

Vegetation response following dredged material placement and management efforts in a coastal marsh area in New Jersey



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Introduction

Beneficial placement of dredged materials was used to create an elevated nesting habitat for colonial nesting birds on Ring Island, New Jersey in 2014 and replenished with more sand from routine dredging operations in 2018 (Fig. 1). Succession of vegetation is a management challenge for target species that prefer open areas with sparse vegetation to nest. In summer 2018, dense vegetation grew on site above the flood tide range (MHHW). Dense vegetation can limit nesting success for focal species but best management practices to control emergent vegetation in this system is relatively unknown. Information on vegetation species present, growth and cover classes, and responses to control methods can help inform management practices to promote and sustain nesting on newly established elevated nesting areas in the marsh.



Fig. 1. Aerial image of Elevated Nesting Habitat, Ring Island (~1 acre). December 2018.



Fig. 2. Locations of control (red) and treatment (green) plots on Elevated Nesting Habitat, Ring Island in 2019.

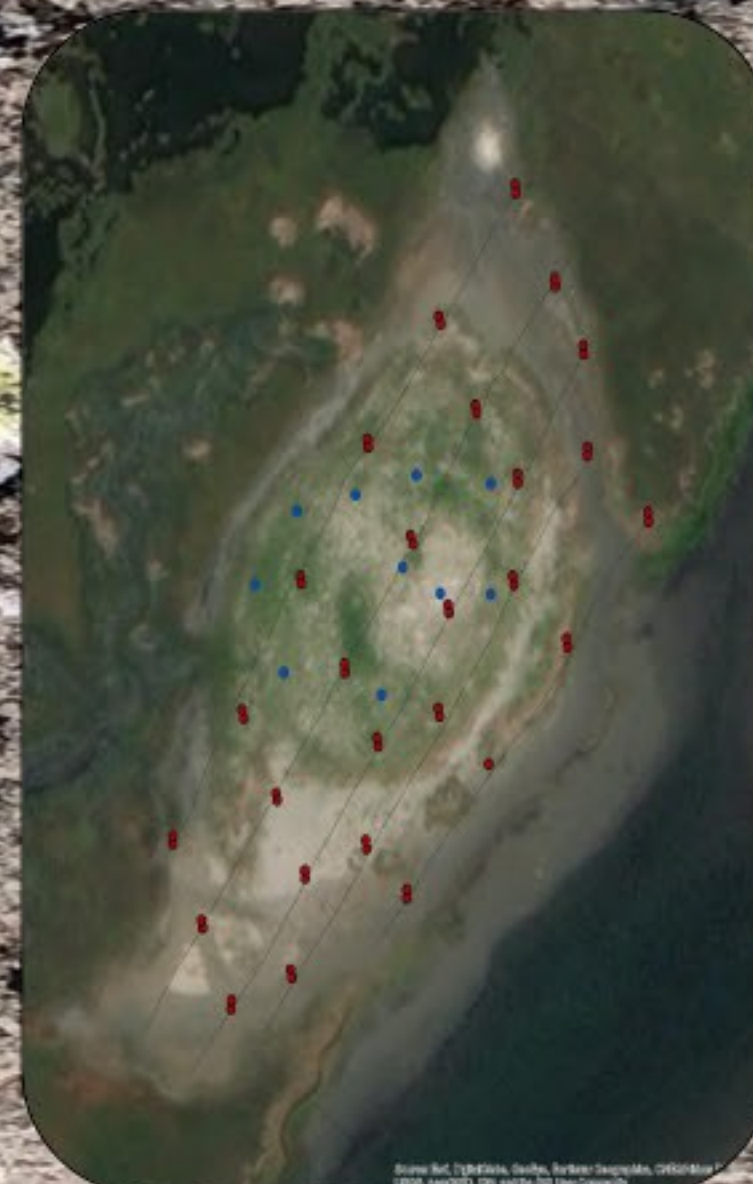


Fig. 3. Locations of vegetation monitoring plots established along transects (red) and random plots (blue) on Ring Island in 2020.

Habitat Management

- Prescribed burn of the elevated nesting habitat conducted both years prior to nesting season.
- Manual extraction (hand pulling, burr removal, leaf blowing) conducted prior to the nesting season in 2019.
- Trial of salt spray to control vegetation during the nesting season in 2019. Treatment plots sprayed with 10% salt solution on a weekly basis during the nesting season (April – July).
- 400 – 520lbs of rock salt spread over the entire nesting habitat prior to and during the nesting season in 2020.

