Understanding Nevada's restoration needs through forecasting

What is certain in the native seed market?

Increasing need for restoration material

Resilient landscapes are diverse landscapes

Photo: C. Carroon

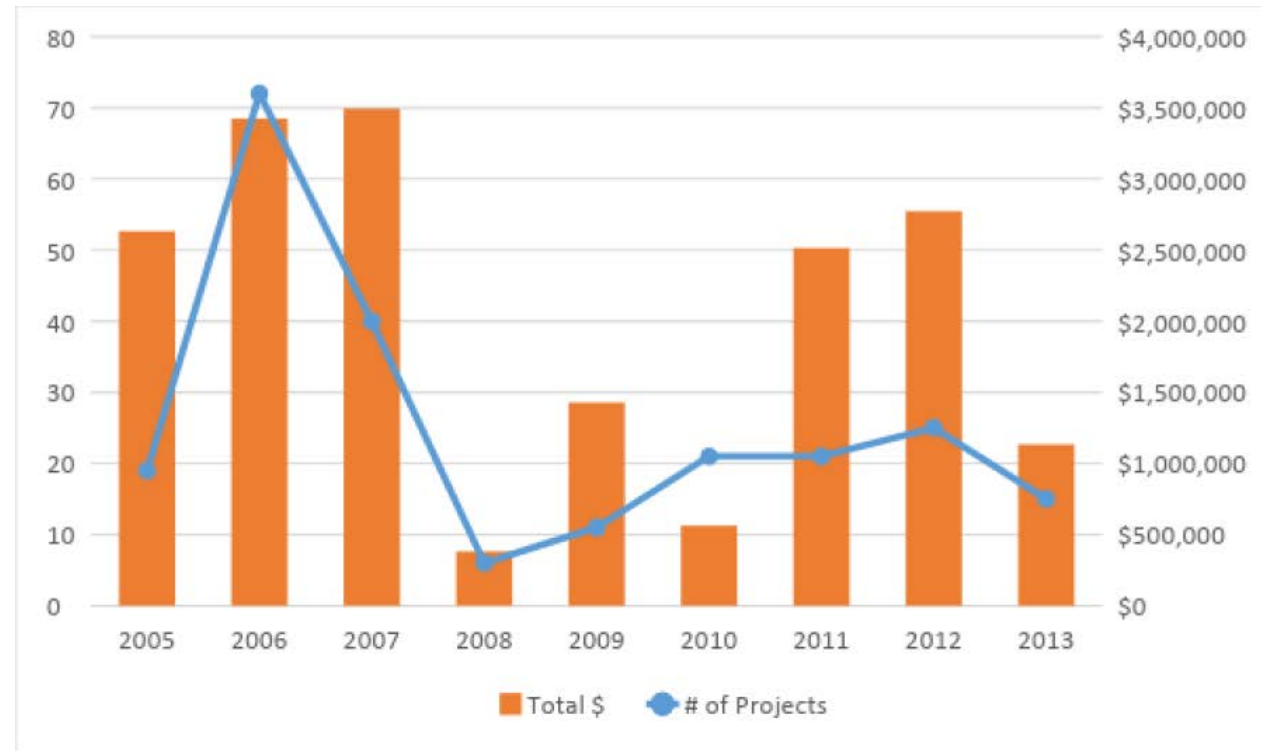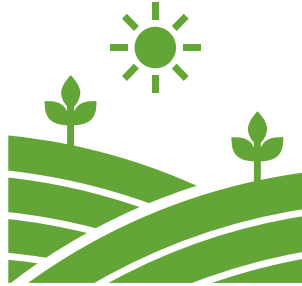# High volatilely in seed use, driven mostly by fire activity

Figure 2. Number of BLM Restoration Projects and BLM NPM Expenditure by Year from 2005-2013 in the five Great Basin field offices in Nevada (Battle Mountain, Carson City, Elko, Ely, and Winnemucca).

