My name is Wade Lee and I am one of the managing members Hāloa Aina LLC.

We do not support HB 1765.

HB 1765 will cause more harm to the current sustainability of the sandalwood forests in the State of Hawaii.

We are a 3,000 acre, Dry land forest restoration entity the forest includes *Santalum paniculatum* Sandalwood where we harvest the dead and dying trees and have replanted in the last 3 years over 700,000 sandalwood trees and the host trees for these sandalwood trees, including koa, ohia, mamane, pukiawe, and alaii. In addition, we are working with Kamehameha Schools/Bishop Estate on managing over 20,000 acres of their sandalwood forests. There are over 100,000 acres (about 1/ 2 the size of Oahu) of Santalum *paniculatum* stretching from Maunakea to Volcano. Most of these forests are on either private or state lands.

The International Sandalwood Association whose members are scientists, sandalwood forest owners, governments, sandalwood manufactures, sandalwood oil producers, and many other entities that are involved in the sandalwood industry met here at the EAST WEST CENTER in 2012 and recognized Hāloa Aina's sandalwood forest farm to be the model of a "Sustainable" sandalwood forest in the world.

"Sustainable" is a scientific term and standard given to owners of forests who must meet strict requirements and standards. These forests must be environmentally, economically, and socially sustainable.

Hāloa Aina has also established a seed bank (we have provided over 50 lbs of sandalwood seed to the State of Hawaii for planting on the slopes of Mauna Kea, and other nonprofit organizations and have developed new coppicing methods in growing new Sandalwood keiki plants).

In 2012, we were here before your Honorable legislators testifying on similar sandalwood legislation. As a result of the overwhelming testimony by all stakeholders of the sandalwood industry including us, the biologists, the Hawaii Forest industry, the environmentalists, the department of agriculture, it was clear that a scientific baseline for the Hawaiian Sandalwood industry must be established before any type of legislation should be considered.

Because of the lack of this scientific baseline for the Hawaiian Sandalwood industry (i.e., the number of sandalwood trees, the age of the sandalwood trees, which species of Sandalwood are being harvested—there are 6 species of the 18 species of Sandalwood in the world that are indigenous and native to Hawaii, and other important factual data, this LEGISLATURE passed resolutions to implement a task force comprised of all the major stakeholders of the Sandalwood industry with the Department of the Land and Natural Resources to be the chair and lead this task force.

Unfortunately, the Task Force was never implemented due to a lack of funding. The DLNR established an anonymous online survey which simply asked whether you support or do not support the regulation in the sandalwood industry.

Until, this scientific baseline of the Sandalwood forests are established in Hawaii, HB 1765 will cause more harm than good.

Because this task force was never implemented, Hāloa Aina has and has been in discussions with UH Hilo School of Forestry to chair this task force and has received commitments from Bishop Estate, the Hawaii Forest Industry, and others to participate in this fact finding investigation. This task force will be opened to any and all other stakeholders of the Sandalwood forests, including the DLNR.

We along with many of the other stakeholders of the Sandalwood forests request that HB 1765 not be passed and that this Legislature allow us to establish this task force and report back to you in the next session in 2015 with facts and well founded information to pass good legislation concerning the Sandalwood forests of Hawaii.

Thank You

lowen2-Lanaly

From: mailinglist@capitol.hawaii.gov
Sent: Wednesday, January 29, 2014 3:37 PM
To: waltestimony
Cc: larry@rosewoodcraft.com
Subject: Submitted testimony for HB1765 on Jan 31, 2014 09:15AM

HB1765
Submitted on: 1/29/2014
Testimony for WAL on Jan 31, 2014 09:15AM in Conference Room 325

Submitted By	Organization	Testifier Position	Present at Hearing
lawrence rose	Individual	Comments Only	No

Comments: My name is Larry Rose and I own a 10 acre parcel near Milolii, South Kona, Island of Hawaii. The native dryland forest on my parcel and the surrounding thousands of acres includes many Hawaiian sandalwood trees. I do not think there is a consensus on the current distribution or population of native sandalwood trees in Hawaii. Writing legislation without any idea of the current problem (if any) seems premature. Certainly I don't think we should be creating penalties for currently allowed activities without evidence of some need. Thank you for allowing me to submit this testimony.

