned to walk by starlight when I was 20 years old. I had left the lights of a big city and moved to a 1000-acre ranch in the Colorado mountains. I never knew there were so many stars! I had never even seen the Milky Way! I fell in love with our incredible night skies.

In 1995 Crestone and the Baca Grande subdivision were still fairly small, but growth was on the horizon. We were seeing light pollution threaten to change one of the things we most loved about being here. Suzanne Frazier along with amateur astronomer Neyle Sollee started a movement to protect our dark skies. Suzanne wrote numerous articles for *The Crestone Eagle* campaigning to protect our dark skies. I happily printed them as a dark skies advocate to get this message out. Our efforts paid off and all agencies enacted rules to protect our dark sky back in 1995 and 1996. The Town of Crestone reduced the number of streetlights it and had the electric company install Hubbel Sky Caps on the remaining ones, plus started on dark sky and lighting recommendations.

*The Crestone Eagle* continues to strongly support dark skies. We feature a monthly astronomy column by Kim Malville. We feature photos of our brilliant starry night sky—from comets to the Milky Way to galaxies far, far away.

Nearly every month the *Eagle* includes a small ad promo of "Enjoy the Night Sky. Turn off your lights!". We have set and encourage a dark sky standard.

As you walk around Crestone at night you will need a flashlight (unless you can see by stars and many do). Our neighborhoods are dark, and we like it that way. As we apply for Dark Skies certification we are fortunate that we already have a populace that is in support of it. They have been doing so for 25 years.

Kizzen Laki, Publisher



The Crestone Eagle



**Caddis Environmental Consulting, LLC**  
*Experience, Quality, Dependability*

---

January 4, 2021

Re: Crestone Dark Sky Initiative Letter of Support

To Whom It May Concern,

Please consider this a formal letter of support for the Crestone Dark Sky Initiative and their efforts to obtain Dark Sky certification for the Crestone, Colorado area.

As a professional visual resource analyst who is certified to conduct visual analyses for the Bureau of Land Management and the US Forest Service, I have firsthand experience with the effects light pollution can have on night sky views. I also know how rare the quality of our dark skies here in Crestone are. One of the reasons that I chose to live in the Crestone area was the magnificent Dark Sky views of the stars, Milky Way, and other astronomical sights that many, many people never get the opportunity to see.

Based on my professional knowledge of how unique Crestone's night sky views are, I would like to include my support for certification of Crestone as a Dark Sky Community. I would be happy to provide any additional help that I can to assist in moving the certification forward.

Thank you for your consideration.

Respectfully,

Karen Caddis

Principal/Senior Environmental Specialist

---

PO Box 1186 • 636 Panorama Way • Crestone, CO 81131 • Phone: (970) 218-0031 or 719-256-2007  
kcaddis@caddisenviro.com



January 5, 2021

International Dark-Sky Association  
3223 North First Avenue  
Tucson, AZ 85711

Dear IDA Board Members,

San Luis Valley Great Outdoors (SLV GO) extends its strong support for the Town of Crestone's application to become an internationally designated Dark Sky Community.

The mission of SLV GO is to provide residents and visitors throughout the San Luis Valley with accessible and inclusive outdoor recreation opportunities that connect communities, improve wellness, encourage stewardship, and contribute to the economic vitality of the region. Over the past several years, SLV GO has been working with several partners, including the Town of Crestone, on initiatives which aim to protect and connect communities with our natural resources.

SLV GO is the backbone organization for the Sangre de Cristo Dark Sky Reserve, another dark-sky designation initiative of which the Town of Crestone has been a valued partner. SLV GO proudly assisted the Town of Crestone in hosting "Myths from the Heavens," a recent star-story presentation by University of Colorado Professor Emeritus J. McKim Malville.

With our history of strong and effective partnership, SLV GO believes the Town of Crestone is an ideal candidate for Dark Sky designation and we fully support the Town in this endeavor. We hope that you will favorably consider this effort to preserve the precious dark skies over Crestone.

Sincerely,

Mick Daniel  
Executive Director  
San Luis Valley Great Outdoors

San Luis Valley Great Outdoors Coalition  
PO Box 300  
Alamosa CO 81101  
[www.slvgo.com](http://www.slvgo.com)



January 5, 2021

Board of Directors

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

Dear Board Members,

On behalf of the Way of Nature and the Sacred Land Sanctuary, it is my pleasure to support your recognition of the Town of Crestone as an International Dark Sky community. It is said that I am one of the founding fathers of the modern environmental movement, and it is true that I have worked and studied extensively in many of the world's shamanic and enlightening traditions, beginning with my first vision quest at age seven. Starting in the 1950's I was one of the first to bring a contemporary vision quests from methodology into Western culture. I founded the Way of Nature to provide a clear, universal way to access Source Awareness, refine experiential connection to nature and give people a direct path to realizing their true purpose in this lifetime. I have authored "Sky Above, Earth Below", "Spiritual Practice in Nature" and have created several DVD's on tai chi and qigong. Thousands of people have now participated in these Sacred Passages, and the Way of Nature today hosts these events all over the world.

I have been a resident of Crestone since the mid-70's and the owner of the Sacred Land Sanctuary located just north of the Town, since then. It is a powerful environment which has a rich ancestral history. Those who have experienced a sacred passage on the land report feelings of deep peace, mental clarity and a release of energetic and emotional blockages, It was formed to help conserve land that has unique sacred qualities that are beneficial to spiritual exploration and growth. These are environments that have been revered throughout history as sacred sites for vision questing and spiritual transformation. The ancient wisdom within these sacred places continues to aid personal and cultural transformation through modern-day wilderness excursions such as those offered by Way of Nature.

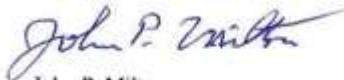
Our future goals for the Sacred Land Sanctuary are to preserve and protect sacred lands across the globe. We wish to conserve places that are not only stunningly beautiful and biologically



diverse, but that are energetically powerful and steeped in a rich history of spiritual advancement. I believe that by protecting these Sacred Sites, we take a first definitive step towards committing our culture to the realization and honor of Nature as the church, as the temple. We have done much to protect lands for wilderness, biodiversity, recreation, watershed protection, and for wildlife, but until now we have never set aside natural land simply because it is sacred. Given the overwhelming ecological crisis now facing all the species with which we share this planet, the time is upon us to put our priorities in order, and place our emotional energy and financial resources where they also belong – protecting the original places of worship and spiritual opening that were created directly by Great Spirit and Nature. Through conservation efforts, these sacred lands can be protected from development, pollution, and misuse, and continue to serve as safe and supportive environments for the diverse ecosystems within, and for the deep spiritual unfoldment of their visitors.

It is a privilege to submit this letter of support for the goals of the International Dark Sky Association and for the application of the Town of Crestone to become recognized by the Association as an international dark sky community as it carries out those goals and shares experiences of the Eternal night sky that stir the senses and touch the spirit, humbling and yet grand.

Sincerely,

A handwritten signature in blue ink, reading "John P. Milton". The signature is fluid and cursive, with the first name "John" being more prominent than the last name "Milton".

John P. Milton  
Founder and CEO, Way of Nature

## Letter from the Baca Grande Property Owners Association

December 15, 2020

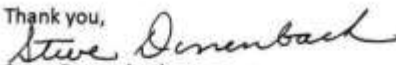
Board of Directors  
International Dark Sky Association  
3223 North First Avenue  
Tucson, Arizona 85719

Dear Application Review Members,

On behalf of the Board of Directors of the Baca Grande Property Owners Association I am writing to support the town of Crestone's application to be designated as an International Dark Sky Community.

As stated in Article III.1 of the BGPOA Declaration of Covenants: "which covenants, terms and provisions are hereby established for the purpose of enhancing and protecting the value, desirability and attractiveness of that real property." Being a rural community, one value that we not only want to protect but enhance are our dark skies. We are a community encompassing over 80 square miles adjacent to the town of Crestone and an integral part of maintaining dark skies, and, as such have a policy "where all exterior lighting should be cast downward."

Thank you very much for your consideration and please feel free to contact me with any questions or for more information.

Thank you,  
  
Steve Dossenbach  
Board of Directors, President  
Baca Grande Property Owners Association



## SAGUACHE COUNTY

501 Fourth Street • P. O. Box 100  
Saguache, Colorado 81149

Phone: (719) 655-2231 • Fax: (719) 655-2635

December 22, 2020

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


Dear IDA Board of Directors:

We, the Saguache County Board of Commissioners are writing this letter to formally support the request of the Town of Crestone as an International Dark Sky Community (IDSC) area. It is our privilege to offer this letter of support for the Town of Crestone.

Crestone's remote location affords it outstanding opportunities for astronomical events and night skies viewing. Due to the intervening Sangre De Cristo Mountains, which shelter the Town of Crestone from much of the skyglow created by the cities of Colorado's Front Range. Crestone area is an important dark sky viewing site for residents and visitors in southern Colorado.

With the support of the Town of Crestone, we are pleased to have the opportunity to promote dark skies conservation. We also appreciate the efforts of IDA to identify special locations where the night sky can be appreciated in its natural beauty.

Sincerely,

  
Jason Anderson  
Chairman

  
Ken Anderson  
Commissioner

  
Tim Lovato  
Commissioner

December 4, 2020

993 East Moorhead Circle  
Boulder, Colorado 80305

International Dark-sky Association  
5049 E Broadway Blvd, #105  
Tucson, AZ 85711



Dear International Dark-sky Association staff,

On behalf of the Colorado Chapter of the International Dark Sky Association, I am writing in support of Crestone, Colorado's application to be recognized as an International Dark Sky Community.

I have visited Crestone, and have listened to many meetings of the Sangre de Cristo Dark Sky Reserve group, of which Crestone Mayor Kairina Danforth is an important leader. As part of the Reserve discussions, Kairina has shared information about the dark sky work underway in the town of Crestone.

The people of Crestone have done considerable work on outdoor lighting ordinances, over many months. They have worked on replacing old city-owned lighting with compliant lighting. They have worked extensively with adjacent property owners who are not inside the official boundaries of Crestone but part of the Crestone community. This adjacent property area is much larger than the property inside the official town boundaries. Among the adjacent property owners is Colorado College, whose people have made a significant contribution to dark-sky work in the area.

The people of Crestone have begun a Sky Quality Measurement program to assess the night sky resource over time, and identify potential future threats to the night-sky resource.

Surrounding the town and the immediately adjacent residential property is federally-owned land under the control of the National Park Service, the National Forest Service, the Bureau of Land Management, and the US Fish and Wildlife Service, all of whom have been contributing to dark-sky work in the area. There's no through traffic in Crestone; County Road T ends in town. There's no motor traffic through the adjacent National Forest and Sangre de Cristo Wilderness Area. People who visit or reside in Crestone are particularly aware of the pristine environment.

Crestone is a jewel to the state. Extensive long-term preservation efforts are important, and will be supported by everyone in Colorado.

On the behalf of the Colorado chapter of the IDA, I strongly support Crestone's application to be recognized as an International Dark Sky Community, and I look forward to the community's future conservation efforts.

Sincerely,

Richard OBrien  
IDA Colorado

Letter from Jeremy Chen

Northwest Suburban Astronomers  
Members of the Astronomical League

*"My visit to Crestone remains in my memory as the single best sky I have ever seen. It is likely a 1 on the Bortle Scale, which is the highest attainable."*

To:  
Town of Crestone  
P.O. Box 64  
Crestone, CO 81131

To Whom it may concern:

I was excited to hear that Crestone is under consideration for designation as an official dark sky site. As a lifelong amateur astronomer, and 23-year member of a very large Chicago-area astronomy club, I am keenly aware of the negative effects of light pollution. Many of our club members are accomplished astrophotographers who spend tens of thousands of dollars on telescopes and mounts to track the sky for many-hours-long exposures. They must use multiple bands of light-pollutions filters to fight the problem.

Of course, light pollution's damage to the environment in terms of wildlife is well-documented, as well.

My visit to Crestone remains in my memory as the single best sky I have ever seen. It is likely a 1 on the Bortle Scale, which is the highest attainable. I remember M31 glaring at us, and globular clusters visible with our unaided eyes. Where I live, our club members have to travel hours to get to Bortle 4 skies for observing and imaging. You are very fortunate, being in Crestone. I hope and expect that the dark sky designation you seek will be granted, since most any area of the country would envy your blessing.

Clear skies,  
Jerry Chern  
Buffalo Grove, IL  
Northwest Suburban Astronomers  
Members of the Astronomical League  
(847) 634-3499



# ACKNOWLEDGEMENTS

---

## The Crestone Dark Sky Committee



### Mayor Kairina Danforth Chairperson

The Crestone Dark Sky Committee would like to offer a special thanks to Mayor Danforth, and acknowledge the time and effort she has given to the Dark Sky initiative, both locally and regionally. Kairina has been the driving force behind this International Dark Sky Community application.

