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Bureau of Land Management

Native Seed Production Tools to Procure, Increase and Distribute Source Identified Seed via Seed Transfer Zones at an Ecoregional Scale in the Western, U.S

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An Assessment of Native Seeds Needs and Capacities Public Meeting - June 18th 2021



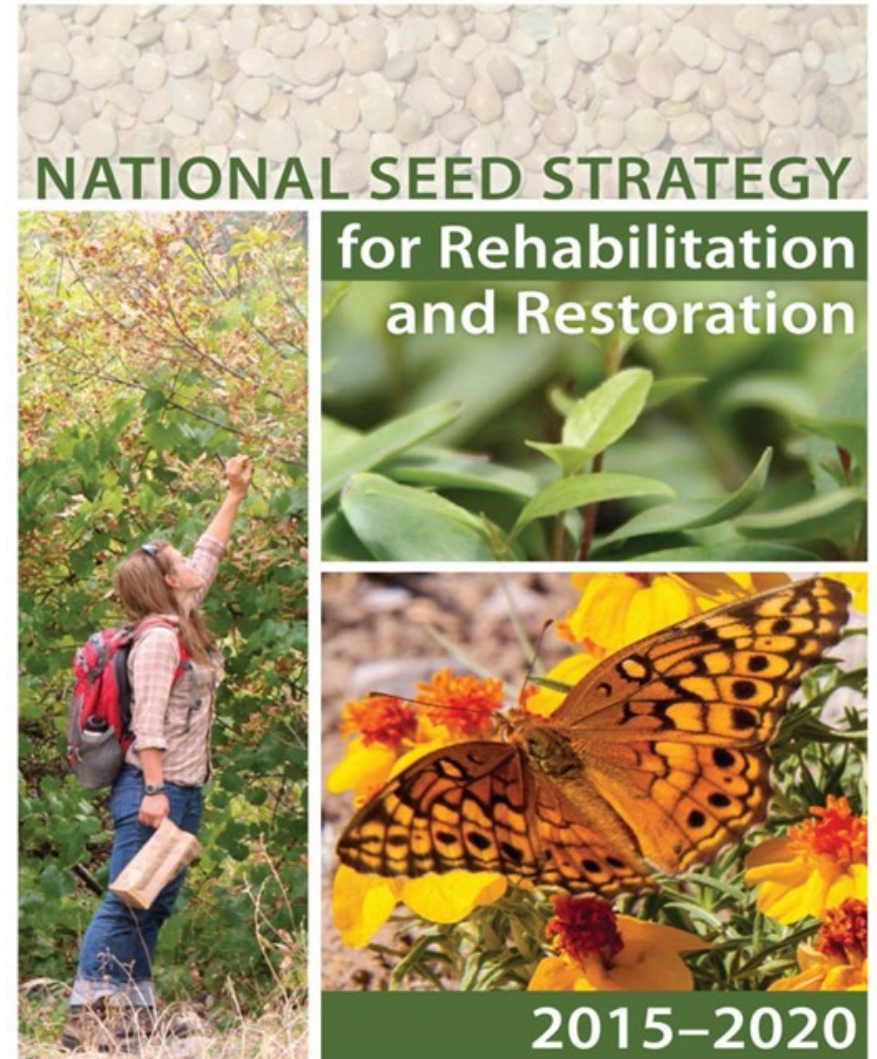
Benson Farms Inc. native forb production fields - Nancy Shaw photo



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National Seed Strategy - Twelve US Federal Agencies and Other Partners

Goal 1 - Identify Seed Needs, and Ensure the Reliable Availability of Genetically Appropriate Seed





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The Need for Native Seed Standards

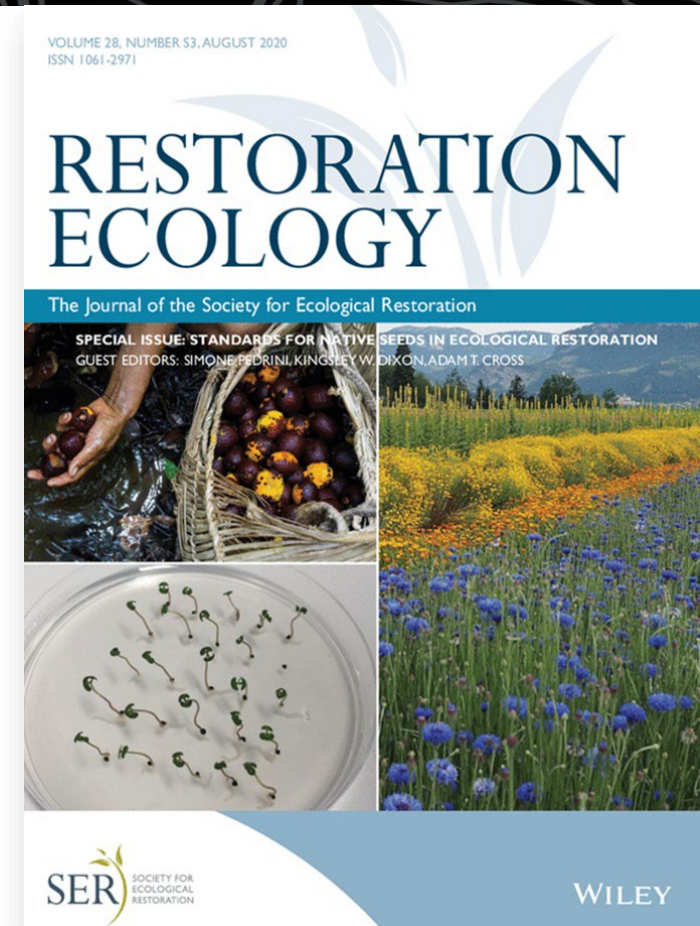
- The use of native seeds is critical to the recovery of functional ecosystems following degradation.
- The native seed supply chain is not ready to provide enough seed to fill the rising demand.
- Local and national native seed markets still often lack the guidelines and framework necessary to support sustainable development to the benefit of ecological restoration.
- There is not a clear and shared definition of what constitutes native seeds for ecological restoration.