Taylor et al (2018)

High uncertainty in native seed markets

Restoration demand

Seed yield

Technical information for different species

Native seed market is a "growing" concern nationally

Both Bipartisan Infrastructure Law and Inflation Reduction Act provide additional funding for restoration and native seed production

◦ Do we have the plant materials we need to meet the demand?

NASEM's An Assessment of Native Seed Needs and the Capacity for Their Supply (2023)
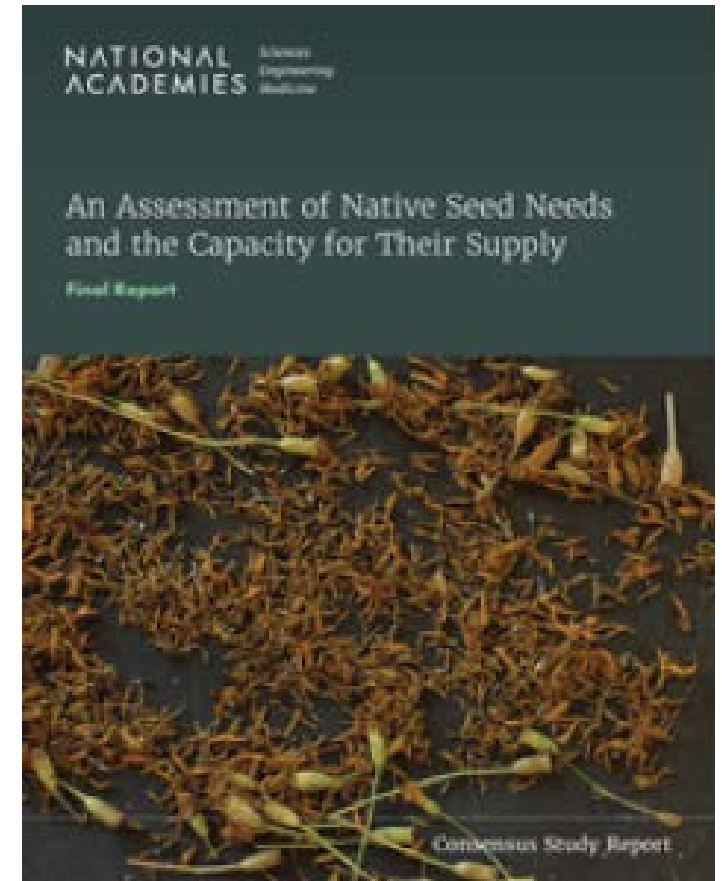
NASEM's Conclusions and Recommendations

- Conclusion 4-0: "Suppliers view unpredictable demand as their leading challenge"

- Conclusion 5-0: "…difficult-to-grow and lack of stock seed from appropriate seed zones or locations are their top two technical challenges"

- Recommendations for better information sharing and better tools

- Not just more seed is needed, more infrastructure for the whole seed market cycle

Nevada's response to the native seed questions

Nevada Native Seed Partnership

"We are a partnership helping Nevada increase the availability of genetically appropriate seed to restore diverse plant communities and sustainable landscapes"

https://www.partnersinthesage.com/nevada-native-seed-partnership

Goals for Seed Needs Assessment

| Create	Create seed menus for the major rangeland vegetation types within the Carson City District boundaries, including non-BLM managed lands with the goal of re-establishing perennial vegetation
Forecast	Forecast the seed needs for the project area for the next 10 years
Pilot	Pilot a project that could be replicated in other areas to develop a more comprehensive picture of seed needs

