SB
536

EDT

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Statement of
THEODORE E. LIU
Director
Department of Business, Economic Development & Tourism
before the

SENATE COMMITTEE ON ECONOMIC DEVELOPMENT & TECHNOLOGY

Wednesday, February 25, 2009
1:15 p.m.
State Capitol, Conference Room

in consideration of
SB 536
RELATING TO STARLIGHT RESERVE.

Chair Fukunaga, Vice Chair Baker, and members of the Committee. The department supports the concept behind SB 536, which supports the development of a statewide starlight reserve strategy to preserve the quality of Hawaii's night sky and its associated cultural, scientific, natural, and landscape-related values.

We concur that establishing a starlight reserve in Hawaii would help to reduce the amount of ambient light pollution in the night skies over our State. In so doing, we believe this reserve would both protect and promote cultural heritages associated with the night sky, help safeguard the equilibrium of the biosphere in which nocturnal and diurnal habitats are threatened by light pollution, and significantly enhance the quality of our night skies for astronomical observation and research.

In order to achieve the potential benefits for astronomy, tourism, public health, education, biological diversity, land management, and economic development statewide, we believe that a starlight reserve strategy must be developed and implemented in coordination with appropriate State, County and Municipal agencies and organizations to ensure its quality, efficacy and sustainability. The proposed starlight reserve advisory committee would work with our department to include all stakeholders potentially impacted by the reserve and take into account all pertinent safety regulations.

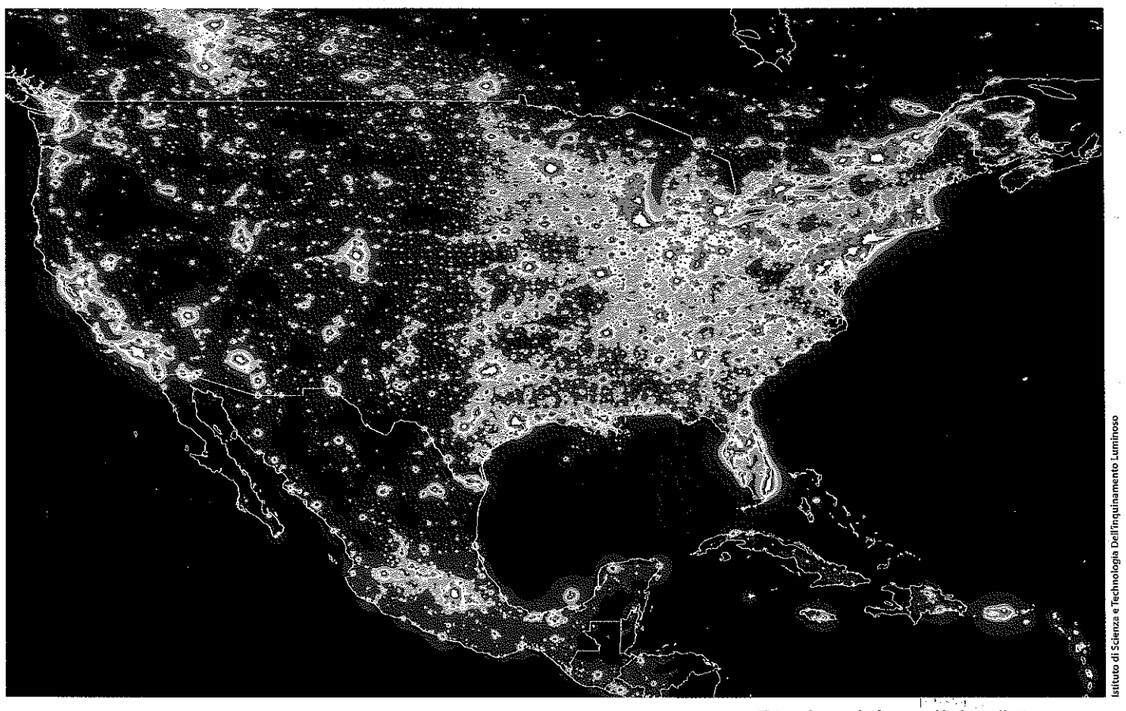
We understand that the intent of the proponents of the starlight reserve is to reduce the potential financial impact of implementation by proposing the replacement of existing light fixtures, after they degrade/expire, with more energy and cost efficient technology.

