National Resources Inventory Rangeland Resource Assessment

March, 2018

Contents

Introduction

Overview

This report presents summary results from National Resources Inventory (NRI) on-site data collected on non-Federal rangelands. The survey is conducted by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as a part of the NRI survey program. The findings reported here focus on key issues in rangeland science, including rangeland health, non-native plant species, non-native and native invasive plant species, bare ground, inter-canopy gaps and soil surface aggregate stability. NRI rangeland on-site data collected 2004-2010 and 2011-2015 are used to provide estimates of change in rangeland conditions.

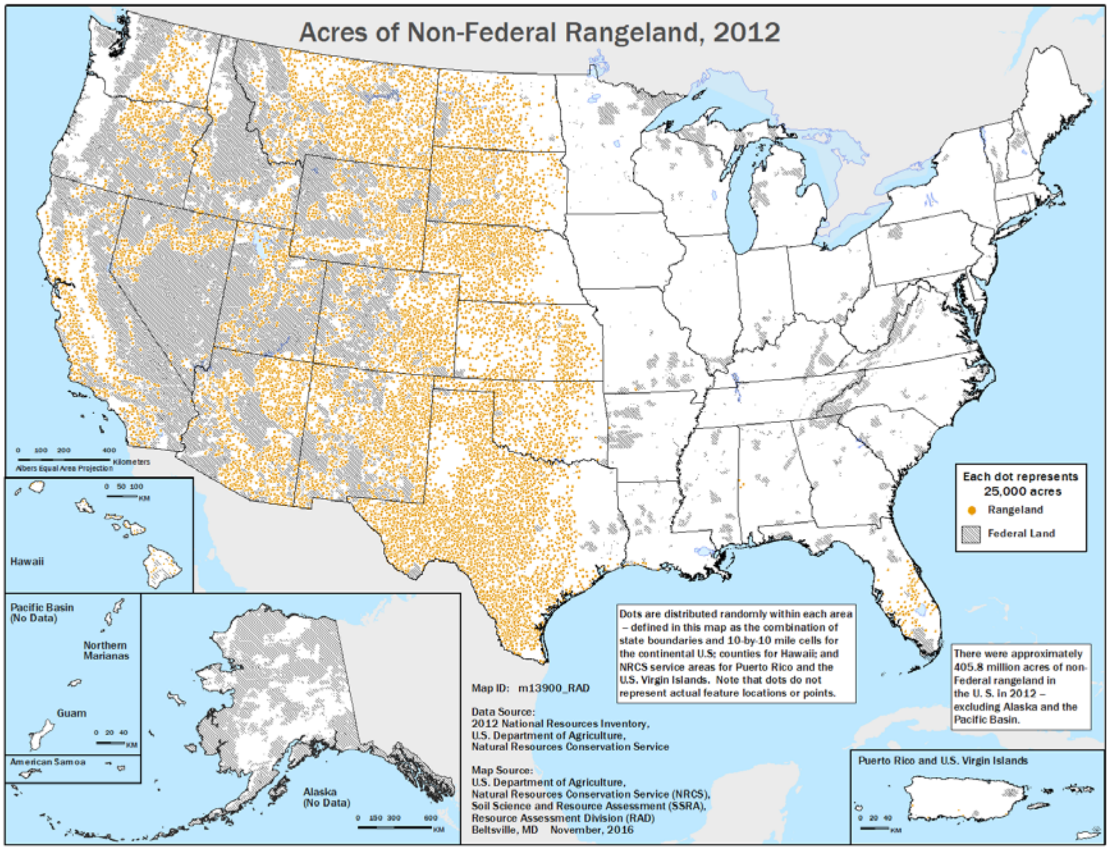
The NRI survey program is scientifically based, employing recognized statistical sampling methods. The NRI rangeland on-site survey was conducted by NRCS in cooperation with Iowa State University's Center for Survey Statistics and Methodology (ISU-CSSM), which serves as the NRI Statistical Unit providing statistical and survey methods support for the NRI survey program.

Background

Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

NRI rangeland on-site data has been collected in 17 western states, encompassing those states from North Dakota to Texas and west. A limited amount of NRI rangeland on-site data has also been collected in Louisiana and Florida.
The NRI rangeland on-site data are collected at a scientifically selected subset of NRI sample points, allowing the NRI rangeland on-site data to be linked to broader estimates of surface area and land cover use provided in the NRI. Rangeland area estimates were developed based on 2012 NRI estimates of nearly 405 million acres of rangeland in these states (U.S. Department of Agriculture, 2015) (Figure 1).

Figure 1 Acres of Non-Federal Rangeland, 2012



The NRI rangeland results presented here address current conditions and change in conditions based on data collected on approximately 10,000 NRI rangeland field locations during each of two time periods, 2004 to 2010 and 2011- 2015. With the assistance of a global positioning system (GPS), data collectors navigate to sample locations and collect on-site data. Data collected at these locations are assimilated and analyzed in order to present estimates that meet statistical standards and are scientifically credible in accordance with NRCS policy and Office of Management and Budget (OMB) and USDA Quality of Information Guidelines.

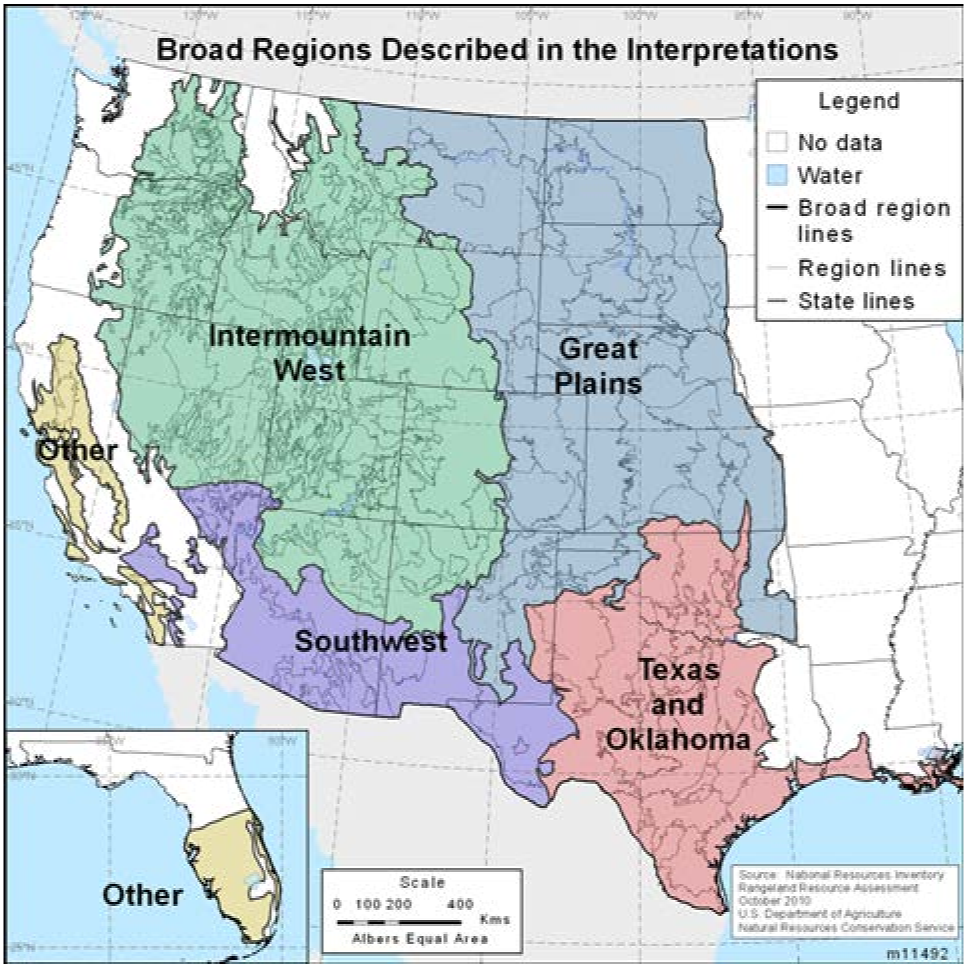
An interagency group—the USDA-NRCS, USDA-Agricultural Research Service (ARS), U.S. Department of Interior (USDI)-Bureau of Land Management (BLM), USDI-U.S. Geological Survey (USGS), and the USDA-Forest Service (USFS)—worked together to develop field data collection protocols and data elements that could be used for national inventories. Pilot studies tested the rangeland protocols prior to implementing them as part of the NRI Grazing Land Study that began in 2003. Rangeland data collected according to these protocols provide information that can be used to assess current conditions, and in the future as sites are revisited, data collected with these protocols will provide the basis for determining changes in rangeland conditions.

Regional Interpretation

The National Resources Inventory (NRI) is a statistical survey of natural resource conditions and trends on non-Federal land in the United States. Non- Federal land includes privately owned lands, tribal and trust lands, and lands controlled by state and local governments. This report is specific to the USDA-NRCS on-site rangeland NRI sample segments collected during the periods 2004 to 2010 and 2011 to 2015. Neither Federal lands nor forest lands were included in the NRI rangeland on-site data collection. Regional interpretations are presented to provide basic trend information that is relative to that specific region (Figure 1). Five regions are represented: Texas and Oklahoma; Great Plains; Southwest; Intermountain West; and the sub-tropical rangelands of Florida and annual grasslands of California.

The regional interpretations focus on rangeland health determinations for the following attributes: biotic integrity, soils and site stability, and hydrologic function. Rangeland Health interpretations rely primarily on qualitative assessments which reference individual rangeland ecological site reference sheets to establish a baseline for the 17 individual indicators relative to the reference and/or historic plant community. Some of these 17 indicators can be verified by quantitative data collected at the site. These quantitative data will serve as a baseline for current conditions. The emphasis of the discussion is on those areas where the status of the land differed significantly from the expected status and rangeland indicator potentials as defined in individual ecological site descriptions. Lands with significant departure may have crossed ecological thresholds; therefore, they may not be sufficiently resilient to recover naturally from degradation.

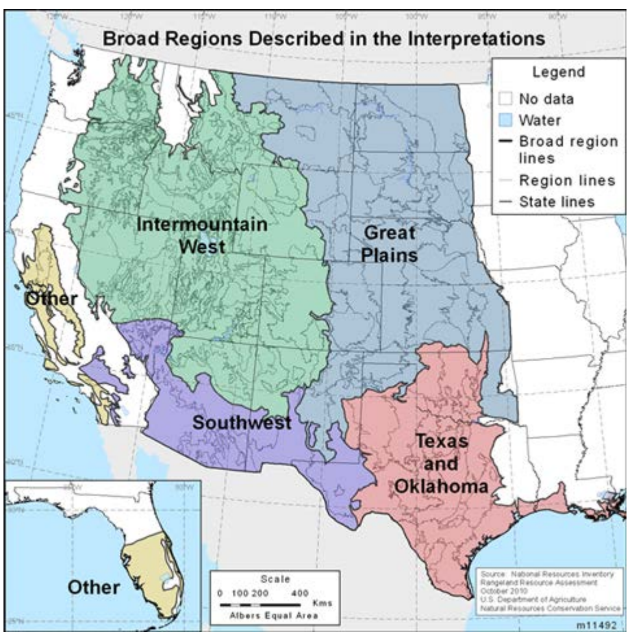
Figure 1. Broad Regions Described in the Interpretations.



Great Plains

The Great Plains region includes the greatest expanse of grasslands in the United States. The ten plains states extend east from the Rocky Mountains (originating in Canada) to the Central Lowlands in New Mexico. The vegetation of the Great Plains is highly diverse and is a “land of marked contrasts and limitless variety: canyons carved into solid rock of an arid land by the waters of the Pecos and the Rio Grande; the seemingly endless grainfields of Kansas; the desolation of the Badlands; and the beauty of the Black Hills” (Trimble, 1980). The region boundaries (Figure 1) include the tallgrass, mixed grass, and shortgrass prairies. Although grasslands are the dominant vegetation type, shrub, forest and woodland vegetation also exists throughout the region. The northeastern portion and central area of New Mexico support more species associated with shortgrass. The Southwestern Tablelands situated in central New Mexico supports juniper-scrub-oak-grass savannahs. Biodiversity is high in the Great Plains. The USDA-NRCS NRI data set for the Great Plains includes 146 plant families and 764 plant genera. The breakdown of plant growth habit is as follows: 483 graminoids, 950 forb/herbs, 393 shrubs and subshrubs, and 174 tree species.

Figure 1 - Broad Regions Described in the Interpretations



The grasslands in the Great Plains are associated with high productivity due to the generally reliable summer precipitation, a long growing season, and deep, fertile soils. Productivity is greatest in the eastern region (tallgrass prairie), followed by mixed grass, then shortgrass prairie. Lands that were formally grasslands, now farmed are some of the most fertile cropland in the U.S. and the world.

When Lewis and Clark first visited the Great Plains in 1804-06, they observed and recorded the abundant wildlife which included large herds of bison, and elk. Lewis and Clark were in awe as to the abundance and diversity of wildlife and vegetation. Rangelands that remain uncultivated typically occur on areas that are marginally or not suitable for crop production. Settlement of the Great Plains began after Louisiana Purchase (1803) and the Lewis and Clark expedition (1806). By the mid 1800's settlement expanded rapidly with the advent of railroads and the Homestead Act of 1862. Adequate rainfall and abundant arable land attracted settlers. However, the Great Plains are susceptible to periodic droughts, which caused farms to be abandoned, economic recessions, and turned fields into dry wastelands. These events occurred several times in the 1800s and early 1900s in the mid- and southern parts of the Great Plains with the worst dust bowls occurring during the Depression years and "Dust Bowl" of the 1930s (Hurt, 1981). Major droughts occur approximately every 20 years (1890s, 1910s, 1930s, 1950s, and 1970s). The 1990s witnessed yet another period of serious drought conditions, especially in the southern Great Plains with some of the hottest and driest conditions that this region has ever experienced. In the Great Plains, summer rainfall generally occurs mostly during May–August. However, in 2012, the drought developed rapidly from May, reaching its peak intensity in August, and continuing through the fall. Records show that the 4-month cumulative rainfall deficit (averaged over a six-state area including Wyoming, Colorado, Nebraska, Kansas, Missouri, and Iowa), was the greatest since record keeping began in 1895. This drought is ranked as the most severe summertime drought 117 years, surpassing the droughts of 1988, 1934, and 1936 (Hoerling, 2014).

Figures 2-13 show the drought severity over the two periods nationally and by areas of states within the Great Plains. While this region was abnormally dry during both periods, the southwestern portion of the Great Plains region experienced severe to extreme drought during the more recent period (2011-2015). The figures provide context for subsequent summary results based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015.

Figures 2-3. Drought Index Maps

Figure 2.

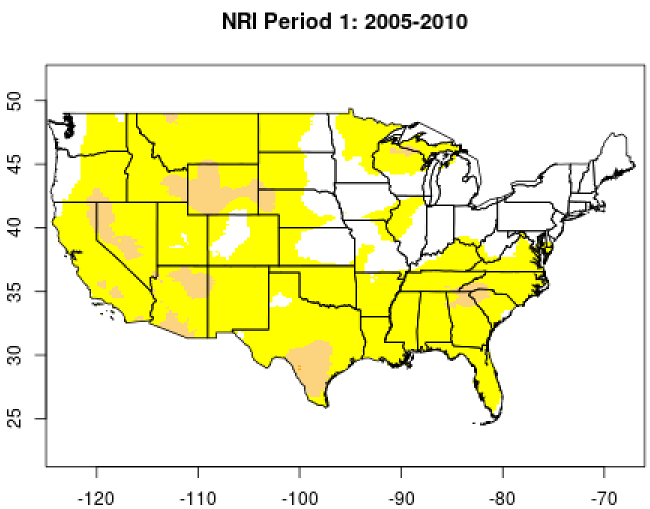
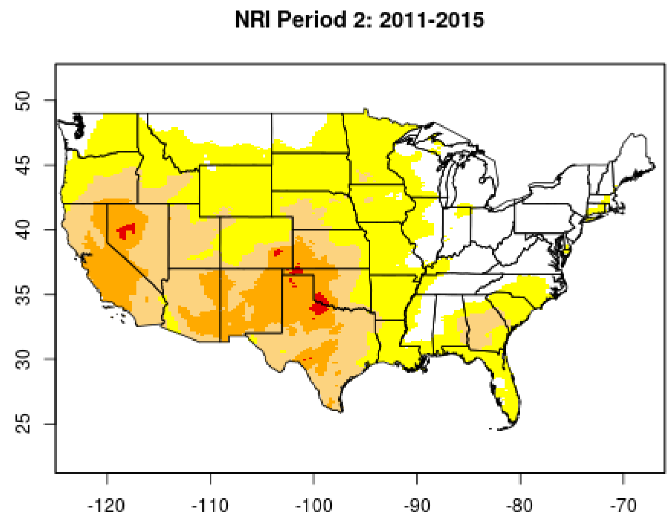


Figure 3.



Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Figure 4. Average drought severity in North Dakota portion of the Great Plains.

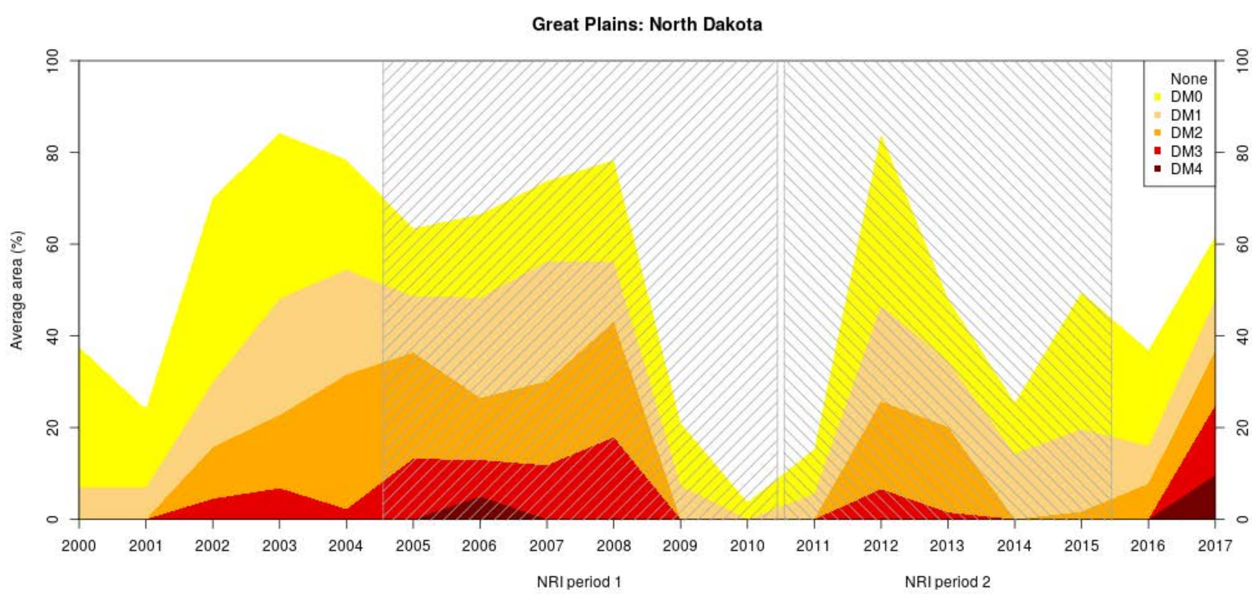


Figure 5. Average drought severity in South Dakota portion of the Great Plains.

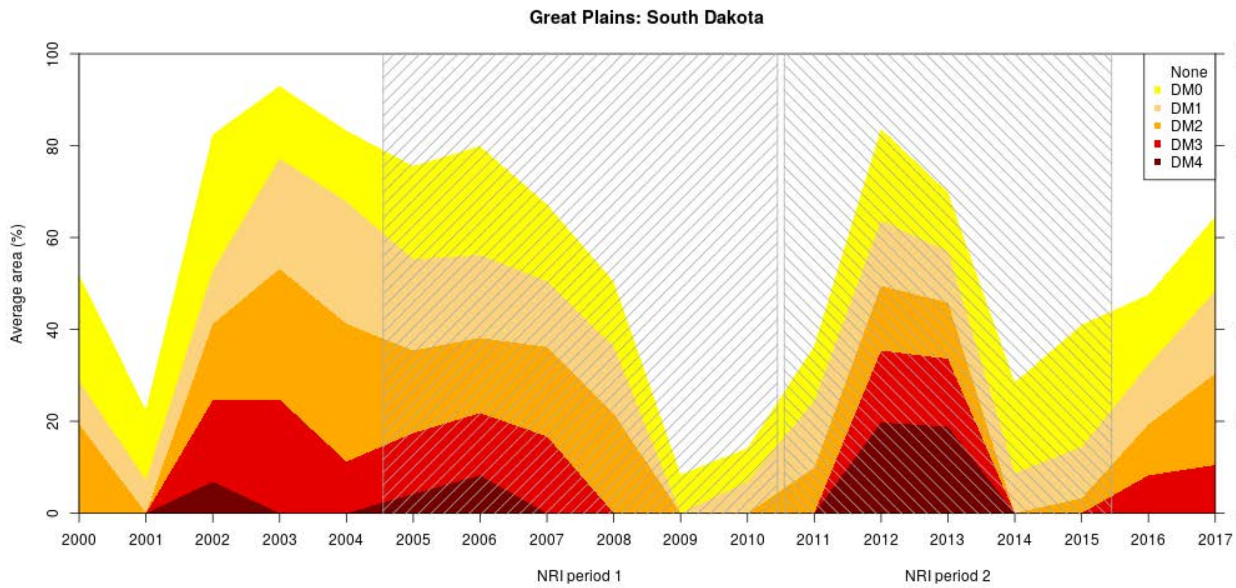


Figure 6. Average drought severity in Nebraska portion of the Great Plains.

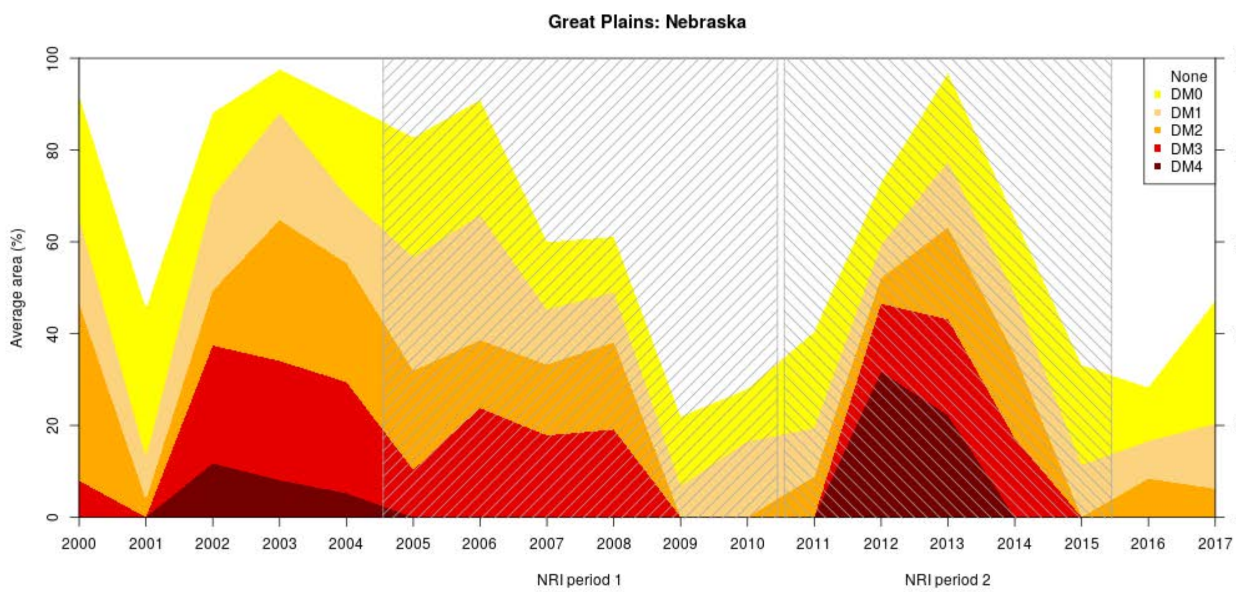


Figure 7. Average drought severity in Kansas portion of the Great Plains.

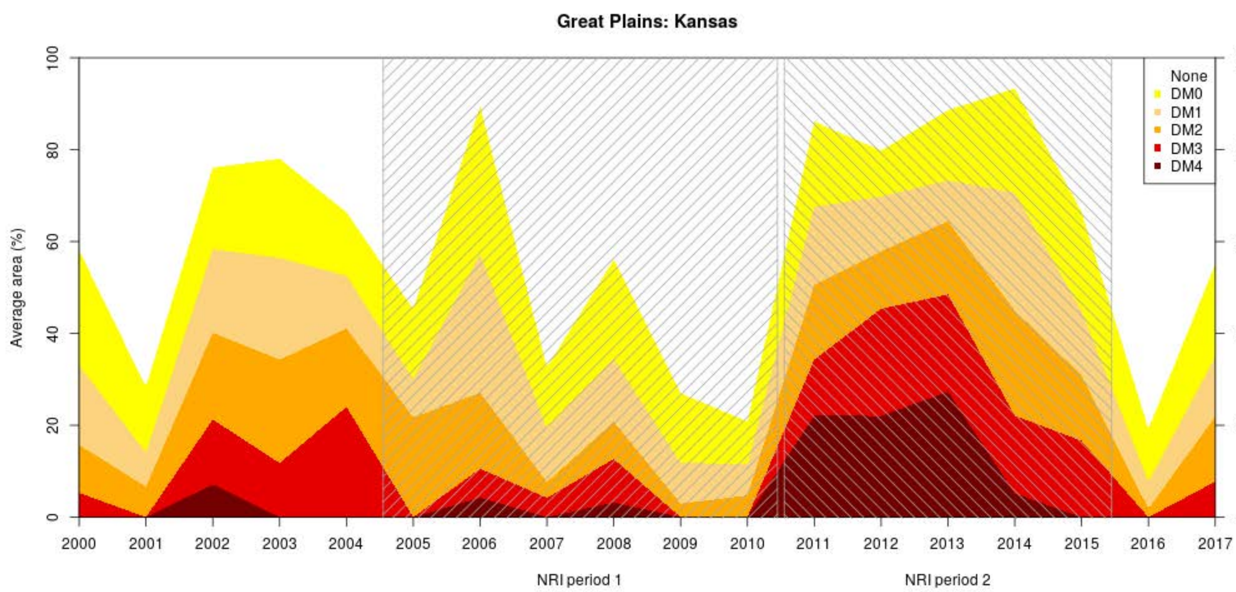


Figure 8. Average drought severity in Oklahoma portion of the Great Plains.

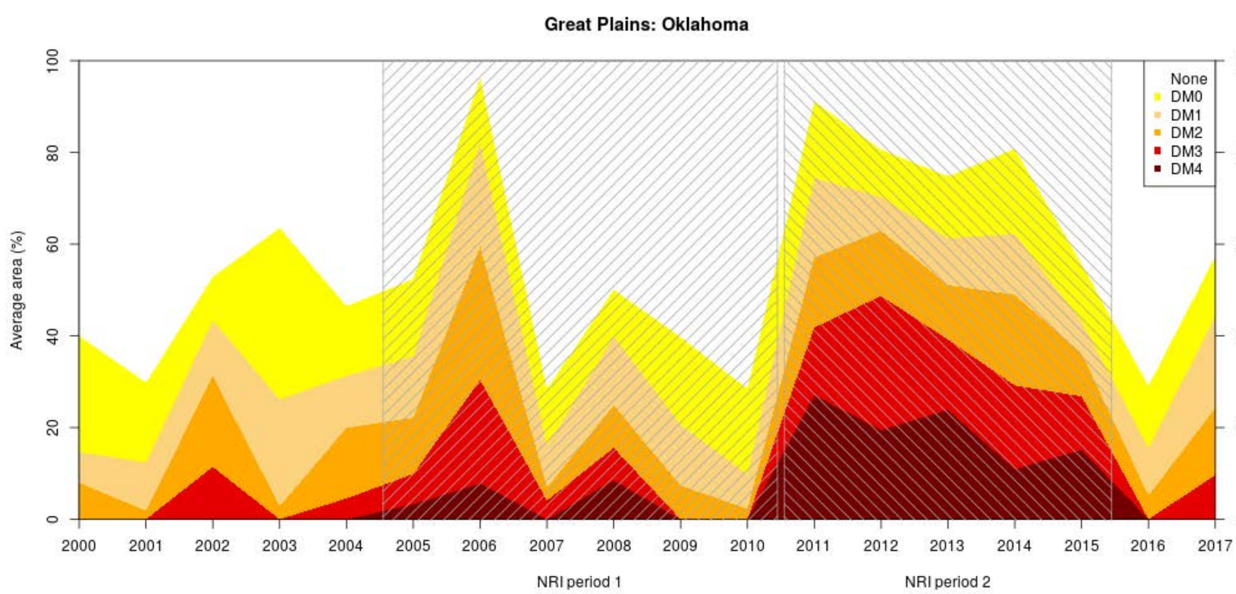


Figure 9. Average drought severity in Texas portion of the Great Plains.

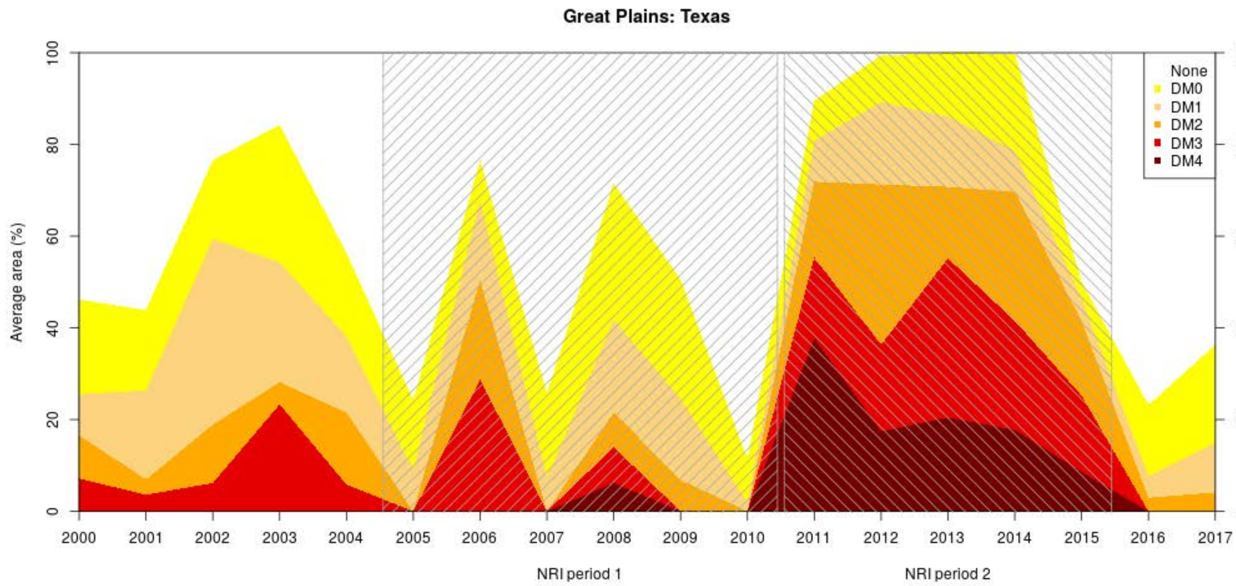


Figure 10. Average drought severity in New Mexico portion of the Great Plains.

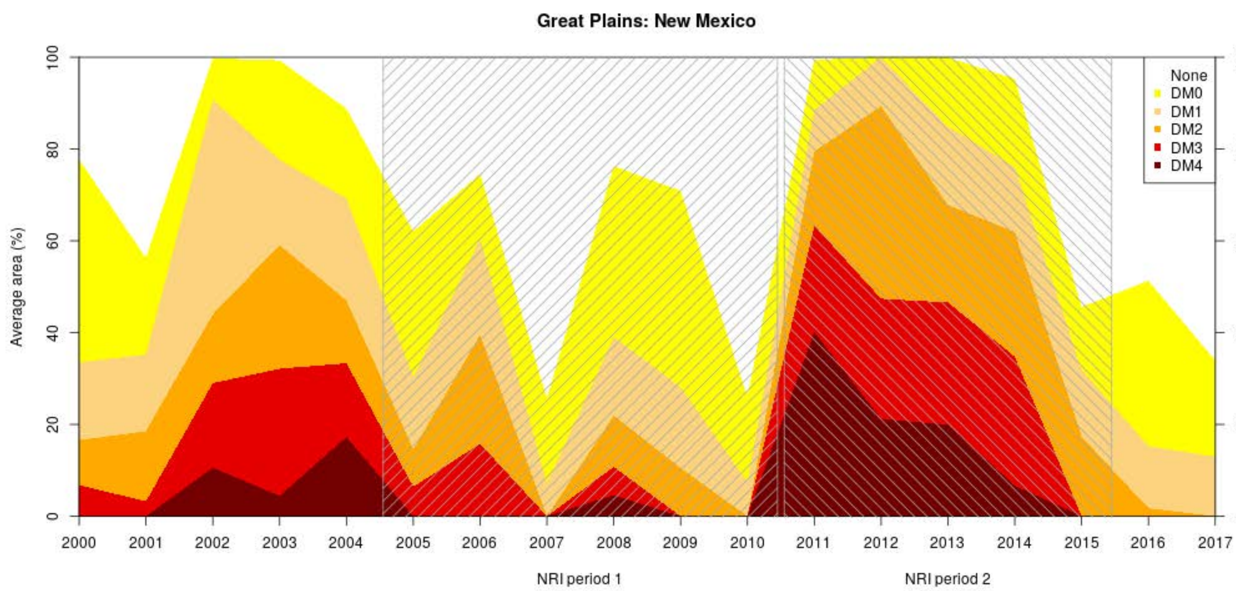


Figure 11. Average drought severity in Colorado portion of the Great Plains.

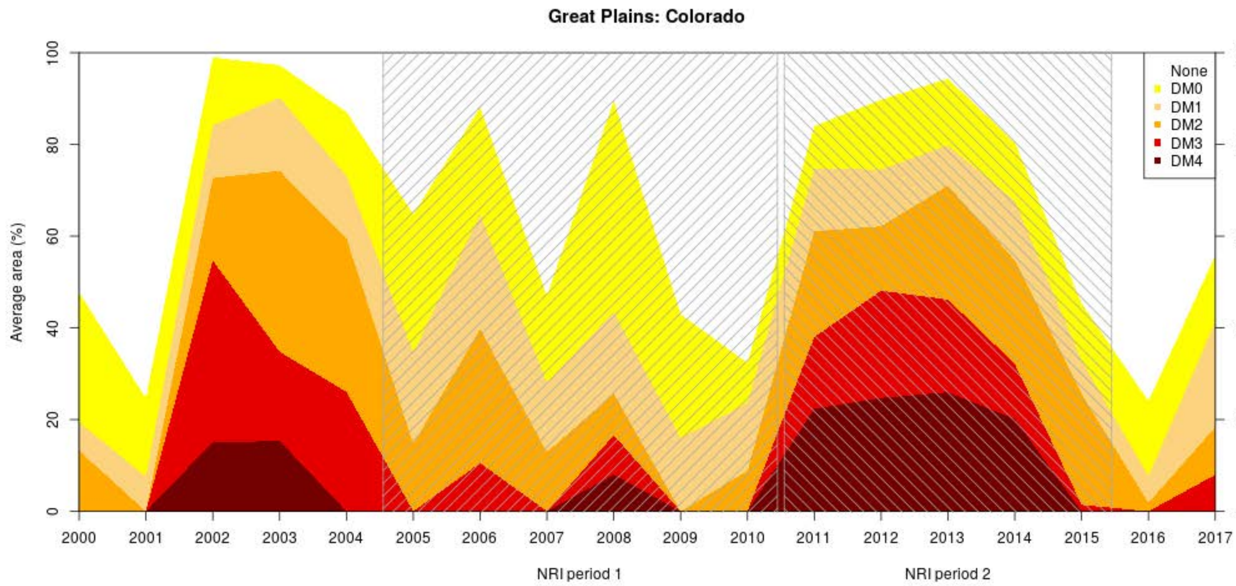


Figure 12. Average drought severity in Wyoming portion of the Great Plains.

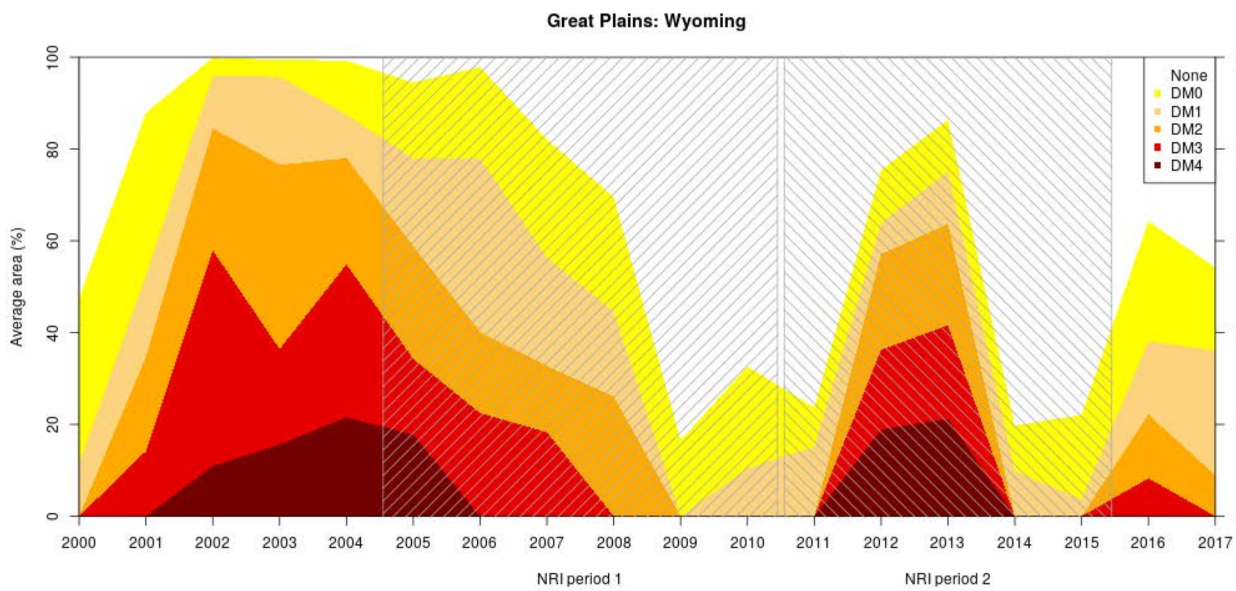
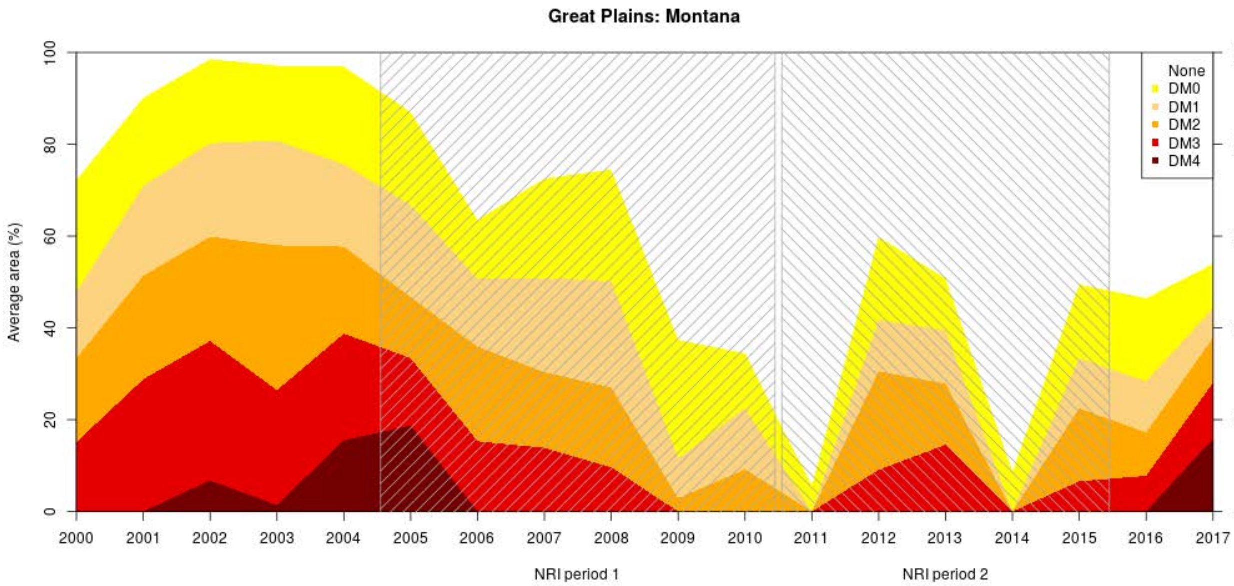


Figure 13. Average drought severity in Montana portion of the Great Plains.



Rangeland Health Attributes

Soil and Site Stability

Soil and site stability assessment in the USDA-NRCS Rangeland National Resource Inventory report showed predominantly stable conditions in the northern Great Plains, not more than 10% of non-Federal acres with moderate or greater departure from expected reference conditions for the two time periods (Figures 9-11). The southwestern area of the Great Plains was the exception, especially during the second period (2011-2015) when drought conditions in that area were severe to extreme (Figure 2). Areas of New Mexico and Texas within the southwestern Great Plains were especially affected (Figure 9-10).
Within the New Mexico portion of the Great Plains, the percent of non-Federal rangeland with soil and site stability ratings of moderate or greater departure from reference conditions increased from 11.1 ±4.0 percent to 37.8 ±8.9 percent and within the Texas portion of the Great Plains the percent area increased from 4.4 ±3.8 to 32.8 ±11.0 (Figure 11). This increase coincides with increases in percent bare ground and percent of rangeland acres with vegetation canopy gaps on non-Federal rangeland (see below).

Figure 9-10. Non-Federal Rangeland Where Soil and Site Stability Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 9. 2004-2010

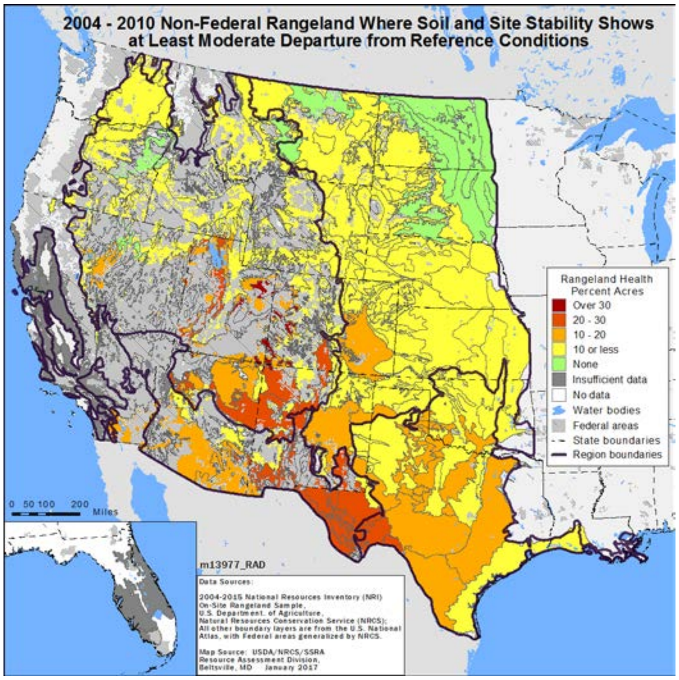


Figure 10. 2011-2015

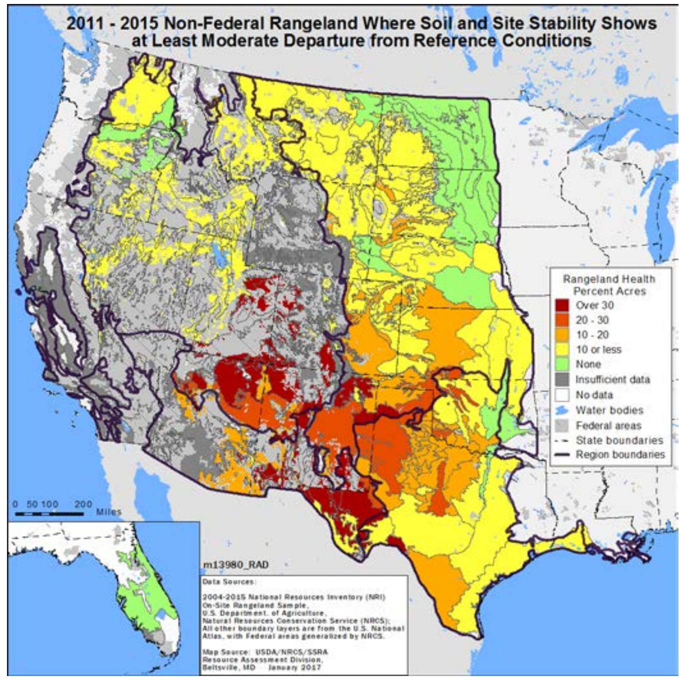
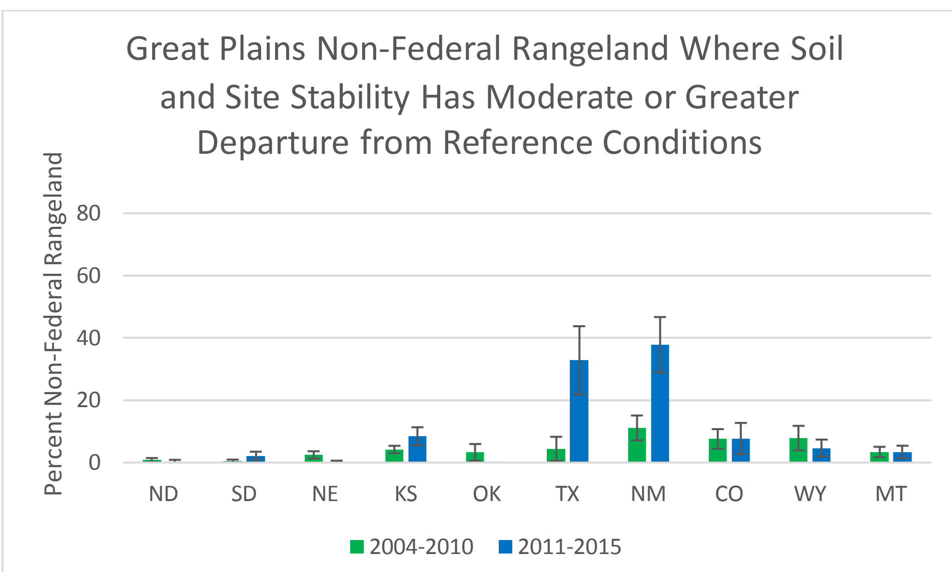


Figure 11. Percent non-Federal rangeland with soil site stability ratings of moderate or greater departure from reference conditions by state. Error bars represent margins of error.



Hydrologic Function

Trends in hydrologic function from 2004-2010 to 2011-2015 in the Great Plains were very similar to the soil and site stability results. The greatest changes were observed in the southwestern portions of the Great Plains, where the percentage of non-Federal rangeland where hydrologic function has moderate or greater departure from reference conditions increased from 14.4 ±4.3 to 47.6±8.1 percent and from 3.7 ±3.5 to 35.0 ±11.3 percent in the New Mexico and Texas portions, respectively, of the Great Plains (Figures 12-14).

Figures 12-13. Non-Federal Rangeland Where Hydrologic Function Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 12. 2004-2010

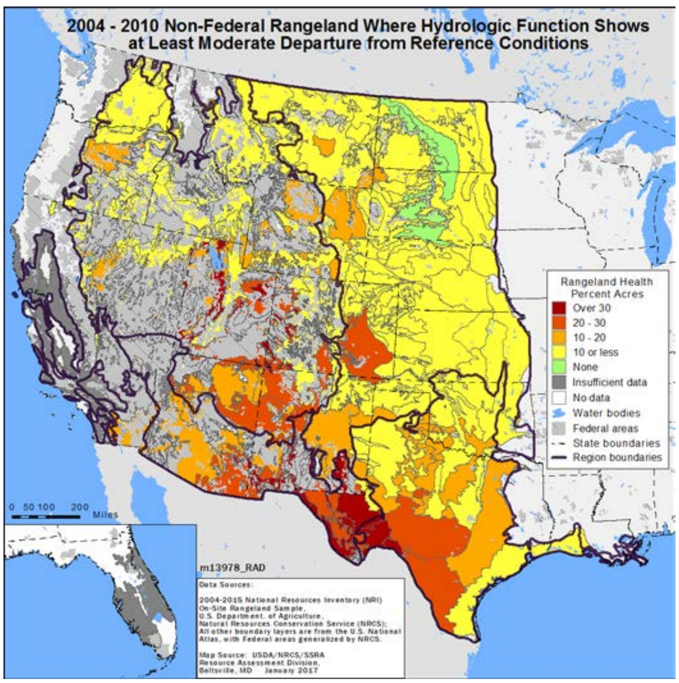


Figure 13. 2011-2015

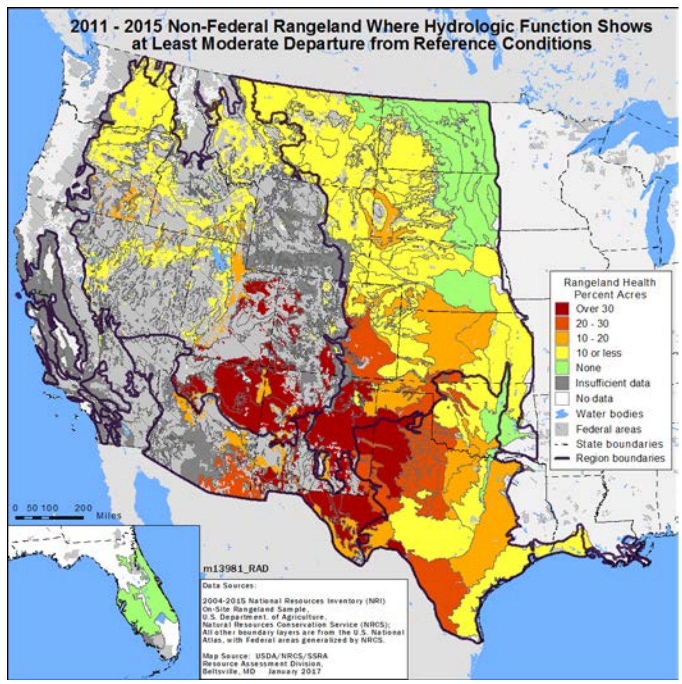
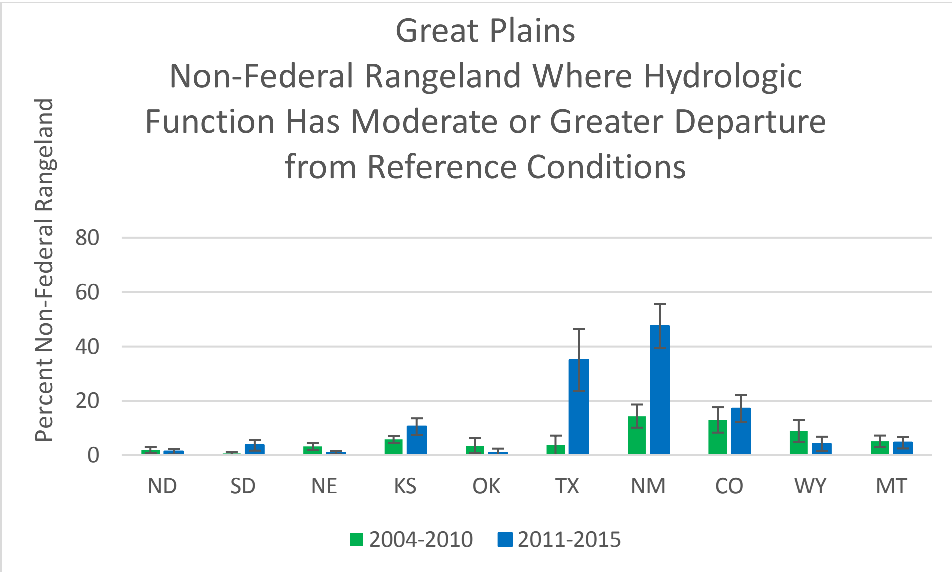


Figure 14. Non-Federal rangeland where hydrologic function shows at least moderate departure from reference conditions. Error bars represent margins of error.



Biotic Integrity

Biotic integrity shifts were observed within the Great Plains in Kansas, Oklahoma, Texas, and New Mexico (Figures 15-17). Biotic integrity ratings are based on indicators that include invasive plants, functional structural groups, annual production, litter amount, and reproduction. These indicator variables would have been sensitive not only to the 2012 drought, but also to the average drought conditions over 2011-2015 (Figures 2-14).

Figures 15-16. Non-Federal Rangeland Where Biotic Integrity Shows at Least Moderate Departure from Reference Conditions (Source: Table 2, Table 3, and Table 4**)**

Figure 15. 2004-2010

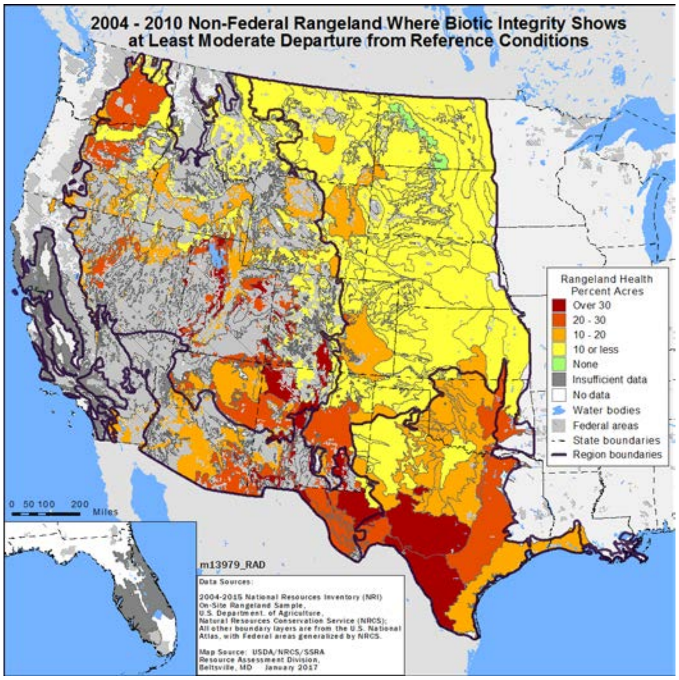


Figure 16.2011-2015

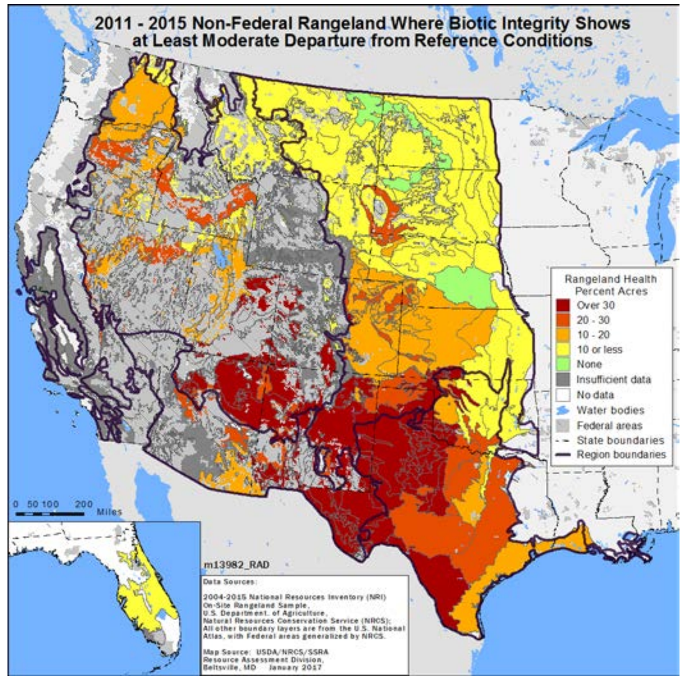
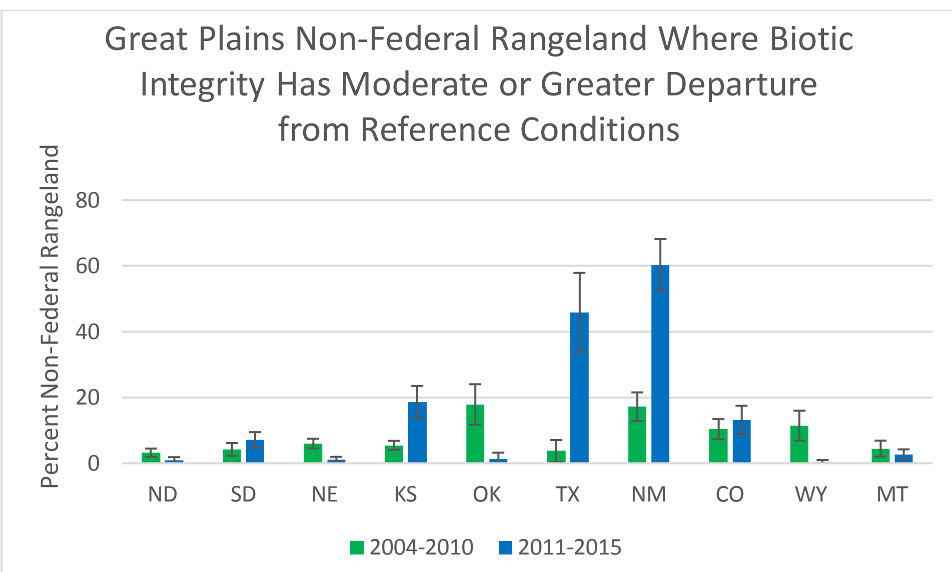


Figure 17. Non-Federal rangeland where biotic integrity shows at least moderate departure from reference conditions. Error bars represent margins of error.



Specific Indicator Discussion

Bare Ground

Within the north Texas area of the Great Plains, average bare ground increased from 4.2 ±1.2 to 13.9 ±3.2 percent. Within the New Mexico portion of the Great Plains, the average percent bare ground increased from 19.6 ±2.1 percent to 31.1 ±3.5 percent between years 2004-2010 and 2011-2015 (Figures 18-20) and the percent area with at least 50 percent bare ground increased from 4.4 ±3.2 to 14.6 ±5.5 percent (Figures 21-23). As described above in the soil and surface stability section, increases in bare ground, vegetative canopy gaps were associated with drought conditions during 2011-2015 (Figures 2-13).

Figures 18-19. Bare Ground on Non-Federal Rangeland. (Source: Table 111, Table 112, and Table 113**)**

Figure 18. 2004-2010

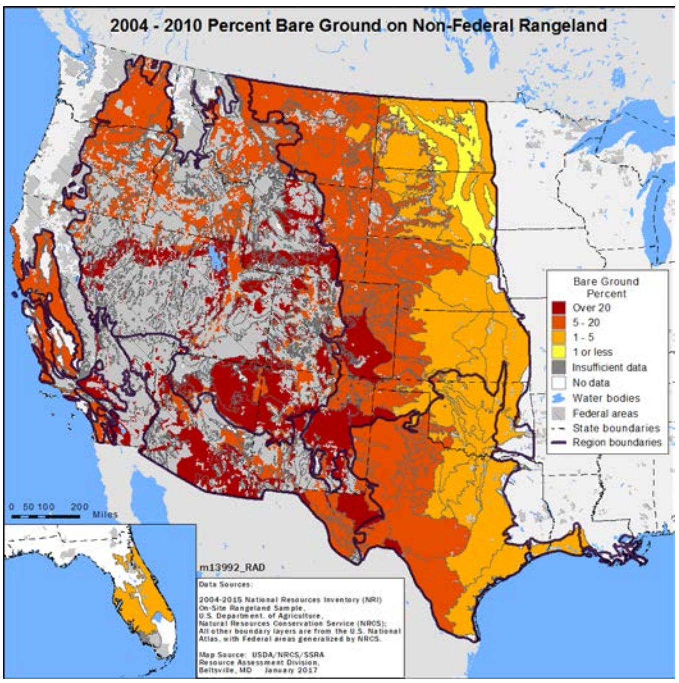


Figure 19. 2011-2015

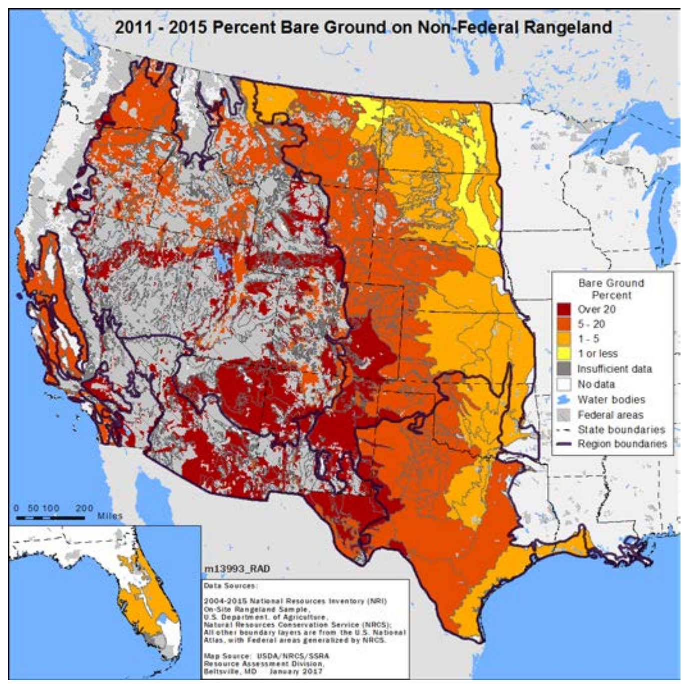
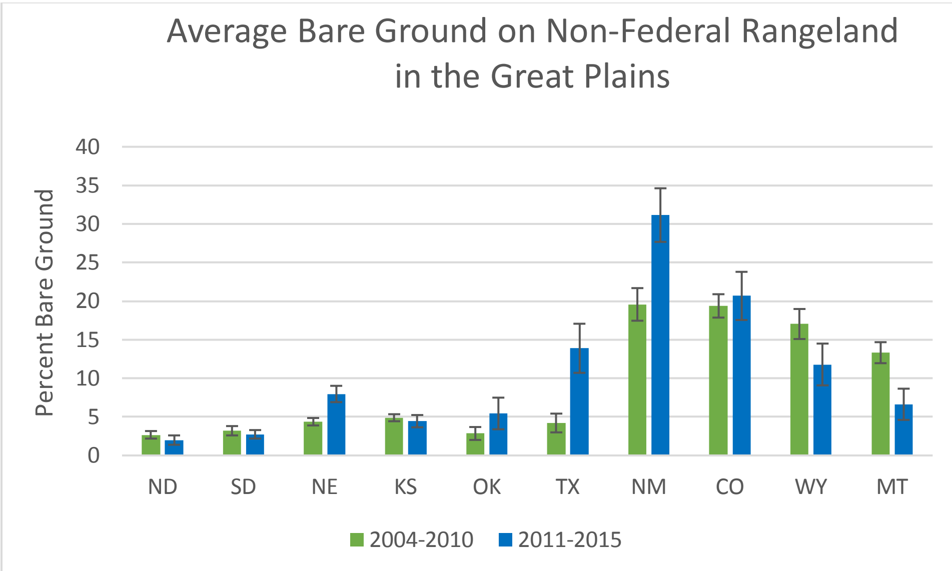


Figure 20. Bare ground on non-Federal rangeland in the Great Plains. Error bars represent margins of error.



Figures 21-22. Non-Federal Rangeland that is at Least 50% Bare Ground. (Source: Table 114, Table 115, and Table 116**)**

Figure 21. 2004-2010

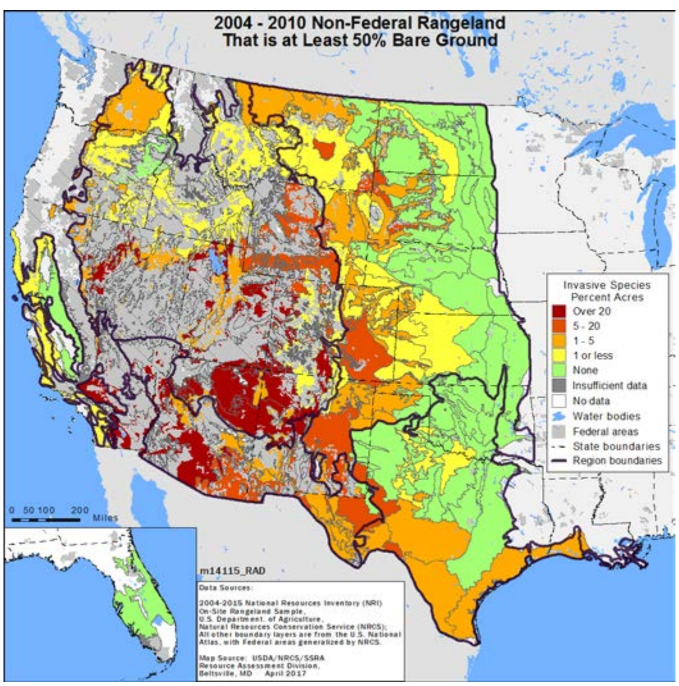


Figure 22. 2011-2015

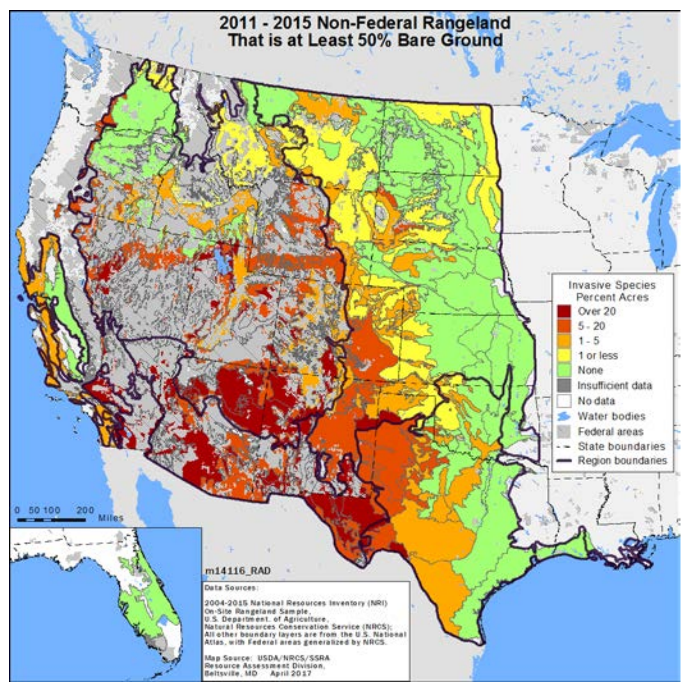
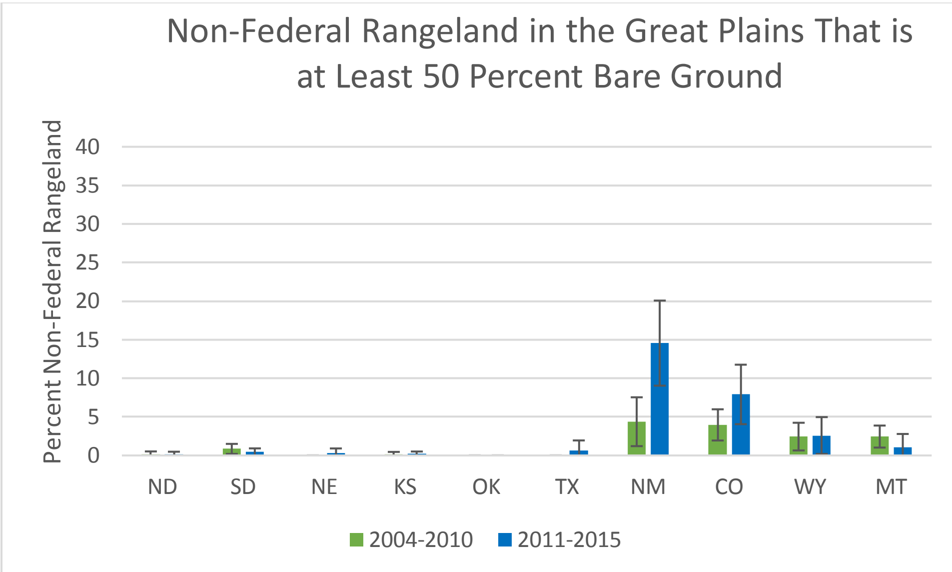


Figure 23. Non-Federal rangeland in the Great Plains that is at Least 50 percent bare ground. Error bars represent margins of error.



Intercanopy gaps

The same area of New Mexico that had an increase in bare ground also had an increase, (from 0.9 ±0.7 percent to 10.0 ±4.6 percent) in non-Federal rangeland where canopy gaps of 2 meters or greater cover at least 20 percent of the ground and bare ground in those gaps is at least 50 percent (Figure 24-26). Increased areas with large canopy gaps and bare ground within the gaps were associated with drought conditions during 2011-2015.

Figures 24-25. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119**)**

Figure 24. 2004-2010

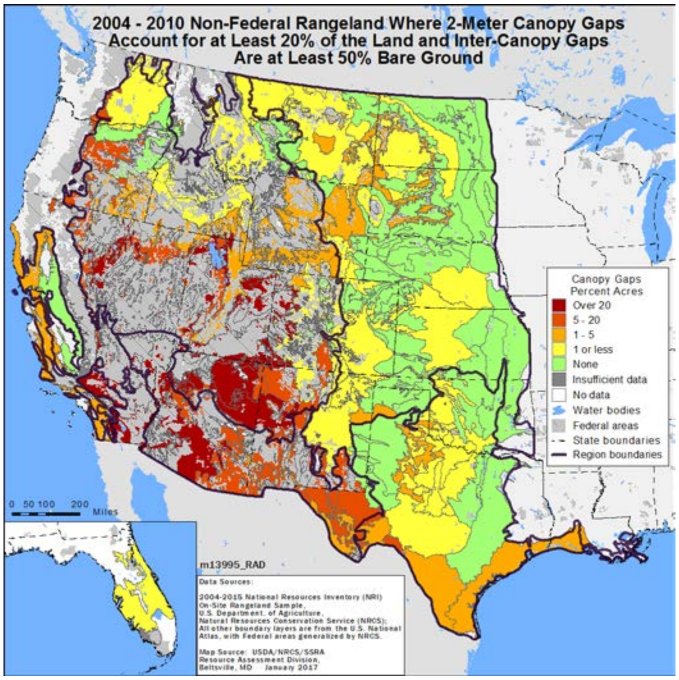


Figure 25. 2011-2015

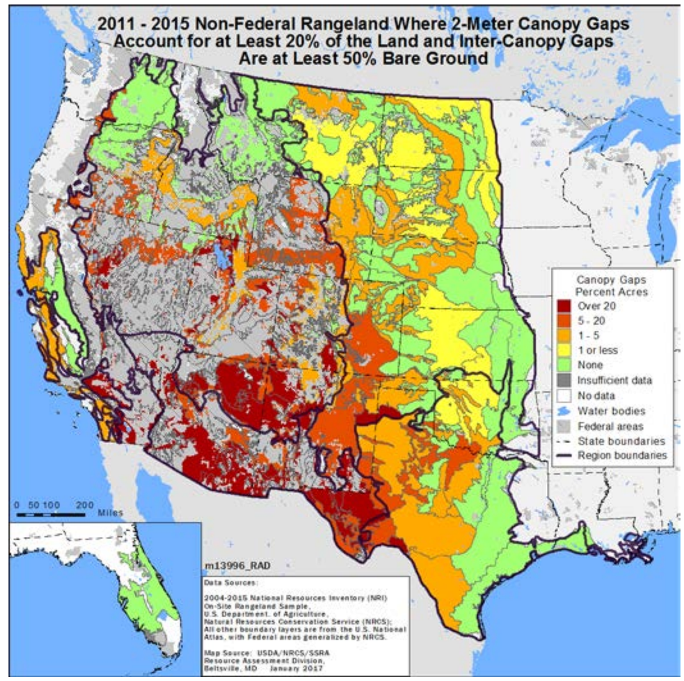
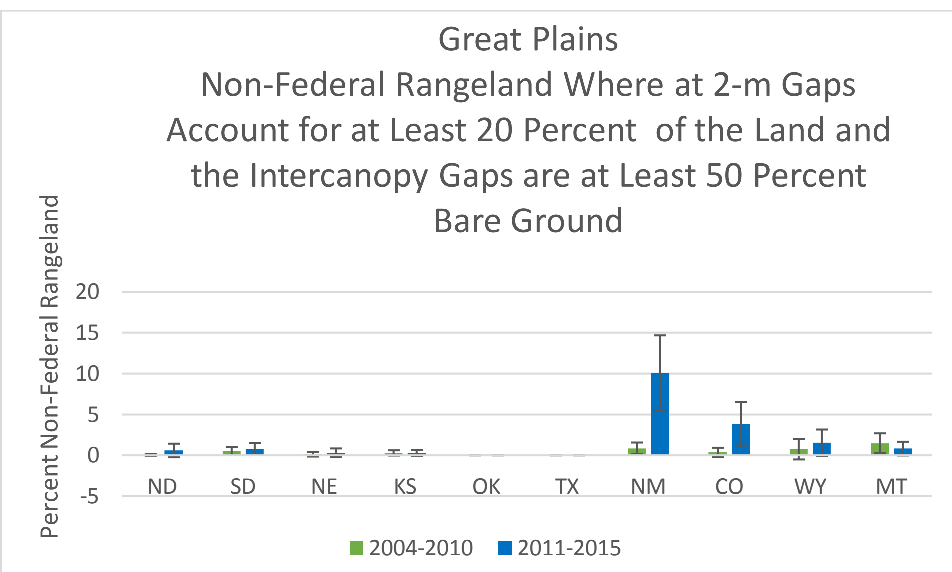


Figure 26. Non-Federal rangeland in New Mexico where canopy gaps cover at least 20 percent of the land and where at least 50 percent of the land within those canopy gaps is bare ground. Error bars represent margins of error.



Non-native plants

Although the presence of non-native plants in the Great Plains changed very little during the two time periods, within the region on non-Federal rangeland they are most widespread in Wyoming, (81.9 ±6.9 percent), South Dakota (81.2 ±3.8 percent), North Dakota (79.7 ±3.7 percent), and Montana (75.4 ±4.4 percent). Within the region they cover at least 50 percent of the soil surface on 16.7 (±3.2) percent of non-Federal rangeland in South Dakota, 12.2 (±3.2) percent in Kansas, 9.8 (±3.5) percent in North Dakota, and 8.3 (±3.0) percent in Montana (Figures 27-29).

Figures 27-28. Non-Federal Rangeland Where Non-native Plant Species are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 27. 2004-2010

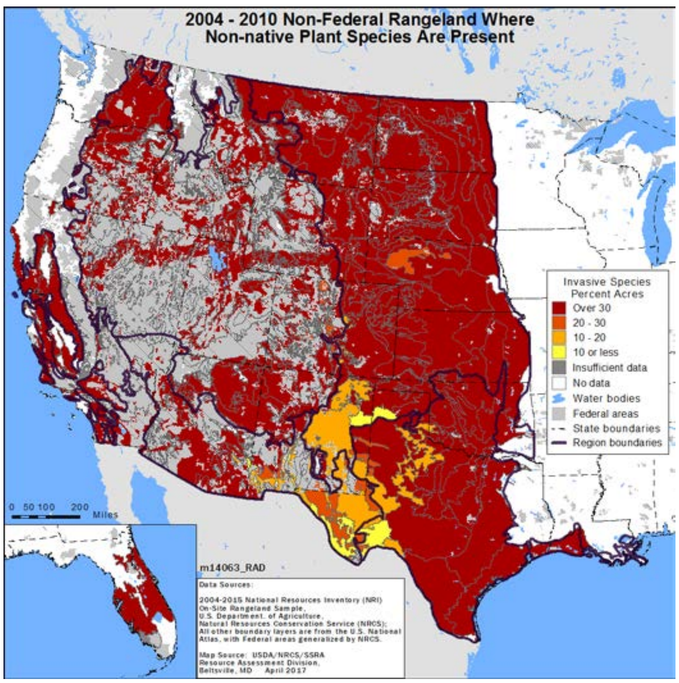


Figure 28. 2011-2015

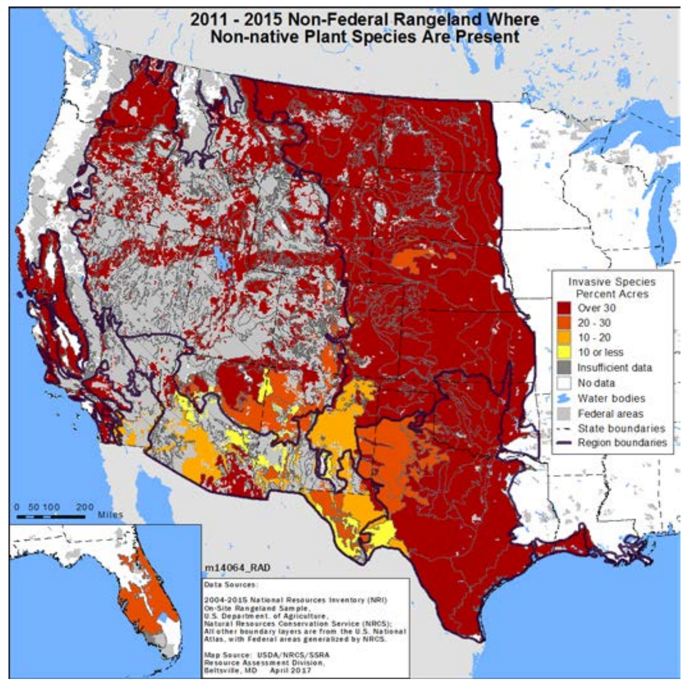
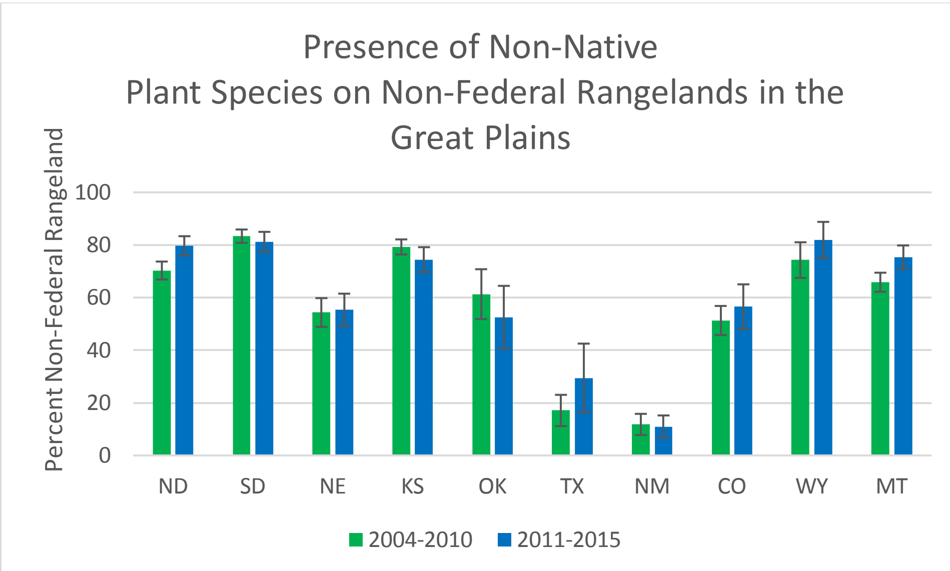


Figure 29. Non-Federal rangeland where non-native plant species are present. Error bars represent margins of error.



Figures 30-31. Non-Federal Rangeland Where Non-native Plant Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 30. 2004-2010

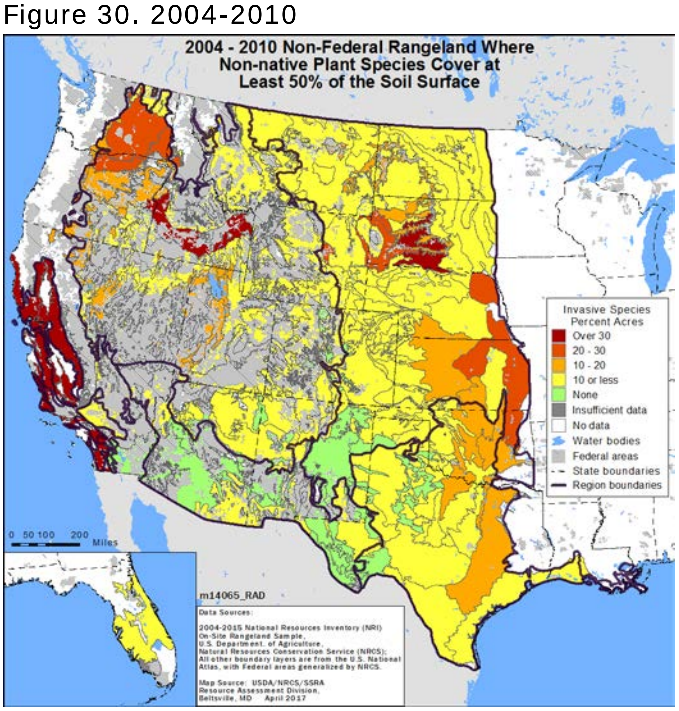


Figure 31. 2011-2015

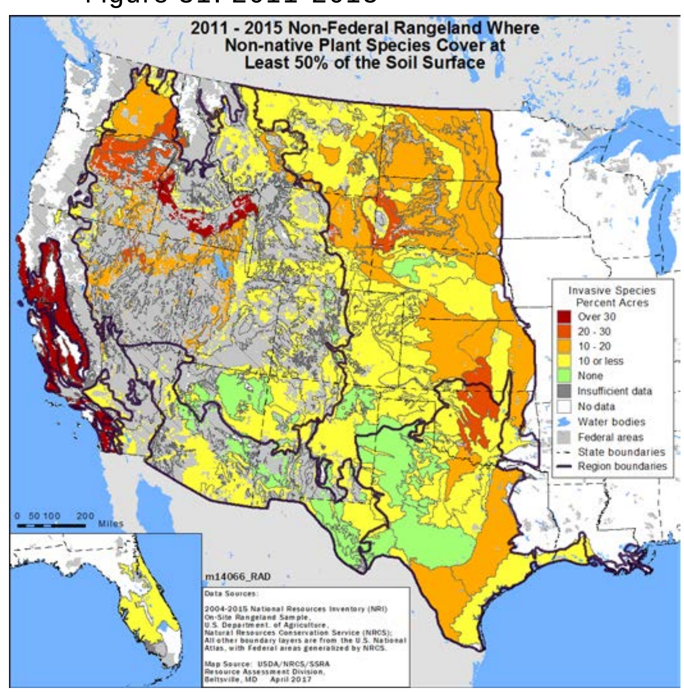
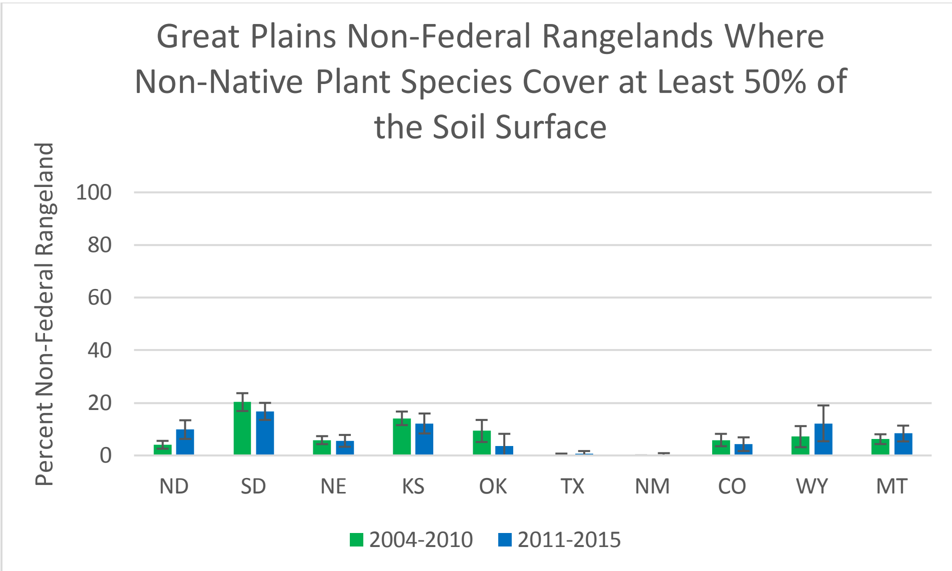


Figure 32. Great Plains Non-Federal Rangeland Where Non-native Plant Species Cover at Least 50% of the Soil Surface. Error bars represent margins of error.



Invasive grasses

Annual bromes (*Bromus* spp.) are non-native invasive grasses that are most prevalent in the northwestern and central part of the region where they are present on 74.4 (±8.0) percent of non-Federal rangeland in Wyoming, 55.8 (±5.5) percent in Kansas, 53.9 (±5.0) percent in South Dakota, 52.7(±6.0) percent in Montana, and 40.4 (±5.5) percent in Nebraska (Figures 33-35). Annual bromes cover at least 50 percent of the soil surface on 8.3 (±3.6) percent of the land in Kansas, 6.8 (±2.4) percent in South Dakota, and 6.1 (±4.6) percent in Wyoming.

Among the annual bromes, cheatgrass (*Bromus tectorum*) is highly invasive (DiTomaso, 2000; Ogle S.M., 2003; Chambers, 2007). It is present on 48.5 (± 8.3) percent of non-Federal rangeland in Wyoming, 45.2 (±4.9) percent in South Dakota, 31.2 (±4.9) percent in Kansas, and 27.2 (±4.7) percent in Nebraska (Figures 39-41). Cheatgrass covers at least 50 percent of the soil surface on 6.1 (±3.5) of the non-Federal rangeland in Kansas and 5.4 (±2.5) percent in South Dakota (Figures 42-44).

Smooth brome *(Bromus inermis*) is a native perennial that has been widely planted as forage on pasture and hayland, and used for other conservation practices such as grassed waterways and field borders (Bush, 2002; Hall, 2008). However, it has become invasive in many areas, including rangeland in much of the Great Plains (Figures 45-50). Within the region smooth brome is most common along its eastern boundary where it is present on non-Federal rangelands in North Dakota (47.0 ±7.0 percent), South Dakota (28.1 ±2.8 percent), Kansas (20.9 ±3.8 percent), and Nebraska (16.7 ±3.2 percent). Smooth brome covers at least 50 percent of the soil surface on 8.0 (±2.2) percent of non-Federal rangeland in South Dakota, 5.6 (±2.6) percent in North Dakota, and 4.3 (±2.0) percent in Nebraska.

Although Kentucky bluegrass (*Poa pratensis*) is commonly planted on pasturelands especially in the north central and northeastern regions of the United States as important persistent perennial cool-season forage species (Hall, 1996; Bush, 2002; Wennerberg, 2004; Toledo, 2014), it is listed as an invasive weed in the Great Plains. Canada bluegrass (*Poa compressa*) may have spread to many areas by contaminated seed for other bluegrass species and may become weedy and invasive in some regions or habitats (St.John, 2012; Toledo, 2014). In the Great Plains Kentucky and Canada bluegrasses are present on 86.0 (±3.7) percent of non-Federal rangeland in North Dakota, 62.8 (±3.5) percent in South Dakota, 39.9 (±6.2) percent in Kansas, 37.9 (±3.7) percent in Nebraska, and 31.7 (±7.3) percent in Montana (Figures 51-53). Kentucky and Canada bluegrasses are perennial sod-forming grasses that spread by strong rhizomes and seeds. These dense stands covering greater than 50 percent of the soil surface account for 38.9 (±5.8) percent of non-Federal rangeland in North Dakota and 15.1 (±3.6) percent in South Dakota (Figures 54-56).

Figures 33-34. Non-Federal Rangeland Where Annual Bromes are Present.
(Source: Table 17, Table 18, and Table 19**)**

Figure 33. 2004-2010

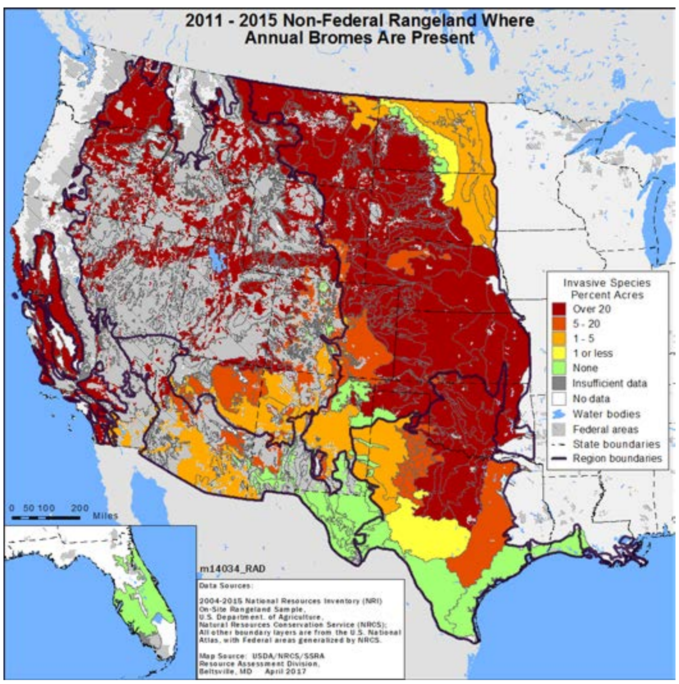


Figure 34. 2011-2015

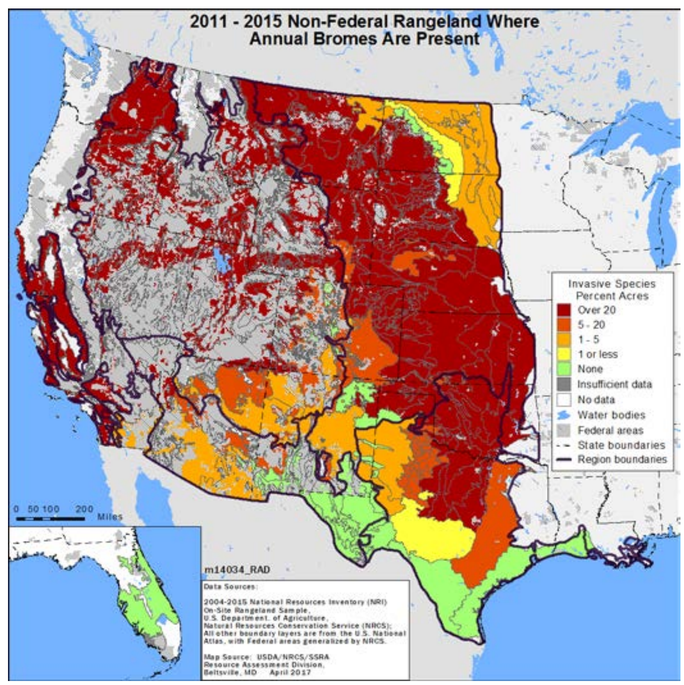
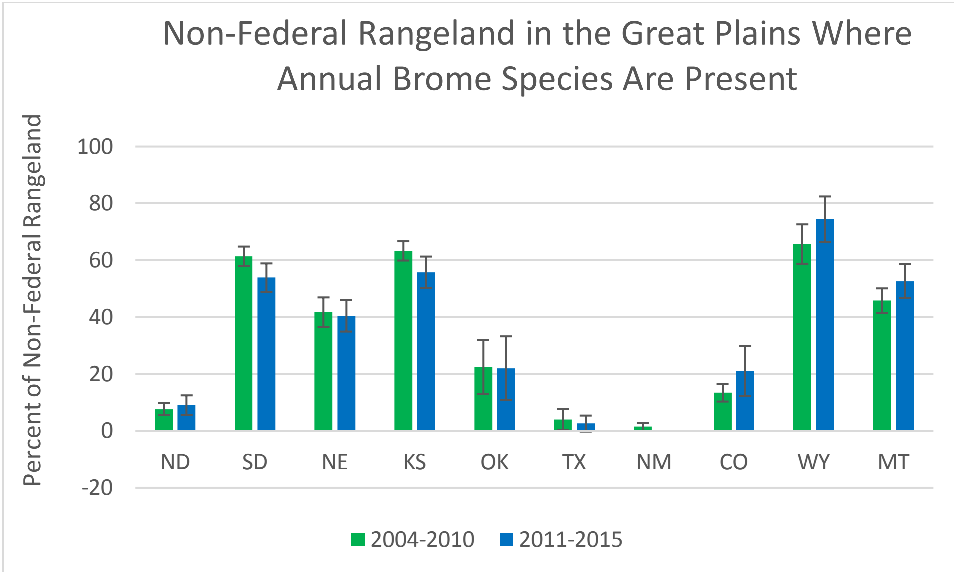


Figure 35. Great Plains Non-Federal Rangeland Where Annual Bromes are Present. Error bars represent margins of error.



Figures 36-37. Non-Federal Rangeland Where Annual Brome Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 36. 2004-2010

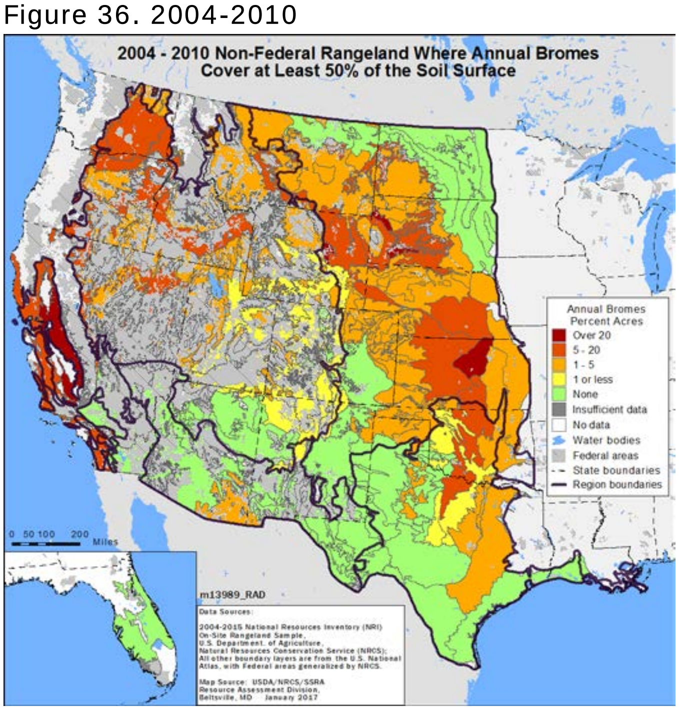


Figure 37. 2011-2015

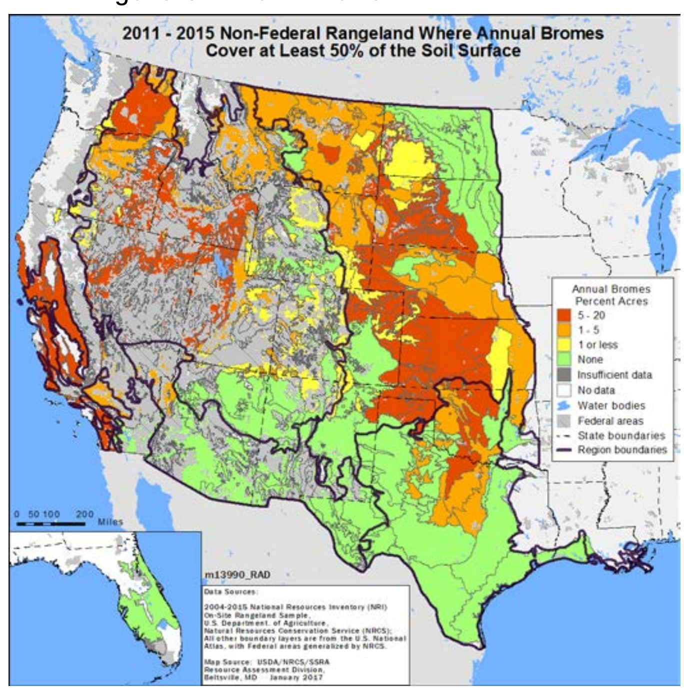
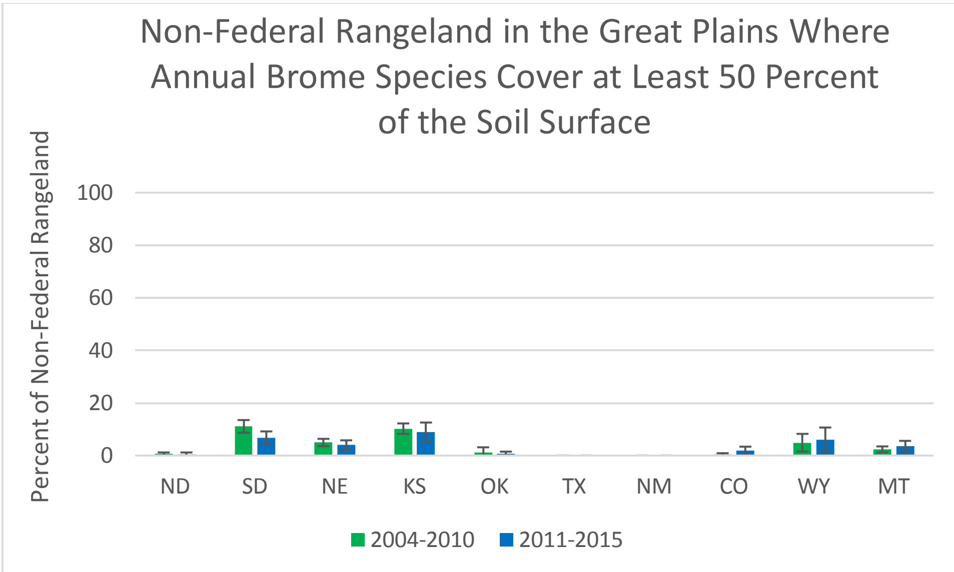


Figure 38. Non-Federal Rangeland Where Annual Brome Species Cover at Least 50% of the Soil Surface. Error bars represent margins of error.



Figures 39-40. Non-Federal Rangeland Where Cheatgrass is Present. (Source: Table 24), Table 25, and Table 26**)**

Figure 39. 2004-2010

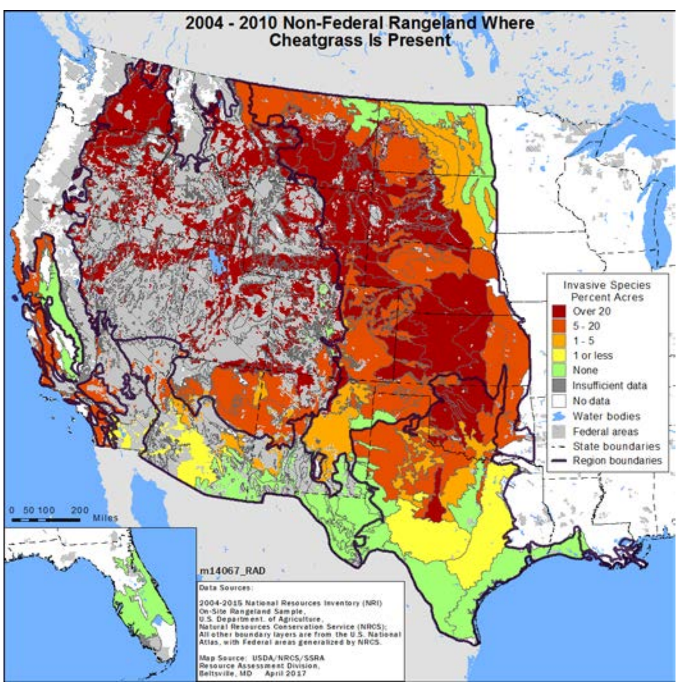


Figure 40. 2011-2015

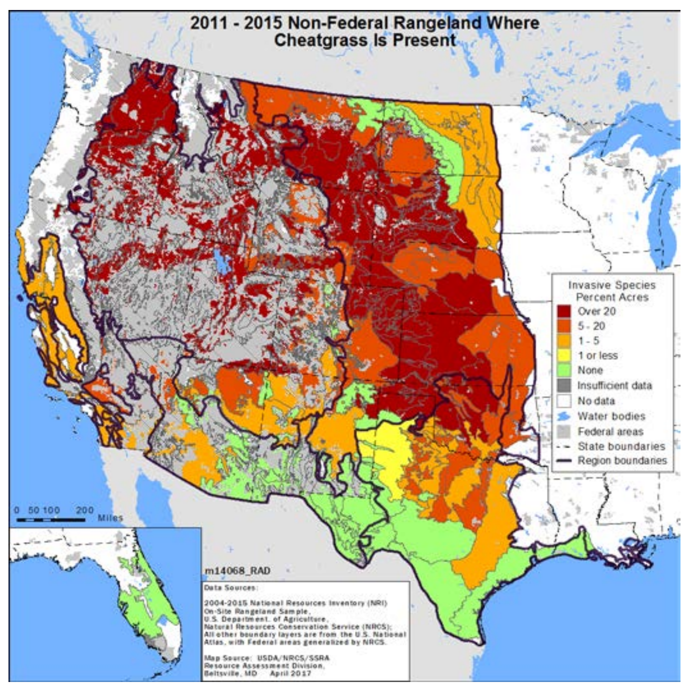
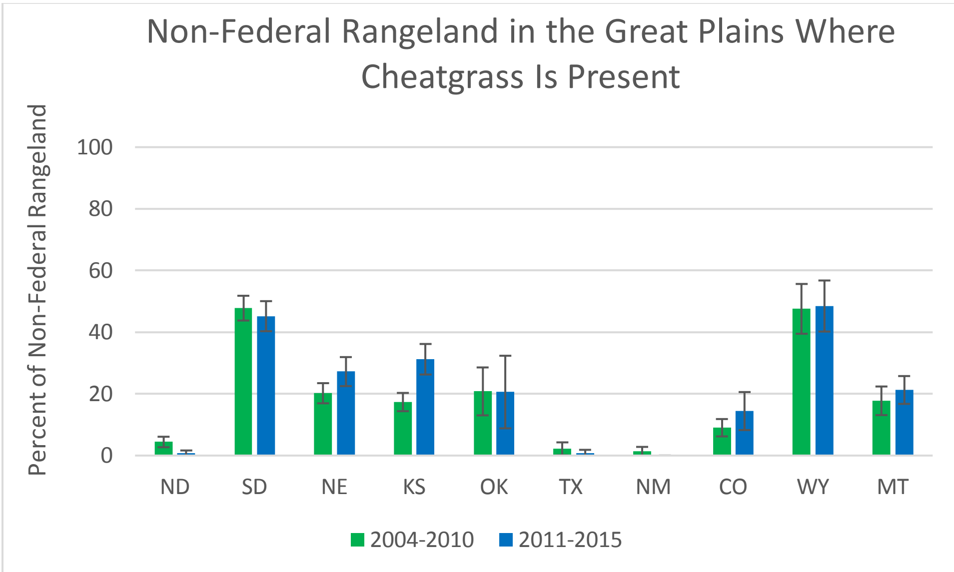


Figure 41. Non-Federal Rangeland Where Cheatgrass is Present. Error bars represent margins of error.



Figures 42-43. Non-Federal Rangeland Where Cheatgrass Covers at Least 50% of the Soil Surface. (Source: Table 24), Table 25, and Table 26**)**

Figure 42. 2004-2010

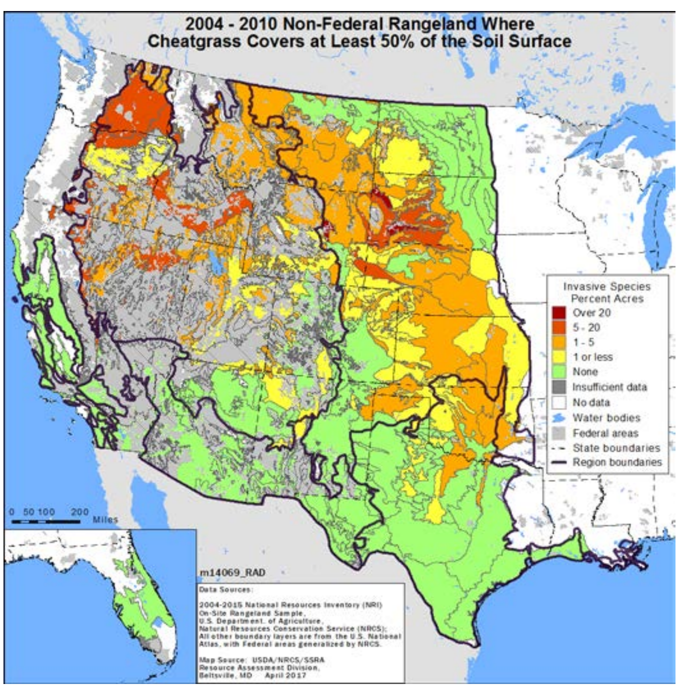


Figure 43. 2011-2015

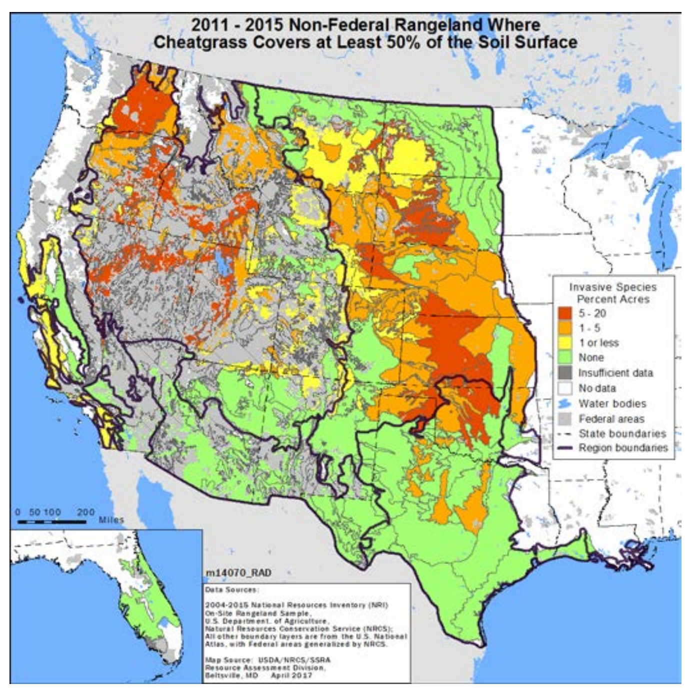
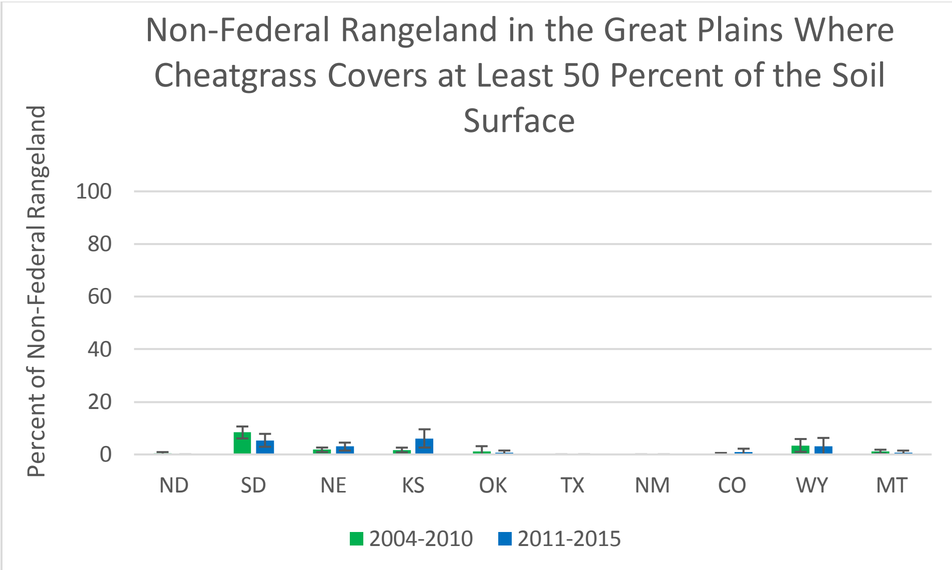


Figure 44. Non-Federal Rangeland Where Cheatgrass Covers at Least 50% of the Soil Surface. Error bars represent margins of error.



Figures 45-46. Non-Federal Rangeland Where Smooth Brome is Present. (Source: Table 30, Table 31, and Table 32**)**

Figure 45. 2004-2010

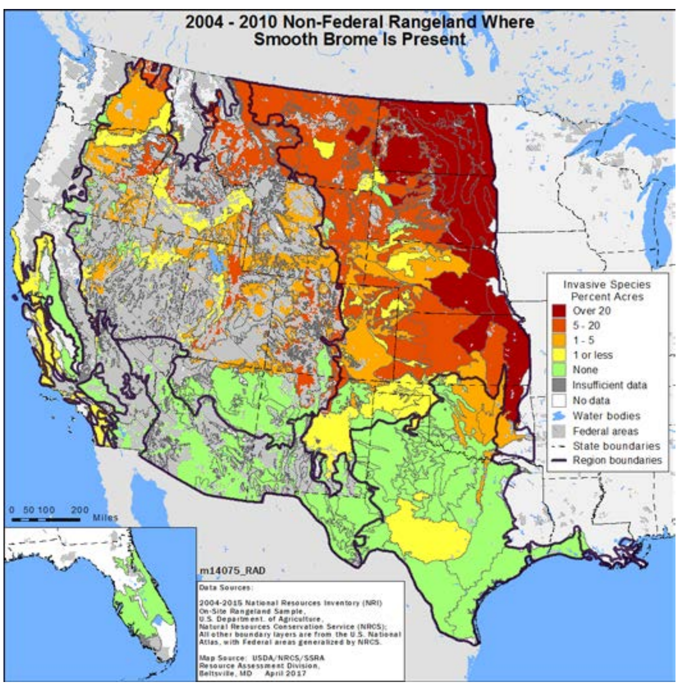


Figure 46. 2011-2015

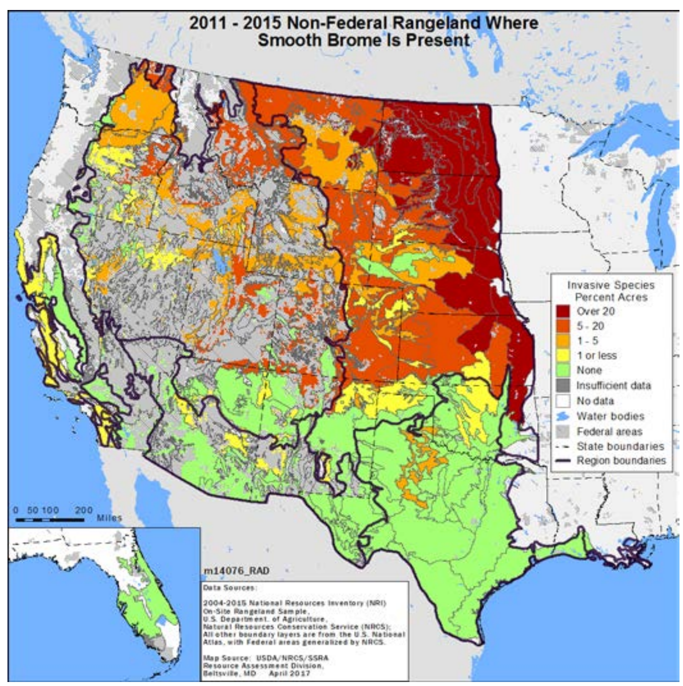
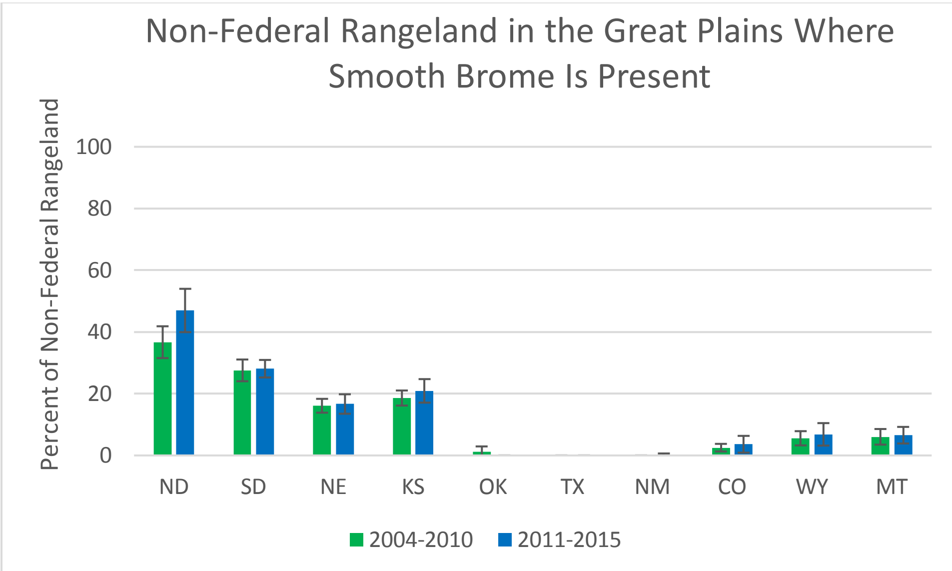


Figure 47. Great Plains Non-Federal Rangeland Where Smooth Brome is Present. Error bars represent margins of error.



Figures 48-49. Non-Federal Rangeland Where Smooth Brome Covers at Least 50% of the Soil Surface. (Source: Table 30, Table 31, and Table 32**)**

Figure 48. 2004-2010

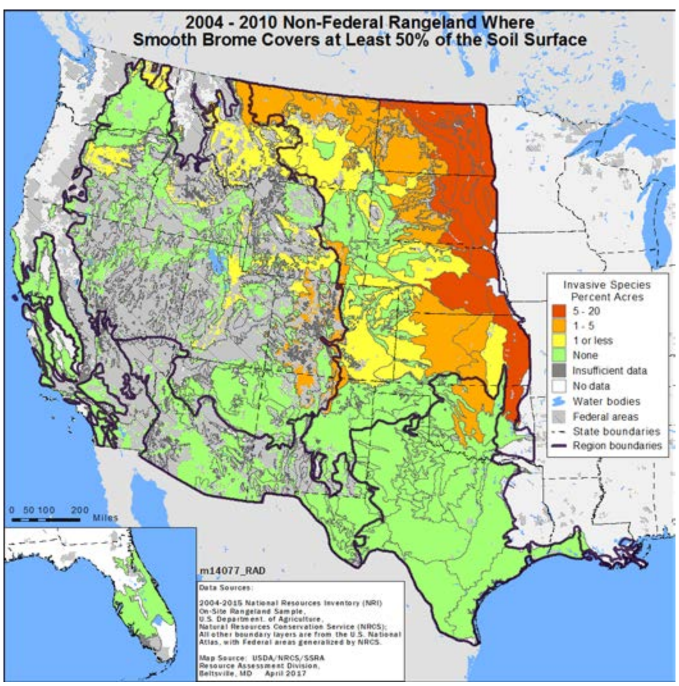


Figure 49. 2011-2015

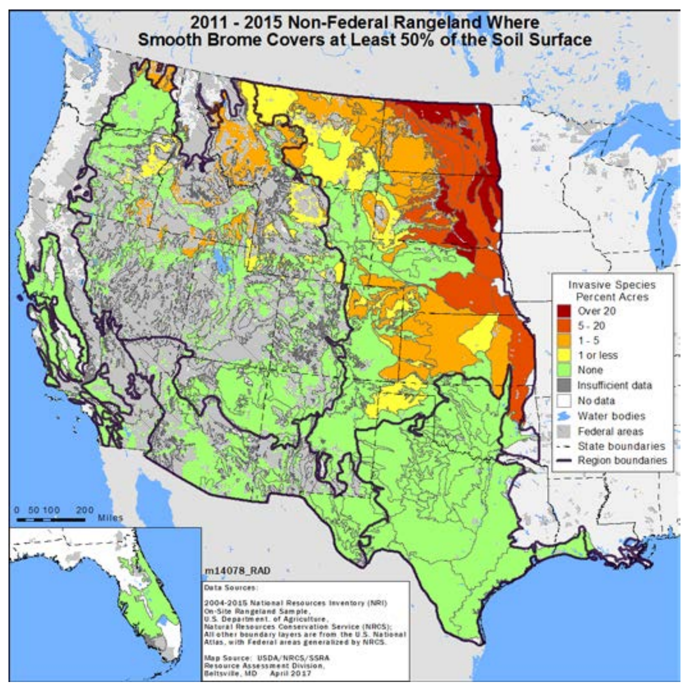
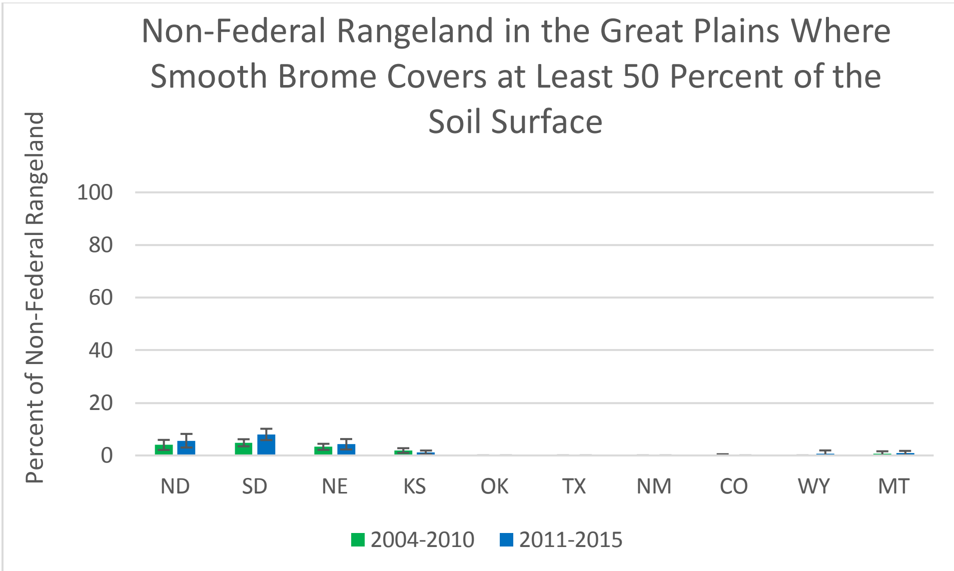


Figure 50. Great Plains Non-Federal Rangeland Where Smooth Brome Covers at Least 50 % of the Soil Surface. Error bars represent margins of error.



Figures 51-52. Non-Federal Rangeland Where Kentucky and Canada bluegrass are Present. (Source: Table 27, Table 28, and Table 29**)**

Figure 51. 2004-2010

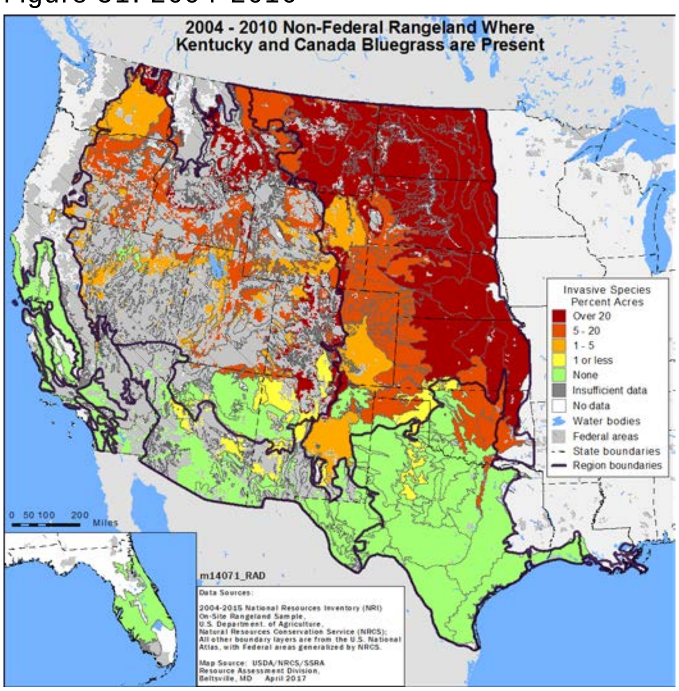


Figure 52. 2011-2015

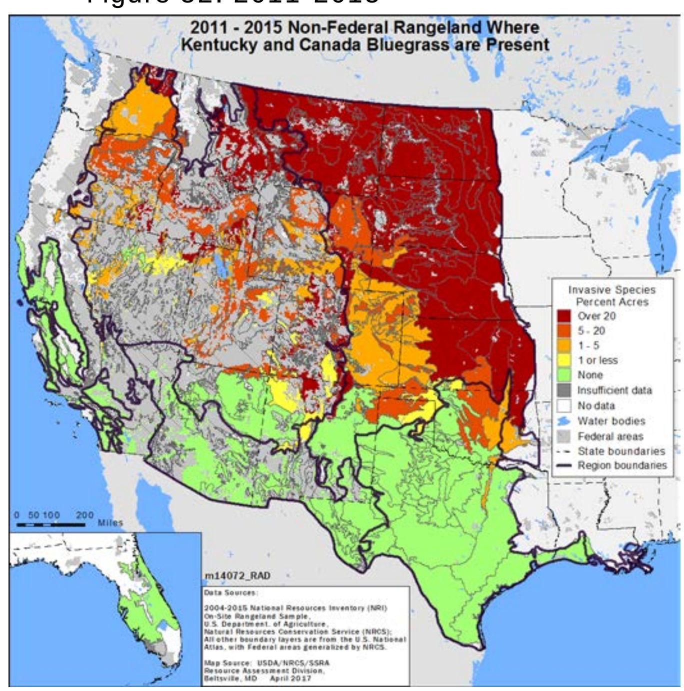
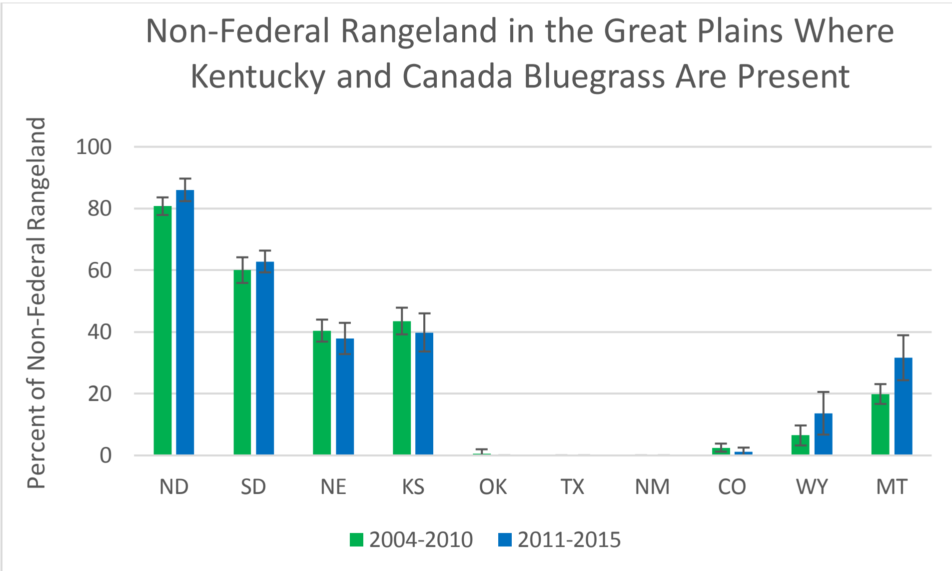


Figure 53. Great Plains Non-Federal Rangeland Where Kentucky and Canada Bluegrass are Present. Error bars represent margins of error.



Figures 54-55. Non-Federal Rangeland Where Kentucky and Canada Bluegrass Cover at Least 50% of the Soil Surface. (Source: Table 27, Table 28, and Table 29**)**

Figure 54. 2004-2010

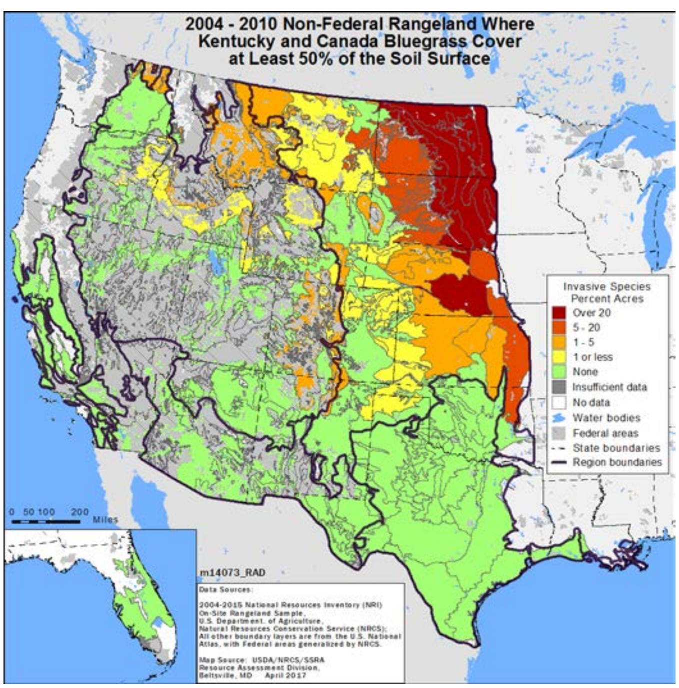


Figure 55. 2011-2015

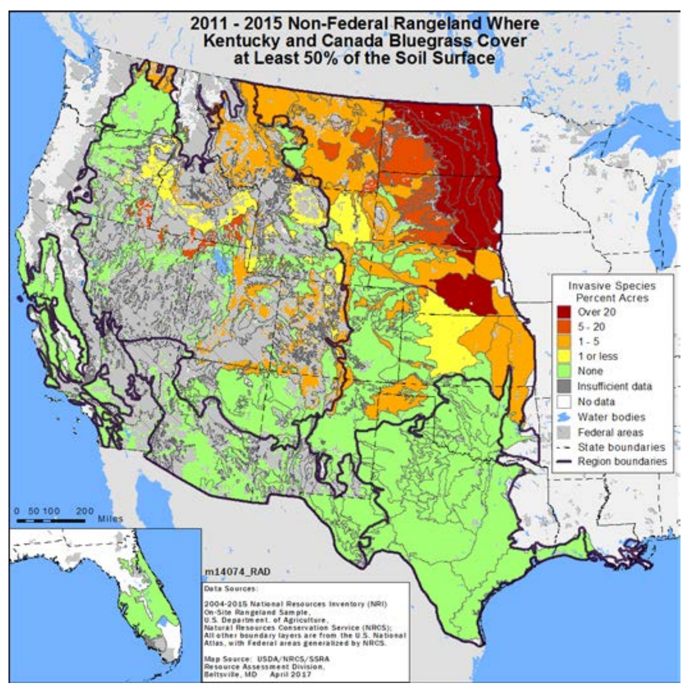
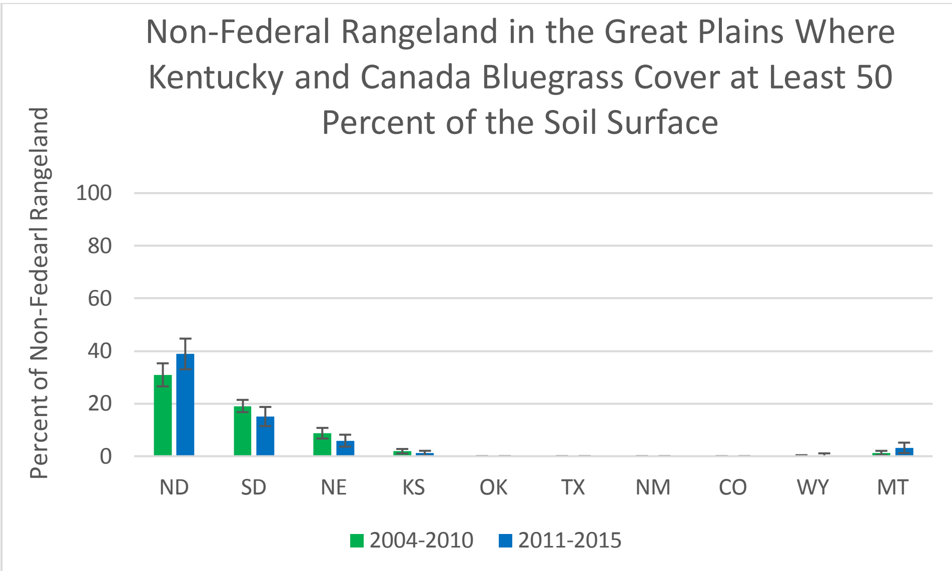


Figure 56. Great Plains Non-Federal Rangeland Where Kentucky and Canada Bluegrass Cover at Least 50% of the Soil Surface. Error bars represent margins of error.



Invasive Forbs

In the Great Plains, Canada and bull thistles (*Cirsium arvense* and *Cirsium vulgare*) are present on 7.7 (±2.6) percent of non-Federal rangeland in North Dakota and on 4.6 (±1.9) percent in South Dakota (Figures 57-59). Leafy Spurge (*Euphorbia esula*) is present on 9.8 (±4.0) percent of non-Federal rangeland in North Dakota (Figures 60-62). Non-native *Centaurea* spp. (Figures 63-64) and *Halogeton* spp. (Figures 65-66) are beginning to spread into the Great Plains, but are more common to the west.

Figures 57-58. Non-Federal Rangeland Where *Cirsium* species are Present.
(Source: Table 51, Table 52, and Table 53**)**

Figure 57. 2004-2010

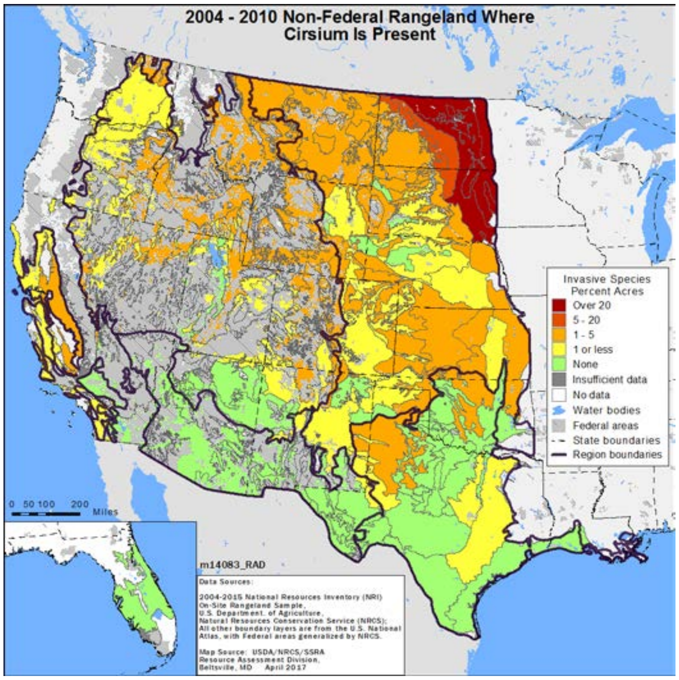


Figure 58. 2011-2015

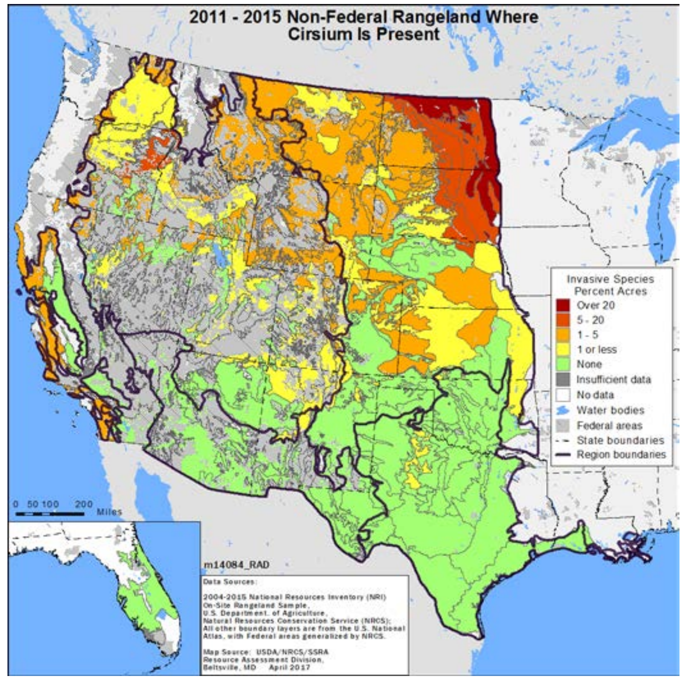
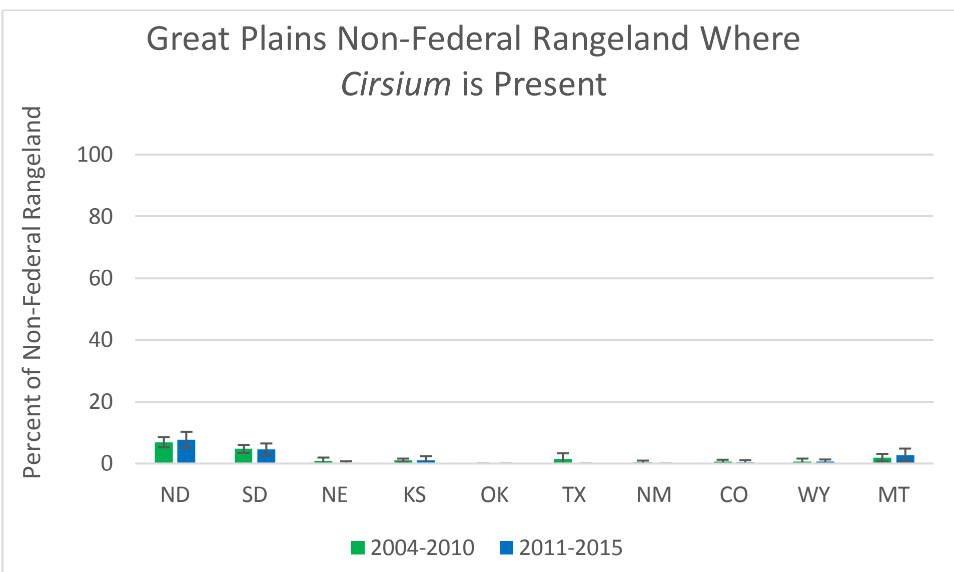


Figure 59. Great Plains Non-Federal Rangeland Where *Cirsium* species are Present. Error bars represent margins of error.