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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NEIL ABERCROMBIE
GOVERNOR OF HAWAII

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

ESTHER KIA'AINA
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

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
WATER & LAND

Friday, January 31, 2014
9:15 AM
State Capitol, Conference Room 325

In consideration of
HOUSE BILL 1765
RELATING TO SANDALWOOD

House Bill 1765 proposes to establish policies with Department of Land and Natural Resources (Department) for Hawaiian sandalwood species, ʻiliahi. The proposed policies include incentives for ʻiliahi cultivation and plantation development, establishes penalties for harvest of native sandalwood trees deemed older than 236 years, and prohibits export of raw sandalwood timbers. The Department believes encouraging sound management of native forest species is important to ensure ecological and cultural sustainability of Hawaii's forest resources, thus **the Department supports the intent of this bill, but offers the following comments.**

Over the past 200 years, there has been a steady decline of all native sandalwood species (*Santalum sps.*) in Hawaiʻi. The major decline of Hawaiian sandalwood can be attributed to harvesting during the Sandalwood Era from 1815-1825, as well as other deleterious regeneration impacts such as rodent seed predation and ungulate browsing. Hawaiian sandalwood harvesting continues today, but is mostly focused on one species of Hawaiian sandalwood found only on Hawaiʻi Island. The State Conservation District provides a level of protection for sandalwood found within those lands, but there is no regulation or oversight on the harvest, sale or destruction of native forests outside of that district.

The Department supports the development of a sustainable harvest plan for commercial production of native sandalwood species, similar to a Forest Practices Acts that have been adopted by many mainland U.S. states. It is in the best interest of the State to assure sustainable management of our rare and valuable forest species; however, the Department does not want to restrict sustainable harvest practices on private lands. The Department is support of developing a Forest Practices Act in consultation with forestry, ecology and cultural experts to determine the needs and methods for State regulation on commercial harvest of Hawaiian sandalwood and other commercially valuable native forest species. Such discussions would focus on the need

and value of sustainable harvest plans, guiding harvest principles on sensitive areas, environmental protection, regeneration practices, sustainable production, and best management practices commonly found Forest Practice Acts.

The Department is interested in supporting the continued use of sandalwood for commercial purposes, especially with the potentially high value for the oil from Hawaiian varieties, and is hopeful that we can achieve a sustainable sandalwood program in the State. The existing six (plus the two sub-varieties) endemic Hawaiian sandalwood species represent one-fourth of all the sandalwood species found in the world, and Hawai‘i is the only region globally where sandalwood is being commercially harvested without oversight or regulation, outside of the Conservation District. However, restricting or banning the commercial production of sandalwood at this time may not be necessary to achieve protection of this species. With a stronger support of incentive programs, such as the Forest Stewardship Program, the resurgence of Hawaiian sandalwood as an important economic resource could be attained.

The Department would be pleased to work with this Committee to develop an initiative highlighting the sustainable management of Hawaiian sandalwood and other commercially valuable forest species that ensure sustained use of our forest resources into the future.

Forest Solutions Inc
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30th January, 2014

Honorable Representatives and Senators,

In my capacity as Research Forester with Forest Solutions, Inc., a Hawaii Island forestry consulting company, **I would like to express our opposition to HB No. 1765**. As written, this sandalwood bill lacks a scientific foundation, suffers from contradictory and misleading phrasing, and would be largely ineffective as conservation legislation. Our concerns about this bill fall into four categories:

1. Inadequate background knowledge of sandalwood population and ecology.
2. Imprecise, misleading, or conflicting regulatory proposals.
3. Insufficient grasp of economic consequences of regulation.
4. Arbitrary implication of the Hawaiian timber industry in potential impacts to sandalwood.