Lomatium nudicaule (nude-stem biscuitroot) BLM Seeds of Success
Smug Mug Photo

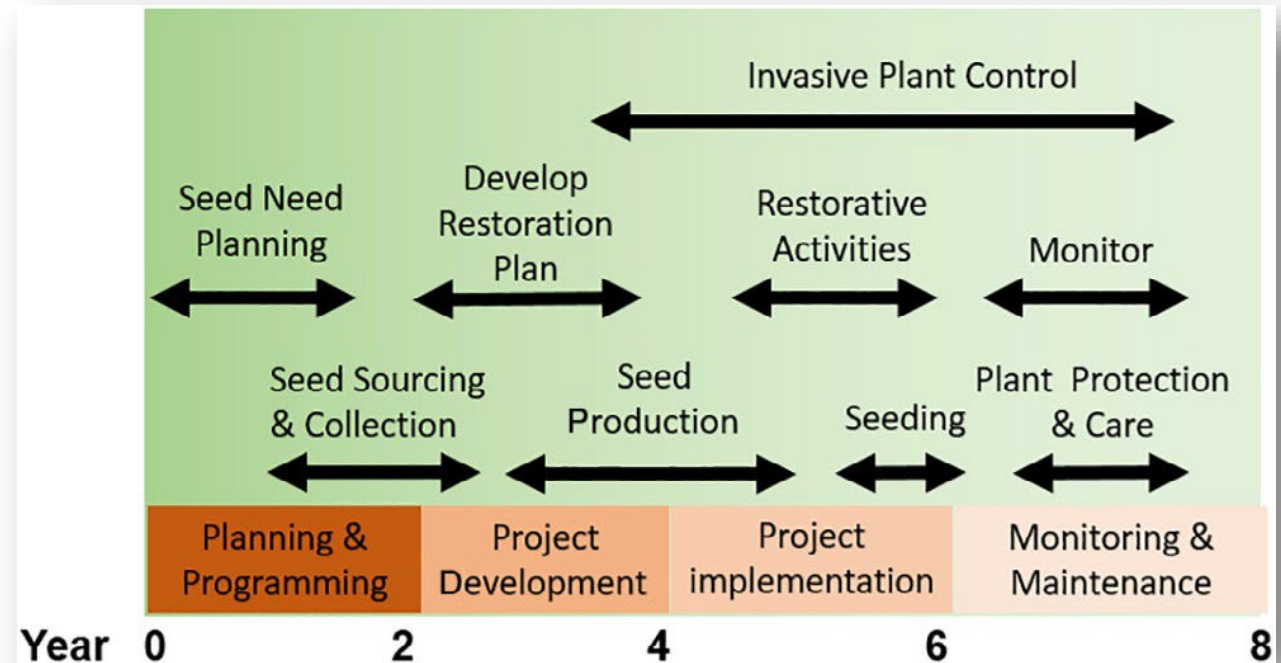
International Network for Seed-based Restoration (INSR) – International Native Seed Standards

The [standards document](#) is published in a special issue of the journal Restoration Ecology. The [special issue](#) also contains 7 articles that describe in detail each step in the native seed supply chain from sourcing to seed use.



Seed Based Practices to Consider – Early Planning

Early planning for seed needs based on site evaluation and examination of reference areas enables procurement of adequate quantities of seed of adapted species and seed sources.



Schematic timeline for planning, implementing and conducting restoration project activities (from Armstrong et al. 2017)

[Seed planning, sourcing, and procurement](#)