Figures 60-61. Non-Federal Rangeland Where Leafy spurge is Present. (Source: Table 54, Table 55, and Table 56**)**

Figure 60. 2004-2010

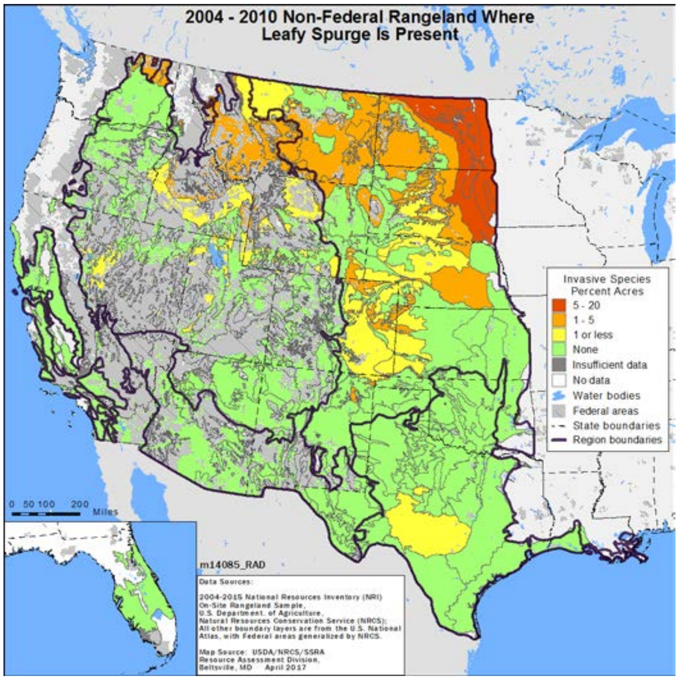


Figure 61. 2011-2015

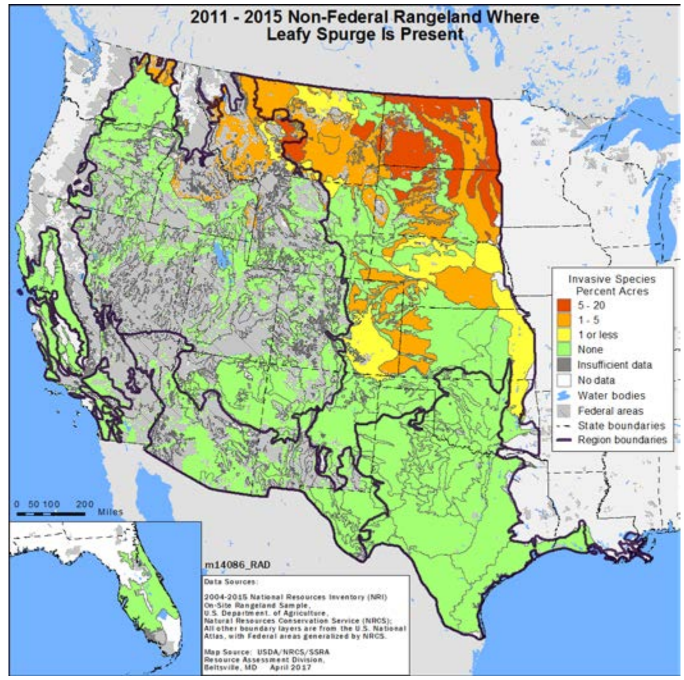
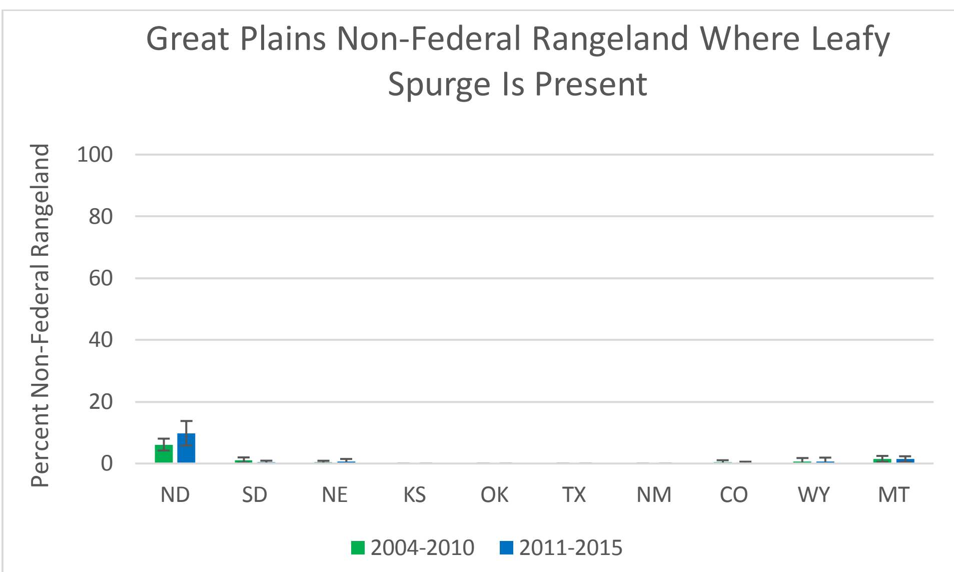


Figure 62. Great Plains Non-Federal Rangeland Where Leafy spurge is Present. Error bars represent margins of error.



Figures 63-64. Non-Federal Rangeland Where *Centaurea* species are Present.
(Source: Table 57, Table 58, and Table 59**)**

Figure 63. 2004-2010

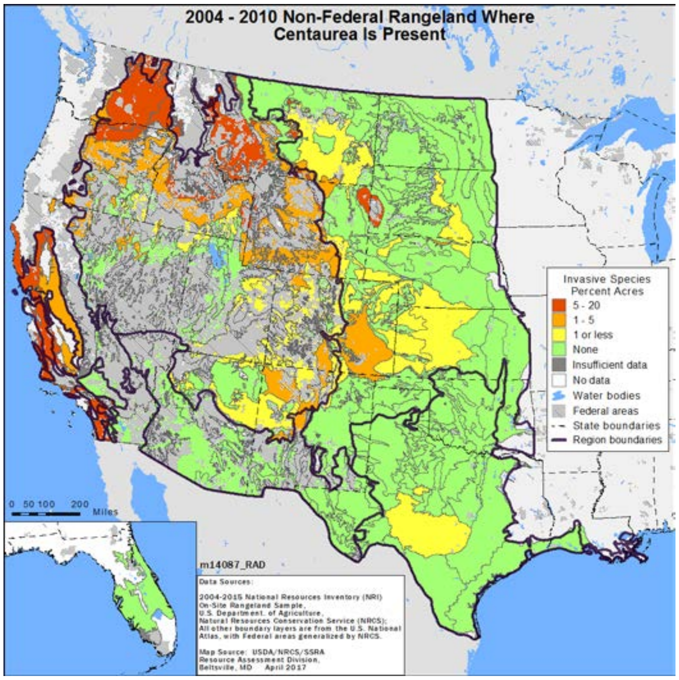
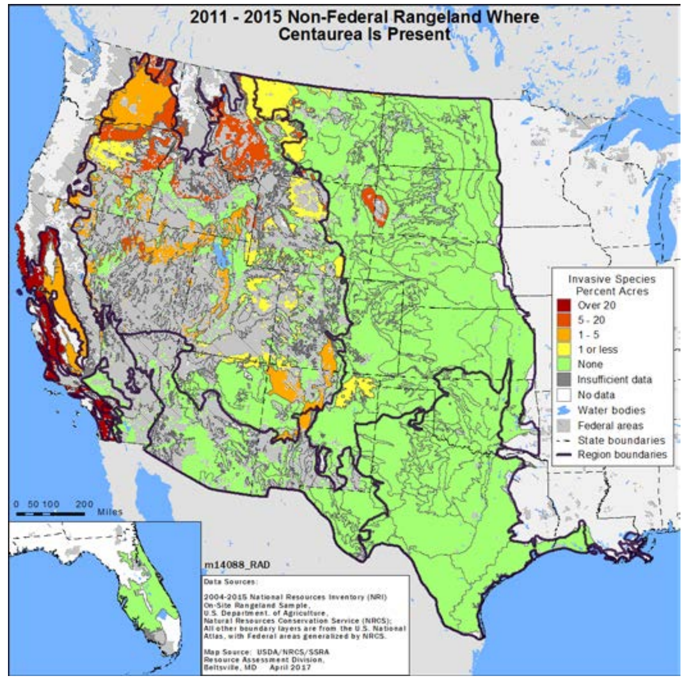


Figure 64. 2011-2015



Figures 65-66. Non-Federal Rangeland Where *Halogeton* species are Present.
(Source: Table 57, Table 58, and Table 59**)**

Figure 65. 2004-2010

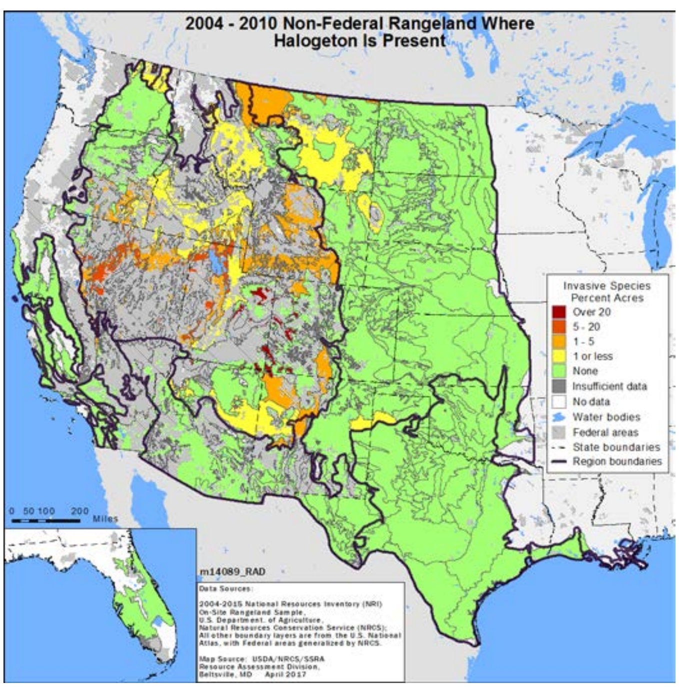
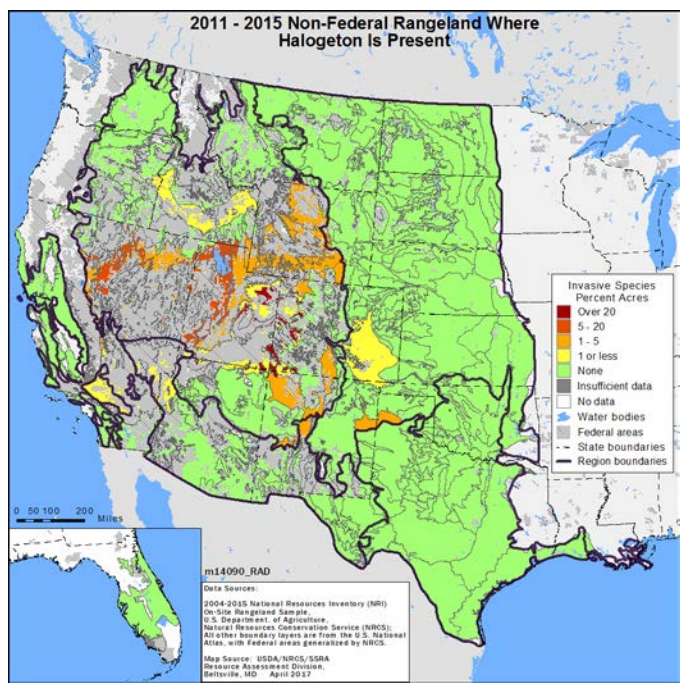


Figure 66. 2011-2015



Invasive woody species

Presence of native juniper species (Figures 67-69) on non-Federal rangelands in the Great Plains is highest in New Mexico (14.3 ±8.4 percent) and Montana (7.6 ±4.8 present). In the region mesquite species (Figures 70-72) are present in Texas (17.5 ±7.9 percent) and New Mexico (17.4 ±6.7 percent).

Figures 67-68. Non-Federal Rangeland Where Juniper Species are Present. (Source: Table 75, Table 76, and Table 77**)**

Figure 67. 2004-2010

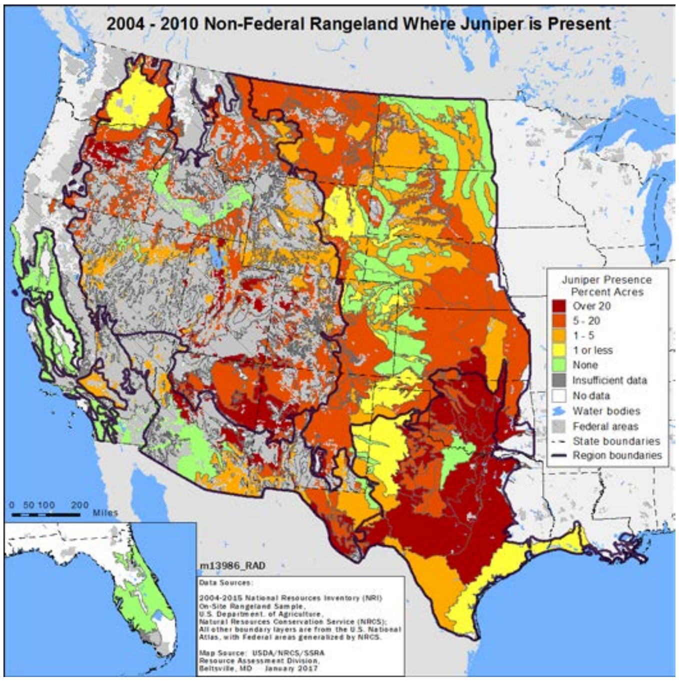


Figure 68. 2011-2015

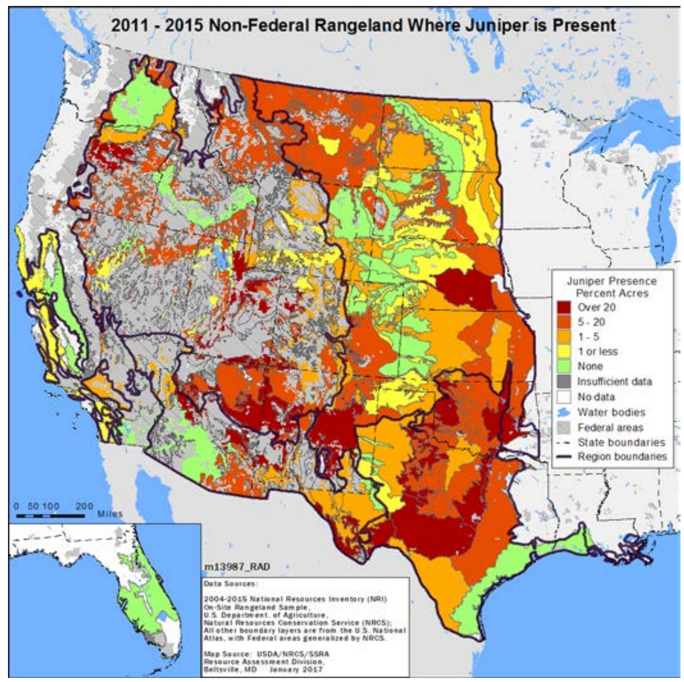
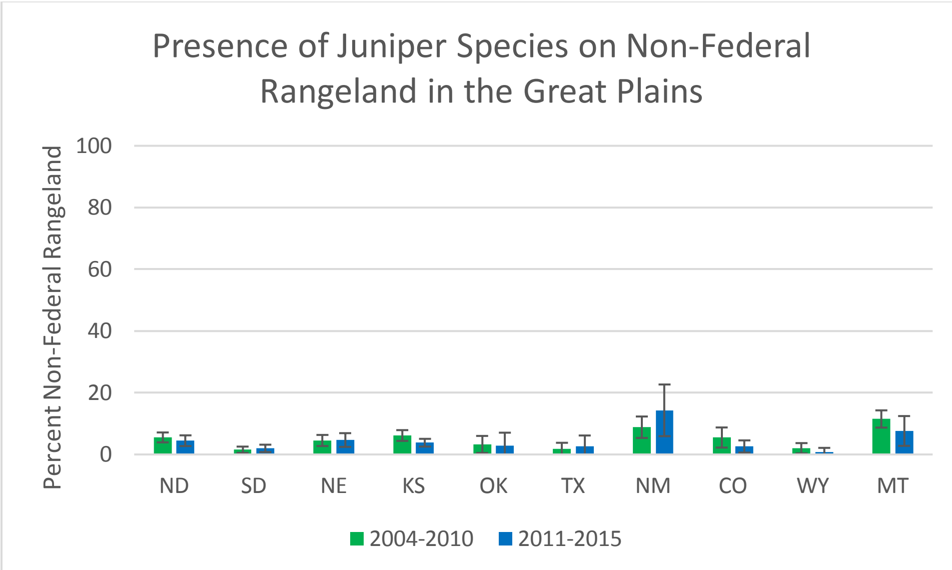


Figure 69. Non-Federal rangeland where juniper (*juniperus*) species are present in the Great Plains. Error bars represent margins of error.



Figures 70-71. Non-Federal Rangeland Where *Mesquite S*pecies are Present.
(Source: Table 96, Table 97, and Table 98**)**

Figure 70. 2004-2010

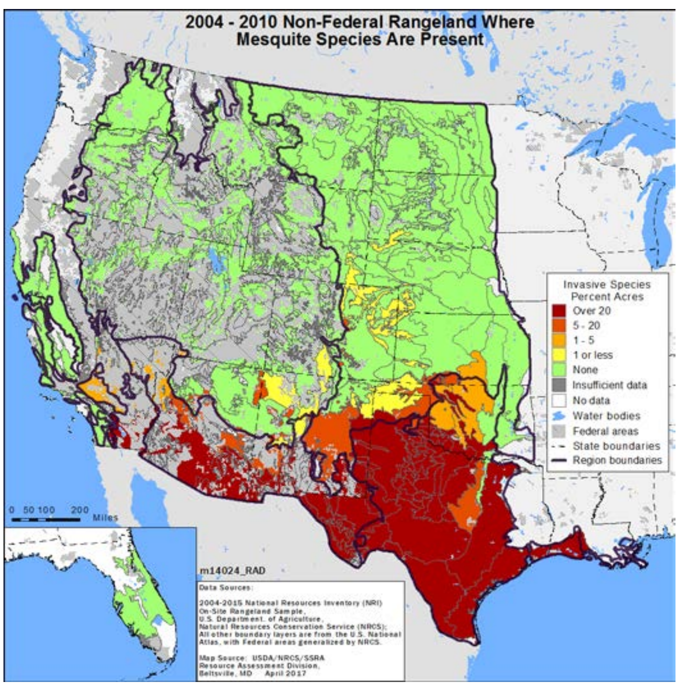


Figure 71. 2011-2015

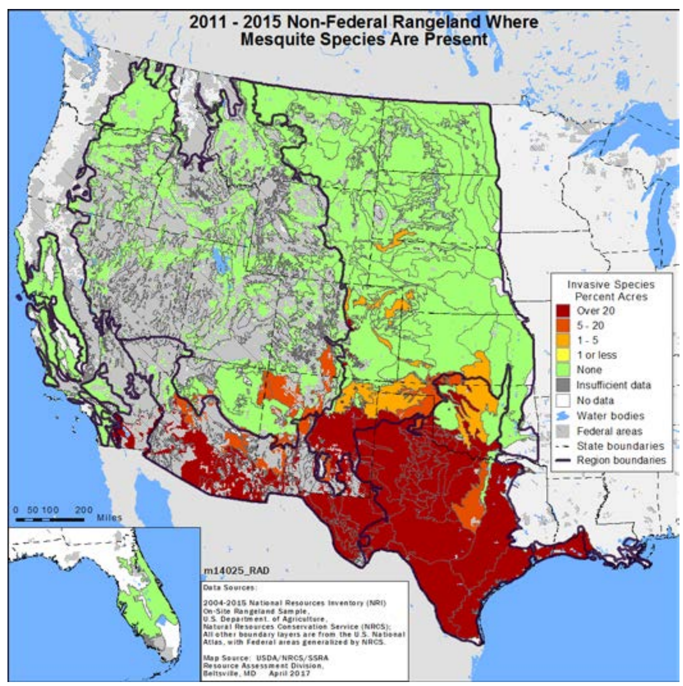
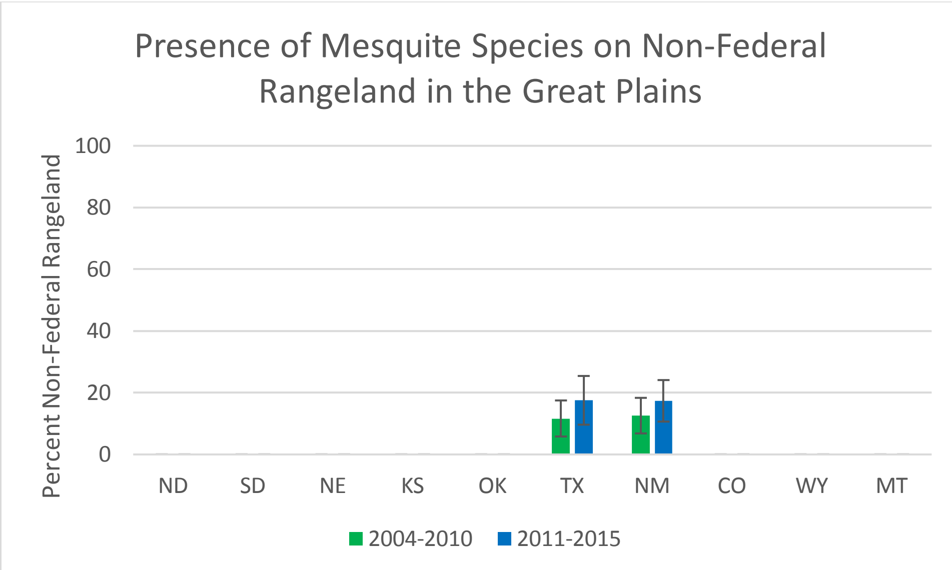


Figure 72. Non-Federal rangeland where mesquite species are present in the Great Plains. Error bars represent margins of error.



Summary and Conclusions

Much of the of non-Federal rangeland in Great Plains is in relatively good condition, with 10 percent or less of the area having moderate or greater departures from reference conditions for the rangeland health attributes, soil and site stability, hydrologic function and biotic integrity. In the northern and central part of the Great Plains there was little change in the proportion of non-Federal rangeland where rangeland health attribute ratings had moderate or greater departure from reference conditions.

However, in southwestern portion of the Great Plains generally 10-20 percent of non-Federal rangeland had at least moderate departures for the rangeland health attributes in 2004-2010 and these percentages generally increased to 20-30 percent or more during 2011-2015. The severe to extreme drought conditions that occurred in the southwestern Great Plains during 2011-2015 undoubtedly had an effect on soil moisture, vegetative cover and composition. In this area there were corresponding increases in percentages of bare ground and inter-canopy gaps.

Non-native plant species are widespread across the region. Invasive grasses including annual bromes (Bromus spp.), smooth brome (*Bromus inermis*), and Kentucky and Canada bluegrass (*Poa pratensis* and *Poa compressa*) are pervasive in the northern and central portions of the Great Plains. Invasive thistles (*Cirsium arvense* and *Cirsium vulgare*) are common in North and South Dakota, and leafy spurge (*Euphorbia esula*) is present on nearly 10 percent of non-Federal rangeland in North Dakota. Non-native *Centaurea* and *Halogeton* species, more common west of the Great Plains, are beginning to spread into the Great Plains.

Woody species including mesquite (Prosopis spp.) and juniper (*Juniperus spp*.) are common in the southern portion of the Great Plains. Although native, these species can become invasive in certain areas replacing native grasses and forbs (DiTomaso, 2000; Miller, et al., 2008.).

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The rangeland health maps represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

The source data used to construct the drought figures are from the National Drought Mitigation Center, and follow the drought monitor categories: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx. The weekly drought monitor data were converted to a 1/8-degree grid, and the state and broad region polygons were used to clip out the grid cells within each region for the two time periods. Both the stack plots show the distribution of 1/8-degree grid cells of each drought monitor class for each year.

Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

More information

Bush, T., 2002. *Plant fact sheet for Kentucky Bluegrass (Poa pratensis L.),* s.l.: USDA NRCS Rose Lake Plant Materials Center East Lansing, Michigan. (https://plants.usda.gov/plantguide/pdf/pg_popr.pdf).

Bush, T., 2002. *Plant fact sheet for Smooth brome (Bromus inermis Leyss.),* s.l.: USDA NRCS Rose Lake Plant Materials Center East Lansing, Michigan. (https://plants.usda.gov/factsheet/pdf/fs_brin2.pdf).

Chambers, J. B. R. R. B. S. M. a. A. W., 2007. What makes Great Basin sagebrush ecosystems invasible by Bromus tectorum?. *Ecological Monographs. 77:117-145.*

DiTomaso, J., 2000. Invasive weeds in rangelands: species, impacts, and management. *Weed Science 48:255-265.*

Hall, M., 1996. *Agronomy Facts 50 Kentucky Bluegrass. Agronomy Facts 50 Kentucky Bluegrass,* s.l.: Penn State Cooperative Extension, College of Agricultural Sciences, Pennsylvania State University. (http://extension.psu.edu/plants/crops/forages/species/kentucky-bluegrass).

Hall, M., 2008. *Agronomy Facts 27 Smooth Bromegrass,* s.l.: Penn State Cooperative Extension, College of Agricultural Sciences, Pennsylvania State University. (http://extension.psu.edu/plants/crops/forages/species/smooth-bromegrass/extension_publication_file).

Hoerling, M. J. E. A. K. R. L. A. M. K. M. S. S. a. R. S., 2014. Causes and predictablilty of the 2012 Great Plains drought. *Bulletin of the American Meteorological Society ,* Volume 95, pp. 269-282.
Hurt, R., 1981. The Dust Bowl: An Agricultural and Social History. Chicago: Nelson-Hall.
Miller, R. F., Tausch, R. J., McArthur, E. D. & Johnson, D. D., 2008.. *Age structure and expansion of pinon-juniper woodlands: a regional perspective in the Intermountain West,* s.l.: Res. Pap. RMRS-RP-69. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 15 p.
Ogle S.M., W. R. a. K. G., 2003. Impacts of Exotic Annual Brome Grasses (Bromus spp.) on Ecosystem Properties of Northern Mixed Grass Prairie. *American Midland Naturalist 149: 46-58.*
St.John, L. D. T. a. S. W., 2012. *Plant guide for Canada bluegrass (Poa compressa),* s.l.: USDA-Natural Resources Conservation Service, Plant Materials Center, Aberdeen, Idaho 83210 (https://plants.usda.gov/plantguide/pdf/pg_poco.pdf).
Toledo, D. M. S. K. S. J. H. J. P., 2014. Extent of Kentucky Bluegrass and Its Effect on Native Plant Species Diversity and Ecosystem Services in the Northern Great Plains of the United States. *Invasive Plant Science and Management: October-December 2014, Vol. 7, No. 4, pp. 543-552. (http://dx.doi.org/10.1614/IPSM-D-14-00029.1).*
Trimble, D., 1980. Cenozoic tectonic history of the Great Plains contrasted with that of the southern Rocky Mountains, a synthesis: The Mountain Geologist. 17(3), pp. 59-69.
Wennerberg, S., 2004. *Plant Guide Kentucky bluegrass,* s.l.: USDA NRCS National Plant Data Center, Baton Rouge, Louisiana.
(https://plants.usda.gov/plantguide/pdf/pg_popr.pdf).

Intermountain West

The Intermountain West includes the Columbia River Basin and Snake River Plateau in the northwest, the Great Basin in Nevada and western Utah, and the Colorado Plateau in the Four Corners area of Utah, Arizona, New Mexico and Colorado (Figure 1). In addition to large areas of forest, this region has the highest proportion of Federal lands (Figure 2). Much of the rangeland in the Intermountain West is characterized by plant communities that were historically dominated by bunchgrasses and shrubs (Cronquist et al. 1977). Typical bunchgrasses include bluebunch wheatgrass [*Pseudoroegneria spicata*, Idaho fescue (*Festuca idahoensis*), Sandberg's bluegrass (*Poa secunda*), various needlegrass species (*Stipa* spp., *Achnatherum* spp., *Hesperostipa* spp., *Nassella* spp.), dropseed spp. (*Sporobolus* spp.), and prairie junegrass (*Koeleria macrantha*). Sagebrush (*Artemisia* spp.) and juniper (*Juniperus* spp.) with pinyon pine (*Pinyon* spp.), mountain mahogany (*Cercocarpus* spp.), salt desert shrub (*Atriplex* spp and others), and greasewood (*Sarcobatus* spp.) are found throughout various shrub vegetation types. In Intermountain West vegetation, a shrub canopy zone often exists with a dominant shrub, an understory and interspace area consisting of smaller shrubs, bunchgrasses, forbs, and biological soil crusts (lichens, mosses and cyanobacteria at the soil surface). Intermountain West plant communities are especially susceptible to non-native exotic plants due to a combination of disturbances such as heavy grazing, frequent wildfires, and vehicular traffic. Exotic annual grasses can negatively impact biotic integrity, ecosystem stability, composition and structure, natural fire cycles, diversity, soil biota, vegetation production, forage quality, wildlife habitat, soil physical properties, organic matter dynamics, carbon balance, nutrient and energy cycles, and hydrology and erosion dynamics (Chapin III, 2000; Evans R.D., 2001; Pierson F.B., 2002; Ehrenfeld, 2003; Ogle S.M., 2003; Brooks M.L., 2004; Norton J.B., 2004; Belnap J., 2005; Hooper D.U., 2005;Boxell J., 2008; Herrick, 2010; Davies, 2011).

Figure 1 - Broad Regions Described in the Interpretations

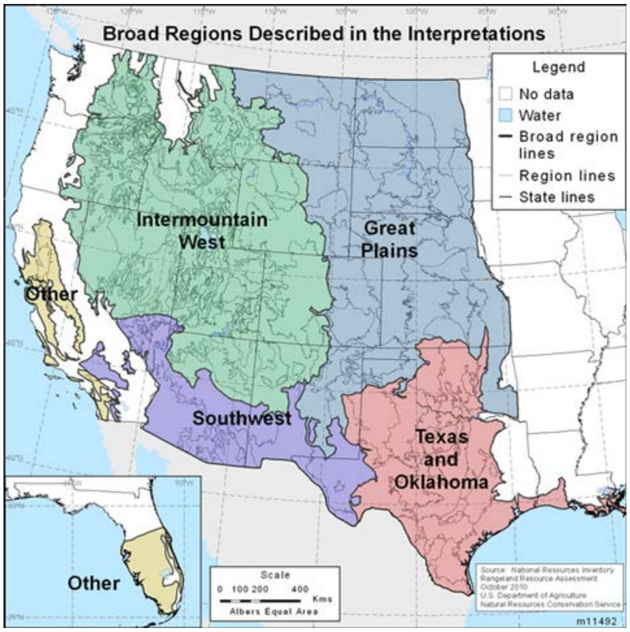


Figure *2*. Acres of Non-Federal Rangeland, 2012

Dramatic soil variability, driven by geology (soil parent material) and subsequent landscape formation, contribute to large differences in potential plant community composition. Soil-driven differences in plant communities are particularly evident in many parts of Utah, where salt-affected soils cover large areas (e.g., Bonneville Salt Flats). Large precipitation gradients and differences in potential evaporation and transpiration associated with aspect and elevation (lower on north-facing slopes and higher on south- and west-facing slopes) also contribute to variability in ecological potentials in this region. There are some significant localized areas of irrigated agriculture. Where cropland fields have been abandoned, they revert to rangeland, often with a predominance of non-native invasive plants.

Results in this report are based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015. Drought impacted the area during the second period (Figures 3-14). While this region was abnormally dry or moderate drought during the early period (2004-2010), much of this region experienced severe to extreme drought during the more recent period (2011-2015). The figures provide context for subsequent summary results.

Water is the limiting resource throughout this region and droughts are common. Extended droughts may impact plant communities and result in increases in exposed bare ground. During the 2004 through 2010 sampling period Nevada and Oregon had all or portions of their land in the region with at least 25 percent of the land area in severe to extreme drought for four of the seven years, but that portion tended to change location annually and it never extended beyond two years. During the second sampling period (2011 – 2015), Nevada and Oregon had portions or all of their land in the region with severe to exceptional drought for four of the five years (2012 – 2015). The surrounding states only had two of the five years with severe to extreme drought and only ID and WA had years with repeated drought (2013-14 and 2014-15). For states on the periphery of the region (northern AZ, northwestern NM, western CO, WY and MT), the latter time period tended to have more years of drought. Northern AZ and northwestern NM had severe to extreme drought for three of the five years (2011-12 and 2014). None of these peripheral locations had extended droughts in the 2005 to 2010 period.

Figures 3-4. Map of average drought monitor rating (0 to 4 scale, where 0 is mild drought and 4 is extreme) across the two NRI sampling periods.

Figure 3.

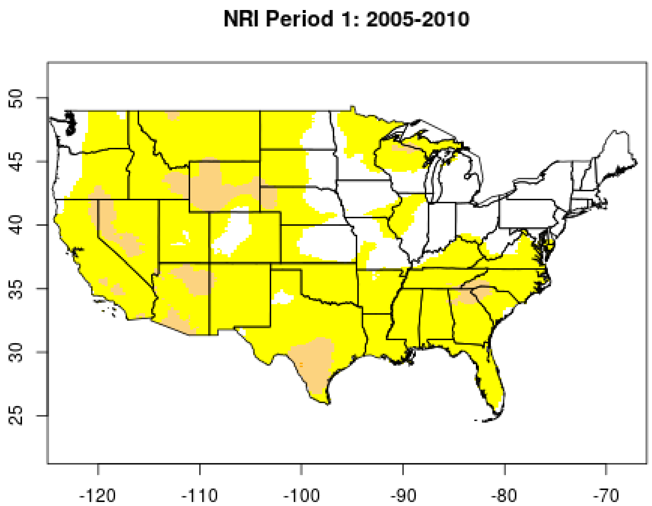
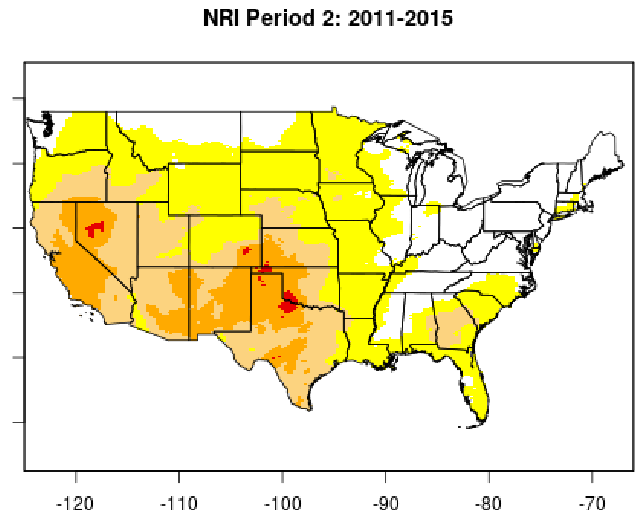


Figure 4.



Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Figure 5. Average drought severity in the Washington portion of the Intermountain West region

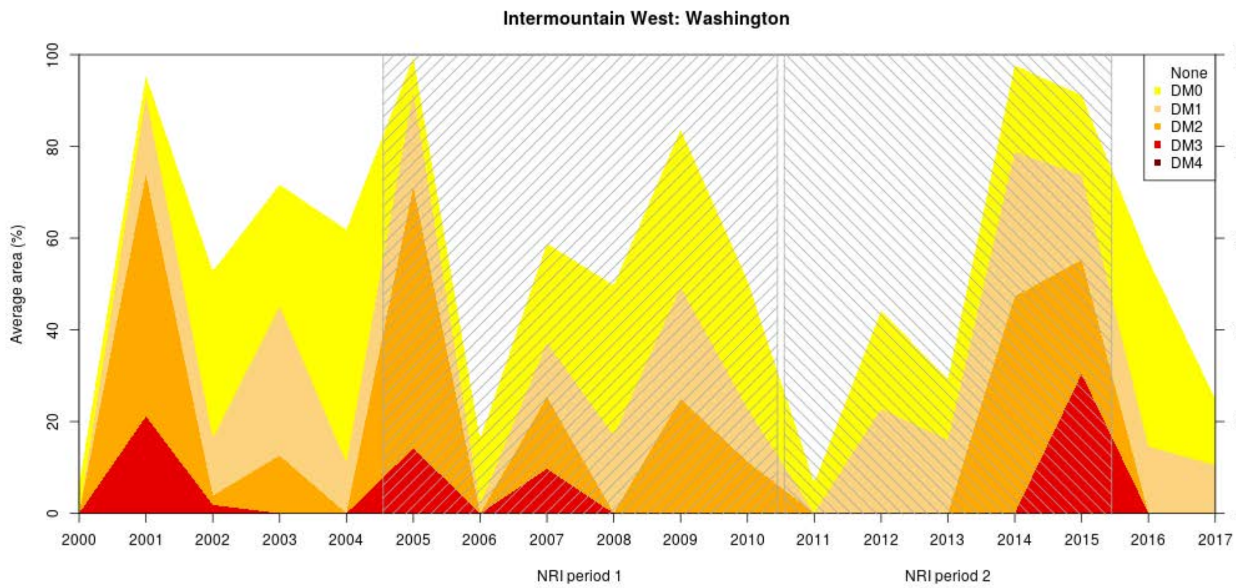


Figure 6. Average drought severity in the Oregon portion of the Intermountain West region

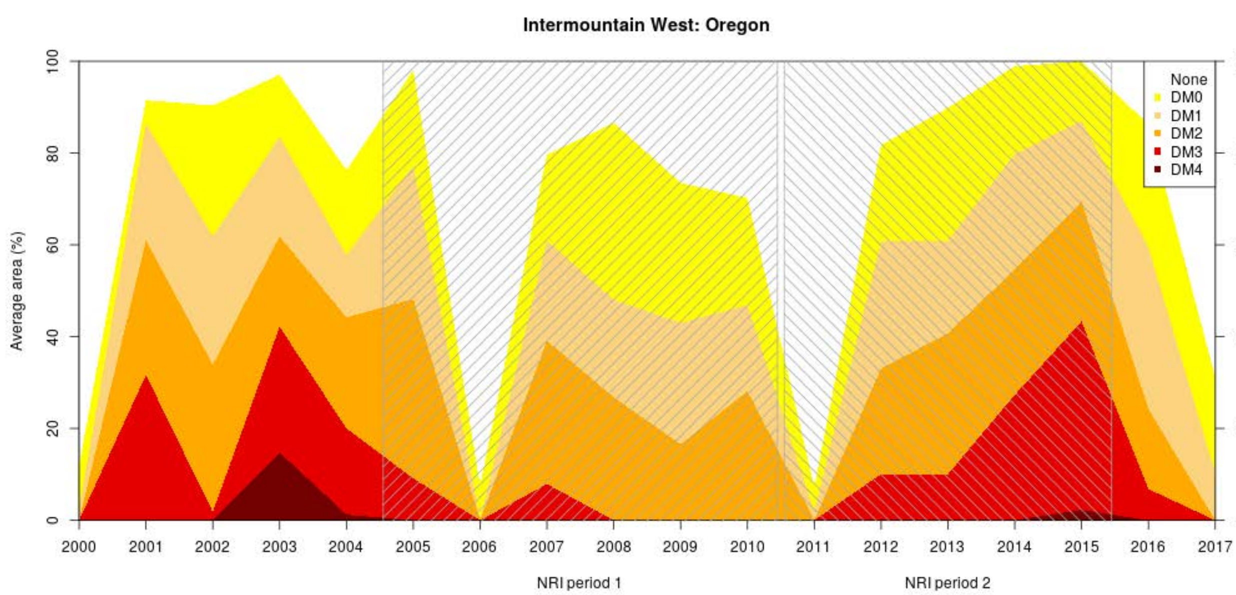


Figure 7. Average drought severity in the Idaho portion of the Intermountain West region

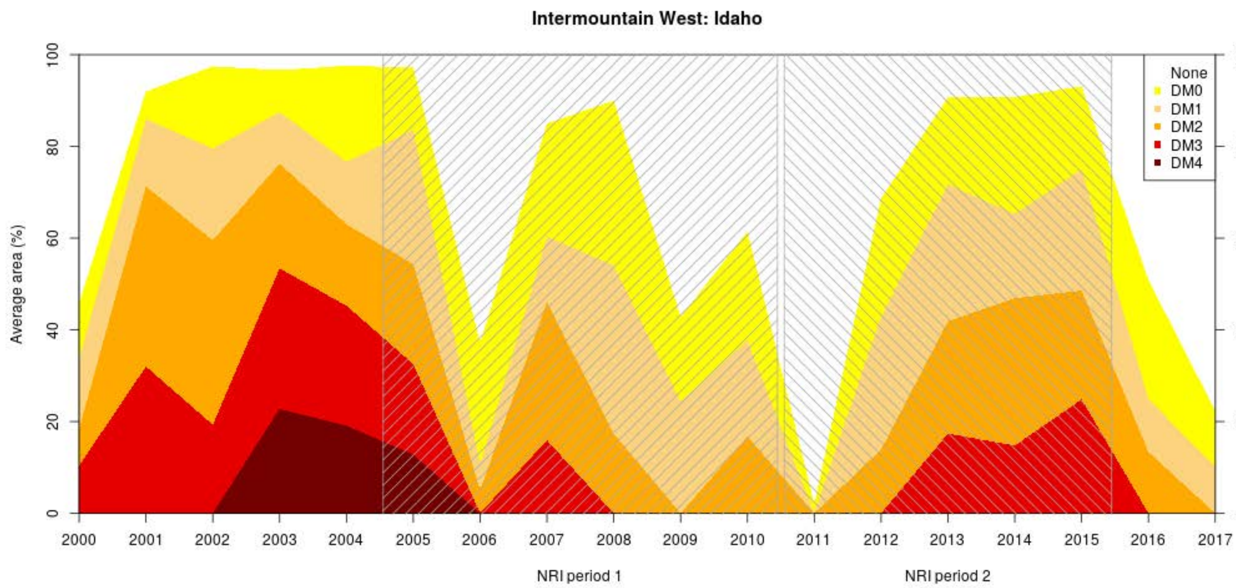


Figure 8. Average drought severity in the Nevada portion of the Intermountain West region

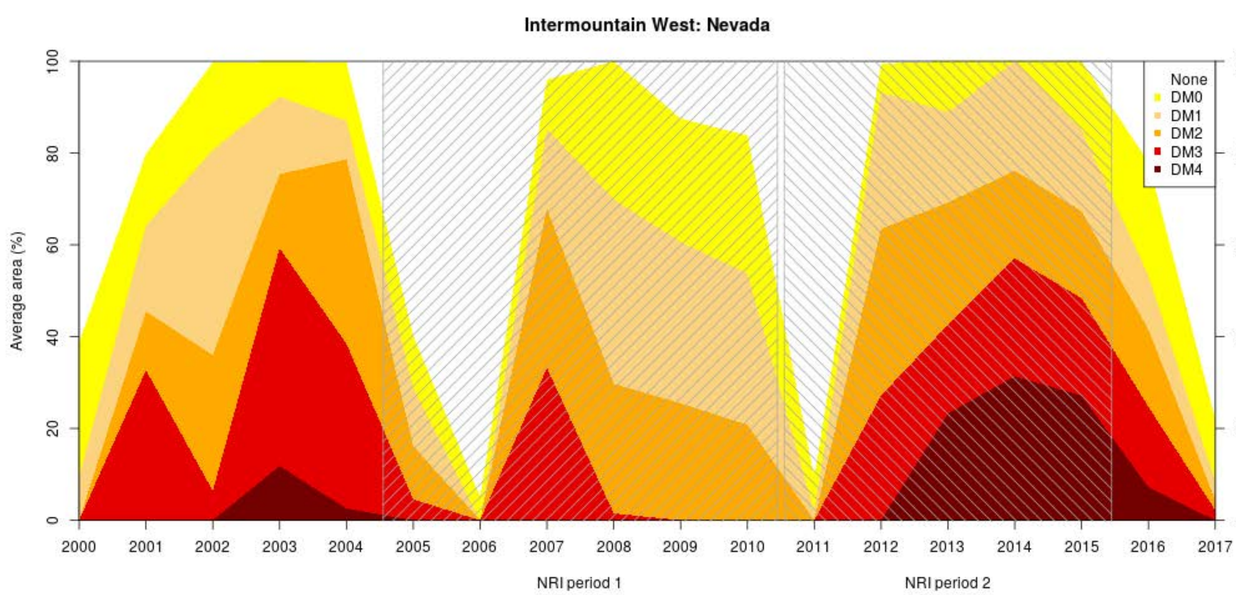


Figure 9. Average drought severity in the Utah portion of the Intermountain West region

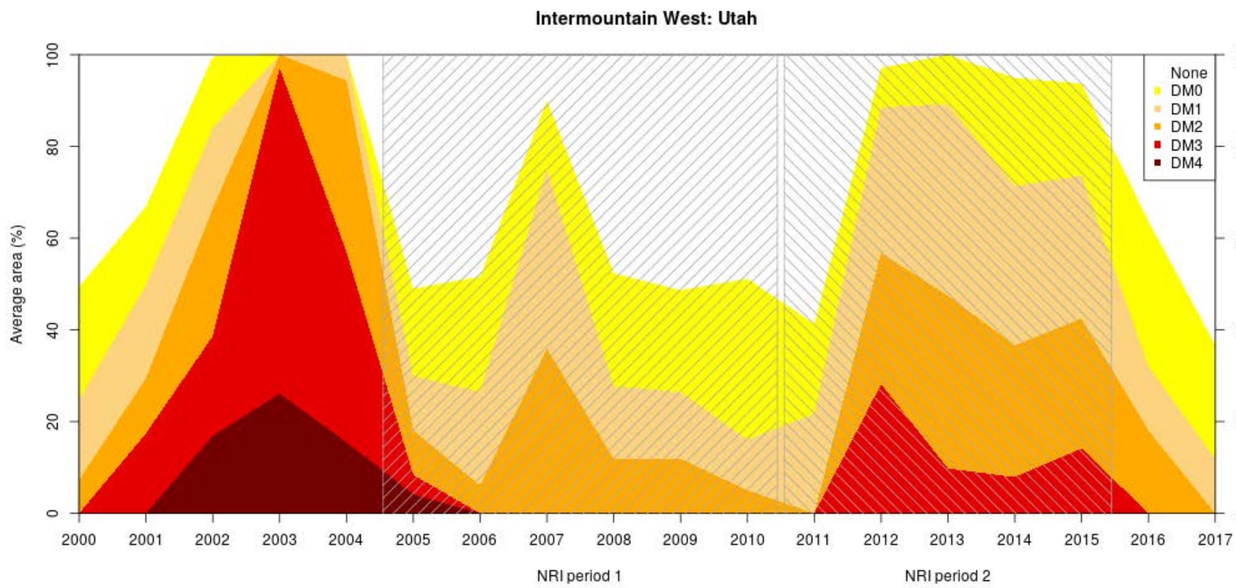


Figure 10. Average drought severity in the Montana portion of the Intermountain West region

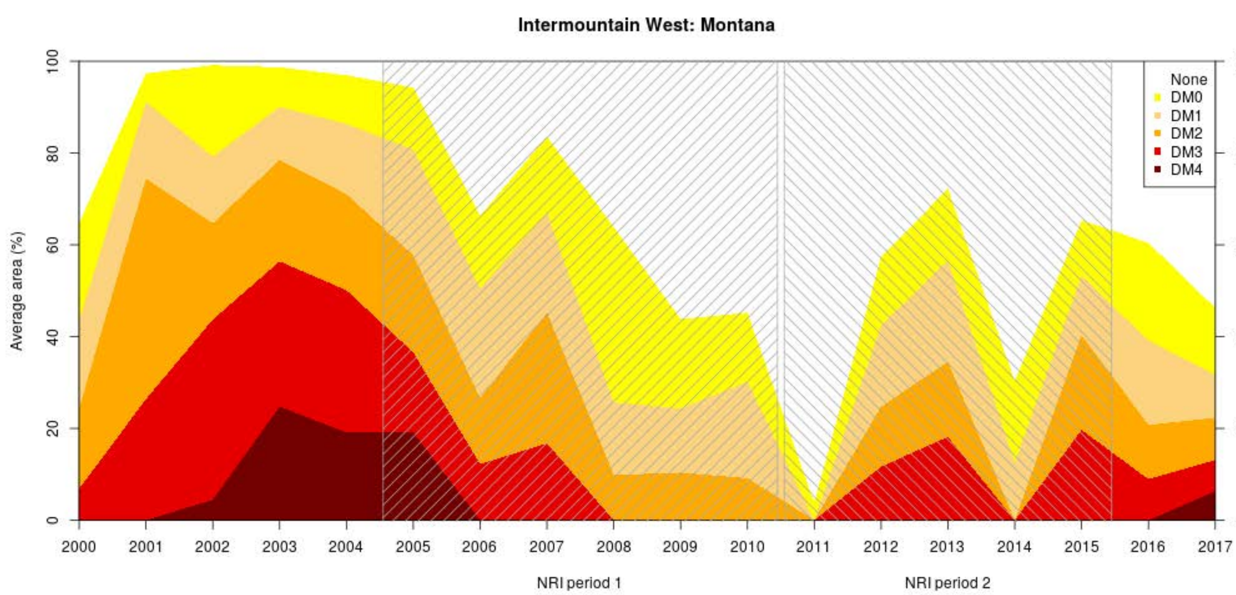


Figure 11. Average drought severity in the Wyoming portion of the Intermountain West region

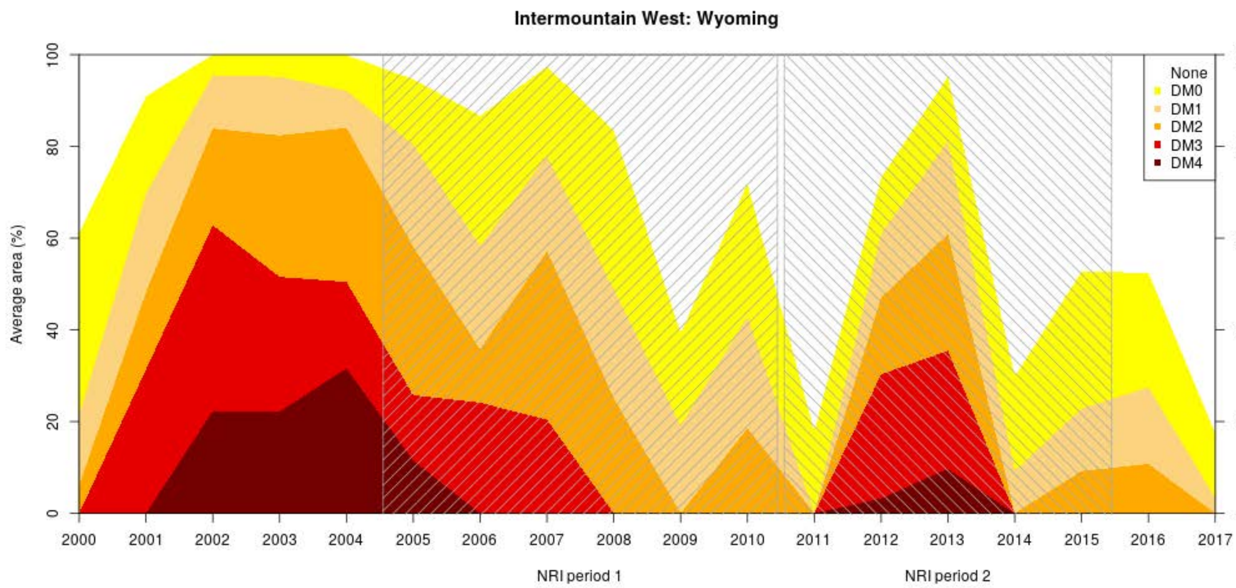


Figure 12. Average drought severity in the Colorado portion of the Intermountain West region

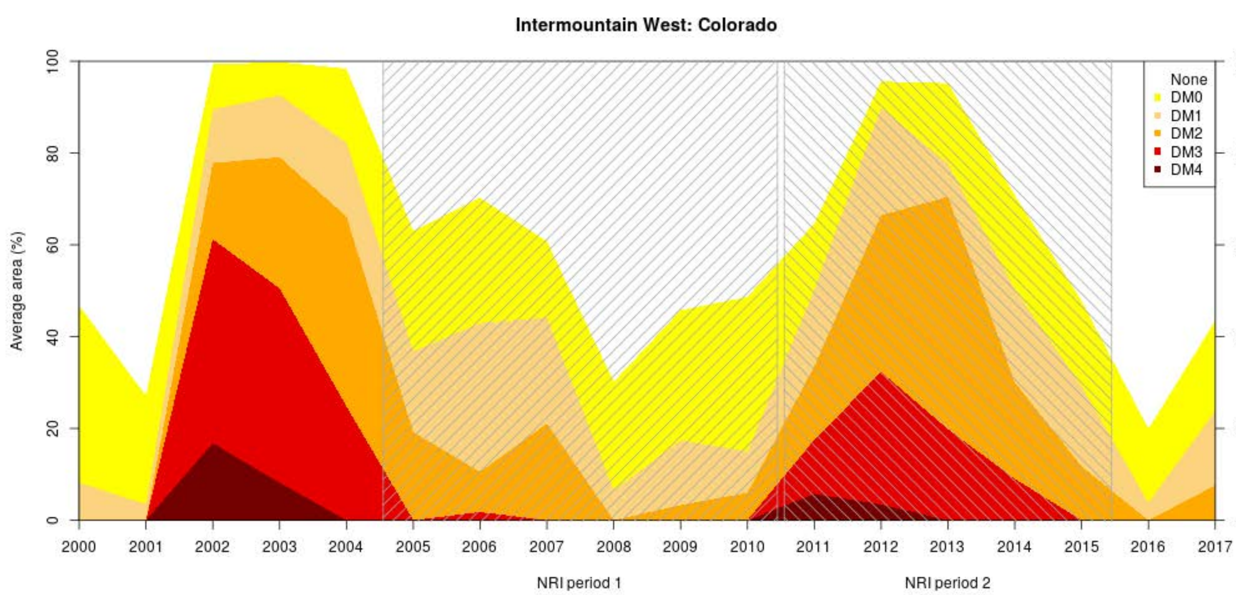


Figure 13. Average drought severity in the Arizona portion of the Intermountain West region

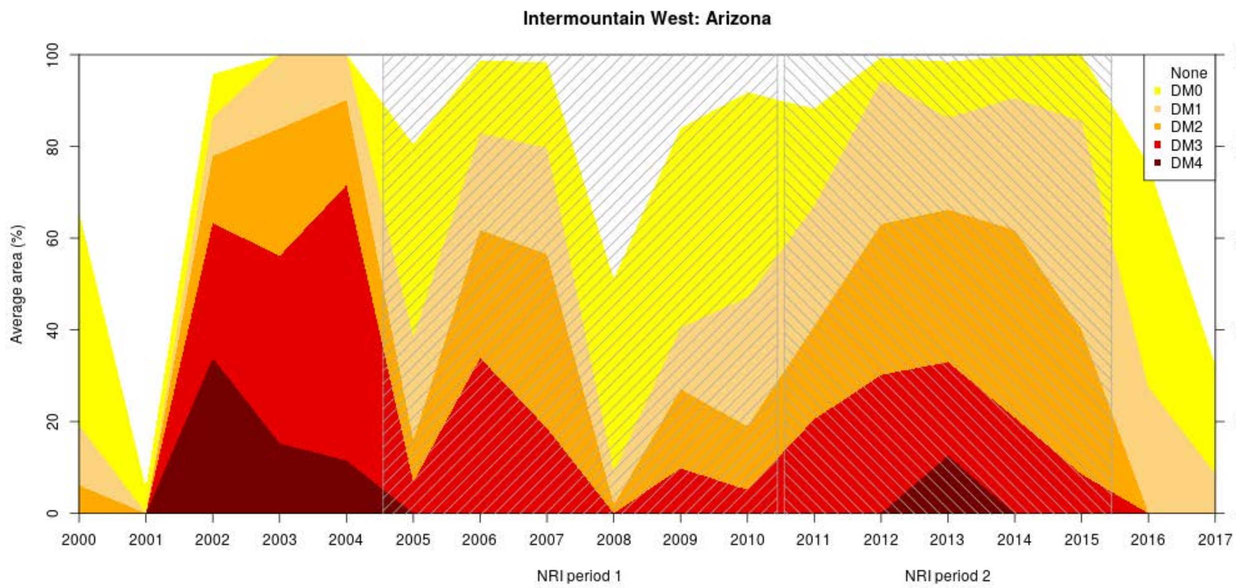
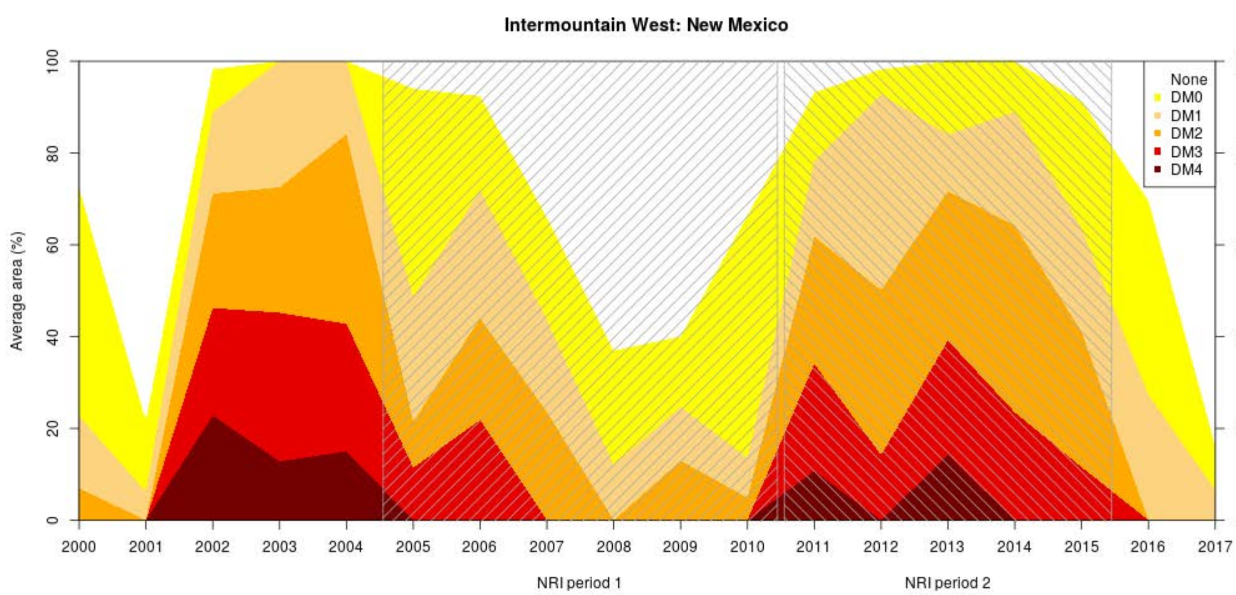


Figure 14. Average drought severity in the New Mexico portion of the Intermountain West region



Rangeland Health Attributes

Within the Intermountain West region, there were increases in area where all three attributes showed moderate or greater departure from reference conditions in Arizona (from 6.7 ±2.7 percent to 22.3 ±8.0 percent) and New Mexico (from 23.0 ±6.2 percent to 50.5 ±9.9 percent) between the earlier and later periods. Figures 15-20 show these departures were especially evident in the Colorado Plateau, generally comprising northeast Arizona, southwest Utah, western Colorado, and northwest New Mexico. In the Colorado Plateau there was an increase in area between the two periods with at least one Rangeland Health attribute showing moderate or greater departure (Figures 15-16). In the same region, areas with all three Rangeland Health attributes having a moderate departure also increased (Figures 17-18). Parts of these states experienced severe to exceptional drought during the both periods and the years prior.

Utah was the only state in the region to report a statistically significant reduction (from 21.2 ±4.2 percent to 8.2 ±4.1 percent) in the non-Federal rangeland area where all three rangeland health attributes were at least a moderate departure from reference condition between the two sampling periods (Figures 15-17). In 2004-2010, 21.3 (±4.3) percent of the land exhibited at least moderate departures from reference condition, while in the 2011-2015 period only 8.2 (±4.1) percent of the land showed the same departures (Table 2, Table 3, and Table 4). During the same two periods Utah also had a reduction in non-Federal rangeland area with at least one rangeland health attribute with moderate or greater departure from reference conditions, declining from 41.2 (±5.8) percent to 29.5 (±6.3) percent between the two sample periods (Figures 18-20). The figures, however, show most of the improvements were on the west side of the state, but not in the portion that is part of the Colorado Plateau. Utah never had two years adjacent with severe or greater drought conditions relative to the other states, but in years prior to the first period much of the state experience extreme to exceptional drought. These factors may have contributed to the improved rangeland health results between 2004-2010 and 2011-2015.

Figures 15-16. Non-Federal Rangeland Where All Three Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 15. 2004-2010

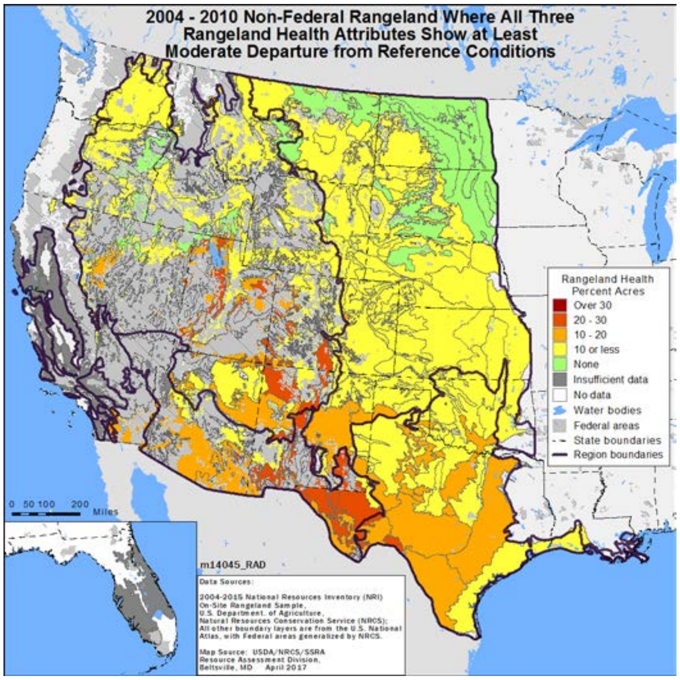


Figure 16. 2011-2015

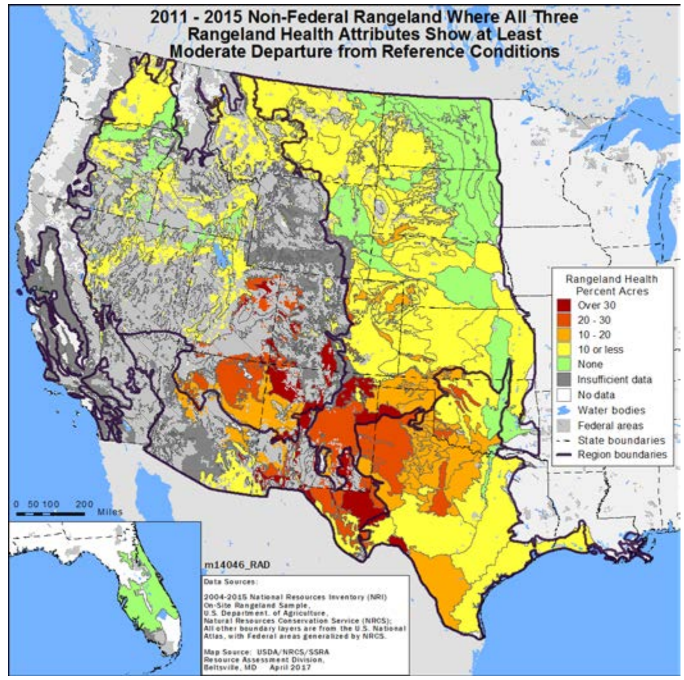
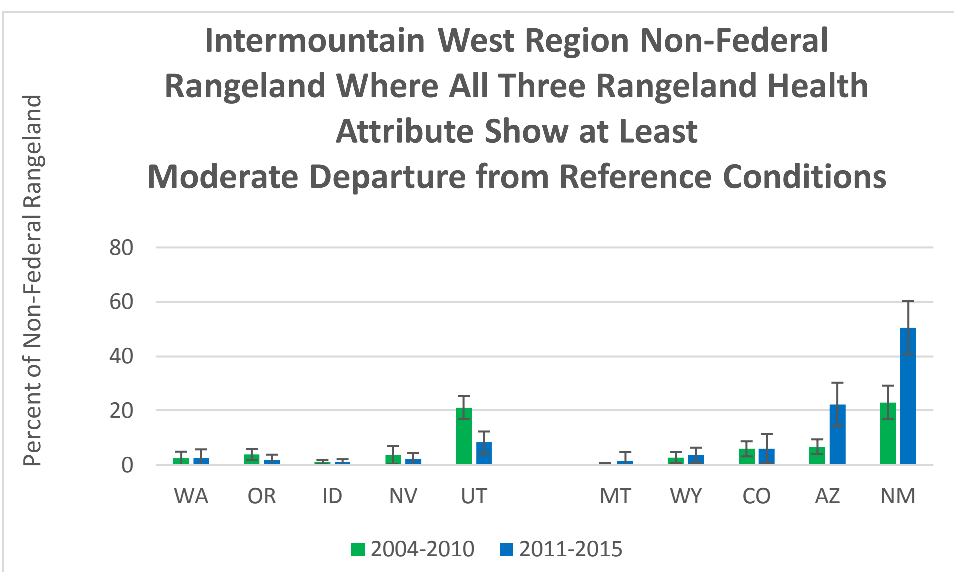


Figure 17. Non-Federal Rangeland Where All Three Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. Error bars represent margins of error.



Figures 18-19. Non-Federal Rangeland Where at Least One Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 18. 2004-2010

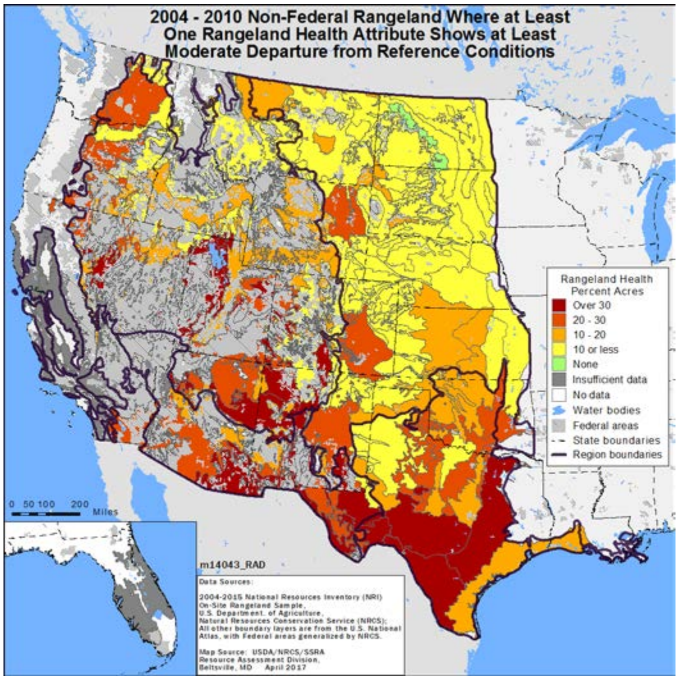


Figure 19. 2011-2015

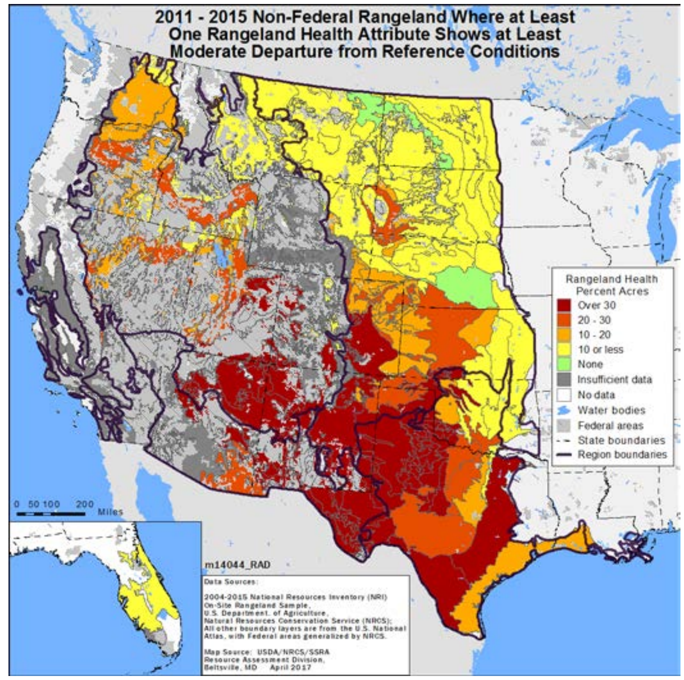
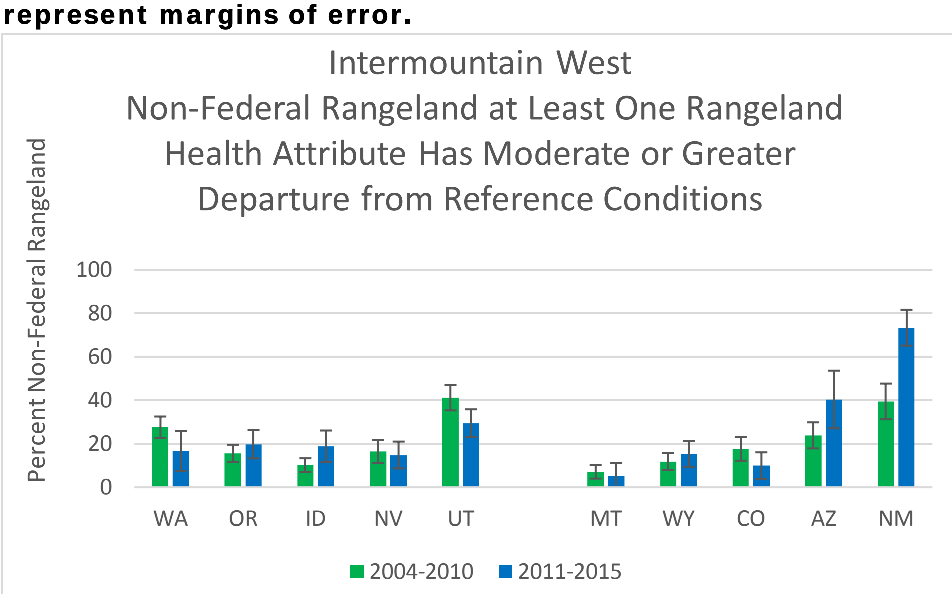


Figure 20. Non-Federal Rangeland Where at Least One Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. Error bars represent margins of error.



Soil and Site Stability

Most states in this region did not show a statistically significant change between the two time periods in the amount of area with Soil and Site Stability having a moderate or greater departure. Utah was an exception where the amount of area with moderate or greater departure reduced from 25.2 (±4.7) percent to 12.4 (±4.9) percent. This improvement was not reflected in any quantitative measurement for Utah (see bare ground, soil aggregate stability below). The New Mexico and Arizona portions of the Colorado Plateau both increase the percent non-Federal rangeland area with moderate or greater departure for this attribute (Figures 21-23).

Figure 21-22. Non-Federal Rangeland Where Soil and Site Stability Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 21. 2004-2010

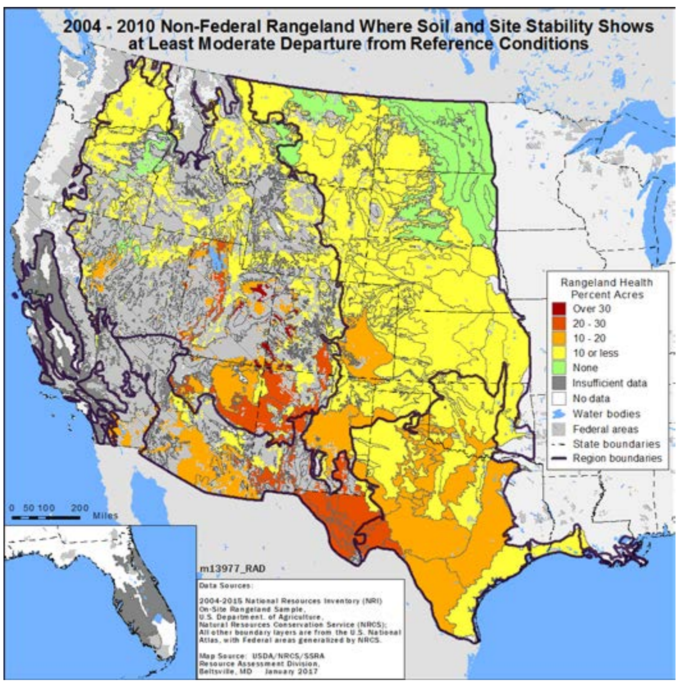


Figure 22. 2011-2015

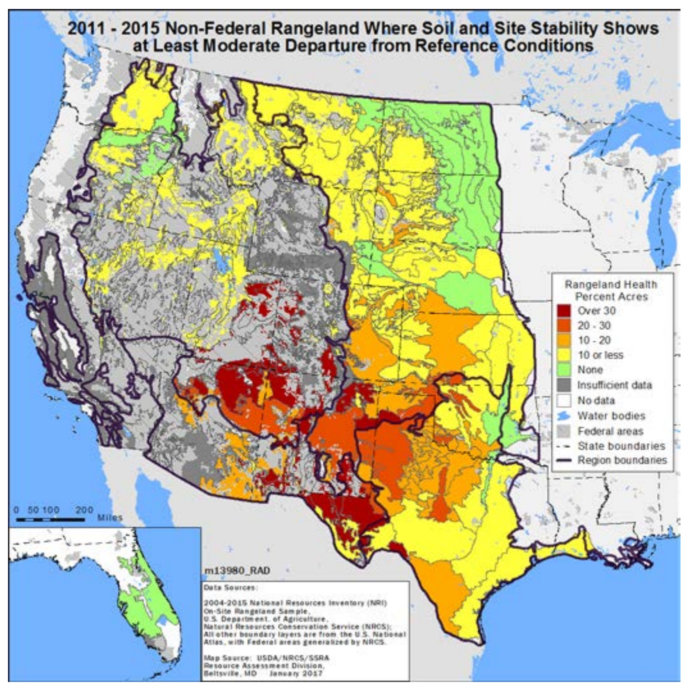
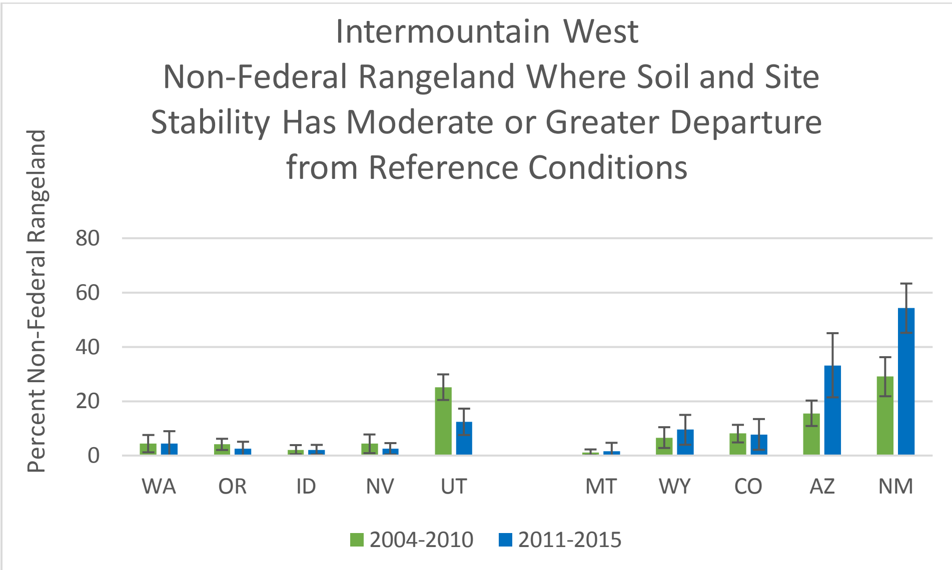


Figure 23. Intermountain West Non-Federal Rangeland Where Soil and Site Stability Has Moderate or Greater Departure from Reference Conditions. Error bars represent margins of error.



Hydrologic Function

Similar to Soil and Site Stability, the amount of non-Federal rangeland area with moderate or greater departure in Hydrologic Function remained roughly the same between the two time periods in all states in the region except Utah, where the percent area was reduced from 30.4 (±5.3) to 16.2 (±4.5) between the two periods. In the Colorado Plateau, straddling the borders between AZ, UT, NM and CO along with the northwestern NM, there were increases in the areas of moderate or greater departure (Figures 24-26).

Figure 24-25. Non-Federal Rangeland Where Hydrologic Function Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 24. 2004-2010

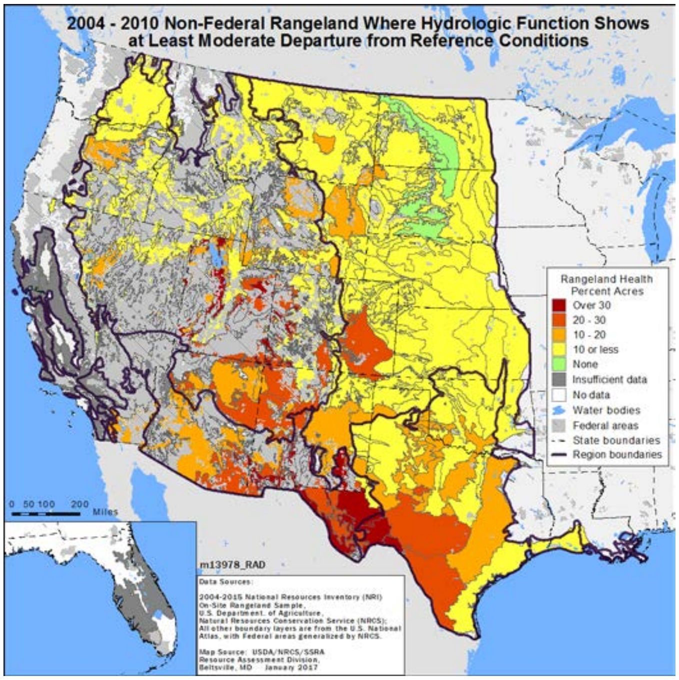


Figure 25. 2011-2015

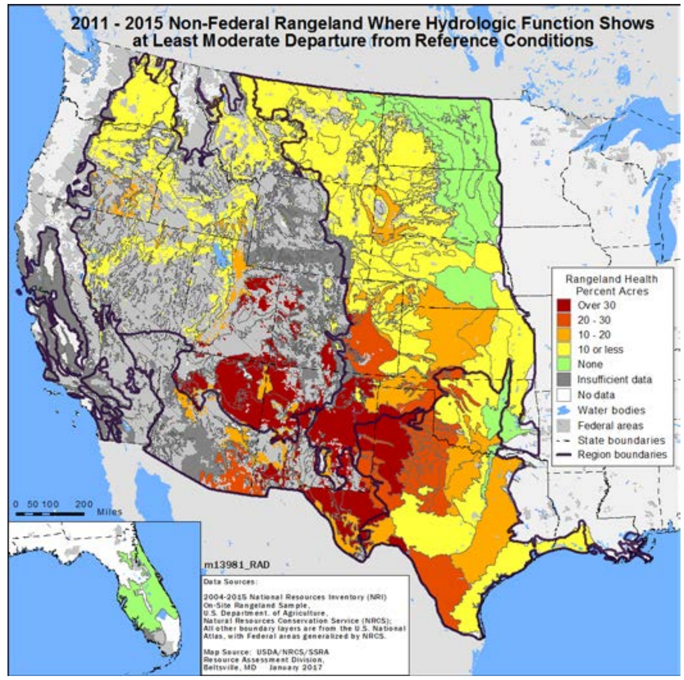
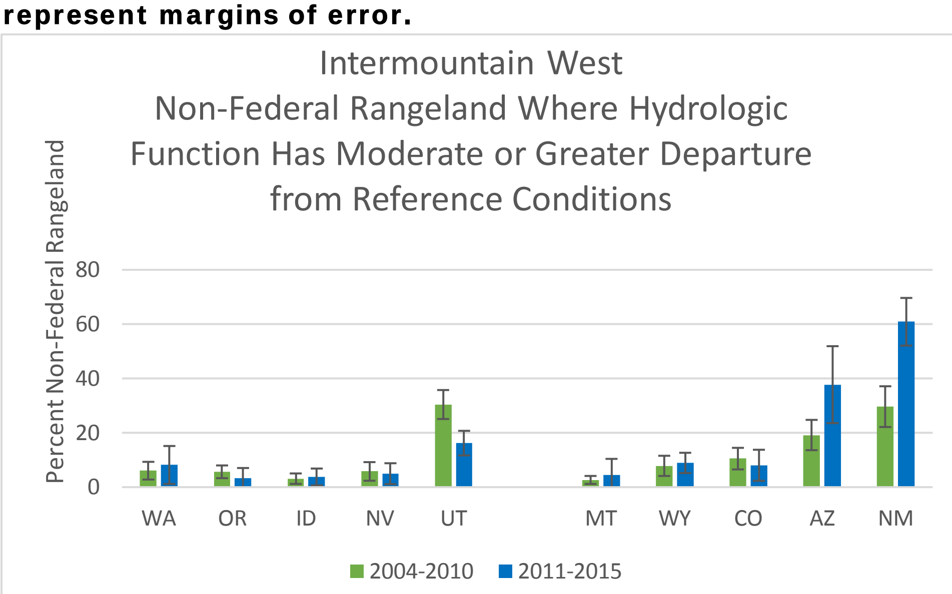


Figure 26. Intermountain West Non-Federal Rangeland Where Hydrologic Function Has Moderate or Greater Departure from Reference Conditions. Error bars represent margins of error.



Biotic Integrity

Although there were some changes between the two time periods in the amount of non-Federal rangeland area that had moderate or greater departures in Biological Integrity within smaller areas (Figures 27-28), most states within the region had very little change (Figure 29). Within the Intermountain West, New Mexico was the exception with an increase from 33.0 (±6.8) to 69.2 (±9.2) percent.

Figure 27-28. Non-Federal Rangeland Where Biotic Integrity Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2), Table 3, and Table 4**)**

Figure 27. 2004-2010

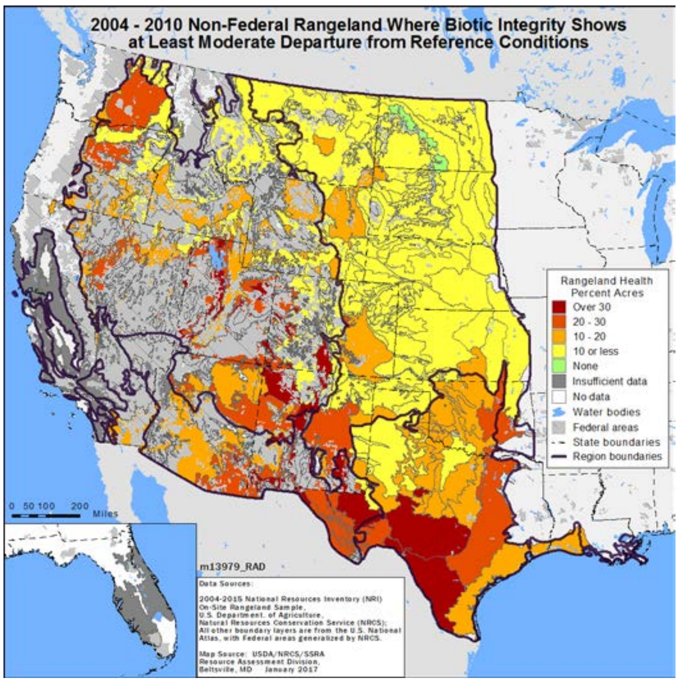


Figure 28. 2011-2015

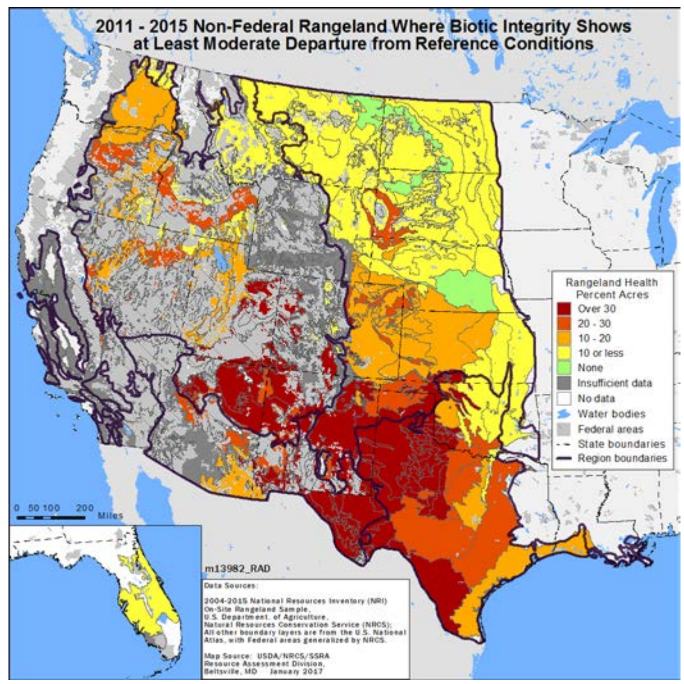
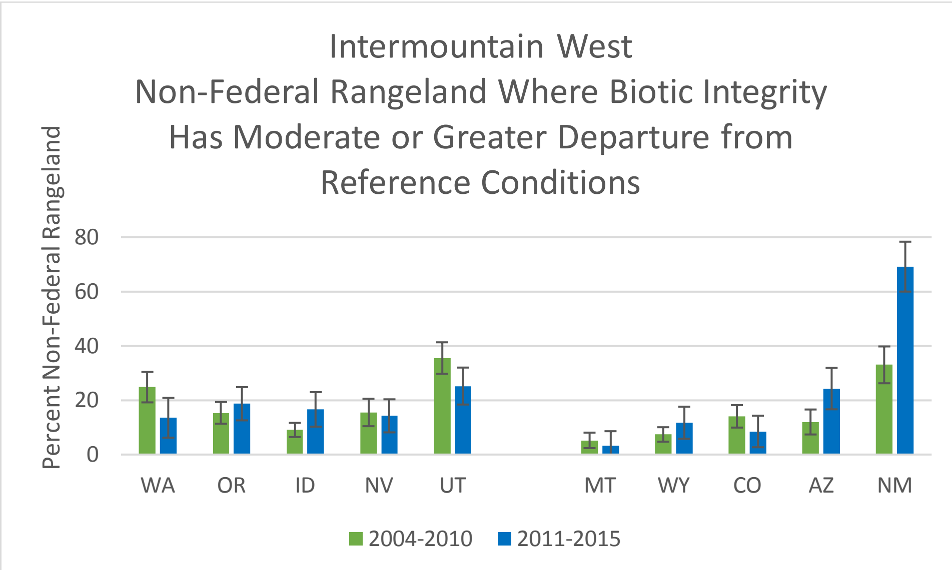


Figure 29. Intermountain West Non-Federal Rangeland Where Biotic Integrity Has Moderate or Greater Departure from Reference Conditions. Error bars represent margins of error.



Specific Indicator Discussion

Bare ground

In the Intermountain West there was very little change in the amount of bare ground on non-Federal rangeland between 2004-2010 and 2011-2015 (Figures 30-32), but is highest in New Mexico (43.4 ±6.0 percent) and Arizona (41.7 ±5.9 percent). Similarly, there was no change in the percent of non-Federal rangeland where at least 50 percent of the land was bare ground (Figures 33-35). Within the Intermountain West the states with the highest percent non-Federal rangeland with at least 50 percent bare ground are New Mexico (40.9 ±13.0 percent) and Arizona (37.1 ±13.3 percent).

Figures 30-31. Bare Ground on Non-Federal Rangeland. (Source: Bare Ground, Inter-Canopy Gaps, and Soil Aggregate Stability Table 111, Table 112, and Table 113**)**

Figure 30. 2004-2010

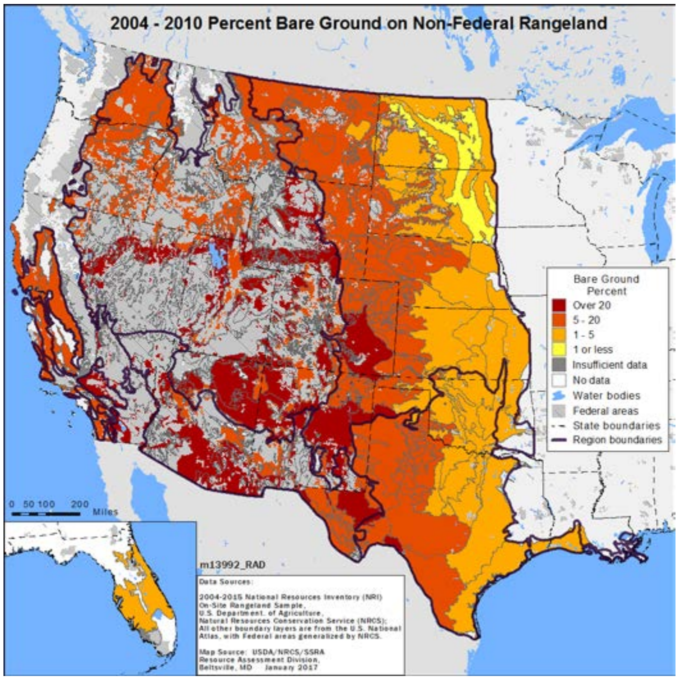


Figure 31. 2011-2015

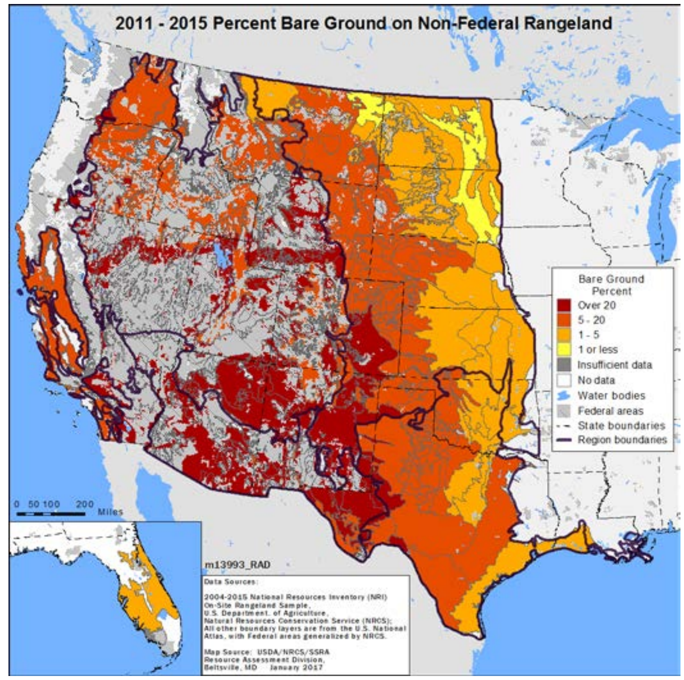
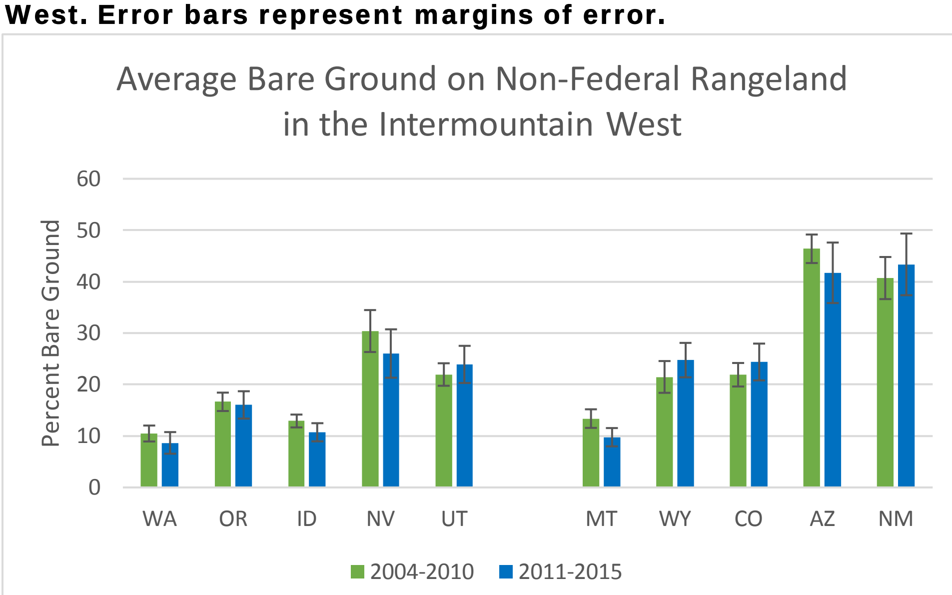


Figure 32. Average Bare Ground on Non-Federal Rangeland in the Intermountain West. Error bars represent margins of error.



Figures 33-34. Non-Federal Rangeland that is at Least 50% Bare Ground. (Source: Table 114, Table 115, and Table 116**)**

Figure 33. 2004-2010

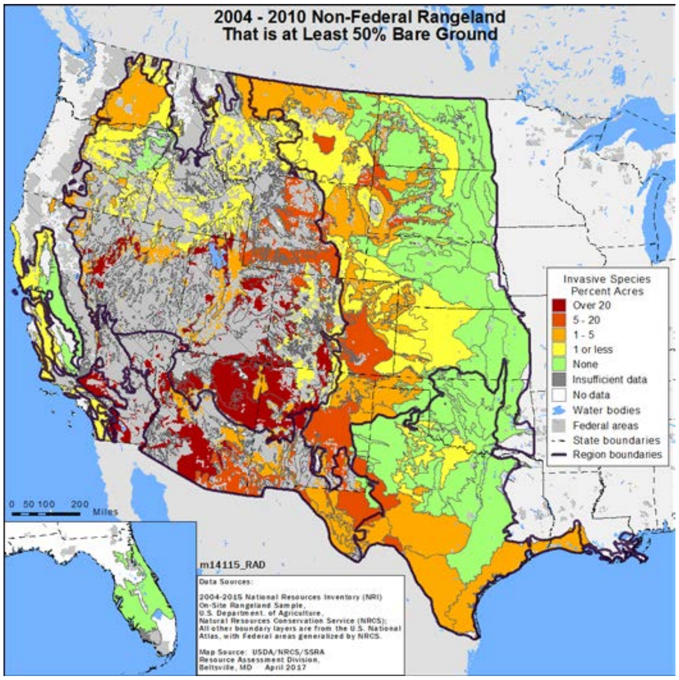


Figure 34. 2011-2015

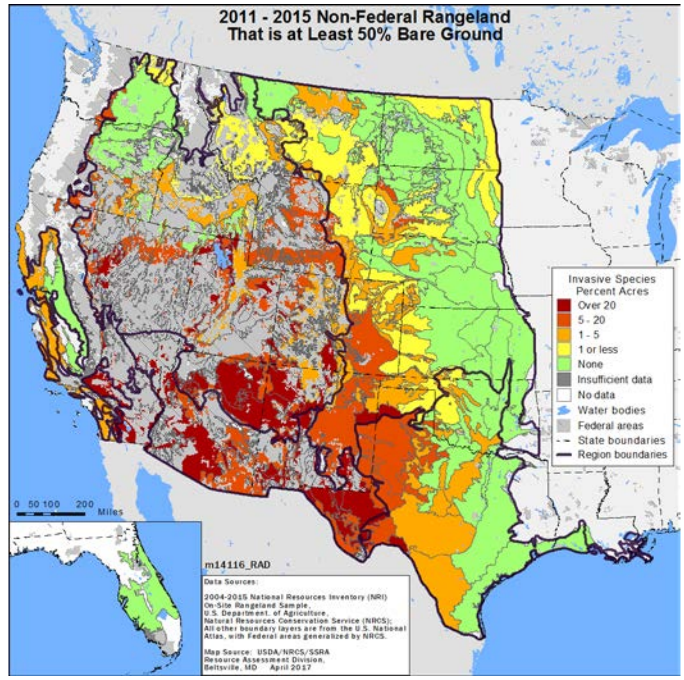
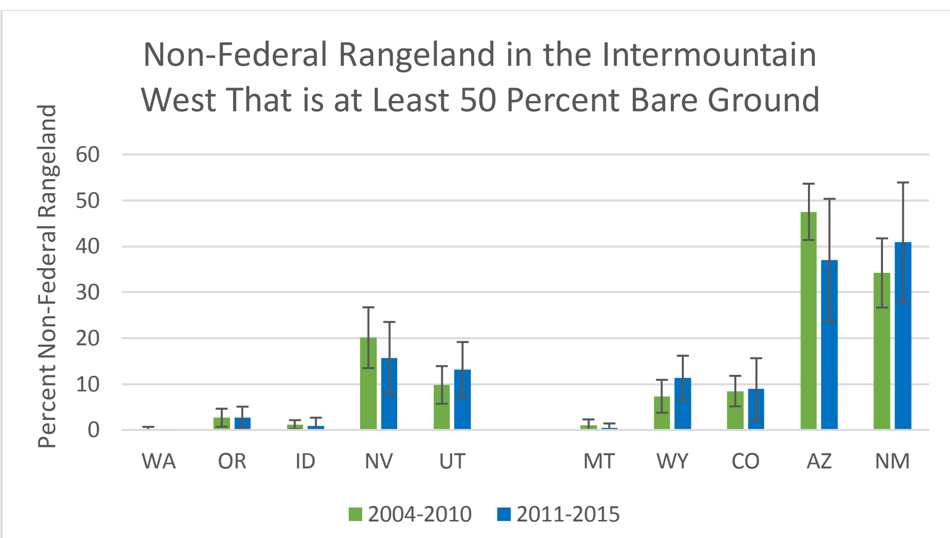


Figure 35. Non-Federal Rangeland That Is At Least 50 Percent Bare Ground in the Intermountain West. Error bars represent margins of error.



Soil Aggregate Stability

Soil aggregate stability is a measure of resistance to water erosion and an indicator of soil quality and rangeland health. In this procedure soil peds are repeatedly immersed in water and rated 1 to 6 based on their ability to resist breaking apart during the process. Values of 4 or less indicate less stable aggregates. Within the Intermountain West region, there was little change in areas of non-Federal rangeland with soil aggregate stability values of 4 or less (Figures 36-38). However, within the region the pervasiveness of non-Federal rangeland with soil aggregate stability values of 4 or less in several states including New Mexico (91.3 ±4.6 percent), Arizona (90.7 ±7.0 percent), and Nevada (75.1 ±6.8 percent) is a concern. Without knowledge of the potential soil aggregate stability value for the site it is difficult to interpret this result.

Figures 36-37. Non-Federal Rangeland Where Soil Aggregate Stability is Rated 4 or Less. (Source: Bare Ground, Inter-Canopy Gaps, and Soil Aggregate Stability Table 120, Table 121, and Table 122**)**

Figure 36. 2004-2010

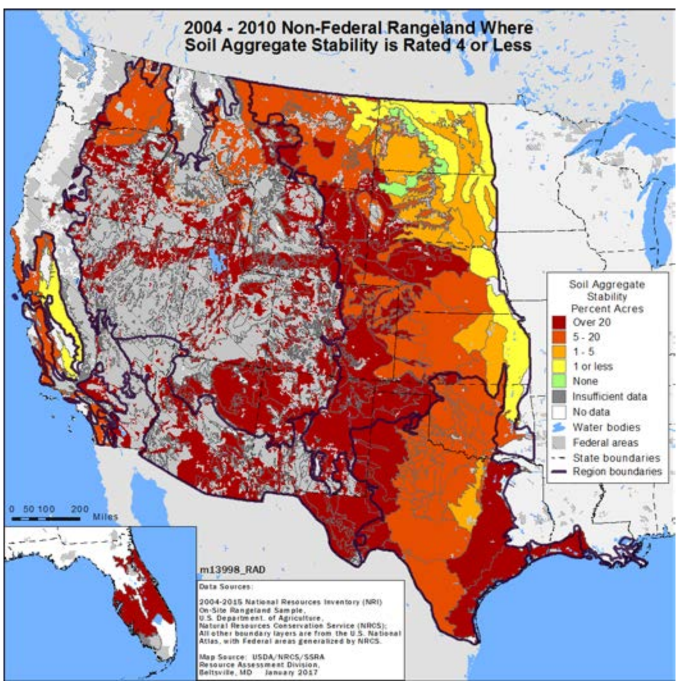


Figure 37. 2011-2015

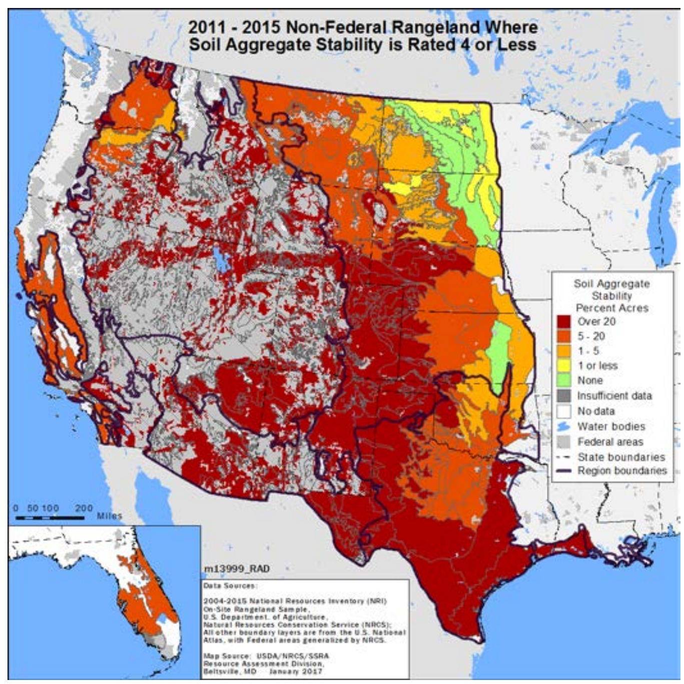
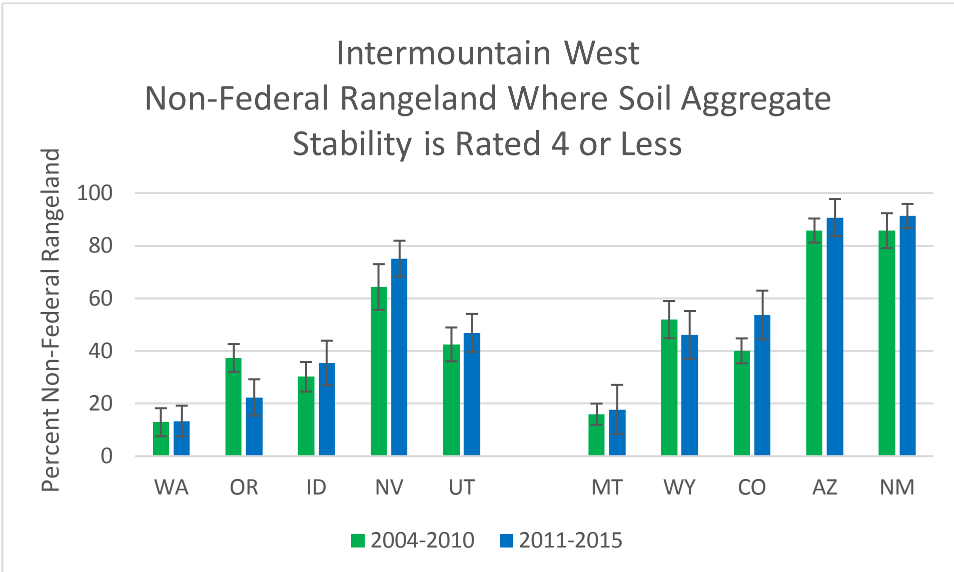


Figure 38. Intermountain West Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less. Error bars represent margins of error.



[1] Soil aggregate stability ratings:

1 = 50% of structural integrity lost, (melts) within 5 seconds of immersion in water and less than 10% remains after 5 dipping cycles or soil too unstable to sample (falls through the sieve).

2 = 50% of structural integrity lost (melts) 5–30 seconds after immersion and less than 10% remains after 5 dipping cycles.

3 = 50% of structural integrity lost, (melts) 30–300 seconds after immersion or less than 10% remains on the sieve after five dipping cycles.

4 = 10–25% of original soil material remains on the sieve after five dipping cycles.

5 = 25–75% of original soil material remains on the sieve after five dipping cycles.

6 = 75–100% of original soil material remains on the sieve after five dipping cycles.

Gaps with 20% of land greater than 2 meters

Within the region there was little change between the two periods in non-Federal rangeland area where 2 meter of greater inter-canopy gaps account for at least 20% of the land. Arizona (45.9 ±10.9 percent), Nevada (39.5 ±8.1 percent), New Mexico (38.1 ±11.0 percent), and Utah (31.1 ±8.1) had the highest proportions of non-Federal rangeland with these large and numerous inter-canopy gaps (Figures 39-41). Within the region these same states, Arizona (30.7 ±10.3 percent), New Mexico (29.4 ±10.9 percent), Nevada (20.1 ±7.1 percent), and Utah (14.6 ±6.4 percent), had high proportions of non-Federal rangeland where 2-meter canopy gaps account for at least 20 percent of the land and inter-canopy gaps are at least 50% bare ground (Figures 42-44).

Figures 39-40. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. (Source: Bare Ground, Inter-Canopy Gaps, and Soil Aggregate Stability Table 117, Table 118, and Table 119**)**

Figure 39. 2004-2010

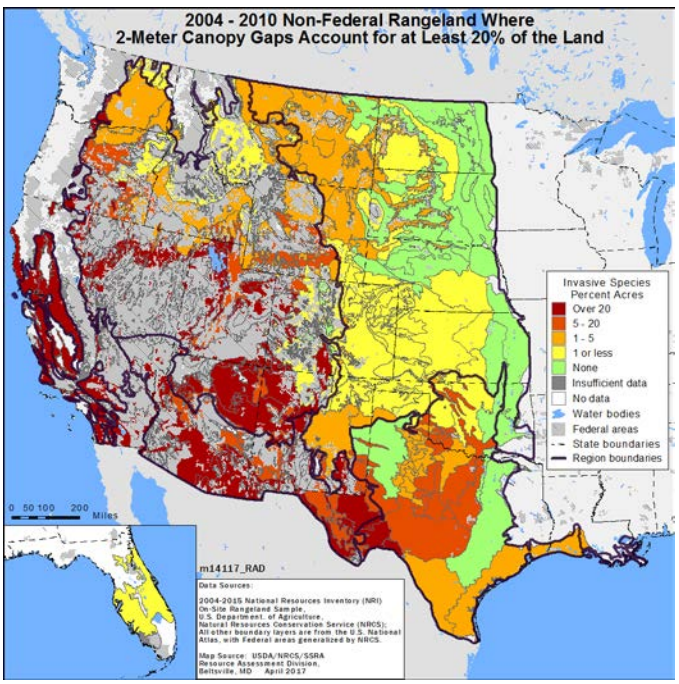


Figure. 40 2011-2015

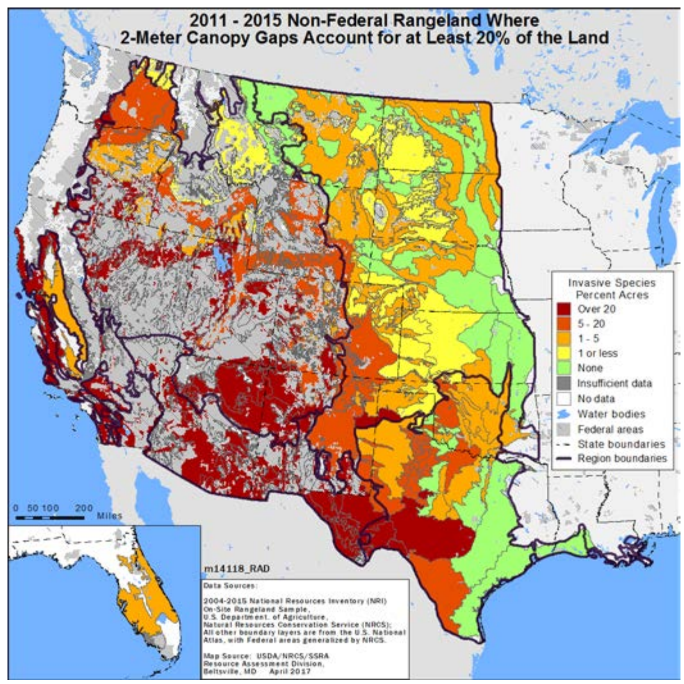
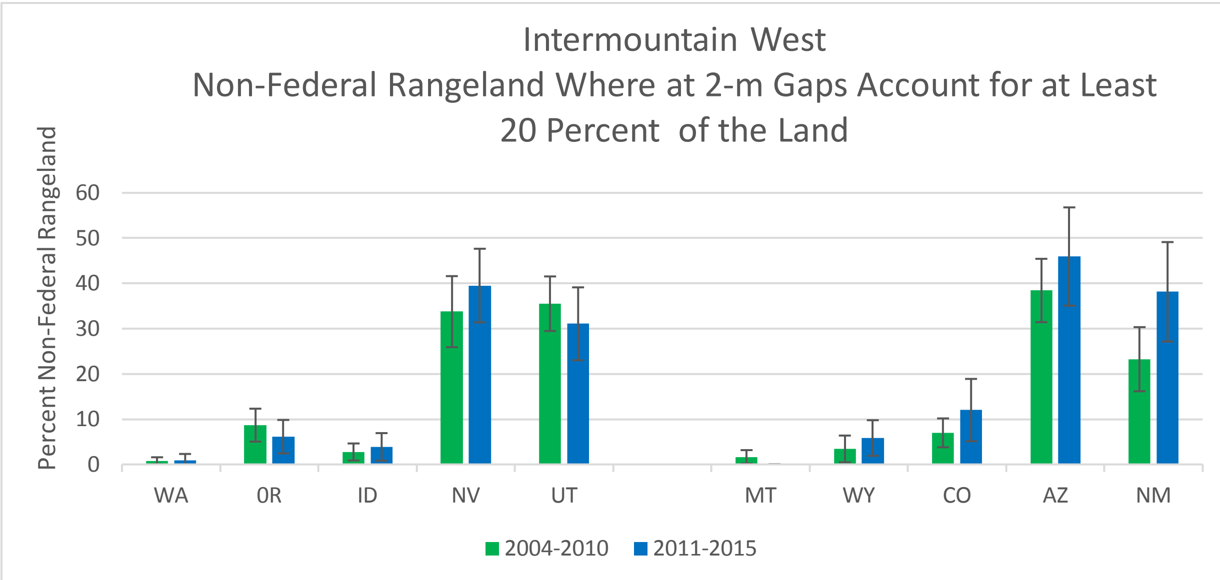


Figure 41. Intermountain West Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. Error bars represent margins of error.



Figures 42-43. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119

Figure 42. 2004-2010

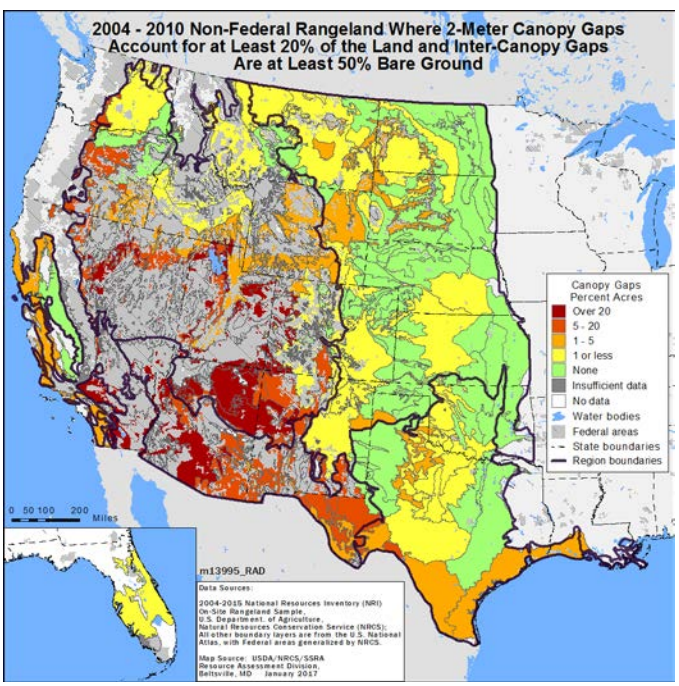


Figure 43. 2011-2015

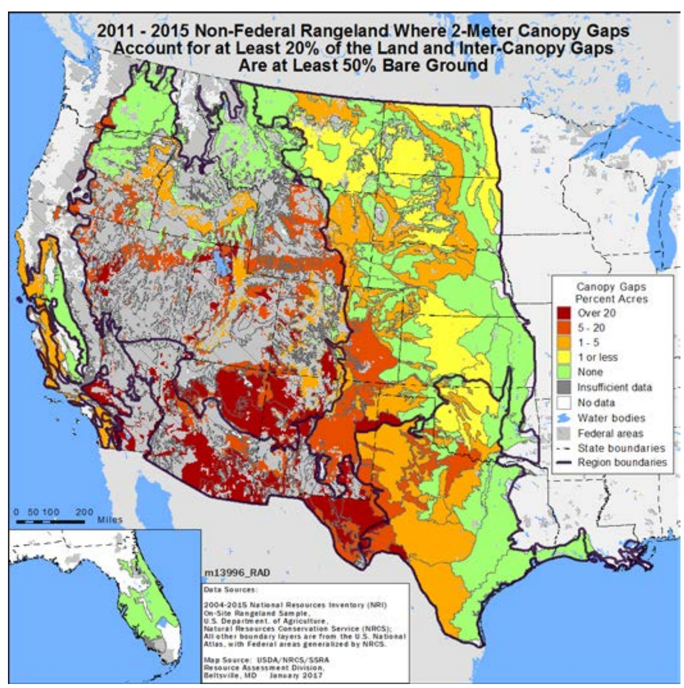
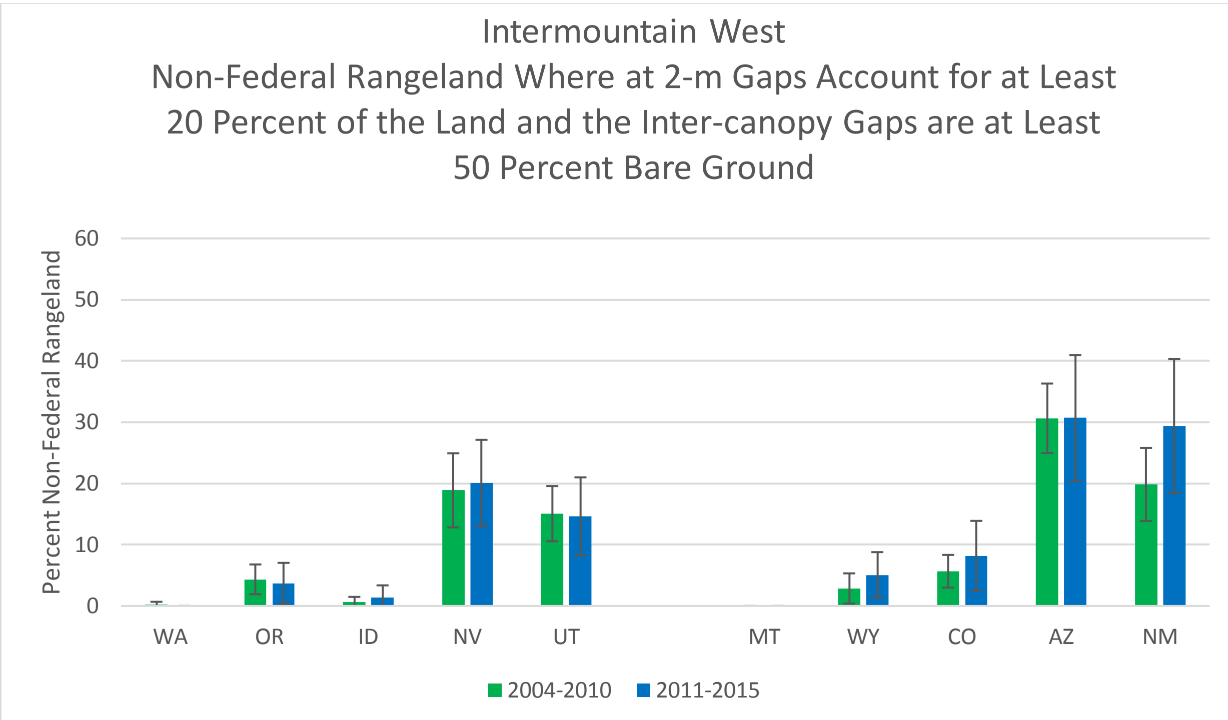


Figure 44. Intermountain West Non-Federal Rangeland Where 2-Meter Inter-canopy Gaps Account for at Least 20 Percent of the Land and the Inter-canopy Gaps are at Least 50 Percent Bare Ground. Error bars represent margins of error.



Invasive Plants

The Intermountain West fire regimes on rangelands have changed because of the spread and dominance of annual grasses including annual bromes [for example, cheatgrass (*Bromus tectorum*) and red brome (*Bromus rubens*)], medusahead (*Taeniatherum* sp.) and North Africa grass (*Ventenata dubia*). Dominance of annual bromes (*Bromus* spp.) in the Intermountain West is widespread (Figures 45-47). Areas of non-Federal rangeland dominated by annual bromes having at least 50 percent relative cover of those species is 20.0 (±5.6) percent in Nevada, 15.5 (±5.4) percent in Oregon, 14.0 (±8.5) percent in Idaho, 11.5 (±7.2) percent in Washington, and 8.2 (±3.8) percent in Utah.

Medusahead and North Africa grass are also invasive within the region. Medusahead is widespread and now present on 24.3 (±6.5) percent of non-Federal rangeland in Idaho, 22.6 (±9.3) percent in Oregon, and 8.8 (±6.3) percent in Washington (Figure 48-50). Although not statistically significant, it is important to note the new presence of medusahead on lands in Nevada (0.2 ±0.4 percent), Utah (0.1 ±0.2 percent) and Wyoming (0.6 ± 1.3 percent) during the latter period. Presence of North Africa grass (*ventenata*) remained the same between the two time periods (Figures 51-53). It is present in Oregon on 8.1 (±4.4) percent of non-Federal rangeland and detected on trace amounts of land in Idaho and Washington.

Figures 45-46. Non-Federal Rangeland Annual Brome Species Cover at Least 50% of the Soil Surface. (Source: Invasive Plant Species Table 17, Table 18, and Table 19**)**

Figure 45. 2004-2010

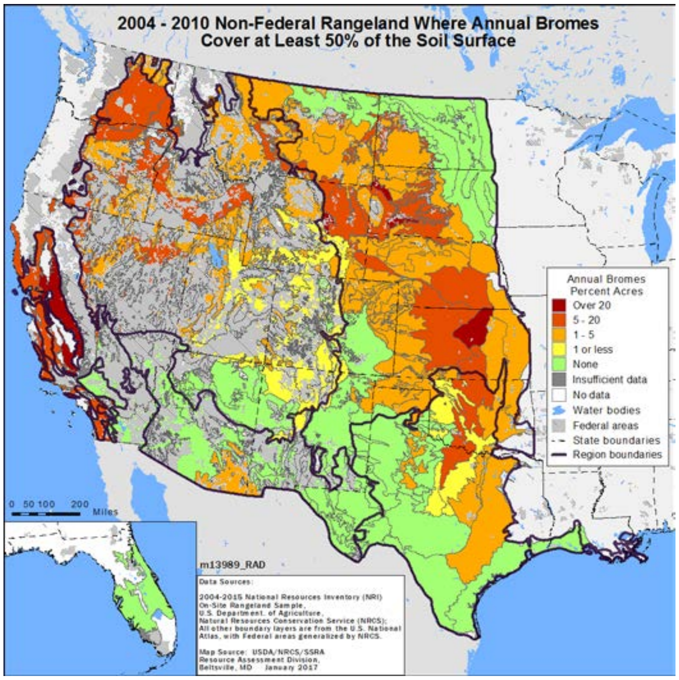


Figure 46. 2011-2015

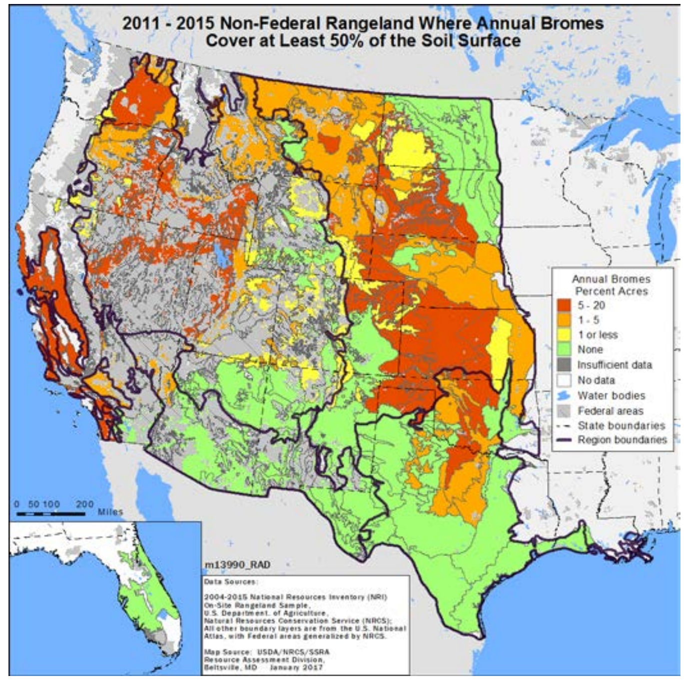
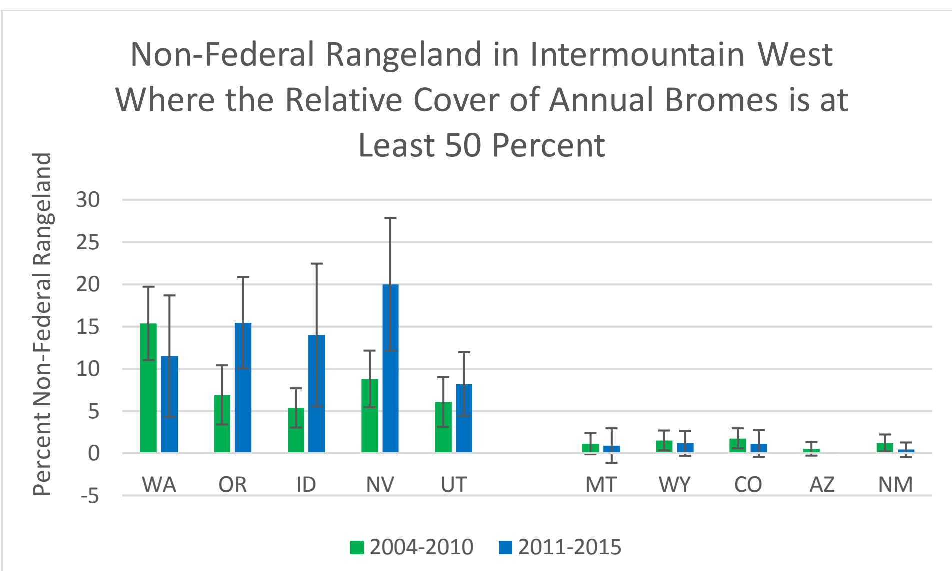


Figure 47. Intermountain West Non-Federal Rangeland Where Relative Cover of Annual Bromes is at Least 50 Percent. Error bars represent margins of error.



Figures 48-49. Non-Federal Rangeland Where Medusahead is Present. (Source: Invasive Plant Species Table 33, Table 34, and Table 35**)**

Figure 48. 2004-2010

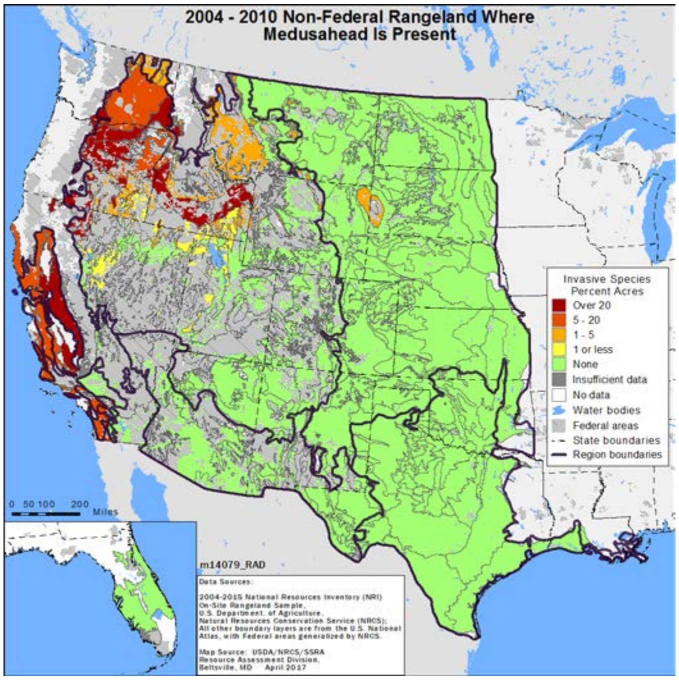


Figure 49. 2011-2015

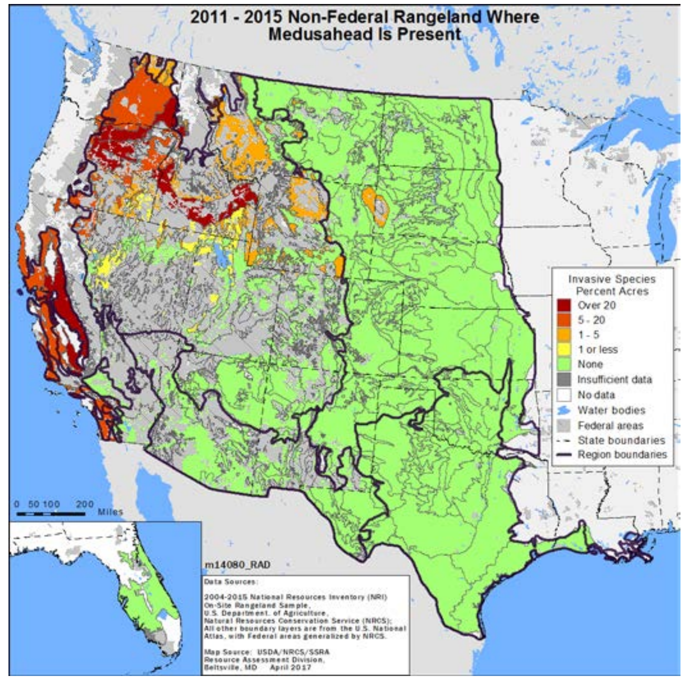
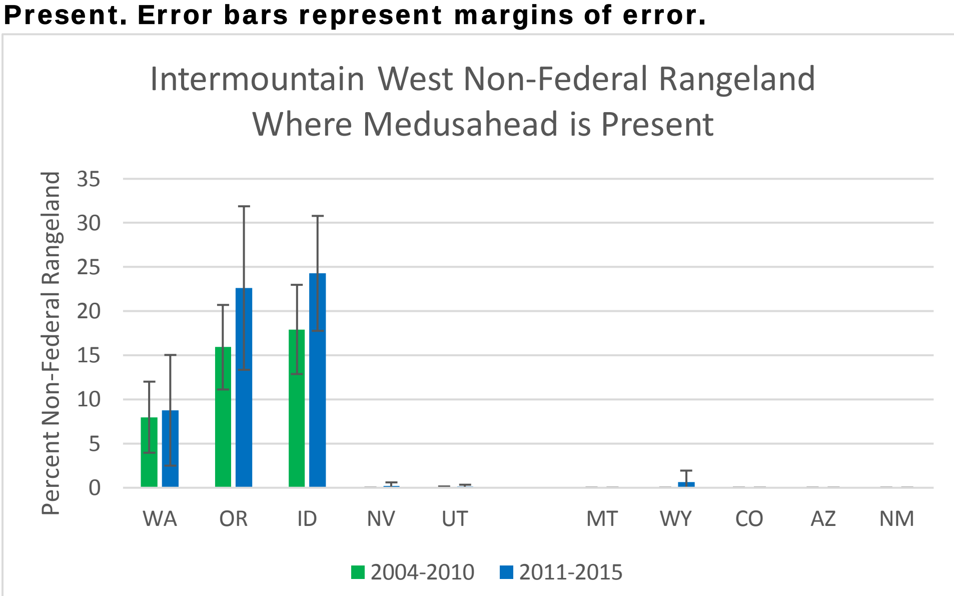


Figure 50. Intermountain West Non-Federal Rangeland Where Medusahead is Present. Error bars represent margins of error.



Figures 51-52. Non-Federal Rangeland Where *Ventenata* is Present. (Source: Invasive Plant Species Table 36, Table 37, and Table 38**)**

Figure 51. 2004-2010

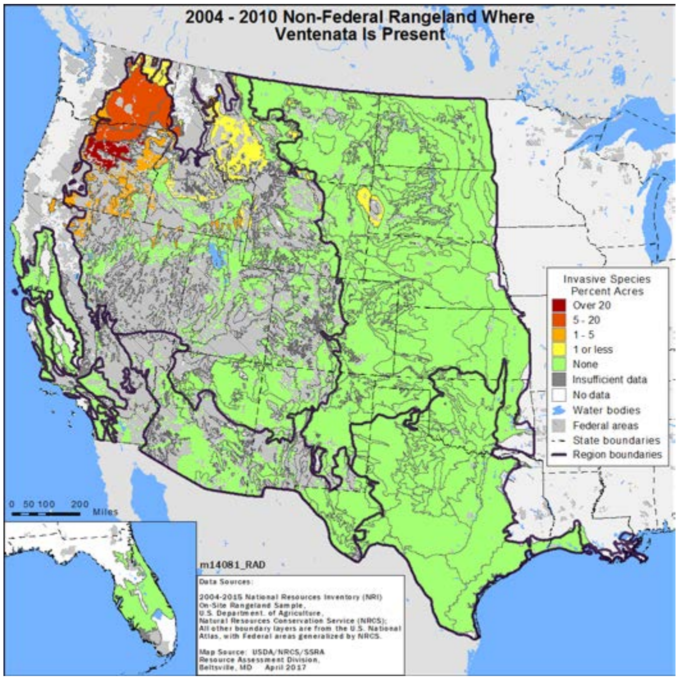


Figure 52. 2011-2015

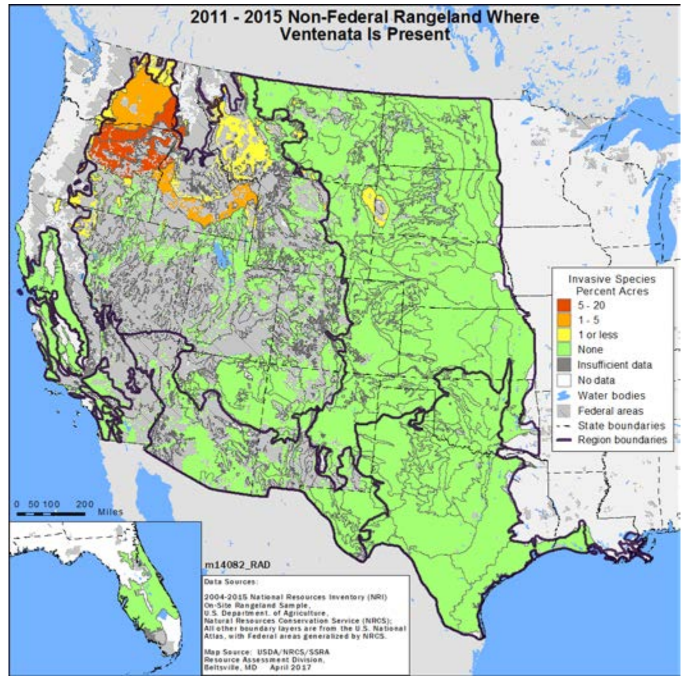
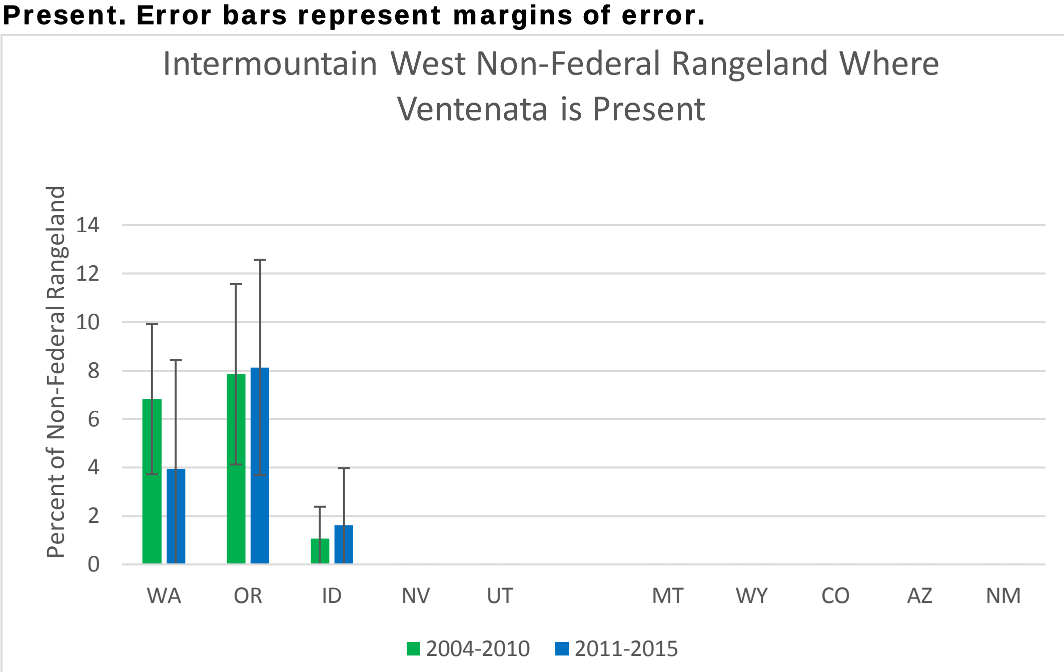


Figure 53. Intermountain West Non-Federal Rangeland Where *Ventenata* is Present. Error bars represent margins of error.



