

System shock: native seed mix composition and price change during rapid implementation of a popular ag conservation program

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Conservation programs for ecosystem services

Emerging role of large ag conservation programs

Conservation Reserve Program (CRP)

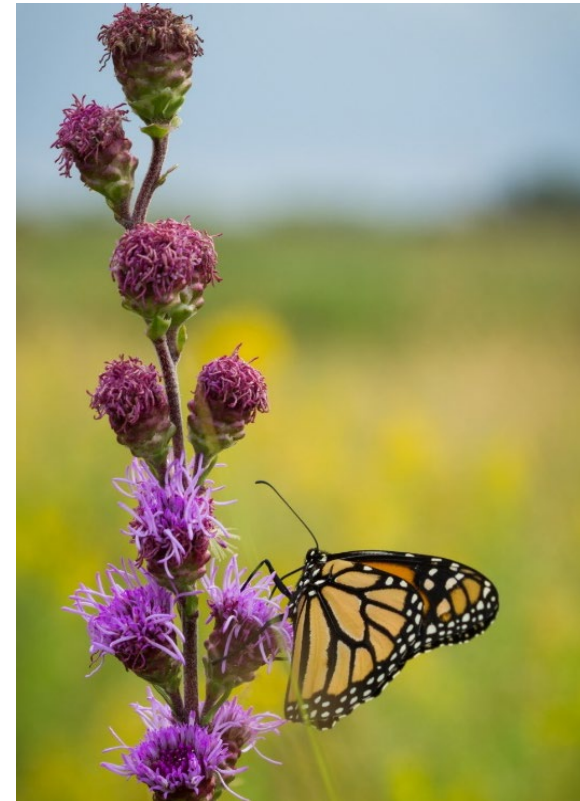
- USDA infrastructure at scale (~2.6 million acres*)
- Revegetation as main tool

Emerging role to address complex conservation issues

- More ecosystem rehabilitation
 - Rare habitat restoration, pollinator recovery

Ecological prerequisites for success

- Dependable native seed supply
- Ecologically sound seed mix



Pollinator Habitat Initiative Case Study

Iowa as ground zero

High practice adoption in IA

- Most CP-42 acres (218,482)
- 8 /10 top counties for CP-42 acres

Highly developed seed market in IA

- Many native seed retailers in IA/
nearby

Iowa well positioned for success

2020 Rank	State	County	Acres
1	IA	Ringgold	10,415
2	IA	Taylor	10,244
3	MO	Carroll	7,543
4	IL	Mason	7,188
5	IA	Black Hawk	7,095
6	IA	Howard	6,963
7	IA	Clay	6,617
8	IL	Vermilion	6,403
9	IA	Kossuth	6,311
10	MO	Harrison	6,243

Research Objectives

Examine the execution of the CP-42 practice in IA and its ecological and implementation outcomes

Two focus areas:

1. Explore how CP-42 influenced native seed market dynamics
2. Assess how seed mix specs translated into actual seed mixes



Methods

Track native seed market dynamics during CP-42

Track market-wide seed costs

- Price lists/seed quotes from annual UNI purchases (multiple Upper Midwest native seed growers)
- Evaluate price fluxes 2015-2018

Assess CP-42 seed mix costs

- FSA cost-share data from >800 CP-42 contracts
- Track seed cost per acre during the program (2014-2018)