In the attached sections of this letter, I shall review each section and subsection of HB No. 1765 and identify which of these objections, if any, pertain to each clause.

Forest Solutions has operated a commercial forest management consulting business in Hawaii since 1996, working to plant trees over more than 20,000 acres of former sugar cane land, and in recent years focusing on reforestation with native tree species (koa, māmane, ʻiliahi) across Hawaii Island. It is the mission of our five professional foresters and ten full-time forest workers to help improve the profile, economic output, and social and ecological responsibility of the commercial forestry industry in Hawaii. As a forestry company dedicated to improving Hawaiian forest ecosystems, we must express significant reservations about HB No. 1765, while at the same time endorsing its broader goals of supporting reforestation efforts throughout the State.

Sincerely,

Thomas Baribault, Ph.D.
Research Forester | Forest Solutions, Inc.
P.O. Box 2037 | Kamuela, HI 96743
Office: (808) 776-9900 | Fax: (808) 776-9901

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Specific comments and concerns regarding SB No. 2960, RELATING TO NATURAL RESOURCES (Jan 23 2014)

1. §183-A

Subsection (1) is an admirable goal, and Forest Solutions (FSI) is already actively engaged in the work of re-establishing sandalwood forest at sites in Kohala (80 acres) and beginning at sites in Kona (several thousand acres). Subsection (2) is also a positive goal; economic and legal incentives to cultivate native sandalwood species (on Hawaii Island, this means *Santalum paniculatum*, a full-sized tree, and *Santalum ellipticum*, a smaller-statured species) would certainly facilitate expanding the current range. If the State, per subsection (3) could provide support for programs to ensure sustainability of commercial sandalwood operations (whether wild-harvest or plantation), conservation goals would be enhanced. Despite incentives, landowners, individuals, or companies may still engage in destructive practices, so subsection (4) is necessary to prevent further degradation of the sandalwood resource. FSI enthusiastically supports subsections (1) – (3), and in principle we support subsection (4). As written, however (e.g. §183-B), violations are poorly defined, and new regulations could be willfully misinterpreted so as to achieve effects opposite to those intended.

2. §183-B

Subsection (a) is a worthwhile and reasonable regulation to conserve legacy trees that are very old, having sprouted before 1778. In practice, it will be virtually impossible to enforce this regulation without rigorously testing the age of every tree. Current dendrochronology practices are partially destructive, which may unduly stress these legacy trees. Moreover, aging trees based on their growth rings is problematic in Hawaii—a growth ring may or may not correspond to a calendar year, and is more related to rainfall patterns that can vary on time scales quite disconnected from the calendar. The specification of 1778 has cultural and historical significance, but does not clearly translate to any ecologically significant date for sandalwood. Rather than specifying this ecologically arbitrary threshold age for protected sandalwood, best management practices dictate that tree populations—of any species—should be maintained at densities and age structures determined by scientific research and observation.

Subsection (b) could be a useful mechanism by which State officials could ensure that vulnerable sandalwood populations are not decimated. As written, however, the licensing scheme is completely open to arduous restrictions that could eliminate all sandalwood harvesting, and therefore *disincentivize* further conservation plantings. Any licensing scheme should be independent of taxation (§183-C), and licensing should be contingent on the ecological impact of proposed projects. The most significant problem with this subsection is that is effectively eliminates any incentive to plant native Hawaiian sandalwood in commercial plantations. Landowners who plant sandalwood on their property would be required, under the current language, to obtain a harvesting license to utilize *their own creative property* simply because of its genetic composition. Other forestry activities are ***NOT*** subject to such species-identity regulations, and this clause would discourage sandalwood planting in favor of e.g. non-native species or non-forest land uses.