Thank you for the opportunity to testify on this bill.

Army of darkness

Can we win the war against light pollution?

The night sky is getting brighter. Here's how we can reverse the trend. **by Michael E. Bakich**



Istituto di Scienza e Tecnologia Dell'Inquinamento Luminoso

This color-coded map of light pollution across the United States shows the darkest areas as black. These areas generally are remote. Gray and mauve regions are ideal hunting grounds for pristine skies. Often, these areas are rural and are not accessible by road. Green sections have acceptable dark-sky conditions. If you don't have access to any of the black areas (as will be the case in many of the northeastern states), go for the green.

Observers, astrophotographers, and nature-lovers all have a common enemy: light pollution. This insidious problem, caused by excess nighttime lighting, is growing worldwide. Satellite images show few regions of our planet's nightside are truly dark. It's possible, in fact, that the Moon is the only object young people in large cities will ever see. Indeed, the dark night sky is an endangered natural resource.

Nobody denies that some outdoor lighting is necessary for people's safety and security. Other lighting, such as that used for advertising, may not be necessary, but it's a consequence of living in our world today. If those lights are designed and maintained correctly, they can be a benefit without taking away from the night sky's beauty.

Michael E. Bakich *is a senior editor of* Astronomy.

Defining the problem

Outdoor light pollution manifests itself in three ways: light trespass, glare, and clutter. Light trespass occurs when unwanted external light enters your property. It can ruin an imaging session or cause sleep deprivation if bright light enters through a bedroom window.

Glare results from high contrast between lit and unlit areas. Although it affects amateur astronomers, it's most often a problem for drivers. Bright streetlights, advertising signs, and poorly placed lights used by businesses are the primary causes of glare.

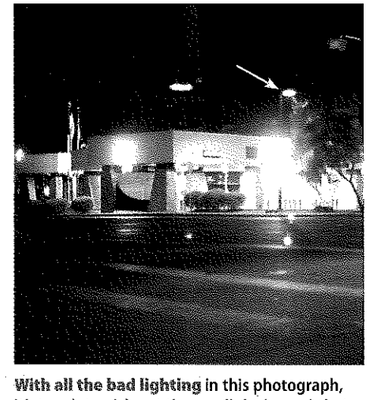
Bad lighting in El Paso, Texas — and many other cities — has multiplied in recent years. If not for the mountains in the background, these lights might have gone on farther. Michael E. Bakich

Clutter refers to badly designed or excessive light groups that generate confusion or cause safety issues. This generally affects automobile drivers.

The light stops here

The best outdoor lighting falls under the classification "full-cutoff." Full-cutoff fixtures do not allow light to escape above 90°, which marks the edge of the lamp's shade. Such fixtures distribute light in a directed pattern and provide equivalent ground lighting with less power. The first full-cutoff light fixture was General Electric's M100, introduced in 1959.

Many states mandate full-cutoff lights for building or highway construction. Today's full-cutoff fixtures generally employ high-pressure sodium lamps. Introduced in 1970, they are the dominant streetlights in the United States. The main characteristic is their orange-yellow glow. They use far less energy than mercury-vapor or metal-halide lamps.



With all the bad lighting in this photograph, it's tough to pick out the one light (arrow) that conforms to the full-cutoff standard. Michael E. Bakich

Earth at night gets less dark every year. As this image shows, the worst offenders are the United States and Europe. Data courtesy Marc Imhoff of NASA GSFC and Christopher Elvidge of NOAA NGDC. Image by Craig Mayhew and Robert Simmon, NASA GSFC.

