

# Restoration Ecology and Ecophysiology

**Dr. Susan Cordell**  
**Plant Physiological Ecologist, Restoration Team**  
**Institute of Pacific Islands Forestry**  
**USDA Forest Service**  
**Scordell01@fs.fed.us**



## Education

B.A. Aquatic Biology, 1987, University of California, Santa Barbara  
M.S. Botany, 1996, University of Hawaii, Manoa  
Ph.D. Botany, 1999, University of Hawaii, Manoa

## Research Interests/Duties

Dr. Cordell's interests involve ecophysiology, restoration ecology, functional ecology, tropical dry ecosystems, grass invasions, and Hawaiian ecosystems.

## Current Emphases, Studies, Projects

- Ecosystem level impacts of invasive grasses on Hawaiian dry forest ecosystems.
- Mechanisms by which fountain grass limits Hawaiian dry forest native plant establishment and growth by manipulating fountain grass, available water, and available light separately and in concert.
- Functional ecology and phenology of dry forest canopy trees  
Investigating the role that native plant reforestation plays in reducing fine fuel load hazards and reversing the cumulative adverse ecosystem level effects of monotypic stands of invasive grasses in leeward Hawaii.
- Impacts of invasive species on lowland forest ecosystem processes, specifically, rainfall interception, plant water use and acquisition, light availability and plant productivity.

## Selected Publications

- Ostertag, R. Cordell, S. Michaud, J., Cole, T.C., Schulten, J.R., Publico, K.M., Enoke, J.H. *in press*. Ecosystem and restoration consequences of invasive woody species in Hawaiian lowland wet forest: Ecosystems.
- Brooks, S., Cordell, S., and Perry, L. *in press*. Broadcast seeding as a potential tool to reestablish native species in dry forest ecosystems in Hawaii. *Ecological Restoration*.
- Cordell, S., McClellan, M., Yarber Carter, Y. Hadway, L.J. *In press*. Towards Restoration of Hawaiian Tropical Dry Forests: The Kaupulehu Outplanting Program. *Pacific Conservation Biology*.
- Cordell, S., and Sandquist, D.R. 2008. The impact of an invasive African bunchgrass (*Pennisetum setaceum*) on water availability and productivity of canopy trees within a tropical dry forest in Hawaii. *Functional Ecology* 22: 1008-1017.
- Ostertag, R. Giardina, C.P., and Cordell, S. 2008. Understory invasion of *Eucalyptus* plantations in relation to light and nutrient levels. *Restoration Ecology* 16:475-485.
- Zimmerman N., Flint Hughes R., Cordell S., Hart P., Chang H.K., Perez D., Like R.K. and Ostertag R. 2008. Patterns of Primary Succession of Native and Introduced Plants in Lowland Wet Forests in Eastern Hawaii. *Biotropica* 40: 277-284.
- Litton C.M., Sandquist D.R. and Cordell S. 2008. A non-native invasive grass increases soil carbon flux in a Hawaiian tropical dry forest. *Global Change Biology* 14: 726-739.
- Sandquist D.R. and Cordell S. 2007. Functional diversity of carbon-gain, water-use, and leaf-allocation traits in trees of a threatened lowland dry forest in Hawaii. *Am. J. Bot.* 94: 1459-1469.