Conifer Presence

Pacific junipers (*Juniperus occidentalis* and *Juniperus californica*) exist in the Intermountain West region as trace amounts in Idaho, Montana and Utah (Figures 54-56). However, in Oregon they were present on 17.9 (±4.4) percent of non-Federal rangeland during 2004-2010 and 13.1 (±7.7) percent during 2011-2015 (5 percent or greater relative cover on 12.2 (±3.1) vs 9.1 (±6.2) percent of non-Federal rangeland and 15 percent or greater relative cover on 6.5 (±2.7) vs. 5.1 (±4.8) percent of land between the earlier vs the later period). Although the difference was not significant between the periods, the direction of change was moving toward a reduction which may be a reflection of removal treatments.

Presence of Montane/intermontane junipers (*Juniperus osteosperma* and *Juniperus scopulorum*) did not change significantly in most states within this region (Figures 57-59). The exception is Arizona. In Arizona, their presence declined from 10.4 (±4.1) percent in 2004-2010 to 0.3 (±0.7) percent during 2011-2015. Pinyon pine (*Pinus edulis* and *Pinus monophylla*) presence did not change in Utah, Colorado, New Mexico, Arizona, and Nevada where they were detected (Figures 60-62).

Figures 54-55. Non-Federal Rangeland Where Pacific Juniper species are Present. (Source: Invasive Plants Table 81, Table 82, and Table 83**)**

Figure 54. 2004-2010

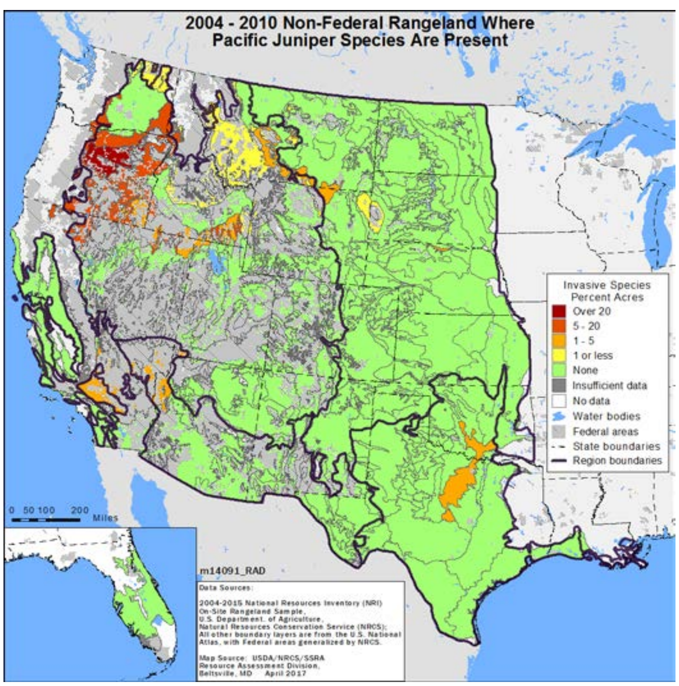


Figure 55. 2011-2015

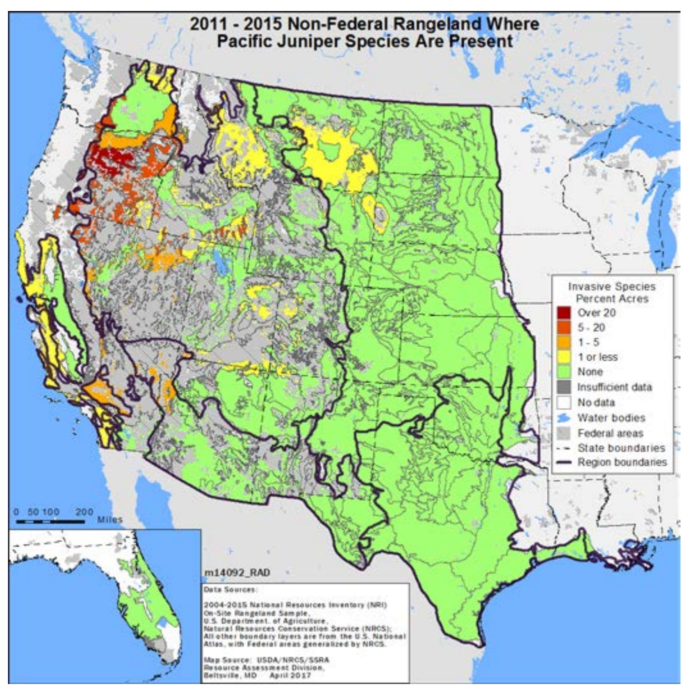
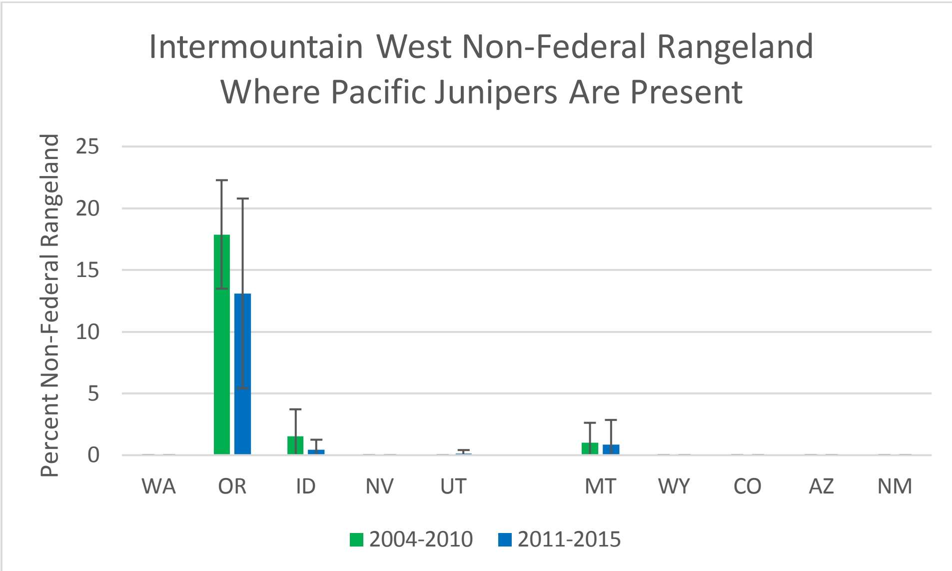


Figure 56. Intermountain West Non-Federal Rangeland Where Pacific Juniper species are Present. Error bars represent margins of error.



Figures 57-58. Non-Federal Rangeland Where Montane/Intermontane Juniper Species are Present. (Source: Invasive Plants Table 84, Table 85, and Table 86**)**

Figure 57. 2004-2010

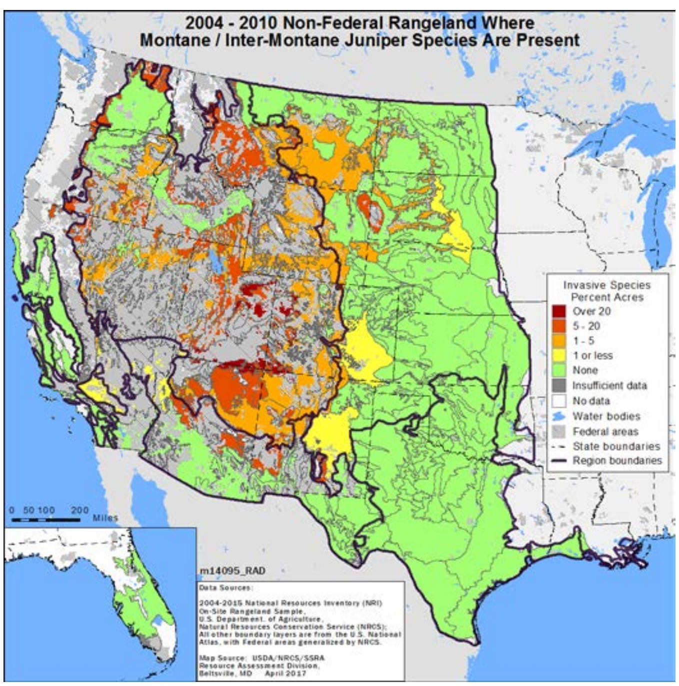


Figure 58. 2011-2015

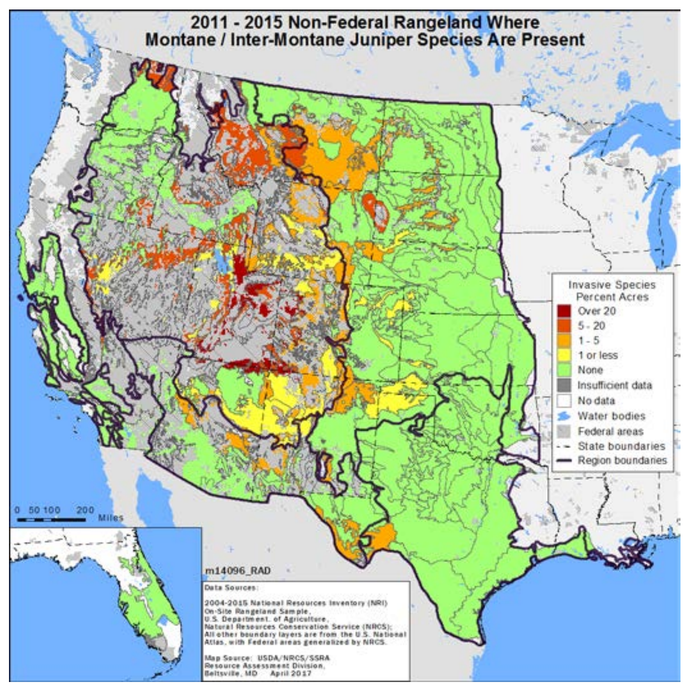
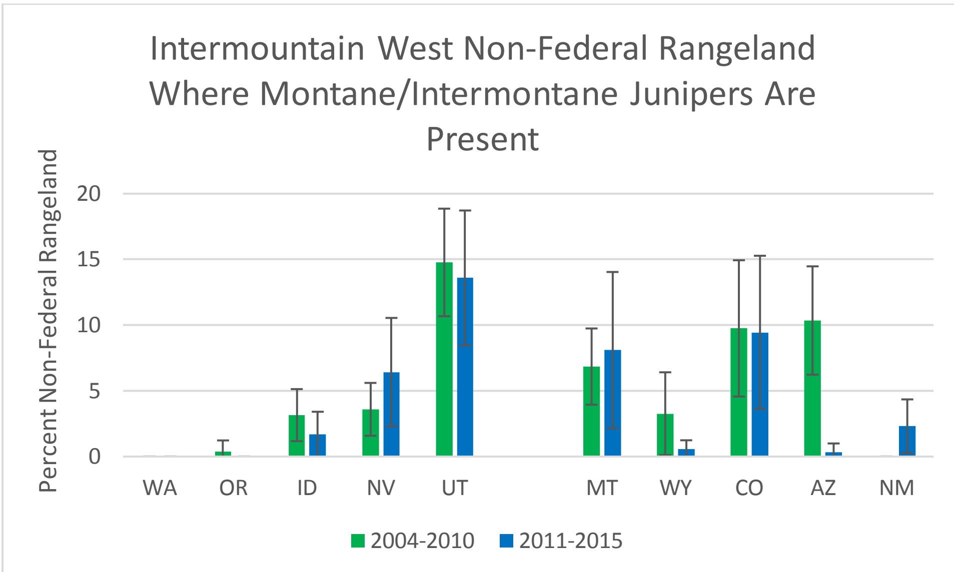


Figure 59. Intermountain West Non-Federal Rangeland Where Montane/Intermontane Juniper Species are Present. Error bars represent margins of error.



Figures 60-61. Non-Federal Rangeland Where Pinyon Pine Species are Present. (Source: *Invasive Plants* Table 90, Table 91, and Table 92)

Figure 60. 2004-2010

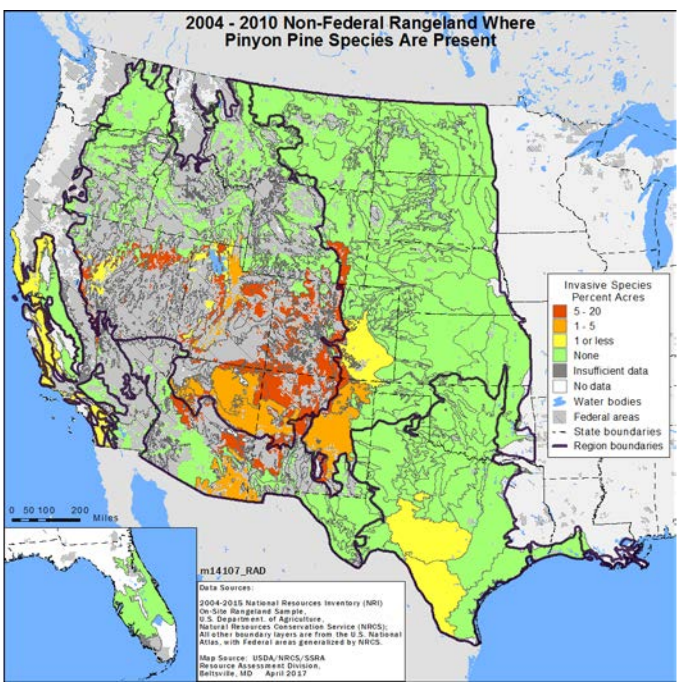


Figure 61. 2011-2015

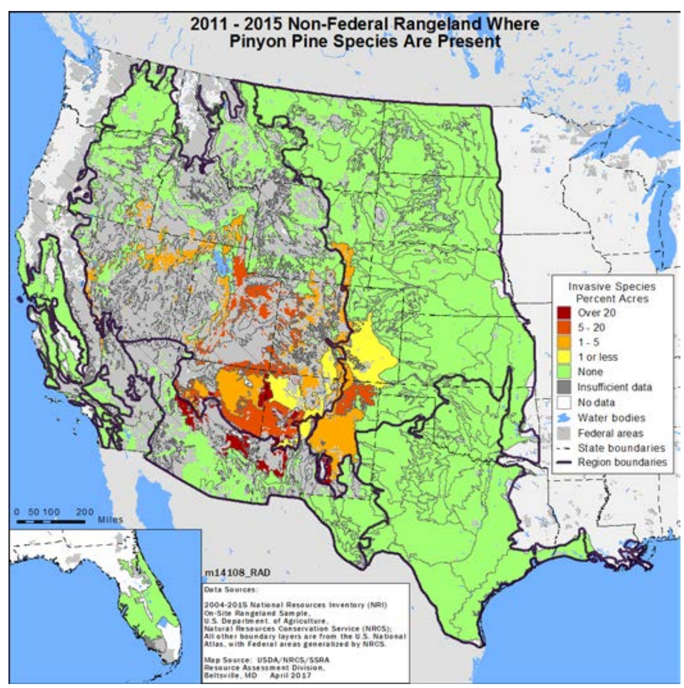
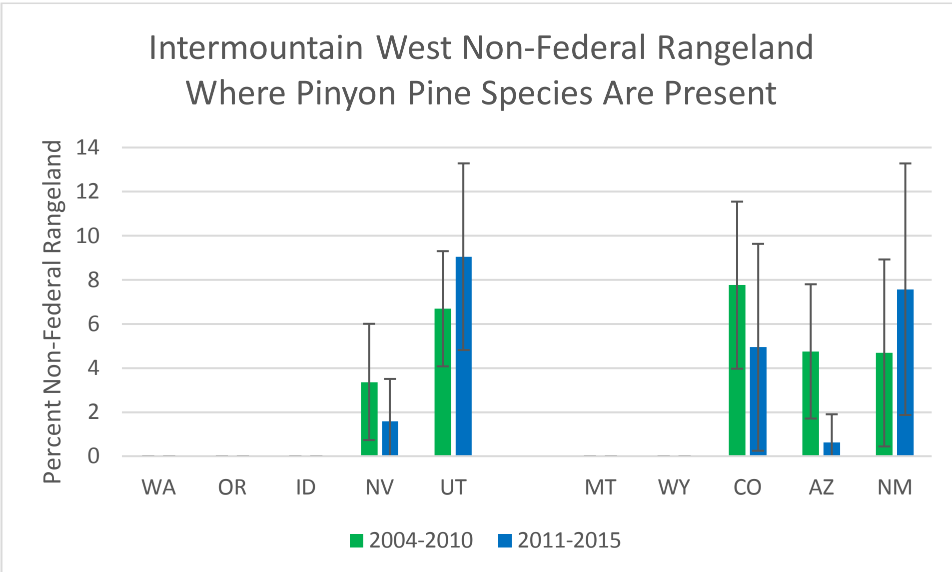


Figure 62. Intermountain West Non-Federal Rangeland Where Pinyon Pine Species are Present. Error bars represent margins of error.



Summary and Conclusions

Within the Intermountain West region, the high desert Colorado Plateau which surrounds the four corners of northeast Arizona, northwest New Mexico, southwest Colorado, and southeast Utah had increased area of non-Federal rangeland where all three rangeland health attributes had at least moderate departure from reference conditions. This area also has high percentages of bare ground, numerous large (greater than two meters) inter-canopy gaps, and large inter-canopy gaps with at least 50 percent bare ground in the interspaces. Those openings in the plant canopy provide opportunities for erosion and invasion by weedy plant species. Although native to the region, Montane/intermontane junipers (*Juniperus osteosperma* and *Juniperus scopulorum*) and pinyon pine (*Pinus edulis* and *Pinus monophylla*) are common in this area. In places where they form dense stands, they can alter nutrient and water cycles, and energy flow through the ecosystem, affect hydrology, and reduce wildlife habitat and forage for domestic animals and wildlife (DiTomaso 2000, Archer 1995).

In the northwest area of the Intermountain West region, biotic integrity is the rangeland health attribute of most concern. Non-native annual bromes (*Bromus* spp.) are widespread and dominate areas of non-Federal rangeland in this part of the U.S. Medusahead and North Africa grass are also invasive within the region. These species are not only highly invasive in shrub communities often outcompeting native grasses and forbs, but they can be highly flammable, thus changing the fire regime in areas they invade (Brooks 2004).

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The rangeland health maps represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

The source data used to construct the drought figures are from the National Drought Mitigation Center, and follow the drought monitor categories: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx. The weekly drought monitor data were converted to a 1/8-degree grid, and the state and broad region polygons were used to clip out the grid cells within each region for the two time periods. Both the stack plots show the distribution of 1/8-degree grid cells of each drought monitor class for each year.

Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

More Information

Belnap J., W. J. (2005). Linkages between microbial and hydrologic processes in arid and semiarid watersheds. *Ecology, 86(2), 298-307*.

Boxell J., a. P. (2008). Surface soil physical properties and hydrological characgteristics in Bromus tectorum L. (cheatgrass) versus Artemisia tridentata Nutt. (big sagebrush) habitat. *Geoderma 149:305-311*.

Brooks M.L., D. C. (2004). Effects of invasive alien plants on fire regimes. *BioScience 54: 677–88*.

Chapin III, F. Z. (2000). Consequences of changing biodiversity. *Nature, 405(6783), 234-242*.

Davies, K. (2011). Plant community diversity and native plant abundance decline with increasing abundance of an exotic annual grass. *Oecologia 167:481-491*.

Ehrenfeld, J. (2003). Effects of exotic plant invasions on soil nutrient cycling processes. *Ecosystems, 6(6), 503-523*.

Evans R.D., R. R. (2001). Exotic plant invasion alters nitrogen dynamics in an arid grassland. *Ecol. Appl. 11:1301-1310*.

Herrick, J. ,. (2010). National ecosystem assessments supported by scientific and local knowledge. Frontiers in ecology and the environment 2010 Oct., v. 8, no. 8 http://handle.nal.usda.gov/10113/45178.

Hooper D.U., C. I. (2005). Effects of biodiversity on ecosystem functioning: a consensus of current knowledge. *Ecological monographs, 75(1), 3-35*.

Norton J.B., T. M. (2004). Soil morphology and organic matter dynamics under cheatgrass and sagebrush-steppe plant communities. *Journal of Arid Environments 57: 445–466*.

Ogle S.M., W. R. (2003). Impacts of Exotic Annual Brome Grasses (Bromus spp.) on Ecosystem Properties of Northern Mixed Grass Prairie. *American Midland Naturalist 149: 46-58*.

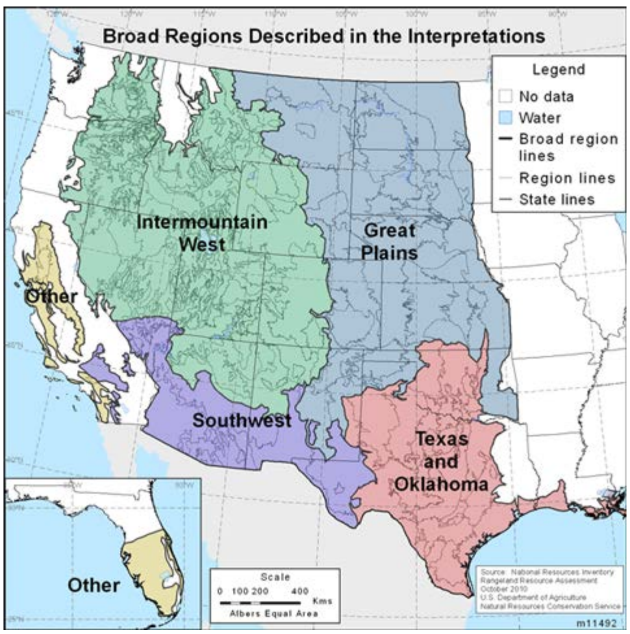
Pierson F.B., D. C. (2002). Impacts of wildfire on soil hydrologic properties of steep sagebrush-steppe rangeland. *International Journal of Wildland Fire 11: 45-151*.

Sommer M.L., R. B. (2007). *Habitat guidelines for mule deer: California Woodland Chaparral Ecoregion.* Mule Deer Working Group, Western Association of Fish and Wildlife Agencies.

Southwest

The Southwest region is a diverse region of plateaus, plains, basins, and isolated mountain ranges. The extent of southwestern rangeland includes the Sonoran Desert of Arizona, the Mojave Desert of southern California and Nevada, and the Chihuahuan Desert of southern New Mexico and west Texas (Figure 1). It also includes the southern Rocky Mountains of south-central Colorado and north-central New Mexico. This region includes the most arid areas of the United States and has developed many adaptations to resist drought. Strong precipitation and temperature gradients associated with latitude, longitude, and elevation largely determine general patterns of potential vegetation and plant production in the region, with local differences associated with differences in soils and landscape position.

Figure 1. Broad regions described in the interpretations



Potential plant communities in most Southwest rangeland ecosystems include a significant shrub component and are usually dispersed at greater distances between plants than in other regions. The Chihuahuan Desert grasslands are susceptible to shrub invasion in the absence of fire, exotic grasses tend to become invasive with disturbance; and the Sonoran Desert is characterized by a high proportion of succulent species, where survival depends on the infrequency of sub-freezing temperatures. Common shrub species include creosote bush (*Larrea tridentata*), American tarwort (*Flourensia cernua*), burrobush or bursage [*Ambrosia dumosa*], saltbush (*Atriplex* spp.), greasewood (*Sarcobatus* spp.), oaks (*Quercus* spp.), juniper (*Juniperus* spp.) and pinyon pine (*Pinyon* spp.).

Like the Intermountain West region, the Southwest includes large areas of non-surveyed public lands interspersed with non- Federal lands (Figure 2). The Mojave Desert, in particular, has very small proportions of non-Federal land. There are also significant areas of forest in the higher elevations, particularly in west-central New Mexico and east-central Arizona.

Figure 2. Acres of non-Federal rangeland, 2012

Results in this report are based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015. Drought impacted the area during the second period (Figures 3-7). While this region was abnormally dry or moderate drought during the early period (2004-2010), much of this region experienced severe drought during the more recent period (2011-2015). The figures provide context for subsequent summary results.

Figures 3-4. Map of average drought monitor rating (0 to 4 scale, where 0 is mild drought and 4 is extreme) across the two NRI sampling periods.

Figure 3.

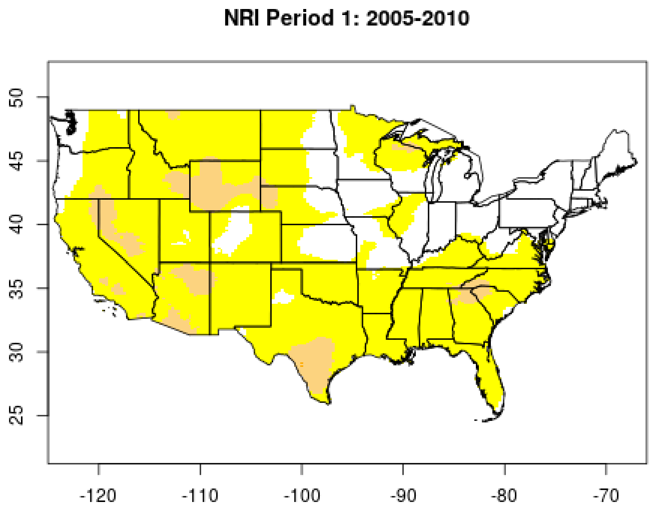
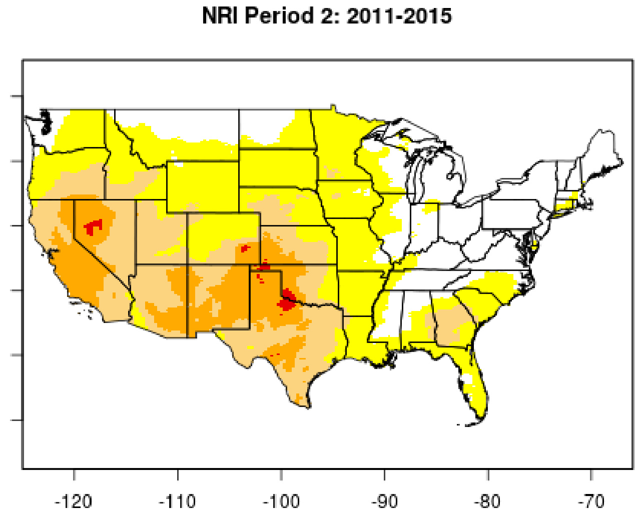


Figure 4.



Drought severity is displayed in five categories:

D0 (Abnormally Dry)

D1 (Moderate Drought)

D2 (Severe Drought)

D3 (Extreme Drought)

D4 (Exceptional Drought)

Figure 5. Average drought severity in the Arizona portion of the Southwest Region.

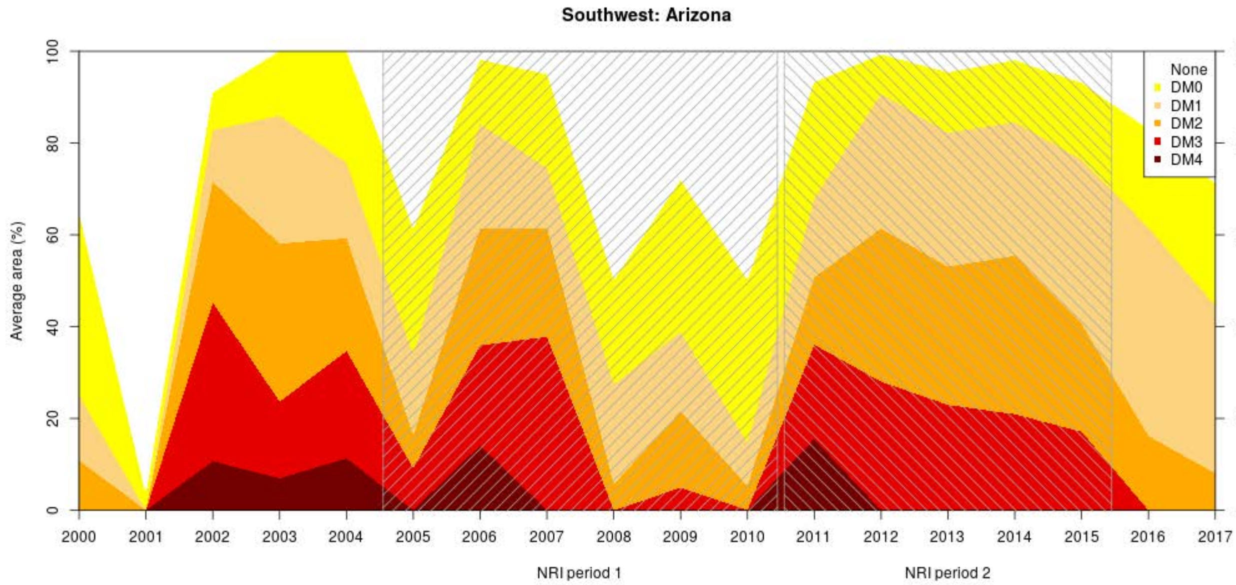


Figure 6. Average drought severity in the New Mexico portion of the Southwest Region.

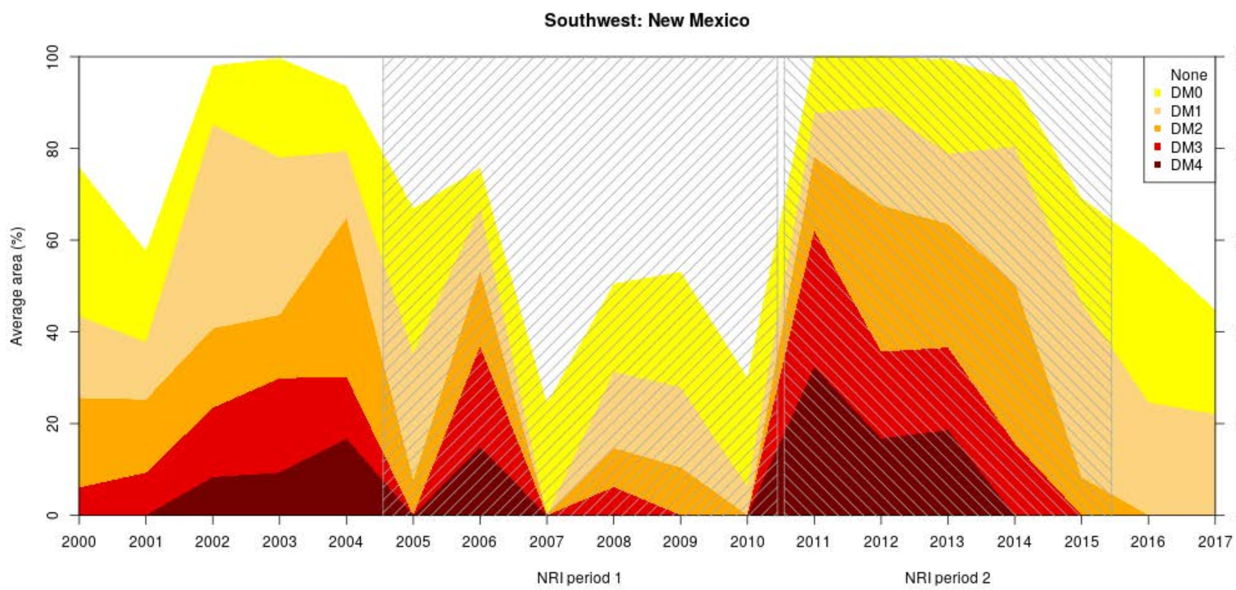
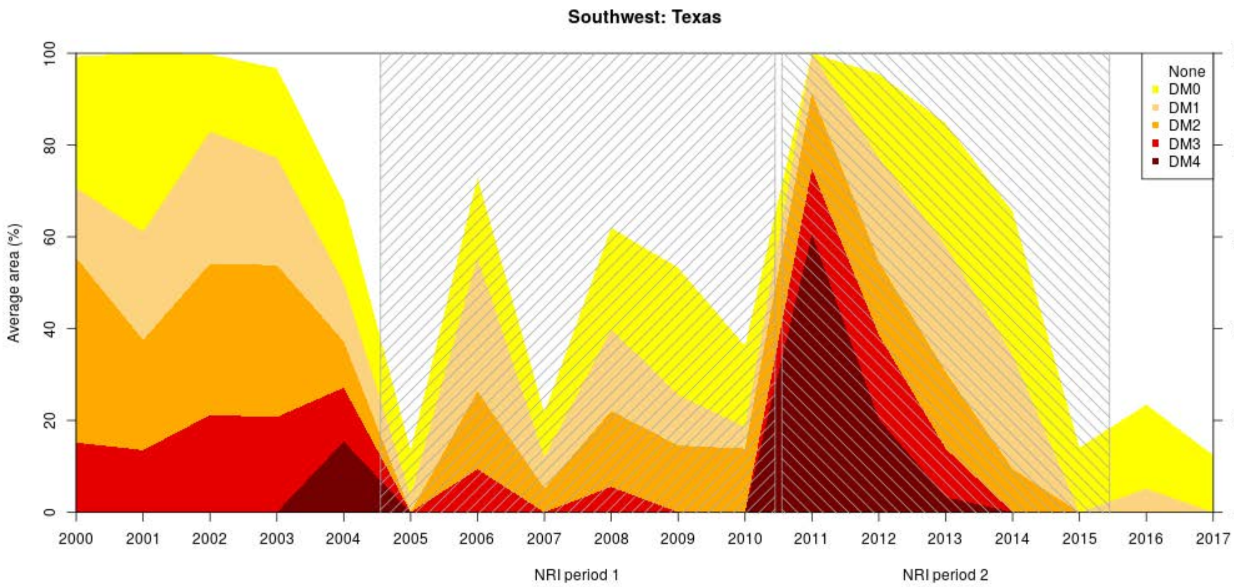


Figure 7. Average drought severity in the Texas portion of the Southwest Region.



Rangeland Health

New Mexico and Texas exhibited the largest changes in the land area where all three rangeland health attributes were at least a moderate departure from reference condition between the two sampling periods (Figures 8-10). The Southwest region of the US was affected by abnormally dry to exceptional drought conditions for both reporting periods according to the US drought monitor (Figures 5-11). However, the period from 2011 to 2015 had more successive years with drought. In 2011 New Mexico and Texas were also affected with exceptional drought, the worst possible drought level.

Figures 8-9. Non-Federal Rangeland Where All Three Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. (Source: Table 2, Table 3, and Table 4**)**

Figure 8. 2004-2010

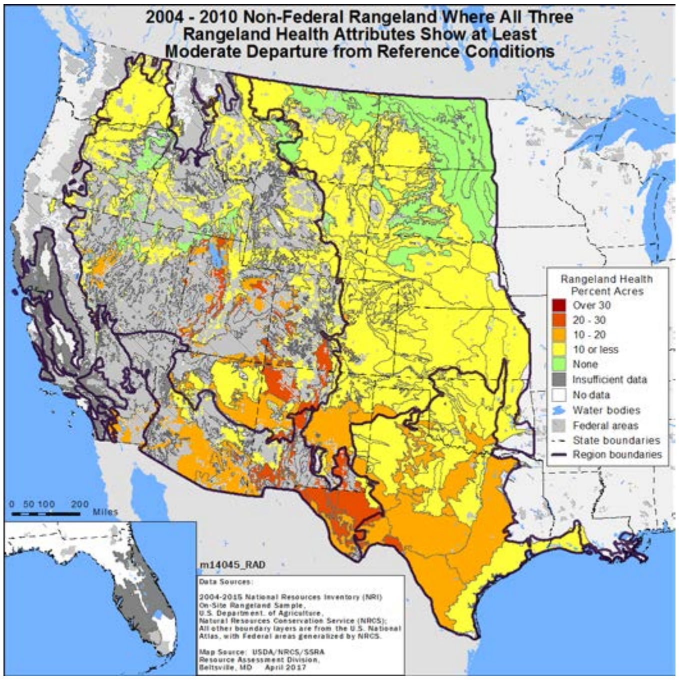


Figure 9. 2011-2015

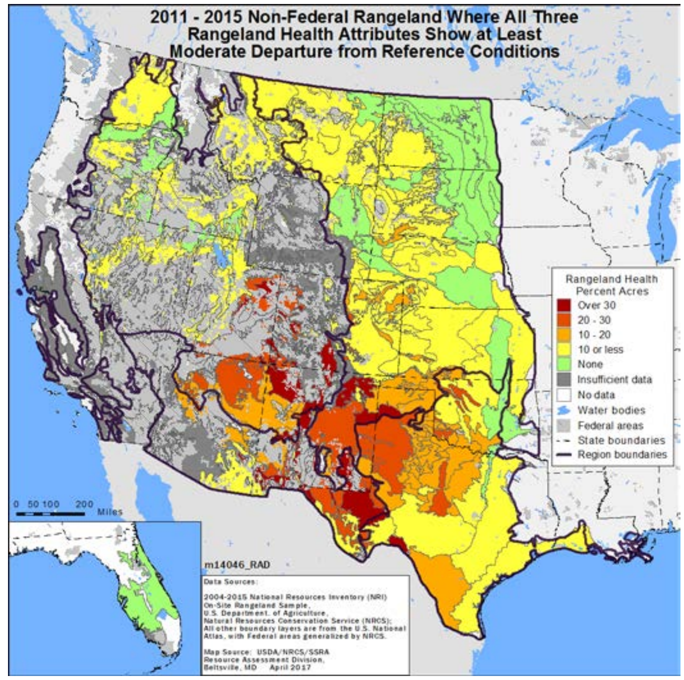
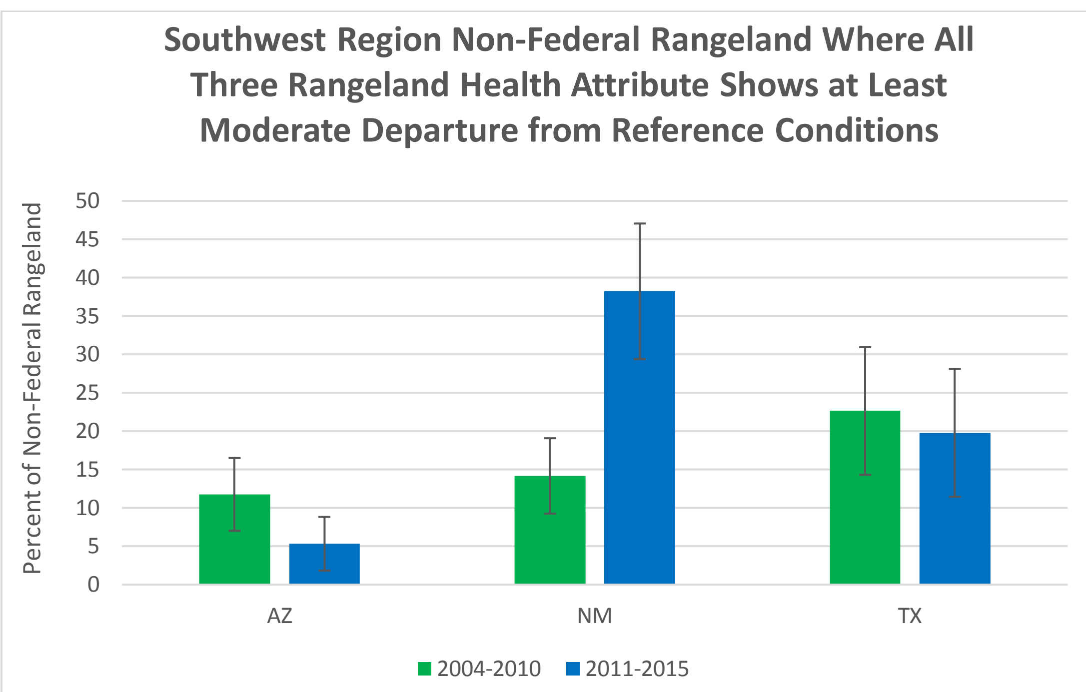


Figure 10. Southwest Region Non-Federal Rangeland Where All Three Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. Error bars represent margins of error.



Soil and Site Stability

Most states in this region did not show a significant change in the amount of area with soil and site stability having a departure from reference condition. New Mexico was the exception. In the New Mexico portion of the Southwest region, the amount of area with moderate departure in soil and site stability from reference condition changed from 12.6 (±4.2) percent in the 2004-2010 period to 26.0 (±8.4) percent in the 2011-2015 period (Figures 11-13). The amount of area with moderate to extreme and extreme to total departure from reference condition also changed from 4.2 (±2.3) percent in the 2004-2010 period to 17.1 (±6.3) percent in the 2011-2015 period (Figures 14-16). These changes correlate with an increase in areas covered by bare ground, and increase in areas with large gaps (>1m) between plant canopies, and an increase in area where soil aggregate stability has been degraded (see below).

Figures 11-12. Non-Federal Rangeland Where Soil and Site Stability Shows Moderate Departure from Reference Conditions (Source: Table 5, Table 6, Table 7**)**

Figure 11. 2004-2010

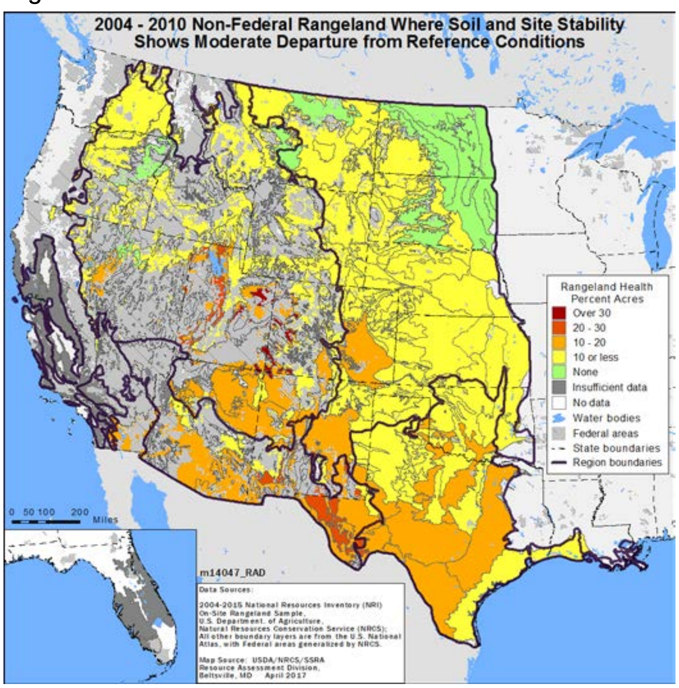


Figure 12. 2011-2015

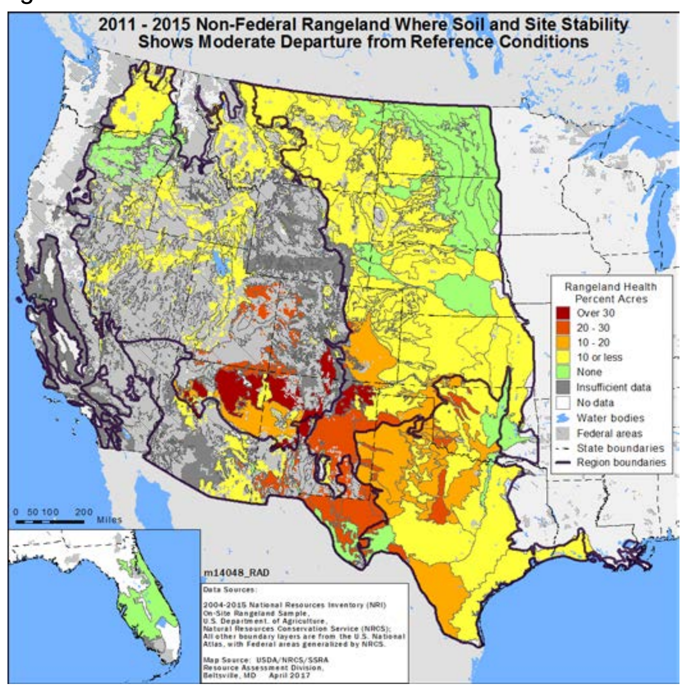
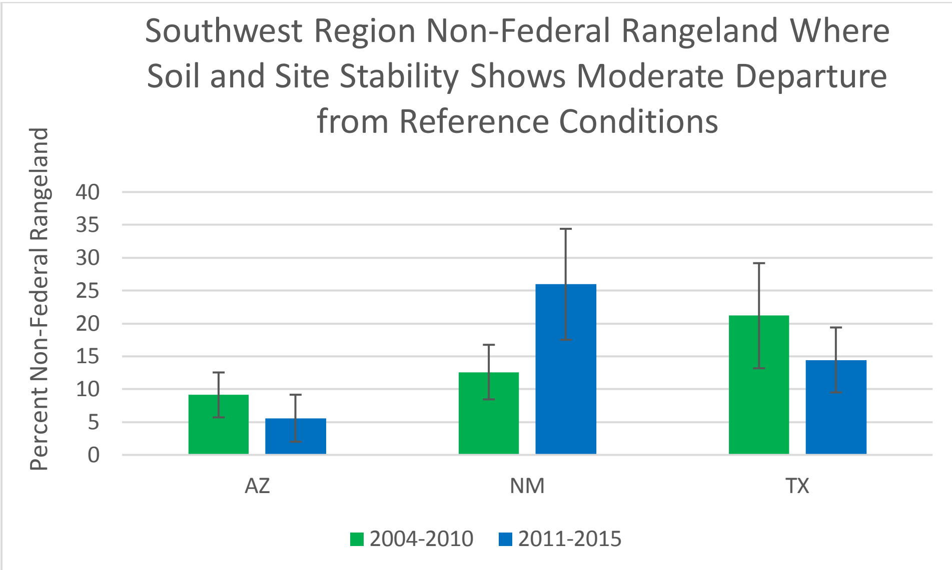


Figure 13. Southwest Region Non-Federal Rangeland Where Soil and Site Stability Shows Moderate Departure from Reference Conditions. Error bars represent margins of error.



Figures 14-15. Non-Federal Rangeland Where Soil and Site Stability Shows Above Moderate Departure from Reference Conditions (Source: Table 5, Table 6, Table 7**)**

Figure 14. 2004-2010

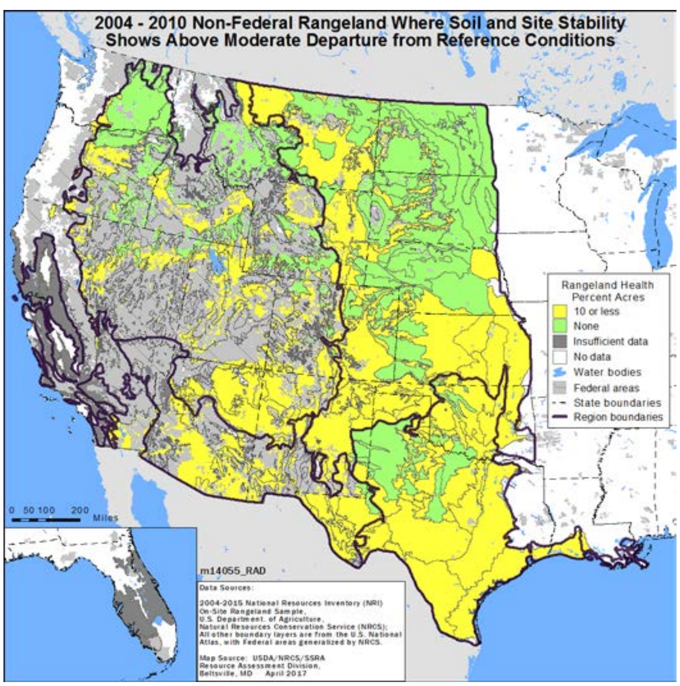


Figure 15. 2011-2015

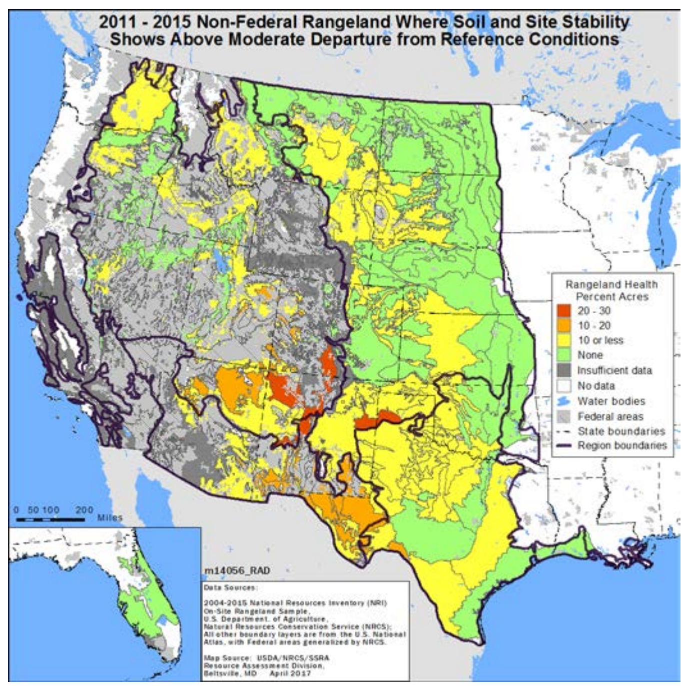
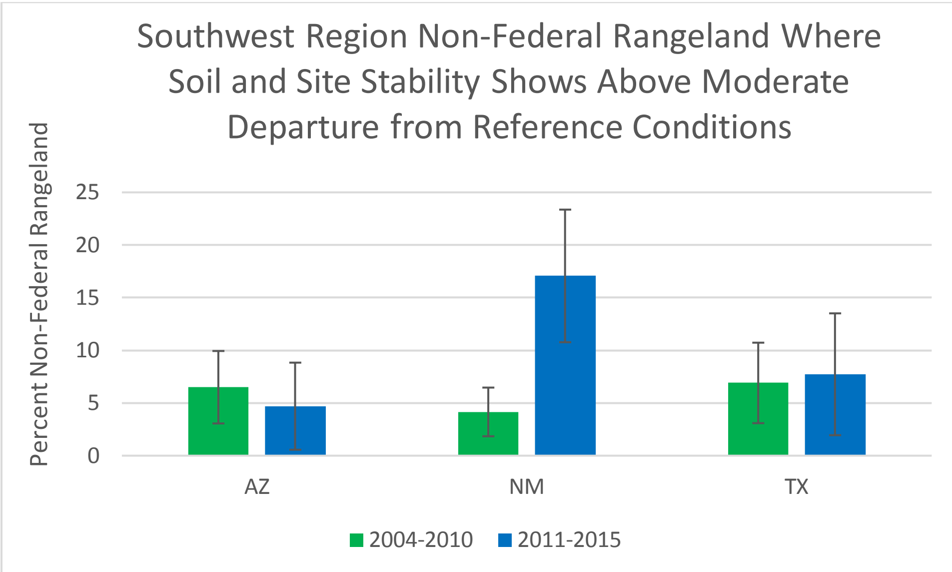


Figure 16. Southwest Region Non-Federal Rangeland Where Soil and Site Stability Shows Above Moderate Departure from Reference Conditions. Error bars represent margins of error.



Hydrologic Function

Similar to soil and site stability, most of this region had no significant change in the amount of area with hydrologic function having a departure from reference condition, except for New Mexico. In the New Mexico portion of the Southwest region, the amount of area with moderate departure in hydrologic function from reference condition changed from 13.0 (±5.2) percent in the 2004-2010 period to 32.0 (±6.9) percent in the 2011-2015 period (Figures 17-19). The amount of area with moderate to extreme and extreme to total departure from reference condition also changed from 6.2 (±3.7) percent in the 2004-2010 period to 16.9 (±7.3) percent in the 2011-2015 period (Figures 20-22).

Figures 17-18. Non-Federal Rangeland Where Hydrologic Function Shows Moderate Departure from Reference Conditions (Source: Table 8, Table 9, Table 10**)**

Figure 17. 2004-2010

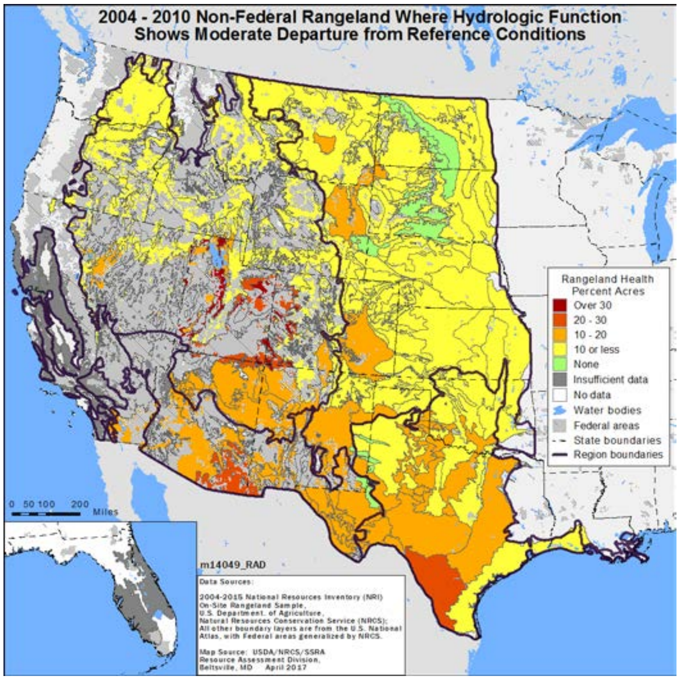


Figure 18. 2011-2015

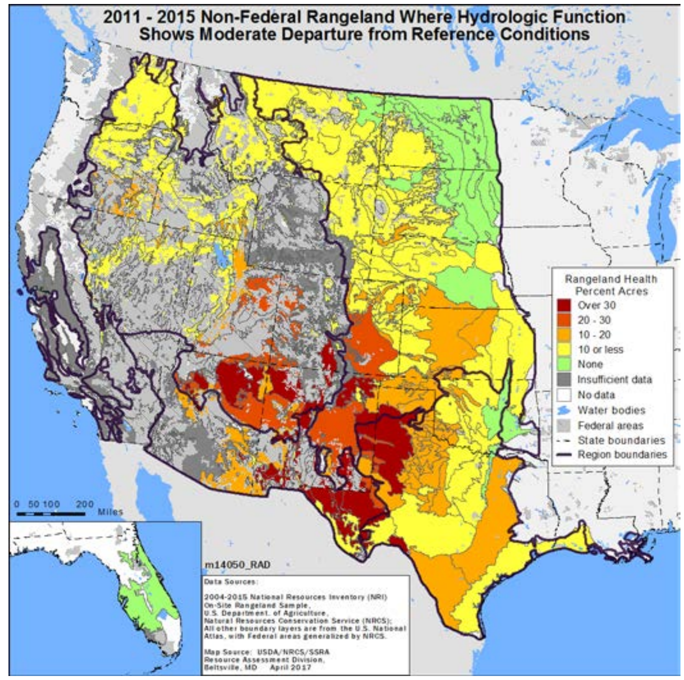
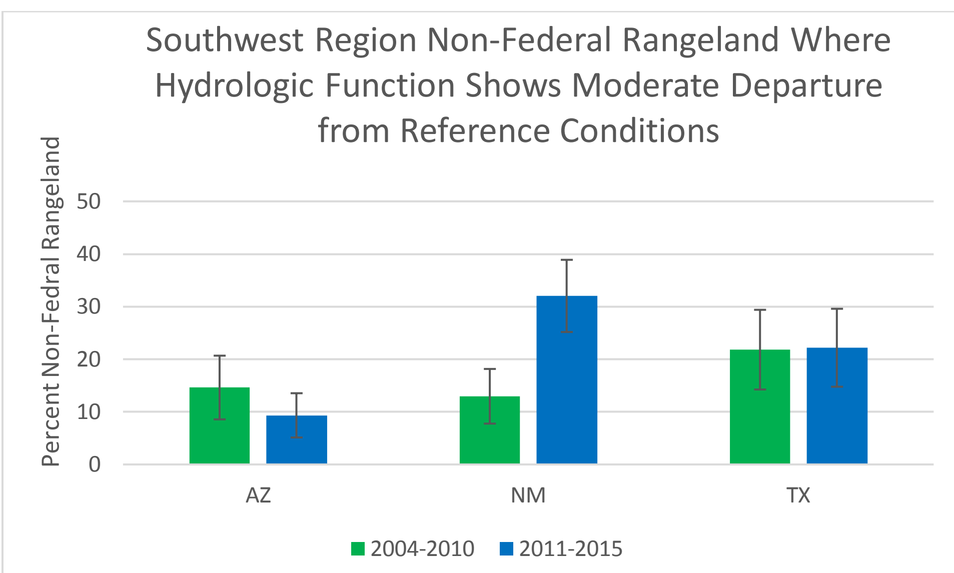


Figure 19. Southwest Region Non-Federal Rangeland Where Hydrologic Function Shows Moderate Departure from Reference Conditions. Error bars represent margins of error.



Figures 20-21. Non-Federal Rangeland Where Hydrologic Function Shows Above Moderate Departure from Reference Conditions (Source: Table 8, Table 9, Table 10**)**

Figure 18. 2004-2010

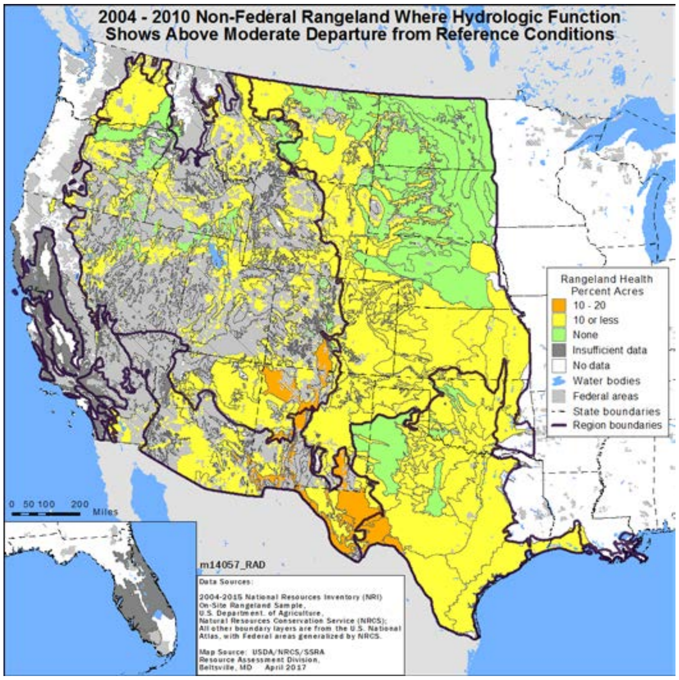


Figure 19. 2011-2015

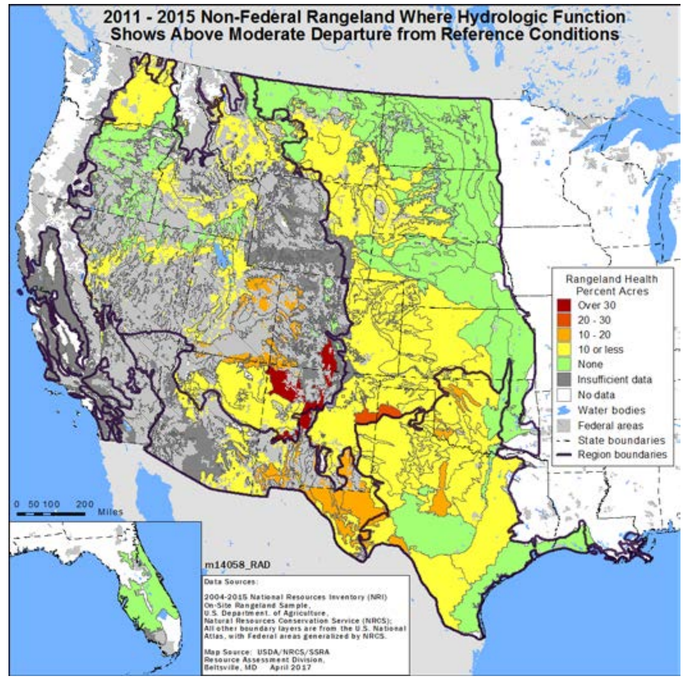
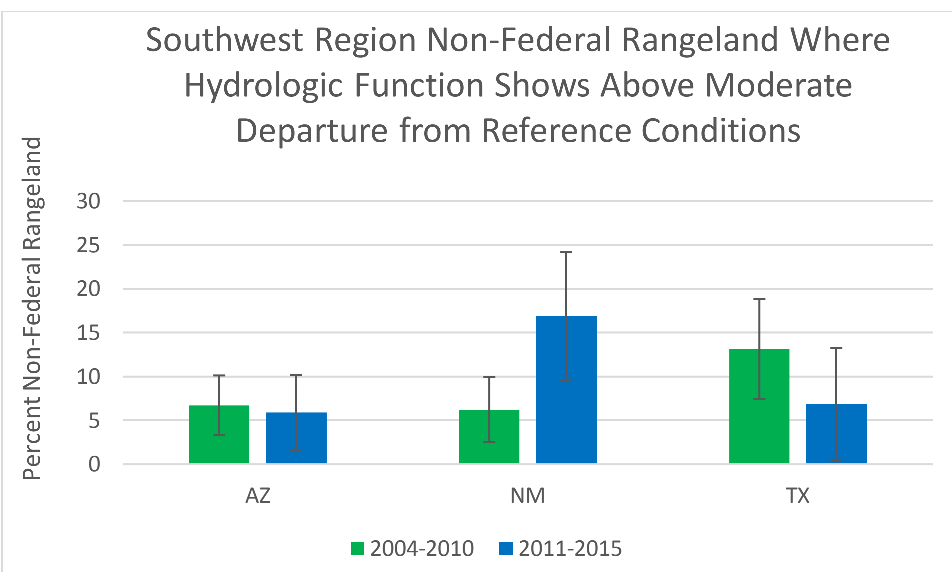


Figure 22. Southwest Region Non-Federal Rangeland Where Hydrologic Function Shows Above Moderate Departure from Reference Conditions. Error bars represent margins of error.



Biotic Integrity

Within the Southwest region, the states showing statistically significant changes in the amount of area that had at least moderate departures from reference condition for biotic integrity were New Mexico (24.0 ± 5.5 percent in 2004-2010 to 59.9 ± 9.9 percent in 2011-2015) and Texas (31.7 ± 8.7 percent in 2004-2010 to 53.9 ± 9.5 percent in 2011-2015). The western edge of Texas, the area considered within the Southwest region, the amount of area with moderate departure changed from18.0 (±4.5) in 2004-2010 to 40.3 (±9.7) percent in 2011-2015. In the New Mexico portion of the Southwest region, the amount of area with moderate departure increased from 16.5 (±5.0) percent 25.8 (±8.0) percent (Figures 23-25). Also in the New Mexico portion of the Southwest region, the amount of area with above moderate departure from reference increased from 7.5 (±3.8) percent to 34.2 (±11.6) percent (Figures 26-28).

Figures 23-24. Non-Federal Rangeland Where Biotic Integrity Shows Moderate Departure from Reference Conditions (Source: Table 11, Table 12, Table 13**)**

Figure 23. 2004-2010

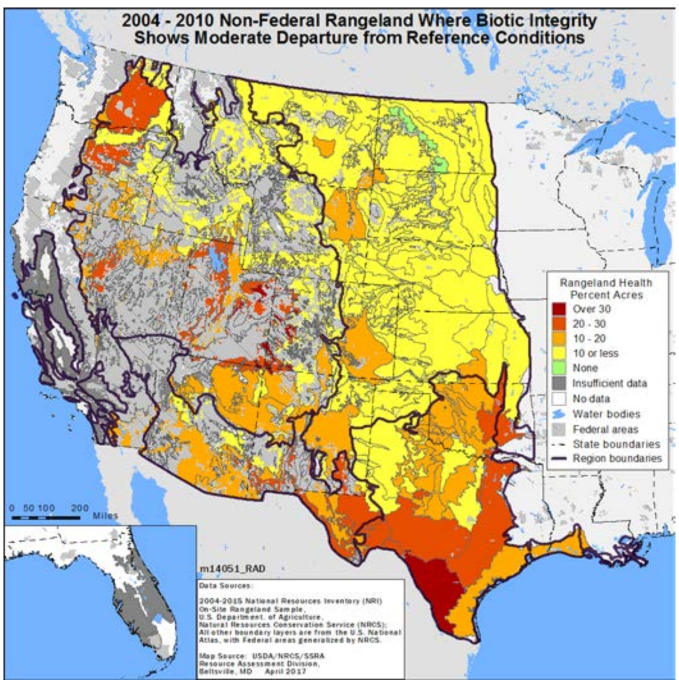


Figure 24. 2011-2015

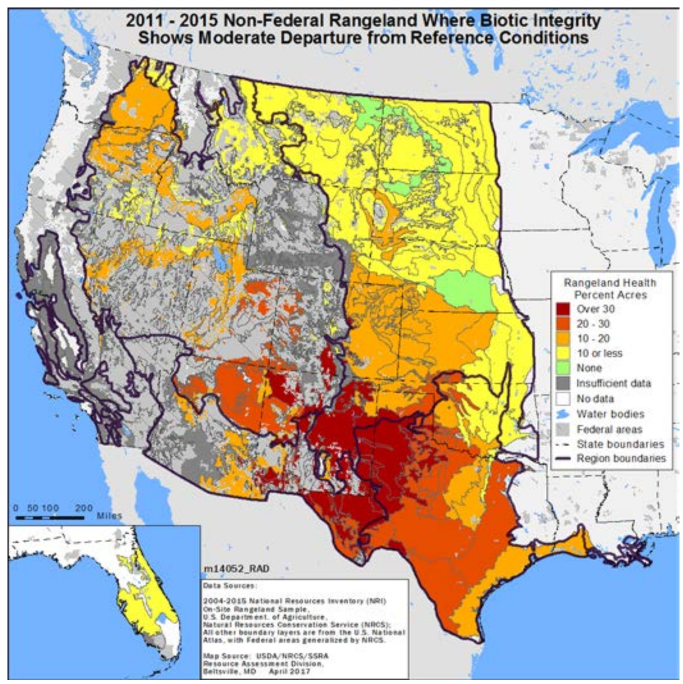
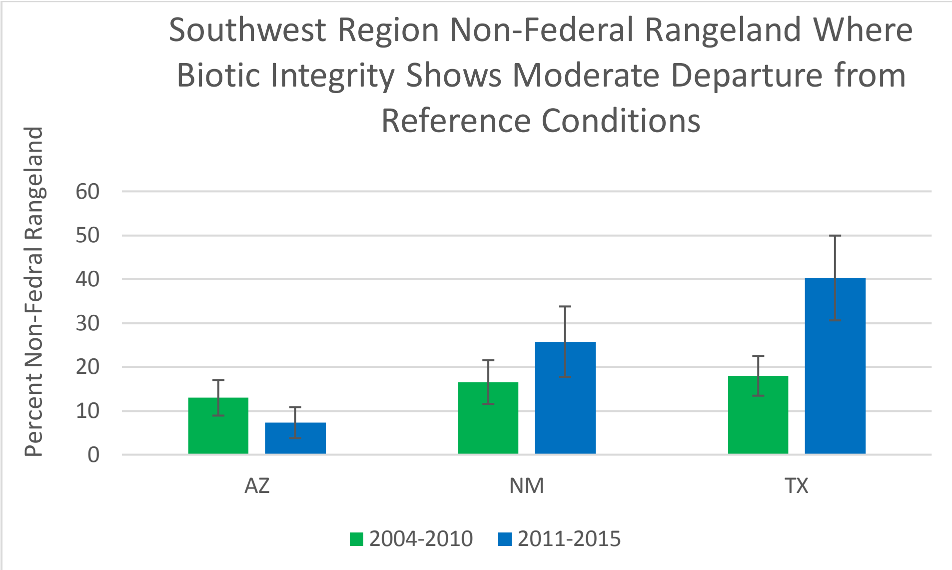


Figure 25. Southwest Region Non-Federal Rangeland Where Biotic Integrity Shows Moderate Departure from Reference Conditions. Error bars represent margins of error.



Figures 26-27. Non-Federal Rangeland Where Biotic Integrity Shows Above Moderate Departure from Reference Conditions (Source: Table 11, Table 12, Table 13**)**

Figure 26. 2004-2010

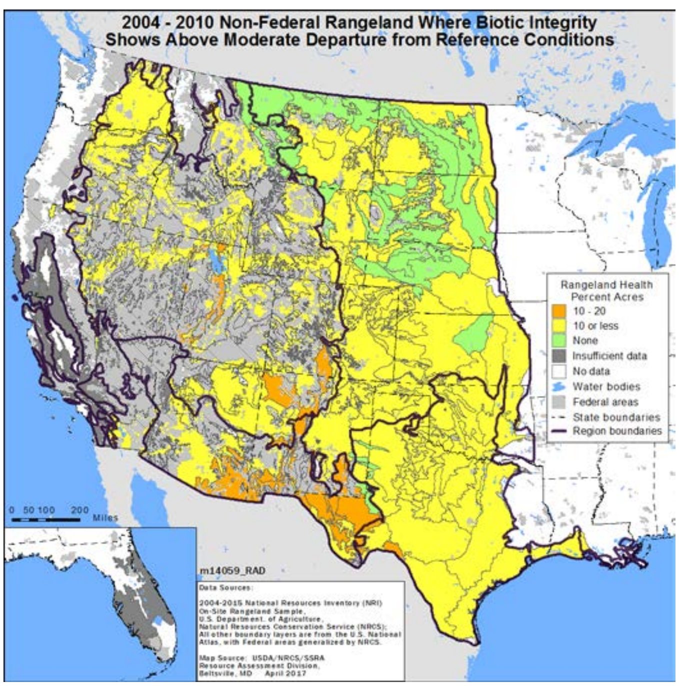


Figure 27. 2011-2015

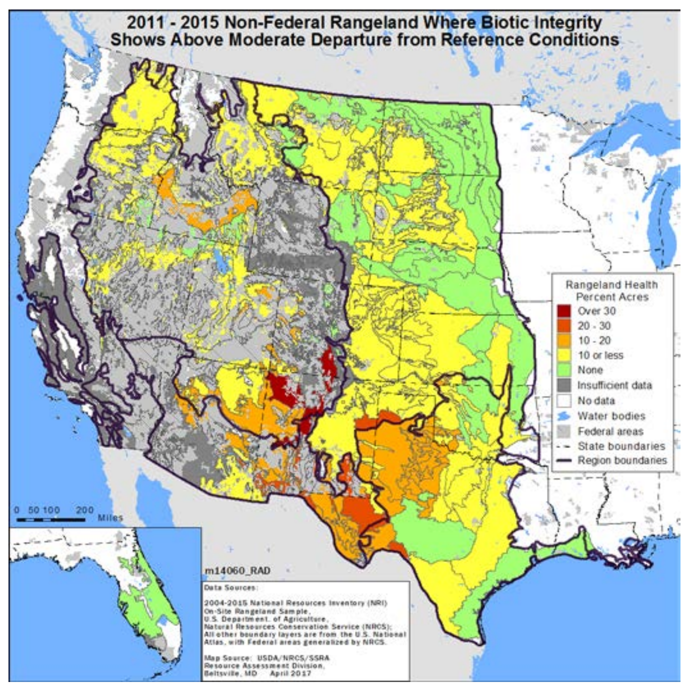
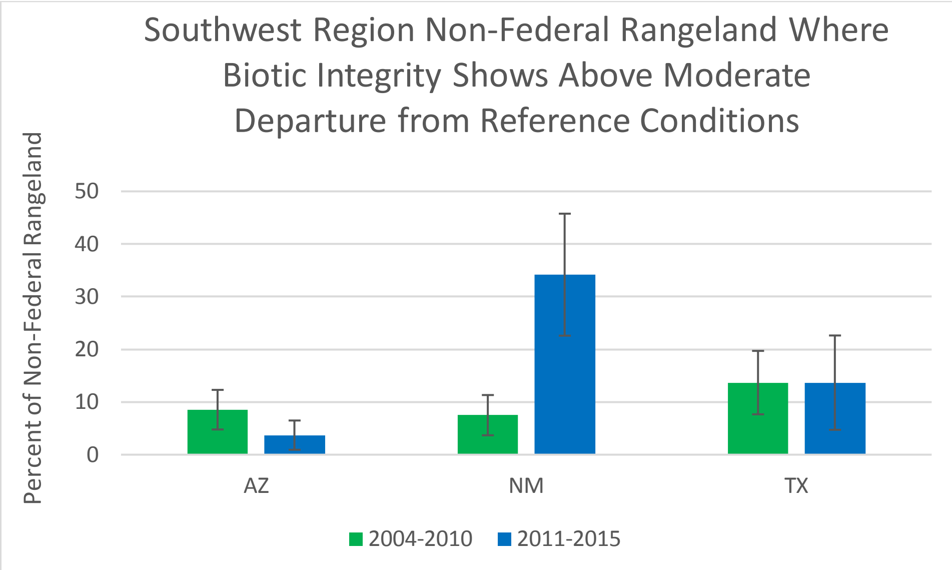


Figure 28. Southwest Region Non-Federal Rangeland Where Biotic Integrity Shows Above Moderate Departure from Reference Conditions. Error bars represent margins of error.



Specific Indicator Discussion

Bare Ground

New Mexico and Texas had the only statistically significant changes in area covered by bare ground. The western portion of Texas, the area within the Southwest region, having some of the greatest changes for that State. In the New Mexico portion of the Southwest region, the amount of area in bare ground increased from 26.6 (±4.1) percent to 38.8 (± 6.0) percent between the two time periods (Figures 29-31). In the Texas portion, the amount of area in bare ground increased from 15.0 (±3.4) percent to 28.1 (±4.5) percent between the two time periods. Within the Southwest region for these two states, the amount of area with at least 50 percent bare ground increased from 16.8 (±5.7) percent to 36.5 (±11.1) percent in New Mexico; and from 4.6 (±3.4) percent to 14.3 (±6.6) percent in Texas (Figures 32-34).

Figures 29-30. Bare Ground on Non-Federal Rangeland. (Source: Table 111, Table 112, and Table 113**)**

Figure 29. 2004-2010

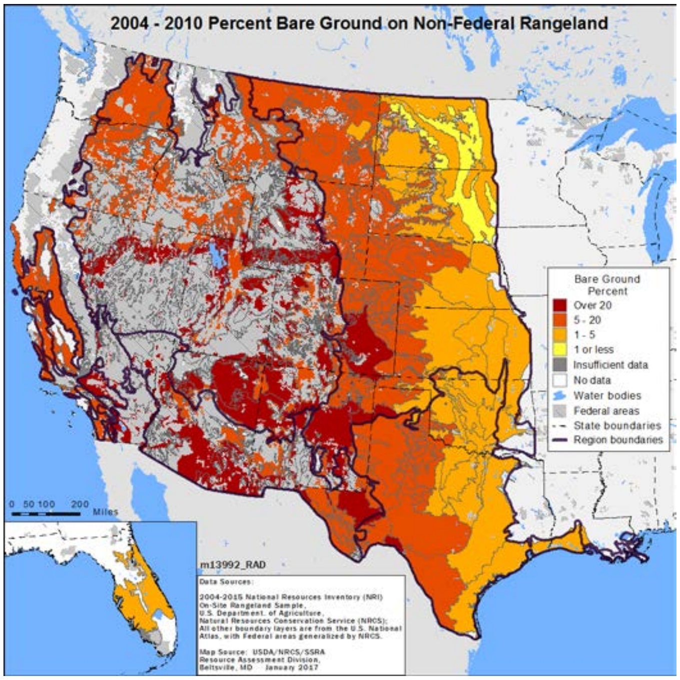
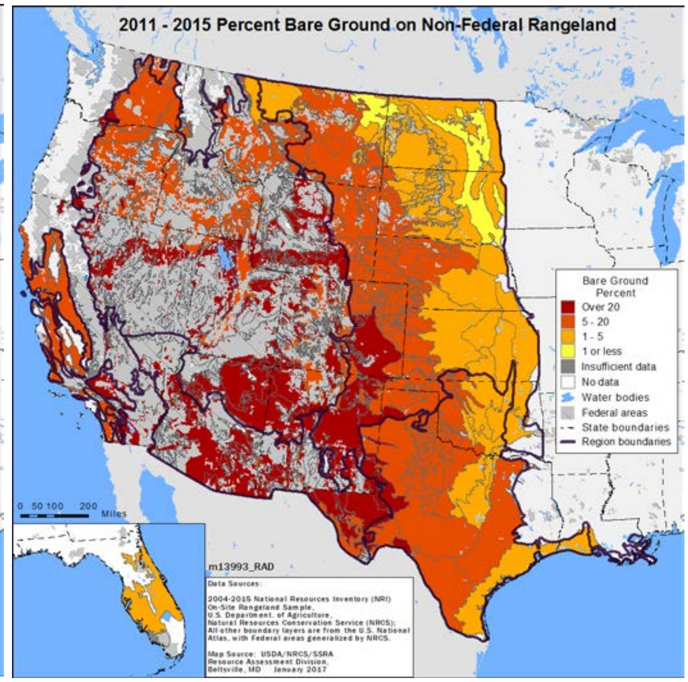
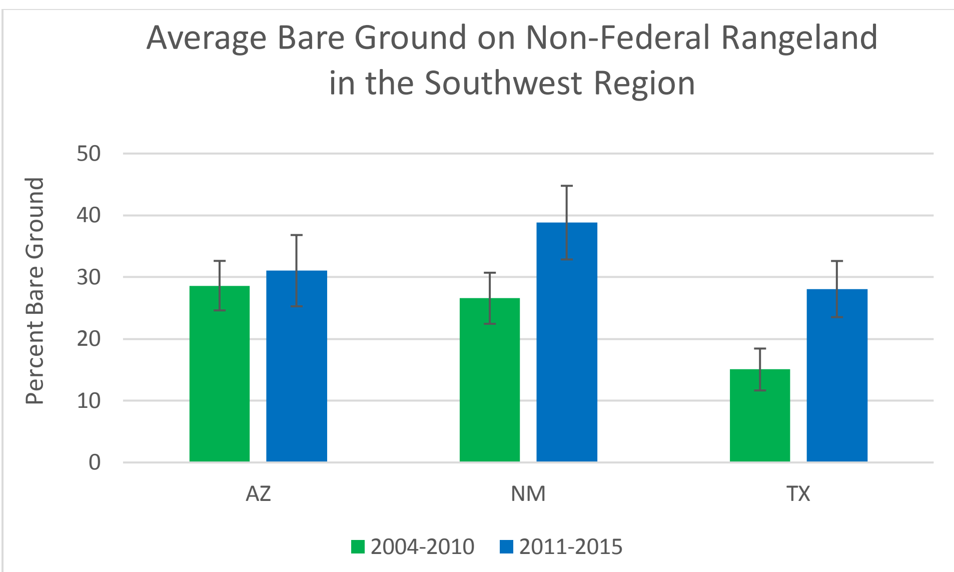


Figure 30. 2011-2015



Figures 31. Southwest Region Bare Ground on Non-Federal Rangeland. Error bars represent margins of error.



Figures 32-33. Non-Federal Rangeland that is at Least 50% Bare Ground. (Source: Table 114, Table 115, and Table 116**)**

Figure 32. 2004-2010

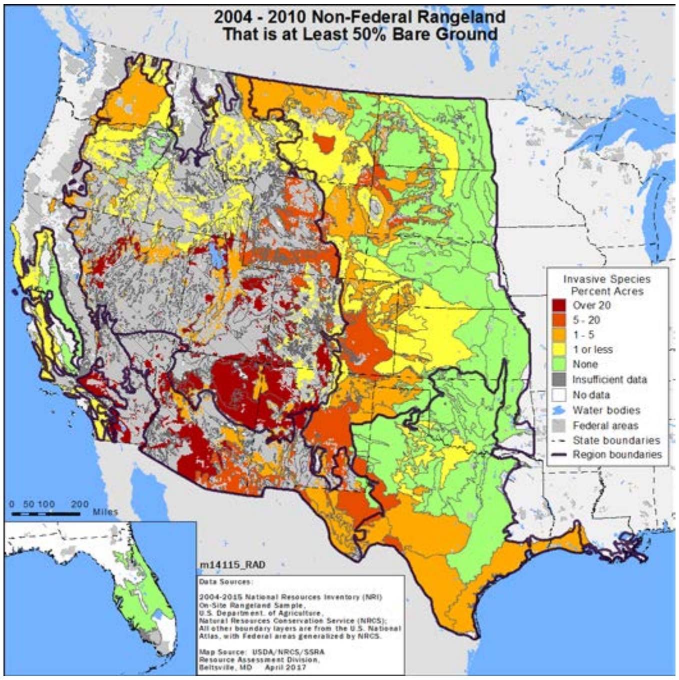


Figure 33. 2011-2015

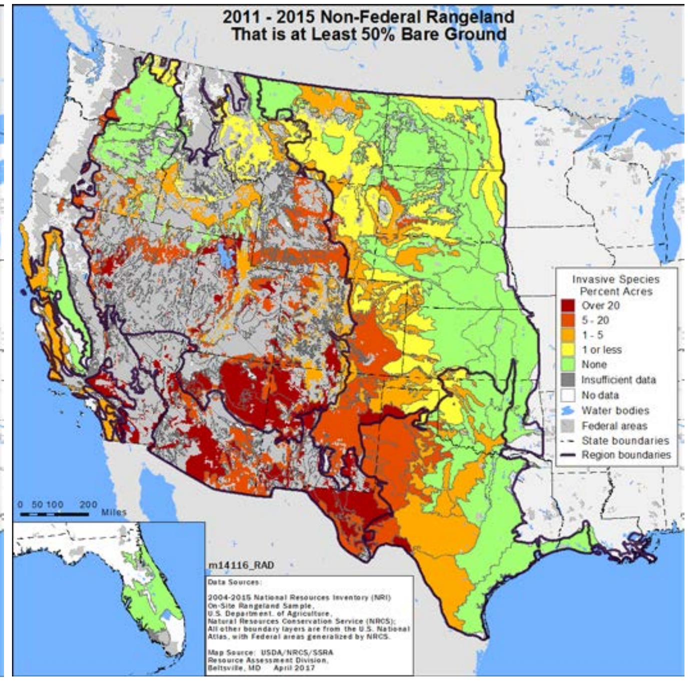
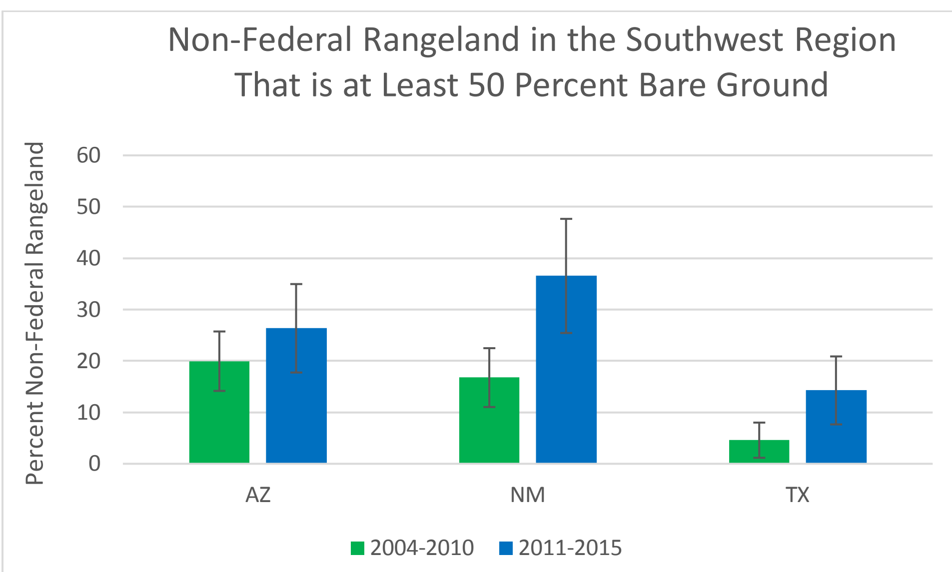


Figure 34. Southwest Region Non-Federal Rangeland that is at Least 50% Bare Ground. Error bars represent margins of error.



Gap Intercept

The area of New Mexico within the Southwest region experienced the most change in non-Federal rangeland where gaps between plant canopies increased (Figures 35-40). In the New Mexico portion of the Southwest region, the area with at least 20 percent of non-Federal rangeland with gaps of 2 m or more increased from 26.3 (±8.4) percent to 49.1 (±14.2) percent. There was also an increase in the area where at least 20 percent of non-Federal rangeland had gaps of at least 2 m and also had 50 percent or more bare ground in the canopy interspaces from 15.1 (±6.1) percent to 38.9 (±13.3) percent.

Figures 35-36. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. (Source: Table 117, Table 118, and Table 119**)**

Figure 35. 2004-2010

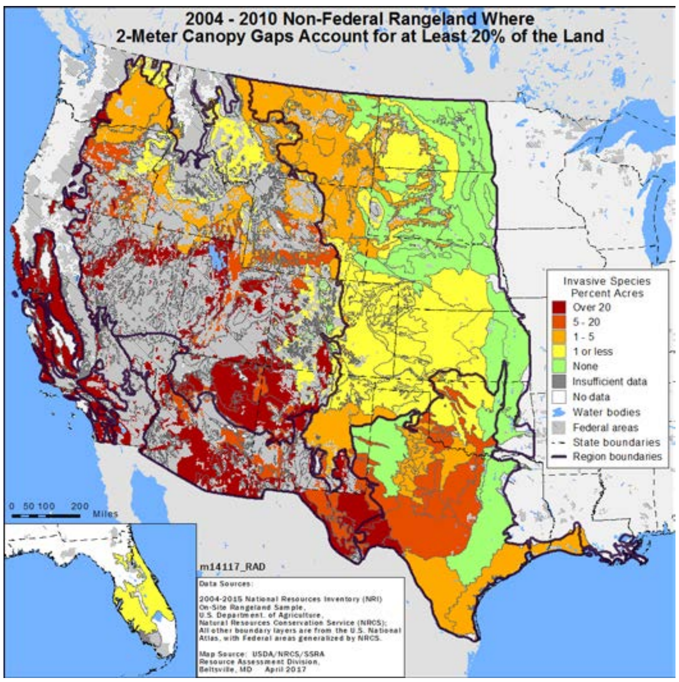


Figure 36. 2011-2015

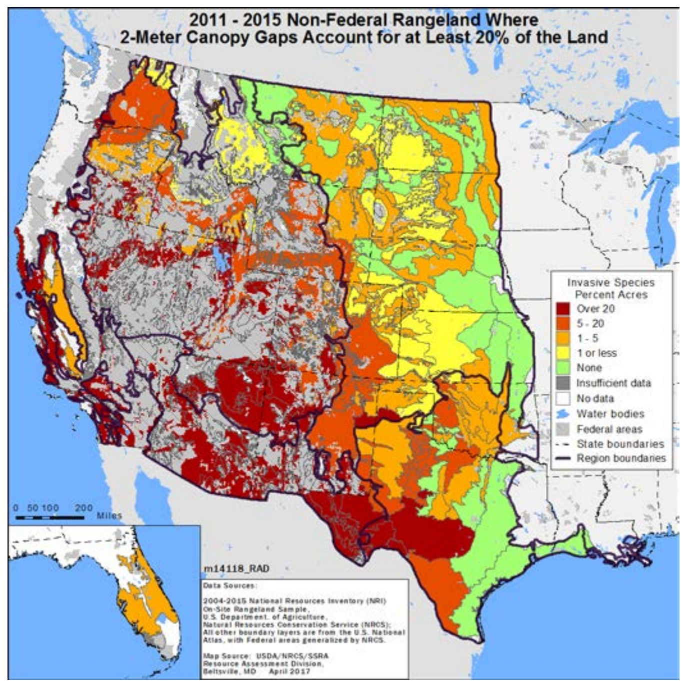
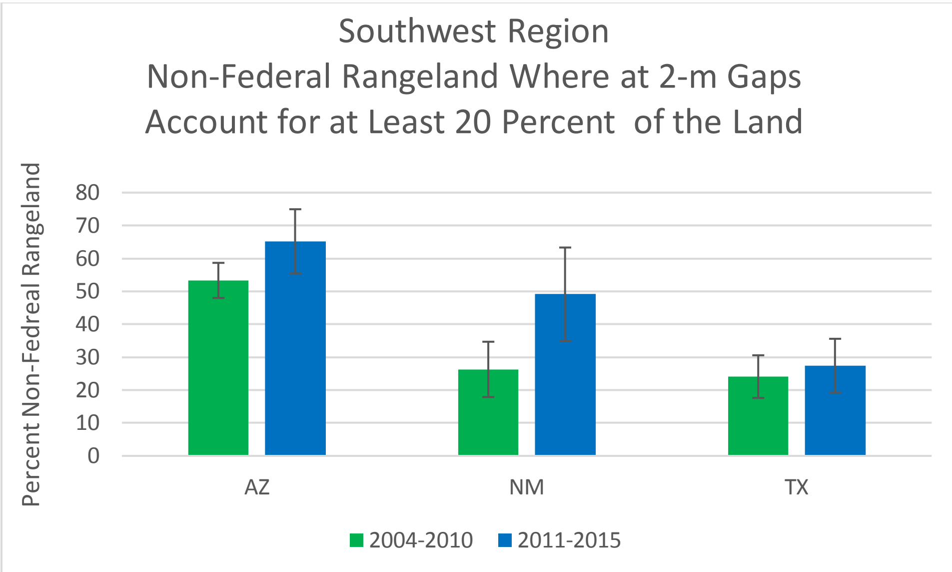


Figure 37. Southwest Region Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. Error bars represent margins of error.



Figures 38-39. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119**)**

Figure 38. 2004-2010

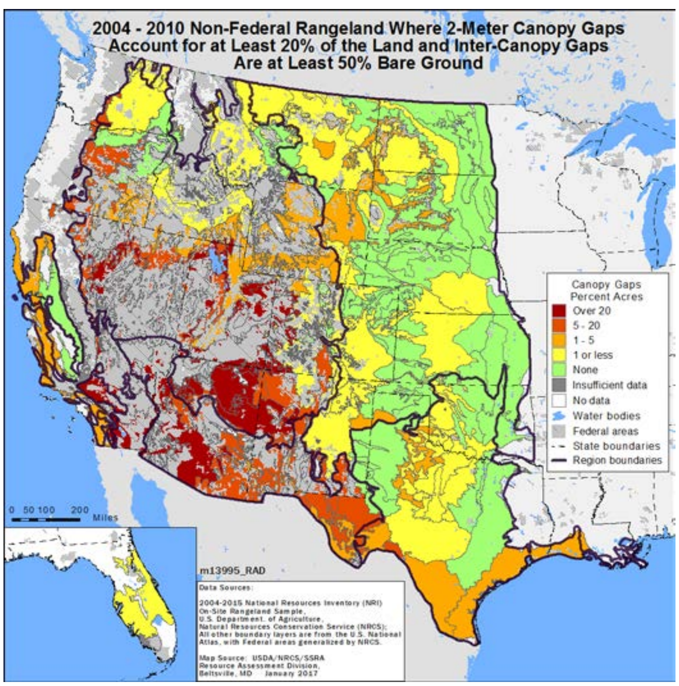


Figure 39. 2011-2015

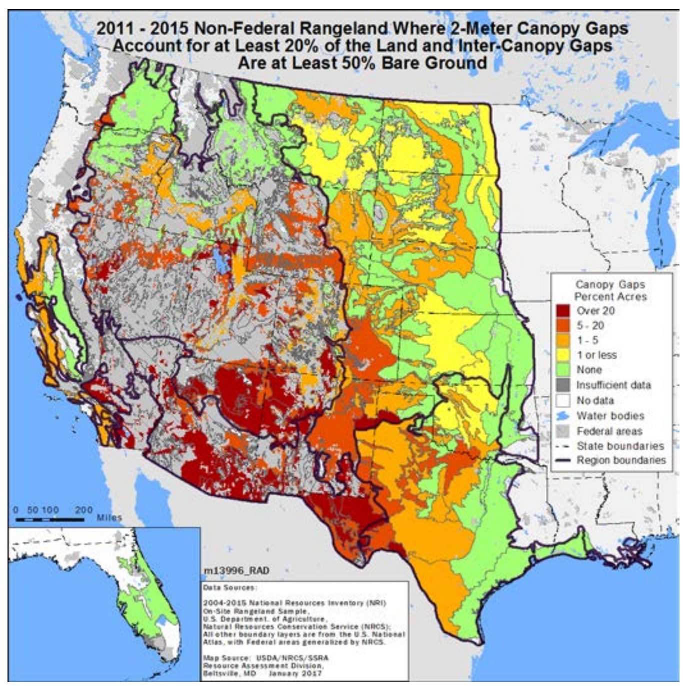
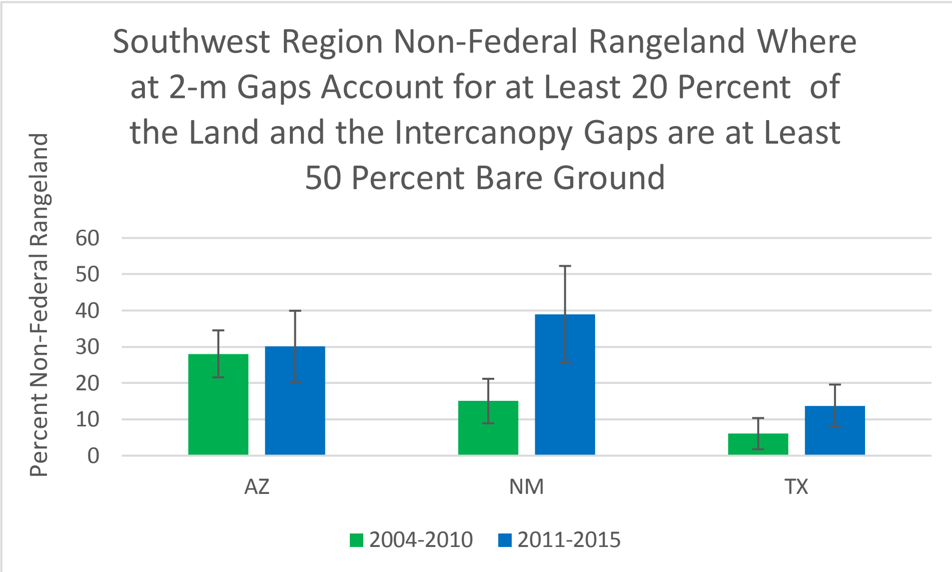


Figure 40. Southwest Region Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. Error bars represent margins of error.



Soil Aggregate Stability

Although there was little change in percentages of Southwest region non-Federal rangeland where soil stability values were 4 or less, the entire region has relatively high percentages of land with that condition (Figures 41-43). Within the Southwest region during 2011-2015, New Mexico, Arizona, and Texas, respectively, had 74.3 (±11.3), 64.7 (±8.9), and 53.6 (±9.2) percent of non-Federal rangeland where soil stability values were 4 or less. Without knowledge of the potential soil aggregate stability value for the site it is difficult to interpret this result.

Figures 41-42. Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less. (Source: Table 120, Table 121, and Table 122**)**

Figure 41. 2004-2010

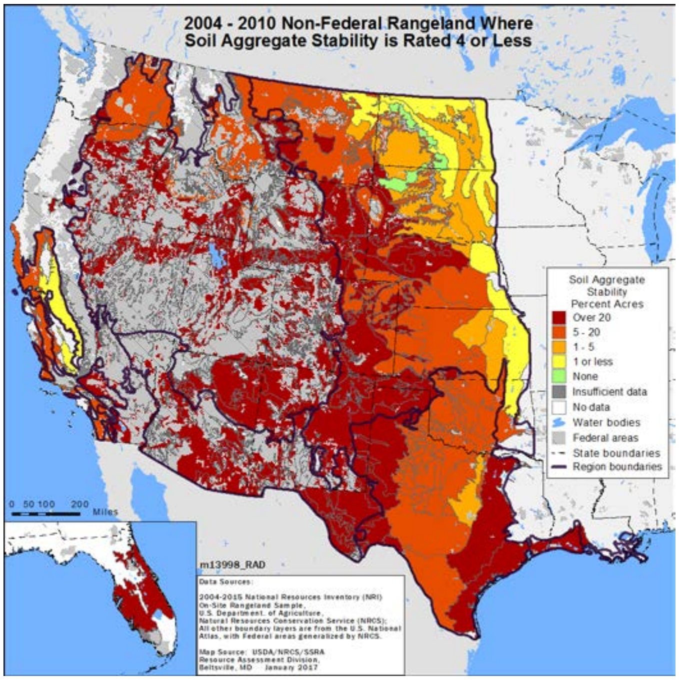
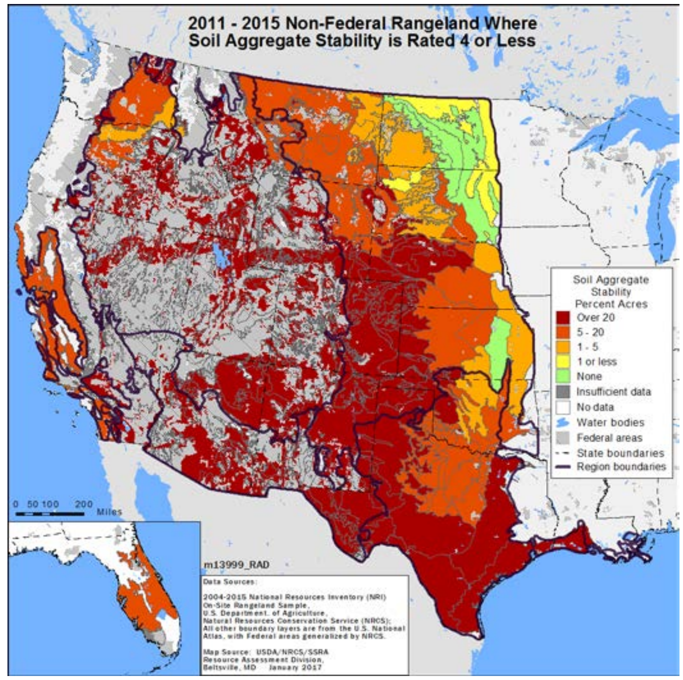


Figure 42. 2011-2015



[1] Soil aggregate stability ratings:

1 = 50% of structural integrity lost, (melts) within 5 seconds of immersion in water and less than 10% remains after 5 dipping cycles or soil too unstable to sample (falls through the sieve).

2 = 50% of structural integrity lost (melts) 5–30 seconds after immersion and less than 10% remains after 5 dipping cycles.

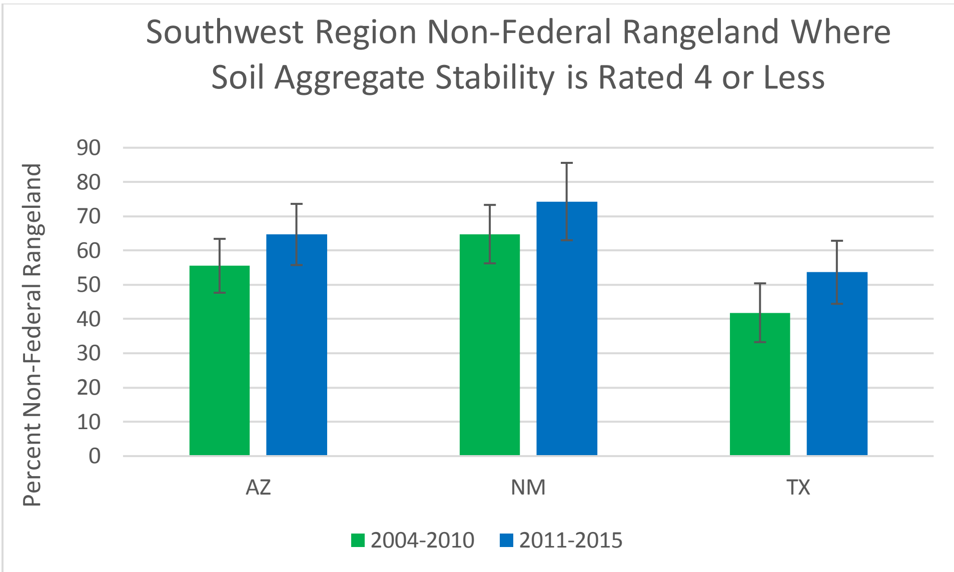
3 = 50% of structural integrity lost, (melts) 30–300 seconds after immersion or less than 10% remains on the sieve after five dipping cycles.

4 = 10–25% of original soil material remains on the sieve after five dipping cycles.

5 = 25–75% of original soil material remains on the sieve after five dipping cycles.

6 = 75–100% of original soil material remains on the sieve after five dipping cycles.

Figure 43. Southwest Region Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less. Error bars represent margins of error.



Invasive Plants

Mesquite is a concern in this region (Figures 44-46). Although for most of the Southwest region the percent of non-Federal rangeland where mesquite is present remained unchanged, in the Texas portion there was an increase from 33.9 (±6.9) to 52.2 (±10.2) percent. Juniper presence is less pervasive than mesquite in the region, but present on 15.7 (±7.0) percent of non-Federal rangeland in New Mexico, 15.6 (±8.9) percent in Texas, and 7.6 (±5.4) percent in Arizona (Figures 47-49). Non-native annual brome grasses are also starting to become invasive in this region (Figures 50-51).

Figures 44-45. Non-Federal Rangeland Where *Mesquite S*pecies are Present. (Source: Table 96, Table 97, and Table 98**)**

Figure 44. 2004-2010

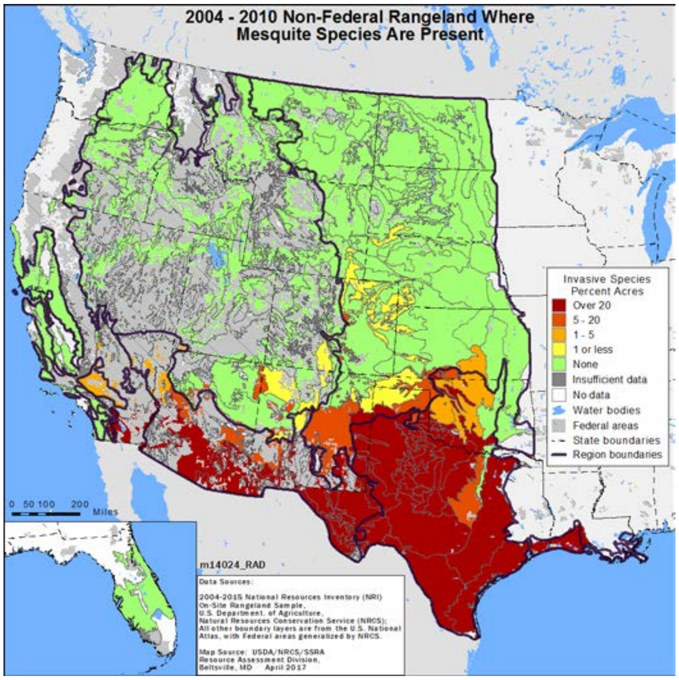


Figure 45. 2011-2015

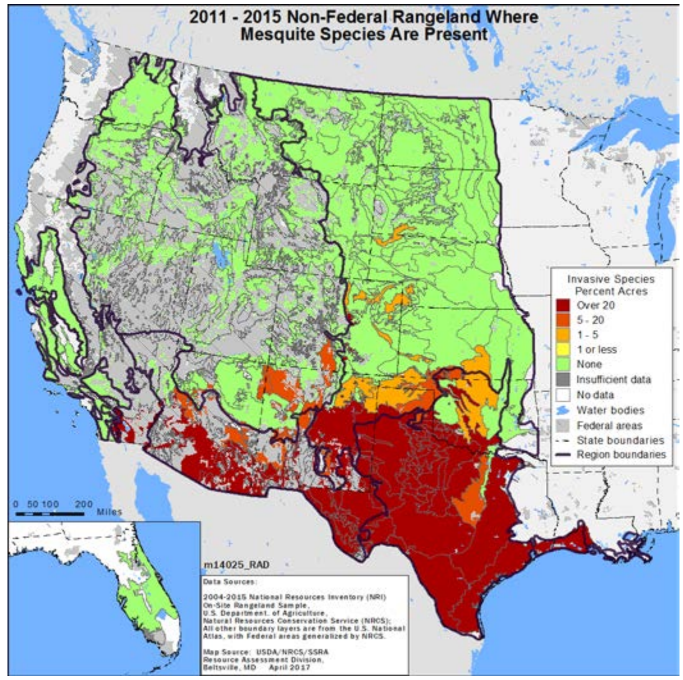
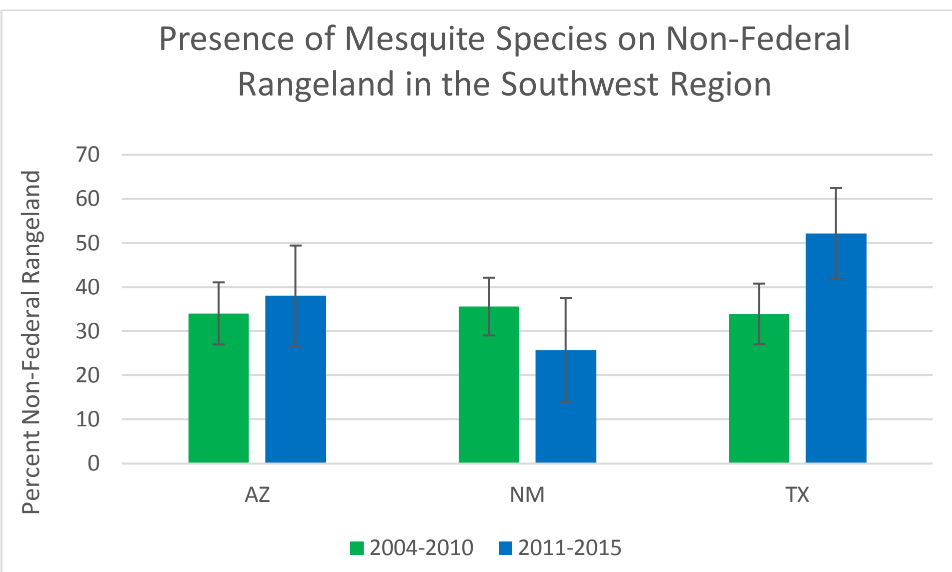


Figure 46. Non-Federal Rangeland Where *Mesquite S*pecies are Present. Error bars represent margins of error.



Figures 47-48. Non-Federal Rangeland Where Juniper Species are Present. (Source: Table 75, Table 76, and Table 77**)**

Figure 47. 2004-2010

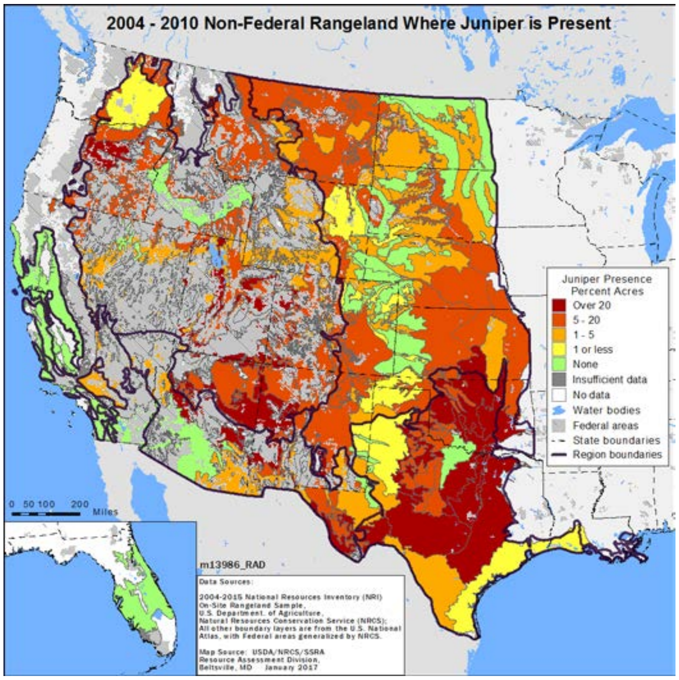


Figure 48. 2011-2015

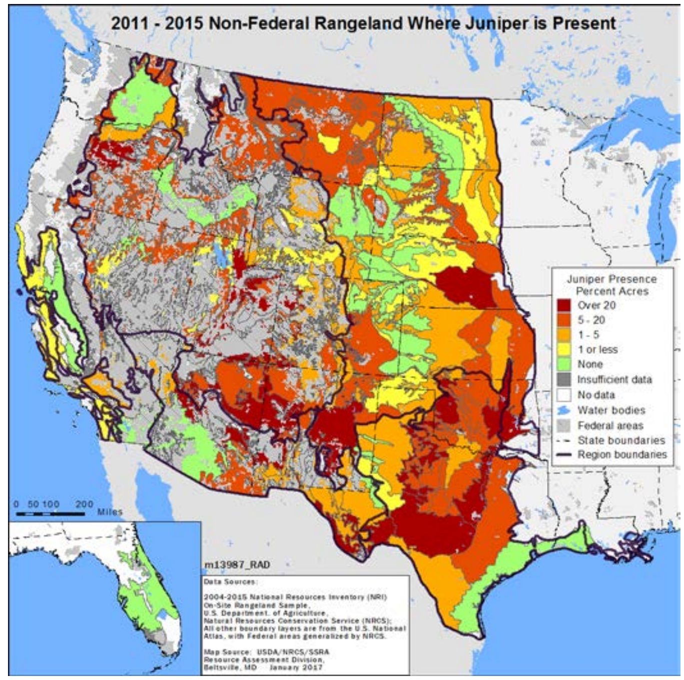
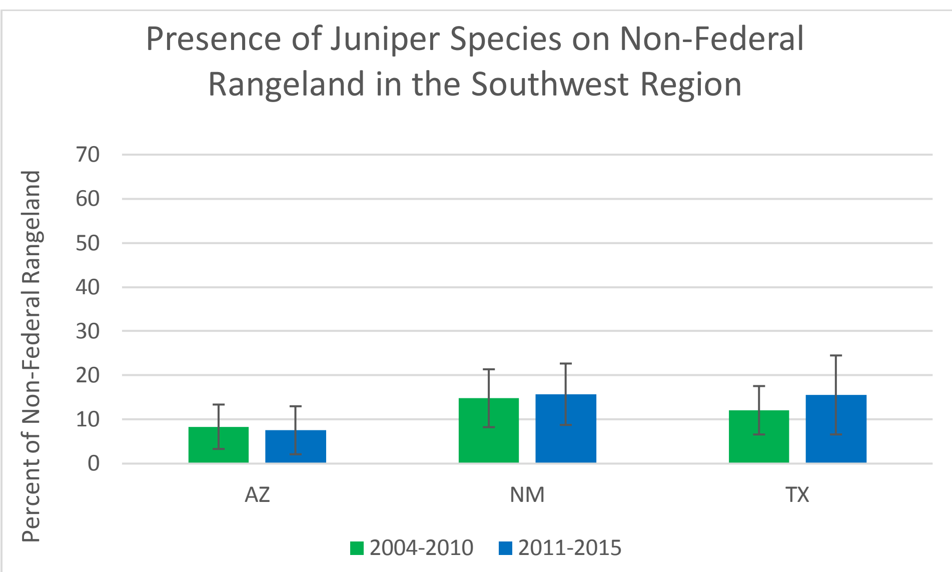


Figure 49. Southwest Region Non-Federal Rangeland Where Juniper Species are Present. Error bars represent margins of error.



Figures 50-51. Non-Federal Rangeland Where Annual Bromes are Present.
(Source: Table 17, Table 18, and Table 19**)**

Figure 50. 2004-2010

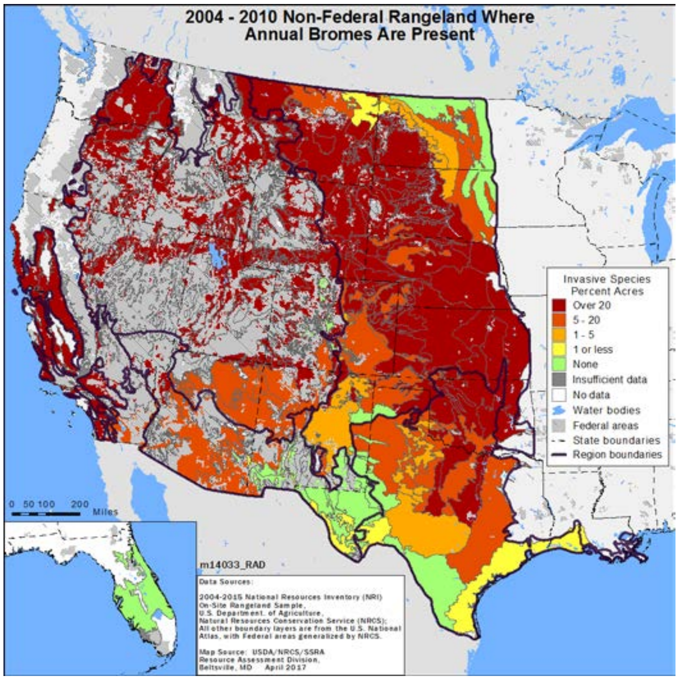
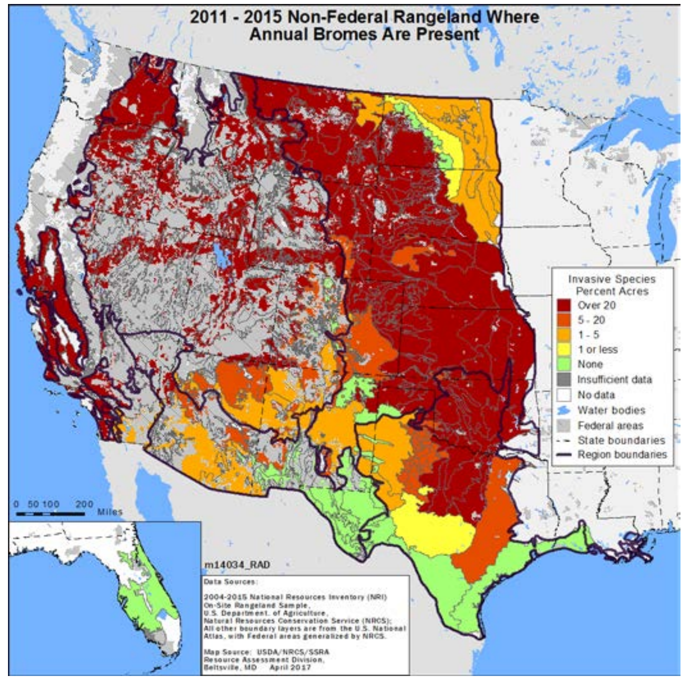


Figure 51. 2011-2015



Summary and Conclusions

Within the Southwest region, New Mexico and Texas had statistically significant increases in the percent of non-Federal rangeland where all three rangeland health attributes had at least moderate departure from reference conditions. While only New Mexico had statistically significant increases in the percent of non-Federal rangeland where soil and site stability, and hydrologic function had moderate or greater departure from reference conditions, both New Mexico and Texas experienced increases in areas with moderate or greater departure for biotic integrity. Aridity contributes to lower resistance and resilience of these areas and the drought in the Southwest region during the second period (2011-2015) very likely contributed to these results.

Areas of non-Federal rangeland that were at least 50 percent bare ground increased in New Mexico and Texas. There was also in increase in the percent of non-Federal rangeland in the New Mexico portion of the Southwest region where at least 20 percent of the land covered by canopy gaps of at least 2 meters and where 2-m or larger gaps not only covered at least 20 percent of the land but had at least 50 percent bare ground in the inter-canopy spaces. Exposed bare ground and loss of vegetation (above and below ground biomass), loss of organic matter, grazing impacts, and loss of microbiotic soil crusts contribute to much of the increased departure from reference conditions for soil stability in southern New Mexico and

West Texas. High levels of bare ground can occur naturally on some ecological sties, particularly in the extremely arid parts of southwestern Arizona and western New Mexico.

The pattern of soil site stability (Figures 11-16) and hydrologic function (Figures 17-22) are similar. A loss of herbaceous cover associated with replacement of grasses by shrubs leads to increased bare ground (Figures 29-31), the formation of vesicular crusts (e.g., physical soil crusts), and a higher proportion of bare ground in large inter-canopy gaps (Figures 35-40). These conditions are conducive to reduced infiltration capacity, accelerated runoff, and increased erosion (Blackburn W.H. 1990). In the Southwestern region, and throughout most of the rangeland areas in the U.S., high intensity storms can generate substantial rainfall and raindrop energy that disturb and move soil surface particles. These storm intensities can result in considerable runoff and erosion in a very short period of time. If conditions have deteriorated, resulting in a high percentage of bare ground and loss of vegetative cover, these storms can initiate rills, gullies, eroded water flow paths, and loss of soil (B. J. Pierson F.B 2007, W. C. Pierson F.B 2010). High intensity storms associated with disturbed rangeland are the principle force associated with loss of soil surface stability and hydrologic function. All three of the rangeland health attributes (soil site stability, hydrologic function, and biotic integrity) are usually correlated with each other and as rangeland conditions degrade they all will eventually show signs of departure from reference conditions and transition to potentially less desirable states.

The reduction in biotic integrity in much of this region (Figure 23-25) is due to the invasion of native, rather than non-native shrub species. Mesquite species (Figures 44-46), for example, can be highly invasive on many sites in the Chihuahuan and Sonoran Deserts. Juniper species (Figures 47-49) are also highly invasive throughout this region. Although mesquite and juniper are native shrubs on many rangeland ecological sites in the region, they are expanding their range to areas where they have not been part of the reference conditions (Figures 21-22). Non-native annual brome grasses are also starting to become invasive in this region (Figures 50-51). This shift in species composition negatively impacts nutrient cycling and the quality of wildlife habitat, both directly and through its effects on the fire regime (fire intensity and frequency often increases with higher densities of certain invasive plant species) where wildfire can threaten urban areas. This shift also affects soil surface and soil-plant-water relations, which affects all three rangeland health attributes. These feedbacks occur in all regions, but are particularly important in the Southwest and Intermountain West regions (S. D. Archer 1995, Ansley 1997, DiTomaso 2000, Mack 1998) (S. D. Archer 1995, Ansley 1997, Mack 1998, DiTomaso 2000, Evans R.D. 2001, Ogle S.M. 2003, Brooks M.L. 2004, Norton J.B. 2004, Boxell J. 2008, S. K. Archer 2011)

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The rangeland health maps represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

The source data used to construct the drought figures are from the National Drought Mitigation Center, and follow the drought monitor categories: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx. The weekly drought monitor data were converted to a 1/8-degree grid, and the state and broad region polygons were used to clip out the grid cells within each region for the two time periods. Both the stack plots show the distribution of 1/8-degree grid cells of each drought monitor class for each year.

Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

More Information

Ansley, R.J., J.A. Huddle and B.A. Kramp. 1997. *Mequite ecology.* Texas Agricultural Experiment Station, Vernon, TX 76384 (http://texnat.tamu.edu/library/symposia/brush-sculptors-innovations-for-tailoring-brushy-rangelands-to-enhance-wildlife-habitat-and-recreational-value/mesquite-ecology/).

Archer, S., D.S. Schimel, and E.A. Holland. 1995. "Mechanisms of shrubland expansion: land use, climate or CO2?" *Climatic Change 29:91–99.*

Archer, S.R., K.W. Davies, T. E. Fulbright, K.C. McDaniel, B.P. Wilcox, and K.I. Predick. 2011. Brush Management as a Rangeland Conservation Tool: A Critical Evaluation. In: Briske, D.D., editor. 2011. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service. (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?cid=stelprdb1045811 (last accessed11/07/2016)).

Blackburn W.H., F.B. Pierson, and M.S. Seyfried. 1990. Spatial and temporal influence of soil frost on infiltration and erosion of sagebrush rangelands. Water Resources Bull. 26:991-997.

Boxell J., and P.J. Drohan. 2008. "Surface soil physical properties and hydrological characgteristics in Bromus tectorum L. (cheatgrass) versus Artemisia tridentata Nutt. (big sagebrush) habitat." *Geoderma 149:305-311.*

Brooks M.L., D'Antonio C.M., Richardson D.M., et al. 2004. "Effects of invasive alien plants on fire regimes." *BioScience 54: 677–88.*

DiTomaso, J.M. 2000. "Invasive weeds in ranelands: Speicies, impacts, and management." *Weed Science: March 2000, vol. 48, No. 2, pp. 255-265.*

Evans R.D., R. Rimer, and S.P. Belnap. 2001. "Exotic plant invasion alters nitrogen dynamics in an arid grassland." *Ecol. Appl. 11:1301-1310.*

Mack, M.C. and C.M. D'Antonio. 1998. "Impacts of biological invasion on disturbance regimes." *Tends in Ecological Evolution* 13:195-198.

Norton J.B., T.A. Monaco, J.M Norton, D.A. Johnson, and T.A. Jones. 2004. "Soil morphology and organic matter dynamics under cheatgrass and sagebrush-steppe plant communities." *Journal of Arid Environments 57: 445–466.*

Ogle S.M., W.A. Reiners, and K.G. Gerow. 2003. "Impacts of Exotic Annual Brome Grasses (Bromus spp.) on Ecosystem Properties of Northern Mixed Grass Prairie." *American Midland Naturalist 149: 46-58.*

Pierson F.B, Bates J.D, Svejcar T.J, and Hardegree S.P. 2007. *Runoff and erosion after cutting western juniper.* Rangeland ecology & management, 60(3), 285-292.

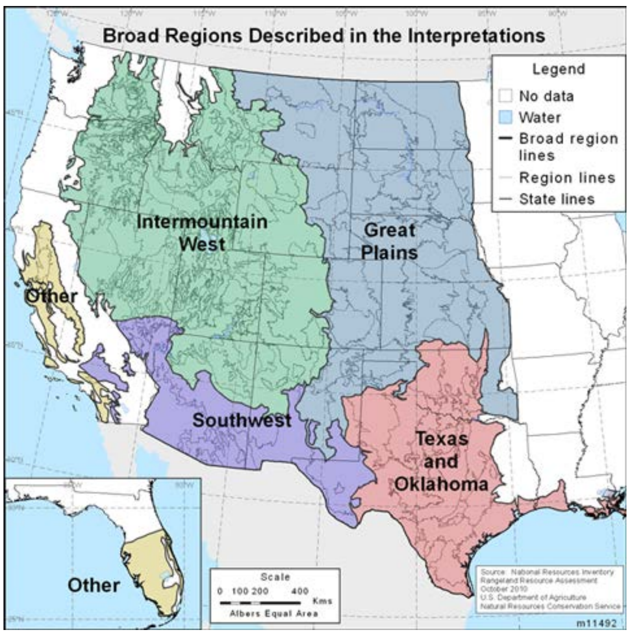
Pierson F.B, Williams, C.J, Kormos, P.R, Hardegree, S.P, Clark, P.E, and Rau B.M. 2010. *Hydrologic vulnerability of sagebrush steppe following pinyon and juniper encroachment.* Rangeland Ecology & Management, 63: 614-629.

Send comments and questions to the NRI Help Desk

Texas and Oklahoma

Rangelands in this region are extremely diverse and include Gulf prairies and marshes, post oak savannahs, Blackland prairies, tall- and mixed-grass prairie, cross timbers and prairies, south Texas plains, and eastern fringe of the Edwards Plateau and Rolling Plains (Figure 1). This region exemplifies high diversity of rangeland plant community types: tallgrass and shortgrass prairies, thorn-shrub, to savannah. Biodiversity is high in the Texas and Oklahoma region. The USDA-NRCS NRI data set includes 122 plant families and 584 plant genera. The breakdown of plant growth habit is as follows: 305 graminoids, 533 forb/herbs, 266 shrubs and subshrubs, and 151 tree species.

Figure 1. Broad Regions Described in the Interpretations



Climate in this region is variable from east-to-west and north-to-south, but is characterized as a warm-temperate/subtropical zone. The growing season is long, up to 330 days in the lower Rio Grande Valley of Texas. Rainfall is variable and ranges from 8 inches on the western fringe to 40 inches or more along the Gulf Coast. Winters are dry and summers are humid. Drought, a recurring phenomenon in Texas and Oklahoma, is generally unpredictable and can have an extreme effect on vegetation.

Shrub invasion of juniper (*Juniperus* spp.) and honey mesquite (*Prosopis glandulosa* Torr) is a common problem and is exacerbated by a combination of events such as recurring drought, subsequent overgrazing, and lack of prescribed fire. The potential for high runoff and erosion expands as juniper overstory increases and understory vegetation decreases ((B. J. Pierson F.B 2007, W. C. Pierson F.B 2010, S. K. Weltz M.A 2012, K. S. Weltz M.A 2014, Pierson F.B. 2002).

Results in this report are based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015. Drought impacted the area during the second period (Figures 2-5). While this region experienced abnormally dry or moderate drought during the early period (2004-2010), much of this region experienced severe to extreme drought during the more recent period (2011-2015). The figures provide context for subsequent summary results.

Figures 2-3. Map of average drought monitor rating (0 to 4 scale, where 0 is mild drought and 4 is extreme) across the two NRI sampling periods.

Figure 2.

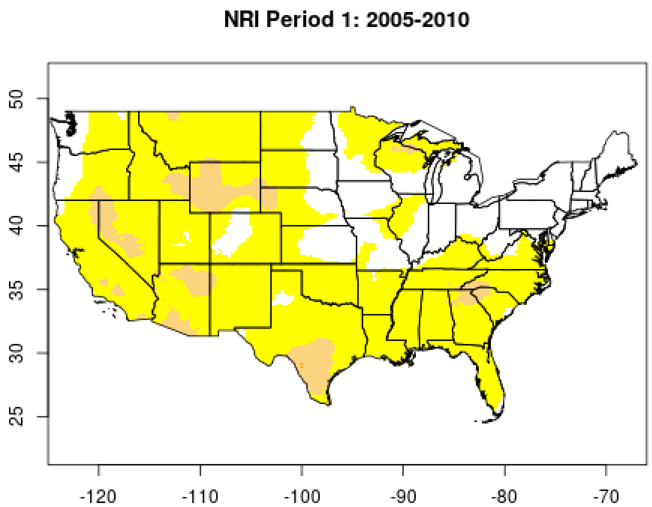
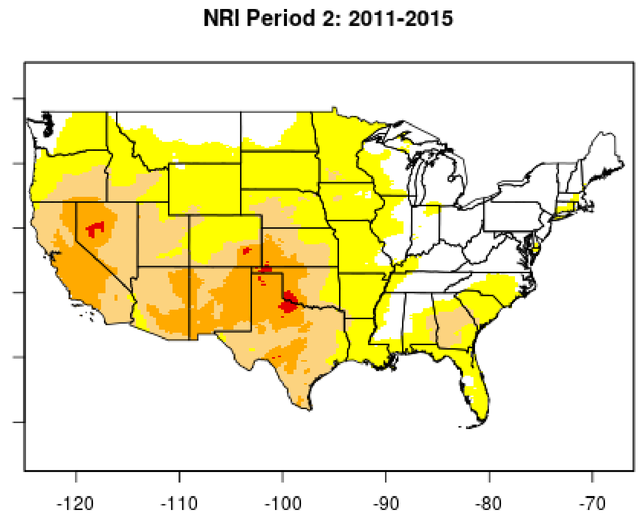


Figure 3.



Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Figure 4. Average drought severity in the Texas portion of the Texas and Oklahoma region.

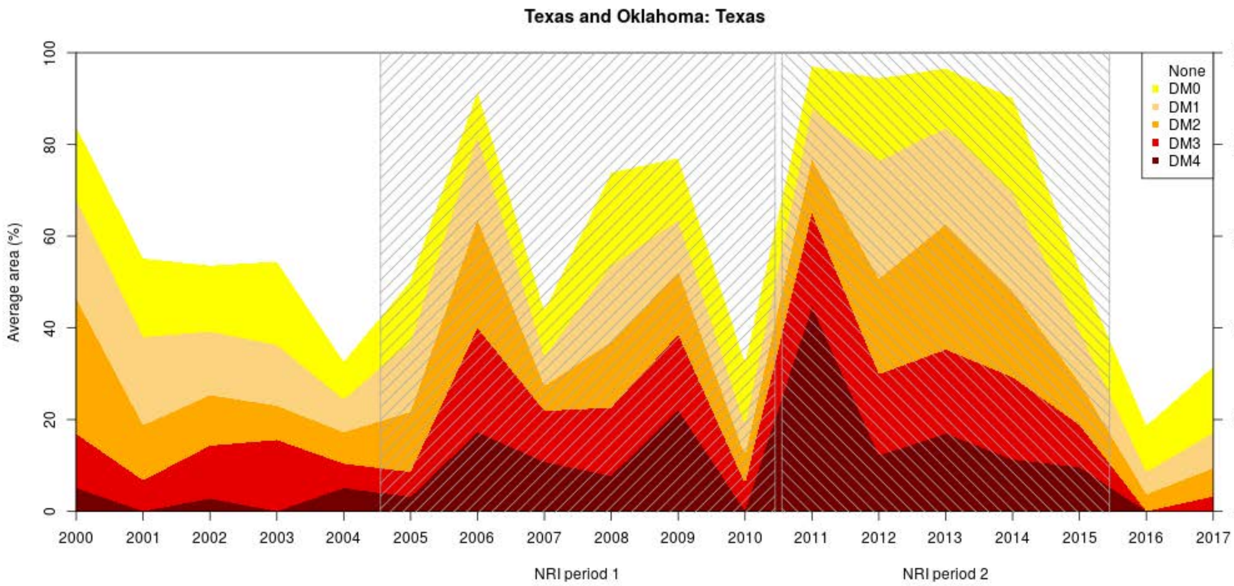
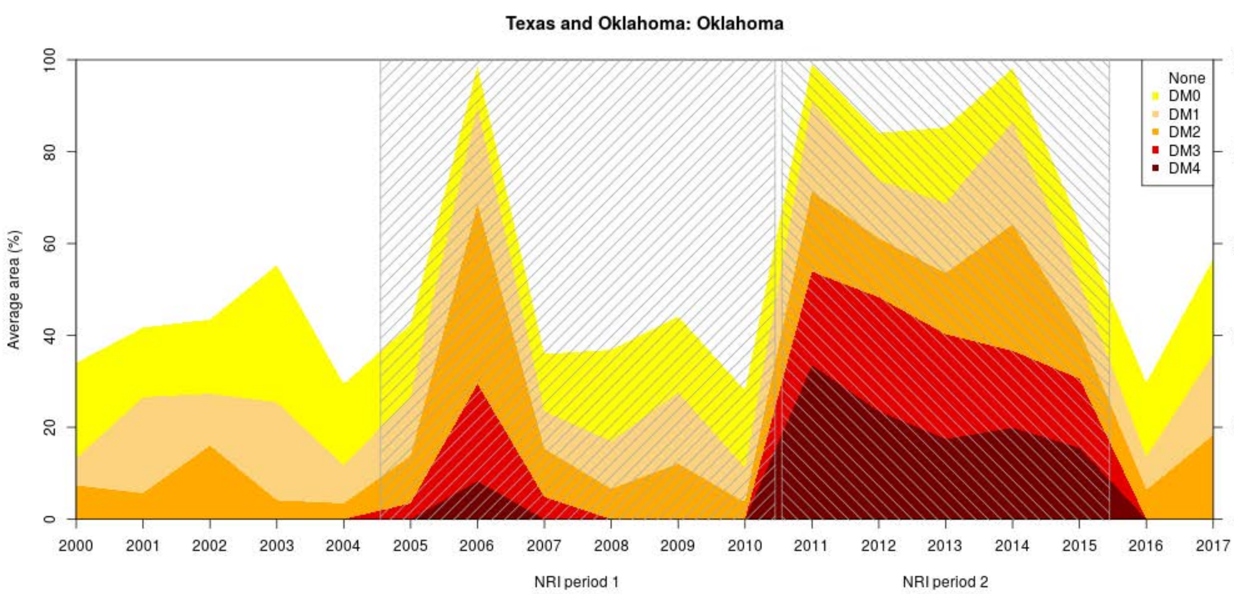


Figure 5. Average drought severity in the Oklahoma portion of the Texas and Oklahoma region.



