Seed Industry Successes and Challenges of Wildland Seed Collections at Regional and Local Levels

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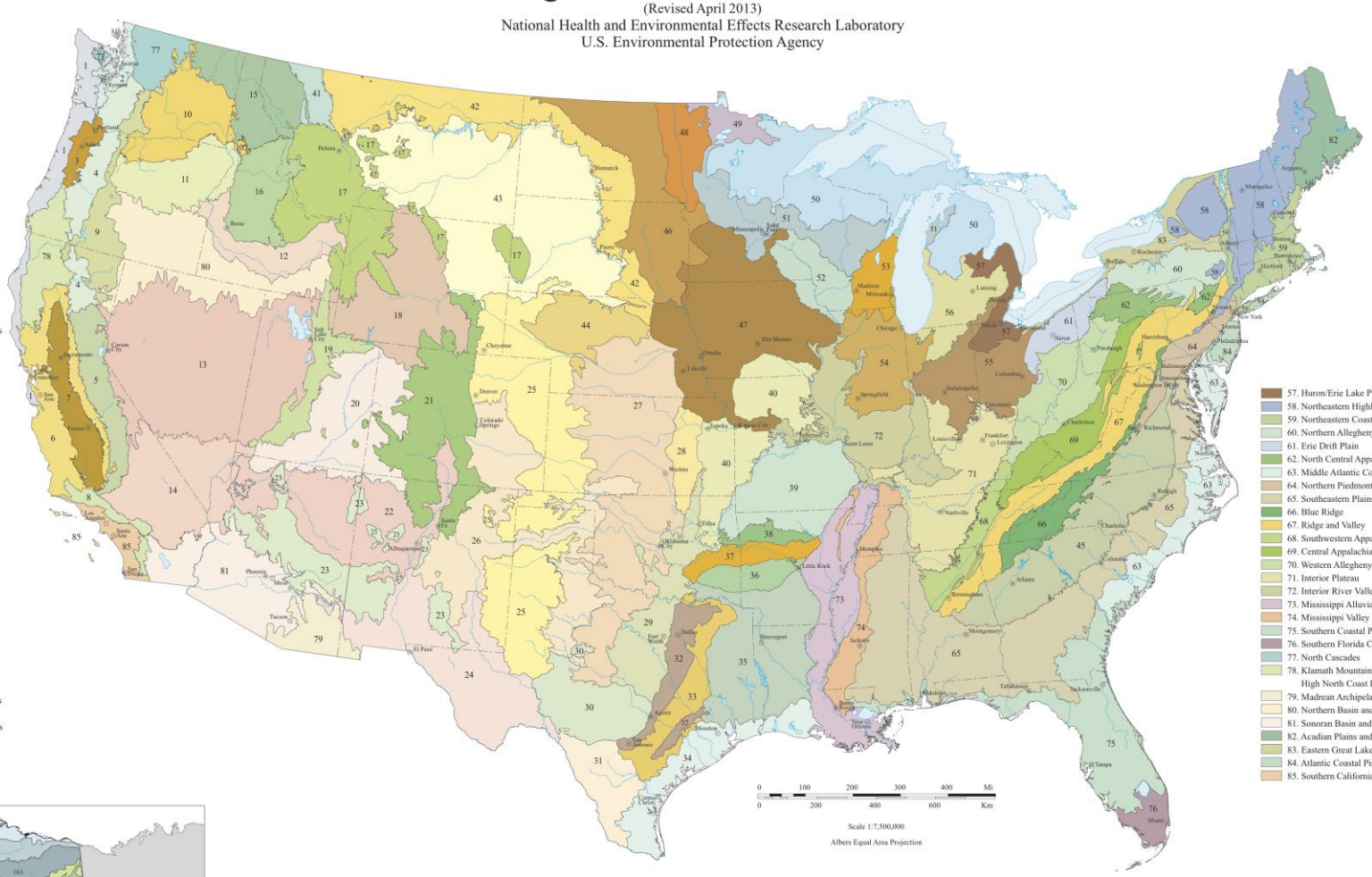
Level III Ecoregions of the Continental United States