- Giardina, C. P., Litton, C.M., Thaxton, J.M., Cordell, S., and Sandquist, D.R. 2007 Science driven restoration: A candle in a demon haunted world – Response to Cabin (2007). *Restoration Ecology*. 15: 171-176.
- Fisher, J.B., Goldstein, G., Jones, T.J., and Cordell, S. 2007. Wood vessel Diameter is related to elevation and Ecotype in the tree *Metrosideros polymorpha* (Myrtaceae). *American Journal of Botany*. 94: 709-715.
- Cornwell, W. K., Bhaskar, R., L. Sack, L., and Cordell, S. 2007. Hydraulic strategies of Hawaiian *Metrosideros polymorpha* at high and low precipitation. *Functional Ecology*. 21: 1063-1071.
- Wong, C.P. 2006. Hawaiian Lowland Wet Forests: Impacts of Invasive Plants on Light Availability, Advisors: Susan Cordell (1) and Rebecca Ostertag (2) *Journal of Young Investigators*. 6 (16): <http://www.jyi.org/research/re.php?id=1080>.
- Litton, C.M., Sandquist, D.R., and Cordell, S. 2006. Aboveground live biomass in pristine, invaded and converted tropical dry forests of Hawai'i. *Forest Ecology and Management* 231: 105-113.
- Baskin, J.M., B. H. Davis, C. C. Baskin, S. M. Gleason and S. Cordell. 2004. Physical dormancy in seeds of *Dodonaea viscosa* (Sapindales, Sapindaceae) from Hawaii. *Seed Science Research* 14: 81-90.
- James, S. A., S. Cordell, C.F. Puttock, and R.P. Adams. 2004 Morphological and genetic variation within *Metrosideros polymorpha* (Myrtaceae) populations from different habitats on Hawai'i. *New Zealand Journal of Botany* 42: 263-270.
- Cordell, S.; Sandquist, D.R.; Litton, C.; Cabin, R.J.; Thaxton, J.; Hadway, L.; Castillo, J.M.; Bishaw, D. 2004. An invasive grass has significant impacts on tropical dry forest ecosystems in Hawaii: The role of science in landscape level resource management and native forest restoration in West Hawaii. In: Proceedings of the Society for Ecological Restoration annual meeting, 2004 August 24-27; Victoria, Canada.
- Cordell, S., R. J. Cabin, and L. J. Hadway. 2002. Physiological ecology of native and alien dry forest shrubs in Hawaii. *Biological Invasions* 4:387-396.
- Cabin, R. J., S. G. Weller, D. H. Lorence, S. Cordell, L. J. Hadway, R. Montgomery, D. Goo, and A. Urakami. 2002. Effects of light availability, alien grass control, and native species additions on the restoration of a degraded tropical dry forest in Hawai'i. *Ecological Applications* 12:1595-1610.
- Cordell, S. 2002. Outplanting at Ka'upulehu; Restoring Native Hawaiian Dry Forests. *Hawaii Landscape*: 6: 12-13.
- Cordell, S., R.J. Cabin, S.G. Weller, D.H Lorence. 2002 Simple and Cost-Effective Methods Control Fountain Grass in Dry Forests (Hawaii). *Ecological Restoration*: 20: 139-140.
- Cabin, R.J., S.G. Weller, D.H. Lorence, S. Cordell, and L.J Hadway. 2002 Effects of microsite, water, weeding and direct seeding on the regeneration of native and alien species within a Hawaiian dry forest preserve. *Biological Conservation*: 104: 181-190.
- Cordell, S., G. Goldstein, F.C Meinzer, and P.M Vitousek. 2001 Regulation of leaf life-span and nutrient-use efficiency of *Metrosideros polymorpha* in N and P limited Hawaiian forests. *Oecologia*: 127: 198-206.
- Cordell, S., G. Goldstein, F.C Meinzer, and P.M Vitousek. 2001 Morphological versus physiological adjustment to N and P fertilization in *Metrosideros polymorpha* canopy trees in Hawaii. *Tree Physiology*. 21: 43-50.
- Cordell, S., G. Goldstein, F.C Meinzer, and L.L Handley. 1999 Allocation of nitrogen and carbon in leaves of *Metrosideros polymorpha* regulates carboxylation capacity and  $d^{13}C$  along an altitudinal gradient. *Functional Ecology*: 13: 811-818.
- Cordell, S., G. Goldstein. 1999 Light distribution and photosynthesis of *Metrosideros polymorpha* dominated forests at both ends of a nutrient and substrate age gradient in Hawaii. *Selbyana* 20: 350-356.
- Cordell, S., G. Goldstein, D. Mueller-Dombois, D. Webb, and P.M. Vitousek. 1998 Physiological and morphological variation in *Metrosideros polymorpha*, a dominant Hawaiian tree species: The role of phenotypic plasticity. *Oecologia* 113: 188-196.