Subsection (c) will be critical to ensuring that sandalwood forests expand across the State, even as the current resource is harvested to fund this expansion. As written, however, the language is imprecise and potentially confusing. First, the wording of the first sentence should likely be: "Any person who harvests or otherwise destroys a tree or trees of any native Hawaiian sandalwood (*Santalum*) species is required to restore, within an ecologically feasible time-frame, the ecosystem function of the destroyed tree or trees." If we interpret the current phrasing correctly, harvest operations would be required to replant e.g. 60 sandalwood seedlings following harvest of a 60 year-old sandalwood tree. Superficially, this may appear to promote reforestation, but in practice this requirement could easily lead to undesirable outcomes. In particular, if harvesters are required to plant the *numerical age-equivalent* to each harvested tree, the resources available to nurture each seedling are reduced. The preceding concerns are in addition to the basic problem of calculating the age of sandalwood trees. Instead, harvesters (or others who destroy sandalwood) should be required at minimum to plant / tend a number of seedlings necessary to replace the destroyed tree plus one additional. This is the basic threshold for increasing population over time. Additional research will be necessary to determine the number of seedlings to be planted. For example, with 80% mortality rate in some harsh climates, it could be necessary to plant 10 seedlings to replace one tree and add one more to the population. Fewer seedlings would be necessary in areas with favorable conditions. The second clause in subsection (c) is not a provision of the first, but rather a separate, unrelated idea. We support this requirement in spirit, although stipulating that the department be responsible for monitoring out-planting success could obstruct operations and discourage projects. Provisions should be made to allow third-party certifying bodies (e.g. Forest Stewardship Council) to enforce adequate monitoring via market-driven mechanisms that and legal requirements.

Subsection (d) contains language for which we do not understand the motivation. Certain sandalwood products are in their finished condition immediately when they are harvested. In particular, large pieces of heartwood intended for the carving / art / furniture markets cannot be processed at all because buyers expect intact sections of wood. This sandalwood product is among the most valuable, so arbitrarily forbidding its export is an unreasonable restriction that would significantly reduce the economic viability of sandalwood harvesting. In addition, many landowners have neither the technical / financial capability to process sandalwood nor an interest in processing. By allowing subsection (d) to remain in the Bill, such landowners would see no reason to harvest sandalwood, no reason to replant areas where sandalwood has been extirpated, and no reason to establish commercial sandalwood plantations. By extension, *any regulation that reduces the economic viability of harvest or plantation operations* ***is a disincentive to reforestation***, and is therefore in direct conflict with the stated goal of the Bill.

3. §183-C

Per subsection (a), a percentage-dollar fee would be assessed on all sandalwood products harvested or sold. In principle, this could be a sound mechanism for revenue generation to support further sandalwood reforestation efforts as per subsection (b). In practice, this non-progressive fee system would discourage economic activity. Specifically, there would be little incentive to produce processed sandalwood products (essential oils, high-value powders, sandalwood-based value-added products) because such products would be subject to more significant absolute fees than unprocessed or minimally processed material. In addition the current language does not clearly account for multiple products derived from the same sandalwood material. In particular, after essential oils are removed from wood, the resulting material can be sold for other purposes, but the fee structure as written would discourage this efficient use of resources.

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4. §183-D

Criminal penalties are not our area of expertise, but we must observe that highly unintentional effects could evolve from this section if it is allowed to become part of the Bill without substantial modification. For example, as written, any cattle rancher with native sandalwood on her/his property who allows cattle to destroy the sandalwood would be subject to fines, imprisonment, or both. As a second example, it could be argued that the State itself is responsible for destroying native sandalwood trees via failure to control feral ungulate populations. What entity would be criminally responsible for this negligence? Finally, per SECTION 4, the impending enactment of the Bill could directly cause a spike in irresponsible, unsustainable, highly destructive sandalwood harvesting prior to the date on which it takes effect; helping forests recover from this destruction could be a serious challenge.

The FOUNDATION FOR ISLANDS OF HARMONY

H.B. 1765 Relating to SANDALWOOD

Hawaii State Legislature,, House of Representatives, Committee on Water and Land January 31, 2014.
Testimony of Leigh-Wai Doo… Thank You for this hearing.

We advocate the adoption of HB 1765. It would establish a process to reforest Sandalwood species endemic, found only in Hawaii ILIAHI.