Balancing a wide suite of perspectives, objectives, and goals
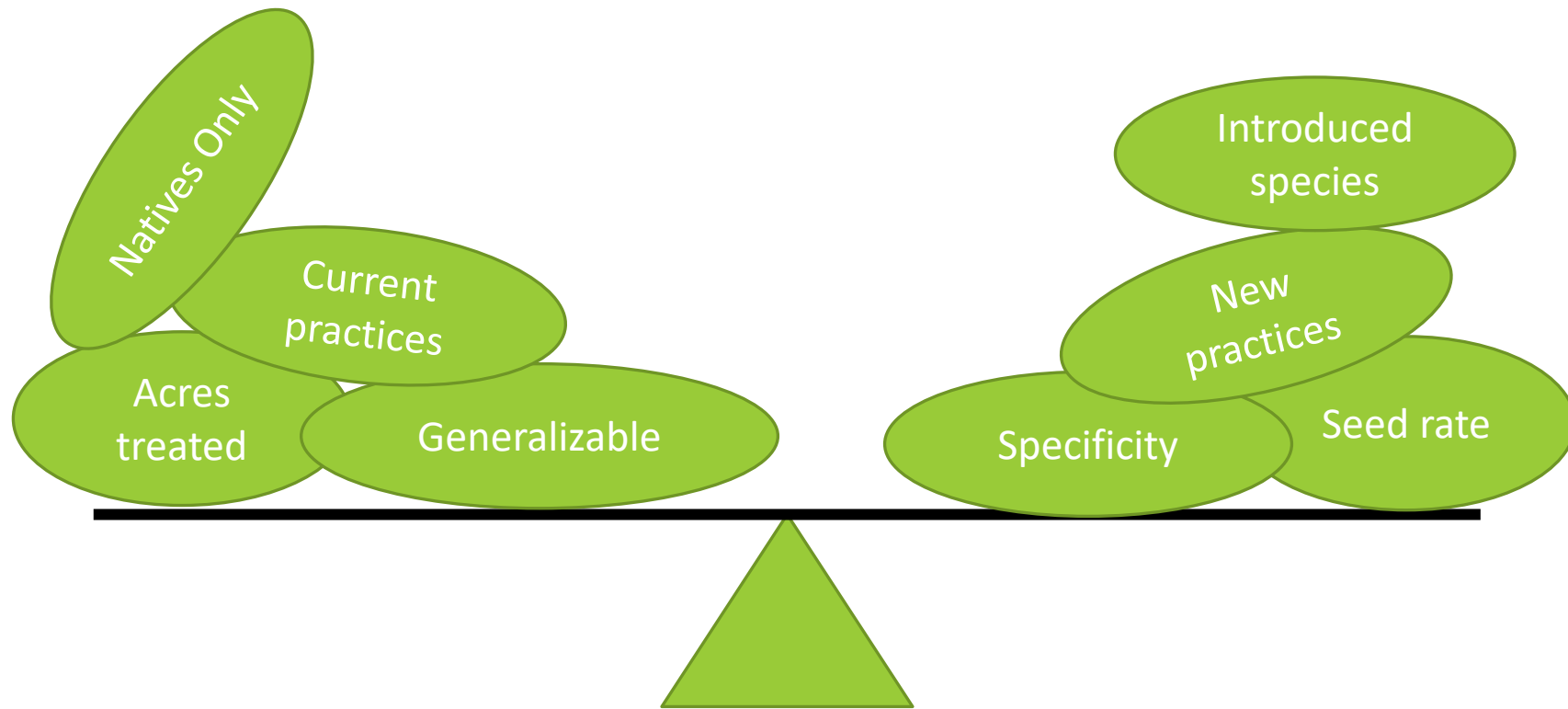
Assumptions

"Aspirational but not delusional"
◦ What are the seeds we really want vs seeds we readily have?
◦ How many acres could we treat with more seed and reasonable capacity?

All seed sources are available
◦ No accounting for differences in locally vs. non-locally adapted sources

Only aerial broadcast

Focused on post-fire seeding

Step 1-Develop Priority Layer

| Priority Name	Data Source	Goal	Burned Acres Treated Rate
Local Authority	Surface Management	Respect local policy (natives spp. only)	0.5
WUI	LandFire, NLCD	Reduce flame lengths and fire risk	0.75 – 1.0
Wildlife	NDOW habitat maps & SETT	Increased diversity, fire resiliency, and BRTE competition	0.75 – 1.0
Degraded	RAP	Fire resiliency and BRTE competition	0.5
Baseline	Not the above	Diversity and perennial establishment	0.5

