# Alternative Urban Landscapes : A Look into public perspective and ecosystems trade-offs


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## INTRODUCTION

- Ecosystems provide different benefits that contribute to the human's well-being. Carbon sequestration, temperature abatement, recreational benefits, and pollination are examples of ecosystem services (ES) provided by urban landscapes. Mixing plants belonging to different functional groups have the potential to increase ES in urban landscapes, assuming they are aesthetically pleasing and accepted by the end-user

- This study evaluated four different landscape types, adapted to subtropical climates. The goal of this study is to generate science-based information about the overall benefits, performance, and management requirements of these model landscape alternatives. As a result, different landscapes can be selected based on ecosystem tradeoffs, community goals, and consumer preference, rather than relying on opinions or anecdotal observations. Additionally, we will develop recommendations for managing (e.g., establishment periods, mowing requirements, weed control, etc.) these mixed-species groundcovers to educate the end user

**Objectives: Evaluate the feasibility, ecosystem tradeoffs, and public perception of different lawn alternatives**

## METHODS

- In April 2021, turfgrass plots located at the West Florida Research and Education Center, Jay, FL, U.S. were stripped using a sod harvester. After one week, the plots were planted/covered with three alternative landscapes (Figure 1), which included: **Legume-Grass mix; Forb mixture; Cypress woodchips; Turfgrass Lawn**
- The turfgrass plots consisted of a mixture of common centipedegrass (*Eremochloa ophiuroides* Munro) or 'Floratam' St. Augustinegrass [*Stenotaphrum secundatum* (Walt.) Kuntze]. The experiment was arranged as a randomized complete block design with eight replications
- All landscapes were irrigated with 2.5 cm of water for one month for establishment. Irrigation was not applied thereafter. The turfgrass plots were fertilized once with polymer-coated urea at 24 Kg N $ha^2$

## MEASUREMENTS

- A survey was administered to the Gulf Coast Turfgrass Field Day attendees and Master Gardeners to quantify their understanding and perception of these alternative lawns. Additionally, we measured; aesthetics (Visual quality); percent ground cover; temperature abatement (Surface temperature, FLIR E8 thermal imaging device); weed pressure (weed counts); pollinators (visual assessment of insects visiting flowers)

- ✓ Preliminary results suggest that the legume + turfgrass mixture provides a middle ground between the traditional turfgrass lawns and the forb mixtures

- ✓ While only ~25% of the survey respondents consider using the forb mix in their yards, ~40% indicated they would use the peanut + turfgrass mix

- ✓ The peanut + turfgrass mixture retains the recreational benefits and cultural values from a traditional turfgrass lawn being more likely to be adopted by end users


Figure 1. Picture showing an example of the four landscape types evaluated at located at the West Florida Research and Education Center, Jay, FL, U.S. Legume-Grass mix (Peanut + Turf): 'Pensacola' bahiagrass + 'Ecoturf' perennial peanut. Mowed biweekly at 7.6 cm; Forb mixture: sunshine mimosa (*Mimosa strigillosa* Torrey & A. Gray), coreopsis (*Coreopsis lanceolata*), frogfruit (*Phyla nodiflora*), and centipedegrass (*Eremochloa ophiuroides* Munro) ; Nonliving ground cover (Mulch): Cypress woodchips; Turfgrass Lawn: centipedegrass or 'Floratam' St. Augustinegrass [*Stenotaphrum secundatum* (Walt.) Mowed biweekly at 5 cm

## RESULTS AND DISCUSSION

- **Public Perception and Aesthetics:** Reducing the amount of fertilizer, erosion control and conserving irrigation were identified as the most important ES by the survey respondents (Figure 2). The traditional turfgrass lawn had the least variability in visual quality and percent ground cover over time compared to the forbs and the peanut + bahiagrass (Figure 3)