Methods

Assess seed mixes of CP-42 pollinator plantings

Assess seed mix composition in response to CP-42/seed market

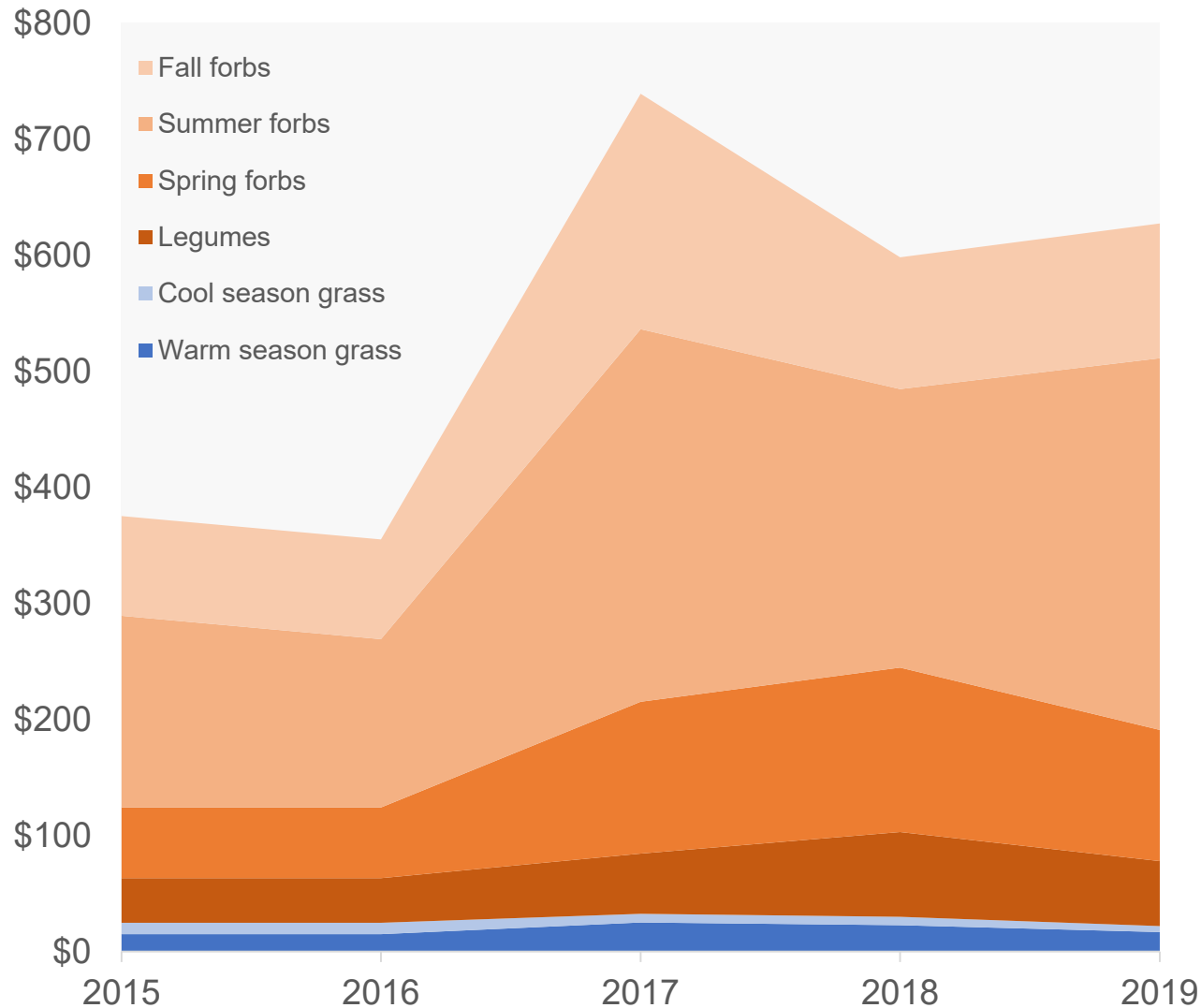
- Seed mix sample from IA landowners enrolled in program
- Of 800 requests, procured 81 seed mixes
- Data transformation to standardize seed mix information
- Use origin data from seed mixes to estimate approximate seed source distance

