

**Power analysis to detect changes in the abundance of juvenile and adult Farallon arboreal salamanders under cover boards**

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**Objectives**:

* To determine whether current monitoring of juvenile and adult salamanders provides sufficient statistical power to demonstrate change in abundance in 5 year increments over 20 years.
* To determine if the addition of small cover boards increased our power to detect changes in juvenile salamander abundance, to inform assessments in the event of mouse eradication.
* To determine the number of years required to detect an ecologically significant change in the abundance of juvenile and adult salamanders.

**Background/Justification for study:**

A study on the Farallon arboreal salamander (*Aneides lugubris farallonensis*)population was initiated in 2006 to determine seasonal activity, relative abundance, population status and trends and reproductive behavior. This information was important to establish a baseline to measure potential impacts of the planned mouse eradication. Results from a power analysis conducted in 2012 using data from 2006-2011 indicated that pre-eradication data provided sufficient statistical power to detect a 40% increase in juvenile salamanders within two to three years of data collection post-eradication. Information drawn from the original study is unfortunately limited to a small portion of Southeast Farallon Island and was not representative of the island-wide population size or density, and relied on data that may be skewed towards larger individuals.

In order to gain a more complete understanding of abundance and distribution of this species, a series of extensive island-wide surveys were conducted from the Fall of 2012 to the Spring of 2015. In addition, this new study included “small” cover boards paired with the “large” cover boards in an attempt to increase our ability to detect juvenile salamanders. To meet our objectives listed above we plan on combining data collected in the initial study with that of the new study (8 years of data) and conduct a power analysis to examine differences in detection prior vs post implementation of the “small” boards. Based on simple analysis of the current data we believe that the small boards are increasing our detection of juvenile salamanders and that performing another power analysis with our current data will provide more robust results to aid in management decisions related to the proposed mouse eradication project.

In addition to conducting power analyses on juvenile Farallon arboreal salamanders, we will employ similar methods for adult salamander population. With that information, we can determine whether the current study design is adequate to detect changes in salamander population over the long-term. This measure is important because it reflects more on the overall salamander population, including long-term production and survivorship.

**Budget:** $12,200