Remote Camera Monitoring and a Mark – Recapture Study of the Wandering Salamander in a Redwood Forest Canopy[1]

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Abstract

Crowns of old redwoods (*Sequoia sempervirens* (D. Don) Endl.) are teaming with life. Storm damage followed by recovery via trunk reiteration increases the structural complexity of redwood crowns over time. Bark and wood surfaces within complex redwood crowns accumulate debris and become covered with epiphytes. Arboreal soils develop beneath mats of the leather-leaf fern, *Polypodium scouleri*, and within pockets of decaying wood colonized by the evergreen huckleberry, *Vaccinium ovatum*, promoting water storage and allowing desiccation-sensitive creatures to flourish high above the ground. These habitats provide year-round refugia for insects, mollusks, and vertebrates like the wandering salamander (*Aneides vagrans*).

In 2013, we installed 48 crack-boards, which were designed to provide shelter for salamanders, within crowns of three trees at the Redwood Experimental Forest (REF), Klamath, California. Since then we conducted 38 visits and marked 59 salamanders, 21 of which have been recaptured at least once. Twelve recaptured salamanders were found in locations differing from their original point of capture. Of the 59 marked individuals, 27 were fitted with passive integrated transponder (PIT) tags. Using a handheld reader, tagged individuals can be located within arboreal habitats without disturbance. Detecting movement between ground and crown locations is also possible via tag-reading stations installed around tree bases.

Using power from a tree-based solar panel array and battery bank, a network of motion-triggered cameras continuously monitors use of selected habitats within two redwoods. To date, our remote monitoring yielded 70 salamander sightings and observations of many other arboreal organisms, including a frog, three rodent species, a bird, and a wide variety of invertebrates. Video data are sent via Wi-Fi to an off-site recording device that can be accessed remotely via computer. Within-crown microclimate data, including soil moisture at six locations, are also collected and available for download via the same Wi-Fi network system supporting the cameras. Internet service is available at the off-site location, which makes online live-streaming of video and microclimate data possible.

The mark-recapture study will be continued through 2018 and expanded to include PIT tagging salamanders captured on the ground beneath study trees. We will use paired stationary dataloggers and tag-reading stations installed both near ground level and within crowns to quantify movement of tagged salamanders between arboreal and terrestrial habitats. Video monitoring of arboreal habitats will also continue. Many of our video detections have been unexpected, revealing arboreal behaviors of species that until recently were unknown to occur in redwood canopies.

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