



U.S. Department of the Interior
Bureau of Land Management

Volume 2c: Appendix 1. Maps
Maps 3.1 3.22
October 2024

Greater Sage-Grouse Rangewide Planning

Proposed Resource Management Plan Amendment and Final Environmental Impact Statement



The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

Cover Photo: Steve Ting

Lower Bar Photos (left to right):

US Fish and Wildlife, Rachel Woita, James Yule

Appendix I

Maps

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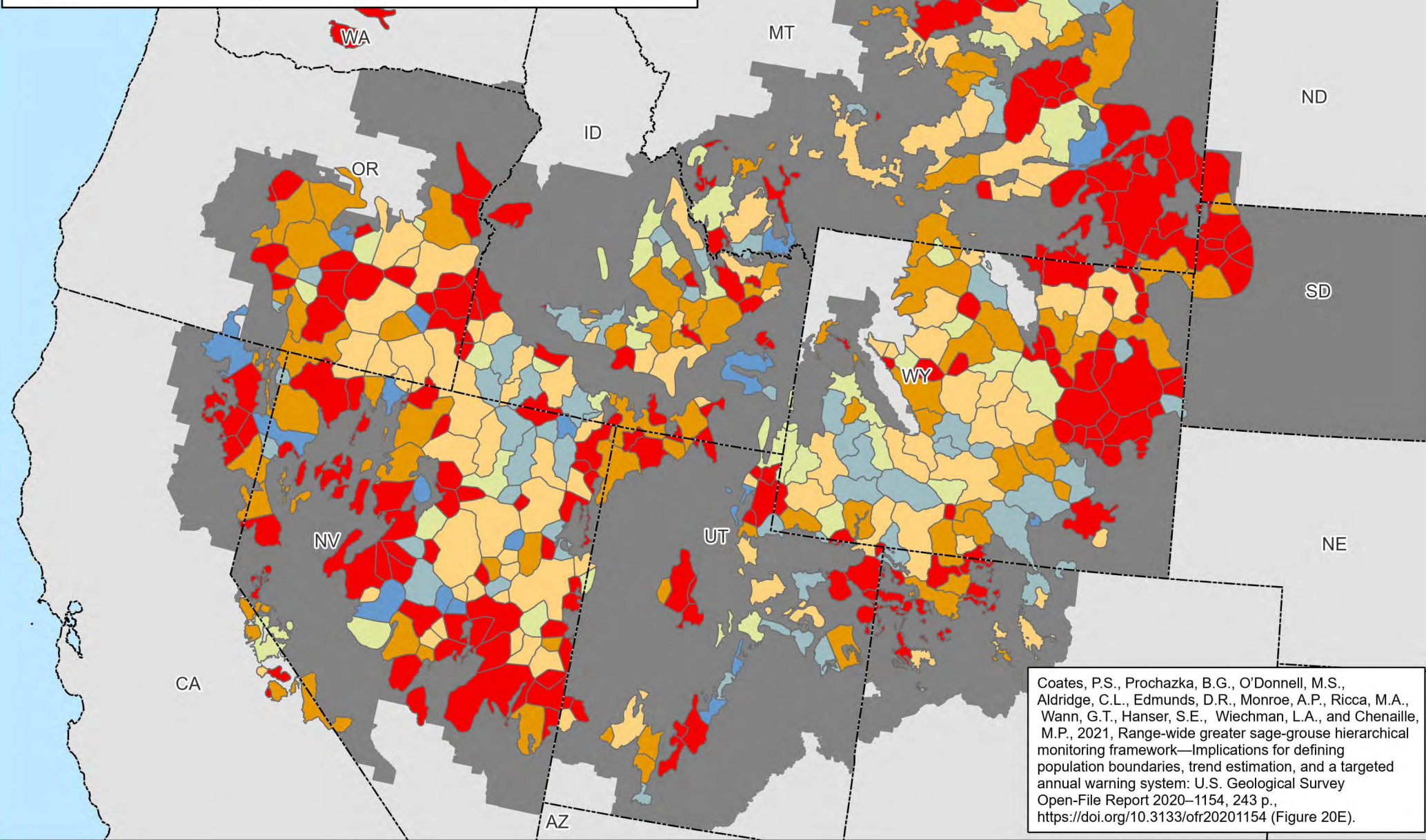
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Average Annual Rate of Change in Greater Sage-Grouse Abundance (Short term - 2002-2021) within Greater Sage-Grouse Planning Areas



