Mark-Recapture: Robust Design

Quantitative Analysis of Vertebrate Populations

Learning objectives

- Understand the limitations of open and closed population methods and improvements using the robust design.
- Describe the structure of the robust design

Define:

- super-population
- temporary emigration
- permanent emigration
- survival
- fidelity
- encounter probability
- apparent encounter probability
- return rate

Design

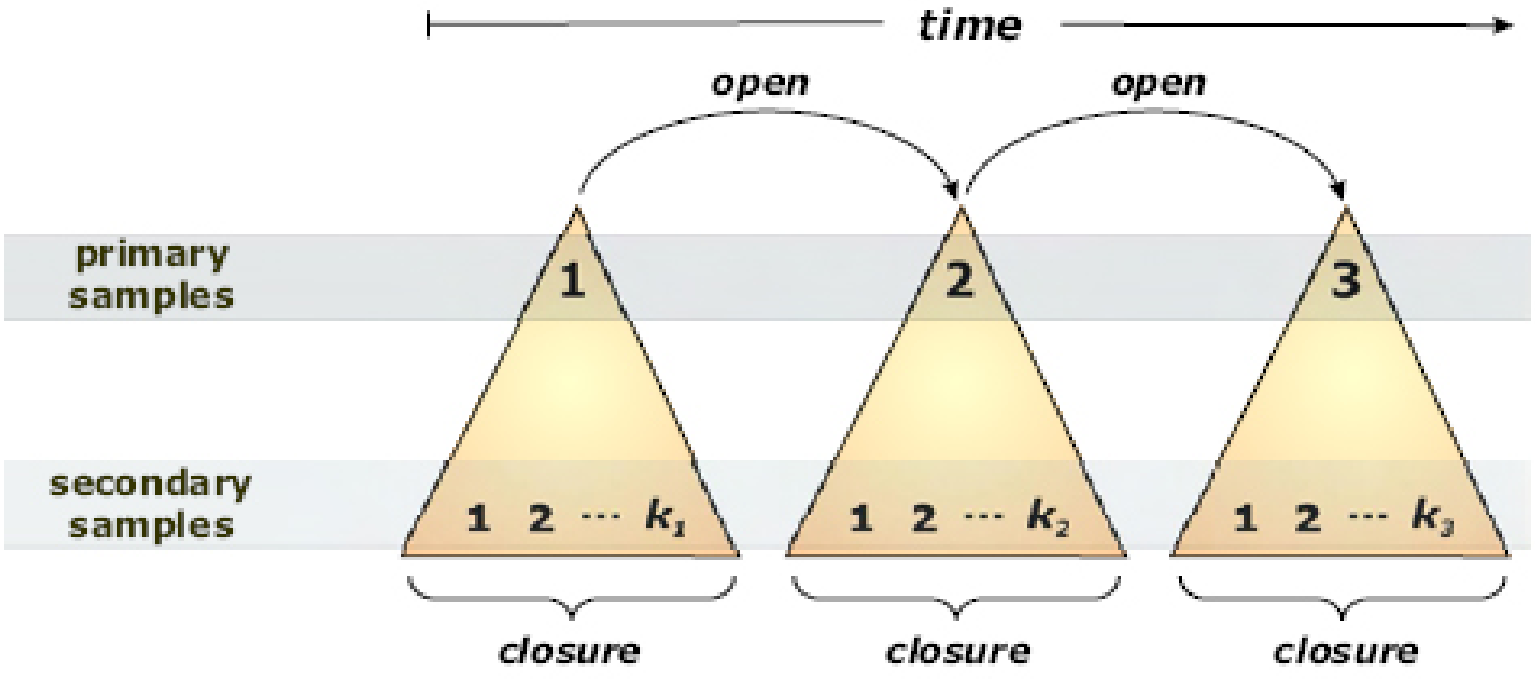

Figure 1: Figures/robust_design.jpg

Survival vs. Apparent Survival

Population vs. Super-Population

Encounter (detection)

Apparent Encounter Probability - probability of encounter given available

$$p = (1 - \gamma)p^*$$

where p^* is the probability of encounter (*e.g.* sighted, captured, detected)

Temporary Emigration vs. Permanent Emigration

temporary emigration γ

Return Rate

$$R = SF(1 - \gamma)p^*$$

Two Gammas

$\gamma^{\text{`}}$ vs. $\gamma^{\text{``}}$