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GOVERNOR



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

IN REPLY REFER TO:

March 12, 2012

**S.B. 2402, S.D. 1**  
**RELATING TO LIGHT POLLUTION**

**HOUSE COMMITTEE ON TRANSPORTATION**

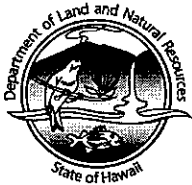
The Department of Transportation supports this Senate Bill 2402, SD1 with comments.

The DOT has testified on similar bills last session expressing concerns that implementation of new and replacement outdoor light fixtures be fully shielded 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 to maintain and ensure transportation safety and security are necessary.

Thank you for the opportunity to provide testimony.



NEIL ABERCROMBIE  
GOVERNOR OF HAWAII



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

POST OFFICE BOX 621  
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**Testimony of  
WILLIAM J. AILA, JR.  
Chairperson**

**Before the House Committee on  
TRANSPORTATION**

**Monday, March 12, 2012  
9:00 AM  
State Capitol, Conference Room 309**

**In consideration of  
SENATE BILL 2402, SENATE DRAFT 1  
RELATING TO LIGHT POLLUTION**

Senate Bill 2402, Senate Draft 1 proposes to require that certain light sources be modified or replaced with fixtures that will limit and reduce sources of light pollution. The measure provides exemptions for public safety, lights that are temporary in nature, fixtures that emit less than 3,000 lumens, and any lights installed prior to July 1, 2013 and the Senate Draft 1 added a new exemption for historic properties. The measure would apply only to state agencies. The Department of Land and Natural Resources (Department) supports Senate Bill 2402, Senate Draft 1 as a welcomed first step in reducing sources of light pollution.

Light pollution in Hawaii impacts wildlife and increases consumption of fossil fuels that contribute to climate change. Lighting can disrupt breeding the breeding biology of endangered sea turtles and cause harm or death to seabirds, which can become disoriented and grounded by the lights. Once on the ground, the birds quickly fall prey to cats and other predators. On Kauai, for example, seabird fallout due to lights is a major threat contributing to the decline of the endangered Newell's Shearwater, a Hawaiian seabird whose population is now on a trajectory to extinction, having declined by approximately 75% in recent years.

Although light sources that impact wildlife and endangered species are not limited to those maintained by state agencies, this is a first step to reduce light pollution and may set the standard that other entities can follow as they move to deal with the issue and implement solutions.

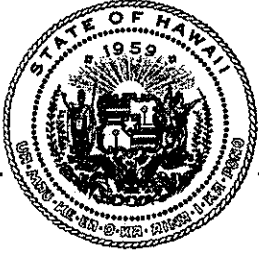
The Department supports the measure, which will contribute to a reduction of light pollution in Hawaii, reduce emissions of greenhouse gasses, and enhance the survival of endangered sea turtles and seabirds.

**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



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

**NEIL ABERCROMBIE**  
GOVERNOR

**RICHARD C. LIM**  
DIRECTOR

**MARY ALICE EVANS**  
DEPUTY DIRECTOR

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Statement of  
**RICHARD C. LIM**  
Director

Department of Business, Economic Development & Tourism  
before the

**HOUSE COMMITTEE ON TRANSPORTATION**

Monday, March 12, 2012

9:00 a.m.

State Capitol, Conference Room 309

in consideration of  
**SB 2402 SD1**

**RELATING TO LIGHT POLLUTION.**

Chair Souki, Vice Chair Ichiyama, and members of the Committee. The department supports the intent of SB 2402 SD1 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 today on this measure.

Thank you for the opportunity to testify on this bill.

**NEIL ABERCROMBIE**  
GOVERNOR



**DEAN H. SEKI**  
ACTING COMPTROLLER  
**JAN S. GOUVEIA**  
DEPUTY COMPTROLLER

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

WRITTEN TESTIMONY  
OF  
DEAN H. SEKI, ACTING COMPTROLLER  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
TO THE  
HOUSE COMMITTEE  
ON  
TRANSPORTATION  
ON  
March 12, 2012  
S.B. 2402, S.D. 1

**RELATING TO LIGHT POLLUTION**

Chair Souki and members of the Committee, thank you for the opportunity to submit written testimony on S.B. 2402, S.D. 1.

The Department of Accounting and General Services supports S.B. 2402, S.D. 1, and defers to the Department of Land and Natural Resources Historic Preservation Division regarding the exemption for the refurbishment, repair, or replacement-in-kind of lighting fixtures that are character-defining features of a historic property, as reflected in the current bill draft.

Thank you for the opportunity to submit written testimony on this matter.



# UNIVERSITY OF HAWAII SYSTEM

## Legislative Testimony

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Written Testimony Presented Before the  
House Committee on Transportation  
Monday, March 12, 2012 at 9:00 a.m.

by

Virginia S. Hinshaw, Chancellor

and

Richard J. Wainscoat

Astronomer, University of Hawai'i at Mānoa

Chair, Light Pollution Working Group, International Astronomical Union

### SB 2402 SD1 Relating to Light Pollution

Chair Souki, Vice Chair Ichiyama and members of the Committee. My name is Richard Wainscoat 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 is an important first step in reducing light pollution 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 Oahu 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.

The primary focus of this bill is proper shielding of outdoor lighting. 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. Poorly designed and improperly shielded lights continue to be installed by government agencies, and a quick inventory of nighttime lighting shows that some of the most poorly shielded lighting is county and state lighting.

We note that SB 2402 SD1 affects only lighting by the state and state agencies. Careful use of all nighttime lighting in the state of Hawai'i — not just state lighting — including proper shielding, is required to protect the observatories.

We have provided suggested changes to the wording of the bill for clarification purposes. The suggested changes do not affect the intent of the bill.

**Testimony Related to**  
**Senate Bill 2402 SD1**  
**RELATING TO LIGHT POLLUTION**  
**Presented before the**  
**House Committee on Transportation**  
**The Twenty-Sixth Legislature**  
**March 12, 2012**  
**by**  
**Richard J. Wainscoat**  
**Chair, Starlight Reserve Committee**

Chair Souki 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 during 2011 met on a regular basis. One of the tasks of the Committee is to develop proposed legislation for statewide intelligent lighting laws that reduce light pollution. This bill contains language recommended by the committee related to proper shielding of outdoor lights in Hawaii.

The bill contains numerous exemptions aimed at reducing or eliminating any possible additional cost by using properly shielded lights. These include:

1. Existing legally installed lights are exempt — only new and replacement lights are affected;
2. Full shielding is required only for bright light sources (brighter than 3,000 lumens) — this means that most residential lighting is exempt; and
3. Numerous other exemptions such as emergency lighting, temporary lighting, and navigational lighting.

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. Substantial energy savings of up to 40% are possible by use of carefully shielded lights.
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 skyglow, 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 slowly 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 Starlight Reserve Committee has not yet discussed the exemption for historic lighting inserted by the Economic Development and Technology and the Energy and Environment Committees in SD1. I note that historical lighting typically predates the invention of the high intensity discharge lamp, and is normally designed for use with light sources significantly dimmer than 3,000 lumens (the limit already included in this bill for the requirement of full shielding).