POSITION: Vegetation Ecologist

Vegetation Ecologist familiar with plants and ecosystems of Hawai‘i to draft and complete a classification of terrestrial ecological systems for the state. This is a short-term contract-for-services, or possibly as a paid internship. We seek a person with skills in vegetation classification, a solid background in vegetation ecology and Hawai‘i ecosystems (preferably with some field-work-based knowledge), good scientific writing skills, willingness to make contacts with other vegetation ecologists in the state to solicit input, review & comment on the draft classification, and able to help facilitate discussion in a workshop setting. This person is expected to be from, and remain in, Hawai‘i for the work.

Timeframe:
Start work in mid- to late-September, complete in late December, 2008. Total work days ~25-30.

About NatureServe
NatureServe is a non-profit conservation organization headquartered in Arlington, VA with regional offices in Boston, Minneapolis, Durham, Boulder, and Ottawa Ontario. Our mission is to provide the scientific basis for effective conservation action. We specialize in the field of biodiversity data management and are a leading source of information on rare and endangered species and threatened ecosystems. Our approach is to integrate science, services, and technology to bring this information to the public and our clients for conservation planning and resource management to address today’s most pressing conservation issues. To achieve our mission, we work collaboratively with an extensive network of 80+ independent national and international member programs to collect, record, aggregate, analyze, and disseminate the biodiversity information needed to assess environmental impacts. NatureServe provides the methodology, data assessment, and technology frameworks needed to manage a large-scale biodiversity inventory. The data is used by our member programs, scientists, universities, government, corporations, and the public to make informed conservation decisions.

Project Background And Overview
NatureServe defines a terrestrial ecological system as a group of plant community types (communities, as defined by the Association concept of the U.S. National Vegetation Classification) that tend to co-occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. The concept of each classification unit encompasses secondary succession among vegetation components that is characteristic in the initial decades following disturbance.

NatureServe’s approach to ecological classification integrates vegetation with biophysical setting to describe recurrent ‘natural’ patterns within regional to local landscapes. Ecological systems are intended to provide a “mesoscale” classification of upland and wetland units that is readily mapped, often from remote imagery, and readily identifiable in the field. They lend themselves to mapping patterns in existing vegetation, and often define the map legend for 'natural' portions of the landscape. NatureServe has assisted GAP in mapping ecological systems in various projects across the country. In addition, the integration of vegetative components and biophysical setting
within the concept of each unit also facilitates a number of modeling applications, such as those desired for the LANDFIRE effort.

LANDFIRE (www.landfire.gov) is a national effort aimed at producing a series of nationally consistent maps that depict existing vegetation, vegetation structure, biophysical settings, and the degree to which current fire/fuels conditions have departed from expected or 'historical' ranges of variation. These are ‘mid-scale’ maps (both spatially and thematically) are intended to integrate well with more detailed mapped data produced locally (e.g., an individual national forest).

NatureServe is participating in this multi-agency effort encompassing the United States. The primary aim of NatureServe’s contribution to LANDFIRE is to update and document current knowledge of terrestrial ecological systems in the United States, and then apply that knowledge in support of mapping existing vegetation and terrestrial biophysical settings. These maps, produced at 30m-pixel resolution, will be used provide robust depictions of fire and fuel conditions. Initial phases of this effort have emphasized the coterminous western United States. Work is currently taking place in Alaska to define and describe the ecological systems of that state, and support the LANDFIRE mapping effort there. The next phase will complete work in Hawai‘i.

Terrestrial ecological systems concepts form the basis for three map products from the inter-agency LANDFIRE effort. First, they define the map legend for mapping Existing Vegetation Type (EVT); i.e., the current location of vegetative components of each terrestrial ecological system are mapped in that layer. Second, Environmental Site Potential (ESP) is a spatial model of environments that constrain the possible locations where a given ecological system could occur, without including natural disturbance regime as a factor. Third, Biophysical Settings (BpS) provide another spatial model depicting the probable location of each ecological system type, assuming the inclusion of natural disturbance regimes as a factor.

SCOPE OF WORK

XXX will provide the skills and knowledge to complete the following tasks. This contract is to provide the funding necessary for an 4 month effort to classify and describe the terrestrial ecological systems of Hawai‘i, and to work with NatureServe (NS) to identify additional LANDFIRE (LF) map legend types to represent non-natural land cover units necessary for comprehensive LF mapping of Hawai‘i. The scope of work is divided into 2 components, with 2 deliverable dates (October 2007, and final products December 2008). The budget for this work is divided nearly equally across the 2 deliverable dates.

1a. Hawai‘i Draft ecological systems classification and map legend workshop (Honolulu?); xxx will develop a draft classification of ecological systems for Hawai‘i, building upon existing information and classifications for the state.

NatureServe ecology staff will provide guidelines and standards for the classification, along with pre-existing classification materials. NS will also assist with developing the draft concepts, identifying experts to invite to the workshop, and coordinating with the TNC LANDFIRE staff.

1b. Hawai‘i map legend workshop (Honolulu?); Xxx will then convene a group of vegetation classification experts in a workshop setting to discuss draft system concepts developed for Hawai‘i and to solidify the ecological systems for the state. This may need to be supplemented by additional meetings or work sessions (via email/conf call) to finalize the classification. This workshop should be held sometime in October or early November 2008 in order to meet the deliverable deadlines NatureServe has (all products for Hawai‘i due to LANDFIRE in January 2009).
NatureServe will participate in the workshop, and assist with facilitation of discussion and review. TNC staff will also participate, and will solicit input from vegetation experts in the development of state-transition succession models for the ecological systems of the state.

