

Testimony Related to
Senate Bill 1493 SD1 HD2
RELATING TO LIGHT POLLUTION

Presented before the
House Committee on Finance
The Twenty-Sixth Legislature

March 31, 2011

by

Richard J. Wainscoat
Chair, Starlight Reserve Committee

Chair Oshiro, and members of the Committee. My name is Richard Wainscoat and I am submitting this testimony in my capacity as Chair of the Starlight Reserve Committee.

The Starlight Reserve Committee was established by the 2009 state legislature. It held its first meeting in July 2010, and has met on four occasions. The committee engaged in much fact finding during these meetings, and found a common factor that proper shielding of nighttime lighting is critically important. During its third meeting, the committee recommended introduction of legislation in the 2011 legislature that would result in shielding of new and replacement bright light sources.

Full shielding of lights has the following important advantages:

1. Light sources are not visible from above, meaning that the impact on endangered birds that are attracted to lights at night, such as the Newell's shearwater, is much reduced.
2. Fully shielded lights emit little light near the horizontal, so the impact on endangered turtles that become disoriented by lights on beaches is much reduced.
3. Fully shielded lights cause much less glare than partially shielded lights, improving safety, including on our roadways. It is particularly important to avoid glare for elderly drivers, who may have degraded vision due to cataracts or other reasons.
4. Fully shielded lights cause much less skyglow, dramatically reducing the impact of artificial lighting on Hawaii's astronomical observatories. Light emitted at small angles above the horizontal travels enormous distances through Earth's atmosphere. It does not respect county boundaries. Light from Honolulu affects both Haleakala and Mauna Kea Observatories. Use of fully shielded light fixtures is the most important technique for protecting astronomy in Hawaii.

5. Partially shielded lights emit some of their energy directly into space where it is wasted. Fully shielded lights direct their energy downwards only, where it is needed, and can therefore save energy. Fully shielded lights produce higher illuminance on the roadway per Watt of energy used, and higher small target visibility. Use of fully shielded lights allow lower Wattage lamps to be selected in some cases, producing substantial energy savings.
6. Fully shielded lights emit much less light at near horizontal angles, meaning that light trespass is substantially reduced. Light from adjacent properties or from streetlights entering our bedrooms is a form of light trespass. It can make it difficult to sleep at night. Excessive light at night has been linked to some forms of cancer, particularly breast cancer.
7. Use of fully shielded lights across Hawaii will result in a substantial decrease in sky glow, and restore the ability of Hawaii's residents and visitors to see the night sky. The Milky Way is no longer visible from urban Honolulu. Only about the brightest 20 stars are visible from urban Honolulu. About 2,000 stars can be seen from a dark location. The dark night sky on the island of Hawaii is becoming a tourist attraction — many of Hawaii's visitors come from urban locations that have severe light pollution, and are amazed by the view of the dark night sky from the island of Hawaii. Sadly, many of our children are growing up without ever seeing the magnificent night sky. This is unnecessary, and is a direct result of irresponsible and careless use of light at night.

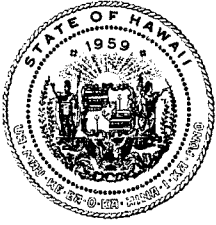
The 3,000 lumen exemption recommended for this legislation is a very generous exemption. It is the equivalent of a 150 Watt halogen lamp. The Starlight Reserve Committee will discuss this exemption in future meetings and may recommend a lower limit in the future. Because lighting is on the verge of a revolution coming from rapid improvements of light emitting diodes, the committee felt that it was important to make a first step at improving lighting this year, and chose the 3,000 lumen exemption in an effort to make the proposed legislation uncontroversial, while yielding meaningful results from good shielding of the brightest new light sources.

The 3,000 lumen exemption means that most residential lighting in Hawaii will be exempt — only very bright outdoor residential lights, such as high intensity discharge lamps, will be affected.

The exemption for recreational lighting specified in HD1 of this bill would substantially decrease energy usage by recreational lighting by reducing stray light from these facilities, and would also improve the light quality for the athletes at recreational facilities. It is consistent with the lighting being used on Kauai to minimize impact on endangered birds, and is the same exemption used in Pima County, Arizona, where Tucson and the University of Arizona are located. The University of Arizona's recreational lighting is in conformance with the exemption as stated in HD1. The exemption in HD2 is substantially weaker.

Testimony Related to Senate Bill 1493 SD1 HD2
House Committee on Finance
April 2011
Page 3

The change made in HD2 related to uniformity and pole spacing does not mention roadways, and based upon the Committee report, this appears to have been an accidental omission. This should be clarified. The present wording substantially weakens the bill.



NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
DIRECTOR

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355
Fax: (808) 586-2377

Statement of

RICHARD C. LIM
Director

Department of Business, Economic Development & Tourism

before the

HOUSE COMMITTEE ON FINANCE

Thursday, March 31, 2011

5:00 p.m.

State Capitol, Conference Room 308

in consideration of

SB 1493 SD1, HD2

RELATING TO LIGHT POLLUTION.

Chair Oshiro, Vice Chair Lee, and members of the Committee. The department supports the intent of SB 1493 SD1, HD2 to minimize glare and light pollution in Hawaii's night skies.

Our department convened a Starlight Reserve Committee in July of 2010 to study the impacts of nighttime light pollution statewide and provide recommendations for a Starlight Reserve Strategy that would address these issues. The chairman of this committee, Dr. Richard Wainscoat, is providing testimony on this measure.