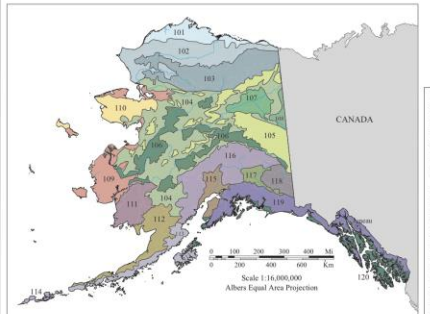
(Revised April 2013)

National Health and Environmental Effects Research Laboratory

U.S. Environmental Protection Agency



1. Coast Range
2. Puget Lowland
3. Willamette Valley
4. Cascades
5. Sierra Nevada
6. Central California Foothills and Coastal Mountains
7. Central California Valley
8. Southern California Mountains
9. Eastern Cascades Slopes and Foothills
10. Columbia Plateau
11. Blue Mountains
12. Snake River Plain
13. Central Basin and Range
14. Mojave Basin and Range
15. Northern Rockies
16. Idaho Batholith
17. Middle Rockies
18. Wyoming Basin
19. Wasatch and Uinta Mountains
20. Colorado Plateaus
21. Southern Rockies
22. Arizona/New Mexico Plateau
23. Arizona/New Mexico Mountains
24. Chihuahuan Deserts
25. High Plains
26. Southwestern Tablelands
27. Central Great Plains
28. Flint Hills
29. Cross Timbers
30. Edwards Plateau
31. Southern Texas Plains
32. Texas Blackland Prairies
33. East Central Texas Plains
34. Western Gulf Coastal Plain
35. South Central Plains
36. Ouachita Mountains
37. Arkansas Valley
38. Boston Mountains
39. Ozark Highlands
40. Central Irregular Plains
41. Canadian Rockies
42. Northwestern Glaciated Plains
43. Northwestern Great Plains
44. Nebraska Sand Hills
45. Piedmont
46. Northern Glaciated Plains
47. Western Corn Belt Plains
48. Lake Agassiz Plain
49. Northern Minnesota Wetlands
50. Northern Lakes and Forests
51. North Central Hardwood Forests
52. Driftless Area
53. Southeastern Wisconsin Till Plains
54. Central Corn Belt Plains
55. Eastern Corn Belt Plains
56. Southern Michigan/Northern Indiana Drift Plains
57. Huron/Erie Lake Plains
58. Northeastern Highlands
59. Northeastern Coastal Zone
60. Northern Allegheny Plateau
61. Erie Drift Plain
62. North Central Appalachians
63. Middle Atlantic Coastal Plain
64. Northern Piedmont
65. Southeastern Plains
66. Blue Ridge
67. Ridge and Valley
68. Southwestern Appalachians
69. Central Appalachians
70. Western Allegheny Plateau
71. Interior Plateau
72. Interior River Valleys and Hills
73. Mississippi Alluvial Plain
74. Mississippi Valley Loess Plains
75. Southern Coastal Plain
76. Southern Florida Coastal Plain
77. North Cascades
78. Klamath Mountains/California High North Coast Range
79. Madrean Archipelago
80. Northern Basin and Range
81. Sonoran Basin and Range
82. Acadian Plains and Hills
83. Eastern Great Lakes Lowlands
84. Atlantic Coastal Pine Barrens
85. Southern California/Northern Baja Coast



101. Arctic Coastal Plain
102. Arctic Foothills
103. Brooks Range
104. Interior Forested Lowlands and Uplands
105. Interior Highlands
106. Interior Bottomlands
107. Yukon Flats
108. Ogilvie Mountains
109. Subarctic Coastal Plains
110. Seward Peninsula
111. Ahklun and Kilbuck Mountains
112. Bristol Bay-Nushagak Lowlands
113. Alaska Peninsula Mountains
114. Aleutian Islands (Western portion not shown)
115. Cook Inlet
116. Alaska Range
117. Copper Plateau
118. Wrangell Mountains
119. Pacific Coastal Mountains
120. Coastal Western Hemlock-Sitka Spruce Forests

Ecoregions are areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. This ecoregion framework is derived from Omernik (1987) and from mapping done in collaboration with U.S. EPA regional offices, other Federal agencies, state resource management agencies, and neighboring North American countries (Omernik and Griffith 2014). Designed to serve as a spatial framework for the research, assessment, and monitoring of ecosystems and ecosystem components, ecoregions denote areas of similarity in the mosaic of biotic, abiotic, terrestrial, and aquatic ecosystem components, with humans considered as part of the biota. These ecoregions have been used to develop regional biological criteria and water quality standards, set management goals for nonpoint source pollution, assess land cover trends, report on ecosystem carbon sequestration, and frame wildlife conservation research, among other applications.