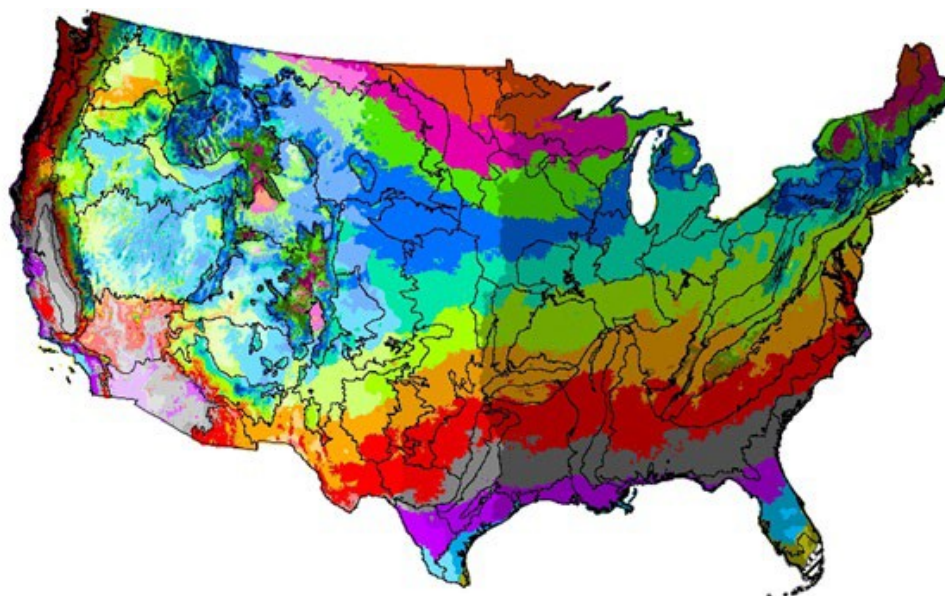
Erickson et. al 2020.



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Seed Based Practices to Consider - Seed Source

Seed zone maps and related tools, where available, can aid in selecting seed sources and lower the risk of maladaptation.



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Communication | [Free Access](#)

Generalized provisional seed zones for native plants

Andrew D. Bower , J. Bradley St. Clair, Vicky Erickson

First published: 01 July 2014 | <https://doi.org/10.1890/13-0285.1> | Citations: 70

WWETAC Seed Zone Layers
<https://www.fs.fed.us/wwetac/threat-map/TRMSeedZoneMapper.php>

BLM Colorado Native Plant Materials GIS Story Board- Seed Transfer Zones -
Seed Selection and Use
<https://storymaps.arcgis.com/stories/b234b0c9a913452296ae3de5d1152aa3>

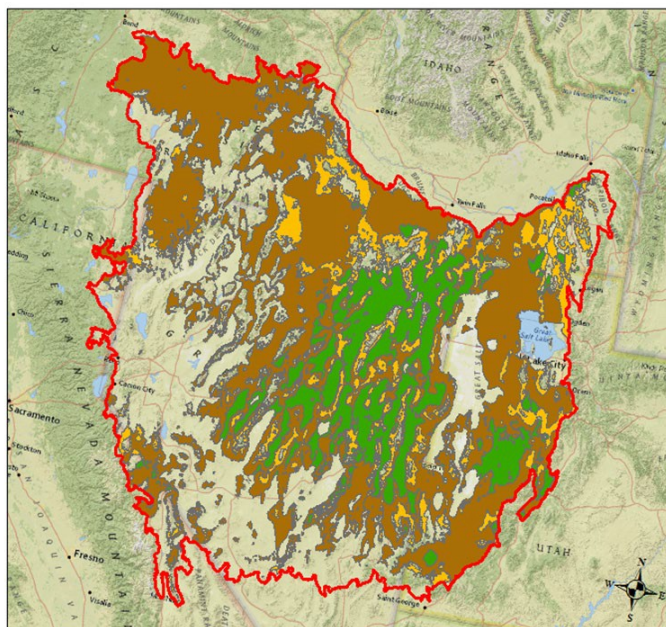


Seed Based Practices to Consider - Seed Source – cont'd

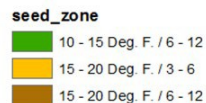
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WWETAC Seed Zone Layers

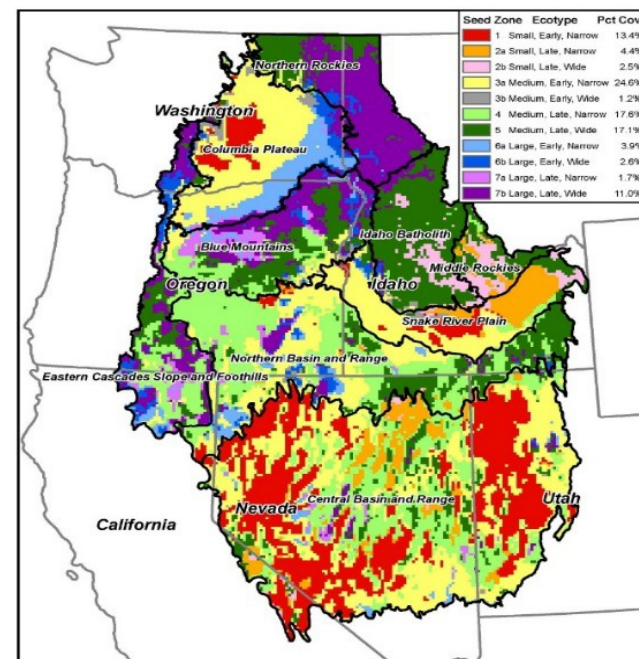
<https://www.fs.fed.us/wwetac/threat-map/TRMSeedZoneMapper.php>



Great Basin Priority Provisional Seed Zones



Great Basin Provisional Seed
Zones Bower *et al.* 2013



Empirical Seed Zone (blue bunch
wheatgrass (*Pseudoregneria spicata*)
St. Clair *et al.* (2013)



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Seed Based Practices to Consider - Maintenance of Genetic Diversity

Maintaining genetic diversity from seed collection through field increase and planting is crucial for reducing the risk of project failure.