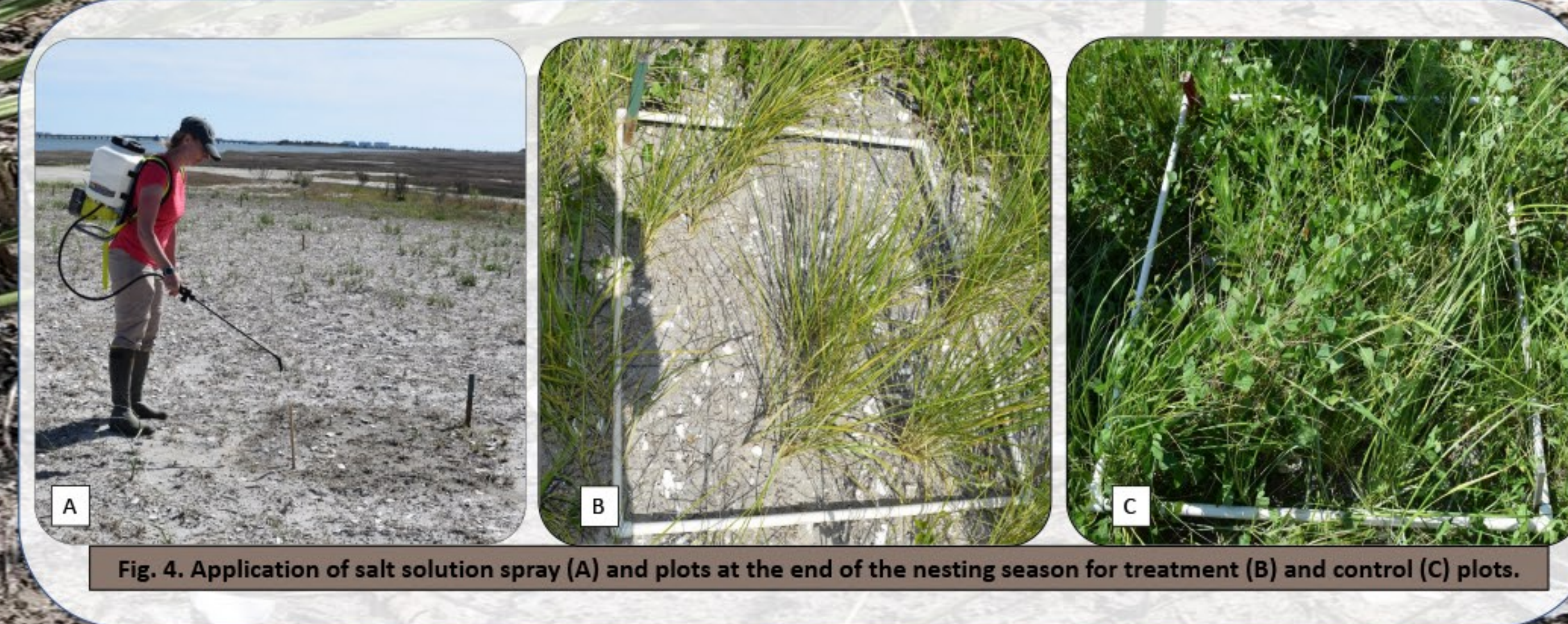


Fig. 4. Application of salt solution spray (A) and plots at the end of the nesting season for treatment (B) and control (C) plots.



Fig. 5. Prescribed burn on Elevated Nesting Habitat (A) and vegetation at the end of the nesting season in 2019 (B) and 2020 (C) plots.