Ecological regions can be identified by analyzing the patterns and composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral classification scheme has been adopted for different levels of ecological regions. Level I is the coarsest level, dividing North America into 15 ecological regions; at Level II the continent is subdivided into 50 classes (CEC 1997, 2006). Level III, shown here, has 105 ecoregions in the continental U.S. For the conterminous United States, the ecoregions have been further subdivided to 967 Level IV ecoregions. Details about the ecoregions or their applications are explained in reports and publications from the state and regional projects (e.g., Bryce et al., 1998, 2003; Chapman et al., 2001, 2006; Gallant et al., 1989, 1995; Griffith et al., 2004, 2009, 2014; McGrath et al., 2002; Omernik, 2004; Omernik et al., 2000; Thorson et al., 2003; Wiken et al., 2011); and Woods et al., 1996, 2002, 2004). For additional information, contact James M. Omernik, USGS, c/o U.S. EPA, 200 SW 35th Street, Corvallis, OR 97333, phone (541) 754-4458, email omernik.james@epa.gov; or Glenn Griffith, USGS, c/o US EPA, 200 SW 35th Street, Corvallis, OR 97333, phone (541) 754-4465, email ggriffith@usgs.gov.

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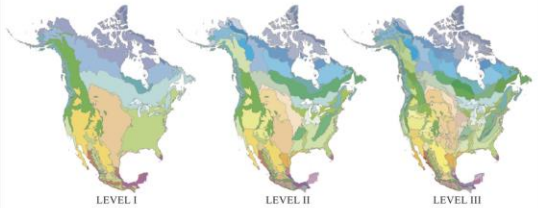
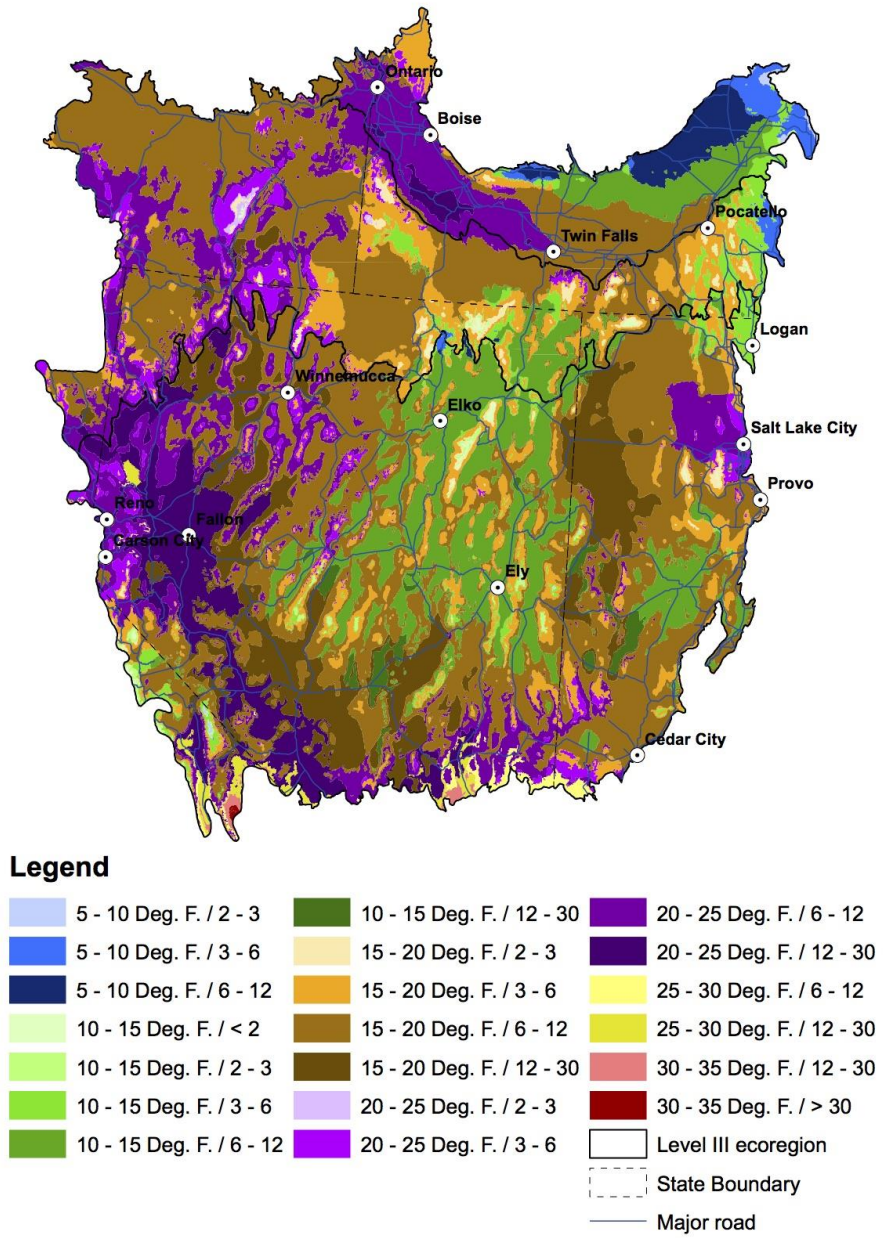
ECOLOGICAL REGIONS OF NORTH AMERICA