Production fields of Utah sweetvetch (*Hedysarum boreale*) – Nancy Shaw (USFS)



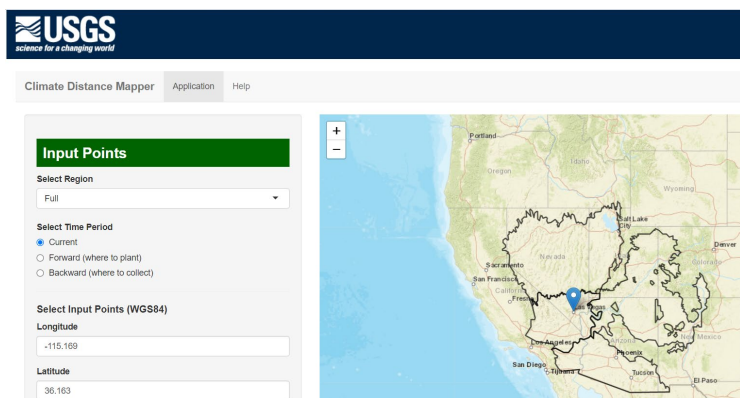
Production fields of showy Penstemon (*Penstemon speciosus*) – Nancy Shaw (USFS)



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Seed Based Practices to Consider - Seed Source and Climate Change

Seed source selection and management practices to maintain diversity and adaptive capacity are critical for effective response to climate change.



[Climate Distance Mapper](#)

↙
Seed Selector and Climpart – Dohery
et al. 2017 – see [Pilmanis, A. \(2019\)](#)
[Seed Sourcing Tool Flowchart.](#)

Climate Smart Restoration Tool

About

Tool

Layers

Saved Runs

Planting for the future



[Climate Smart Restoration Tool](#)

Seed Based Practices to Consider- Short and Long-Term Procurement Needs

Coordination of short- and long-term seed procurement needs improves availability of necessary seed sources.

Source Identified Seed (Crater's bluegrass – *Poa secunda* – Danelle Nance (BLM)



Eriogonum heracleoides (parsnip buckwheat)
seed – Nancy Shaw (USFS)



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Seed Needs Assessment, Sourcing, and Procurement Planning

- Species to be used
- Seed sources appropriate for the species and the restoration site location and conditions
- Quantity of seeds needed
- Seed procurement methods: commercial market purchases, internal seed bank, wildland collection and/or production
- Budget limitations
- Timelines
- The risks associated with seeding and how those risks can be mitigated to increase the chance of success
- Seed quality and testing



Oregon State Malheur Experiment Station, Ontario, OR – Fields of *Dalea ornata* (blue mountain prairie clover) Nancy Shaw, USFS. Text Society for Ecological Restoration BLM Arid Lands Restoration Course 2021.



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Native Seed Procurement

**SHOULD YOU WORRY
ABOUT PANIC BUYING
CAUSING A
SEED SHORTAGE?**

GARDEN
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GARDENCULTUREMAGAZINE.COM

SOURCE IDENTIFIED SEED

Agency
logo
here

Species Name	<i>Sporobolus heterolepis</i>
Common Name	Prairie Dropseed
Germplasm ID, Gen.	G3/5
G3 State, County, Elev.	WI, Dane, 800 ft.
G0 State, Region, Elev.	WI, Southwest, 790 ft.
G0 Indigenous?	Yes
Natural-Track?	Yes
Lot:	2999-SPOHET-3-SE; 03346

MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES



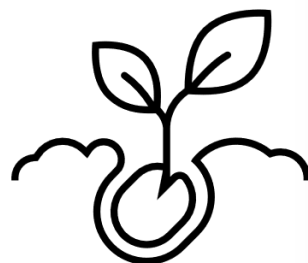
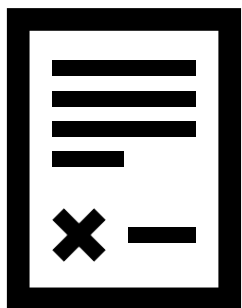
BLM Regional Seed
Warehouse, Boise ID



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Seed Procurement Tools

- Blanket Purchasing Agreements
- Assistance Agreements
- Interagency Agreements
- Indefinite Delivery, Indefinite Quantity Contracts
- Standard Contracts



NYPMC – National Resource
Conservation Service – Plant Material
Center pollinator forb field.



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Regional Example of a Native Seed Procurement Tool