Mix %	PLS lb	Bulk lb	Lot Number	Common Name	Scientific Name	Variety	Origin
14.84%	4.09	5.35	ANDOER013D	Big Bluestem	Andropogon gerardii	VNS	IA
14.84%	4.09	5.16	BOUCUR014A	Sideoats Grama	Bouteloua curtipendula	VNS	IA
0.74%	0.20	0.21	CARVUL494A	Brown Fox Sedge	Carex vulpinoidea	VNS	WI
3.30%	0.91	0.94	ELYCAN465A	Canada Wild Rye	Elymus canadensis	VNS	IA
4.95%	1.38	1.55	ELYVIR013C	Virginia Wild Rye	Elymus virginicus	VNS	MN
1.65%	0.45	0.48	PANVIR484A	Switchgrass	Panicum virgatum	VNS	IA
19.79%	5.45	7.17	SCHSCO014B	Little Bluestem	Schizachyrium scoparium	VNS	MN
13.19%	3.63	4.41	SORNUT014H	Indiangrass	Sorghastrum nutans	VNS	IA
2.47%	0.68	0.73	SPOASP025A	Rough Dropseed	Sporobolus aspera	VNS	MN
0.16%	0.05	0.05	SPOHET014B	Prairie Dropseed	Sporobolus heterolepis	VNS	MN
0.08%	0.02	0.03	ANEVIR685A	Tall Thimbleweed	Anemone virginiana	VNS	Per PA
0.16%	0.05	0.05	AQUCAN465A	Columbine	Aquilegia canadensis	VNS	IA
0.16%	0.05	0.05	ASCTUB155A	Butterfly Milkweed	Asclepias tuberosa	VNS	Upper Midwest
0.49%	0.14	0.15	ASTAZU484A	Sky Blue Aster	Aster azureus	VNS	IA
0.36%	0.10	0.12	ASTERI145A	Heath Aster	Aster ericoides	VNS	IA
0.49%	0.14	0.15	ASTLAE814A	Smooth Blue Aster	Aster laevis	VNS	MN
0.08%	0.02	0.03	BAPALB014A	White Wild Indigo	Baptisia alba	VNS	MN
3.30%	0.91	0.93	CHAFAS014A	Partridge Pea	Chamaecrista fasciculata	VNS	MN
4.95%	1.38	1.59	DALPUR055B	Purple Prairie Clover	Dalea purpurea	VNS	MN
1.65%	0.45	0.48	DESIL2023A	Illinois Bundle Flower	Desmanthus illinoensis	VNS	MN
0.16%	0.05	0.05	DESCAN464A	Showy Tick Trefoil	Desmodium canadense	VNS	IA
1.65%	0.45	0.51	ECHPAL155B	Pale Purple Coneflower	Echinacea pallida	VNS	IA
1.65%	0.45	0.49	ERYVUC025A	Rattlesnake Master	Eryngium yuccifolium	VNS	MN
0.10%	0.05	0.05	EUPCOR465A	Flowering Spurge	Euphorbia corollata	VNS	IA
1.65%	0.45	0.46	HELHEL463A	Eye Sunflower	Helopsis helianthoides	VNS	Per IA
0.12%	0.03	0.03	HEURIC145A	Frairie Alumroot	Heuchera richardsonii	VNS	IA
0.10%	0.05	0.05	LESCAP465B	Round-headed Bush Clover	Lespedeza capitata	VNS	IA
0.08%	0.02	0.03	LOBSP1145A	Pale Spiked Lobelia	Lobelia spicata	VNS	Per IL
0.82%	0.23	0.24	MONFIS012A	Wild Bergamot	Monarda fistulosa	VNS	MN
0.99%	0.27	0.28	OENBIE464B	Common Evening Primrose	Oenothera biennis	VNS	IA
0.08%	0.02	0.02	PHYVIR773A	Obedient Plant	Physostegia virginiana	VNS	Per IA
3.30%	0.91	0.93	RATPIN465A	Yellow Coneflower	Ratibida pinnata	VNS	IA
0.82%	0.23	0.23	RUDHIR464A	Black-eyed Susan	Rudbeckia hirta	VNS	IA
0.16%	0.05	0.05	SILLAC464A	Compass Plant	Silphium laciniatum	VNS	IA
0.19%	0.05	0.09	VERVIR225A	Culver's Root	Veronicastrum virginicum	VNS	Per WI
0.33%	0.09	0.10	ZIZAU025A	Golden Alexanders	Zizia aurea	VNS	MN
100.00%	27.53	33.24					