Map 3.1

Average annual rate of change in
GRSG abundance (2002-2021)

Short Term (2 oscillations)

Red ≤ 0.95

Orange > 0.95 - 0.97

Yellow > 0.97 - 0.99

Light Green > 0.99 - 1.00

Medium Green > 1.00 - 1.03

Blue > 1.03

Dashed Line State Boundaries

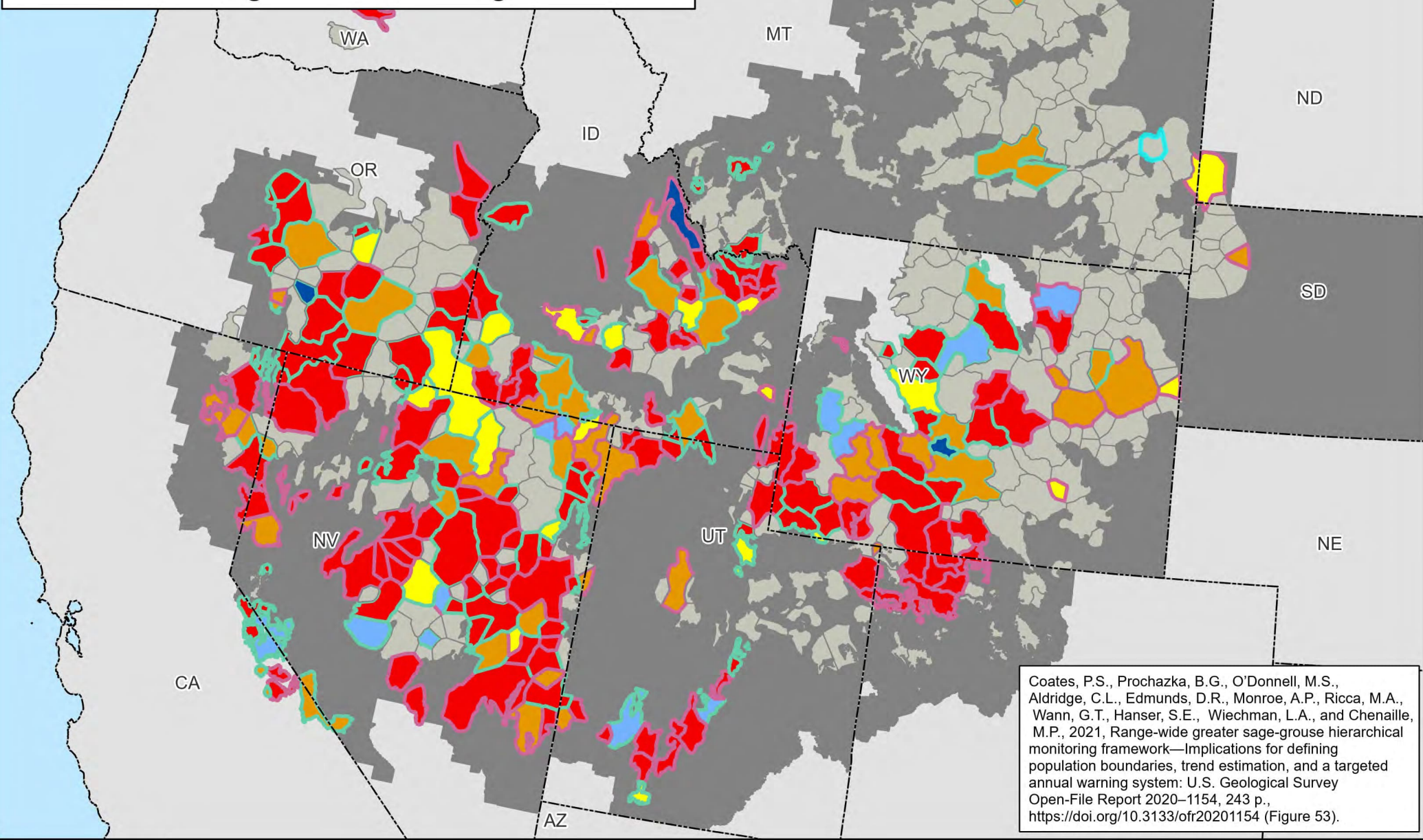
Solid Grey Planning Area Extent



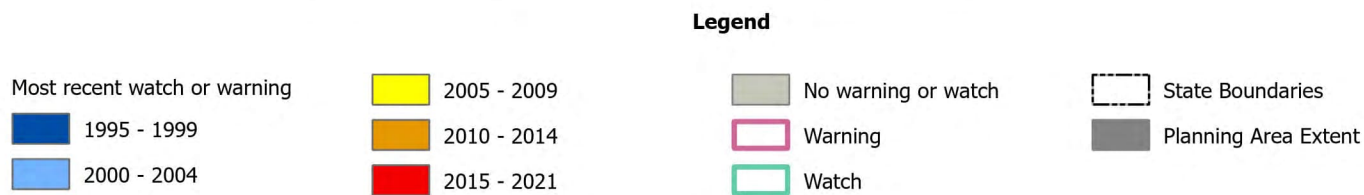
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Watch and Warning Signals for