

**PACIFIC COOPERATIVE STUDIES UNIT
UNIVERSITY OF HAWAII AT MĀNOA**

Dr. David C. Duffy, Unit Leader
Department of Botany
3190 Maile Way, St. John #408
Honolulu, Hawaii 96822



Technical Report 194

Development of tree snail protection enclosures: From design to implementation

March 2016

Jobriath Rohrer¹, Vincent Costello¹, Jamie Tanino¹, Lalasia Bialic-Murphy², Michelle Akamine¹, Jonathan Sprague³, Stephanie Joe¹ and Clifford Smith¹

Funded by: U.S. Army via U.S. Army Corps of Engineers Cooperative Agreement
W9126G-10-2-0017

¹ The Oahu Army Natural Resource Program (OANRP) USAG-HI, Directorate of Public Works Environmental Division IMPC-HI-PWE 947 Wright Ave., Wheeler Army Airfield, Schofield Barracks, HI 96857-5013

² Department of Botany, University of Hawaii at Manoa 3190 Maile Way, St. John 101, Honolulu, Hawaii 96822, USA

³ Pacific Islands Fish and Wildlife Office. 300 Ala Moana Boulevard, Room 3-122. Honolulu, HI 96850

PCSU is a cooperative program between the University of Hawai'i and U.S. National Park Service, Cooperative Ecological Studies Unit.

Organization Contact Information:

The Oahu Army Natural Resource Program (OANRP) USAG-HI, Directorate of Public Works
Environmental Division IMPC-HI-PWE 947 Wright Ave., Wheeler Army Airfield, Schofield Barracks, HI
96857-5013. Office: (808) 295-2556. jobriath.l.rohrer.ctr@mail.mil

Recommended Citation:

Rohrer, J, V. Costello, J. Tanino, L. Bialic-Murphy, M. Akamine, J. Sprague, S. Joe and C. Smith. 2016. Development of tree snail protection enclosures: From design to implementation. Pacific Cooperative Studies Unit Technical Report 193. University of Hawai'i at Mānoa, Department of Botany. Honolulu, HI. 58 pages.

Key words:

Predator proof fence, *Achatinella mustelina*, endangered tree snails

Place key words:

Pacific islands, O'ahu, Pu'u Hapapa, Honouliuli Forest Reserve

Editor: David C. Duffy, PCSU Unit Leader (Email: dduffy@hawaii.edu)

Series Editor: Clifford W. Morden, PCSU Deputy Director (Email: cmorden@hawaii.edu)

About this technical report series:

This technical report series began in 1973 with the formation of the Cooperative National Park Resources Studies Unit at the University of Hawai'i at Mānoa. In 2000, it continued under the Pacific Cooperative Studies Unit (PCSU). The series currently is supported by the PCSU.

The Pacific Cooperative Studies Unit at the University of Hawai'i at Mānoa works to protect cultural and natural biodiversity in the Pacific while encouraging a sustainable economy. PCSU works cooperatively with private, state and federal land management organizations, allowing them to pool and coordinate their efforts to address problems across the landscape.

TABLE OF CONTENTS

ABSTRACT	1
INTRODUCTION.....	2
THE O‘AHU TREE SNAILS	3
<i>ACHATINELLA</i> BIOLOGY AND MANAGEMENT	4
OANRP MANAGEMENT STRATEGY	4
NON-NATIVE PREDATORS OF <i>ACHATINELLA</i>	6
<i>Rats</i>	7
<i>Rosy Wolfsnails</i>	7
<i>Jackson’s Chameleons</i>	8
SNAIL ENCLOSURES	8
EARLY ENCLOSURES.....	8
DEVELOPMENT OF NEW BARRIERS	9
<i>Angle Barrier</i>	10
<i>Cut Mesh Barrier</i>	14
<i>Electric Barrier</i>	19
COMPLETE FENCE	23
<i>Fence Integrity Monitoring</i>	26
<i>Debris Alarm Monitoring</i>	27
<i>Electric Fence Monitoring</i>	29
FENCE MANAGEMENT	30
<i>Introduction</i>	30
THREAT CONTROL	34
<i>Rodent Eradication</i>	34
<i>Chameleon Eradication</i>	34
<i>Euglandina Eradication</i>	38
HABITAT RESTORATION	42
SNAIL REINTRODUCTION	42
<i>Post-release Monitoring</i>	46
<i>Monitoring Protocols</i>	46
ENCLOSURE HABITAT RESTORATION	52
CONCLUSIONS.....	55
MANAGEMENT IMPLICATIONS	55
ACKNOWLEDGEMENTS.....	56
LITERATURE CITED.....	56