Standard Operating Procedure (SOP) #2:

Training Observers

Version 1.02 (May 3, 2021)

Change History

New Version #	Revision Date	Author	Changes Made	Reason for Change	Previous Version #
1.01	1/12/2017	Ali Ainsworth, Kathryn Akamine	Added reference to previous species lists	Improve training recommendation	1.0
1.02	5/3/2021	Kathryn Akamine	Added new procedures and training SOP. Updated SOP references and external links.	The addition of new methods and new technology. SOP references and external links were outdated.	1.01

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP outlines the steps to train field crew members to identify native and non-native plant species within the Pacific Island Network (PACN) parks and to become familiar with methods used to collect field data on focal plant communities. Skill in plant identification is particularly important as misidentification of a species is one of the most serious errors crew members can make during vegetation monitoring.

Procedures

Prior to initiating monitoring all field crew members should review the monitoring protocol SOPs. Time should be spent learning or reviewing field identification characteristics for plant species that may be observed during the field season as well as practicing field collection methods.

Species Identification

The ability to identify both native and non-native plant species is essential to the collection of credible, high-quality plant community data. Recognizing that a species is unknown and collecting a voucher specimen is equally as crucial. Field crew may be composed of seasoned crew members, interns, and/or volunteers. Be aware of the current training level of each crew member and work

with them to establish a basic understanding of field botany as well as plant anatomy. Field leaders will have a more advanced understanding of field botany and ability to identify plant species; however, there will be times when an unknown plant is encountered and cannot be identified to the desired taxonomic level. In these cases, detailed photos must be taken and, if possible, a voucher specimen must be collected and assigned a temporary name to be recorded in the field records until a proper determination can be made for that specimen (see SOP #12 Collecting and Vouchering and SOP #10 Conduction Community Vegetation Monitoring).

Reference materials provided to the crew include species lists for each sampling area. In order to become familiar with the flora of an intended sampling frame, field crew members may examine lists of species encountered during previous sampling events, books, reports, journal publications, web sites, photographs, and herbarium collections that contain examples of all of the plant species that are expected to be encountered during the monitoring effort that coming year. A list of references is provided in the suggested reading section of this SOP. Copies of most of these resources should be available at each park so they can be used to assist with field identifications as needed.

At least one day should be dedicated to species identification training (or refresher training). It is recommended to go into the sampling frame to identify common species that will be seen throughout the season. On this day a variety of species can be discussed, and ample time is given for the crew to take notes and photos for their own reference.

When sampling a plot, prior to the initiation of data collection, the crew should record what species is seen within the plot's boundaries (Form 3 Species Presence). It is at this time that each species recorded can be further discussed, described, and pointed out to ensure each crew member can identify species correctly. This should be done at every plot to increase confidence and proficiency of species identification.

Field Sampling Methodology

A detailed description of the methods used to monitor focal plant communities is provided in SOP #10 Conducting Community Vegetation Surveys. Additional procedures used during monitoring are described in SOP #6 Using Garmin® GPS Units, SOP #8 Using ArcGIS® Field Maps App, SOP #9 Establishing and Marking Vegetation Monitoring Plots, and SOP #11 Using a Clinometer to Measure Height. These techniques are based on standard vegetation sampling procedures that are described in several of the references listed in the bibliography.

Suggested Reading

Field Sampling Methods

Elzinga, C. L., D. W. Salzer, J. W. Willoughby and J. Gibbs. 2001. Monitoring Plant and Animal Populations. Denver, Colorado, Blackwell Science Ltd.**:** 360.

Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and Methods of Vegetation Ecology. New York, London, Sydney, Toronto, John Wiley and Sons.

Species Identification

Bohm, B. A. 2004. Hawai‘i's Native Plants. Honolulu, HI, Mutual Publishing.

Craig, P. 2010. National Park of American Samoa: Nature and Science. Department of the Interior, National Park Service. Available at https://www.nps.gov/npsa/learn/nature/index.htm (accessed 3 May 2021).