Greater Sage-Grouse Population Declines 1995-2021 within Greater Sage-Grouse Planning Areas



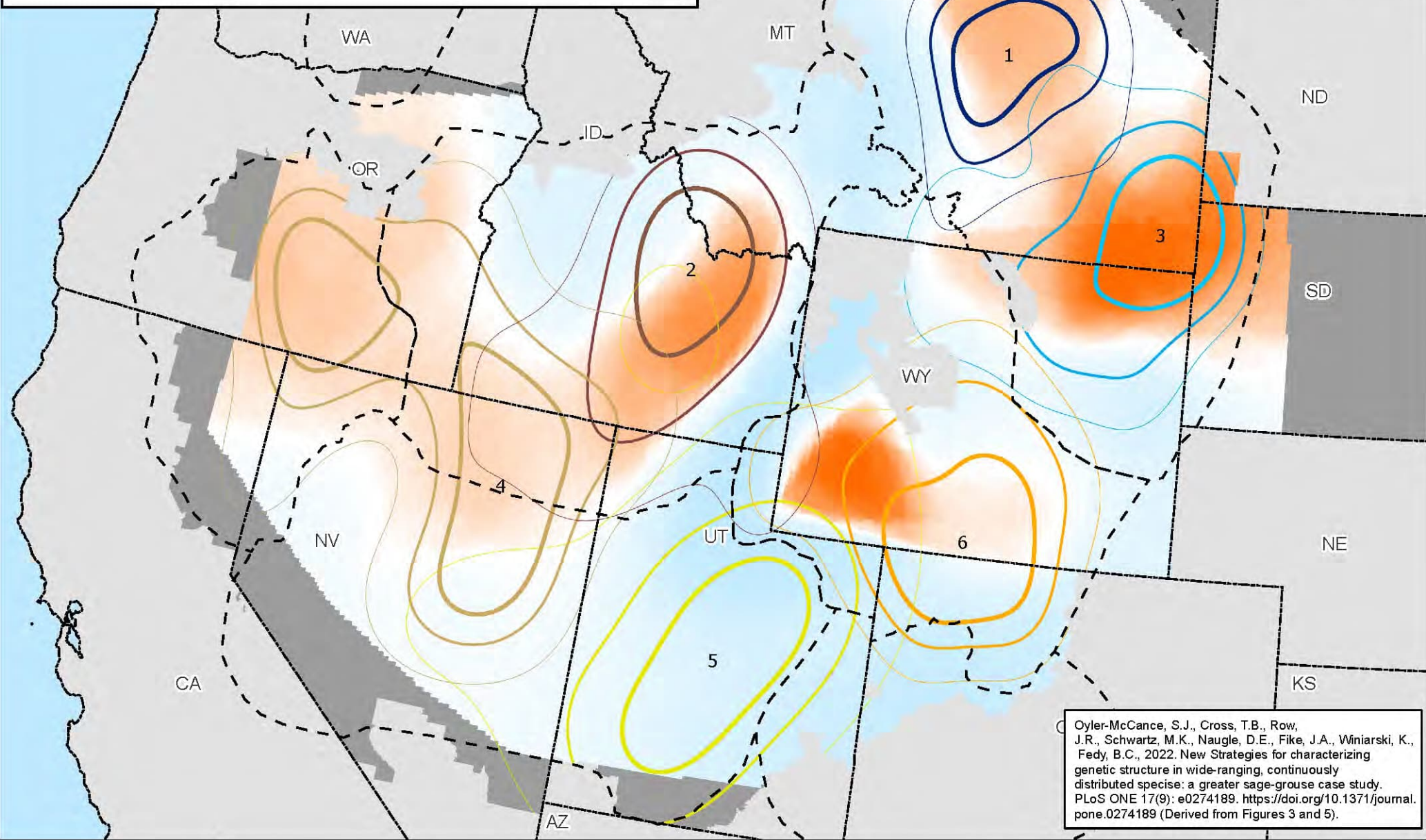
Map 3.2



N
W E S
0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Distinct Genetic Greater Sage-Grouse Groups within Greater Sage-Grouse Planning Areas



Map 3.3

Legend
Subpopulation boundaries are 25% (darkest), 50% (medium), 75% (lightest) kernel density estimates to determine genetically distinct groups.