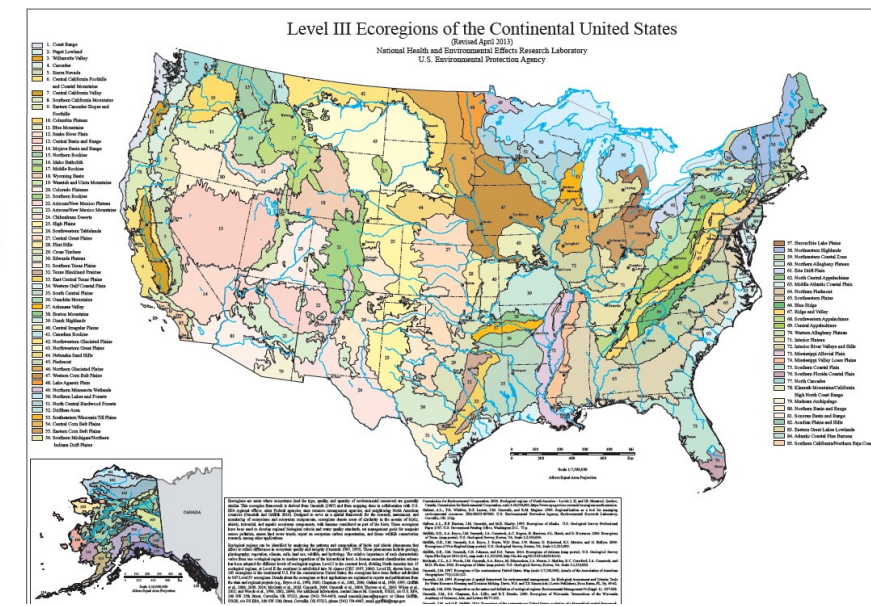
BUREAU OF LAND MANAGEMENT



70 FORBS
41 GRASSES
6 VENDORS

INDEFINITE DELIVERY
INDEFINITE QUANTITY (IDIQ)
SEED PRODUCTION CONTRACT

To procure and increase source identified seed following seed transfer zones within ecoregions

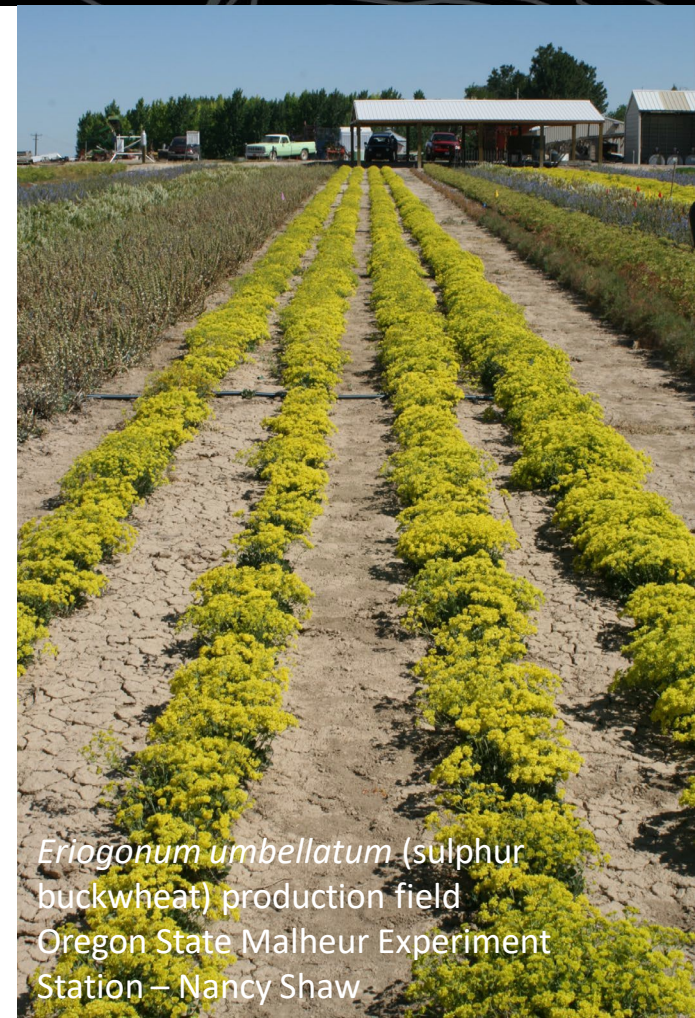




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Summary of IDIQ Contract Goals

- Develop seed increase contracts for Bureau of Land Management (BLM) focusing on native grass and forb seed
- Include both small and large commercial seed producers
- Develop unified standards for field production and seed quality based on current industry standards
 - State Seed Certification Services and Association of Official Seed Certifying Agencies (AOSCA)
Purity, germination, moisture and weeds
 - Association of Official Seed Analysts (AOSA)
- Track native seed increase production contracts by species, seed transfer zones, Ecoregions, elevation and states



Eriogonum umbellatum (sulphur buckwheat) production field
Oregon State Malheur Experiment Station – Nancy Shaw



From Seed Collection to Project Availability

– Contract Work-Flow

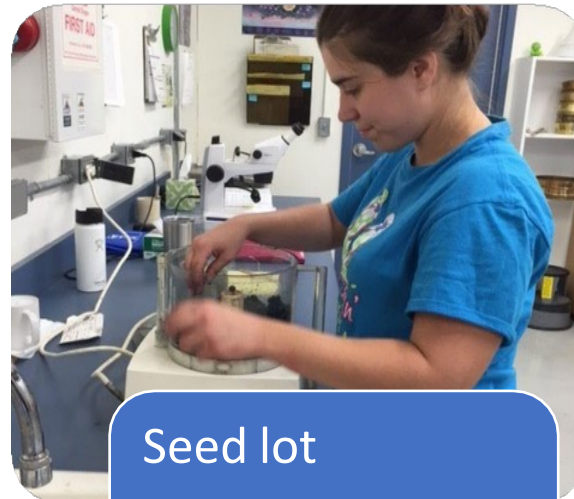
Phase I – Seed Collection to Certification