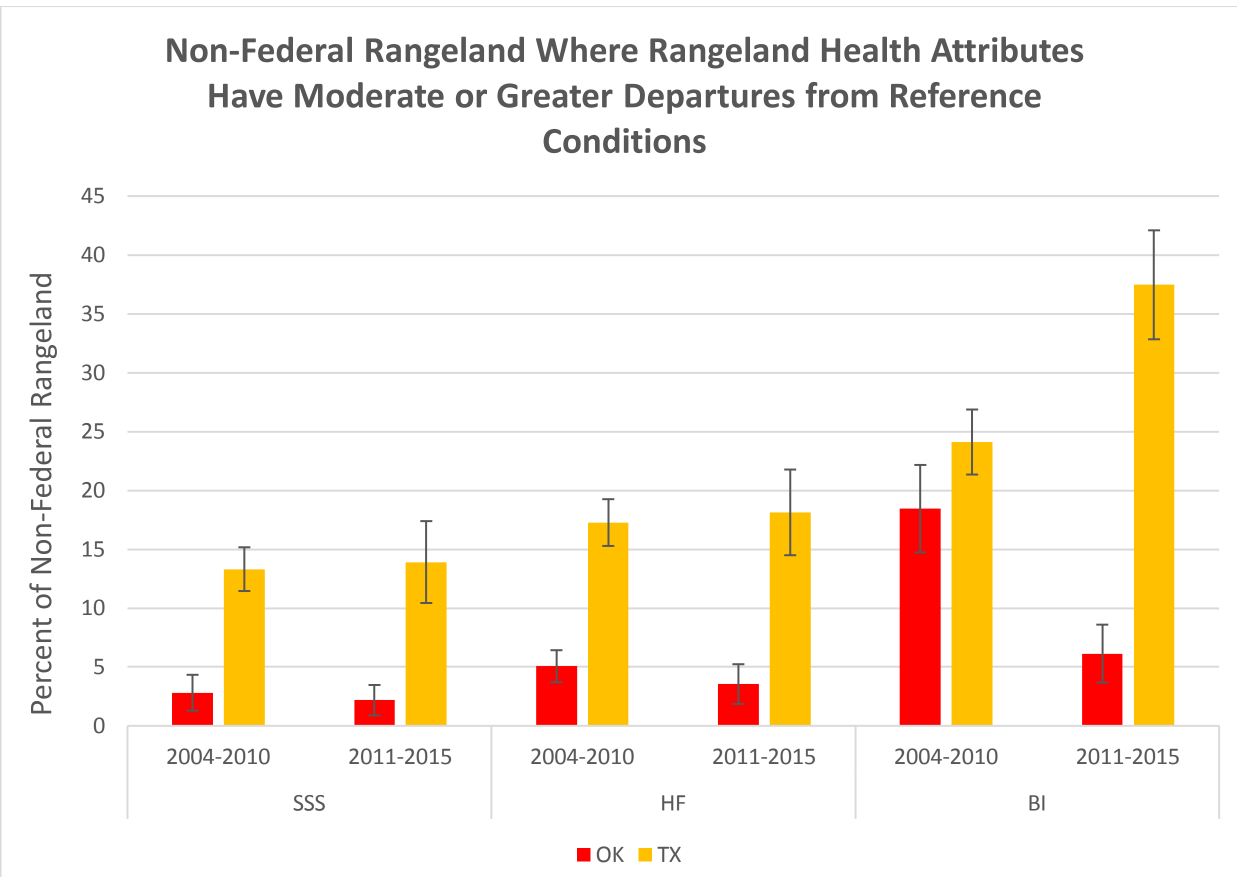
Rangeland Health Attributes

Although there was little change between 2004-2010 and 2011-2015 in the percent of non-Federal rangeland where soil site stability and hydrologic function ratings of moderate or greater departure from reference conditions, the drought in Texas and Oklahoma during 2011-2015 may have impacted on biotic integrity in Texas.

Soil and Site Stability

Within the Texas and Oklahoma region, the percent of Texas non-Federal rangeland where soil and surface stability showed at least moderate departure from reference conditions remained at the same level between 2004-2010 (13.3 ± 1.9 percent) and 2011-2015 (13.9 ± 3.5 percent). The percent of non-Federal rangeland where soil and site stability had moderate and greater departure from expected reference conditions was lower in the Oklahoma portion of the region than in the Texas portion, but also remained unchanged between 2004-2010 (2.8 ± 1.5 percent) and 2011-2015 (2.2 ± 1.3 percent) (Figure 6).

Figure 6. Non-Federal rangeland in Oklahoma and Texas where rangeland health attributes have moderate or greater departures from reference conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**).**



However, Figures 7-8 show that within Texas and Oklahoma, there were differences in areas of non-Federal rangeland where soil and site stability had moderate or greater departure. This was especially the case in the Texas panhandle area, where these departures from reference conditions corresponded with the areas of drought (Figures 2-3).

Figure 7-8. Non-Federal Rangeland Where Soil and Site Stability Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 7. 2004-2010

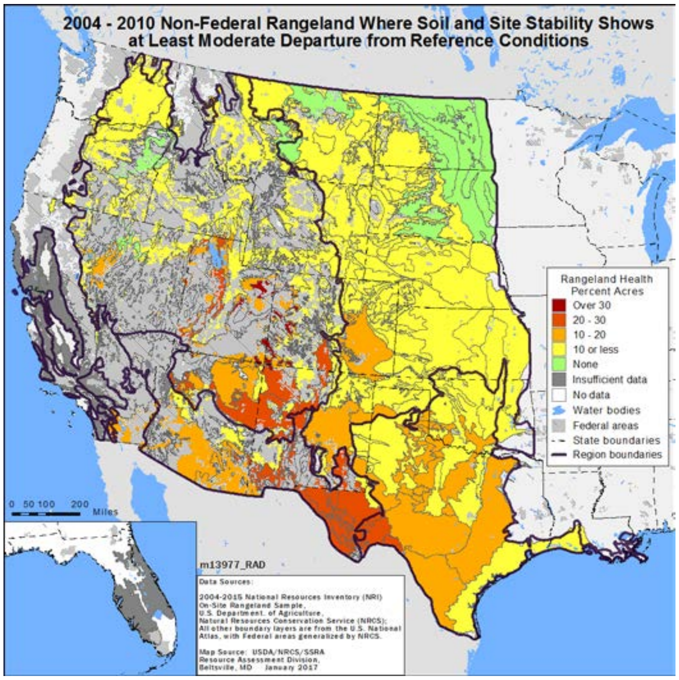
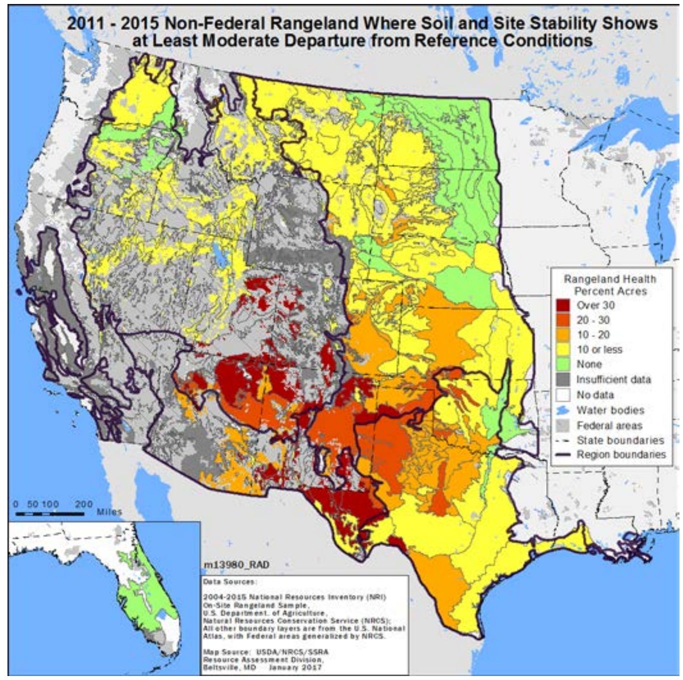


Figure 8. 2011-2015



Hydrologic Function

Within the Texas and Oklahoma region, the percent of Texas non-Federal rangeland where hydrologic function had moderate or greater departure from reference conditions remained at the same level between 2004-2010 (17.3 ± 2.0 percent) and 2011-2015 (18.1 ±3.6 percent). Also within the region, the percent of Oklahoma non-Federal rangeland acres with moderate and greater departure from expected reference conditions also remained unchanged between 2004-2010 (5.1 ± 1.4 percent) and 2011-2015 (3.5 ± 1.7 percent) (Figure 6). As with the soil and site stability, areas of non-Federal rangeland with hydrologic function showing moderate or greater departures from reference again correspond with areas of drought (Figures 9-10).

Figures 9-10. Non-Federal Rangeland Where Hydrologic Function Shows at Least Moderate Departure from Reference Conditions (Source: Rangeland Health Table 2, Table 3, and Table 4**)**

Figure 9. 2004-2010

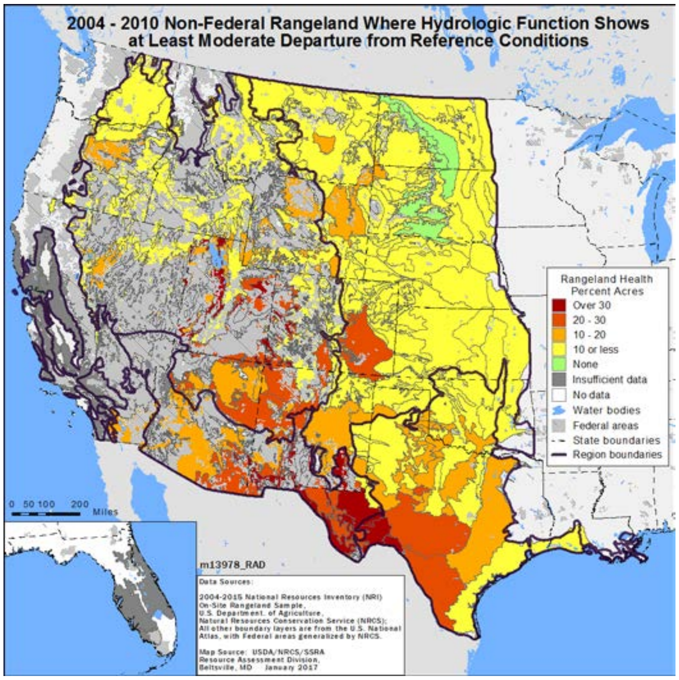
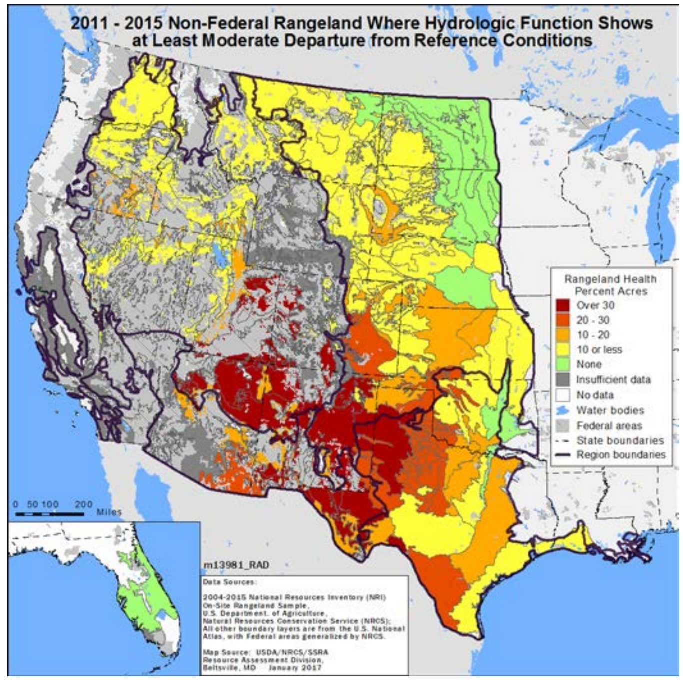


Figure 10. 2011-2015



Biotic Integrity

Within the region biotic integrity shifts were observed for both Texas and Oklahoma. In Texas, a 16.3 ± 5.6 percent increase in non-Federal rangeland areas of at least moderate departure from reference conditions was observed from 24.1 (±2.8) to 37.5 (±4.6) percent between 2004-2010 and 2011-2015. However, in the Oklahoma portion of the region there was a decrease from 18.4 (±3.7) to 6.1 (±2.5) between those time periods.

Figures 11-12. Non-Federal Rangeland Where Biotic Integrity Shows at Least Moderate Departure from Reference Conditions (Source: Table 2, Table 3, and Table 4**)**

Figure 11. 2004-2010

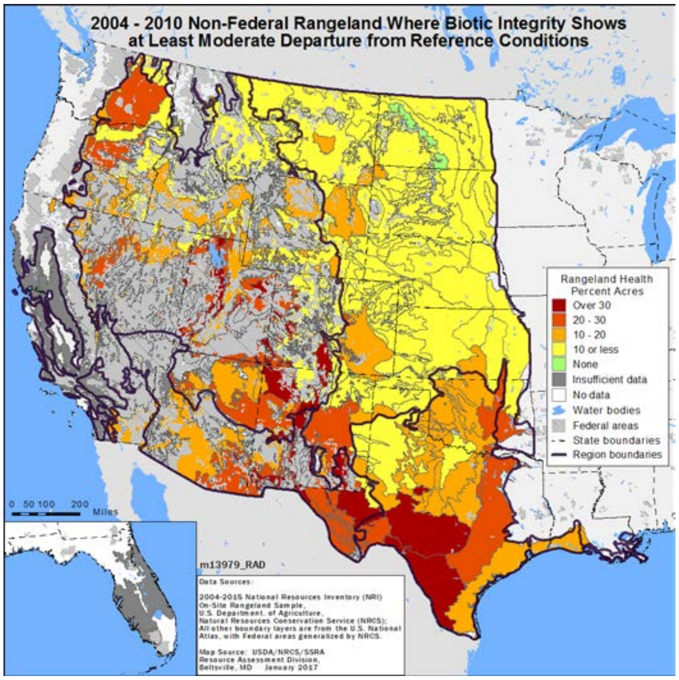
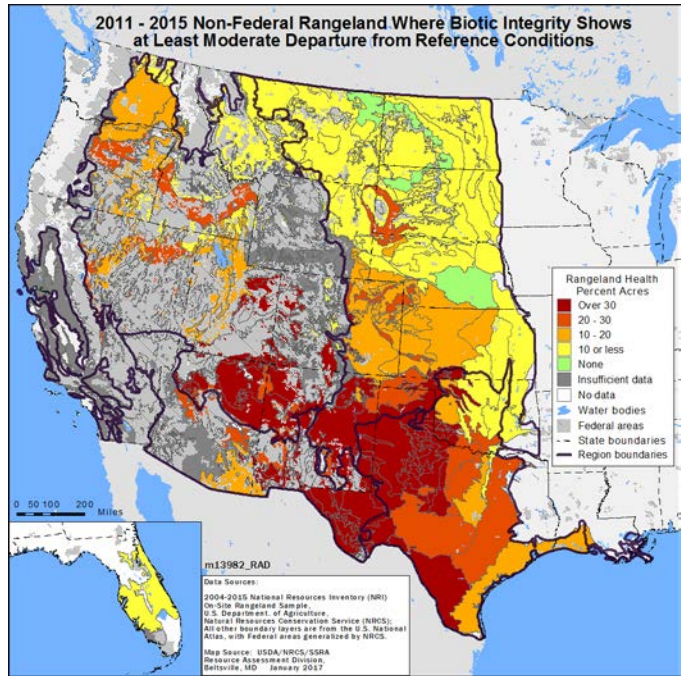


Figure 12. 2011-2015

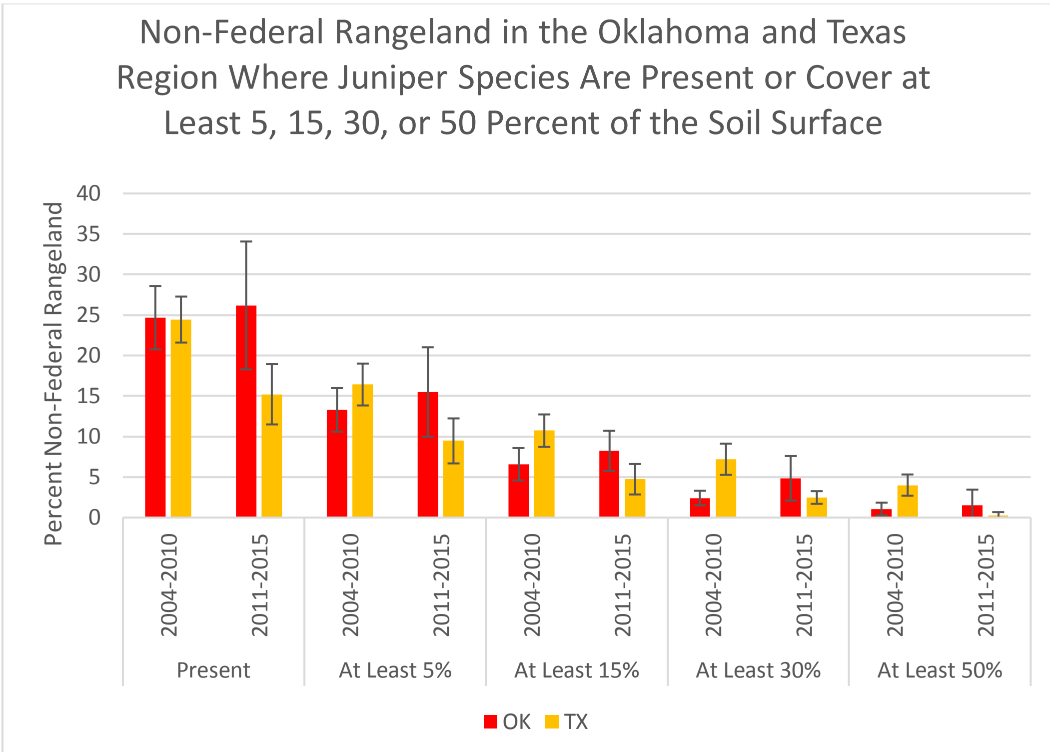


Specific Indicator Discussion

Invasive Woody Species

Within the region, Juniper (*Juniperus* spp.) presence on non-Federal rangeland shifted downward in Texas from 24.4 (±2.8) to 15.2 (±3.7) percent, but changed very little in Oklahoma (24.7 ±3.9 percent in 2004-2010 to 26.2 ±7.9 percent in 2011-2015) (Figures 13-15). Mesquite presence within the region changed very little in Texas (53.8 ±2.7 to 57.2 ±5.1 percent) and Oklahoma (8.8 ±2.8 to 8.9 ±4.2 percent) (Figures 16-19).

Figure 13. Non-Federal Rangeland in Oklahoma and Texas Where Juniper Species Are Present or Cover at Least 5, 15, 30, or 50 Percent of the Soil Surface



Figures 14-15. Non-Federal Rangeland Where Juniper Species are Present. (Source: Table 75, Table 76, and Table 77**)**

Figure 14. 2004-2010

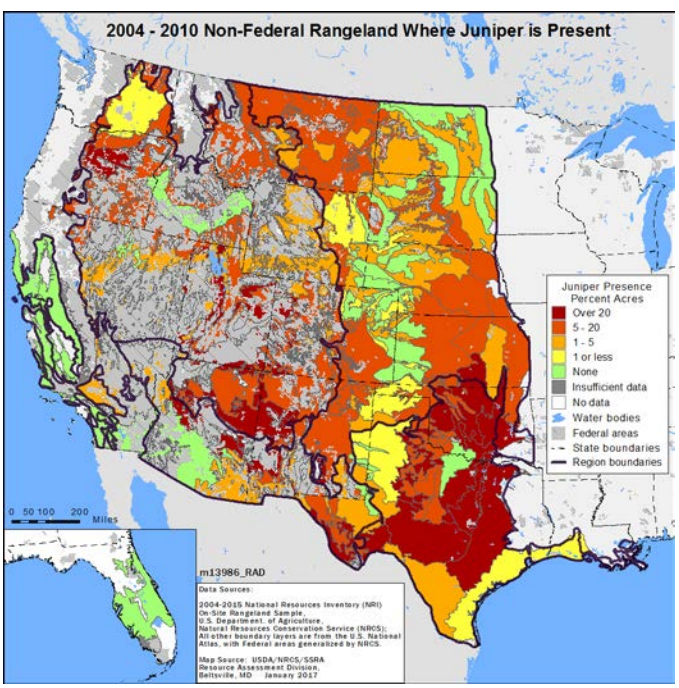


Figure 15. 2011-2015

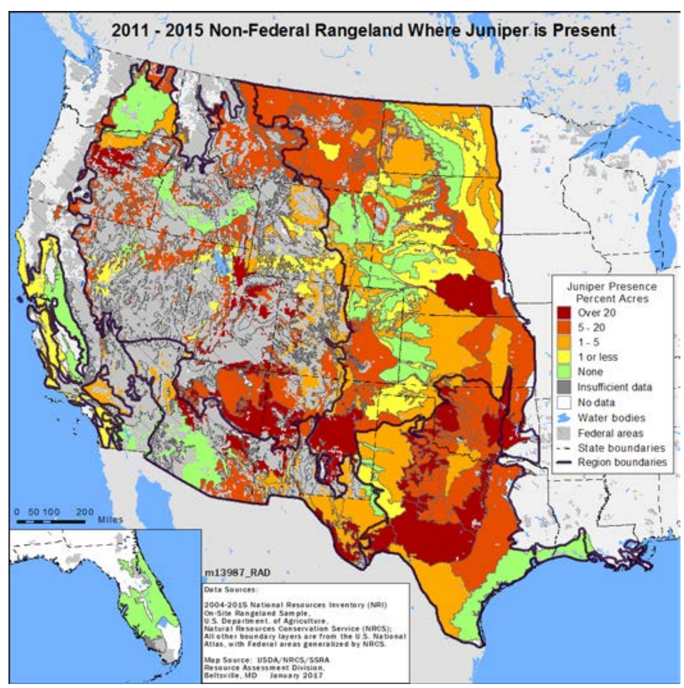
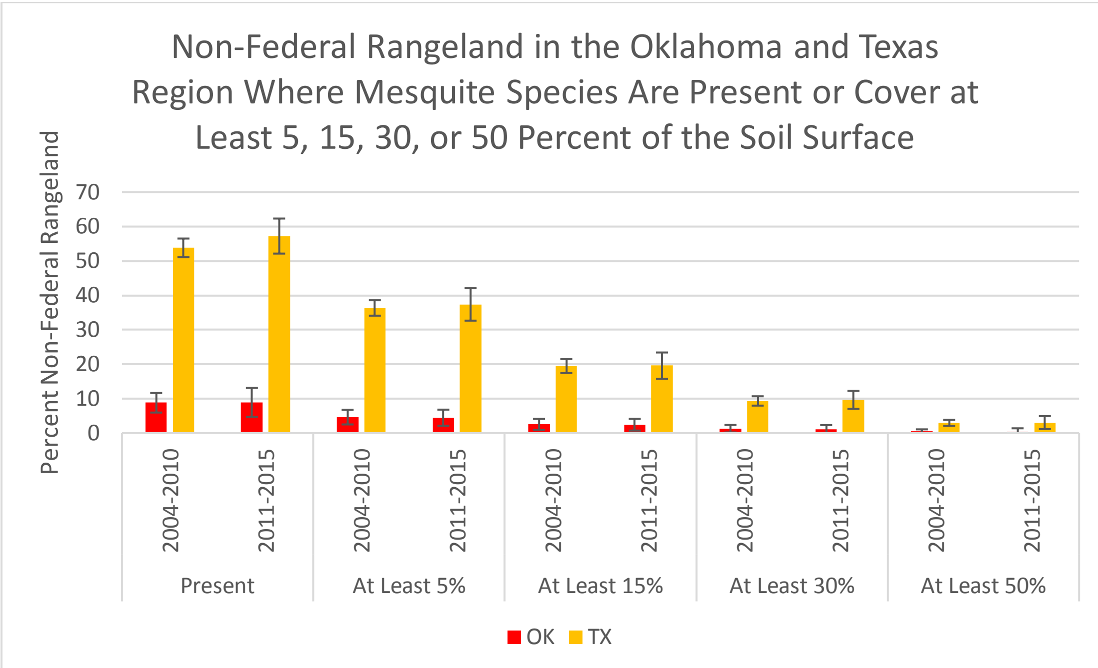


Figure 16. Non-Federal Rangeland in the Oklahoma and Texas Region Where Mesquite Species Are Present or Cover at Least 5, 15, 30, or 50 Percent of the Soil Surface. Error bars represent margins of error.



Figures 17-18. Non-Federal Rangeland Where Mesquite Species are Present. (Source: Table 96, Table 97, and Table 98**)**

Figure 17. 2004-2010

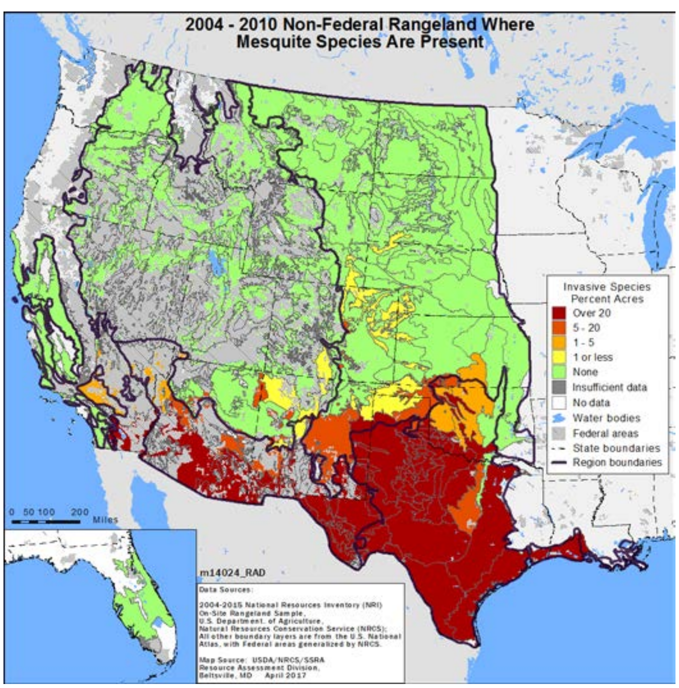
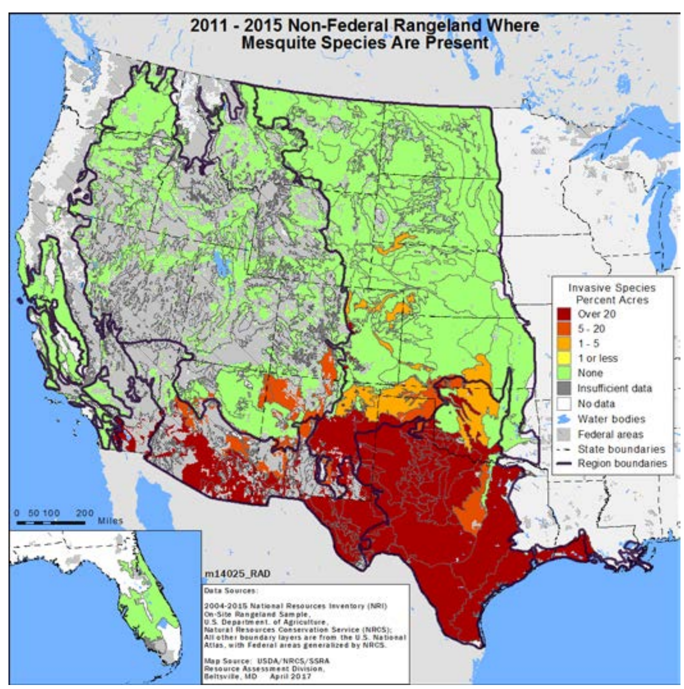


Figure 18. 2011-2015



Invasive Grasses

Within the region, annual bromes are present in Oklahoma on 30.3 (±4.9) and 41.7 (±6.9) percent of non-Federal rangeland during 2004-2010 and 2011-2015, respectively, and in Texas on 8.4 (±1.5) and 7.7 (±2.3) percent (Figures 19-20). Buffelgrass (*Pennisetum ciliare*) is making inroads in Texas and has become invasive in southwest Texas where it is present on over 20 percent of non-Federal rangeland (Figures 21-22).

Figures 19-20. Non-Federal Rangeland Where Annual Bromes are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 19. 2004-2010

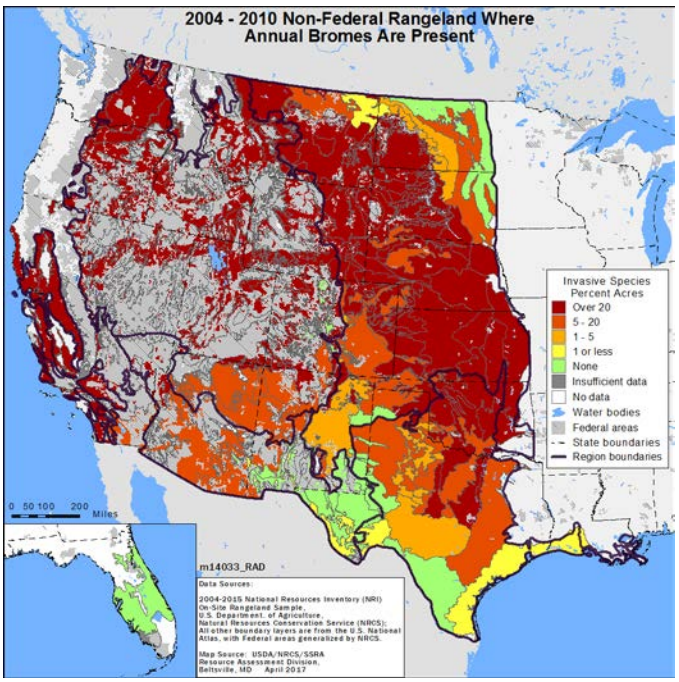
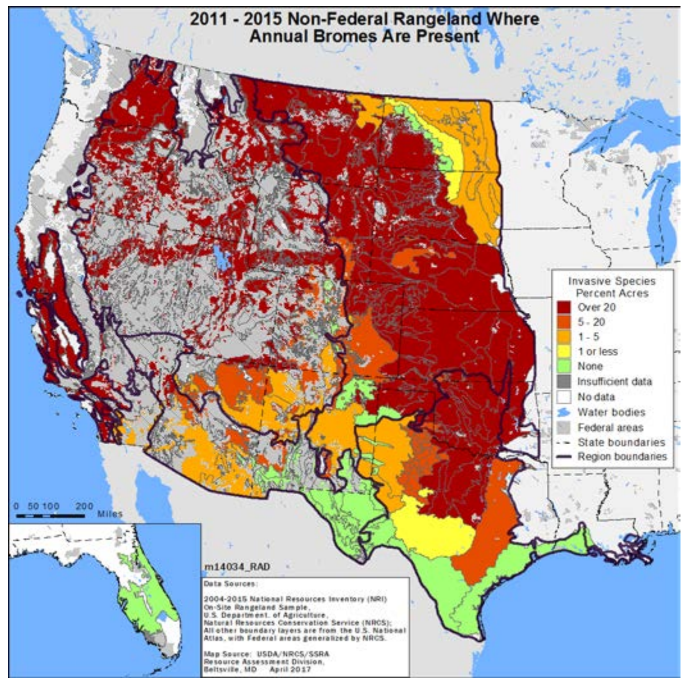


Figure 20. 2011-2015



Figures 21-22. Non-Federal Rangeland Where Buffelgrass is Present. (Source: Table 39, Table 40, and Table 41**)**

Figure 21. 2004-2010

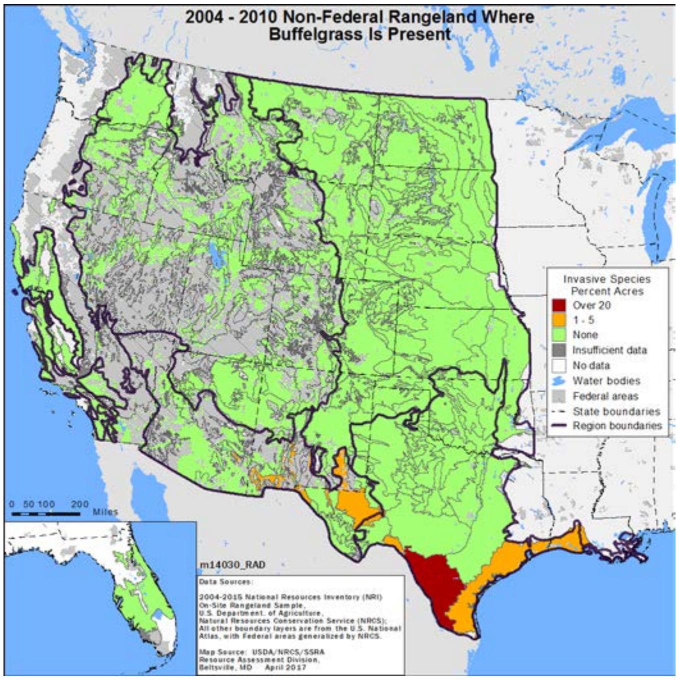
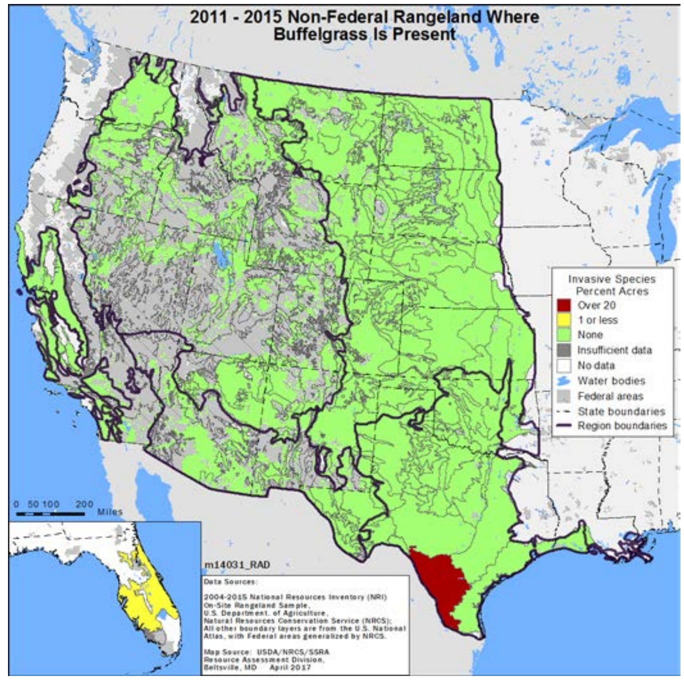


Figure 22. 2011-2015



Summary and Conclusions

Although areas non-Federal rangeland within the Texas and Oklahoma region where at least moderate departures from reference conditions for rangeland health attributes, soil and site stability, and hydrologic function, remained at the same levels for the two periods, within these regions there were differences that coincided with severe to extreme drought during the more recent period (2011-2015). Most notably, the Texas panhandle saw increases for all three rangeland health attributes.

Annual brome grasses (*bromus* spp.), also widespread in the region, are highly invasive in shrub communities including juniper and often completely out-compete native grasses and forbs. Communities of annual bromes can be highly flammable in the late spring through early fall (DiTomaso 2000). In this region, annual brome grasses are present on 41.7 (±6.9) percent of non-Federal rangeland in Oklahoma and 7.7 (±2.3) percent in Texas. Buffelgrass (*Pennisetum ciliare*) is an invasive perennial grass that is highly resistant to drought events and can choke out native grasses. When dry, this tall grass burns rapidly if ignited, making it especially dangerous during wildfire season (Tellman 2002, Sands 2009). Buffelgrass is present on over 20 percent of non-Federal rangeland in southwest Texas.

Juniper (*Juniperus* spp.) and mesquite *(Prosopis* spp.) presence is pervasive in the Texas and Oklahoma region. Juipers are present on 26.2 ±7.9 percent of non-Federal rangeland in Oklahoma and on 15.2 (±3.7) percent in Texas. Junipers can invade areas replacing native grasses and forbs. Dense stands can alter nutrient and energy cycles, affect hydrology, and reduce wildlife habitat and forage for domestic animals and wildlife (DiTomaso 2000, Chambers 2007, Miller, et al. 2008.). Mesquite is present on 57.2 (±5.1) percent of non-Federal rangeland in Texas and 8.9 (±4.2) percent in Oklahoma. Mesquite typically has a deep root system that enables it to withstand droughts and severe competition from grasses. Replacement of grasses by mesquite over time modifies the soils and microclimate, facilitating establishment of additional woody species (Archer 1995).

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The rangeland health maps represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

The source data used to construct the drought figures are from the National Drought Mitigation Center, and follow the drought monitor categories: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx. The weekly drought monitor data were converted to a 1/8-degree grid, and the state and broad region polygons were used to clip out the grid cells within each region for the two time periods. Both the stack plots show the distribution of 1/8-degree grid cells of each drought monitor class for each year.

Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

More Information

Archer, S., D.S. Schimel, and E.A. Holland. 1995. "Mechanisms of shrubland expansion: land use, climate or CO2?" *Climatic Change 29:91–99.*

Chambers, J.C., B.A. Roundy, R.R. Blank, S.E. Meyer, and A. Whittaker. 2007. "What makes Great Basin sagebrush ecosystems invasible by Bromus tectorum?" *Ecological Monographs. 77:117-145.*

DiTomaso, J.M. 2000. "Invasive weeds in ranelands: Speicies, impacts, and management." *Weed Science: March 2000, vol. 48, No. 2, pp. 255-265.*

Miller, Richard F., Robin J. Tausch, E. Durant McArthur, and Dustin D. Johnson. 2008. *Age structure and expansion of pinon-juniper woodlands: a regional perspective in the Intermountain West.* Res. Pap. RMRS-RP-69. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 15 p.

Pierson F.B, Bates J.D, Svejcar T.J, and Hardegree S.P. 2007. *Runoff and erosion after cutting western juniper.* Rangeland ecology & management, 60(3), 285-292.

Pierson F.B, Williams, C.J, Kormos, P.R, Hardegree, S.P, Clark, P.E, and Rau B.M. 2010. *Hydrologic vulnerability of sagebrush steppe following pinyon and juniper encroachment.* Rangeland Ecology & Management, 63: 614-629.

Pierson F.B., D.H. Carlson, and K.E. Spaeth. 2002. "Impacts of wildfire on soil hydrologic properties of steep sagebrush-steppe rangeland." *International Journal of Wildland Fire 11: 45-151.*

Sands, J.P., L.A, Brennan, F. Hernandez, W.P. Kuvlesky Jr., J.F. Gallagher, D.D. Ruthven III, and J.E. Pittman III. 2009. "Impacts of Buffelgrass (Pennisetum ciliare) on a Forb Community in South Texas." *Invasive Plant Science and Management 2(2)* 130-140.

Tellman, B. 2002. *Invasive Exotic Species in the Sonoran Desert Region.* University of Arizona Press (www.desertmuseum.org/invaders).

Weltz M.A, K. Spaeth, M.H. Taylor, K. Rollins, F. Pierson, L. Jolley, M. Nearing, D. Goodrich, M. Hernandez, S.K. Nouwakpo, and C. Rossi. 2014. *Cheatgrass invasion and woody species encroachment in the Great Basin: Benefits of conservation.* J. Soil and Water Cons. 69:39A-44A.

Weltz M.A, Spaeth, K. 2012. Estimating effects of targeted conservation on nonfederal rangelands. Rangelands. 34(4):35-40.

Send comments and questions to the NRI Help Desk

Other (California annual grasslands and Florida)

The unique characteristics of California annual grasslands and Florida (Figures 1-2) limit the ability to apply and interpret assessments of the three rangeland health attributes, albeit in slightly different ways. In the case of California, continuing debate about the reference conditions to be used for evaluations and incomplete implementation of ecological sites prevented development of the ecological site-specific reference sheets necessary to carry out the evaluations. In the case of Florida, the qualitative evaluation protocol has not been well tested and may need refinement to meet the needs of a subtropical system. Therefore, we are not reporting Rangeland Health attribute data for these areas, but only the quantitative data related to the attributes.

Figure 1. Acres of Non-Federal Rangeland, 2012

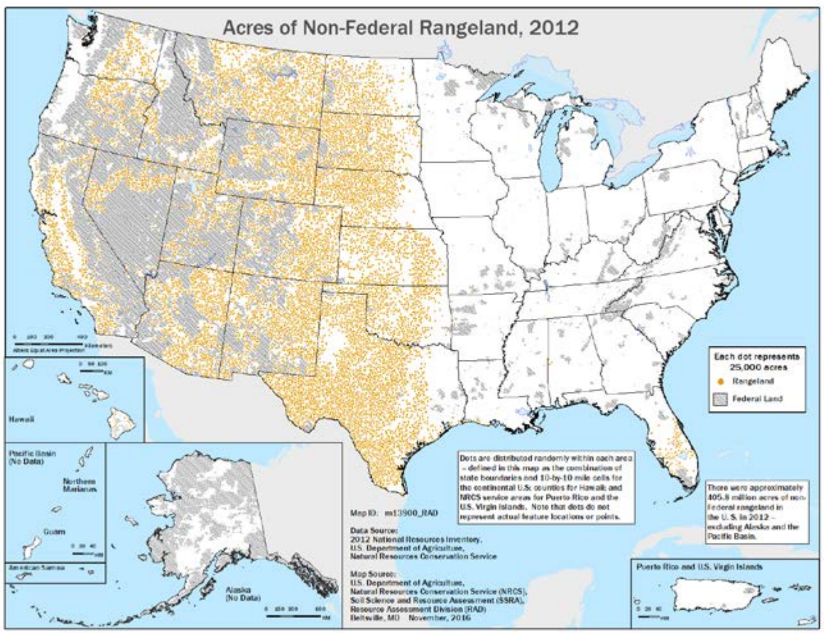
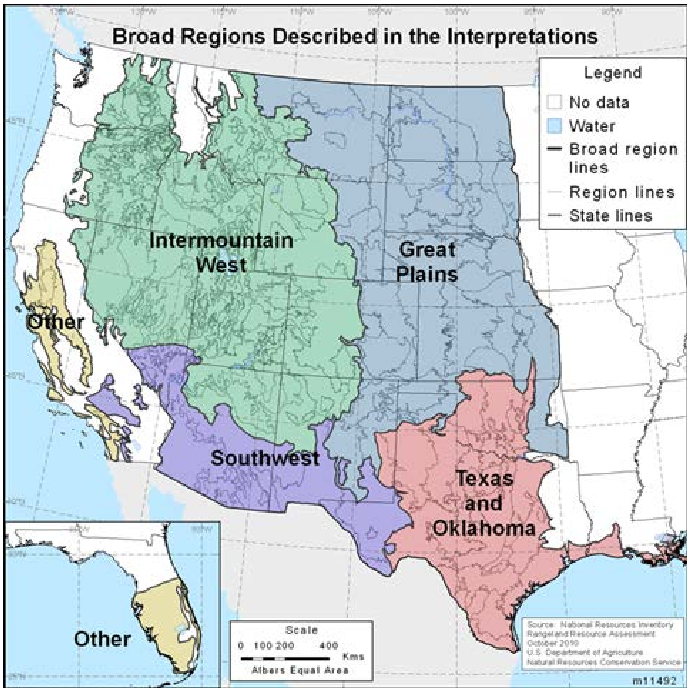


Figure 2. Broad Regions Described in the Interpretations



California

Much of California's annual grassland surrounds the flat central valley which is primarily dominated by cropland. Surrounding the central valley are the Klamath Mountains to the north, the Coast Ranges to the west and the Sierra Nevada to the east (Figures 1-2). Annual grasslands form a ring surrounding of the central valley at lower elevations. Lower precipitation on these lands combined with the fine soil texture tend to favor grasslands over woody chaparral and savannahs generally more common at higher elevations receiving greater precipitation and having courser soil structure. Chaparral and oak savannas occupy areas between the grasslands and the mixed coniferous forests at higher elevations and higher precipitation. This area's Mediterranean climate, with mild and moist winters and hot and dry summers, is typical of other mid-latitude areas located on the west side of continents. The Coast Range also impacts this area by creating a rain-shadow effect on the western side of the central valley. Annual precipitation in rangelands surrounding the central valley decreases from north to south and increases with elevation. Coastal regions receive greater annual precipitation and cooler temperatures than the interior region's precipitation (Kottek 2006, J. a. Bartolome 2016, George 2016, Griffith 2016).

Figure 3. Acres of Non-Federal Rangeland, 2012

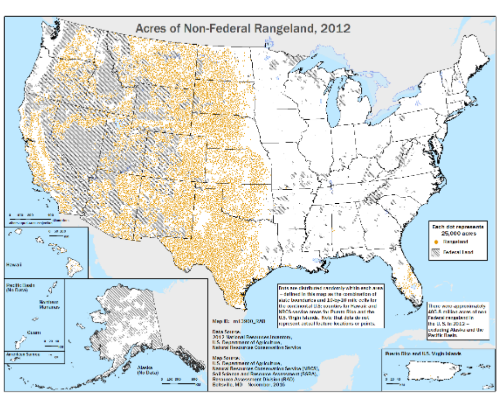
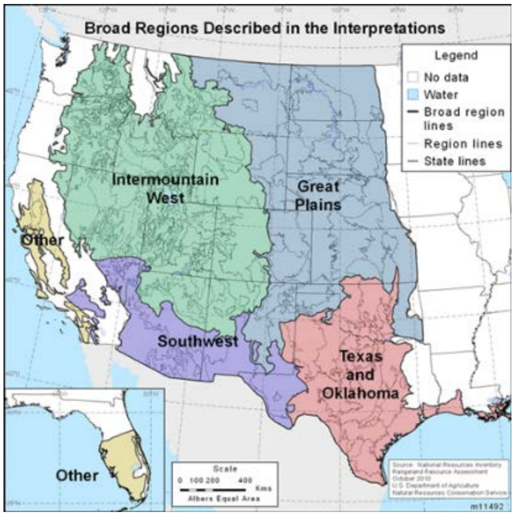


Figure 4. Broad Regions Described in the Interpretations



The California coast lies along the border of two tectonic plates. Soils of the Coast Range were formed by accretions of the sea floor scraped off by subduction of the western plate. As the two plates came together, volcanic action formed the Klamath Mountains to the north and the Sierra Nevada to the east of the Central valley. Soil eroded over millennia from the Coast Range into the Central Valley is generally of fine texture. Landslides are common in the Coast Range due to the soil structure (J. a. Bartolome 2016).

California's grasslands were transformed over the last 250 years by a series of events. Spaniards introduced the first cattle, horses, and sheep to the area in 1769. Although settlement and livestock increased over the next 80 years, the Gold Rush which began in 1848 dramatically increased numbers of settlers, livestock, and conversion of rangelands to cropland. Major flooding in 1862 followed by two years of severe drought further impacted native plant communities. The Homestead Act of 1862 accelerated the conversion of arable lands in the valley to cropland. Areas not suitable for farming became known as "open range" and the high concentration of livestock grazing during the 1880'and 1890's decimated those lands. Together the combination of grazing, introduction of alien plants, drought from 1862-1864, and cultivation changed the California grasslands forever (J. W. Bartolome 2007, Larson-Praplan 2014).

The California annual grasslands represent an area where a group of non-native plant species (primarily annual grasses) have replaced pre-European historic plant communities that included grasslands, chaparrals, savannas, and woodlands with what has been speculated to be a perennial grass-dominated understory, although others suggest many of these grasslands were actually made up primarily of forbs and native annual grasses (Menke 1989, J. W. Bartolome 2007, D'Antonio 2007, Evett 2013, Larson-Praplan 2014). Restoration of the original vegetation in the drier regions of the annual grassland is difficult as invasive exotic species are now ubiquitous and native grass and forb species occur in trace amounts. The annual grasslands are now dominated by and managed as annual grasslands. There is continuing debate about the extent to which original plant communities can be restored, since reseeding of perennial grasses is difficult due to erratic temperatures, low rainfall, competitiveness of annual grasses, and the availability and cost of native species (Daehler 2003, Moyes A.B 2005). The challenge of assessing, monitoring, and managing land that has crossed an ecological threshold in annual grasslands is similar to that encountered in many other parts of the country where native plant communities have been replaced by functionally and structurally different invasive species that may be either native or non-native. California is unique because of the spatial extent of the transformation by non-native plant species.

Results in this report are based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015. Drought impacted the area during the second period (Figure 3-5). While this region was abnormally dry during the early period (2004-2010), much of this region experienced moderate to severe drought during the more recent period (2011-2015). The figures provide context for subsequent summary results.

Figures 3-4. Map of average drought monitor rating (0 to 4 scale, where 0 is mild drought and 4 is extreme) across the two NRI sampling periods.

Figure 3.

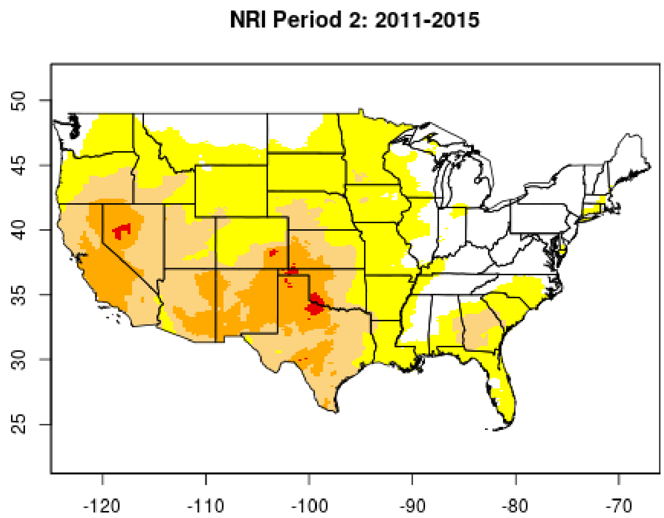
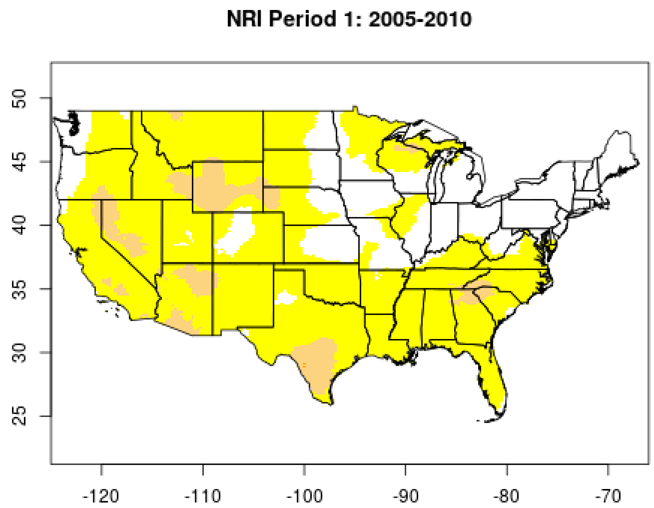


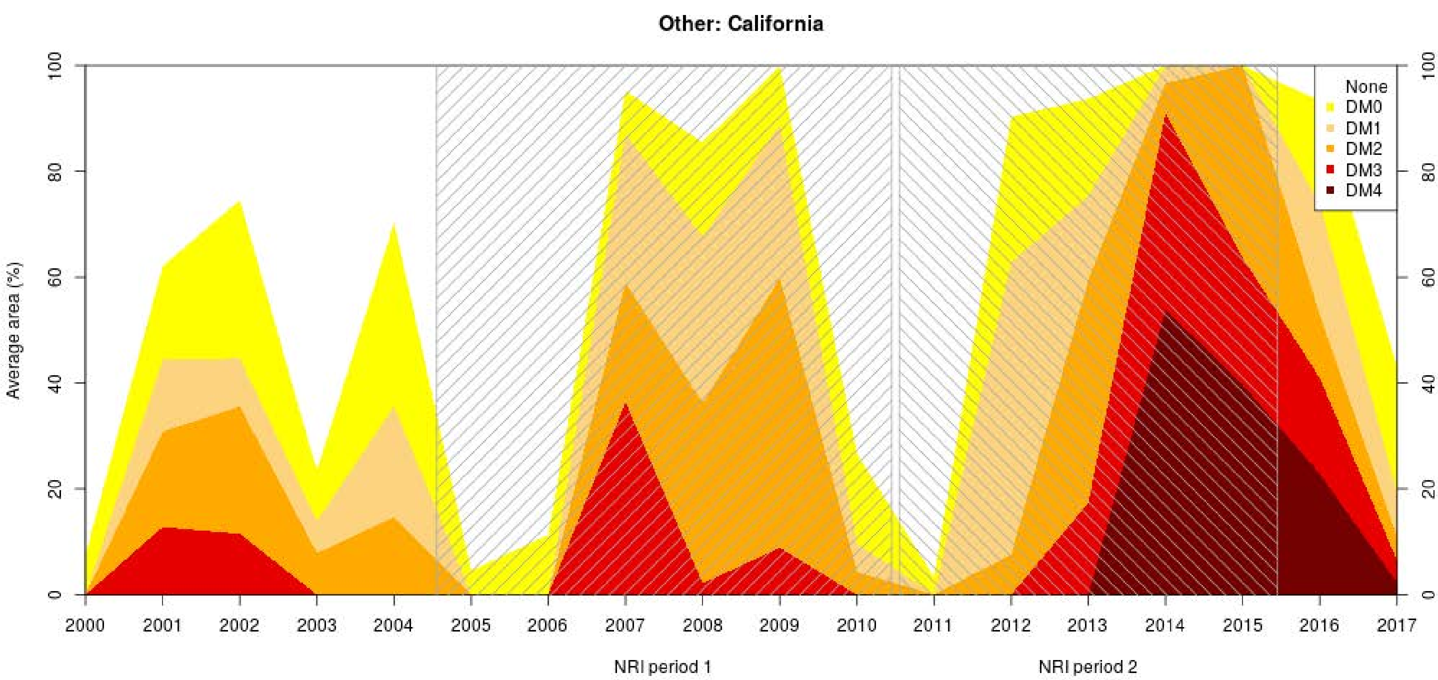
Figure 4.



Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Figure 5. Average drought severity in the California portion of the Other: California and Florida region.



Rangeland Health

Rangeland health assessments included in other sections of the NRI Rangeland Resource Assessment evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For much of the California annual grasslands, no ecological site description has been developed. The extensive invasion of non-native plant species in the California annual grasslands has thwarted attempts to develop ecological site descriptions for in much of this area. Reference conditions characterized in ecological site descriptions are used for evaluations and incomplete implementation of ecological sites prevented development of the ecological site-specific reference sheets necessary to carry out the evaluations. Instead, the quantitative indicators provide an appropriate and useful baseline for monitoring.

Soil and Site Stability

Moderate to severe drought conditions affected much of the California during 2011-2015 (Figures 3-5) and may have impacted the results described in this report. In the California annual grasslands (Figure 2), average bare ground on non-Federal rangelands increased from 9.2 (±1.9) to 14.8 (± 3.1) percent between 2004-2010 and 2011-2015, although there was no change in the percent of non-Federal rangeland that was at least 50 percent bare ground (Figures 6-10). Numerous large canopy gaps (gaps of 2 meters or greater that account for at least 20 percent of the land) were present on 29.0 (±6.4) percent of non-Federal rangeland during 2004-2010 and on 18.8 (±7.7) percent during 2011-2015 (Figures 11-12, 15). Rangelands along the Coast Range generally have more bare ground and areas where large canopy gaps are numerous, than those along the Sierra Nevada (Figures 8-9, 11-15). Areas with at least 50% bare ground within large canopy gaps are also more common in non-Federal rangelands of the Coast Range (Figures 13-14). In addition, rangelands along the Coast Range generally have greater areas where soil aggregate stability is rated 4 or less, indicating less stable soil (Figures 16-17). Together these indicators characterize rangelands in the Coast Range that are more susceptible to erosion and establishment of invasive species.

Figures 6-7. Average Bare Ground on Non-Federal Rangeland. (Source: Table 111, Table 112, and Table 113**)**

Figure 6. 2004-2010

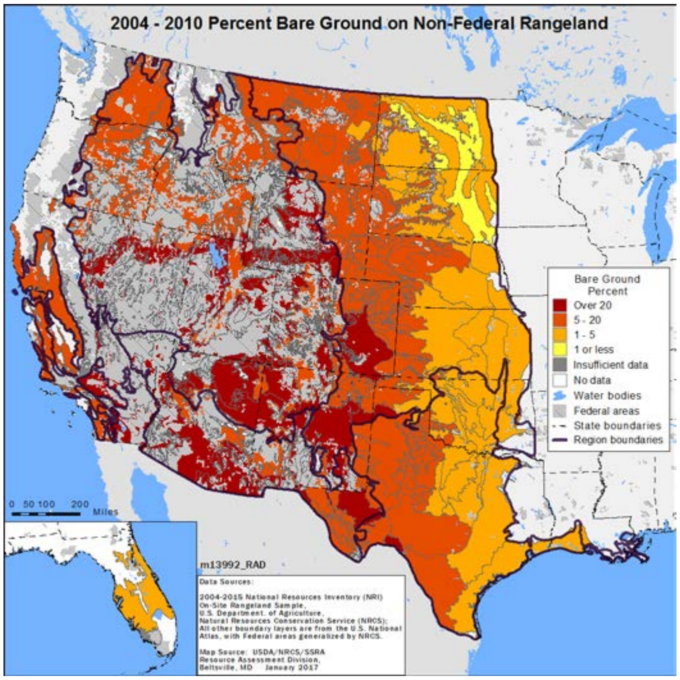
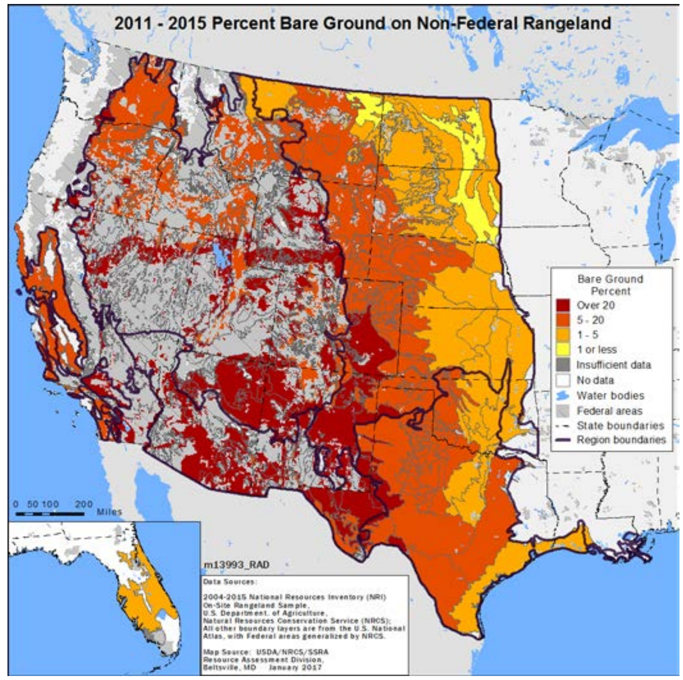


Figure 7. 2011-2015



Figures 8-9. Non-Federal Rangeland that is at Least 50% Bare Ground. (Source: Table 114, Table 115, and Table 116**)**

Figure 8. 2004-2010

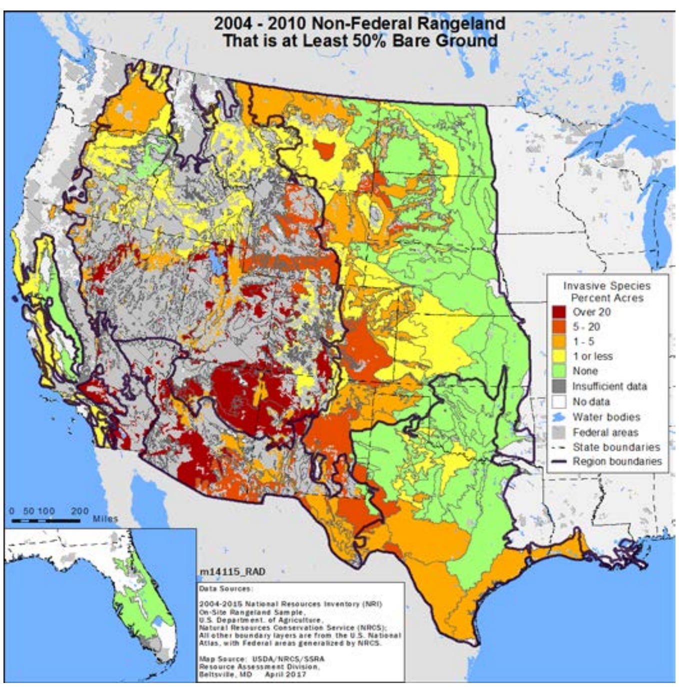


Figure 9. 2011-2015

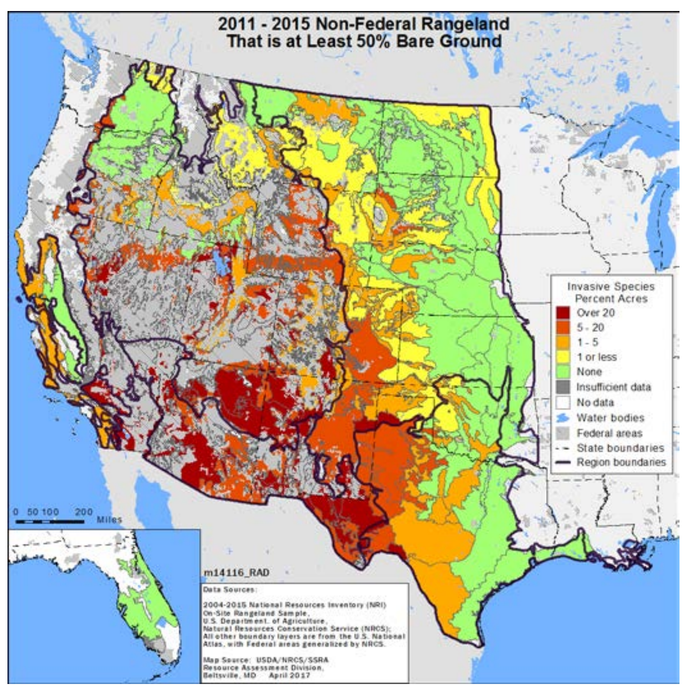
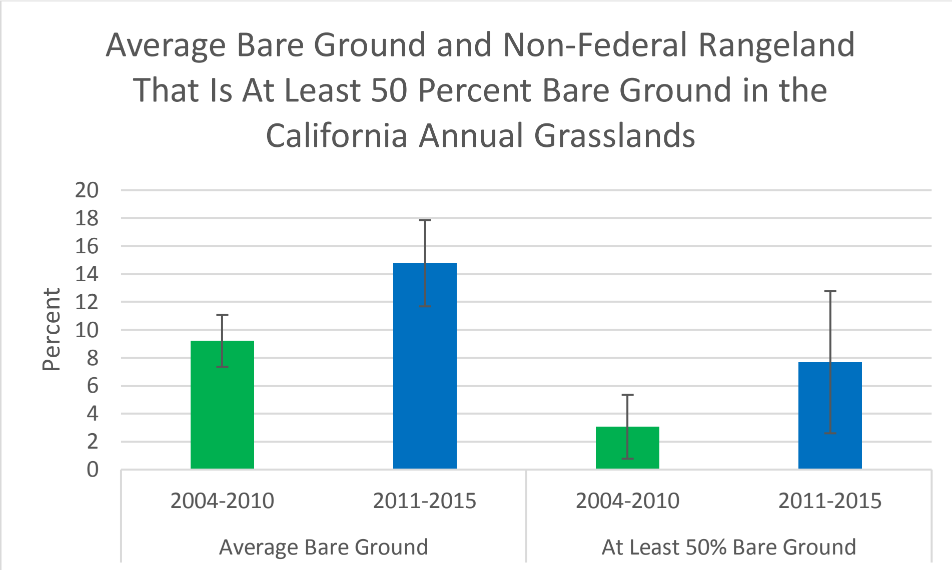


Figure 10. Average Bare Ground and Non-Federal Rangeland That Is At Least 50 Percent Bare Ground in the California Annual Grasslands. Error bars represent margins of error.



Figures 11-12. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. (Source: Table 117, Table 118, and Table 119**)**

Figure 11. 2004-2010

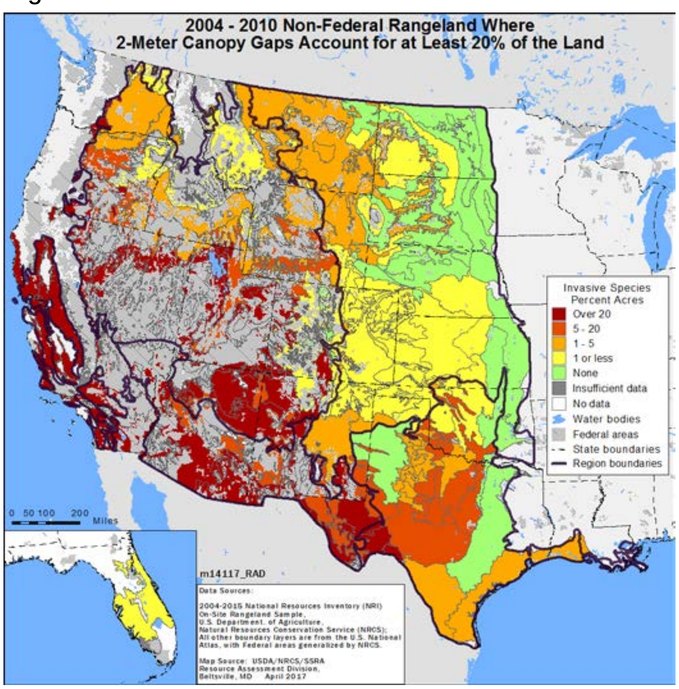
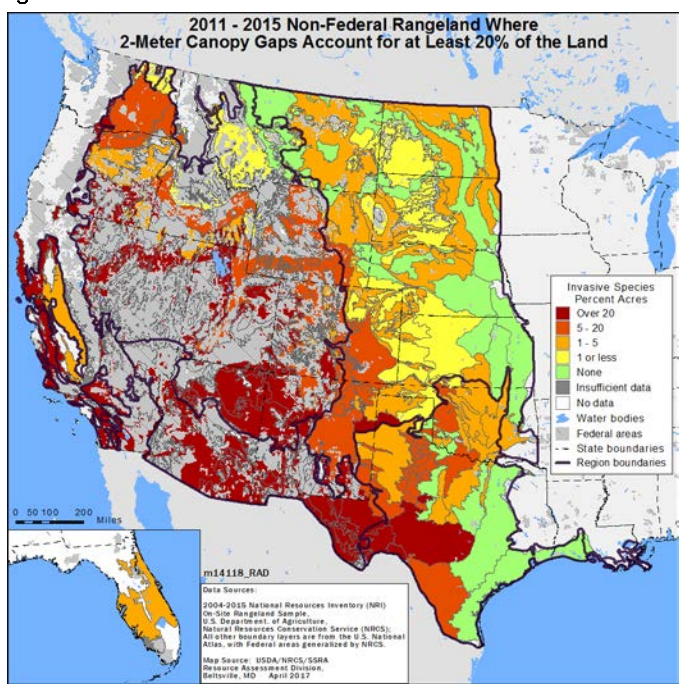


Figure 12. 2011-2015



Figures 13-14. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119**)**

Figure 13. 2004-2010

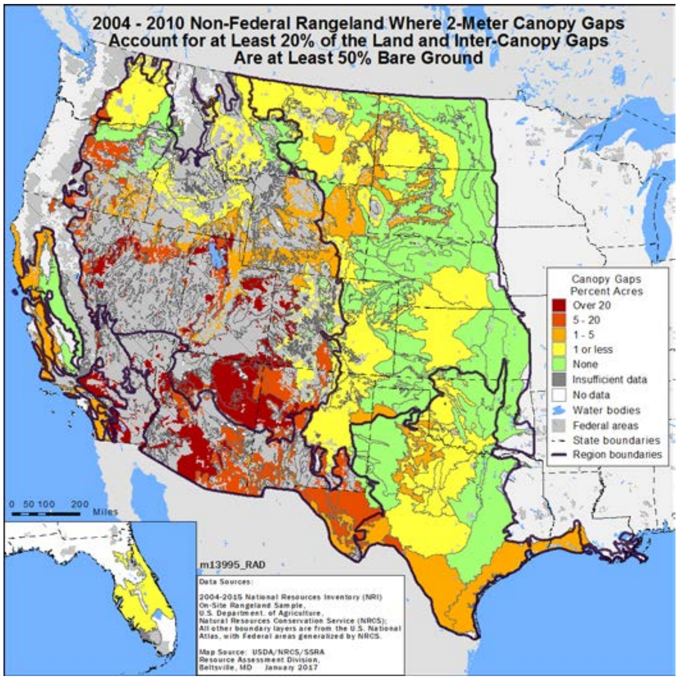


Figure 14. 2011-2015

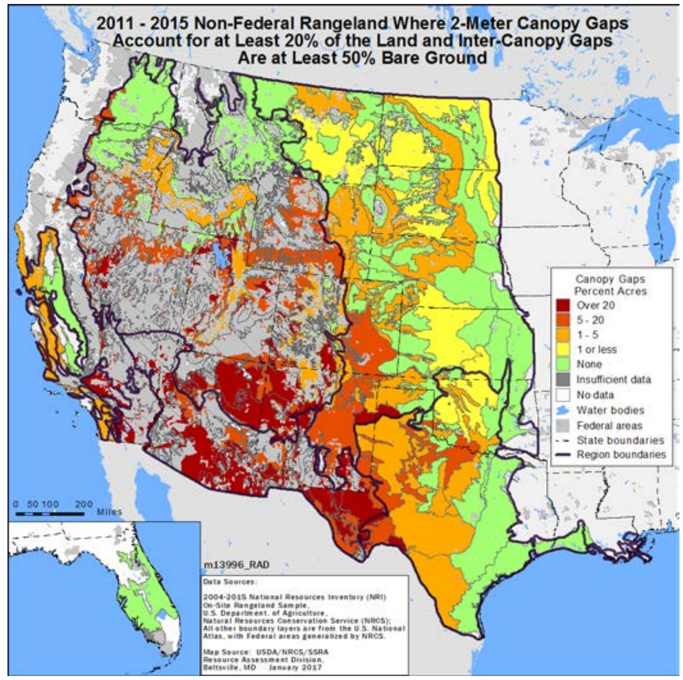
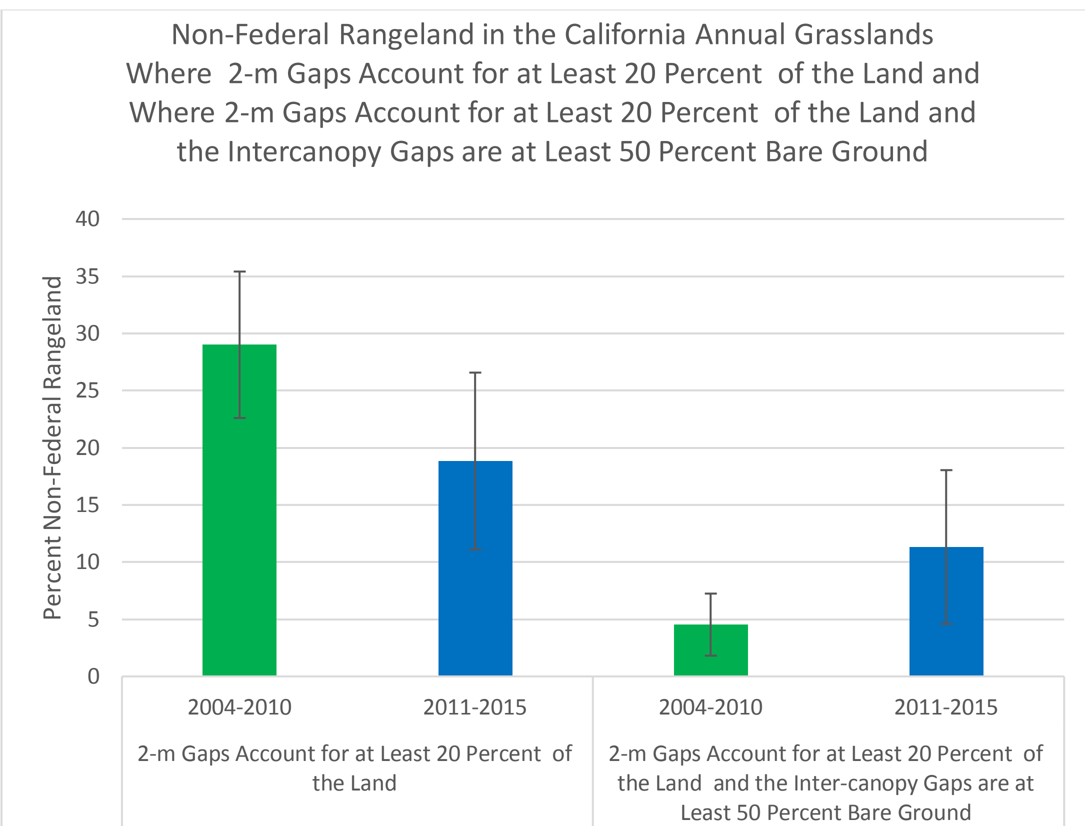


Figure 15. Percent Non-Federal Rangeland in the California Annual Grasslands Where 2-m Gaps Account for at Least 20 Percent of the Land and Where 2-m Gaps Account for at Least 20 Percent of the Land and the Inter-canopy Gaps are at Least 50 Percent Bare Ground. Error bars represent margins of error.



Figures 16-17. Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less.
(Source: Table 120, Table 121, and Table 122**)**

Figure 16. 2004-2010

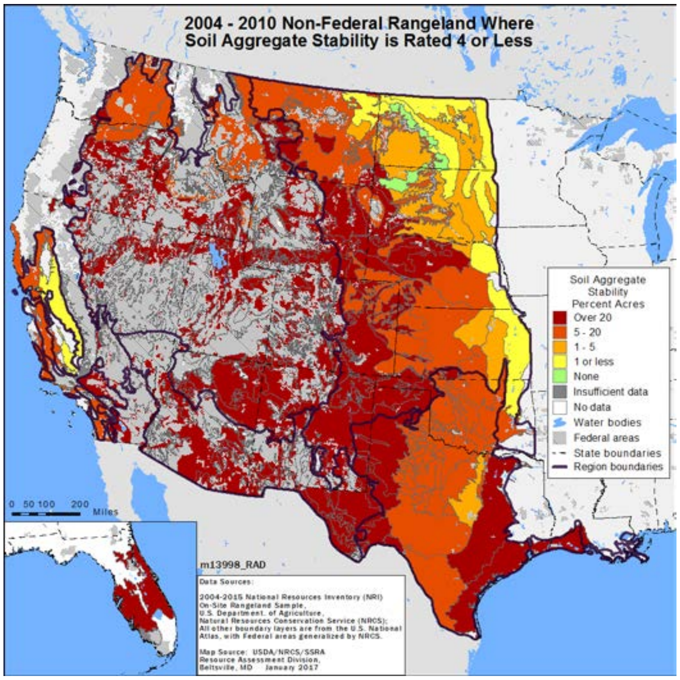
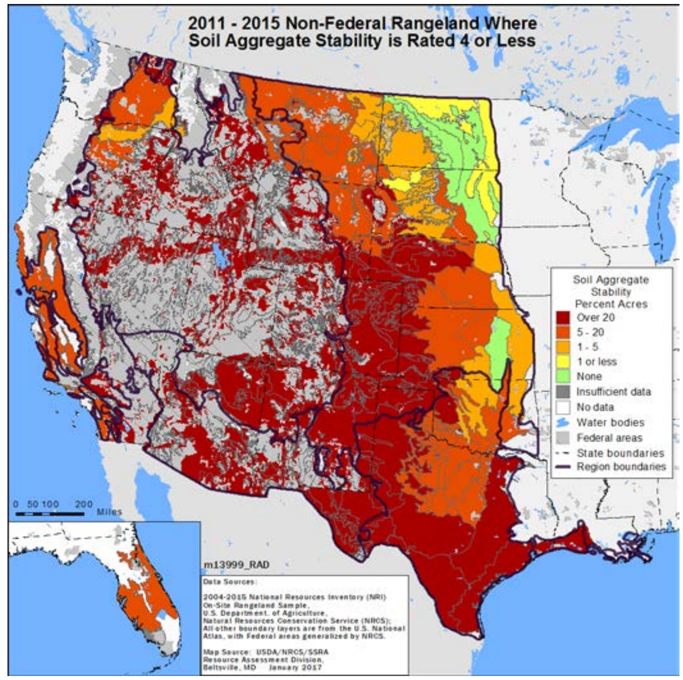


Figure 17. 2011-2015



[1] Soil aggregate stability ratings:

1 = 50% of structural integrity lost, (melts) within 5 seconds of immersion in water and less than 10% remains after 5 dipping cycles or soil too unstable to sample (falls through the sieve).

2 = 50% of structural integrity lost (melts) 5–30 seconds after immersion and less than 10% remains after 5 dipping cycles.

3 = 50% of structural integrity lost, (melts) 30–300 seconds after immersion or less than 10% remains on the sieve after five dipping cycles.

4 = 10–25% of original soil material remains on the sieve after five dipping cycles.

5 = 25–75% of original soil material remains on the sieve after five dipping cycles.

6 = 75–100% of original soil material remains on the sieve after five dipping cycles.

Hydrologic Function

Bare ground and canopy gaps on rangelands lead to reduced infiltration capacity and increased runoff. Where bare ground is concentrated in large inter-canopy gaps, the effect is even more pronounced. These contributing characteristics are generally greater in rangelands along the Coast Range than those along the Sierra Nevada (Figures 8-14).

Biotic Integrity

Non-native species are present on 91.2 (±5.1) percent of non-Federal rangeland in the California annual grasslands and cover at least 50 percent of the soil surface on 60.2 (± 7.5) percent (Figures 18-22). Annual bromes (*Bromus* spp.) are present on 82.5 (± 6.3) percent of non-Federal California annual grasslands and cover at least 50 percent of the soil surface on 8.3 (± 4.2) percent (Figures 23-27). Medusahead (*Taeniatherum caput-medusae*) is present on 18.5 (± 6.3) percent of non-Federal rangelands in the California annual grasslands and more widespread along the eastern part of the central valley

(Figures 28-29). *Centaurea* species, including diffuse knapweed (*Centaurea diffusa*) and yellow starthistle (*Cetaurea solstitialis*) are present on 19.1 (± 7.7) percent of non-Federal rangelands in the California annual grasslands and more prevalent on the western side of the central valley (Figures 30-31).

Figures 18-19. Non-Federal Rangeland Where Non-native Plant Species are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 18. 2004-2010

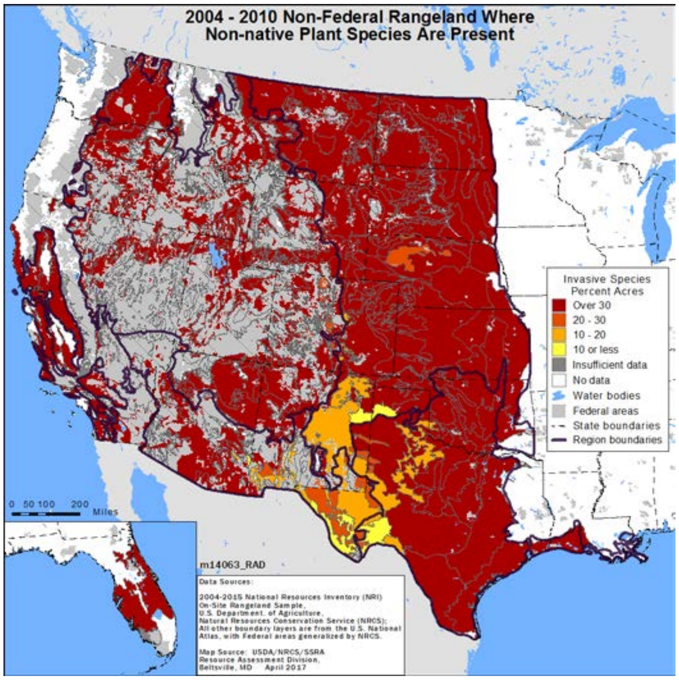
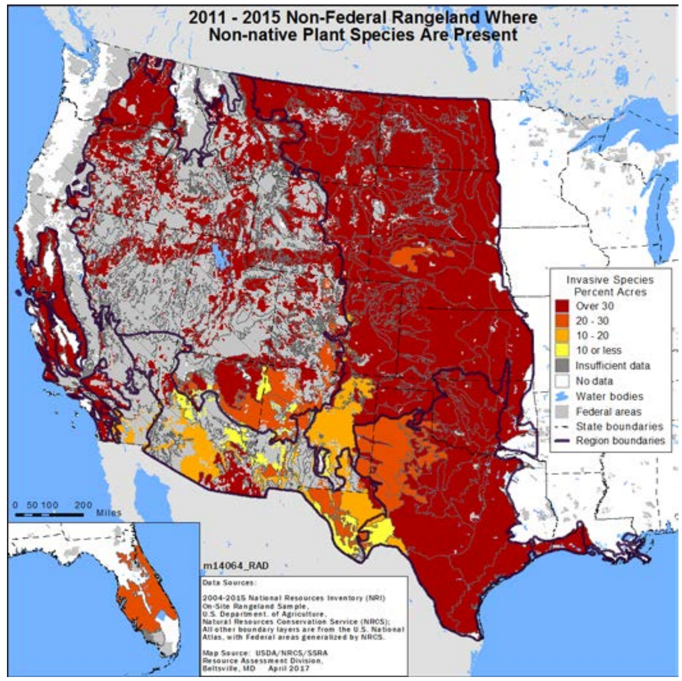


Figure 19. 2011-2015



Figures 20-21. Non-Federal Rangeland Where Non-native Plant Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 20. 2004-2010

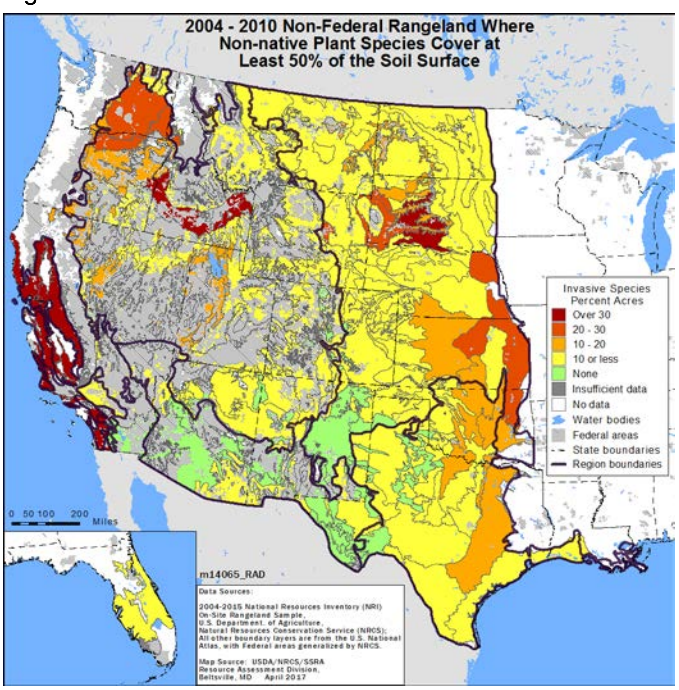


Figure 21. 2011-2015

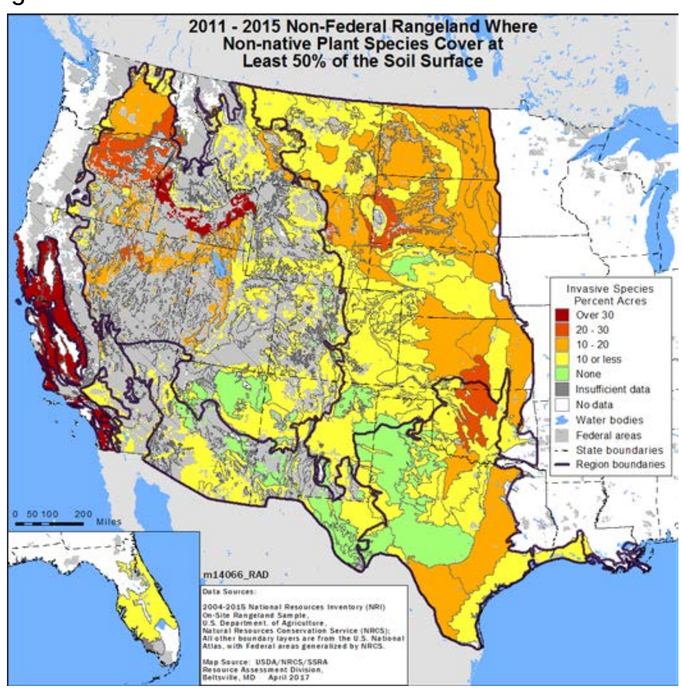
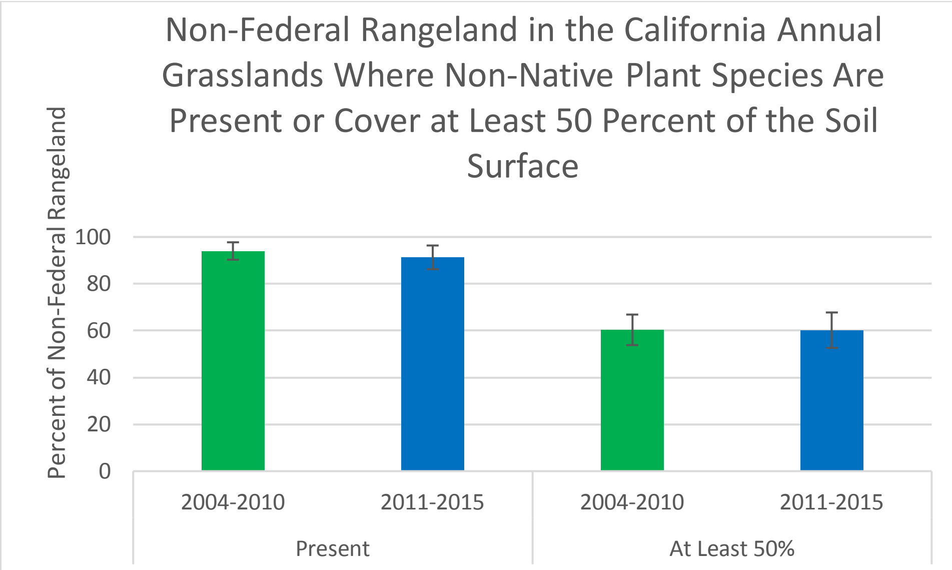


Figure 22. Non-Federal Rangeland in the California Grasslands Where Non-Native Plant Species Are Present or Cover at Least 50 Percent of the Soil Surface. Error bars represent margins of error.



Figures 23-24. Non-Federal Rangeland Where Annual Bromes are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 23. 2004-2010

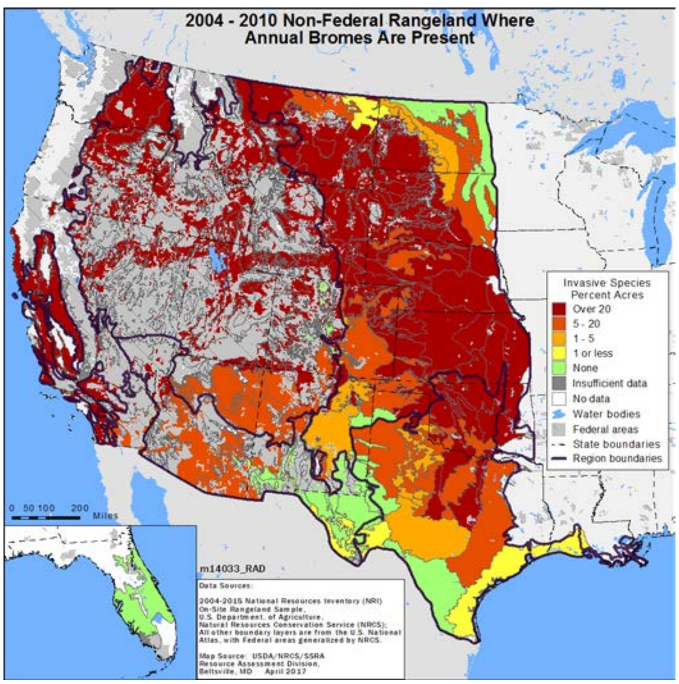
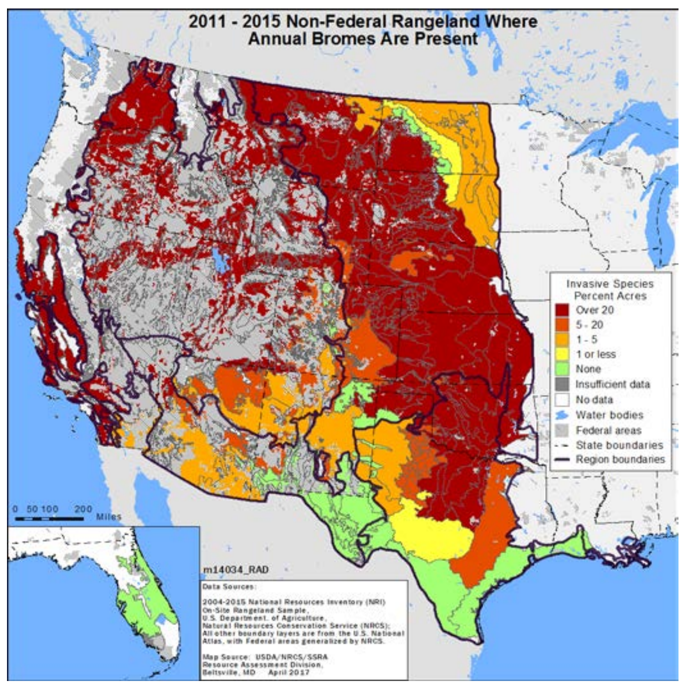


Figure 24. 2011-2015



Figures 25-26. Non-Federal Rangeland Annual Brome Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 25. 2004-2010

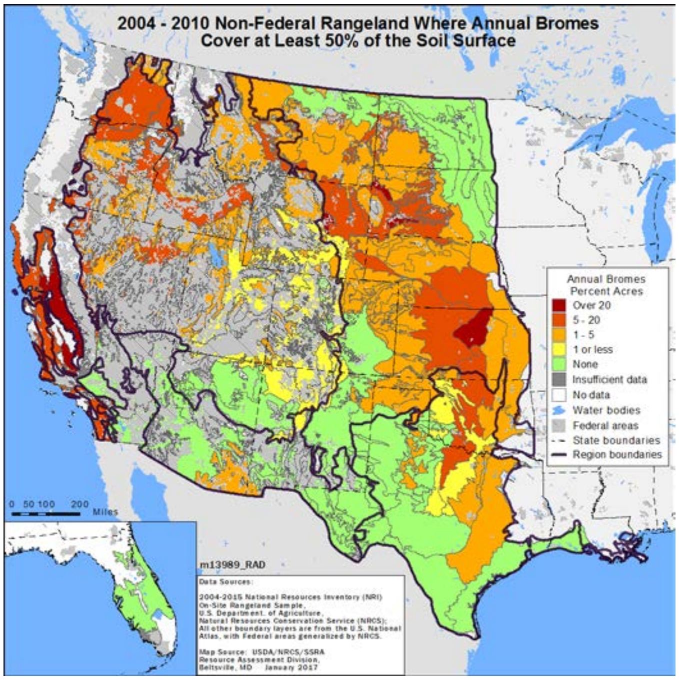


Figure 26. 2011-2015

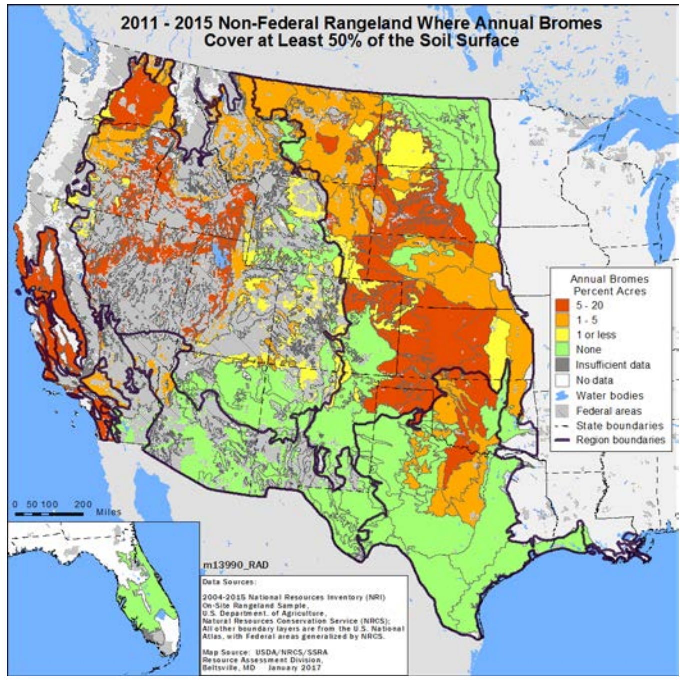
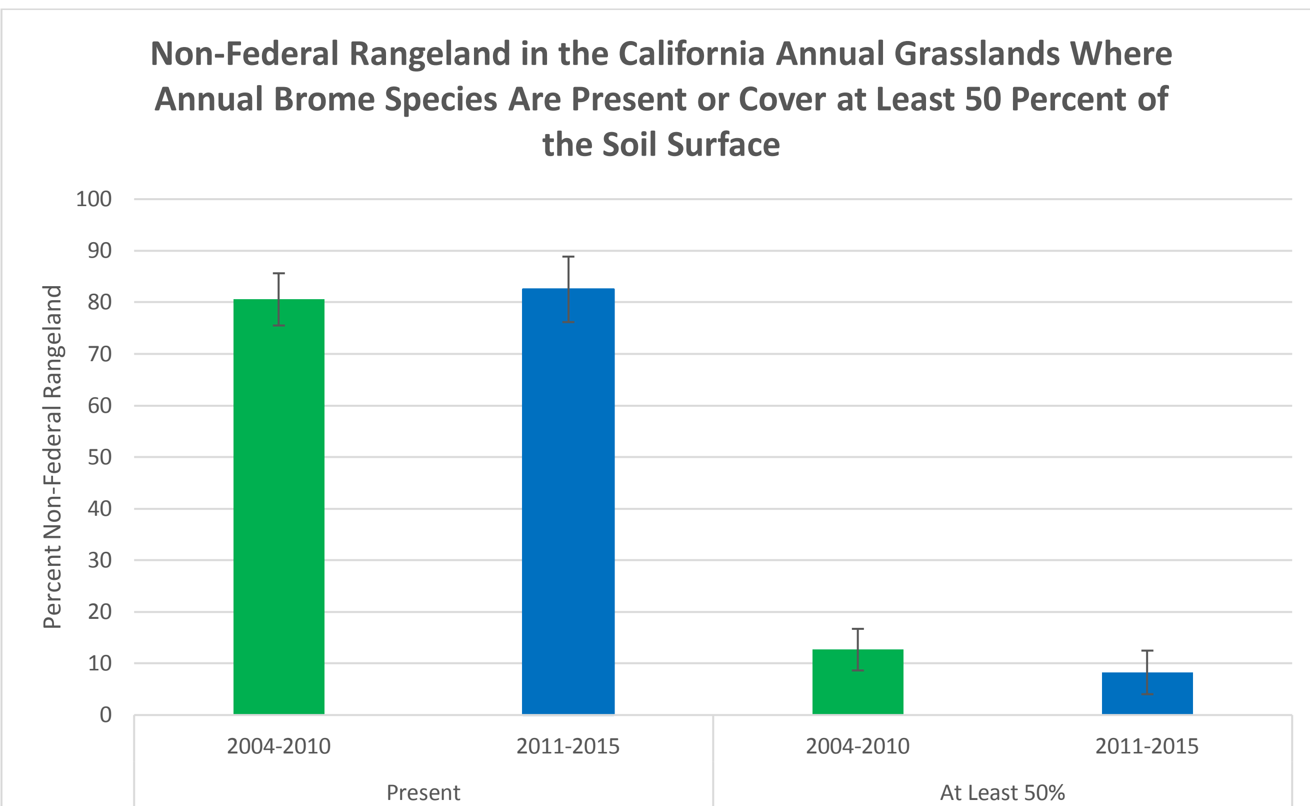


Figure 27. California Annual Grasslands Where Annual Brome Species Are Present and Where They Cover at Least 50% of the Soil Surface on Non-Federal Rangeland



Figures 28-29. Non-Federal Rangeland Where Medusahead is Present. (Source: Table 33, Table 34, and Table 35**)**

Figure 28. 2004-2010

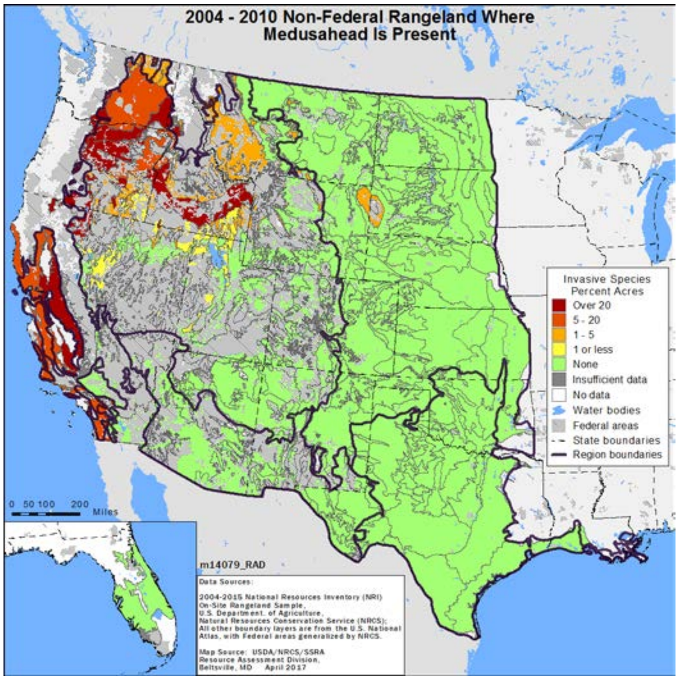
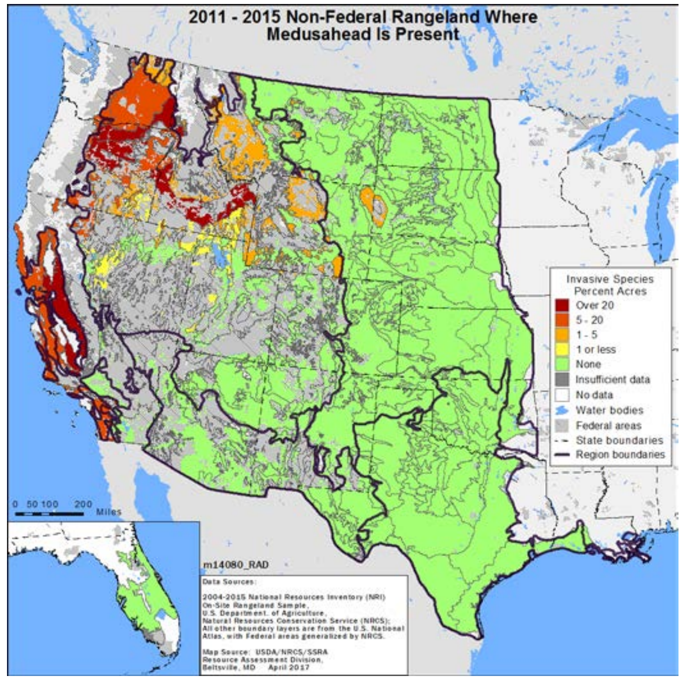


Figure 29. 2011-2015



Figures 30-31. Non-Federal Rangeland Where *Centaurea* species are Present. (Source: Table 57, Table 58, and Table 59**)**

Figure 30. 2004-2010

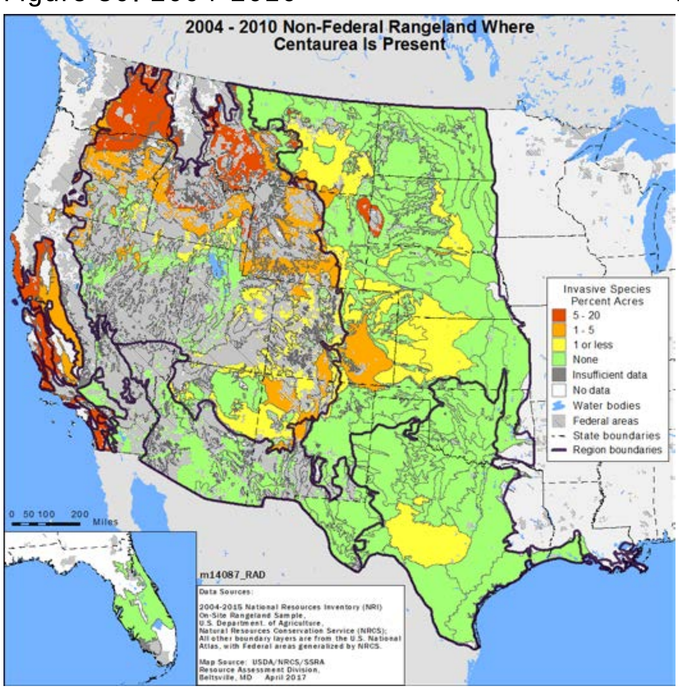
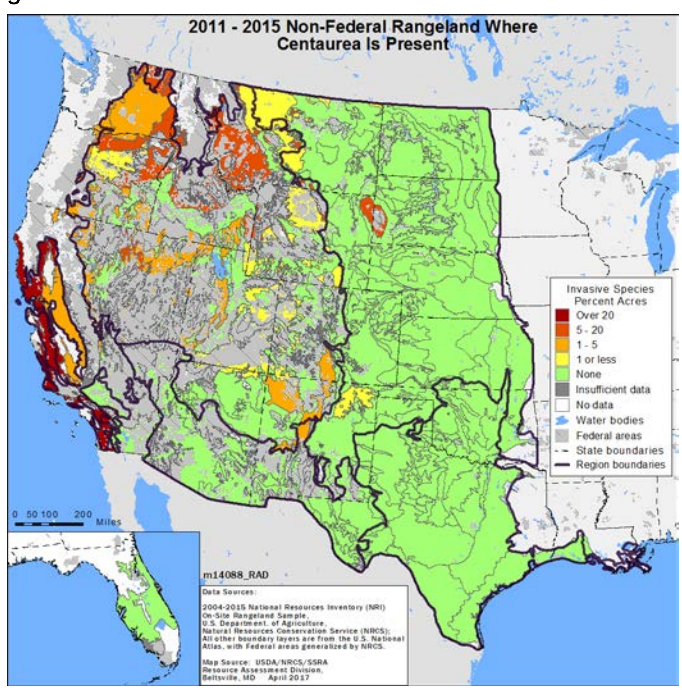


Figure 31. 2011-2015



Summary and Conclusions

Moderate to severe drought conditions in the California grasslands during 2011-2015 were accompanied increased area of bare ground. The Coast Range have generally greater percentages of bare ground, large canopy gaps with bare ground in the interspaces, and less stable soil than areas along the Sierra Nevada.

Non-native species are present on over 90 percent of California grasslands and cover at half the soils surface on over 60 percent of that area. Some of the most prevalent of these species are annual bromes, medusahead, knapweed and star thistles.

Florida

Rangeland vegetation in Florida has a combination of temperate and sub-tropical floristic elements. These plant communities developed with a long growing season, more than 48 inches of seasonal rainfall and high rates of lightning ignited fires (Korosy 2013). Where rangelands still occur in the peninsula the physiognomy is influenced by high near-surface water tables, low topographic relief, and sandy soils with wet to sub-xeric moisture regimes. The naturally low fertility of the sandy soils is reflected in the emblematic presence of plants in the genus of Bejaria, Drosera, and Sarracenia which have primitive characteristics of capturing nutrients from insects to supplement the sparse resources stored in sterile sandy soil.

The NRI database tallies 365 unique plant symbols with data collected in Florida during these two time periods. The species diversity can be high under a rather monotypic dominance layers of pyrogenic pine, palmetto, and wiregrass. Floristic studies documented Florida prairies have among the highest fine-scale vascular plant species richness values recorded in North America. Up to 27 species in 0.1 m^2, 49 species in 1 m^2, and 171 species in 1000 m^2 (Orzell 2006).

Reference conditions and rangeland health assessments must recognize that Florida rangeland vegetation developed under a closely timed disturbance regime of fire and flooding. Annually, the frequent (dry) lightning strikes in April-June occurs at the same time that the rain-free interval reaches a maximum and the below-ground water levels have dropped away from the surface. Frequent landscape fires are expected at this time. Within a few weeks the frequency of thunderstorms with rainfall increases rapidly saturating the soil and water table. Consequently, early lightning season fires are followed soon by flooding.

Florida's settlement history from the 1500 to 1900s caused minor changes. But one change was the altered timing of fires from the lightning season to earlier in the winter when cold fronts are followed by several days of weather with consistent wind direction and speeds. Settlers avoided wildfire dangers and improved livestock husbandry were benefits.

Fire suppression efforts in the 1930s and water table drainage further disconnected the closely timed disturbance regimes and began the systemic encroachment of shrubs and trees. Significant peninsular hydrology alterations occurred after the 1949 flood death toll led to Federal help in drainage and flood control. After the 1970 channelization of the Kissimmee River between Lake Kissimmee and Lake Okeechobee, the wetland system impact was recognized as undesirable and an effort to restore the Kissimmee River as part of the Everglades Restoration was initiated. In 2003 the first flows returned to Kissimmee River's old oxbows. However, the hydrology is permanently lowered in depth and timing which favor the more deeply rooted woody vegetation encroachment.

This disconnection and other broken pieces limit the composition and functional group dynamics of vegetation, particularly the herbaceous species, which are identified in a reference plant community phase in the Ecological Site Descriptions and the Range Health reference sheets (https://esis.sc.egov.usda.gov/).

The emergent wetlands and shallow sloughs generally remain with native tall grass herbaceous vegetation. These are embedded throughout the landscape. Some of which have organic or muck soils. Rangeland health assessments are designed primarily for uplands. Use of rangeland health assessments on these wetlands are problematic and other hydro-geomorphic assessments are used more validly.

Rapid population growth and land conversions in the 1990s had impacts far from population centers too. High demand for turf sod for residential yards and highway rights of way increased the amount of rangeland changed to introduced sod grasses and pasture. Prescribed burn smoke management was a growing public concern from the rapid population growth. This reduced the incentive for private landowners to maintain native vegetation. The State of Florida, however, owns and manages large tracts of native rangeland vegetation as part of watershed, water supply and salt-water intrusion avoidance projects.

Results in this report are based on NRI rangeland on-site data collected over two periods, 2004-2010 and 2011-2015. Estimates of change on Florida rangelands during the two time periods is hampered by the relatively small size of Florida compared to other regions, resulting in fewer sites with collected data.

Abnormally dry conditions were present in this region during both periods (Figure 3-5) and the figures provide context for subsequent summary results.

Figures 3-4. Map of average drought monitor rating (0 to 4 scale, where 0 is mild drought and 4 is extreme) across the two NRI sampling periods.

Figure 3.

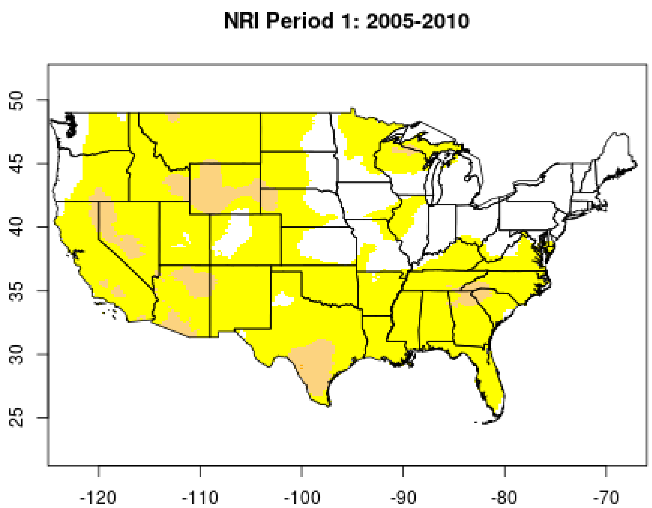
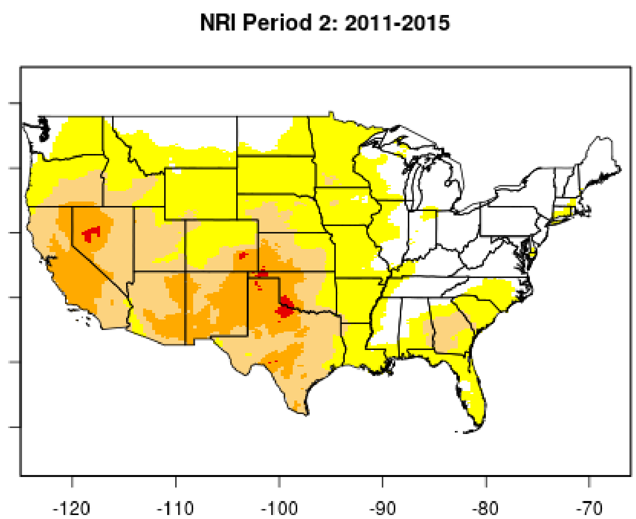


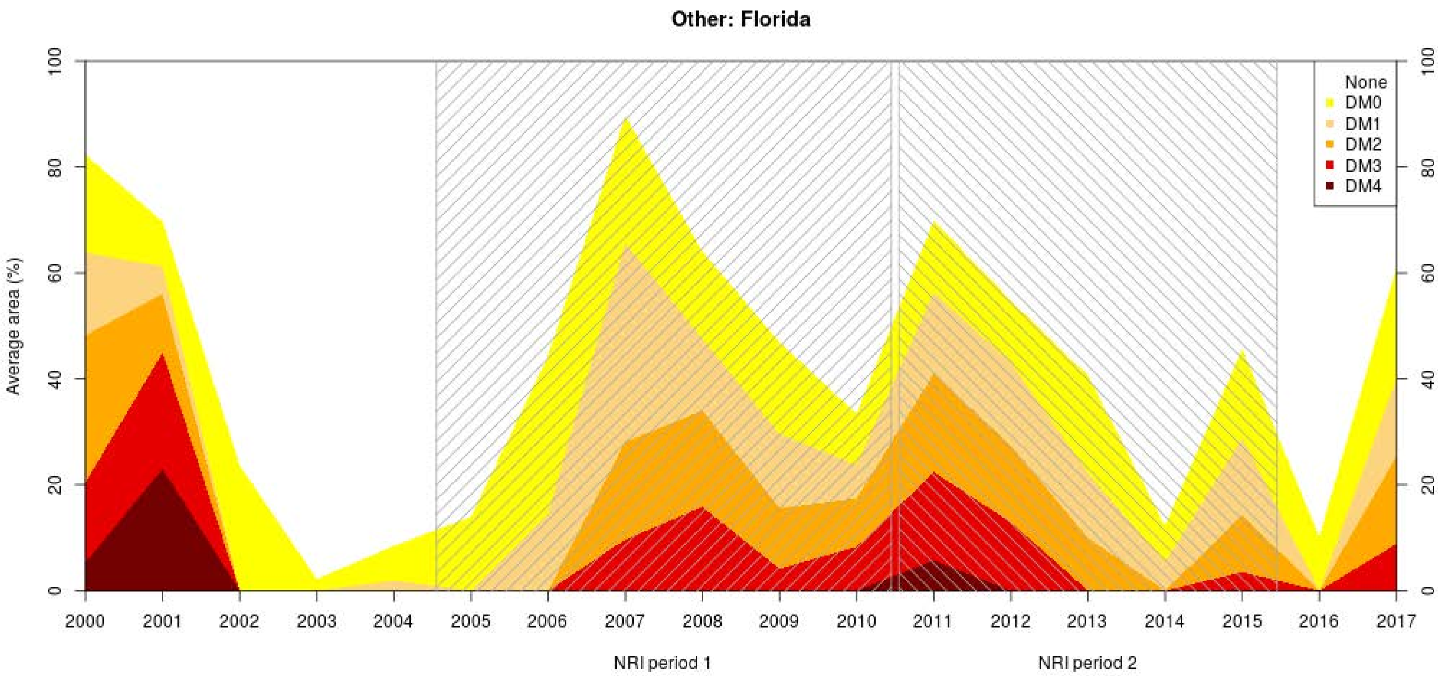
Figure 4.



Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

Figure 5. Average drought severity in the Florida portion of the Other: California and Florida region.



Rangeland Health

The fire and flooding regime, under which Florida's rangeland vegetation developed, has been altered. Changes in hydrology and native plant communities limit the ability to characterize reference conditions. Although native tall grass herbaceous vegetation generally remains in emergent wetlands and shallow sloughs interspersed throughout the landscape, current rangeland health assessments are designed primarily for uplands. Further refinement is needed to adapt them to a subtropical system. For Florida, this report instead relies on quantitative assessments related to the three rangeland health attributes: soil and site stability, hydrologic function, and biotic integrity.

Soil and Site Stability

Quantitative indicators related to the rangeland health attribute soil and site stability are less sensitive and informative in Florida than in other regions. For example, soil aggregate stability ratings used to quantify the location's surface resistance to erosion are obtained by dipping soil peds in water and observing the portions that fall through a screen. The peds are rated 1 to 6, where a rating of 1 is assigned if at least half of the ped completely falls apart during the dipping cycle or a rating of 6 is assigned if the ped is a root mat or the opportunistic fungi hyphae that held the sand grains together as the surface dried. Although the percent of non-Federal rangeland in Florida where soil aggregate stability is rated 4 or less is 18.2 (±15.9) during 2011-2015 and 32.2 (±13.4) during 2004-2010 (Figures 6-7), in much of Florida rangelands single grain structure and organics being stripped in the top 6 inches due to water table fluctuations complicates interpretation of soil aggregate stability and other soil and site stability range health indicators. Litter movement is accomplished during flooding but the litter is already waterlogged so there is no first flush and there seems to be replacement.

Figures 6-7. Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less.
(Source: Table 120, Table 121, and Table 122**)**

Figure 6. 2004-2010

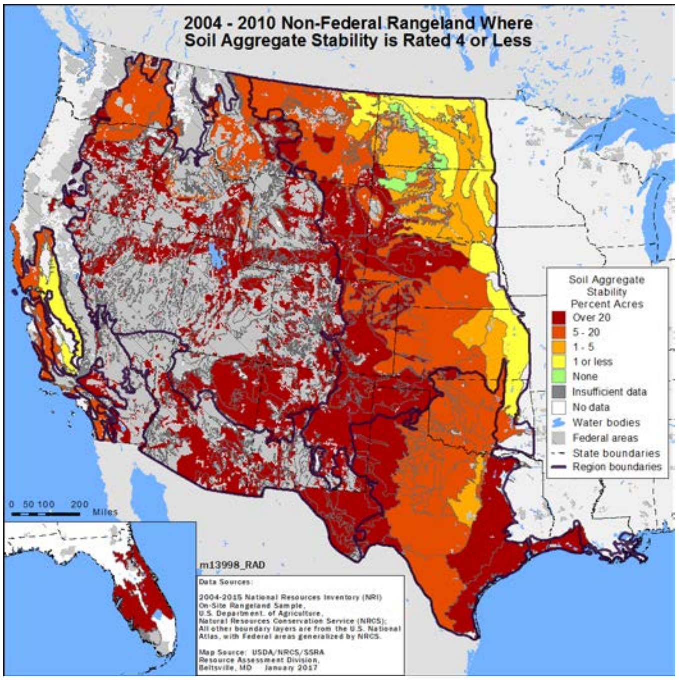
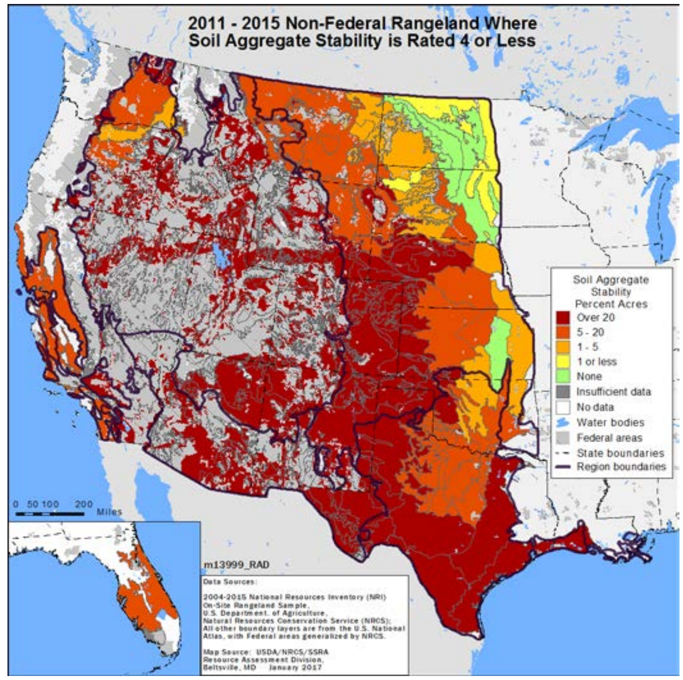


Figure 7. 2011-2015



[1] Soil aggregate stability ratings:

1 = 50% of structural integrity lost, (melts) within 5 seconds of immersion in water and less than 10% remains after 5 dipping cycles or soil too unstable to sample (falls through the sieve).

2 = 50% of structural integrity lost (melts) 5–30 seconds after immersion and less than 10% remains after 5 dipping cycles.

3 = 50% of structural integrity lost, (melts) 30–300 seconds after immersion or less than 10% remains on the sieve after five dipping cycles.

4 = 10–25% of original soil material remains on the sieve after five dipping cycles.

5 = 25–75% of original soil material remains on the sieve after five dipping cycles.

6 = 75–100% of original soil material remains on the sieve after five dipping cycles.

Bare Ground is one of the lowest for the 19 states in the report at 3.6 (±1.6) percent (Figures 8-9). Canopy Gaps greater than 1 or 2 meters is rare and the gaps generally have a good covering of litter so they are not bare (Figures 10-13). The average wind speed at Orlando, Florida is 8.6 mph (including hurricane winds) while Dodge City, Kansas is at 13.9 mph. Wind erosion is a minimal concern for ecological function.

Figures 8-9. Bare Ground on Non-Federal Rangeland. (Source: Table 111, Table 112, and Table 113**)**

Figure 8. 2004-2010

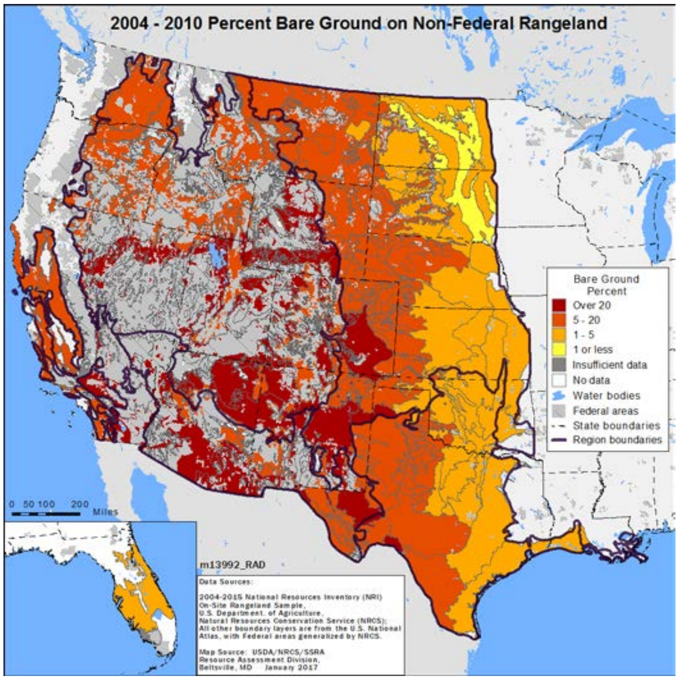
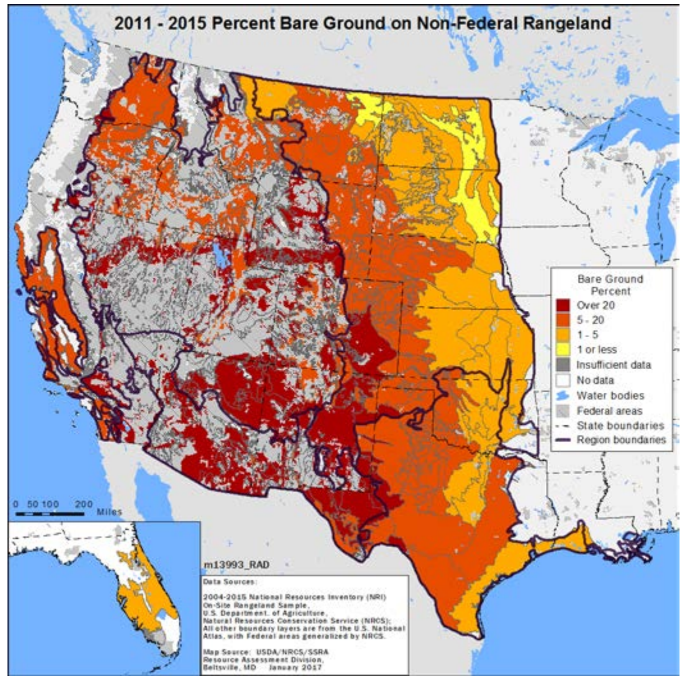


Figure 9. 2011-2015



Figures 10-11. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. (Source: Table 117, Table 118, and Table 119**)**

Figure 10. 2004-2010

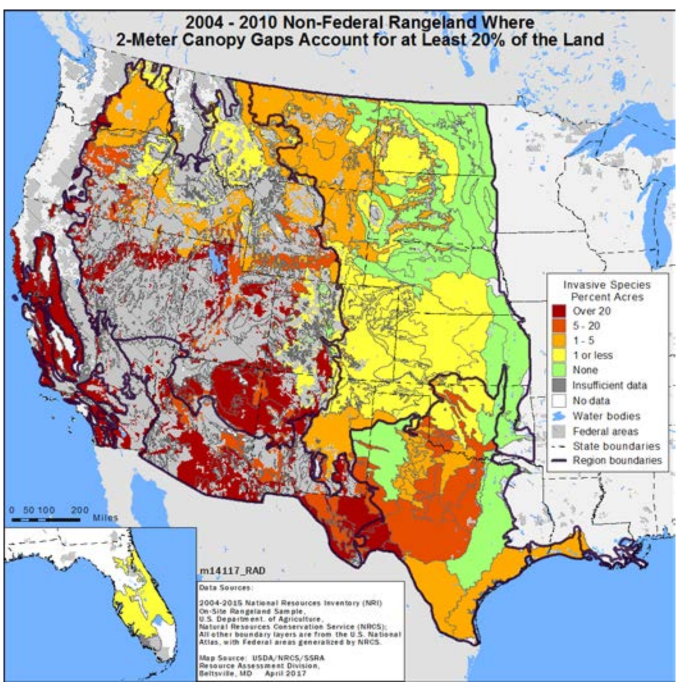
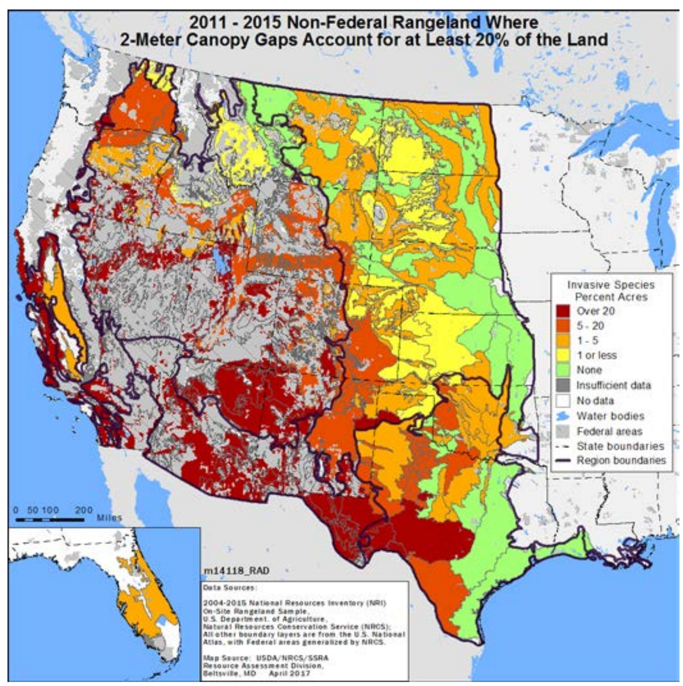


Figure 11. 2011-2015



Figures 12-13. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119**)**

Figure 12. 2004-2010

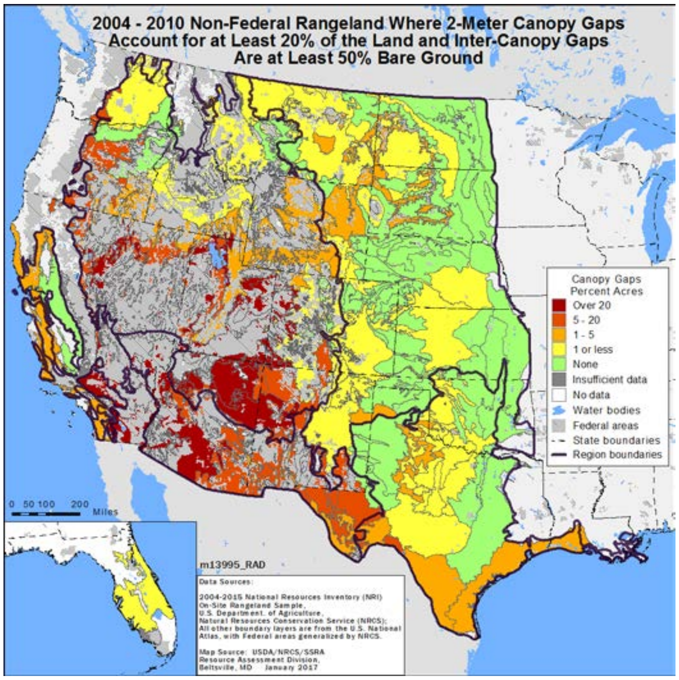
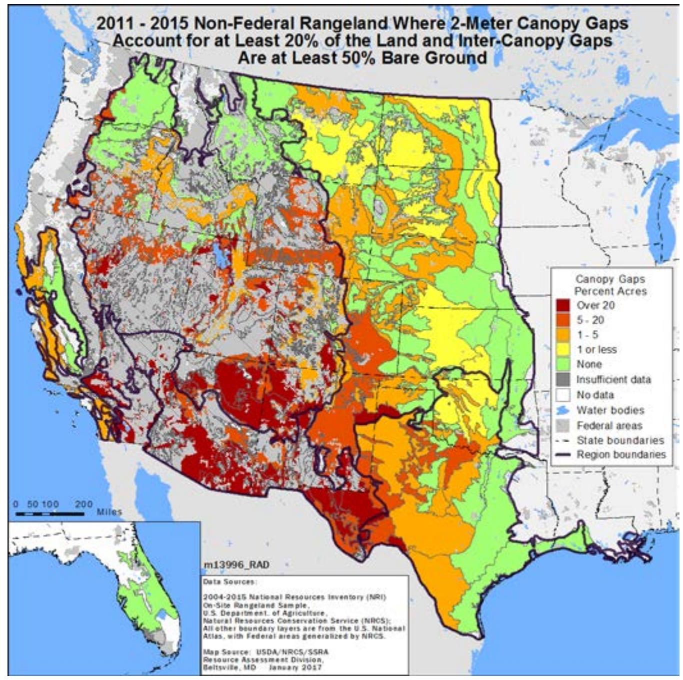


Figure 13. 2011-2015



Hydrologic Function

Functional group composition relative to precipitation and runoff has a slight impact in the amount of interception rate but both canopies are dense, just different in height. Florida's sub-surface water table hydrology has been greatly affected but the hydrologic function indicators instead address water flow patterns to gullies which are non-existent on the low relief landscape. The mean slope percent for 85 locations on a South Florida Flatwoods ecological site is 0.4%. Water does flow once elevated above the surface but the weight and speed seems to compress sediment movement.

Biotic Integrity

Non-native plant species were present on 30.6 (±11.6) percent of Florida non-Federal rangeland during 2011-2015 and remained unchanged between the two time periods (Figures 14-18). The entire Florida flora is about 32 percent introduced species (Wunderlin 2003).

Figures 14-15. Non-Federal Rangeland Where Non-native Plant Species are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 14. 2004-2010

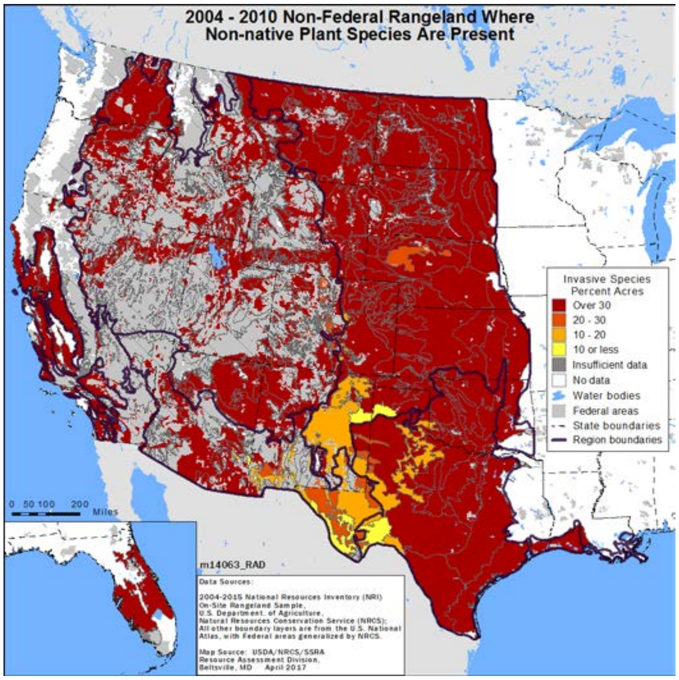
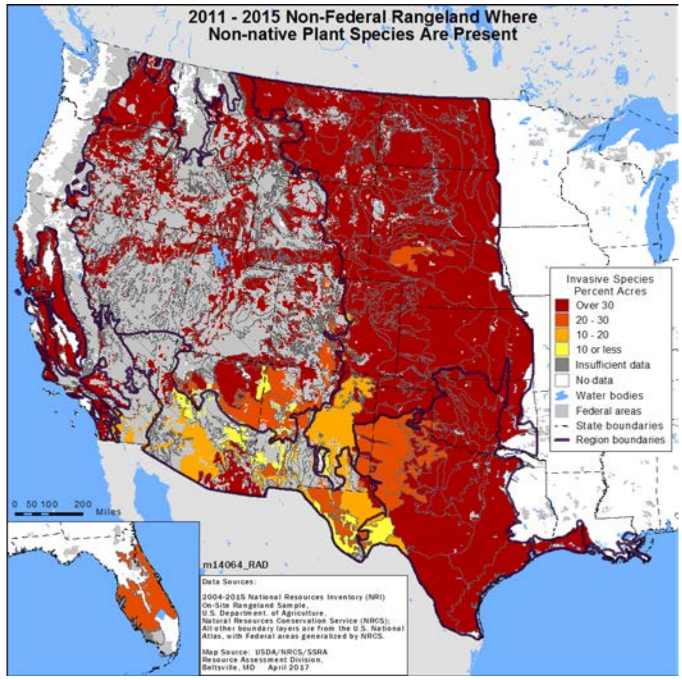


Figure 15. 2011-2015



Figures 16-17. Non-Federal Rangeland Where Non-native Plant Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 16. 2004-2010

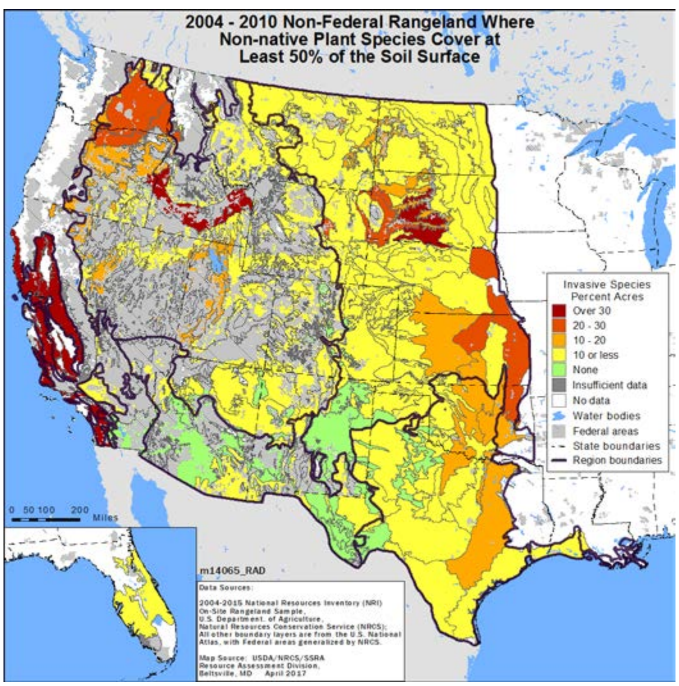


Figure 17. 2011-2015

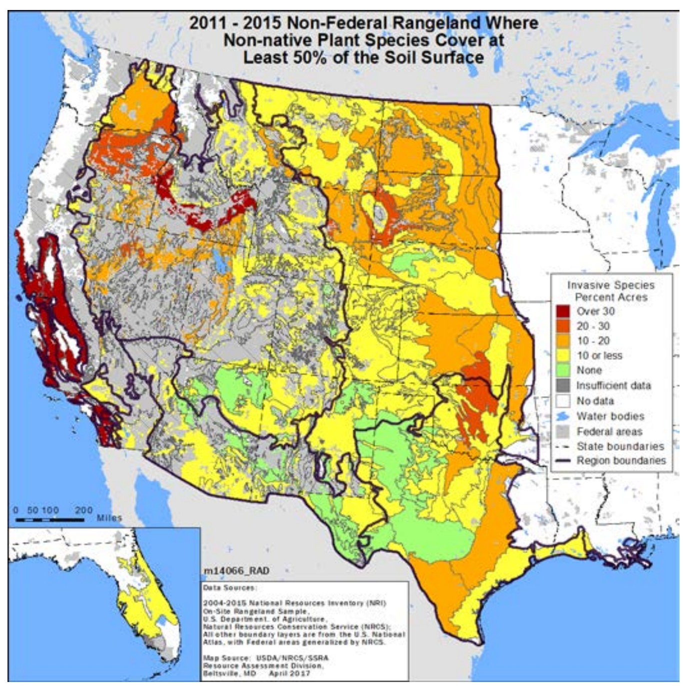
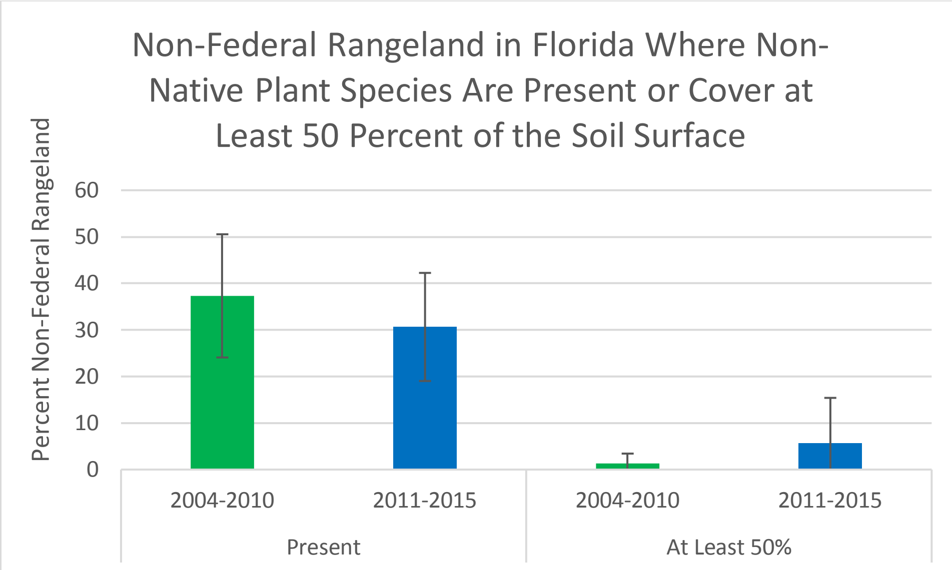


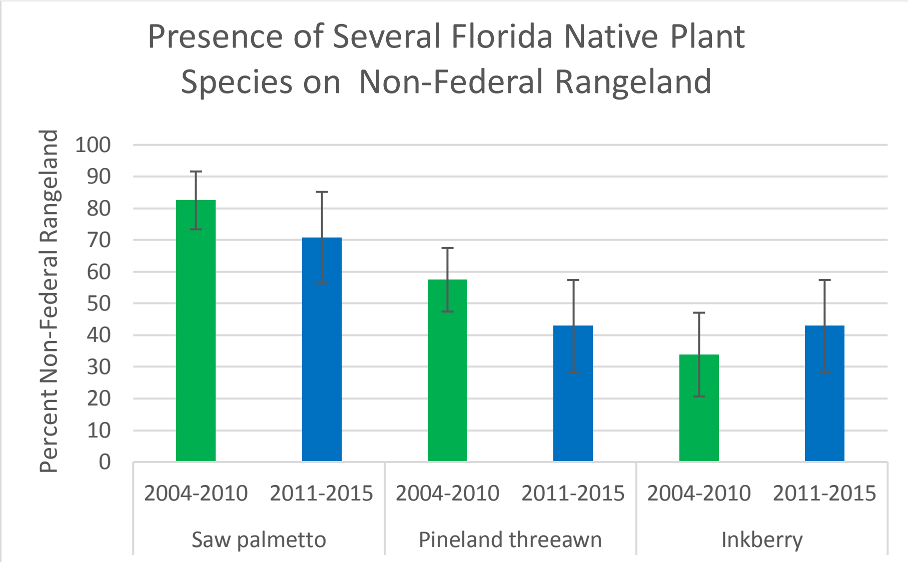
Figure 18. Non-Federal Rangeland Where Non-native Plant Species Are Present and Where They Cover at Least 50% of the Soil Surface. Error bars represent margins of error.