Results

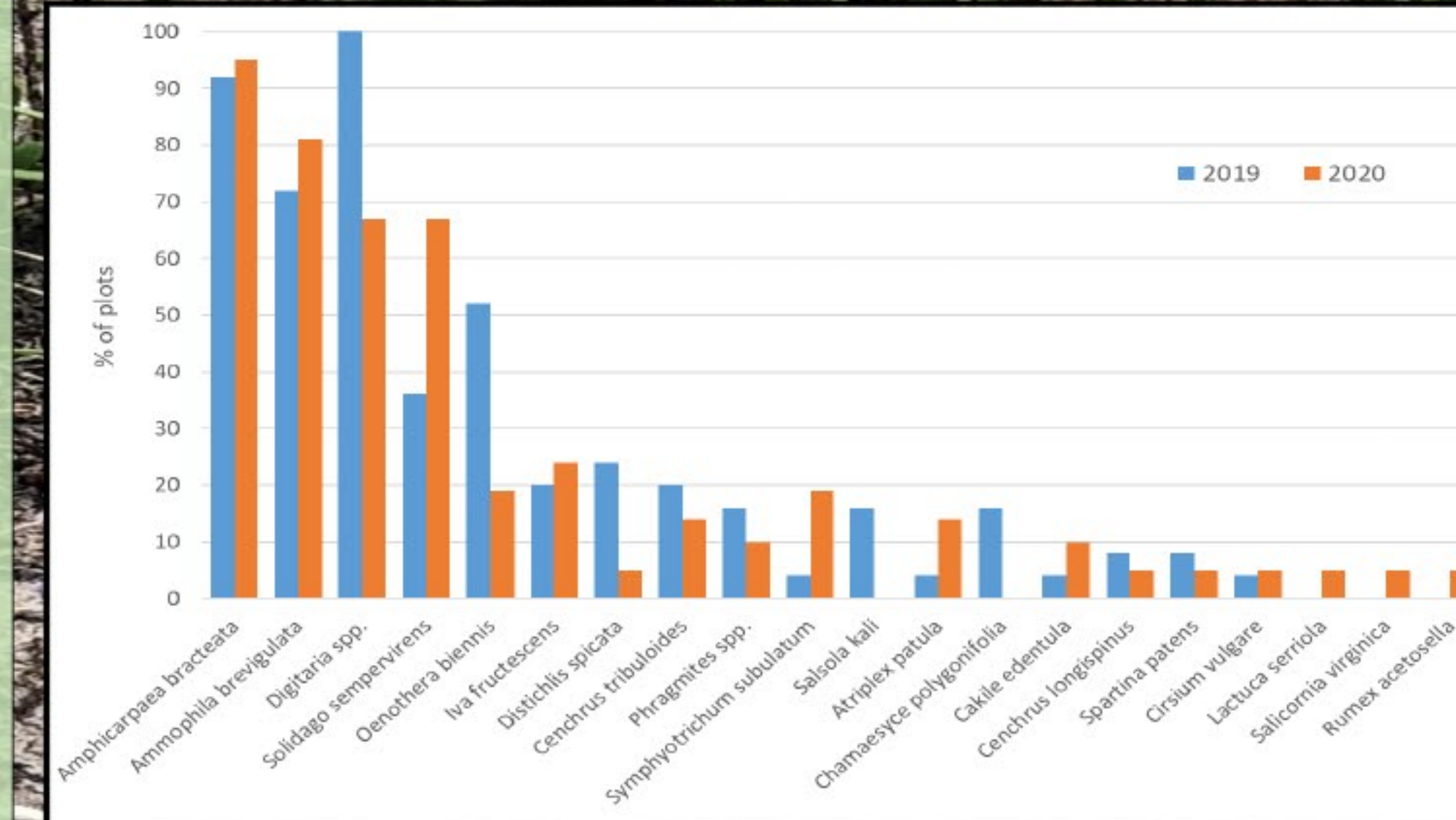


Fig. 6. Frequency of occurrence for vegetation species observed on Elevated Nesting Habitat, Ring Island.

