

STATE OF HAWAI‘I
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai‘i 96813

November 13, 2020

Chairperson and Members
Board of Land and Natural Resources
State of Hawai‘i
Honolulu, Hawai‘i

Land Board Members:

SUBJECT: REQUEST FOR DELEGATION OF AUTHORITY TO THE DIVISION OF FORESTRY AND WILDLIFE ADMINISTRATOR TO ENTER INTO A MEMORANDUM OF AGREEMENT WITH THE BISHOP MUSEUM TO DEVELOP A PLANTS OF HAWAI‘I DATABASE AND WEBSITE.

SUMMARY

This submittal requests approval to enter into a written Memorandum of Agreement (MOA) to develop a Plants of Hawai‘i database and website. This project is managed by the Herbarium Pacificum at the Bishop Museum in Honolulu, Hawai‘i. This project will support development of a website, search engine, and map-based tool that includes information on every flowering plant species documented in Hawai‘i from Mokuapāpapa (Kure atoll) to Hawai‘i island (Big Island). It is a work in progress that will feature detailed descriptions of each taxon, multi-access ID keys, specimen images, and thousands of contributed field images from Hawai‘i’s botanists, plant enthusiasts, seed banks, arboreta, and botanical gardens. On August 27, 2020, that Hawai‘i Invasive Species Council (HISC), an interagency board administered by the Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR DOFAW) approved a recommended budget that included \$66,972 to support this effort.

The purpose of the Memorandum of Agreement (MOA) is to formalize the relationship between Bishop Museum and DLNR DOFAW as the administrative host of the HISC, identify the roles and responsibilities of the Parties, and enable the creation of a purchase order to support the work.

LOCATION:

Bishop Museum, Herbarium Pacificum, Honolulu, Hawai‘i.

BACKGROUND

The interagency HISC receives funds from the legislature each year to support projects that are interagency in scope, involve new research, or are otherwise not captured by recurring departmental programs. The call for proposals is generally open to government agencies and research institutions like the University of Hawai‘i, but not to private entities. As the State museum, HISC has previously interpreted Bishop Museum as being eligible for the HISC funding process, which is not a procurement process but an interagency budget development using agreements between partnering entities. The Bishop Museum has previously been the recipient of funds for research or development projects that benefit invasive species management. In Fiscal Year 2021, the Bishop Museum’s

Herbarium Pacificum submitted a proposal to continue developing their Plants of Hawai'i database and website to provide easier access to information on flowering plant species in Hawai'i. Because of the inclusion of non-native and/or invasive species in this database, the HISC and its partners that participate in developing the annual recommended budget supported the provision of HISC funds to this project.

Where University of Hawai'i projects submit proposals (including a scope of work) under a master agreement in order to support the creation of purchase order, the Bishop Museum submits a scope of work that is attached to a Memorandum of Agreement (MOA) signed by the President of the Bishop Museum. This submittal seeks approval from the Board of Land and Natural Resources for the Administrator of DLNR DOFAW to sign this MOA in support of the project.

RECOMMENDATIONS

That the Board:

- 1) Authorize the Administrator of the Division of Forestry and Wildlife to enter into and sign the Memorandum of Agreement on behalf of DOFAW, providing that the Attorney General review and approve the contents of the Memorandum of Agreement to ensure compliance with all state legal requirements and in the best interests of the State.

Respectfully submitted,



David G. Smith, Administrator
Division of Forestry and Wildlife

APPROVED FOR SUBMITTAL:



Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Attachments:

Exhibit A: Draft MOA between DLNR DOFAW and Bishop Museum

MEMORANDUM OF AGREEMENT
BETWEEN THE STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
AND
BERNICE PAUAHI BISHOP MUSEUM
TO SUPPORT THE PROJECT ENTITLED
" THE PLANTS OF HAWAI'I (SPECIES INFORMATION SYSTEM) WEBSITE"

This Memorandum of Agreement (MOA) is a cooperative agreement entered into by and between the Bernice Pauahi Bishop Museum, hereinafter referred to as "Bishop Museum", and the State of Hawaii, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife, hereinafter referred to as "DOFAW", for support of the project entitled "The Plants of Hawai'i (Species Information System) website."

Bishop Museum is officially designated as the State of Hawaii Museum of Natural and Cultural History by Hawaii Revised Statutes Chapter 6E-40. Bishop Museum's Herbarium Pacificum was designated by the State Legislature in 1992 as the primary repository for plant vouchers in the State. The Herbarium Pacificum receives plant specimens from a variety of state, federal, and private organizations, as well as from the general public.