Seed Collection

- Single collection/ accession or,
- Multiple collections/accessions by Seed Transfer Zone(s)
- Within 150-200 m elevation band

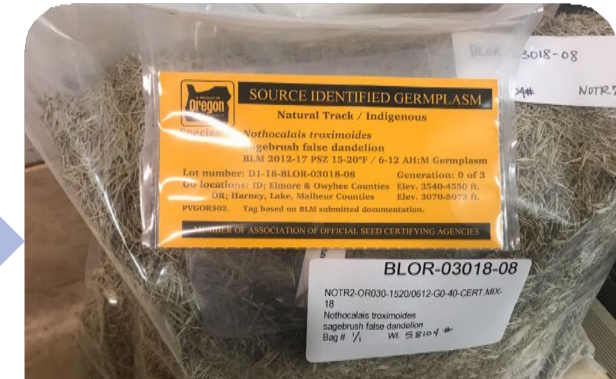
BLM Seeds of Success Smug Mug Photo



Seed lot

- Seed provenance verified
- Seed cleaned and tested

USFS Bend Seed Extractory – seed weighing and testing – Kayla Herriman



Seed Certification

- Seed sent to Seed Certifying Agency
- Source Identified and certified by,
- Single or pooled seed lots and
- by Seed Transfer Zone and elevation

BLM Source Identified Seed Label for sagebrush false dandelion (*Nothocalis troximoides*) – Kayla Herriman



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From Seed Collection to Project Availability

– Contract Work-Flow Cont'd

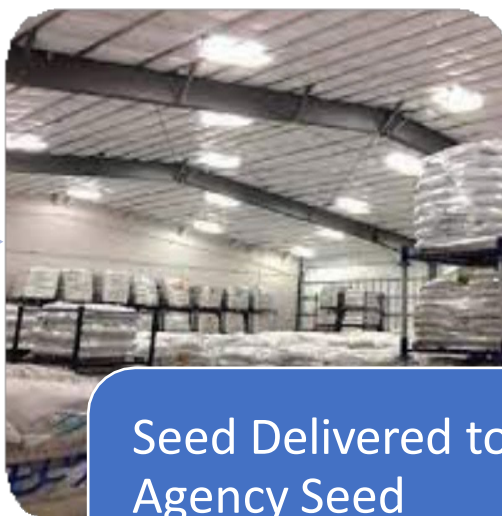
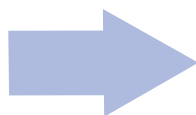
Phase II – Native Seed Production to Field Application



Certified Seed
Sent to Seed
Producer

- Via contract delivery orders

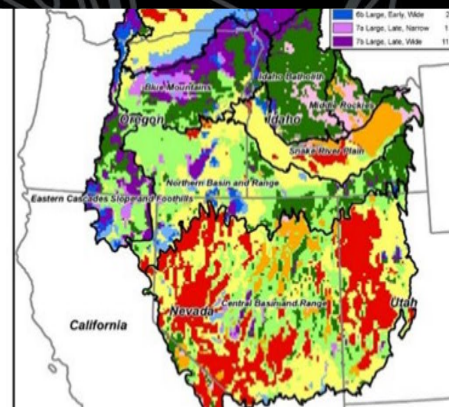
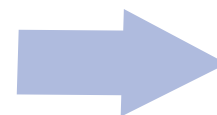
Lucky Peak Nursery – Nancy Shaw, USFS



Seed Delivered to
Agency Seed
Warehouse

- Seed lots tracked by **X** species from **Y** Seed Transfer Zone

BLM Regional Seed
Warehouse, BLM



Seed Requested by Species and
Seed Transfer Zone

- Seed is purchased by customer
- Purchase funds are used to pay for future seed production contract delivery orders
- Seed is tracked all the way through to field application

Empirical Seed Zone for bluebunch wheatgrass (*Pseudoregneria spicata*) St. Clair et al. (2013)



Current IDIQ Contract Metrics Since 2019

STZs – Seed Transfer Zones



Total species	42
Total taxa (species x STZs)	94
Total unique STZs	40
Total provisional STZs	23
Total empirical STZs	15
Total genetic STZs	2