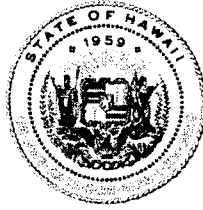
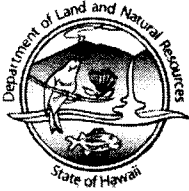
In addition, we would request that care be taken to ensure that this bill does not weaken existing county ordinances that mandate full shielding of outdoor lighting and maintains those sections that insert language to provide an exemption for outdoor athletic lighting, such as lighting at ballparks, under certain conditions, as well as for night-time film production activity.

We also note that the exemption for recreational lighting specified in HD2 of this measure is substantially weaker than the language set forth in HD1. The latter would both significantly decrease recreational lighting energy use by reducing stray light from recreational facilities, as well as improve the light quality for athletes using these facilities.

Furthermore, we note that the exemption inserted in HD2 related to “uniformity and pole spacing” does not mention roadways, which, based upon the EEP Committee report, appears to have been an unintentional omission. This should be clarified.

Thank you for the opportunity to testify on this bill.

NEIL ABERCROMBIE
GOVERNOR OF HAWAII



**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES**

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

**Testimony of
WILLIAM J. AILA, JR.
Chairperson**

**Before the House Committee on
FINANCE**

**Thursday, March 31, 2011
5:00 PM
State Capitol, Conference Room 308**

**In consideration of
SENATE BILL 1493, SENATE DRAFT 1, HOUSE DRAFT 2
RELATING TO LIGHT POLLUTION**

Senate Bill 1493, Senate Draft 1, House Draft 2 proposes to require the use of full-cutoff lights for all new outdoor lighting fixtures, including those for government agencies. While the Department of Land and Natural Resources (Department) supports the intent of this bill and its future implementation, the Department nonetheless defers to affected parties to further identify potential difficulties, if any, in its implementation and discuss appropriate modifications to reduce unintended and avoidable impacts on operations and safety.

The use of artificial lighting serves the essential purpose of providing safety and security, and facilitates many of the routine activities of society. However, artificial lighting also affects biological and cultural resources by impacting wildlife populations and interfering with night sky viewing. The excessive use of artificial lights also contributes to wasted consumption of energy resources and exacerbates global climate change.

Adoption of this measure is an important step to reduce the negative impacts of artificial lighting on cultural and natural resources. This legislation is one of the initial recommendations of the Starlight Reserve Advisory Committee, which was established by Act 161 of the 2009 Legislature to examine issues related to artificial lighting and recommend workable solutions to reduce the negative impacts of lighting on natural resources and related activities.

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

GUY H. KAULUKUKUI
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

NEIL ABERCROMBIE
GOVERNOR



BRUCE A. COPPA
Comptroller

RYAN OKAHARA
Deputy Comptroller

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING
AND GENERAL SERVICES
P.O. BOX 119
HONOLULU, HAWAII 96810-0119

TESTIMONY
OF
BRUCE A. COPPA, COMPTROLLER
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
TO THE
HOUSE COMMITTEE
ON
FINANCE
ON
March 31, 2011

S.B. 1493, S.D. 1, H.D. 2

RELATING TO STATE FUNDS

Chair Oshiro and members of the Committee, thank you for the opportunity to testify on S.B. 1493, S.D. 1, H.D. 2.

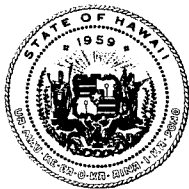
The Department of Accounting and General Services (DAGS) opposes S.B. 1493, S.D. 1, H.D. 2.

One reason for DAGS' opposition to this bill is because as a member of the Starlight Reserve Committee, this bill does not represent the consensus of all of its members. DAGS suggests that the Starlight Reserve Committee be allowed to complete its mission, which is to develop recommendations and present them to the Legislature for appropriate action.

We also believe that such a proposal should be routed through the existing State Building Code Council for review, comment, and possible implementation. Since this proposal would

have significant cost impacts to both private and public sectors that it should be evaluated in light of Hawaii's struggling economy.

Thank you for the opportunity to testify on this matter.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

March 30, 2011

TESTIMONY OF THE DEPARTMENT OF TRANSPORTATION

SENATE BILL NO. 1493, SD1, HD2

HOUSE COMMITTEE ON FINANCE

The Department of Transportation opposes the bill.

The Department, as it testified earlier before other House Committees, has already taken steps, over the past years, to provide the higher or more stringent lighting fixtures in counties within the State but those efforts were accomplished under a systematic and planned program of projects.

The Department's actions demonstrate our effort to address the intent of this bill. However, as proposed, we maintain our concerns and reservations with this bill.

The Department's effort to implement new lighting projects and change outs through maintenance or repairs need to be done in a coordinated and consistent program that is systematically planned and budgeted, especially due to the limited resources and funding currently facing the Department.

Implementation will require coordination with the scientific and environmental parties to properly address our lighting needs and to ensure that energy waste, light trespass, visual confusion, sky glow, etc. are considered so as not to adversely impact the need for dark night sky in areas such as astronomy or the protection of endangered species in Hawaii. These considerations must be balanced with the need to maintain and ensure transportation safety and security on our facilities and around our buildings, for which the DOT is responsible through its Airports, Highways and Harbors Divisions.

