Background

- CP42 is a general conservation practice that attempts to establish pollinator-friendly habitat.
- In total, >500,000 acres have been converted to CP42 (>40% of which is in Iowa) [1].
- To date, there has been no formal assessment of practice success (i.e., post-seeding forb establishment).

Methods

- In 2018, we surveyed 18 randomly selected three-year old CP42 fields, located within 60 minutes of Cedar Falls, Iowa (Fig. 1).
- Five-100m transects were randomly placed at each site.
- Along each transect, we surveyed fifteen 0.5m x 2m quadrats (total per site: 75m²).
- We recorded: # plants (>20cm), stems/plant, sown grass cover, unsown grass cover, and bare ground.

Analyses:

- In this study, we focus on the 26 species seeded in >50% of surveyed fields.
- At each field, we computed % establishment as: number of plants per acre / number of sown seeds per acre, for each species [2].
- We computed average species establishment across sites.
- Species were divided into four categories based on cost per 10,000 seeds: $0-2, $2-5, $5-50, >$200 [3].
- Species that: (1) are costly, (2) have poor establishment, (3) provide few resources for pollinators, and (4) are not essential to meet practice requirements (e.g., Euphorbia corollata), should be replaced with other candidate species.
- Fruit removal could improve establishment success for Allium canadense.

Results

- Median establishment was 1.325% across species (Fig. 3).
- Species with high establishment include: Chamaecrista fasciculata, Asclepias tuberosa, Asclepias syriaca, Echinacea pallida, and Heliopsis helianthoides.
- C. fasciculata is an annual and may become less common.

Interpretation

- Species with low establishment include: Heuchera richardsonii, Aquilegia canadensis and Allium canadense, but all three are early flowering species that may be necessary to meet the requirements of CP42 (i.e., 3 species flowering April-June15).
- Aquilegia canadensis and Allium canadense are also costly.
- Species establishment in 2017 and 2018 were correlated (Fig. 4), suggesting that species establishment values are somewhat consistent across years in CP42 fields.

Management Recommendations

- With consideration to CP42 seed mix design:
  - It may be possible to reduce seeding rates of species with high establishment (e.g., C. fasciculata, Fig. 5).
  - Species that: (1) are costly, (2) have poor establishment, (3) provide few resources for pollinators, and (4) are not essential to meet practice requirements (e.g., Euphorbia corollata), should be replaced with other candidate species.
  - Fruit removal could improve establishment success for Allium canadense.

Acknowledgements

We thank Drs. Ai Wen, Laura Jackson, Mark Myers, Kenneth Elgersma, and Justin Meissen. We thank the Summer research students: Ethan Marburger, Olivia Wiloughby, Alyssa Burgert, Corrine Myers, Alec Glidden, Jenn Pauley, Esther Edgerton, Michael Lashbrook. We thank the Roy J. Carver Charitable Trust, US Dept. of Agriculture Farm Services Agency, and the UNI College of Humanities Arts and Sciences for funding this research.

References

2) Seeds per ounces are based on Kew (when available) or Prairie Moon Nursery
3) Seed costs are based on lowest value from: Allendan, Prairie Moon, Agrecol, Hoksey, Osenbaugh, Minnesota Native Landscapes, Shooting Star, Ion Exchange
4) Jonas K, Jackson L (2017) Effects of planting time and grass-forb seeding ratio on establishment in CRP pollinator habitat. UNI SURP Poster