Regan Murray – BLM SOS contractor 6/2021



Showy penstemon – BLM SOS
Smug Mug Photo



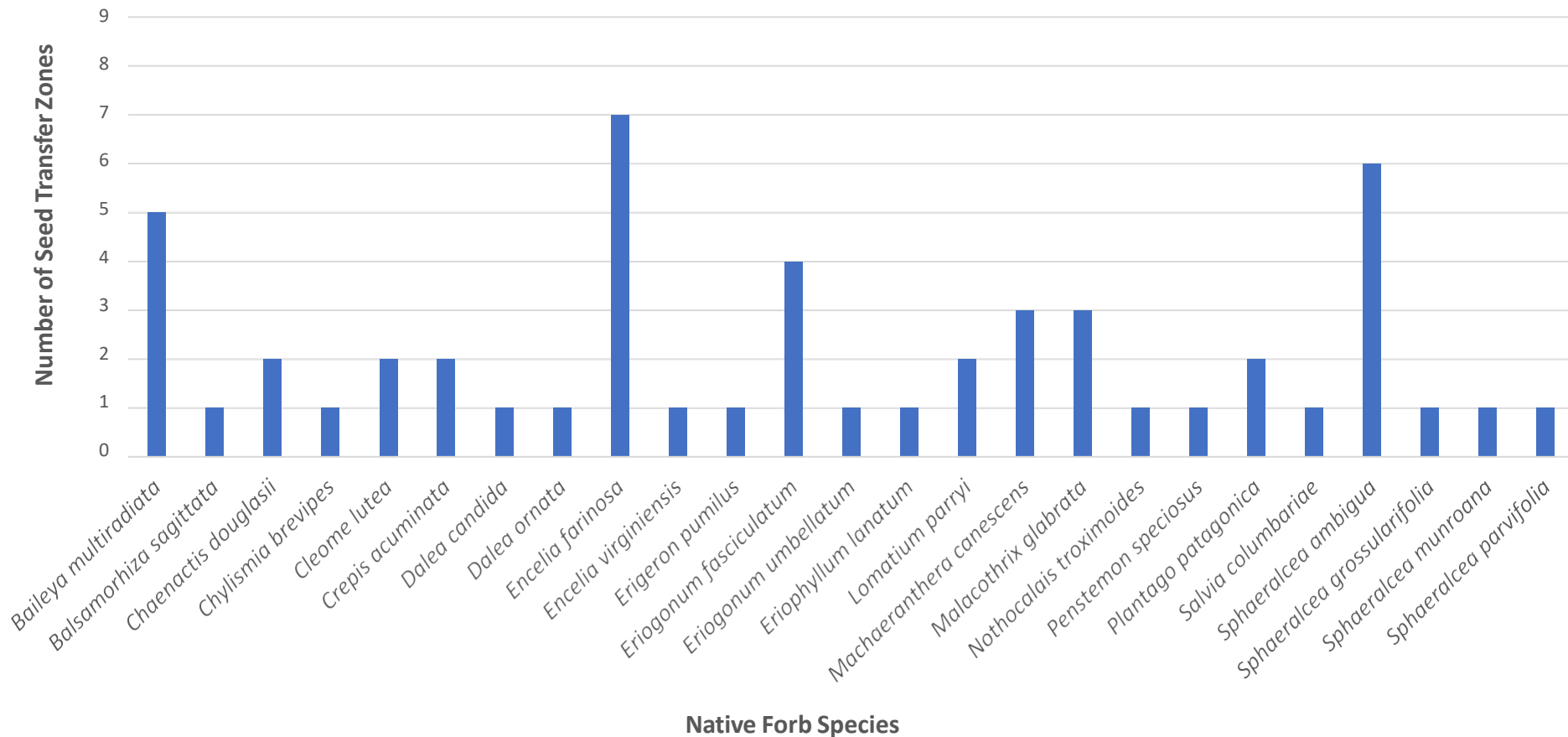
Douglas false yarrow – BLM SOS Smug Mug Photo



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Native Forb Target Species in Production Since 2019