For the last two (or more) years she has collaborated with multiple individuals, groups and agencies in support of Dark Skies, and has continued to hold her vision of Crestone becoming a Dark Sky Community, and part of a much larger International Dark Sky Reserve. The Dark Sky Committee, and the entire community, applaud her dedication to this cause.

During Kairina's tenure as trustee and mayor, she has worked to enhance economic viability, environmental preservation, and sustainable tourism. One of her early projects was the certification of the Crestone Cemetery as a natural and "green" burial cemetery. To date, it is still the only certified natural burial ground in the State of Colorado

She was a founding member of our ongoing Trails Coalition that is responsible for a large system of trails connecting the Baca National Wildlife Refuge to the Colorado College Baca campus. She was also instrumental in Crestone becoming designated as a Colorado Creative Arts District.

Through her efforts, the Teyuna Mamo visited Crestone Elders from the Sierra Nevada de Santa Marta region of Colombia, and Crestone's Board of Trustees approved a Resolution on July 9, 2018 recognizing The Rights of Nature.

During her tenure, Crestone completed Phase 1 and Phase 2 of our Downtown Redevelopment project. Thereafter, a volunteer group, Fellowship of the Flowers, filled the beds created by the project with drought tolerant, deer resistant plants and flowers. In 2020, the entire community rallied around the creation of a resident-designed, volunteer-created playground where families can congregate and kids can play.

## Committee Members



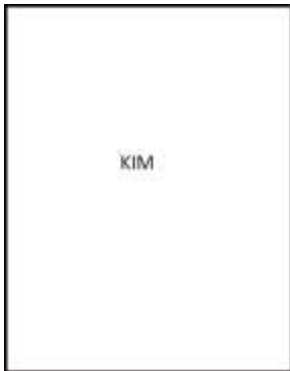
### **Kizzen Laki**

Kizzen is the owner and editor of the local newspaper, the Crestone Eagle. She has served on the Town Council for 23 years, ten of those as mayor. Always an advocate of Dark Skies, she was part of the successful 1995 to 2000 initiative to “Save our Night Sky.” Those articles are a major contribution to this application. On the Town Council she advocated for, and helped formulate, our early Dark Sky Ordinances. She has also been responsible for planting 75-80 trees in our parks and public places.



### **Benjamin Byer**

Benjamin owns the local health food store, coffee shop and gas station. As part of the Dark Skies Initiative Benjamin modified the street light above his gas pumps, and generously donated a year’s worth advertising in the Crestone Eagle. He is Town Trustee and Chair of the Crestone Planning Committee. He and Kairina drove to Denver to pick up the telescope donated by Kim Malville. As a result of his involvement in Dark Skies, he has become an avid amateur astronomer.



### **Kim Martinez**

Unfortunately Kim was not available for a photo, but her help with this Application was invaluable. A lifetime resident of Crestone, Kim served for 10 years on the Town Board of Trustees in the 80’s and early 90’s, and is currently serving. Her input in this application was invaluable.



### **Diane Bairstow**

Diane has served on the Town Council for 11 years. She is a freelance writer and graphic artist as well as the photo editor of the Crestone Eagle. She was involved in the promotion of the Myths from the Heavens event and has worked closely with Mayor Kairina Danforth on most aspects of this application.

## *Special Thanks to our Photographers*

### **Peter Ismert**

Peter Ismert is an accomplished wildlife and landscape photographer residing part-time in Crestone, Colorado. The San Luis Valley provides him inspiration as he pursues images of natural beauty and emotional connections in nature throughout Colorado and abroad. His work has been recognized through photography competitions and publications, while also providing occasional workshops, gallery showings, and presentations.

<https://peterismert.zenfolio.com/>

### **Doug Beechwood**

Doug Beechwood, local filmmaker and conference planner, donated many carefully selected photos for their relevance to this application.

He has worked extensively with many of the centers in and around Crestone to preserve the silence, stillness and dark night skies of the Crestone region. With Mark Elliott, he co-produced two short films about Crestone which have helped to bring statewide, nationwide, and worldwide recognition and funding to our town. "A Place of the Heart" and "Profound Silence" can be found on Crestone Film's YouTube channel.

<https://www.linkedin.com/in/douglas-beechwood-4a08479>

### **Stephen Hume**

Steve came to Crestone initially as artist-in-residence at the Crestone Mountain Zen Center. Previously he was a mural painter and a scenic artist for the film industry. His career transitioned into photography and filmmaking during those early days in Crestone. For thirty-five years Steve has owned property in Crestone. Recently he built a new home here, in his words, "beneath the glorious skies of this remarkable valley".

Today, Steve is an accomplished and successful artist, photographer and filmmaker. He has served as a Crestone Planning Commissioner and is presently a Crestone Town Trustee. He has donated these paintings on behalf of the Crestone initiative to become accredited as an International.

[http://www.bluestoneproductions.com/About\\_Me.html](http://www.bluestoneproductions.com/About_Me.html)

### **Lori Nagel**

Lori Nagel (aka Lori Sunflower) moved to Crestone in 2010, has been the photographer for Darlene Yarbrough Real Estate since 2012, the official Staff Photographer for the Crestone Eagle monthly newspaper since 2012, and has had a column in the Eagle, "Out & About with Lori Sunflower" since 2016. While she specializes in portraiture and real estate photography, she can't help but also be a scenic photographer in the fantastic wilderness of the San Luis Valley and has lovely postcards that are sold in stores across the valley. In addition to snapping photos, she also does graphic design and web design. Lori genuinely enjoys the beauty of the area and especially living underneath the fantastical dark skies!

<https://sunflowerstudios.us.com/>

## APPENDIX A

### PROCLAMATION OF CRESTONE DAY BY GOVERNOR HICKENLOOPER



Colorado Governor John Hickenlooper presents Crestone Mayor Kairina Danforth with a proclamation declaring May 24th as Crestone Day.



## APPENDIX B

---

### Dark Sky Event #2 Myths from the Heavens Kim Malville's Lighting Suggestions and Call to Action

The Town of Crestone is blessed with an exceptionally dark sky overhead, and it believes strongly in the importance of education and local involvement to inspire future generations of residents and visitors alike to become stewards of dark sky conservation and lifelong lovers of a dark night sky.

Light pollution affects everybody! The good news is that light pollution, unlike many other forms of pollution, is reversible and each one of us can make a difference. Here are a few easy, practical solutions to combat light pollution locally, nationally and internationally. Here's what each of us can do.

**1. Check the outdoor lighting around your home.** Is it really needed? If not, turn it off! If so, make sure that it's fully shielded. That means that it's directing light down on the ground where it's needed and not up in the sky where it's not. Bad (unshielded) lighting wastes energy, money and creates unnecessary greenhouse gas emissions. If you need new lighting, check out our database of IDA dark sky approved light fixtures.

**2. Talk to your neighbors.** Often folks with bad outdoor lighting just don't know that it's a problem. We have lots of public outreach materials that you can use to help your community learn why good outdoor lighting is so important, including a guide on how to talk to your neighbors and a new IDA brochure that you can download or we can mail to you.

**3. Become a citizen scientist** and help measure light pollution in your community using mobile apps or just your eyes. No experience necessary! The data that you collect is used by scientists across the globe to better understand the levels and implications of light pollution.

**4. Become a member or supporter of IDA.** We couldn't exist without you! Our members and supporters are the heart of IDA and their generosity contributes to more than half of our annual budget. More importantly, by becoming a member or supporter, you'll be part of our global family working to protect night skies.

**5. Spread the word to your social media network** – starting with sharing this blog post – about the importance of protecting the night sky. And encourage your friends and family to sign up for our email list. That way they can stay up-to-date on all things light pollution and dark skies.

Everyone can make a difference! The challenge is getting people to invest in the issue and take action. Anything that you can do to raise public awareness can help.



## APPENDIX C

---

### Baca National Wildlife Refuge Acquires Land Bordering Crestone



The 92,500 acre Baca National Wildlife Refuge was established to help protect water resources in the San Luis Valley. Water is the lifeblood of the valley and the runoff from the surrounding mountains and groundwater flows are crucial to its many land uses. These waters create a network of riparian corridors and wetlands that break up large expanses of desert and upland habitats, resulting in high plant diversity. This habitat combination creates tremendous foraging and nesting opportunities for a variety of bird species and resident wildlife. The Refuge also contains the rich archeological telling of over 12,000 years of use by humans, including the extensive history of the Luis Maria Baca Grant Ranch.



## APPENDIX D

# Colorado College Plans Liberal Arts Observatory and Planetarium at Baca Campus

## A Liberal Arts Observatory at the Baca Campus

Shane Burns & Natalie Gossell  
Department of Physics

*The most beautiful thing we can experience is the mysterious. It is the source of all true art and science.*— Albert Einstein

We have all, at some point in our lives, looked up at the night sky and been struck with awe and wonder. This is the experience described by Einstein in the quote above, and it is this sense of wonder at the universe that motivates scientists and artists alike. This document describes an observatory facility to be built at Colorado College's Baca Campus. The facility is intended to help those that view the night sky from Baca to become inspired and desire to know more about the world. Its design will enable those inspired to engage in scientific exploration as well as appreciate the work of the ancient astronomers of the southwest.

Colorado College students and faculty will use the observatory for inspiration and scholarly work, but we intend for it also to be used by the local community and others associated with the College. The facility design is meant to both engage interested students in scholarly activities related to astronomy and expose local K-12 students to the sky, STEM fields, and highlight the work of the Chacoans, the first scientific astronomers in North America.

### Design Overview

The facility will consist of a robotic telescope, an observing deck, and an outdoor planetarium. The layout is shown in Figure 1. The telescope will be similar to the Great Basin Observatory (see Figure 2), but with some storage underneath for small telescopes and other equipment that could be moved out onto the observing deck. It will be designed so that it can be used from Baca, remotely from the CC campus, or in an automated mode.

The deck would echo the design of Pueblo Bonito in Chaco Canyon. The shape of the deck will be a half circle with the straight axis aligned east-west as is the case at Pueblo Bonito. The observing deck will include a few locations where portable telescopes can be set up, as well as a mount for a gramin (vandal). There will be markers at the edge of the deck showing the directions of the rising and setting sun on the solstices and other significant astronomical alignments.

The outdoor planetarium would be directly south of the midline of the deck. The layout is similar to the location of Casa Rinconada in Chaco Canyon. Casa Rinconada is a great kiva with traditional entrances on the north and south. The planetarium

where after visiting one wants to learn more not just about stars and galaxies, but more about our place in the universe. As we envision the future for this liberal arts observatory we anticipate partnering with faculty from other departments, perhaps including Anthropology, Southwest Studies, and Studio Art, creating a facility that reflects the innovative spirit of Colorado College.



Figure 3: An open-air planetarium similar to the design of the one proposed for the Baca facility. The Baca planetarium would likely only have one circle of seats instead of two.

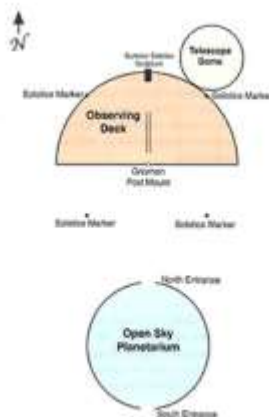


Figure 1: A schematic of the proposed Baca Astronomy Facility. NOT TO SCALE.



Figure 2: The Great Basin Observatory in Great Basin National Park.

entrances would echo this design. Figure 3 is an image of an outdoor planetarium in Chaco, CA that is similar to our expected design. The Baca planetarium would most likely be smaller, with one circle of seats rather than two.

### Astronomy Program Coordinator

The success of this project is contingent on hiring a permanent staff member to maintain the facility and coordinate its use, envisioned as an Astronomy Program Coordinator. We anticipate that this new staff member would also be responsible for maintenance and activities for the Phipps Observatory at the Colorado Springs campus. The coordinator would teach the laboratory portion of our introductory astronomy courses, our astronomy adjunct courses, and assist with the upper-level observational astronomy course. We currently hire block visitors to teach the laboratory portion of the introductory astronomy courses and another astronomer to teach the adjunct courses.

### Our Vision

Our hope and goal for the Observatory at Baca Campus is to serve Colorado College and the Crestone and San Luis Valley communities by providing a location for both astronomical scholarship and astronomical inspiration. This facility will be far more than a traditional astronomical observatory. We want the site to be a place

# APPENDIX E

The following articles from the Crestone Eagle follow a 5 year campaign to protect Crestone's Dark Skies

Page 6 • The Crestone Eagle • April, 1995

Light pollution doesn't have to happen, solutions are easy and cost effective

## An in-depth look at lighting up the night sky

by Suzanne Franzer and Nylee Solter, four neighborhood astronomers

Our neighbors in the South, the Hopi Indians, have a word for it: KUYAANISQWESI. This word means "life out of balance." The news services keep us up-to-date on the "kayansiqwesi" of our society. Everyday we hear of people who are robbed or killed under the security lights which line the streets of our cities.