Subpopulation Boundaries



4
5
6

Effective Migration Rates

High : 0.8

Low : -0.7

State Boundaries

WAFWA Mgmt Zones

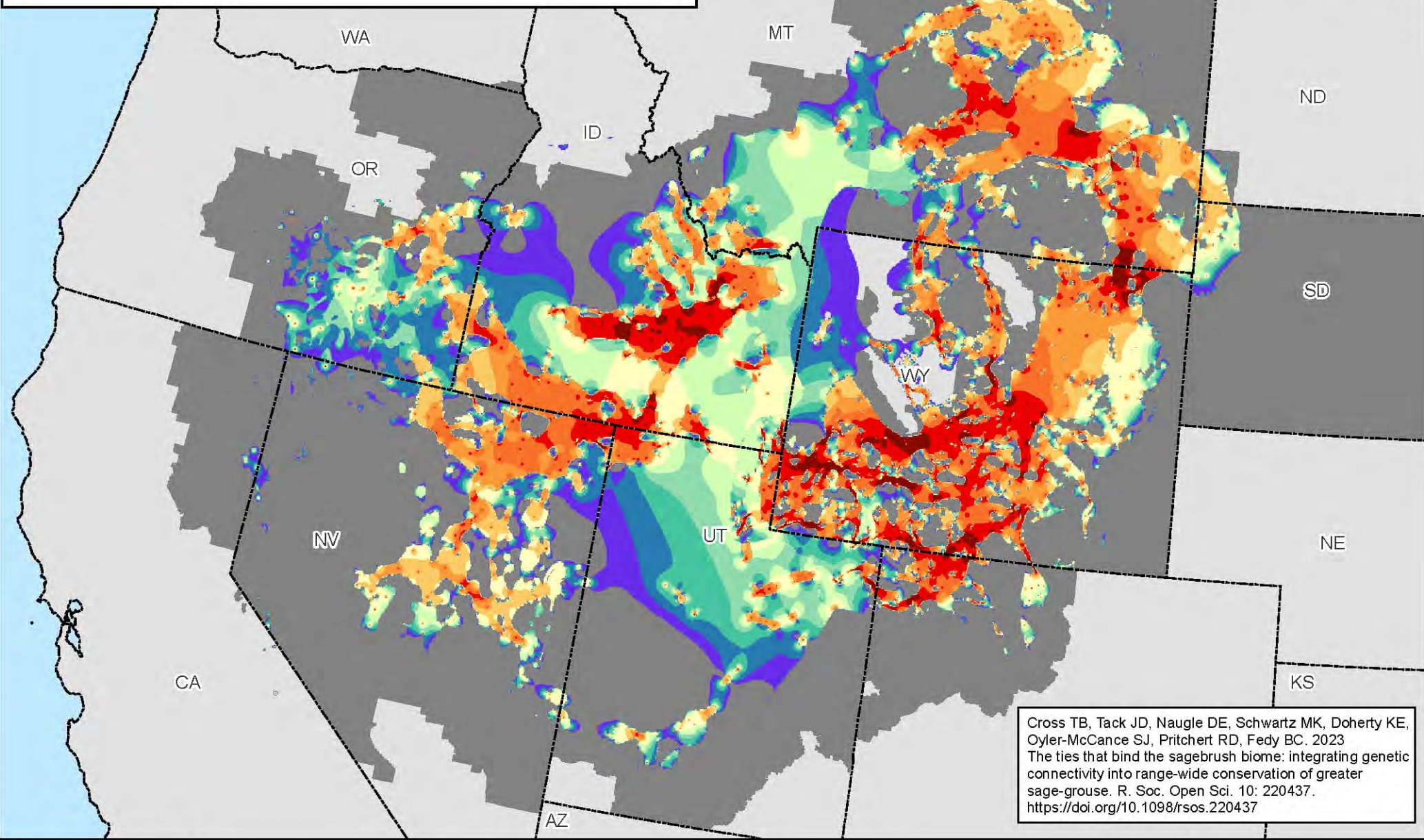
Planning Area Extent



0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Greater Sage-Grouse Genetic Connectivity within Greater Sage-Grouse Planning Areas