The attached scope of work describes the project entitled " The Plants of Hawai'i (Species Information System) website" to facilitate the work of the Herbarium Pacificum through the completion of the current phase of developing the Plants of Hawaii species information system, including:

- Completing full species information gathering for 450 plant species.
- Completing full species information gathering for 50 high risk terrestrial plant species not currently naturalized in Hawai'i but at high risk for naturalization. These will be selected from the HPWRA.
- Databasing and making available 5,000 specimen images and 10,000 field images with the goal of having representative images for every naturalized or potentially naturalizing species in the database.
- Designing one educational module that teaches about how to identify invasive plant species, what work is being done to prevent and control invasive species and how people of all ages can become engaged in document and report the spread of alien species.

The Hawaii Invasive Species Council (HISC) is a coordinating entity established by Hawaii Revised Statutes Chapter 194, administered by DOFAW. On August 27, 2020, the HISC approved a Fiscal Year 2021 spending plan including \$66,972 to support the Bishop Museum in achieving the goals described in the attached scope of work.

This agreement describes the responsibilities of Bishop Museum and DOFAW in implementing the project "The Plants of Hawai'i (Species Information System) website."

AGREEMENT

DOFAW shall:

- Provide funds necessary to partially support project costs described in the attached scope of work
- Allow for the provision of these funds as an advance at the start of the project period, up to a maximum of \$66,972.

Bishop Museum shall:

- Submit an invoice or invoices to DOFAW for project costs up to a maximum of \$66,972, with a final invoice received by DOFAW no later than December 1, 2021
- Complete the activities described in the attached scope of work, in the section "Project Summary", by the project end date (September 30, 2021)
- Provide a final narrative report of activities supported by this agreement within 30 days of project completion
- Provide data generated by the project upon request.

Project Agreements are subject to the availability of funds and may be subject to budget restrictions and procedures implemented under the FY20-21 Executive Biennium Budget. Funded projects that are dependent for facilities and staff support from the DLNR may be subject to restrictions in work schedules and number of days worked per month or other project changes to conform with facility closures at the DLNR.

Changes in project budgets and service period, revisions in total amounts budgeted for projects, and corresponding project objectives, deliverables and scope of work may be implemented via amendment to the cooperative agreement.

Melanie Y. Ide, President and CEO
Bishop Museum

Date

David G. Smith, Administrator

Date

Division of Forestry and Wildlife, Department of Land and Natural Resources

Attachment 1: Scope of Work for the project entitled “The Plants of Hawai’i (Species Information System) website”

Project Title: The Plants of Hawai’i (Species Information System) website

Principal Investigator: Timothy Gallaher

Bernice Pauahi Bishop Museum, Department of Natural Sciences

Project Dates 1-Oct. 2020 to 30-Sep. 2021

Project Summary

In 2020, Bishop Museum botanists with support from the Hawai’i Invasive Species Council began work on the Plants of Hawai’i (POH) project. POH is a website, search engine, and map-based tool that includes information on every flowering plant species documented in Hawai’i from Mokuapāpapa (Kure atoll) to Hawai’i island (Big Island). It is a work in progress that will feature detailed descriptions of each taxon, multi-access ID keys, specimen images, and thousands of contributed field images from Hawai’i’s botanists, plant enthusiasts, seed banks, arboreta, and botanical gardens.

A POH search will resolve taxonomic synonyms to their currently accepted name and will allow for searches by common or Hawaiian names, geographic area, and key identification characters. For non-native taxa, we record information similar to what is used to construct the Hawai’i Pacific Weed Risk Assessments (HPWRA) including where the plant is likely to invade (agricultural, disturbed areas, or native ecosystems), how it is dispersed, the risks that it may pose (fire promoting, puncture hazard, etc.) and how it is controlled (herbicide, biocontrol, manual), along with the HPWRA rating if any, and the number of reported populations or individuals.

For all species we record from the literature ecological and life history info including whether the taxon is allelopathic, benefits from disturbance, forms thickets, hybridizes readily, sets viable seed, reproduces vegetatively, or fixes nitrogen. We also record ploidy, dispersal agents, known toxicity and allergenicity to people and animals, and human uses including for landscaping, food or agriculture, forestry, medicine, or textiles. Using the specimens at Bishop Museum we are generating new plant descriptions including key diagnostic characters, habitats, collection localities, elevation ranges, the date of first and last recorded occurrence, and the establishment status statewide and per island.

