



The Great Basin Native Plant Project

a plant material development partnership

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**Impetus to
formulate the
GBNPP**

The Great Basin

Total Area: 550,000 km²

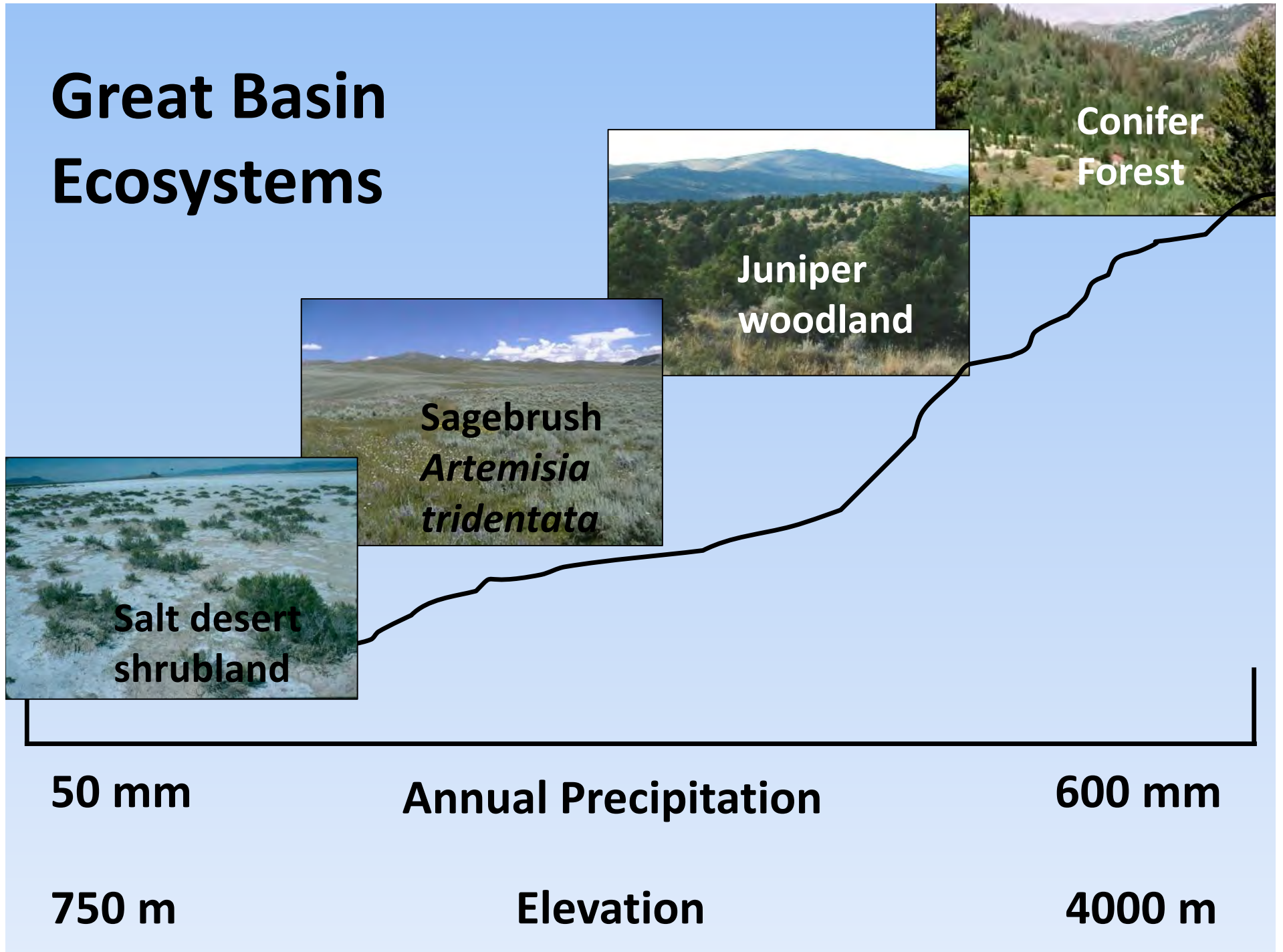
Public Lands: 410,000 km²

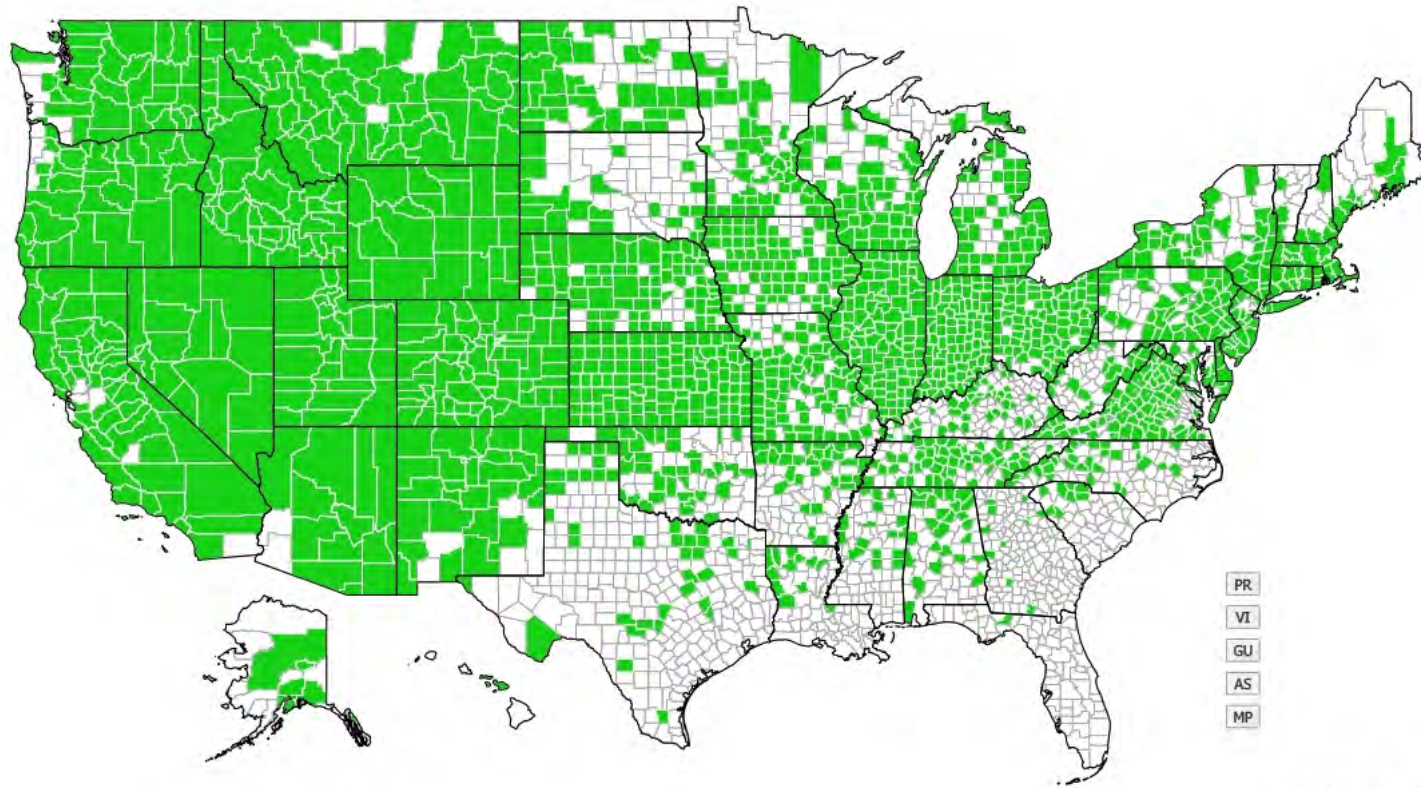


DRY!!!