Briefly, HB 1765 entrusts a duty to a State agency, DLNR. To: 1. Preserve old growth Iliahi. 2. Develop incentives for entrepreneurs to cultivate Iliahi. 3. Support the sustainability of commercial sandalwood operations in Hawaii. 4. Encourage Hawaii wood craftsman to carve and fashion Hawaii made mementos, spiritual icons, oils and perfumes, and thus boost a true home based cottage industry.
Without HB 1965 and its associated licensing and penalties, the remaining stands of ILIAHI may be destroyed on private lands as there are no controls in Hawaii.

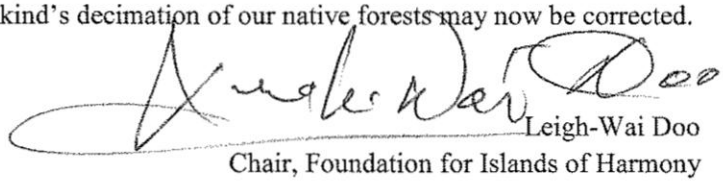
Hawaii's ILIAHI, Hawaii's endemic species of Sandalwood, is in immediate threat of destruction of a high percentage of the last remaining stands. Trees, hundreds of years old, may be cut today without legal impunity. Hawaii is far behind other nations in protecting and reforesting its Sandalwood. Examples of the regulations are available. See the regulations of Queensland, Australia; India, Vanuatu and others provided in research at a Sandalwood Conference, held at the East West Center over a dozen years ago and an international conference on sandalwood which was held on October 20 to 24, 2012 in furtherance of the earlier conference.

Sandalwood is precious; historically, spiritually, and for Hawaii's future. Historically, sandalwood trade was the turning point of Hawaii, from a self-sufficient economy to a commercial economy. It was Hawaii's first source of revenue and major debt. Credit secured by payment in sandalwood saddled the Hawaiian Chiefs. Harbor portaged fees was learned. Hawaii's present flag was designed for Hawaii's trade of sandalwood with China. See the June 9, 2009 DVD of "Save Sandalwood Symposium" held at the UH, KCC Campus and shown 4 times on OLELO TV.

Spiritually, Sandalwood is revered; by Hindus, by Buddhist, by Catholics of Southeast Asia, was used by the Polynesians. Hawaii's future economy, as it relates to the Chinese tourist and branding, may greatly be strengthened by the goodwill of caring for our namesake, Sandalwood Mountain.

In the Chinese language, oral and by written characters, over a billion people know of Hawaii's name, particularly Honolulu's name, as Sandalwood Mountain.
Yet where can a sandalwood tree, Iliahi, be seen? What does it look like? There are no ILIAHI trees to be found in any of Honolulu's 5 Botanical Gardens on Oahu.

HB 1765 is a ray of hope that the wrongs of mankind's decimation of our native forests may now be corrected.
Please pass HB1765.



Leigh-Wai Doo
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January 30, 2014

TESTIMONY ON HB1765
RELATING TO SANDALWOOD

Dear Representative Faye Hanohano,

Thank you for giving us the opportunity to testify and provide comments on HB1765. For more than 15 years, the Hawai'i Forest Industry Association (HFIA) has been actively managing and conserving sandalwood and other native species on our dryland forest restoration project at Kaʻūpūlehu and other sites. We are active supporters of programs and people that also demonstrate their aloha for this and other native species.

We appreciate this legislature and public agencies such as DLNR's Division of Forestry and Wildlife (DOFAW) for being actively engaged in the pursuit of the betterment of forestry in Hawaii, including its care for native species like sandalwood. We compliment this legislature and the current State administration for their ongoing concern for Hawaii's forest products industry. We are grateful for the well intended efforts to protect this important facet of Hawaii's economy and their efforts to help it grow.

We have demonstrated our concern for conservation of our native dryland forests and of course we support measures to encourage forest conservation and reforestation. We oppose HB 1765, however, for the following reasons:

1. The bill would prohibit destruction of any sandalwood that was in existence prior to 1778. This section is completely impractical as it is impossible to determine how old any given sandalwood tree is. There are no reliable aging techniques that work on sandalwood and would give such precise results. Even growth rates of sandalwood are unknown.