Government action?

In August 2008, the International Dark-Sky Association (IDA) worked with Congress on a bipartisan letter in support of light pollution research and education. Signed by 11 U.S. Congressional representatives, it asked the U.S. Environmental Protection Agency (EPA) to take four steps against light pollution:

1) Codify a formal definition for "light pollution" that captures the detrimental effects that result from unchecked nighttime illumination.

2) Incorporate consideration of the environmental, safety, and health effects

Confronting light pollution: National Dark Sky Week

Each year, the International Dark-Sky Association (IDA) chooses one week during which they hope everyone in the United States helps to temporarily reduce light pollution. It's called **National Dark-Sky Week** (NDSW). The IDA encourages us all to turn off unnecessary lights so we can realize the wonder that our universe holds. If everyone participates, NDSW will inspire us to use better lighting systems. NDSW was founded not only to reduce light pollution, but also to help people connect with the night sky.

NDSW usually occurs in April during the week of New Moon. This year, New Moon occurs April 25. So, across the United States, amateur astronomers and concerned citizens will participate in NDSW each night between April 20 and April 26 from 10 P.M. to 12 A.M. EDT.

Besides raising awareness of the problem, NDSW's goals are to reduce light pollution temporarily, allowing us to see the night sky in greater detail; encourage people to use better light fixtures; and give everyone a greater appreciation for astronomy, thus recruiting others to help reclaim our dark skies lost because of poor lighting. If you want to get involved with NDSW, visit star parties and observatories that are hosting local events. — *M. E. B.*

Forget about astronomy for a moment. These streetlights produce so much glare that safety is the issue for drivers and pedestrians. Michael E. Bakich

of current levels of light pollution into EPA research programs.

3) Expand the discussion of well-designed (and thus energy-efficient) outdoor lighting in [the federal efficiency program] Energy Star publications and standards.

4) Support education about light pollution in the agency's education, outreach, and grant programs.

"Encouraging the EPA to address light pollution is a great first step at federal protection of our night skies," says Christian K. Monrad, president of the IDA Board of Directors. "We [IDA] estimate that there are approximately 2,500 outdoor lighting codes in the U.S. alone; some of them very well-written and others that are not. Having federal research and recognition of light pollution would assist states and municipalities in having a solid baseline for future codes and revisions to current ones."

Moving to protect dark skies, Energy Star included specifications for full shielding of solid-state streetlights in its proposed criteria for 2009. If passed, the requirements will impact the design of all future LED (light-emitting diode) streetlights. These criteria are the result of input gathered at a series of Department of Energy (DOE) sponsored workshops.

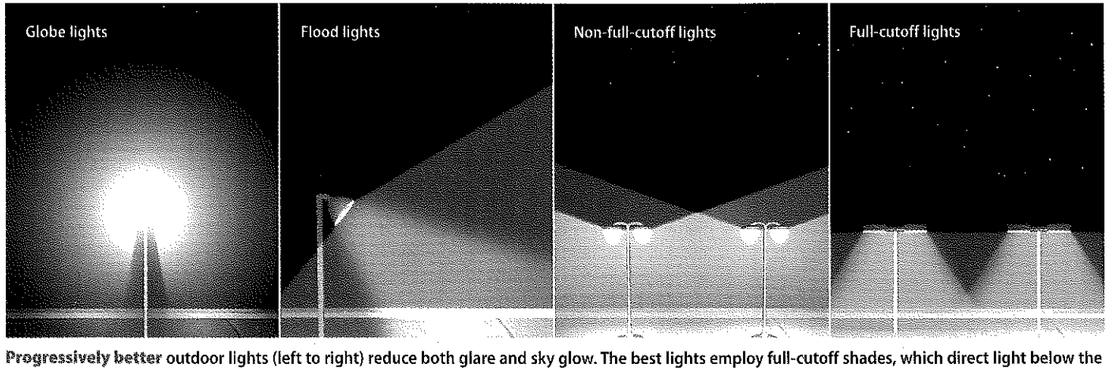
Energy Star is America's most widely recognized energy efficiency program. It began in 1992 as a cooperative effort between the DOE and the EPA. Energy Star's primary goals are to save money and reduce environmental impact through energy-efficient products and practices. Visit the Energy Star web site at http://www.energystar.gov for more information about Energy Star's goals.