Listed in priority order, so if Local Authority overlapped with WUI, only natives spp. were used

Step 2-Develop Seed Groups

Needed wall-to-wall (or nearly) vegetation coverage

Found 86 ESDs in the landscape across 3 MLRAs

Combined to form Seed Groups

Major Land Resource Areas

↓

Ecological Site Descriptions

↓

Disturbance Response Groups

↓
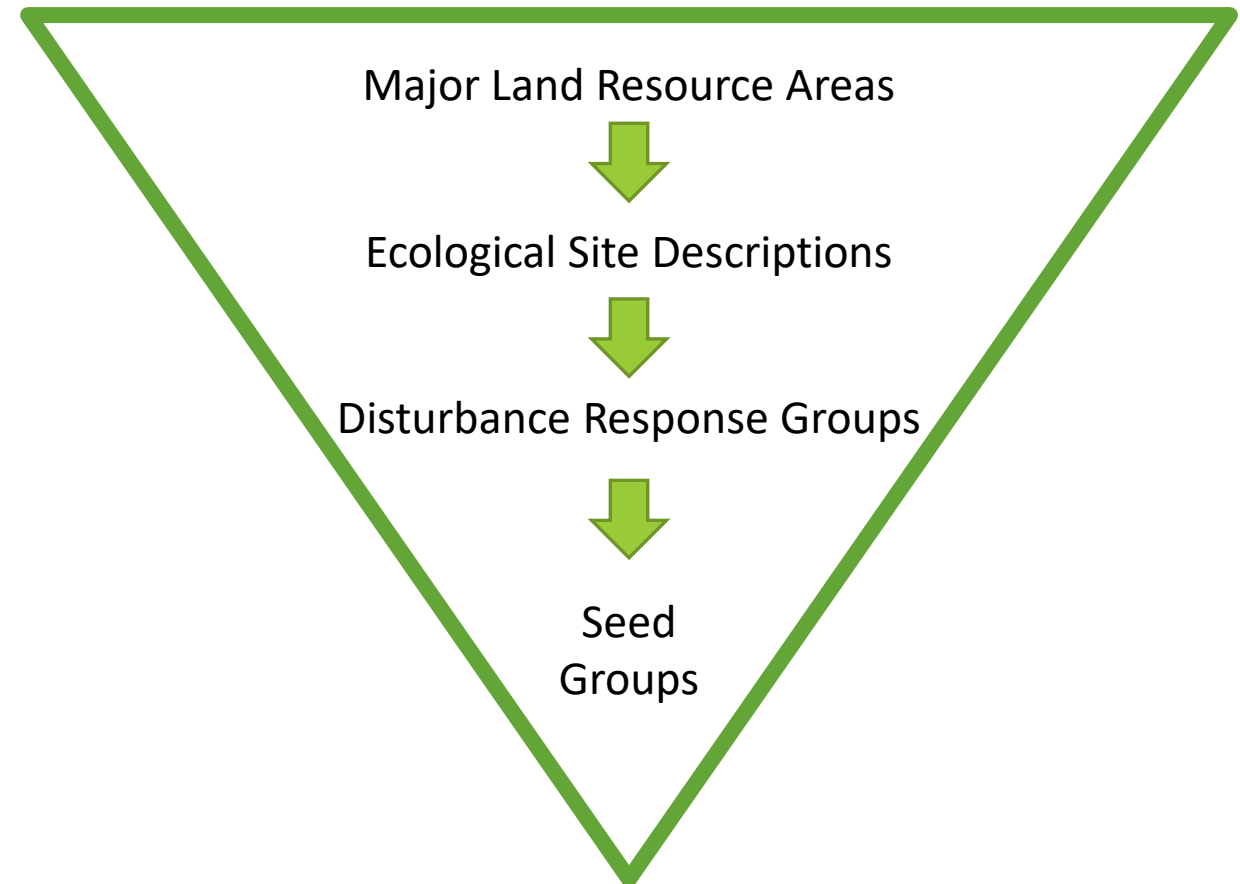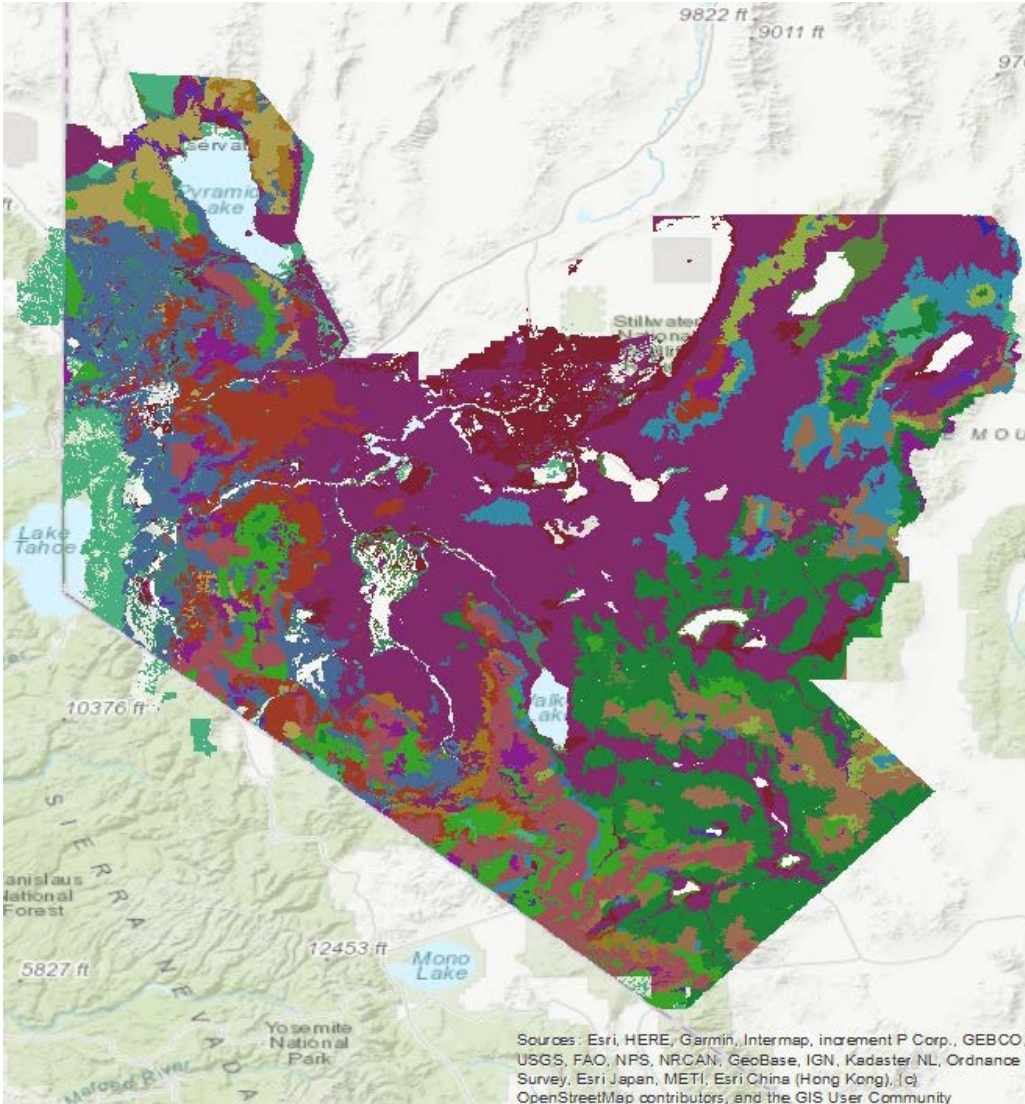
Seed Groups