Native Forb Species by Number of Seed Transfer Zones

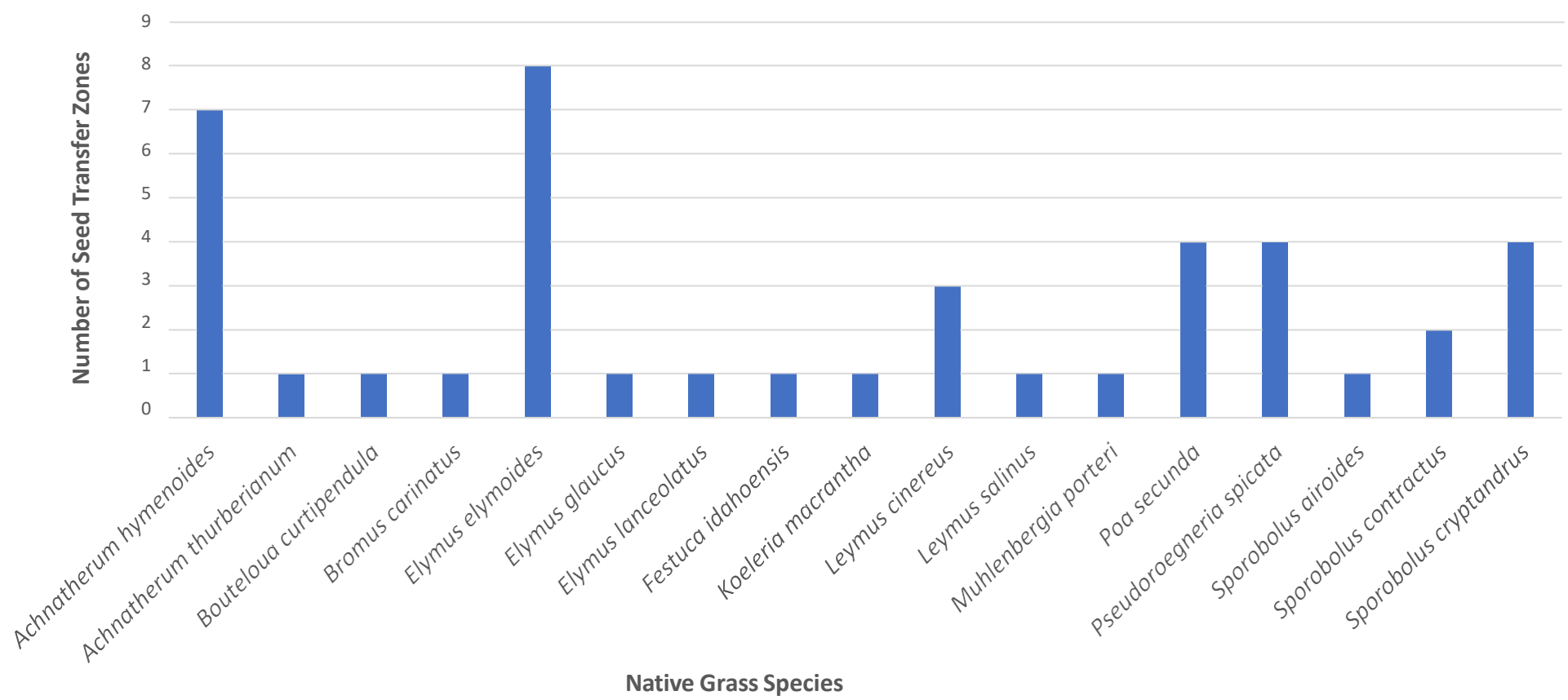




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Native Grass Target Species in Production Since 2019

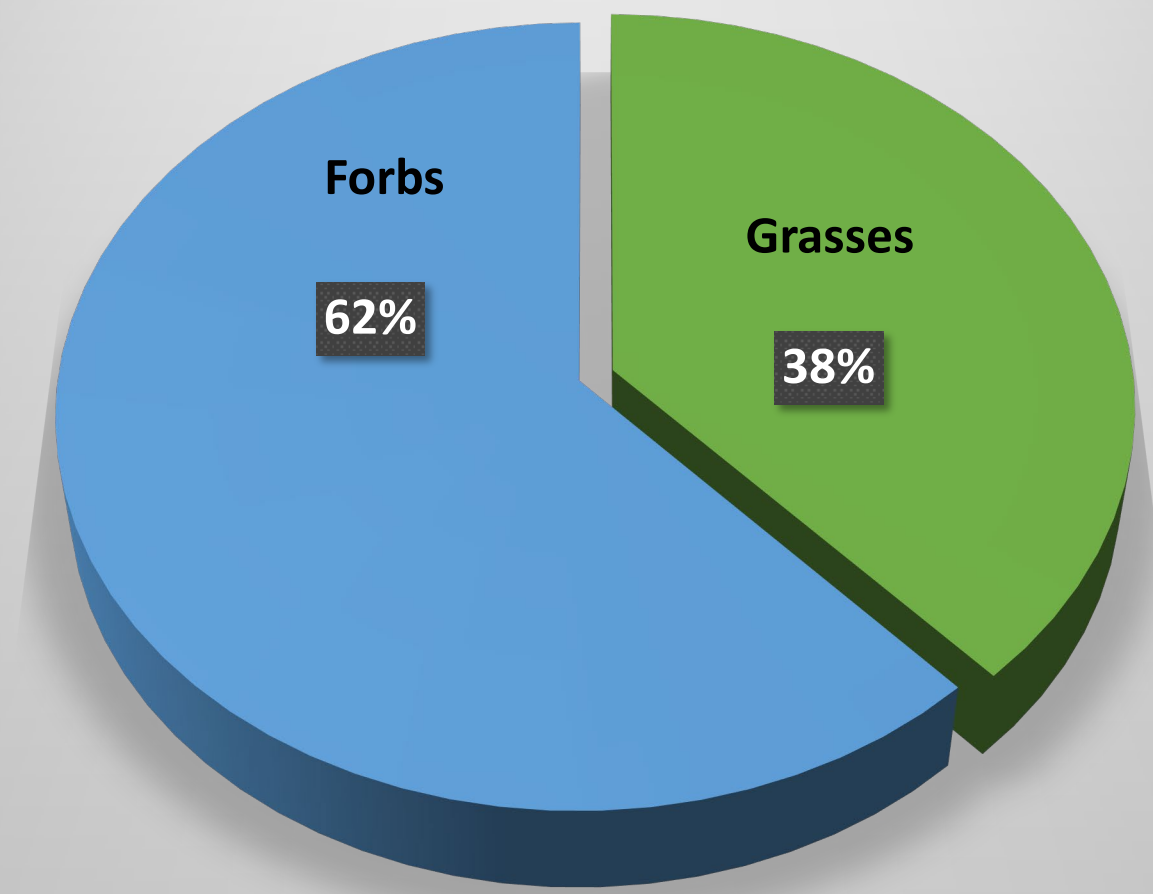
Native Grass Species by Number of Seed Transfer Zones





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Ratio of Native Forb to Grass Target Species in Production Since 2019





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Conclusion and Acknowledgements



SEEDS
OF
SUCCESS



Photo Credits:

- BLM Seeds of Success Smug Mug Photos
- Institute for Applied Ecology
- Francis Kilkenny, USFS RMRS
- Danelle Nance, BLM
- Oregon State Seed Certifying Agency
- Nancy Shaw, USFS RMRS
- USDA National Conservation Service