Many of us in Crestone have left the well lighted metropolitan areas to move into an environment which is more in balance. The mountains, the wild life, the clear waters, the clean air, the wide valley and the stars feed our souls. Yes, we can see the night sky.

We have a precious natural resource in the dark sky filled with stars and planets. In this valley we can see the Milky Way, the constellations, shooting stars, satellites and, for some people, UFO's. So many people in America do not have this privilege. The glow of outdoor lighting has stolen the night sky from them.

Here, we also witness the phases of the moon by the amount of light that is available each

But we need to start now creating personal habits and decision-making processes which will preserve this valuable source of inspiration and comfort: the night sky.

### The Problem of Light Pollution

In most metropolitan areas, such as the Front Range of Colorado, the outdoor lighting has overwhelmed the starry glow. Children are growing up only knowing the brightest stars in the sky from small pockets of darkness in the cities. The spectacular night sky which inspired poets and painters throughout the centuries has been wiped out in many areas of this country. The San Luis Valley is a special place with its unobstructed night sky.

The problem is not outdoor lighting, but rather the lighting fixtures releasing the light spread into the night sky. Light pollution is inefficient lighting which provides poor security lighting and wastes significant amounts of energy and money.

The result of inefficient lighting is "urban sky glow." When the clouds are low over the Sangre de Cristos, we can see the glow from Colorado Springs reflected over the mountains. As one person pointed



The Night Face of North America — This mosaic of satellite images showing the city lights of the continental U.S., southern Canada and northern Mexico illustrates the problem of light pollution. Nearly all the light seen is being wasted upward, providing no lighting benefit, stealing the night sky, and squandering energy. (International Dark-Sky Association)

can see light directly from the fixtures creating over-lighted areas and very dark, deep shadows. This blinds you and you can't see as well as you would if the light fixture was properly directing the light as the area needing illumination instead of in your eyes. When you walk from a over-lighted area into the darkness, it is hard for your eye to adapt to such a transition and your capacity to see is greatly reduced.

Poor outdoor lighting also creates a creepy feeling, creating a nighttime environment with bright lights and harsh shadows. Many people spend time creating a beautiful daytime environment which is quickly erased in the night with

beautiful environment.)

3) Good lighting uses "fully-shielded" light fixtures which only light the intended area. Such well designed fixtures create a minimum of glare as well as directing all the light below a horizontal line and onto the ground. Thus, all the energy for lighting the area is used for just that and not lighting up the sky or shining in your eyes. A fully-shielded light fixture is more effective and actually increases safety, since there is very little glare.

4) Good lighting does the job it is supposed to do without impacting areas beyond the intended coverage area or past property lines. Positioning of fixtures is very

important. Fixtures are not intended to be in rhythm with what nature intended. We are not living in an environment of constant and consistent light. Instead, we enjoy the variety of the night sky with the daylight brightness of the full moon and the black darkness of the new moon.

The night sky is not on the endangered list. But it should be. Here in the valley we can still see the stars. Will this only become a precious natural resource after we have lost it? We haven't had to create a campaign to relocate it. We still have time to protect our night sky.

### Light Up the Reader

Light trespassing is another aspect of light pollution which creates disharmony between neighbors. Light trespassing is when poor lighting not only illuminates the area that it is intended to light but also areas which it is not supposed to light. Light trespassing includes bright lights shining in neighbor's windows, into other people's yards, into our eyes as we view the landscape around us.

Inefficient lighting fixtures create glare which decreases visibility and reduces safety and security, by limiting what you can actually see. Glare occurs when you

### Good Outdoor Lighting

Good outdoor lighting is designed for the sole purpose of illuminating the ground to provide safe movement in the night and a sense of security. An efficient lighting fixture will not create blinding glare, waste energy or offend neighbors.

Well designed outdoor lighting, properly installed, is very useful and necessary for improving visibility, safety, and security. We need lighting to see in dark nights and to provide an attractive nighttime environment.

Good lighting does its intended job well and with a minimum of adverse impact to the environment and neighbors. An excellent example of good outdoor lighting is the Base Firehouse. The fully-shielded light fixtures are on the side of the building instead of a tall pole. The light only shines on the driveway in front of the doors. The lighting does not light up the night sky, trespasses on adjacent property nor create glare as you approach the building. This is an efficient and effective lighting system without light pollution.

### Four Characteristics of Good Lighting

1) Good lighting never over-lights. Most outdoor lights "over-light." In other words, the light is too bright for the job. Some modern lighting systems illuminate areas to a level 100 times as bright or more than a full moon. Today, people make a lighting decision based on a myth that "brighter is better." This is not the case. And besides, over-lighting costs more and can ruin an otherwise aesthetic and

as opposed to "hot spots" or bright lights, create safer and more attractive environments.

4) Good lighting uses high-efficiency lamps which not only save energy but reduce operating costs. Most high-efficiency lamps last a long time and reduce costly maintenance and gaps in service. Also fully-shielded lights are more efficient and effective as a lower wattage lamp can be used, saving even more money and energy. They will light an area better than unshielded lights of higher wattage since they use light rather than waste it.

### Waste of money

The International Dark-Sky Association, Inc. estimates that ineffective outdoor lighting costs \$1.5 billion annually. This equates to 6,000,000 tons of coal to generate electricity for lights that are not lighting anything but the sky.

Most people with security lights choose cheap lighting fixtures and lamps which have poor control of the light output, produce a lot of glare, have a short life span and use far more energy than is needed. For example, a \$10.00, 100-watt Quartz Halogen (QH) sign flood light costs about \$6.50 per month to run and has a life of 2000 hours. While a \$70.00, 58 watt compact fluorescent has flood-light with vico costs about \$0.73 per month to run with a lamp life of 50,000 hours.

Not counting the effort it takes to change the lamp on a high pole, the HQ flood-light cost about \$432 over five years while the compact fluorescent light costs about

Continued on next page

COMING IN APRIL FROM  
MediaChaos

**IN THE TIME OF THE WOLF**  
by David Nicholas

A story for all seasons  
on sale at the only bookstore near you.

COMING IN JUNE/JULY PEGGY GODFREY'S WHITE TIGER

**Woodstock™**  
Studio & Cabinet Shop  
In Crestone

Quality Craftsmanship	Georgio Nisadorf
Planing & Design	Shop (719) 256-4479
Natural Materials Available	Home (719) 256-4477

SINCE 1992 EXPERIENCED IN BIRCH, AMERICA & CRESTONE





Downtown Crestone at night. Photos by Neyle Sollee



P.O.A. building lights

## The Crestone Baca Light Pollution Scorecard

by Neyle Sollee and Suzanne Frazier

We cruised the Crestone/Baca area one Saturday night looking for outstanding examples of light pollution to photograph.

As we drove around we noticed several people have purchased the inexpensive 175 watt mercury vapor security lights which overlight the area, create glare and really light up the sky. Between 1/3 and 1/2 of their light is emitted upward or in a horizontal direction. The remaining light is illuminating the ground. We knew they didn't spend much on the lamp but we are concerned about the amount of their monthly electric bill. Glare occurs when you can see light directly from the fixture or bulb.

The best example of glare is the security light at the side of the POA Water and Sanitation Building. At least this light is at the side of the building instead of on a high pole. The light could be modified very easily with just a simple hood to deflect the light onto the ground instead of all over the place.

The street lights in Crestone are a fine illustration of the beginnings of urban sky glow. And the security light at the post office is an outstanding representation of over-lighting.

Finally, we went looking for light trespassing. As we stood at the Carmelite Monastery looking towards Mt. Crestone, we could see lights from several houses that rise above the canopy of trees. So we went looking for outside lighting that was creating this blatant light trespassing. We drove around and much to our surprise the lights were from inside the houses. Having no curtains on their windows their interior lights appeared as light pollution from the valley floor.

Standing above Oakley's house at the Willow Creek trail

head, we looked towards the valley floor. The number of lights in the valley are increasing. We had a feeling that urban sky glow was about to erupt.

The finest example of good lighting in the area is the Baca Firehouse. The well-shielded light fixtures are located on the side of the building, instead of a tall pole. The doors and the driveway are well lit providing just enough light to see well without blinding over-lighting. The lights are providing efficient illumination without lighting up the sky, trespassing onto adjacent properties, nor glare.



Overlighting of the Water & Sanitation building in motorist's eyes as they drive by.

If we all took the time to modify our outdoor lights; if we created building codes that gave new residents this perspective on lighting; and if we passed ordinances to protect our future public lighting needs, then we will be able to continue to look into the night sky and see the infinite stars that remind us of concepts beyond ourselves.

With the installation of efficient and effective light fixtures we can keep the sky over the San Luis Valley dark while we have the lighting we need to light up our streets and homes to provide the safety and security that is desired.

Many cities have instituted ordinances to protect their night sky. They are benefiting by better lighting for their citizens, energy savings and lower electrical bills. And at the same time their children can see the stars.

Next issue we will list light fixtures and lights available in the area and rate them according to their reduction of light pollution. We will also discuss what other communities such as Tucson and Pima County, Arizona have done to protect their night sky.

The information for this article has been provided by the Dark-Sky Association, a non-profit organization, formed to provide the public with information, education and research on light pollution. With members in 56 countries, this organization is dedicated to preserving the night sky.

## Night Sky

Continued from previous page

\$115 for the same period. If money talks, the more efficient lower wattage lamp will save you \$317 over five years!

Another comparison can be made between a \$30.00, 175 watt mercury-vapor "dusk to dawn" lamp costing about \$9.00 per month to operate with 24,000 hours of life and a \$200.00, fully shielded, 50 watt high pressure sodium (HPS) "out of cobra head" lamp costing about \$2.50 per month to operate with 24,000 hours of life. The HPS creates zero glare as opposed to the mercury-vapor light. Money talks again with an operating cost over five years of \$570 for the mercury-vapor lamp and \$350 for the HPS lamp. The low-pressure sodium (LPS) lighting is even more economical and adequate in many cases.

### Light Solutions

1) The solution to light pollution is simply: using fully-shielded light fixtures.

2) The only characteristic of a good lighting fixture is that it shines the light down where it is needed, lighting only areas that need to be lit for safety or security reasons.

3) Good lighting design reduces glare and maximizes the lighting source.

4) Redesign "over-lighting". Use the right amount of light for the job. More light, many times, is not the solution but rather efficient use of less light goes a lot further. Moving from darkness to bright-

ness is a difficult transition for the eye to adjust to. The eye is a marvelous instrument and can see very well, or even better, at what seems to be low lighting levels.

5) Use infrared sensor spotlight fixtures which respond with light when it is needed and remains dark when there is no need. This reduces electric bills and reduces the amount of light energy being wasted. The spotlight only comes on when the sensor sees movement. For security reasons, an intruder will be scared off by the sudden light rather than hiding in the dark shadows of a constant bright light.

6) Use time controls (or dimmers) to eliminate wasteful use of light and electricity.

### What you can do

1) Always remember that lighting should benefit people. Controlled, effective, efficient lighting will enhance your environment and provide a safe and secure place. People do not appreciate poorly-installed, overly-bright lighting.

2) Before adding or modifying your outdoor lighting take a survey of what light is already available for your use. Find a level of brightness that is adequate but not overbearing. Your neighbors will appreciate your concern for light trespassing.

3) Check out light fixtures for their specific lighting pattern and decide if they match your needs.

4) Try to keep your lighting uniform and reduce glare by not creating "hot-spots" of light. Glare and "hot spots" make it hard to see well, especially for older people. If you need consistent lighting: try

low wattage compact fluorescent lamps in well shielded fixtures. The light level will be adequate and you will save money.

5) Install an infrared sensor spotlight with a light shield to provide you with visibility when you need it. This will not only save you money but you will have an effective security system in place due to its "instant-on" characteristic.

6) If you must have a security light choose a low wattage, low pressure sodium fixture which is well shielded to reduce light pollution and direct the light where you need it. There will be lots of light, little or no glare, no deep shadows, and excellent visibility.

7) For security lighting, try not to place your light fixture on a tall pole but rather on the side of the building. A fully-shielded light fixture on the side of a building directing light where it is needed is more effective than a light on a pole creating dark shadows, hot spots and glare.

**Dark Sky But Not Darker Streets**

## Lighting up the night sky

### Light Pollution, the Solution #2

by Suzanne Frazier and Neyle Sollee

Light pollution is about lighting up the night sky so the stars are not visible. Light trespassing is about lights shining onto a neighbor's property and into their eyes.

Security lights are important for security and safety. Not one light needs to be turned off in the valley to decrease light pollution. Rather, if the security lights in this area were shielded, light pollution would be reduced. And if they were shielded and the bulb replaced with a low wattage, high pressure sodium light, the lighting would be efficient, effective and cheaper to operate.

