

Standard Operation Procedure (SOP) #21:

Snail (hihiwai) Surveys in Hawaii

Version 1.00

Change History

New Version #	Revision Date	Author	Changes Made	Reason for Change	Previous Version #

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, identify paragraphs and pages where changes are made, who approved the revision, and the reason for making the changes along with the new version number.

Purpose

This Standard Operating Procedure describes setting up a sampling station (reach) and conducting a snail survey using a quadrat sampling design. This SOP will be used in Hawaii on the island of Maui at HALE and on the island of Molokai at KALA.

Overview of procedure

Sampling moves from downstream to upstream. A total of 10 quadrats per reach will be surveyed. Sampling requires one observer collecting snails, and a second observer measuring snails and recording data. The observers first collect and measures all snails, and count all post-larval snails called spat that measure less than 5mm then proceed to an adjacent area to count egg capsules. Datasheets are included in Appendix #11: “Data Sheets: Hawaii.”

Conducting a survey for snails

Within each reach ten random number pairs are generated using the Cartesian coordinate system. These number pairs are the same coordinates used to conduct the fish and shrimp surveys. The Y coordinate represents the distance in meters upstream between 0 and 30. The X coordinate represents the distance in meters across the stream and varies depending on the maximum width of the stream. X coordinates for streams in Hawaii should be between 0 and 7. Coordinates should be ordered using the Y coordinate starting with 0 to facilitate movement upstream. When facing upstream, 0 begins on the left bank. To count snails each observer paces off the meters to the appropriate quadrat location based on the coordinate system and places a thin wire $\frac{1}{4}$ m² quadrat plot frame on the stream bed. Wearing a face mask and snorkel, the observer collects all snails (visible or located between and beneath boulders) within the quadrat and measures them with calipers. As demonstrated in Figure S.21.1, shell lengths are measured to the nearest millimeter,

as the longest distance between the apex (origin of whorl) and the anterior margin (Ford 1979). All loose gravel, cobble, and rocks are then removed and additional snails found within the quadrat are collected and measured. Snails are returned to the stream after being measured. Place the snail so that it can reattach to the substrate; don't just toss it back in or it may be eaten by a prawn. The number of post-larval snails [any snail ≤ 5 mm (Ford 1979; Hodges 1992)] within each quadrat is also recorded (counted). After all snails in each quadrat are measured, the quadrat is flipped upstream and to the right once in order to count unhatched egg capsules in an undisturbed 156 cm² quadrat (one-quarter of the plot frame).



Figure S.21.1. Measure the snail as the longest distance from the apex of the shell to the anterior margin (indicated by the pink line).