The bill's effective date also imposes an unreasonable timeframe to achieve compliance for our divisions to meet the requirements of the bill. Additional time is needed to effectively coordinate, plan, program and, most importantly, obtain the funding for implementation of the lighting. The bill also does not include an exception or exemption for DOT because our lighting requirements are further governed by federal standards or transportation safety and security guidelines.

Name

Letter Number

Date

Page

Our Department has been a participant in the Starlight Reserve Committee and continuation of this Committee to allow further dialog among all affected parties and agencies and provide inter-agency coordination to develop a night sky strategy is critical.

The Department of Transportation stands ready to continue its participatory work with the Starlight Reserve Committee and is committed to work to address dark night sky conditions as well as enable our modal divisions to provide for the lighting needs of the traveling public and for the safe and efficient transportation of goods and services.

**DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813

Phone: (808) 768-8480 • Fax: (808) 768-4567
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR

COLLINS D. LAM, P.E.
DIRECTOR

LORI M. K. KAHIKINA, P.E.
DEPUTY DIRECTOR



March 29, 2011

The Honorable Marcus R. Oshiro, Chair
and Members
Committee on Finance
State Capitol
Honolulu, Hawaii 96813

Dear Chair Oshiro and Members:

Subject: Senate Bill No. 1493 SD1, HD2, Relating to Light Pollution

The Department of Design and Construction (DDC) respectfully supports SB1493 SD1, HD2 in its current form.

Pertinent components of the bill that make its implementation practical and that should be retained in any future versions of the bill include the following:

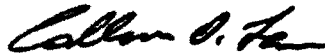
1. Section 2: Chapter 201, Hawaii Revised Statutes, Subsection __ (a), should indicate that every new and replacement outdoor light fixture shall be full-cutoff unless a full-cutoff fixture does not meet the Illuminating Engineering Society of North America (IES) illumination and uniformity design criteria required for the intended location and application. In such circumstances a non-complying fixture that meets or exceeds the IES illumination and uniformity design criteria may be used.
2. Section 2: Chapter 201, Hawaii Revised Statutes, Subsection __ (b) should indicate that the lighting requirements for athletic facilities, where a registered electrical engineer certifies that full-cutoff fixtures are impractical, shall include fixtures that can provide the required illumination as determined by a registered electrical engineer, while minimizing light directed above the horizontal plane and off-site light trespass.
3. Section 2: Chapter 201, Hawaii Revised Statutes, Subsection __ (c) provides five exemptions from the requirements of the bill that improve the practicality of implementing the bill's requirements.

The Honorable Marcus R. Oshiro, Chair
and Members
Committee on Finance
Page 2
March 29, 2011

DDC previously had concerns regarding earlier versions of SB1493 that made implementation of the bill impractical. Therefore, DDC requested revisions to the bill to improve the practicality of implementation and the clarity of terminology in the bill. These requested revisions have been adequately incorporated into the current version of the bill. Because the current version of the bill has incorporated our previously stated concerns, we respectfully support SB1493 SD1, HD2.

Thank you for the opportunity to testify.

Very truly yours,



Collins Lam, P.E.
Director

CDL:WB:hm

Enclosure

Bernard P. Carvalho, Jr.
Mayor



Leonard A. Rapozo, Jr.
Director

Gary K. Heu
Managing Director

Ian K. Costa
Deputy Director

DEPARTMENT OF PARKS & RECREATION

County of Kaua'i, State of Hawai'i

4444 Rice Street, Suite 105, Lihu'e, Hawai'i 96766
TEL (808) 241-4460 FAX (808) 241-5126

March 21, 2011

The Honorable Denny Coffman, Acting Chair
Committee on Energy & Environmental Protection
House of Representatives
State Capitol, Room 419
Honolulu, Hawai'i 96813

Dear Acting Chair Coffman:

SUBJECT: SB 1493, SD 1, HD 2 – Relating to Light Pollution

I am Leonard A. Rapozo, Jr; Director of the County of Kaua'i's Department of Parks and Recreation. In regards to SB 1493, the financial burden on the County of Kaua'i for this unfunded mandate is not reasonable. To require all outdoor lighting to be retrofit on all County facilities would cause a financial burden on the County of Kaua'i's budget that may affect standard delivery of services to the community.

As part of our commitment to reduce the outdoor lighting effects on the native species, the County of Kaua'i Department of Parks and Recreation have begun to retro-fit the lighting fixtures on all the island's outdoor recreational facilities such as football stadiums, tennis courts, softball fields and some of the buildings that were due maintenance upgrades. In addition, during the fledgling season September 15 thru December 15, the County of Kaua'i turns off island wide all outdoor lighting on facilities with the exception to the football stadiums where some football games continued to be played.

The County of Kaua'i continues to dialogue with the Department of Land and Natural Resources and Federal Fish and Wildlife to address this issue and to comply with any Requirements while being as fiscally efficient as possible. SB 1493 will place an unreasonable financial burden on the County of Kaua'i.

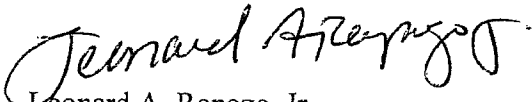
An Equal Opportunity Employer

Senate Committee
Page 2
March 21, 2011

Furthermore, as a member of the Starlight Reserve Committee, this bill does not represent the consensus of all of its members. It appears that this measure is the product of a few committee members with special interest. We request that this measure be sent back to the Starlight Reserve Committee for further discussion.

Please call me at (808) 241-4455 should you have any questions regarding this matter.

