

The Use of Coverboards in Herpetofauna Monitoring

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Methods

Sampling design

A sampling design using coverboards was established to facilitate herpetofauna detection by volunteers in a natural environment. One hundred forty-four coverboards were placed within two protected areas located in the Mayacamas and Sonoma Mountains: Pepperwood Preserve (PWD) and Sonoma State University's Fairfield Osborn Preserve (FOP). Both preserves are located in Sonoma County, San Francisco North Bay Area, CA. Monitoring locations were centered around two pond sites at each preserve that contained water for at least part of the year because herpetofauna diversity is usually greatest in areas with moisture (Brode & Bury 1984). Also to increase the diversity of herpetofauna observations, the coverboard arrays were established in a variety of habitat types and canopy cover. At each pond, transects of coverboards were placed within the origin at the estimated average annual water level and spreading outward from the pond in three different habitat types: (1) grassland, (2) forest canopy edge, and (3) forest. Within each habitat type there were two 25-meter long transects spaced at a distance of 15 meters apart with six coverboards placed every 5 meters (Grant et al. 1992).

The canopy cover for each of the 144 coverboards was recorded using a conical densitometer. The average of four readings per coverboard were documented. Each coverboard was comprised of half-inch thick plywood and was two feet wide by four feet and was seasoned in the described environment for three months prior to data collection (Grant et al. 1992; Tietje and Vreeland 1997). Coverboards were set flush with the ground surface level. When present, grass was removed and duff was gently relocated prior to the placement of each coverboard in order to ensure sufficient contact. After each coverboard is checked, any displaced duff was replaced around coverboard edges to maintain the local herpetofaunal habitat. A GPS unit and preserve map was used to identify and place each transect. These plots were marked with a survey flag in case vegetation may hinder the ability of monitoring participants to visually locate the plot.

Survey Protocol

Coverboards were sampled every other week spanning the wet through dry season (December through July) from December 2015 through July 2017 (and will continue for two seasons post fire through July 2019). This seasonal time frame allowed for both amphibian and reptile peak abundances (Joppa et al. 2009). Surveys were

conducted at variable times of day to capture variation in climatic and environmental conditions and pond site visited first alternated. Upon sampling, coverboards were lifted whereupon all herpetofauna observations were recorded without the use of debris removal or tools. All reptile and/or amphibian (or lack thereof) were recorded on field datasheets.

Surveys occurred during as many different times of the day and weather conditions as possible so that all herpetofauna taxa in residence had a chance to be encountered and volunteers had the opportunity to use their smartphone technology during a variety of environmental conditions. Since two pond sites (72 coverboards) were included in one survey, pond sites were alternated for each survey. Therefore, each pond site included a half of a survey (36 coverboards). These survey halves were noted as “first half” or “second half”.

Weather variables

Precipitation during each survey was recorded as either “rain” or “no rain”. Percent cloud cover during each survey was categorized as “No (or few) Clouds” (0-33%), “Moderately Cloudy” (34-66%), or “Very Cloudy” (67-100%). Weather stations deployed in the Mayacamas Mountains at Pepperwood Preserve and Sonoma State University’s Fairfield Osborn Preserve on Sonoma Mountain collected a variety of weather-related data. The weather station logged temperature at a height of 1.5 meters and data were collected every 15 minutes. Air temperature (minimum, mean and maximum) and precipitation (previous months rainfall, current months rainfall, cumulative rainfall in water year, and previous years rainfall) was documented. The water year totals, the amount of precipitation that occurred October through September, was documented for both 2016 and 2017 for both the current year and previous year to sampling. Soil moisture (average during survey) data was collected at a depth of four inches (convert to cm) and was collected every 15 minutes.

References

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