



Introduction

- Captive Sonoran Desert Tortoises (*Gopherus morafkai*; "tortoise") cannot be released to the wild due to disease risk and unknown genetics, presenting a need for public adoptions^{1,2,3}
- Arizona Game & Fish's Tortoise Adoption Program (AZGFD-TAP) manages captive tortoises via public adoptions but is frequently over-capacity
- 4,600+ tortoises were adopted between 1982 and 2005¹
- Tortoise intake and surrender patterns remain unclear, but wild tortoise activity increases following spring rains and monsoons^{4,5,6}, possibly driving higher intake rates
- Herptile ownership is associated with higher income and education levels^{7,8}, making adopter demographics key for guiding future efforts

Research Questions:

- Q1:** Do tortoise intakes vary with rainfall within a year?
- Q2:** Do intakes and adoptions follow the same patterns?
- Q3:** Do frequency of adoptions vary with household income?

Methods

- Data provided from AZGFD-TAP:
 - INTAKES: Any tortoise surrendered, confiscated or brought to AZGFD-TAP (date, reason, age; n = 1464)
 - ADOPTIONS: Any tortoise acquired via application to AZGFD-TAP (date, zip code [adopter]; n = 1011)
- Rainfall Data: Maricopa County Historic Rainfall Database (2022-2025)
- Income Data: U.S. Census Bureau (2019-2023) 5-Year Estimates for AZ
- Data Analysis: R/R-Studio's packages "readxl," "lubridate," & "tidyverse"
 - Spearman's Rank correlations and linear models for Intakes-Adoptions, Adoptions/Intakes-Rainfall, Adoptions-Income
 - χ^2 goodness-of-fit between incomes classes for adoptions

Results

- Adoptions and intakes follow a similar pattern throughout the year, but Intakes peak in September ($p[43] = 0.489, p < 0.001$) (**Fig. 1**)
- Intake hatchlings increase in Sep and Oct (same highest months for Intakes) following peak monsoon rain months (Aug and Sep) (**Fig. 2**).
- No significant relationship between Rainfall and Adoptions (Adj. $R^2 = 0.001, p = 0.314$) or Intakes (Adj. $R^2 = -0.023, p = 0.960$) (**Fig. 3**).
- Adoptions are associated most frequently with middle-class household incomes ($\chi^2[4, n = 969] = 629.63, p < 0.001$) (**Fig. 4**).

Results

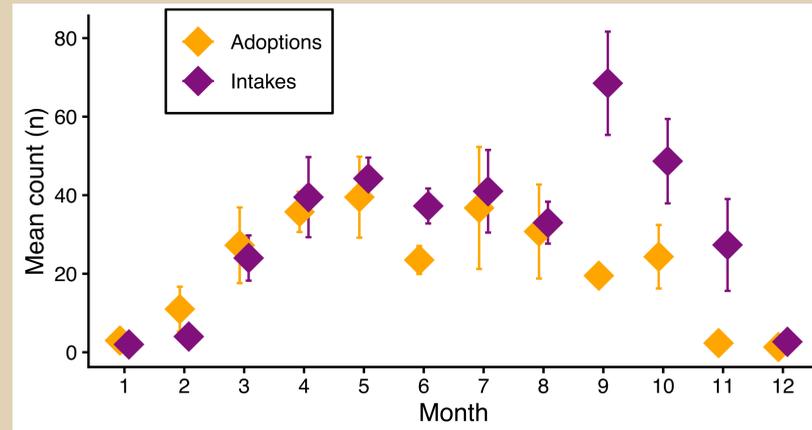


Figure 1. Mean number of intakes and adoptions by month between 2022 and 2025. Means are plotted with standard error bars for each group and months are represented numerically.

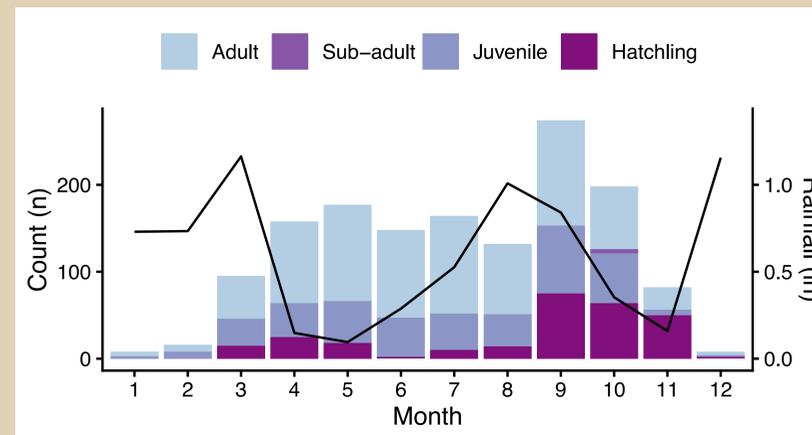


Figure 2. Total number of intakes by age class per month plotted with mean monthly cumulative rainfall between 2022 and 2025.