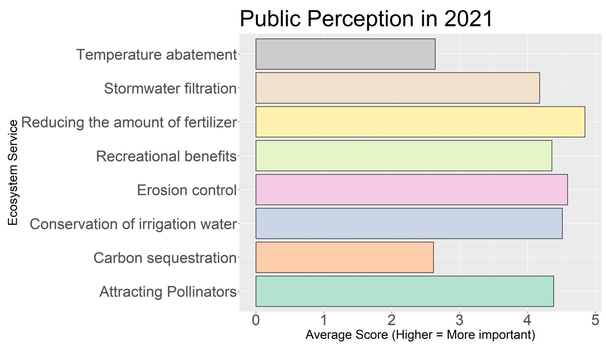


Figure 2. Ecosystem service ranking from survey respondents. Rankings are represented as weighted averaged scores (Higher number = more important)

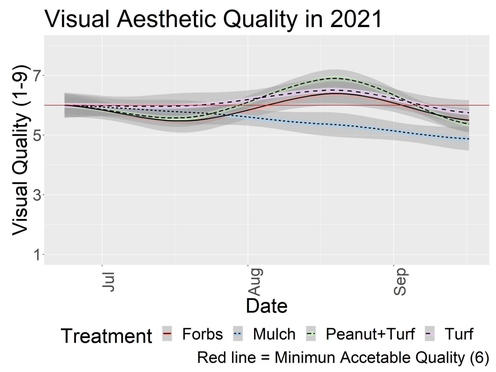


Figure 3. Mean Visual Aesthetic Quality (1 = poor quality, 6 = minimum acceptable quality and 9 = excellent). Four landscape types: Forbs; Mulch; Peanut + Turf; Turf

- **Weed Pressure:** The forb mix had the greatest weed pressure during establishment. Those differences evened out by September. We suggest that these changes were influenced by increasing percent ground cover in the forb mixture and the type of weeds present in the plots (annuals vs. perennials) (Figure 4)

- **Temperature abatement:** The vegetated groundcovers reduced surface temperatures compared to the wood chip mulch. Temperature abatement increased with canopy height

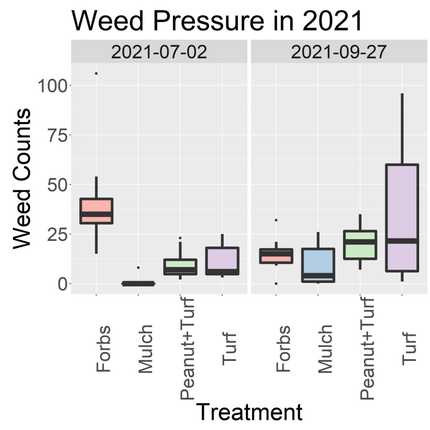


Figure 4. Weed pressure quantified as weed counts in July and September 2021. Four landscape types: Forbs; Mulch; Peanut + Turf; Turf

**Syrphid Flies maggots in Bahiagrass seedheads**

**Syrphid Flies Adults**

- **Pollinators:** the forb mixture had the greatest pollinator visits and biodiversity (Figure 5). However, we observed various pollinators and beneficial insects in the turfgrass and peanut + bahiagrass plots including, syrphid flies, bumble bees, and damselflies. The presence of these insects was highly influenced by the seasonal flower producing in both forbs and turfgrass

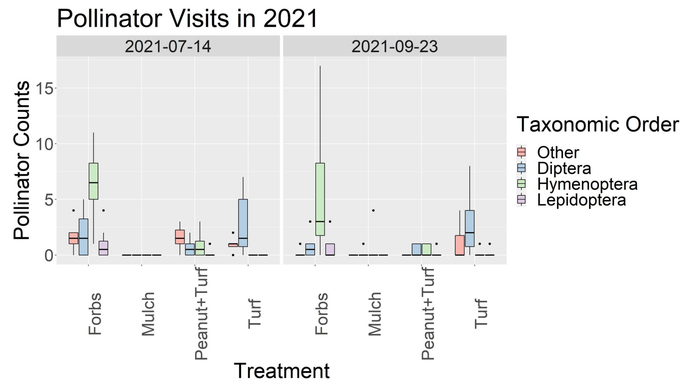


Figure 5. Pollinator counts in July and September 2021. Four landscape types: Forbs; Mulch; Peanut + Turf; Turf. Pollinators were groped into four taxonomic groups; Diptera (Syrphidae, Dolichopodidae, etc.), Hymenoptera (Apidae, Vespidae, etc.), Lepidoptera (Pieridae, Nymphalidae, etc.) and Other (Odonata, Hemiptera, etc.).