**Sali Demographic Literature**

**Fecundity information:**

Savidge et al. (2018) reports Sali nest surveys and monitoring on Anderson Airforce Base (AAFB), both before and after deployment of newly developed nest boxes. Prior to deployment of new nest boxes, from May 2015 to January 2016, they monitored the fate of 52 nesting attempts in natural nests. The authors report that 50% of the 52 nests fledged young and the other 50% of nests failed at either the egg laying or nestling phase. The reported 50% nest success was calculated using raw data, i.e., the number of nests that fledged young, and, as reported by the authors, is likely biased high since the nests that fail early have a low probability of being found. The nests they monitored were primarily found in housing structures of AAFB, where brown treesnakes (BTS) are heavily controlled. After deployment of newly designed nest boxes, the authors monitored nests from March 2016 to August 2016. They found that nest success was higher in nest boxes than in natural nests, i.e., 82% nest success in nest boxes vs. 50% in natural nests. The number of eggs laid per clutch was found to be similar between natural nests and nest boxes.

* Parameter information from Savidge et al. (2018)
  + Estimates from natural nests (see Table 1-2 and page 6 of report)
    - 0.5 probability of nest success
    - Number of nesting attempts is 1.8125
      * Calculated from the number of nesting attempts (n=58) divided by the number of nests found (n=32)
    - Mean number of chicks fledged per clutch reported as 0.88
  + Estimated from newly developed nest boxes (see Table 2-1 and page 22 of report)
    - Probability of nest success was 0.8235
    - Number of nesting attempters per nest box used was 2.13
    - Number of fledglings per successful nest was 1.81 and number of fledglings per nest was 1.49

Savidge et al. (2022) reports on the breeding biology of Sali located on AAFB from 2015 to 2018. This work provides some reproductive data from 36 active nests found in both natural and artificial structures, along with data from predator-resistant nest boxes used by 48 pairs. They found that nest boxes placed at least 34 meters from the forest edge surround AAFB were colonized with 77% occupancy by the end of their research. They observed 431 nesting attempts, where pairs nested multiple times throughout the year. The average clutch size for the 431 nesting attempts was reported as 2.19, in either natural or artificial structures (including predator-resistant nest boxes). The clutch size ranged from 1 egg to 4 eggs: 31 nesting attempts resulted in 1 egg, 290 nesting attempts resulted in 2 eggs, 109 nesting attempts resulted in 3 eggs, and 1 nesting attempt resulted in 4 eggs. Additionally, the authors provide information on the duration of the incubation and nestling period: the average incubation period across 11 nests was 14.2 days and the average nestling period across 8 nests was 25.1 days. They also report the approximate days of young in each stage, i.e., naked young (1-9 days), partially feathered (10- 15 days), fully feathered (16 days until fledgling), and juvenile plumage (22-23 days). The mention that Sali reach full plumage at approximately 1 year old but may retain juvenile plumage for up to 16 months. All but two individuals were in full adult plumage when observed in breeding pairs. Nests were observed to be active in every month of the year, but there was higher breeding from March to September and less from October to February.

* Parameter information from Savidge et al. 2022
  + Average clutch size and range
    - Number of eggs per pair: 2.19, SD = 0.55 (1-4 range)
  + Approximate number of days spent in each early life stage, from hatch to fledge

**Fledgling survival information:**

Pollock et al. (2019) investigates post-fledgling survival on AAFB by tracking radio telemetered fledglings from April to December in 2017. Nestlings were banded on day 15 after hatching, then 2-3 days prior to fledgling (22-23 days post hatching), birds were fitted with a radio transmitter. They monitored a total of 43 fledglings across 7 age classes (0,1,2,3,4,5-8, and 9+ days post-fledging). From the total 43 fledglings monitored, 21 died within the first 5 days post-fledging, 4 died 5-8 days post-fledging, and 7 died 9+ days post-fledging. This results in an overall fledgling survival of 25.6%. The authors also calculated the cumulative probabilities of fledgling survival through days 5, 20, and 53. The most common causes of mortality for the individuals monitored were brown treesnakes (BTS, 56%), cat predation (19%), and exposure (13%). Further, nests located closer to the forest were associate with higher rates of BTS predation. This work also reports on movements and habitat use of the fledglings monitored, citing fledglings dispersed 3 weeks post-fledging (21.7 days). The authors compare the observed survival probability of Sali fledglings to other passerines that are cavity or cup nesters and mention that Sali are among the lowest for Passerines.

* Parameter information from Pollock et al. 2019
  + Fledgling survival ~0.26
    - 0.5 through day 5 post-fledging, 0.38 through day 20 post-fledging, and 0.26 through day 53 post-fledging
    - Mortality dropped to 0 after day 53 for the 11 birds that survived
      * Indicating older age classes, juveniles and adults, may have higher survival rates
    - Similar species fledgling survival rates:
      * Cavity nesters: mean = 0.79, range: 0.64 - 0.87
      * Cup nesters: mean = 0.54, range: 0.23 – 0.83

**Adult and juvenile survival information:**

Pollock et al. (2022) combines intensive surveys on AAFB with island-wide transect surveys and opportunistic observations of Sali to update the current understanding of the distribution and abundance on Guam. They report that the abundance of Sali has increased since the last survey in the 1990s. Further, Sali were sighted in other urban areas outside of AAFB but remain at low densities likely due to limited snake control outside of AAFB. They estimate approximately 1400 Sali are present on Guam and report a highly skewed age ratio at AAFB (where more than 90% of the population observed were adults or subadults).

* Parameter information from Pollock et al. (2022)
  + Abundance counts show highly skewed age ratio between adults and other age classes. See Table 2 for counts of Sali by age class in 2018.

In McElderry et al. (2022)’s work modeling native bird species persistence and BTS predation, the authors utilize the average of adult survival rates from Polynesian and Samoan Starlings from Pyle et al. (2018) in their Sali model. Pyle et al. (2018) reports mean Samoan Starling yearly adult survival as 0.664 across 3 islands and mean Polynesian Starling yearly adult survival as 0.824 across two islands. Further, McElderry et al. (2022) also utilizes Pollock et al. (2019)’s work on Sali fledgling survival to extrapolate to juvenile survival, using a juvenile survival value of 0.425 in their work.

* Parameter information from Pyle et al. (2018)
  + Adult survival
    - See Table 13 in Pyle et al. (2018) for Polynesian and Samoan Starling adult survival estimates
  + Juvenile survival
    - Extrapolated from Pollock et al. (2019)’s work

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| **On average, across time and individuals:** | | **Literature** |
| Adult survival | For birds that are 1 year old or older, what is the annual probability of survival? | See Pollock et al. 2022 for counts by age  McElderry et al. 2022 and Pyle et al. 2018 rates from other Starling species |
| Juvenile survival | From 1 month old to 1 year old, what is the probability of survival? | See Pollock et al. 2022 for counts by age.  Pollock et al. 2019 may be extrapolated to estimate juvenile survival from fledgling survival, as done in McElderry et al. 2022 |
| Fledgling survival | From fledging to 1 month old, what is the probability of survival? | Pollock et al. 2019  0.38 at day 20 |
| Nest Success | What is the probability that a nest produces at least one fledgling? | Savidge et al. 2018  0.5 – natural nests  0.8235 – nest boxes |
| Fledglings per nest | What is the number of fledglings produced per successful nest? | Savidge et al. 2018  0.88 – natural nests  1.81 – nest boxes |
| Nest attempts | What is the number of nesting attempts per adult per year? | Savidge et al. 2018  1.8125 – natural nests  2.13 – nest boxes |

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