AMS 6818

Results

Track native seed market dynamics during CP-42: species price over time



Acres rapidly increased

- 15k ac in 2015 to 175k ac in 2017

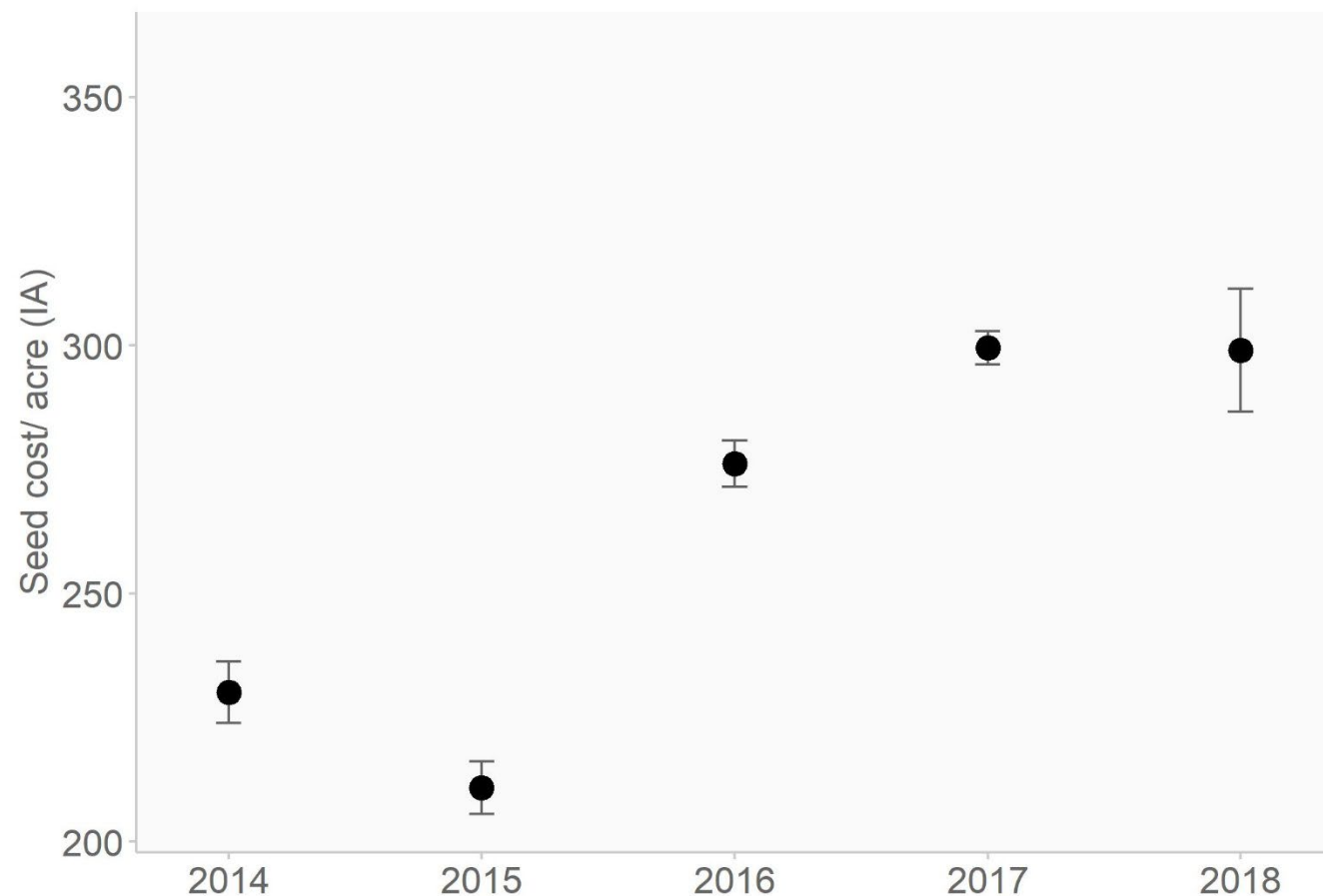
Seed prices increased

- Avg forb price/oz +68%, some +400%
- Limited change in grasses, legumes
- Same mix in 2015 97% more in 2017