What can you do?

I talked to a leading vendor of approved light fixtures, Anthony Arrigo, president of Starry Night Lights. He's come up with 10 ways you can help in the fight against light pollution. They're listed here with only slight modifications:

1) Light only what needs lighting. This sounds simple, but it typically gets overlooked. Ask yourself, "Does this even require lighting?"

2) Light only when you need it to be lit. OK, so you've determined that it really requires light. Does it need to be lit at all times? If you go out to your shed only once a week, does it really need to be lit dusk to dawn every night?



Progressively better outdoor lights (left to right) reduce both glare and sky glow. The best lights employ full-cutoff shades, which direct light below the horizontal, sending the least amount of light into the sky. *Astronomy:* Roen Kelly

Fleeing light pollution: Arizona Sky Village

Many folks who seek a remedy for light pollution have taken up residence in premier observing locations. The country's most ambitious astronomical development is Arizona Sky Village (ASV).

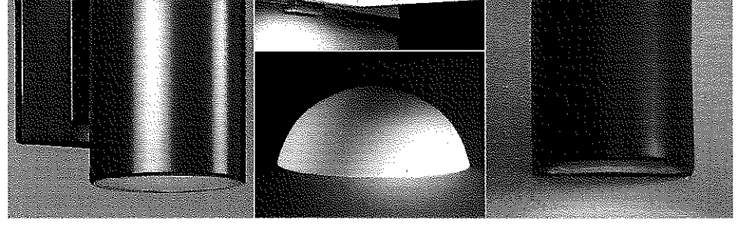
Located in the foothills of the Chiricahua Mountains, ASV sits at the mouth of Cave Creek Canyon in Portal, Arizona. Four-acre lots of deed-restricted property and Interval Ownership Haciendas (time shares) occupy this expanse of high desert. Several dozen homes already populate the development.

Arizona Sky Village is the vision of its first residents, Gene Turner and Jack Newton. Turner combines a lifelong fascination with astronomy with a career in real estate development to manage the project's nuts and bolts. Newton, a leading astroimager for decades, is a household name among amateur astronomers. He's producing his best images ever from his observatory on the ASV site and also has discovered several supernovae.

ASV's sky is only a couple tenths of a magnitude brighter than the most remote locations on Earth. Southeastern Arizona enjoys a dry, yet moderate climate characterized by insignificant snow and tolerable summer heat. Its latitude is southerly enough to elude cold fronts and far enough west to remain dry.

Developments such as Arizona Sky Village represent the future of dark-sky astronomy. Filling desirable locations with amateur astronomers can only help to keep light pollution at bay. — *M. E. B.*

This light fixture, installed when a restaurant opened, is an example of extreme light pollution because of the amount of light it emits horizontally. People with no interest in astronomy complained about it from the first night it went into operation. Michael E. Bakich



This selection of IDA-approved lighting is part of the line offered by Starry Night Lights. As these examples show, full-cutoff lights don't have to be ugly to be effective. Images courtesy starrynightlights.com

3) Use only as much light as is required. Don't always install the highest available wattage. If you're not performing surgery on your patio, there's no need for operating room illumination levels.

4) Use only full-cutoff light fixtures. Full-cutoff fixtures shine light onto the ground and prevent light from crossing property lines or up into the night sky.

