

MITIGATING WILDLIFE IMPACTS ON BOTTOMLAND HARDWOOD FOREST RESTORATION EFFORTS IN EAST TEXAS

RESTORATION EFFORTS IN EAST TEXAS

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Introduction

Objectives of this research: (1) Determine if white-tailed deer and feral swine cause a significant impact on the success of bottomland hardwood forests (BLHW) restoration attempts using multiple exclusion techniques; (2) Determine the most effective and economical procedures to reduce wildlife impact on seedling survival in bottomland hardwood forest restoration sites.

- BLHW are productive forested wetland ecosystems that provide a diversity of mast, browse, and structure for wildlife.
- Healthy BLHWs have the capability to support a high diversity of wildlife alongside important ecosystem services such as water quality enhancement, water storage and nutrient cycling.
- Over the past 100 years BLHW have been degraded and reduced due to unsustainable harvesting practices and via conversion to row crop agriculture. More recently, awareness and interest of BLHW habitat and ecological value has increased, driving restoration efforts.

Study Sites

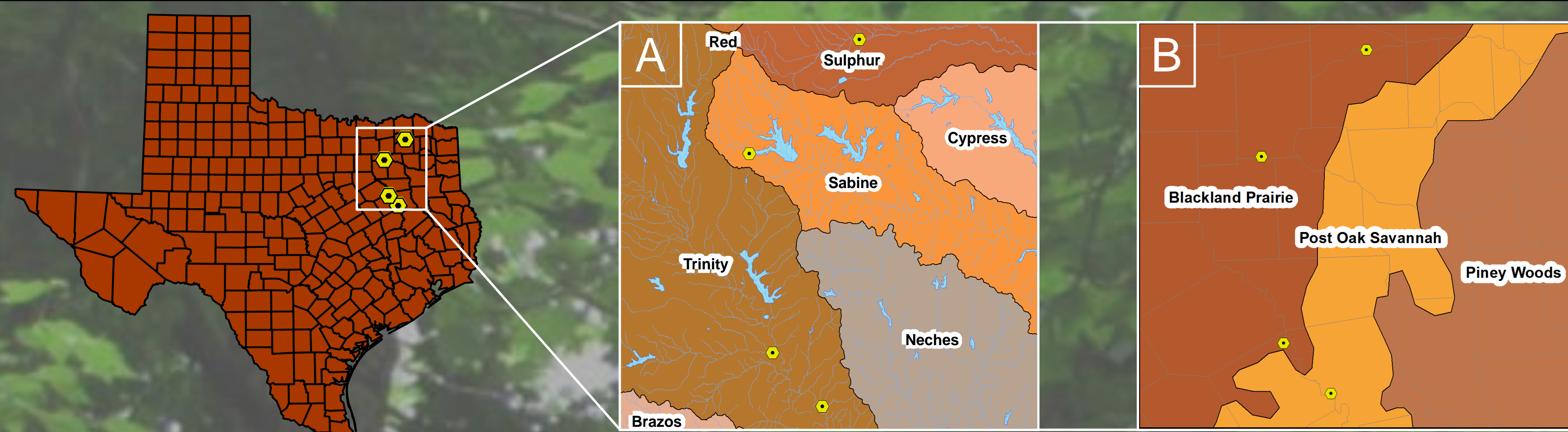
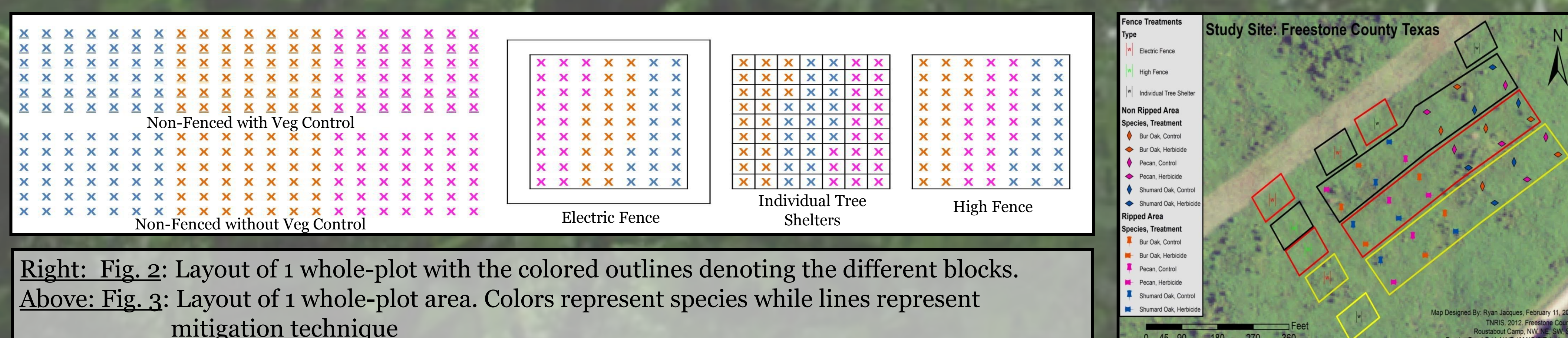