2. The bill would create a special license to harvest, on private agriculturally zoned land, one genus of trees: sandalwoods. This extra regulation and uncertainty certainly would discourage landowners from planting sandalwood for future harvest, since alone of all species of tree they would need special permits. Landowners would rather plant the non-native Indian sandalwood (*Santalum album*), other species of trees, or go into orchard crops or ranching.

3. The bill would require reforestation with sandalwood to compensate for any harvests. We support reforestation in concept (and indeed our members conduct many reforestation projects across the islands) but the method prescribed is insufficient. Merely planting sandalwood trees does not guarantee a forest, when most sandalwood seedlings are destroyed by feral ungulates, fire, or perish from drought.

4. The bill would prohibit export of raw or unprocessed sandalwood timber. The highest value product obtained from sandalwood trees is whole logs used for carving in the Far East. If export of logs is prohibited, sandalwood harvesters would have to chip the wood for oil extraction, lowering its value. This would destroy rather than create jobs.

5. The bill would levy various penalties on people who cut or destroy sandalwood trees. The implication that the main threat to sandalwoods comes from commercial harvesting is incorrect. The main threats to our sandalwood forests are feral and domestic animals (cattle, sheep, and goats in particular), fire, and invasive species. Would ranchers whose cattle destroy sandalwood seedlings be subject to these penalties? Would houselot owners who clear woody vegetation including the coast sandalwood all along the leeward sides of the islands? Would the State, which manages much former sandalwood forest land as grazing leases?

Two years ago a task force was supposed to have been formed to look into the essential questions about the health and sustainability of the sandalwood forest in Hawai'i. That task force was never convened and we have little more information now than we did then. HFIA would encourage the legislature to table this legislation and re-commit to funding a task force to get the facts on the Hawaiian sandalwood forest before proposing any further legislation.

Sincerely,
Lloyd Jones, Legislative Chair
Hawai'i Forest Industry Association

California State University, Chico
Chico, California 95929

M E M O R A N D U M

RANDALL S. SENOCK, PhD
Associate Professor Geological and Environmental Sciences
California State University at Chico
400 West 1st Street, Chico, CA 95929-0205

My name is Randall S. Senock and I am thankful to the Water and Land Committee and the Committee On Ocean, Marine Resources, & Hawaiian Affairs for the opportunity to submit testimony in response to H B 1765 : A BILL FOR AN ACT RELATING TO SANDALWOOD (HB LRB 14-0697.doc) and the corresponding Senate version SB2960.

I am currently an associate professor for the California State University at Chico in the Department of Geological and Environmental Sciences and director of the degree options in Applied Ecology and Atmospheric Science. Formally I was a research fellow with the University of Hawaii at Manoa in forestry and then an assistant professor of tropical forestry at the University of Hawaii at Hilo, College of Agriculture. My research on forests around the world has been directed towards understanding the ecology and sustainability of forest ecosystems.

The proposed legislation in its broadest context should be supported as a measure to aid in supporting sustainable land management in Hawaii. As proposed however, the legislation is too broad, over reaching and unsubstantiated at this point in time to ensure either the sustainability of the forest ecosystem or the proper role of government agencies in forest management practices on privately owned land. **There cannot be one single approach applied equally to the several Sandalwood species and varieties found throughout Hawaii. Each species in each of its own environments will likely require a different approach to ensure regeneration of the species for future generations to enjoy.** Given that a large majority of Hawaiian sandalwood resources are found on private land the role of government agencies should be to cooperatively work with landowners to ensure the sustainability of all forest resources. This need is directly acknowledged by the U.S. Forest Service who works cooperatively with non-industrial private landowners that manage over 40% of the nation's forest resources.