Here are some examples:

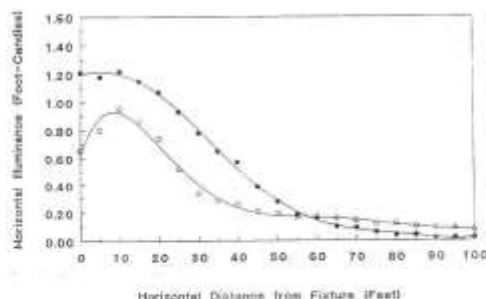
Lamp	Price	Annual Operating Cost (at \$.08 per KWH)
Regent 175W Mercury Vapor	\$26.96	\$68.22*
G.E. 100W High Pressure Sodium	\$29.64	\$42.64
Regent 70W High Pressure Sodium	\$24.99	\$32.14

\*The mercury vapor light will operate at this cost every year even though the illumination of the light decreases over time.

With a shield placed over a 100W High Pressure Sodium light, the illumination is increased by 43%.

#### Light Distribution of HPS Luminaire NEMA Type: Shielded vs. Unshielded

□ 100W HPS Unshielded    ● 100W HPS Shielded

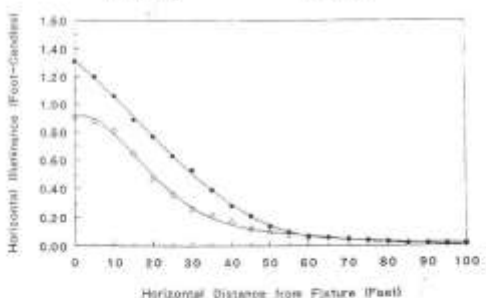


Hubbell Skycap Retrofit (2' x 10") results in 43% more light on the ground in the zone 0 - 100 ft.

If a 175 W Mercury Vapor light is used with a shield, the effectiveness of the lighting is increased 47%.

#### Light Distribution of MV Luminaire NEMA Type: Shielded vs. Unshielded

□ 175W MV Unshielded    ● 175W MV Shielded



Hubbell Skycap Retrofit (2' x 10") results in 47% more light on the ground in the zone 0 - 100 ft.

The shielding of the security lights provides a uniform and wide distribution of light on the ground. Glare which reduces visibility is reduced. Light trespassing and light pollution is eliminated. Thus a shielded lamp on a 25 foot pole lights an area of 200 feet in diameter and increases light levels on the ground from 45% up to 130%. In many cases, a 70W High Pressure Sodium lamp would be adequate, thus significantly reducing operating costs.

The POA Board of Directors has decided to shield the lights at the POA Building and the park. They have also set up a "POA Adopt a Light" fund for those who wish to support reducing light pollution in the Baca. Please send your check payable to:

"POA Adopt a Light", P.O. Box 237, Crestone, CO 81131. The money will be used to pay for the light shields (\$40 each) and installation costs for the security lights.

With the "Adopt a Light" program, shields can be installed over the

175W Mercury Vapor lights. This would increase the illumination of the lights (see chart above) while at the same time reducing glare and eliminating light trespassing onto adjacent properties. When the mercury vapor lights need replacing, the 70W or 100W High Pressure Sodium lights could be added. This POA plan involves the installation of the shields at this time. The cost of replacing the mercury vapor bulbs with low wattage high pressure sodium lights can be spread over several years.

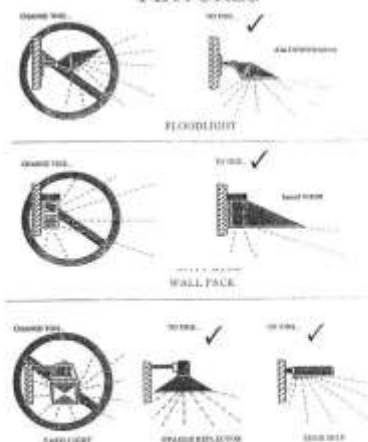
Light pollution reduction is not limited to security lights on poles. Lighting on the outside of homes and businesses can be modified to reduce glare and light trespassing. The brochure "Good Neighbor Outdoor Lighting" is now available. You can pick up a copy at Margota, Crestone Mart or Cort's Store. Or, you can send a self-addressed #10 envelope with \$.55 postage to Light Pollution Solutions, P.O. Box 104, Crestone, CO 81131.

This brochure outlines ways to modify the outdoor lighting fixtures commonly used to light residences and businesses.



The Hubbell SkyCap directs light down and is very fashionable.

#### MODIFYING EXISTING FIXTURES



It also gives the manufacturer's names and model numbers of light fixtures to reduce glare, direct light towards the ground and create aesthetic lighting patterns. Mike at the Crestone Mart has this information and can assist you in modifying your lighting.

Many communities including Tucson/Pima County, Arizona and Flagstaff, Arizona have adopted Outdoor Lighting Codes. The intent of the Flagstaff, Arizona ordinance is "to encourage lighting practices and systems which will: minimize light pollution, glare, light trespass; conserve energy and resources while maintaining night-time safety, utility, security and productivity..."

Both Arizona ordinances outline specifications for light usage in designated sections of the community. Different parts of their community have different needs, and these needs are addressed.

In the codes, Mercury vapor lights are prohibited. High Pressure Sodium lights are limited to shielded lights only. While Low Pressure Sodium lights are encouraged as well as Incandescent Lamps of 160W or less.

Light pollution is not a very big issue right now. The residents of the Crestone/Baca can still see the stars at night. However, it could quickly become a concern, if the anticipated number of new residents really do arrive in the area. Right now the number of security lights are low and the retrofitting costs are reasonable. When additional security lights are needed, the cost of shielding the light could be included in the installation figures. With guidelines in place, each new light in the area could be a light that is really needed, instead of another source of light pollution taking away the night sky.

The San Luis Valley has a precious resource in the night sky filled with stars. Few places in the United States are left where as much of the Milky Way can be viewed. Here the cycles of the moon are experienced. The movement of the planets through the stars are easy to observe. All of this inspired the peoples of this land for centuries. Why should this be denied to future generations?

The information for this article has been provided by the Dark-Sky Association, a non-profit organization, formed to provide the public with information, education and research on light pollution. With members in 56 countries, this organization is dedicated to preserving the night sky.



This article appeared in the July 1995 issue of the Crestone Eagle.

Pueblo in order to hear a presentation to the Colorado Airspace Initiative Citizens Working Committee and ask questions about the Governor's "solution" prior to

his naming prior to his creating another alternative. In addition, Denver newspapers and wire services received detailed information of the Governor's "solution" prior to

Open Space Alliance members are particularly concerned that the Governor did not accept the Working Committee's recommendation that VR 413 be eliminated entirely

Call August 17 am  
Sun. Morning Worship 9  
Sun. Evening Worship 5  
Wed. Evening Prayer 5

## Light pollution solution team gets favorable response from Rural Electric

by Suzanne Fraizer and Neyle Sollee

On Tuesday, May 30, we met with three representatives of the San Luis Valley Rural Electric Cooperative to discuss our research on light pollution and some of the solutions we proposed in the previous Crestone Eagle articles.

Jim Claire, Manager of Operations and Tom Barnish, Manager of Engineering, inspected the Hubbell Skycap we brought along. They are interested in the possibility of reducing light pollution in the Valley and at the same time reducing energy costs.

We gave them the Hubbell Skycap to test for the next couple of months. They will assess the luminosity of various mercury vapor and high pressure sodium lights with the Hubbell Skycap as well as take monitor energy usage.

They are also investigating other light pollution products avail-


able through their distributors to find the most economical solution.

Karen Webb, Manager of Human Relations, is interested in doing a story in the Cooperative's monthly newsletter, *The Newsbey*, on light pollution solutions as well as offering the Good Neighbor Outdoor Lighting brochure to SLVREC members.

At this time, we are waiting to find out the results of the all the tests the SLVREC is running to make sure we have the best solution to light pollution. We won't have an answer until September. After receiving the information from SLVREC, we will be able to offer some cost-effective alternative lighting solutions for this area.

The SLVREC emphasized that they would make their decision regarding reducing light pollution based on the economic benefits since that is their first responsibility to their members.

**Kailash Computing Services**  
Specializing in Desktop Publishing  
Newsletters - Brochures - Flyers - Custom Graphics  
**Graphic & Text Design**  
Also  
Macintosh Systems Setup and diagnostics  
Custom Database & Accounting Programs  
Reasonable Rates  
Kailash - (719) 256-4548

**PUEBLO BANK & TRUST**  
**CUSTOMER HOURS**  
**Mon.-Fri.:**  
Main Lobby 8 a.m. - 6 p.m.  
Drive-Through 6 a.m. - 6 p.m.  
**Saturday**  
Main Lobby 8 a.m. - 5 p.m.  
Drive-Through 6 a.m. - 5 p.m.  
**Pueblo Bank & Trust**  
SINCE 1864  
**SALIDA**  
200 F St.  
Salida, CO 81201  
719/539-6696  
  
**PUEBLO BANK & TRUST**

## Save the Night Sky, Adopt-a-Light catching on

by Suzanne Frazier

Everyone now can participate in reducing the light pollution in the Crestone/Baca area. Programs are in place for both the town of Crestone and the Baca to 'adopt a light.' 'adopting a light' means paying for a skycap to be installed over the trespassing light by the San Luis Rural Electric Cooperative.

As to the number of lights that can be adopted, the town of Crestone has 14 lights.

In the Baca, there are six lights located at: the entrance to Casita Park, the entrance to the POA, the POA parking lot, the entrance to Camper Village, inside

Camper Village and the Stables.

In the town of Crestone, anyone wanting to adopt a light can make arrangements by calling the SLVEC at 1-800-332-7634. The cost is \$35.00 for the skycap and between \$13-\$25 for installation. The SLVEC will install the skycap on their next available trip in the area. When you call, just tell the operator you want to make a service change. Before you call it is best to have either the number off the pole, or the location of the light.

In the Baca, Petie Lipscomb at the POA is handling the arrangements for adopting lights. By calling Petie at 256-4171 you can

make arrangements for adoption. Several people in the Baca are forming groups to share in the cost of adopting a light.

The costs are the same: \$35.00 for the skycap and between \$13-\$25 for installation.

To check out what you are adopting, there is already a skycap installed on the light at the entrance of the Baca, just off T

Read, all of the light is being directed downward towards the road which needs the light while the sky above remains dark. This is the goal of the adopt a light program: to reduce the glare of the street lights into the night sky without reducing the efficiency of lighting the roads. It is possible to have both the night sky filled with stars and well lighted roads.

## Forest Watch meeting Nov. 8

Care about your national forest? This is the time to become involved. The National Forest Service is formulating its Forest Management Plan for the next ten years. Many of you may have attended a meeting about a year ago to hear about the planning process and the Biodiversity alternate, alternative F. The planning process is nearing an end now, and our opportunity for input as citizens ends December 7. Therefore, another local meeting is being planned to update you on the selected plan.

Unfortunately, alternative F was not selected, although some of the features from this alternative were introduced into the selected plan. Thanks to Forest Watch and many of you who provided input to the Forest Service, as well as concerned staff persons in the local Forest Service, the concepts of Biodiversity were incorporated into the chosen plan, alternative D. Regrettably, the concepts are not synonymous with implementation,

ationists have put pressure to allow snowmobiles in otherwise unmotorized areas. The very few old growth areas have not been properly identified and protected. Some of these appear to be slated for timber harvest which should instead be protected for their Biodiversity, esthetic, and inspirational qualities. Oil and gas extraction, which has not previously occurred in the Rio Grande National Forest, is being anticipated and an area near Crestone is one area where leases may be permitted.

These, and other issues still confront us. Therefore, an informational meeting and opportunity to discuss these issues with Ron Pugh of NFS has been scheduled for November 8 at 7:00 P.M. at the White Eagle. Please plan to attend. The comment period for this NFS selected plan lasts only until December 7. —Forest Watch

## Maha Lakshmi Shop moves to Haidakhandi Ashram

The Maha Lakshmi shop, which was located in the Chaleta, has been moved up to the earthship on the Ashram land and is open and ready for business. To celebrate the move, all visitors to the shop between now and Christmas will receive 10% off all purchases. Business hours are from 10am to 4pm, every day except Monday. For more information, a free catalogue, or directions to the shop, you may call 719-256-4108.

Other Ashram news includes the completion of a wonderful

ceremonies and special evening chanting in the Temple. Besides completion of the shop room in the earthship, the garden has been planted in winter rye and a storage area has been built for building supplies.

As the daylight hours diminish, we have adjusted the daily schedule of Aarati (sung worship service) to 7am and 5 pm. Weekly Ashram Council meetings are at 3 pm on Sunday followed by Satsang (spiritual discussion) at 4 pm. Both




Crestone Baptist  
Church

# Vanishing Night Skies

FROM : GRSa FAX NO. : 7193782594 JUL. 22 1999 08:34AM P2

United States Department of the Interior  
NATIONAL PARK SERVICE

Great Sand Dunes National Monument  
11500 Highway 150  
Breckenridge, Colorado 81404-9798  
CEN 178312  
FAX 719/178-1298

FAX TELECOMMUNICATION

TO: Science Center @ 854-4166 (en)

FROM: Steve Canyon @ 378-2512

SUBJECT: Mon. Sails

DATE: 7-22-99 # OF PAGES: 5+ cover

REMARKS/SPECIAL INSTRUCTIONS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PA-000-1000 00/00 7193782594 001 4/92

Light pollution is a growing problem in a number of parks, according to an NPCA survey. The Park Service could take a number of simple, inexpensive steps to help correct this problem that can both obscure the stars and compromise the educational story presented in many parks.

BY WENDY MITMAN CLARKE

**I**N THE SUMMER of 1991, Joe Sovick, then acting superintendent of Chaco Culture National Historical Park, fell in love with New Mexico's night sky. He would attend the evening campfire talk that began at dusk and ended beneath a blanket of glinting stars. Then he would ride his bicycle five miles in the velvet darkness to his quarters.

"It was an incredible experience, the quiet, the stars," says Sovick, now chief of recreation and partnerships for the National Park Service's Intermountain Support Office. Incredible, that is, until he turned a corner and confronted the visitor center, blazing like the Love Boat with mercury vapor lights, a diffuse source that sends much of its light skyward. "I would get angry every night," he recalls.

That nightly assault on Sovick's enjoyment of Chaco's sky prompted him to encourage Southwestern parks to establish a "night sky initiative." Chaco defined the night sky as a park resource as precious as its ancient buildings and archaeological sites. The park retrofitted the mercury vapor lights with incandescents—shielded so they prevented light from escaping sideways and skyward—and placed them on motion sensors to illuminate only when needed. Though the park spent \$1,000 on the project, its electric bill dropped by 30 percent.

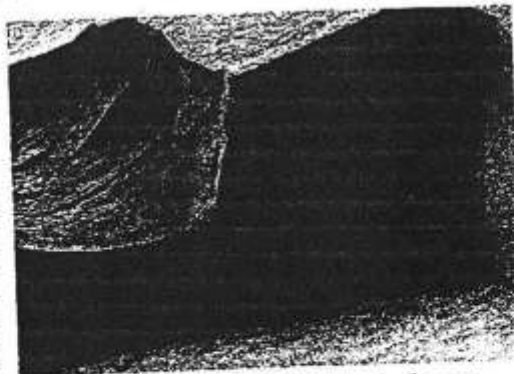
Now, says Sovick, "When you're at Chaco at night and looking at the sky, you are viewing essentially the same nighttime landscape the Chacoans viewed 800 years ago."

Park ranger G. B. Cornucopia agrees, pointing out that "the sky is part of the history and cultural history." Indeed at Chaco, the night sky is a key part of interpretive programs about American Indians who used the stars and planets to develop celestial calendars. Many re-

**The Hale-Bopp comet as seen from The Garden of Eden in Arches National Park, Utah.**

searchers believe that a pictograph at Chaco of a bright star, a crescent moon, and a hand print dates from 1054, when a supernova occurred that was so bright people could see it by day for three weeks.

But while the technology exists to replace light-polluting fixtures and bulbs with something less intrusive and wasteful, some parks—many in the East and those already inundated with haze and urban lighting—do not see the night sky as a high enough priority to spend the time and money to preserve it. And among those that do, fighting invasive light is often an uphill battle, requiring change both within the park and in neighboring communities, since



Researchers believe that this pictograph of a star, moon, and hand dates back to 1054, when a supernova occurred that was so bright it was visible by day.

light pollution sources can affect national parks more than 100 miles away.

Light pollution is most often caused by excessive or misdirected outdoor lighting and hinders the ability to view celestial features. Under ideal conditions, a viewer might observe a night sky with more than 15,000 visible stars, plus the Milky Way (which itself contains billions of stars). Only about 10 percent of the U.S. population experiences these conditions regularly.

If you haven't thought about it before, designating a dark night sky as a natural resource—as worthy of protection as, say, an old-growth forest or a spectacular waterfall—may seem peculiar. That's part of the problem: too many people either take it for granted or overlook it.

"It's just one of those things we don't

think about because we've lost it substantially in our urban environment," says Terri Martin, who from 1982 to 1996 was National Parks and Conservation Association's Rocky Mountain regional director. "But when people go to a place and step out of their tent or car and see the night sky, I think it's sort of life-changing."

"People look up at the sky and get a completely different feel of how they fit into the scheme of things," she says. "That's one of the things parks are about—to give us that perspective."

In many parks, particularly in the Pacific, Southwest, and Intermountain regions, a night sky free of light pollution is gaining increasing recognition as a park resource—one that is significantly threatened. At Rocky Mountain National Park, for example, planners recently listed light pollution as one of six major problems, says land use specialist Larry Gamble. Although the problem has been identified, the park has made little progress because of a lack of funds.

At White Sands National Monument, where astronomy programs, star parties, meteor shower viewings, and star-gazing are among the park's major activities, the night sky is part of the park's interpretive planning documents, says Superintendent Dennis Vasquez. "We view the night sky as one of the park resources that we're entrusted to care for," he says. But that responsibility is growing more difficult. About 20 years ago, Vasquez conducted night sky programs as a White Sands ranger. These nights, he's concerned about what he sees.

"To me it's obvious there are more lights and more pollution in the area," he says. "This is anecdotal of course—we haven't measured that. But as someone who did Friday night star programs for many summers, I was pretty attuned to what the night sky looked like. And I'm pretty convinced there is incrementally more light pollution around here."

Vasquez's experience underscores the importance of establishing a baseline and continually monitoring park resources, says Dave Simon, NPCA's



## NIGHT SKY Continued

Southwest regional director, who, along with Duke University student Scott Babcock, compiled a nationwide survey of the effects of light pollution on the park system. (See page 25.)

In one attempt to measure the problem, Don Davis, a senior scientist at the Planetary Science Institute in Tucson and president of the board of the International Dark Sky Association, is trying to simplify a method that was tried—with mixed success—at Organ Pipe Cactus National Monument in Arizona. Using an astronomical photometer (essentially a highly sensitive video camera), the park monitored light pollution by measuring background light.

"The amount of effort the parks would need to expend to see how bad or good their skies are is not that great, particularly if we could have this straight-up protocol to make it easier," Davis says.

In White Sands' case, nearly all light pollution is external. The park itself has no lights, other than those on timers at residential areas and the administration building. The nearby town of Alamogordo—population about 30,000—has a local ordinance to reduce light pollution, Vasquez says. But the majority of light at White Sands comes from Holloman Air Force Base and El Paso, Texas, 80 miles away.

Such is the case at many national parks. Though Gulf Islands National Seashore in Florida and Mississippi uses low-pressure sodium lights that throw less glare, has others on motion sensors, and simply shuts off many lights deemed unnecessary, sea turtles continue to be threatened by external light sources. As hatchlings make their nocturnal way into the world, the first thing they seek is light. Historically, that light would come from starlight and moonlight bouncing off the waves, guiding the vulnerable turtles into their ocean home. But lately, the light is coming from land—street lights, high-rise condominiums, parking lots.

"Sometimes the tracks will go up to a street light and wander around and around, and then they'll go off to another street light," says Riley Hoggard, a

Gulf Islands resource management specialist. In their haywire wanderings, the hatchlings become prey to birds, crabs, cars, and eventually the sunlight, which dries them out and kills them.

Hoggard says the local power company shields its lights to eliminate glare, and the park is working with the private sector to print stickers for every hotel room encouraging occupants to turn off their lights or draw their blinds late in the evening. The response, Hoggard says, has been mixed. Developers continue to oppose light restrictions as threatening their ability to build on the beach.

In most cases, though, communities



Lights draw baby turtles away from the ocean, making them easy prey.

pass lighting ordinances, leading the way on this issue rather than the parks. And most often, communities have passed lighting ordinances to provide observatories with a clear view to the night skies.

"If we want communities outside parks to take action, the Park Service must lead by example," says NPCA President Thomas C. Kiernan. "Protecting dark night skies in our national parks is as vital as protecting clean air, water, wildlife, and the sounds of nature. Star gazing is a connection to humanity's earliest curiosity about our place in the universe. Clear night vistas in our national parks are an important resource that is literally fading from sight."

Ordinances vary, but some common requirements are placing shields and

"full cut-offs" on light fixtures to prevent light from going sideways and skyward; creating different lighting zones within a community; requiring timers on lights or imposing light curfews; limiting the total lumens (or light) from bulbs and fixtures; prohibiting lights and fixtures that promote glare, such as mercury vapor lights or "wall-packs," which bounce light off the walls on which they are mounted; and requiring developers to limit light pollution.

In the Southwest, several national parks benefit from the efforts of Pima County and Flagstaff, Arizona, which have passed lighting ordinances largely at the behest of astronomers and observatories. "The local politics and the astronomy lobby in Tucson have done more than the parks" to limit light pollution, says Meg Weesner, chief of the science and resource management division at Saguaro National Park, but the park has benefited.

In the East and Southeast, the problem is a little hazier, like the air itself. Doug Morris, superintendent at Shenandoah National Park, uses his recent management experience in the western parks to define Shenandoah's light pollution as a low priority by comparison.

"In Alaska, there is a great expectation of freedom from all consequences of human occupation, so even a little bit of light that impinges on that experience is an issue. The same is true in the desert Southwest," he says. "The expectation of Shenandoah and the Piedmont is not really clear skies."

NPCA's survey suggests that residents in the East have become desensitized to the loss of night sky—but in the desert Southwest a clear night sky is one of the primary attributes, says Steve Oakes at Carlsbad Caverns National Park in New Mexico. Not only are several of our country's premier astronomical observatories located in New Mexico, Texas, and Arizona, Oakes points out, but "light pollution has a negative impact on bats and other nighttime animal species. Normal behavioral patterns are altered depending on unnatural lighting conditions."

Edmund Nieto, a Park Service archi-



## Survey Results

In an effort to measure how light pollution is affecting parks, Dave Simon, NPCA's Southwest regional director, recently completed a survey that found "a quiet crisis."

"Although the public believes that the National Park System and all of its resources are protected, the truth is more complicated," Simon wrote in his report. "Unless light pollution problems are remedied, dark night skies within parks will continue to disappear."

In addition to obscuring the stars, excessive light pollution can seriously compromise the educational story presented in many national parks. Observing the night sky has been a crucial human activity since the Pleistocene era, inspiring wonder and curiosity, shaping religious beliefs, propelling scientific inquiry, motivating and guiding global exploration to the present day. "From the builders of celestial calendars at Chaco Culture National Historical Park in New Mexico to the builders of rockets at Canaveral National Seashore in Florida, the mission of our national parks could not be complete without dark night skies to help tell these stories," states the executive summary of *Vanishing Night Skies*, a public policy paper that was released by NPCA this spring. It was compiled by Simon with the help of Scott R. Babcock, a Stanback Conservation Program intern from Duke University.

NPCA surveyed superintendents at 776 park units and received responses from 189. The analysis focused particular attention on 130 parks that allow overnight visitation. Of those, 111 responded to the survey. Among the survey's findings:

► Light pollution is a widespread problem for national parks, regardless of size or geographic location.

► Ninety-four percent of all parks that were surveyed offer overnight visitation and consider dark night skies an important resource. Sixty-two percent of these



A map of the United States shows a night view of light sources.

overnight parks offer some type of night sky interpretive program.

► The Park Service considers light pollution a serious problem at many national parks and at many locations within parks. Two-thirds of the overnight parks reported problems, and more than 35 percent of these parks judged the problem to be "moderately serious" or "very serious."

► Of all parks with overnight visitation, only 10 percent report the presence of helpful ordinances in nearby communities that limit light pollution.

Though NPS has made excellent progress reducing light pollution in some places, there is still a great deal of room for improvement. NPCA recommended several steps to help national parks reduce the negative effects of light pollution, including:

1. NPS must lead by example to aggressively reduce sources of light pollution

within the national parks. Park facilities should be retrofitted using best available technology. NPS should establish a comprehensive light pollution monitoring program.

2. Parks should expand their night sky interpretation programs. Educating park visitors about the night sky is not only part of the interpretive story of many parks but is also crucial for increasing public awareness about light pollution.

3. Communities adjacent to parks, as well as communities at greater distances that have an effect on parks, should adopt progressive outdoor lighting ordinances to reduce light pollution.

4. Congress should expand the Environmental Protection Agency's existing "Green Lights" program, which provides incentives to install energy-efficient lighting, to assist

communities near parks to reduce light pollution.

5. To prevent further deterioration of night sky quality from air pollution, Congress should support and strengthen the Clean Air Act and regulations to control regional haze. EPA and the National Park Service should aggressively enforce them.

6. Light pollution in the Midwest, Pacific, and Intermountain regions should be addressed before the problem becomes more widespread and serious.