Fig. 1: Four study location spread across the East Texas region within three river basins (A) and two ecoregions (B).

Methods

- *In situ* restoration experiment replicated across four locations (Fig. 1)
- Nested split-split-plot design with 3 blocks at the sub-plot level with each whole-plot (Fig. 2)
 - Whole-plot: Canopy Cover (0%, 50%)
 - Subplot: Wildlife Mitigation (2.4 m wire fence, individual tree shelters, portable electric fence, non-fenced with competing vegetation, non-fenced without competing vegetation) (Fig. 3)
 - Sub-subplot: Tree Species (Planted 1-o bare root seedlings: bur oak, Shumard oak, pecan)
- Spot herbicide application to appropriate plots once a year using Makaze[®] Herbicide (AI: Glyphosate, 41%)
- Measure and record: height, diameter, survival, and cause of mortality 2 months post-planting, year 1, and year 2
- August – September 2015: Conduct 14 day, trail camera surveys at 1 camera per 41 ha to estimate population density for white-tailed deer and feral swine for each location

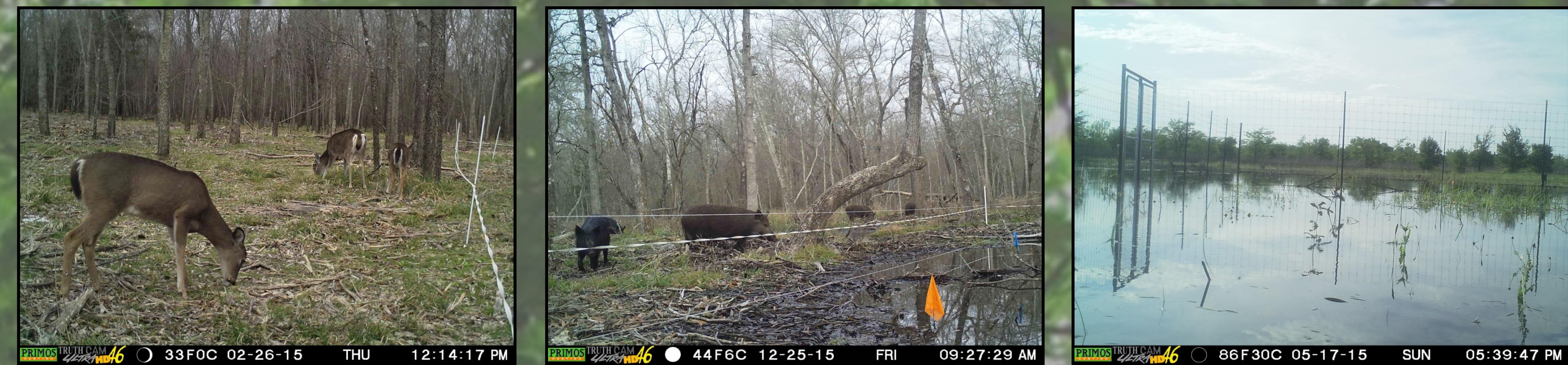


Right: Fig. 2: Layout of 1 whole-plot with the colored outlines denoting the different blocks.

Above: Fig. 3: Layout of 1 whole-plot area. Colors represent species while lines represent mitigation technique



Results



Above, Left to Right: Wildlife species and environmental conditions impacting seedling survival: White-tailed Deer (*Odocoileus virginianus*), Feral Swine (*Sus scrofa*), prolonged flooding during the growing season.

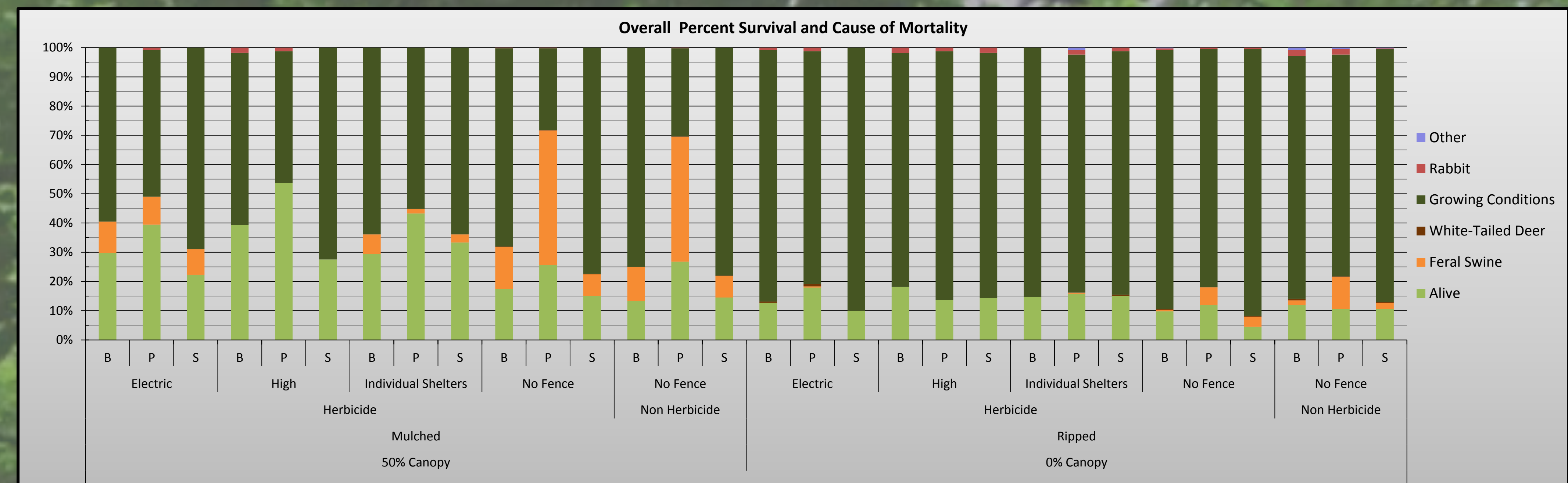


Fig.4: All four study sites broken down by whole-plot, subplot, and sub-subplot of bur oak (B), pecan (P), and Shumard oak (S).

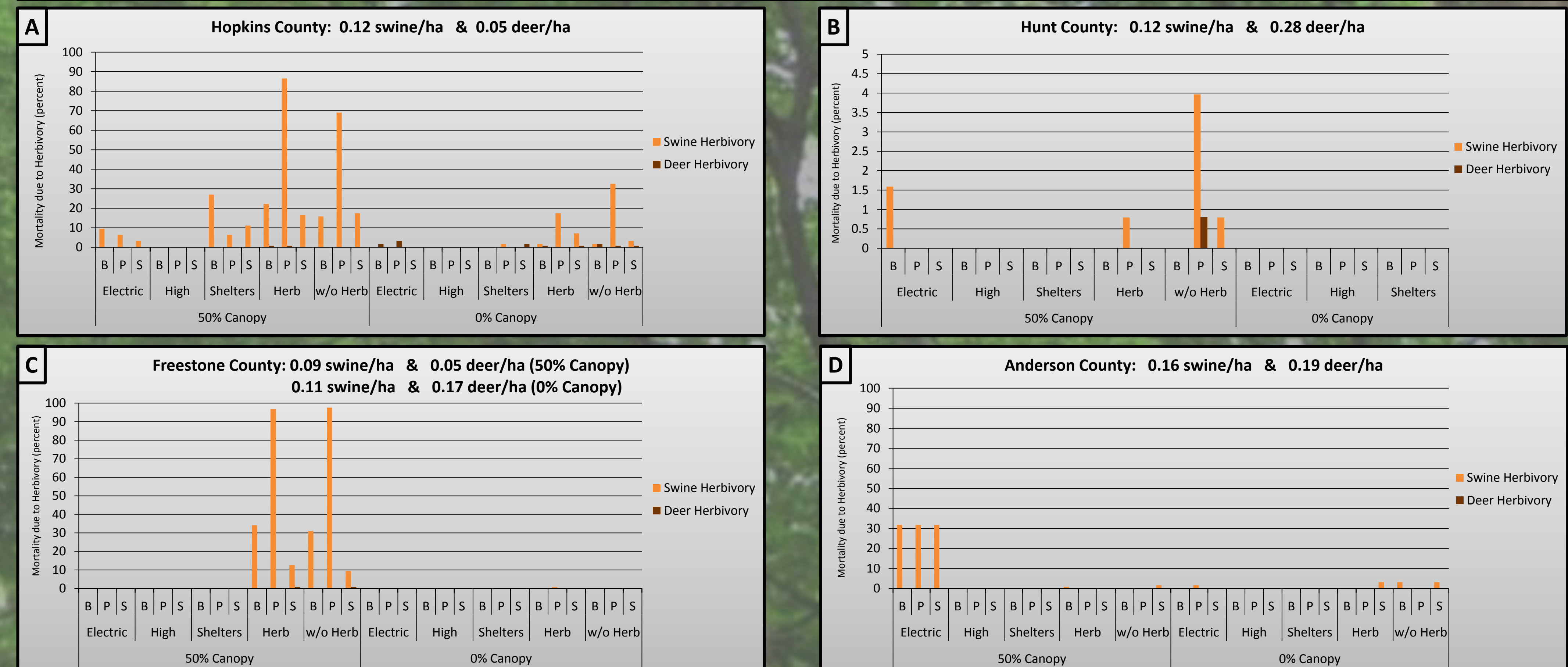


Fig.5: Percent mortality due to herbivory compared to each study location's wildlife population densities (A, B, C, and D). Freestone county (C) whole-plots required separate wildlife density surveys due to the distance between whole-plots.

Conclusions

- White-tailed deer are not causing increased mortality overall. Feral swine showed evidence of selective herbivory towards pecan seedlings by uprooting up to 97% of the seedlings in non-fenced plots.
- Overall, impacts of climatic events and growing conditions (e.g., flooding, drought, pH, and potentially disease) far outweigh herbivory in causing reduction in survival.
- Population density of feral swine and white-tailed deer does not seem to be a factor in predicting herbivory impacts: Anderson County has the highest density of feral swine and 2nd highest density of white-tailed deer, but there has yet to be any observable impacts by white-tailed deer.
 - Wildlife impacts seem to be episodic and difficult to predict (e.g., feral swine breached 1 electric fence in Anderson County and destroyed all seedlings in a single event).
- Fence treatments protect the seedlings but vary in efficacy, ease of implementation, and maintenance requirements.

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