Respectfully submitted,



Leonard A. Rapozo, Jr.
Director

LAR/st

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
Phone: (808) 768-8480 • Fax: (808) 768-4667
Web site: www.honolulu.gov

PETER B. CARLISLE
MAYOR



COLLINS D. LAM, P.E.
DIRECTOR

LORI M. K. KAHIKINA, P.E.
DEPUTY DIRECTOR

March 31, 2011

The Honorable Marcus R. Oshiro, Chair
and Members
Committee on Finance
State Capitol
Honolulu, Hawaii 96813

Dear Chair Oshiro and Members:

Subject: Senate Bill No. 1493 SD1, HD2, Relating to Light Pollution, Supplemental Testimony

The Department of Design and Construction (DDC) respectfully supports the intent of SB1493 SD1, HD2, but wishes to supplement earlier testimony by requesting one important revision to the current version of the bill, as follows:

Section 2: Chapter 201, Hawaii Revised Statutes, Subsection __ (a), should indicate that every new and replacement outdoor light fixture shall be full-cutoff unless a full-cutoff fixture does not meet the Illuminating Engineering Society of North America (IES) illumination and uniformity design criteria or other government-adopted lighting criteria required for the intended location and application. In such circumstances a non-complying fixture that meets or exceeds the IES illumination and uniformity design criteria or other government-adopted lighting criteria may be used.

This revision would accommodate the State Department of Transportation and other counties that may use other lighting standards, such as those provided by the American Association of State Highway and Transportation Officials (AASHTO), or wish to adopt such standards in the future. With this revision DDC would fully support SB1493 SD1, HD2.

Thank you for the opportunity to provide supplemental testimony.

Very truly yours,

for 
Collins Lam, P.E.
Director

CDL:WB:hm

Enclosure



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

Written Testimony Presented Before the
House Committee on Finance
Thursday, March 31, 2011 at 5:00 p.m.

by
Virginia S. Hinshaw, Chancellor
and
Robert McLaren, Astronomer
Institute for Astronomy
University of Hawai'i at Mānoa

SB 1493 SD1 HD2 RELATING TO LIGHT POLLUTION

Chair Oshiro and members of the Committee. My name is Robert McLaren and I am here today to submit this testimony on behalf of the University of Hawai'i. The University of Hawai'i strongly supports this bill that will require full shielding of new and replacement bright lights in Hawai'i.

Mauna Kea on the island of Hawai'i, and Haleakala on the island of Maui, are two of the best astronomy sites in the world. Dark night skies are essential for these observatories to continue to operate. However, increasing urban lighting is threatening the dark night skies over these observatories. Light pollution extends well beyond county boundaries; lights from O'ahu have a major and growing impact on Haleakala, and also affect Mauna Kea. Statewide legislation is needed to protect the observatories.

Astronomy in Hawai'i has a major economic impact. The present economic impact of astronomy is estimated to be \$150 to \$200 million per year.

Full shielding of lights is one of the most important techniques for protecting astronomical observatories from light pollution. Light emitted from poorly shielded fixtures at small angles above the horizontal travels enormous distances through the atmosphere, and is a major contributor to light pollution — it increases sky glow at remote locations, making it difficult or impossible to see faint objects. Fully shielded light fixtures emit no light above the horizontal, and therefore have much less impact on remote locations.

Full shielding also reduces glare, which is a very important safety factor, particularly for older drivers, and greatly reduces the impact of nighttime lighting on species that are affected by light at night, including endangered birds and turtles. Fully shielded lights also deliver more light to the area being lit, producing higher average illuminance per Watt of energy used, and allowing the possible selection of lower Wattage fixtures for roadways, thereby reducing energy usage.

We believe that use of fully shielded lighting will result in only very minimal additional costs for the state for roadway lighting. The State Department of Transportation has recently installed fully shielded lighting in the new highway lighting on H-1 near the Pearl City exit, on H-1 at the new exit in Kapolei, and on Kalanianaʻole Highway near Olomana Golf Course. Fully shielded lights are also being used at other locations on highways and city roads, including numerous locations where it is intermixed with partially shielded lighting. The City and County of Honolulu now uses fully shielded lighting in all new street lighting.

Fully shielded lighting was adopted many years ago for lighting of highways in California, Arizona and Texas.

We have evaluated roadway lighting uniformity from fully shielded lights using the AGI32 roadway lighting software. For any new roadway lighting, we find that satisfactory uniformity of roadway lighting can be achieved using pole spacing that is typical of current installations, and slightly higher mounting height for the light. This means that use of fully shielded lights does not require additional light poles, and therefore the only additional cost would be for slightly taller light poles (which would increase cost by a fraction of a percent of the total cost of a new roadway). We also find that the fully shielded lights result in higher illuminance levels on the roadway for the same Wattage lamps. Fully shielded light fixtures are more efficient because the prismatic lenses in partially shielded fixtures absorb substantial amounts of light. The roadway lighting software shows that use of fully shielded lights in some cases can allow lower Wattage fixtures to be selected (for example 200 Watts instead of 250 Watts), reducing energy usage and therefore reducing operating costs.

