**Scope of Work**

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Habitat conversion to agriculture and ongoing climate change will determine the fate of biodiversity in the Anthropocene. Many forms of habitat conversion (e.g., agricultural expansion, urbanization) remove insulating tree canopies, thereby reducing local thermal buffering and exposing organisms to extreme heat. Both increased heat and less vegetation cover may accelerate evaporation, reducing water available to organisms for use in thermoregulation, and further exacerbating the effects of heat. Physiological heat effects (i.e., overheating of nestlings) and food supply reductions are two main mechanisms through which heat might decrease the growth and survival of birds. Furthermore, we expect that irrigation and other sources of water will increase growth and survival of nestlings during hot periods. Our study leverages a network of 165 songbird nest boxes in California’s Central Valley, established by the UC Davis Museum of Wildlife and Fish Biology (MWFB) in 2000 (i.e., the Putah Creek Nestbox Highway), supplemented by 120 additional boxes placed in grassland, row crops, and orchard. Our focus is on the two most common nest box species: Tree Swallow and Western Bluebird, both of which nest in nest boxes in all four studied land uses. In April-August 2021 and 2022, we recorded weekly growth for nestlings, canopy cover at nest, and logged internal and external temperature every five minutes at 231 boxes. We also placed one relative humidity sensor per site to track water availability. In 2022 we collected a small blood sample to quantify nestling stress (N = 161 nests). We also used a small Raspberry Pi-based motion-activated camera to quantify parental food delivery rate at 48 nests.

**Deliverables**

During Spring/Summer 2023, I will conduct a third field season to increase sample size for parental food delivery rates. In Fall 2023 and Winter 2024, I will use ELISA assays to quantify corticosterone content in nestling blood samples. In Winter, Spring, and Summer 2024, I will write up my findings for publication and complete my dissertation.

**Requested support**

Summer 2023:

Spring 2023:

Fall 2023: I have a TA opportunity available for Fall, but if possible, funding for this quarter would allow me to focus exclusively on my research work.

Winter 2024:

Spring 2024: