Introduction

- Altona Flat Rock sandstone pavement barren is dominated by Pinus banksiana (jack pine) and spans approximately 32 km² forest in Altona, NY (Clinton County).
- Fire is rare in this region and is required to maintain biodiversity in this unique pine barren community (Natural Heritage Program rating S1G2) (Franzi and Adams, 1993).
- July 12-18, 2018 a wildfire burned 221 ha of the Flat Rock forest.
- Overstory is dominated by jack pine, a serotinous conifer. Within weeks of the burn there was rapid regeneration of jack pine, Pteridium aquilinum (bracken fern), and Vaccinium sp. (blueberry, huckleberry).

Objectives & Hypothesis

- Evaluate wildlife habitat use immediately following the fire and as the Flat Rock community regenerates.
- Compare diel and seasonal trends in wildlife community composition and occurrences in unburned vs. burned sites.
- We hypothesize that there will be species-specific wildlife responses to the burn, with immediate increases in granivores and carnivores, and declines in browsers such as deer and snowshoe hare.

Methods

- Non-invasive wildlife monitoring took place between September 2018-March 2019 at the Altona Flat Rock State Forest in Clinton County NY.
- Two burned and two unburned (reference) sites were chosen along transects (300, 400) traversing the fire extent.
- Game cameras (Bushnell HD) (n = 8) were deployed (two per site) and erected at ~0.5 m from the base of trees to capture both small and large wildlife activity (Meek et al. 2014). Image capture was set at every 15 sec. Only images taken 5 min apart were used to distinguish consecutive animal sighting events (Meek et al. 2014).
- camTrap Package in R was used to organize, annotate, and graph species-specific diel and seasonal wildlife activity patterns (Niedballa et al. 2016).

Results (Composition & Diel Use)

Figure 1. A) Location of burn within Clinton County, NY. B) Post-fire aerial image of the Altona Flat Rock State Forest with overlain research transects and plots.

Figure 2. The Altona Flat Rock State Forest: A) prior to burn with dense Vaccinium understory, B) ash-covered soils and standing dead jack pine following the July 2018 wildfire and, C) serotinous jack pine cone opened during the burn.

Figure 3. A) game camera at the unburned and B) burned sites.

Figure 4. Total and species-specific wildlife occurrences at the unburned and burned sites September 2018 - March 2019.

Figure 5. Diel activity overlain for Odocoileus virginianus (white-tailed deer) and Canis latrans (coyote) in A) unburned, and B) burned sites during September 2018 - March 2019.

Figure 6. Game camera images of A) Vulpes vulpes (red fox), B) Canis latrans (coyote), C) Odocoileus virginianus (white-tailed deer), D) Lynx rufus (bobcat), E) Tamiasciurus hudsonicus (red squirrel), and F) snowshoe hare (Lepus americanus).

Results (Seasonal Use)

Figure 7. Seasonal white-tailed deer occurrences at the unburned and burned sites September 2018-March 2019.

Conclusions

- Greater wildlife species richness occurred in the unburned (S = 10) versus the burned site (S = 8) site (Figure 4).
- Biodiversity typically increases following wildfire in pine barren habitats (Franzi and Adams 1993), contrary to our early post-fire findings. Diversity patterns are expected to shift as succession progresses.
- Lack of resources and cover likely contribute to reduced species richness at the burn site (Spitz et al. 2018). Snowshoe hare occurred in high abundance where browse was high (unburned site).
- The unburned site had 2.5 times greater wildlife occurrences (n = 256) than the burned (n = 93) site (Figure 4).
- White-tailed deer, the most common species at both sites, were diurnally active but varied diel activity patterns between unburned and burned sites (Figure 5).
- Unburned: deer become active at 0600, reduce activity briefly at 0900, and then sustain activity from 1200-1500.
- Coyote overlap with deer in their earlier diel activity bout in the unburned site.
- Deer temporally partition diel activity to reduce coyote interactions in the riskier open burn (Figure 5).
- Deer were indifferent to sites in the winter, whereas deer occurrences were two-fold greater at the unburned site in the fall (Figure 7).
- Deer may shift habitat when mobility constrained in winter (Gulsby et al. 2018).

Future Research Directions:

- Monitor seasonal and successional variation in wildlife use of the burn site.

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Literature Cited