Craig, P., editor. 2009. Natural History Guide to American Samoa (3rd edition). National Park of American Samoa, American Samoa Department of Marine and Wildlife Resources, and American Samoa Community College: Community and Natural Resources Division, Pago Pago, American Samoa. Available at http://www.botany.hawaii.edu/basch/uhnpscesu/pdfs/NatHistGuideAS09op.pdf (accessed 23 June 2022).

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Hawai‘i Ecosystems at Risk Project Hawai‘i Ecosystems at Risk Project Web Pages. www.hear.org.

Merlin, M. 1999. Hawaiian Coastal Plants, Pacific Guide Books.

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Moore, P. H. and P. McMakin. 2005. I Tinanom Guahan Siha - Plants of Guam Website. https://www.uog.edu/schools-and-colleges/college-of-natural-and-applied-science/ (accessed 3 May 2021).

Palmer, D. D. 2002. Hawai‘i's Ferns and Fern Allies., University of Hawai‘i Press, Honolulu.

Raulerson, L. and A. Reinhart. 1991. Trees and Shrubs of the Northern Mariana Islands. Saipan, CNMI, Office of the Governor, Saipan, CNMI.

Staples, G. W. and D. R. Herbst. 2005. A tropical garden flora: plants cultivated in the Hawaiian Islands and other tropical places. Honolulu, HI, Bishop Museum Press.

Vogt, S. R. and L. L. Williams. 2004. Common Flora and Fauna of the Mariana Islands. Saipan, WinGuide.

Wagner, W. L., D. R. Herbst and S. H. Sohmer. 1990. Manual of the Flowering Plants of Hawai‘i. Honolulu, HI, University of Hawai‘i Press, Bishop Museum Press.

Wagner, W. L., D. R. Herbst, and D. H. Lorence. 2005-. Flora of the Hawaiian Islands website. https://naturalhistory2.si.edu/botany/hawaiianflora/ (accessed 3 May 2021).

Walter, M. 2004. A Guide to Hawai‘i`s Coastal Plants. Honolulu, HI, Mutual Publishing.

Whistler, A. 2004. Rainforest Trees of Samoa: A guide to the common lowland and foothill forest trees of the Samoan Archipelago. Honolulu, HI, Isle Botanica.

Yoshioka, J. 2005. Vegetation Survey of the War in the Pacific National Historical Park, Guam, Mariana Islands. Honolulu, HI, University of Hawai‘i at Manoa, Pacific Cooperative Studies Unit: 106.

Plant Communities and Species Lists

Cuddihy, L. and C. P. Stone. 1990. Alteration of native Hawaiian vegetation: effects of humans, their activities and introductions., Cooperative National Park Resources Studies Unit, University of Hawai'i, Manoa.

Mueller-Dombois, D. and F. R. Fosberg. 1998. Vegetation of the Tropical Pacific Islands. New York, New York USA, Springer-Verlag.

Obha, T. 1994. Flora and Vegetation of the Northern Mariana Islands. Chiba, Japan, Natural History Museum and Institute.

Ragone, D. and D. H. Lorence. 2003. Botanical and Ethnobotanical Inventories of the National Park of American Samoa. Kalaheo, Kauai, Hawai‘i, National Tropical Botanical Garden: 96.

Space, J. D. and T. Flynn. 2000. Reports on Invasive Species on Pacific Islands. http://www.hear.org (accessed 3 May 2021), Pacific Island Ecosystems at Risk (PIER).

Staples, G. W. and R. H. Cowie, Eds. 2001. Hawai‘i's Invasive Species: A guide to invasive plants and animals in the Hawaiian Islands. Honolulu, HI, Mutual Publishing and the Bishop Museum Press.

Stone, C. P., C. W. Smith and J. T. Tunison, Eds. 1992. Alien Plant Invasions in Native Ecosystems of Hawai‘i: Management and Research, Cooperative National Park Resources Studies Unit, University of Hawai‘i, Department of Botany.

Whistler, A. 2002. The Samoan Rainforest: A Guide to the Vegetation of the Samoan Archipelago, Isle Botanica.

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