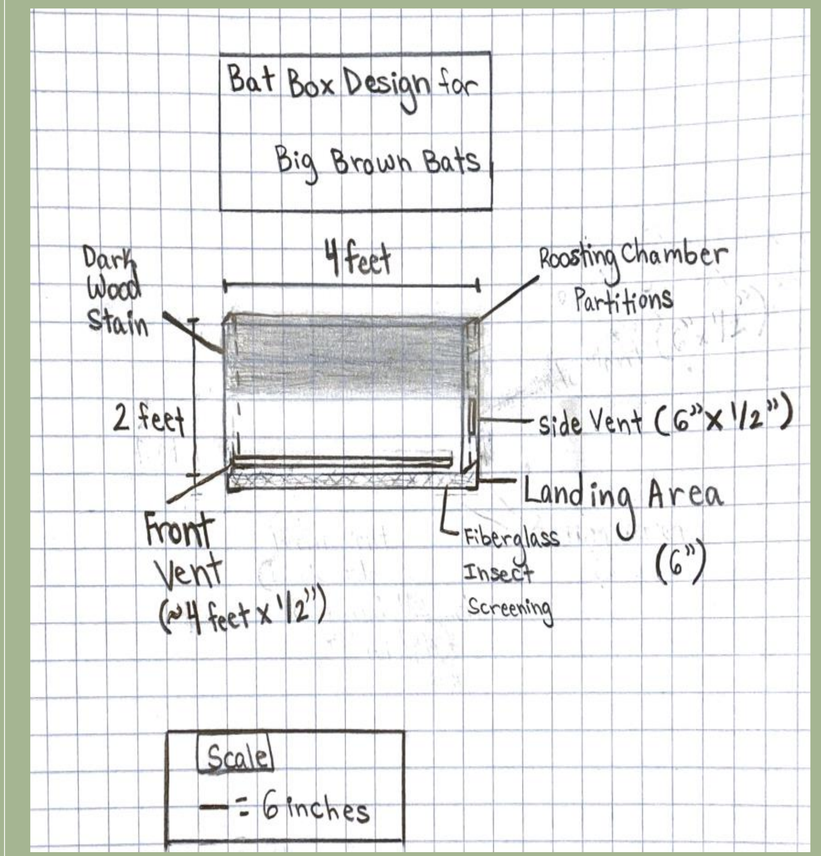
HOUSING AND INTEGRATING BATS INTO THE SUNY GENESEO CAMPUS ECOSYSTEM

Hailey Cullen, Gabrielle Joseph, & Faculty Advisor Professor Ahmad Almomani



Design

Optimal Temperature

- Bat boxes should have a wide internal temperature gradient to accommodate maternity colonies who need higher temperatures to promote pup growth/shorten gestation periods and avoid overheating
- Our design creates a temperature gradient using dark wood stain in the upper third of the box and vents without wood stain towards the bottom, a design adapted from a 2000 study on bat boxes for big brown bats that successfully created an internal temperature gradient (Brittingham & Williams, 2000)

Optimal Size

- Larger designs are best to allow for bat movement throughout the house to avoid overheating
- Our design is large at two feet tall and four feet wide
- Each roosting chamber is one inch wide since this is the preferred size for big brown bats

Shape and Features

- Rectangle shape with an open bottom, which is self-cleaning
- The backboard extends below the entrance six inches to create a landing area for the bats
- We included three roosting chambers and a wooden roof
- The interior walls, roosting chamber partitions, and landing area are covered with fiberglass insect screening (III) (IV)

White-nose Syndrome

- First detected in Albany, NY
- Thought to have originated in Europe or Asia
- Caused by *Pseudogymnoascus destructans*, a member of the fungal group geomyces
- Fungus can live in air, soil, water, and reproduce in cold temperatures
- Causes bats to leave caves prematurely during hibernation
- Primary mode of transmission is bat to bat
- Largest bat die-off in New York State history (I)