Range Health indicators that are important for reflecting changes in Biotic Integrity are sensitive and informative in Florida. Changes in functional groups do effect litter accumulation rate and type. Data collectors noted a higher prevalence of woody litter following a series of hurricanes. However, frequent prescribed fires and rapid oxidation soon altered the litter composition. Prescribed fire frequency changes plant height and structure and therefore, relative composition for interception.

Invasive species departures rated on range health assessments seem to point to an overabundance of the presence of native species such as small saw palmetto (*Serenoa repens*), inkberry (*Ilex glabra*), or pineland threeawn (*Aristida stricta*). Trace amounts of two non-native invasive species, Buffelgrass (*Pennisetum ciliare*), and Cogongrass (*Imperata cylindrica*), were observed in the Florida non-Federal rangeland data. Buffelgrass was introduced as a stabilizing cover grass on the deep sandy soils of the central Florida Ridge where former orange groves had frozen out in the early 1980s. Buffelgrass survives in Florida, but is not listed as one of the 16 problematic forage grasses that has been introduced to Florida (Overholt 2017). Cogongrass (*Imperata cylindrica*) is one of the 16 grasses introduced and is a common invasive species in relatively natural rangeland vegetation. Similar to the fire stimulated spread of the annual cheatgrass (*Bromus tectorum*), cogongrass is a perennial whose seed production is stimulated by fire, has strong rhizomatous spreading, is non-palatable, and has high volume biomass which make herbicide treatments difficult. Trace amounts of other non-native invasive species such as torpedo grass (*Panicum repens*), Brazilian peppertree (*Schinus terebinthifolius*), and Caesarweed (*Urena lobate*) were detected in the data.

Figure 19. Non-Federal Rangeland Where Saw Palmetto, Inkberry, and Pineland Threeawn Are Present. Error bars represent margins of error.



Summary and Conclusions

The long-term abiotic drivers of climate, soil, and time since settlement are unique factors in the regional reports. Florida's unique and isolated rangelands create interesting challenges to a National assessment of change in conditions. Florida is well known for 500 years of European settlement but the rangeland ecology has been relatively unaltered till these last 50 years when rapid changes occurred. The NRI Grazing Land on-site data collection began shortly after a major hydrologic restoration on the Kissimmee River in 2003. So change is expected but has not been captured in this report. This is partly caused by the need to test and evaluate an optional 18th indicator for the specifics to Florida's climate and soil. There is also the need to focus rangeland health assessments on reference condition descriptions or the departure descriptions relative to the ecological functions being addressed.

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The rangeland health maps represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

The source data used to construct the drought figures are from the National Drought Mitigation Center, and follow the drought monitor categories: http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx. The weekly drought monitor data were converted to a 1/8-degree grid, and the state and broad region polygons were used to clip out the grid cells within each region for the two time periods. Both the stack plots show the distribution of 1/8-degree grid cells of each drought monitor class for each year.

Drought severity is displayed in five categories:

- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

More Information

Bartolome, J. and S. Spiegal. 2016. "Ecological history." In *Ecology and Managemnt of Annual Rangelands*, by M.R. (ed.) George, 16-29. Davis, California: Department of Plant Science.

Bartolome, J.W., W.J. Barry, T. Griggs, and P. Hopkinson. 2007. "Valley grassland." In *Terrestrial vegetation of California. 3rd ed. M.G. Barbour, T. Keeler-Wolf, and A.A. Schoenherr, eds*, 367-393. Berkeley, California: University of Califorina Press.

Daehler, C.C. 2003. "Performance comparisons of co-occuring native and alien invasive plants: implications for conservation and restoration." *Annual Review of Ecology, Evolution, and Systematics*, 183-211.

D'Antonio, C.M., C. Malmstrom, S.A. Reynolds, and J. Gerlach. 2007. "Ecology of invasive non-native species in California grassland." In *California Grasslands: Ecology and Management*, by M.R., J.D. Corbin, and C.M. D'Antonio (eds.) Stromberg, 67-83. Berkeley, California: University of California Press.

Evett, R. and J. Bartolome. 2013. "Phytolith evidence for the extent and nature of prehistoric Californian grasslands." *The Holocene* Vol 23, Issue 11, pp. 1644 - 1649.

George, M.R. 2016. "Mediterranean climate." In *Ecology and Management of Annual Rangelands*, by M.R. (ed.) George, 1-15. Davis, California: Department of Plant Science.

Griffith, G.E., J.M. Omernik, D.W. Smith, T.D. Cook, E. Tallyn, Moseley, K. and C.B. Johnson. 2016. *Ecoregions of California.* 2 sided color poster with map, descriptive text, and photographs, U.S. Geological Survey Open-File Report 2016-1021, map scale 1:1,100,000, http://dx.doi.org/10.3133/ofr20161021.

Korosy, M.J. J.S. Reece, and R.F. Noss. 2013. "Winter habitat associations of four grassland sparrows." *The Wilson Journal of Ornithology* 125(3):502-512.

Kottek, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel. 2006. "World Map of the Köppen-Geiger climate classification updated." *Meteorologische Zeitschrift* 15, 259-263. DOI: 10.1127/0941-2948/2006/0130.

Larson-Praplan, S. 2014 . "History of Rangeland Management in California." *Rangelands* Rangelands 36(5):11-17. https://doi.org/10.2111/Rangelands-D-14-00020.1.

Menke, J.W. 1989. "Management Controls on Productivity." In *Grassland Structure and Function: California Annual Grassland*, by L.F. and H. Mooney (eds). Hueneke, 173-199. Dordrecht, Netherlands: Kluwer Academic Publishers.

Moyes A.B, M.S. Witter, and J.A, Gamon. 2005. "Restoration of native perennials in a California annual grassland after prescribed spring burning and solarization." *Restoration Ecology* 13(4), 659-666.

Orzell, S.L. and E. Bridges. 2006. "Floristic composition and species richness of subtropical seasonally wet Muhlenbergia sericea prairie in portions of central and south Florida." *Land of fire and water: the Florida dry prairie ecosystem. Proceedings of the Florida dry prairie conference (R. F. Noss, Editor).* Painter, DeLeon Springs, Florida, USA. 136–175 .

Overholt, W.A. and A.R. Franck. 2017. "The invasive legacy of forage grass introductions into Florida." *Natural Areas Journal* 37(2):254-264.

Wunderlin, R.P. and B.F. Hansen. 2003. *Guide to the vascular plants of Florida. Second Edition.* Gainesville: University Press of Florida.

Rangeland Health

Rangeland health provides information on types, patterns and severity of problems in rangeland ecosystems relative to an agreed upon standard ("reference") for each site. Land managers and policy-makers need this information to support strategic decisions and to identify the ecosystem processes that must be restored to improve services that the land provides and to maintain or improve profitability.

Non-Federal rangeland makes up 21% of the total area of the lower 48 States and thus:

- The condition of these lands directly or indirectly influences the environment enjoyed by the Nation.
- Meeting the Nation's objectives for natural resources and environmental quality will depend on how these lands are used and conserved.

The status and change in the three attributes of rangeland health (soil and site stability, hydrologic function, and biotic integrity) throughout the United States is reported based on an assessment of seventeen indicators at each point. These three attributes collectively reflect the status of key ecological processes which are related to the land's potential to support ecosystem services. Assessments were completed by all members of the team during the same visit when quantitative data were collected.

Plant and animal life depend on ecological processes such as the water cycle (the capture, storage, and safe release of precipitation), energy flow (conversion of sunlight to plant and then animal matter), and nutrient cycle (the cycle of nutrients through physical and biotic components of the environment). The rangeland health assessment provides information about how ecological processes are functioning relative to ecological potential. Because ecological potential varies both locally and regionally, NRI assessments of rangeland health use unique reference information for ecological sites. Ecological sites are basically climate and soil groupings that differ in their ability to produce specific kinds, amounts and proportions of plants, and in their response to management.

Direct measures of the three attributes of rangeland health site integrity and status are difficult or expensive due to the complexity of their processes and interrelationships. Instead, biological and physical characteristics are used as indicators of the functionality of these processes. Taken together, these indicators are used to assess three rangeland health attributes (Table 1):

- **Soil and site stability** is the capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
- **Hydrologic function** characterizes the capacity of an area to capture, store, and safely release water from rainfall, run-on and snowmelt (where relevant), to resist a reduction in this capacity and to recover this capacity when a reduction does occur.
- **Biotic integrity** is defined as the capacity of the biotic community to support ecological processes within the normal range of variability expected for the site, to resist a loss in the capacity to support these processes, and to recover this capacity when losses do occur. The biotic community includes plants, animals, and microorganisms occurring both above and below the ground.

Rangeland health assessments evaluate 17 separate but interrelated indicators associated with the three attributes, enabling identification of potential problems with respect to these attributes. The rangeland health tool is intended to communicate ecological concepts to the public and landowners, help identify possible land monitoring areas for more comprehensive programs, and provide "early warnings" of potential problems.

- Rangeland health evaluations are not designed to assign cause, nor to determine trend. The differences in rangeland health attributes are presented only to highlight areas where closer examination of the *measured* differences may be warranted.
- Continued collection of the quantitative data will allow NRCS to determine whether the differences reported are permanent.
- Additional research is required to determine the extent to which the reported differences were due to drought, invasive species, management and/or other factors.

To standardize rangeland health attribute ratings at the national level, attribute ratings in this, and the previous NRI Rangeland Resource Assessments (2010 and 2014), reports were calculated as the median of associated indicator ratings. For local and ongoing NRI applications of the method, NRCS advocates the use of the 'preponderance of evidence' approach to rate attributes, as described in the protocol, Interpreting Indicators of Rangeland Health (Pellant et al, 2005). Therefore, starting with the 2014 field data collection season, the NRI has been collecting Rangeland Health attribute scores using the preponderance of evidence method supported by the protocol. This and future NRI Rangeland Resource Assessment reports will not provide a comparison of the two methods (calculated median values vs. preponderance of evidence). Once enough data are accumulated the preponderance of evidence results will be included in the NRI Rangeland Resource Assessment reports. Generally, the median value may be considered as a less severe estimate of the attribute ratings than the preponderance of evidence approach. For example, Biotic Integrity has nine indicators that are assessed and contribute to the final attribute score. Depending upon the reference conditions of the ecological site, it may only take one or two of the indicator ratings to very strongly influence the attribute score. If a median value is calculated, instead of using the preponderance of evidence method to determine the attribute score, the final attribute score may be quite different from reality. As an example, in the Northern Great Plains, the invasion of Kentucky bluegrass is contributing to a significant departure of Biotic Integrity from reference conditions. Only two of the nine Biotic Integrity indicators would adequately reflect this. When median values are calculated for the Biotic Integrity attribute scores, that may result in muted attribute scores. Whereas when the attribute score is determined based on preponderance of evidence, it would clearly show there is a threat to the Biotic Integrity attribute on the ecological site with a greater departure from the reference than the median method would indicate. With the correct attribute scores, using preponderance of evidence, ranchers and conservationists can take quick corrective actions to reverse a continued departure from reference conditions.

Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the summary tables provide estimates of non-Federal rangeland where no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the tables and maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Key Findings

Although over 77% of the Nation’s 409 million acres of non-Federal rangeland in the 48 contiguous states is in relatively healthy condition and has no significant soil, hydrologic or biotic integrity problems, between 2004-2010 and 2011-2015 there has been an increase in the areas that show at least moderate departure from reference conditions.

During 2011-2015, 25.8 (±1.4) percent of non-Federal rangeland showed moderate, moderate-to-extreme, or extreme-to-total departure from reference conditions for at least one of the rangeland health attributes (Table 2). This was a 7.5 (±1.7) percent increase over 2004-2010 (Table 3, Table 4).

Figures 1-2. Non-Federal Rangeland Where at Least One Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. (Source: Table 2, Table 3, and Table 4**)**

Figure 1. 2004-2010

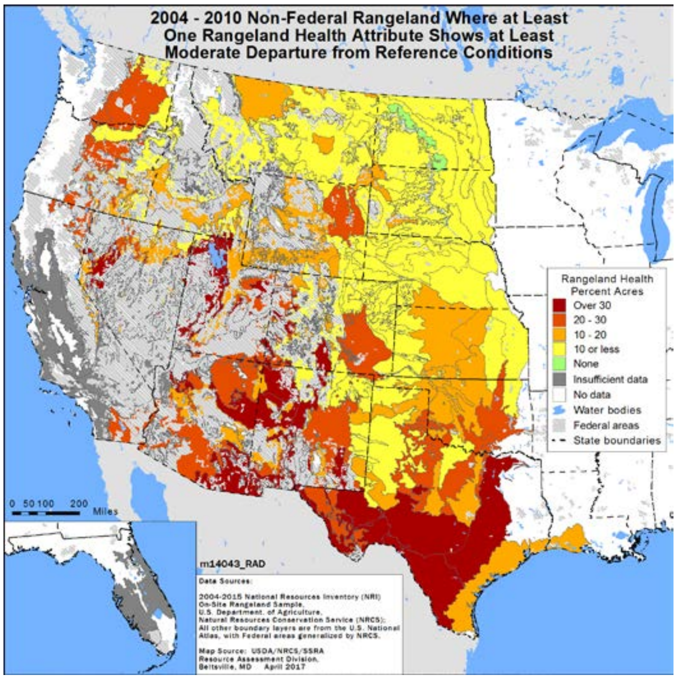
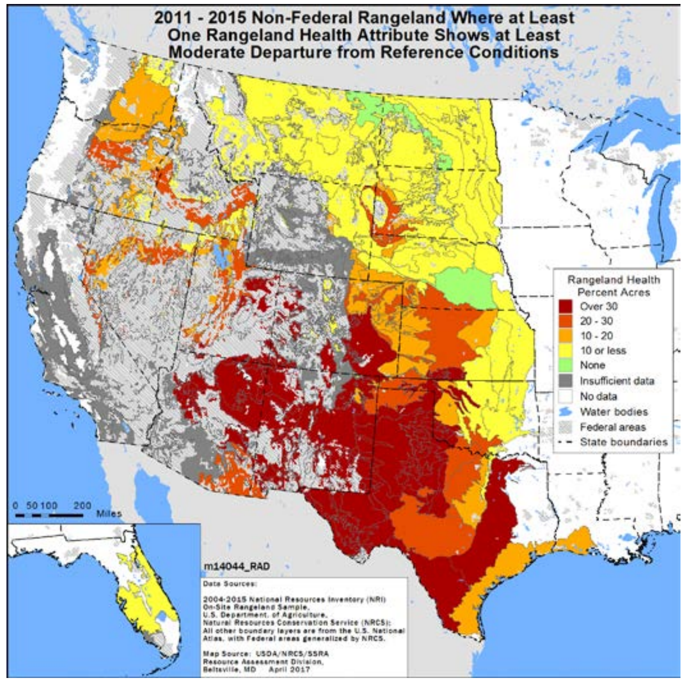


Figure 2. 2011-2015



During 2011-2015, 10.5 (±0.9) percent of non-Federal rangeland showed moderate, moderate-to-extreme, or extreme-to-total departure from reference conditions for at least one of the rangeland health attributes (Table 2). This was a 3.3 (±0.9) percent increase over 2004-2010 (Table 3, Table 4)

Figures 3-4. Non-Federal Rangeland Where All Three Rangeland Health Attribute Shows at Least Moderate Departure from Reference Conditions. (Source: Table 2, Table 3, and Table 4**)**

Figure 3. 2004-2010

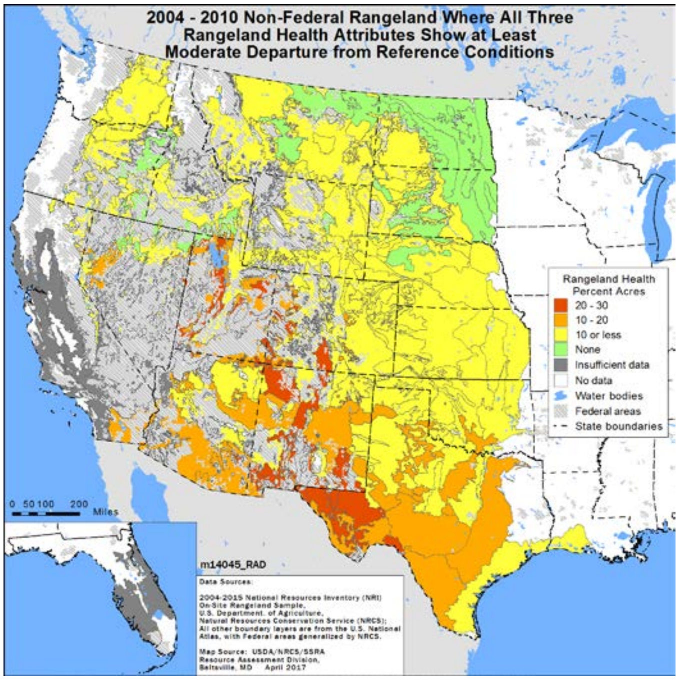
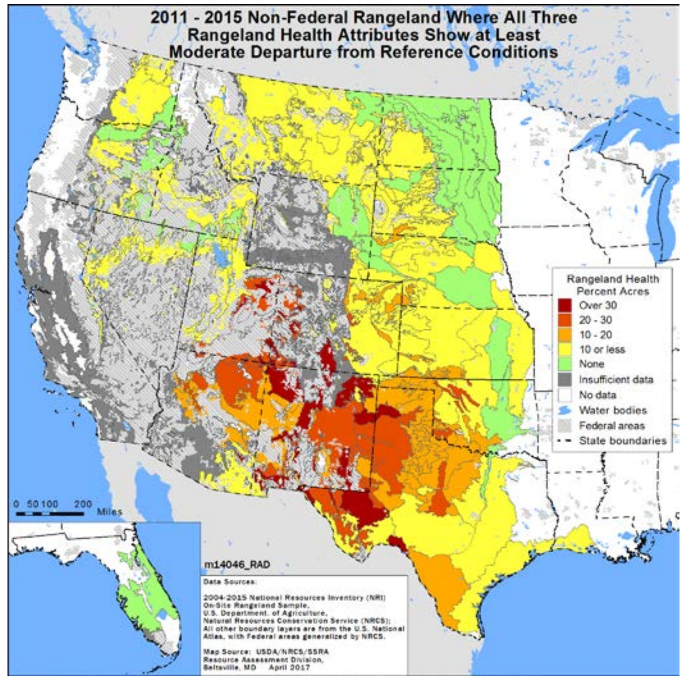


Figure 4. 2011-2015



Of the three attributes, soil and site stability nationally showed at least moderate departure from reference conditions on 12.7 (±1.0) percent of non-Federal rangeland during 2011-2015 (Table 2). This was an increase of 3.4 (±1.1) percent from 2004-2010 (Table 3, Table 4). Hydrologic function was second at 16.0 (±1.2) percent, while biotic integrity was the most widespread showing moderate, moderate-to-extreme, or extreme-to-total departure from reference conditions on 22.7 (±1.4) percent of non-Federal rangeland during 2011-2015 (Table 2), and increase of 4.1 (±1.3) and 7.5 (±1.7) percent, respectively, over 2004-2010 (Table 3, Table 4).

Figures 5-6. Non-Federal Rangeland Where Soil and Site Stability Shows at Least Moderate Departure from Reference Conditions (Source: Table 2, Table 3, and Table 4**)**

Figure 5. 2004-2010

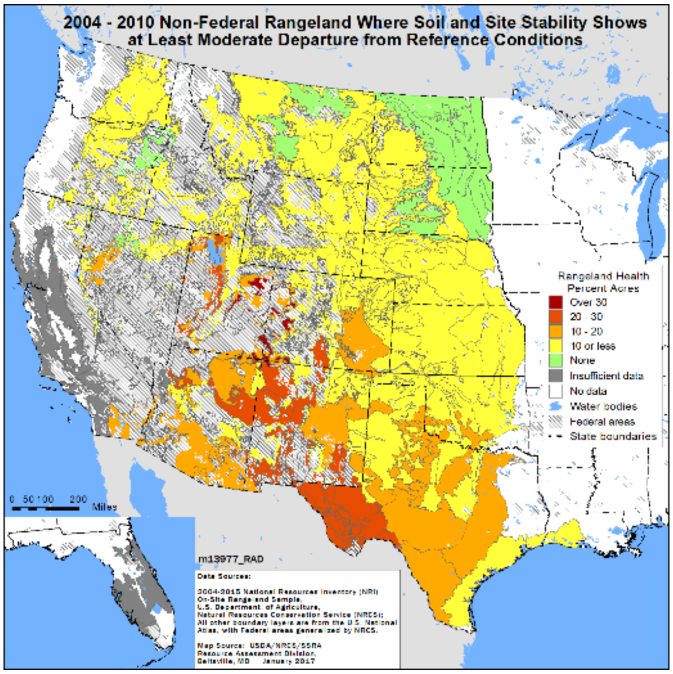
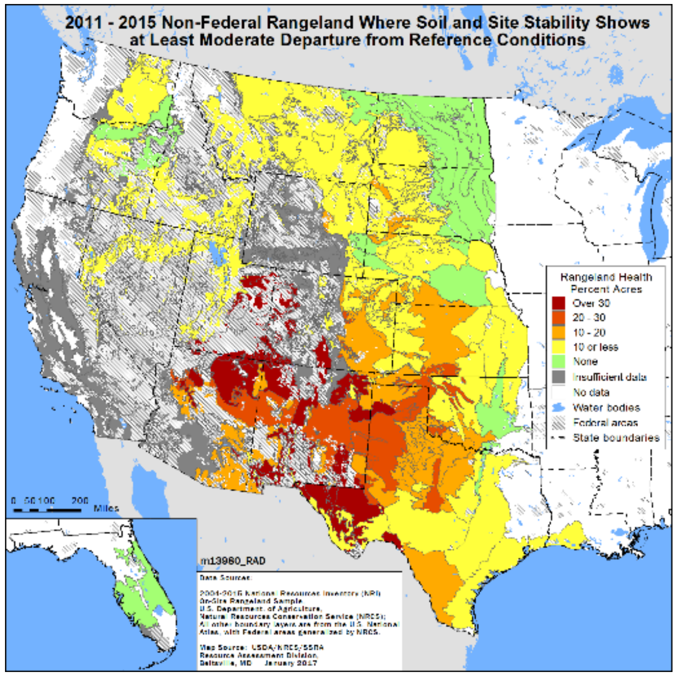


Figure 6. 2011-2015



Figures 7-8. Non-Federal Rangeland Where Hydrologic Function Shows at Least Moderate Departure from Reference Conditions (Source: Table 2, Table 3, and Table 4**)**

Figure 7. 2004-2010

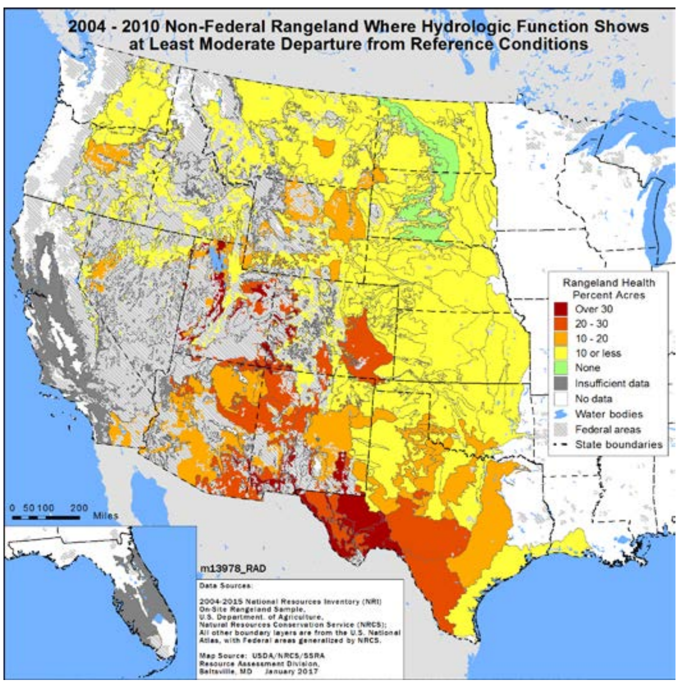
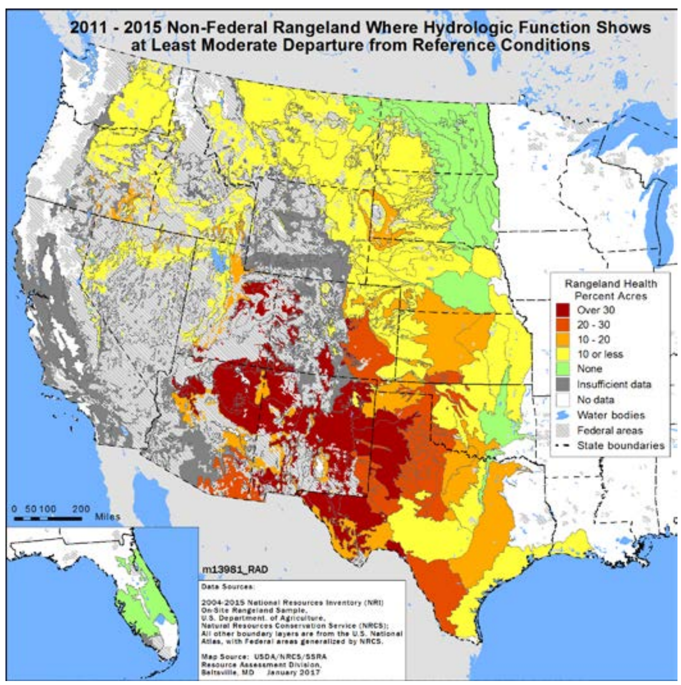


Figure 8. 2011-2015



Figures 9-10. Non-Federal Rangeland Where Biotic Integrity Shows at Least Moderate Departure from Reference Conditions (Source: Table 2, Table 3, and Table 4**)**

Figure 9. 2004-2010

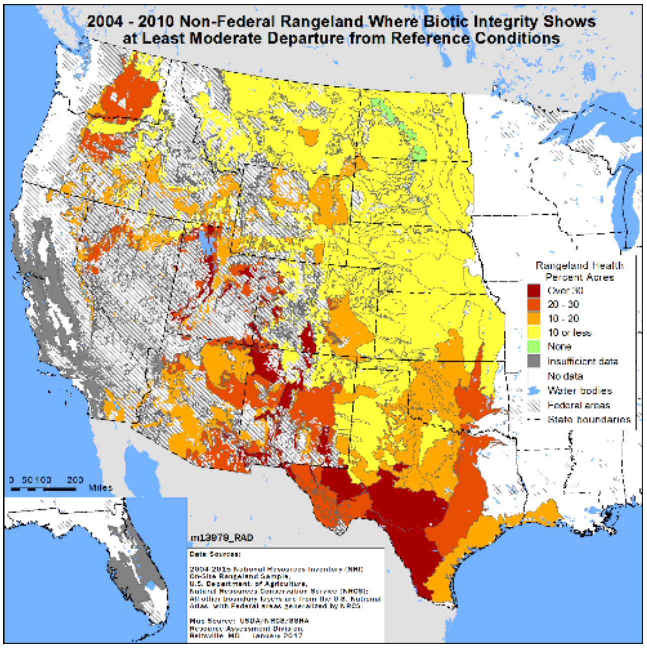
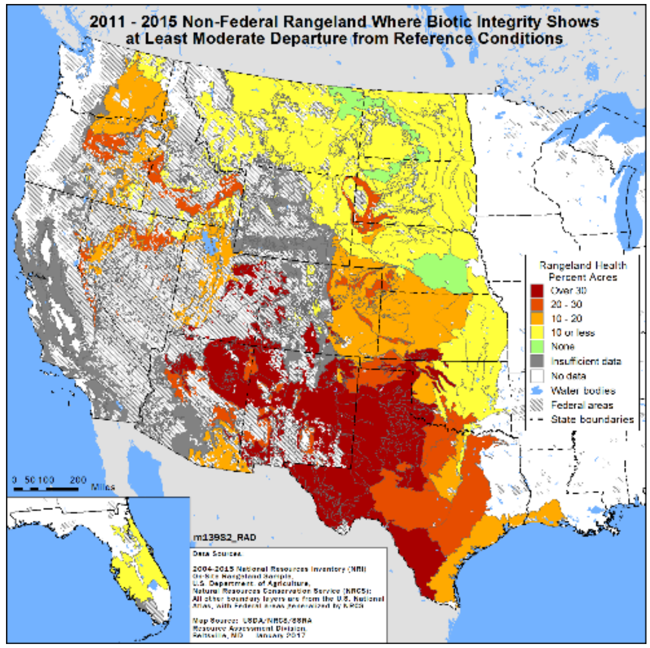


Figure 10. 2011-2015



Ecological sites where the rangeland health attributes show moderate departure from reference conditions are more likely to have the potential to be brought back to an improved status through good management practices than those with ratings of moderate-to-extreme or extreme-to-total departure. Nationally during 2011-2015, the soil and site stability attribute shows moderate departure from reference conditions for 9.5 (±0.9) percent of non-Federal rangeland (Table 5), and increase of 2.1 (±0.9) percent over 2004-2010 (Table 6, Table 7). Hydrologic function shows moderate departure from reference conditions for 12.2 (±1.1) percent of the nation's non-Federal rangeland during 2011-2015 (Table 8), an increase of 3.0 (±1.3) percent over 2004-2010 (Table 9, Table 10). Biotic integrity shows moderate departure for 16.9 (±1.2) percent of non-Federal rangeland during 2011-2015 (Table 11), an increase of 5.2 (±1.5) percent over 2004-2010 (Table 12, Table 13).

Figures 11-12. Non-Federal Rangeland Where Soil and Site Stability Shows Moderate Departure from Reference Conditions (Source: Table 5, Table 6, Table 7**)**

Figure 11. 2004-2010

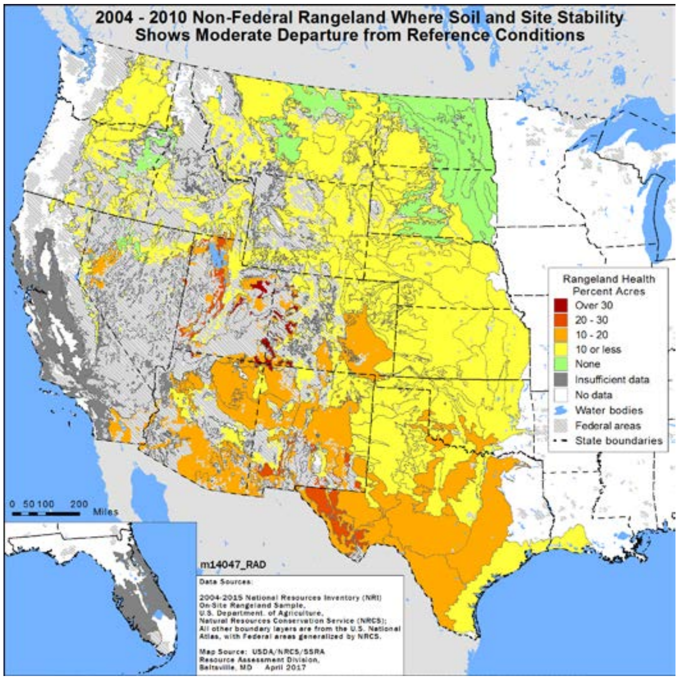
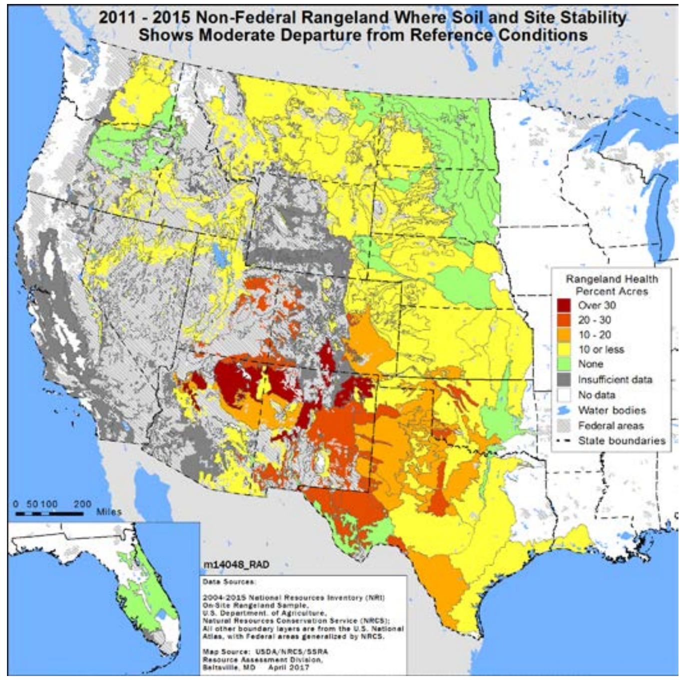


Figure 12. 2011-2015



Figures 13-14. Non-Federal Rangeland Where Hydrologic Function Shows Moderate Departure from Reference Conditions (Source: Table 8, Table 9, Table 10**)**

Figure 13. 2004-2010

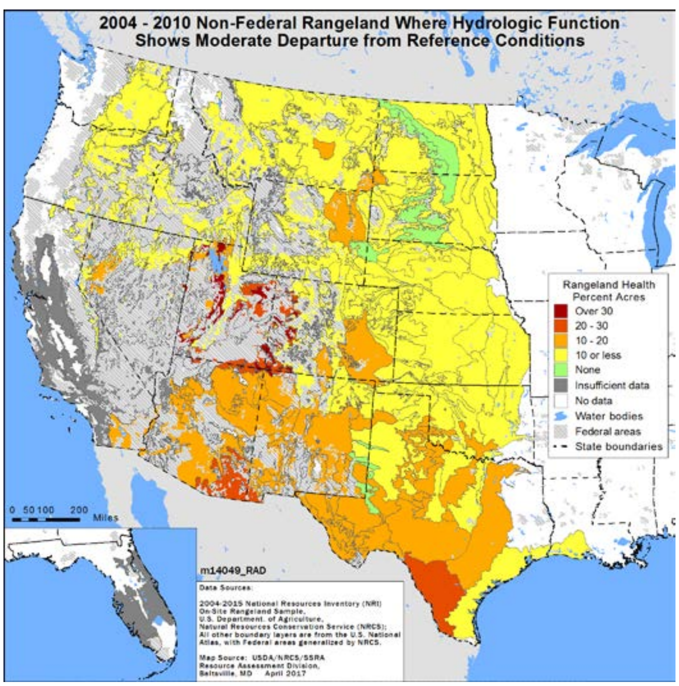
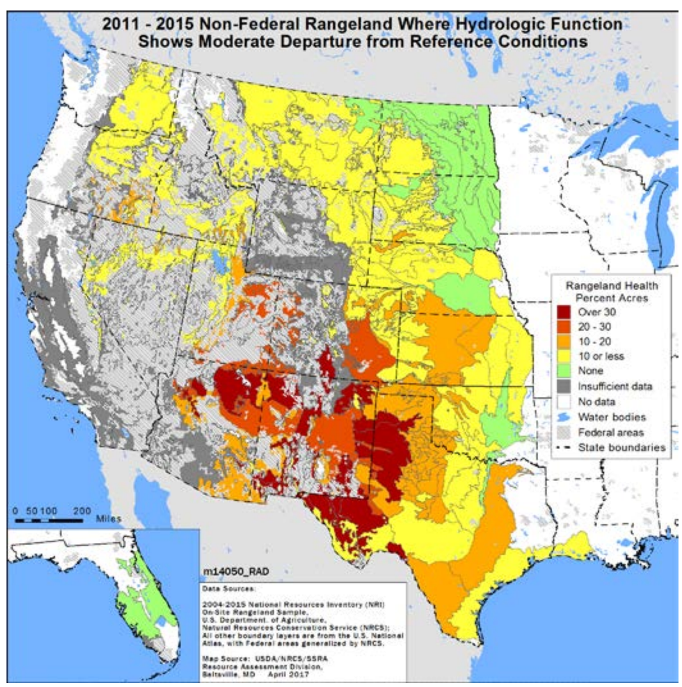


Figure 14. 2011-2015



Figures 15-16. Non-Federal Rangeland Where Biotic Integrity Shows Moderate Departure from Reference Conditions (Source: Table 11, Table 12, Table 13**)**

Figure 15. 2004-2010

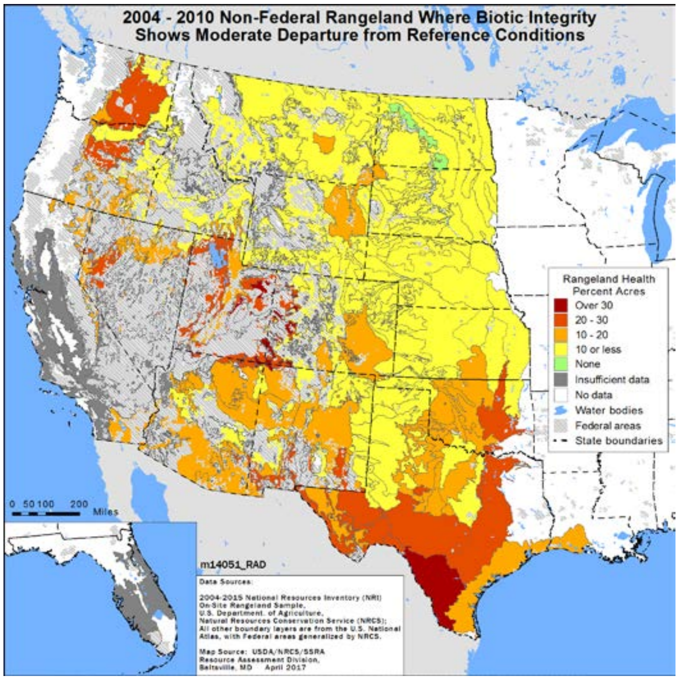
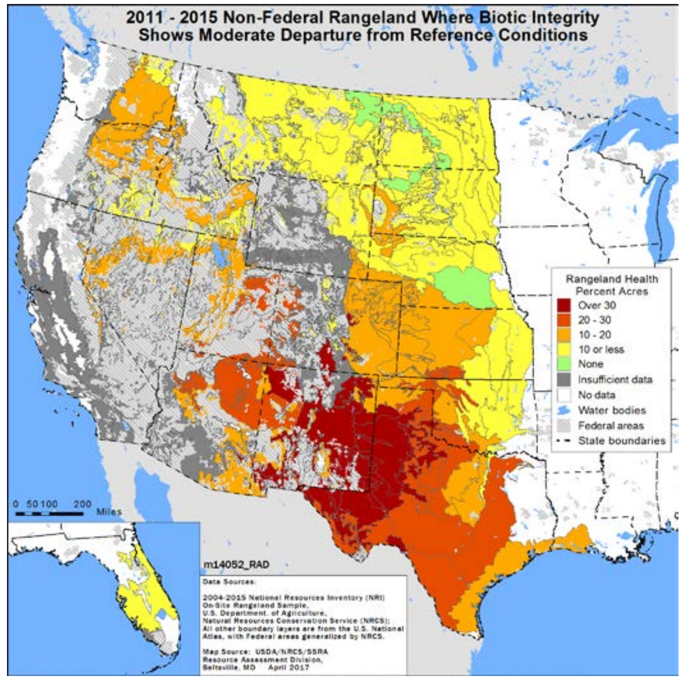


Figure 16. 2011-2015



At least one of the three attributes shows moderate departure from reference conditions on 22.5 (±1.4) percent of non-Federal rangeland during 2011-2015 (Table 14), a 6.2 (±1.7) percent increase over 2004-2010 (Table 15, Table 16). Between 2004-2010 and 2011-2015, the area of non-Federal rangeland where all three attributes showed none-to-slight or slight-to-moderate departure from reference conditions decreased by 7.5 (±1.7) percent (Table 16) to 74.2 (±1.4) percent.

Figures 17-18. Non-Federal Rangeland At Least One Rangeland Health Attribute Shows Moderate Departure from Reference Conditions. (Source: Table 14, Table 15, Table 16**)**

Figure 17. 2004-2010

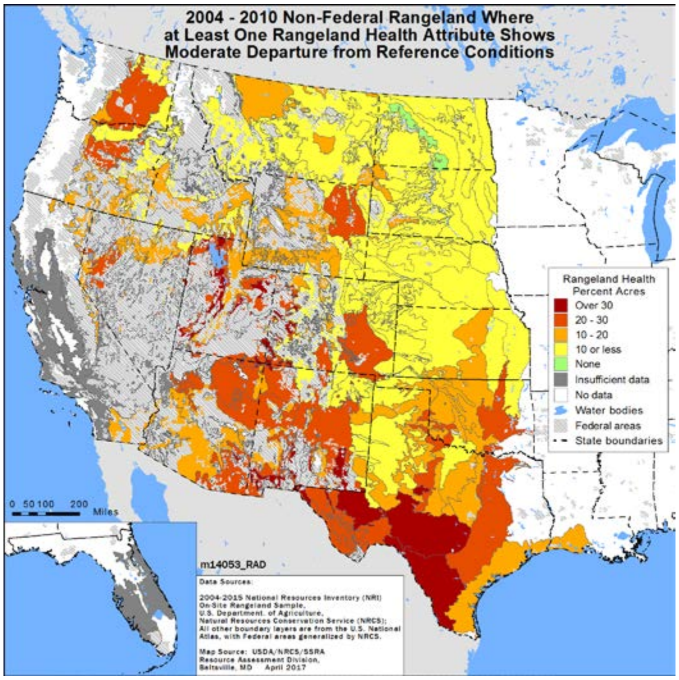
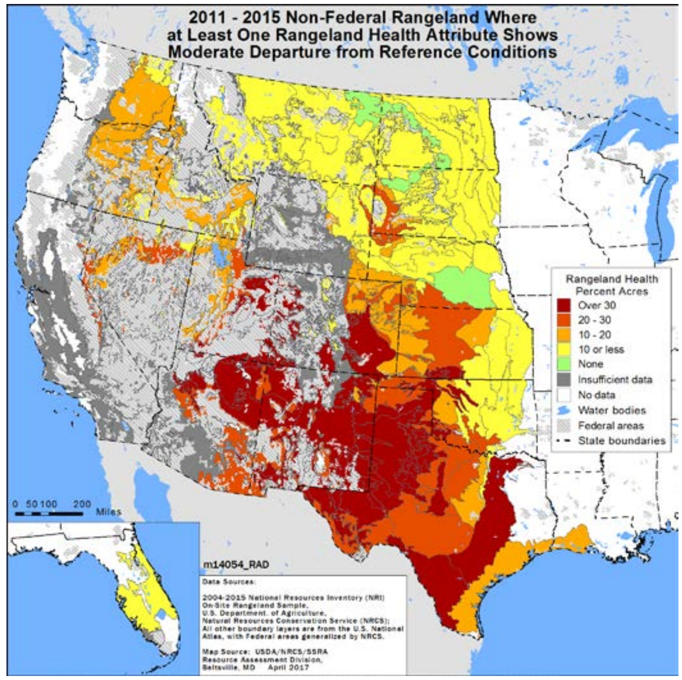


Figure 18. 2011-2015



Between 2004-2010 and 2011-2015, there was a decrease in the percent of non-Federal rangeland where the departure from reference conditions were none-to-slight or slight-to-moderate for soil site stability (3.4 ±1.1), hydrologic function (4.2 ±1.3), and biotic integrity (7.5 ±1.7) percent. During the same time was an increase in the percent of non-Federal rangeland where the departure from reference conditions were moderate-to-extreme or extreme-to-total for soil site stability (1.3 ±0.6), hydrologic function (1.2 ±0.7), and biotic integrity (2.3 ±0.7) percent (Table 7, Table 10, Table 13).

Figures 19-20. Non-Federal Rangeland Where Soil and Site Stability Shows Above Moderate Departure from Reference Conditions (Source: Table 5, Table 6, Table 7**)**

Figure 19. 2004-2010

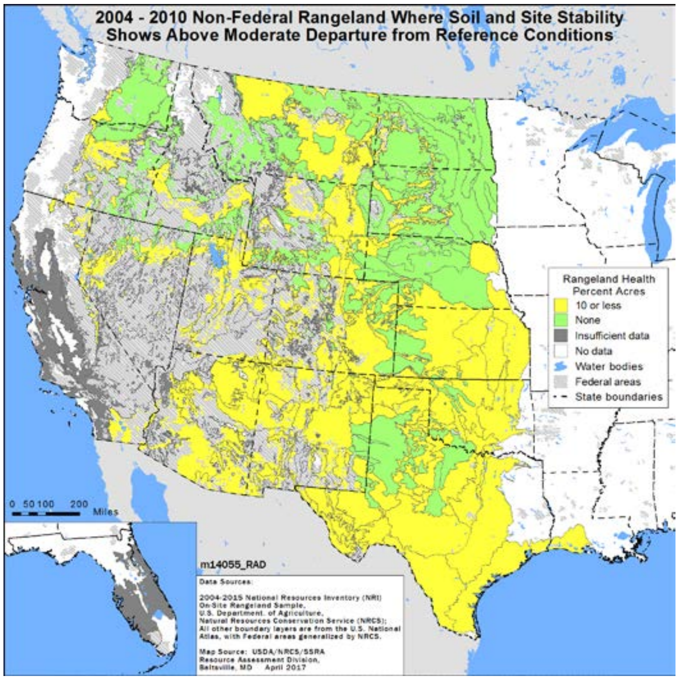
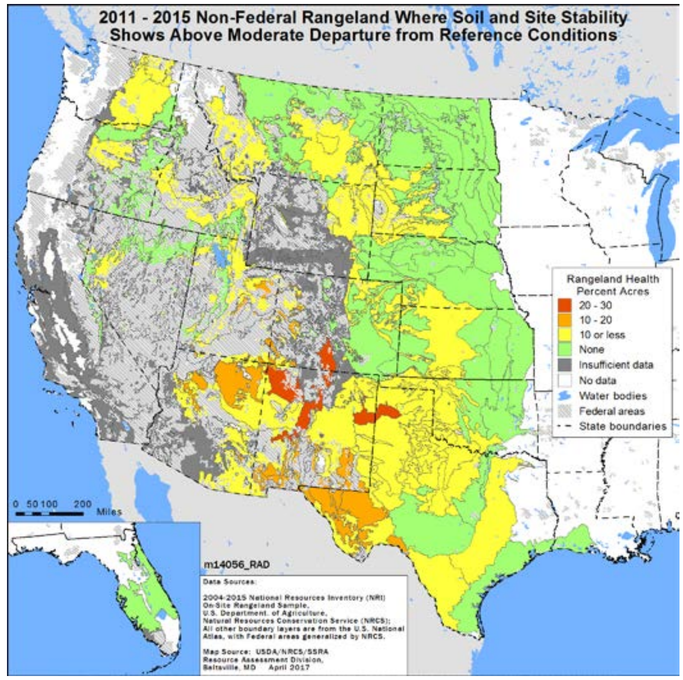


Figure 20. 2011-2015



Figures 21-22. Non-Federal Rangeland Where Hydrologic Function Shows Above Moderate Departure from Reference Conditions (Source: Table 8, Table 9, Table 10**)**

Figure 21. 2004-2010

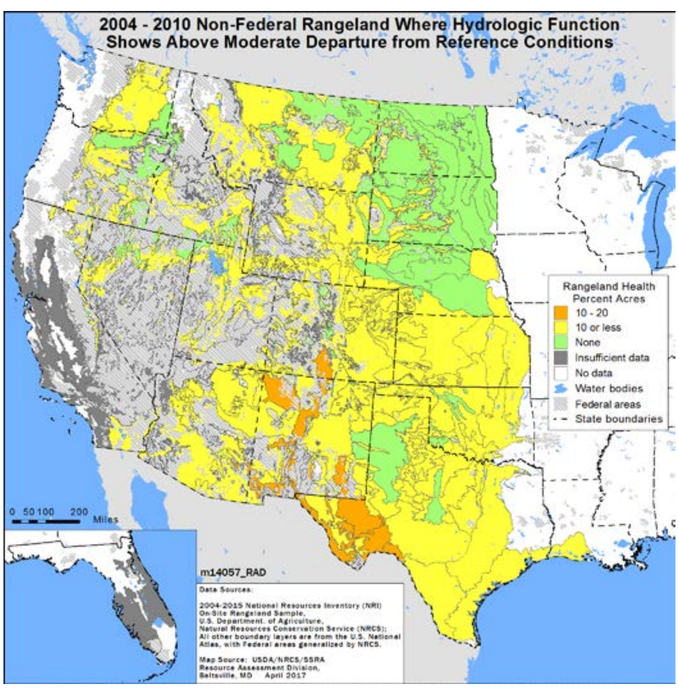
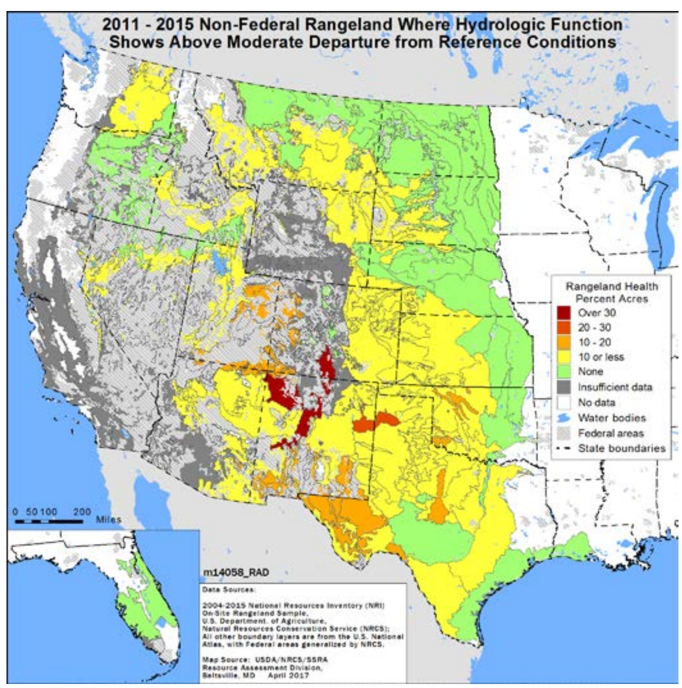


Figure 22. 2011-2015



Figures 23-24. Non-Federal Rangeland Where Biotic Integrity Shows Above Moderate Departure from Reference Conditions (Source: Table 11, Table 12, Table 13**)**

Figure 23. 2004-2010

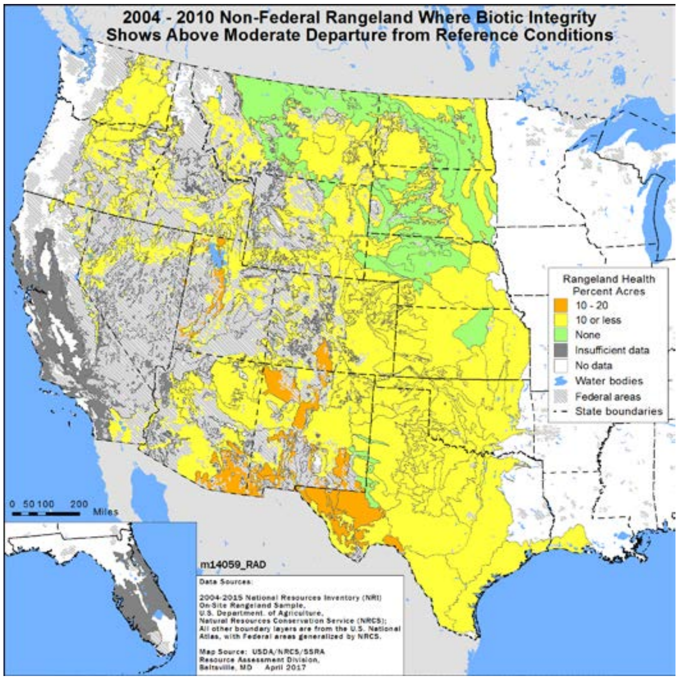
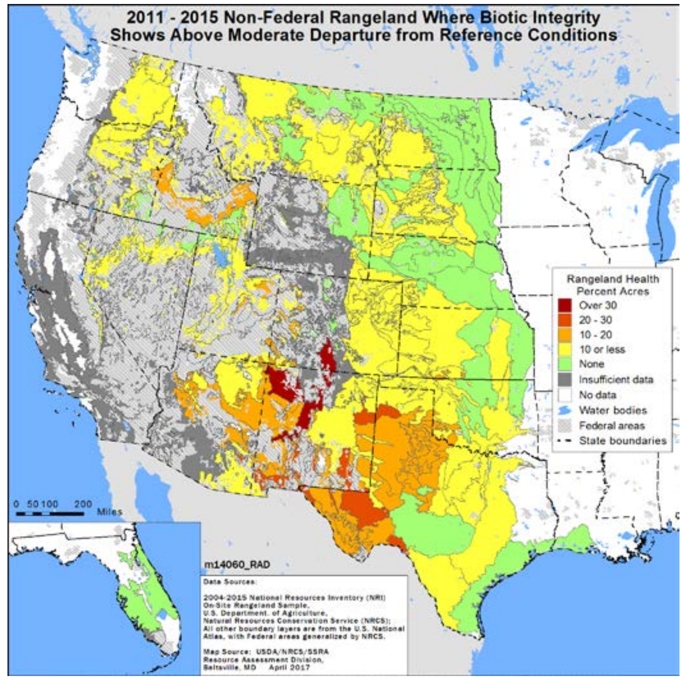


Figure 24. 2011-2015



Between 2004-2010 and 2011-2015, the area of non-Federal rangeland where all three attributes showed moderate-to-extreme or extreme-to-total departure from reference conditions decreased by 0.8 (±0.5) percent (Table 16) to 2.0 (±0.3) percent.

Figures 25-26. Non-Federal Rangeland Where All Three Rangeland Health Attributes Show Above Moderate Departure from Reference Conditions (Source: Table 14, Table 15, Table 16**)**

Figure 25. 2004-2010

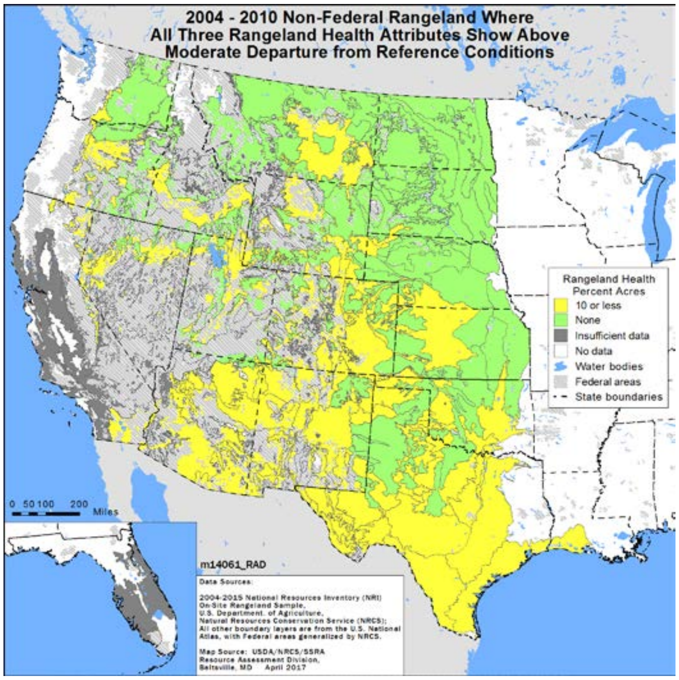
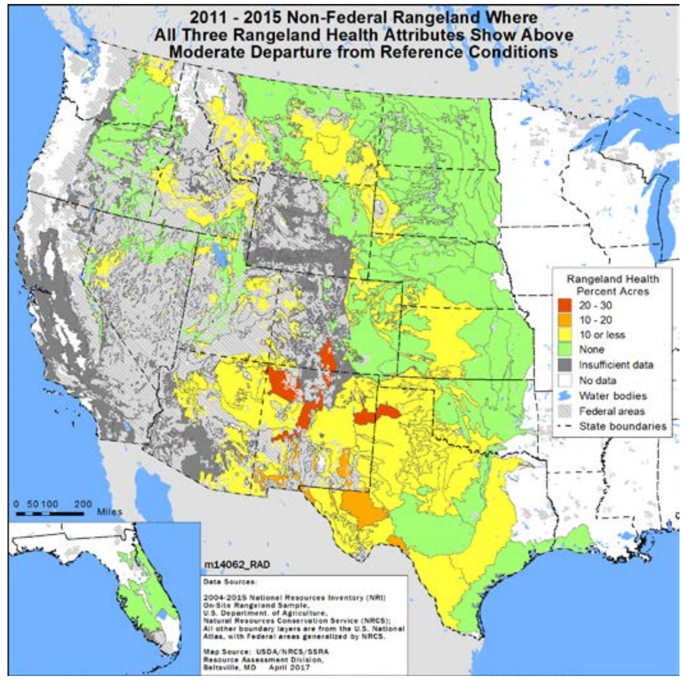


Figure 26. 2011-2015



Tables and Results

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI), a sample survey using scientific statistical principles and procedures. These results, based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015, address status and change in conditions. These estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

Margins of error are reported for each NRI estimate and must be considered at all scales of analysis.

The margin of error is used to construct the 95 percent confidence interval for the estimate. The lower bound of the interval is obtained by subtracting the margin of error from the estimate; the upper bound is obtained by adding the margin of error to the estimate. A 95 percent confidence interval means that in repeated samples from the same population, 95 percent of the time the true underlying population parameter will be contained within the lower and upper bounds of the interval.

In the following tables, estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 1-Standard Indicators included in the Rangeland Health protocol and attribute (soil and site stability, hydrologic function, and/or biotic integrity) to which each indicator applies (Pellant 2005). The "X" indicates that the indicator is applied to the attribute.

Rangeland Health Indicator	Rangeland Health Attribute		
	Soil and Site Stability	Hydrologic Function	Biotic Integrity
1. Rills	X	X	
2. Water flow patterns	X	X	
3. Pedestals and/or Terracettes	X	X	
4. Bare ground	X	X	
5. Gullies	X	X	
6. Wind scoured, blowouts, and/or deposition areas	X		
7. Litter movement	X		
8. Soil surface resistance to erosion	X	X	X
9. Soil surface loss or degradation	X	X	X

10. Plant community composition and distribution relative to infiltration and runoff		X	
11. Compaction layer	X	X	X
12. Functional/structural groups			X
13. Plant mortality/decadence			X
14. Litter amount		X	X
15. Annual aboveground production			X
16. Invasive plants			X
17. Reproductive capability of perennial plants			X

Table 2- 2011-2015 non-Federal rangeland by state where rangeland health attribute ratings are moderate, moderate-to-extreme, or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 3)	Hydrologic Function Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 3)	Biotic Integrity Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 3)	All 3 Rangeland Health Attributes Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)	At Least 1 Rangeland Health Attribute Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)
		Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	3.2	21.1	25.7	17.1	13.4	28.5
Arizona	MOE	(3.8)	(7.4)	(7.9)	(4.3)	(4.6)	(7.3)
California	Est	91.1	4.8	9.8	18.7	2.4	21.1
California	MOE	(4.7)	(10.0)	(11.5)	(17.1)	(5.0)	(20.2)
Colorado	Est	1.2	7.8	14.2	11.6	4.8	17.8
Colorado	MOE	(0.8)	(3.9)	(3.7)	(3.0)	(2.6)	(3.7)
Florida	Est	**	**	**	4.0	**	4.0
Florida	MOE				(5.2)		(5.2)
Idaho	Est	5.1	2.1	3.8	16.6	1.0	18.9

Idaho	MOE	(5.0)	(1.8)	(3.2)	(6.5)	(1.1)	(7.4)
Kansas	Est	**	8.1	10.0	18.3	6.0	21.2
Kansas	MOE		(2.9)	(3.0)	(4.6)	(2.4)	(5.2)
Louisiana	Est	**	**	**	**	**	**
Louisiana	MOE						
Montana	Est	0.2	3.0	4.5	2.9	1.1	5.9
Montana	MOE	(0.2)	(1.5)	(1.9)	(1.8)	(1.0)	(2.3)
Nebraska	Est	**	0.3	0.9	1.1	**	1.7
Nebraska	MOE		(0.3)	(0.6)	(0.8)		(1.0)
Nevada	Est	**	2.7	4.8	13.9	2.2	14.8
Nevada	MOE		(2.2)	(3.8)	(6.0)	(2.1)	(6.4)
New Mexico	Est	**	42.7	49.8	60.4	39.4	63.7
New Mexico	MOE		(5.6)	(4.7)	(5.2)	(5.8)	(4.6)
North Dakota	Est	**	0.4	1.3	0.9	0.2	1.8
North Dakota	MOE		(0.6)	(1.0)	(1.0)	(0.3)	(1.4)
Oklahoma	Est	**	1.7	2.9	5.0	0.7	6.6
Oklahoma	MOE		(1.0)	(1.4)	(2.0)	(0.8)	(2.1)

Oregon	Est	**	2.5	3.4	18.7	1.8	19.8
Oregon	MOE		(2.6)	(3.7)	(6.2)	(2.0)	(6.6)
South Dakota	Est	**	2.3	3.7	7.2	2.0	7.9
South Dakota	MOE		(1.4)	(2.1)	(2.5)	(1.3)	(2.6)
Texas	Est	0.2	16.4	20.9	40.6	15.7	41.7
Texas	MOE	(0.3)	(3.2)	(3.4)	(4.3)	(3.1)	(4.4)
Utah	Est	2.2	12.3	16.1	25.1	8.2	29.3
Utah	MOE	(3.2)	(4.9)	(4.6)	(7.0)	(4.1)	(6.5)
Washington	Est	0.3	4.5	8.2	13.5	2.4	16.7
Washington	MOE	(0.7)	(4.6)	(7.1)	(7.4)	(3.4)	(9.3)
Wyoming	Est	11.0	7.4	6.9	6.8	2.0	10.8
Wyoming	MOE	(4.8)	(3.5)	(2.4)	(3.6)	(1.7)	(3.8)
National	Est	5.5	12.7	16.0	22.7	10.5	25.8
National	MOE	(0.6)	(1.0)	(1.2)	(1.4)	(0.9)	(1.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 3- 2004-2010 non-Federal rangeland by state where rangeland health attribute ratings are moderate, moderate-to-extreme, or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 3)	Hydrologic Function Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 3)	Biotic Integrity Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 3)	All 3 Rangeland Health Attributes Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)	At Least 1 Rangeland Health Attribute Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)
		Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	15.3	19.9	16.7	9.2	25.3
Arizona	MOE		(3.2)	(3.7)	(4.1)	(3.1)	(4.2)
California	Est	58.2	1.4	1.4	10.3	1.4	10.3
California	MOE	(7.0)	(1.6)	(1.6)	(6.3)	(1.6)	(6.3)
Colorado	Est	**	7.8	12.1	11.7	5.1	17.7
Colorado	MOE		(2.9)	(3.6)	(2.5)	(2.0)	(4.0)
Florida	Est	15.7	0.9	0.9	12.0	0.9	12.0
Florida	MOE	(11.6)	(2.0)	(2.0)	(6.9)	(2.0)	(6.9)
Idaho	Est	**	2.2	3.1	9.1	1.1	10.2

Idaho	MOE		(1.7)	(2.0)	(2.7)	(0.9)	(3.2)
Kansas	Est	**	4.1	5.5	5.3	2.2	8.0
Kansas	MOE		(1.2)	(1.4)	(1.4)	(1.0)	(1.7)
Louisiana	Est	**	**	**	**	**	**
Louisiana	MOE						
Montana	Est	**	2.6	4.3	4.7	1.2	7.1
Montana	MOE		(1.2)	(1.4)	(2.2)	(0.7)	(2.3)
Nebraska	Est	**	2.4	3.1	5.9	0.8	7.9
Nebraska	MOE		(1.2)	(1.4)	(1.5)	(0.6)	(1.8)
Nevada	Est	**	4.2	5.7	15.2	3.6	16.1
Nevada	MOE		(3.4)	(3.4)	(5.0)	(3.3)	(5.2)
New Mexico	Est	**	15.5	17.3	20.9	12.8	24.2
New Mexico	MOE		(2.9)	(3.2)	(2.9)	(2.6)	(3.4)
North Dakota	Est	**	0.8	1.9	3.2	0.4	4.2
North Dakota	MOE		(0.7)	(1.1)	(1.3)	(0.5)	(1.6)
Oklahoma	Est	**	2.9	4.7	18.3	1.8	20.0
Oklahoma	MOE		(1.4)	(1.2)	(3.0)	(0.9)	(3.2)

Oregon	Est	**	4.1	5.7	15.4	3.9	15.7
Oregon	MOE		(2.1)	(2.4)	(4.1)	(2.1)	(4.0)
South Dakota	Est	**	0.5	0.6	4.2	0.3	4.4
South Dakota	MOE		(0.4)	(0.5)	(2.0)	(0.4)	(2.0)
Texas	Est	0.1	15.5	19.7	24.3	13.8	26.5
Texas	MOE	(0.1)	(2.6)	(2.9)	(3.3)	(2.2)	(3.3)
Utah	Est	**	25.3	30.6	35.7	21.3	41.3
Utah	MOE		(4.8)	(5.5)	(6.0)	(4.3)	(6.0)
Washington	Est	**	4.4	6.1	24.8	2.4	27.6
Washington	MOE		(3.2)	(3.3)	(5.7)	(2.6)	(5.1)
Wyoming	Est	0.0	7.1	8.2	8.9	2.9	13.8
Wyoming	MOE	(0.1)	(2.8)	(2.6)	(2.1)	(1.5)	(2.9)
National	Est	2.7	9.3	11.9	15.2	7.1	18.3
National	MOE	(0.3)	(0.8)	(0.8)	(0.7)	(0.5)	(0.8)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 4- Change between 2004-2010 and 2011-2015 on non-Federal rangeland by state where rangeland health attribute ratings are moderate, moderate-to-extreme, or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 3)	Hydrologic Function Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 3)	Biotic Integrity Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 3)	All 3 Rangeland Health Attributes Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)	At Least 1 Rangeland Health Attribute Had Moderate Or Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=3)
		Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	3.2	5.9	5.8	0.4	4.2	3.2
Arizona	MOE	(3.8)	(7.6)	(8.2)	(5.2)	(5.0)	(7.9)
California	Est	32.9	3.4	8.4	8.4	1.0	10.8
California	MOE	(8.1)	(9.5)	(11.3)	(17.6)	(4.6)	(20.9)
Colorado	Est	1.2	0.0	2.1	0.0	-0.4	0.1
Colorado	MOE	(0.8)	(4.5)	(5.5)	(3.8)	(3.1)	(5.4)
Florida	Est	-15.7	-0.9	-0.9	-8.0	-0.9	-8.0
Florida	MOE	(11.6)	(2.0)	(2.0)	(7.9)	(2.0)	(7.9)
Idaho	Est	5.1	0.0	0.6	7.6	-0.1	8.6

Idaho	MOE	(5.0)	(2.3)	(3.5)	(6.5)	(1.6)	(7.3)
Kansas	Est	**	4.0	4.5	13.0	3.8	13.2
Kansas	MOE		(3.1)	(3.5)	(4.9)	(2.5)	(5.8)
Louisiana	Est	**	**	**	**	**	**
Louisiana	MOE						
Montana	Est	0.2	0.3	0.3	-1.8	-0.1	-1.2
Montana	MOE	(0.2)	(2.2)	(2.4)	(3.0)	(1.3)	(3.5)
Nebraska	Est	**	-2.1	-2.2	-4.7	-0.8	-6.2
Nebraska	MOE		(1.2)	(1.3)	(1.5)	(0.6)	(2.0)
Nevada	Est	**	-1.5	-0.8	-1.3	-1.3	-1.4
Nevada	MOE		(4.3)	(4.9)	(7.1)	(4.0)	(7.6)
New Mexico	Est	**	27.2	32.5	39.5	26.6	39.5
New Mexico	MOE		(5.4)	(4.9)	(4.9)	(5.7)	(4.4)
North Dakota	Est	**	-0.5	-0.6	-2.3	-0.3	-2.4
North Dakota	MOE		(0.9)	(1.3)	(1.6)	(0.6)	(2.2)
Oklahoma	Est	**	-1.2	-1.8	-13.2	-1.1	-13.5
Oklahoma	MOE		(1.6)	(2.0)	(3.2)	(1.1)	(3.5)

Oregon	Est	**	-1.6	-2.3	3.3	-2.1	4.1
Oregon	MOE		(3.3)	(4.3)	(6.9)	(2.7)	(7.2)
South Dakota	Est	**	1.8	3.1	3.0	1.7	3.4
South Dakota	MOE		(1.2)	(2.0)	(2.9)	(1.1)	(3.1)
Texas	Est	0.1	0.9	1.1	16.3	1.9	15.2
Texas	MOE	(0.3)	(3.8)	(3.9)	(5.6)	(3.4)	(5.5)
Utah	Est	2.2	-13.0	-14.5	-10.6	-13.2	-11.9
Utah	MOE	(3.2)	(6.1)	(7.1)	(7.6)	(5.6)	(8.1)
Washington	Est	0.3	0.1	2.1	-11.3	0.0	-10.9
Washington	MOE	(0.7)	(5.6)	(7.9)	(9.7)	(4.4)	(11.1)
Wyoming	Est	11.0	0.3	-1.4	-2.2	-0.8	-3.0
Wyoming	MOE	(4.9)	(4.0)	(3.5)	(4.7)	(2.2)	(4.9)
National	Est	2.9	3.4	4.1	7.5	3.3	7.5
National	MOE	(0.6)	(1.1)	(1.3)	(1.7)	(0.9)	(1.7)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 5 - 2011-2015 non-Federal rangeland by state where soil and site stability ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (SSS <= 2)	Soil And Site Stability Had Moderate Departure From Reference Conditions (SSS = 3)	Soil And Site Stability Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	78.9	14.9	6.2
Arizona	MOE	(3.8)	(7.4)	(6.0)	(4.0)
California	Est	91.1	95.2	4.8	**
California	MOE	(4.7)	(10.0)	(10.0)	
Colorado	Est	1.2	92.2	7.6	0.2
Colorado	MOE	(0.8)	(3.9)	(3.8)	(0.4)
Florida	Est	**	100	**	**
Florida	MOE				
Idaho	Est	5.1	97.9	2.0	0.1
Idaho	MOE	(5.0)	(1.8)	(1.8)	(0.3)
Kansas	Est	**	91.7	7.2	0.9
Kansas	MOE		(2.9)	(2.7)	(0.8)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	0.2	97.0	2.7	0.2
Montana	MOE	(0.2)	(1.5)	(1.5)	(0.3)
Nebraska	Est	**	99.7	0.3	**
Nebraska	MOE		(0.3)	(0.3)	
Nevada	Est	**	97.3	2.7	**
Nevada	MOE		(2.2)	(2.2)	
New Mexico	Est	**	57.3	27.0	15.7
New Mexico	MOE		(5.6)	(4.8)	(3.2)
North Dakota	Est	**	99.6	0.2	0.2
North Dakota	MOE		(0.6)	(0.3)	(0.4)
Oklahoma	Est	**	98.3	1.6	0.1
Oklahoma	MOE		(1.0)	(0.9)	(0.2)
Oregon	Est	**	97.5	1.4	1.1
Oregon	MOE		(2.6)	(1.8)	(1.7)
South Dakota	Est	**	97.7	1.4	0.9

South Dakota	MOE		(1.4)	(1.0)	(0.6)
Texas	Est	0.2	83.6	13.4	2.9
Texas	MOE	(0.3)	(3.2)	(2.5)	(1.2)
Utah	Est	2.2	87.7	10.0	2.3
Utah	MOE	(3.2)	(4.9)	(3.8)	(2.0)
Washington	Est	0.3	95.5	3.9	0.6
Washington	MOE	(0.7)	(4.6)	(4.6)	(0.9)
Wyoming	Est	11.0	92.6	6.0	1.4
Wyoming	MOE	(4.8)	(3.5)	(3.2)	(1.4)
National	Est	5.5	87.3	9.5	3.2
National	MOE	(0.6)	(1.0)	(0.9)	(0.5)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 6 - 2004-2010 non-Federal rangeland by state where soil and site stability ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (SSS <= 2)	Soil And Site Stability Had Moderate Departure From Reference Conditions (SSS = 3)	Soil And Site Stability Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	**	84.7	10.6	4.6
Arizona	MOE		(3.2)	(2.3)	(2.4)
California	Est	58.2	98.6	0.9	0.5
California	MOE	(7.0)	(1.6)	(1.3)	(1.1)
Colorado	Est	**	92.2	7.3	0.5
Colorado	MOE		(2.9)	(2.9)	(0.5)
Florida	Est	15.7	99.1	0.9	**
Florida	MOE	(11.6)	(2.0)	(2.0)	
Idaho	Est	**	97.8	2.1	0.1
Idaho	MOE		(1.7)	(1.7)	(0.2)
Kansas	Est	**	95.9	3.1	0.9
Kansas	MOE		(1.2)	(1.1)	(0.7)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	**	97.4	2.5	0.2
Montana	MOE		(1.2)	(1.2)	(0.3)
Nebraska	Est	**	97.6	2.3	0.1
Nebraska	MOE		(1.2)	(1.2)	(0.2)
Nevada	Est	**	95.8	3.9	0.4
Nevada	MOE		(3.4)	(3.3)	(0.5)
New Mexico	Est	**	84.5	10.3	5.2
New Mexico	MOE		(2.9)	(2.3)	(1.8)
North Dakota	Est	**	99.2	0.8	0.0
North Dakota	MOE		(0.7)	(0.7)	(0.0)
Oklahoma	Est	**	97.1	2.5	0.4
Oklahoma	MOE		(1.4)	(1.4)	(0.4)
Oregon	Est	**	95.9	3.1	1.0
Oregon	MOE		(2.1)	(1.8)	(1.0)
South Dakota	Est	**	99.5	0.3	0.2

South Dakota	MOE		(0.4)	(0.4)	(0.3)
Texas	Est	0.1	84.5	12.6	3.0
Texas	MOE	(0.1)	(2.6)	(2.3)	(0.9)
Utah	Est	**	74.7	21.6	3.8
Utah	MOE		(4.8)	(4.2)	(2.1)
Washington	Est	**	95.6	4.4	0
Washington	MOE		(3.2)	(3.2)	
Wyoming	Est	0.0	92.9	6.2	0.9
Wyoming	MOE	(0.1)	(2.8)	(2.5)	(0.8)
National	Est	2.7	90.7	7.4	2.0
National	MOE	(0.3)	(0.8)	(0.7)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 7- Changes between 2004-2010 and 2011-2015 on non-Federal rangeland by state where soil and site stability ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Soil And Site Stability Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (SSS <= 2)	Soil And Site Stability Had Moderate Departure From Reference Conditions (SSS = 3)	Soil And Site Stability Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (SSS >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	-5.9	4.3	1.6
Arizona	MOE	(3.8)	(7.6)	(6.4)	(3.9)
California	Est	32.9	-3.4	3.9	-0.5
California	MOE	(8.1)	(9.5)	(9.3)	(1.1)
Colorado	Est	1.2	0.0	0.3	-0.3
Colorado	MOE	(0.8)	(4.5)	(4.5)	(0.7)
Florida	Est	-15.7	0.9	-0.9	0.0
Florida	MOE	11.6	2	2	(0.0)
Idaho	Est	5.1	0.0	0.0	0.0
Idaho	MOE	(5.0)	(2.3)	(2.2)	(0.4)
Kansas	Est	**	-4.2	4.0	0.0
Kansas	MOE		(3.1)	(3.0)	(1.0)

Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	0.2	-0.3	0.3	0.0
Montana	MOE	(0.2)	(2.2)	(2.2)	(0.4)
Nebraska	Est	**	2.1	-2.0	-0.1
Nebraska	MOE		(1.2)	(1.2)	(0.2)
Nevada	Est	**	1.5	-1.1	-0.4
Nevada	MOE		(4.3)	(4.2)	(0.5)
New Mexico	Est	**	-27.2	16.7	10.5
New Mexico	MOE		(5.4)	(4.3)	(3.6)
North Dakota	Est	**	0.5	-0.7	0.2
North Dakota	MOE		(0.9)	(0.8)	(0.4)
Oklahoma	Est	**	1.2	-1.0	-0.3
Oklahoma	MOE		(1.6)	(1.7)	(0.5)
Oregon	Est	**	1.6	-1.7	0.1
Oregon	MOE		(3.3)	(2.7)	(1.6)
South Dakota	Est	**	-1.8	1.1	0.7

South Dakota	MOE		(1.2)	(0.8)	(0.8)
Texas	Est	0.1	-0.9	0.9	0.0
Texas	MOE	(0.3)	(3.8)	(2.7)	(1.7)
Utah	Est	2.2	13.0	-11.6	-1.4
Utah	MOE	(3.2)	(6.1)	(5.1)	(2.8)
Washington	Est	0.3	-0.1	-0.5	0.6
Washington	MOE	(0.7)	(5.6)	(5.7)	(0.9)
Wyoming	Est	11.0	-0.3	-0.2	0.5
Wyoming	MOE	(4.9)	(4.0)	(3.7)	(1.5)
National	Est	2.9	-3.4	2.1	1.3
National	MOE	(0.6)	(1.1)	(0.9)	(0.6)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 8 - 2011-2015 non-Federal rangeland by state where hydrologic function ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Hydrologic Function Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (HF <= 2)	Hydrologic Function Had Moderate Departure From Reference Conditions (HF = 3)	Hydrologic Function Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	74.3	18.8	6.9
Arizona	MOE	(3.8)	(7.9)	(6.3)	(3.3)
California	Est	91.1	90.2	9.8	**
California	MOE	(4.7)	(11.5)	(11.5)	
Colorado	Est	1.2	85.8	12.6	1.5
Colorado	MOE	(0.8)	(3.7)	(3.6)	(1.3)
Florida	Est	**	100	**	**
Florida	MOE				
Idaho	Est	5.1	96.2	3.8	**
Idaho	MOE	(5.0)	(3.2)	(3.2)	
Kansas	Est	**	89.9	8.3	1.6
Kansas	MOE		(3.0)	(2.6)	(1.2)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	0.2	95.5	4.0	0.5
Montana	MOE	(0.2)	(1.9)	(1.8)	(0.5)
Nebraska	Est	**	99.1	0.9	**
Nebraska	MOE		(0.6)	(0.6)	
Nevada	Est	**	95.2	4.3	0.5
Nevada	MOE		(3.8)	(3.4)	(1.1)
New Mexico	Est	**	50.2	32.7	17.2
New Mexico	MOE		(4.7)	(3.6)	(4.0)
North Dakota	Est	**	98.7	1.1	0.2
North Dakota	MOE		(1.0)	(1.0)	(0.4)
Oklahoma	Est	**	97.1	2.3	0.6
Oklahoma	MOE		(1.4)	(1.3)	(0.8)
Oregon	Est	**	96.6	3.0	0.4
Oregon	MOE		(3.7)	(3.6)	(0.9)
South Dakota	Est	**	96.3	2.6	1.1

South Dakota	MOE		(2.1)	(1.6)	(0.8)
Texas	Est	0.2	79.1	17.0	3.9
Texas	MOE	(0.3)	(3.4)	(2.7)	(1.9)
Utah	Est	2.2	83.9	13.6	2.5
Utah	MOE	(3.2)	(4.6)	(3.7)	(2.1)
Washington	Est	0.3	91.8	7.6	0.6
Washington	MOE	(0.7)	(7.1)	(7.1)	(0.9)
Wyoming	Est	11.0	93.1	6.1	0.7
Wyoming	MOE	(4.8)	(2.4)	(2.5)	(0.9)
National	Est	5.5	84.0	12.2	3.8
National	MOE	(0.6)	(1.2)	(1.1)	(0.5)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 9 - 2004-2010 non-Federal rangeland by state where hydrologic function ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Hydrologic Function Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (HF <= 2)	Hydrologic Function Had Moderate Departure From Reference Conditions (HF = 3)	Hydrologic Function Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	**	80.1	14.9	5.0
Arizona	MOE		(3.7)	(3.8)	(2.4)
California	Est	58.2	98.6	1.4	**
California	MOE	(7.0)	(1.6)	(1.6)	
Colorado	Est	**	87.9	11.0	1.2
Colorado	MOE		(3.6)	(3.5)	(0.7)
Florida	Est	15.7	99.1	0.9	**
Florida	MOE	(11.6)	(2.0)	(2.0)	
Idaho	Est	**	96.9	2.6	0.5
Idaho	MOE		(2.0)	(1.8)	(0.5)
Kansas	Est	**	94.5	4.3	1.2
Kansas	MOE		(1.4)	(1.1)	(0.7)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	**	95.7	4.1	0.2
Montana	MOE		(1.4)	(1.5)	(0.3)
Nebraska	Est	**	96.9	2.9	0.2
Nebraska	MOE		(1.4)	(1.3)	(0.2)
Nevada	Est	**	94.3	5.3	0.4
Nevada	MOE		(3.4)	(3.3)	(0.5)
New Mexico	Est	**	82.7	11.1	6.2
New Mexico	MOE		(3.2)	(2.5)	(1.9)
North Dakota	Est	**	98.1	1.8	0.1
North Dakota	MOE		(1.1)	(1.1)	(0.1)
Oklahoma	Est	**	95.3	4.0	0.7
Oklahoma	MOE		(1.2)	(1.2)	(0.5)
Oregon	Est	**	94.3	4.5	1.2
Oregon	MOE		(2.4)	(1.9)	(1.0)
South Dakota	Est	**	99.4	0.6	0.1

South Dakota	MOE		(0.5)	(0.5)	(0.1)
Texas	Est	0.1	80.3	15.2	4.6
Texas	MOE	(0.1)	(2.9)	(2.4)	(1.3)
Utah	Est	**	69.4	26.1	4.5
Utah	MOE		(5.5)	(4.4)	(2.4)
Washington	Est	**	93.9	5.4	0.6
Washington	MOE		(3.3)	(3.1)	(1.0)
Wyoming	Est	0.0	91.8	6.9	1.3
Wyoming	MOE	(0.1)	(2.6)	(2.3)	(1.1)
National	Est	2.7	88.1	9.3	2.6
National	MOE	(0.3)	(0.8)	(0.8)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 10 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland by state where hydrologic function ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Hydrologic Function Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (HF <= 2)	Hydrologic Function Had Moderate Departure From Reference Conditions (HF = 3)	Hydrologic Function Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (HF >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	-5.8	3.9	1.9
Arizona	MOE	(3.8)	(8.2)	(7.4)	(3.3)
California	Est	32.9	-8.4	8.4	**
California	MOE	(8.1)	(11.3)	(11.3)	
Colorado	Est	1.2	-2.1	1.7	0.4
Colorado	MOE	(0.8)	(5.5)	(5.5)	(1.6)
Florida	Est	-15.7	0.9	-0.9	**
Florida	MOE	(11.6)	(2.0)	(2.0)	
Idaho	Est	5.1	-0.6	1.1	-0.5
Idaho	MOE	(5.0)	(3.5)	(3.4)	(0.5)
Kansas	Est	**	-4.6	4.0	0.5
Kansas	MOE		(3.4)	(3.0)	(1.4)

Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	0.2	-0.3	-0.1	0.3
Montana	MOE	(0.2)	(2.4)	(2.3)	(0.6)
Nebraska	Est	**	2.2	-2.0	-0.2
Nebraska	MOE		(1.3)	(1.3)	(0.2)
Nevada	Est	**	0.8	-1.0	0.1
Nevada	MOE		(4.9)	(4.7)	(1.2)
New Mexico	Est	**	-32.5	21.5	11.0
New Mexico	MOE		(4.9)	(3.9)	(4.6)
North Dakota	Est	**	0.6	-0.8	0.1
North Dakota	MOE		(1.3)	(1.3)	(0.5)
Oklahoma	Est	**	1.8	-1.7	-0.1
Oklahoma	MOE		(2.0)	(1.8)	(0.9)
Oregon	Est	**	2.3	-1.5	-0.8
Oregon	MOE		(4.3)	(4.0)	(1.0)
South Dakota	Est	**	-3.1	2.0	1.1
South Dakota	MOE		(2.0)	(1.5)	(0.8)

Texas	Est	0.1	-1.1	1.9	-0.7
Texas	MOE	(0.3)	(3.9)	(3.2)	(2.5)
Utah	Est	2.2	14.5	-12.5	-2.0
Utah	MOE	(3.2)	(7.1)	(5.7)	(3.4)
Washington	Est	0.3	-2.1	2.2	-0.1
Washington	MOE	(0.7)	(7.9)	(7.7)	(1.3)
Wyoming	Est	11.0	1.4	-0.8	-0.6
Wyoming	MOE	(4.9)	(3.5)	(3.3)	(1.7)
National	Est	2.9	-4.2	3.0	1.2
National	MOE	(0.6)	(1.3)	(1.3)	(0.7)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 11 - 2011-2015 non-Federal rangeland by state where biotic integrity ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to-extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Biotic Integrity Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (BI <= 2)	Biotic Integrity Had Moderate Departure From Reference Conditions (BI = 3)	Biotic Integrity Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	82.9	13.0	4.0
Arizona	MOE	(3.8)	(4.3)	(4.1)	(2.1)
California	Est	91.1	81.3	11.1	7.6
California	MOE	(4.7)	(17.1)	(12.1)	(8.7)
Colorado	Est	1.2	88.4	9.9	1.7
Colorado	MOE	(0.8)	(3.0)	(2.5)	(1.4)
Florida	Est	**	96.0	4.0	**
Florida	MOE		(5.2)	(5.2)	
Idaho	Est	5.1	83.4	8.9	7.7
Idaho	MOE	(5.0)	(6.5)	(4.8)	(5.2)
Kansas	Est	**	81.5	16.3	2.0
Kansas	MOE		(4.7)	(4.1)	(1.5)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	0.2	97.1	2.5	0.4
Montana	MOE	(0.2)	(1.8)	(1.8)	(0.5)
Nebraska	Est	**	98.9	1.0	0.1
Nebraska	MOE		(0.8)	(0.8)	(0.2)
Nevada	Est	**	86.1	10.7	3.2
Nevada	MOE		(6.0)	(5.4)	(3.6)
New Mexico	Est	**	39.6	37.5	22.9
New Mexico	MOE		(5.2)	(4.1)	(5.5)
North Dakota	Est	**	99.1	0.9	**
North Dakota	MOE		(1.0)	(1.0)	
Oklahoma	Est	**	95.0	4.4	0.6
Oklahoma	MOE		(2.0)	(1.9)	(0.7)
Oregon	Est	**	81.3	14.5	4.2
Oregon	MOE		(6.2)	(5.6)	(3.1)
South Dakota	Est	**	92.8	5.5	1.6

South Dakota	MOE		(2.5)	(1.9)	(1.1)
Texas	Est	0.2	59.4	32.1	8.5
Texas	MOE	(0.3)	(4.3)	(4.4)	(1.7)
Utah	Est	2.2	74.9	19.0	6.1
Utah	MOE	(3.2)	(7.0)	(6.3)	(3.1)
Washington	Est	0.3	86.5	11.2	2.3
Washington	MOE	(0.7)	(7.4)	(6.9)	(3.6)
Wyoming	Est	11.0	93.2	5.4	1.4
Wyoming	MOE	(4.8)	(3.6)	(3.0)	(1.4)
National	Est	5.5	77.3	16.9	5.8
National	MOE	(0.6)	(1.4)	(1.2)	(0.6)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 12 - 2004-2010 non-Federal rangeland by state where biotic integrity ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to-extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Biotic Integrity Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (BI <= 2)	Biotic Integrity Had Moderate Departure From Reference Conditions (BI = 3)	Biotic Integrity Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	**	83.3	11.4	5.3
Arizona	MOE		(4.1)	(3.5)	(2.3)
California	Est	58.2	89.7	7.9	2.5
California	MOE	(7.0)	(6.3)	(5.5)	(3.0)
Colorado	Est	**	88.3	10.5	1.2
Colorado	MOE		(2.5)	(2.3)	(0.7)
Florida	Est	15.7	88.0	8.3	3.7
Florida	MOE	(11.6)	(6.9)	(5.8)	(5.4)
Idaho	Est	**	90.9	8.2	0.9
Idaho	MOE		(2.7)	(2.7)	(0.8)
Kansas	Est	**	94.7	4.5	0.8
Kansas	MOE		(1.4)	(1.2)	(0.5)

Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	**	95.3	4.3	0.4
Montana	MOE		(2.2)	(2.1)	(0.4)
Nebraska	Est	**	94.1	5.4	0.5
Nebraska	MOE		(1.5)	(1.4)	(0.5)
Nevada	Est	**	84.8	11.8	3.5
Nevada	MOE		(5.0)	(4.5)	(2.2)
New Mexico	Est	**	79.1	14.0	6.8
New Mexico	MOE		(2.9)	(2.3)	(1.8)
North Dakota	Est	**	96.8	2.8	0.3
North Dakota	MOE		(1.3)	(1.4)	(0.4)
Oklahoma	Est	**	81.7	16.6	1.7
Oklahoma	MOE		(3.0)	(3.0)	(1.2)
Oregon	Est	**	84.6	12.4	2.9
Oregon	MOE		(4.1)	(3.7)	(1.9)
South Dakota	Est	**	95.8	4.1	0.1

South Dakota	MOE		(2.0)	(2.0)	(0.1)
Texas	Est	0.1	75.7	18.0	6.3
Texas	MOE	(0.1)	(3.3)	(2.6)	(1.7)
Utah	Est	**	64.3	27.5	8.1
Utah	MOE		(6.0)	(4.2)	(4.1)
Washington	Est	**	75.2	20.0	4.8
Washington	MOE		(5.7)	(5.1)	(2.6)
Wyoming	Est	0.0	91.1	8.4	0.5
Wyoming	MOE	(0.1)	(2.1)	(2.0)	(0.5)
National	Est	2.7	84.8	11.7	3.5
National	MOE	(0.3)	(0.7)	(0.7)	(0.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 13 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland by state where biotic integrity ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to-extreme or extreme-to-total departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	Biotic Integrity Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (BI <= 2)	Biotic Integrity Had Moderate Departure From Reference Conditions (BI = 3)	Biotic Integrity Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (BI >= 4)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	-0.4	1.7	-1.3
Arizona	MOE	(3.8)	(5.2)	(5.2)	(3.2)
California	Est	32.9	-8.4	3.3	5.1
California	MOE	(8.1)	(17.6)	(10.7)	(9.5)
Colorado	Est	1.2	0.0	-0.6	0.5
Colorado	MOE	(0.8)	(3.8)	(3.1)	(1.7)
Florida	Est	-15.7	8.0	-4.3	-3.7
Florida	MOE	(11.6)	(7.9)	(6.6)	(5.4)
Idaho	Est	5.1	-7.6	0.7	6.9
Idaho	MOE	(5.0)	(6.5)	(4.8)	(5.3)
Kansas	Est	**	-13.1	11.8	1.2
Kansas	MOE		(5.0)	(4.3)	(1.6)

Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	0.2	1.8	-1.8	0.0
Montana	MOE	(0.2)	(3.0)	(2.9)	(0.6)
Nebraska	Est	**	4.7	-4.4	-0.4
Nebraska	MOE		(1.5)	(1.5)	(0.6)
Nevada	Est	**	1.3	-1.0	-0.3
Nevada	MOE		(7.1)	(7.2)	(3.4)
New Mexico	Est	**	-39.5	23.4	16.1
New Mexico	MOE		(4.9)	(4.9)	(5.5)
North Dakota	Est	**	2.3	-2.0	-0.3
North Dakota	MOE		(1.6)	(1.8)	(0.4)
Oklahoma	Est	**	13.2	-12.1	-1.1
Oklahoma	MOE		(3.2)	(3.3)	(1.4)
Oregon	Est	**	-3.3	2.1	1.2
Oregon	MOE		(6.9)	(6.6)	(3.2)
South Dakota	Est	**	-3.0	1.4	1.6

South Dakota	MOE		(2.9)	(2.6)	(1.0)
Texas	Est	0.1	-16.3	14.1	2.2
Texas	MOE	(0.3)	(5.6)	(5.5)	(2.4)
Utah	Est	2.2	10.6	-8.6	-2.0
Utah	MOE	(3.2)	(7.6)	(6.4)	(4.9)
Washington	Est	0.3	11.3	-8.8	-2.4
Washington	MOE	(0.7)	(9.7)	(8.0)	(4.9)
Wyoming	Est	11.0	2.2	-3.0	0.9
Wyoming	MOE	(4.9)	(4.7)	(3.9)	(1.6)
National	Est	2.9	-7.5	5.2	2.3
National	MOE	(0.6)	(1.7)	(1.5)	(0.7)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 14 - 2011-2015 non-Federal rangeland by state where all three attribute ratings are none-to-slight or slight-to-moderate; all three attribute ratings are moderate-to-extreme or extreme-to-total; and where at least one attribute is rated moderate departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	All 3 Rangeland Health Attributes Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (<=2)	All 3 Rangeland Health Attributes Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=4)	At Least 1 Rangeland Health Attribute Had Moderate Departure From Reference Conditions (=3)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	71.5	2.7	24.4
Arizona	MOE	(3.8)	(7.3)	(2.1)	(6.5)
California	Est	91.1	78.9	**	18.5
California	MOE	(4.7)	(20.2)		(18.6)
Colorado	Est	1.2	82.2	**	17.3
Colorado	MOE	(0.8)	(3.7)		(3.6)
Florida	Est	**	96.0	**	4.0
Florida	MOE		(5.2)		(5.2)
Idaho	Est	5.1	81.1	**	11.4
Idaho	MOE	(5.0)	(7.4)		(5.8)
Kansas	Est	**	78.6	0.6	20.2

Kansas	MOE		(5.3)	(0.6)	(5.0)
Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	0.2	94.1	0.1	5.7
Montana	MOE	(0.2)	(2.3)	(0.2)	(2.2)
Nebraska	Est	**	98.3	**	1.6
Nebraska	MOE		(1.0)		(1.0)
Nevada	Est	**	85.2	**	14.1
Nevada	MOE		(6.4)		(6.2)
New Mexico	Est	**	36.3	11.4	49.6
New Mexico	MOE		(4.6)	(3.0)	(4.1)
North Dakota	Est	**	98.2	**	1.6
North Dakota	MOE		(1.4)		(1.2)
Oklahoma	Est	**	93.4	**	5.9
Oklahoma	MOE		(2.1)		(2.0)
Oregon	Est	**	80.2	0.4	16.5
Oregon	MOE		(6.6)	(0.9)	(6.4)

South Dakota	Est	**	92.1	0.4	7.0
South Dakota	MOE		(2.6)	(0.5)	(2.2)
Texas	Est	0.2	58.3	2.1	37.9
Texas	MOE	(0.3)	(4.4)	(1.0)	(4.3)
Utah	Est	2.2	70.7	0.4	27.3
Utah	MOE	(3.2)	(6.5)	(0.5)	(6.3)
Washington	Est	0.3	83.3	**	15.8
Washington	MOE	(0.7)	(9.3)		(9.8)
Wyoming	Est	11.0	89.2	0.1	10.4
Wyoming	MOE	(4.8)	(3.8)	(0.3)	(3.8)
National	Est	5.5	74.2	2.0	22.5
National	MOE	(0.6)	(1.4)	(0.3)	(1.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 15 - 2004-2010 non-Federal rangeland by state where all three attribute ratings are none-to-slight or slight-to-moderate; all three attribute ratings are moderate-to-extreme or extreme-to-total; and where at least one attribute is rated moderate departures from expected. Margins of error included.

State	Type	No Rangeland Health Reported	All 3 Rangeland Health Attributes Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (<=2)	All 3 Rangeland Health Attributes Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=4)	At Least 1 Rangeland Health Attribute Had Moderate Departure From Reference Conditions (=3)
		Percent	Percent	Percent	Percent
Arizona	Est	**	74.7	2.0	22.0
Arizona	MOE		(4.2)	(1.5)	(4.3)
California	Est	58.2	89.7	**	8.4
California	MOE	(7.0)	(6.3)		(5.6)
Colorado	Est	**	82.3	0.3	16.8
Colorado	MOE		(4.0)	(0.4)	(3.9)
Florida	Est	15.7	88.0	**	8.3
Florida	MOE	(11.6)	(6.9)		(5.8)
Idaho	Est	**	89.8	0.1	9.9
Idaho	MOE		(3.2)	(0.2)	(3.1)
Kansas	Est	**	92.0	0.1	7.1

Kansas	MOE		(1.7)	(0.2)	(1.5)
Louisiana	Est	**	100	**	**
Louisiana	MOE				
Montana	Est	**	92.9	0.1	6.8
Montana	MOE		(2.3)	(0.2)	(2.3)
Nebraska	Est	**	92.1	**	7.6
Nebraska	MOE		(1.8)		(1.8)
Nevada	Est	**	83.9	0.4	13.8
Nevada	MOE		(5.2)	(0.5)	(4.8)
New Mexico	Est	**	75.8	3.6	19.4
New Mexico	MOE		(3.4)	(1.6)	(2.8)
North Dakota	Est	**	95.8	**	3.9
North Dakota	MOE		(1.6)		(1.7)
Oklahoma	Est	**	80.0	0.2	18.7
Oklahoma	MOE		(3.2)	(0.3)	(3.3)
Oregon	Est	**	84.3	0.7	14.1
Oregon	MOE		(4.0)	(0.8)	(3.8)

South Dakota	Est	**	95.6	**	4.4
South Dakota	MOE		(2.0)		(2.0)
Texas	Est	0.1	73.5	2.4	23.6
Texas	MOE	(0.1)	(3.3)	(0.8)	(3.1)
Utah	Est	**	58.7	2.2	38.1
Utah	MOE		(6.0)	(1.7)	(5.2)
Washington	Est	**	72.4	**	23.7
Washington	MOE		(5.1)		(4.9)
Wyoming	Est	0.0	86.2	0.2	13.5
Wyoming	MOE	(0.1)	(2.9)	(0.3)	(2.8)
National	Est	2.7	81.7	1.3	16.3
National	MOE	(0.3)	(0.8)	(0.2)	(0.9)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 16 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland by state where all three attribute ratings are none-to-slight or slight-to-moderate; all three attribute ratings are moderate-to-extreme or extreme-to-total; and where at least one attribute is rated moderate departure from expected. Margins of error included.

State	Type	No Rangeland Health Reported	All 3 Rangeland Health Attributes Had None-To-Slight Or Slight-To-Moderate Departure From Reference Conditions (<=2)	All 3 Rangeland Health Attributes Had Moderate-To-Extreme Or Extreme-To-Total Departure From Reference Conditions (>=4)	At Least 1 Rangeland Health Attribute Had Moderate Departure From Reference Conditions (=3)
		Percent	Percent	Percent	Percent
Arizona	Est	3.2	-3.2	0.6	2.3
Arizona	MOE	(3.8)	(7.9)	(2.4)	(7.9)
California	Est	32.9	-10.8	**	10.1
California	MOE	(8.1)	(20.9)		(18.3)
Colorado	Est	1.2	-0.1	-0.3	0.4
Colorado	MOE	(0.8)	(5.4)	(0.4)	(5.2)
Florida	Est	-15.7	8.0	**	-4.3
Florida	MOE	(11.6)	(7.9)		(6.6)
Idaho	Est	5.1	-8.6	-0.1	1.5
Idaho	MOE	(5.0)	(7.3)	(0.2)	(5.7)
Kansas	Est	**	-13.3	0.5	13.1
Kansas	MOE		(5.9)	(0.7)	(5.5)

Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	0.2	1.2	0.0	-1.2
Montana	MOE	(0.2)	(3.5)	(0.3)	(3.5)
Nebraska	Est	**	6.2	**	-6.0
Nebraska	MOE		(2.0)		(2.1)
Nevada	Est	**	1.4	-0.4	0.3
Nevada	MOE		(7.6)	(0.5)	(7.4)
New Mexico	Est	**	-39.5	7.8	30.2
New Mexico	MOE		(4.4)	(3.6)	(3.9)
North Dakota	Est	**	2.4	**	-2.3
North Dakota	MOE		(2.2)		(2.2)
Oklahoma	Est	**	13.5	-0.2	-12.7
Oklahoma	MOE		(3.5)	(0.3)	(3.7)
Oregon	Est	**	-4.1	-0.3	2.3
Oregon	MOE		(7.2)	(0.7)	(7.1)
South Dakota	Est	**	-3.4	0.4	2.6
South Dakota	MOE		(3.1)	(0.5)	(2.9)

Texas	Est	0.1	-15.2	-0.3	14.3
Texas	MOE	(0.3)	(5.5)	(1.4)	(5.1)
Utah	Est	2.2	11.9	-1.8	-10.8
Utah	MOE	(3.2)	(8.1)	(1.6)	(7.7)
Washington	Est	0.3	10.9	**	-7.9
Washington	MOE	(0.7)	(11.1)		(11.1)
Wyoming	Est	11.0	3.0	0.0	-3.1
Wyoming	MOE	(4.9)	(4.9)	(0.5)	(4.9)
National	Est	2.9	-7.5	0.8	6.2
National	MOE	(0.6)	(1.7)	(0.5)	(1.7)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

About the Data

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI). Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

These results are based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Current estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

The findings presented here summarize departures from reference conditions for three rangeland health attributes:

- Soil and site stability
- Hydrologic function
- Biotic integrity

Quality assurance and statistical procedures are designed and implemented to ensure data are scientifically legitimate. Irrespective of the scale of analysis, margins of error must be considered. Margins of error (at the 95 percent confidence level) are presented for all NRI estimates.

About the Rangeland Health Protocol

A reference sheet is developed for each ecological site by experts with knowledge of soil, hydrology, and plant relationships to facilitate consistent application of the rangeland health assessment by integrating all available sources of data and knowledge for each of 17 rangeland health indicators (Pyke et al., 2002). The range of reference conditions is based on the natural variation of plant communities within the reference state which includes the historic climax plant community. The 17 rangeland health indicators including the ecological site description, scientific literature, local knowledge and reference sites, if any are known and available (Pyke et al., 2002). The range of reference conditions is based on the natural variation of plant communities within the reference state which includes but is not limited to the historic climax plant community. The 17 indicators are evaluated on degree of departure (none-to-slight, slight-to-moderate, moderate, moderate-to-extreme, and extreme-to-total) from the reference sheet (Pellant et al., 2005). The rangeland health attribute ratings for soil and site stability, hydrologic function, and biotic integrity were determined by calculating as the median rating for the group of indicators evaluated at the NRI sample location and associated with each attribute (See Table 1 for the list of indicators and associated attribute). The median was used in place of the 'preponderance of evidence' approach prescribed by the original method in order to standardize the method at the national level. For local and future NRI applications of the method, the NRCS continues to advocate the use of the 'preponderance of evidence' approach.

About the Rangeland Health Tables

The tables are constructed with NRI rangeland data collected in the field on non-Federal rangelands during the periods 2004 to 2010 and 2011 to 2015. The tables represent rangeland health at a regional scale where the three attributes (soil and site stability, hydrologic function, and biotic integrity) represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Rangeland Health Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process.

Although the rangeland health tables portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one table reports non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate.

Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the summary tables provide estimates of non-Federal rangeland where no rangeland health data are reported. Rangeland health attribute assessments in the tables are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

Tabular summaries are provided for non-Federal rangelands where: (1) rangeland health attribute ratings that are moderate, moderate-to-extreme, or extreme-to-total departures from expected; (2) rangeland health attribute ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected; and (3) all three attribute ratings are none-to-slight or slight-to-moderate; all three attribute ratings are moderate-to-extreme or extreme-to-total; and where at least one attribute is rated moderate departure from expected.

Three sets of tabular estimates are presented for the percent of non-Federal rangelands where the attribute of interest is observed: (1) during the period 2011 to 2015; (2) during the period 2004 to 2010; and (3) for the change between 2004 to 2010 and 2011 to 2015. All change is estimated as the difference in the estimated percentages for the two time periods. Margins of error (95 percent) are included with the estimates.

About the Rangeland Health Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the period 2004 to 2011. The rangeland health maps present the percent by classes (none, 10% or less, 10-20%, 20-30%, and over 30%) of non-Federal rangeland where rangeland health attributes have specified levels of departure from reference conditions. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points or areas for which the ecological site descriptions are under development and there is no reported rangeland health data reported for over 10 percent of the region. Estimates were mapped for regions where at least 90 percent of the region reported rangeland health data. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

The figures in this module represent rangeland health at a regional scale where the three attributes (soil and site stability, hydrologic function, and biotic integrity) represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process.

Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate.

Rangeland health assessments evaluate the function of ecological processes for rangeland sites relative to their ecological site descriptions, which define expected ecological processes based on climate and soil. For some rangeland sites, no soil survey exists and no ecological site description has been developed. For those areas the no rangeland health data are reported. Maps exclude rangeland health estimates for mapping regions where at least 10 percent of non-Federal rangeland does not report rangeland health data. Rangeland health attribute assessments in the maps are based on percentages of non-Federal rangeland where rangeland health evaluations are reported.

More Information

Pellant, M. P. S. D. P. a. J. H., 2005. *Interpreting indicators of rangeland health, version 4. Technical Reference 1734-6,* s.l.: Department of the Interior, Bureau of Land Mangement, National Science and Technology Center, Denver, CO. BLM/WO/ST-00/001+1734/REV05. 122pp.

U.S. Department of Agriculture , 2014. *National Resources Inventory Rangeland Resource Assessment,* s.l.: Natural Resources Conservation Service. Washington, DC. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?cid=stelprdb1253602.

Send comments and questions to the NRI Help Desk

Non-Native Plant Species

Certain non-native plant species have the potential to outcompete native species. Loss of native species negatively impacts quality of forage for grazing animals and can lead to fire risks, land degradation and erosion. Land managers and policymakers need this information to support strategic decisions and to identify areas of risk and implement strategies to eradicate and control the spread of invasive species. The NRI findings presented here provide information about non-native plant species growing on non-Federal rangeland. The term non-native refers to plants that have been introduced from other regions or countries. Plants included in the summaries are those identified as non-native species by the USDA Plants Database.

Most non-native plant species are not a problem, and some are considered beneficial. Crested wheatgrass (*Agropyron cristatum*), for example, is an introduced species that is commonly recommended for forage production and for soil stabilization in semi-arid regions. Other non-native species such as cheatgrass (*Bromus tectorum*) have become severe weeds that often out-compete native grasses and forbs in arid regions.

Some non-native species have become invasive. Where these species replace significant proportions of native plant communities, they may modify vegetation structure, the fire regime, hydrology, soil erosion rates, and forage production. These changes in turn can have significant effects on both livestock production and wildlife populations. Chapter 5 provides details for selected invasive grasses, forbs, and woody species.

Key Findings

During 2011-2015, non-native species were present on 55.3 (±1.5) percent of non-Federal rangeland and covered at least 50 percent of the soil surface on 9.3 (±0.6) percent on these lands (Table 17). There little change, increases of 1.7 (±1.6) and 0.9 (±0.8) percent, respectively, over 2004-2010 (Table 18, Table 19).

Figures 1-2. Non-Federal Rangeland Where Non-native Plant Species are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 1. 2004-2010

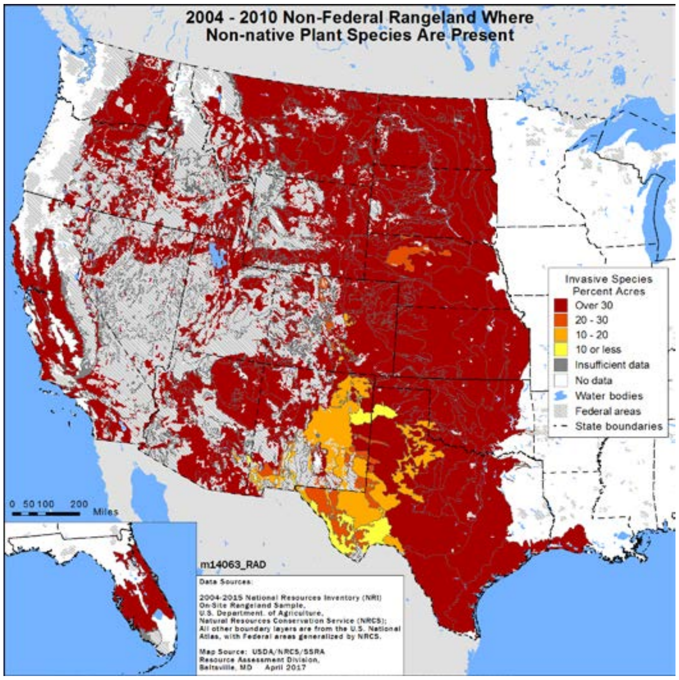
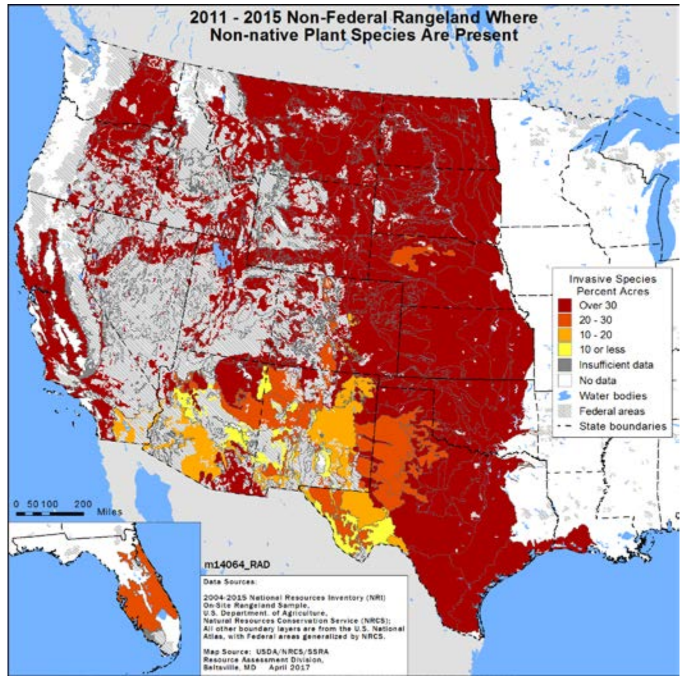


Figure 2. 2011-2015



Figures 3-4. Non-Federal Rangeland Where Non-native Plant Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 3. 2004-2010

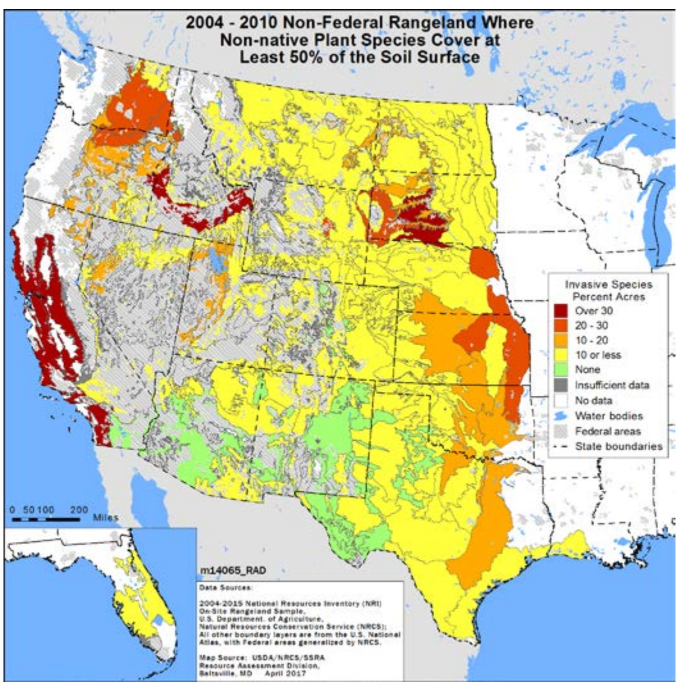
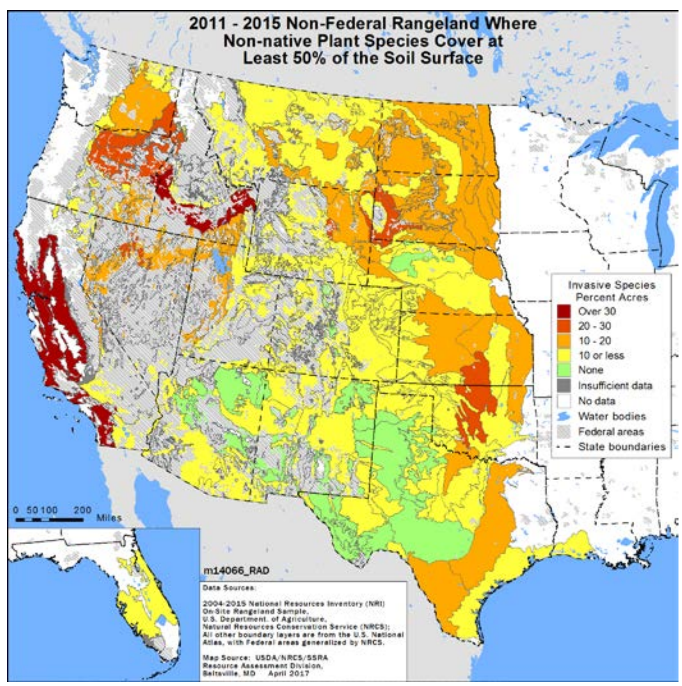


Figure 4. 2011-2015



Tables and Results

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI), a sample survey using scientific statistical principles and procedures. These results, based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015, address status and change in conditions. These estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

Margins of error are reported for each NRI estimate and must be considered at all scales of analysis. The margin of error is used to construct the 95 percent confidence interval for the estimate. The lower bound of the interval is obtained by subtracting the margin of error from the estimate; the upper bound is obtained by adding the margin of error to the estimate. A 95 percent confidence interval means that in repeated samples from the same population, 95 percent of the time the true underlying population parameter will be contained within the lower and upper bounds of the interval. In the following tables, if there are instances where the margin of error is greater than or equal to the estimate, the confidence interval includes zero and the estimate should not be used. In those cases, the estimate in the table is displayed in red text.

Table 17- 2011-2015 non-Federal rangeland where non-native plant species are present; where they cover at least 25 percent or 50 percent of the soil surface (foliar cover); and where they make up at least 25 percent or 50 percent of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Non-Native Plants Are Present	At Least 25% Foliar Cover of Non-Native Plants	At Least 50% Foliar Cover of Non-Native Plants	At Least 25% Relative Plant Canopy Cover of Non-Native Plants	At Least 50% Relative Plant Canopy Cover of Non-Native Plants
		Percent	Percent	Percent	Percent	Percent
Arizona	Est	30.0	3.6	2.3	8.2	4.7
Arizona	MOE	(7.5)	(1.9)	(1.7)	(3.7)	(2.5)
California	Est	81.2	60.1	49.7	70.3	56.9
California	MOE	(8.5)	(8.7)	(8.2)	(8.0)	(9.4)
Colorado	Est	53.7	12.6	3.9	16.4	8.0
Colorado	MOE	(7.3)	(3.7)	(2.0)	(4.1)	(2.5)
Florida	Est	30.6	7.4	5.7	7.4	5.7
Florida	MOE	(11.6)	(8.9)	(9.7)	(8.9)	(9.7)
Idaho	Est	87.6	54.3	28.5	58.6	41.4
Idaho	MOE	(4.7)	(7.7)	(7.0)	(8.4)	(10.1)
Kansas	Est	75.7	27.6	14.2	21.2	6.1
Kansas	MOE	(4.3)	(4.7)	(3.7)	(4.7)	(2.7)
Louisiana	Est	4.5	4.5	4.5	4.5	**
Louisiana	MOE	(16.8)	(16.8)	(16.8)	(16.8)	
Montana	Est	75.1	18.8	7.5	16.5	5.1
Montana	MOE	(4.4)	(3.4)	(2.5)	(4.2)	(2.2)
Nebraska	Est	55.5	16.3	6.2	13.5	1.6

Nebraska	MOE	(6.4)	(3.1)	(2.6)	(3.5)	(1.0)
Nevada	Est	68.9	28.3	13.6	42.4	29.8
Nevada	MOE	(10.1)	(7.5)	(5.3)	(10.5)	(8.4)
New Mexico	Est	16.4	1.9	0.5	5.4	2.4
New Mexico	MOE	(4.2)	(1.3)	(0.5)	(2.6)	(1.6)
North Dakota	Est	79.7	19.4	9.8	12.4	4.4
North Dakota	MOE	(3.7)	(4.2)	(3.5)	(3.5)	(2.2)
Oklahoma	Est	68.3	22.9	10.3	17.5	5.2
Oklahoma	MOE	(5.0)	(4.6)	(3.8)	(3.9)	(2.1)
Oregon	Est	92.6	47.3	20.2	64.1	35.3
Oregon	MOE	(4.2)	(9.8)	(7.2)	(8.7)	(9.8)
South Dakota	Est	81.3	32.1	16.7	22.4	7.0
South Dakota	MOE	(3.7)	(5.1)	(3.2)	(4.0)	(3.0)
Texas	Est	42.1	11.6	5.0	12.9	5.1
Texas	MOE	(4.1)	(3.2)	(2.1)	(3.0)	(2.4)
Utah	Est	73.9	31.2	9.0	47.0	32.2
Utah	MOE	(8.4)	(7.1)	(3.8)	(8.3)	(6.9)
Washington	Est	96.0	46.3	16.9	65.5	35.2
Washington	MOE	(3.9)	(10.7)	(7.0)	(10.1)	(10.6)
Wyoming	Est	58.3	18.5	6.8	17.5	5.1
Wyoming	MOE	(5.8)	(4.7)	(3.5)	(4.3)	(2.4)
National	Est	55.3	18.9	9.3	20.5	10.3
National	MOE	(1.5)	(1.0)	(0.6)	(1.2)	(0.9)

Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 18 - 2004-2010 non-Federal rangeland where non-native plant species are present; where they cover at least 25 percent or 50 percent of the soil surface (foliar cover); and where they make up at least 25 percent or 50 percent of the relative plant canopy cover (composition); by state, with margins of error.

State	Type	Non-Native Plants Are Present	At Least 25% Foliar Cover of Non-Native Plants	At Least 50% Foliar Cover of Non-Native Plants	At Least 25% Relative Plant Canopy Cover of Non-Native Plants	At Least 50% Relative Plant Canopy Cover of Non-Native Plants
		Percent	Percent	Percent	Percent	Percent
Arizona	Est	35.6	3.3	0.6	12.8	4.4
Arizona	MOE	(4.5)	(1.4)	(0.6)	(3.3)	(1.6)
California	Est	91.6	71.8	52.2	79.3	62.0
California	MOE	(4.3)	(5.8)	(5.8)	(5.2)	(6.5)
Colorado	Est	52.6	10.9	4.5	15.8	7.1
Colorado	MOE	(4.5)	(1.9)	(1.5)	(2.7)	(1.6)
Florida	Est	37.3	2.7	1.3	2.3	0.8
Florida	MOE	(13.2)	(2.5)	(2.1)	(2.5)	(1.8)
Idaho	Est	84.8	45.7	21.8	51.0	29.0
Idaho	MOE	(4.2)	(7.3)	(5.2)	(6.3)	(5.4)
Kansas	Est	79.4	30.1	14.6	19.5	3.5
Kansas	MOE	(2.5)	(2.7)	(2.5)	(2.9)	(1.0)
Louisiana	Est	38.4	13.8	10.8	10.8	3.1
Louisiana	MOE	(27.1)	(11.5)	(9.5)	(10.5)	(6.6)
Montana	Est	65.0	17.0	5.6	19.5	7.0
Montana	MOE	(3.5)	(2.0)	(1.3)	(2.6)	(1.6)
Nebraska	Est	54.5	16.4	6.0	10.3	1.9
Nebraska	MOE	(5.5)	(2.9)	(1.6)	(2.6)	(0.9)
Nevada	Est	63.2	18.7	6.3	37.3	18.2
Nevada	MOE	(6.2)	(4.2)	(3.0)	(6.6)	(4.6)
New Mexico	Est	21.1	2.4	0.7	5.0	2.1
New Mexico	MOE	(3.2)	(0.8)	(0.4)	(1.5)	(0.9)
North Dakota	Est	70.3	13.3	4.1	7.4	2.7
North Dakota	MOE	(3.4)	(3.1)	(1.5)	(2.2)	(1.3)
Oklahoma	Est	64.3	21.9	11.3	15.0	5.0
Oklahoma	MOE	(4.7)	(3.4)	(3.0)	(3.3)	(2.1)
Oregon	Est	90.6	41.1	15.8	51.8	25.6
Oregon	MOE	(4.0)	(5.1)	(4.1)	(5.1)	(4.1)
South Dakota	Est	83.2	38.0	20.3	29.3	7.8

South Dakota	MOE	(2.6)	(3.7)	(3.3)	(3.8)	(1.9)
Texas	Est	36.0	9.0	3.7	8.3	3.1
Texas	MOE	(2.4)	(1.1)	(1.0)	(1.2)	(0.8)
Utah	Est	71.9	27.4	11.1	42.5	24.3
Utah	MOE	(5.8)	(5.8)	(4.3)	(6.5)	(5.5)
Washington	Est	95.2	49.9	21.7	64.9	37.6
Washington	MOE	(3.4)	(7.0)	(6.1)	(6.3)	(6.3)
Wyoming	Est	55.9	15.0	5.4	17.1	5.1
Wyoming	MOE	(7.0)	(3.9)	(2.3)	(3.8)	(1.9)
National	Est	53.5	17.9	8.4	19.4	9.0
National	MOE	(0.9)	(0.6)	(0.5)	(0.6)	(0.5)

Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 19 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland where non-native plant species are present; where they cover at least 25 percent or 50 percent of the soil surface (foliar cover); and where they make up at least 25 percent or 50 percent of the relative plant canopy cover (composition); by state, with margins of error.

State	Type	Non-Native Plants Are Present	At Least 25% Foliar Cover of Non-Native Plants	At Least 50% Foliar Cover of Non-Native Plants	At Least 25% Relative Plant Canopy Cover of Non-Native Plants	At Least 50% Relative Plant Canopy Cover of Non-Native Plants
		Percent	Percent	Percent	Percent	Percent
Arizona	Est	-5.6	0.3	1.6	-4.6	0.4
Arizona	MOE	(8.1)	(2.0)	(1.5)	(5.1)	(2.8)
California	Est	-10.5	-11.7	-2.5	-9.0	-5.1
California	MOE	(9.3)	(10.1)	(8.9)	(9.1)	(11.4)
Colorado	Est	1.2	1.7	-0.6	0.6	0.9
Colorado	MOE	(7.5)	(4.2)	(2.5)	(5.7)	(3.1)
Florida	Est	-6.7	4.6	4.3	5.0	4.9
Florida	MOE	(16.6)	(9.0)	(10.1)	(9.0)	(10.1)
Idaho	Est	2.8	8.6	6.7	7.6	12.4
Idaho	MOE	(5.7)	(9.9)	(8.9)	(9.1)	(9.3)
Kansas	Est	-3.7	-2.5	-0.4	1.8	2.6
Kansas	MOE	(4.7)	(5.5)	(4.0)	(5.1)	(2.8)
Louisiana	Est	-33.9	-9.3	-6.3	-6.3	-3.1
Louisiana	MOE	(29.9)	(19.5)	(19.6)	(20.1)	(6.6)
Montana	Est	10.1	1.8	1.9	-3.0	-1.9
Montana	MOE	(5.1)	(3.4)	(2.3)	(4.8)	(2.7)
Nebraska	Est	1.0	-0.1	0.1	3.1	-0.3
Nebraska	MOE	(7.8)	(4.2)	(2.8)	(3.9)	(1.0)
Nevada	Est	5.7	9.6	7.4	5.2	11.6
Nevada	MOE	(12.1)	(8.5)	(4.9)	(13.6)	(10.0)
New Mexico	Est	-4.7	-0.5	-0.2	0.4	0.3
New Mexico	MOE	(4.6)	(1.4)	(0.7)	(2.7)	(1.8)
North Dakota	Est	9.4	6.1	5.8	4.9	1.7
North Dakota	MOE	(4.6)	(4.5)	(3.7)	(3.5)	(2.2)
Oklahoma	Est	4.0	1.0	-1.0	2.5	0.1
Oklahoma	MOE	(5.8)	(4.8)	(4.4)	(4.6)	(3.0)
Oregon	Est	2.0	6.2	4.4	12.4	9.7
Oregon	MOE	(5.2)	(10.8)	(8.2)	(9.0)	(11.1)
South Dakota	Est	-1.9	-5.9	-3.5	-6.9	-0.8

South Dakota	MOE	(3.8)	(5.6)	(3.9)	(4.8)	(3.5)
Texas	Est	6.2	2.5	1.3	4.5	2.0
Texas	MOE	(4.5)	(3.4)	(2.3)	(3.4)	(2.2)
Utah	Est	2.0	3.7	-2.1	4.5	7.9
Utah	MOE	(9.1)	(9.2)	(5.8)	(10.3)	(8.4)
Washington	Est	0.8	-3.7	-4.8	0.6	-2.5
Washington	MOE	(5.0)	(13.6)	(10.6)	(12.4)	(13.1)
Wyoming	Est	2.4	3.4	1.4	0.4	0.0
Wyoming	MOE	(8.6)	(4.6)	(3.4)	(4.0)	(3.0)
National	Est	1.7	1.0	0.9	1.1	1.3
National	MOE	(1.6)	(1.2)	(0.8)	(1.4)	(0.8)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

About the Data

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI). Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grass-like plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

These results are based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Current estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana. Findings are presented here for non-Federal rangeland where non-native plant species (as defined by the NRCS Plants Database) are present and where at least 25 or 50 percent of the plant canopy cover or relative plant canopy cover (composition) is composed of non-native species.

Quality assurance and statistical procedures are designed/developed to ensure data are scientifically legitimate. Irrespective of the scale of analysis, margins of error must be considered. Margins of error (at the 95 percent confidence level) are presented for all NRI estimates.

About the Line Point Intercept Protocol

Line point intercept data are utilized in summaries of non-native plant species, non-native invasive herbaceous species, native invasive woody species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

About the Non-Native Plant Species Tables

The tables are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Tables summarize the percent of non-Federal land where non-native plant species: (1) are present; (2) cover at least 25 or 50 percent of the plant canopy cover; and (3) make up at least 25 or 50 percent of the relative plant canopy cover (composition).

Presence is calculated as the percent of non-Federal rangeland where at least one of the species is observed. Plant canopy cover represents the proportion of the soil surface covered by an individual species. For each sample site, plant canopy cover is calculated as the percent of marks at which a plant in the non-native species group is observed. Relative plant canopy cover is an indicator of species composition and is calculated for each sample site as the percent of foliar observations that were in the non-native species group.

About the Non-Native Plant Species Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the period 2004 to 2011. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

Non-native plant species maps are displayed by classes (none, 10% or less, 10-20%, 20-30%, over 30%) of non-Federal rangeland where non-native plant species are present or where they compose at least 25 or 50 percent of the plant cover.

More Information

More information about the USDA Plants Database may be found at http://plants.usda.gov/.

Related journal article: National Ecosystem Assessments Supported by Scientific and Local Knowledge, Frontiers in Ecology and the Environment, October 2010

Send comments and questions to the NRI Help Desk

Invasive Plant Species

Findings are presented here for groups of invasive grasses, forbs, and woody plant species selected because of their ubiquitous nature in rangeland plant communities. Some plant species in these groups were introduced from other countries and once established, have been very difficult to eradicate. Others are native, but have the potential to outcompete native plant species in communities where they typically would be only minor components or absent from the plant community. Loss of native herbaceous species negatively impacts forage and watershed functions and can lead to land degradation and erosion (Archer, 2011). Land managers and policymakers need this information to support strategic decisions and to identify areas of risk and implement strategies to eradicate and control the spread of native invasive species.

This report focuses on invasive grass, forb, and woody species groups listed in Table 20.

Key Findings

Invasive Grasses

The invasive grasses included in this report are introduced species that in some regions are able to form dense stands and negatively change the native plant communities. Where these species replace significant proportions of native plant communities, they may modify vegetation structure, the fire regime, hydrology, soil erosion rates, and forage production. These changes in turn can have significant effects on both livestock production and wildlife populations.

While certain introduced species are considered as beneficial and are recommended for planting in some areas, in other areas they are considered invasive. Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis)* are examples of plants in this category.

Annual bromes (*Bromus* spp.) – Annual brome grasses included in this group are highly invasive in shrub communities including sagebrush, and pinyon-juniper and often completely out-compete native grasses and forbs. Communities of annual bromes can be highly flammable in the late spring through early fall (DiTomaso, 2000).

Nationally, annual bromes were present on 30.0 (±1.4) percent of non-Federal rangelands during 2011-2015 (Table 21). Their presence was greatest in Washington (87.1 ±5.1 percent), Oregon (83.7 ±6.7 percent), California (73.2 ±8.4 percent), and Idaho (72.0 ± 6.1 percent).

Although nationally there was no change in presence of annual brome grassed between 2004-2010 and 2011-2015, an increase in annual brome presence was observed in Oklahoma (8.9 ±5.5 percent). During that same time, decreases in annual brome presence was observed in Arizona (6.2 ±4.3 percent), Kansas (6.1 ±5.6 percent), and South Dakota (7.5 ±6.1 percent) (Table 22, Table 23).