Great Basin Ecosystems



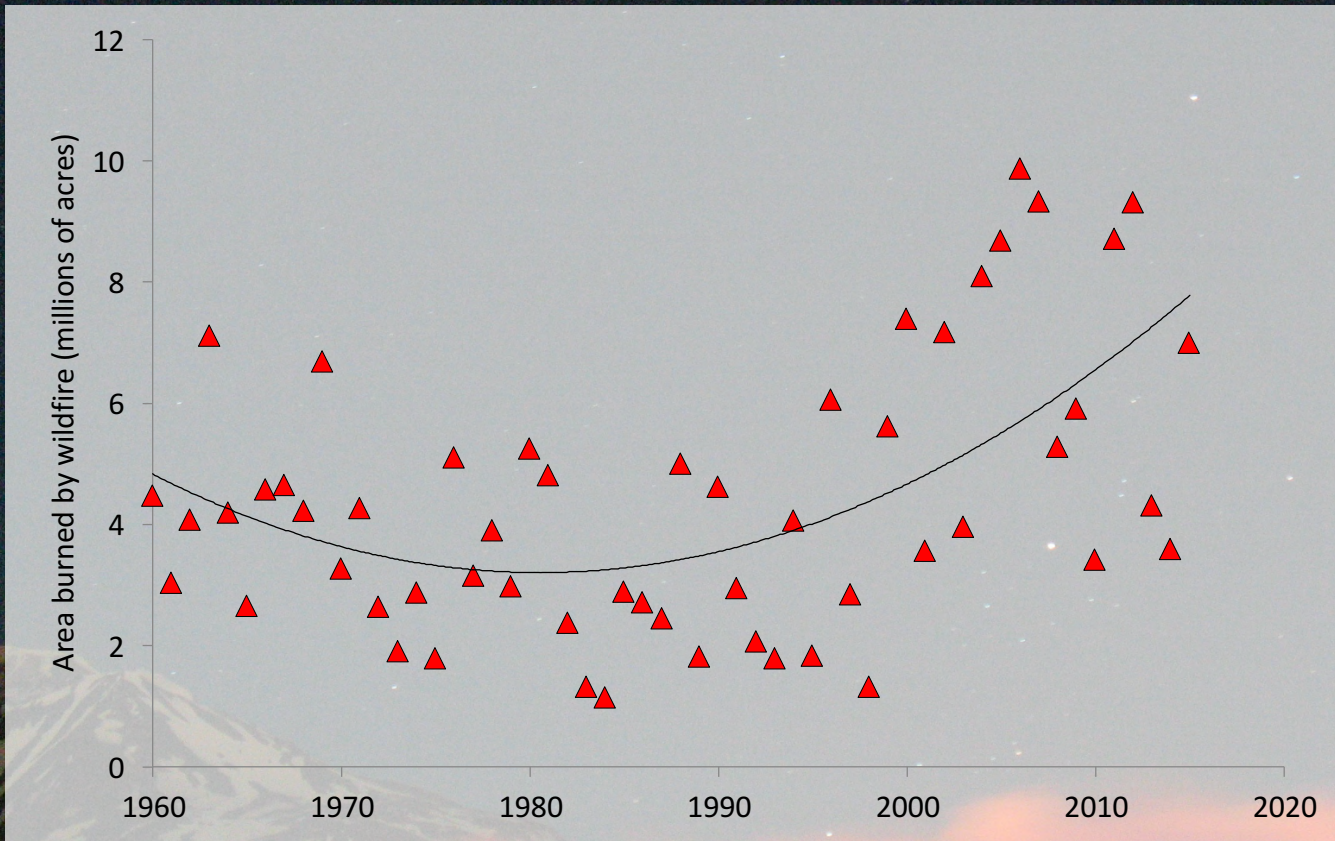


Last observation: January 22, 2014 - Map generated: March 12, 2014

EDD MapS
Early Detection & Distribution Mapping System

Invasive and non-native species Cheatgrass!

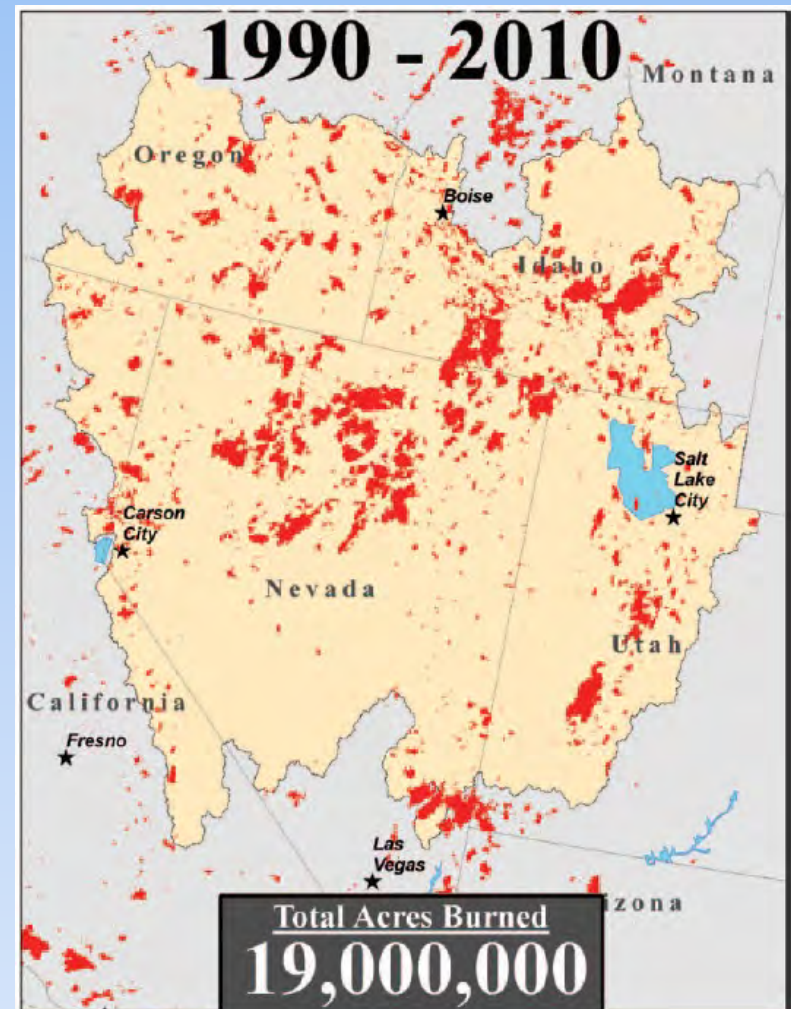
Photo by: Famartin



Fire!

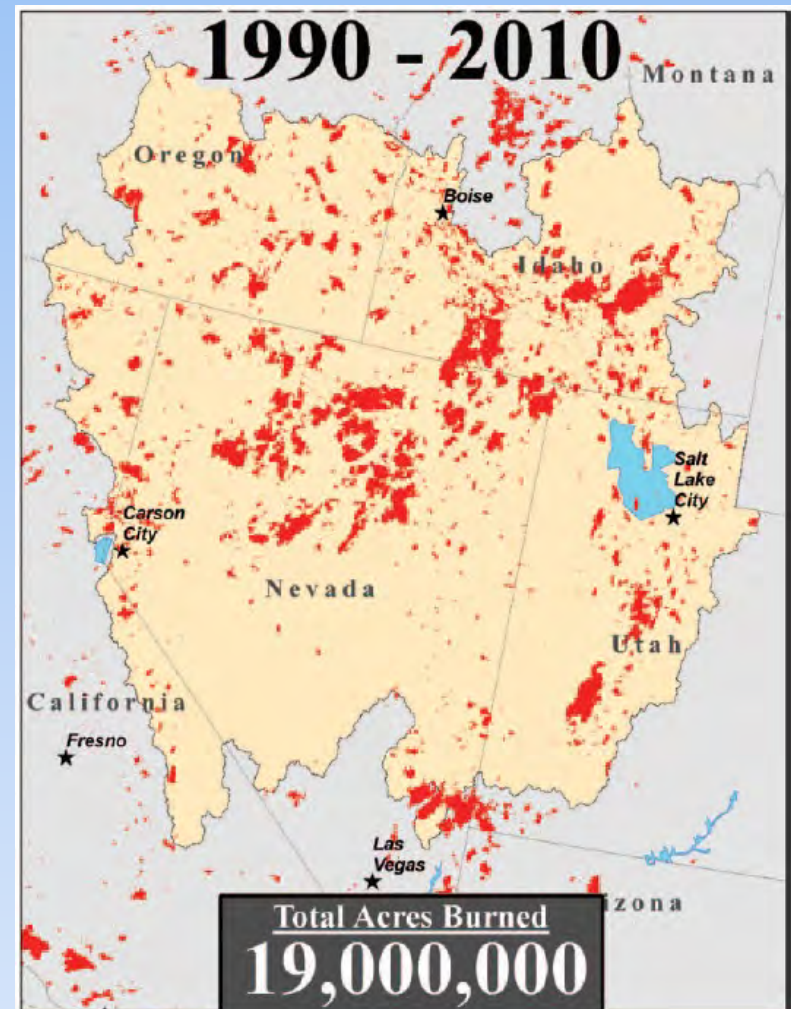
History of GBNPP organization and partnerships

- Wildfires in 1999 and 2000 burned more than 1 million ha in the Great Basin
- Restoration efforts limited by inadequate supplies of appropriate plant materials, especially for native species
- Department of the Interior and Related Agencies Appropriations Act of FY2001: directs USDI and USDA to plan to “supply native plant materials for emergency stabilization and longer-term rehabilitation and restoration efforts.”
- Report to Congress outlined recommendations for development of an *Interagency Native Plant Materials Development Program* to “ensure a stable and economical supply of native plant materials” for public lands.



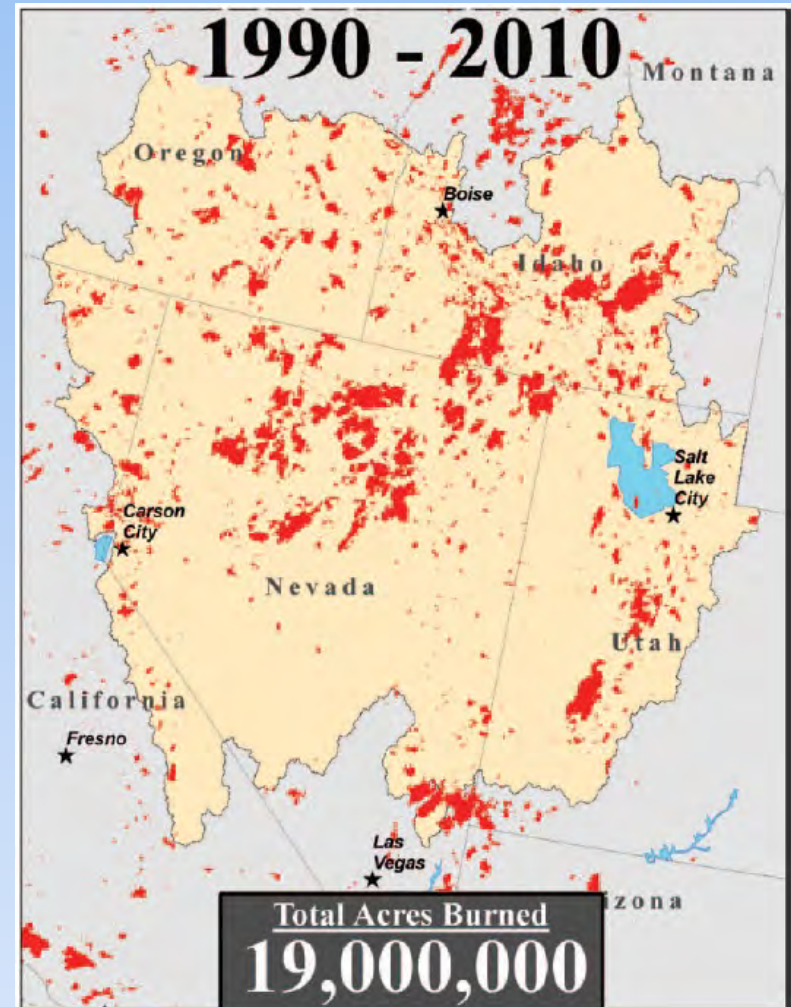
Shaw *et al.* 2012, Rangelands

- *Great Basin Restoration Initiative (GBRI)*: effort led by BLM to proactively address invasive species spread and altered fire regimes, maintain high-value native plant communities, strategically restore degraded areas
- *The Great Basin Native Plant Selection and Increase Project (GBNPSIP)* organized by the GBRI in 2001 in collaboration with the USFS Rocky Mountain Research Station (RMRS) and with funding provided by BLM's National Native Plant Materials Development Program



Shaw *et al.* 2012, Rangelands

- USDI Bureau of Land Management (Nevada, Utah and Idaho)
- USDA Forest Service RMRS, Shrub Sciences Laboratory
- Utah Division of Wildlife Resources
- USDA Agricultural Research Service, Forage and Range Research Laboratory
- USDA Agricultural Research Service, Bee Biology and Systematics Laboratory
- Utah Crop Improvement Association
- USDA Natural Resources Conservation Service (Idaho and Utah)



Shaw *et al.* 2012, Rangelands

COOPERATORS

USDA Forest Service, Rocky Mountain Research Station

Grassland, Shrubland and Desert Ecosystem Research Program, Boise, ID, Provo, UT, and Albuquerque, NM

USDI Bureau of Land Management, Plant Conservation Program, Washington, DC

Boise State University, Boise, ID

Brigham Young University, Provo, UT

College of Western Idaho, Nampa, ID

Eastern Oregon Stewardship Services, Prineville, OR

Oregon State University Malheur Experiment Station, Ontario, OR

Private Seed Industry

Texas Tech University, Lubbock, TX

Truax Company, Inc., New Hope, MN

University of Idaho, Moscow, ID

University of Idaho Parma Research and Extension Center, Parma, ID

University of Nevada, Reno, NV

University of Nevada Cooperative Extension, Elko and Reno, NV

Utah State University, Logan, UT

USDA Agricultural Research Service, Bee Biology and Systematics Laboratory, Logan, UT

USDA Agricultural Research Service, Eastern Oregon Agriculture Research Center, Burns, OR

USDA Agricultural Research Service, Forage and Range Research Laboratory, Logan, UT

USDA Agricultural Research Service, Great Basin Rangelands Research Unit, Reno, NV

USDA Agricultural Research Service, Western Regional Plant Introductions Station, Pullman, WA

USDA Forest Service, National Seed Laboratory, Dry Branch, GA

USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR

USDA Natural Resources Conservation Service, Aberdeen Plant Materials Center, Aberdeen, ID

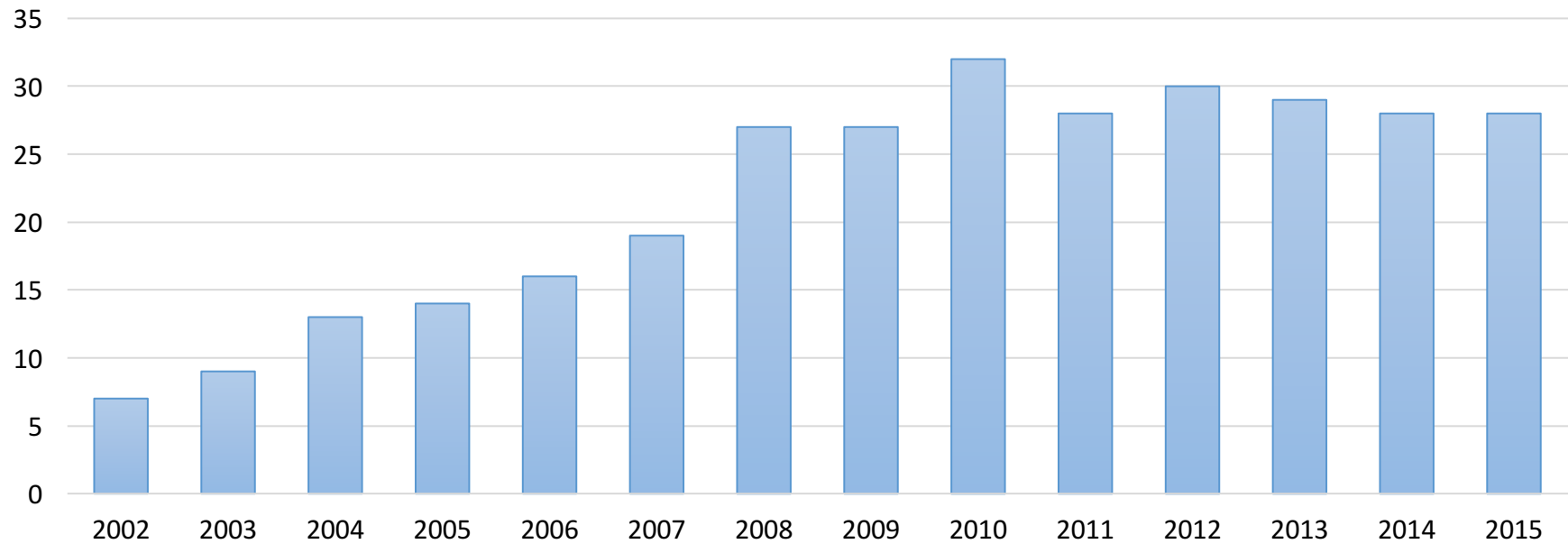
USDI Bureau of Land Management, Morley Nelson Birds of Prey National Conservation Area, Boise, ID

US Geological Survey Forest and Rangeland Ecosystem Science Center, Boise, ID

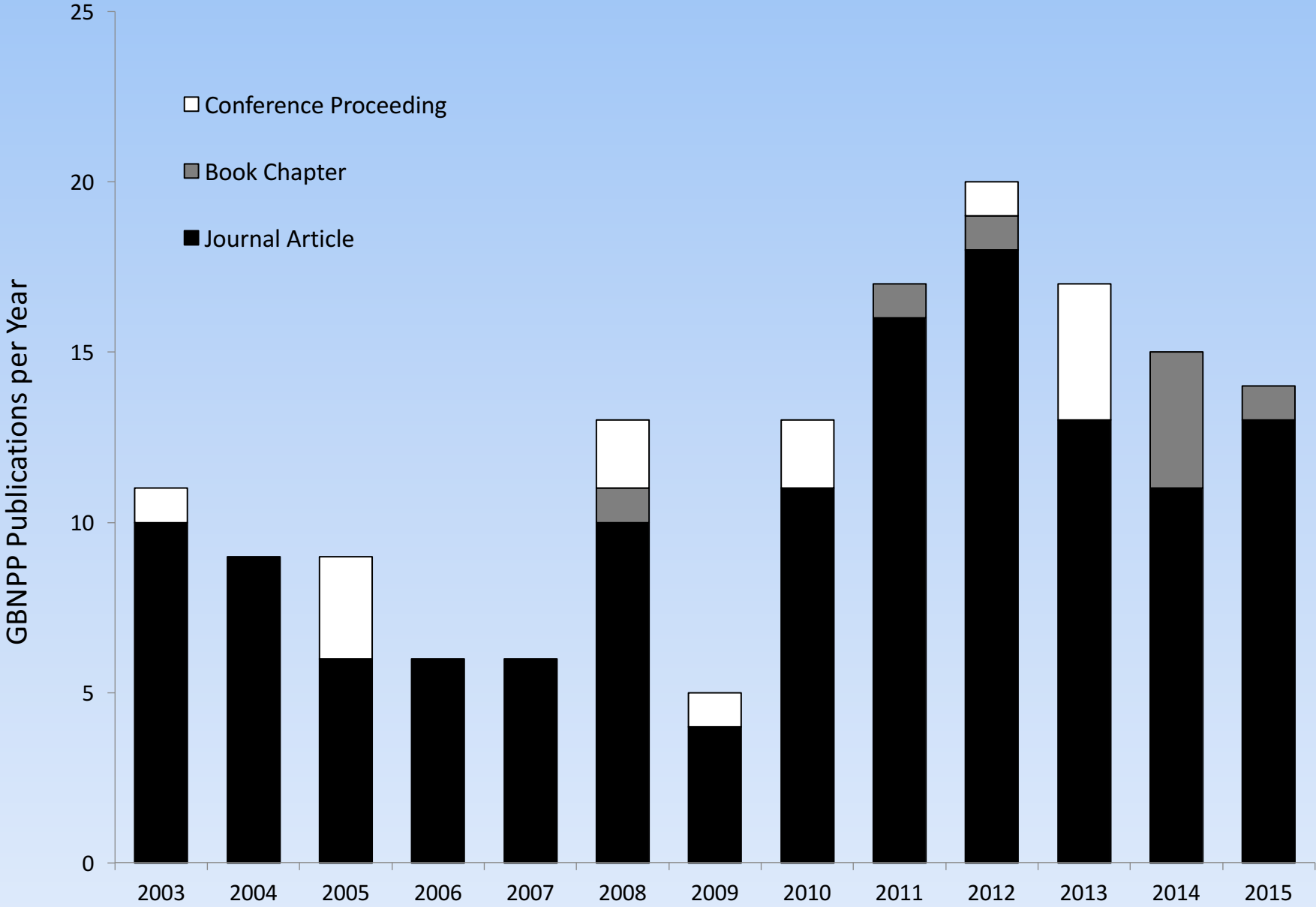
Utah Division of Wildlife Resources, Great Basin Research Center, Ephraim, UT

Utah Crop Improvement Association, Logan, UT

Institutional Cooperators



Great Basin Native Plant Project Publications



| Genus | Taxa | Type | Genus | Taxa | Type |
|--|------|------|---|------|------|
| <i>Achillea</i> L. Asteraceae | 2 | F | <i>Heterotheca</i> Cass. Asteraceae | 1 | F |
| <i>Achnatherum</i> P. Beauv. Poaceae | 4 | G | <i>Blinnia</i> Greene Malvaceae | 1 | F |
| <i>Agastache</i> Clayton ex Gronov. Lamiaceae | 1 | F | <i>Ipomopsis</i> Michx. Polemoniaceae | 2 | F |
| <i>Agoseris</i> Raf. Asteraceae | 4 | F | <i>Koeleria</i> Pers. Poaceae | 1 | G |
| <i>Allium</i> L. Liliaceae | 1 | F | <i>Krascheninnikovia</i> Goldenstaedt Chenopodiaceae | 1 | S |
| <i>Amsinckia</i> Lehm. Boraginaceae | 3 | F | <i>Lappula Moench</i> Boraginaceae | 1 | F |
| <i>Aquilegia</i> L. Ranunculaceae | 1 | F | <i>Lathyrus</i> L. Fabaceae | 1 | F |
| <i>Arenaria</i> L. Caryophyllaceae | 1 | F | <i>Lepidium</i> L. Brassicaceae | 1 | F |
| <i>Argemone</i> L. Papaveraceae | 1 | F | <i>Leymus</i> Hochst. Poaceae | 3 | G |
| <i>Aristida</i> L. Poaceae | 1 | G | <i>Ligusticum</i> L. Apiaceae | 2 | F |
| <i>Artemisia</i> L. Asteraceae | 13 | S | <i>Linum</i> L. Linaceae | 5 | F |
| <i>Astragalus</i> L. Fabaceae | 5 | F | <i>Lomatium</i> Raf. Apiaceae | 12 | F |
| <i>Atriplex</i> L. Chenopodiaceae | 3 | S | <i>Lotus</i> L. Fabaceae | 1 | F |
| <i>Balsamorhiza</i> Nutt. Asteraceae | 3 | F | <i>Lupinus</i> L. Fabaceae | 8 | F |
| <i>Blepharipappus</i> Hook. Asteraceae | 1 | F | <i>Machaeranthera</i> Nees Asteraceae | 1 | F |
| <i>Bromus</i> L. Poaceae | 2 | G | <i>Mentzelia</i> L. Loasaceae | 3 | F |
| <i>Castilleja</i> Nutt. ex L.f. Scrophulariaceae | 1 | F | <i>Microsteris gracilis</i> (Hook) Greene Polemoniaceae | 1 | F |
| <i>Chamaedix</i> D.C. Asteraceae | 3 | F | <i>Muhlenbergia</i> Schreb. Poaceae | 1 | G |
| <i>Chamerion</i> Raf. ex Holub Onagraceae | 1 | F | <i>Namophila</i> Nutt. Hydrophyllaceae | 1 | F |
| <i>Chenopodium</i> L. Chenopodiaceae | 1 | F | <i>Nicotiana</i> L. Solanaceae | 1 | F |
| <i>Chrysothamnus</i> Nutt. Asteraceae | 3 | S | <i>Oenothera</i> L. Onagraceae | 1 | F |
| <i>Clarkia Pursh</i> Onagraceae | 1 | F | <i>Packera</i> A. Löve & D. Löve Asteraceae | 1 | F |
| <i>Cleome</i> L. Capparaceae | 2 | F | <i>Pascopyrum</i> A. Löve Poaceae | 1 | G |
| <i>Collinsia</i> Nutt. Scrophulariaceae | 2 | F | <i>Pentstemon</i> Schmidt Scrophulariaceae ¹ | 26 | F |
| <i>Crepis</i> L. Asteraceae | 3 | F | <i>Perideridia</i> Rdb. Apiaceae | 1 | F |
| <i>Cryptantha</i> Lehm. ex G. Don Boraginaceae | 2 | F | <i>Phacelia</i> Juss. Hydrophyllaceae | 7 | F |
| <i>Cymopterus</i> Raf. Apiaceae | 2 | F | <i>Phlox</i> L. Polemoniaceae | 1 | F |
| <i>Dalea</i> L. Fabaceae | 3 | F | <i>Plagiobothrys</i> Fisch. & C.A. Mey. Boraginaceae | 1 | F |
| <i>Delphinium</i> L. Ranunculaceae | 2 | F | <i>Poa</i> L. Poaceae | 2 | G |
| <i>Descurainia</i> Webb & Bethel. Brassicaceae | 1 | F | <i>Potentilla</i> L. Rosaceae | 2 | F |
| <i>Elymus</i> L. Poaceae | 8 | G | <i>Pseudonegrexia</i> (Nevskii) A. Löve Poaceae | 1 | G |
| <i>Encalopsis</i> (A. Gray) A. Nelson Asteraceae | 1 | F | <i>Psoralea</i> Rydb. Fabaceae | 1 | F |
| <i>Epilobium</i> L. Onagraceae | 1 | F | <i>Pumila</i> DC. ex Poir. Rosaceae | 4 | S |
| <i>Eriastrum Wooton & Standl. Polemoniaceae</i> | 1 | F | <i>Rudbeckia</i> L. Asteraceae | 1 | F |
| <i>Eriocameria</i> Nutt. Asteraceae | 1 | F | <i>Scrophularia</i> L. Scrophulariaceae ² | 1 | F |
| <i>Eriogonum</i> L. Asteraceae | 3 | F | <i>Shepherdia</i> Nutt. Elaeagnaceae | 2 | S |
| <i>Eriogonum</i> Michx. Polygonaceae | 9 | F | <i>Sphaeralcea</i> A. St.-Hil. Malvaceae | 5 | F |
| <i>Eriophyllum</i> Lag. Asteraceae | 1 | F | <i>Spombolus</i> R. Br. Poaceae | 1 | G |
| <i>Festuca</i> L. Poaceae | 1 | G | <i>Stanleya</i> Nutt. Brassicaceae | 2 | F |
| <i>Frasera</i> Walter Gentianaceae | 1 | F | <i>Stenotus</i> Nutt. Asteraceae | 1 | F |
| <i>Gallardia</i> Foug. Asteraceae | 1 | F | <i>Thelypodium</i> Endl. Brassicaceae | 1 | F |
| <i>Gilia Ruiz & Pav. Polemoniaceae</i> | 2 | F | <i>Townsendia</i> Hook. Asteraceae | 1 | F |
| <i>Grayia</i> Hook. & Arn. Chenopodiaceae | 1 | F | <i>Veratrum</i> L. Liliaceae | 1 | F |
| <i>Hedysarum</i> L. Fabaceae | 2 | F | <i>Vicia</i> L. Fabaceae | 1 | F |
| <i>Helianthus</i> Nutt. Asteraceae | 3 | F | <i>Vulpia</i> C.C. Gmel. Poaceae | 1 | G |
| <i>Hesperostipa</i> (Elias) Barkworth Poaceae | 1 | G | <i>Wyethia</i> Nutt. Asteraceae | 1 | F |

2001-2014, the **Great Basin Native Plant Project** evaluated:

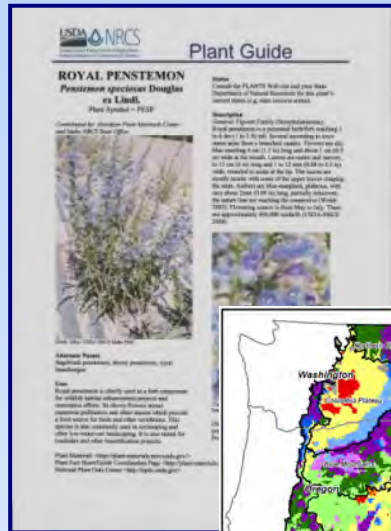
- 92 genera of native plant
- 225 taxa
- 80% are forbs
- 30+ varieties in production

Science delivery

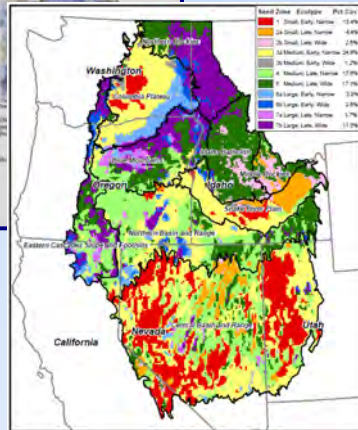
- Manuals
- Manuscripts
- Annual report



- Website
- Technical notes
- Webinars



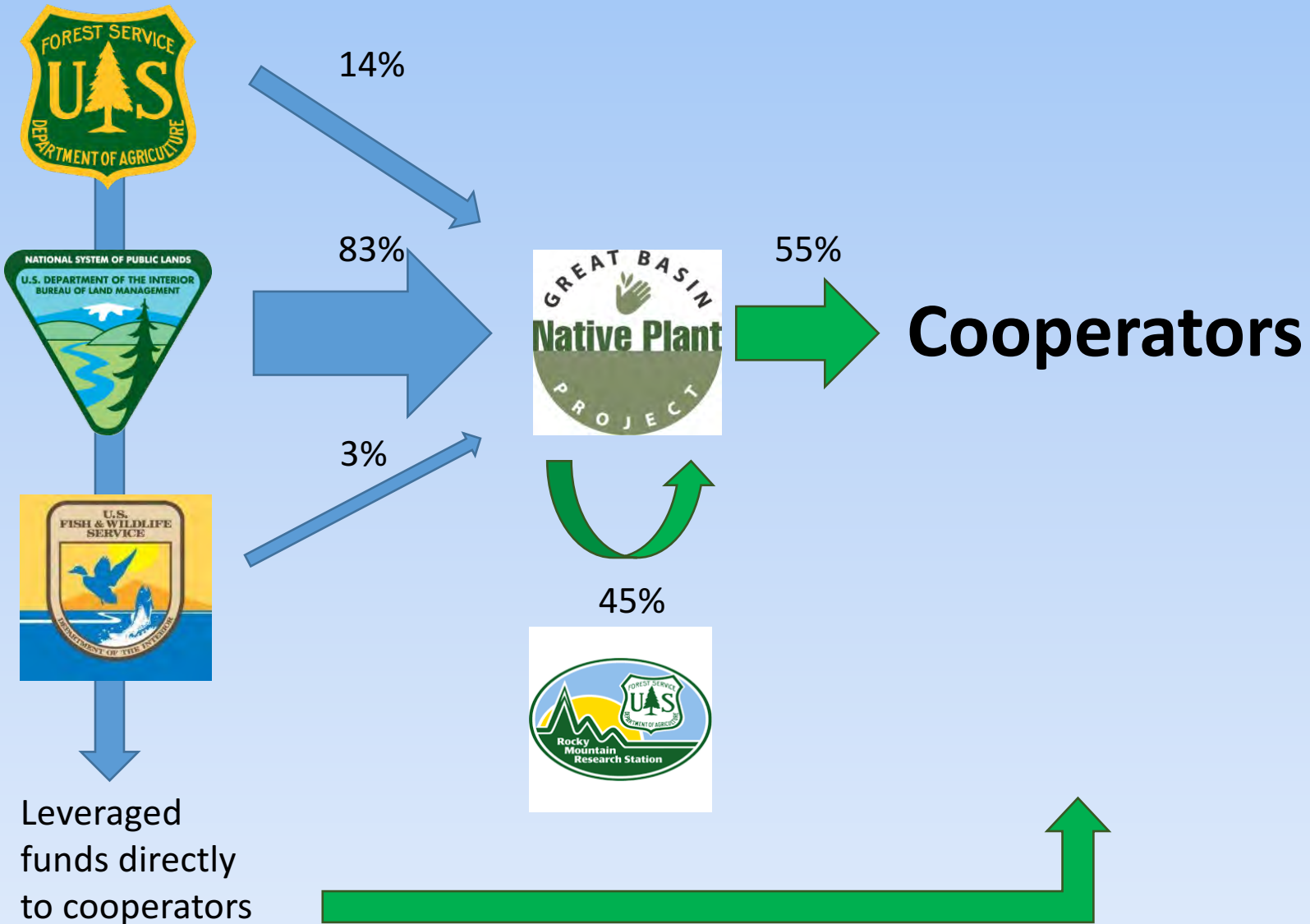
- Plant guides
- Planting protocols
- Seed transfer guidelines



- Workshops
- Symposia
- Field tours

GBNPP goals and operative basis

Funding

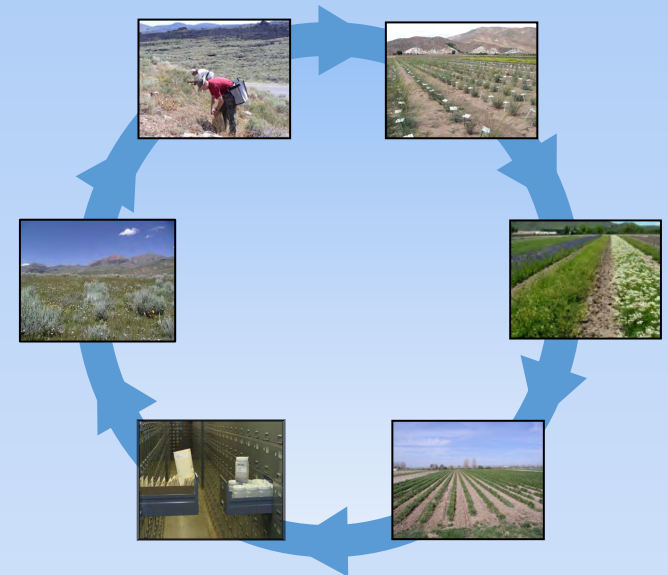


Native plant material restoration cycle

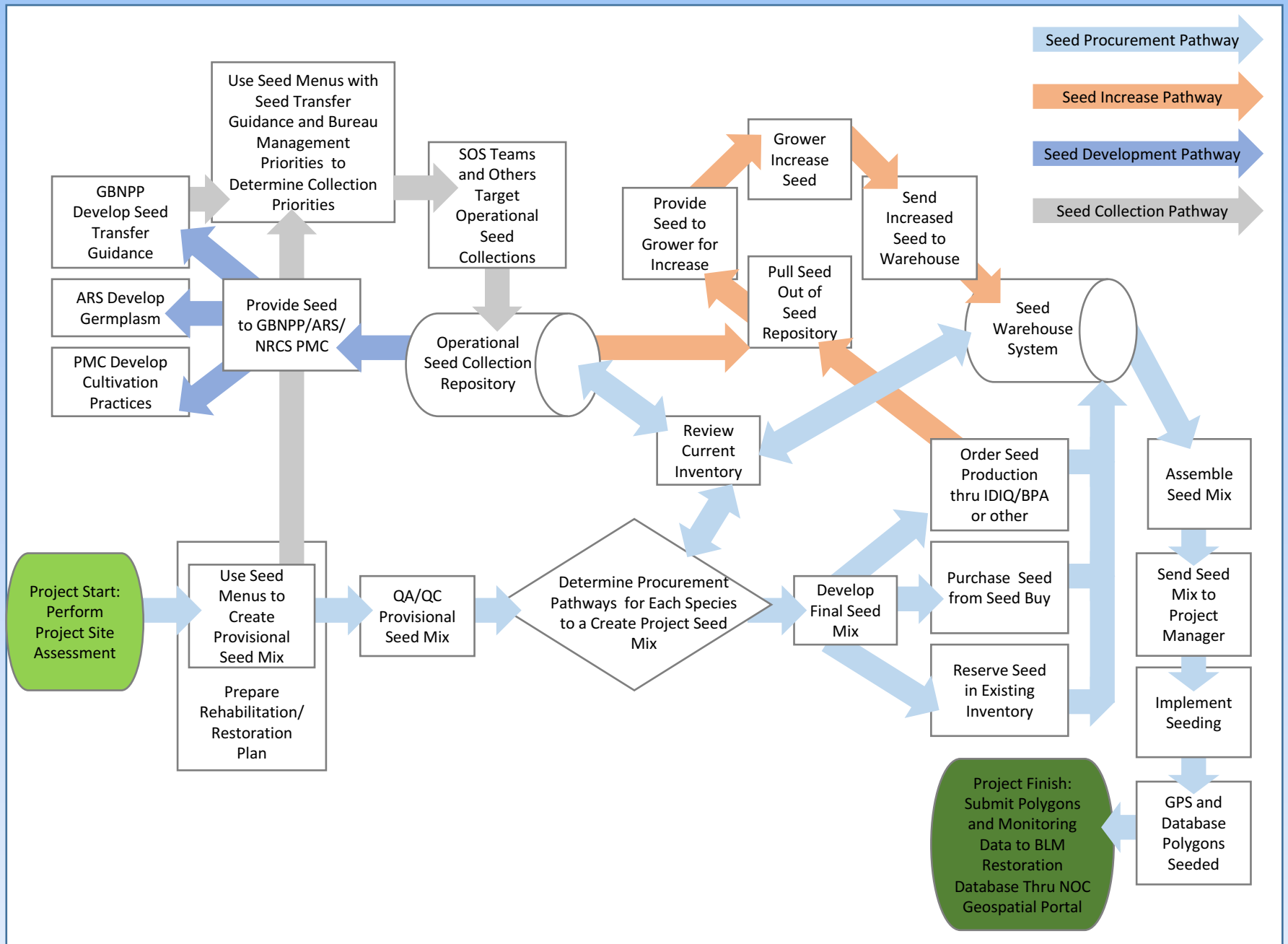


Goals

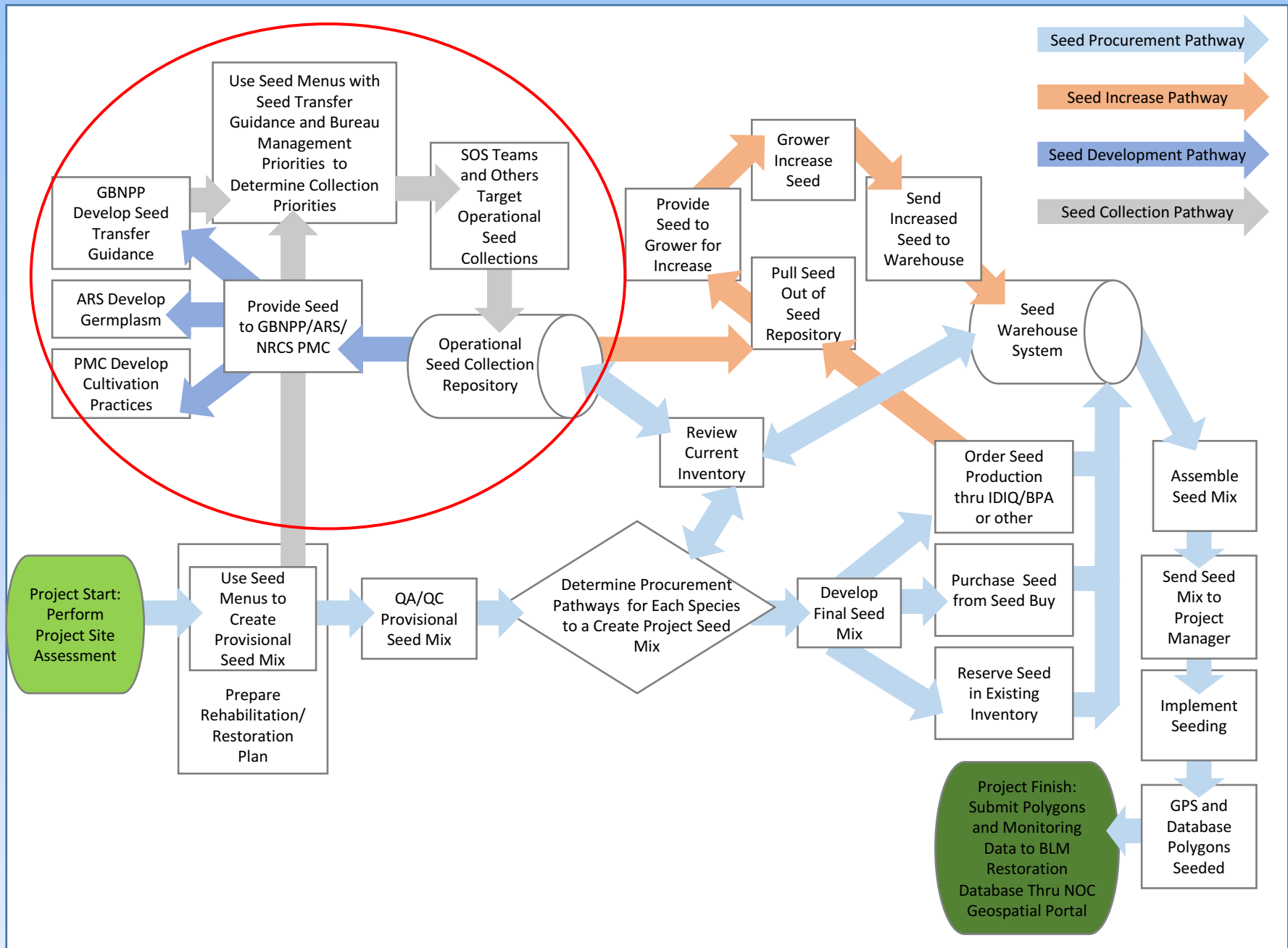
1. Work with land managers to select native species appropriate for restoring successional processes that will contribute to the recovery of degraded ecosystems
2. Increase commercial seed availability of genetically diverse, regionally adapted native plant materials, particularly native forbs
3. Develop cultural practices for producing seed and seedlings of these materials;
4. Devise strategies and equipment for reestablishing healthy, diverse ecosystems at the landscape scale
5. Provide tools for selection of plant materials and restoration strategies for reestablishing healthy, resilient native communities in light of continued human impacts



Flow Chart of Seed Procurement, Increase, Development, and Collection Pathways



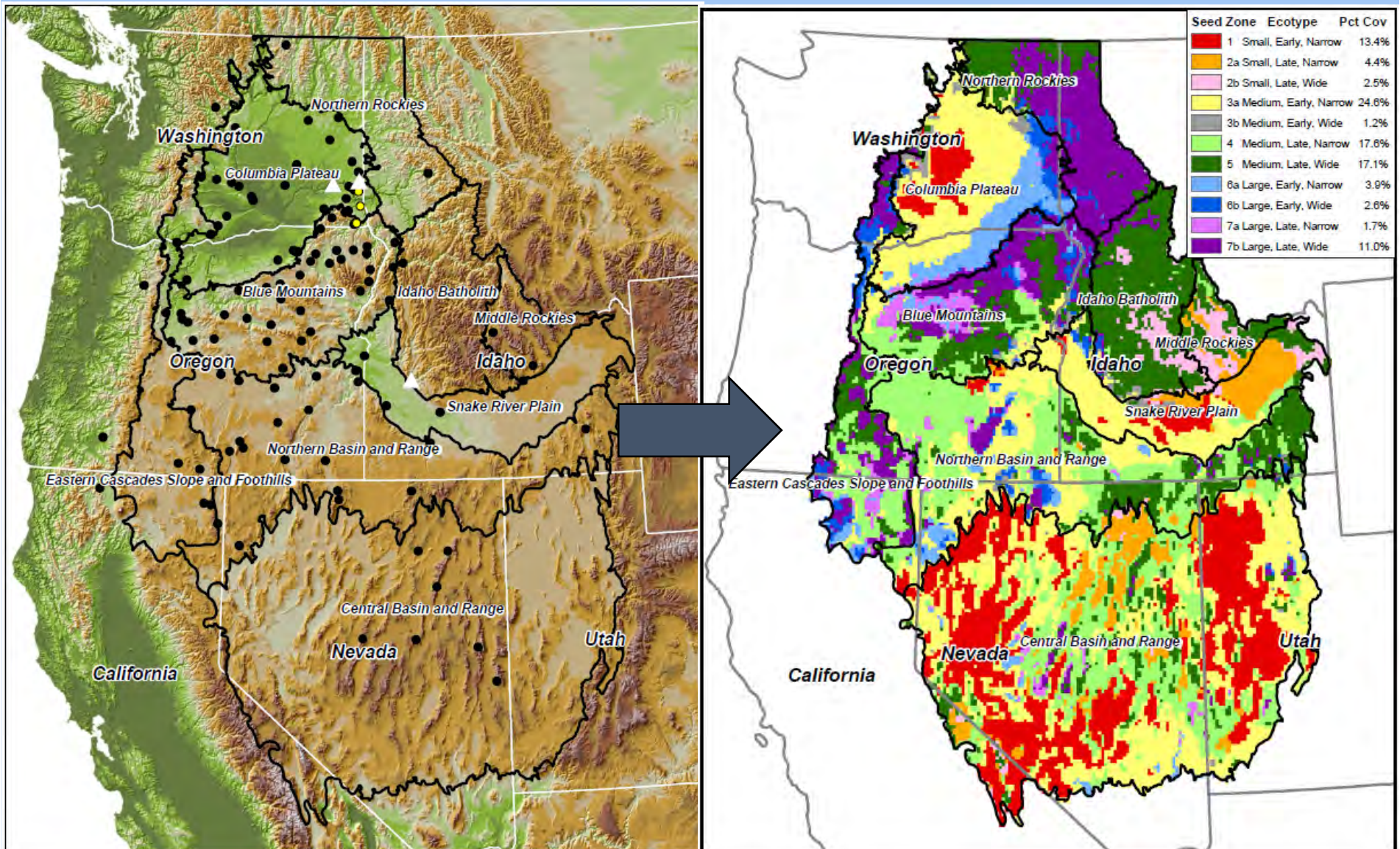
Flow Chart of Seed Procurement, Increase, Development, and Collection Pathways



Example seed menu for Wyoming big sagebrush shrubland with species list by bloom time, flower color, and plant habit

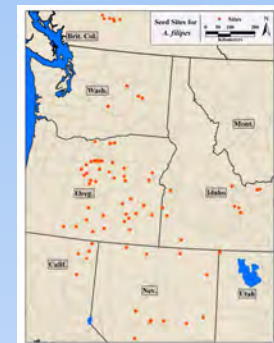
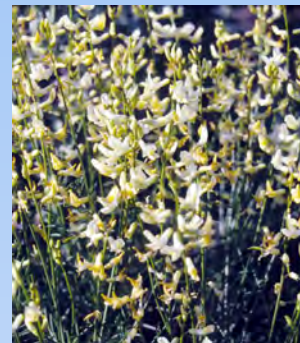
| Species | Common Name | | Bloom time, Flower color, & Plant habit | | | | | | | |
|--|--------------------------|------|---|-----------------|-----------------|-------|------|--------|-----------|---------|
| | | | March | April | May | June | July | August | September | October |
| <i>Achnatherum hymenoides</i> | Indian ricegrass | ACHY | | | Perennial Grass | | | | | |
| <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> | Wyoming big sagebrush | ARTR | | | | | | Shrub | | |
| <i>Cleome lutea</i> | yellow beeplant | CLLU | | Annual forb | | | | | | |
| <i>Elymus elymoides</i> | squirreltail | ELEL | | Perennial Grass | | | | | | |
| <i>Ericameria nauseosa</i> | rubber rabbitbrush | ERNA | | | | Shrub | | | | |
| <i>Eriogonum umbellatum</i> | sulphur-flower buckwheat | ERUM | | | Perennial forb | | | | | |
| <i>Hesperostipa comata</i> | needle and thread grass | HECO | | | Perennial grass | | | | | |
| <i>Poa secunda</i> | Sandberg bluegrass | POSE | Perennial Grass | | | | | | | |
| <i>Sphaeralcea ambigua</i> | desert globemallow | SPAM | | Perennial forb | | | | | | |

Bluebunch wheatgrass genecology study



Partnership with ARS to develop native legume germplasm

Basalt milkvetch
(*Astragalus filipes*)