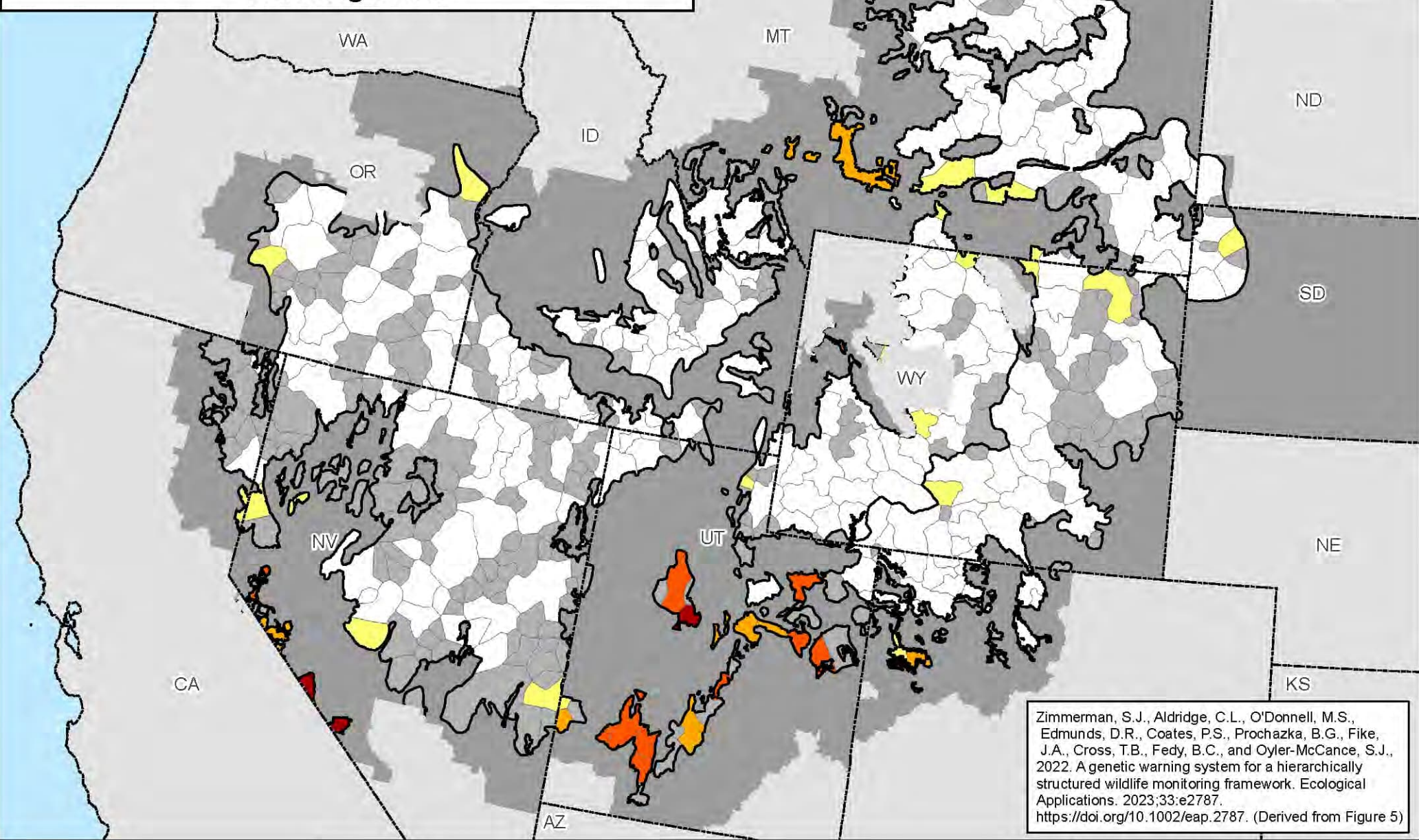
Map 3.4



0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Greater Sage-Grouse Population Clusters Declining in Genetic Diversity within Greater Sage-Grouse Planning Areas