5) Shield existing fixtures. If you're not quite ready to install new, full-cutoff fixtures, light shades are available for many fixtures. Shades will convert the fixtures into night-sky friendly fixtures for a minimal cost.

6) Install motion sensors. Such devices will turn your lights on automatically whenever there is activity outside your home or business. Taking this step typically reduces your use of electricity for lighting by more than 90 percent. Such a saving easily pays for the cost of the sensor and its installation.

7) Install reflectors. Many times, you can use reflectors to outline a driveway instead of a string of lights. Reflectors are cheaper to purchase, cost nothing to run, and are unaffected by power outages.

8) Get used to the dark. Our eyes are quite good at night. If you take the trash out at night, do you need to turn your outdoor lights on? Chances are good that you'll be able to find the trash can and make your way to the curb.

9) Educate those around you about light pollution. This includes your family, friends, neighbors, and elected officials. With just a little bit of thought and effort, light pollution is one type of environmental problem that can be cleaned up without any side effects.

10) Show your support for current efforts. Help promote groups such as the International Dark-Sky Association and manufacturers who produce approved fixtures. If you blog, write about light pollution. Don't just gripe! Mention success stories whenever you can.

Taking a proactive approach to light pollution ensures that future nights will be safe, healthy, and dark.

UNIVERSITY OF HAWAI‘I SYSTEM
Legislative Testimony

Testimony Presented Before the
Senate Committee on Economic Development and Technology
February 25, 2009, 1:15 p.m.
by
Virginia S. Hinshaw, Chancellor
and
Richard Wainscoat
Astronomer, Institute for Astronomy, University of Hawai‘i at Mānoa
and
President, Commission 50, International Astronomical Union

SB 536 RELATING TO STARLIGHT RESERVE

Chair Fukunaga, Vice-Chair Baker, and members of the committee. My name is Richard Wainscoat and I am here today to submit this testimony in my capacity as an Astronomer at the University of Hawai‘i Institute for Astronomy, and as President of Commission 50 of the International Astronomical Union, for the protection of existing and potential observatory sites.

The University of Hawai‘i strongly supports this bill and recommends that it be passed with some changes.

Hawai‘i has two of the best astronomical observatory sites in the world. Mauna Kea Observatory on the Island of Hawai‘i is arguably the best observing site on Earth. Haleakalā Observatory on Maui is among the best observing sites in the Northern hemisphere. Mauna Kea is threatened by light pollution. Haleakalā already suffers from significant light pollution that comes both from Maui County and from O‘ahu.

Much of the populated area of the Earth suffers from unnecessary light pollution. Light pollution is adverse effects of man-made lighting including sky glow, energy waste, glare, and environmental harm. Much of it is unnecessary, and results from careless and wasteful use of light at night. The island of Hawai‘i has had a lighting ordinance for many years, and it has protected the dark night sky over Mauna Kea. However, continued population growth and the associated growth in lighting is threatening the dark night sky over Mauna Kea, and will require more careful choice of lighting in the future. Maui County enacted a new lighting ordinance in 2008 that will help to reduce light pollution over Haleakalā. However, Maui’s lighting ordinance will do nothing to reduce the light from O‘ahu that is affecting Haleakalā. Kaua‘i does not have a lighting ordinance, but already has some of the best lighting in Hawai‘i because it has many endangered birds. All streetlights on Kaua‘i are fully shielded, and emit no light above the horizontal plane; unshielded lights cause confusion to birds (possibly leading to death).

Light can travel for over 200 miles through the atmosphere (light from Honolulu can be seen from Mauna Kea). Therefore, preservation of the night sky is a statewide issue.