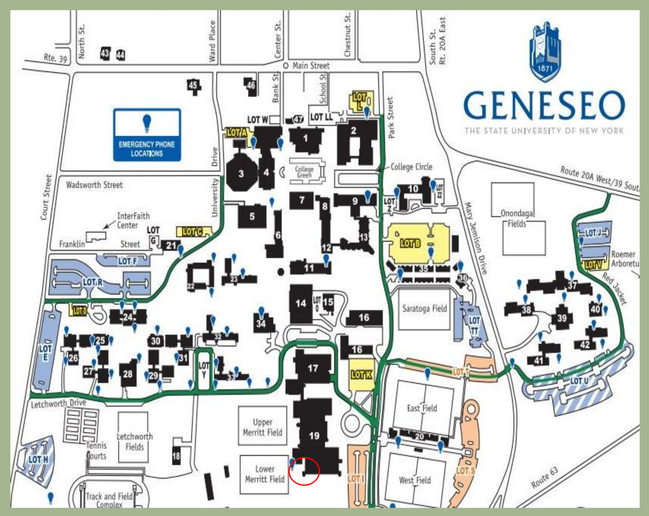
Sustainability of Materials

The materials necessary for implementing this design are sufficiently sustainable in their durability and minimal harmful impact on the environment.

- *Untreated plywood*; durable and sustainable if FSC certified
- *Fiberglass insect screening*; Recyclable and biodegradable
- *Screws*; promote longevity for the box
- *Water-based dark wood stain*; low VOC emission
- *Caulk*; promotes durability of the bat box

Considerations for Implementation

- Install the box before spring
- Gauge internal temperature range throughout the box hourly and daily before bats arrive
- Monitor bat occupancy in bat box once implemented



Big Brown Bat (*Eptesicus fuscus*)

- New York's largest cave bat, with a 13-inch wingspan
- Recognized by dark ears and face, and glossy, light to dark brown fur
- Typically winters near cave and mine entrances and is the only NY bat to regularly winter in buildings
- Raises young in trees and buildings
- Common summer bat, can be seen early evening and into the night foraging among the treetops
- Least affected New York species by white-nose syndrome (II)

References

Kerwin, Jenna, and Carl Harzog. "Bats on the Brink White Nose Disease Takes a Toll on New York's Bats." *New York S* (I) *tate Conservationist* , Feb. 2012.

(II) Stegemann, E., & Hicks, A., Bats of New York (n.d.). New York State Department of Environmental Conservation.

(III) Brittingham, M. C., & Williams, L. M. (2000). Bat boxes as alternative roosts for displaced bat maternity colonies . *Wildlife Society Bulletin*, *28*, 197–207.

(IV) Maslo, B., & Kerwin, K. (2017, February). *Guidance for siting and installing bat roost boxes*. New Jersey Agricultural Experiment Station. Retrieved April 2023, from https://njaes.rutgers.edu/fs1269/#:~:text=Bat%20houses%20are%20constructed%20to,brown%20bats%20(Myotis%20lucifugus).

(V) Crawford, R. D., & O'Keefe, J. M. (2021). Avoiding a conservation pitfall: Considering the risks of unsuitably hot bat boxes . *Conservation Science and Practice: A Journal of the Society for Conservation Biology* .

(VI) Maslo , B., & Kerwin, K. (2017, February). *Guidance for siting and installing bat roost boxes*. New Jersey Agricultural Experiment Station. Retrieved April 2023, from https://njaes.rutgers.edu/fs1269/#:~:text=Bat%20houses%20are%20constructed%20to,brown%20bats%20(Myotis%20lucifugus).

Location

The following factors make the northwestern corner of the Merritt Athletic Center the optimal location for a bat box:

1. Minimal disturbances
2. The box can be mounted at least 12 feet high
3. Building wall blocks drafts on one side of the box
4. At least seven hours of direct sunlight
5. Within half a mile of a permanent water source, the Genesee River (VI)