For a copy of the *Vanishing Night Skies* report, call 800-628-7275, ext. 222, or visit our web site, at [www.npsa.org](http://www.npsa.org). For additional information on night skies and the effects of light pollution, contact the International Dark Sky Association in Timmon, Arizona. Visit its web site at [www.darksky.org](http://www.darksky.org).

—WMC

tect and illumination specialist at the Denver Service Center, speaks for many when he says parks are obligated to take the lead in reducing light pollution. Nieto would like to see guidelines for all parks to retrofit their lights and fixtures, adding timers, motion sensors, shields, and low-wattage bulbs while

examining high-wattage equipment. He suspects that when parks take a critical look at their lighting, they'll find they can do with much less.

"We CAN do something about it, that's the great thing," says Cornucopia. "This isn't one of those things where once the forest is cut down, it's gone."

ALL I CAN SAY IS THAT IT'S AN IMPORTANT thing about. It's just a matter of education and doing it."

WENDY CORNUCOPIA lives in Mariposa and last winter led National Park Service in rebuilding Yosemite National Park after the flood.



## Continued Commitment to Customer Service

I hope that everyone has had a good start to their New Year. The months and years seem to roll around quicker each year, with 1999 being no exception.

We have begun the first stages of our software conversion which will update and help to streamline operations in many departments here at REC. With the help of the software company, we feel the change-over to the new system in June will be smooth. As a consumer you might notice some changes when the conversion happens, as it will affect meter reading and billing. We hope that you will have patience at that time, as we continue our commitment to provide better customer service.

You're probably already weary of hearing about the Y2K issue, even though 1999 has just begun. It is a complex problem that will be one of the most important challenges electric cooperatives will face over the next several months. We have already begun to take steps and will be working hard to do everything that can be possibly done to maintain the high level of service and reliability you have come to expect.

Over the next few months we will be providing information to consumers to help educate them on the facts and how the Y2K issue will affect them.

We experienced an outage last Thursday, the 14th that affected the Great Sand Dunes area. After repair and inspection of the equipment, it was determined that the transformer had been shot with a gun. From the best of my knowledge, I am not aware of a transformer season for local hunters and would just like to encourage those who choose to carry a firearm to exercise more caution.

Please remember, for your own safety, practice smart safety when it comes to power lines and electricity.

Looking for ways to save electricity has always been an important issue for the REC. An area recently addressed has been that of light pollution from yard lights. Their purpose is to provide light for sight and safety in a certain area, but many show light everywhere. We have begun exploring options and alternative ways to help cut down on the waste of light that sometimes can be unnecessary. We will be soon be changing the design of yard lights that we offer, as a step in that direction.

I would like to encourage you to read through the capital credit list in this issue and let us know if you have any information that might help us to update it.

At the January Board Meeting, the decision was made to change our after hours answering service. The new service, CRC will help us to provide better service to those who call with electrical outages or concerns after hours. The board was updated on the computer conversion and the challenges the REC will face with these changes the next few months.

Have a great February and remember...*"The foolish person seeks happiness in the distance, the wise grow it under their feet."*

### Statement of Publisher

The **NEWSBOY** is the official publication of the San Luis Valley Rural Electric Cooperative, Inc., 3625 US Hwy 160 W., Monte Vista, CO 81144, and is published monthly for consumers of the Cooperative. Periodical postage paid at Monte Vista, CO 81144. Subscription price \$4./year. Postmaster, send form 3579 to **NEWSBOY**, 3625 US Hwy 160 W., Monte Vista, CO 81144.

Beth Keck- Editor

### BOARD OF DIRECTORS

Rick Iman- President, 658-2455  
Eleanor Valdez- Vice-President, 274-5680  
Sam Holland- Director, 873-5226  
Gerald Lorenz- Director, 672-4489  
David Holland- Director, 754-3386  
Rick McCormick- Director, 754-2577  
Mike Rierson- Director, 589-5315

Board of Directors meets the last Tuesday of each month unless otherwise stated. Members are welcome to attend.

### BOARD FEEDBACK COMMITTEE

Kay Wyley- Chairperson, 658-2541  
Rob Jones- Vice- Chairperson, 378-2299  
Carol Lee Dugan- Secretary, 852-5412  
Jack Hamilton- 274-4273  
Tressesa Martinez- 274-5623  
David Marsh- 378-2000  
Robert Wardell- 658-2435  
Gerald Mathes- 672-4492  
Florence Ortega- 672-4422  
La Verne Schmidt- 754-2577  
Phil Varoz- 754-3630  
Eric Bothell- 754-3686  
Mark Mueller- 852-5650

### CEO

Chuck Archer- 852-5474

### INTERESTING FACTS YOU DON'T REALLY NEED TO KNOW

- The only national flag with no writing or decoration on it is Libya's. It's green, the traditional color of Islam.
- A report says 27% of the annual US food supply is tossed into the garbage.
- A penguin with its 6-inch stride can run as fast as an able-bodied man.
- Henry David Thoreau's biographers insist it was he who invented raisin bread.

## Light Pollution Solutions move out-of-state

Eagle articles generate interest in protecting the night sky

by Suzanne Frazier

"My daughter and her husband, who live a few miles from Ridgway, CO., sent me a copy of the article which related what the Crestone area is doing about light pollution. You are certainly to be commended for your efforts and success in the conservation of the beautiful night sky. Your citizens are obviously aware of the need to save the great educational value of a dark night sky."

Jerome Stueber, of Muskego, Wisconsin, continues, "I'm having a difficult time getting the Muskego Planning Commission to establish a city night lighting regulation. I suspect this is primarily due to the small number of people in the city who complain about light pollution since many of them have never seen a dark night sky . . . and as a result don't know what a dark sky looks like."

This is just an example of letters sent to the Pollution Solution address asking for more information on how to slow down the deterioration of the night sky due to inefficient lighting. The articles written in the *Crestone Eagle* a year ago are still being passed around among people interested in preserving the night sky.

Inquiries have also been received from Cedaredge, Crawford, Paonia and Hotchkiss, Colorado as well as from Kearney, Nebraska and Sandpoint, Idaho.

The Delta County Planning, in western Colorado, requires all

new subdivisions to have a covenant requiring shielded lights. Then, a month later, they wrote back asking for information on the Hubbell Skycaps because "no one knows where to get them."

Valley View Hot Springs is also in the process of installing shields over all their outdoor lights. They have retrofitted approximately 30 lights already and are working on the few remaining uncovered lights. "We have received positive feedback from our visitors about the covered lights," comments Terry Seitz. "They really enjoy being able to see the stars."

The San Luis Valley Rural Electric Cooperative has completed installing Hubbell Skycaps and high pressure sodium lights in the area. They were instrumental in achieving the quality of lighting available in the Crestone/Baca area without reducing the security of the lighting nor the beauty of the night sky. Installation of Hubbell Skycaps on private security lights is still available through the SLVREC by calling 1-800-332-7634.

For more information on reducing light pollution, stopping light trespassing, covering outdoor lights, installing motion sensors instead of leaving lights on, and smart lighting strategies, send a self-addressed envelope with \$.55 postage to "Pollution Solutions", P.O. Box 104, Crestone, CO 81131. In the return mail, you will receive

a brochure on "Good Neighbor Outdoor Lighting."

Light pollution is about lighting up the night sky so the stars are not visible. Light trespassing is about lights shining onto a neighbor's property and into their eyes,

Security lights are important for security and safety. Not one light needs to be turned off in this valley to decrease light pollution. Rather, if the remaining security lights in this area were shielded, light pollution would be reduced.

The four characteristics of good lighting are: 1) Good lighting never over-lights, creating glare and dark spots. 2) Good lighting uses "fully shielded" light fixtures which only lights the intended area, directing all the light below a horizontal line and onto the ground. 3) Good lighting does the job it is supposed to do without impacting areas beyond the intended coverage area or past property lines. 4) Good lighting uses high-efficiency lamps which not only saves energy but saves money.

Finally, what can the new residents in this area do to maintain the dark sky that has been preserved so far?

1) By installing controlled, effective and efficient lighting which enhances your residence instead of over-lighting the area.

2) Check with your neighbors to make sure you are not creating "light trespassing" with your exterior or interior lights.

3) Check to see that your light fixtures really match your needs, providing uniform low lighting without hot spots.

4) Install infrared sensors on your shielded outdoor lights, so you have the visibility you need when you need it and, if need be, a security system with "instant-on" characteristics.

**Crestone Realty, Inc.**

P.O. Box 279 - Crestone, CO 81131

719-256-4864

Located at White Eagle Village





Spiral Galaxy M101, photo taken by Neyle Sollee from his observatory in the Baca.

## 'Operation Dark Skies' Saving the night sky in our own backyard

by Suzanne Frazier

Recently, light pollution solutions have been in the news both in the San Luis Valley and across the nation.

### Operation Dark Skies in Taos

Just this spring, residents in Taos, New Mexico, formed a group called "Operation Dark Skies". Anne Matterling, one of the organizers, was interviewed on KRZA regarding the plans for the group. They have a three-point program which they hope to put in place this year: education, local ordinances and shielding street lights.

1. Their education program includes informing people that they don't need to sacrifice their lighting needs. They just need to be more aware of where they are shining the light. She spoke about both light pollution and light trespassing. Light pollution is when lights shine into the sky instead of where the light is needed. Light

trespassing is when light travels beyond the area that needs to be lighted into neighbor's eyes and property. Similar educational articles have been published in the *Crestone Eagle* in years past.

She also pointed out that the practice of turning on outside porch lights when homeowners are away in the evening is the first thing that burglars look for when they plan to rob a house. Leaving an outside porch light on is an invitation to everyone driving by that you are not at home. She recommended that people who need porch lights to reenter their houses after being away should install motion sensors. Then the light comes on when it is needed and doesn't act as an advertisement to unwanted guests.

2. The group also plans to promote the installation of light pollution prevention ordinances by the local governing bodies in Taos to protect the night sky from fur-

The Crestone Eagle • BUILDING & REAL ESTATE • June, 2000 • Page B-5

ther pollution by lighting. Last year, Sagunche County took steps to reduce light pollution in the county through the Sagunche County Land Use Code. Any new lights installed in the county must face downward to light the area on the ground that needs light instead illuminating the sky.

3. Finally, they hope to install shields on all street lights in Taos over several years. Street lights are the major contributors to light pollution. Please note that all the street lights in both Crestone and the Baca have shields. The only remaining lights to be shielded are privately owned.

### Time Magazine

In the January 31 issue, *Time Magazine* published an article called "Bag Those Beams" which summarized some of the light pollution prevention activities across the nation. Although they did not cover the light pollution activities in Crestone, they did report that Texas and New Mexico passed tough laws restricting outdoor lighting last year. Similar legislation is pending in four states including New York and Massachusetts.

According to the Dark Sky Association, which supplied Crestone with light pollution information, "efforts to curb light pollution are under way from the Australian Outback to Britain's Sherwood Forest." Complaints about light pollution are even coming from the Inuits, living 200 miles north of the Arctic Circle, who are being affected by over-lighting the globe.

The new interest in curbing light pollution has been attributed to the publicity surrounding the Comet Hale-Bopp and other "heavily hyped celestial events." When people around the globe realized that they couldn't see the stars from their locale, light pollution became an issue. As Wini Brewer was quoted in the article, "The stars are an endangered species. Ruining the sky is no different from ruining the view of Yosemite."

In a study of commercial lighting by the Illuminating Society of North America, it was deter-

mined that most commercial lighting uses "five times the amount of light effective for marketing". Some experts are recommending that commercial outdoor lighting can be reduced by 80% and still be effective. As Nancy Clanton, a lighting designer, was quoted in the article, "Business lights are out of control."

The *Time* article concludes by pointing out that fighting crime in residential areas does not require "whiting out the sky." They quote Tim Hunter, co-founder of the International Dark Sky Association, "we're not suggesting you live in the dark. We're saying it's time to keep lights on the ground where we need them." The solution offered in *Time Magazine* is simply to put shields around outdoor lights to stop the beams of light from moving in an upward or horizontal direction.

### Crestone Light Pollution Solutions

1. Turn off your outside lights when you don't need them.
2. Install an infrared motion sensor on all your outdoor lights. If you feel you need a light for security, an infrared sensor is a good security system with it's "instant-on" characteristic. Both you and any intruder will be alerted by the sudden turn-on of the light.
3. Check out your outdoor light fixtures to see if their specific lighting pattern matches your needs and are not shining on your neighbor's property however far away they live. Shield all outdoor lights so the light is directed to the area you need lighted.
4. Install window shades or shield all lights inside your house that may shine into the outdoors. Making sure that you are not light trespassing with either interior or exterior lights makes for good neighbors.
5. Encourage people who have pole lights to shield their mercury vapor lights. The SLV Rural Electric Cooperative has shields ready to install on all pole lights.