2. **Hawai‘i Legend type descriptions, distributions and crosswalks**: following the Oct/Nov 2008 workshop, xxx will complete final descriptions of all Hawai‘i ecological system types, as well as distributional information, and attribution of the existing NVC associations for Hawai‘i to ecological systems. An example of a draft system description is given in Appendix 1. NatureServe will provide standards and guidance for completion of these descriptions and other data. We estimate a total of somewhere between 30 and 40 systems for the state.

**DELIVERABLES/EXPECTED PRODUCTS:**

**Deliverable 1 (November 15, 2008)**: A draft systems classification (list of names, simple concept summaries, supporting literature) and workshop with vegetation experts to review the draft. NatureServe will review the draft, and assist as necessary in completion of final versions.

**Deliverable 2 (December 31, 2008)**: Final system descriptions (maximum of 40 systems), and distributional data, for all of Hawai‘i, and input on land cover types for the transitional and non-native vegetation of Hawai‘i. All of these to be provided to NS and other LF partners in Microsoft Word format or in a MS Access database which NatureServe will provide, in support of field work/mapping which may begin in January 2009. NatureServe will provide standards and guidance for the completion of these products, will review them as drafts are completed, will be responsible for incorporating them into Biotics, and providing Hawai‘i BMP with Biotics records for their installation should they desire them. The products will be finished in January 2009.

Payment: ~$11,500; this includes about $2000 for travel if needed.

Estimated to be about 5 full-time weeks of work.

The amount NatureServe has for this project is not to exceed the above. The travel funds would allow the contractor to travel from O‘ahu to other islands for meetings with experts if that seems appropriate. If travel doesn’t seem necessary, or less is needed, it could possibly be rolled into the salary to provide for more time for the contractor.

**CONTACT FOR MORE INFORMATION OR TO APPLY:**

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APPENDIX 1. An example of a final ecological system description.

HAWAI'I ULUHE FERNWOODLAND (CES412.219)

CLASSIFIERS
Classification Status: Standard
Primary Division: Northern Polynesia (412)
Land Cover Class: Woody Wetland
Spatial Scale & Pattern: Large patch, Matrix
Required Classifiers: Natural/Semi-natural; Vegetated (>10% vasc.); Wetland
Non-Diagnostic Classifiers: Montane [Lower Montane]; Lowland
National Mapping Codes: ESLF 9157

CONCEPT
Summary: Hawai'i Uluhe Fern Woodland occurs as a mosaic of small to large patches over moderate to steep slopes in lowland rainforest between 100 and 1200 m (330-3940 feet) elevation. The system extends up some ridges and peaks in the montane zones of Kaua'i, O'ahu, Moloka'i, Lâna'i, Maui, and Hawai'i in high rainfall areas, up to 5000 mm (200 inches), sometimes on newly exposed substrates, such as recent landslides. The substrate ranges from grey acid clays to thin organic mucks over 'a'a, ash beds, or young lava flows. The dominant uluhe fern (*Dicranopteris linearis*) forms a 1- to 2-m thick, nearly continuous ground cover of interlocked uluhe branches across open patches and between widely spaced *Metrosideros* trees. Associated species include *Broussaisia arguta, Dianella sandwicensis, Hedyotis centranthoides, Lycopodiella cernua (= *Palhinhaea cernua*), Machaerina spp., and *Sadleria* spp.

Classification Comments: This system is represented by a single community type recognized in Gagne and Cuddihy's treatment (Chapter 2, Wagner et al. 1999). Ziegler (2002) describes it as a late-intermediate seral stage in the development of upper lowland to lower montane wet forest. Mueller-Dombois and Fosberg (1998) describe the lowland and montane areas dominated by the species as a late-pioneer stage of successional development and, in older forests, as a pioneer of forest gaps and landslides.

DESCRIPTION
Dynamics: Invasive shrubs *Melastoma candidum, Psidium cattleianum*, and *Psidium guajava* alter community structure and may reduce available soil moisture during periods of drought. The uluhe mat is known to carry wildfire, and its presence may indicate presence of past disturbance by fire; however, current fire in this system favors the invasion of broomsedge (*Andropogon virginicus)*.

MEMBERSHIP
Associations:
• *Dicranopteris linearis* Lowland Wet Shrubland (CEGL008048, G4)
• *Metrosideros polymorpha / Dicranopteris* spp. Lowland Wet Shrubland (CEGL008049, G3)
• *Metrosideros polymorpha / Dicranopteris* spp. Montane Wet Woodland (CEGL008041, G3)

Alliances:
• *Dicranopteris linearis* Shrubland Alliance (A.699)
• *Metrosideros polymorpha / Dicranopteris linearis* Shrubland Alliance (A.702)
• *Metrosideros polymorpha* Woodland Alliance (A.466)

SPATIAL CHARACTERISTICS
Adjacent Ecological Systems:
• Hawai'i Montane Rainforest (CES412.215)

DISTRIBUTION
Range: This system occurs from 100 to 1200 m (330-3940 feet) elevation on Kaua'i, O'ahu, Moloka'i, Lâna'i, Maui, and Hawai'i.
Divisions: 412:C
Nations: US
Subnations: HI
TNC Ecoregions: 65:C

SOURCES
Description Author: M. Castillo
Version: 20 Apr 2005
Concept Author: M. Castillo and G. Kittel

Stakeholders: West
ClassifResp: West