Step 2-Develop Seed Groups

21 seed groups

When spatially assessed, 99 seed group-priority combinations were found

95 seed menus were created
◦ 2 seed groups (17 and 20) no menus created

Seed Groups	Acres	Percent of Area	BLM Acres	Percent of BLM Lands
N/A	611,456	4.8%	83,049	1.1%
1	166,138	1.3%	46,488	0.6%
2	4,986	0.0%	4,986	0.1%
3	538,245	4.2%	498,012	6.5%
4	708,600	5.5%	395,807	5.2%
5	4,246	0.0%	0	0.0%
6	315,296	2.5%	123,268	1.6%
7	1,106,007	8.7%	393,022	5.1%
8	227,985	1.8%	59,052	0.8%
9	4,377,247	34.3%	2,740,708	35.8%
10	850,586	6.7%	357,204	4.7%
11	588,335	4.6%	551,129	7.2%
12	2,819	0.0%	0	0.0%
13	298,905	2.3%	151,264	2.0%
14	164,108	1.3%	103,123	1.3%
15	681,739	5.3%	145,561	1.9%
16	781,569	6.1%	243,748	3.2%
#17	1,663,182	13.0%	1,507,069	19.7%
18	73,849	0.6%	46,620	0.6%
19	6,926	0.1%	6,894	0.1%
#20	5,671	0.0%	0	0.0%
21	211,242	1.7%	204,738	2.7%

Acreage for each of the seed group across area and on BLM lands

Step 3- Create the Seed Menus

Species Common Name	Baseline	Local Authority	Wildlife	Degraded	WUI
TaperTip hawksbeard	1	1.2	1.75	0	0
Indian Ricegrass	2	2	2	2	2
Bottlebrush squirreltail	2	2	2	3	4
Needle-and-thread	.4	.4	.4	0	0
Sandberg's bluegrass	1	1	1	2	2
Wyoming sagebrush	1	1	1	1	0
Thurber's needlegrass	1	2	2	0	0
Green ephedra	.75	1.5	1.5	1	0
Spiny hopsage	1	1	1	0	0
Winterfat	2	2	2	0	0
Siberian wheatgrass	0	0	0	4	4