(Source: *Time Magazine*, January 31, 2000, pp. 56-57.)

Spanish Creek Metalworks



## Create a Garden



## Tri-State Moves Ahead With New Generation Facility

Tri-State Generation and Transmission Association and Tucson Electric Power Company (TEP) announced plans to proceed with the development of a 400-megawatt coal-based generating facility in eastern Arizona.

The new unit will be sited at TEP's existing two-unit Springerville Generating Station and is scheduled to be operational by December 2006. Ground breaking will begin immediately. Bechtel Power Corporation has been contracted to design and construct the plan under a turnkey, lump sum contract.

J.M. Shafer, Tri-State executive vice president and general manager, said, "The development of Springerville Unit 3 is one of the most significant projects in Tri-State's history. Our investment in this new resource helps strengthen our core business—assuring that our membership continues to receive affordable and reliable power for years to come."

Once built, Tri-State will lease 100 percent of

the new unit and will use 200 megawatts to serve existing load and projected growth in the southwestern Colorado and New Mexico portion of its service territory. Under a purchase power agreement with Tri-State, TEP will receive 100 megawatts for up to five years, while Salt River Project of Phoenix will receive the remaining 100 megawatts under a 30-year contract with Tri-State.

SLVREC CEO John Villyard said, "The addition of this new generation facility will eliminate pressure on existing generation facilities; but it will not alleviate the need for the development of future resources. Tri-State has been pursuing a number of other options in addition to this facility."

The project will cost about \$939 million dollars with \$90 million of that being spent on upgrades to the emissions control equipment of Units 1 and 2 and other facilities at the power plant.

Tri-State provides power to SLVREC and forty-three other rural electric cooperatives in Wyoming, Nebraska, Colorado and New Mexico. ☛

## Newsboy Wins Awards

For the second year in a row, *The Newsboy* had a strong showing in the state-wide rural electric newsletter competition. In the competition, newsletters from electric cooperatives of similar sizes compete.

*The Newsboy* won seven awards including first and second place for best safety article, first and second place for best explanation of an industry situation, and second place for best story on a community program. Kelly Mortensen won first place for best photo of "Life at the Co-Op" for photos he took of the Million Fire. Shan Hunter won second place for best photo of "Life at the Co-Op" for a photo he took of a bear cub on a utility pole. ☛

## Open House was Well Attended

About 50 people attended SLVREC's open house on October 9. The open house provided members an opportunity to see the recently completed shop and to view plans for the second and third phases of the proposed building project.

Architect Mark Jones and Construction Manager Arvyn Van Rye provided refreshments for guests. All members attending the open house were entered in a door prize drawing. Don Jansen of South Fork won the drawing. The Jansens will receive \$50 off their electric bill. ☛



719-852-3538 • 800-332-7634 • [power@slvrec.com](mailto:power@slvrec.com)

## POA adopts 2005 budget, no dues increase this year

by Glenn Ennis

On December 18, the Board of Directors voted 2-1 to adopt the proposed 2005 budget, with no dues increase. The alternative before the Board was to adopt a \$15 increase. The bottom-line choice was whether to keep dues as low as possible this year or to adopt a modest increase with an eye toward the future. In the end, the Board chose to dip into our substantial reserves to fund about \$65,000 in improvements rather than to increase the dues.

The total 2005 budget is \$1.35 million dollars. Of that, about 31% goes for maintenance, including road maintenance, Camper Village, parks and greenbelts. Another 31% funds administrative activities, including management, communications, finance, taxes, insurance, and legal expenses. Land Use activities comprise 8%. The remaining funds support Fire Department (14%), Ambulance (9%), and Library (8%) activities.

Significant efforts are funded this year for further debt collection, the development of the Elk Park commercial area, and a Master plan. The new CAFS fire truck will be paid off upon delivery in early 2005. Considerable attention will be paid in 2005 to developing revenue sources other than membership dues.

The budget adoption followed an extensive budget review that

grading, more ambulance runs, more fire calls, and more patrons at the library. The third major factor is the desire on the part of some of the members for expansion of services or activities, generally falling under the scope of long-term planning.

That put us in a place where we were concurrently trying to catch up from the past, expand on present growth, and also plan for the future. Department heads were asked to assess needs in the face of these trends — the 9% growth rate translates to a 50% increase in population in five years. For some services, like ambulance, 50% more people may mean 50% more ambulance calls. One new home out in the Grants may mean the maintenance department has to grade 6 miles of new road. Land Use and E&AC activities would increase. There would be an increase in library patronage. Parks would see additional visitors.

The department heads went through that exercise and also had discussions with volunteers from the fire department, ambulance service, and the library. We took that list and built a preliminary budget in November. That early budget had about a 50% increase in total spending. To fund all of that through dues would have resulted in a dues increase of \$118 per lot this year. So we slashed that, financing a matter of a mil-



Whoopie! Fran Savin and her Toyota pickup truck went a little too far at the Crestone Post Office parking lot. Instead of stopping, the truck went over the curb and kept going the few feet into the P.O. wall, crunching the outside stucco and breaching the exterior wall; the window was undamaged. Thankfully, no one was hurt in the accident.

## Town of Crestone News

Ordinances passed to control exterior lighting & debris

by Janet Dossigny,  
Town Clerk

The Town of Crestone Board welcomed Mary Newton as new Trustee. She was appointed at the December 13 meeting, to replace Rebecca Myrren who resigned, as she is moving out of the Town limits.

The 2005 budget has been approved. If you would like to see a copy, please stop by the Town Hall any weekday but Wednesday from 9am-1pm.

Two ordinances were passed amending the Town of Crestone nuisance ordinance, one regarding exterior lighting throughout town, and the other addressing trash and debris in the commercial area.

All Town property owners were sent the lighting amendment, and all commercial property owners and downtown business owners were sent the trash and debris amendment. If you fall into these categories and did not receive your copy or copies, please stop by or call the Clerk at 256-4313. Property owners, please inform your tenants. The two amending ordinances are published in full in this issue of the Eagle.

The burning ban in the Town has been lifted for the time being. Please use caution with any exterior burning.

Have a healthy, prosperous, joyful 2005.



Office Services  
& Supplies



## APPENDIX F

---

### Neighboring Baca Grande Subdivision's Light Ordinances

From: "Tamar Ellentuck" <landuse@bacapoa.org>  
Subject: **Outdoor Lighting**  
Date: April 20, 2005 11:33:18 AM MDT  
To: <frazier@fone.net>

Hi Susanne –

Here is what the covenants say about outdoor lighting: I quote it in it's entirely but you pick whatever part works for you.

Section 11.5 Outdoor lighting.

- (a) All outdoor lighting must be fully shielded or hooded so that the light is cast downward, and must, at a minimum, conform to county outdoor lighting codes. (Motion-activated lights are highly recommended.)
- (b) Outdoor lights may not directly illuminate areas beyond the Owner's property.
- (c) There shall be no mast-mounted or pole-mounted outdoor lights on lots.

Saguache County Land Development Code outdoor lighting codes:

Article XVI, Section XVI.6.4.1 Lighting

Outdoor lighting is to be directed downward and shielded. High or low pressure sodium bulbs may be a maximum 75 watts. Mercury vapor lamps are prohibited. Mast-mounted lights must be kept to a minimum number and maximum height of 20 feet.

In the past six months I have asked about three owners to come into compliance with these codes – and they have, by shielding them and directing them downward. I also mentioned to one owner that the interior lights from their kitchen were visible from two miles away – they also did something to shield those.

I'll get you the lot consolidation info we talked about after I get through my current deadline crunch. I enjoyed our lunch. Thanks.

Tamar

## APPENDIX G

---

### SANGRE DE CRISTO RESERVE DATABASE.

Please click this URL to see the spreadsheet in full. [2-9 20201014 summary \(1\).xlt](#)

[https://drive.google.com/file/d/1N-\\_VOU3qZAt0Lxn68lyvqfPWRgO0AUB5/view?usp=sharing](https://drive.google.com/file/d/1N-_VOU3qZAt0Lxn68lyvqfPWRgO0AUB5/view?usp=sharing)



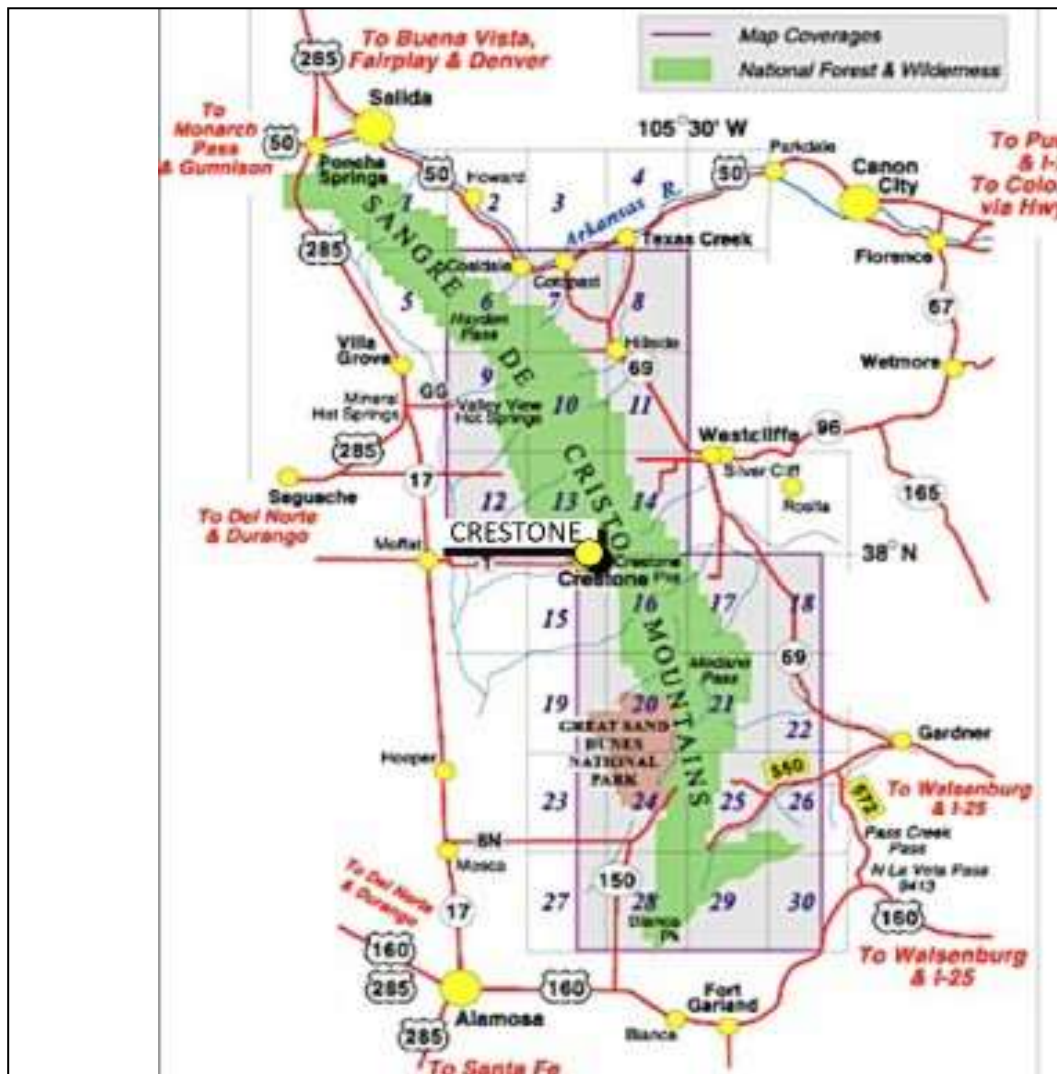
## APPENDIX H

### Regional Dark Skies

#### Town of Crestone

Whether by chance or fate, the Town of Crestone finds itself today fortuitously positioned at the very heart of a vast treasury of protected public lands and outdoor recreational opportunities. Given the Town's remote location, its powerfully austere setting and destination as an international center for contemplative retreats, Crestone possesses an unparalleled allure for those seeking deep, personally meaningful adventure.

The town of Crestone is in a unique position to become the central 'hub' and gateway for information, hospitality, and services for those seeking access to the stillness for contemplation, celestial observation, and extended trekking. Walking and hiking is cultivated in the community, and visitors come for birding and photography to imbibe a taste of the secret elixir that satisfies all hunger – the wilderness experience.



### **U.S. Forest Service - Trailheads**

Extensive studies have been done to ascertain the impacts and importance of our national forests and their contributions to quality of life and economic development through recreation. Visitors to all of Colorado's public lands combined contribute \$21 billion annually to the State's economy.

According to the Forest Service (USFS), a campground with 10-12 sites can generate more than \$1 million in annual revenue. A study conducted in 2001, estimated that the amount of money each visitor to the Rio Grande National Forest spent per visit within a 50 mile radius of the recreation site amounted to over \$1,000 in food, lodging and transportation costs.