Figures 1-2. Non-Federal Rangeland Where Annual Bromes are Present. (Source: Table 17, Table 18, and Table 19**)**

Figure 1. 2004-2010

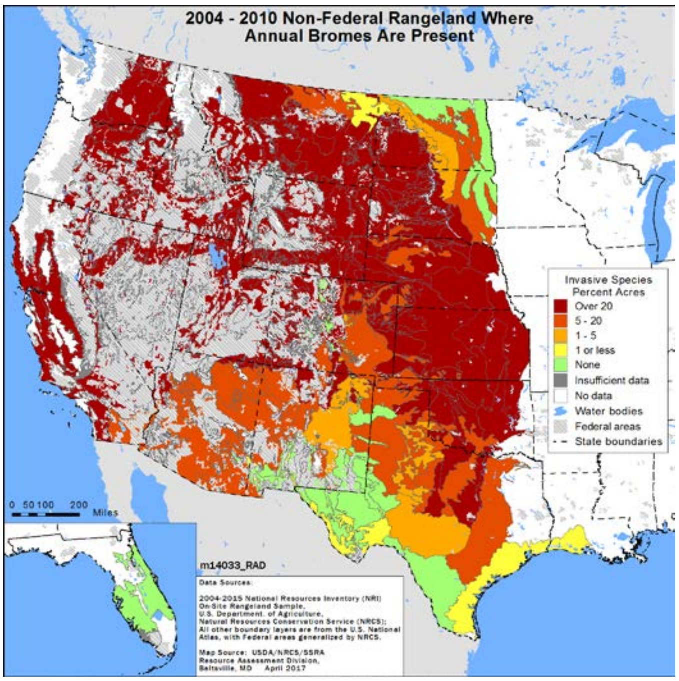
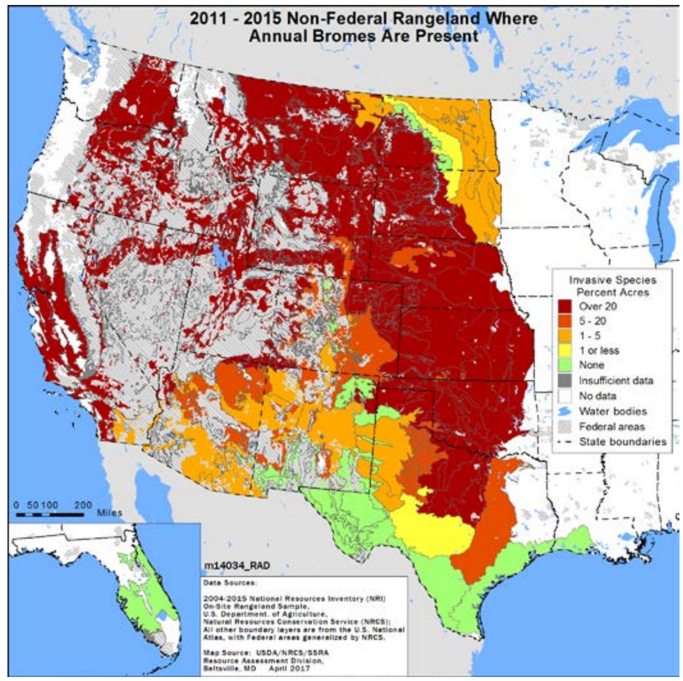


Figure 2. 2011-2015



Once established, annual bromes can form dense stands. During 2011-2015, annual bromes covered at least 50 percent of the soil surface on 11.3 (±5.6), 10.8 (±5.0), and 9.7 (±3.5) percent of non-Federal rangelands in Idaho, Nevada, and Kansas, respectively (Table 21). Increases in non-Federal rangeland where annual bromes covered at least 50 percent of the soil surface were observed in Nevada (7.5 ±4.3 percent), Idaho (6.4 ±6.1 percent), and Oklahoma (3.0 ±2.2 percent), while a decrease was observed in South Dakota (4.4 ±3.1 percent) (Table 22, Table 23).

Figures 3-4. Non-Federal Rangeland Annual Brome Species Cover at Least 50% of the Soil Surface. (Source: Table 17, Table 18, and Table 19**)**

Figure 3. 2004-2010

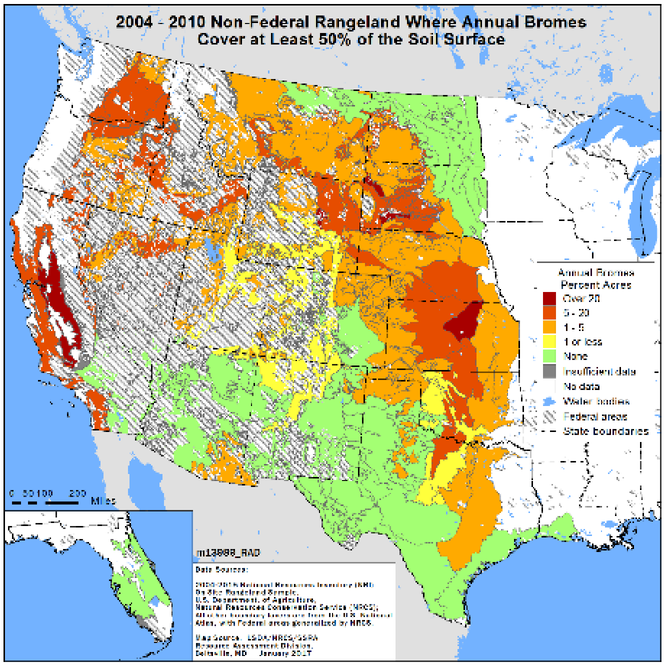
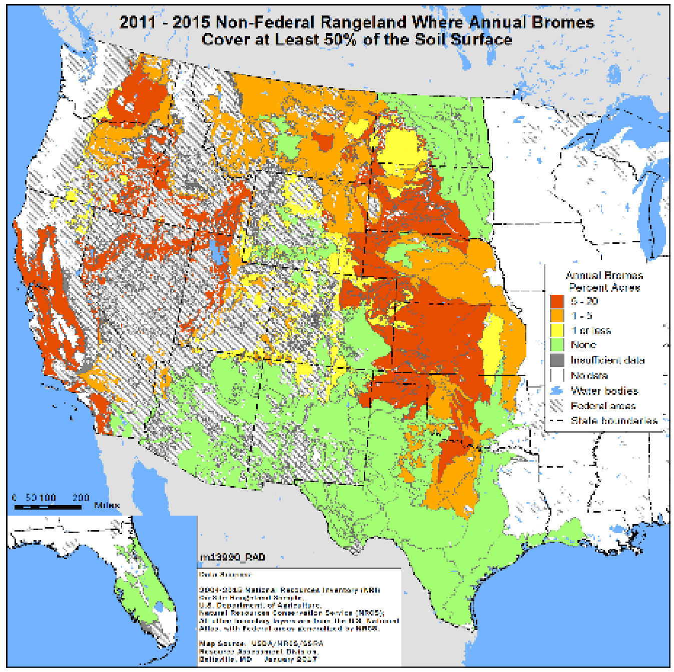


Figure 4. 2011-2015



Cheatgrass (*Bromus tectorum*) is one of the more prevalent types of annual brome grasses. It has the potential to dramatically alter the ecosystems it invades, and can completely replace native vegetation and can change fire regimes (DiTomaso, 2000; Chambers, 2007).

Cheatgrass was present nationally on 18.6 (±1.0) percent of non-Federal rangeland during 2011-2015 (Table 24). In Washington (82.6 ±6.7 percent), Oregon (78.5 ±6.7 percent), Idaho (58.1 ±8.6 percent), and Nevada (52.4 ±12.3 percent), cheatgrass presence was greatest during this period.

Figures 5-6. Non-Federal Rangeland Where Cheatgrass is Present. (Source: Table 24), Table 25, and Table 26**)**

Figure 5. 2004-2010

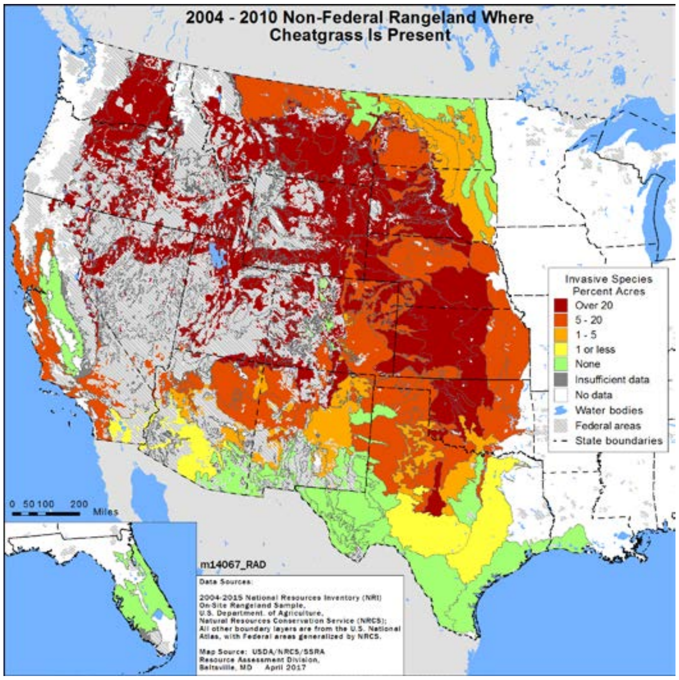
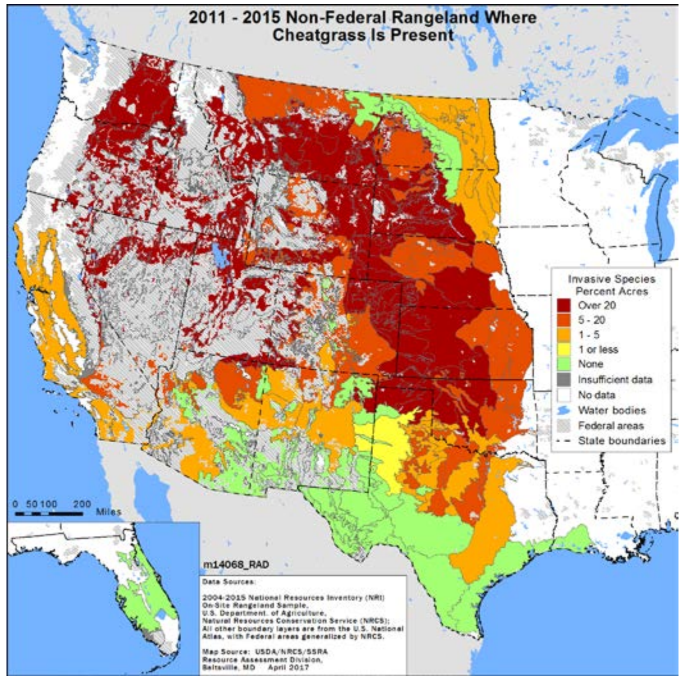


Figure 6. 2011-2015



Figures 7-8. Non-Federal Rangeland Where Cheatgrass Covers at Least 50% of the Soil Surface. (Source: Table 24), Table 25, and Table 26**)**

Figure 7. 2004-2010

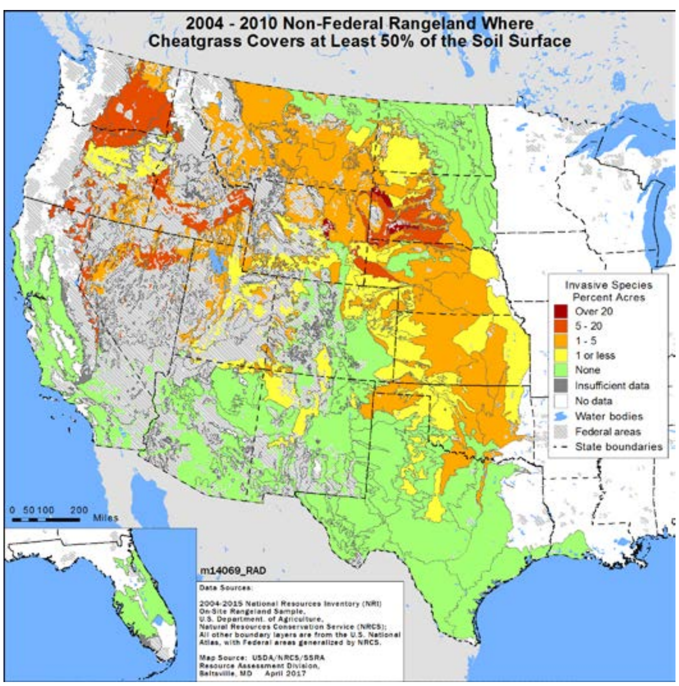
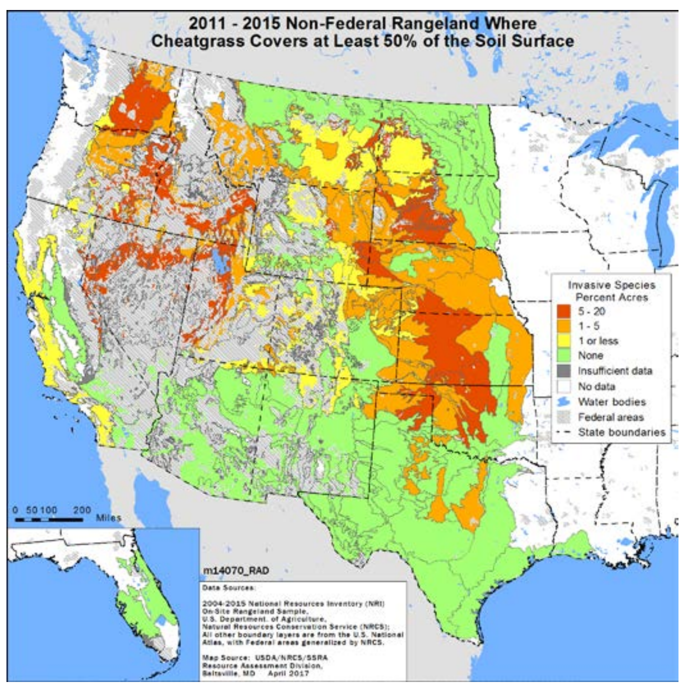


Figure 8. 2011-2015



Cheatgrass has the ability to create dense stands. During 2011-2015 cheatgrass covered at least 50 percent of the soil surface on 10.8 (±5.0), 7.7 (±3.8), 7.2 (±5.1), and 6.8 (±3.4) percent of non-Federal rangelands in Nevada, Oregon, Idaho, and Kansas, respectively.

Nationally no change in cheatgrass presence was observed between 2004-2010 and 2011-2015, but increases were observed in Kansas (15.0 ±5.5 percent) and Nebraska (7.3 ±5.7) during this time (Table 25, Table 26).

Kentucky and Canada bluegrass (*Poa pratensis* and *Poa compressa*) – Kentucky bluegrass (*Poa pratensis*) has a complicated history in the U.S. Although Kentucky bluegrass is commonly planted on pasturelands especially in the north central and northeastern regions of the United States as important persistent perennial cool-season forage species (Hall, 1996), it is listed as an invasive weed in the Great Plains States and Wisconsin (Bush, 2002; Wennerberg, 2004; Toledo, 2014). Canada bluegrass (*Poa compressa*) may have spread to many areas by contaminated seed for other bluegrass species. Canada bluegrass is listed as potentially invasive and banned in Connecticut (St.John, 2012). Both bluegrass species may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed (St.John, 2012; Toledo, 2014).

Kentucky and Canada bluegrass was present on 14.5 (±0.8) percent of non-Federal rangeland nationally during 2011-2015 (Table 27). In the Great Plains their presence was greatest on non-Federal rangelands in North Dakota (86.0 ±3.7 percent), South Dakota (62.9 ±3.4 percent), Kansas (39.8 ±5.8 percent), Nebraska (37.8 ±4.8 percent), and Montana (32.1 ±5.6 percent).

Between 2004-2010 and 2011-2015, Kentucky and Canada bluegrass presence increased nationally by 1.1 (±0.7) percent, but its presence increased most within Montana (8.4 ±5.2 percent) (Table 28, Table 29).

Figures 9-10. Non-Federal Rangeland Where Kentucky and Canada Bluegrass are Present. (Source: Table 27, Table 28, and Table 29**)**

Figure 9. 2004-2010

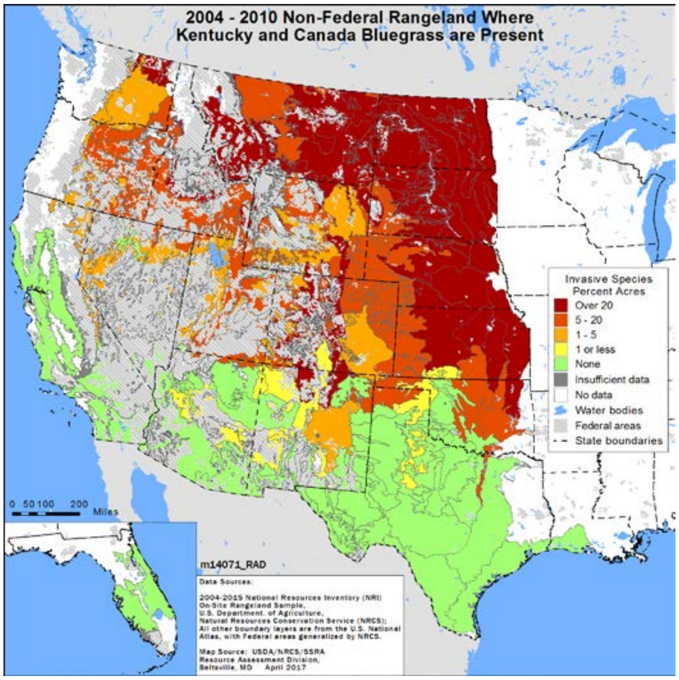
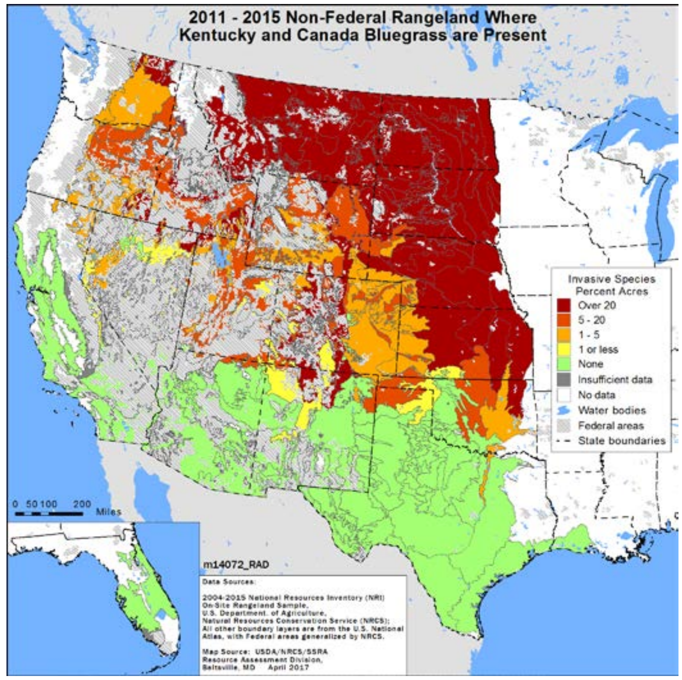


Figure 10. 2011-2015



In North Dakota and South Dakota, Kentucky and Canada bluegrass covered at least 50 percent of the soil surface on 38.9 (±5.8) and 15.1 (±3.6) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 27).

Figures 11-12. Non-Federal Rangeland Where Kentucky and Canada Bluegrass Cover at Least 50% of the Soil Surface. (Source: Table 27, Table 28, and Table 29**)**

Figure 11. 2004-2010

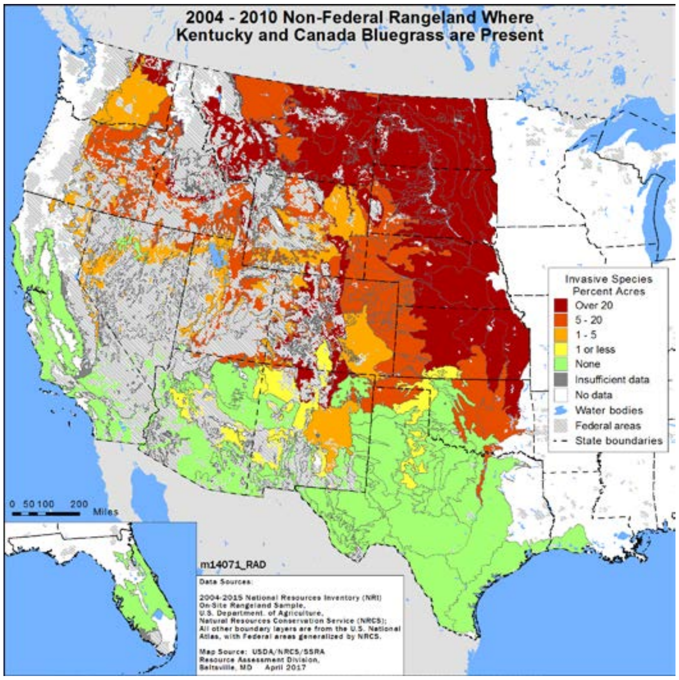
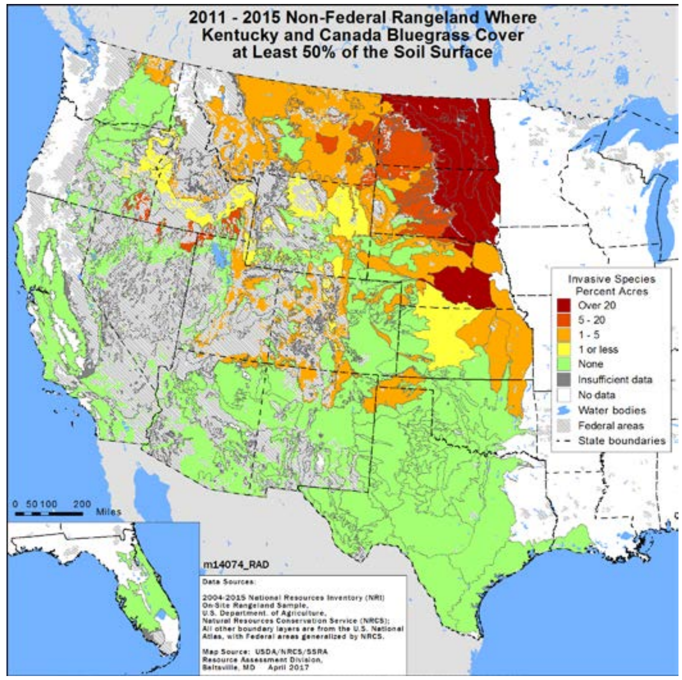


Figure 12. 2011-2015



Smooth Brome (*Bromus inermis)* has been widely a cultivated perennial forage grass and is distributed throughout most of the United States. However this plant may become weedy or invasive in some regions or habitats and may displace desirable vegetation if not properly managed (Bush, 2002; Hall, 2008). Smooth brome can alter the soil bacterial community by suppression of dominant bacterial species, allowing rarer bacteria to increase in relative abundance (Piper, 2015).

Nationally smooth brome was present on 6.4 (±0.4) percent of non-Federal rangelands during 2011-2015, but in the Great Plains it was commonly present on non-Federal rangelands in North Dakota (47.0 ±7.0 percent), South Dakota (28.0 ±2.8 percent), Kansas (19.4 ±3.4 percent), and Nebraska (17.0 ±2.9 percent). In South Dakota and North Dakota, it covered at least 50 percent of the land on 7.9 (±2.1) and 5.6 (±2.6) percent, respectively, of non-Federal rangelands (Table 30).

Nationally between 2004-2010 and 2011-2015, smooth brome presence increased slightly (0.7 ±0.4), but in North Dakota its presence increased by 10.3 (±7.3) percent (Table 31, Table 32).

Figures 13-14. Non-Federal Rangeland Where Smooth Brome is Present. (Source: Table 30, Table 31, and Table 32**)**

Figure 13. 2004-2010

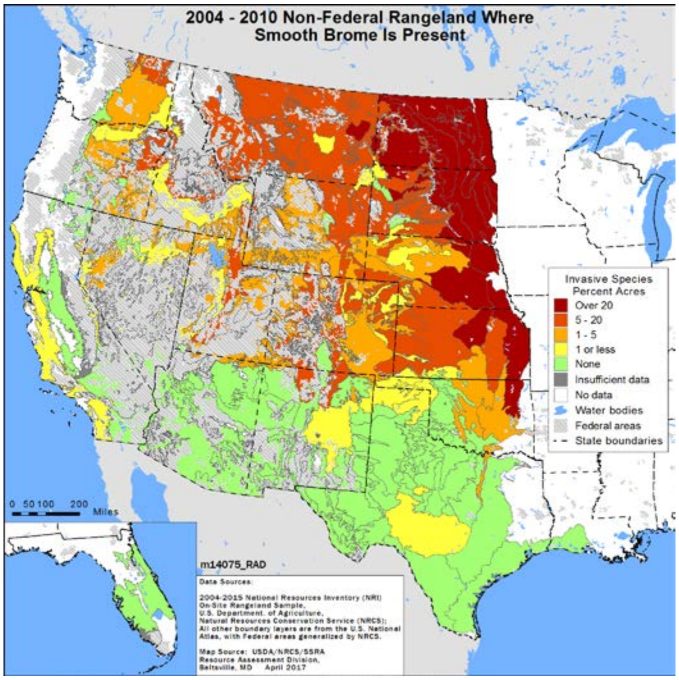
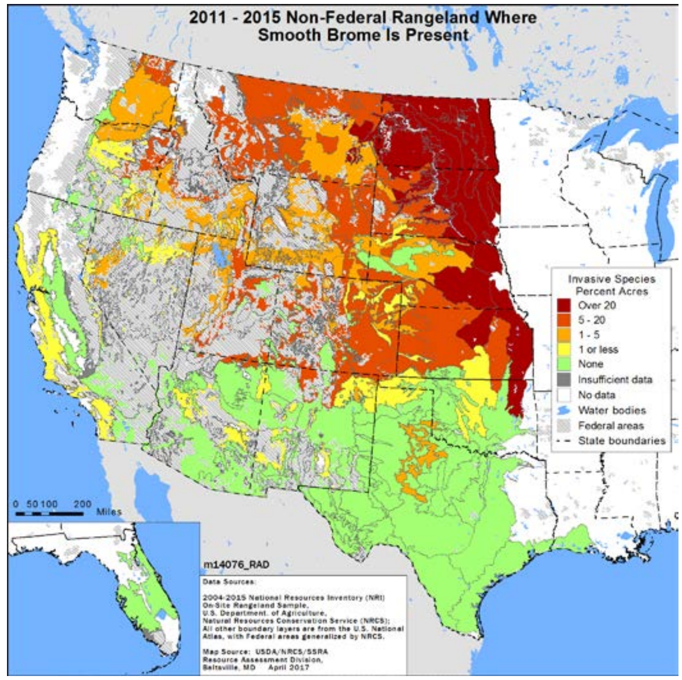


Figure 14. 2011-2015



Figures 15-16. Non-Federal Rangeland Where Smooth Brome Covers at Least 50% of the Soil Surface. (Source: Table 30, Table 31, and Table 32**)**

Figure 15. 2004-2010

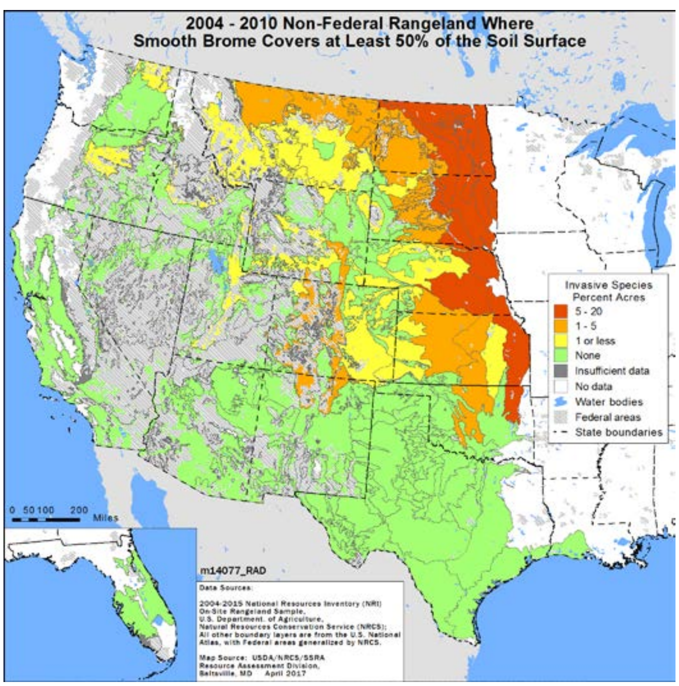
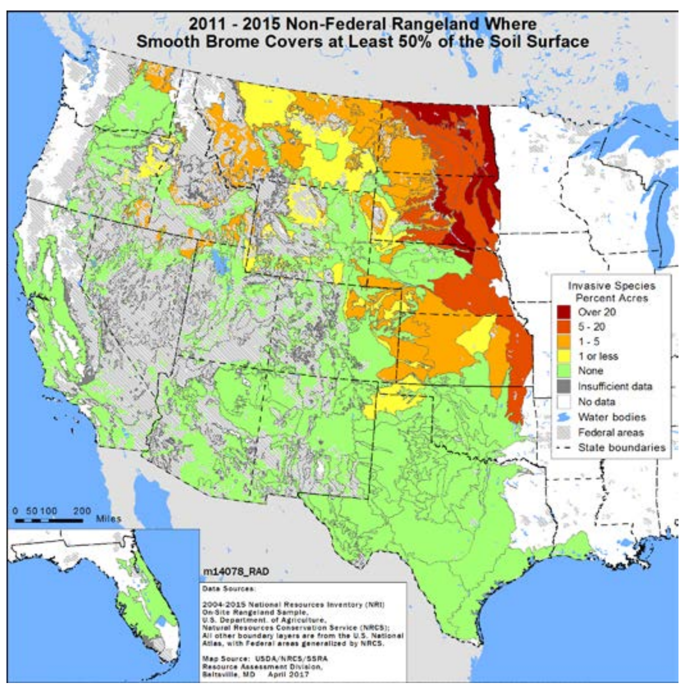


Figure 16. 2011-2015



Medusahead (*Taeniatherum caput-medusae*) typically invades rangeland communities, displacing desirable vegetation. Medusahead has a high silica content making it generally unpalatable to livestock and wildlife. Its seeds are avoided by most seed eating birds. Dense communities present risk of wildfire and alteration of the hydrologic cycle (Kyser, 2014).

Medusahead is most common in the northwestern U.S. During 2011-2015 it was present in Idaho, Oregon, California, and Washington on 24.3 (±6.5), 22.6 (±9.3), 18.1 (±4.1), and 8.8 (±6.3) percent, respectively, of non-Federal rangelands (Table 33).

No significant change in presence of medusahead on non-Federal rangelands was observed between 2004-2010 and 2011-2015 (Table 34, Table 35).

Figures 17-18. Non-Federal Rangeland Where Medusahead is Present. (Source: Table 33, Table 34, and Table 35**)**

Figure 17. 2004-2010

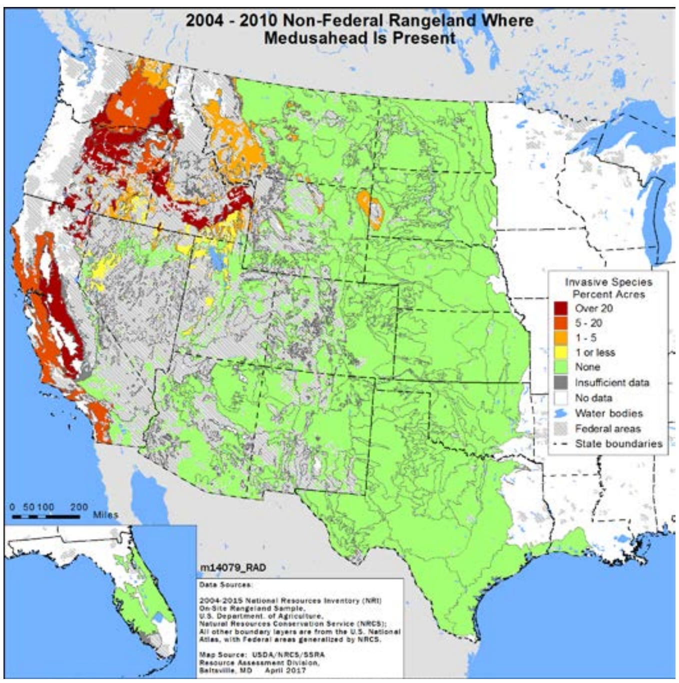
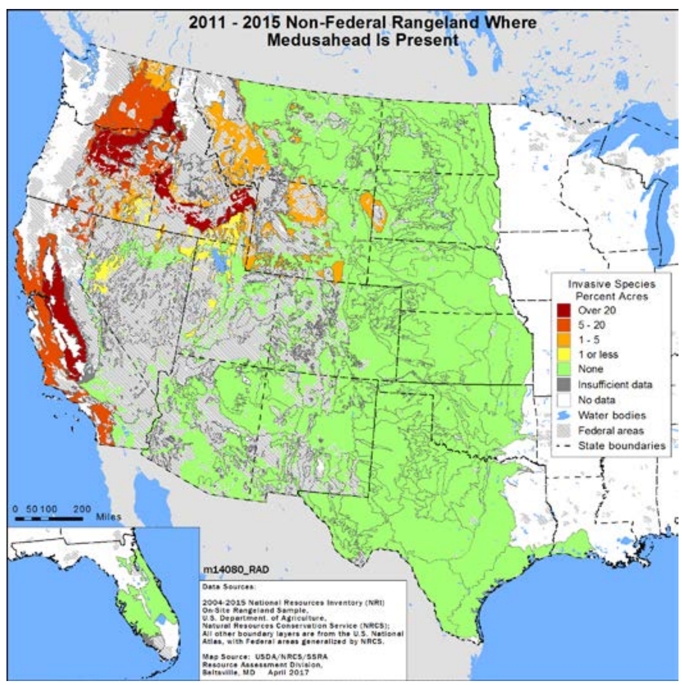


Figure 18. 2011-2015



Ventenata *(Ventenata dubia)* is a winter annual grass that is beginning to replace perennial grasses and forbs along roadsides and in hay, pasture, range and CRP fields in the western U.S. It has minimal forage value for livestock and its shallow root system may cause soil to be more susceptible to erosion (Scheinost, 2008).

Ventenata was observed on 8.1 (±4.4) percent of non-Federal rangelands in Oregon during 2011-2015. Trace amounts were also observed in Idaho and Washington (Table 36). No significant change in presence of *ventenata* was observed between 2004-2010 and 2011-2015 (Table 37, Table 38).

Figures 19-20. Non-Federal Rangeland Where *Ventenata* is Present. (Source: Table 36, Table 37, and Table 38**)**

Figure 19. 2004-2010

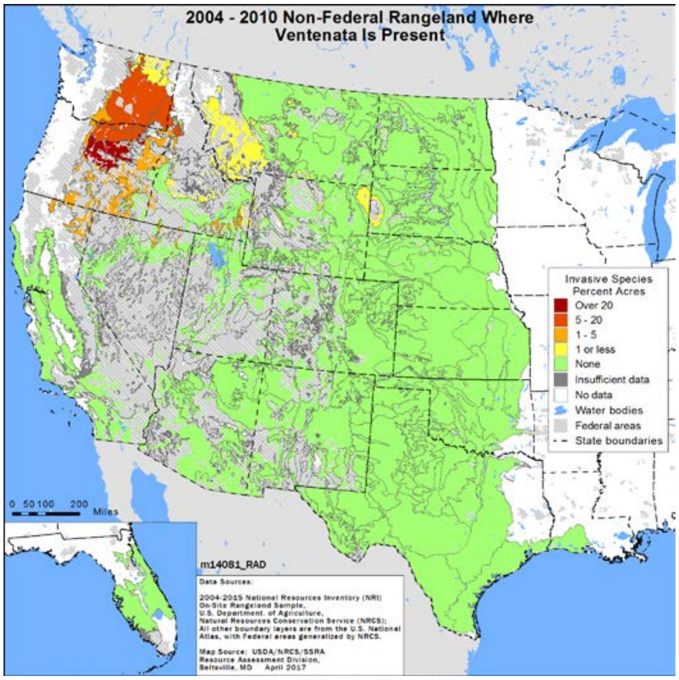
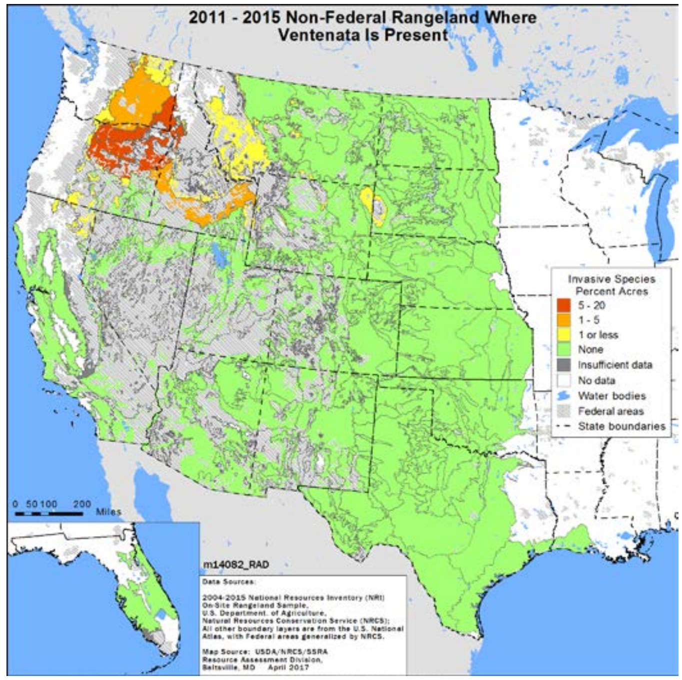


Figure 20. 2011-2015



Buffelgrass (*Pennisetum ciliare*) is an invasive perennial grass that is immune highly resistant to drought events and can choke out native grasses. When dry, this tall grass burns rapidly if ignited, making it especially dangerous during wildfire season (Tellman, 2002; NPS, 2011).

Buffelgrass was present on 5.3 (±2.4) percent of non-Federal rangeland in Texas during 2011-2015 (Table 39). No significant change in presence of buffelgrass on non-Federal rangelands was observed between 2004-2010 and 2011-2015 (Table 40, Table 41).

Figures 21-22. Non-Federal Rangeland Where Buffelgrass is Present. (Source: Table 39, Table 40, and Table 41**)**

Figure 21. 2004-2010

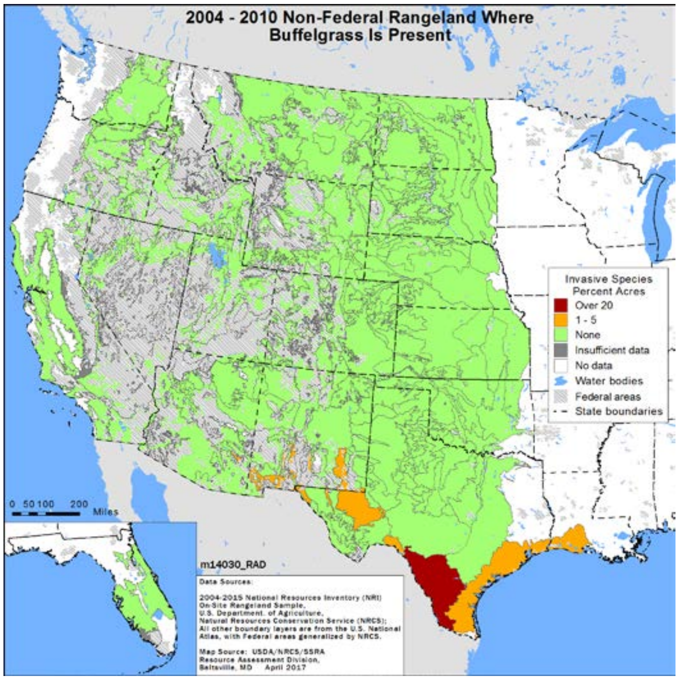
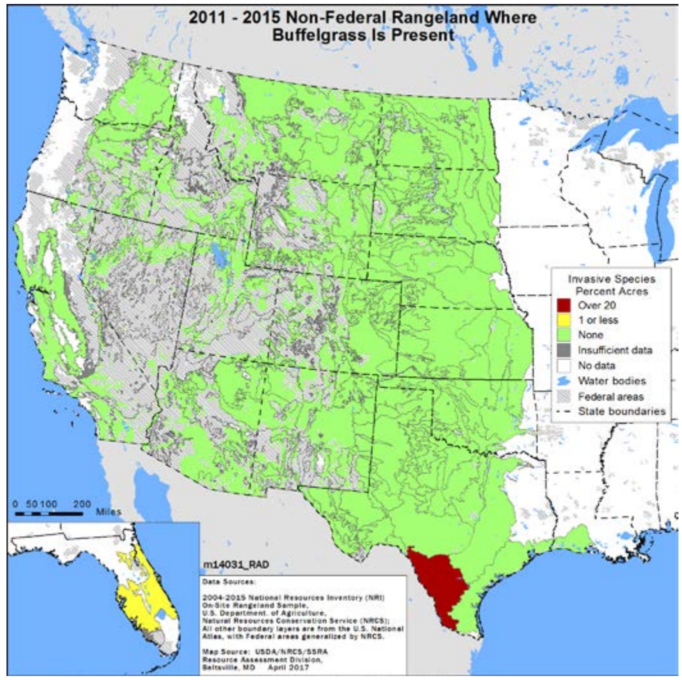


Figure 22. 2011-2015



Reed canarygrass (*Phalaris arundinacea*) has both native and nonnative strains in the United States. European and Asian varieties have been introduced and cultivated for livestock forage and wastewater pollution control. The nonnative varieties and hybrids of nonnative and native varieties are aggressive in many environments and have the capacity to shade out and displace desirable vegetation. Once established, reed canarygrass is very competitive and will frequently develop a solid monoculture (Stannard, 2002; Hall, 2008).

Reed canarygrass was present on 2.2 (±1.6) and 2.1 (±0.9) percent of non-Federal rangelands in North Dakota and South Dakota, respectively, during 2011-2015, while trace amounts were observed in a number of states (Table 42). No significant change in presence of reed canarygrass on non-Federal rangelands was observed between 2004-2010 and 2011-2015 (Table 43, Table 44).

Johnsongrass (*Sorghum halepense*) is a tall, coarse, perennial grass that spreads aggressively via stout rhizomes. It grows in dense clumps or nearly solid stands that prevents growth of desirable vegetation. If Johnsongrass is stressed by cutting or frost, it can cause cyanide poisoning in livestock feeding (Byrd, 2009).

Johnsongrass was observed on 3.7 (±1.8), 0.9 (±0.7), and 0.5 (±0.4) percent of non-Federal rangeland in Oklahoma, Kansas, and Texas, respectively, during 2011-2015 (Table 45). In Texas, this was a slight decrease (0.9 ±0.7) from 2004-2010 (Table 46, Table 47).

Japanese stiltgrass (*Microstegium vimineum*) grows well in a wide range of ecosystems including pasturelands and can expand into dense stands that prevent desirable vegetation from growing. It grows well under a variety of light conditions and prefers damp locations (MDC, 2010). No Japanese stiltgrass was observed on non-Federal rangelands during 2004-2010 or 2011-2015 (Table 48, Table 49).

Invasive Forbs

Once established, the invasive forbs in this report are able to outcompete native species in certain areas. Some, such as leafy spurge and halogeton, are also toxic to grazing animals.

Cirsium spp. – Canada thistles and bull thistles in this group can form dense stands that can shade out native vegetation. The species are unpalatable to many livestock and wildlife (DiTomaso, 2000).

In North Dakota, South Dakota, and Montana, *cirsium* species were present on 7.7 (±2.6), 4.5 (±1.9), and 3.1 (±1.9) percent, respectively, of non-Federal rangelands during 2011-2015 (Table 51). Very little change in presence of *cirsium* on non-Federal rangeland was observed between 2004-2010 and 2011-2015 (Table 52, Table 53).

Figures 23-24. Non-Federal Rangeland Where *Cirsium* Species Are Present. (Source: Table 51, Table 52, and Table 53**)**

Figure 23. 2004-2010

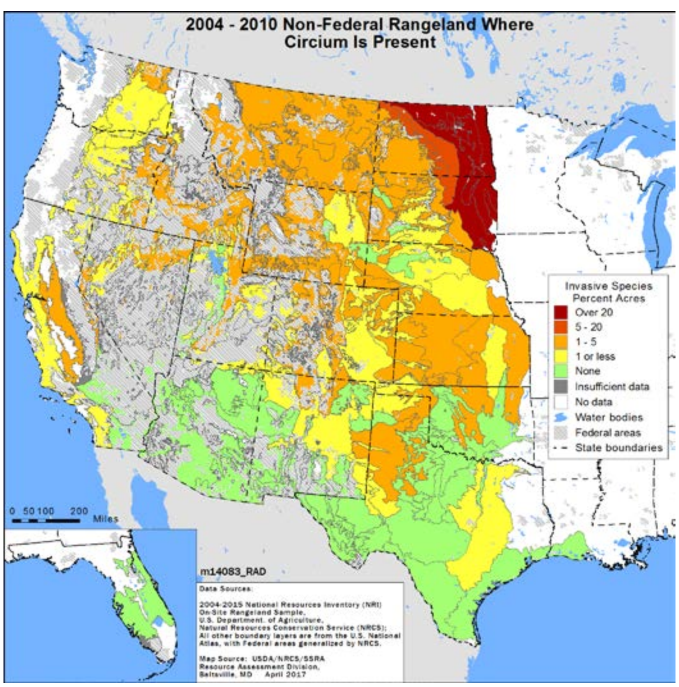
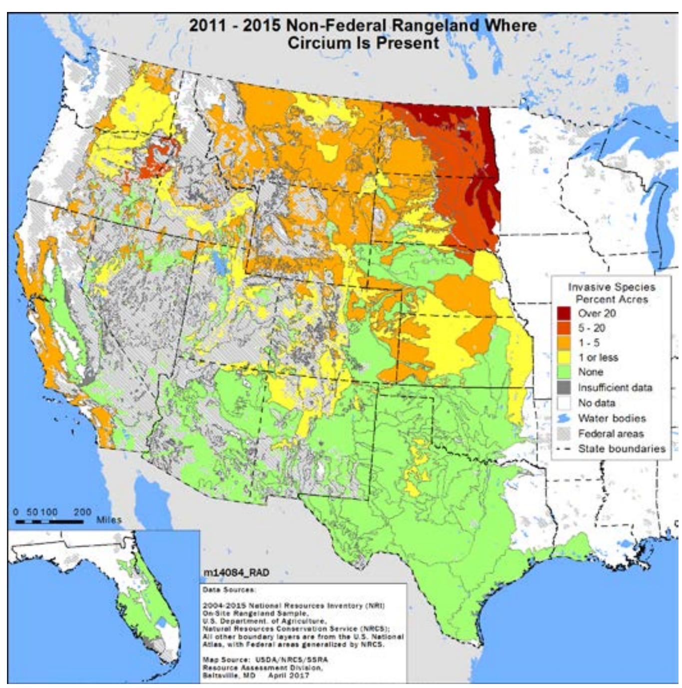


Figure 24. 2011-2015



Leafy spurge *(Euphorbia esula*) is a deep-rooted invasive plant that is highly competitive with native species causing degradation of grazing land and wildlife habitat. The plant produces milky latex that causes irritation to the skin and is poisonous to some animals (DiTomaso, 2000; Wallace, 1992).

Leafy spurge was present on 9.8 (±4.0) and 2.3 (±1.6) percent of non-Federal rangelands in North Dakota and Montana, respectively, during 2011-2015 (Table 54). No significant change in presence of leafy spurge on non-Federal rangelands was observed between 2004-2010 and 2011-2015 (Table 55, Table 56).

Figures 25-26. Non-Federal Rangeland Where Leafy spurge is Present. (Source: Table 54, Table 55, and Table 56**)**

Figure 25. 2004-2010

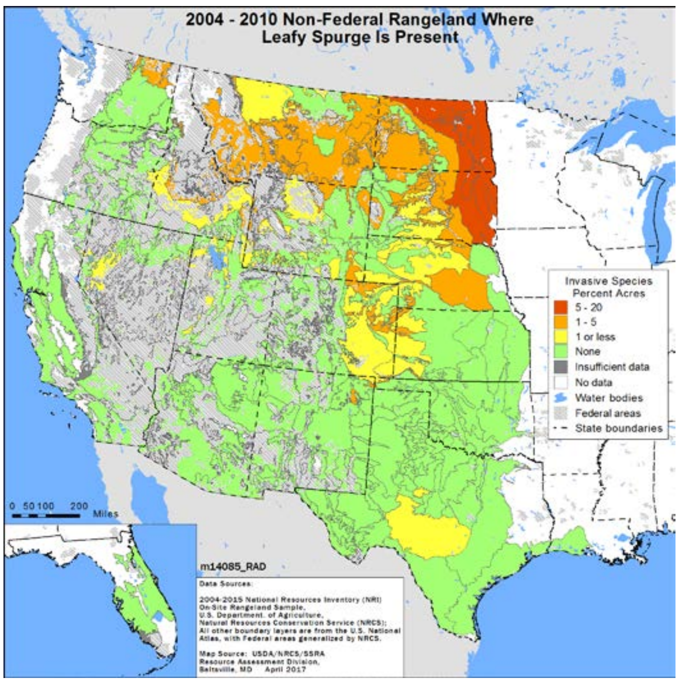
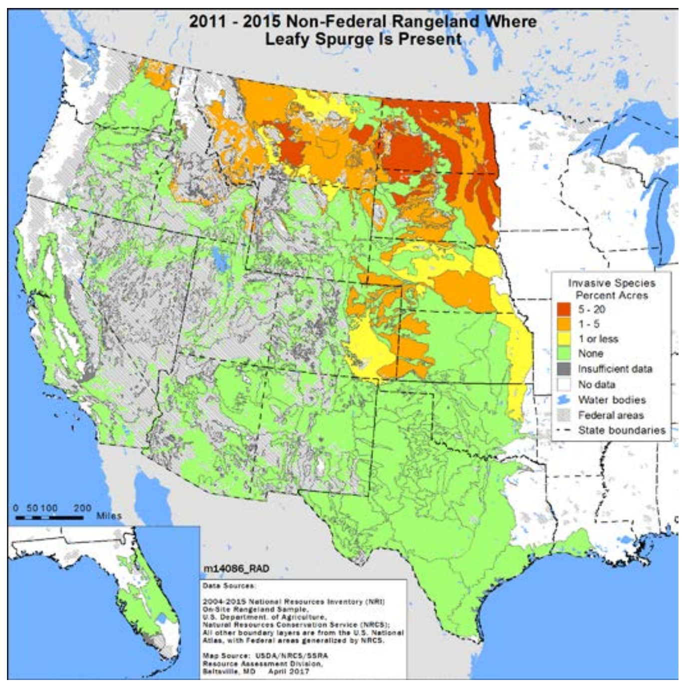


Figure 26. 2011-2015



Centaurea spp. - The roots of species in this group produce toxins that stunt the growth of many native plant species. These nonnative *Centaurea* species are inedible to most livestock and poisonous to some (DiTomaso, 2000).

Centaurea species were present on 16.6 (±6.2) and 4.1 (±3.4) percent of non-Federal rangelands in California and Washington, respectively, during 2011-2015 (Table 57). Very little change in presence of *centaurea* on non-Federal rangeland was observed between 2004-2010 and 2011-2015 (Table 58, Table 59).

Figures 27-28. Non-Federal Rangeland Where *Centaurea* species are Present. (Source: Table 57, Table 58, and Table 59**)**

Figure 27. 2004-2010

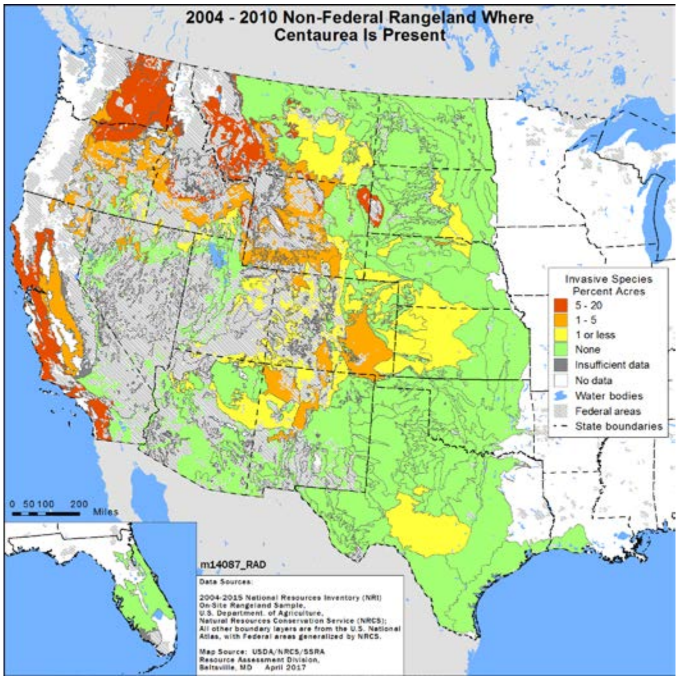
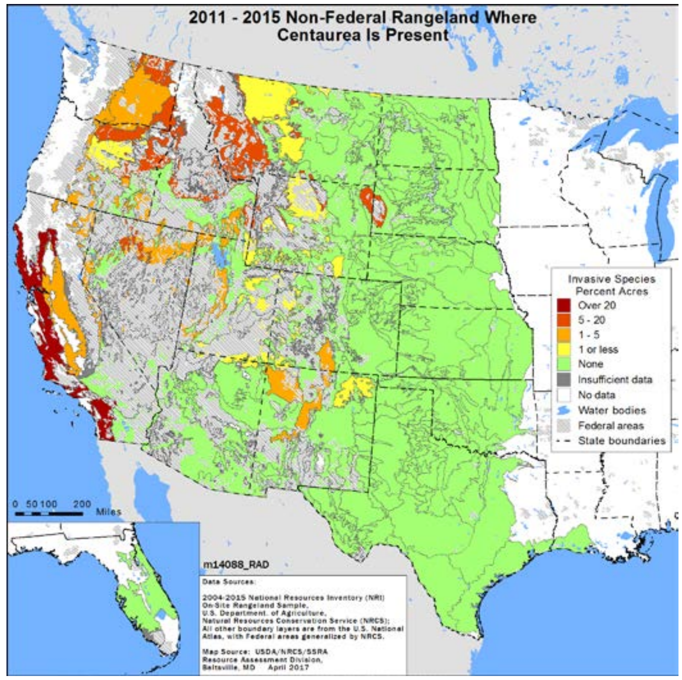


Figure 28. 2011-2015



Halogeton (*Halogeton glomeratus*) was introduced from Eurasia to the United States early in the 20th century. It is highly toxic to both sheep and cattle. Salt from the soil accumulates in the plant tissues and is also leached from roots back onto the soil surface increasing salinity and favoring establishment of *halogeton* over other species (Pavek, 1992).

During 2011-2015, *halogeton* was observed in Utah on 9.7 (±4.7) percent of non-Federal rangeland (Table 60). No significant change in presence of *halogeton* was observed between 2004-2010 and 2011-2015 (Table 61, Table 62).

Figures 29-30. Non-Federal Rangeland Where *Halogeton* species are Present. (Source: Table 57, Table 58, and Table 59**)**

Figure 29. 2004-2010

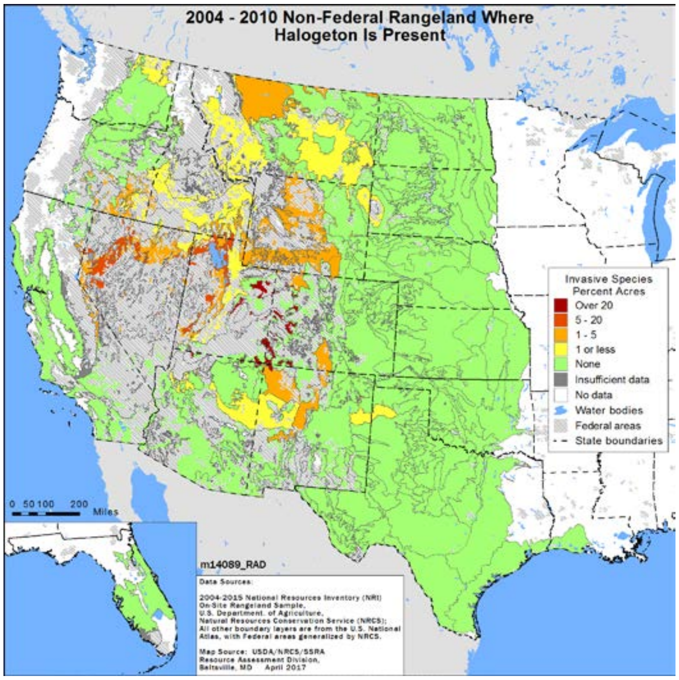
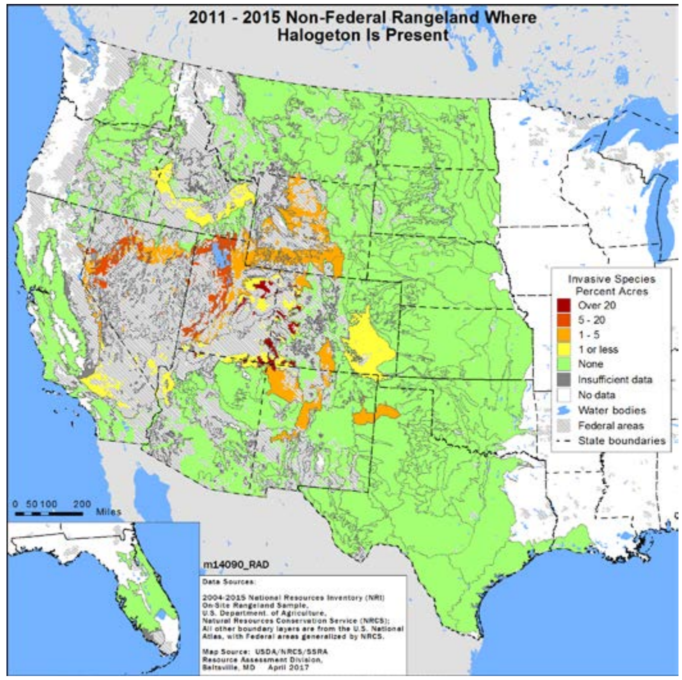


Figure 30. 2011-2015



Garlic mustard (*Alliaria petiolata*) is an invasive forb species found in the forest understory, at the edges of wooded areas, near trails, along roadsides and in areas where trees have been removed. It is difficult to control once it has reached a site and can quickly outcompete other plant species (Pratt, 2004). No garlic mustard was observed on non-Federal rangeland during 2004-2010 and 2011-2015 (Table 63, Table 64).

Wild parsnip *(Pastinaca sativa)* is commonly found along roadsides, but is also found invading pastures, natural areas, forest harvest areas, idle lands and disturbed lands. Once established, it can spread into adjacent areas and form dense stands. The plant produces a compound in its leaves, stems, flowers and fruits that causes intense rash or blistering on contact with skin on sunny days (Averill, 2007). Trace amounts of wild parsnip were observed on non-Federal rangeland in North Dakota and South Dakota during 2011-2015 (Table 66) and no wild parsnip was observed on these lands during 2004-2010 (Table 67).

Dalmatian and yellow toadflax *(Linaria genistifolia* spp. *dalmatica* and *Linaria vulgaris)* Dalmatian toadflax can become extremely invasive, especially on dryland sites, disturbed areas, and roadsides. Yellow toadflax is found in pastures, meadows, and ditches on more moist sites than Dalmatian toadflax. Once an area becomes infested, both species can dramatically reduce forage production and decrease native plants and wildlife habitat (Lym, 2002). Trace amounts of Dalmatian and yellow toadflax are observed on non-Federal rangelands in Colorado, Idaho, Montana, North Dakota, Oregon, Utah, and Washington (Table 69, Table 70).

Common tansy (*Tanacetum vulgare*) often invades disturbed areas, roadsides, and fence lines, but once established is considered highly invasive. This species can severely reduce desirable forage in pastures and degrade wildlife habitat. Tansy spreads both from seed and rhizomes that form dense stands (Gucker, 2009). Trace amounts of common tansy are observed on non-Federal rangeland in Colorado, Idaho, and Wyoming (Table 75, Table 76).

Invasive Woody Species

Some native woody shrubs such as juniper and mesquite can invade areas replacing native grasses and forbs. Dense stands can alter nutrient and energy cycles, affect hydrology, and reduce wildlife habitat and forage for domestic animals and wildlife. Deep root systems of woody species such as mesquite can reduce water availability to other native plants and eventually animals. Other invasive woody species, such as multiflora rose, were introduced, but have become invasive in certain areas. The invasive woody species groups in this report include:

Junipers (*Juniperus* spp.) Some native invasive woody plant species such as junipers can invade areas replacing native grasses and forbs. Dense stands can alter nutrient and energy cycles, affect hydrology, and reduce wildlife habitat and forage for domestic animals and wildlife (DiTomaso, 2000; Chambers, 2007; Miller, et al., 2008.).

Nationally during 2011-2015, juniper species were present on 9.4 (±1.2) percent of non-Federal rangelands and their presence was greatest in Oklahoma (20.9 ±5.8 percent), Oregon (15.7 ±7.6 percent), New Mexico (14.8 ±3.9 percent), Texas (14.5 ±3.8 percent), Utah (14.2 ±4.9 percent), Arizona (11.4 ±5.4 percent), and Montana (8.4 ±4.0 percent) (Table 75). Between 2004-2010 and 2011-2015, a small decrease was observed nationally (2.1 ±1.3 percent) on non-Federal rangelands. Decreases in presence of juniper were observed between those periods in Texas (6.4 ±4.3 percent) and Wyoming (2.5 ±2.3 percent), while an increase was observed in New Mexico (4.6 ±4.4 percent) (Table 76, Table 77).

Figures 31-32. Non-Federal Rangeland Where Juniper Species are Present. (Source: Table 75, Table 76, and Table 77**)**

Figure 31. 2004-2010

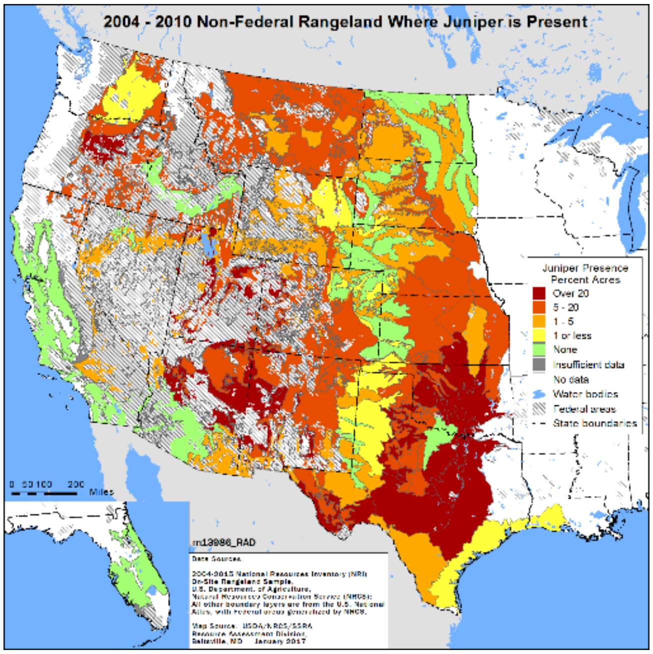
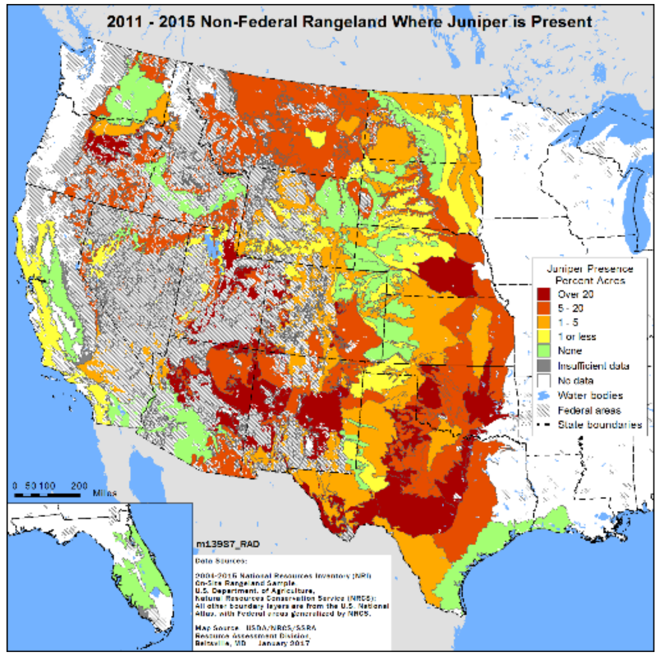


Figure 32. 2011-2015



Four juniper species groups are also examined separately:

Eastern juniper - Eastern redcedar (*J. virginiana*) was observed in Oklahoma, Nebraska, and Kansas on 20.0 (±5.8), 5.3 (±2.3) and 3.9 (±1.4) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 78). Between 2004-2010 and 2011-2015, a decrease in eastern redcedar was observed in Texas (2.0 ±0.9) percent (Table 79, Table 80).

Figures 33-34. Non-Federal Rangeland Where Eastern Juniper Species are Present. (Source: Table 78, Table 79, and Table 80**)**

Figure 33. 2004-2010

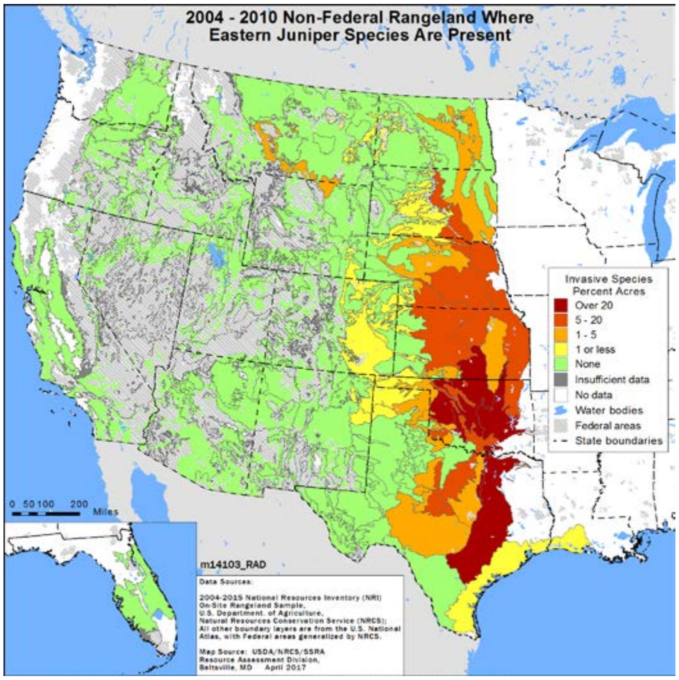
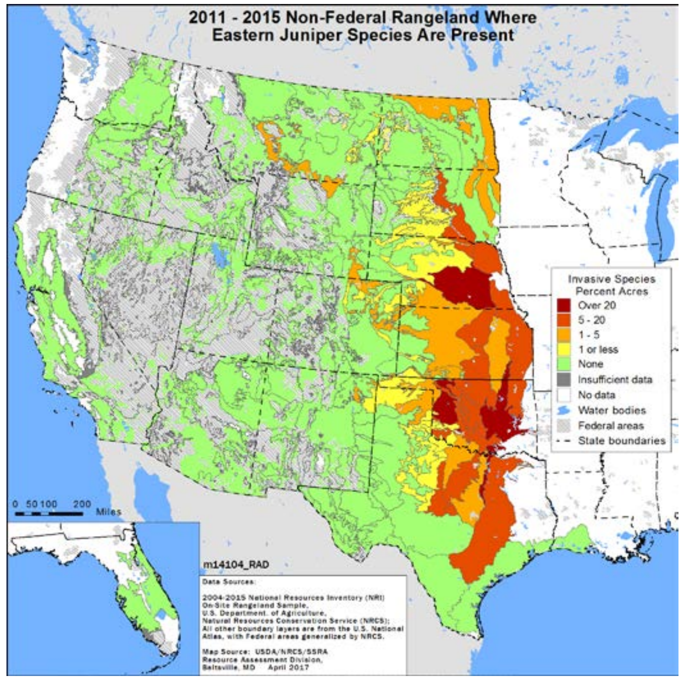


Figure 34. 2011-2015



Figures 35-36. Non-Federal Rangeland Where Eastern Juniper Species Cover at Least 50 Percent of the Soil Surface. (Source: Table 78, Table 79, and Table 80**)**

Figure 35. 2004-2010

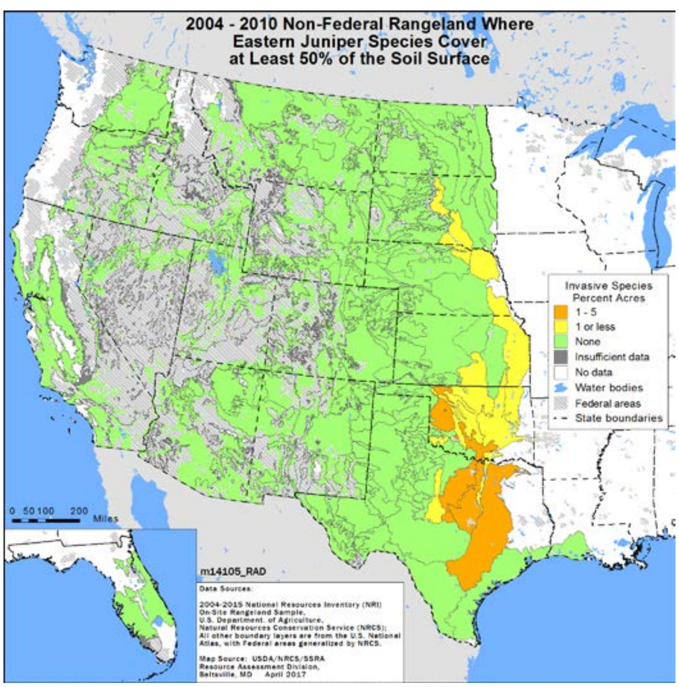
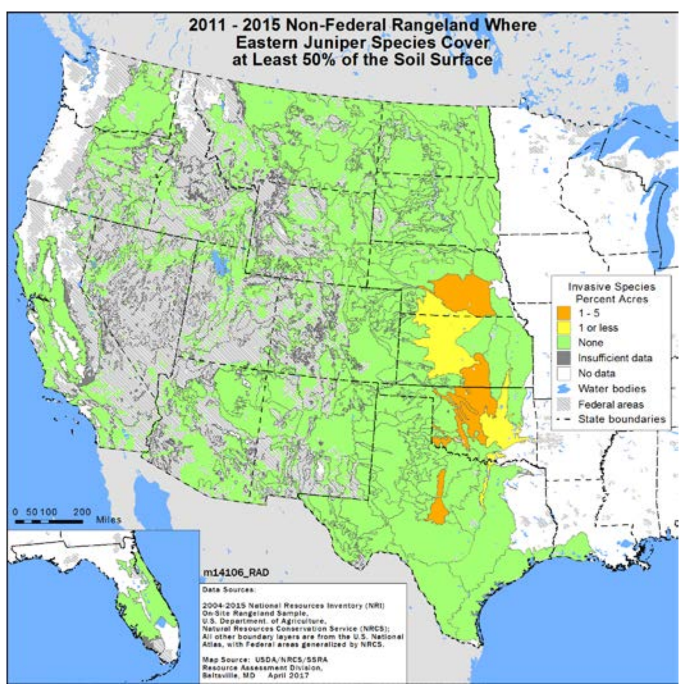


Figure 36. 2011-2015



Pacific junipers – Western juniper (*J. occidentalis*) and California juniper (*J. californica*) were observed in Oregon and California on 13.1 (±7.7) and 2.2 (±1.9) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 81). There was no significant change in presence of Pacific junipers on non-Federal rangeland between 2004-2010 and 2011-2015 (Table 82, Table 83).

Figures 37-38. Non-Federal Rangeland Where Pacific Juniper Species are Present. (Source: Table 81, Table 82, and Table 83**)**

Figure 37. 2004-2010

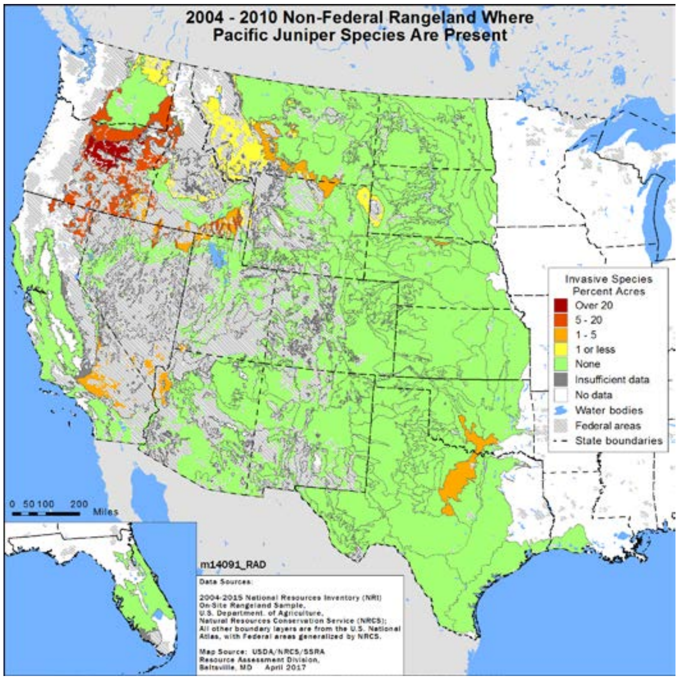
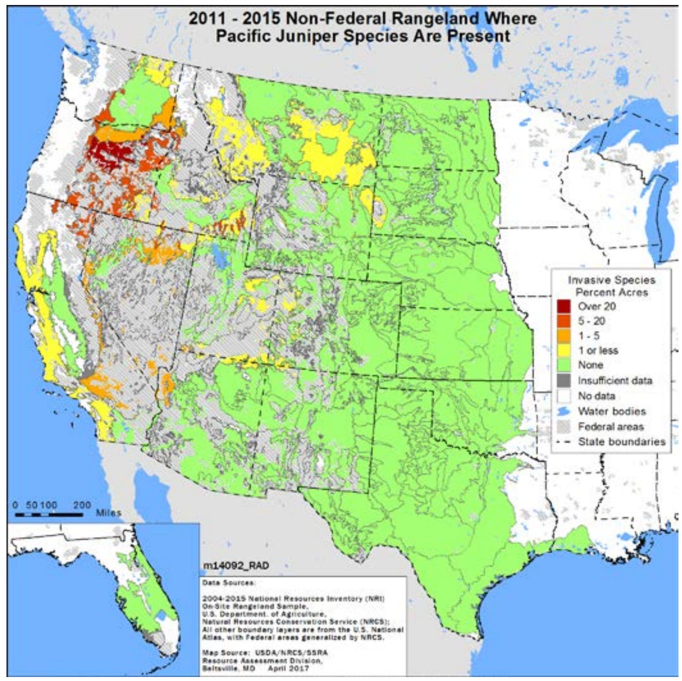


Figure 38. 2011-2015



Figures 39-40. Non-Federal Rangeland Where Pacific Juniper Species Cover at Least 50 Percent of the Soil Surface. (Source: Table 81, Table 82, and Table 83**)**

Figure 39. 2004-2010

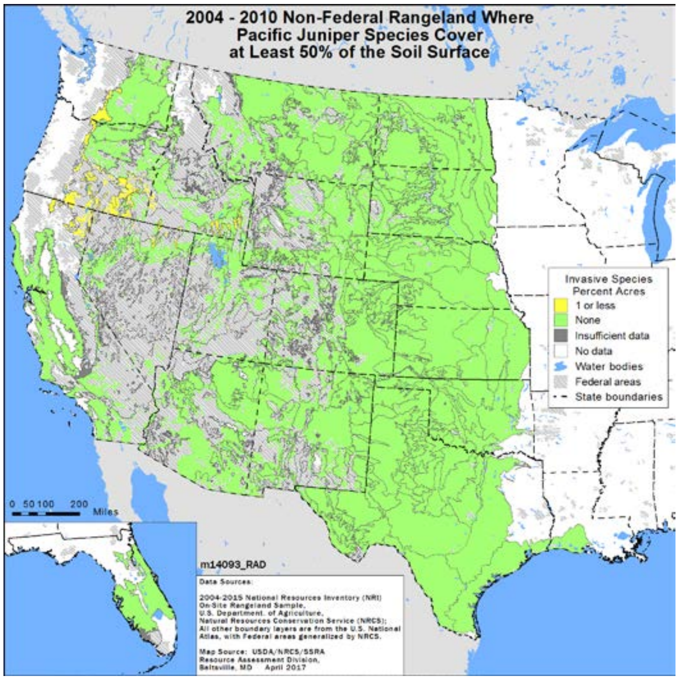
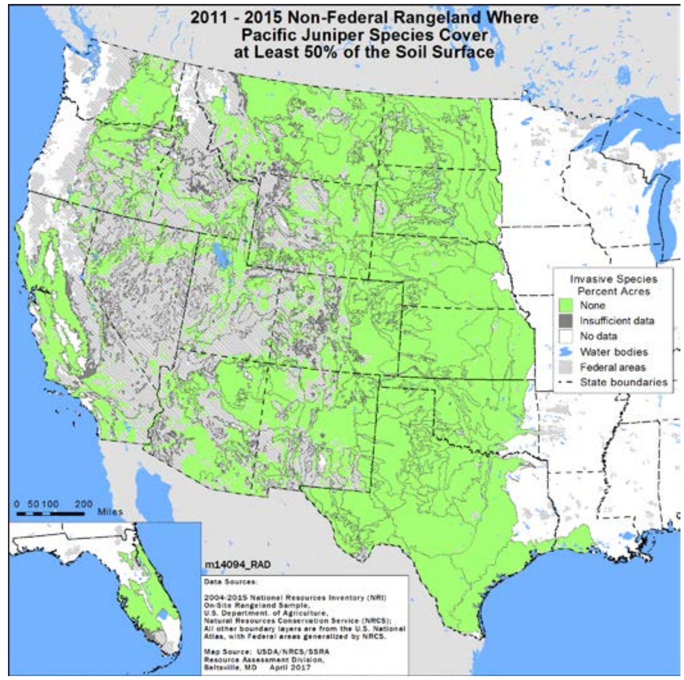


Figure 40. 2011-2015



Montane/intermontane junipers - Utah juniper (*J. osteosperma*) and Rocky Mountain juniper (*J. scopulorum*) were present in Utah, Nevada, Montana, and Colorado on 13.4 (±5.0), 6.3 (±4.0), 3.7 (±2.3) and 3.2 (±2.0) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 84). Between 2004-2010 and 2011-2015, a decrease in presence of these species was observed on non-Federal rangelands in Arizona (6.6 ±2.3 percent), while a slight increase was observed in New Mexico (1.1 ±1.0 percent) (Table 85, Table 86).

Figures 41-42. Non-Federal Rangeland Where Montane / Intermontane Juniper Species are Present. (Source: Table 84, Table 85, and Table 86**)**

Figure 41. 2004-2010

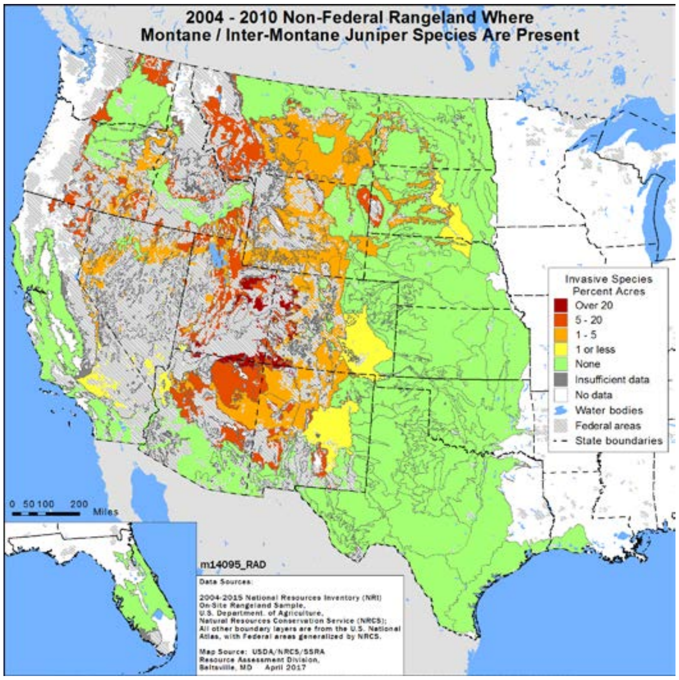
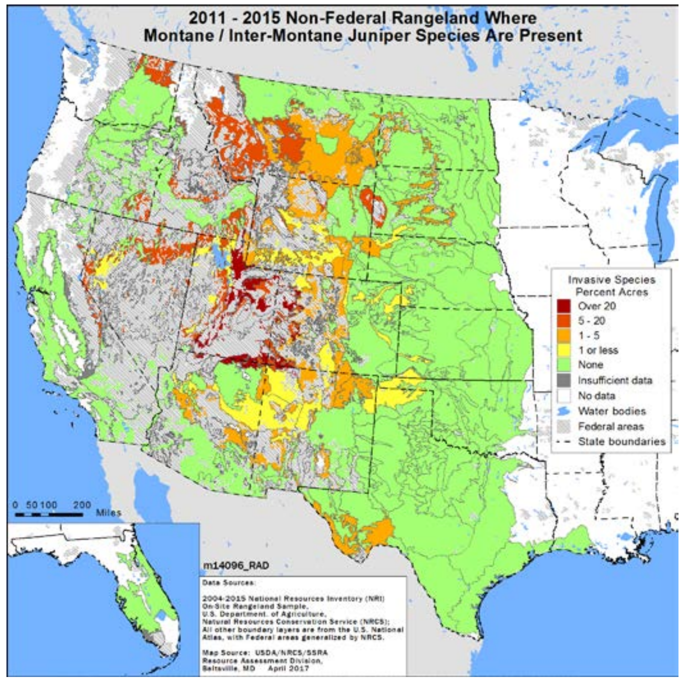


Figure 42. 2011-2015



Figures 43-44. Non-Federal Rangeland Where Montane / Intermontane Juniper Species Cover at Least 50 Percent of the Soil Surface. (Source: Table 84, Table 85, and Table 86**)**

Figure 43. 2004-2010

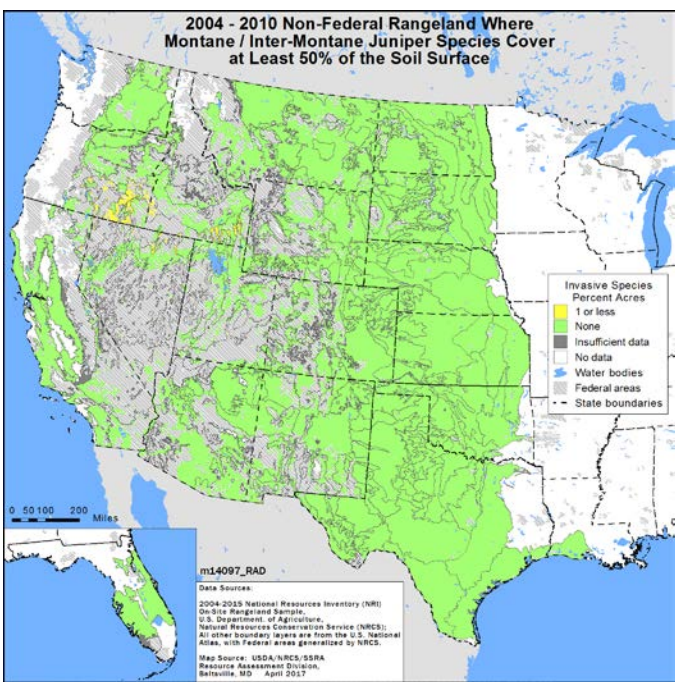
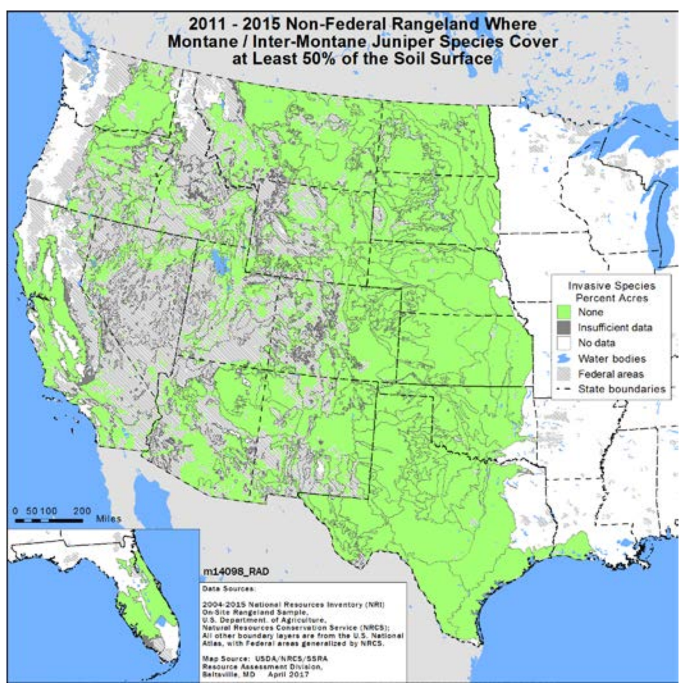


Figure 44. 2011-2015



Southern junipers - Ashe's juniper (J. *ashei*), redberry juniper (*J. coahuilensis*), alligator juniper (*J. deppeana*), oneseed juniper (*J. monosperma*), and Pinchot's juniper (*J. pinchotii*) were present in New Mexico, Texas, and Arizona on 13.5 (± 3.7), 13.4 (±3.6), and 11.0 (±5.3) percent, respectively, on non-Federal rangelands during 2011-2015 (Table 87). In New Mexico between 2004-2010 and 2011-2015 there was an increase of 5.1 (±4.1) percent of non-Federal rangeland where Southern junipers were observed (Table 88, Table 89).

Figures 45-46. Non-Federal Rangeland Where Southern Juniper Species are Present. (Source: Table 87, Table 88, and Table 89**)**

Figure 45. 2004-2010

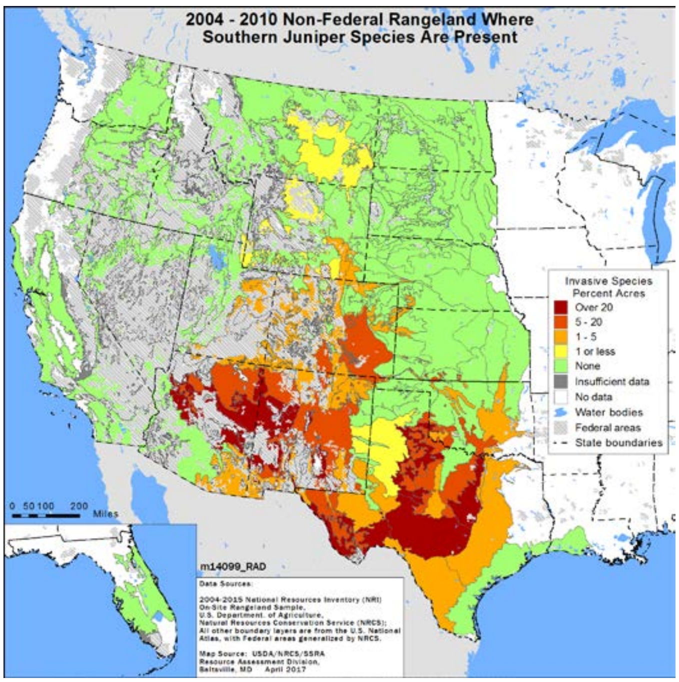
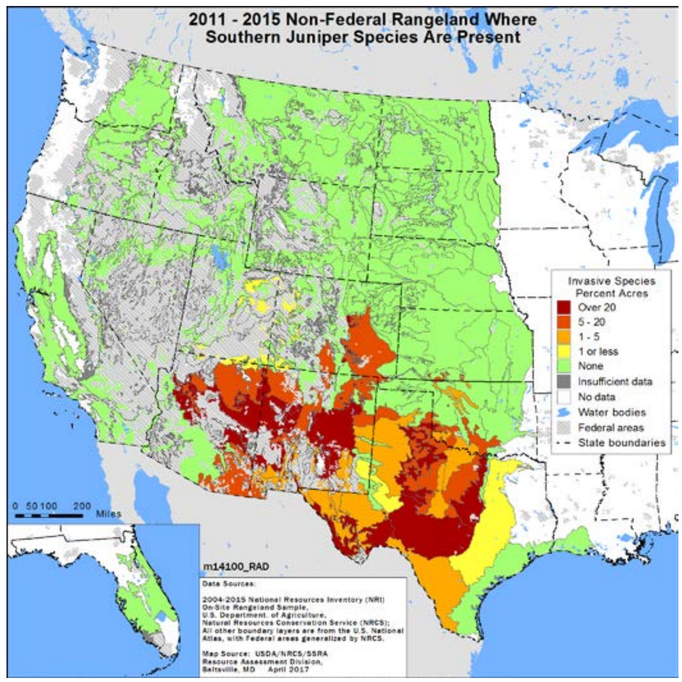


Figure 46. 2011-2015



Figures 47-48. Non-Federal Rangeland Where Southern Juniper Species Cover at Least 50 Percent of the Soil Surface. (Source: Table 87, Table 88, and Table 89**)**

Figure 47. 2004-2010

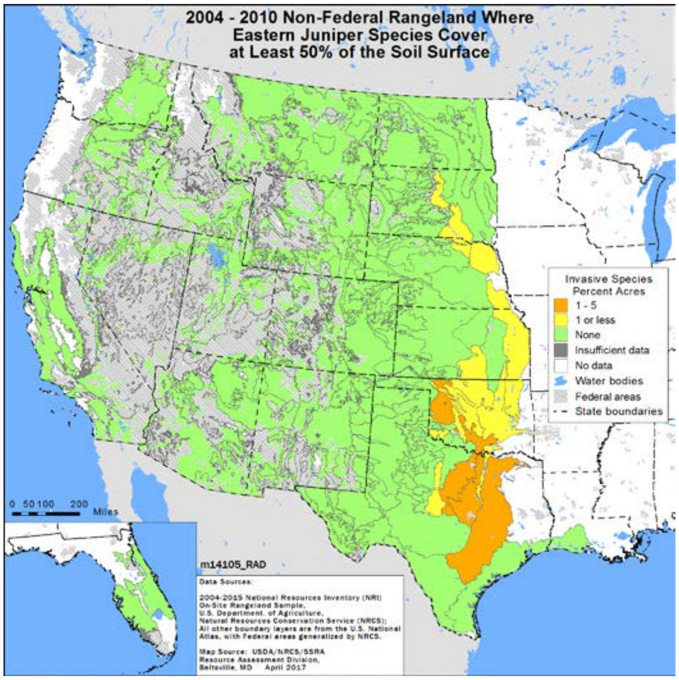
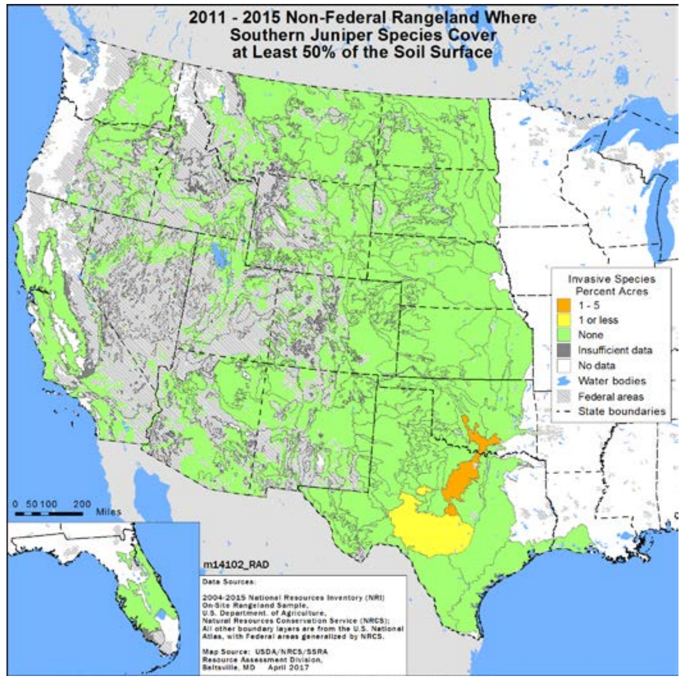


Figure 48. 2011-2015



Pinyon pine (*Pinus spp.*) has the ability to invade and dominate a wide range of plant communities. As tree crowns increase in size, danger of increased fire intensity increases and water availability for understory plants decreases (Miller, et al., 2008.; Tausch, 2007).

Pinyon pines were present in Utah and New Mexico on 8.9 (±4.1) and 6.0 (±2.9) percent, respectively, of non-Federal rangelands during 2011-2015 (Table 90). In Arizona between 2004-2010 and 2011-2015, presence of pinyon pine on non-Federal rangelands decreased by 4.4 (±2.4) percent from a 2004-2010 level of 4.7 (±2.2) percent (Table 91, Table 92).

Figures 49-50. Non-Federal Rangeland Where Pinyon Pine Species are Present. (Source: Table 90, Table 91, and Table 92**)**

Figure 49. 2004-2010

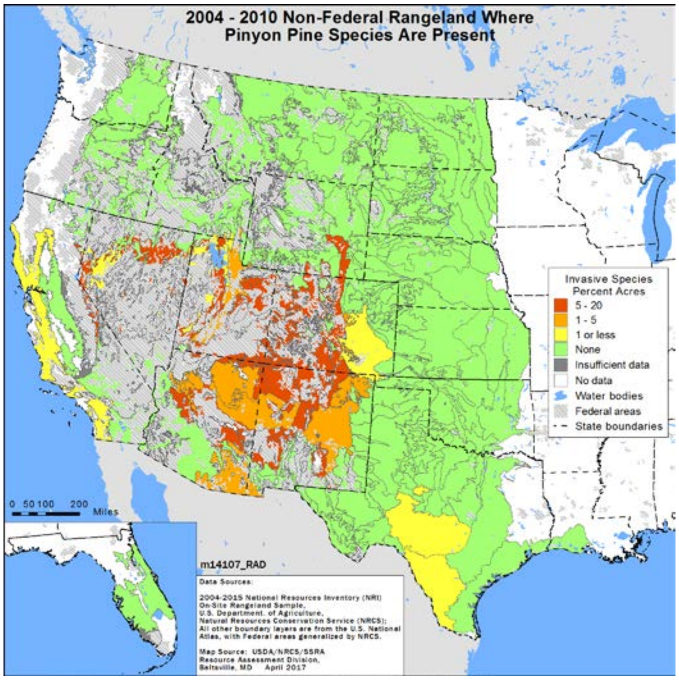
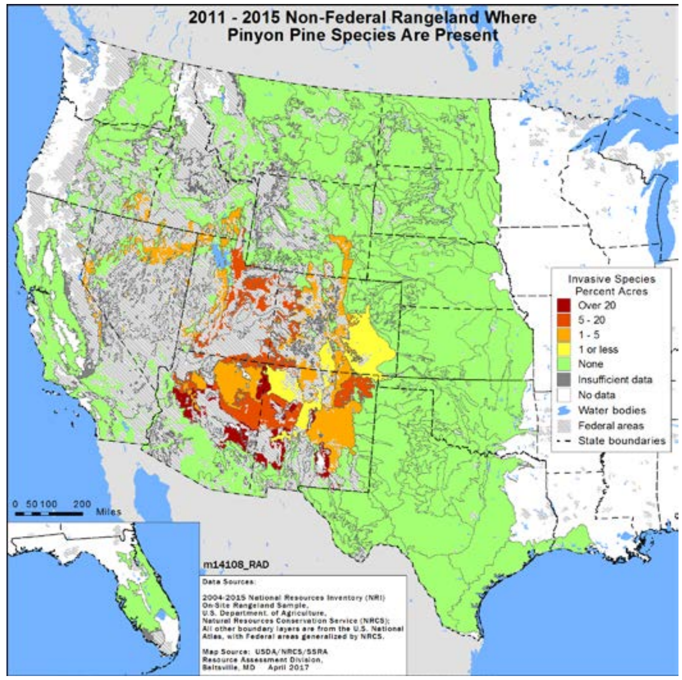


Figure 50. 2011-2015



Results for a subgroup of pinyon pine species, two-needle pinyon (*P. edulis*) and singleleaf pinyon (*P. monophylla),* were generally the same as that of the full group of pinyon pines, indicating that the two species were most common among the full group (Table 93, Table 94, Table 95).

***Mesquite** (*Prosopis spp.) typically has a deep root system that enables it to withstand droughts and severe competition from grasses. Replacement of grasses by mesquite over time modifies the soils and microclimate, facilitating establishment of additional woody species (Archer, 1995). Honey mesquite (*P. glandulosa*) and velvet mesquite (*P. velutina*) are the two most common species found in the southwestern U.S. (Ansley, 1997).

Nationally during 2011-2015, mesquite species were present on 15.8 (±1.3) percent of non-Federal rangelands and they were observed most commonly on these lands in Texas (54.0 ±4.7 percent), Arizona (18.4 ±5.5 percent), New Mexico (15.7 ±3.8 percent) and Oklahoma (6.9 ±3.4 percent) (Table 96). While there was little change in presence of mesquite species on non-Federal rangelands in most states between 2004-2010 and 2011-2015, in Texas an increase of 6.3 (±5.0) percent was observed (Table 97, Table 98).

Figures 51-52. Non-Federal Rangeland Where *Mesquite S*pecies are Present. (Source: Table 96, Table 97, and Table 98**)**

Figure 51. 2004-2010

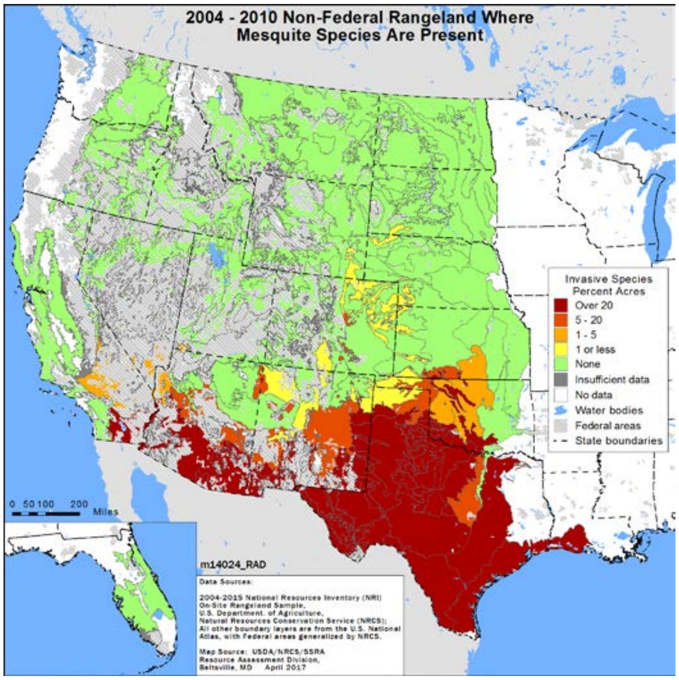
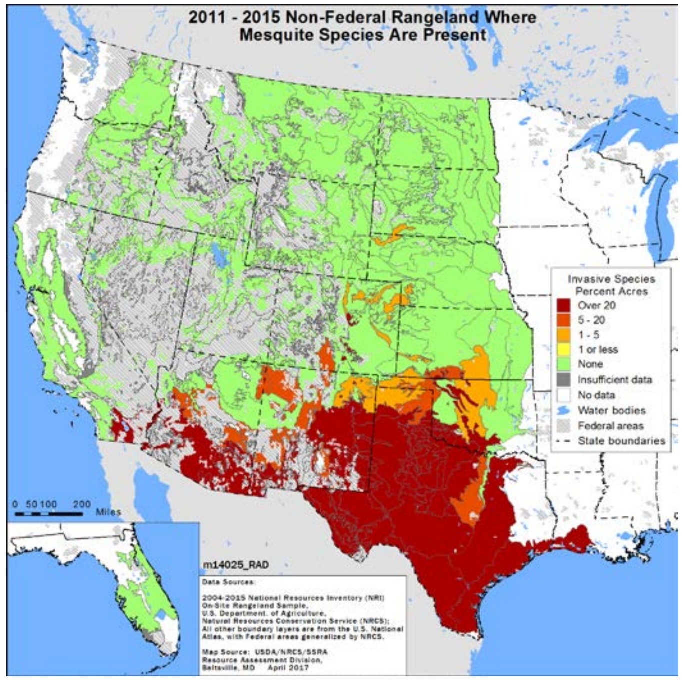


Figure 52. 2011-2015



Figures 53-54. Non-Federal Rangeland Where *Mesquite S*pecies Cover at Least 50 Percent of the Soil Surface. (Source: Table 96, Table 97, and Table 98**)**

Figure 53. 2004-2010

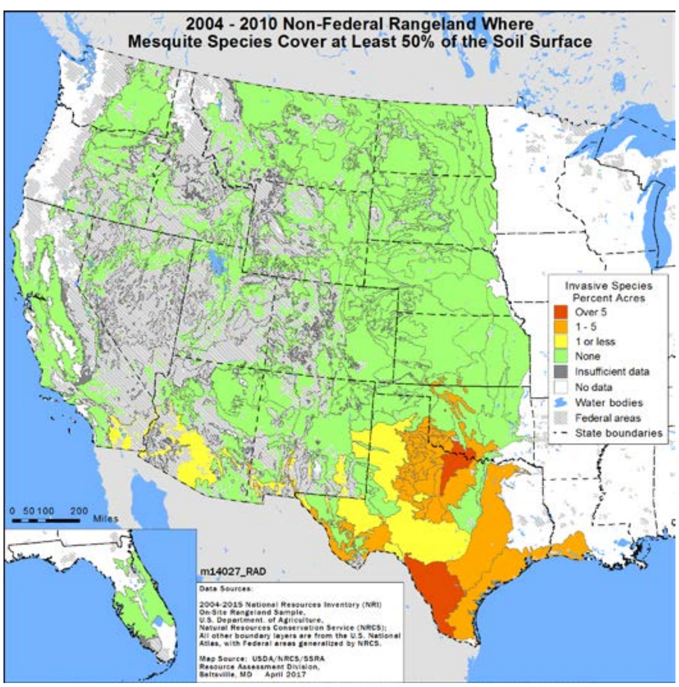
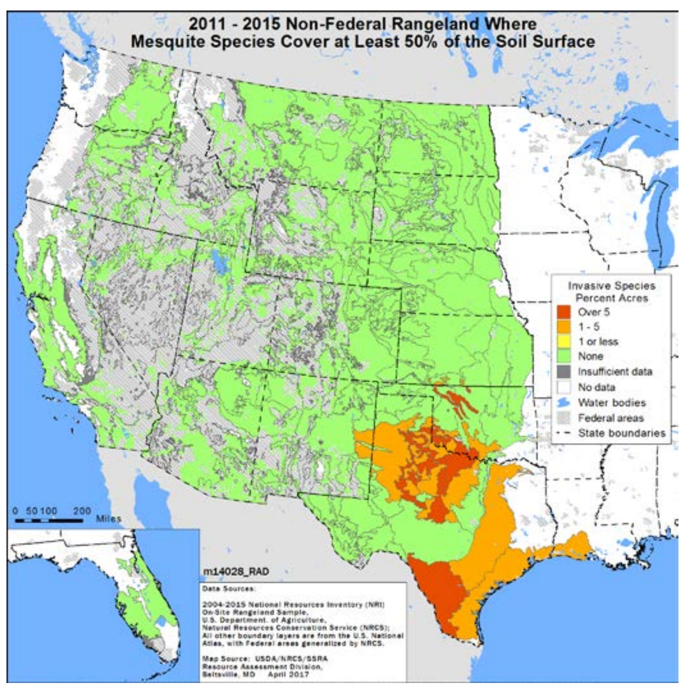


Figure 54. 2011-2015



Tamarix (*Tamarix* spp.) is a fast-growing, deep-rooted invasive shrub-tree that can colonize riparian wetlands and floodplains. It absorbs large amounts of water and secretes salt which is deposited on the soil surface increasing its advantage over other plants (Morissette, 2006.; DiTomaso, 1998). Because these species are generally confined to waterways and their associated wetlands and floodplains, there dispersion across rangelands is somewhat confined. However, the impact on these vital areas can be great.

During 2011-2015 *tamarix* species were present on 1.0 (±0.8) and 0.2 (±0.1) percent of non-Federal rangelands in New Mexico and Texas, respectively, and on trace amounts of these lands in Arizona, California, Montana, Nevada, Oklahoma, Utah, and Wyoming (Table 99). No statistically significant changes in presence of *tamarix* species were observed on non-Federal rangelands between 2004-2010 and 2011-2015 (Table 100, Table 101).

Figures 55-56. Non-Federal Rangeland Where *Tamarix* Species are Present. (Source: Table 99, Table 100, and Table 101**)**

Figure 55. 2004-2010

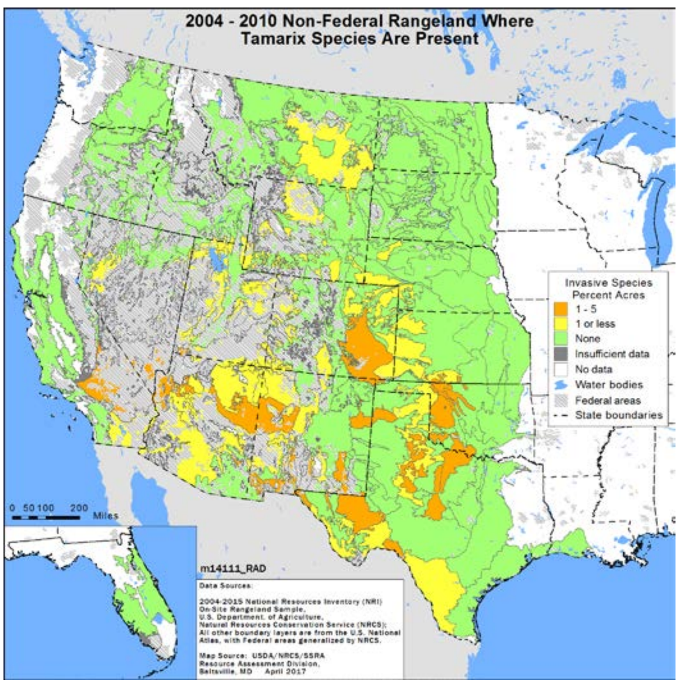
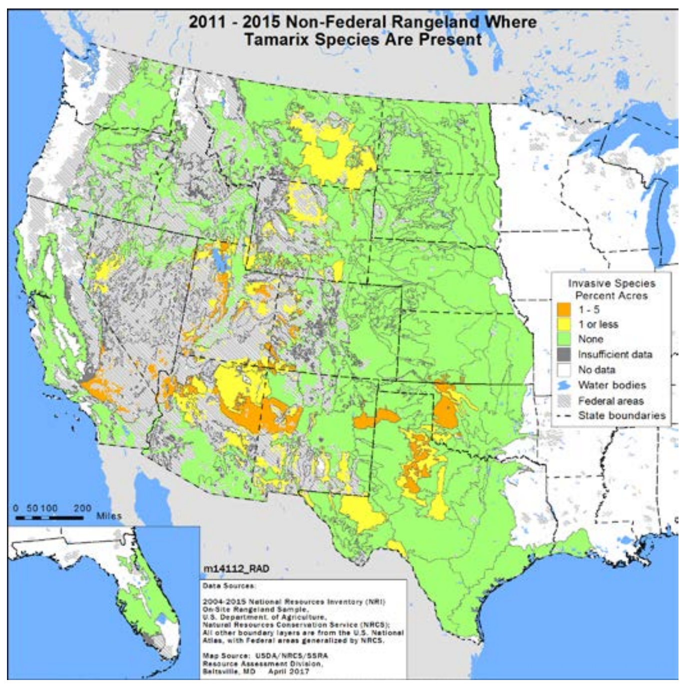


Figure 56. 2011-2015



Multiflora rose (*Rosa multiflora*) is a subshrub or vine introduced from Japan to cultivate rose rootstock, but later was used for erosion control and as a component of living fences. Multiflora rose rapidly outcompetes surrounding vegetation, takes over pastures, and lowers crop yields (Johnson, 2007; Wenning, 2012).

During 2011-2015 multiflora rose was present on 2.7 (±2.2) percent of non-Federal rangelands in Oklahoma and on trace amounts of these lands in Kansas and Texas (Table 102). Very little change was observed in presence of multiflora rose on these lands between 2004-2010 and 2011-2015 (Table 103, Table 104).

Figures 57-58. Non-Federal Rangeland Where Multiflora Rose Is Present. (Source: Table 102, Table 103, and Table 104**)**

Figure 57. 2004-2010

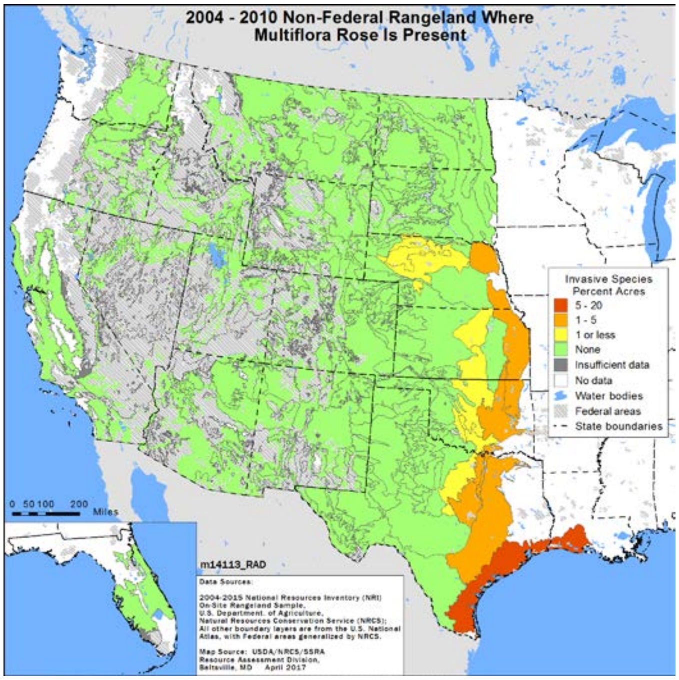
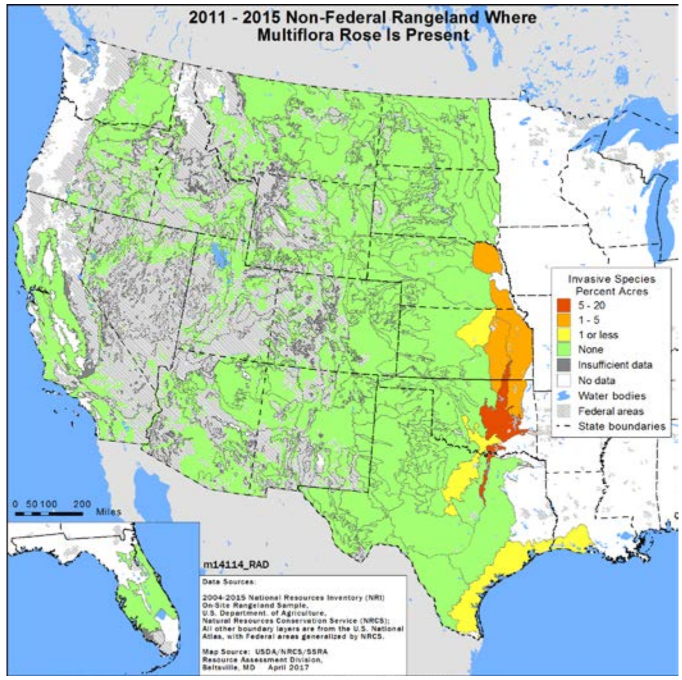


Figure 58. 2011-2015



Japanese honeysuckle (*Lonicera japonica)* is an aggressive vine that seriously alters or destroys the understory and herbaceous layers of plant communities it invades. The shade tolerant vine often occurs along field edges, rights-of-way or in forested areas (Bravo, 2005). Japanese honeysuckle was observed on trace amounts of non-Federal rangeland during 2011-2015 in Oklahoma (Table 105) and also in Louisiana, Oklahoma, and Texas during 2004-2010 (Table 106).

Common Buckthorn *(Rhamnus cathartica)* outcompetes other plants for nutrients, light and moisture and serves as host to pests including crown rust fungus and soybean aphid. It contributes to erosion by shading out other plants (Archibold, 1997; PCA, 2005; Klionsky, 2011). No common buckthorn was observed on non-Federal rangeland during 2004-2010 and 2011-2015 (Table 108, Table 109).

Tables and Results

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI), a sample survey using scientific statistical principles and procedures. These results, based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015, address status and change in conditions. These estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

Margins of error are reported for each NRI estimate and must be considered at all scales of analysis. The margin of error is used to construct the 95 percent confidence interval for the estimate. The lower bound of the interval is obtained by subtracting the margin of error from the estimate; the upper bound is obtained by adding the margin of error to the estimate. A 95 percent confidence interval means that in repeated samples from the same population, 95 percent of the time the true underlying population parameter will be contained within the lower and upper bounds of the interval.

In the following tables, estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 1- Invasive Plant Species Groups (source: USDA PLANTS Database accessed 2013)

Invasive Grass Species Groups

Annual bromes

- BRTE - Bromus tectorum L., cheatgrass
- BRJA - Bromus japonicus Thunb. ex Murr., Bromus arvensis
- BRAR5 new symbol for BRJA
- BRST2 - *Bromus sterilis L.,* poverty brome
- BRRU2 - *Bromus rubens*, red brome
- BRDI3 - Bromus diandrus ssp. diandrus, ripgut brome
- BRDIR - Bromus diandrus ssp. rigidus, ripgut brome
- BRRI8 2004 symbol for BRDI3
- BRHO2 - *Bromus hordeaceus,* soft brome
- BRSE - *Bromus secalius,* rye brome

Cheatgrass

- BRTE - Bromus tectorum L., cheatgrass

Kentucky and Canada bluegrasses

- POPR *Poa pratensis* L. Kentucky bluegrass
- POCO *Poa compressa* L. Canada bluegrass

Smooth brome

- BRIN2 - *Bromus inermis* Leyss., smooth brome

Medusahead

- TACA8 - Taeniatherum caput-medusae (L.) Nevski, medusahead
- TAENI2 - *Taeniatherum Nevski*, medusahead

Ventenata

- VENTE, *Ventenata* Koeler, North Africa grass
- VEDU, *Ventenata dubia* (Leers) Coss., North Africa grass

Buffelgrass

- PECI *Pennisetum ciliare* (L.) Link, buffelgrass
- CECI *Cenchrus ciliaris* (L.), buffelgrass

Reed canarygrass

- PHAR3 – *Phalaris arundinacea* L., reed canarygrass
- PHARP – *Phalaris arundinacea* L. var. *picta* L., reed canarygrass
- PHAR15 – Phalaroides arundinacea (L.) Raeusch.
- PHARP3 – *Phalaroides arundinacea* (L.) Raeusch. var. *picta* (L.) Tzvelev

Johnsongrass

- SOHA - Sorghum halepense (L.) Pers., Johnsongrass

Japanese stiltgrass

- MIVI - Microstegium vimineum (Trin.) A. Camus, Napalese browntop (aka Japanese stiltgrass)

Invasive Forb Species Groups

Cirsium

- CIAR4 - *Cirsium arvense* (L.) Scop., Canada thistle
- CIVU - *Cirsium vulgare* (Savi) Ten., bull thistle

Leafy spurge

- EUES - *Euphorbia esula L.*, leafy spurge

Centaurea

* CENTA not included from AZ, KS, NM, OK, TX since in those states the genus *Centaurea* may include both native and introduced species.

- CENTA - *Centaurea L.*, knapweed*
- CESO3 - *Centaurea solstitialis L.*, yellow star-thistle
- CEDI3 - *Centaurea diffusa Lam*., diffuse knapweed
- CEME2 - *Centaurea melitensis L.*, Maltese star-thistle
- ACRE3 – *Acroptilon repens* (L.) DC., hardheads
- CEBI2 – Centaurea biebersteinii DC.
- CEST8 new symbol for CEBI2

Halogeton

- HALOG - *Halogeton* C.A. Mey, saltlover
- HAGL - *Halogeton glomeratus* (M. Bieb.) C.A. Mey., saltlover

Garlic mustard

- ALPE4 - *Alliaria petiolata* (M. Bieb.) Cavara & Grande, garlic mustard

Wild parsnip

- PASA2 - *Pastinaca sativa* L., wild parsnip

Yellow and Dalmation toadflax (*Linaria* sp.)

- LIVU2 - *Linaria vulgaris*, Mill., butter and eggs (aka yellow toadflax)
- LIDA - *Linaria dalmatica* (L.) Mill., Dalmatian toadflax
- LIDAD - Linaria dalmatica (L.) Mill. ssp. Dalmatica

Common tansy

- TAVU - *Tanacetum vulgare* L., common tansy

Woody Invasive Species Groups

Juniper

- JUCO6 - *Juniperus communis* L., common juniper
- JUHO2 - *Juniperus horizontalis* Moench, creeping juniper
- JUNIP - *Juniperus* L., juniper
- JUOC - *Juniperus occidentalis* Hook., western juniper
- JUCA7 - *Juniperus californica* Carrière, California juniper
- JUOS - *Juniperus osteosperma* (Torr.) Little, Utah juniper
- JUSC2 - *Juniperus scopulorum* Sarg., Rocky Mountain juniper
- JUAS - *Juniperus ashei* J. Buchholz, Ashe's juniper
- JUCO11 - *Juniperus coahuilensis* (Martiñez) Gaussen ex R.P. Adams, redberry juniper
- JUDE2 - *Juniperus deppeana* Steud., alligator juniper
- JUMO - *Juniperus monosperma* (Engelm.) Sarg., oneseed juniper
- JUPI - *Juniperus pinchotii* Sudw., Pinchot's juniper
- JUVI - *Juniperus virginiana* L., Eastern redcedar

Eastern juniper

- JUVI - *Juniperus virginiana* L., Eastern redcedar

Pacific junipers

- JUOC - *Juniperus occidentalis* Hook., western juniper
- JUCA7 - *Juniperus californica* Carrière, California juniper

Montane/intermontane junipers

- JUOS - *Juniperus osteosperma* (Torr.) Little, Utah juniper
- JUSC2 - *Juniperus scopulorum* Sarg., Rocky Mountain juniper

Southern junipers

- JUAS - *Juniperus ashei* J. Buchholz, Ashe's juniper
- JUCO11 - *Juniperus coahuilensis* (Martiñez) Gaussen ex R.P. Adams, redberry juniper
- JUDE2 - *Juniperus deppeana* Steud., alligator juniper
- JUMO - *Juniperus monosperma* (Engelm.) Sarg., oneseed juniper
- JUPI - *Juniperus pinchotii* Sudw., Pinchot's juniper

Pinyon Pines (full list)

- PICE *Pinus cembroides* Mexican pinyon
- PIDI3 *Pinus discolor* Border pinyon
- PIED *Pinus edulis* two-needle pinyon
- PIQU *Pinus quadrifolia* Parry pinyon
- PIRE5 *Pinus remota* papershell pinyon
- PIMO *Pinus monophylla* singleleaf pinyon
- PICA16 (synonym to PIMO)

Pinyon Pines (short list)

- PIED *Pinus edulis* two-needle pinyon
- PIMO *Pinus monophylla* singleleaf pinyon

Mesquite

- PROSO - *Prosopis* L., mesquite
- PRGL2 - *Prosopis glandulosa* Torr., honey mesquite
- PRJU3 - *Prosopis juliflora* (Sw.) DC., mesquite
- PRVE - *Prosopis velutina* Woot., velvet mesquite

Tamarix

- TAGA - *Tamarix gallica* L., French tamarisk
- TAMAR2 - *Tamarix* L. , tamarisk
- TARA - *Tamarix ramosissima* Ledeb., saltcedar

Multiflora rose

- ROMU - Rosa multiflora Thunb.

Japanese honeysuckle

- LOJA - Lonicera japonica Thunb.