Step 4- Model Future Fire Activity

Predicted fire active for 2023-2033
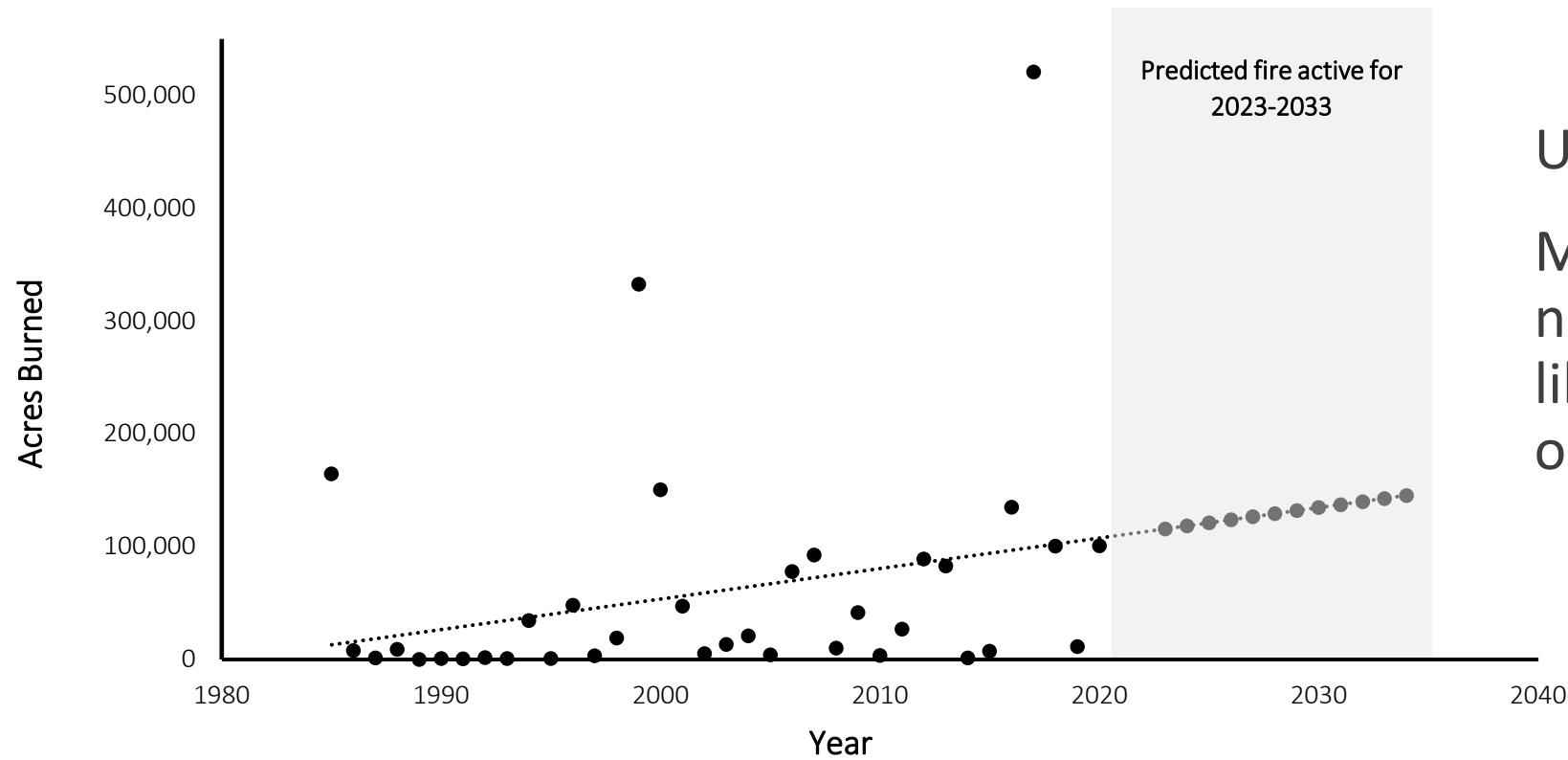
Used data from 1985-2020

May underrepresents number of fires but captures likely restoration opportunities

Acres Burned

Year

As we know, some vegetation are more likely to burn than others

Seed Groups	Percent of Total Area	Percent of Total Burned
N/A	4.8%	7.5%
1	1.3%	0.9%
2	0.0%	0.0%
3	4.2%	7.7%
4	5.5%	9.4%
5	0.0%	0.0%
6	2.5%	15.5%
7	8.7%	19.0%
8	1.8%	1.7%
9	34.3%	10.9%
10	6.7%	12.4%
11	4.6%	1.7%
12	0.0%	0.0%
13	2.3%	2.4%
14	1.3%	0.0%
15	5.3%	0.1%
16	6.1%	5.1%
17	13.0%	3.0%
18	0.6%	0.3%
19	0.1%	0.3%
20	0.0%	0.0%
21	1.7%	2.1%