The Hawai’i Alien Plant Informatics (HAPI) project (HISC funded) is now fully integrated with POH providing a map-based and data-rich species information portal. POH (with HAPI) will ultimately be a key tool for tracking the introduction, spread, and control of invasive plant species. It will aid in the early identification of potentially invasive species and be a tool for quickly identifying known invasive species enabling appropriate personnel to prevent spread through conveyances, harbors, ports, or airports.

POH currently includes basic information for 10,065 accepted flowering plant taxa (all native, naturalized, potentially naturalizing, and cultivated species). Through partnerships with researchers throughout the state we have added basic name data on all ferns and lycophytes (255 taxa) and, marine, freshwater, and terrestrial eukaryotic algae (~1027 pending verification).

We anticipate that POH will become an indispensable tool for natural resource conservation workers in Hawai'i. We aim to partner with conservation agencies to build on the information available in POH by contributing information about control and eradication efforts, native species out-planting, or the results of field surveys. Some data is sensitive particularly the exact locations of plant populations. We have put into place measures to mask much of this information for the general public but we would like to begin a dialog with relevant agencies to create a secure portal where appropriate data can be made available to conservation partners.

POH will also be a user-friendly portal for the general public to learn about plants, easily identify plants, and importantly gain information about which plants are natives, low-risk cultivated species, or high-risk potential invaders. POH will be the anchor for several educational products being developed jointly with our culture and education staff. These resources will support distance or in-class formal education by matching activities with state grade-level standards and facilitate informal active learning at the Bishop Museum campus by people of all ages.

The POH website, www.plantsofhawaii.org, will go-live in December 2020. HISC funds from the FY2020 funding cycle were used to complete the names database and build the informatics infrastructure and website and complete detailed data entry and key building for all members of the Asteraceae. Much of the work researching species information, databasing images, writing new descriptions, and recording occurrences remain to be done.

We are requesting funds to cover a portion of the salaries of existing personnel who will be working on this project and funds to hire two part-time student workers. The Botany Curator will work primarily on contacting various federal, state and local agencies (i.e. watershed partnerships, major landholders, Nature Conservancy), and individual researchers, consultants and notable people in the natural resource management community to discuss data integration and to continue to improve POH whenever possible to meet their individual information needs.

The collections manager and research botanist will work primarily to lead the research, recording and, verification of species information, manage the imaging and databasing of specimens and train and mentor student workers and volunteers. One student will work on data entry for terrestrial plants and the other will work on data entry for algae. We will recruit from graduate students at UH.

Deliverables

Funding of this work will result in a complete, verified, and updated list of all terrestrial plants in Hawai'i including a full list of synonymy, statewide native or naturalized status, and island by

island statuses (per available literature and specimens), a list of observations and linked specimen and field images. This data will be displayed on a searchable web page for each species on www.plantsofhawaii.org.

We will complete full species information for 450 species. We will continue to prioritize families and genera with a large proportion of invasive species. We will also complete full species information for 50 high risk terrestrial plant species not currently naturalized in Hawai'i but at high risk for naturalization. These will be selected from the HPWRA.

We will database and make available 5,000 specimen images and 10,000 field images with the goal of having representative images for every naturalized or potentially naturalizing species in our database.

We will design one educational module that will be hosted on POH that teaches about how to identify invasive plant species, what work is being done to prevent and control invasive species and how people of all ages can become engaged in document and report the spread of alien species.

Finally, the training and experience gained for the two students involved in the project is an important deliverable that will increase the capacity for invasive plant species work in Hawai'i.

Budget

Personnel	Units (hours)	Total Cost
Collections Manager (1.5 Mos FTE)	250	\$8,700.33
Botany Curator (1.5 Mos FTE)	250	\$12,169.31
Student 1 (6 Mos FTE)	988	\$20,007.00
Student 2 (6 Mos FTE)	988	\$20,007.00
Subtotal Personnel	2476	\$60,883.64
Overhead (10%)		\$6,088.36
Total		\$66,972.00

Budget Justification

Funds will be used to cover a portion of the salaries of two current museum staff (Collections Manager and Botany Curator) who will be working on this project full time over the next year and to hire two new student workers who will work 19 hours per week for one year. The Botany Curator will work primarily on recruiting and supervising the students, contacting federal, state and local agencies (i.e. watershed partnerships, major landholders, Nature Conservancy), individual researchers, and notable people in the natural resource management community to discuss data integration and to continue to improve POH whenever possible to meet their individual information needs. The collections manager will work primarily to train and manage student workers and volunteers. We will recruit the student workers from undergraduate, recently graduated, or graduate students in Botany/Biology.