Common buckthorn

- RHCA3 - *Rhamnus cathartica* L., common buckthorn

Table 2- 2011-2015 non-Federal rangeland where annual brome species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Annual Bromes Are Present	At Least 5% Foliar Cover Of Annual Bromes	At Least 15% Foliar Cover Of Annual Bromes	At Least 30% Foliar Cover Of Annual Bromes	At Least 50% Foliar Cover Of Annual Bromes	At Least 5% Relative Plant Canopy Cover Of Annual Bromes	At Least 15% Relative Plant Canopy Cover Of Annual Bromes	At Least 30% Relative Plant Canopy Cover Of Annual Bromes	At Least 50% Relative Plant Canopy Cover Of Annual Bromes
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	3.6	0.7	0.5	0.4	0.2	2.6	0.9	0.5	0.3
Arizona	MOE	(3.0)	(0.9)	(0.8)	(0.6)	(0.4)	(2.8)	(1.1)	(0.8)	(0.5)
California	Est	73.2	62.1	37.2	20.5	6.7	64.8	43.6	20.7	4.9
California	MOE	(8.4)	(7.5)	(7.5)	(6.3)	(3.5)	(7.8)	(7.1)	(5.1)	(2.3)
Colorado	Est	19.4	9.5	5.3	2.7	1.5	10.7	5.5	3.2	1.3
Colorado	MOE	(5.7)	(3.7)	(2.5)	(1.7)	(1.2)	(3.6)	(2.9)	(2.0)	(1.4)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									

Idaho	Est	72.0	54.3	37.1	20.5	11.3	55.3	38.5	26.0	14.0
Idaho	MOE	(6.1)	(9.7)	(10.1)	(8.5)	(5.6)	(9.9)	(9.8)	(9.2)	(8.5)
Kansas	Est	57.7	37.6	27.6	15.9	9.7	36.8	21.6	12.1	3.3
Kansas	MOE	(5.1)	(5.2)	(5.9)	(4.2)	(3.5)	(5.3)	(4.4)	(3.7)	(2.1)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	48.9	25.7	10.9	5.4	2.9	25.8	9.8	3.5	0.3
Montana	MOE	(7.1)	(4.5)	(2.8)	(1.8)	(1.4)	(5.4)	(2.4)	(1.5)	(0.6)
Nebraska	Est	41.0	27.7	18.3	9.8	4.1	26.9	14.0	6.2	0.8
Nebraska	MOE	(5.8)	(5.6)	(3.5)	(2.4)	(1.8)	(5.3)	(3.1)	(1.9)	(0.7)
Nevada	Est	52.4	40.2	29.8	17.1	10.8	45.3	38.1	26.7	19.5
Nevada	MOE	(12.3)	(11.8)	(10.9)	(6.5)	(5.0)	(12.4)	(11.5)	(9.1)	(7.6)
New Mexico	Est	1.5	0.6	0.1	**	**	1.3	0.7	0.5	0.1
New Mexico	MOE	(0.9)	(0.6)	(0.3)			(0.8)	(0.5)	(0.4)	(0.3)

North Dakota	Est	9.1	3.8	1.7	1.1	0.5	2.6	0.9	**	**
North Dakota	MOE	(3.4)	(1.9)	(1.4)	(1.3)	(0.7)	(1.7)	(1.2)		
Oklahoma	Est	37.3	25.0	14.2	8.6	4.2	24.8	11.6	5.1	0.9
Oklahoma	MOE	(5.4)	(4.9)	(4.1)	(3.4)	(2.1)	(4.9)	(4.0)	(2.0)	(0.9)
Oregon	Est	83.7	63.4	41.4	21.4	7.8	69.7	51.0	33.4	15.5
Oregon	MOE	(6.7)	(9.6)	(9.9)	(6.8)	(3.8)	(10.1)	(9.8)	(8.8)	(5.4)
South Dakota	Est	54.0	36.9	22.0	14.7	6.8	33.7	18.1	4.7	0.2
South Dakota	MOE	(5.0)	(3.8)	(4.5)	(3.2)	(2.3)	(4.1)	(3.8)	(1.5)	(0.3)
Texas	Est	6.2	2.9	1.5	1.0	0.3	3.0	1.7	0.7	0.1
Texas	MOE	(1.8)	(1.0)	(0.6)	(0.6)	(0.3)	(1.0)	(0.7)	(0.4)	(0.2)
Utah	Est	53.1	33.8	19.9	10.2	2.5	43.6	29.6	18.3	8.5
Utah	MOE	(7.1)	(6.8)	(5.8)	(3.7)	(2.1)	(6.5)	(6.4)	(5.3)	(3.7)
Washington	Est	87.1	71.7	47.3	20.2	5.7	78.7	60.6	35.4	11.5

Washington	MOE	(5.1)	(8.3)	(10.8)	(8.2)	(4.1)	(7.0)	(10.2)	(9.1)	(7.2)
Wyoming	Est	47.2	30.9	19.6	9.0	3.0	33.1	18.1	6.7	1.3
Wyoming	MOE	(6.3)	(4.8)	(4.2)	(3.3)	(2.1)	(5.9)	(4.6)	(2.7)	(1.0)
National	Est	30.0	19.8	12.0	6.5	2.8	20.8	12.3	6.2	2.1
National	MOE	(1.4)	(0.9)	(0.9)	(0.7)	(0.4)	(1.1)	(0.9)	(0.6)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 3 - 2004-2010 non-Federal rangeland where annual brome species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Annual Bromes Are Present	At Least 5% Foliar Cover Of Annual Bromes	At Least 15% Foliar Cover Of Annual Bromes	At Least 30% Foliar Cover Of Annual Bromes	At Least 50% Foliar Cover Of Annual Bromes	At Least 5% Relative Plant Canopy Cover Of Annual Bromes	At Least 15% Relative Plant Canopy Cover Of Annual Bromes	At Least 30% Relative Plant Canopy Cover Of Annual Bromes	At Least 50% Relative Plant Canopy Cover Of Annual Bromes
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent

Arizona	Est	9.7	4.2	1.8	0.8	0.3	7.2	3.5	1.3	0.6
Arizona	MOE	(2.7)	(2.0)	(1.4)	(0.8)	(0.4)	(2.5)	(2.0)	(1.0)	(0.7)
California	Est	77.3	60.3	44.6	26.3	11.0	63.3	44.2	22.9	4.6
California	MOE	(5.4)	(6.3)	(6.6)	(5.1)	(3.5)	(5.9)	(7.5)	(4.7)	(1.8)
Colorado	Est	18.4	8.6	3.9	1.9	0.6	10.2	4.5	2.3	0.7
Colorado	MOE	(3.2)	(2.3)	(1.1)	(0.8)	(0.3)	(2.5)	(1.5)	(1.0)	(0.4)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	67.1	48.0	30.7	17.1	4.9	51.6	32.0	15.3	5.4
Idaho	MOE	(4.6)	(6.4)	(4.9)	(4.7)	(2.2)	(5.9)	(5.9)	(4.8)	(2.3)
Kansas	Est	63.8	45.0	29.9	18.9	10.4	40.7	21.6	9.4	1.2
Kansas	MOE	(3.1)	(3.5)	(3.2)	(2.4)	(2.1)	(3.3)	(2.2)	(1.8)	(0.6)
Louisiana	Est	1.5	**	**	**	**	**	**	**	**
Louisiana	MOE	(3.3)								
Montana	Est	43.2	25.0	14.7	6.8	2.3	27.2	15.4	8.2	2.5

Montana	MOE	(3.8)	(3.4)	(3.0)	(1.7)	(0.8)	(3.4)	(2.9)	(2.0)	(1.1)
Nebraska	Est	42.0	27.0	17.4	11.3	5.2	24.6	13.2	6.0	1.2
Nebraska	MOE	(5.1)	(3.9)	(3.1)	(2.5)	(1.5)	(3.8)	(2.8)	(2.2)	(0.8)
Nevada	Est	44.9	32.0	20.0	9.0	3.3	38.4	31.4	22.5	8.6
Nevada	MOE	(6.9)	(7.0)	(5.3)	(3.9)	(2.4)	(6.7)	(7.6)	(5.5)	(3.3)
New Mexico	Est	2.7	1.4	1.0	0.4	0.2	1.8	1.2	0.8	0.4
New Mexico	MOE	(1.2)	(0.8)	(0.7)	(0.4)	(0.2)	(0.9)	(0.7)	(0.6)	(0.4)
North Dakota	Est	7.6	4.2	2.3	1.0	0.6	3.6	1.0	0.4	**
North Dakota	MOE	(2.1)	(1.4)	(1.2)	(0.8)	(0.6)	(1.3)	(0.6)	(0.4)	
Oklahoma	Est	28.3	16.1	9.6	3.6	1.1	13.1	4.5	1.1	0.0
Oklahoma	MOE	(4.3)	(2.9)	(2.4)	(1.4)	(0.8)	(3.0)	(2.3)	(0.8)	(0.1)
Oregon	Est	81.8	65.0	37.9	20.0	6.7	70.1	49.4	21.8	6.9
Oregon	MOE	(4.6)	(5.6)	(5.5)	(4.0)	(4.0)	(5.5)	(5.7)	(4.5)	(3.5)

South Dakota	Est	61.5	47.2	33.9	21.6	11.2	44.7	28.0	13.6	2.1
South Dakota	MOE	(3.4)	(3.9)	(3.5)	(2.9)	(2.3)	(3.9)	(3.4)	(2.8)	(1.3)
Texas	Est	6.6	3.6	1.7	0.7	0.5	2.9	1.0	0.3	**
Texas	MOE	(1.2)	(1.0)	(0.7)	(0.4)	(0.4)	(0.9)	(0.5)	(0.2)	
Utah	Est	48.5	30.4	18.0	8.0	2.0	36.7	24.9	13.2	6.1
Utah	MOE	(6.8)	(5.5)	(4.1)	(3.4)	(1.8)	(5.8)	(3.9)	(4.0)	(2.9)
Washington	Est	91.3	70.7	49.1	26.2	7.6	79.6	61.3	35.8	15.4
Washington	MOE	(4.3)	(7.6)	(6.9)	(6.0)	(3.4)	(7.3)	(7.3)	(6.5)	(4.3)
Wyoming	Est	43.1	27.8	16.4	8.9	3.8	31.1	17.7	9.4	2.5
Wyoming	MOE	(6.5)	(4.3)	(3.3)	(2.9)	(1.9)	(5.0)	(3.3)	(2.8)	(1.3)
National	Est	29.9	19.9	12.6	7.0	3.0	20.7	12.6	6.4	1.8
National	MOE	(0.9)	(0.7)	(0.6)	(0.5)	(0.3)	(0.8)	(0.7)	(0.4)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 4 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where annual brome species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Annual Bromes Are Present	At Least 5% Foliar Cover Of Annual Bromes	At Least 15% Foliar Cover Of Annual Bromes	At Least 30% Foliar Cover Of Annual Bromes	At Least 50% Foliar Cover Of Annual Bromes	At Least 5% Relative Plant Canopy Cover Of Annual Bromes	At Least 15% Relative Plant Canopy Cover Of Annual Bromes	At Least 30% Relative Plant Canopy Cover Of Annual Bromes	At Least 50% Relative Plant Canopy Cover Of Annual Bromes
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-6.2	-3.5	-1.3	-0.4	-0.1	-4.6	-2.6	-0.9	-0.3
Arizona	MOE	(4.3)	(2.1)	(1.7)	(1.1)	(0.6)	(3.8)	(2.3)	(1.4)	(0.9)
California	Est	-4.1	1.8	-7.4	-5.8	-4.2	1.5	-0.6	-2.2	0.3
California	MOE	(10.1)	(9.3)	(8.0)	(7.6)	(5.5)	(9.3)	(8.9)	(6.6)	(2.9)
Colorado	Est	1.0	0.9	1.5	0.7	0.9	0.6	1.0	0.9	0.6
Colorado	MOE	(6.8)	(4.3)	(2.9)	(1.9)	(1.3)	(4.0)	(3.3)	(2.4)	(1.4)
Florida	Est	**	**	**	**	**	**	**	**	**

Florida	MOE									
Idaho	Est	5.0	6.3	6.4	3.3	6.4	3.6	6.5	10.7	8.6
Idaho	MOE	(7.1)	(9.6)	(9.5)	(8.0)	(6.1)	(9.8)	(9.5)	(7.6)	(8.4)
Kansas	Est	-6.1	-7.3	-2.2	-3.0	-0.7	-3.8	0.0	2.7	2.1
Kansas	MOE	(5.6)	(6.1)	(7.2)	(4.8)	(4.3)	(6.0)	(4.7)	(4.0)	(2.1)
Louisiana	Est	-1.5	**	**	**	**	**	**	**	**
Louisiana	MOE	(3.3)								
Montana	Est	5.8	0.7	-3.8	-1.4	0.6	-1.4	-5.6	-4.7	-2.1
Montana	MOE	(7.1)	(5.4)	(3.5)	(2.2)	(1.5)	(5.9)	(3.1)	(2.0)	(1.1)
Nebraska	Est	-1.0	0.7	0.9	-1.5	-1.1	2.3	0.8	0.2	-0.4
Nebraska	MOE	(6.5)	(6.5)	(4.5)	(3.1)	(2.2)	(6.0)	(3.5)	(2.4)	(1.1)
Nevada	Est	7.4	8.1	9.9	8.1	7.5	6.9	6.7	4.2	10.9
Nevada	MOE	(13.5)	(13.4)	(12.2)	(7.2)	(4.3)	(13.5)	(13.7)	(10.5)	(8.0)
New Mexico	Est	-1.2	-0.8	-0.9	-0.4	-0.2	-0.5	-0.5	-0.3	-0.3

New Mexico	MOE	(1.2)	(1.0)	(0.7)	(0.4)	(0.2)	(1.0)	(0.8)	(0.6)	(0.5)
North Dakota	Est	1.4	-0.3	-0.7	0.0	-0.1	-1.0	-0.1	-0.4	**
North Dakota	MOE	(3.1)	(1.8)	(1.6)	(1.4)	(0.8)	(1.8)	(1.1)	(0.4)	
Oklahoma	Est	8.9	9.0	4.6	5.0	3.0	11.7	7.1	4.0	0.9
Oklahoma	MOE	(5.5)	(5.3)	(4.7)	(3.5)	(2.2)	(5.6)	(4.4)	(2.3)	(0.9)
Oregon	Est	1.9	-1.6	3.6	1.4	1.0	-0.4	1.5	11.5	8.6
Oregon	MOE	(8.5)	(10.9)	(11.7)	(7.7)	(6.0)	(11.0)	(10.8)	(10.2)	(7.1)
South Dakota	Est	-7.5	-10.3	-11.8	-6.9	-4.4	-11.1	-9.8	-8.9	-1.9
South Dakota	MOE	(6.1)	(5.4)	(5.2)	(4.2)	(3.1)	(5.1)	(4.7)	(2.6)	(1.3)
Texas	Est	-0.5	-0.7	-0.2	0.3	-0.2	0.1	0.6	0.4	0.1
Texas	MOE	(2.3)	(1.3)	(0.8)	(0.6)	(0.4)	(1.2)	(0.7)	(0.4)	(0.2)
Utah	Est	4.5	3.4	1.9	2.3	0.5	6.9	4.8	5.1	2.5
Utah	MOE	(8.6)	(7.7)	(6.9)	(4.9)	(2.9)	(7.7)	(5.7)	(5.9)	(4.3)

Washington	Est	-4.2	0.9	-1.8	-6.0	-1.9	-0.9	-0.8	-0.5	-3.9
Washington	MOE	(6.0)	(11.5)	(13.7)	(10.9)	(5.7)	(9.6)	(12.8)	(11.9)	(8.8)
Wyoming	Est	4.0	3.0	3.2	0.1	-0.8	2.0	0.4	-2.7	-1.2
Wyoming	MOE	(7.8)	(5.5)	(4.4)	(3.7)	(2.5)	(6.5)	(4.5)	(3.2)	(1.8)
National	Est	0.2	-0.1	-0.6	-0.4	-0.1	0.0	-0.3	-0.2	0.3
National	MOE	(1.5)	(0.9)	(0.8)	(0.7)	(0.4)	(1.2)	(1.0)	(0.6)	(0.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 5 - 2011-2015 non-Federal rangeland where cheatgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Cheatgrass Are Present	At Least 5% Foliar Cover Of Cheatgrass	At Least 15% Foliar Cover Of Cheatgrass	At Least 30% Foliar Cover Of Cheatgrass	At Least 50% Foliar Cover Of Cheatgrass	At Least 5% Relative Plant Canopy Cover Of Cheatgrass	At Least 15% Relative Plant Canopy Cover Of Cheatgrass	At Least 30% Relative Plant Canopy Cover Of Cheatgrass	At Least 50% Relative Plant Canopy Cover Of Cheatgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	1.5	0.2	0.2	0.2	0.0	0.8	0.2	**	**
Arizona	MOE	(1.9)	(0.5)	(0.5)	(0.5)	(0.0)	(1.4)	(0.5)		
California	Est	9.3	5.0	1.7	1.1	0.3	6.8	4.0	2.6	0.5
California	MOE	(4.2)	(3.1)	(1.6)	(1.0)	(0.5)	(3.8)	(3.2)	(2.2)	(0.6)
Colorado	Est	14.5	7.0	4.1	2.1	1.0	7.9	4.2	2.5	1.1
Colorado	MOE	(4.3)	(3.3)	(2.3)	(1.4)	(1.0)	(3.2)	(2.7)	(1.9)	(1.3)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	58.1	40.3	24.6	14.5	7.2	42.2	27.7	19.5	11.1
Idaho	MOE	(8.6)	(10.8)	(9.7)	(8.5)	(5.1)	(11.0)	(9.5)	(10.2)	(8.5)
Kansas	Est	32.2	21.9	16.2	10.7	6.8	21.9	14.7	8.7	2.8
Kansas	MOE	(4.8)	(4.5)	(4.5)	(3.9)	(3.4)	(4.6)	(3.8)	(3.2)	(2.0)

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	22.2	7.4	3.9	2.2	0.8	8.4	3.7	1.9	0.2
Montana	MOE	(4.3)	(2.8)	(1.7)	(1.2)	(0.8)	(2.5)	(1.5)	(1.3)	(0.5)
Nebraska	Est	27.7	18.9	12.8	7.4	3.1	18.5	10.4	4.5	0.7
Nebraska	MOE	(5.1)	(4.8)	(3.5)	(2.1)	(1.5)	(4.5)	(2.8)	(1.9)	(0.7)
Nevada	Est	52.4	40.2	29.8	17.1	10.8	45.3	38.1	26.7	19.5
Nevada	MOE	(12.3)	(11.8)	(10.9)	(6.5)	(5.0)	(12.4)	(11.5)	(9.1)	(7.6)
New Mexico	Est	1.5	0.6	0.1	0.0	0.0	1.3	0.7	0.5	0.1
New Mexico	MOE	(0.9)	(0.6)	(0.3)	(0.0)	(0.0)	(0.8)	(0.5)	(0.4)	(0.3)
North Dakota	Est	0.7	0.3	**	**	**	0.3	**	**	**

North Dakota	MOE	(0.9)	(0.7)				(0.7)			
Oklahoma	Est	24.2	14.9	7.8	4.5	1.9	14.8	6.9	3.3	0.9
Oklahoma	MOE	(5.9)	(4.6)	(3.0)	(1.7)	(1.2)	(4.4)	(2.3)	(1.5)	(0.9)
Oregon	Est	78.5	55.6	31.2	18.2	7.7	61.4	41.4	28.6	14.9
Oregon	MOE	(6.7)	(8.9)	(8.4)	(6.7)	(3.8)	(9.3)	(8.9)	(7.8)	(5.7)
South Dakota	Est	45.4	28.6	15.7	10.6	5.3	25.4	12.3	2.9	0.1
South Dakota	MOE	(4.9)	(3.9)	(4.1)	(3.3)	(2.4)	(4.3)	(3.6)	(1.5)	(0.3)
Texas	Est	1.3	0.5	0.2	0.1	0.1	0.6	0.3	0.1	0.1
Texas	MOE	(0.7)	(0.4)	(0.2)	(0.2)	(0.1)	(0.4)	(0.3)	(0.1)	(0.1)
Utah	Est	51.0	32.8	19.5	9.7	2.4	42.3	29.0	17.9	8.1
Utah	MOE	(7.4)	(6.9)	(5.8)	(3.8)	(2.1)	(6.6)	(6.5)	(5.2)	(3.7)
Washington	Est	82.6	66.1	39.2	12.8	4.1	72.5	53.5	25.9	9.1

Washington	MOE	(6.7)	(8.5)	(9.1)	(5.4)	(3.6)	(7.7)	(9.4)	(7.7)	(5.5)
Wyoming	Est	31.8	18.3	9.4	4.6	1.4	19.9	9.6	4.3	0.9
Wyoming	MOE	(5.6)	(3.8)	(2.6)	(2.1)	(1.3)	(4.9)	(2.8)	(1.9)	(1.0)
National	Est	18.6	11.4	6.7	3.8	1.7	12.3	7.4	4.1	1.7
National	MOE	(1.0)	(0.7)	(0.6)	(0.5)	(0.3)	(0.8)	(0.6)	(0.5)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 6 - 2004-2010 non-Federal rangeland where cheatgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Cheatgrass Are Present	At Least 5% Foliar Cover Of Cheatgrass	At Least 15% Foliar Cover Of Cheatgrass	At Least 30% Foliar Cover Of Cheatgrass	At Least 50% Foliar Cover Of Cheatgrass	At Least 5% Relative Plant Canopy Cover Of Cheatgrass	At Least 15% Relative Plant Canopy Cover Of Cheatgrass	At Least 30% Relative Plant Canopy Cover Of Cheatgrass	At Least 50% Relative Plant Canopy Cover Of Cheatgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	4.0	1.2	0.1	**	**	2.4	1.1	0.4	0.2
Arizona	MOE	(1.8)	(1.0)	(0.3)			(1.4)	(0.8)	(0.7)	(0.4)
California	Est	15.6	8.3	5.5	3.0	0.4	10.7	7.0	4.5	0.8
California	MOE	(5.3)	(4.1)	(3.4)	(2.1)	(0.5)	(5.0)	(4.7)	(3.4)	(0.8)
Colorado	Est	14.5	6.9	3.0	1.4	0.4	8.1	3.6	2.1	0.7
Colorado	MOE	(3.3)	(2.2)	(1.2)	(0.7)	(0.3)	(2.5)	(1.5)	(1.0)	(0.4)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	61.1	37.9	23.8	14.1	4.2	41.6	25.7	13.0	4.9
Idaho	MOE	(4.7)	(6.8)	(5.6)	(4.7)	(2.2)	(6.2)	(6.0)	(4.8)	(2.4)
Kansas	Est	17.2	9.7	5.8	3.4	1.7	8.7	3.7	1.6	0.2
Kansas	MOE	(2.9)	(2.0)	(1.5)	(1.4)	(0.8)	(1.9)	(1.1)	(0.9)	(0.3)

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	20.5	10.8	5.1	2.3	1.1	11.9	5.4	3.1	1.4
Montana	MOE	(3.8)	(2.6)	(1.5)	(1.0)	(0.7)	(2.6)	(1.9)	(1.4)	(1.0)
Nebraska	Est	20.3	12.8	8.2	5.1	2.0	12.3	6.8	2.6	0.5
Nebraska	MOE	(3.3)	(2.1)	(1.6)	(1.3)	(0.9)	(2.0)	(1.5)	(1.2)	(0.3)
Nevada	Est	44.5	31.6	19.6	9.0	3.3	38.0	30.8	22.4	8.5
Nevada	MOE	(7.2)	(7.6)	(5.8)	(3.9)	(2.4)	(6.9)	(7.4)	(5.5)	(3.2)
New Mexico	Est	2.5	1.4	1.0	0.4	0.2	1.7	1.2	0.8	0.4
New Mexico	MOE	(1.2)	(0.8)	(0.7)	(0.4)	(0.2)	(1.0)	(0.7)	(0.6)	(0.4)
North Dakota	Est	4.4	2.1	1.0	0.7	0.4	1.8	0.4	0.2	**

North Dakota	MOE	(1.7)	(1.2)	(1.1)	(0.7)	(0.5)	(1.2)	(0.5)	(0.3)	
Oklahoma	Est	17.3	10.2	6.2	2.3	0.9	8.5	2.6	0.7	0.0
Oklahoma	MOE	(3.5)	(2.8)	(2.2)	(1.2)	(0.7)	(2.9)	(1.7)	(0.6)	(0.1)
Oregon	Est	75.4	55.8	30.1	15.0	4.0	60.0	41.1	17.0	4.6
Oregon	MOE	(6.6)	(6.7)	(4.9)	(4.4)	(2.9)	(7.1)	(6.2)	(4.8)	(3.0)
South Dakota	Est	47.8	35.5	25.2	15.8	8.5	34.1	21.0	10.2	1.6
South Dakota	MOE	(4.1)	(4.1)	(3.7)	(2.8)	(2.2)	(3.9)	(3.5)	(2.4)	(1.3)
Texas	Est	2.2	1.0	0.4	0.1	0.1	0.9	0.3	0.1	**
Texas	MOE	(0.6)	(0.5)	(0.3)	(0.2)	(0.1)	(0.4)	(0.2)	(0.1)	
Utah	Est	47.7	28.7	17.1	7.7	1.9	34.6	23.8	13.0	6.0
Utah	MOE	(6.7)	(4.9)	(4.2)	(3.5)	(1.8)	(5.3)	(4.3)	(4.0)	(3.0)
Washington	Est	88.9	66.4	44.0	23.3	7.3	75.7	54.1	31.8	14.3

Washington	MOE	(4.8)	(7.5)	(6.5)	(4.7)	(3.4)	(7.5)	(6.6)	(6.4)	(4.1)
Wyoming	Est	34.3	21.2	11.4	5.7	2.2	23.2	12.6	6.8	2.0
Wyoming	MOE	(6.1)	(4.1)	(2.6)	(1.7)	(1.3)	(4.3)	(2.5)	(2.1)	(1.1)
National	Est	18.2	11.4	6.7	3.6	1.4	12.3	7.3	3.9	1.3
National	MOE	(0.6)	(0.6)	(0.4)	(0.3)	(0.2)	(0.6)	(0.5)	(0.3)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 7 -Change between 2004-2010 and 2011-2015 in non-Federal rangeland where cheatgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Cheatgrass Are Present	At Least 5% Foliar Cover Of Cheatgrass	At Least 15% Foliar Cover Of Cheatgrass	At Least 30% Foliar Cover Of Cheatgrass	At Least 50% Foliar Cover Of Cheatgrass	At Least 5% Relative Plant Canopy Cover Of Cheatgrass	At Least 15% Relative Plant Canopy Cover Of Cheatgrass	At Least 30% Relative Plant Canopy Cover Of Cheatgrass	At Least 50% Relative Plant Canopy Cover Of Cheatgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-2.5	-1.0	0.0	0.2	**	-1.5	-0.9	-0.4	-0.2
Arizona	MOE	(2.7)	(1.2)	(0.6)	(0.5)		(2.0)	(0.9)	(0.7)	(0.4)
California	Est	-6.3	-3.3	-3.9	-1.9	0.0	-3.8	-3.0	-1.9	-0.3
California	MOE	(6.9)	(4.9)	(3.5)	(2.1)	(0.6)	(5.7)	(5.2)	(3.9)	(0.8)
Colorado	Est	0.0	0.1	1.1	0.7	0.5	-0.2	0.5	0.4	0.5
Colorado	MOE	(5.5)	(4.1)	(2.9)	(1.7)	(1.1)	(3.8)	(3.2)	(2.3)	(1.4)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-3.0	2.4	0.8	0.4	3.0	0.7	1.9	6.5	6.2
Idaho	MOE	(9.3)	(10.1)	(8.0)	(7.7)	(5.2)	(10.7)	(8.4)	(8.6)	(8.1)
Kansas	Est	15.0	12.2	10.4	7.3	5.2	13.2	11.0	7.1	2.6
Kansas	MOE	(5.5)	(4.9)	(4.6)	(3.8)	(3.4)	(4.8)	(3.7)	(3.1)	(2.0)

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	1.7	-3.4	-1.1	-0.1	-0.3	-3.5	-1.8	-1.2	-1.2
Montana	MOE	(5.8)	(3.7)	(1.9)	(1.5)	(0.9)	(3.5)	(2.3)	(1.9)	(0.9)
Nebraska	Est	7.3	6.1	4.6	2.4	1.1	6.1	3.6	1.9	0.2
Nebraska	MOE	(5.7)	(5.2)	(3.8)	(2.1)	(1.7)	(4.9)	(2.8)	(1.8)	(0.7)
Nevada	Est	7.8	8.5	10.2	8.1	7.5	7.3	7.4	4.3	11.0
Nevada	MOE	(13.9)	(14.0)	(12.7)	(7.2)	(4.3)	(13.8)	(13.3)	(10.4)	(7.9)
New Mexico	Est	-1.0	-0.8	-0.9	-0.4	-0.2	-0.4	-0.5	-0.3	-0.3
New Mexico	MOE	(1.2)	(1.0)	(0.7)	(0.4)	(0.2)	(1.0)	(0.8)	(0.6)	(0.5)
North Dakota	Est	-3.7	-1.8	-1.0	-0.7	-0.4	-1.5	-0.4	-0.2	**

North Dakota	MOE	(1.9)	(1.3)	(1.1)	(0.7)	(0.5)	(1.3)	(0.5)	(0.3)	
Oklahoma	Est	7.0	4.8	1.6	2.1	0.9	6.4	4.3	2.5	0.9
Oklahoma	MOE	(5.6)	(4.6)	(3.6)	(2.2)	(1.4)	(4.6)	(2.6)	(1.6)	(0.9)
Oregon	Est	3.1	-0.2	1.1	3.2	3.7	1.3	0.2	11.5	10.3
Oregon	MOE	(9.0)	(11.8)	(10.0)	(7.7)	(4.8)	(11.6)	(10.8)	(9.6)	(6.8)
South Dakota	Est	-2.3	-6.9	-9.5	-5.2	-3.2	-8.7	-8.8	-7.3	-1.4
South Dakota	MOE	(6.6)	(6.1)	(5.9)	(4.7)	(3.5)	(6.1)	(5.3)	(2.9)	(1.3)
Texas	Est	-0.9	-0.5	-0.2	0.0	0.0	-0.3	0.0	0.0	0.1
Texas	MOE	(0.9)	(0.7)	(0.4)	(0.3)	(0.2)	(0.7)	(0.4)	(0.2)	(0.1)
Utah	Est	3.3	4.1	2.4	2.0	0.5	7.7	5.2	4.9	2.1
Utah	MOE	(8.1)	(7.5)	(6.9)	(5.0)	(2.9)	(7.4)	(5.7)	(5.9)	(4.4)
Washington	Est	-6.4	-0.3	-4.8	-10.5	-3.2	-3.1	-0.6	-5.9	-5.3

Washington	MOE	(7.8)	(12.0)	(12.2)	(7.2)	(5.6)	(10.5)	(13.0)	(10.0)	(7.1)
Wyoming	Est	-2.5	-2.9	-2.0	-1.1	-0.8	-3.4	-3.0	-2.5	-1.0
Wyoming	MOE	(7.7)	(5.7)	(3.4)	(2.4)	(1.6)	(6.3)	(3.7)	(2.4)	(1.6)
National	Est	0.4	0.0	0.0	0.2	0.3	0.0	0.1	0.2	0.4
National	MOE	(1.0)	(0.8)	(0.7)	(0.5)	(0.3)	(0.8)	(0.7)	(0.5)	(0.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 8- 2011-2015 non-Federal rangeland where Kentucky and Canada bluegrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Kentucky And Canada Bluegrasses Are Present	At Least 5% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 15% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 30% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 50% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 5% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 15% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 30% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 50% Relative Plant Canopy Cover Of Kentucky And Canada

							Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	7.1	4.0	2.7	0.7	0.4	4.0	2.6	0.3	0
Colorado	MOE	(2.3)	(2.2)	(1.9)	(0.9)	(0.7)	(2.2)	(2.0)	(0.7)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	18.1	13.4	8.2	5.2	4.3	12.5	7.0	2.5	**
Idaho	MOE	(7.2)	(6.5)	(6.4)	(4.7)	(4.2)	(6.5)	(5.1)	(2.3)	
Kansas	Est	39.8	19.1	9.7	3.4	1.0	15.7	5.0	0.6	**

Kansas	MOE	(5.8)	(4.2)	(2.9)	(1.6)	(0.9)	(3.9)	(1.7)	(0.7)	
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	32.1	21.4	12.4	7.4	2.7	20.6	10.4	4.3	1.0
Montana	MOE	(5.6)	(4.8)	(3.9)	(3.0)	(1.5)	(5.3)	(3.8)	(1.5)	(0.9)
Nebraska	Est	37.8	27.0	19.8	13.5	6.0	25.2	16.7	7.1	1.6
Nebraska	MOE	(4.8)	(4.5)	(4.2)	(3.4)	(2.2)	(4.5)	(3.9)	(2.6)	(1.1)
Nevada	Est	1.9	**	**	**	**	0.8	**	**	**
Nevada	MOE	(3.5)					(1.7)			
New Mexico	Est	0.2	**	**	**	**	0.1	**	**	**
New Mexico	MOE	(0.4)					0.2			
North Dakota	Est	86.0	75.1	62.4	51.5	38.9	69.6	55.5	38.7	15.1

North Dakota	MOE	(3.7)	(4.5)	(5.4)	(6.2)	(5.8)	(5.5)	(5.6)	(5.7)	(4.5)
Oklahoma	Est	0.5	**	**	**	**	**	**	**	**
Oklahoma	MOE	(1.1)								
Oregon	Est	6.9	4.0	2.2	0.4	0.3	4.5	1.7	1.7	0.3
Oregon	MOE	(4.5)	(2.6)	(2.1)	(0.6)	(0.6)	(3.4)	(2.0)	(2.0)	(0.6)
South Dakota	Est	62.9	42.7	32.3	23.4	15.1	39.6	26.1	15.3	5.9
South Dakota	MOE	(3.4)	(3.8)	(3.8)	(4.1)	(3.6)	(3.6)	(4.0)	(3.0)	(2.5)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	9.6	4.2	3.9	2.1	0.8	5.8	3.4	2.4	0.9
Utah	MOE	(5.1)	(3.5)	(3.5)	(2.4)	(1.2)	(3.9)	(3.3)	(2.3)	(1.2)
Washington	Est	5.6	5.0	2.2	0.4	0.4	5.0	2.2	1.0	0.4

Washington	MOE	(3.8)	(3.6)	(2.7)	(0.9)	(0.9)	(3.6)	(2.7)	(1.5)	(0.9)
Wyoming	Est	12.2	6.6	3.7	1.3	0.7	6.6	2.7	0.9	**
Wyoming	MOE	(4.1)	(2.9)	(2.0)	(1.0)	(0.6)	(2.8)	(1.8)	(1.1)	
National	Est	14.5	9.8	6.8	4.5	2.7	9.2	5.6	2.9	1.0
National	MOE	(0.8)	(0.7)	(0.6)	(0.5)	(0.3)	(0.7)	(0.6)	(0.3)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 9 - 2004-2010 non-Federal rangeland where Kentucky and Canada bluegrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Kentucky And Canada Bluegrasses Are Present	At Least 5% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 15% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 30% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 50% Foliar Cover Of Kentucky And Canada Bluegrasses	At Least 5% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 15% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 30% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 50% Relative Plant Canopy Cover Of Kentucky And Canada

							Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.1	0.1	0.1	0.0	0.0	0.1	0.1	**	**
California	MOE	(0.1)	(0.1)	(0.1)	(0.0)	(0.0)	(0.1)	(0.1)		
Colorado	Est	9.1	5.8	3.4	1.7	0.6	6.1	3.4	0.8	0.0
Colorado	MOE	(2.1)	(1.6)	(1.2)	(1.0)	(0.6)	(1.8)	(1.3)	(0.5)	(0.1)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	12.7	8.0	3.8	0.7	0.4	8.2	3.9	1.0	**
Idaho	MOE	(3.7)	(2.6)	(2.4)	(0.8)	(0.7)	(2.7)	(2.3)	(1.0)	
Kansas	Est	41.8	23.5	14.1	5.4	1.7	18.5	6.2	0.8	**

Kansas	MOE	(4.2)	(3.2)	(2.1)	(1.3)	(0.8)	(2.5)	(1.7)	(0.6)	
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	23.7	11.7	6.1	2.9	1.0	12.2	4.8	1.6	0.3
Montana	MOE	(2.8)	(2.0)	(1.2)	(1.0)	(0.6)	(2.1)	(1.0)	(0.7)	(0.3)
Nebraska	Est	40.4	29.5	22.3	15.3	8.8	28.5	18.4	9.2	0.9
Nebraska	MOE	(3.4)	(2.6)	(2.7)	(2.0)	(1.9)	(2.7)	(2.1)	(2.0)	(0.6)
Nevada	Est	2.0	**	**	**	**	0.6	**	**	**
Nevada	MOE	(1.7)					(1.2)			
New Mexico	Est	0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	**
New Mexico	MOE	(0.4)	(0.4)	(0.1)	(0.1)	(0.0)	(0.4)	(0.1)	(0.1)	
North Dakota	Est	80.8	67.1	54.0	43.0	30.9	64.1	47.0	32.4	11.3

North Dakota	MOE	(2.9)	(4.4)	(4.8)	(5.0)	(4.4)	(4.3)	(4.9)	(5.2)	(2.5)
Oklahoma	Est	0.3	**	**	**	**	**	**	**	**
Oklahoma	MOE	(0.4)								
Oregon	Est	9.7	5.6	3.2	1.3	0.2	5.5	2.9	1.4	0.2
Oregon	MOE	(4.3)	(3.6)	(3.5)	(1.9)	(0.4)	(4.0)	(3.3)	(1.9)	(0.4)
South Dakota	Est	59.9	44.8	33.7	25.0	18.8	42.6	28.4	20.5	8.7
South Dakota	MOE	(4.3)	(3.6)	(3.5)	(2.8)	(2.3)	(3.5)	(3.3)	(2.4)	(1.7)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	6.8	2.7	1.1	0.4	0.0	3.0	1.2	0.2	**
Utah	MOE	(3.3)	(1.7)	(1.2)	(0.6)	(0.0)	(1.7)	(1.2)	(0.3)	
Washington	Est	4.8	1.6	0.8	0.7	0.1	1.8	1.0	0.6	0.2

Washington	MOE	(2.6)	(1.5)	(0.8)	(0.8)	(0.3)	(1.5)	(0.9)	(0.7)	(0.3)
Wyoming	Est	9.2	5.4	2.9	2.0	0.6	5.5	2.8	0.9	0.1
Wyoming	MOE	(2.5)	(1.6)	(1.3)	(1.0)	(0.5)	(1.7)	(1.2)	(0.5)	(0.2)
National	Est	13.4	9.0	6.2	4.1	2.6	8.6	5.1	2.9	0.9
National	MOE	(0.5)	(0.4)	(0.3)	(0.3)	(0.2)	(0.4)	(0.3)	(0.3)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 10 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Kentucky and Canada bluegrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Kentucky And Canada Bluegrasses Are Present	At Least 5% Foliar Cover Of Kentucky And Canada	At Least 15% Foliar Cover Of Kentucky And Canada	At Least 30% Foliar Cover Of Kentucky And Canada	At Least 50% Foliar Cover Of Kentucky And Canada	At Least 5% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 15% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 30% Relative Plant Canopy Cover Of Kentucky And Canada	At Least 50% Relative Plant Canopy Cover Of Kentucky And Canada

			Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses	Bluegrasses
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	-0.1	-0.1	-0.1	**	**	-0.1	-0.1	**	**
California	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)		
Colorado	Est	-2.0	-1.8	-0.7	-1.0	-0.2	-2.1	-0.9	-0.5	0.0
Colorado	MOE	(2.9)	(2.1)	(1.8)	(1.0)	(0.8)	(2.1)	(1.9)	(0.7)	(0.1)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	5.4	5.4	4.4	4.6	3.9	4.3	3.0	1.5	**
Idaho	MOE	(7.4)	(7.2)	(7.3)	(4.8)	(4.2)	(6.7)	(6.0)	(2.5)	
Kansas	Est	-2.0	-4.4	-4.4	-1.9	-0.7	-2.7	-1.3	-0.2	**

Kansas	MOE	(6.0)	(4.9)	(3.3)	(1.5)	(1.1)	(4.2)	(2.0)	(0.9)	
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	8.4	9.7	6.3	4.5	1.8	8.4	5.6	2.8	0.8
Montana	MOE	(5.2)	(4.3)	(3.4)	(3.1)	(1.6)	(4.9)	(3.6)	(1.5)	(0.8)
Nebraska	Est	-2.6	-2.5	-2.6	-1.8	-2.8	-3.3	-1.7	-2.2	0.7
Nebraska	MOE	(4.1)	(4.8)	(4.3)	(3.7)	(2.3)	(4.6)	(4.1)	(2.8)	(1.2)
Nevada	Est	0.0	**	**	**	**	0.2	**	**	**
Nevada	MOE	(4.0)					(2.1)			
New Mexico	Est	0.0	-0.2	0.0	0.0	**	-0.1	0.0	0.0	**
New Mexico	MOE	(0.6)	(0.4)	(0.1)	(0.1)		(0.5)	(0.1)	(0.1)	
North Dakota	Est	5.3	8.1	8.4	8.5	7.9	5.5	8.5	6.3	3.9

North Dakota	MOE	(5.1)	(6.2)	(6.5)	(7.1)	(6.1)	(6.8)	(6.8)	(7.1)	(5.2)
Oklahoma	Est	0.2	**	**	**	**	**	**	**	**
Oklahoma	MOE	(1.2)								
Oregon	Est	-2.8	-1.7	-1.0	-0.9	0.1	-1.1	-1.3	0.3	0.1
Oregon	MOE	(4.9)	(3.7)	(2.9)	(1.5)	(0.7)	(3.5)	(2.6)	(1.6)	(0.7)
South Dakota	Est	3.0	-2.2	-1.4	-1.6	-3.8	-3.0	-2.3	-5.2	-2.8
South Dakota	MOE	(5.8)	(4.9)	(4.3)	(4.1)	(3.6)	(4.3)	(3.9)	(3.8)	(2.4)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	2.8	1.5	2.7	1.7	0.8	2.8	2.2	2.2	0.9
Utah	MOE	(6.1)	(3.6)	(3.7)	(2.3)	(1.2)	(4.2)	(3.5)	(2.2)	(1.2)
Washington	Est	0.8	3.3	1.4	-0.3	0.2	3.2	1.2	0.4	0.2

Washington	MOE	(4.4)	(3.6)	(2.7)	(1.0)	(0.6)	(3.6)	(2.8)	(1.6)	(1.0)
Wyoming	Est	3.0	1.2	0.8	-0.7	0.1	1.2	0.0	0.0	-0.1
Wyoming	MOE	(4.4)	(3.1)	(2.0)	(1.1)	(0.7)	(3.1)	(1.9)	(1.2)	(0.2)
National	Est	1.1	0.8	0.6	0.4	0.1	0.6	0.5	0.1	0.1
National	MOE	(0.7)	(0.7)	(0.6)	(0.5)	(0.4)	(0.7)	(0.5)	(0.3)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 11 - 2011-2015 non-Federal rangeland where smooth brome is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Smooth Brome Are Present	At Least 5% Foliar Cover Of Smooth Brome	At Least 15% Foliar Cover Of Smooth Brome	At Least 30% Foliar Cover Of Smooth Brome	At Least 50% Foliar Cover Of Smooth Brome	At Least 5% Relative Plant Canopy Cover Of Smooth Brome	At Least 15% Relative Plant Canopy Cover Of Smooth Brome	At Least 30% Relative Plant Canopy Cover Of Smooth Brome	At Least 50% Relative Plant Canopy Cover Of Smooth Brome

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.5	**	**	**	**	**	**	**	**
California	MOE	(1.1)								
Colorado	Est	5.1	3.6	1.8	0.7	0.0	3.7	1.4	1.0	**
Colorado	MOE	(2.4)	(1.7)	(1.7)	(1.5)	(0.0)	(1.7)	(1.6)	(1.6)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	2.7	1.5	1.0	1.0	0.4	1.5	1.0	1.0	0.4
Idaho	MOE	(1.9)	(1.6)	(1.1)	(1.1)	(0.8)	(1.6)	(1.1)	(1.1)	(0.8)
Kansas	Est	19.4	9.1	5.0	2.8	1.1	7.1	3.6	1.5	0.4
Kansas	MOE	(3.4)	(2.3)	(2.0)	(1.4)	(0.7)	(2.4)	(1.5)	(1.2)	(0.5)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	7.8	4.2	1.8	1.1	0.8	3.9	2.2	0.8	0.3
Montana	MOE	(2.7)	(1.8)	(0.9)	(0.7)	(0.6)	(1.8)	(1.2)	(0.6)	(0.4)
Nebraska	Est	17.0	12.4	10.4	7.4	4.3	12.0	8.8	5.6	1.7
Nebraska	MOE	(2.9)	(3.1)	(3.2)	(3.0)	(2.1)	(3.1)	(3.3)	(2.6)	(1.2)
Nevada	Est	0.3	**	**	**	**	**	**	**	**
Nevada	MOE	(0.6)								
New Mexico	Est	0.5	0.3	**	**	**	0.3	0.1	**	**
New Mexico	MOE	(0.5)	(0.4)				(0.4)	(0.1)		
North Dakota	Est	47.0	31.3	16.4	9.5	5.6	25.7	11.5	5.7	1.8
North Dakota	MOE	(7.0)	(5.6)	(4.0)	(3.3)	(2.6)	(4.6)	(3.2)	(2.2)	(1.4)
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	3.7	2.6	2.2	1.7	0.3	2.6	2.3	1.2	0.8

Oregon	MOE	(3.1)	(2.4)	(2.2)	(1.5)	(0.6)	(2.4)	(2.2)	(1.2)	(0.9)
South Dakota	Est	28.0	21.6	16.3	12.3	7.9	20.9	14.6	9.2	3.0
South Dakota	MOE	(2.8)	(2.6)	(2.6)	(2.3)	(2.1)	(2.5)	(2.4)	(2.3)	(1.4)
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	7.2	3.4	2.4	1.1	**	3.4	2.1	2.1	2.1
Utah	MOE	(6.2)	(4.6)	(4.6)	(2.3)		(4.6)	(4.6)	(4.6)	(4.6)
Washington	Est	2.1	1.3	0.6	0.6	0.3	1.3	0.6	0.6	0.3
Washington	MOE	(3.0)	(2.1)	(1.3)	(1.3)	(0.8)	(2.1)	(1.3)	(1.3)	(0.8)
Wyoming	Est	6.1	3.2	2.0	1.3	0.7	3.1	2.2	0.8	0.2
Wyoming	MOE	(2.3)	(1.7)	(1.3)	(1.0)	(0.7)	(1.7)	(1.3)	(0.7)	(0.5)
National	Est	6.4	4.1	2.7	1.8	1.0	3.8	2.3	1.3	0.5
National	MOE	(0.4)	(0.3)	(0.3)	(0.3)	(0.2)	(0.3)	(0.3)	(0.3)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 12 - 2004-2010 non-Federal rangeland where smooth brome is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Smooth Brome Are Present	At Least 5% Foliar Cover Of Smooth Brome	At Least 15% Foliar Cover Of Smooth Brome	At Least 30% Foliar Cover Of Smooth Brome	At Least 50% Foliar Cover Of Smooth Brome	At Least 5% Relative Plant Canopy Cover Of Smooth Brome	At Least 15% Relative Plant Canopy Cover Of Smooth Brome	At Least 30% Relative Plant Canopy Cover Of Smooth Brome	At Least 50% Relative Plant Canopy Cover Of Smooth Brome
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.4	**	**	**	**	**	**	**	**
California	MOE	(0.8)								
Colorado	Est	4.9	2.3	1.0	0.5	0.4	2.3	1.1	0.4	0.3
Colorado	MOE	(1.3)	(1.0)	(0.6)	(0.4)	(0.3)	(0.9)	(0.6)	(0.3)	(0.3)

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	3.3	1.3	1.0	0.4	0.1	1.6	1.0	0.8	0.3
Idaho	MOE	(2.2)	(1.2)	(1.0)	(0.5)	(0.2)	(1.3)	(1.2)	(1.1)	(0.4)
Kansas	Est	17.4	9.0	5.3	3.3	1.9	7.1	3.5	1.8	0.7
Kansas	MOE	(2.2)	(2.0)	(1.4)	(1.3)	(0.9)	(1.4)	(1.2)	(0.8)	(0.6)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	7.0	2.8	1.8	1.1	0.6	3.0	1.7	1.0	0.4
Montana	MOE	(1.9)	(0.9)	(0.9)	(0.7)	(0.5)	(1.0)	(0.8)	(0.7)	(0.4)
Nebraska	Est	16.2	11.3	8.9	5.7	3.3	10.1	6.9	3.6	1.5
Nebraska	MOE	(2.3)	(2.1)	(1.7)	(1.3)	(1.1)	(1.9)	(1.5)	(1.1)	(0.7)
Nevada	Est	0.4	**	**	**	**	**	**	**	**

Nevada	MOE	(1.2)								
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	36.7	21.7	11.7	6.6	4.0	17.7	8.6	3.8	1.0
North Dakota	MOE	(5.2)	(4.2)	(2.9)	(2.8)	(1.9)	(3.9)	(2.7)	(1.9)	(0.9)
Oklahoma	Est	0.6	0.1	**	**	**	0.1	**	**	**
Oklahoma	MOE	(0.7)	(0.2)				(0.2)			
Oregon	Est	3.4	1.5	1.3	0.3	0.0	1.6	1.3	0.7	0.2
Oregon	MOE	(1.9)	(1.3)	(1.1)	(0.5)	(0.1)	(1.3)	(1.1)	(0.7)	(0.4)
South Dakota	Est	27.5	19.8	12.3	8.3	4.8	17.8	10.2	5.6	1.6
South Dakota	MOE	(3.6)	(2.5)	(2.0)	(1.6)	(1.3)	(2.5)	(1.8)	(1.5)	(0.7)
Texas	Est	0.1	**	**	**	**	**	**	**	**

Texas	MOE	(0.1)								
Utah	Est	4.0	1.9	0.7	0.2	0.1	2.0	1.1	1.0	0.2
Utah	MOE	(2.1)	(1.5)	(0.8)	(0.3)	(0.2)	(1.5)	(1.1)	(1.1)	(0.3)
Washington	Est	1.6	1.0	0.7	0.5	0.2	1.2	0.7	0.3	0.2
Washington	MOE	(1.7)	(1.1)	(0.6)	(0.6)	(0.4)	(1.4)	(0.6)	(0.5)	(0.4)
Wyoming	Est	5.3	1.6	0.9	0.5	0.1	1.9	0.9	0.3	0.1
Wyoming	MOE	(1.6)	(0.8)	(0.5)	(0.4)	(0.2)	(1.0)	(0.5)	(0.3)	(0.1)
National	Est	5.7	3.3	2.1	1.3	0.7	3.0	1.7	0.9	0.3
National	MOE	(0.4)	(0.3)	(0.2)	(0.2)	(0.1)	(0.3)	(0.2)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 13 -Change between 2004-2010 and 2011-2015 in non-Federal rangeland where smooth brome is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Smooth	At Least	At Least	At Least	At Least	At Least	At Least	At Least	At Least

		Brome Are Present	5% Foliar Cover Of Smooth Brome	15% Foliar Cover Of Smooth Brome	30% Foliar Cover Of Smooth Brome	50% Foliar Cover Of Smooth Brome	5% Relative Plant Canopy Cover Of Smooth Brome	15% Relative Plant Canopy Cover Of Smooth Brome	30% Relative Plant Canopy Cover Of Smooth Brome	50% Relative Plant Canopy Cover Of Smooth Brome
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.1	**	**	**	**	**	**	**	**
California	MOE	(1.4)								
Colorado	Est	0.1	1.3	0.8	0.2	-0.4	1.4	0.3	0.6	-0.3
Colorado	MOE	(2.3)	(2.0)	(2.0)	(1.7)	(0.3)	(2.0)	(1.9)	(1.7)	(0.3)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-0.6	0.2	0.0	0.6	0.3	-0.1	-0.1	0.2	0.1
Idaho	MOE	(2.5)	(1.8)	(1.6)	(1.3)	(0.9)	(1.9)	(1.7)	(1.6)	(1.0)

Kansas	Est	2.0	0.1	-0.3	-0.5	-0.8	0.1	0.1	-0.3	-0.2
Kansas	MOE	(3.3)	(2.4)	(2.0)	(1.5)	(1.1)	(2.6)	(1.7)	(1.1)	(0.7)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.8	1.4	-0.1	0.0	0.2	0.9	0.5	-0.2	-0.1
Montana	MOE	(2.7)	(1.8)	(0.8)	(0.6)	(0.7)	(1.9)	(1.1)	(0.6)	(0.5)
Nebraska	Est	0.8	1.1	1.6	1.7	1.0	1.9	1.9	2.0	0.2
Nebraska	MOE	(3.1)	(3.2)	(3.3)	(2.9)	(2.2)	(3.1)	(3.3)	(2.7)	(1.2)
Nevada	Est	-0.1	**	**	**	**	**	**	**	**
Nevada	MOE	(1.3)								
New Mexico	Est	0.5	0.3	**	**	**	0.3	0.1	**	**
New Mexico	MOE	(0.5)	(0.4)				(0.4)	(0.1)		
North Dakota	Est	10.3	9.5	4.8	2.9	1.6	8.0	2.8	1.9	0.8

North Dakota	MOE	(7.3)	(6.3)	(3.5)	(3.7)	(3.4)	(5.1)	(3.6)	(2.8)	(1.7)
Oklahoma	Est	-0.6	-0.1	**	**	**	-0.1	**	**	**
Oklahoma	MOE	(0.7)	(0.2)				(0.2)			
Oregon	Est	0.3	1.1	0.8	1.4	0.2	1.0	0.9	0.6	0.6
Oregon	MOE	(3.9)	(2.6)	(2.5)	(1.6)	(0.6)	(2.6)	(2.5)	(1.1)	(0.9)
South Dakota	Est	0.5	1.9	4.0	4.0	3.2	3.1	4.3	3.6	1.4
South Dakota	MOE	(4.1)	(3.2)	(2.7)	(2.6)	(2.3)	(3.2)	(2.6)	(2.5)	(1.5)
Texas	Est	0.0	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	3.2	1.6	1.7	0.8	-0.1	1.5	1.1	1.1	1.9
Utah	MOE	(6.7)	(5.2)	(4.9)	(2.3)	(0.2)	(5.2)	(5.0)	(5.0)	(4.6)
Washington	Est	0.5	0.3	-0.1	0.1	0.1	0.1	-0.1	0.3	0.1
Washington	MOE	(3.0)	(2.0)	(1.2)	(1.1)	(0.5)	(2.1)	(1.2)	(1.1)	(0.5)

Wyoming	Est	0.8	1.6	1.1	0.8	0.6	1.2	1.3	0.6	0.2
Wyoming	MOE	(2.7)	(1.7)	(1.4)	(1.0)	(0.7)	(1.7)	(1.4)	(0.7)	(0.5)
National	Est	0.7	0.9	0.6	0.5	0.3	0.8	0.6	0.5	0.2
National	MOE	(0.4)	(0.4)	(0.3)	(0.3)	(0.2)	(0.4)	(0.3)	(0.3)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 14 - 2011-2015 non-Federal rangeland where medusahead species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Medusahead Are Present	At Least 5% Foliar Cover Of Medusahead	At Least 15% Foliar Cover Of Medusahead	At Least 30% Foliar Cover Of Medusahead	At Least 50% Foliar Cover Of Medusahead	At Least 5% Relative Plant Canopy Cover Of Medusahead	At Least 15% Relative Plant Canopy Cover Of Medusahead	At Least 30% Relative Plant Canopy Cover Of Medusahead	At Least 50% Relative Plant Canopy Cover Of Medusahead
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									

California	Est	18.1	11.8	9.2	5.5	2.1	13.0	8.1	4.3	0.6
California	MOE	(4.1)	(3.9)	(3.3)	(2.7)	(1.7)	(3.8)	(3.5)	(2.8)	(0.7)
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	24.3	19.6	16.0	7.9	4.0	20.6	17.8	11.5	6.1
Idaho	MOE	(6.5)	(6.4)	(4.9)	(5.3)	(4.1)	(7.1)	(5.4)	(5.2)	(5.1)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**

Nebraska	MOE									
Nevada	Est	0.2	**	**	**	**	0.2	**	**	**
Nevada	MOE	(0.4)					(0.4)			
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	22.6	14.9	9.3	5.3	2.3	15.1	10.6	7.1	2.8
Oregon	MOE	(9.3)	(8.0)	(7.0)	(4.9)	(3.2)	(8.3)	(7.0)	(5.1)	(3.4)
South Dakota	Est	**	**	**	**	**	**	**	**	**

South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.1	**	**	**	**	**	**	**	**
Utah	MOE	(0.2)								
Washington	Est	8.8	8.0	5.9	2.4	0.0	8.0	6.2	2.4	0.7
Washington	MOE	(6.3)	(6.3)	(5.7)	(4.0)	(0.0)	(6.3)	(5.3)	(3.4)	(1.7)
Wyoming	Est	0.4	**	**	**	**	**	**	**	**
Wyoming	MOE	(0.8)								
National	Est	1.9	1.3	1.0	0.5	0.2	1.4	1.0	0.6	0.2
National	MOE	(0.3)	(0.3)	(0.2)	(0.2)	(0.1)	(0.3)	(0.2)	(0.2)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 15 - 2004-2010 non-Federal rangeland where medusahead species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Medusahead Are Present	At Least 5% Foliar Cover Of Medusahead	At Least 15% Foliar Cover Of Medusahead	At Least 30% Foliar Cover Of Medusahead	At Least 50% Foliar Cover Of Medusahead	At Least 5% Relative Plant Canopy Cover Of Medusahead	At Least 15% Relative Plant Canopy Cover Of Medusahead	At Least 30% Relative Plant Canopy Cover Of Medusahead	At Least 50% Relative Plant Canopy Cover Of Medusahead
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	20.8	15.6	10.9	5.0	2.3	16.1	10.6	5.4	1.8
California	MOE	(5.3)	(5.0)	(4.0)	(2.3)	(1.8)	(5.2)	(4.6)	(2.5)	(1.8)
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**

Florida	MOE									
Idaho	Est	17.9	14.4	12.1	10.3	5.8	14.6	12.4	9.0	4.5
Idaho	MOE	(5.1)	(4.6)	(4.3)	(3.9)	(2.6)	(4.5)	(4.4)	(3.6)	(2.6)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									

New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	15.9	9.4	6.1	2.4	0.8	9.9	6.3	3.1	0.2
Oregon	MOE	(4.8)	(2.9)	(2.3)	(1.5)	(0.6)	(2.9)	(2.3)	(1.5)	(0.2)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									

Utah	Est	0.1	0.1	**	**	**	0.1	**	**	**
Utah	MOE	(0.1)	(0.1)				(0.1)			
Washington	Est	8.0	5.7	2.8	1.2	0.5	6.4	3.2	1.4	0.3
Washington	MOE	(4.0)	(3.2)	(2.2)	(1.1)	(0.6)	(4.0)	(2.1)	(1.1)	(0.4)
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.7	1.2	0.9	0.5	0.2	1.3	0.9	0.5	0.2
National	MOE	(0.3)	(0.3)	(0.2)	(0.1)	(0.1)	(0.3)	(0.2)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 16 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where medusahead species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Medusahead	At Least 5%	At Least 15%	At Least 30%	At Least 50%	At Least 5%	At Least 15%	At Least 30%	At Least 50%

		Are Present	Foliar Cover Of Medusahead	Foliar Cover Of Medusahead	Foliar Cover Of Medusahead	Foliar Cover Of Medusahead	Relative Plant Canopy Cover Of Medusahead	Relative Plant Canopy Cover Of Medusahead	Relative Plant Canopy Cover Of Medusahead	Relative Plant Canopy Cover Of Medusahead
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	-2.7	-3.9	-1.7	0.5	-0.1	-3.1	-2.4	-1.0	-1.2
California	MOE	(5.7)	(5.7)	(5.0)	(3.1)	(2.1)	(5.5)	(5.8)	(3.4)	(2.0)
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	6.4	5.3	3.9	-2.4	-1.8	6.0	5.4	2.5	1.6

Idaho	MOE	(6.4)	(6.4)	(6.1)	(6.1)	(4.8)	(7.0)	(5.8)	(5.0)	(5.2)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	0.2	**	**	**	**	0.2	**	**	**
Nevada	MOE	(0.4)					(0.4)			
New Mexico	Est	**	**	**	**	**	**	**	**	**

New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	6.7	5.5	3.2	2.9	1.4	5.3	4.3	3.9	2.6
Oregon	MOE	(9.6)	(7.5)	(6.6)	(4.9)	(3.3)	(8.1)	(6.7)	(5.1)	(3.5)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.1	-0.1	**	**	**	-0.1	**	**	**

Utah	MOE	(0.2)	(0.1)				(0.1)			
Washington	Est	0.8	2.3	3.1	1.2	-0.5	1.6	3.0	1.1	0.4
Washington	MOE	(6.4)	(6.5)	(6.3)	(3.6)	(0.6)	(6.9)	(5.2)	(3.3)	(1.8)
Wyoming	Est	0.4	**	**	**	**	**	**	**	**
Wyoming	MOE	(0.8)								
National	Est	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0
National	MOE	(0.4)	(0.3)	(0.2)	(0.2)	(0.1)	(0.3)	(0.2)	(0.2)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 17 - 2011-2015 non-Federal rangeland where ventenata species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Ventenata Are Present	At Least 5% Foliar Cover Of	At Least 15% Foliar Cover Of	At Least 30% Foliar Cover Of	At Least 50% Foliar Cover Of	At Least 5% Relative Plant Canopy	At Least 15% Relative Plant Canopy	At Least 30% Relative Plant Canopy	At Least 50% Relative Plant Canopy

			Ventenata	Ventenata	Ventenata	Ventenata	Cover Of Ventenata	Cover Of Ventenata	Cover Of Ventenata	Cover Of Ventenata
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.6	**	**	**	**	**	**	**	**
Idaho	MOE	(2.3)								

Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									

North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	8.1	5.0	3.3	0.7	0.5	4.8	1.6	0.7	0.7
Oregon	MOE	(4.4)	(4.5)	(3.2)	(1.1)	(1.0)	(3.9)	(1.8)	(1.1)	(1.1)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									

Washington	Est	3.9	2.4	1.1	1.1	0.3	2.7	1.4	0.3	**
Washington	MOE	(4.5)	(3.0)	(2.3)	(2.3)	(0.7)	(3.2)	(2.4)	(0.7)	
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.3	0.1	0.1	**	**	0.1	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 18 - 2004-2010 non-Federal rangeland where ventenata species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Ventenata Are Present	At Least 5% Foliar Cover Of	At Least 15% Foliar Cover Of	At Least 30% Foliar Cover Of	At Least 50% Foliar Cover Of	At Least 5% Relative Plant Canopy Cover Of	At Least 15% Relative Plant Canopy Cover Of	At Least 30% Relative Plant Canopy Cover Of	At Least 50% Relative Plant Canopy Cover Of

			Ventenata	Ventenata	Ventenata	Ventenata	Ventenata	Ventenata	Ventenata	Ventenata
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.1	0.8	0.6	0.6	0.1	0.8	0.6	0.6	**
Idaho	MOE	(1.3)	(0.9)	(0.9)	(0.9)	(0.3)	(0.9)	(0.9)	(0.9)	
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	7.8	4.1	2.5	1.2	0.6	4.3	2.6	1.0	0.4
Oregon	MOE	(3.7)	(2.1)	(1.6)	(1.1)	(0.9)	(2.3)	(1.5)	(1.0)	(0.8)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	6.8	1.9	0.5	0.4	0.2	2.6	0.8	0.4	**

Washington	MOE	(3.1)	(1.7)	(0.9)	(0.8)	(0.4)	(1.8)	(1.0)	(0.8)	
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.3	0.1	0.1	**	**	0.1	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.0)			(0.1)	(0.0)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 19 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where ventenata species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Ventenata Are Present	At Least 5% Foliar Cover Of Ventenata	At Least 15% Foliar Cover Of Ventenata	At Least 30% Foliar Cover Of Ventenata	At Least 50% Foliar Cover Of Ventenata	At Least 5% Relative Plant Canopy Cover Of Ventenata	At Least 15% Relative Plant Canopy Cover Of Ventenata	At Least 30% Relative Plant Canopy Cover Of Ventenata	At Least 50% Relative Plant Canopy Cover Of Ventenata

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.6	-0.8	-0.6	-0.6	-0.1	-0.8	-0.6	-0.6	**
Idaho	MOE	(2.7)	(0.9)	(0.9)	(0.9)	(0.3)	(0.9)	(0.9)	(0.9)	
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.3	1.0	0.8	-0.5	-0.1	0.5	-1.1	-0.3	0.3
Oregon	MOE	(6.1)	(5.2)	(3.6)	(1.5)	(1.4)	(4.7)	(2.5)	(1.5)	(1.4)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	-2.9	0.5	0.5	0.7	0.1	0.1	0.5	-0.1	**

Washington	MOE	(4.8)	(2.6)	(2.3)	(2.5)	(0.8)	(3.0)	(2.5)	(1.1)	
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**	**
National	MOE	(0.2)	(0.1)	(0.1)	(0.0)	(0.0)	(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 20 - 2011-2015 non-Federal rangeland where buffelgrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Buffelgrass Are Present	At Least 5% Foliar Cover Of Buffelgrass	At Least 15% Foliar Cover Of Buffelgrass	At Least 30% Foliar Cover Of Buffelgrass	At Least 50% Foliar Cover Of Buffelgrass	At Least 5% Relative Plant Canopy Cover Of Buffelgrass	At Least 15% Relative Plant Canopy Cover Of Buffelgrass	At Least 30% Relative Plant Canopy Cover Of Buffelgrass	At Least 50% Relative Plant Canopy Cover Of Buffelgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	0.7	**	**	**	**	**	**	**	**
Florida	MOE	(1.7)								
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	5.3	3.6	2.9	1.9	1.1	3.6	2.9	1.8	1.3
Texas	MOE	(2.4)	(2.0)	(1.8)	(1.7)	(1.0)	(1.8)	(2.0)	(1.3)	(1.4)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.2	0.8	0.7	0.4	0.3	0.8	0.7	0.4	0.3
National	MOE	(0.6)	(0.5)	(0.4)	(0.4)	(0.2)	(0.4)	(0.5)	(0.3)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 21 - 2004-2010 non-Federal rangeland where buffelgrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Buffelgrass Are Present	At Least 5% Foliar Cover Of Buffelgrass	At Least 15% Foliar Cover Of Buffelgrass	At Least 30% Foliar Cover Of Buffelgrass	At Least 50% Foliar Cover Of Buffelgrass	At Least 5% Relative Plant Canopy Cover Of Buffelgrass	At Least 15% Relative Plant Canopy Cover Of Buffelgrass	At Least 30% Relative Plant Canopy Cover Of Buffelgrass	At Least 50% Relative Plant Canopy Cover Of Buffelgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	3.0	2.0	1.4	0.9	0.4	2.3	1.6	0.9	0.5
Texas	MOE	(0.8)	(0.7)	(0.5)	(0.4)	(0.3)	(0.7)	(0.5)	(0.5)	(0.3)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.7	0.5	0.3	0.2	0.1	0.5	0.4	0.2	0.1
National	MOE	(0.2)	(0.2)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 22 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where buffelgrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Buffelgrass Are Present	At Least 5% Foliar Cover Of Buffelgrass	At Least 15% Foliar Cover Of Buffelgrass	At Least 30% Foliar Cover Of Buffelgrass	At Least 50% Foliar Cover Of Buffelgrass	At Least 5% Relative Plant Canopy Cover Of Buffelgrass	At Least 15% Relative Plant Canopy Cover Of Buffelgrass	At Least 30% Relative Plant Canopy Cover Of Buffelgrass	At Least 50% Relative Plant Canopy Cover Of Buffelgrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	0.7	**	**	**	**	**	**	**	**
Florida	MOE	(1.7)								
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	2.3	1.6	1.5	1.0	0.7	1.3	1.4	0.9	0.8
Texas	MOE	(2.5)	(2.1)	(1.9)	(1.8)	(1.0)	(2.1)	(2.1)	(1.4)	(1.4)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.5	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2
National	MOE	(0.6)	(0.5)	(0.5)	(0.4)	(0.2)	(0.5)	(0.5)	(0.3)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 23 - 2011-2015 non-Federal rangeland where reed canarygrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Reed Canary grass Are Present	At Least 5% Foliar Cover Of Reed Canary grass	At Least 15% Foliar Cover Of Reed Canary grass	At Least 30% Foliar Cover Of Reed Canary grass	At Least 50% Foliar Cover Of Reed Canary grass	At Least 5% Relative Plant Canopy Cover Of Reed Canary grass	At Least 15% Relative Plant Canopy Cover Of Reed Canary grass	At Least 30% Relative Plant Canopy Cover Of Reed Canary grass	At Least 50% Relative Plant Canopy Cover Of Reed Canary grass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.3	**	**	**	**	**	**	**	**
Colorado	MOE	(1.0)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Idaho	MOE	(1.9)	(0.5)	(0.4)	(0.4)	(0.4)	(0.5)	(0.4)	(0.4)	(0.4)
Kansas	Est	0.2	**	**	**	**	**	**	**	**
Kansas	MOE	(0.5)								

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.1	0.1	**	**	**	0.0	**	**	**
Montana	MOE	(0.2)	(0.2)				(0.1)			
Nebraska	Est	0.9	0.6	0.3	0.3	0.2	0.4	0.3	0.2	0.2
Nebraska	MOE	(1.1)	(0.6)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	2.2	1.1	0.3	**	**	0.7	**	**	**

North Dakota	MOE	(1.6)	(1.0)	(0.7)			(0.9)			
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.1	0.1	**	**	**	0.1	**	**	**
Oregon	MOE	(0.3)	(0.3)				(0.3)			
South Dakota	Est	2.1	1.4	1.1	0.7	0.6	1.4	0.8	0.6	0.3
South Dakota	MOE	(0.9)	(1.0)	(1.0)	(0.8)	(0.7)	(1.0)	(0.8)	(0.7)	(0.5)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.4	**	**	**	**	**	**	**	**
Utah	MOE	(0.8)								
Washington	Est	0.6	**	**	**	**	**	**	**	**

Washington	MOE	(1.2)								
Wyoming	Est	0.5	0.1	**	**	**	**	**	**	**
Wyoming	MOE	(0.7)	(0.2)							
National	Est	0.3	0.2	0.1	0.1	**	0.1	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.1)	(0.0)		(0.1)	(0.0)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 24 - 2004-2010 non-Federal rangeland where reed canarygrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Reed Canary grass Are Present	At Least 5% Foliar Cover Of Reed Canary grass	At Least 15% Foliar Cover Of Reed Canary grass	At Least 30% Foliar Cover Of Reed Canary grass	At Least 50% Foliar Cover Of Reed Canary grass	At Least 5% Relative Plant Canopy Cover Of Reed Canary grass	At Least 15% Relative Plant Canopy Cover Of Reed Canary grass	At Least 30% Relative Plant Canopy Cover Of Reed Canary grass	At Least 50% Relative Plant Canopy Cover Of Reed Canary grass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.1	**	**	**	**	**	**	**	**
Colorado	MOE	(0.1)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Idaho	MOE	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Kansas	Est	0.1	0.1	**	**	**	**	**	**	**
Kansas	MOE	(0.2)	(0.2)							

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.1	**	**	**	**	**	**	**	**
Montana	MOE	(0.1)								
Nebraska	Est	0.3	0.0	0.0	0.0	**	0.0	0.0	**	**
Nebraska	MOE	(0.3)	(0.1)	(0.1)	(0.1)		(0.1)	(0.1)		
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	2.5	0.8	0.5	0.4	0.3	1.0	0.5	0.4	0.3

North Dakota	MOE	(1.0)	(0.6)	(0.5)	(0.4)	(0.4)	(0.7)	(0.5)	(0.4)	(0.4)
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.1	0.0	0.0	**	**	0.1	0.0	**	**
Oregon	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)		
South Dakota	Est	2.4	1.0	0.5	0.3	0.2	0.8	0.4	0.2	0.1
South Dakota	MOE	(0.6)	(0.4)	(0.3)	(0.3)	(0.2)	(0.4)	(0.3)	(0.2)	(0.2)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.3	0.3	**	**	**	0.3	0.2	**	**
Utah	MOE	(0.4)	(0.4)				(0.4)	(0.4)		
Washington	Est	0.3	0.1	**	**	**	0.1	**	**	**

Washington	MOE	(0.5)	(0.3)				(0.3)			
Wyoming	Est	0.1	0.1	**	**	**	0.1	**	**	**
Wyoming	MOE	(0.2)	(0.2)				(0.2)			
National	Est	0.3	0.1	0.1	**	**	0.1	**	**	**
National	MOE	(0.1)	(0.0)	(0.0)			(0.0)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 25 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where reed canarygrass species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Reed Canary grass Are Present	At Least 5% Foliar Cover Of Reed Canary grass	At Least 15% Foliar Cover Of Reed Canary grass	At Least 30% Foliar Cover Of Reed Canary grass	At Least 50% Foliar Cover Of Reed Canary grass	At Least 5% Relative Plant Canopy Cover Of Reed	At Least 15% Relative Plant Canopy Cover Of Reed	At Least 30% Relative Plant Canopy Cover Of Reed	At Least 50% Relative Plant Canopy Cover Of Reed

							Canary grass	Canary grass	Canary grass	Canary grass
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.2	**	**	**	**	**	**	**	**
Colorado	MOE	(1.0)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.1	0.3	0.1	0.1	0.1	0.3	0.1	0.1	0.1
Idaho	MOE	(1.9)	(0.4)	(0.3)	(0.3)	(0.3)	(0.4)	(0.3)	(0.3)	(0.3)
Kansas	Est	0.1	-0.1	**	**	**	**	**	**	**

Kansas	MOE	(0.5)	(0.2)							
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.0	0.1	**	**	**	0.0	**	**	**
Montana	MOE	(0.2)	(0.2)				(0.1)			
Nebraska	Est	0.6	0.6	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Nebraska	MOE	(1.1)	(0.6)	(0.3)	(0.3)	(0.4)	(0.4)	(0.3)	(0.4)	(0.4)
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	-0.4	0.2	-0.2	-0.4	-0.3	-0.3	-0.5	-0.4	-0.3

North Dakota	MOE	(1.5)	(1.1)	(0.8)	(0.4)	(0.4)	(1.1)	(0.5)	(0.4)	(0.4)
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.0	0.1	0.0	**	**	0.0	0.0	**	**
Oregon	MOE	(0.3)	(0.2)	(0.1)			(0.3)	(0.1)		
South Dakota	Est	-0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.2
South Dakota	MOE	(1.1)	(1.1)	(1.1)	(0.8)	(0.8)	(1.1)	(0.8)	(0.8)	(0.5)
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.0	-0.3	**	**	**	-0.3	-0.2	**	**
Utah	MOE	(0.9)	(0.4)				(0.4)	(0.4)		
Washington	Est	0.3	-0.1	**	**	**	-0.1	**	**	**

Washington	MOE	(1.1)	(0.3)				(0.3)			
Wyoming	Est	0.4	0.0	**	**	**	-0.1	**	**	**
Wyoming	MOE	(0.7)	(0.3)				(0.2)			
National	Est	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	**
National	MOE	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 26 - 2011-2015 non-Federal rangeland where Johnsongrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Johnsongrass Are Present	At Least 5% Foliar Cover Of Johnsongrass	At Least 15% Foliar Cover Of Johnsongrass	At Least 30% Foliar Cover Of Johnsongrass	At Least 50% Foliar Cover Of Johnsongrass	At Least 5% Relative Plant Canopy Cover Of Johnsongrass	At Least 15% Relative Plant Canopy Cover Of Johnsongrass	At Least 30% Relative Plant Canopy Cover Of Johnsongrass	At Least 50% Relative Plant Canopy Cover Of Johnsongrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	0.9	0.4	0.1	0.1	0.0	0.1	0.1	**	**
Kansas	MOE	(0.7)	(0.4)	(0.1)	(0.1)	(0.0)	(0.2)	(0.1)		

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	0.1	**	**	**	**	**	**	**	**
New Mexico	MOE	(0.1)								
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	3.7	2.3	1.2	1.0	0.8	2.3	1.0	0.1	**
Oklahoma	MOE	(1.8)	(1.5)	(1.1)	(1.1)	(1.2)	(1.5)	(1.3)	(0.2)	
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.5	0.2	0.2	**	**	0.2	0.2	**	**
Texas	MOE	(0.4)	(0.3)	(0.2)			(0.3)	(0.2)		
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	0.8	**	**	**	**	**	**	**	**

Washington	MOE	(1.6)								
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.3	0.1	0.1	**	**	0.1	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 27 - 2004-2010 non-Federal rangeland where Johnsongrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Johnsongrass Are Present	At Least 5% Foliar Cover Of Johnsongrass	At Least 15% Foliar Cover Of Johnsongrass	At Least 30% Foliar Cover Of Johnsongrass	At Least 50% Foliar Cover Of Johnsongrass	At Least 5% Relative Plant Canopy Cover Of Johnsongrass	At Least 15% Relative Plant Canopy Cover Of Johnsongrass	At Least 30% Relative Plant Canopy Cover Of Johnsongrass	At Least 50% Relative Plant Canopy Cover Of Johnsongrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	1.3	0.8	0.3	0.1	**	0.5	**	**	**
Kansas	MOE	(0.7)	(0.5)	(0.3)	(0.2)		(0.4)			

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	5.6	1.7	0.8	0.4	0.3	1.0	0.6	0.3	0.3
Oklahoma	MOE	(1.5)	(0.9)	(0.9)	(0.8)	(0.8)	(0.8)	(0.8)	(0.8)	(0.8)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	1.4	0.3	0.2	0.0	0.0	0.3	0.1	**	**
Texas	MOE	(0.6)	(0.3)	(0.3)	(0.1)	(0.0)	(0.3)	(0.1)		
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.6	0.2	0.1	**	**	0.1	**	**	**
National	MOE	(0.1)	(0.1)	(0.1)			(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 28 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Johnsongrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Johnsongrass Are Present	At Least 5% Foliar Cover Of Johnsongrass	At Least 15% Foliar Cover Of Johnsongrass	At Least 30% Foliar Cover Of Johnsongrass	At Least 50% Foliar Cover Of Johnsongrass	At Least 5% Relative Plant Canopy Cover Of Johnsongrass	At Least 15% Relative Plant Canopy Cover Of Johnsongrass	At Least 30% Relative Plant Canopy Cover Of Johnsongrass	At Least 50% Relative Plant Canopy Cover Of Johnsongrass

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	-0.4	-0.4	-0.2	0.0	0.0	-0.4	0.1	**	**
Kansas	MOE	(0.9)	(0.7)	(0.4)	(0.3)	(0.0)	(0.3)	(0.1)		

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	0.1	**	**	**	**	**	**	**	**
New Mexico	MOE	(0.1)								
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	-1.9	0.6	0.4	0.7	0.5	1.3	0.4	-0.2	-0.3
Oklahoma	MOE	(2.2)	(1.7)	(1.2)	(1.3)	(1.4)	(1.6)	(1.5)	(0.8)	(0.8)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.9	-0.1	0.0	0.0	0.0	0.0	0.1	**	**
Texas	MOE	(0.7)	(0.4)	(0.4)	(0.1)	(0.0)	(0.4)	(0.3)		
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	0.8	**	**	**	**	**	**	**	**

Washington	MOE	(1.6)								
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	-0.3	0.0	0.0	**	**	0.0	0.0	**	**
National	MOE	(0.2)	(0.1)	(0.1)			(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 29 - 2011-2015 non-Federal rangeland where Japanese stiltgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Stiltgrass Are Present	At Least 5% Foliar Cover Of Japanese Stiltgrass	At Least 15% Foliar Cover Of Japanese Stiltgrass	At Least 30% Foliar Cover Of Japanese Stiltgrass	At Least 50% Foliar Cover Of Japanese Stiltgrass	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Stiltgrass	Stiltgrass	Stiltgrass	Stiltgrass
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 30 - 2004-2010 non-Federal rangeland where Japanese stiltgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Stiltgrass Are Present	At Least 5% Foliar Cover Of Japanese Stiltgrass	At Least 15% Foliar Cover Of Japanese Stiltgrass	At Least 30% Foliar Cover Of Japanese Stiltgrass	At Least 50% Foliar Cover Of Japanese Stiltgrass	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Stiltgrass	Stiltgrass	Stiltgrass	Stiltgrass
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 31 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Japanese stiltgrass is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Stiltgrass Are Present	At Least 5% Foliar Cover Of Japanese Stiltgrass	At Least 15% Foliar Cover Of Japanese Stiltgrass	At Least 30% Foliar Cover Of Japanese Stiltgrass	At Least 50% Foliar Cover Of Japanese Stiltgrass	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Stiltgrass	Stiltgrass	Stiltgrass	Stiltgrass
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 32 - 2011-2015 non-Federal rangeland where *Cirsium* species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Cirsium* Are Present	At Least 5% Foliar Cover Of *Cirsium*	At Least 15% Foliar Cover Of *Cirsium*	At Least 30% Foliar Cover Of *Cirsium*	At Least 50% Foliar Cover Of *Cirsium*	At Least 5% Relative Plant Canopy Cover Of *Cirsium*	At Least 15% Relative Plant Canopy Cover Of *Cirsium*	At Least 30% Relative Plant Canopy Cover Of *Cirsium*	At Least 50% Relative Plant Canopy Cover Of *Cirsium*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	1.0	**	**	**	**	0.1	**	**	**
California	MOE	(1.1)					(0.2)			
Colorado	Est	0.8	0.1	**	**	**	0.1	**	**	**
Colorado	MOE	(0.7)	(0.3)				(0.3)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.9	**	**	**	**	**	**	**	**
Idaho	MOE	(1.5)								
Kansas	Est	1.0	0.2	**	**	**	0.2	**	**	**
Kansas	MOE	(1.3)	(0.5)				(0.5)			
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	3.1	0.6	**	**	**	0.6	**	**	**
Montana	MOE	(1.9)	(0.4)				(0.5)			
Nebraska	Est	0.3	0.1	**	**	**	**	**	**	**
Nebraska	MOE	(0.4)	(0.2)							
Nevada	Est	0.2	**	**	**	**	**	**	**	**
Nevada	MOE	(0.4)								
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	7.7	1.3	0.6	**	**	1.0	**	**	**
North Dakota	MOE	(2.6)	(1.3)	(0.9)			(1.1)			
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	1.8	0.4	**	**	**	0.9	**	**	**

Oregon	MOE	(1.8)	(0.6)				(1.1)			
South Dakota	Est	4.5	0.4	**	**	**	**	**	**	**
South Dakota	MOE	(1.9)	(0.3)							
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.1	**	**	**	**	**	**	**	**
Utah	MOE	(0.3)								
Washington	Est	1.4	0.5	0.1	0.1	**	0.5	0.1	0.1	**
Washington	MOE	(2.0)	(0.9)	(0.3)	(0.3)		(0.9)	(0.3)	(0.3)	
Wyoming	Est	1.2	0.4	0.2	**	**	0.3	**	**	**
Wyoming	MOE	(1.0)	(0.4)	(0.3)			(0.4)			
National	Est	1.1	0.2	**	**	**	0.2	**	**	**
National	MOE	(0.3)	(0.1)				(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 33 - 2004-2010 non-Federal rangeland where Cirsium species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Cirsium* Are Present	At Least 5% Foliar Cover Of *Cirsium*	At Least 15% Foliar Cover Of *Cirsium*	At Least 30% Foliar Cover Of *Cirsium*	At Least 50% Foliar Cover Of *Cirsium*	At Least 5% Relative Plant Canopy Cover Of *Cirsium*	At Least 15% Relative Plant Canopy Cover Of *Cirsium*	At Least 30% Relative Plant Canopy Cover Of *Cirsium*	At Least 50% Relative Plant Canopy Cover Of *Cirsium*
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.6	0.6	0.2	**	**	0.6	0.1	**	**
California	MOE	(0.8)	(0.8)	(0.3)			(0.8)	(0.1)		
Colorado	Est	0.9	0.2	**	**	**	0.3	**	**	**
Colorado	MOE	(0.5)	(0.3)				(0.4)			

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	4.2	1.0	0.3	**	**	0.6	0.3	**	**
Idaho	MOE	(2.5)	(0.9)	(0.5)			(0.7)	(0.5)		
Kansas	Est	1.1	0.1	**	**	**	0.1	**	**	**
Kansas	MOE	(0.6)	(0.2)				(0.2)			
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	2.2	0.2	**	**	**	0.1	**	**	**
Montana	MOE	(0.9)	(0.3)				(0.3)			
Nebraska	Est	0.9	**	**	**	**	**	**	**	**
Nebraska	MOE	(1.0)								
Nevada	Est	1.0	**	**	**	**	**	**	**	**
Nevada	MOE	(1.8)								
New Mexico	Est	0.4	**	**	**	**	**	**	**	**

New Mexico	MOE	(0.4)								
North Dakota	Est	6.9	1.4	0.3	**	**	0.9	**	**	**
North Dakota	MOE	(1.7)	(0.8)	(0.4)			(0.6)			
Oklahoma	Est	0.3	**	**	**	**	**	**	**	**
Oklahoma	MOE	(0.3)								
Oregon	Est	0.9	0.3	0.1	**	**	0.3	**	**	**
Oregon	MOE	(0.9)	(0.4)	(0.2)			(0.4)			
South Dakota	Est	4.7	1.0	0.3	0.2	**	0.8	0.2	0.1	**
South Dakota	MOE	(1.3)	(0.7)	(0.3)	(0.2)		(0.6)	(0.3)	(0.2)	
Texas	Est	0.2	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	1.1	0.3	**	**	**	0.3	**	**	**
Utah	MOE	(1.0)	(0.6)				(0.6)			

Washington	Est	1.6	0.6	**	**	**	0.5	**	**	**
Washington	MOE	(1.1)	(0.7)				(0.7)			
Wyoming	Est	1.5	0.5	0.3	**	**	0.4	**	**	**
Wyoming	MOE	(0.7)	(0.5)	(0.5)			(0.5)			
National	Est	1.2	0.2	0.1	**	**	0.2	**	**	**
National	MOE	(0.2)	(0.1)	(0.0)			(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 34 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Cirsium species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Cirsium* Are Present	At Least 5% Foliar Cover Of *Cirsium*	At Least 15% Foliar Cover Of *Cirsium*	At Least 30% Foliar Cover Of *Cirsium*	At Least 50% Foliar Cover Of *Cirsium*	At Least 5% Relative Plant Canopy Cover Of *Cirsium*	At Least 15% Relative Plant Canopy Cover Of *Cirsium*	At Least 30% Relative Plant Canopy Cover Of *Cirsium*	At Least 50% Relative Plant Canopy Cover Of *Cirsium*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	0.4	-0.6	-0.2	**	**	-0.5	-0.1	**	**
California	MOE	(1.3)	(0.8)	(0.3)			(0.8)	(0.1)		
Colorado	Est	-0.1	-0.1	**	**	**	-0.2	**	**	**
Colorado	MOE	(0.9)	(0.4)				(0.5)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-3.3	-1.0	-0.3	**	**	-0.6	-0.3	**	**
Idaho	MOE	(2.8)	(0.9)	(0.5)			(0.7)	(0.5)		
Kansas	Est	-0.1	0.2	**	**	**	0.2	**	**	**
Kansas	MOE	(1.6)	(0.6)				(0.6)			
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	0.9	0.4	**	**	**	0.5	**	**	**
Montana	MOE	(2.0)	(0.5)				(0.6)			
Nebraska	Est	-0.6	0.1	**	**	**	**	**	**	**
Nebraska	MOE	(1.1)	(0.2)							
Nevada	Est	-0.8	**	**	**	**	**	**	**	**
Nevada	MOE	(1.8)								
New Mexico	Est	-0.4	**	**	**	**	**	**	**	**
New Mexico	MOE	(0.4)								
North Dakota	Est	0.8	0.0	0.3	**	**	0.1	**	**	**
North Dakota	MOE	(3.0)	(1.5)	(1.0)			(1.3)			
Oklahoma	Est	-0.3	**	**	**	**	**	**	**	**
Oklahoma	MOE	(0.3)								
Oregon	Est	0.9	0.1	-0.1	**	**	0.6	**	**	**

Oregon	MOE	(2.1)	(0.8)	(0.2)			(1.3)			
South Dakota	Est	-0.1	-0.6	-0.3	-0.2	**	-0.8	-0.2	-0.1	**
South Dakota	MOE	(2.3)	(0.8)	(0.3)	(0.2)		(0.6)	(0.3)	(0.2)	
Texas	Est	-0.2	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	-0.9	-0.3	**	**	**	-0.3	**	**	**
Utah	MOE	(1.0)	(0.6)				(0.6)			
Washington	Est	-0.1	-0.1	0.1	0.1	**	0.0	0.1	0.1	**
Washington	MOE	(2.3)	(1.0)	(0.3)	(0.3)		(1.2)	(0.3)	(0.3)	
Wyoming	Est	-0.3	-0.2	-0.1	**	**	-0.1	**	**	**
Wyoming	MOE	(1.1)	(0.7)	(0.6)			(0.6)			
National	Est	-0.1	-0.1	**	**	**	0.0	**	**	**
National	MOE	(0.4)	(0.1)				(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 35 - 2011-2015 non-Federal rangeland where leafy spurge is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Leafy Spurge Are Present	At Least 5% Foliar Cover Of Leafy Spurge	At Least 15% Foliar Cover Of Leafy Spurge	At Least 30% Foliar Cover Of Leafy Spurge	At Least 50% Foliar Cover Of Leafy Spurge	At Least 5% Relative Plant Canopy Cover Of Leafy Spurge	At Least 15% Relative Plant Canopy Cover Of Leafy Spurge	At Least 30% Relative Plant Canopy Cover Of Leafy Spurge	At Least 50% Relative Plant Canopy Cover Of Leafy Spurge
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.2	0.1	**	**	**	0.1	**	**	**
Colorado	MOE	(0.2)	(0.2)				(0.2)			

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	2.3	0.8	0.4	0.3	0.3	0.9	0.3	**	**
Montana	MOE	(1.6)	(0.7)	(0.6)	(0.5)	(0.5)	(0.8)	(0.6)		
Nebraska	Est	0.7	0.6	0.2	0.2	0.0	0.4	0.2	**	**
Nebraska	MOE	(0.8)	(0.7)	(0.5)	(0.5)	(0.0)	(0.6)	(0.5)		
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**

New Mexico	MOE									
North Dakota	Est	9.8	4.8	1.7	0.4	0.0	3.5	0.5	0.3	**
North Dakota	MOE	(4.0)	(2.7)	(1.5)	(0.7)	(0.0)	(2.1)	(0.7)	(0.7)	
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	0.4	**	**	**	**	**	**	**	**
South Dakota	MOE	(0.5)								
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									

Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	0.3	0.2	**	**	**	0.2	**	**	**
Wyoming	MOE	(0.5)	(0.5)				(0.5)			
National	Est	0.6	0.3	0.1	0.0	**	0.2	0.1	**	**
National	MOE	(0.2)	(0.1)	(0.1)	(0.1)		(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 36 - 2004-2010 non-Federal rangeland where leafy spurge is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Leafy Spurge Are Present	At Least 5% Foliar Cover Of Leafy Spurge	At Least 15% Foliar Cover Of Leafy Spurge	At Least 30% Foliar Cover Of Leafy Spurge	At Least 50% Foliar Cover Of Leafy Spurge	At Least 5% Relative Plant Canopy Cover Of Leafy Spurge	At Least 15% Relative Plant Canopy Cover Of Leafy Spurge	At Least 30% Relative Plant Canopy Cover Of Leafy Spurge	At Least 50% Relative Plant Canopy Cover Of Leafy Spurge

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.3	**	**	**	**	**	**	**	**
Colorado	MOE	(0.4)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.5	**	**	**	**	**	**	**	**
Idaho	MOE	(0.6)								
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	1.5	0.9	0.3	0.2	0.1	1.1	0.3	0.2	0.1
Montana	MOE	(0.7)	(0.6)	(0.3)	(0.3)	(0.2)	(0.7)	(0.3)	(0.3)	(0.2)
Nebraska	Est	0.5	0.3	0.1	**	**	0.1	0.1	**	**
Nebraska	MOE	(0.4)	(0.3)	(0.1)			(0.1)	(0.1)		
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	6.1	2.3	1.1	0.5	0.2	1.7	0.6	0.2	0.2
North Dakota	MOE	(1.9)	(1.2)	(0.7)	(0.4)	(0.3)	(1.0)	(0.6)	(0.3)	(0.3)
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**

Oregon	MOE									
South Dakota	Est	1.1	0.6	0.2	**	**	0.5	0.1	**	**
South Dakota	MOE	(0.8)	(0.7)	(0.3)			(0.7)	(0.1)		
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	0.2	**	**	**	**	**	**	**	**
Utah	MOE	(0.4)								
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	0.4	0.1	0.0	0.0	**	0.1	0.0	0.0	**
Wyoming	MOE	(0.5)	(0.2)	(0.1)	(0.1)		(0.2)	(0.1)	(0.1)	
National	Est	0.5	0.2	0.1	**	**	0.2	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.0)			(0.1)	(0.0)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 37 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where leafy spurge is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Leafy Spurge Are Present	At Least 5% Foliar Cover Of Leafy Spurge	At Least 15% Foliar Cover Of Leafy Spurge	At Least 30% Foliar Cover Of Leafy Spurge	At Least 50% Foliar Cover Of Leafy Spurge	At Least 5% Relative Plant Canopy Cover Of Leafy Spurge	At Least 15% Relative Plant Canopy Cover Of Leafy Spurge	At Least 30% Relative Plant Canopy Cover Of Leafy Spurge	At Least 50% Relative Plant Canopy Cover Of Leafy Spurge
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	-0.1	0.1	**	**	**	0.1	**	**	**
Colorado	MOE	(0.5)	(0.2)				(0.2)			

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-0.5	**	**	**	**	**	**	**	**
Idaho	MOE	(0.6)								
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.8	-0.1	0.0	0.1	0.2	-0.2	0.0	-0.2	-0.1
Montana	MOE	(1.6)	(0.9)	(0.6)	(0.6)	(0.6)	(0.9)	(0.6)	(0.3)	(0.2)
Nebraska	Est	0.2	0.3	0.1	0.2	0.0	0.3	0.1	**	**
Nebraska	MOE	(0.7)	(0.6)	(0.4)	(0.5)	(0.0)	(0.5)	(0.4)		
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**

New Mexico	MOE									
North Dakota	Est	3.7	2.6	0.6	-0.1	-0.2	1.7	-0.1	0.2	-0.2
North Dakota	MOE	(4.0)	(2.7)	(1.6)	(0.8)	(0.3)	(2.1)	(0.9)	(0.7)	(0.3)
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	-0.7	-0.6	-0.2	**	**	-0.5	-0.1	**	**
South Dakota	MOE	(1.0)	(0.7)	(0.3)			(0.7)	(0.1)		
Texas	Est	-0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	-0.2	**	**	**	**	**	**	**	**
Utah	MOE	(0.4)								

Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	-0.1	0.1	0.0	0.0	0	0.1	0.0	0.0	**
Wyoming	MOE	(0.7)	(0.5)	(0.1)	(0.1)		(0.5)	(0.1)	(0.1)	
National	Est	0.1	0.1	0.0	0.0	0.0	0.0	0.0	**	**
National	MOE	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 38 - 2011-2015 non-Federal rangeland where nonnative Centaurea species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Centaurea* Are Present	At Least 5% Foliar Cover Of *Centaurea*	At Least 15% Foliar Cover Of *Centaurea*	At Least 30% Foliar Cover Of *Centaurea*	At Least 50% Foliar Cover Of *Centaurea*	At Least 5% Relative Plant Canopy Cover Of *Centaurea*	At Least 15% Relative Plant Canopy Cover Of *Centaurea*	At Least 30% Relative Plant Canopy Cover Of *Centaurea*	At Least 50% Relative Plant Canopy Cover Of *Centaurea*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	16.6	8.4	3.6	1.0	**	8.5	3.4	0.5	0.5
California	MOE	(6.2)	(4.4)	(4.1)	(2.1)		(4.5)	(4.2)	(1.0)	(1.0)
Colorado	Est	0.3	**	**	**	**	0.3	**	**	**
Colorado	MOE	(0.6)					(0.6)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.8	0.5	**	**	**	0.5	**	**	**
Idaho	MOE	(2.2)	(1.2)				(1.2)			
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	1.4	0.8	0.2	0.2	0.1	0.8	0.5	0.2	**
Montana	MOE	(1.1)	(0.7)	(0.3)	(0.3)	(0.1)	(0.7)	(0.6)	(0.3)	
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	2.1	1.4	0.6	0.3	0	1.4	0.8	0.7	0.3
Nevada	MOE	(3.2)	(2.1)	(1.0)	(0.7)		(2.1)	(1.3)	(1.2)	(0.7)
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	2.1	0.6	0.1	**	**	0.6	0.1	**	**
Oregon	MOE	(2.4)	(1.0)	(0.3)			(1.0)	(0.3)		
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.6	0.1	0.1	0.1	**	0.1	0.1	0.1	**
Utah	MOE	(1.1)	(0.3)	(0.3)	(0.1)		(0.3)	(0.3)	(0.1)	
Washington	Est	4.1	2.0	0.7	0.2	**	2.0	1.1	0.4	**

Washington	MOE	(3.4)	(2.0)	(2.0)	(0.9)		(2.0)	(1.4)	(1.1)	
Wyoming	Est	0.2	0.2	**	**	**	0.2	0.2	**	**
Wyoming	MOE	(0.5)	(0.5)				(0.5)	(0.5)		
National	Est	1.1	0.6	0.2	0.1	**	0.6	0.3	0.1	**
National	MOE	(0.4)	(0.2)	(0.2)	(0.1)		(0.2)	(0.2)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 39 - 2004-2010 non-Federal rangeland where nonnative Centaurea species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Centaurea* Are Present	At Least 5% Foliar Cover Of *Centaurea*	At Least 15% Foliar Cover Of *Centaurea*	At Least 30% Foliar Cover Of *Centaurea*	At Least 50% Foliar Cover Of *Centaurea*	At Least 5% Relative Plant Canopy Cover Of *Centaurea*	At Least 15% Relative Plant Canopy Cover Of *Centaurea*	At Least 30% Relative Plant Canopy Cover Of *Centaurea*	At Least 50% Relative Plant Canopy Cover Of *Centaurea*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	10.9	4.9	2.8	0.5	0.1	5.1	1.8	0.3	0.3
California	MOE	(3.6)	(2.7)	(2.4)	(0.6)	(0.1)	(2.7)	(1.9)	(0.6)	(0.6)
Colorado	Est	1.3	0.4	0.2	0.1	0.0	0.6	0.3	0.1	0.1
Colorado	MOE	(0.7)	(0.4)	(0.2)	(0.1)	(0.1)	(0.4)	(0.3)	(0.2)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.8	1.3	1.3	0.5	0.2	1.3	1.1	0.6	0
Idaho	MOE	(1.5)	(1.3)	(1.3)	(0.6)	(0.5)	(1.3)	(1.2)	(0.8)	
Kansas	Est	0.1	**	**	**	**	**	**	**	**
Kansas	MOE	(0.2)								

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	1.7	0.9	0.3	**	**	0.8	0.5	0.1	**
Montana	MOE	(0.8)	(0.6)	(0.4)			(0.5)	(0.4)	(0.2)	
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	0.2	**	**	**	**	**	**	**	**
Nevada	MOE	(0.4)								
New Mexico	Est	0.1	0.1	0.1	**	**	0.1	0.1	0.1	0.1
New Mexico	MOE	(0.3)	(0.3)	(0.3)			(0.3)	(0.3)	(0.3)	(0.3)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	2.8	1.0	0.4	0.3	0.1	1.4	0.7	0.3	0.1
Oregon	MOE	(2.0)	(1.0)	(0.5)	(0.5)	(0.2)	(1.3)	(1.0)	(0.5)	(0.2)
South Dakota	Est	0.1	**	**	**	**	**	**	**	**
South Dakota	MOE	(0.1)								
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**
Utah	MOE	(0.2)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	
Washington	Est	7.7	3.1	1.5	1.0	0.4	3.0	1.5	0.8	0.3

Washington	MOE	(4.0)	(2.1)	(1.2)	(1.0)	(0.5)	(2.0)	(1.1)	(0.9)	(0.5)
Wyoming	Est	1.0	0.5	0.2	0.0	**	0.5	0.1	0.1	**
Wyoming	MOE	(1.0)	(0.6)	(0.3)	(0.0)		(0.6)	(0.1)	(0.1)	
National	Est	1.0	0.5	0.2	0.1	**	0.5	0.2	0.1	**
National	MOE	(0.2)	(0.2)	(0.1)	(0.0)		(0.1)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 40 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where nonnative Centaurea species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Centaurea* Are Present	At Least 5% Foliar Cover Of *Centaurea*	At Least 15% Foliar Cover Of *Centaurea*	At Least 30% Foliar Cover Of *Centaurea*	At Least 50% Foliar Cover Of *Centaurea*	At Least 5% Relative Plant Canopy Cover Of *Centaurea*	At Least 15% Relative Plant Canopy Cover Of *Centaurea*	At Least 30% Relative Plant Canopy Cover Of *Centaurea*	At Least 50% Relative Plant Canopy Cover Of *Centaurea*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	5.7	3.5	0.8	0.5	-0.1	3.5	1.6	0.2	0.2
California	MOE	(7.1)	(4.9)	(4.7)	(2.2)	(0.1)	(5.3)	(4.6)	(1.2)	(1.2)
Colorado	Est	-1.0	-0.4	-0.2	-0.1	0.0	-0.3	-0.3	-0.1	-0.1
Colorado	MOE	(1.0)	(0.4)	(0.2)	(0.1)	(0.1)	(0.8)	(0.3)	(0.2)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.0	-0.8	-1.3	-0.5	-0.2	-0.8	-1.1	-0.6	**
Idaho	MOE	(2.6)	(1.7)	(1.3)	(0.6)	(0.5)	(1.7)	(1.2)	(0.8)	
Kansas	Est	-0.1	**	**	**	**	**	**	**	**
Kansas	MOE	(0.2)								

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	-0.3	-0.1	-0.1	0.2	0.1	0.0	0.0	0.1	**
Montana	MOE	(1.0)	(0.8)	(0.5)	(0.3)	(0.1)	(0.8)	(0.6)	(0.3)	
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	2.0	1.4	0.6	0.3	**	1.4	0.8	0.7	0.3
Nevada	MOE	(3.2)	(2.1)	(1.0)	(0.7)		(2.1)	(1.3)	(1.2)	(0.7)
New Mexico	Est	-0.1	-0.1	-0.1	**	**	-0.1	-0.1	-0.1	-0.1
New Mexico	MOE	(0.3)	(0.3)	(0.3)			(0.3)	(0.3)	(0.3)	(0.3)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	-0.7	-0.4	-0.3	-0.3	-0.1	-0.8	-0.6	-0.3	-0.1
Oregon	MOE	(2.5)	(1.5)	(0.6)	(0.5)	(0.2)	(1.7)	(1.0)	(0.5)	(0.2)
South Dakota	Est	-0.1	**	**	**	**	**	**	**	**
South Dakota	MOE	(0.1)								
Texas	Est	-0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	0.5	0.1	0.1	0.0	-0.1	0.0	0.1	0.0	**
Utah	MOE	(1.1)	(0.2)	(0.2)	(0.1)	(0.1)	(0.2)	(0.2)	(0.1)	
Washington	Est	-3.6	-1.1	-0.9	-0.7	-0.4	-1.0	-0.3	-0.4	-0.3

Washington	MOE	(5.0)	(2.8)	(2.1)	(1.2)	(0.5)	(2.8)	(1.8)	(1.3)	(0.5)
Wyoming	Est	-0.7	-0.2	-0.2	**	**	-0.2	0.2	-0.1	**
Wyoming	MOE	(1.1)	(0.8)	(0.3)			(0.8)	(0.5)	(0.1)	
National	Est	0.1	0.1	0.0	0.0	**	0.1	0.0	0.0	0.0
National	MOE	(0.4)	(0.2)	(0.2)	(0.1)		(0.3)	(0.2)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 41 - 2011-2015 non-Federal rangeland where Halogeton species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Halogeton* Are Present	At Least 5% Foliar Cover Of *Halogeton*	At Least 15% Foliar Cover Of *Halogeton*	At Least 30% Foliar Cover Of *Halogeton*	At Least 50% Foliar Cover Of *Halogeton*	At Least 5% Relative Plant Canopy Cover Of *Halogeton*	At Least 15% Relative Plant Canopy Cover Of *Halogeton*	At Least 30% Relative Plant Canopy Cover Of *Halogeton*	At Least 50% Relative Plant Canopy Cover Of *Halogeton*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	1.7	1.3	0.8	0.3	0	1.5	1.5	1.2	0.8
Colorado	MOE	(1.7)	(1.6)	(1.5)	(0.7)		(1.7)	(1.7)	(1.6)	(1.5)
Florida	Est	0	0	0	0	0	0	0	0	0
Florida	MOE									
Idaho	Est	0.3	0.1	0.1	0	0	0.3	0.1	0.1	0
Idaho	MOE	(0.5)	(0.3)	(0.3)			(0.5)	(0.3)	(0.3)	
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	4.9	2.1	1.1	**	**	4.3	2.4	2.1	1.4
Nevada	MOE	(4.9)	(3.1)	(1.7)			(4.7)	(3.4)	(3.0)	(2.3)
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.0	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	9.7	3.7	2.1	0.5	**	7.5	5.2	3.2	1.9
Utah	MOE	(4.7)	(2.8)	(2.5)	(1.0)		(4.2)	(3.3)	(2.6)	(2.4)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.7	0.1	**	**	**	0.2	0.1	0.1	**
Wyoming	MOE	(0.9)	(0.2)				(0.4)	(0.2)	(0.2)	
National	Est	0.5	0.2	0.1	**	**	0.4	0.3	0.2	0.1
National	MOE	(0.2)	(0.1)	(0.1)			(0.2)	(0.1)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 42 - 2004-2010 non-Federal rangeland where Halogeton species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins or error.

State	Type	*Halogeton* Are Present	At Least 5% Foliar Cover Of *Halogeton*	At Least 15% Foliar Cover Of *Halogeton*	At Least 30% Foliar Cover Of *Halogeton*	At Least 50% Foliar Cover Of *Halogeton*	At Least 5% Relative Plant Canopy Cover Of *Halogeton*	At Least 15% Relative Plant Canopy Cover Of *Halogeton*	At Least 30% Relative Plant Canopy Cover Of *Halogeton*	At Least 50% Relative Plant Canopy Cover Of *Halogeton*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.2	**	**	**	**	0.2	0.2	**	**
Arizona	MOE	(0.4)					(0.4)	(0.4)		
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	1.0	0.5	0.4	0.0	0	0.6	0.6	0.6	0.4
Colorado	MOE	(1.0)	(0.5)	(0.3)	(0.1)		(0.6)	(0.6)	(0.5)	(0.3)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.7	0.2	0.1	0.1	0	0.2	0.2	0.1	0.1
Idaho	MOE	(0.8)	(0.3)	(0.2)	(0.2)		(0.3)	(0.3)	(0.2)	(0.2)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.3	0.2	0.1	**	**	0.2	0.1	**	**
Montana	MOE	(0.4)	(0.2)	(0.1)			(0.2)	(0.1)		
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	5.5	2.2	0.4	**	**	3.9	2.3	2.0	1.5
Nevada	MOE	(2.7)	(2.3)	(1.2)			(2.8)	(2.5)	(2.3)	(2.0)
New Mexico	Est	0.2	**	**	**	**	0.2	**	**	**
New Mexico	MOE	(0.3)					(0.3)			
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.3	**	**	**	**	**	**	**	**
Oregon	MOE	(0.6)								
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	6.9	3.6	0.6	**	**	4.8	4.0	2.9	0.9
Utah	MOE	(2.8)	(2.4)	(0.8)			(2.4)	(2.5)	(2.0)	(0.9)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	2.0	0.4	**	**	**	1.3	0.2	0.1	**
Wyoming	MOE	(1.0)	(0.3)				(0.9)	(0.2)	(0.2)	
National	Est	0.6	0.2	0.1	**	**	0.4	0.2	0.2	0.1
National	MOE	(0.1)	(0.1)	(0.0)			(0.1)	(0.1)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 43 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Halogeton species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Halogeton* Are Present	At Least 5% Foliar Cover Of *Halogeton*	At Least 15% Foliar Cover Of *Halogeton*	At Least 30% Foliar Cover Of *Halogeton*	At Least 50% Foliar Cover Of *Halogeton*	At Least 5% Relative Plant Canopy Cover Of *Halogeton*	At Least 15% Relative Plant Canopy Cover Of *Halogeton*	At Least 30% Relative Plant Canopy Cover Of *Halogeton*	At Least 50% Relative Plant Canopy Cover Of *Halogeton*

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-0.2	**	**	**	**	-0.2	-0.2	**	**
Arizona	MOE	(0.4)					(0.4)	(0.4)		
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.7	0.7	0.5	0.2	**	0.9	0.9	0.6	0.5
Colorado	MOE	(1.7)	(1.5)	(1.4)	(0.6)		(1.6)	(1.6)	(1.5)	(1.4)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-0.5	-0.1	0.0	-0.1	**	0.0	-0.1	0.0	-0.1
Idaho	MOE	(0.9)	(0.4)	(0.4)	(0.2)		(0.5)	(0.4)	(0.4)	(0.2)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	-0.3	-0.2	-0.1	**	**	-0.2	-0.1	**	**
Montana	MOE	(0.4)	(0.2)	(0.1)			(0.2)	(0.1)		
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	-0.6	-0.1	0.7	**	**	0.4	0.1	0.1	-0.1
Nevada	MOE	(6.1)	(4.0)	(2.1)			(5.8)	(4.3)	(3.9)	(3.1)
New Mexico	Est	-0.2	**	**	**	**	-0.2	**	**	**
New Mexico	MOE	(0.3)					(0.3)			
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	-0.3	**	**	**	**	**	**	**	**
Oregon	MOE	(0.6)								
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	2.8	0.1	1.5	0.5	**	2.7	1.1	0.3	1.0
Utah	MOE	(5.4)	(3.3)	(2.6)	(1.0)		(4.9)	(3.7)	(3.0)	(2.6)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	-1.3	-0.3	**	**	**	-1.1	-0.1	0.0	**
Wyoming	MOE	(1.3)	(0.3)				(0.8)	(0.3)	(0.3)	
National	Est	-0.1	0.0	0.1	**	**	0.0	0.1	0.0	0.1
National	MOE	(0.3)	(0.1)	(0.1)			(0.2)	(0.2)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 44 - 2011-2015 non-Federal rangeland where garlic mustard is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Garlic Mustard Are Present	At Least 5% Foliar Cover Of Garlic Mustard	At Least 15% Foliar Cover Of Garlic Mustard	At Least 30% Foliar Cover Of Garlic Mustard	At Least 50% Foliar Cover Of Garlic Mustard	At Least 5% Relative Plant Canopy Cover Of Garlic Mustard	At Least 15% Relative Plant Canopy Cover Of Garlic Mustard	At Leas 30% Relativ Plant Canopy Cover Of Garlic Mustar

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**
Arizona	MOE								
California	Est	**	**	**	**	**	**	**	**
California	MOE								
Colorado	Est	**	**	**	**	**	**	**	**
Colorado	MOE								
Florida	Est	**	**	**	**	**	**	**	**
Florida	MOE								
Idaho	Est	**	**	**	**	**	**	**	**
Idaho	MOE								
Kansas	Est	**	**	**	**	**	**	**	**
Kansas	MOE								
Louisiana	Est	**	**	**	**	**	**	**	**
Louisiana	MOE								

Montana	Est	**	**	**	**	**	**	**	**
Montana	MOE								
Nebraska	Est	**	**	**	**	**	**	**	**
Nebraska	MOE								
Nevada	Est	**	**	**	**	**	**	**	**
Nevada	MOE								
New Mexico	Est	**	**	**	**	**	**	**	**
New Mexico	MOE								
North Dakota	Est	**	**	**	**	**	**	**	**
North Dakota	MOE								
Oklahoma	Est	**	**	**	**	**	**	**	**
Oklahoma	MOE								
Oregon	Est	**	**	**	**	**	**	**	**

Oregon	MOE								
South Dakota	Est	**	**	**	**	**	**	**	**
South Dakota	MOE								
Texas	Est	**	**	**	**	**	**	**	**
Texas	MOE								
Utah	Est	**	**	**	**	**	**	**	**
Utah	MOE								
Washington	Est	**	**	**	**	**	**	**	**
Washington	MOE								
Wyoming	Est	**	**	**	**	**	**	**	**
Wyoming	MOE								
National	Est	**	**	**	**	**	**	**	**
National	MOE								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 45 - 2004-2010 non-Federal rangeland where garlic mustard is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Garlic Mustard Are Present	At Least 5% Foliar Cover Of Garlic Mustard	At Least 15% Foliar Cover Of Garlic Mustard	At Least 30% Foliar Cover Of Garlic Mustard	At Least 50% Foliar Cover Of Garlic Mustard	At Least 5% Relative Plant Canopy Cover Of Garlic Mustard	At Least 15% Relative Plant Canopy Cover Of Garlic Mustard	At Least 30% Relative Plant Canopy Cover Of Garlic Mustard
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**
Arizona	MOE								
California	Est	**	**	**	**	**	**	**	**
California	MOE								
Colorado	Est	**	**	**	**	**	**	**	**
Colorado	MOE								
Florida	Est	**	**	**	**	**	**	**	**
Florida	MOE								

Idaho	Est	**	**	**	**	**	**	**	**
Idaho	MOE								
Kansas	Est	**	**	**	**	**	**	**	**
Kansas	MOE								
Louisiana	Est	**	**	**	**	**	**	**	**
Louisiana	MOE								
Montana	Est	**	**	**	**	**	**	**	**
Montana	MOE								
Nebraska	Est	**	**	**	**	**	**	**	**
Nebraska	MOE								
Nevada	Est	**	**	**	**	**	**	**	**
Nevada	MOE								
New Mexico	Est	**	**	**	**	**	**	**	**
New Mexico	MOE								

North Dakota	Est	**	**	**	**	**	**	**	**
North Dakota	MOE								
Oklahoma	Est	**	**	**	**	**	**	**	**
Oklahoma	MOE								
Oregon	Est	**	**	**	**	**	**	**	**
Oregon	MOE								
South Dakota	Est	**	**	**	**	**	**	**	**
South Dakota	MOE								
Texas	Est	**	**	**	**	**	**	**	**
Texas	MOE								
Utah	Est	**	**	**	**	**	**	**	**
Utah	MOE								
Washington	Est	**	**	**	**	**	**	**	**

Washington	MOE								
Wyoming	Est	**	**	**	**	**	**	**	**
Wyoming	MOE								
National	Est	**	**	**	**	**	**	**	**
National	MOE								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 46 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where garlic mustard is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Garlic Mustard Is Present	At Least 5% Foliar Cover Of Garlic Mustard	At Least 15% Foliar Cover Of Garlic Mustard	At Least 30% Foliar Cover Of Garlic Mustard	At Least 50% Foliar Cover Of Garlic Mustard	At Least 5% Relative Plant Canopy Cover Of Garlic Mustard	At Least 15% Relative Plant Canopy Cover Of Garlic Mustard	At Least 30% Relative Plant Canopy Cover Of Garlic Mustard
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**

Arizona	MOE								
California	Est	**	**	**	**	**	**	**	**
California	MOE								
Colorado	Est	**	**	**	**	**	**	**	**
Colorado	MOE								
Florida	Est	**	**	**	**	**	**	**	**
Florida	MOE								
Idaho	Est	**	**	**	**	**	**	**	**
Idaho	MOE								
Kansas	Est	**	**	**	**	**	**	**	**
Kansas	MOE								
Louisiana	Est	**	**	**	**	**	**	**	**
Louisiana	MOE								
Montana	Est	**	**	**	**	**	**	**	**
Montana	MOE								

Nebraska	Est	**	**	**	**	**	**	**	**
Nebraska	MOE								
Nevada	Est	**	**	**	**	**	**	**	**
Nevada	MOE								
New Mexico	Est	**	**	**	**	**	**	**	**
New Mexico	MOE								
North Dakota	Est	**	**	**	**	**	**	**	**
North Dakota	MOE								
Oklahoma	Est	**	**	**	**	**	**	**	**
Oklahoma	MOE								
Oregon	Est	**	**	**	**	**	**	**	**
Oregon	MOE								
South Dakota	Est	**	**	**	**	**	**	**	**

South Dakota	MOE								
Texas	Est	**	**	**	**	**	**	**	**
Texas	MOE								
Utah	Est	**	**	**	**	**	**	**	**
Utah	MOE								
Washington	Est	**	**	**	**	**	**	**	**
Washington	MOE								
Wyoming	Est	**	**	**	**	**	**	**	**
Wyoming	MOE								
National	Est	**	**	**	**	**	**	**	**
National	MOE								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 47 - 2011-2015 non-Federal rangeland where wild parsnip is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Wild Parsnip Is Present	At Least 5% Foliar Cover Of Wild Parsnip	At Least 15% Foliar Cover Of Wild Parsnip	At Least 30% Foliar Cover Of Wild Parsnip	At Least 50% Foliar Cover Of Wild Parsnip	At Least 5% Relative Plant Canopy Cover Of Wild Parsnip	At Least 15% Relative Plant Canopy Cover Of Wild Parsnip	At Least 30% Relative Plant Canopy Cover Of Wild Parsnip	At Least 50% Relative Plant Canopy Cover Of Wild Parsnip
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									

Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	0.2	**	**	**	**	**	**	**	**

North Dakota	MOE	(0.3)								
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	0.2	**	**	**	**	**	**	**	**
South Dakota	MOE	(0.4)								
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									

Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 48 - 2004-2010 non-Federal rangeland where wild parsnip is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Wild Parsnip Is Present	At Least 5% Foliar Cover Of Wild Parsnip	At Least 15% Foliar Cover Of Wild Parsnip	At Least 30% Foliar Cover Of Wild Parsnip	At Least 50% Foliar Cover Of Wild Parsnip	At Least 5% Relative Plant Canopy Cover Of Wild Parsnip	At Least 15% Relative Plant Canopy Cover Of Wild Parsnip	At Least 30% Relative Plant Canopy Cover Of Wild Parsnip	At Least 50% Relative Plant Canopy Cover Of Wild Parsnip
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									

California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**

Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									

Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 49 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where wild parsnip is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Wild Parsnip Are Present	At Least 5% Foliar Cover Of Wild Parsnip	At Least 15% Foliar Cover Of Wild Parsnip	At Least 30% Foliar Cover Of Wild Parsnip	At Least 50% Foliar Cover Of Wild Parsnip	At Least 5% Relative Plant Canopy Cover Of Wild Parsnip	At Least 15% Relative Plant Canopy Cover Of Wild Parsnip	At Least 30% Relative Plant Canopy Cover Of Wild Parsnip	At Least 50% Relative Plant Canopy Cover Of Wild Parsnip
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									

Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	0.2	**	**	**	**	**	**	**	**

North Dakota	MOE	(0.3)								
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	0.2	**	**	**	**	**	**	**	**
South Dakota	MOE	(0.4)								
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									

Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 50 - 2011-2015 non-Federal rangeland where yellow and Dalmatian toadflax are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Yellow And Dalmation Toadflax (*Linaria* Sp.) Are Present	At Least 5% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 15% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 30% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 50% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 5% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 15% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 30% Relative Plant Canopy Cover of Yellow and Dalmation toadflax (Linaria sp.)	At Least 50% Relative Plant Canopy Cover of Yellow and Dalmation toadflax (Linaria sp.)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent

Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.1	**	**	**	**	**	**	**	**
Colorado	MOE	(0.2)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.4	**	**	**	**	**	**	**	**
Idaho	MOE	(0.8)								
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**

Louisiana	MOE									
Montana	Est	0.2	**	**	**	**	**	**	**	**
Montana	MOE	(0.4)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									

Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	1.5	**	**	**	**	**	**	**	**
Oregon	MOE	(3.2)								
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.5	0.4	**	**	**	**	**	**	**
Utah	MOE	(0.8)	(0.8)							
Washington	Est	2.1	0.3	**	**	**	0.3	**	**	**
Washington	MOE	(2.7)	(0.8)				(0.8)			

Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.1	**	**	**	**	**	**	**	**
National	MOE	(0.1)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 51 - 2004-2010 non-Federal rangeland where yellow and Dalmatian toadflax are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Yellow And Dalmation Toadflax (*Linaria* Sp.) Are Present	At Least 5% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 15% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 30% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 50% Foliar Cover Of Yellow And Dalmation Toadflax (*Linaria* Sp.)	At Least 5% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax	At Least 15% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax	At Least 30% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax	At Least 50% Relative Plant Canopy Cover Of Yellow And Dalmation Toadflax

							(*Linaria* Sp.)	(*Linaria* Sp.)	(*Linaria* Sp.)	(*Linaria* Sp.)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.5	0.0	**	**	**	0.0	**	**	**
Colorado	MOE	(0.5)	(0.1)				(0.1)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.4	**	**	**	**	**	**	**	**
Montana	MOE	(0.4)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	0.2	**	**	**	**	**	**	**	**

North Dakota	MOE	(0.4)								
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	0.5	**	**	**	**	0.0	**	**	**
Oregon	MOE	(0.8)					(0.1)			
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.3	0.2	**	**	**	0.1	**	**	**
Utah	MOE	(0.3)	(0.2)				(0.2)			
Washington	Est	0.7	**	**	**	**	**	**	**	**

Washington	MOE	(1.0)								
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.1	**	**	**	**	**	**	**	**
National	MOE	(0.0)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 52 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where yellow and Dalmatian toadflax are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Yellow And Dalmation Toadflax (*Linaria* Sp.) Are Present	At Least 5% Foliar Cover Of Yellow And Dalmation Toadfla	At Least 15% Foliar Cover Of Yellow And Dalmation Toadfla	At Least 30% Foliar Cover Of Yellow And Dalmation Toadfla	At Least 50% Foliar Cover Of Yellow And Dalmation Toadfla	At Least 5% Relative Plant Canopy Cover Of Yellow And Dalmat	At Least 15% Relative Plant Canopy Cover Of Yellow And Dalmat	At Least 30% Relative Plant Canopy Cover Of Yellow And Dalmat	At Least 50% Relative Plant Canopy Cover Of Yellow And Dalmat

			x (*Linaria* Sp.)	x (*Linaria* Sp.)	x (*Linaria* Sp.)	x (*Linaria* Sp.)	ion Toadfla x (*Linaria* Sp.)	ion Toadfla x (*Linaria* Sp.)	ion Toadfla x (*Linaria* Sp.)	ion Toadfla x (*Linaria* Sp.)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	-0.4	0.0	**	**	**	0.0	**	**	**
Colorado	MOE	(0.5)	(0.1)				(0.1)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.4	**	**	**	**	**	**	**	**
Idaho	MOE	(0.8)								

Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	-0.2	**	**	**	**	**	**	**	**
Montana	MOE	(0.4)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									

North Dakota	Est	-0.2	**	**	**	**	**	**	**	**
North Dakota	MOE	(0.4)								
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	1.0	**	**	**	**	0.0	**	**	**
Oregon	MOE	(3.4)					(0.1)			
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	0.2	0.2	**	**	**	-0.1	**	**	**
Utah	MOE	(0.8)	(0.8)				(0.2)			

Washington	Est	1.4	0.3	**	**	**	0.3	**	**	**
Washington	MOE	(2.5)	(0.8)				(0.8)			
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.0	**	**	**	**	**	**	**	**
National	MOE	(0.1)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 53 - 2011-2015 non-Federal rangeland where common tansy species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Tansy Are Present	At Least 5% Foliar Cover Of Comm	At Least 15% Foliar Cover Of Comm	At Least 30% Foliar Cover Of Comm	At Least 50% Foliar Cover Of Comm	At Least 5% Relative Plant Canopy Cover Of Comm	At Least 15% Relative Plant Canopy Cover Of Comm	At Least 30% Relative Plant Canopy Cover Of Comm	At Least 50% Relative Plant Canopy Cover Of Comm

			on Tansy	on Tansy	on Tansy	on Tansy	on Tansy	on Tansy	on Tansy	on Tansy
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 54 - 2004-2010 non-Federal rangeland where common tansy species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Tansy Are Present	At Least 5% Foliar Cover Of Common Tansy	At Least 15% Foliar Cover Of Common Tansy	At Least 30% Foliar Cover Of Common Tansy	At Least 50% Foliar Cover Of Common Tansy	At Least 5% Relative Plant Canopy Cover Of Common Tansy	At Least 15% Relative Plant Canopy Cover Of Common Tansy	At Least 30% Relative Plant Canopy Cover Of Common Tansy	At Least 50% Relative Plant Canopy Cover Of Common Tansy

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.0	**	**	**	**	**	**	**	**
Colorado	MOE	(0.1)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.1	**	**	**	**	**	**	**	**
Idaho	MOE	(0.1)								
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.0	**	**	**	**	**	**	**	**
Wyoming	MOE	(0.1)								
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 55 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where common tansy species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Tansy Are Present	At Least 5% Foliar Cover Of Common Tansy	At Least 15% Foliar Cover Of Common Tansy	At Least 30% Foliar Cover Of Common Tansy	At Least 50% Foliar Cover Of Common Tansy	At Least 5% Relative Plant Canopy Cover Of Comm	At Least 15% Relative Plant Canopy Cover Of Comm	At Least 30% Relative Plant Canopy Cover Of Comm	At Least 50% Relative Plant Canopy Cover Of Comm

							on Tansy	on Tansy	on Tansy	on Tansy
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.0	**	**	**	**	**	**	**	**
Colorado	MOE	(0.1)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-0.1	**	**	**	**	**	**	**	**
Idaho	MOE	(0.1)								
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.0	**	**	**	**	**	**	**	**
Wyoming	MOE	(0.1)								
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 56 - 2011-2015 non-Federal rangeland where all juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Juniper Are Present	At Least 5% Foliar Cover Of Juniper	At Least 15% Foliar Cover Of Juniper	At Least 30% Foliar Cover Of Juniper	At Least 50% Foliar Cover Of Juniper	At Least 5% Relative Plant Canopy Cover Of Juniper	At Least 15% Relative Plant Canopy Cover Of Juniper	At Least 30% Relative Plant Canopy Cover Of Juniper	At Least 50% Relative Plant Canopy Cover Of Juniper

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	11.4	5.7	0.8	**	**	10.1	4.9	1.8	0.7
Arizona	MOE	(5.4)	(2.9)	(1.2)			(5.0)	(2.7)	(1.8)	(1.1)
California	Est	2.6	0.9	0.4	**	**	1.9	0.6	0.3	**
California	MOE	(2.2)	(1.1)	(0.6)			(1.6)	(0.6)	(0.5)	
Colorado	Est	5.3	1.9	1.1	0.3	**	2.6	1.6	0.9	0.1
Colorado	MOE	(3.0)	(1.5)	(1.2)	(0.4)		(1.9)	(1.2)	(0.8)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	2.3	1.2	0.2	0.1	**	0.8	0.2	0.2	**
Idaho	MOE	(2.2)	(1.4)	(0.7)	(0.3)		(1.2)	(0.7)	(0.7)	
Kansas	Est	3.9	1.8	0.3	0.2	**	1.1	0.3	0.1	0.1
Kansas	MOE	(1.4)	(1.1)	(0.4)	(0.4)		(0.9)	(0.4)	(0.1)	(0.1)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	8.4	4.6	2.0	0.2	0.1	4.6	2.1	0.4	0
Montana	MOE	(4.0)	(2.2)	(1.3)	(0.3)	(0.2)	(2.8)	(1.3)	(0.6)	
Nebraska	Est	5.4	2.7	0.9	0.3	0.3	2.3	0.7	0.3	0.3
Nebraska	MOE	(2.3)	(1.4)	(0.9)	(0.4)	(0.4)	(1.4)	(0.7)	(0.4)	(0.4)
Nevada	Est	6.3	3.7	1.4	**	**	4.8	2.9	0.7	0.7
Nevada	MOE	(4.0)	(3.4)	(2.8)			(4.0)	(3.3)	(1.4)	(1.4)
New Mexico	Est	14.8	7.8	1.9	0.2	**	12.6	7.7	4.4	1.7
New Mexico	MOE	(3.9)	(2.9)	(1.8)	(0.4)		(3.7)	(2.9)	(2.4)	(1.4)
North Dakota	Est	4.5	3.2	1.8	0.6	0.2	3.0	1.8	0.1	**
North Dakota	MOE	(1.7)	(1.7)	(1.0)	(0.7)	(0.5)	(1.7)	(1.0)	(0.2)	
Oklahoma	Est	20.9	12.0	6.6	3.8	1.3	10.7	4.6	2.5	0.9
Oklahoma	MOE	(5.8)	(4.1)	(2.3)	(2.2)	(1.6)	(3.1)	(2.3)	(1.9)	(1.2)
Oregon	Est	15.7	8.9	3.1	1.5	0	10.4	5.5	2.9	**

Oregon	MOE	(7.6)	(5.8)	(4.1)	(2.9)		(6.1)	(4.6)	(3.3)	
South Dakota	Est	2.1	1.2	**	**	**	0.8	**	**	**
South Dakota	MOE	(1.2)	(1.1)				(1.0)			
Texas	Est	14.5	8.4	3.8	1.9	0.2	9.5	5.9	2.8	1.0
Texas	MOE	(3.8)	(2.5)	(1.5)	(0.6)	(0.3)	(2.7)	(2.0)	(1.2)	(0.7)
Utah	Est	14.2	9.7	4.4	1.0	**	11.8	8.2	2.7	1.0
Utah	MOE	(4.9)	(4.2)	(3.5)	(1.4)		(4.2)	(4.0)	(2.3)	(1.4)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	1.0	0.4	0.2	0.2	**	0.4	0.2	**	**
Wyoming	MOE	(0.7)	(0.6)	(0.6)	(0.6)		(0.6)	(0.6)		
National	Est	9.4	5.1	2.0	0.8	0.1	6.3	3.5	1.6	0.6
National	MOE	(1.2)	(0.7)	(0.5)	(0.2)	(0.1)	(0.9)	(0.6)	(0.4)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 57 - 2004-2010 non-Federal rangeland where all juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Juniper Are Present	At Least 5% Foliar Cover Of Juniper	At Least 15% Foliar Cover Of Juniper	At Least 30% Foliar Cover Of Juniper	At Least 50% Foliar Cover Of Juniper	At Least 5% Relative Plant Canopy Cover Of Juniper	At Least 15% Relative Plant Canopy Cover Of Juniper	At Least 30% Relative Plant Canopy Cover Of Juniper	At Least 50% Relative Plant Canopy Cover Of Juniper
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	14.9	9.2	2.7	**	**	12.2	7.9	3.1	1.3
Arizona	MOE	(3.7)	(2.5)	(1.4)			(3.3)	(2.7)	(1.7)	(1.1)
California	Est	2.4	0.7	**	**	**	1.0	0.7	0.1	0.1
California	MOE	(2.5)	(0.9)				(1.3)	(0.9)	(0.1)	(0.1)
Colorado	Est	8.0	4.7	1.4	0.3	**	6.1	2.8	1.6	0.4
Colorado	MOE	(2.5)	(1.7)	(0.7)	(0.5)		(2.1)	(1.2)	(0.9)	(0.5)

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	4.7	3.0	1.3	0.5	0.3	3.1	1.5	0.8	0.8
Idaho	MOE	(2.7)	(1.9)	(1.1)	(0.9)	(0.5)	(1.9)	(1.4)	(1.0)	(1.0)
Kansas	Est	6.0	1.9	0.6	0.1	**	1.5	0.2	0.1	**
Kansas	MOE	(1.7)	(1.0)	(0.4)	(0.2)		(0.9)	(0.2)	(0.1)	
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	11.2	5.8	3.2	0.8	**	6.2	3.3	1.0	0.3
Montana	MOE	(2.2)	(1.4)	(1.5)	(0.6)		(1.3)	(1.3)	(0.7)	(0.4)
Nebraska	Est	5.0	1.3	0.4	0.3	**	1.0	0.3	0.1	**
Nebraska	MOE	(1.8)	(0.6)	(0.4)	(0.3)		(0.5)	(0.3)	(0.3)	
Nevada	Est	3.9	2.8	1.4	0.4	**	3.1	2.5	1.8	0.7
Nevada	MOE	(2.1)	(1.8)	(1.3)	(0.8)		(2.0)	(1.8)	(1.4)	(1.0)
New Mexico	Est	10.2	3.4	0.8	0.1	**	7.0	3.2	1.7	0.5

New Mexico	MOE	(2.5)	(1.7)	(0.6)	(0.2)		(2.3)	(1.5)	(1.2)	0.8
North Dakota	Est	5.5	3.6	2.1	0.8	**	3.5	1.8	0.2	**
North Dakota	MOE	(1.6)	(1.3)	(1.0)	(0.8)		(1.2)	(1.0)	(0.4)	
Oklahoma	Est	19.3	10.3	5.0	1.9	0.9	8.8	3.1	1.2	0.8
Oklahoma	MOE	(2.9)	(2.0)	(1.5)	(0.7)	(0.6)	(1.9)	(1.0)	(0.7)	(0.6)
Oregon	Est	18.4	10.5	4.5	0.7	0.3	12.2	6.5	3.1	1.4
Oregon	MOE	(4.6)	(2.9)	(2.2)	(0.9)	(0.6)	(3.1)	(2.7)	(2.5)	(1.2)
South Dakota	Est	1.5	0.8	0.6	0.5	0.3	0.7	0.6	0.4	0.1
South Dakota	MOE	(1.0)	(0.6)	(0.6)	(0.6)	(0.4)	(0.6)	(0.6)	(0.5)	(0.2)
Texas	Est	20.8	13.4	8.3	5.5	3.0	13.6	8.7	5.2	2.0
Texas	MOE	(2.7)	(2.1)	(1.6)	(1.4)	(1.0)	(2.1)	(1.6)	(1.4)	(0.9)
Utah	Est	16.4	10.2	3.9	1.4	**	13.5	7.5	4.8	2.0
Utah	MOE	(4.5)	(3.7)	(2.1)	(1.3)		(4.6)	(2.7)	(1.9)	(1.8)

Washington	Est	0.1	**	**	**	**	0.1	**	**	**
Washington	MOE	(0.3)					(0.3)			
Wyoming	Est	3.6	1.9	0.9	0.3	**	2.1	1.1	0.9	**
Wyoming	MOE	(2.3)	(2.0)	(1.5)	(0.6)		(2.1)	(1.5)	(1.5)	
National	Est	11.4	6.5	3.3	1.6	0.8	7.3	4.2	2.2	0.8
National	MOE	(0.8)	(0.6)	(0.5)	(0.4)	(0.2)	(0.6)	(0.5)	(0.4)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 58 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where all juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Juniper Are Present	At Least 5% Foliar Cover Of Juniper	At Least 15% Foliar Cover Of Juniper	At Least 30% Foliar Cover Of Juniper	At Least 50% Foliar Cover Of Juniper	At Least 5% Relative Plant Canopy Cover Of Juniper	At Least 15% Relative Plant Canopy Cover Of Juniper	At Least 30% Relative Plant Canopy Cover Of Juniper	At Least 50% Relative Plant Canopy Cover Of Juniper

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-3.5	-3.5	-1.9	**	**	-2.1	-3.0	-1.4	-0.6
Arizona	MOE	(5.6)	(3.5)	(1.8)			(5.4)	(3.7)	(2.5)	(1.4)
California	Est	0.3	0.1	0.4	**	**	0.9	-0.1	0.2	-0.1
California	MOE	(1.4)	(1.0)	(0.6)			(0.8)	(0.9)	(0.6)	(0.1)
Colorado	Est	-2.8	-2.8	-0.3	-0.1	**	-3.6	-1.2	-0.7	-0.4
Colorado	MOE	(3.2)	(2.0)	(1.3)	(0.6)		(2.2)	(1.4)	(1.2)	(0.6)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-2.4	-1.8	-1.0	-0.4	-0.3	-2.3	-1.3	-0.6	-0.8
Idaho	MOE	(3.4)	(2.4)	(1.2)	(0.9)	(0.5)	(2.2)	(1.5)	(1.1)	(1.0)
Kansas	Est	-2.1	-0.1	-0.3	0.1	0.0	-0.4	0.1	**	0.1
Kansas	MOE	(2.2)	(1.4)	(0.5)	(0.4)	(0.0)	(1.0)	(0.4)		(0.1)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	-2.7	-1.2	-1.2	-0.6	0.1	-1.6	-1.2	-0.6	-0.3
Montana	MOE	(4.3)	(2.3)	(1.6)	(0.6)	(0.2)	(2.8)	(1.5)	(0.9)	(0.4)
Nebraska	Est	0.4	1.4	0.5	0.0	0.3	1.3	0.4	0.1	0.3
Nebraska	MOE	(2.5)	(1.4)	(1.0)	(0.5)	(0.4)	(1.4)	(0.7)	(0.5)	(0.4)
Nevada	Est	2.4	0.9	0.1	-0.4	**	1.6	0.3	-1.1	0.0
Nevada	MOE	(3.4)	(2.8)	(2.7)	(0.8)		(3.1)	(2.7)	(1.8)	(1.2)
New Mexico	Est	4.6	4.3	1.2	0.1	**	5.6	4.5	2.8	1.3
New Mexico	MOE	(4.4)	(3.2)	(1.6)	(0.4)		(4.2)	(3.1)	(2.5)	(1.8)
North Dakota	Est	-1.1	-0.4	-0.3	-0.2	0.2	-0.5	0.0	-0.1	**
North Dakota	MOE	(2.3)	(1.8)	(1.1)	(1.0)	(0.5)	(1.9)	(1.2)	(0.4)	
Oklahoma	Est	1.6	1.7	1.6	1.8	0.5	1.8	1.5	1.3	0.1
Oklahoma	MOE	(5.2)	(3.9)	(2.9)	(2.3)	(1.7)	(3.3)	(2.4)	(2.1)	(1.4)
Oregon	Est	-2.7	-1.6	-1.4	0.7	-0.3	-1.8	-1.0	-0.2	-1.4

Oregon	MOE	(8.9)	(7.0)	(4.9)	(3.1)	(0.6)	(6.9)	(5.2)	(4.1)	(1.2)
South Dakota	Est	0.5	0.5	-0.6	-0.5	-0.3	0.1	-0.6	-0.4	-0.1
South Dakota	MOE	(1.5)	(1.3)	(0.6)	(0.6)	(0.4)	(1.2)	(0.6)	(0.5)	(0.2)
Texas	Est	-6.4	-5.0	-4.5	-3.6	-2.8	-4.1	-2.8	-2.4	-1.0
Texas	MOE	(4.3)	(3.1)	(2.3)	(1.3)	(1.0)	(3.6)	(2.7)	(2.0)	(1.2)
Utah	Est	-2.2	-0.4	0.5	-0.4	**	-1.7	0.6	-2.1	-1.0
Utah	MOE	(5.1)	(4.6)	(2.9)	(1.7)		(4.8)	(4.3)	(2.3)	(2.0)
Washington	Est	-0.1	**	**	**	**	-0.1	**	**	**
Washington	MOE	(0.3)					(0.3)			
Wyoming	Est	-2.5	-1.5	-0.7	0.0	**	-1.7	-0.8	-0.9	**
Wyoming	MOE	(2.3)	(2.0)	(1.6)	(0.8)		(2.2)	(1.6)	(1.5)	
National	Est	-2.1	-1.4	-1.3	-0.9	-0.7	-1.0	-0.7	-0.6	-0.3
National	MOE	(1.3)	(0.7)	(0.7)	(0.4)	(0.3)	(1.1)	(0.7)	(0.5)	(0.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.

- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 59 - 2011-2015 non-Federal rangeland where Eastern juniper is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Eastern Juniper Are Present	At Least 5% Foliar Cover Of Eastern Juniper	At Least 15% Foliar Cover Of Eastern Juniper	At Least 30% Foliar Cover Of Eastern Juniper	At Least 50% Foliar Cover Of Eastern Juniper	At Least 5% Relative Plant Canopy Cover Of Eastern Juniper	At Least 15% Relative Plant Canopy Cover Of Eastern Juniper	At Least 30% Relative Plant Canopy Cover Of Eastern Juniper	At Least 50% Relative Plant Canopy Cover Of Eastern Juniper
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**

Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	3.9	1.8	0.3	0.2	**	1.1	0.3	0.1	0.1
Kansas	MOE	(1.4)	(1.1)	(0.4)	(0.4)		(0.9)	(0.4)	(0.1)	(0.1)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	5.3	2.6	0.9	0.3	0.3	2.2	0.7	0.3	0.3

Nebraska	MOE	(2.3)	(1.3)	(0.9)	(0.4)	(0.4)	(1.4)	(0.7)	(0.4)	(0.4)
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	20.0	12.0	6.6	3.8	1.3	10.7	4.6	2.5	0.9
Oklahoma	MOE	(5.8)	(4.1)	(2.3)	(2.2)	(1.6)	(3.1)	(2.3)	(1.9)	(1.2)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	1.0	0.7	**	**	**	0.3	**	**	**

South Dakota	MOE	(0.8)	(0.8)				(0.6)			
Texas	Est	0.8	0.7	0.2	**	**	0.5	0.1	**	**
Texas	MOE	(0.6)	(0.6)	(0.3)			(0.5)	(0.2)		
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.4	0.8	0.3	0.2	0.1	0.7	0.2	0.1	**
National	MOE	(0.3)	(0.3)	(0.1)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 60 - 2004-2010 non-Federal rangeland where Eastern juniper is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Eastern Juniper Are Present	At Least 5% Foliar Cover Of Eastern Juniper	At Least 15% Foliar Cover Of Eastern Juniper	At Least 30% Foliar Cover Of Eastern Juniper	At Least 50% Foliar Cover Of Eastern Juniper	At Least 5% Relative Plant Canopy Cover Of Eastern Juniper	At Least 15% Relative Plant Canopy Cover Of Eastern Juniper	At Least 30% Relative Plant Canopy Cover Of Eastern Juniper	At Least 50% Relative Plant Canopy Cover Of Eastern Juniper
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	0.3	**	**	**	**	**	**	**	**
Colorado	MOE	(0.4)								

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	6.0	1.9	0.6	0.1	**	1.5	0.2	0.1	**
Kansas	MOE	(1.7)	(1.0)	(0.4)	(0.2)		(0.9)	(0.2)	(0.1)	
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	4.9	1.3	0.4	0.3	**	1.0	0.3	0.1	**
Nebraska	MOE	(1.8)	(0.6)	(0.4)	(0.3)		(0.5)	(0.3)	(0.3)	
Nevada	Est	**	**	**	**	**	**	**	**	**

Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	19.0	10.1	4.7	1.9	0.9	8.5	2.9	1.2	0.8
Oklahoma	MOE	(3.0)	(2.0)	(1.5)	(0.7)	(0.6)	(2.0)	(1.0)	(0.7)	(0.6)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	1.0	0.5	0.4	0.4	0.1	0.5	0.4	0.2	0.1
South Dakota	MOE	(0.8)	(0.5)	(0.4)	(0.4)	(0.2)	(0.5)	(0.4)	(0.4)	(0.1)
Texas	Est	2.8	1.8	1.1	0.6	0.3	1.4	0.8	0.4	0.1

Texas	MOE	(0.8)	(0.8)	(0.6)	(0.4)	(0.3)	(0.7)	(0.5)	(0.3)	(0.2)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.9	0.9	0.5	0.3	0.1	0.8	0.3	0.1	0.1
National	MOE	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.0)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 61 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Eastern juniper is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Eastern Juniper Are Present	At Least 5% Foliar Cover Of Eastern Juniper	At Least 15% Foliar Cover Of Eastern Juniper	At Least 30% Foliar Cover Of Eastern Juniper	At Least 50% Foliar Cover Of Eastern Juniper	At Least 5% Relative Plant Canopy Cover Of Eastern Juniper	At Least 15% Relative Plant Canopy Cover Of Eastern Juniper	At Least 30% Relative Plant Canopy Cover Of Eastern Juniper	At Least 50% Relative Plant Canopy Cover Of Eastern Juniper
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	-0.3	**	**	**	**	**	**	**	**
Colorado	MOE	(0.4)								
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									

Kansas	Est	-2.1	-0.1	-0.3	0.1	**	-0.4	0.1	**	0.1
Kansas	MOE	(2.2)	(1.4)	(0.5)	(0.4)		(1.0)	(0.4)		(0.1)
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	0.5	1.3	0.5	0.0	0.3	1.2	0.4	0.1	0.3
Nebraska	MOE	(2.5)	(1.4)	(1.0)	(0.5)	(0.4)	(1.5)	(0.7)	(0.5)	(0.4)
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	1.0	1.9	1.9	1.8	0.5	2.2	1.7	1.3	0.1
Oklahoma	MOE	(5.1)	(4.0)	(2.8)	(2.3)	(1.7)	(3.2)	(2.4)	(2.1)	(1.4)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	-0.1	0.2	-0.4	-0.4	-0.1	-0.2	-0.4	-0.2	-0.1
South Dakota	MOE	(1.2)	(0.9)	(0.4)	(0.4)	(0.2)	(0.8)	(0.4)	(0.4)	(0.1)
Texas	Est	-2.0	-1.1	-0.9	-0.6	-0.3	-1.0	-0.8	-0.4	-0.1
Texas	MOE	(0.9)	(0.8)	(0.6)	(0.4)	(0.3)	(0.7)	(0.5)	(0.3)	(0.2)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**

Wyoming	MOE									
National	Est	-0.5	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	0.0	0.0
National	MOE	(0.3)	(0.3)	(0.2)	(0.1)	(0.1)	(0.3)	(0.2)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 62 - 2011-2015 non-Federal rangeland where Pacific juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pacific Junipers Are Present	At Least 5% Foliar Cover Of Pacific Junipers	At Least 15% Foliar Cover Of Pacific Junipers	At Least 30% Foliar Cover Of Pacific Junipers	At Least 50% Foliar Cover Of Pacific Junipers	At Least 5% Relative Plant Canopy Cover Of Pacific Junipers	At Least 15% Relative Plant Canopy Cover Of Pacific Junipers	At Least 30% Relative Plant Canopy Cover Of Pacific Junipers	At Least 50% Relative Plant Canopy Cover Of Pacific Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.2	0.2	**	**	**	0.2	**	**	**
Arizona	MOE	(0.4)	(0.4)				(0.4)			
California	Est	2.2	0.7	0.4	**	**	1.8	0.6	0.3	**

California	MOE	(1.9)	(1.1)	(0.6)			(1.5)	(0.6)	(0.5)	
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	0.4	0.2	0.2	0.1	**	0.2	0.2	0.2	**
Idaho	MOE	(0.8)	(0.7)	(0.7)	(0.3)		(0.7)	(0.7)	(0.7)	
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.4	0.4	0.2	**	**	0.4	0.4	**	**
Montana	MOE	(0.6)	(0.6)	(0.5)			(0.6)	(0.6)		
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									

Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	13.1	7.9	2.8	1.5	**	9.1	5.1	2.6	**
Oregon	MOE	(7.7)	(5.9)	(4.2)	(2.9)		(6.2)	(4.8)	(3.5)	
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**

Texas	MOE									
Utah	Est	0.1	0.1	**	**	**	0.1	0.1	**	**
Utah	MOE	(0.3)	(0.3)				(0.3)	(0.3)		
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.5	0.3	0.1	0.0	**	0.3	0.2	0.1	**
National	MOE	(0.2)	(0.2)	(0.1)	(0.1)		(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 63 - 2004-2010 non-Federal rangeland where Pacific juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pacific Junipers Are Present	At Least 5% Foliar Cover Of	At Least 15% Foliar Cover Of	At Least 30% Foliar Cover Of	At Least 50% Foliar Cover Of	At Least 5% Relative Plant Canopy Cover	At Least 15% Relative Plant Canopy Cover	At Least 30% Relative Plant Canopy Cover	At Least 50% Relative Plant Canopy Cover

			Pacific Junipers	Pacific Junipers	Pacific Junipers	Pacific Junipers	Of Pacific Junipers	Of Pacific Junipers	Of Pacific Junipers	Of Pacific Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.2	0.1	0.0	**	**	0.2	0.0	0.0	0.0
Arizona	MOE	(0.4)	(0.2)	(0.1)			(0.4)	(0.1)	(0.1)	(0.1)
California	Est	0.8	0.4	**	**	**	0.4	0.4	**	**
California	MOE	(1.1)	(0.8)				(0.8)	(0.8)		
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.5	0.7	0.4	0.1	0.1	0.7	0.7	0.4	0.3
Idaho	MOE	(2.2)	(1.2)	(0.6)	(0.3)	(0.1)	(1.2)	(1.2)	(0.6)	(0.6)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.3	0.1	0.1	0.0	0.0	0.1	0.1	**	**
Montana	MOE	(0.6)	(0.1)	(0.1)	(0.0)	(0.0)	(0.1)	(0.1)		
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**

Oklahoma	MOE									
Oregon	Est	17.9	10.5	4.5	0.7	0.3	12.2	6.5	3.1	1.4
Oregon	MOE	(4.4)	(2.9)	(2.2)	(0.9)	(0.6)	(3.1)	(2.7)	(2.5)	(1.2)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.5	0.3	0.1	**	**	0.3	0.2	0.1	**

National	MOE	(0.1)	(0.1)	(0.0)			(0.1)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 64 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Pacific juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pacific Junipers Are Present	At Least 5% Foliar Cover Of Pacific Junipers	At Least 15% Foliar Cover Of Pacific Junipers	At Least 30% Foliar Cover Of Pacific Junipers	At Least 50% Foliar Cover Of Pacific Junipers	At Least 5% Relative Plant Canopy Cover Of Pacific Junipers	At Least 15% Relative Plant Canopy Cover Of Pacific Junipers	At Least 30% Relative Plant Canopy Cover Of Pacific Junipers	At Least 50% Relative Plant Canopy Cover Of Pacific Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-0.1	0.0	0.0	**	**	-0.1	0.0	0.0	0.0
Arizona	MOE	(0.5)	(0.4)	(0.1)			(0.5)	(0.1)	(0.1)	(0.1)
California	Est	1.3	0.4	0.4	**	**	1.4	0.2	0.3	**
California	MOE	(2.0)	(1.3)	0.6			(1.4)	(1.0)	(0.5)	
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									

Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-1.1	-0.4	-0.1	0.0	-0.1	-0.4	-0.4	-0.1	-0.3
Idaho	MOE	(2.3)	(1.2)	(0.7)	(0.1)	(0.1)	(1.2)	(1.2)	(0.7)	(0.6)
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.1	0.3	0.2	**	**	0.3	0.3	**	**
Montana	MOE	(0.8)	(0.5)	(0.4)			(0.5)	(0.5)		
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**

New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	-4.8	-2.6	-1.7	0.7	-0.3	-3.1	-1.3	-0.6	-1.4
Oregon	MOE	(8.7)	(6.8)	(5.0)	(3.1)	(0.6)	(6.8)	(5.3)	(4.2)	(1.2)
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	0.1	0.1	**	**	**	0.1	0.1	**	**
Utah	MOE	(0.3)	(0.3)				(0.0)	(0.3)		

Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	-0.1	0.0	0.0	0.0	**	0.0	0.0	0.0	**
National	MOE	(0.3)	(0.2)	(0.1)	(0.1)		(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 65 - 2011-2015 non-Federal rangeland where montane/intermontane juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Montane/Intermontane Junipers Are Present	At Least 5% Foliar Cover Of Montane/Intermontane Junipers	At Least 15% Foliar Cover Of Montane/Intermontane Junipers	At Least 30% Foliar Cover Of Montane/Intermontane Junipers	At Least 50% Foliar Cover Of Montane/Intermontane Junipers	At Least 5% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 15% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 30% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 50% Relative Plant Canopy Cover Of Montane/Intermontane

							Junipers	Junipers	Junipers	Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.2	0.2	**	**	**	0.2	0.2	**	**
Arizona	MOE	(0.3)	(0.3)				(0.3)	(0.3)		
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	3.2	1.4	0.6	0.1	**	1.7	1.1	0.4	0.1
Colorado	MOE	(2.0)	(1.4)	(0.9)	(0.2)		(1.5)	(1.1)	(0.5)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	1.7	0.7	**	**	**	0.4	**	**	**
Idaho	MOE	(1.7)	(1.1)				(0.8)			
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	3.7	1.0	**	**	**	1.8	**	**	**
Montana	MOE	(2.3)	(0.9)				(1.5)			
Nebraska	Est	0.1	0.1	**	**	**	0.1	**	**	**
Nebraska	MOE	(0.1)	(0.1)				(0.1)			
Nevada	Est	6.3	3.7	1.4	**	**	4.8	2.9	0.7	0.7
Nevada	MOE	(4.0)	(3.4)	2.8			(4.0)	(3.3)	(1.4)	(1.4)
New Mexico	Est	1.1	0.2	**	**	**	0.9	0.1	**	**
New Mexico	MOE	(1.0)	(0.3)				(0.9)	(0.3)		
North Dakota	Est	0.2	**	**	**	**	**	**	**	**

North Dakota	MOE	(0.5)								
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	0.5	0.1	**	**	**	0.1	**	**	**
South Dakota	MOE	(0.7)	(0.3)				(0.3)			
Texas	Est	0.1	0.1	**	**	**	0.1	**	**	**
Texas	MOE	(0.2)	(0.1)				(0.2)			
Utah	Est	13.4	9.2	4.4	1.0	**	11.3	7.6	2.3	0.6
Utah	MOE	(5.0)	(4.3)	(3.5)	(1.4)		(4.3)	(4.0)	(2.0)	(0.7)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.7	0.1	**	**	**	0.1	**	**	**
Wyoming	MOE	(0.4)	(0.3)				(0.3)			
National	Est	1.3	0.6	0.2	**	**	0.8	0.4	0.1	**
National	MOE	(0.3)	(0.2)	(0.1)			(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 66 - 2004-2010 non-Federal rangeland where montane/intermontane juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Montane/Intermontane Junipers Are Present	At Least 5% Foliar Cover Of Montane/Intermontane	At Least 15% Foliar Cover Of Montane/Intermontane	At Least 30% Foliar Cover Of Montane/Intermontane	At Least 50% Foliar Cover Of Montane/Intermontane	At Least 5% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 15% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 30% Relative Plant Canopy Cover Of Montane/Intermontane	At Least 50% Relative Plant Canopy Cover Of Montane/Intermontane

			Junipers	Junipers	Junipers	Junipers	Junipers	Junipers	Junipers	Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	6.7	3.7	0.9	**	**	4.9	3.6	1.0	0.2
Arizona	MOE	(2.3)	(1.6)	(0.7)			(1.7)	(1.6)	(0.9)	(0.3)
California	Est	1.5	0.3	**	**	**	0.6	0.3	0.1	0.1
California	MOE	(2.2)	(0.6)				(1.1)	(0.6)	(0.1)	(0.1)
Colorado	Est	3.7	2.3	0.9	0.3	**	3.1	1.7	1.2	0.4
Colorado	MOE	(2.0)	(1.3)	(0.6)	(0.5)		(1.6)	(1.0)	(0.8)	(0.5)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	3.2	2.4	0.9	0.4	0.2	2.4	0.9	0.4	0.4
Idaho	MOE	(2.0)	(1.8)	(1.1)	(0.9)	(0.4)	(1.8)	(1.1)	(0.9)	(0.9)
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	3.7	1.1	0.7	0.1	**	1.5	0.8	0.5	0.2
Montana	MOE	(1.5)	(0.7)	(0.6)	(0.2)		(0.9)	(0.6)	(0.5)	(0.4)
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	3.5	2.4	1.4	0.4	**	2.8	2.2	1.8	0.7
Nevada	MOE	(2.0)	(1.7)	(1.3)	(0.8)		(1.8)	(1.6)	(1.4)	(1.0)
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	0.3	0.1	**	**	**	0.1	**	**	**

North Dakota	MOE	(0.4)	(0.1)				(0.1)			
Oklahoma	Est	0.1	**	**	**	**	0.1	**	**	**
Oklahoma	MOE	(0.1)					(0.1)			
Oregon	Est	0.4	**	**	**	**	**	**	**	**
Oregon	MOE	(0.8)								
South Dakota	Est	0.1	0.1	**	**	**	0.1	**	**	**
South Dakota	MOE	(0.1)	(0.1)				(0.1)			
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	14.7	9.8	3.7	1.4	**	12.2	7.3	4.8	2.0
Utah	MOE	(4.1)	(3.6)	(2.1)	(1.3)		(3.8)	(2.7)	(1.9)	(1.8)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	2.7	1.7	0.9	0.3	**	1.7	1.0	0.9	**
Wyoming	MOE	(2.0)	(1.9)	(1.5)	(0.6)		(2.0)	(1.5)	(1.5)	
National	Est	1.9	1.0	0.4	0.1	**	1.3	0.8	0.4	0.1
National	MOE	(0.3)	(0.2)	(0.2)	(0.1)		(0.3)	(0.2)	(0.2)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 67 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where montane/intermontane juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Montane/Intermontane Junipers Are Present	At Least 5% Foliar Cover Of Montane/Intermontane	At Least 15% Foliar Cover Of Montane/Intermontane	At Least 30% Foliar Cover Of Montane/Intermontane	At Least 50% Foliar Cover Of Montane/Intermontane	At Least 5% Relative Plant Canopy Cover Of Montane/Intermonta	At Least 15% Relative Plant Canopy Cover Of Montane/Intermonta	At Least 30% Relative Plant Canopy Cover Of Montane/Intermonta	At Least 50% Relative Plant Canopy Cover Of Montane/Intermonta

			Junipers	Junipers	Junipers	Junipers	ne Junipers	ne Junipers	ne Junipers	ne Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-6.6	-3.5	-0.9	**	**	-4.8	-3.5	-1.0	-0.2
Arizona	MOE	(2.3)	(1.6)	(0.7)			(1.8)	(1.7)	(0.9)	(0.3)
California	Est	-1.5	-0.3	**	**	**	-0.6	-0.3	-0.1	-0.1
California	MOE	(2.2)	(0.6)				(1.1)	(0.6)	(0.1)	(0.1)
Colorado	Est	-0.6	-0.9	-0.3	-0.2	**	-1.4	-0.6	-0.8	-0.3
Colorado	MOE	(2.2)	(1.7)	(1.0)	(0.5)		(1.6)	(1.1)	(1.0)	(0.5)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	-1.5	-1.6	-0.9	-0.4	-0.2	-2.1	-0.9	-0.4	-0.4
Idaho	MOE	(2.5)	(2.2)	(1.1)	(0.9)	(0.4)	(2.1)	(1.1)	(0.9)	(0.9)
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.0	-0.1	-0.7	-0.1	**	0.3	-0.8	-0.5	-0.2
Montana	MOE	(2.4)	(1.1)	(0.6)	(0.2)		(1.7)	(0.6)	(0.5)	(0.4)
Nebraska	Est	0.1	0.1	**	**	**	0.1	**	**	**
Nebraska	MOE	(0.1)	(0.1)				(0.1)			
Nevada	Est	2.7	1.3	0.1	-0.4	**	2.0	0.7	-1.1	0.0
Nevada	MOE	(3.5)	(3.0)	(2.7)	(0.8)		(3.3)	(2.9)	(1.8)	(1.2)
New Mexico	Est	1.1	0.2	**	**	**	0.9	0.1	**	**
New Mexico	MOE	(1.0)	(0.3)				(0.9)	(0.3)		
North Dakota	Est	-0.1	-0.1	**	**	**	-0.1	**	**	**

North Dakota	MOE	(0.4)	(0.1)				(0.1)			
Oklahoma	Est	-0.1	**	**	**	**	-0.1	**	**	**
Oklahoma	MOE	(0.1)					(0.1)			
Oregon	Est	-0.4	**	**	**	**	**	**	**	**
Oregon	MOE	(0.8)								
South Dakota	Est	0.4	0.1	**	**	**	0.1	**	**	**
South Dakota	MOE	(0.7)	(0.3)				(0.3)			
Texas	Est	0.1	0.1	**	**	**	0.1	**	**	**
Texas	MOE	(0.2)	(0.1)				(0.2)			
Utah	Est	-1.3	-0.7	0.7	-0.4	0	-0.9	0.3	-2.5	-1.5
Utah	MOE	(4.9)	(4.4)	(2.9)	(1.7)		(4.2)	(4.3)	(2.2)	(1.7)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	-2.0	-1.5	-0.9	-0.3	**	-1.6	-1.0	-0.9	**
Wyoming	MOE	(2.1)	(2.0)	(1.5)	(0.6)		(2.0)	(1.5)	(1.5)	
National	Est	-0.6	-0.4	-0.2	-0.1	**	-0.5	-0.5	-0.3	-0.1
National	MOE	(0.4)	(0.3)	(0.2)	(0.1)		(0.4)	(0.2)	(0.2)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 68 - 2011-2015 non-Federal rangeland where southern juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Southern Junipers Are Present	At Least 5% Foliar Cover Of Southern Junipers	At Least 15% Foliar Cover Of Southern Junipers	At Least 30% Foliar Cover Of Southern Junipers	At Least 50% Foliar Cover Of Southern Junipers	At Least 5% Relative Plant Canopy Cover Of Southern	At Least 15% Relative Plant Canopy Cover Of Southern	At Least 30% Relative Plant Canopy Cover Of Southern	At Least 50% Relative Plant Canopy Cover Of Southern

							Junipers	Junipers	Junipers	Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	11.0	5.3	0.8	**	**	9.7	4.7	1.8	0.7
Arizona	MOE	(5.3)	(2.9)	(1.2)			(5.0)	(2.6)	(1.8)	(1.1)
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	1.7	0.5	0.5	0.2	**	0.8	0.5	0.5	**
Colorado	MOE	(1.3)	(0.8)	(0.8)	(0.4)		(0.9)	(0.8)	(0.8)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	13.5	7.6	1.9	0.2	**	11.5	7.6	4.4	1.7
New Mexico	MOE	(3.7)	(2.9)	(1.8)	(0.4)		(3.6)	(2.9)	(2.4)	(1.4)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	0.2	**	**	**	**	**	**	**	**
Oklahoma	MOE	(0.5)								
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	13.4	7.6	3.5	1.9	0.2	8.9	5.8	2.8	1.0
Texas	MOE	(3.6)	(2.4)	(1.3)	(0.6)	(0.3)	(2.6)	(1.9)	(1.2)	(0.7)
Utah	Est	0.4	0.4	**	**	**	0.4	0.4	0.4	0.4
Utah	MOE	(1.0)	(1.0)				(1.0)	(1.0)	(1.0)	(1.0)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	5.5	3.0	1.1	0.5	0.1	4.1	2.5	1.3	0.5
National	MOE	(0.9)	(0.6)	(0.4)	(0.1)	(0.1)	(0.7)	(0.6)	(0.4)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 69 - 2004-2010 non-Federal rangeland where southern juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Southern Junipers Are Present	At Least 5% Foliar Cover Of Southern Junipers	At Least 15% Foliar Cover Of Southern Junipers	At Least 30% Foliar Cover Of Southern Junipers	At Least 50% Foliar Cover Of Southern Junipers	At Least 5% Relative Plant Canopy Cover Of Southern	At Least 15% Relative Plant Canopy Cover Of Southern	At Least 30% Relative Plant Canopy Cover Of Southern	At Least 50% Relative Plant Canopy Cover Of Southern

							Junipers	Junipers	Junipers	Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	8.1	5.2	1.5	**	**	7.0	4.0	2.1	1.1
Arizona	MOE	(2.5)	(2.1)	(0.9)			(2.4)	(1.9)	(1.4)	(0.9)
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	3.3	2.2	0.5	**	**	2.7	1.1	0.3	0.1
Colorado	MOE	(2.1)	(1.4)	(0.5)			(1.8)	(0.9)	(0.4)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.0	**	**	**	**	**	**	**	**
Montana	MOE	(0.1)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	8.4	3.1	0.8	0.1	**	6.2	2.8	1.4	0.4
New Mexico	MOE	(2.2)	(1.7)	(0.6)	(0.2)		(2.1)	(1.5)	(1.1)	(0.8)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	0.4	0.3	0.3	**	**	0.3	0.2	**	**
Oklahoma	MOE	(0.5)	(0.5)	(0.5)			(0.5)	(0.4)		
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	15.7	10.1	6.2	4.2	2.3	10.7	6.9	4.1	1.5
Texas	MOE	(2.4)	(1.7)	(1.5)	(1.3)	(0.8)	(1.8)	(1.5)	(1.2)	(0.6)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.2	**	**	**	**	0.1	**	**	**
Wyoming	MOE	(0.2)					(0.2)			
National	Est	5.5	3.3	1.7	1.0	0.5	3.9	2.3	1.3	0.5
National	MOE	(0.6)	(0.4)	(0.4)	(0.3)	(0.2)	(0.5)	(0.4)	(0.3)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 70 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where southern juniper species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Southern Junipers Are Present	At Least 5% Foliar Cover Of Southern Junipers	At Least 15% Foliar Cover Of Southern Junipers	At Least 30% Foliar Cover Of Southern Junipers	At Least 50% Foliar Cover Of Southern Junipers	At Least 5% Relative Plant Canopy Cover Of Southern	At Least 15% Relative Plant Canopy Cover Of Southern	At Least 30% Relative Plant Canopy Cover Of Southern	At Least 50% Relative Plant Canopy Cover Of Southern

							Junipers	Junipers	Junipers	Junipers
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	3.0	0.2	-0.7	**	**	2.8	0.7	-0.3	-0.3
Arizona	MOE	(5.5)	(3.6)	(1.5)			(5.2)	(3.1)	(2.4)	(1.3)
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	-1.6	-1.7	0.0	0.2	**	-1.8	-0.6	0.1	-0.1
Colorado	MOE	(2.2)	(1.3)	(0.8)	(0.4)		(1.8)	(1.0)	(0.8)	(0.2)
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.0	**	**	**	**	**	**	**	**
Montana	MOE	(0.1)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	5.1	4.6	1.2	0.1	**	5.3	4.8	3.0	1.3
New Mexico	MOE	(4.1)	(3.3)	(1.6)	(0.4)		(4.2)	(3.0)	(2.4)	(1.7)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	-0.2	-0.3	-0.3	**	**	-0.3	-0.2	**	**
Oklahoma	MOE	(0.6)	(0.5)	(0.5)			(0.5)	(0.4)		
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-2.3	-2.5	-2.7	-2.2	-2.0	-1.8	-1.0	-1.3	-0.5
Texas	MOE	(3.9)	(2.6)	(1.9)	(1.2)	(0.9)	(3.2)	(2.4)	(1.8)	(1.0)
Utah	Est	0.4	0.4	**	**	**	0.4	0.4	0.4	0.4
Utah	MOE	(1.0)	(1.0)				(1.0)	(1.0)	(1.0)	(1.0)
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	-0.2	**	**	**	**	-0.1	**	**	**
Wyoming	MOE	(0.2)					(0.2)			
National	Est	0.0	-0.3	-0.6	-0.5	-0.5	0.2	0.2	0.0	0.0
National	MOE	(1.1)	(0.7)	(0.6)	(0.3)	(0.2)	(0.9)	(0.7)	(0.5)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 71 - 2011-2015 non-Federal rangeland where all pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Full List) Are Present	At Least 5% Foliar Cover Of Pinyon Pines (Full List)	At Least 15% Foliar Cover Of Pinyon Pines (Full List)	At Least 30% Foliar Cover Of Pinyon Pines (Full List)	At Least 50% Foliar Cover Of Pinyon Pines (Full List)	At Least 5% Relative Plant Canopy Cover Of Pinyon Pines	At Least 15% Relative Plant Canopy Cover Of Pinyon Pines	At Least 30% Relative Plant Canopy Cover Of Pinyon Pines	At Least 50% Relative Plant Canopy Cover Of Pinyon Pines

							(Full List)	(Full List)	(Full List)	(Full List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.3	**	**	**	**	0.3	0.3	**	**
Arizona	MOE	(0.6)					(0.6)	(0.6)		
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	1.7	0.3	**	**	**	1.0	**	**	**
Colorado	MOE	(1.6)	(0.7)				(1.2)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	1.5	1.4	0.3	0.3	**	1.4	1.1	0.6	0.3
Nevada	MOE	(1.9)	(1.9)	(0.6)	(0.6)		(1.9)	(1.6)	(1.2)	(0.6)
New Mexico	Est	6.0	2.0	0.5	0.1	**	4.2	1.7	0.3	0.1
New Mexico	MOE	(2.9)	(1.6)	(0.8)	(0.2)		(2.3)	(1.3)	(0.4)	(0.2)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**

Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	8.9	4.6	1.3	0.4	**	6.9	3.2	2.2	1.2
Utah	MOE	(4.1)	(3.0)	(1.4)	(0.5)		(4.0)	(2.3)	(1.9)	(1.3)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									

National	Est	1.0	0.4	0.1	**	**	0.7	0.3	0.1	**
National	MOE	(0.3)	(0.2)	(0.1)			(0.3)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 72 - 2004-2010 non-Federal rangeland where all pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Full List) Are Present	At Least 5% Foliar Cover Of Pinyon Pines (Full List)	At Least 15% Foliar Cover Of Pinyon Pines (Full List)	At Least 30% Foliar Cover Of Pinyon Pines (Full List)	At Least 50% Foliar Cover Of Pinyon Pines (Full List)	At Least 5% Relative Plant Canopy Cover Of Pinyon Pines (Full List)	At Least 15% Relative Plant Canopy Cover Of Pinyon Pines (Full List)	At Least 30% Relative Plant Canopy Cover Of Pinyon Pines (Full List)	At Least 50% Relative Plant Canopy Cover Of Pinyon Pines (Full List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	4.7	3.0	0.5	**	**	3.4	1.8	0.5	**
Arizona	MOE	(2.2)	(1.7)	(0.5)			(2.0)	(1.1)	(0.5)	
California	Est	0.4	**	**	**	**	**	**	**	**

California	MOE	(0.8)								
Colorado	Est	3.4	1.7	0.5	**	**	2.3	1.1	0.4	**
Colorado	MOE	(1.5)	(1.3)	(0.6)			(1.3)	(0.8)	(0.5)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									

Nevada	Est	3.3	2.5	1.7	0.6	**	2.9	2.5	2.1	1.5
Nevada	MOE	(2.6)	(2.2)	(1.5)	(0.9)		(2.2)	(2.2)	(2.0)	(1.3)
New Mexico	Est	3.0	1.1	0.2	0.1	**	2.0	1.3	0.3	**
New Mexico	MOE	(1.8)	(0.8)	(0.3)	(0.1)		(1.3)	(1.1)	(0.4)	
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.2	0.1	0.1	**	**	0.1	0.1	**	**

Texas	MOE	(0.3)	(0.2)	(0.2)			(0.2)	(0.2)		
Utah	Est	6.7	3.7	1.3	0.3	**	5.8	3.0	2.4	0.6
Utah	MOE	(2.6)	(1.8)	(1.4)	(0.6)		(2.3)	(1.9)	(1.8)	(1.1)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.2	0.6	0.2	**	**	0.8	0.5	0.2	**
National	MOE	(0.2)	(0.2)	(0.1)			(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 73 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where all pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Full	At Least 5%	At Least 15%	At Least 30%	At Least 50%	At Least 5%	At Least 15%	At Least 30%	At Least 50%

		List) Are Present	Foliar Cover Of Pinyon Pines (Full List)	Foliar Cover Of Pinyon Pines (Full List)	Foliar Cover Of Pinyon Pines (Full List)	Foliar Cover Of Pinyon Pines (Full List)	Relative Plant Canopy Cover Of Pinyon Pines (Full List)	Relative Plant Canopy Cover Of Pinyon Pines (Full List)	Relative Plant Canopy Cover Of Pinyon Pines (Full List)	Relative Plant Canopy Cover Of Pinyon Pines (Full List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-4.4	-3.0	-0.5	**	**	-3.1	-1.5	-0.5	**
Arizona	MOE	(2.4)	(1.7)	(0.5)			(2.2)	(1.4)	(0.5)	
California	Est	-0.4	**	**	**	**	**	**	**	**
California	MOE	(0.8)								
Colorado	Est	-1.7	-1.5	-0.5	**	**	-1.3	-1.1	-0.4	**
Colorado	MOE	(2.1)	(1.4)	(0.6)			(1.5)	(0.8)	(0.5)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									

Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	-1.8	-1.1	-1.4	-0.3	**	-1.5	-1.4	-1.5	-1.2
Nevada	MOE	(2.8)	(2.5)	(1.3)	(0.9)		(2.5)	(2.4)	(1.9)	(1.3)
New Mexico	Est	3.0	0.8	0.3	0.0	**	2.2	0.5	0.1	0.1
New Mexico	MOE	(3.1)	(1.7)	(0.8)	(0.1)		(2.4)	(1.4)	(0.5)	(0.2)
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.2	-0.1	-0.1	**	**	-0.1	-0.1	**	**
Texas	MOE	(0.3)	(0.2)	(0.2)			(0.2)	(0.2)		
Utah	Est	2.3	0.9	0.0	0.0	**	1.2	0.2	-0.2	0.5
Utah	MOE	(4.7)	(3.3)	(1.8)	(0.7)		(3.9)	(2.8)	(2.7)	(1.6)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									

Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	-0.2	-0.3	-0.1	**	**	-0.1	-0.2	-0.1	**
National	MOE	(0.4)	(0.3)	(0.1)			(0.3)	(0.2)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 74 - 2011-2015 non-Federal rangeland where two-needle and singleleaf pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Short List) Are Present	At Least 5% Foliar Cover Of Pinyon Pines (Short List)	At Least 15% Foliar Cover Of Pinyon Pines (Short List)	At Least 30% Foliar Cover Of Pinyon Pines (Short List)	At Least 50% Foliar Cover Of Pinyon Pines (Short List)	At Least 5% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 15% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 30% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 50% Relative Plant Canopy Cover Of Pinyon Pines (Short List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.3	**	**	**	**	0.3	0.3	**	**

Arizona	MOE	(0.6)					(0.6)	(0.6)		
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	1.7	0.3	**	**	**	1.0	**	**	**
Colorado	MOE	(1.6)	(0.7)				(1.2)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									

Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	1.5	1.4	0.3	0.3	**	1.4	1.1	0.6	0.3
Nevada	MOE	(1.9)	(1.9)	(0.6)	(0.6)		(1.9)	(1.6)	(1.2)	(0.6)
New Mexico	Est	6.0	2.0	0.5	0.1	**	4.2	1.7	0.3	0.1
New Mexico	MOE	(2.9)	(1.6)	(0.8)	(0.2)		(2.3)	(1.3)	(0.4)	(0.2)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**

South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	8.9	4.6	1.3	0.4	**	6.9	3.2	2.2	1.2
Utah	MOE	(4.1)	(3.0)	(1.4)	(0.5)		(4.0)	(2.3)	(1.9)	(1.3)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.0	0.4	0.1	**	**	0.7	0.3	0.1	**
National	MOE	(0.3)	(0.2)	(0.1)			(0.3)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 75 - 2004-2010 non-Federal rangeland where two-needle and singleleaf pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Short List) Are Present	At Least 5% Foliar Cover Of Pinyon Pines (Short List)	At Least 15% Foliar Cover Of Pinyon Pines (Short List)	At Least 30% Foliar Cover Of Pinyon Pines (Short List)	At Least 50% Foliar Cover Of Pinyon Pines (Short List)	At Least 5% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 15% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 30% Relative Plant Canopy Cover Of Pinyon Pines (Short List)	At Least 50% Relative Plant Canopy Cover Of Pinyon Pines (Short List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	4.7	3.0	0.5	**	**	3.4	1.8	0.5	**
Arizona	MOE	(2.2)	(1.7)	(0.5)			(2.0)	(1.1)	(0.5)	
California	Est	0.4	**	**	**	**	**	**	**	**
California	MOE	(0.8)								
Colorado	Est	3.4	1.7	0.5	**	**	2.3	1.1	0.4	**
Colorado	MOE	(1.5)	(1.3)	(0.6)			(1.3)	(0.8)	(0.5)	
Florida	Est	**	**	**	**	**	**	**	**	**

Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	3.3	2.5	1.7	0.6	**	2.9	2.5	2.1	1.5
Nevada	MOE	(2.6)	(2.2)	(1.5)	(0.9)		(2.2)	(2.2)	(2.0)	(1.3)
New Mexico	Est	3.0	1.1	0.2	0.1	**	2.0	1.3	0.3	**

New Mexico	MOE	(1.8)	(0.8)	(0.3)	(0.1)		(1.3)	(1.1)	(0.4)	
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	6.7	3.7	1.3	0.3	**	5.8	3.0	2.4	0.6
Utah	MOE	(2.6)	(1.8)	(1.4)	(0.6)		(2.3)	(1.9)	(1.8)	(1.1)

Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.2	0.6	0.2	**	**	0.8	0.5	0.2	**
National	MOE	(0.2)	(0.2)	(0.1)			(0.2)	(0.1)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 76 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where two-needle and singleleaf pinyon pine species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Pinyon Pines (Short List) Are Present	At Least 5% Foliar Cover Of Pinyon Pines (Short List)	At Least 15% Foliar Cover Of Pinyon Pines (Short List)	At Least 30% Foliar Cover Of Pinyon Pines (Short List)	At Least 50% Foliar Cover Of Pinyon Pines (Short List)	At Least 5% Relative Plant Canopy Cover Of Pinyon Pines	At Least 15% Relative Plant Canopy Cover Of Pinyon Pines	At Least 30% Relative Plant Canopy Cover Of Pinyon Pines	At Least 50% Relative Plant Canopy Cover Of Pinyon Pines

							(Short List)	(Short List)	(Short List)	(Short List)
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-4.4	-3.0	-0.5	**	**	-3.1	-1.5	-0.5	**
Arizona	MOE	(2.4)	(1.7)	(0.5)			(2.2)	(1.4)	(0.5)	
California	Est	-0.4	**	**	**	**	**	**	**	**
California	MOE	(0.8)								
Colorado	Est	-1.7	-1.5	-0.5	**	**	-1.3	-1.1	-0.4	**
Colorado	MOE	(2.1)	(1.4)	(0.6)			(1.5)	(0.8)	(0.5)	
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	-1.8	-1.1	-1.4	-0.3	**	-1.5	-1.4	-1.5	-1.2
Nevada	MOE	(2.8)	(2.5)	(1.3)	(0.9)		(2.5)	(2.4)	(1.9)	(1.3)
New Mexico	Est	3.0	0.8	0.3	0.0	**	2.2	0.5	0.1	0.1
New Mexico	MOE	(3.1)	(1.7)	(0.8)	(0.1)		(2.4)	(1.4)	(0.5)	(0.2)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**

Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.2)								
Utah	Est	2.3	0.9	0.0	0.0	**	1.2	0.2	-0.2	0.5
Utah	MOE	(4.7)	(3.3)	(1.8)	(0.7)		(3.9)	(2.8)	(2.7)	(1.6)
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									

National	Est	-0.2	-0.2	-0.1	**	**	-0.1	-0.2	-0.1	**
National	MOE	(0.4)	(0.3)	(0.1)			(0.3)	(0.2)	(0.1)	

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 77 - 2011-2015 non-Federal rangeland where mesquite species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Mesquite Are Present	At Least 5% Foliar Cover Of Mesquite	At Least 15% Foliar Cover Of Mesquite	At Least 30% Foliar Cover Of Mesquite	At Least 50% Foliar Cover Of Mesquite	At Least 5% Relative Plant Canopy Cover Of Mesquite	At Least 15% Relative Plant Canopy Cover Of Mesquite	At Least 30% Relative Plant Canopy Cover Of Mesquite	At Least 50% Relative Plant Canopy Cover Of Mesquite
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	18.4	8.8	2.7	0.8	**	16.4	8.8	3.2	1.4
Arizona	MOE	(5.5)	(3.7)	(1.8)	(1.0)		(5.3)	(3.9)	(1.9)	(1.2)
California	Est	**	**	**	**	**	**	**	**	**

California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**

Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	15.7	6.9	2.9	0.8	**	13.2	7.9	5.1	2.7
New Mexico	MOE	(3.8)	(2.5)	(2.2)	(1.0)		(3.7)	(3.4)	(2.5)	(2.2)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	6.9	3.5	1.9	0.8	0.3	3.9	1.6	0.1	0.1
Oklahoma	MOE	(3.4)	(1.8)	(1.3)	(1.0)	(0.7)	(1.9)	(1.4)	(0.7)	(0.7)
Oregon	Est	**	**	**	**	**	**	**	**	**

Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	54.0	33.4	16.8	7.6	2.5	41.4	24.8	11.4	3.6
Texas	MOE	(4.7)	(4.4)	(3.2)	(2.1)	(1.5)	(4.4)	(4.3)	(2.7)	(1.2)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	15.8	9.3	4.5	1.9	0.6	12.4	7.3	3.4	1.2

National	MOE	(1.3)	(1.1)	(0.8)	(0.6)	(0.3)	(1.2)	(1.1)	(0.7)	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 78 - 2004-2010 non-Federal rangeland where mesquite species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Mesquite Are Present	At Least 5% Foliar Cover Of Mesquite	At Least 15% Foliar Cover Of Mesquite	At Least 30% Foliar Cover Of Mesquite	At Least 50% Foliar Cover Of Mesquite	At Least 5% Relative Plant Canopy Cover Of Mesquite	At Least 15% Relative Plant Canopy Cover Of Mesquite	At Least 30% Relative Plant Canopy Cover Of Mesquite	At Least 50% Relative Plant Canopy Cover Of Mesquite
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	17.7	10.2	2.1	0.9	0.4	14.9	9.0	4.8	1.9
Arizona	MOE	(4.0)	(3.5)	(1.0)	(0.8)	(0.4)	(4.0)	(3.1)	(1.9)	(1.6)
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									

Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									

Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	0.3	0.3	**	**	**	0.3	0.3	**	**
Nevada	MOE	(0.5)	(0.5)				(0.5)	(0.5)		
New Mexico	Est	16.3	7.3	2.1	0.2	0.2	10.7	4.4	2.2	1.1
New Mexico	MOE	(3.3)	(2.0)	(1.1)	(0.4)	(0.4)	(2.3)	(1.4)	(1.1)	(0.6)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	6.6	3.5	1.9	1.0	0.4	3.3	1.4	0.7	0.2
Oklahoma	MOE	(2.2)	(1.6)	(1.2)	(0.8)	(0.4)	(1.3)	(1.0)	(0.8)	(0.4)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									

South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	47.7	29.7	15.4	7.1	2.3	30.9	14.4	5.5	1.3
Texas	MOE	(2.7)	(2.2)	(1.8)	(1.1)	(0.7)	(2.4)	(1.7)	(1.5)	(0.6)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	14.6	8.8	4.1	1.8	0.6	9.8	4.6	1.9	0.6
National	MOE	(0.8)	(0.6)	(0.5)	(0.3)	(0.2)	(0.7)	(0.5)	(0.4)	(0.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 79 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where mesquite species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Mesquite Are Present	At Least 5% Foliar Cover Of Mesquite	At Least 15% Foliar Cover Of Mesquite	At Least 30% Foliar Cover Of Mesquite	At Least 50% Foliar Cover Of Mesquite	At Least 5% Relative Plant Canopy Cover Of Mesquite	At Least 15% Relative Plant Canopy Cover Of Mesquite	At Least 30% Relative Plant Canopy Cover Of Mesquite	At Least 50% Relative Plant Canopy Cover Of Mesquite
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.7	-1.5	0.5	-0.1	-0.4	1.4	-0.2	-1.6	-0.5
Arizona	MOE	(7.5)	(5.2)	(1.8)	(1.2)	(0.4)	(7.1)	(5.5)	(2.9)	(2.0)
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**

Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**

Nebraska	MOE									
Nevada	Est	-0.3	-0.3	**	**	**	-0.3	-0.3	**	**
Nevada	MOE	(0.5)	(0.5)				(0.5)	(0.5)		
New Mexico	Est	-0.6	-0.5	0.9	0.5	-0.2	2.5	3.4	2.9	1.6
New Mexico	MOE	(4.6)	(3.4)	(2.5)	(1.0)	(0.4)	(4.1)	(4.0)	(2.8)	(2.4)
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	0.3	0.0	0.0	-0.2	0.0	0.5	0.2	-0.5	-0.1
Oklahoma	MOE	(3.4)	(2.1)	(1.6)	(1.1)	(0.6)	(1.9)	(1.6)	(0.9)	(0.6)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**

South Dakota	MOE									
Texas	Est	6.3	3.7	1.4	0.6	0.2	10.5	10.4	5.9	2.3
Texas	MOE	(5.0)	(4.7)	(2.9)	(2.3)	(1.5)	(4.5)	(3.9)	(2.8)	(1.4)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	1.2	0.5	0.3	0.1	0.0	2.6	2.7	1.5	0.6
National	MOE	(1.4)	(1.3)	(0.8)	(0.6)	(0.4)	(1.2)	(1.0)	(0.8)	(0.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 80 - 2011-2015 non-Federal rangeland where tamarix species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Tamarix* Are Present	At Least 5% Foliar Cover Of *Tamarix*	At Least 15% Foliar Cover Of *Tamarix*	At Least 30% Foliar Cover Of *Tamarix*	At Least 50% Foliar Cover Of *Tamarix*	At Least 5% Relative Plant Canopy Cover Of *Tamarix*	At Least 15% Relative Plant Canopy Cover Of *Tamarix*	At Least 30% Relative Plant Canopy Cover Of *Tamarix*	At Least 50% Relative Plant Canopy Cover of Tamarix
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	0.1	0.1	0.1	**	**	0.1	0.1	0.1	0.1
Arizona	MOE	(0.3)	(0.3)	(0.2)			(0.3)	(0.3)	(0.2)	(0.2)
California	Est	0.2	0.2	**	**	**	0.2	0.2	0.2	0.2
California	MOE	(0.4)	(0.4)				(0.4)	(0.4)	(0.4)	(0.4)
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									

Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**
Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	0.0	0.0	**	**	**	0.0	**	**	**
Montana	MOE	(0.1)	(0.1)				(0.1)			
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	0.5	**	**	**	**	0.5	**	**	**
Nevada	MOE	(1.1)					(1.1)			
New Mexico	Est	1.0	0.2	0.1	**	**	0.5	**	**	**
New Mexico	MOE	(0.8)	(0.3)	(0.2)			(0.6)			

North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	0.8	0.5	0.3	**	**	0.5	0.1	**	**
Oklahoma	MOE	(0.8)	(0.8)	(0.7)			(0.8)	(0.3)		
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.2	0.1	0.1	**	**	0.2	0.1	0.0	**
Texas	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)	(0.1)	
Utah	Est	1.5	1.3	0.8	0.1	**	1.4	1.2	0.4	**
Utah	MOE	(2.3)	(2.2)	(1.4)	(0.1)		(2.2)	(2.2)	(0.8)	
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	0.2	**	**	**	**	0.2	**	**	**
Wyoming	MOE	(0.5)					(0.5)			
National	Est	0.3	0.1	0.1	**	**	0.2	0.1	**	**
National	MOE	(0.1)	(0.1)	(0.1)			(0.1)	(0.1)		

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 81 - 2004-2010 non-Federal rangeland where tamarix species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Tamarix* Are Present	At Least 5% Foliar Cover Of *Tamarix*	At Least 15% Foliar Cover Of *Tamarix*	At Least 30% Foliar Cover Of *Tamarix*	At Least 50% Foliar Cover Of *Tamarix*	At Least 5% Relative Plant Canopy Cover Of *Tamarix*	At Least 15% Relative Plant Canopy Cover Of *Tamarix*	At Least 30% Relative Plant Canopy Cover Of *Tamarix*	*Tamarix* Are Present
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent

Arizona	Est	0.4	0.2	0.1	0.0	0.0	0.4	0.3	0.3	0.2
Arizona	MOE	(0.5)	(0.2)	(0.2)	(0.1)	(0.1)	(0.5)	(0.4)	(0.4)	(0.4)
California	Est	0.4	0.2	**	**	**	0.4	0.4	0.4	0.2
California	MOE	(0.6)	(0.4)				(0.6)	(0.6)	(0.6)	(0.5)
Colorado	Est	0.6	0.2	**	**	**	0.4	**	**	**
Colorado	MOE	(0.6)	(0.4)				(0.5)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	0.2	0.2	0.1	**	**	0.2	0.2	**	**
Kansas	MOE	(0.5)	(0.5)	(0.3)			(0.5)	(0.5)		
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									

Montana	Est	0.1	**	**	**	**	**	**	**	**
Montana	MOE	(0.2)								
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	0.8	0.5	0.0	**	**	0.8	0.5	0.3	0.0
Nevada	MOE	(1.0)	(0.6)	(0.1)			(1.0)	(0.6)	(0.5)	(0.1)
New Mexico	Est	0.6	0.3	0.0	**	**	0.3	0.2	0.1	0
New Mexico	MOE	(0.5)	(0.3)	(0.1)			(0.4)	(0.3)	(0.2)	
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	1.3	1.1	0.6	0.5	0.2	1.1	0.5	0.2	0.2
Oklahoma	MOE	(1.1)	(1.1)	(0.6)	(0.5)	(0.3)	(1.1)	(0.5)	(0.3)	(0.3)

Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.7	0.4	0.2	0.1	**	0.5	0.1	0.1	0.1
Texas	MOE	(0.8)	(0.5)	(0.3)	(0.3)		(0.6)	(0.3)	(0.3)	(0.3)
Utah	Est	0.5	0.1	0.1	**	**	0.2	0.1	**	**
Utah	MOE	(0.4)	(0.2)	(0.1)			(0.2)	(0.1)		
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	0.0	**	**	**	**	0.0	**	**	**
Wyoming	MOE	(0.1)					(0.1)			
National	Est	0.4	0.2	0.1	0.1	**	0.3	0.1	0.1	0.1

National	MOE	(0.2)	(0.1)	(0.1)	(0.1)		(0.2)	(0.1)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 82 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where tamarix species are present and where they cover at least 5%, 15%, 30%, or 50% of the soil surface or make up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	*Tamarix* Are Present	At Least 5% Foliar Cover Of *Tamarix*	At Least 15% Foliar Cover Of *Tamarix*	At Least 30% Foliar Cover Of *Tamarix*	At Least 50% Foliar Cover Of *Tamarix*	At Least 5% Relative Plant Canopy Cover Of *Tamarix*	At Least 15% Relative Plant Canopy Cover Of *Tamarix*	At Least 30% Relative Plant Canopy Cover Of *Tamarix*	At Least 50% Relative Plant Canopy Cover of Tamarix
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	-0.3	0.0	-0.1	0.0	0.0	-0.3	-0.1	-0.2	-0.2
Arizona	MOE	(0.5)	(0.3)	(0.3)	(0.1)	(0.1)	(0.5)	(0.5)	(0.5)	(0.5)
California	Est	-0.2	0.0	**	**	**	-0.2	-0.2	-0.2	0.0
California	MOE	(0.5)	(0.1)				(0.5)	(0.5)	(0.5)	(0.7)

Colorado	Est	-0.6	-0.2	**	**	**	-0.4	**	**	**
Colorado	MOE	(0.6)	(0.4)				(0.5)			
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	-0.2	-0.2	-0.1	**	**	-0.2	-0.2	**	**
Kansas	MOE	(0.5)	(0.5)	(0.3)			(0.5)	(0.5)		
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	-0.1	0.0	**	**	**	0.0	**	**	**
Montana	MOE	(0.3)	(0.1)				(0.1)			
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	-0.2	-0.5	0.0	**	**	-0.2	-0.5	-0.3	0.0

Nevada	MOE	(1.2)	(0.6)	(0.1)			(1.2)	(0.6)	(0.5)	(0.1)
New Mexico	Est	0.4	-0.1	0.1	**	**	0.1	-0.2	-0.1	**
New Mexico	MOE	(0.9)	(0.4)	(0.2)			(0.4)	(0.3)	(0.2)	
North Dakota	Est	**	**	**	**	**	**	**	**	**
North Dakota	MOE									
Oklahoma	Est	-0.5	-0.6	-0.3	-0.5	-0.2	-0.6	-0.4	-0.2	-0.2
Oklahoma	MOE	(1.1)	(1.1)	(0.8)	(0.5)	(0.3)	(1.1)	(0.5)	(0.3)	(0.3)
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.6	-0.3	-0.1	-0.1	**	-0.4	0.0	-0.1	-0.1
Texas	MOE	(0.8)	(0.4)	(0.3)	(0.3)		(0.6)	(0.2)	(0.2)	(0.3)

Utah	Est	1.0	1.2	0.7	0.1	**	1.2	1.1	0.4	**
Utah	MOE	(2.2)	(2.1)	(1.3)	(0.1)		(2.2)	(2.1)	(0.8)	
Washington	Est	**	**	**	**	**	**	**	**	**
Washington	MOE									
Wyoming	Est	0.2	**	**	**	**	0.2	**	**	**
Wyoming	MOE	(0.5)					(0.5)			
National	Est	-0.2	-0.1	0.0	-0.1	**	-0.1	-0.1	-0.1	-0.1
National	MOE	(0.2)	(0.1)	(0.1)	(0.1)		(0.2)	(0.1)	(0.1)	(0.1)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 83 - 2011-2015 non-Federal rangeland where multiflora rose is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Multiflora Rose Are Present	At Least 5% Foliar Cover Of	At Least 15% Foliar Cover Of	At Least 30% Foliar Cover Of	At Least 50% Foliar Cover Of	At Least 5% Relative Plant Canopy Cover	At Least 15% Relative Plant Canopy Cover	At Least 30% Relative Plant Canopy Cover	At Least 50% Relative Plant Canopy Cover

			Multiflora Rose	Multiflora Rose	Multiflora Rose	Multiflora Rose	Of Multiflora Rose	Of Multiflora Rose	Of Multiflora Rose	Of Multiflora Rose
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	0.4	**	**	**	**	**	**	**	**

Kansas	MOE	(0.5)								
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	2.7	**	**	**	**	**	**	**	**
Oklahoma	MOE	(2.2)								
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.1	**	**	**	**	**	**	**	**
National	MOE	(0.1)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 84 - 2004-2010 non-Federal rangeland where multiflora rose is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Multiflora Rose Are Present	At Least 5% Foliar Cover Of Multiflora Rose	At Least 15% Foliar Cover Of Multiflora Rose	At Least 30% Foliar Cover Of Multiflora Rose	At Least 50% Foliar Cover Of Multiflora Rose	At Least 5% Relative Plant Canopy Cover Of Multiflora Rose	At Least 15% Relative Plant Canopy Cover Of Multiflora Rose	At Least 30% Relative Plant Canopy Cover Of Multiflora Rose	At Least 50% Relative Plant Canopy Cover Of Multiflora Rose

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	0.2	**	**	**	**	**	**	**	**
Kansas	MOE	(0.3)								

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	0.3	0.0	**	**	**	0.0	**	**	**
Nebraska	MOE	(0.2)	(0.1)				(0.1)			
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	1.4	0.2	**	**	**	**	**	**	**
Oklahoma	MOE	(0.8)	(0.3)							
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.6	0.4	0.2	0.1	0.0	0.4	0.2	0.1	0.0
Texas	MOE	(0.4)	(0.3)	(0.2)	(0.1)	(0.1)	(0.3)	(0.2)	(0.1)	(0.1)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.2	0.1	**	**	**	0.1	**	**	**
National	MOE	(0.1)	(0.1)				(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 85 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where multiflora rose is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Multiflora Rose Are Present	At Least 5% Foliar Cover Of Multiflora Rose	At Least 15% Foliar Cover Of Multiflora Rose	At Least 30% Foliar Cover Of Multiflora Rose	At Least 50% Foliar Cover Of Multiflora Rose	At Least 5% Relative Plant Canopy Cover Of Multiflora Rose	At Least 15% Relative Plant Canopy Cover Of Multiflora Rose	At Least 30% Relative Plant Canopy Cover Of Multiflora Rose	At Least 50% Relative Plant Canopy Cover Of Multiflora Rose

		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	0.3	**	**	**	**	**	**	**	**
Kansas	MOE	(0.6)								

Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	-0.3	0.0	**	**	**	0.0	**	**	**
Nebraska	MOE	(0.2)	(0.1)				(0.1)			
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	1.3	-0.2	**	**	**	**	**	**	**
Oklahoma	MOE	(2.4)	(0.3)							
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.6	-0.4	-0.2	-0.1	0.0	-0.4	-0.2	-0.1	0.0
Texas	MOE	(0.4)	(0.3)	(0.2)	(0.1)	(0.1)	(0.3)	(0.2)	(0.1)	(0.1)
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	-0.1	-0.1	**	**	**	-0.1	**	**	**
National	MOE	(0.1)	(0.1)				(0.1)			

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 86 - 2011-2015 non-Federal rangeland where Japanese honeysuckle is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Honeysuckle Are Present	At Least 5% Foliar Cover Of Japanese Honeysuckle	At Least 15% Foliar Cover Of Japanese Honeysuckle	At Least 30% Foliar Cover Of Japanese Honeysuckle	At Least 50% Foliar Cover Of Japanese Honeysuckle	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Honeysuckle	Honeysuckle	Honeysuckle	Honeysuckle
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	0.9	**	**	**	**	**	**	**	**
Oklahoma	MOE	(1.8)								
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.0	**	**	**	**	**	**	**	**
National	MOE	(0.1)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 87 - 2004-2010 non-Federal rangeland where Japanese honeysuckle is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Honeysuckle Are Present	At Least 5% Foliar Cover Of Japanese Honeysuckle	At Least 15% Foliar Cover Of Japanese Honeysuckle	At Least 30% Foliar Cover Of Japanese Honeysuckle	At Least 50% Foliar Cover Of Japanese Honeysuckle	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Honeysuckle	Honeysuckle	Honeysuckle	Honeysuckle
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	6.2	**	**	**	**	**	**	**	**
Louisiana	MOE	(7.2)								
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	**
Oklahoma	MOE	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 88 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where Japanese honeysuckle is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Japanese Honeysuckle Are Present	At Least 5% Foliar Cover Of Japanese Honeysuckle	At Least 15% Foliar Cover Of Japanese Honeysuckle	At Least 30% Foliar Cover Of Japanese Honeysuckle	At Least 50% Foliar Cover Of Japanese Honeysuckle	At Least 5% Relative Plant Canopy Cover Of Japanese	At Least 15% Relative Plant Canopy Cover Of Japanese	At Least 30% Relative Plant Canopy Cover Of Japanese	At Least 50% Relative Plant Canopy Cover Of Japanese

							Honeysuckle	Honeysuckle	Honeysuckle	Honeysuckle
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	-6.2	**	**	**	**	**	**	**	**
Louisiana	MOE	(7.2)								
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	0.7	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	**
Oklahoma	MOE	(1.9)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	-0.1	**	**	**	**	**	**	**	**
Texas	MOE	(0.1)								
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	0.0	**	**	**	**	**	**	**	**
National	MOE	(0.1)								

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 89 - 2011-2015 non-Federal rangeland where common buckthorn is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Buckthorn Are Present	At Least 5% Foliar Cover Of Common Buckthorn	At Least 15% Foliar Cover Of Common Buckthorn	At Least 30% Foliar Cover Of Common Buckthorn	At Least 50% Foliar Cover Of Common Buckthorn	At Least 5% Relative Plant Canopy Cover Of Common	At Least 15% Relative Plant Canopy Cover Of Common	At Least 30% Relative Plant Canopy Cover Of Common	At Least 50% Relative Plant Canopy Cover Of Common

							Buckthorn	Buckthorn	Buckthorn	Buckthorn
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 90 - 2004-2010 non-Federal rangeland where common buckthorn is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Buckthorn Are Present	At Least 5% Foliar Cover Of Common Buckthorn	At Least 15% Foliar Cover Of Common Buckthorn	At Least 30% Foliar Cover Of Common Buckthorn	At Least 50% Foliar Cover Of Common Buckthorn	At Least 5% Relative Plant Canopy Cover Of Common	At Least 15% Relative Plant Canopy Cover Of Common	At Least 30% Relative Plant Canopy Cover Of Common	At Least 50% Relative Plant Canopy Cover Of Common

							Buckthorn	Buckthorn	Buckthorn	Buckthorn
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
Oregon	Est	**	**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 91 - Change between 2004-2010 and 2011-2015 in non-Federal rangeland where common buckthorn is present and where it covers at least 5%, 15%, 30%, or 50% of the soil surface or makes up at least 5%, 15%, 30%, or 50% of the relative plant canopy cover (composition), by state, with margins of error.

State	Type	Common Buckthorn Are Present	At Least 5% Foliar Cover Of Common Buckthorn	At Least 15% Foliar Cover Of Common Buckthorn	At Least 30% Foliar Cover Of Common Buckthorn	At Least 50% Foliar Cover Of Common Buckthorn	At Least 5% Relative Plant Canopy Cover Of Common	At Least 15% Relative Plant Canopy Cover Of Common	At Least 30% Relative Plant Canopy Cover Of Common	At Least 50% Relative Plant Canopy Cover Of Common

							Buckthorn	Buckthorn	Buckthorn	Buckthorn
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Arizona	Est	**	**	**	**	**	**	**	**	**
Arizona	MOE									
California	Est	**	**	**	**	**	**	**	**	**
California	MOE									
Colorado	Est	**	**	**	**	**	**	**	**	**
Colorado	MOE									
Florida	Est	**	**	**	**	**	**	**	**	**
Florida	MOE									
Idaho	Est	**	**	**	**	**	**	**	**	**
Idaho	MOE									
Kansas	Est	**	**	**	**	**	**	**	**	**

Kansas	MOE									
Louisiana	Est	**	**	**	**	**	**	**	**	**
Louisiana	MOE									
Montana	Est	**	**	**	**	**	**	**	**	**
Montana	MOE									
Nebraska	Est	**	**	**	**	**	**	**	**	**
Nebraska	MOE									
Nevada	Est	**	**	**	**	**	**	**	**	**
Nevada	MOE									
New Mexico	Est	**	**	**	**	**	**	**	**	**
New Mexico	MOE									
North Dakota	Est	**	**	**	**	**	**	**	**	**

North Dakota	MOE									
Oklahoma	Est	**	**	**	**	**	**	**	**	**
Oklahoma	MOE									
		**								
Oregon	Est		**	**	**	**	**	**	**	**
Oregon	MOE									
South Dakota	Est	**	**	**	**	**	**	**	**	**
South Dakota	MOE									
Texas	Est	**	**	**	**	**	**	**	**	**
Texas	MOE									
Utah	Est	**	**	**	**	**	**	**	**	**
Utah	MOE									
Washington	Est	**	**	**	**	**	**	**	**	**

Washington	MOE									
Wyoming	Est	**	**	**	**	**	**	**	**	**
Wyoming	MOE									
National	Est	**	**	**	**	**	**	**	**	**
National	MOE									

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

About the Data

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI). Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grass-like plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

These results are based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Current estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

Findings are presented here for non-Federal rangeland where invasive plant species groups (see Table 20) are present and where they cover at least 5, 15, 30, or 50 percent of the soil surface or make up at least 5, 15, 30, or 50 percent of the relative plant canopy cover (composition).

Quality assurance and statistical procedures are designed/developed to ensure data are scientifically legitimate. Irrespective of the scale of analysis, margins of error must be considered. Margins of error (at the 95 percent confidence level) are presented for all NRI estimates.

About the Line Point Intercept Protocol

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval (mark).

About the Invasive Plant Species Tables

The tables are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Tables summarize the percent of non-Federal land where invasive plant species groups: (1) are present; (2) cover at least 5, 15, 30, or 50 percent of the soil surface; and (3) make up at least 5, 15, 30, or 50 percent of the relative plant canopy cover (composition).

Presence is calculated as the percent of non-Federal rangeland where at least one of the species is observed. Plant canopy cover represents the proportion of the soil surface covered by an individual species. For each sample site, plant canopy cover is calculated as the percent of marks at which a plant in the invasive plant species group is observed. Relative plant canopy cover is an indicator of species composition and is calculated for each sample site as the percent of foliar observations that were in the invasive plant species group.

Three sets of tabular estimates are presented for the percent of non-Federal rangelands where the attribute of interest is observed: (1) during the period 2011 to 2015; (2) during the period 2004 to 2010; and (3) for the change between 2004 to 2010 and 2011 to 2015. All change is estimated as the difference in the estimated percentages for the two time periods. Margins of error (95 percent) are included with the estimates.

About the Invasive Plant Species Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S.

Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

Invasive plant species maps are displayed by classes (none, 1% or less, 1-5%, 5-20%, over 20%) of non-Federal rangeland where invasive plant species are present or where they cover at least 50 percent of the of the soil surface.

More Information

Ansley, R. J. H. a. B. K., 1997. *Mequite ecology.,* s.l.: Texas Agricultural Experiment Station, Vernon, TX 76384 (http://texnat.tamu.edu/library/symposia/brush-sculptors-innovations-for-tailoring-brushy-rangelands-to-enhance-wildlife-habitat-and-recreational-value/mesquite-ecology/).

Archer, S. D. S. a. E. H., 1995. Mechanisms of shrubland expansion: land use, climate or CO2?. *Climatic Change 29:91–99.*

Archer, S. K. D. T. E. F. K. M. B. W. a. K. P., 2011. *Brush Management as a Rangeland Conservation Tool: A Critical Evaluation. In: Briske, D.D., editor. 2011. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps.,* s.l.: United States Department of Agriculture, Natural Resources Conservation Service. (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?cid=stelprdb1045811 (last accessed11/07/2016)).

Archibold, O. D. B. a. L. D., 1997. Investigation of the invasive shrub European buckthorn, Rhamnus cathartica L., near Saskatoon, Saskatchewan. *Canadian Field-Naturalist [Can. Field-Nat.], vol. 111, no. 4, pp. 617-621, Dec 1997.*

Averill, K. M. a. A. D., 2007. Wild Parsnip (Pastinaca Sativa): A Troublesome Species of Increasing Concern. *Weed Technology: January 2007, Vol. 21, No. 1, pp. 279-287. (http://dx.doi.org/10.1614/WT-05-186.1).*

Bravo, M., 2005. Fact Sheet: Japanese Honysuckle. Plant Conservation Alliances's Alien Plant Working Group. *Weeds Gone Wild: Alien Plant Invader of Natural Areas. (https://www.nps.gov/plants/alien/fact/pdf/loja1.pdf).*

Bush, T., 2002. *Plant fact sheet for Kentucky Bluegrass (Poa pratensis L.),* s.l.: USDA NRCS Rose Lake Plant Materials Center East Lansing, Michigan. (https://plants.usda.gov/plantguide/pdf/pg_popr.pdf).

Bush, T., 2002. *Plant fact sheet for Smooth brome (Bromus inermis Leyss.),* s.l.: USDA NRCS Rose Lake Plant Materials Center East Lansing, Michigan. (https://plants.usda.gov/factsheet/pdf/fs_brin2.pdf).

Byrd, J. V. M. R. W., 2009. *Johnsongrass (Sorghum halepense (L.) Pers.). ,* s.l.: Mississippi State University. (http://www.gri.msstate.edu/publications/docs/2009/10/6563Johnsongrass_IPAMS.pdf).

Chambers, J. B. R. R. B. S. M. a. A. W., 2007. What makes Great Basin sagebrush ecosystems invasible by Bromus tectorum?. *Ecological Monographs. 77:117-145.*

DiTomaso, J., 1998. Impact, biology, and ecology of saltcedar (Tamarix spp.) in the southwestern United States. *Weed Technology 12:236-336.*

DiTomaso, J., 2000. Invasive weeds in ranelands: Speicies, impacts, and management.. *Weed Science: March 2000, vol. 48, No. 2, pp. 255-265.*

DiTomaso, J., 2000. *Invasive weeds in rangelands: Species, impacts, and management,* s.l.: Weed Science: March 2000, Vol. 48, No. 2, pp. 255-265. (http://library.ndsu.edu/tools/dspace/load/?file=/repository/bitstream/handle/10365/3250/1491di00.pdf?sequence=1).

Gucker, C., 2009. *Tanacetum vulgare. In: Fire Effects Information System, [Online].,* s.l.: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). (http://www.fs.fed.us/database/feis/).

Hall, M., 1996. *Agronomy Facts 50 Kentucky Bluegrass. Agronomy Facts 50 Kentucky Bluegrass,* s.l.: Penn State Cooperative Extension, College of Agricultural Sciences, Pennsylvania State University. (http://extension.psu.edu/plants/crops/forages/species/kentucky-bluegrass).

Hall, M., 2008. *Agronomy Facts 26 Reed Canarygrass,* s.l.: Penn State Cooperative Extension, College of Agricultural Sciences, Pennsylvania State University. (http://extension.psu.edu/plants/crops/forages/species/reed-canarygrass/extension_publication_file).

Hall, M., 2008. *Agronomy Facts 27 Smooth Bromegrass,* s.l.: Penn State Cooperative Extension, College of Agricultural Sciences, Pennsylvania State University. (http://extension.psu.edu/plants/crops/forages/species/smooth-bromegrass/extension_publication_file).

Johnson, J. A. G. a. J. S., 2007. *Managing Multiflora Rose,* s.l.: Conservation Reserve Enhancement Program (CREP) Technical Assistance Series2. U.S. Department of Agriculture and Pennsylvania State University. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_018028.pdf).

Klionsky, S. K. A. a. D. W., 2011. *Above- and Belowground Impacts of European Buckthorn (Rhamnus cathartica) on Four Native Forbs,* s.l.: Restoration Ecology Vol. 19, No. 6, pp. 728-727. November 2011.

Kyser, G. D. J. D. K. D. J. S. B., 2014. *Medusahead Management Guide for the Western States,* s.l.: University of California, Weed Research and Information Center, Davis. 68 p. Available at: wric.ucdavis.edu.

Lym, R., 2002. *Dalmatian toadflax and yellow toadflax(Linaria genistifolia spp. Dalmatica and Linaria vulgaris) identification and control. ,* s.l.: NDSU Extension Service, North Dakota State University, Fargo, North Dakota 58105.(https://www.ag.ndsu.edu/pubs/plantsci/weeds/w1239.pdf).

MDC, 2010. *Japanese Stiltgrass,* s.l.: Missouri Department of Conservation. (https://mdc.mo.gov/sites/default/files/resources/2010/08/9678_6624_0.pdf).

Miller, R. F., Tausch, R. J., McArthur, E. D. & Johnson, D. D., 2008.. *Age structure and expansion of pinon-juniper woodlands: a regional perspective in the Intermountain West,* s.l.: Res. Pap. RMRS-RP-69. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 15 p.

Morissette, J. T. J. C. S. U. A. C. W. P. J. A. G. J. E. S. T. J. a. S. J. L., 2006.. *A tamarisk habitat suitability map for the continental United States.,* s.l.: Frontiers in Ecology and the Environment, 4: 11-17.

NPS, 2011. *Buffelgrass Management,* s.l.: National Park Service, U.S. Department of the Interior.

Pavek, D., 1992. *Halogeton glomeratus. ,* s.l.: In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. (http://www.fs.fed.us/database/feis/plants/forb/halglo/all.html) .

PCA, 2005. *Fact Sheet: Common Buckthorn,* s.l.: Plant Conservation Alliance. (https://www.nps.gov/plants/alien/fact/pdf/rhca1.pdf).

Piper, C. S. S. T. W. a. E. L., 2015. *Smooth brome invasion increases rare soil bacterial species prevalence, bacterial species richness and evenness,* s.l.: Journal of Ecology 2015, 103, 386–396 (doi: 10.1111/1365-2745.12356).

Pratt, R., 2004. *Maine Invasive Plants: Garlic Mustard.,* s.l.: University of Maine Cooperative Extension. (http://www.nyis.info/user_uploads/files/Pratt%202004.pdf).

Scheinost, P. M. S. T. P., 2008. *Plant guide for Ventenata (Ventenata dubia (Leers) Coss.),* s.l.: USDA NRCS Pullman Plant Materials Center, Pullman, WA. (https://plants.usda.gov/plantguide/pdf/pg_vedu.pdf).

St.John, L. D. T. a. S. W., 2012. *Plant guide for Canada bluegrass (Poa compressa),* s.l.: USDA-Natural Resources Conservation Service, Plant Materials Center, Aberdeen, Idaho 83210 (https://plants.usda.gov/plantguide/pdf/pg_poco.pdf).

Stannard, M. a. W. C., 2002. *Plant Guide Reed Canarygrass,* s.l.: USDA NRCS, Pullman Plant Material Center, Pullman, WA. (https://plants.usda.gov/plantguide/pdf/pg_phar3.pdf).

Tausch, R. a. S. H., 2007. *Pinyon/Juniper Woodlands,* s.l.: USDA Forest Service Gen. Tech. Rep. RMRS-GTR-202.

Tellman, B., 2002. *Invasive Exotic Species in the Sonoran Desert Region,* s.l.: University of Arizona Press (www.desertmuseum.org/invaders).

Toledo, D. M. S. K. S. J. H. J. P., 2014. Extent of Kentucky Bluegrass and Its Effect on Native Plant Species Diversity and Ecosystem Services in the Northern Great Plains of the United States. *Invasive Plant Science and Management: October-December 2014, Vol. 7, No. 4, pp. 543-552. (http://dx.doi.org/10.1614/IPSM-D-14-00029.1).*

Wallace, N. M. J. A. L. a. F. L. L., 1992. Economic impact of leafy spurge on North Dakota wildland.. *North Dakota Farm Res.49:9-13.*

Wennerberg, S., 2004. *Plant Guide Kentucky bluegrass,* s.l.: USDA NRCS National Plant Data Center, Baton Rouge, Louisiana. (https://plants.usda.gov/plantguide/pdf/pg_popr.pdf).

Wenning, B., 2012. *Multiflora Rose: An Exotic Invasive Pleant Fact Sheet,* s.l.: In Invasive Plants. Ecological Landscape Alliance. July 16, 2012. (http://www.ecolandscaping.org/07/invasive-plants/multiflora-rose-an-exotic-invasive-plant-fact-sheet/).

More information about the USDA Plants Database may be found at http://plants.usda.gov/.

Related journal article: National Ecosystem Assessments Supported by Scientific and Local Knowledge, Frontiers in Ecology and the Environment, October 2010

Send comments and questions to the NRI Help Desk

Bare Ground, Inter-Canopy Gaps, and Soil Aggregate Stability

Bare ground, inter-canopy gap size, and soil aggregate stability data provide quantitative information for rangeland ecosystems. These data support the interpretations of the qualitative rangeland health summaries. Land managers and policymakers need this information to support strategic decisions and to identify the ecosystem processes that must be restored to improve the land to profitability, functional potential, and sustainability.

The findings are presented here for bare ground, inter-canopy gaps, and soil aggregate stability. The primary purpose of these quantitative data is to establish a baseline for long-term monitoring and to evaluate changes from the baseline data to monitor trends. These data can also be used to help support general interpretations of the findings of the rangeland health assessments. For example, areas of east-central Texas that show high levels of departure from expected soil and site stability conditions but also have relatively low percentages of bare ground. Together, this information may be used to ask whether this reflects soil degradation despite relatively low inter-canopy gaps of the current vegetative cover in this region or past soil degradation with presently recovered vegetation cover.

Bare ground, inter-canopy gaps, and soil aggregate stability data reflect differences in both the land's potential and in its current condition. For example, bare ground percentages are generally higher and soil aggregate stability is generally lower in arid regions, such as the southwestern United States, due to lower potential plant production, which is limited by low precipitation and high evapotranspiration. Within each region, the potential of the land varies with soil, topography and climate. This variability in land potential is reflected in the Ecological Site Descriptions.

Bare Ground

Bare ground is defined as soil that is not protected by plants (including lichens and moss), litter, standing dead vegetation, gravel, or rocks. Areas with high percentages of bare ground (soil) are at greater risk of runoff and erosion. Bare soil lacks protection from impacts of raindrops, detachment by wind, and temperature increases from exposure to the sun.

Inter-Canopy Gaps

Open spaces between canopies of plants are more prone to wind and water erosion, especially when the gaps contain high percentages of bare ground. Wind velocity near the soil surface is higher in large gaps making the soil more vulnerable to saltation (the process of soil particles being lifted and returned to the surface, dislodging other particles) and redistribution. In large gaps, soil particles picked up by moving water have little to prevent them from being carried downslope. Wind and water erosion degrade the soil and in higher concentrations can impact both the hydrology of a site and its biotic community.

Soil Aggregate Stability

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Field tests of soil aggregate stability can provide an indication of current conditions—soil structure may begin to deteriorate rapidly as the soil surface is subjected to destructive forces such as repeated raindrop impacts, machinery traffic, cultivation, and trampling, particularly if there are no organic matter inputs (roots and litter) that support regeneration of soil aggregates. Wind and water erosion can also degrade and remove the more stable aggregates that often occur at the soil surface in rangeland, exposing less stable aggregates below.

Soil aggregates are comprised of groups of soil particles that are bound together by biological agents such as fungi, bacteria, blue-green algae (cyanobacteria), and root exudates. Potential soil aggregate stability is determined by soil texture (soil particle size) and mineralogy, and the type and amount of organic matter inputs. Stable soil aggregates are integral to optimum infiltration capacity and resistance to water erosion. Aggregate stability is a good indicator of soil organic matter content and biological activity, and is correlated with soil nutrient cycling. Unstable aggregates are susceptible to disaggregation and dispersal during rainstorms and may form a hard physical crust on some soils when the soil dries. Physical crusts can restrict plant seedling emergence and are associated with decreased infiltration, higher runoff, and soil loss.

Key Findings

The average bare ground on non-Federal rangeland during 2011-2015 is highest in New Mexico (37.0 ±3.0 percent), Arizona (36.0 ±4.2 percent), Nevada (26.2 ±4.5 percent), Utah (24.0 ±3.6 percent), Colorado (22.0 ±2.1 percent), and Wyoming (19.8 ±2.4 percent) (Table 111).

Nationally, the average percent of bare ground on non-Federal rangeland increased slightly (3.0 ± 0.7 percent) between 2004-2010 and 2011-2015. Greatest increases in bare ground between 2004-2010 and 2011-2015 were observed in New Mexico (11.3 ± 2.7 percent), California (9.7 ± 5.2 percent), and Texas (7.5 ± 1.5 percent), while in Montana average bare ground decreased by 5.9 ± 1.7 percent between the same time periods (Table 112, Table 113).

Figures 1-2. Bare Ground on Non-Federal Rangeland. (Source: Table 111, Table 112, and Table 113**)**

Figure 1. 2004-2010

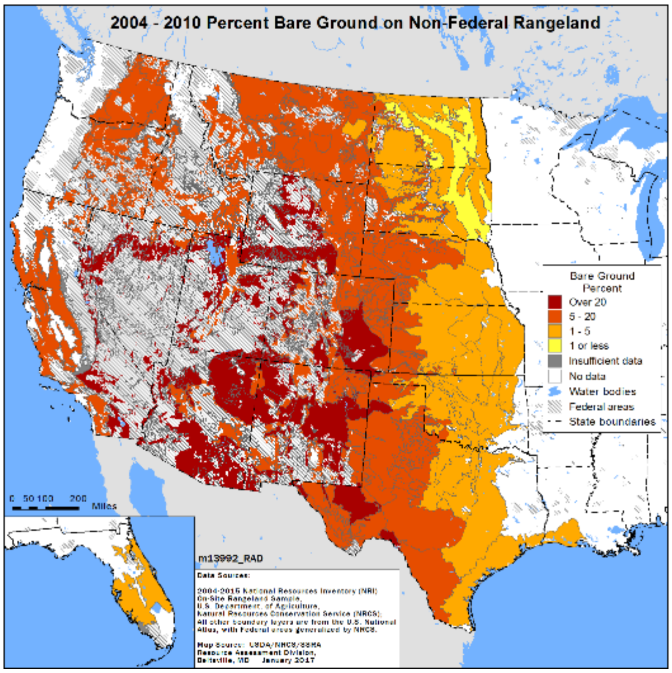
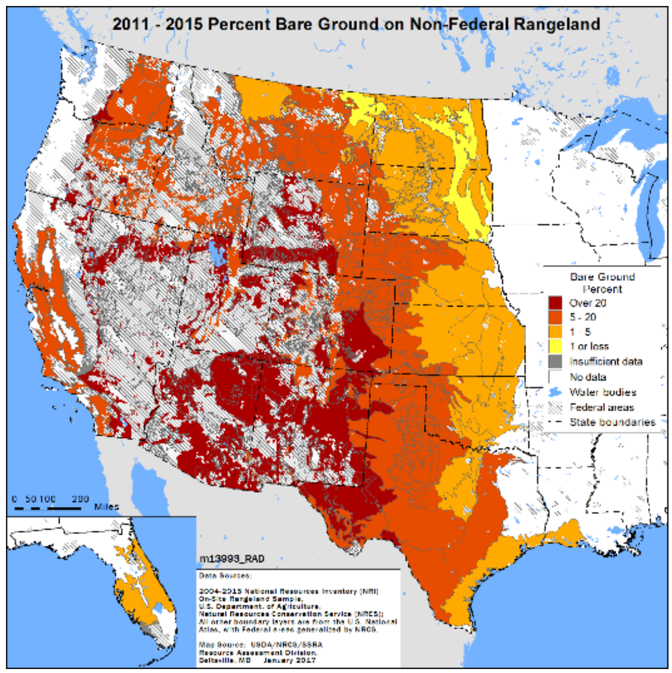


Figure 2. 2011-2015



The amount of non-Federal rangeland that is at least 50 percent bare ground during 2011-2015 was highest in Arizona (31.1 ±6.8 percent), New Mexico (28.6 ±5.7 percent), California (16.4 ±8.5 percent), Nevada (16.3 ±7.3), and Utah (13.1 ±5.9 percent) (Table 114).

The greatest increases between 2004-2010 and 2011-2015 in non-Federal rangeland that is at least 50 percent bare ground were observed in New Mexico (14.0 ±5.7 percent) and California (12.3 ±8.1 percent) (Table 115, Table 116).

Figures 3-4. Non-Federal Rangeland that is at Least 50% Bare Ground. (Source: Table 114, Table 115, and Table 116**)**

Figure 3. 2004-2010

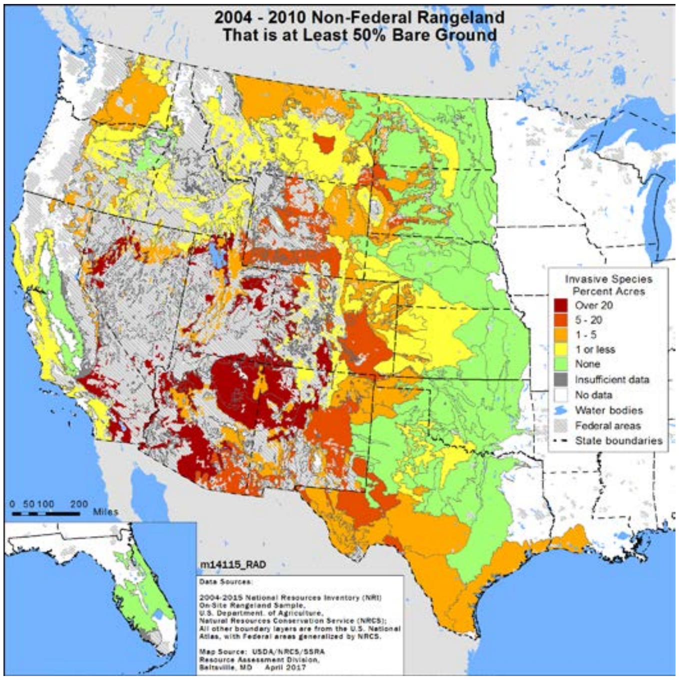
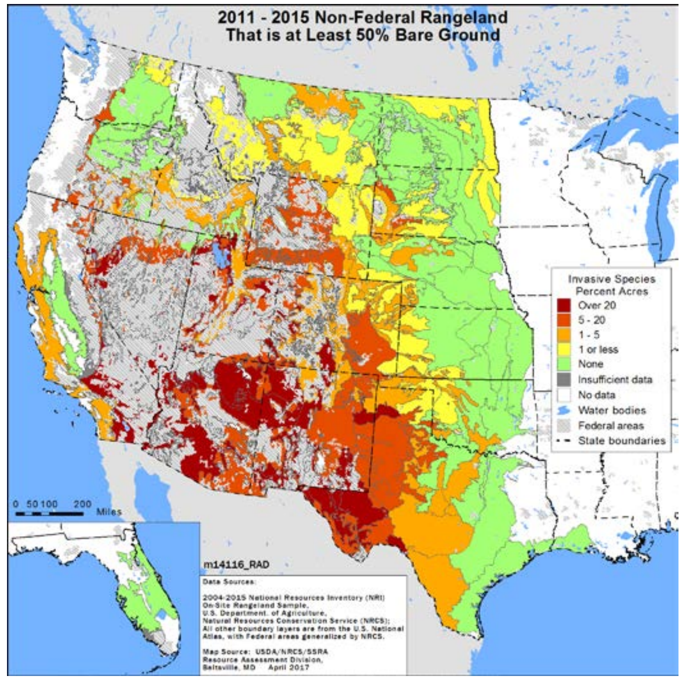


Figure 4. 2011-2015



Areas where large (at least 2-meter) canopy gaps account for at least 20 percent of the land are more susceptible to erosion and opportunity for establishment of invasive plant species. In Arizona, Nevada, California, Utah, and New Mexico, these areas make up 57.9 (±7.2), 42.1 (±7.4), 35.1 (±8.9), 33.2 (±8.5), and 31.3 (±4.7) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 117).

Between 2004-2010 and 2011-2015, New Mexico experienced the greatest increase (18.2 ±6.2 percent) in areas where canopy gaps of at least 2 meters account for at least 20 percent of non-Federal rangeland (Table 118, Table 119).

Figures 5-6. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land. (Source: Table 117, Table 118, and Table 119**)**

Figure 5. 2004-2010

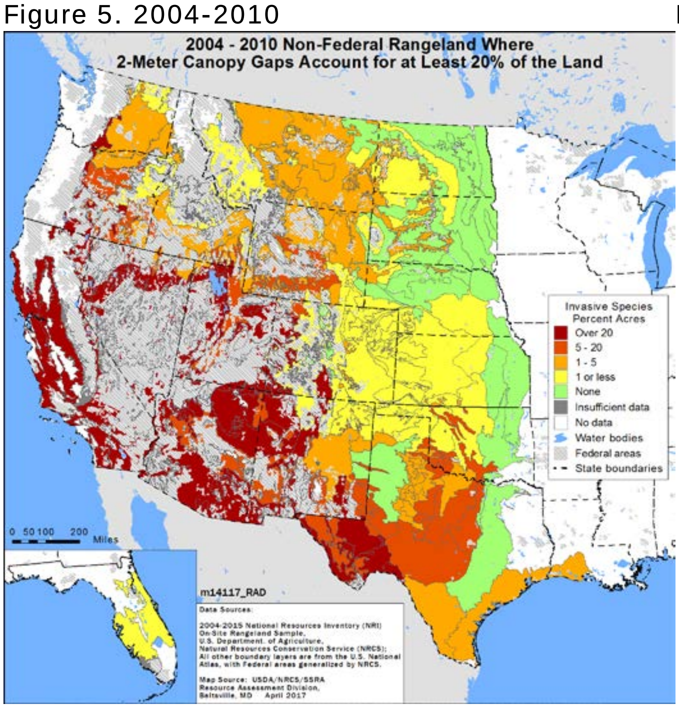
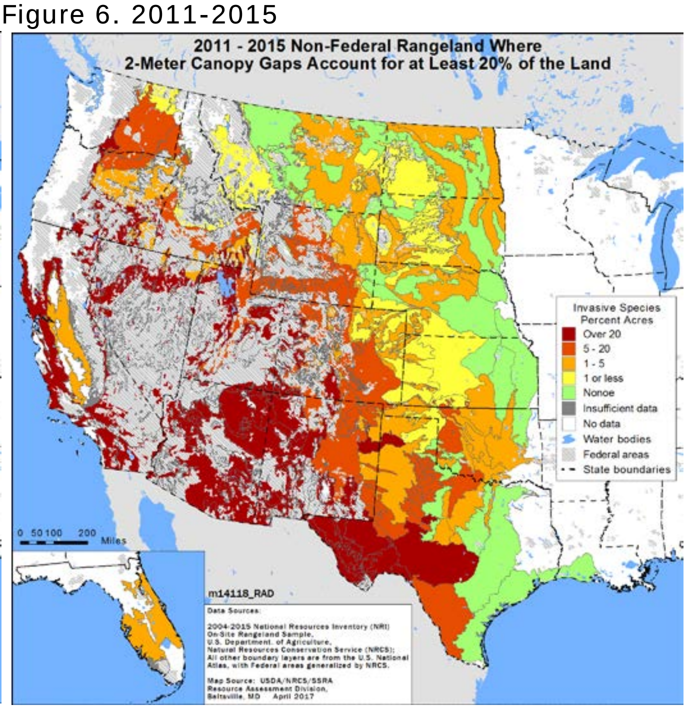


Figure 6. 2011-2015



Areas with canopy gaps are even more vulnerable to erosion and establishment of invasive species when the inter-canopy gaps have higher amounts of bare ground. In Arizona, New Mexico, Nevada, and California, areas where 2-meter canopy gaps account for at least 20 percent of the land and inter-canopy gaps are at least 50 percent bare ground comprise 30.6 (±7.3), 24.8 (±4.7), 21.4 (±7.2), and 19.8 (±8.9) percent, respectively, of non-Federal rangeland during 2011-2015 (Table 117).

Between 2004-2010 and 2011-2015, New Mexico (15.6 ±5.0 percent) and California (13.4 ±8.0 percent) experienced the greatest increase in non-Federal rangeland where 2-meter canopy gaps account for at least 20 percent of the land and inter-canopy gaps are at least 50 percent bare ground (Table 118, Table 119).

Figures 7-8. Non-Federal Rangeland Where 2-Meter Canopy Gaps Account for at Least 20 Percent of the Land and Inter-Canopy Gaps Are at Least 50% Bare Ground. (Source: Table 117, Table 118, and Table 119**)**

Figure 7. 2004-2010

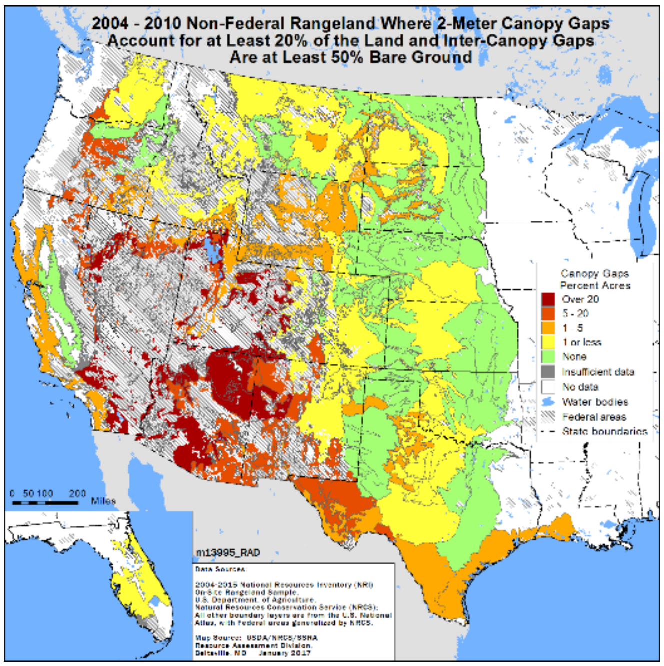
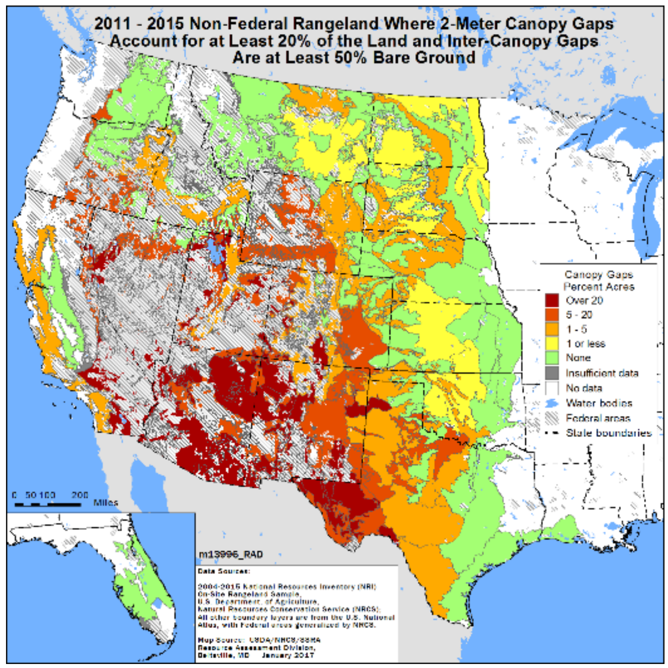


Figure 8. 2011-2015



Soil aggregate stability ratings of 4 or less are indicators of less stable soil. Nationally, 38.1 (±1.4) percent of non-Federal rangelands have soil aggregate stability ratings of 4 or less during 2011-2015 (Table 120). This was 6.3 (±1.8) percent increase over 2004-2010 (Table 121, Table 122).

Figures 9-10. Non-Federal Rangeland Where Soil Aggregate Stability[1] is Rated 4 or Less.
(Source: Table 120, Table 121, and Table 122**)**

Figure 9. 2004-2010

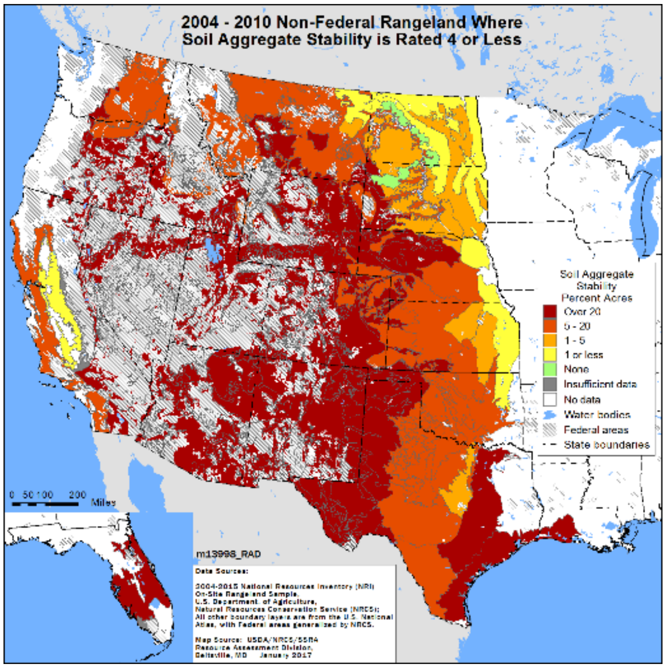
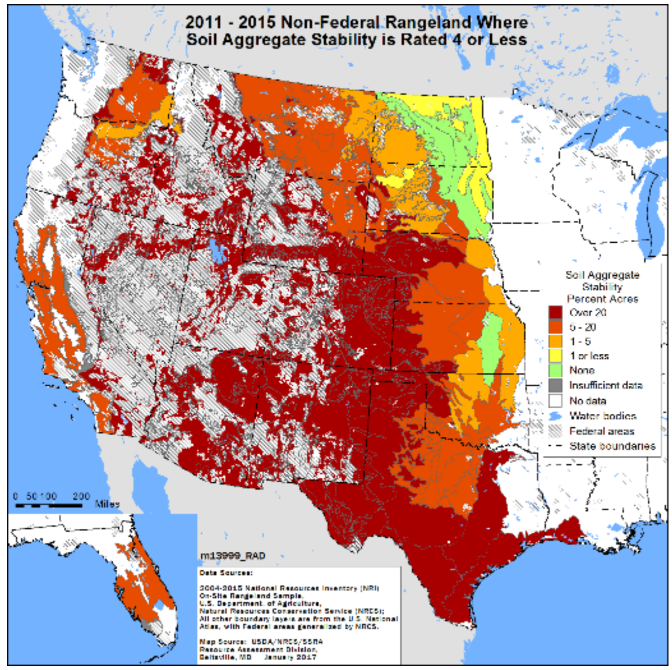


Figure 10. 2011-2015



[1] Soil aggregate stability ratings:
1 = 50% of structural integrity lost, (melts) within 5 seconds of immersion in water and less than 10% remains after 5 dipping cycles or soil too unstable to sample (falls through the sieve).
2 = 50% of structural integrity lost (melts) 5–30 seconds after immersion and less than 10% remains after 5 dipping cycles.
3 = 50% of structural integrity lost, (melts) 30–300 seconds after immersion or less than 10% remains on the sieve after five dipping cycles.
4 = 10–25% of original soil material remains on the sieve after five dipping cycles.
5 = 25–75% of original soil material remains on the sieve after five dipping cycles.
6 = 75–100% of original soil material remains on the sieve after five dipping cycles.

Tables and Results

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI), a sample survey using scientific statistical principles and procedures. These results, based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015, address status and change in conditions. These estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.
Margins of error are reported for each NRI estimate and must be considered at all scales of analysis.

The margin of error is used to construct the 95 percent confidence interval for the estimate. The lower bound of the interval is obtained by subtracting the margin of error from the estimate; the upper bound is obtained by adding the margin of error to the estimate. A 95 percent confidence interval means that in repeated samples from the same population, 95 percent of the time the true underlying population parameter will be contained within the lower and upper bounds of the interval.

In the following tables, estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 1 - Bare ground on non-Federal rangeland during 2011-2015, by state, with margins of error.

State	Type	Percent of Bare Ground
Arizona	Est	36.0
Arizona	MOE	(4.2)
California	Est	21.0
California	MOE	(5.4)
Colorado	Est	22.0
Colorado	MOE	(2.1)
Florida	Est	3.6
Florida	MOE	(1.6)
Idaho	Est	10.7
Idaho	MOE	(1.8)
Kansas	Est	4.4
Kansas	MOE	(0.7)
Louisiana	Est	0.5
Louisiana	MOE	(1.3)
Montana	Est	7.5
Montana	MOE	(1.7)
Nebraska	Est	7.9
Nebraska	MOE	(1.0)
Nevada	Est	26.2
Nevada	MOE	(4.5)
New Mexico	Est	37.0
New Mexico	MOE	(3.0)
North Dakota	Est	2.0
North Dakota	MOE	(0.6)
Oklahoma	Est	5.2

Oklahoma	MOE	(0.6)
Oregon	Est	16.0
Oregon	MOE	(2.7)
South Dakota	Est	2.7
South Dakota	MOE	(0.5)
Texas	Est	15.4
Texas	MOE	(1.5)
Utah	Est	24.0
Utah	MOE	(3.6)
Washington	Est	8.7
Washington	MOE	(2.1)
Wyoming	Est	19.8
Wyoming	MOE	(2.4)
National	Est	17.4
National	MOE	(0.6)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 2 - Bare ground on non-Federal rangeland during 2004-2010, by state, with margins of error.

State	Type	Percent of Bare Ground
Arizona	Est	37.3
Arizona	MOE	(2.6)
California	Est	11.3
California	MOE	(1.9)
Colorado	Est	20.3
Colorado	MOE	(1.1)
Florida	Est	4.0
Florida	MOE	(1.8)
Idaho	Est	12.9
Idaho	MOE	(1.2)
Kansas	Est	4.8
Kansas	MOE	(0.5)
Louisiana	Est	1.2
Louisiana	MOE	(1.6)
Montana	Est	13.3
Montana	MOE	(1.1)
Nebraska	Est	4.3
Nebraska	MOE	(0.5)
Nevada	Est	30.3
Nevada	MOE	(4.0)
New Mexico	Est	25.7

New Mexico	MOE	(2.0)
North Dakota	Est	2.7
North Dakota	MOE	(0.5)
Oklahoma	Est	3.1
Oklahoma	MOE	(0.4)
Oregon	Est	16.6
Oregon	MOE	(1.8)
South Dakota	Est	3.2
South Dakota	MOE	(0.6)
Texas	Est	7.9
Texas	MOE	(0.8)
Utah	Est	22.1
Utah	MOE	(2.2)
Washington	Est	10.5
Washington	MOE	(1.6)
Wyoming	Est	19.8
Wyoming	MOE	(2.2)
National	Est	14.4
National	MOE	(0.3)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 3 - Changes in bare ground on non-Federal rangeland between 2004-2010 and 2011-2015, by state, with margins of error.

State	Type	Percent of Bare Ground
Arizona	Est	-1.3
Arizona	MOE	(4.3)
California	Est	9.7
California	MOE	(5.2)
Colorado	Est	1.8
Colorado	MOE	(1.9)
Florida	Est	-0.4
Florida	MOE	(2.2)
Idaho	Est	-2.2
Idaho	MOE	(2.1)
Kansas	Est	-0.5
Kansas	MOE	(0.8)
Louisiana	Est	-0.7
Louisiana	MOE	(2.1)

Montana	Est	-5.9
Montana	MOE	(1.7)
Nebraska	Est	3.6
Nebraska	MOE	(1.0)
Nevada	Est	-4.1
Nevada	MOE	(6.0)
New Mexico	Est	11.3
New Mexico	MOE	(2.7)
North Dakota	Est	-0.7
North Dakota	MOE	(0.7)
Oklahoma	Est	2.1
Oklahoma	MOE	(0.7)
Oregon	Est	-0.6
Oregon	MOE	(2.6)
South Dakota	Est	-0.4
South Dakota	MOE	(0.8)
Texas	Est	7.5
Texas	MOE	(1.5)
Utah	Est	1.9
Utah	MOE	(4.4)
Washington	Est	-1.8
Washington	MOE	(2.6)
Wyoming	Est	0.0
Wyoming	MOE	(2.7)
National	Est	3.0
National	MOE	(0.7)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 4 - 2011-2015 non-Federal rangeland that is at least 20, 30, 40, or 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Is Bare Ground	At Least 30% Of The Land Is Bare Ground	At Least 40% Of The Land Is Bare Ground	At Least 50% Of The Land Is Bare Ground
Arizona	Est	66.9	55.2	42.8	31.1
Arizona	MOE	(7.9)	(9.0)	(8.1)	(6.8)
California	Est	37.2	25.1	20.7	16.4
California	MOE	(8.9)	(9.2)	(8.6)	(8.5)

Colorado	Est	43.2	29.8	17.1	8.7
Colorado	MOE	(4.4)	(5.7)	(4.8)	(3.3)
Florida	Est	3.2	0.6	0.6	**
Florida	MOE	(3.8)	(1.2)	(1.2)	
Idaho	Est	17.1	6.3	1.8	0.9
Idaho	MOE	(6.7)	(3.3)	(2.0)	(1.8)
Kansas	Est	4.5	2.0	0.6	0.2
Kansas	MOE	(2.4)	(1.0)	(0.7)	(0.3)
Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	9.0	4.6	1.6	0.9
Montana	MOE	(4.3)	(3.9)	(1.5)	(1.3)
Nebraska	Est	10.3	3.5	1.0	0.3
Nebraska	MOE	(4.3)	(2.3)	(1.0)	(0.6)
Nevada	Est	49.8	33.6	22.8	16.3
Nevada	MOE	(9.3)	(8.1)	(8.4)	(7.3)
New Mexico	Est	74.9	59.5	42.6	28.6
New Mexico	MOE	(5.0)	(6.6)	(6.4)	(5.7)
North Dakota	Est	1.9	1.2	0.1	0.1
North Dakota	MOE	(1.5)	(1.1)	(0.3)	(0.3)
Oklahoma	Est	5.6	2.1	0.4	0.1
Oklahoma	MOE	(2.2)	(1.6)	(0.4)	(0.2)
Oregon	Est	29.9	19.5	9.8	2.8
Oregon	MOE	(6.9)	(6.4)	(6.1)	(2.3)
South Dakota	Est	2.2	1.5	0.6	0.4
South Dakota	MOE	(1.3)	(0.9)	(0.6)	(0.5)
Texas	Est	29.6	17.9	11.4	5.4
Texas	MOE	(2.9)	(3.4)	(2.9)	(2.2)
Utah	Est	47.2	29.5	21.7	13.1
Utah	MOE	(8.7)	(7.7)	(6.8)	(5.9)
Washington	Est	9.4	3.3	0.7	**
Washington	MOE	(7.1)	(5.8)	(1.4)	
Wyoming	Est	41.0	25.2	14.7	8.0
Wyoming	MOE	(7.7)	(6.4)	(4.7)	(3.1)
National	Est	32.3	22.3	15.0	9.4
National	MOE	(1.5)	(1.5)	(1.2)	(1.0)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 5 - 2004-2010 non-Federal rangeland that is at least 20, 30, 40, or 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Is Bare Ground	At Least 30% Of The Land Is Bare Ground	At Least 40% Of The Land Is Bare Ground	At Least 50% Of The Land Is Bare Ground
Arizona	Est	67.7	57.7	45.6	33.8
Arizona	MOE	(4.8)	(5.6)	(4.8)	(4.6)
California	Est	18.6	9.1	6.6	4.1
California	MOE	(4.5)	(3.0)	(2.8)	(2.4)
Colorado	Est	40.7	22.3	12.2	5.5
Colorado	MOE	(3.1)	(3.3)	(2.0)	(1.7)
Florida	Est	5.9	0.6	**	**
Florida	MOE	(5.6)	(1.2)		
Idaho	Est	22.3	10.0	3.5	1.2
Idaho	MOE	(4.6)	(2.7)	(1.8)	(1.0)
Kansas	Est	4.3	2.2	0.6	0.2
Kansas	MOE	(1.4)	(1.1)	(0.5)	(0.3)
Louisiana	Est	1.5	1.5	**	**
Louisiana	MOE	(3.3)	(3.3)		
Montana	Est	23.2	9.6	3.7	2.0
Montana	MOE	(4.5)	(2.6)	(1.4)	(1.1)
Nebraska	Est	3.7	1.2	0.4	**
Nebraska	MOE	(1.4)	(0.7)	(0.4)	
Nevada	Est	55.9	41.5	29.3	20.1
Nevada	MOE	(7.5)	(8.3)	(6.1)	(6.6)
New Mexico	Est	50.4	35.8	22.5	14.6
New Mexico	MOE	(5.0)	(4.6)	(3.7)	(2.9)
North Dakota	Est	2.7	0.7	0.5	0.2
North Dakota	MOE	(1.4)	(0.6)	(0.5)	(0.4)
Oklahoma	Est	2.1	0.2	0.2	0.1
Oklahoma	MOE	(0.9)	(0.3)	(0.2)	(0.2)
Oregon	Est	31.3	14.7	8.0	2.7
Oregon	MOE	(6.8)	(4.3)	(3.5)	(2.0)
South Dakota	Est	3.5	2.0	1.1	0.8
South Dakota	MOE	(1.5)	(1.2)	(0.8)	(0.6)
Texas	Est	11.9	6.1	3.0	1.7
Texas	MOE	(2.0)	(1.6)	(1.3)	(0.9)
Utah	Est	44.1	27.8	16.8	10.0
Utah	MOE	(5.7)	(5.0)	(4.6)	(4.1)
Washington	Est	13.1	3.9	1.7	0.2
Washington	MOE	(4.9)	(2.5)	(1.5)	(0.5)
Wyoming	Est	39.9	22.4	12.0	5.5

Wyoming	MOE	(6.3)	(5.2)	(3.4)	(2.3)
National	Est	25.7	16.2	10.2	6.4
National	MOE	(0.9)	(0.7)	(0.5)	(0.5)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 6 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland that is at least 20, 30, 40, or 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Is Bare Ground	At Least 30% Of The Land Is Bare Ground	At Least 40% Of The Land Is Bare Ground	At Least 50% Of The Land Is Bare Ground
Arizona	Est	-0.9	-2.5	-2.8	-2.7
Arizona	MOE	(6.9)	(8.9)	(8.3)	(8.5)
California	Est	18.5	15.9	14.0	12.3
California	MOE	(9.7)	(9.1)	(8.4)	(8.1)
Colorado	Est	2.5	7.5	4.9	3.1
Colorado	MOE	(4.4)	(5.3)	(4.9)	(3.4)
Florida	Est	-2.7	0.0	0.6	**
Florida	MOE	(6.3)	(1.8)	(1.2)	
Idaho	Est	-5.2	-3.7	-1.7	-0.3
Idaho	MOE	(7.6)	(4.6)	(2.8)	(2.0)
Kansas	Est	0.2	-0.2	0.0	0.0
Kansas	MOE	(2.3)	(1.4)	(0.9)	(0.3)
Louisiana	Est	-1.5	-1.5	**	**
Louisiana	MOE	(3.3)	(3.3)		
Montana	Est	-14.2	-5.0	-2.1	-1.1
Montana	MOE	(5.7)	(4.4)	(1.6)	(1.7)
Nebraska	Est	6.6	2.3	0.6	0.3
Nebraska	MOE	(4.0)	(2.2)	(1.1)	(0.6)
Nevada	Est	-6.0	-7.9	-6.5	-3.7
Nevada	MOE	(12.7)	(11.5)	(10.2)	(9.7)
New Mexico	Est	24.5	23.7	20.1	14.0
New Mexico	MOE	(5.4)	(5.9)	(5.8)	(5.7)
North Dakota	Est	-0.7	0.5	-0.3	0.0
North Dakota	MOE	(2.0)	(1.2)	(0.5)	(0.5)
Oklahoma	Est	3.4	1.9	0.2	0.0
Oklahoma	MOE	(2.2)	(1.6)	(0.4)	(0.3)
Oregon	Est	-1.3	4.8	1.8	0.1
Oregon	MOE	(8.4)	(6.7)	(5.7)	(3.0)

South Dakota	Est	-1.3	-0.5	-0.5	-0.4
South Dakota	MOE	(2.3)	(1.5)	(0.9)	(0.7)
Texas	Est	17.7	11.8	8.4	3.7
Texas	MOE	(2.8)	(3.4)	(3.0)	(2.4)
Utah	Est	3.1	1.7	4.9	3.1
Utah	MOE	(10.5)	(9.5)	(8.7)	(7.0)
Washington	Est	-3.7	-0.6	-1.0	-0.2
Washington	MOE	(9.1)	(5.6)	(2.1)	(0.5)
Wyoming	Est	1.1	2.7	2.8	2.5
Wyoming	MOE	(9.1)	(7.9)	(5.5)	(3.8)
National	Est	6.7	6.1	4.8	3.0
National	MOE	(1.7)	(1.8)	(1.3)	(1.0)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 7 - 2011-2015 non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land; and non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land and the inter-canopy gaps are at least 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M And The Gaps Are At Least 50% Bare Ground	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M And The Gaps Are At Least 50% Bare Ground
Arizona	Est	76.5	57.9	39.2	30.6
Arizona	MOE	(6.1)	(7.2)	(8.0)	(7.3)
California	Est	40.4	35.1	22.5	19.8
California	MOE	(8.9)	(8.9)	(9.4)	(8.9)
Colorado	Est	15.0	7.7	8.1	5.4
Colorado	MOE	(3.3)	(2.6)	(2.6)	(2.4)
Florida	Est	1.1	1.1	**	**
Florida	MOE	(2.4)	(2.4)		
Idaho	Est	15.5	8.8	3.2	1.1
Idaho	MOE	(6.2)	(5.4)	(2.8)	(2.0)
Kansas	Est	0.6	0.3	0.4	0.3
Kansas	MOE	(0.5)	(0.3)	(0.5)	(0.3)
Louisiana	Est	**	**	**	**
Louisiana	MOE				
Montana	Est	2.6	0.9	2.2	0.8
Montana	MOE	(2.9)	(0.9)	(2.9)	(0.9)
Nebraska	Est	0.8	0.3	0.6	0.3

Nebraska	MOE	(0.7)	(0.5)	(0.7)	(0.5)
Nevada	Est	60.3	42.1	26.9	21.4
Nevada	MOE	(7.1)	(7.4)	(7.8)	(7.2)
New Mexico	Est	45.5	31.3	34.0	24.8
New Mexico	MOE	(5.1)	(4.7)	(5.9)	(4.7)
North Dakota	Est	1.0	0.8	0.8	0.6
North Dakota	MOE	(1.0)	(0.9)	(1.0)	(0.8)
Oklahoma	Est	3.8	2.8	0.3	0.2
Oklahoma	MOE	(1.8)	(1.9)	(0.4)	(0.3)
Oregon	Est	16.6	6.1	11.7	3.7
Oregon	MOE	(7.7)	(3.7)	(6.9)	(3.3)
South Dakota	Est	1.5	1.2	1.0	0.8
South Dakota	MOE	(1.0)	(1.0)	(0.8)	(0.7)
Texas	Est	16.7	13.2	8.2	6.0
Texas	MOE	(3.5)	(2.9)	(2.3)	(2.0)
Utah	Est	46.7	33.2	19.6	14.0
Utah	MOE	(8.9)	(8.5)	(6.3)	(5.7)
Washington	Est	15.7	13.0	**	**
Washington	MOE	(7.7)	(6.3)		
Wyoming	Est	9.8	4.2	7.7	3.7
Wyoming	MOE	(4.8)	(2.5)	(4.8)	(2.4)
National	Est	22.1	15.9	12.3	9.0
National	MOE	(1.1)	(1.0)	(1.0)	(0.9)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 8 - 2004-2010 non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land; and non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land and the inter-canopy gaps are at least 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M And The Gaps Are At Least 50% Bare Ground	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M And The Gaps Are At Least 50% Bare Ground
Arizona	Est	63.6	47.3	40.2	30.3
Arizona	MOE	(3.9)	(4.5)	(4.6)	(4.3)

California	Est	38.3	32.2	7.4	6.4
California	MOE	(7.6)	(7.0)	(3.3)	(2.9)
Colorado	Est	7.7	3.1	5.1	2.2
Colorado	MOE	(2.2)	(1.3)	(1.7)	(1.0)
Florida	Est	2.2	0.6	2.2	0.6
Florida	MOE	(3.6)	(1.2)	(3.6)	(1.2)
Idaho	Est	6.0	2.7	1.9	0.7
Idaho	MOE	(2.6)	(1.9)	(1.3)	(0.8)
Kansas	Est	1.0	0.7	0.4	0.3
Kansas	MOE	(0.7)	(0.5)	(0.4)	(0.3)
Louisiana	Est	10.8	10.8	**	**
Louisiana	MOE	(23.0)	(23.0)		
Montana	Est	3.9	1.7	1.9	1.0
`Montana	MOE	(1.3)	(0.8)	(0.9)	(0.8)
Nebraska	Est	0.3	0.3	0.1	0.1
Nebraska	MOE	(0.4)	(0.4)	(0.3)	(0.3)
Nevada	Est	48.7	34.5	25.2	18.9
Nevada	MOE	(8.9)	(7.8)	(6.4)	(6.0)
New Mexico	Est	20.5	13.1	14.1	9.2
New Mexico	MOE	(2.7)	(2.4)	(2.7)	(1.9)
North Dakota	Est	0.1	0.0	0.1	0.0
North Dakota	MOE	(0.2)	(0.1)	(0.2)	(0.1)
Oklahoma	Est	1.5	1.2	0.3	0.3
Oklahoma	MOE	(0.9)	(0.8)	(0.3)	(0.3)
Oregon	Est	17.0	8.8	8.8	4.8
Oregon	MOE	(4.2)	(3.7)	(3.6)	(2.9)
South Dakota	Est	1.2	0.7	1.2	0.5
South Dakota	MOE	(0.7)	(0.6)	(0.7)	(0.5)
Texas	Est	11.7	8.5	3.0	1.6
Texas	MOE	(2.0)	(1.6)	(1.2)	(0.8)
Utah	Est	49.7	35.6	19.9	15.9
Utah	MOE	(7.6)	(6.2)	(5.2)	(4.6)
Washington	Est	1.1	0.8	0.2	0.2
Washington	MOE	(1.1)	(0.8)	(0.5)	(0.5)
Wyoming	Est	6.6	2.8	4.7	2.0
Wyoming	MOE	(3.2)	(1.8)	(2.3)	(1.5)
National	Est	15.8	11.1	7.8	5.3
National	MOE	(0.8)	(0.7)	(0.5)	(0.5)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 9 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land; and non-Federal rangeland where 1 or 2 meter inter-canopy gaps account for at least 20 percent of the land and the inter-canopy gaps are at least 50 percent bare ground, by state, with margins of error.

State	Type	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 1 M And The Gaps Are At Least 50% Bare Ground	At Least 20% Of The Land Has Intercanopy Gaps Of At Least 2 M And The Gaps Are At Least 50% Bare Ground
Arizona	Est	12.9	10.6	-1.0	0.3
Arizona	MOE	(6.3)	(7.1)	(8.2)	(7.9)
California	Est	2.1	2.9	15.2	13.4
California	MOE	(10.9)	(11.4)	(8.6)	(8.0)
Colorado	Est	7.2	4.6	3.0	3.2
Colorado	MOE	(3.8)	(2.9)	(2.6)	(2.1)
Florida	Est	-1.1	0.5	-2.2	-0.6
Florida	MOE	(4.1)	(2.6)	(3.6)	(1.2)
Idaho	Est	9.5	6.0	1.3	0.4
Idaho	MOE	(6.8)	(5.8)	(3.0)	(2.1)
Kansas	Est	-0.4	-0.4	0.0	0.0
Kansas	MOE	(0.9)	(0.5)	(0.6)	(0.4)
Louisiana	Est	-10.8	-10.8	**	**
Louisiana	MOE	(23.0)	(23.0)		
Montana	Est	-1.3	-0.8	0.3	-0.2
Montana	MOE	(3.2)	(1.2)	(3.1)	(1.3)
Nebraska	Est	0.5	0.0	0.5	0.2
Nebraska	MOE	(0.9)	(0.7)	(0.8)	(0.6)
Nevada	Est	11.5	7.6	1.8	2.5
Nevada	MOE	(11.8)	(11.2)	(10.9)	(8.5)
New Mexico	Est	24.9	18.2	19.8	15.6
New Mexico	MOE	(6.3)	(6.2)	(6.4)	(5.0)
North Dakota	Est	0.8	0.7	0.6	0.6
North Dakota	MOE	(1.0)	(0.9)	(0.9)	(0.8)
Oklahoma	Est	2.3	1.5	0.0	-0.1
Oklahoma	MOE	(2.1)	(2.1)	(0.3)	(0.3)
Oregon	Est	-0.4	-2.7	2.9	-1.1
Oregon	MOE	(6.7)	(4.8)	(6.3)	(4.0)
South Dakota	Est	0.3	0.6	-0.2	0.2
South Dakota	MOE	(1.3)	(1.3)	(1.1)	(1.0)
Texas	Est	5.1	4.7	5.2	4.5
Texas	MOE	(3.8)	(3.3)	(2.3)	(1.8)

Utah	Est	-3.0	-2.4	-0.2	-1.9
Utah	MOE	(12.2)	(10.1)	(8.6)	(8.5)
Washington	Est	14.6	12.2	-0.2	-0.2
Washington	MOE	(7.5)	(6.4)	(0.5)	(0.5)
Wyoming	Est	3.3	1.3	2.9	1.7
Wyoming	MOE	(5.2)	(3.3)	(5.1)	(2.8)
National	Est	6.3	4.8	4.5	3.7
National	MOE	(1.3)	(1.2)	(1.2)	(1.0)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 10 - 2011-2015 non-Federal rangeland where soil aggregate stability is rated 4 or less, by state, with margins of error.

State	Type	Soil Aggregate Stability Is 4 Or Less (1=Low; 6=High Resistance To Erosion)
Arizona	Est	77.8
Arizona	MOE	(5.2)
California	Est	31.6
California	MOE	(6.8)
Colorado	Est	45.3
Colorado	MOE	(5.6)
Florida	Est	18.2
Florida	MOE	(15.9)
Idaho	Est	35.4
Idaho	MOE	(8.5)
Kansas	Est	18.6
Kansas	MOE	(3.9)
Louisiana	Est	**
Louisiana	MOE	
Montana	Est	13.3
Montana	MOE	(4.1)
Nebraska	Est	29.9
Nebraska	MOE	(5.0)
Nevada	Est	75.4
Nevada	MOE	(6.8)
New Mexico	Est	78.8
New Mexico	MOE	(4.7)
North Dakota	Est	1.3

North Dakota	MOE	(1.7)
Oklahoma	Est	14.4
Oklahoma	MOE	(4.0)
Oregon	Est	22.3
Oregon	MOE	(6.9)
South Dakota	Est	4.0
South Dakota	MOE	(2.2)
Texas	Est	37.3
Texas	MOE	(3.2)
Utah	Est	47.0
Utah	MOE	(7.1)
Washington	Est	13.4
Washington	MOE	(5.8)
Wyoming	Est	34.6
Wyoming	MOE	(6.5)
National	Est	38.1
National	MOE	(1.4)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 11 - 2004-2010 non-Federal rangeland where soil aggregate stability is rated 4 or less, by state, with margins of error.

State	Type	Soil Aggregate Stability Is 4 Or Less (1=Low; 6=High Resistance To Erosion)
Arizona	Est	69.7
Arizona	MOE	(3.7)
California	Est	29.0
California	MOE	(7.5)
Colorado	Est	31.0
Colorado	MOE	(2.9)
Florida	Est	32.2
Florida	MOE	(13.4)
Idaho	Est	30.2
Idaho	MOE	(5.6)
Kansas	Est	5.9
Kansas	MOE	(1.6)
Louisiana	Est	4.6

Louisiana	MOE	(7.5)
Montana	Est	14.7
Montana	MOE	(2.4)
Nebraska	Est	30.3
Nebraska	MOE	(3.8)
Nevada	Est	63.5
Nevada	MOE	(8.3)
New Mexico	Est	59.5
New Mexico	MOE	(4.9)
North Dakota	Est	1.6
North Dakota	MOE	(0.8)
Oklahoma	Est	16.6
Oklahoma	MOE	(2.6)
Oregon	Est	37.3
Oregon	MOE	(5.3)
South Dakota	Est	4.1
South Dakota	MOE	(1.7)
Texas	Est	23.7
Texas	MOE	(2.4)
Utah	Est	42.6
Utah	MOE	(6.4)
Washington	Est	12.9
Washington	MOE	(5.3)
Wyoming	Est	48.7
Wyoming	MOE	(5.7)
National	Est	31.9
National	MOE	(1.2)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

Table 12 - Changes between 2004-2010 and 2011-2015 on non-Federal rangeland where soil aggregate stability is rated 4 or less, by state, with margins of error.

State	Type	Soil Aggregate Stability Is 4 Or Less (1=Low; 6=High Resistance To Erosion)
Arizona	Est	8.1
Arizona	MOE	(6.4)

California	Est	2.6
California	MOE	(7.9)
Colorado	Est	14.3
Colorado	MOE	(5.7)
Florida	Est	-14.0
Florida	MOE	(19.0)
Idaho	Est	5.2
Idaho	MOE	(10.0)
Kansas	Est	12.7
Kansas	MOE	(4.3)
Louisiana	Est	-4.6
Louisiana	MOE	(7.5)
Montana	Est	-1.4
Montana	MOE	(4.5)
Nebraska	Est	-0.3
Nebraska	MOE	(7.1)
Nevada	Est	11.9
Nevada	MOE	(9.9)
New Mexico	Est	19.2
New Mexico	MOE	(7.2)
North Dakota	Est	-0.3
North Dakota	MOE	(1.6)
Oklahoma	Est	-2.1
Oklahoma	MOE	(4.9)
Oregon	Est	-15.0
Oregon	MOE	(8.3)
South Dakota	Est	-0.1
South Dakota	MOE	(2.2)
Texas	Est	13.7
Texas	MOE	(4.5)
Utah	Est	4.3
Utah	MOE	(9.8)
Washington	Est	0.5
Washington	MOE	(8.1)
Wyoming	Est	-14.2
Wyoming	MOE	(8.9)
National	Est	6.3
National	MOE	(1.8)

- Estimates with a double asterisk denote that the attribute or indicator was not detected on non-Federal rangelands within the ecoregion.
- Estimates in red have a large margin of error in relation to the estimate. They are usually based on very few observations. The lower bound of the confidence interval may also be inappropriately negative.

About the Data

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI). Rangeland is defined by the NRI as a land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

These results are based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Current estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.

The findings presented here are obtained from three types of data:

- Bare ground - The percent of bare ground is determined from the line-point intercept at 3-foot intervals along two intersecting 150-foot transects (Herrick et al. 2005).
- Plant inter-canopy gaps - Inter-canopy gaps are measured using the gap intercept protocol, an on-site method to record all foliar gaps of at least 1-foot in length along two intersecting 150-foot transects (Herrick et al. 2005).
- Soil aggregate stability - A rangeland soil stability test is conducted in the field. Soil (~ 1/4" or 6mm diameter) samples are exposed to rapid wetting (USDA-NRCS 2010; Herrick et al. 2001). Soil samples are rated on a scale from 1 to 6 (6 is most stable) based on a combination of ocular observations of slaking during the first 5 minutes following immersion in distilled water, and the percent remaining on a 1.5-mm sieve after five dipping cycles at the end of the 5-minute period.

These quantitative data may be used to support the findings in the Rangeland Health assessments, as well as form a baseline of natural resource conditions. Changes from that baseline data are evaluated in this report.

Quality assurance and statistical procedures are designed / implemented to ensure data are scientifically legitimate. Irrespective of the scale of analysis, margins of error must be considered. Margins of error (at the 95 percent confidence level) are presented for all NRI estimates.

About the Protocols

The findings presented here are derived using data collected for three field protocols:

- Line point intercept data are utilized in summaries of non-native plant species, non-native invasive herbaceous species, native invasive woody species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval.
- Canopy gap data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Data collectors record lengths of plant inter-canopy gaps along the two intersecting 150-foot transects.
- Soil aggregate stability is a recognized indicator of soil quality and rangeland health. Data collectors water immerse soil surface peds collected at the sample site and subject the soil peds to five dipping cycles. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

About the Tables

The tables are constructed with NRI rangeland data collected in the field on non-Federal rangelands during the periods 2004 to 2010 and 2011 to 2015. Summaries tables are presented for: (1) Average bare ground on non-Federal rangeland; (2) Non-Federal rangeland that is at least 20, 30, 40, or 50 percent bare ground; (3) Non-Federal rangeland where 1- or 2-meter canopy gaps account for at least 20 percent of the land; (4) Non-Federal rangeland where 1- or 2-meter canopy gaps account for at least 20 percent of the land and inter-canopy gaps are at least 50% bare ground; and (5) Non-Federal rangeland where soil aggregate stability is rated 4 or less.

Bare ground is calculated for each sample site using line point intercept data to determine the proportion of readings along the two 150-transects with bare soil (i.e., no plant canopy, basal cover, or litter cover). A weighted average of these results provides the estimates of bare ground on non-Federal rangelands. Bare ground site calculations are used to estimate the percent of non-Federal rangeland with at least 20, 30, 40, or 50 percent bare ground.

For each site, canopy gap data are used to calculate the proportion of the two transects covered by gaps of at least 1 or 2 meters. The results are used to determine the proportion of the non-Federal rangeland where canopy gaps of at least 1 or 2 meters in size account for at least 20 percent of the land. Bare ground data are combined with canopy gap data for each site to determine the proportion of the transects where canopy gaps for at least 1 or 2 meters in size account for at least 20 percent of the land and at least 50 percent of the area within those gaps is bare ground. The site results are used to calculate area estimates.

For each site, the average soil aggregate stability rating is calculated. Results are used to determine the percent of non-Federal rangeland where soil aggregate stability ratings are four or less.

Generally three sets of tabular estimates are presented for the percent of non-Federal rangelands where the attribute of interest is observed: (1) during the period 2011 to 2015; (2) during the period 2004 to 2010; and (3) for the change between 2004 to 2010 and 2011 to 2015. While the estimates of average bare ground are calculated for the two time periods and the change between them, the estimates differ in that they represent the average amount of bare ground on non-Federal rangeland. All change is estimated as the difference in the estimated percentages for the two time periods. Margins of error (95 percent) are included with the estimates.

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching.

Bare Ground and Foliar Canopy Gap Maps

The bare ground and canopy gap maps present by classes (none, 1% or less, 1-5%, 5-20%, over 20%) : (1) overall average bare ground on non-Federal rangeland; (2) non-Federal rangelands where at least 20, 30, 40, or 50 percent is bare ground; (3) non-Federal rangelands where 1- or 2-meter inter-canopy gaps account for at least 20 percent of the area; and (4) non-Federal rangelands where 1- or 2-meter inter-canopy gaps account for at least 20 percent of the area and inter-canopy gaps are at least 50 percent bare ground.

Soil Aggregate Stability Maps

The soil aggregate stability maps present by classes (none, 1% or less, 1-5%, 5-20%, over 20%) the amount of non-Federal rangeland where soil aggregate stability ratings are 4 or less, indicating less stable soil.

More Information

Herrick, J.E., J.W. Van Zee, K.M. Havstad, and W.G. Whitford. 2005. Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems. USDA-ARS Jornada Experimental Range, Las Cruces, New Mexico

Herrick, J.E., W.G. Whitford, A.G. de Soyza, J.W. Van Zee, K.M. Havstad, C.A. Seybold, and M. Walton. 2001. Field soil aggregate stability kit for soil quality and rangeland health evaluations. Catena 44:27-35.

Related journal article: National Ecosystem Assessments Supported by Scientific and Local Knowledge, Frontiers in Ecology and the Environment, October 2010

Send comments and questions to the NRI Help Desk

About the Data

About the NRI

The National Resources Inventory (NRI) is a statistical survey designed to help gauge natural resource status, conditions, and trends on the Nation's non-Federal land. Non-Federal land includes privately owned lands, tribal and trust lands, and lands controlled by State and local governments. The NRI is conducted by the Natural Resources Conservation Service (NRCS) in cooperation with Iowa State University's Center for Survey Statistics and Methodology.

The NRI is carried out under the authority of a number of legislative acts including the Rural Development Act of 1972, the Soil and Water Resources Conservation Act of 1977, the Federal Agriculture Improvement and Reform Act of 1996, and the Farm Security and Rural Investment Act of 2002.

Estimates presented here are based upon rangeland data collected on-site as part of the National Resources Inventory (NRI). Rangeland is defined by the NRI as a Land cover/use category on which the climax or potential plant cover is composed principally of native grasses, grasslike plants, forbs, or shrubs suitable for grazing and browsing, and introduced forage species that are managed like rangeland. This includes areas where introduced hardy and persistent grasses, such as crested wheatgrass, are planted and such practices as deferred grazing, burning, chaining, and rotational grazing are used, with little or no chemicals or fertilizer being applied. Grasslands, savannas, many wetlands, some deserts, and tundra are considered to be rangeland. Certain communities of low forbs and shrubs, such as mesquite, chaparral, mountain shrub, and pinyon-juniper, are also included as rangeland.

These results are based upon NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. Current estimates cover non-Federal rangeland in 17 western states (extending from North Dakota south to Texas and west) and to a limited extent in Florida and Louisiana.
Quality assurance and statistical procedures are designed/developed to ensure data are scientifically legitimate. Irrespective of the scale of analysis, margins of error must be considered. Margins of error (at the 95 percent confidence level) are presented for all NRI estimates.

About the Protocols

The findings presented here are derived using data collected for four field protocols: Rangeland Health, Line Point Intercept, Canopy Gap, and Soil Aggregate Stability. These protocols are summarized below. For more information, please see the NRI Grazing Land On-Site Data Collection Handbook of Instructions (https://grazingland.cssm.iastate.edu/).

Rangeland Health

Rangeland health data are used to assess three broad attributes: Soil and site stability, hydrologic function, and biotic integrity. A reference sheet is developed for each ecological site by experts with knowledge of soil, hydrology, and plant relationships to facilitate consistent application of the rangeland health assessment by integrating all available sources of data and knowledge for each of 17 rangeland health indicators (Pyke et al., 2002). The range of reference conditions is based on the natural variation of plant communities within the reference state which includes the historic climax plant community.

The 17 indicators are evaluated on degree of departure (none-to-slight, slight-to-moderate, moderate, moderate-to-extreme, and extreme-to-total) from the expected levels in the ecological site description (Pellant et al., 2005). The rangeland health attribute ratings for soil and site stability, hydrologic function, and biotic integrity were determined at each NRI sample location as the median rating for the group of indicators associated with each attribute (See Rangeland Health Table 1 for the list of indicators and associated attribute). The median was used in place of the 'preponderance of evidence' approach prescribed by the original method in order to standardize the method at the national level. For local applications of the method, the NRCS continues to advocate the use of the 'preponderance of evidence' approach.

Line Point Intercept

Line point intercept data are utilized in summaries of non-native plant species, invasive plant species, and bare ground. Line point intercept data are collected along two intersecting 150-foot transects centered on each sample location. Data collectors record plant species, litter, lichen, moss, rock fragment, bedrock, and/or bare soil present at each 3-foot interval.

Gap Intercept

Data are used to identify areas with large foliar inter-canopy gaps which have more exposure to erosion and may provide opportunity for invasive plants to become established. Inter-canopy gaps are measured using the gap intercept protocol, an on-site method to record all foliar gaps of at least 1-foot in length along two intersecting 150-foot transects (Herrick et al. 2005).

Soil Aggregate Stability

Soil aggregate stability is a recognized indicator of soil quality and rangeland health. A rangeland soil stability test is conducted in the field. Soil samples (soil surface peds approximately 1/4” or 6mm diameter in size) are exposed to rapid wetting (USDA-

NRCS 2010; Herrick et al. 2001). Soil samples are rated on a scale from one to six based on a combination of ocular observations of slaking during the first 5 min following immersion in distilled water, and the percent remaining on a 1.5-mm sieve after five dipping cycles at the end of the 5- minute period. Soil stability is rated based on the outcomes of these water exposure techniques. Ratings range from 1 (very unstable) to 6 (very stable).

About the Tables

Generally three sets of tabular estimates are presented for the percent of non-Federal rangelands where the attribute of interest is observed: (1) during the period 2011 to 2015; (2) during the period 2004 to 2010; and (3) for the change between 2004 to 2010 and 2011 to 2015. While the estimates of average bare ground are calculated for the two time periods and the change between them, the estimates differ in that they represent the average amount of bare ground on non-Federal rangeland. All change is estimated as the difference in the estimated percentages for the two time periods. Margins of error (95 percent) are included with the estimates.

Rangeland Health Tables

The tables represent rangeland health at a regional scale where the three attributes (soil and site stability, hydrologic function, and biotic integrity) represent various levels of departure from the reference state as described in the ecological site description for that land area based on the indicators listed in Rangeland Health Table 1. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process.

Although the rangeland health tables portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may will have that rating. For example, one table reports non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate.

Tabular summaries are provided for non-Federal rangelands where: (1) rangeland health attribute ratings that are moderate, moderate-to-extreme, or extreme-to-total departures from expected; (2) rangeland health attribute ratings are none-to-slight or slight-to-moderate; moderate; or moderate-to- extreme or extreme-to-total departures from expected; and (3) all three attribute ratings are none-to-slight or slight-to-moderate; all three attribute ratings are moderate-to-extreme or extreme-to-total; and where at least one attribute is rated moderate departure from expected.

Non-Native Plant Species Tables

Tables summarize the percent of non-Federal land where non-native plant species: (1) are present; (2) cover at least 25 or 50 percent of the plant canopy cover; and (3) make up at least 25 or 50 percent of the relative plant canopy cover (composition).

Presence is calculated as the percent of non-Federal rangeland where at least one of the species is observed in the line point intercept data. Plant canopy cover represents the proportion of the soil surface covered by an individual species. For each sample site, plant canopy cover is calculated as the percent of marks at which a plant in the non-native species group is observed. Relative plant canopy cover is an indicator of species composition and is calculated for each sample site as the percent of foliar observations that were in the non-native species group.

Invasive Plant Species Tables

Tables summarize the percent of non-Federal land where invasive plant species groups: (1) are present; (2) cover at least 5, 15, 30, or 50 percent of the soil surface; and (3) make up at least 5, 15, 30, or 50 percent of the relative plant canopy cover (composition).

Presence is calculated as the percent of non-Federal rangeland where at least one of the species is observed in the line point intercept data. Plant canopy cover represents the proportion of the soil surface covered by an individual species. For each sample site, plant canopy cover is calculated as the percent of marks at which a plant in the invasive plant species group is observed. Relative plant canopy cover is an indicator of species composition and is calculated for each sample site as the percent of foliar observations that were in the invasive plant species group.

Bare Ground, Inter-Canopy Gap, and Soil Aggregate Stability Tables

Summaries tables are presented for: (1) Average bare ground on non-Federal rangeland; (2) Non-Federal rangeland that is at least 20, 30, 40, or 50 percent bare ground; (3) Non-Federal rangeland where 1- or 2-meter canopy gaps account for at least 20 percent of the land; (4) Non-Federal rangeland where 1- or 2-meter canopy gaps account for at least 20 percent of the land and inter-canopy gaps are at least 50% bare ground; and (5) Non-Federal rangeland where soil aggregate stability is rated 4 or less.

Bare ground is calculated for each sample site using line point intercept data to determine the proportion of readings along the two 150-transects with bare soil (i.e., no plant canopy, basal cover, or litter cover). A weighted average of these results provides the estimates of bare ground on non-Federal rangelands. Bare ground site calculations are used to estimate the percent of non-Federal rangeland with at least 20, 30, 40, or 50 percent bare ground.

For each site, canopy gap data are used to calculate the proportion of the two transects covered by gaps of at least 1 or 2 meters. The results are used to determine the proportion of the non-Federal rangeland where canopy gaps of at least 1 or 2 meters in size account for at least 20 percent of the land. Bare ground data are combined with canopy gap data for each site to determine the proportion of the transects where canopy gaps for at least 1 or 2 meters in size account for at least 20 percent of the land and at least 50 percent of the area within those gaps is bare ground. The site results are used to calculate area estimates.

For each site, the average soil aggregate stability rating is calculated. Results are used to determine the percent of non-Federal rangeland where soil aggregate stability ratings are four or less.

About the Maps

The maps are constructed with NRI rangeland data collected in the field on rangeland during the periods 2004 to 2010 and 2011 to 2015. The regions are based on level IV ecoregion boundaries defined by the U.S. Environmental Protection Agency Western Ecology Division. In some cases level IV ecoregions were combined to include more sample sites. An additional category, referred to as "Insufficient data", represents areas where there were too few data points. Regions without non-Federal rangeland are described as "No data". Areas of Federal land are depicted with cross-hatching. Legend categories differ by map theme (e.g., rangeland health, invasive plant species, etc.)

Rangeland Health Maps

The rangeland health maps present the percent by classes (none, 10% or less, 10-20%, 20-30%, and over 30%) of non-Federal rangeland where rangeland health attributes have at least moderate departures from the reference conditions. For the rangeland health maps the category referred to as "Insufficient data", represents areas where there were too few data points or areas for which the ecological site descriptions are under development and there is no reported rangeland health data reported for over 10 percent of the region. Estimates were mapped for regions where less than 10 percent of the region did not report rangeland health data.

The figures represent rangeland health at a regional scale where the three attributes (soil and site stability, hydrologic function, and biotic integrity) represent various levels (e.g., moderate, moderate-to-extreme, or extreme-to-total) of departure from the reference state as described in the ecological site description for that land area. Soil and site stability maps exhibit departure ratings based upon nine indicators (rills, water flow patterns, pedestals and terracettes, bare ground, gullies, wind scour and depositional areas, soil resistance to erosion, soil surface loss or degradation, and soil compaction). Hydrologic function is determined by rills, water flow patterns, pedestals and terracettes, bare ground, gullies, litter movement, soil resistance to erosion, soil surface loss or degradation, plant composition relative to infiltration, soil compaction, and litter amount. Biotic integrity is associated with soil resistance to erosion, soil surface loss or degradation, soil compaction, plant functional/structural groups, plant mortality, litter amount, annual production, invasive plants, and reproductive capability. Note that some indicators are associated with more than one attribute while others are specific to a single attribute; this is intentional and is part of the evaluation process. See Rangeland Health Table 1 for the list of indicators and associated attribute.

Although these maps portray percentages of non-Federal rangeland with specific attribute ratings, not all of the indicators associated with that attribute may have that rating. For example, one map displays non-Federal rangeland where soil and site stability shows at least moderate departure from reference conditions. Although some of the indicators associated with soil and site stability may have been rated on a scale representing none-to-slight and slight-to-moderate departure, the median rating was at least moderate. The same departure scenario is indicative of hydrologic function and biotic integrity, but with different sets of indicators.

Non-Native Plant Species Maps

Non-native plant species maps are displayed by classes (none, 10% or less, 10-20%, 20-30%, over 30%) of non-Federal rangeland where non-native plant species are present or where they cover at least 50 percent of the soil surface.

Invasive Plant Species Maps

The maps present the percent by classes (none, 1% or less, 1-5%, 5-20%, over 20%) of non-Federal rangeland where native invasive woody species groups are present or cover or make up at least 5%, 15%, 30%, or 50% of the soil surface or relative plant canopy cover.

Bare Ground and Inter-Canopy Gap Maps

The bare ground and inter-canopy gap maps present by classes (none, 1% or less, 1-5%, 5-20%, over 20%): (1) overall average bare ground on non-Federal rangeland; (2) non-Federal rangelands where at least 20, 30, 40, or 50 percent is bare ground; (3) non- Federal rangelands where 1- or 2-meter inter-canopy gaps account for at least 20 percent of the area; and (4) non-Federal rangelands where 1- or 2-meter inter-canopy gaps account for at least 20 percent of the area and inter-canopy gaps are at least 50 percent bare ground.

Soil Aggregate Stability Maps

The soil aggregate stability maps present by classes (none, 1% or less, 1-5%, 5-20%, over 20%) the amount of non-Federal rangeland where soil aggregate stability ratings are 4 or less, indicating less stable soil.