UNIVERSITY OF HAWAIʻI SYSTEM
Legislative Testimony

Testimony Presented Before the
House Committee on Finance
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by
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and
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SB 536 SD1 HD1 RELATING TO STARLIGHT RESERVE

Chair Oshiro, Vice-chair Lee, 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 Hawaiʻi 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 Hawaiʻi at Mānoa strongly supports this bill and recommends that it be passed.

Hawaiʻi has two of the best astronomical observatory sites in the world. Mauna Kea Observatory on the Island of Hawaiʻi 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 Oʻahu.

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 Hawaiʻi 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 Oʻahu that is affecting Haleakalā. Kauaʻi does not have a lighting ordinance, but already has some of the best lighting in Hawaiʻi because it has many endangered birds. All streetlights on Kauaʻi 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.

Sky glow is the aspect of light pollution that most affects astronomy. Air molecules and dust scatter artificial light into the telescopes. Every 10% brighter that artificial light makes the sky from its natural level makes the effective size of a telescope 10% smaller. The following series of photographs, using the same exposure, shows the difference in sky brightness and star visibility 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 the United Nations Educational, Scientific and Cultural Organization (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 the 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.

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.