The aspect of light pollution that most affects astronomy is sky glow. Air molecules and dust scatter artificial light into the telescopes. Every 10% brighter that artificial light makes the sky from its natural value makes the effective size of a telescope 10% smaller. The following series of photographs, using the same exposure, shows the difference in sky brightness between Mauna Kea, Kailua (Oʻahu), and Honolulu. On Oʻahu, the sky at Sandy Beach, where we take our undergraduate astronomy students to view the night sky is about four times brighter than on the Big Island. The Milky Way is barely visible from Sandy Beach. Much of the light that is being sent upwards into the sky is wasted, and therefore corresponds to wasted energy. In Hawaiʻi, approximately $10 million is wasted each year by poor lighting.

The "Starlight Reserve" concept is being developed in cooperation with UNESCO to address the loss of the ability to view the night sky that is happening across the Earth. Over 99% of the visitors to Hawaiʻi come from places with significant light pollution. Much of the continental United States has a serious light pollution problem. The night sky is relatively unpolluted on all of the major Hawaiian Islands except Oʻahu, and even on Oʻahu, the dark night sky could be recovered by more careful use of light at night. The State Department of Transportation is already improving lighting on highways by using fully shielded light fixtures in new installations and when replacing existing fixtures.

The work of advisory committee that will be created by this legislation will have tremendous benefits to Hawaiʻi that extend far beyond protection of astronomy. These include:

1. Energy savings, by reducing or eliminating wasteful use of light at night;
2. Improved road safety by reduction of glare from roadway lighting;
3. Benefits to animals, including endangered birds that become confused by artificial lights at night, and endangered turtles, that use stars to guide them to the water after hatching or nesting, and mistake artificial lights for stars;
4. Preservation and recovery of the ability of Hawaiʻi's residents and visitors to view the beauty of the night sky; and
5. Benefits to human health. Light at night disrupts the human circadian rhythm, and has been linked to breast and prostate cancer. Because of this link, the World Health Organization has listed shift work as a probable carcinogen.

We recommend that two changes be made to the bill:

1. Add a lighting engineer to the membership of the advisory working committee listed on pages 5 and 6 of the bill. It is important to have input from a lighting professional to ensure that the proposed legislation is practical, and that it conforms to national lighting standards.
2. Remove section 5b (from the bottom of page 14 to page 21) from the bill. This subsection unnecessarily restricts the work of the advisory committee. Furthermore, an expert meeting will be held in the Canary Islands in March 2009 that will further develop the concept of "Starlight Reserves," their scientific, cultural and environmental values, and their relationship with World Heritage. It is very likely that some or many of the criteria described in section 5b will be changed.

Thank you for the opportunity to present this testimony.

Photographs of the night sky seen from Mauna Kea (top), Kailua, O‘ahu (middle), and Honolulu (bottom), using exactly the same exposure time. Notice the dramatic differences in sky brightness, and how many more stars are visible from Mauna Kea than from O‘ahu.

fukunaga4 - Michelle

From: John Gallagher [gallaghej002@hawaii.rr.com]
Sent: Saturday, February 21, 2009 12:50 PM
To: EDTTestimony
Subject: SB 536 - Relating to Starlight Reserve

DATE: Wednesday, February 25, 2009

TIME: 1:15 pm

MEASURE: SB 536 - Relating to Starlight Reserve

Chair Fukunaga, Vice Chair Baxter, Committee members:
Mahalo for the opportunity to testify on Senate Bill 536 which sets the stage to develop a statewide lighting law, one of the first states in the country to enact such a law, to preserve the quality of the night sky for current and future generations.

My name is John Gallagher and I am testifying in my position as the Night Sky Coordinator of the Hawaiian Astronomical Society, a non-profit organization founded in 1949 dedicated to advance amateur astronomy and as a private citizen of the Great State of Hawaii.

I am testifying in **strong** support of this bill because:

a. Long range cost savings to the State and Counties.

b. Potential to increase tourism as a premier location for viewing the night sky.

c. Protect our endangered wildlife needing a dark environment.

d. Preserve the night sky for scientific and astronomical studies and observations.

e. Protect the long range health of our citizens as more evidence is being discovered on the effects of light pollution on the human body.

f. Provide for cultural activities associated with dark skies.

g. Open the window to wonder of the night sky for many adults and children who have never seen a dark sky with all the majestic wonder that the imagination can vision.