House Draft 2 is considerably weaker than House Draft 1. We prefer the wording for the exemption for recreational lighting in House Draft 1. The recreational exemption in HD1 is consistent with the lighting now being used on Kaua'i to minimize impact on birds, and the lighting being used in Pima County, Arizona, including Tucson and the University of Arizona. Tucson has several major observatories in its vicinity. The exemption related to uniformity and pole spacing that was inserted in HD2 is vague, and does not directly refer to roadways. Based upon reading the EEP committee report, it appears that the omission of roadway lighting in this exemption was unintentional. We recommend modifying the wording in the following manner:

Replacement lighting for roadways and highways shall be fully shielded unless a registered electrical engineer certifies that fully shielded lighting with the existing pole spacing cannot achieve the lighting uniformity levels recommended by the Illuminating Engineering Society of North America. Where fully shielded fixtures are not used, acceptable luminaires shall be partially shielded lights that emit no more than 5% of their light above the horizontal.

**SB 1493 HD2
RELATING TO LIGHT POLLUTION**

**PAUL T. OSHIRO
MANAGER – GOVERNMENT RELATIONS
ALEXANDER & BALDWIN, INC.**

MARCH 31, 2011

Chair Marcus Oshiro and Members of the House Committee on Finance:

I am Paul Oshiro, testifying on behalf of Alexander & Baldwin, Inc. (A&B) and its agricultural company Hawaiian Commercial & Sugar Company on SB 1493 HD2, "A BILL FOR AN ACT RELATING TO LIGHT POLLUTION."

Hawaiian Commercial & Sugar Company (HC&S) has been in operation for over 125 years and is Hawaii's last remaining sugar plantation. HC&S has approximately 34,000 acres in active cultivation and employs about 800 residents. While Hawaii's many other sugar companies have shut down over the years, HC&S has been fortunate, through significant investments in our agricultural infrastructure and operations and the implementation of our diversified bio-production program, to have sustained our operations and continue as a major employer in the State of Hawaii. Despite a current up tick in sugar prices, history has proven that commodity sugar prices will remain relatively flat, as they have over the last few decades, despite increasing production costs. Thus, HC&S has for a number of years been pursuing, and investing in, a transition from a primary producer of commodity sugar to the production of specialty sugar and bio-based products. In addition to being the main supplier of Sugar In The Raw, the little brown packets of sugar seen at restaurants and

coffee shops across the nation, HC&S is also expanding production and sales of our specialty Maui Brand Sugar.

HC&S also generates biomass produced electricity for its sugar milling, irrigation pumping, and other internal operations and provides electricity to Maui Electric Company (MECO) for general community use. The source of fuel for this biomass electricity is bagasse, the residual fiber of the sugar cane plant. Not only does HC&S provide approximately 6% of MECO's total electricity, HC&S is a firm power source to MECO (i.e. committed power delivery, not on an 'as available' basis), and has played a significant role in the restoration of MECO's electrical service during power outages.

In addition, HC&S is currently participating in significant new Hawaii-based research initiatives on biofuels, closely working with the University of Hawaii and various Federal agencies on energy crop development, energy conversion technologies, and long term resource requirements for biomass production. HC&S also provides water (through the County) to approximately 35,000 Upcountry Maui Residents and to the Kula Agricultural Park.

Once HC&S commences harvesting and milling operations for the processing of its sugar cane, these activities are conducted around the clock, including night field harvesting operations. Night field harvesting is an integral part of HC&S's overall operational plan as it greatly assists in the timely harvesting and processing of our sugar cane crop and makes optimum use of our 24 hour sugar milling operations. Temporary outdoor lighting is used at the night field harvesting locations and at road crossings for worker and community safety.

We respectfully request your consideration to incorporate into Section 2, Subsection (c) of this bill an exemption for temporary outdoor lighting used for night-time agricultural operations. We have attached the following amended language for your consideration:

SECTION 2. Chapter 201, Hawaii Revised Statutes, is amended by adding a new section to be appropriately designated and to read as follows:

"§201- Starlight reserve strategy. (a) Beginning July 1, 2013, every new and replacement outdoor light fixture shall be full-cutoff; provided that if a full-cutoff fixture does not meet the Illuminating Engineering Society of North America illumination and uniformity design criteria required for the intended location and application, a non-complying fixture that meets or exceeds the Illuminating Engineering Society of North America illumination and uniformity design criteria may be used; provided further that artificial light on shoreline and ocean waters shall be subject to section 205A-71. A light fixture is considered full-cutoff when the light fixture is:

- (1) Constructed so that no light is emitted above the horizontal plane; and
- (2) Installed in a manner that does not allow light to be directed above the horizontal plane.

(b) Lighting for outdoor athletic fields, courts, or tracks shall be full-cutoff unless a registered electrical engineer certifies that full-cutoff lighting is impractical. Where full-cutoff fixtures are not used, acceptable luminaire shall include those that provide the required illumination as determined by a registered electrical engineer, while minimizing light directed above the horizontal plane and off-site light trespass.

(c) The following lighting shall be exempt from this section:

- (1) Light sources of three thousand lumens or less;
- (2) Emergency lighting used by police, firefighters, correctional personnel, or medical personnel for the duration of the emergency;
- (3) Temporary outdoor lighting used for construction or major renovation of buildings or for highway improvements or construction;
- (4) Temporary outdoor lighting used for night-time film production;

(5) Temporary outdoor lighting used for night-time agricultural operations; and

[(5)] (6) Navigational lights that are required for waterways and aircraft.

(d) This section shall be considered to be supplemental to any county lighting ordinance and shall not be construed to supersede or modify county lighting ordinances or rules; provided that the ordinance is not less restrictive than this section."