Results

Track native seed market dynamics during CP-42: seed mix price over time



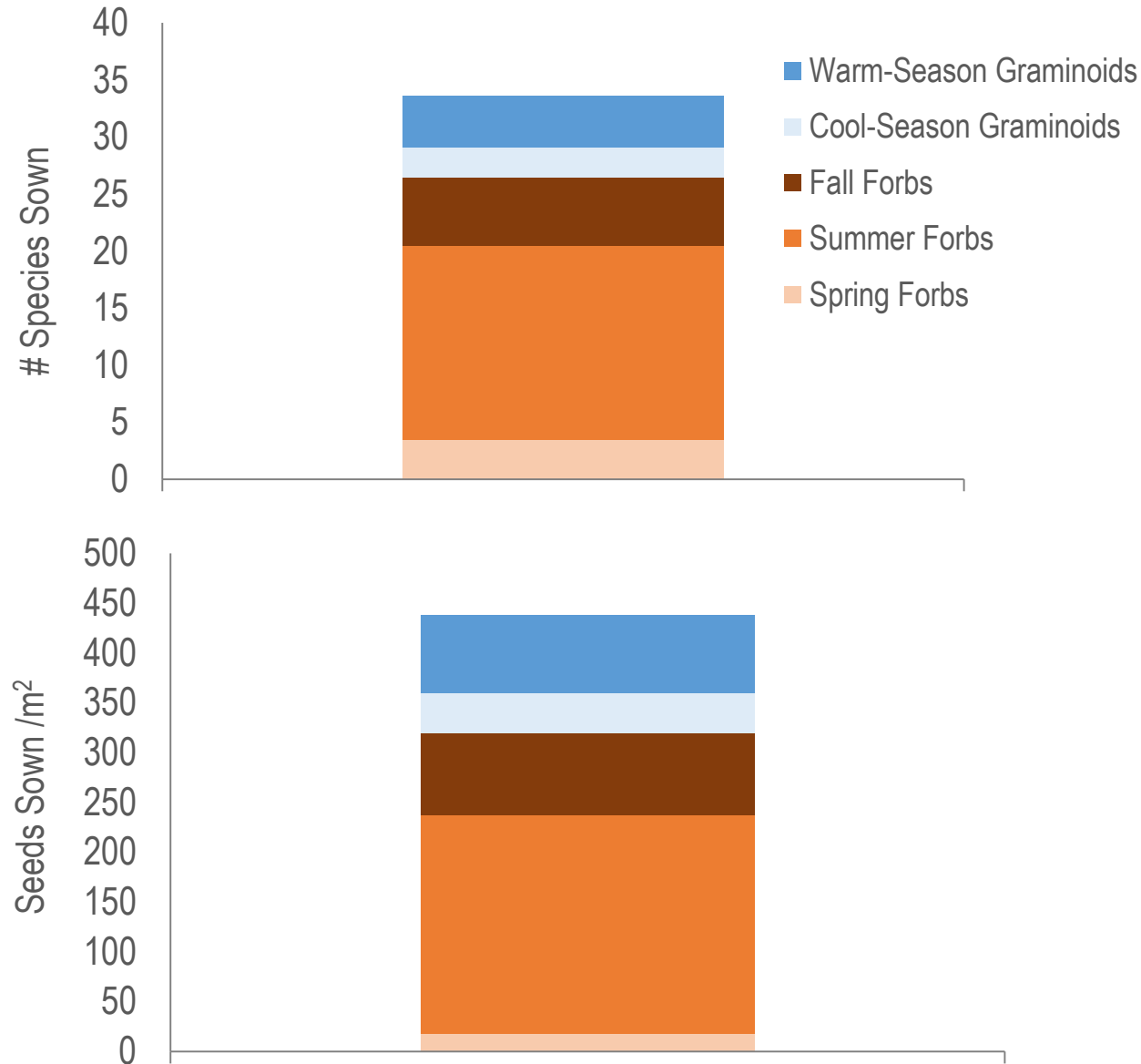
CP-42 seed mix prices increased

- Average cost +30%
- \$210/acre low to \$299/acre high
- Increased less than expected given seed prices for individual species