PROPOSED AMENDMENT:

Modify Part I, Section 2 (Statewide Starlight Reserve; Advisory working committee; duty) to incl

in the temporary advisory committee a member from the Hawaiian Astronomical Society.

REASON:

Currently the makeup of the committee does not appear to have anyone actively involved with showing the night sky to the public. Amateur astronomers can provide invaluable insight into possible problems in "core" areas of the plan in addition to considerations for accommodating public viewing of the night sky. Members of the Hawaiian Astronomical Society provide three public star parties monthly which are free plus free support to our schools for night time observing plus free support to Bishop Museum and other organizations for special events such as Lacey Veach Day of Discovery at Punahou School.

Mahalo for allowing me to testify.

John P. Gallagher
91-893 Nohoihoewa Pl
Ewa Beach, HI 96706

gallaghej002@hawaii.rr.com
(808) 683-0118

fukunaga4 - Michelle

From: Casey Fukuda [casey@enchantedmauihomes.com]
Sent: Monday, February 23, 2009 7:03 AM
To: EDTTestimony
Subject: Senate Bill 536

Dear Chair Fukunaga, Vice Chair Baker, Committee members, thank you for the opportunity to testify on Senate Bill 536, which would designate the State of Hawaii as a Starlight Reserve. My name is Casey Fukuda and I am testifying in my position of Secretary / Treasurer of Haleakala Amateur Astronomers. I am testifying in strong support of this bill because it will preserve the dark skies of Hawaii for future generations. The study of the "final frontier" has had a place in history for as long as history has been written. It is already a known fact that Hawaii (especially Moana Kea and Haleakala) is one of the best locations in the world for observing the night sky. Senate Bill 536 will put Hawaii on the world map as a community that cares about the future of Astronomical Sciences. It has the potential for aiding the future of our economy by giving our visiting guests one more reason to vacation in our wonderful and beautiful State. The isolation of the Hawaiian Islands, in the middle of the Pacific Ocean, already makes our night skies darker (and therefore more desirable) than almost all other locations on Earth. Please keep the threat of additional light pollution on the islands to a minimum and invest in the future of Hawaii by passing the Senate Bill 536.

Casey Fukuda
Secretary / Treasurer
Haleakala Amateur Astronomers
Lahaina, HI

808-264-5362
caseyf@hawaii.rr.com

fukunaga4 - Michelle

From: Rebecca Sydney [bexter@maui.net]
Sent: Tuesday, February 24, 2009 10:52 AM
To: EDTTestimony
Subject: Starlight reserve

Aloha,
My name is Rebecca Sydney.
As President of the Maui Astronomy Club and professional resident astronomer of Maui for over 16 years, I have experienced an increasing **elimination** of dark skies.
This is very sad.
The ancient Hawaiians, if they could see this, would be abhorred by the lack of stars now visible from this island due to unthoughtful development and excessive lighting.
It is one thing to have lights everywhere, from the streets to our homes, but the fact that over 50% of the light is directed UP into the sky, is not only hurting star lovers, but is wasted ENERGY!
Creating a win-win situation can be done and must be done. We can no longer be ignorant of our wasteful ways and how we affect each other and the planet.
Please, please, please, make the wise choice of reserving starlight on Maui.
It is part of the culture, the beauty and the future.
If you'd like more testimony from the thousands of visitors I meet each year about "the washing out" of stars, I'd be more than happy to share this with you.
Thank you for your consideration.
Much aloha,
Rebecca Sydney
808-264-3685

fukunaga4 - Michelle

From: mailinglist@capitol.hawaii.gov
Sent: Friday, February 20, 2009 3:29 PM
To: EDTTestimony
Cc: refrey2001@yahoo.com
Subject: Testimony for SB536 on 2/25/2009 1:15:00 PM