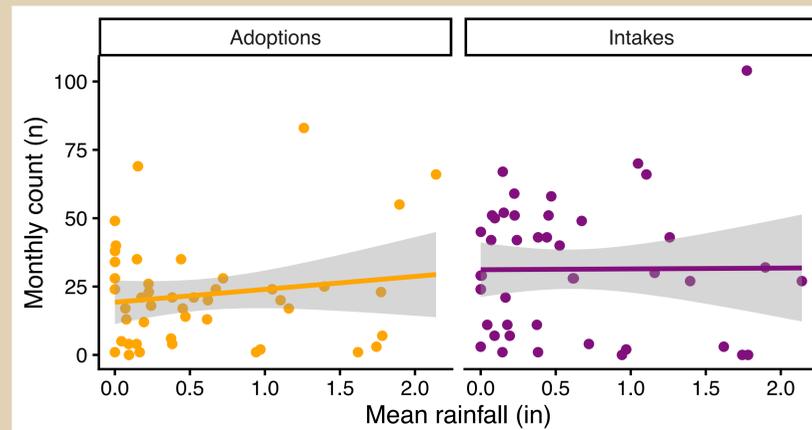


Figure 3. Models for adoptions (left) and intakes (right) by mean monthly rainfall. Neither model yielded a significant relationship, thus rainfall is not a good predictor of how many tortoises are adopted or surrendered.

Results

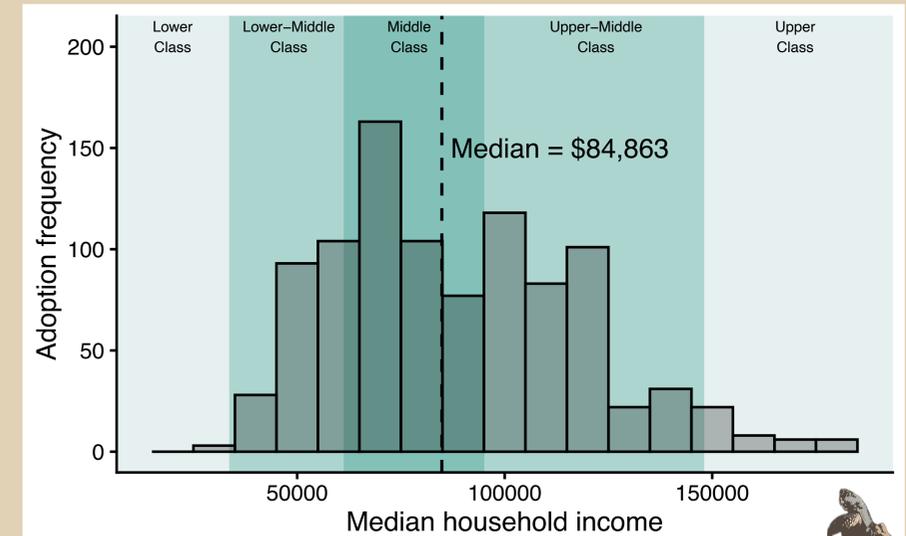


Figure 4. Distribution of adopter's median household income by zip codes between 2022-2025. Income classes are defined by percentile brackets in 20% increments of AZ's population. Based on zip codes of tortoise adopters, most adoptions occur in the middle class (median = ~\$84,800). A climbing Sonoran Desert Tortoise is pictured on the bottom right.



Conclusions & Future Directions

- Rainfall doesn't explain the number of intakes to AZGFD-TAP in a year—likely due to the the unimodal distribution of tortoise intakes and bimodal distribution of rainfall
- Strong correlation between intakes and adoptions warrants investigation of human influences
- Adoptions exhibit a positive correlation with income, with the median adopter belonging to the middle-class. This suggests that understanding motivational drivers, in addition to demographic variables, is essential for predicting adoption and surrender behaviors.
- Future directions include surveying adopters to investigate differences in values, attitudes, and underlying motives associated with adoption and surrender decisions.

Literature Cited & Acknowledgements

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We thank the Arizona Game and Fish Department for their valuable partnership and for providing the data used for this research.