Results

Native seed mixes during CP-42 roll-out: seed mix composition



Species diversity higher than min specs

- Mostly summer forbs
- Practically no introduced species

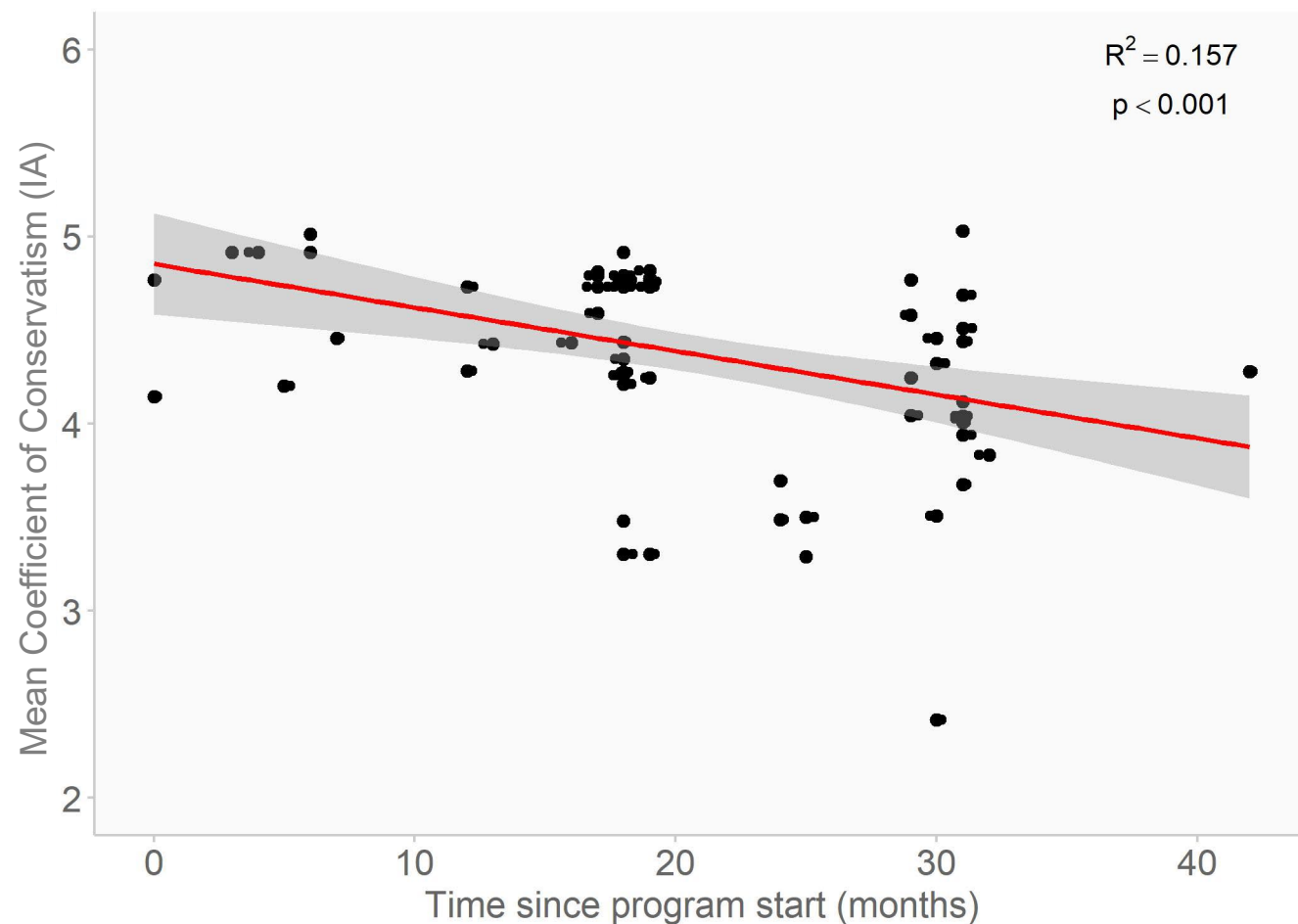
Seeds sown at min specs

- Mostly summer forbs
- Very few spring seeds sown



Results

Native seed mixes during CP-42 roll-out: seed mix quality changes

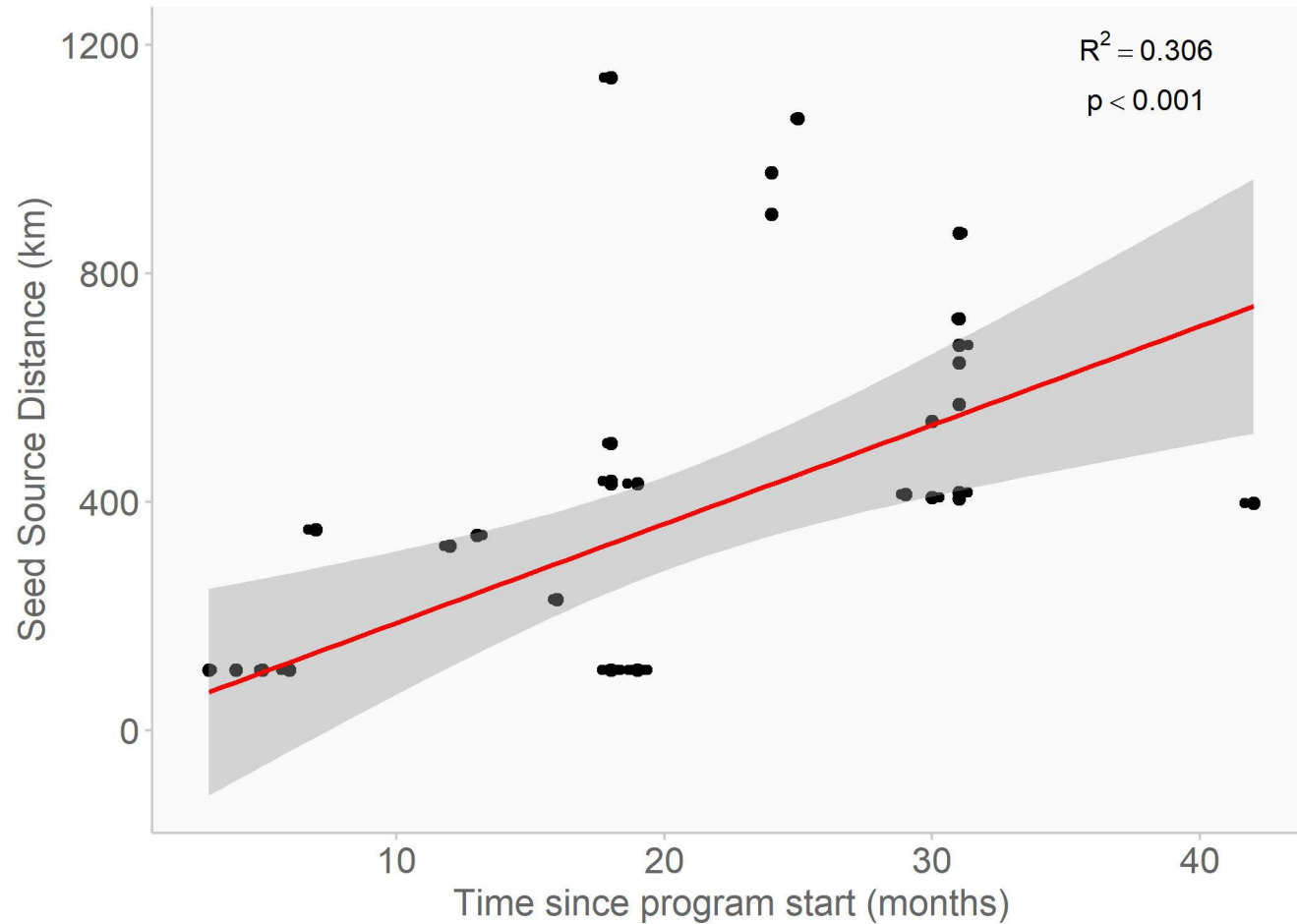


Seed mix quality declined over time

- IA coefficient of conservatism (weighted mean) decreased with more recent time of planting
- Conservation value of seed mixes slightly lower by 2017

Results

Native seed mixes during CP-42 roll-out: seed mix quality changes



Seed mix distance increased over time

- Seed source (weighted mean) increased with more recent time of planting
- Species originating far outside IA by 2017



Research Summary

Explore how CP-42 influenced native seed market dynamics

1. Forb prices increased with rapid addition of thousands of program acres, though grass/legume prices were less volatile
2. Average seed mix costs increased, but less than expected due to cheaper species substitutions

Assess how seed mix specs translated into actual seed mixes

1. Nearly all CP-42 seed mixes met/exceeded criteria for success despite strain on the native seed market
2. Seed mix quality declined (abundance of conservative spp, increased source distance) during peak program implementation

Implications for Practice

Implement new programs gradually

- Stabilize acres / year
- Postpone planting during high demand
- Indicate demand expectations well in advance

Robust native seed markets allow biodiversity oriented ag conservation program to succeed



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