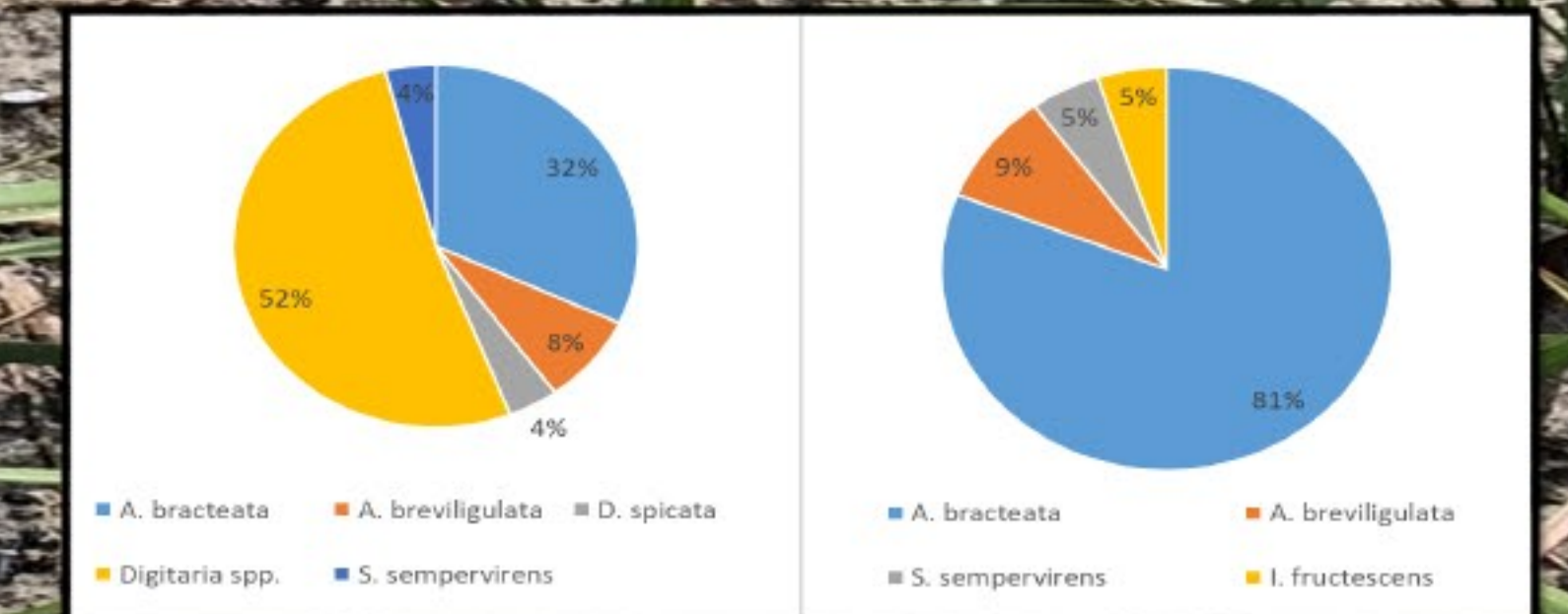


Fig. 7. Dominant species documented for study plots in 2019 (left) and 2020 (right).

Objectives

- Document species occurrence and abundance on the island at the end of the nesting season.
- Assess species' responses to vegetation control methods (burning, manual extraction, salt spray, salt placement).
- Investigate differences in vegetation communities between years.

Vegetation Monitoring

- In 2019, six transects were established perpendicular to the shoreline and 1m² plots were fixed every 5m (Fig. 2) and randomly selected as treatment (10% salt solution spray; n=23) or control (no salt solution spray; n=25).
- In 2020, 1m² plots established every 15m along five transects (n = 25) running parallel to the shoreline following methods for long-term monitoring efforts at pre-placement marsh sites. Additional plots (n = 10) established using random selection (ArcGIS) within the Elevated Nesting Habitat (ENH) area (Fig. 3).
- Vegetation metrics (species present, Braun-Blanquet cover classes (CC), and live stem lengths of dominant species) were measured in each plot at the end of the nesting season (July/August).
- Control plots (2019; n = 25) and plots occurring within the Elevated Nesting Habitat area (2020; n = 21) were used for vegetation comparisons at the ENH site between years.
- Standard parametric and non-parametric tests were performed for statistical analyses to investigate differences between years.

- Salt solution spray successfully reduced vegetation growth and controlled ground cover within treatment plots in 2019 (Fig. 4). Vegetation growth and cover in 2020 suggest that infrequent salt spread was not as effective in reducing vegetation.
- Prescribed burns did not prevent establishment of vegetation species on Elevated Nesting Habitat during the nesting season.
- No significant differences in vegetation cover within study plots between years ($P = 0.7$). The majority of plots had CC > 75% (72% of plots in 2019; 67% of plots in 2020).
- No differences in the number of species detected within plots between years ($P = 0.26$). However, there were observable differences for vegetation species present and frequency of occurrence between years (Fig. 6).
- Significant differences in the dominant species present within study plots between years ($P < .001$; Fig. 7).
- Top three dominant species included *A. bracteata* (American hog-peanut), *A. breviflora* (American beachgrass), and *Digitaria spp.* (crabgrass). Significant differences in CC between years for all three species ($P \leq 0.02$) with higher CC for *A. bracteata* and *A. breviflora* but lower CC for *Digitaria spp.* in 2020.

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