Thank you for the opportunity to testify.

BIA-HAWAII
BUILDING INDUSTRY ASSOCIATION

March 31, 2011

Representative Marcus Oshiro, Chair
Committee on Finance
State Capitol, Room 308
Honolulu, HI 96813

Subject: Senate Bill No. 1493, HD2 Relating to Light Pollution

I am Karen Nakamura, Chief Executive Officer of the Building Industry Association of Hawaii (BIA-Hawaii). Chartered in 1955, the Building Industry Association of Hawaii is a professional trade organization affiliated with the National Association of Home Builders, representing the building industry and its associates. BIA-Hawaii takes a leadership role in unifying and promoting the interests of the industry to enhance the quality of life for the people of Hawaii.

BIA-HAWAII provides the following comments.

Act 161, Session Laws of Hawaii 2009, formed a temporary advisory committee to assist the department to develop a statewide starlight reserve strategy to preserve the quality of the night sky and its associated cultural, scientific, astronomical, natural, and landscape-related values. The temporary advisory committee recommends the enactment of certain measures in the 2011 regular session to conserve energy and promote responsible use of light. The purpose of this bill is to implement the recommended legislation of the temporary advisory committee pursuant to Act 161.

The intent of this legislation is not entirely clear. While it mentions light pollutions in relation to observatories on Mauna Kea and Haleakala, it also mentions light pollution's impact on endangered species. We believe that both the County of Hawaii and County of Maui have laws in place to regulate lighting that may impact their respective observatories, and the U.S. Fish and Wildlife Department have regulations in place to protect endangered species from becoming disoriented by lights at night. It is unclear how this new law will supplement the existing laws and regulations and, more importantly, what is hoped to be gained by mandating compliance with this new law.

The current version of the bill (HD2) makes the following amendments:

- (1) Changing the term "fully shielded" to "full-cutoff" for consistency with the terminology used in the Illuminating Engineering Society of North America illumination standards, which are used by the City and County of Honolulu;
- (2) Adding an exemption from the required use of full-cutoff lighting if this lighting does not provide equivalent or better illumination and uniformity, as recommended by the Illuminating Engineering Society of North America, for the intended location and application; and

- 3) Changing the specified requirements for acceptable luminaries for athletic facilities to those determined acceptable by a registered electrical engineer, subject to certain minimum standards;

While we believe protection of public health and safety should be a priority for governments, this requirement for full cutoff lighting may be too costly. We believe that more information and input is needed from a wider group of individuals and organizations is needed before adoption of this bill.

Thank you for the opportunity to share our views with you.

Karen I. Nakamura

Chief Executive Officer
BIA-Hawaii



Hawaii Farm Bureau
F E D E R A T I O N

2343 Rose Street, Honolulu, HI 96819
PH: (808)848-2074; Fax: (808) 848-1921

HOUSE COMMITTEE ON FINANCE

SB 1493 SD1 HD2

RELATING TO LIGHT POLLUTION

MARCH 31, 2011

5:00 pm

Room 308

Chair Oshiro and Members of the Committee,

The Hawaii Farm Bureau Federation (HFBF), is the largest non-profit general agriculture organization in Hawaii, representing approximately 1,600 farm and ranch family members statewide. We respectfully offer the following comments and proposed amendments to SB 1493 HD2.

During some months of the year, some of our farm members are required to conduct night-time field harvesting. For employee and public safety reasons, temporary outdoor lighting is used at those specific locations and at road crossings.

We would greatly appreciate the addition of the following highlighted language to address this concern for safety:

On page 5, line 1, add (and re-number):

(5) Temporary outdoor lighting used for night-time agricultural operations; and
[(5)] (6) Navigational lights that are required for waterways and aircraft.

Thank you for your continued support of agriculture in Hawaii.



W. M. KECK OBSERVATORY

On the summit of Mauna Kea, Island of Hawai'i

TO: House Finance Committee

FROM: Taft Armandroff, Director, W. M. Keck Observatory

DATE: March 29, 2011

Aloha Chair Marcus Oshiro, Vice-Chair Marilyn Lee and Committee Members,

Thank you for the opportunity to provide testimony for SB1493, relating to light pollution. This testimony is in support of this bill with preference to the wording in House Draft 1 that requires fully-shielded lights on new and replacement outdoor light fixtures.

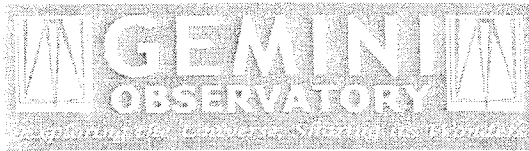
The W. M. Keck Observatory operates the world's two largest fully steerable optical / infrared telescopes on the summit of Mauna Kea. Mauna Kea has been clearly demonstrated to be an excellent environment to study our Cosmos using optical astronomy. Many have argued compellingly that Mauna Kea is a unique site on Earth, allowing the clearest views of the Universe with the least interference by our atmosphere and by man-made interference. Astronomers are using Keck Observatory nightly to deepen our understanding of the Cosmos. Topics studied include the origins of stars and planets.

Astronomy is a clean, sustainable, high-tech industry that Hawaii is uniquely suited for. All of the observatories in Hawaii are actively engaged in educational outreach to our schools and communities, promoting STEM (science, technology, engineering and mathematics) learning. The local public has been captivated by the discoveries from Mauna Kea, including the announcement this fall on the front pages of all Hawaii papers announcing the discovery of an earth-like planet beyond our own Solar System that is sufficiently temperate to permit liquid water on its surface.