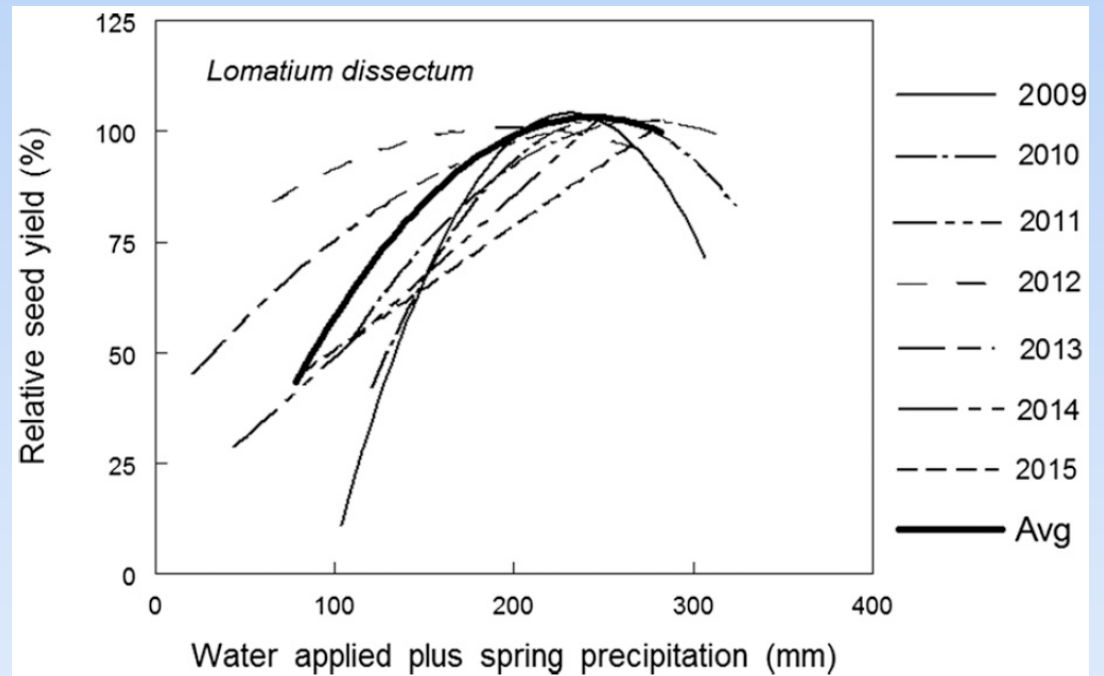
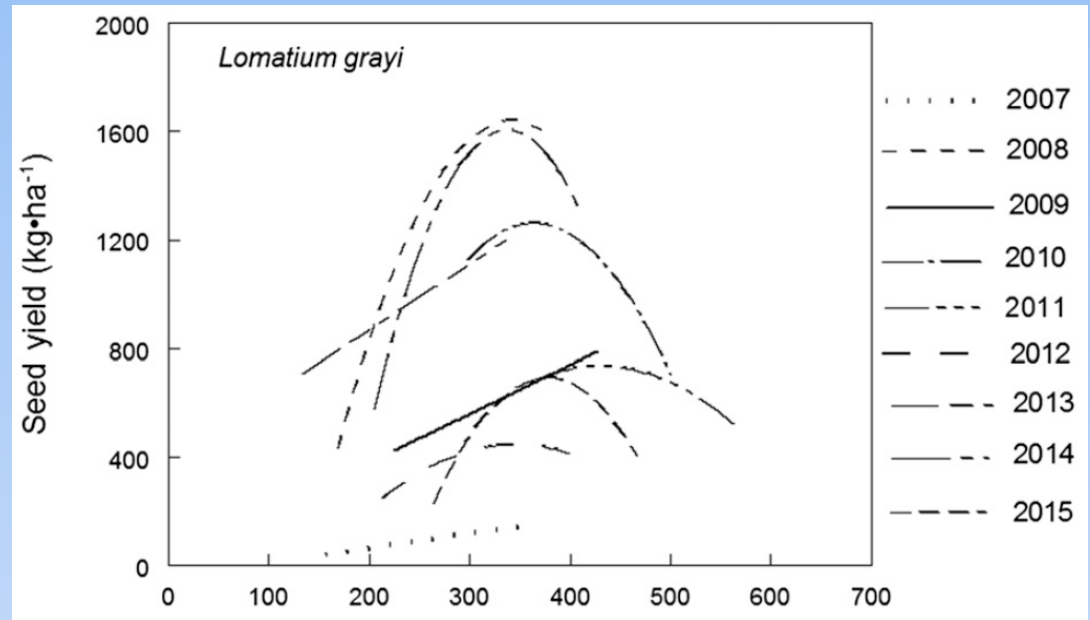
Western prairie clover
(*Dalea ornata*)



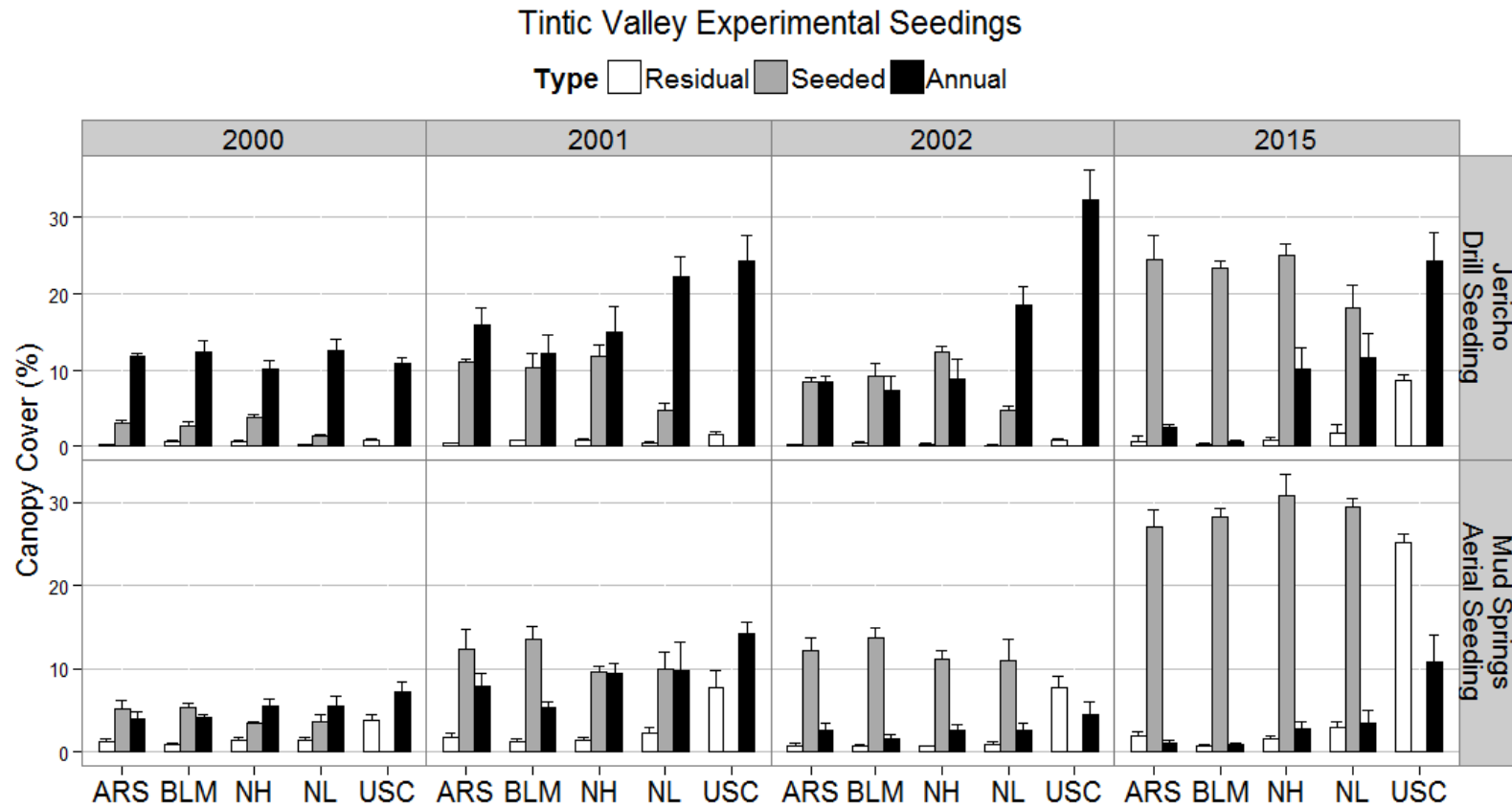
Searls' prairie clover
(*Dalea searlsiae*)



Cultivation practice with OSU Malheur Experiment Station

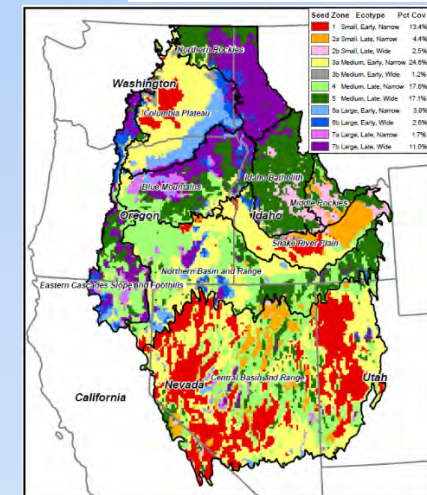
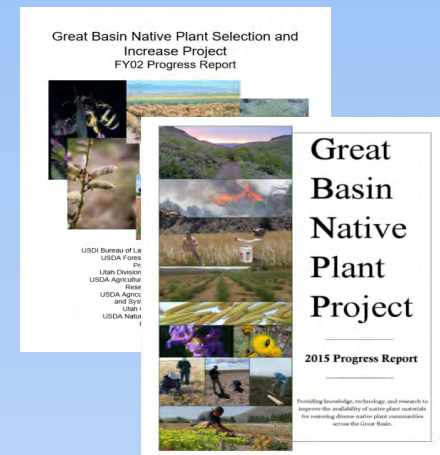


Do native seedings resist invasion as well as introduced seedings?



**Critical
assessment of
GBNPP- what
works, what is
needed?**

1. Work with land managers to select native species appropriate for restoring successional processes that will contribute to the recovery of degraded ecosystems
2. Increase commercial seed availability of genetically diverse, regionally adapted native plant materials, particularly native forbs
3. Develop cultural practices for producing seed and seedlings of these materials;
4. Devise strategies and equipment for reestablishing healthy, diverse ecosystems at the landscape scale
5. Provide tools for selection of plant materials and restoration strategies for reestablishing healthy, resilient native communities in light of continued human impacts



THANK YOU!

Nancy Shaw





The preceding presentation was delivered at the

2017 National Native Seed Conference

Washington, D.C. February 13-16, 2017

This and additional presentations available at <http://nativeseed.info>