Between ~5.5 million and 6.9 million lbs. of seed needed over the next 10 years
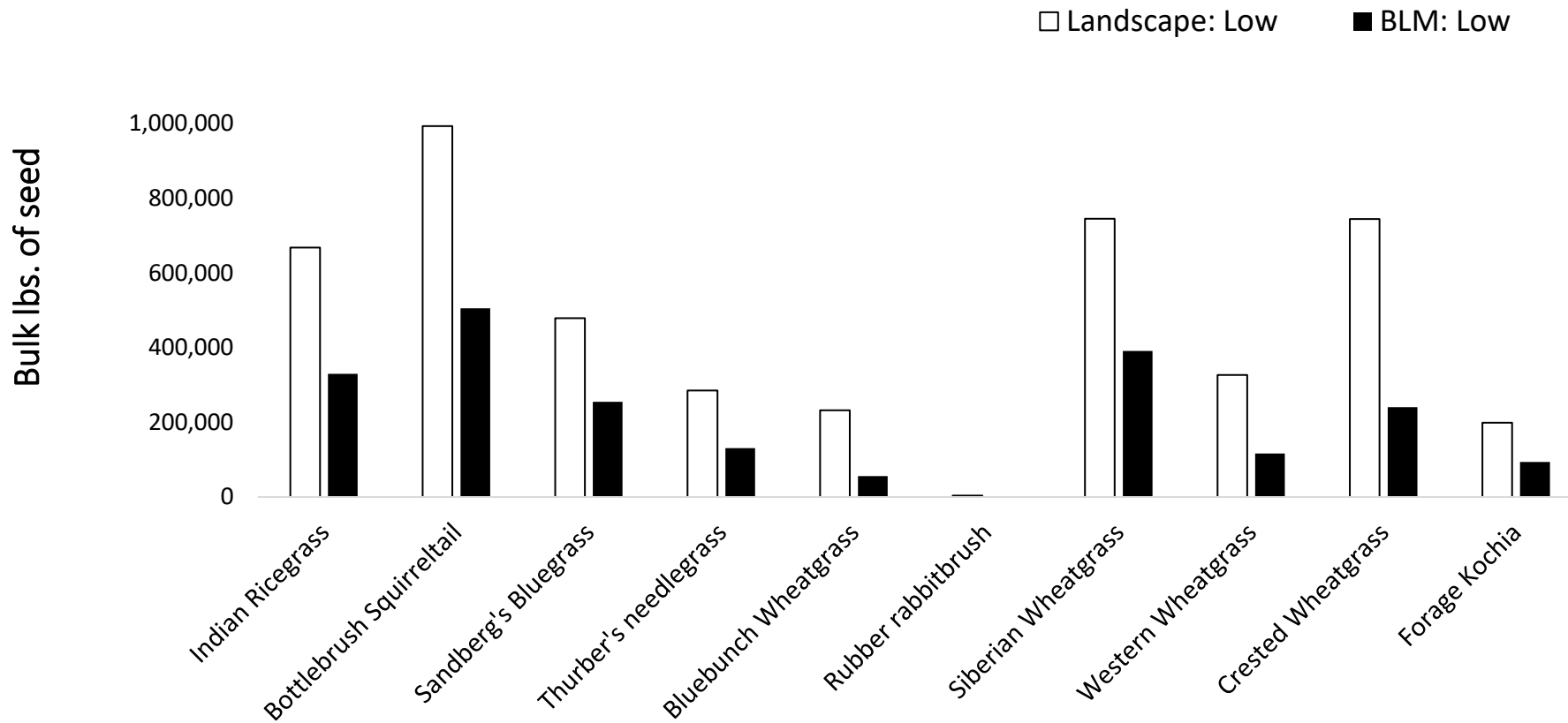
Species	Landscape Occurrence: Low	BLM Occurrence: Low
Indian Ricegrass	50	42
Bottlebrush Squirreltail	42	37
Sandberg's Bluegrass	35	28
Thurber's needlegrass	33	30
Bluebunch Wheatgrass	24	20
Rubber rabbitbrush	21	18
Siberian Wheatgrass	21	16
Western Wheatgrass	19	13
Crested Wheatgrass	17	11
Forage Kochia	17	13
Great Basin Wildrye	17	11
Green ephedra	16	15
Idaho fescue	16	14
Antelope Bitterbrush	15	14
Western Yarrow	15	11

Most frequently prescribed species in the 10-year forecast

40 total species were prescribed in the seed menus

Follow-up recommendations

Conduct similar analyses across the Great Basin.

Document seed-mix decision-making processes to continue to refine our understanding of the true demand for certain species.

Conduct Species-specific gap-analysis with recommendations for interventions to increase supply.

Evaluate storage, transportation, and restoration implementation capabilities for managing this volume of seed.

Potential Future Directions

Move from seed menus to seed mixes

Add provisional seed zones to forecast

What about the forbs?

Outside of Nevada
- ◦ Need new vegetation base layer since DRGs are not available elsewhere. Not insurmountable

Seeds vs. outplanting

What would help producers?

THANKS!

Photo: C. Carroon