Light pollution is the prime factor that we can control that impacts astronomy. The shielding measures recommended in HD1 are highly prudent and are of direct benefit to astronomy. Please preserve this unique resource of our dark Hawaii night sky for astronomical discovery.

Please vote "yes" on this important measure benefitting astronomy and clean industry in Hawaii.

Thank you again for the opportunity to provide testimony.



Office of the Director
 Northern Operations Center – 670 N. A’ohoku Place, Hilo, Hawai’i
 Phone: (808) 974-2514 Fax: (808) 974-2599 Email: dsimons@gemini.edu

To: House Finance Committee Members
 From: Doug Simons, Gemini Observatory Director
 Date: March 30, 2011
 Subj: SB1493 Testimony

Mauna Kea is the premier site for ground-based astronomy worldwide thanks to a number of unique conditions that exist on the Big Island. One of them is the dark Hawaiian nighttime sky which helps enable truly remarkable discoveries from this portal on the universe. Currently, forefront research in astronomy is being conducted by the largest telescopes in the world and a significant fraction of them now operate on Mauna Kea, including Keck, Subaru, and Gemini. Combined with the other Mauna Kea observatories, these facilities represent over a billion dollars in investment and are a key element in the Big Island economy. Beyond supporting research, a core function of Gemini Observatory (which is funded by an international partnership including the US National Science Foundation) is to provide education and outreach opportunities for our local community, which we do through a variety of mechanisms (see below).

Over the past several decades, the viability of conducting forefront astronomical research from Mauna Kea has regretfully been eroded by the steady increase in outdoor lighting in Hawai’i. Though the Big Island has a lighting ordinance in place, additional measures will be needed in the future to protect Mauna Kea as a premier site for conducting astronomical research. For this reason I support Senate Bill 1493 (and prefer version HD1) as it represents a reasonable approach to minimizing the stray outdoor lighting which interferes with observations conducted by Gemini and other Mauna Kea observatories. Simply preventing lights from shining up, into the sky, where they serve no purpose for the public and are not wanted by the astronomical community is the essence of this legislation. It does not require advanced technologies or massive investments in infrastructure – this legislation simply requires shields to block light where it is not needed. This represents a win-win approach to a growing problem as these shields will direct more light downward, improving public safety, and less light upward, preserving the conditions that make Mauna Kea so unique. If passed, this legislation would not take effect for two years, giving enough time to adapt to its requirements while allowing unshielded lights for special applications like road construction, navigation systems, and emergencies.

As a long time resident of Hawai’i I am interested in striking a reasonable balance between the needs of the community and preserving Mauna Kea as a unique resource for so many things, including astronomy. I support SB1493 and hope you will as well.

Aloha,

Dr. Douglas A. Simons
 Director, Gemini Observatory



Above: Big Island teachers prepare to assemble telescopes and receive training in their use through Gemini’s outreach program.

Below: Much of the *Journey Through the Universe* team is seen, preparing to provide unique astronomy education for nearly 7000 K-12 students each year in east Hawaii.



TO: House Finance Committee, Hawaii State Legislature

FROM: Christian Veillet, Executive Director, Canada-France-Hawaii Telescope Corporation

DATE: March 30, 2011

It is an honor to have the opportunity to write this testimony in support of SB 1493, which relates to light pollution and would require every new and replacement outdoor light fixture to be fully shielded.

The Canada-France-Hawaii Telescope Corporation (CFHT) is an international astronomical observatory on Maunakea owned jointly by the State of Hawaii and the nations of France and Canada. It has operated from its Maunakea site for more than three decades and has remained for all these years at the forefront of astronomical thanks in part to the amazing quality of the sky above the mountain, which makes Maunakea one of the best astronomical sites in the world, and likely the best in the Northern hemisphere.

If many factors contribute to the quality of an astronomical site, like its elevation, the overall weather patterns, the stability of the air above, there is one which is key to our exploration of the cosmos: the darkness of its night sky.

It is therefore with both delight and relief that CFHT sees SB 1943 coming in front of your Committee today: Delight because the State of Hawaii has a chance to make a clear stand on how important is dark sky, not just for observatories, but beyond for the people of Hawaii; Relief because we have faced a period of much development over the past decades which brought the level of light pollution in various areas to a point where only a few stars can be seen at night. To see this trend reversed by this Bill is definitely a relief!

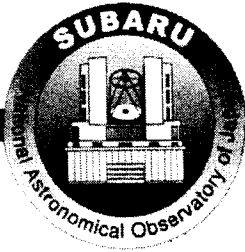
Indeed, beyond the pure professional interest of an observatory for dark skies, there is a more fundamental need to protect the sighting of planets, the stars, and our galaxy, the Milky Way for the people of Hawaii: this sighting is our only direct way to realize the existence of the universe beyond our Earth.

I sincerely hope that you will be in favor of this Bill. Please note that the HD2 version can be seen as weaker than HD1 as a tool to protect, and in some places to rediscover, the Hawaiian night sky. Therefore, it would be good to give preference to HD1.

Thanks for the opportunity to testify.