The names and identification numbers for North American Level I, II, and III ecological regions are given in CEC 1997, 2006.

CITING THIS MAP: U.S. Environmental Protection Agency, 2013, Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA – National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000, https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states.



Great Basin Edited Seed Zones for Grasses and Forbs

- Winter minimum 5 degree temp bands intersected with aridity bands to create seed zones
- Level III Ecoregion superimposed over seed zones to create provisional seed transfer zones.
- Small geographic areas merged
- Two Great Basin Ecoregions combined with Snake River Plain Ecoregion to re-name ‘Great Basin Seed Zone’
- 20 seed transfer zones represented on legend

Source: Western Wildland Environmental Threat Assessment Center

Granite Seed's Recent Experience Under the PSTZ Approach - Success

- BLM FY2018 Seed Buy specific to 3 sagebrush subspecies (WY, Basin, Mtn) with Wyoming Big sage the greatest amount requested by far
- Bid details did not disclose to seed industry specific quantities desired within a given PSTZ; industry required to offer lbs within the PSTZ protocol, using own judgement for demand by zone(s).
- Industry required to research and consider 34 PSTZs within 6 Level III Ecoregions when responding to the bid.
- Awarded nearly 400,000 total lbs Big sagebrush after final field office needs compiled/refined during multiple award process

Overall successful but with some challenges….

- Big challenge but seed industry nearly fulfilled total award
- Regional scale of PSTZ geographically lends itself to collecting large quantities by multiple vendors/collectors
- Regional scale of PSTZ provides opportunity to locate and collect significant stands of sagebrush seed in areas where uneven precip patterns result in variable seed production
- Process still needs refining: 1) Award timing needs to be moved up to allow industry more time to execute on collections 2) Exclusive focus on “new crop collection” is flawed and also handicaps BLM’s ability to consistently be in position to procure the desired pounds

Experience with the Local Ecotype - Challenge

- Special project involving multiple stakeholders on Western Slope for Fall 2017 small quantity collections of 3 subspecies of Big sage in localized area
- Reconnaissance revealed drought conditions and poor seed production
- Travel distance challenged Granite Seed personnel to do reconnaissance, timely seed readiness checks, and seed collections
- Above factors, combined with the small quantities proved unfeasible with other wild-land collection commitments (namely BLM)

Summary

- PSTZs regional in scope and based on intersection of Level III Ecoregions, temperature and precip bands
- PSTZ process, as adopted by BLM, is example of win-win: ecotype collections achievable on a regional scale
- BLM PSTZ process still a work in progress, but government and industry are working together in a productive manner
- Limiting solicitation to only current year production dis-incentivizes seed industry to cold-store seed for large fire years, to the detriment of BLM
- Seed collections on an extremely localized level 1) present significant logistical challenges 2) brings higher risk into execution / success and 3) likely result in substantially higher costs to the customer

Questions?

granite SEED
and erosion control

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