In the same regard, without proper incentives to sustainably produce endemic native sandalwood species landowners will consider other non-native sandalwood species that will then present the potential for hybridization and other biological\ecological impacts on Hawaii's sandalwood forests. This has been demonstrated in other parts of the world where non-native sandalwood species have been introduced in regions with native sandalwood species. There are already non-native Santalum genus species planted in Hawaii that has, in all probability initiated the same ecological process of species hybridization.

The current state of scientific knowledge, however, concerning native Hawaiian Sandalwood species or their ecology is notably insufficient at this time to support legislation that would inadvertently restrict proper sustainable management of native forest containing sandalwood trees. What little is known is based on limited scientific information, antidotal observations and subjective interpretations.

This can easily be seen in the contradicting wording of HB1765 section 183-A(1). The original sandalwood resource in the State of Hawaii can only be estimated from ancillary historical information and thus the statements as to "the objective of replenishing native sandalwood species forests to the level at which those forests existed prior to 1800" are not pragmatic or realistic given the current situation for all of Hawaii's forest resources. Thus, if HB 1765 is enacted as such, than only a vague and nebulous unachievable goal is set. Modern sustainable forestry practices are based are clear, concise goals and objectives.

HB1765 section 183-A(2) states "Provide incentives to local entrepreneurs to cultivate native sandalwood species in plantations for either reforestation programs or commercial operations". The sole emphasis on plantation grown sandalwood ignores the fact the species are only one part of the wider forest tree species communities that need to be considered. It has been repeatedly shown around the world that plantations of any monospecific species has a much lower biological diversity when compared to more natural forest.

The vast majority of the current populations of Santalum paniculatum and S. ellipticum that range on the flanks of Mauna Loa and Hualalai from the Kau to North Kona and the Kohala districts are probably less than 150 years old. This situation and the current regeneration of sandalwood trees on the Ha'Loa Aina forest demonstrates clearly that S. paniculatum sandalwood has been and now again is being regenerated for the future forests of the Big Island.

What is currently known and generally accepted is that much of the Big Island dryland montane forest containing sandalwood trees (Santalum paniculatum and S. ellipticum) is in a state of severe continuing decline from several long term pressures that include deliberate land clearing, grazing animals, the introduction of non-native species, increased frequency and intensity of fires, climate change and **not** sustainable commercial harvesting of endemic Hawaiian sandalwood.

What is also now currently known is that the dry land montane forests of the Big Island containing sandalwood can be revitalized using proper forest management techniques that involve active land management including tree harvesting. This statement is based on direct field observations of several dryland montane forests and empirical measurements of the Ha'Loa Aina forest mauka of Kealakekua.

Specifically field measurements indicate that:

1) The majority of trees in Ha'Loa Aina forests are less than 100 years old (based on counts of tree rings) and not "original old growth" in existence before the late 1700's as presented in previous testimony and in the local press.

2) The harvesting of a single S. paniculatum tree results in the stump coppicing and roots sprouting generally on the order of 10 new sprouts per tree.

3) Un-harvested trees exhibit virtually no new sprouts.

4) The height and diameter growth of the root sprouts is much greater than that of planted Sandalwood seedlings.

5) The survivability of new sprouts through low rainfall periods is greater than planted seedlings.

Based on the above the proposed legislation that contains language that would arbitrarily designate all species of Hawaiian sandalwood as a forest resource in need of conservation is justified. That this designation, however, might lead to burdensome governmental regulation and oversight on private lands is an issue of concern.

In addition I strongly urge re-consideration of the State of Hawaii twenty-sixth legislature, 2012 Senate Resolution 93 that requested the establishment of a state wide task force to examine state regulation of the harvesting of Hawaiian sandalwood and the current state of scientific knowledge regarding Hawaiian sandalwood species.

It is only through careful consideration of all the ecological, social and economic aspects of any government or private land management operations for any Hawaiian forests that the underlying foundation of sustainability, intergenerational equity, can be addressed. It is the future generations of all Hawaiians that will have to reconcile with the decisions that this generation make today. The decisions made today cannot or can lay a solid foundation for the future.