Testimony for EDT 2/25/2009 1:15:00 PM SB536

Conference room: 016
Testifier position: support
Testifier will be present: No
Submitted by: Richard Frey
Organization: Individual
Address:
Phone:
E-mail: refrey2001@yahoo.com
Submitted on: 2/20/2009

Comments:
Please support this attempt to protect the night sky, with the added benefit of reducing energy consumption.

fukunaga4 - Michelle

From: Rob Ratkowski Photography [ratkwski@hawaii.rr.com]
Sent: Sunday, February 22, 2009 11:53 AM
To: EDTTestimony
Subject: Senate Bill 536

Aloha Chair Fukunaga, Vice Chair Baker, Committee members, thank you for the opportunity to testify on Senate Bill 536.

My name is Rob Ratkowski and I am testifying in strong support as president of Haleakala Amateur Astronomers. I am

in support of Senate Bill 536 which would place Hawaii as a premier home of astronomical sciences and preservation of a

great natural resource our night sky. We (Haleakala Amateur Astronomers) have had many guests to our observatory on

Mt. Haleakala and have heard over and over as to what great sky we have here in Hawaii, is my/our belief that the night

should be dark to see the stars that we have been given, to experience the light of the ages striking our eyes as they did our

ancestors. We cannot deny future generations the dark night, the ability to experience the depth of space and the mystery of

the universe, Hawaii is that place! PLEASE keep it dark for all to enjoy.

Rob Ratkowski
President Haleakala Amateur Astronomers
Pukalani,Maui

808-572-6418
ratkwski@hawaii.rr.com

fukunaga4 - Michelle

From: aabaer@aol.com
Sent: Tuesday, February 24, 2009 2:36 PM
To: EDTTestimony
Subject: Senate Bill 536, 2/25/9 Hearing at 1:30 pm

Dear Sirs and Madams,

I am testifying in support of Hawaii establishing a starlight reserve. A starlight reserve will greatly aid in the viewing capabilities of our space observatories.
Hawaii is uniquely situated to be a front runner in space discoveries because of its superb astronomy facilities on Maui and the Big Island. These facilities
are also helping to transform Hawaii into a science hub, and an economy moving away from tourism and toward science will be one that is more stable, as well
as provide employment.

Andrea Baer
Electronics Technician
Institute for Astronomy

LATE

fukunaga4 - Michelle

From: JD Armstrong [jd@maile.ifa.hawaii.edu]
Sent: Tuesday, February 24, 2009 5:16 PM
To: EDTTestimony
Subject: Testimony in favor of SB 536 for Feb. 25 2009

Chair Fukunaga, Vice Chair Baker, Committee members, thank you for the opportunity to testify on Senate Bill 536, the intent of which is to develop a plan for the preservation of dark skies in Hawai`i (Starlight reserve).

My name is James D. Armstrong I am an astronomer working with the University of Hawai`i Institute for Astronomy. However, I am testifying as a member of the community of Maui. I am testifying in strong support of this bill because of my recent experiences assisting Boy Sout Troop
#49 in their efforts to earn the Astronomy merit badge. One of the requirements the boys must fulfill is to observe and chart the motion of a planet over the course of 4 weeks. While we have been working on the badge, Venus was the most feasible choice. However, Venus is in the constellation of Pieces. The stars in this constellation are faint, and many of the boys were unable to see nearby stars to chart the motion of the planet. Their inability to see these stars has been due to light pollution. It deeply saddens me that while much of the light pollution is avoidable, and even wasteful, yet we continue to pollute our night skies. I feel as though the stars themselves have been stolen from the boys.

Sincerely,

Dr. James D. Armstrong

--
J. D. Armstrong
Maui Technology Education & Outreach Specialist
(808) 573 9519
(808) 573-9557 fax

"The best way to predict the future is to create it. " -- Peter Drucker