Regionally important trailheads in the Crestone vicinity include San Isabel, North Crestone Creek, Willow Lake, Cottonwood Creek, and Liberty Creek.

North Crestone Creek is one of the most important trailheads in the Rio Grande National Forest, and currently provides 13 camping sites.

### **Sangre de Cristo Wilderness**

The ***Sangre De Cristo Wilderness Area*** extends 70 linear miles from Poncha Springs to Mount Blanca. At 221,000 acres, it represents the state's third largest wilderness area, and when abutting public lands are included – Forest Service, BLM, the Baca National Wildlife Refuge and the Great Sand Dunes National Park and Preserve – it becomes one of the largest continuous open spaces in the Continental U.S., containing 180 miles of scenic hiking trails.

### **Colorado "Fourteeners"**

Dominating the backdrop of the Town of Crestone are several of the most important mountaineering objectives in the lower 48. These include four of Colorado's 54 "Fourteeners" – Kit Carson, Challenger Peak, Crestone Peak, and the Crestone Needle.

These peaks are the most highly visited destination within the Sangre de Cristo Wilderness Area. Virtually all of those coming to climb these peaks, in their quest to summit all 54 of the States "Fourteeners", will leave from the Willow Lake/South Crestone Creek Trailhead.



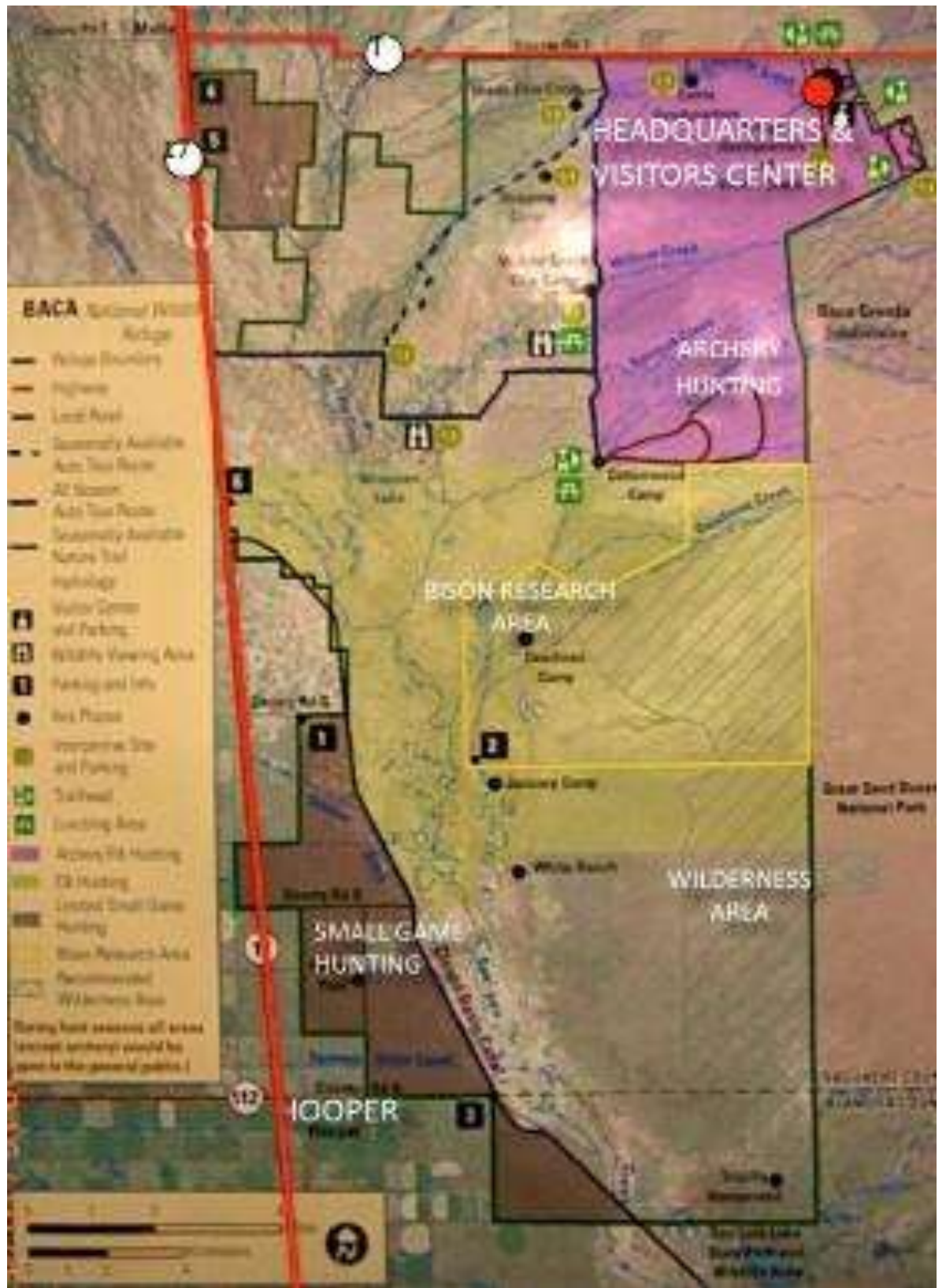
### **Baca National Wildlife Refuge & San Luis Valley Avian Corridor**

The 90,000 Acre Baca National Wildlife Refuge attracts birders and other diverse visitors ranging from photographers and birders to bow hunters. Studies show that 80% of all habitat is directly connected to riparian corridors such as these, and a delicate balance between preserving habitat and providing a quality nature experience is encouraged. The recent purchase of the Briseis Property brings the Refuge next door to the Town of Crestone and the surrounding Baca Grande Subdivision.

Through their partnership with students at the adjacent Colorado College Campus the Refuge provides on the ground interactive studies that enhance the Town's role as a destination center for birders nationwide. Their developing program offers visitors a fascinating and accessible destination to nourish the spirit and connect to the environment. Several connecting trails link the Refuge Visitor Center with the local Charter School and the



Town.





### **Bureau of Land Management (BLM) Lands**

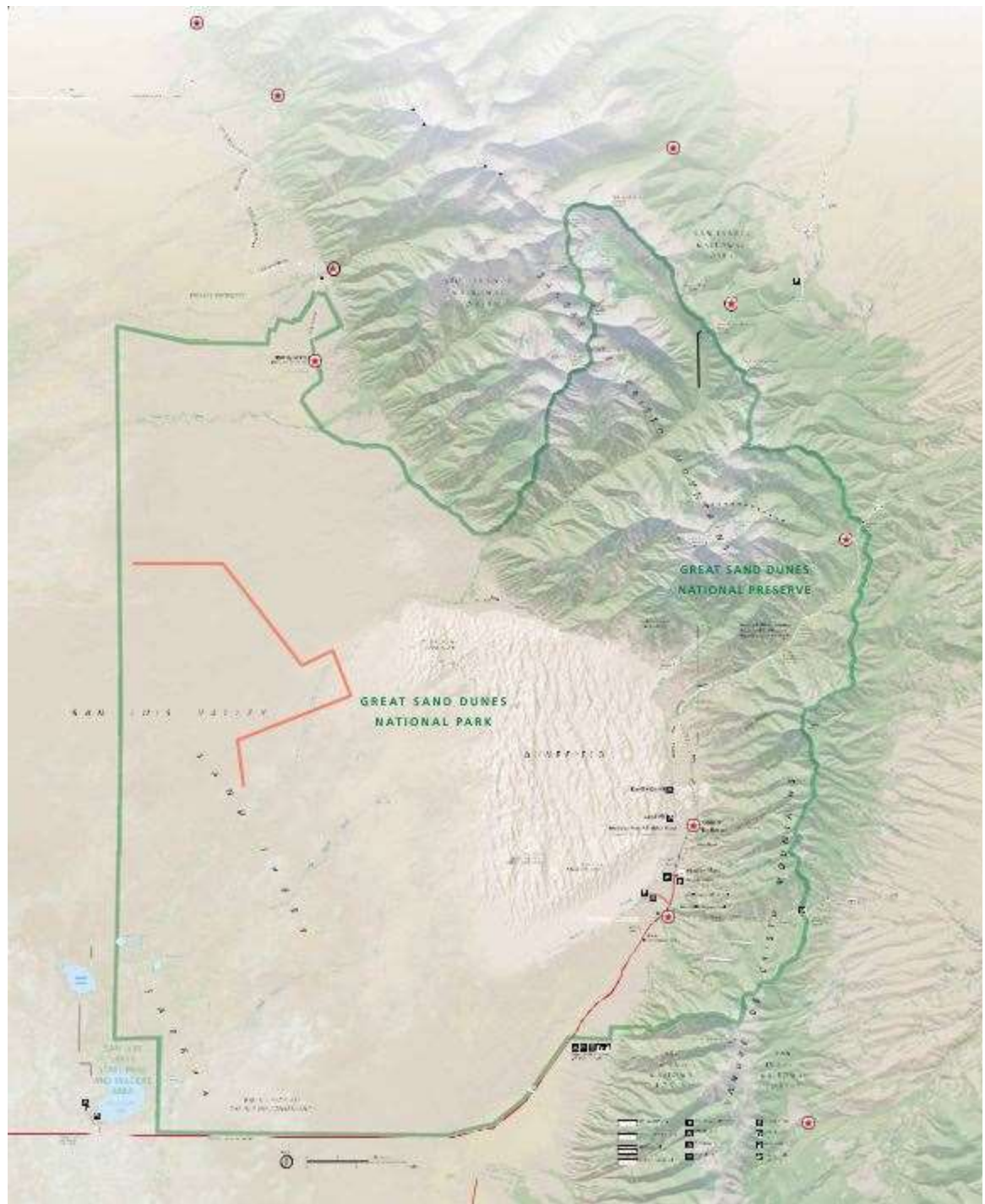
The San Luis Valley Field Office manages nearly 500,000 acres of public land in Colorado's Rio Grande Basin. The public lands managed by the BLM's San Luis Valley Field Office present myriad ecosystems; from alpine desert to the majestic Sangre de Cristo Wilderness on the eastern side of the San Luis Valley.

### **Great Sand Dunes National Park**

Coupled with the Baca National Wildlife Refuge, the Great Sand Dunes National Park and Preserve protects major Valley land masses in perpetuity, maintaining the pristine quality that is characteristic of the San Luis Valley.

Though known primarily for its Dunes, the Great Sand Dunes National Park has extraordinary high alpine backcountry assets which, due to the remote nature of the park and its complete lack of motorized access, remain as some of the most unspoiled in Colorado.

- 'Star Dune' is the tallest dune in America at 755 ft.
- 149,000 acres encompass the entire Sand Creek and Medano Creek watersheds
- 400,000+/- visitors per year
- ATVs are not permitted anywhere in the national park and preserve
- Habitat to six endemic species of insects. Many birds, amphibians, and mammals spend part of their lives in the dunes, and depend on the natural quiet to communicate
- Multiple ecosystems ranging from mixed conifer forests to alpine tundra, and including pristine alpine lakes and major creek headwaters



## APPENDIX I



### The Town of Crestone

#### Proclamation

WHEREAS, the Town of Crestone will, on August 8, 2018, receive a delegation of *Teyuna Elders*, reflecting a weaving together of North and South America long prophesied by many Indigenous Elders to unite all peoples in the Heart of North America; and

WHEREAS, the Town of Crestone values and honors the ancient Harmony with Nature wisdom teachings that emerge from the Heart of Mother Earth and continue uninterrupted among the delegation of *Teyuna Elders* on pilgrimage to our Town; and

WHEREAS, the Town of Crestone recognizes the unique, ceremonial gifts of the *Teyuna* to restore and renew the sacred waters and sacred lands of Mother Earth; and

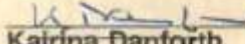
WHEREAS, the Town of Crestone supports the extension and continuation of the *Teyuna* ceremonial practices in our town in the spirit of guidance from an elder sibling to the younger; and

WHEREAS, the Town of Crestone recognizes Colorado College, Baca Campus, for providing full lodging to receive the delegation of *Teyuna Elders* and their representatives;

**NOW, THEREFORE, IT SHALL BE AND IS HEREBY PROCLAIMED BY THE BOARD OF TRUSTEES OF THE TOWN OF CRESTONE, that the 8<sup>th</sup> day of August, in the year 2018, shall be the *Day of the Teyuna*, recognizing the auspicious arrival of this historic delegation of *Teyuna Elders* from the Cabildo (the highest elected governing authority) of the peoples of the Sierra Nevada Maria of Colombia into our Town, and honoring their historic arrival with a day and time, as well as during the days following that the *Teyuna* are in the area, to offer silence, contemplation, and mediation in our community, including all those who may so choose to observe this special time throughout the adjacent spiritual centers and the neighboring Baca Grande development area.**

By the Town of Crestone

Given under my hand this 9<sup>th</sup> day of July, 2018.

  
Kairina Danforth  
Mayor