Aloha,

Christian Veillet



Subaru Telescope

National Astronomical Observatory of Japan

650 North A'ohoku Place, Hilo, Hawaii 96720, U.S.A.

March 30, 2011

Dear Mr. Chair Marcus Oshiro, Ms. Vice Chair Marilyn Lee and Committee on Finance members of the Hawaii State Legislature,

As the director of the Subaru Telescope on Mauna Kea, I would appreciate the opportunity for letting us to submit this testimony in support of SB1493 SD1 HD2 that would require all new and replacement outdoor light fixtures be full-cutoff beginning July 1, 2013 with certain exemptions.

The Subaru Telescope is fortunate to be allowed the use of the world best site for astronomy, the summit of Mauna Kea, for the best telescope Japan could offer to astronomers worldwide. Since the first light in 1999 Subaru Telescope has been contributing to many discoveries ranging those of the most distant and therefore earliest galaxies humankind observed to those of planets other than of our own Solar System. We are continuing our efforts on Mauna Kea to keep the telescope one of the most sensitive in the world in anticipation for more discoveries to come under the best conditions for astronomical observations. One of the most important environmental considerations is darkness of the sky during night.

The Subaru Telescope also recognizes that one of the challenges today to humankind is global energy consumption. The light illuminating the sky upward is not only the pollution of the sky darkness and detrimental to the most sensitive astronomical instrumentations on Mauna Kea, but it is also substantially wasted energy. Being able to eliminate the waste would only lead to the reduction of energy consumption with no harm to anything else.

For these reasons, I would like to submit this testimony in support of the SB1493 SD1 HD2 wholeheartedly, representing the Subaru Telescope and also the astronomical community that benefits from the Subaru Telescope on Mauna Kea.

Thank you very much.

Yours truly,

Dr. Hideki Takami
Director

SB1493 SD1 HD2 Testimony in Support

I represent not only the hobbyists but also business and educational interests who require a starry sky uncompromised by needless overspill of the urban environment.

This state's outdoor evening comfort has for generations provided an iconic incentive for our visitor industry. No one speaks ill of a sky filled with stars. Through the decades we have sold the allure of beaches and palm trees, waterfalls, flowers and stars to folks from places where these things can't be seen. Darkness itself has become an endangered natural resource throughout the developed world. Yes, darkness IS a resource, and resources have value, like clean water and quiet neighborhoods.

Astro-tourism is a crippled industry here in Hawaii. The amateur astronomy communities in Japan and Canada and the mainland US have stopped thinking of our state as a stellar destination. They will come to gawk at the domes on Mauna Kea, but that activity is a very limited daytime devotion. Even the Onizuka Center lacks light pollution controls, so clueless is our concern for darkness.

It would be great if legislators could regard light pollution treatment in the same way as sewage treatment. Cities create both light pollution and sewage. Each needs to be contained and directed away from things it can harm, like visual acuity for seniors, and the celestial jewelry that is our natural ceiling for half of every day. Would we fill Hanauma Bay with sewage because it might boost the building industry? Quality of life matters, in dollars and cents, and balmy, starry nights sell plane tickets as well as telescopic tours.

There are many ways to minimize the cost of conversion to sensible lighting solutions for the urban environment. Experts in the lighting industry are eager to show what they know. We need legislation to counter the inertia of business-as-usual. Cutting coconut trees on Hawaii's beaches is discouraged, for obvious reasons. It should be obvious that preserving the stars over Hawaii helps to keep our natural beauty, for the sake of all.

Sincerely,

K. Barry Peckham, for LITEBOX Telescopes, the Hawaiian Astronomical Society and "The Sky Tonight" program at the Bishop Museum Planetarium.

TO: Committee on Finance

FROM: Natalie Iwasa
Honolulu, HI 96825
808-395-3233

HEARING: 5 p.m. Thursday, March 31, 2011

SUBJECT: SB1493, SD1, HD2 Relating to Light Pollution - **SUPPORT with Amendment**

Aloha Chair Oshiro, Vice Chair Lee and Committee Members,

Thank you for allowing me to provide testimony in support of SB1493, SD1, HD2, which would require fully-shielded (full cut-off) lights on new and replacement outdoor light fixtures with a few exceptions. You may recall the news reports regarding the Lunalilo Home Road (LHR) street lighting project. The county had planned to install three times the amount of light using 40-year-old lighting technology. After residents questioned the City and County of Honolulu regarding their plans, they agreed to reduce lighting and install fully-shielded lights. The fully-shielded lights reduce glare and are a big improvement over the old globe type of fixture.

In addition, just last night at the Hawaii Kai Neighborhood Board meeting, Gerald Hamada from the Department of Design & Construction stated they are in the process of reviewing the standards they are using for determining street lighting requirements and are specifically looking at the standards promulgated by the American Association of State Highway and Transportation Officials' (AASHTO). The city may therefore change the criteria they use.

With this new information in mind, please amend the bill as follows:

- Page 3, line 13, insert "or other standards followed" after "design criteria" and before "required for".

Please vote "yes" on this measure after making this amendment.

FINTestimony

From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 28, 2011 3:26 PM
To: FINTestimony
Cc: babyjean@hotmail.com
Subject: Testimony for SB1493 on 3/31/2011 5:00:00 PM

Testimony for FIN 3/31/2011 5:00:00 PM SB1493

Conference room: 308
Testifier position: support
Testifier will be present: No
Submitted by: Ronnie Perry
Organization: Individual
Address:
Phone:
E-mail: babyjean@hotmail.com
Submitted on: 3/28/2011

Comments:

It is very important to control light pollution on Oahu. it takes away from the beauty of the sky and is a menace to night birds. I strongly support this bill.