Map 3.5

Neighborhood Cluster - Genetic Watches & Warnings

- Watch 1
- Watch 2

- Warning 1
- Warning 2
- None
- No Data

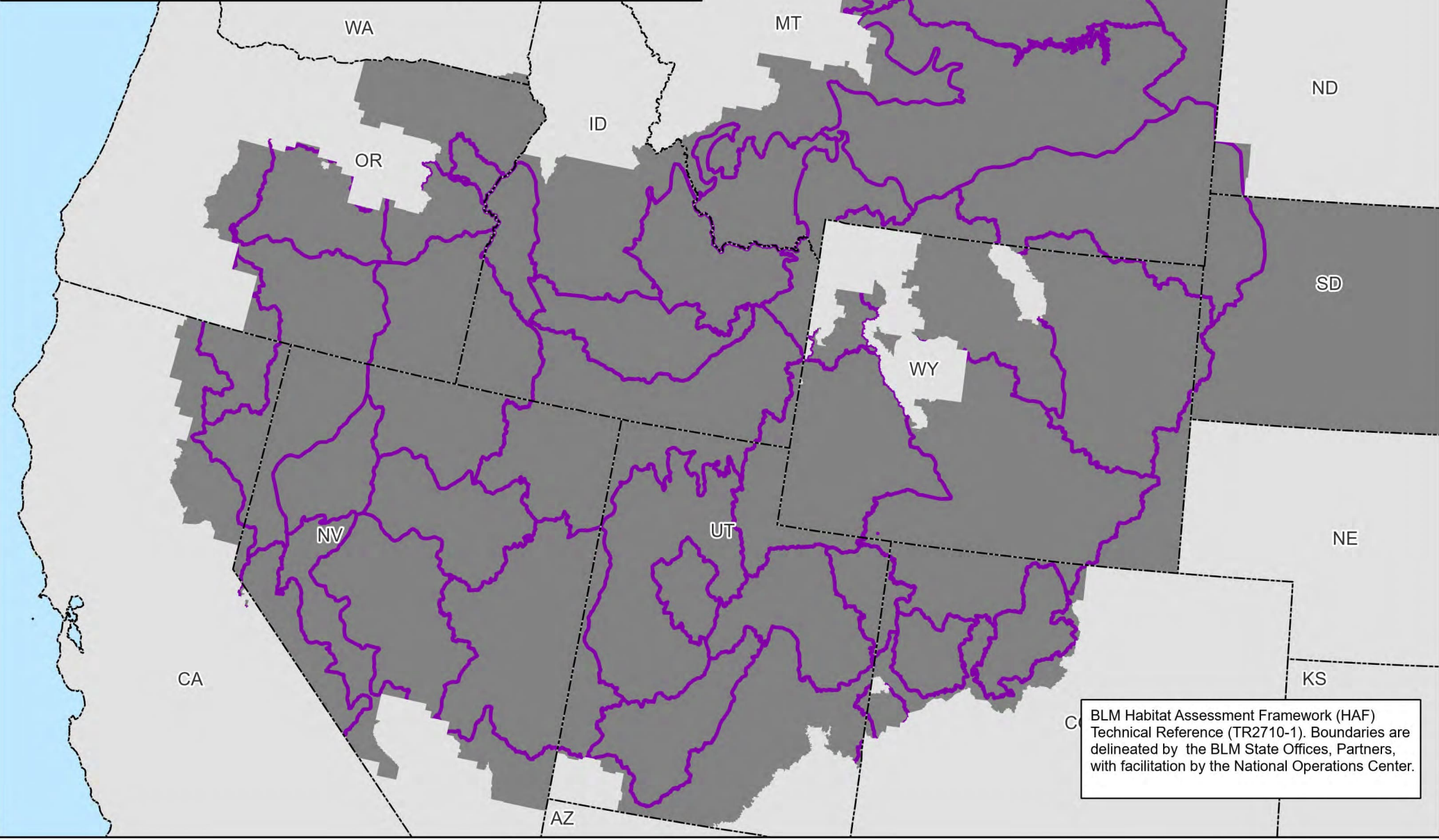
- Climate Clusters
- State Boundaries
- GRSG Planning Area 2022



0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Greater Sage-Grouse Habitat Assessment Framework, Mid-Scale Areas (Level 2) and Greater Sage-Grouse Planning Areas



Map 3.6

Legend

HAF Mid-Scale Areas (Level 2)

State Boundaries

Planning Area Extent

N

E

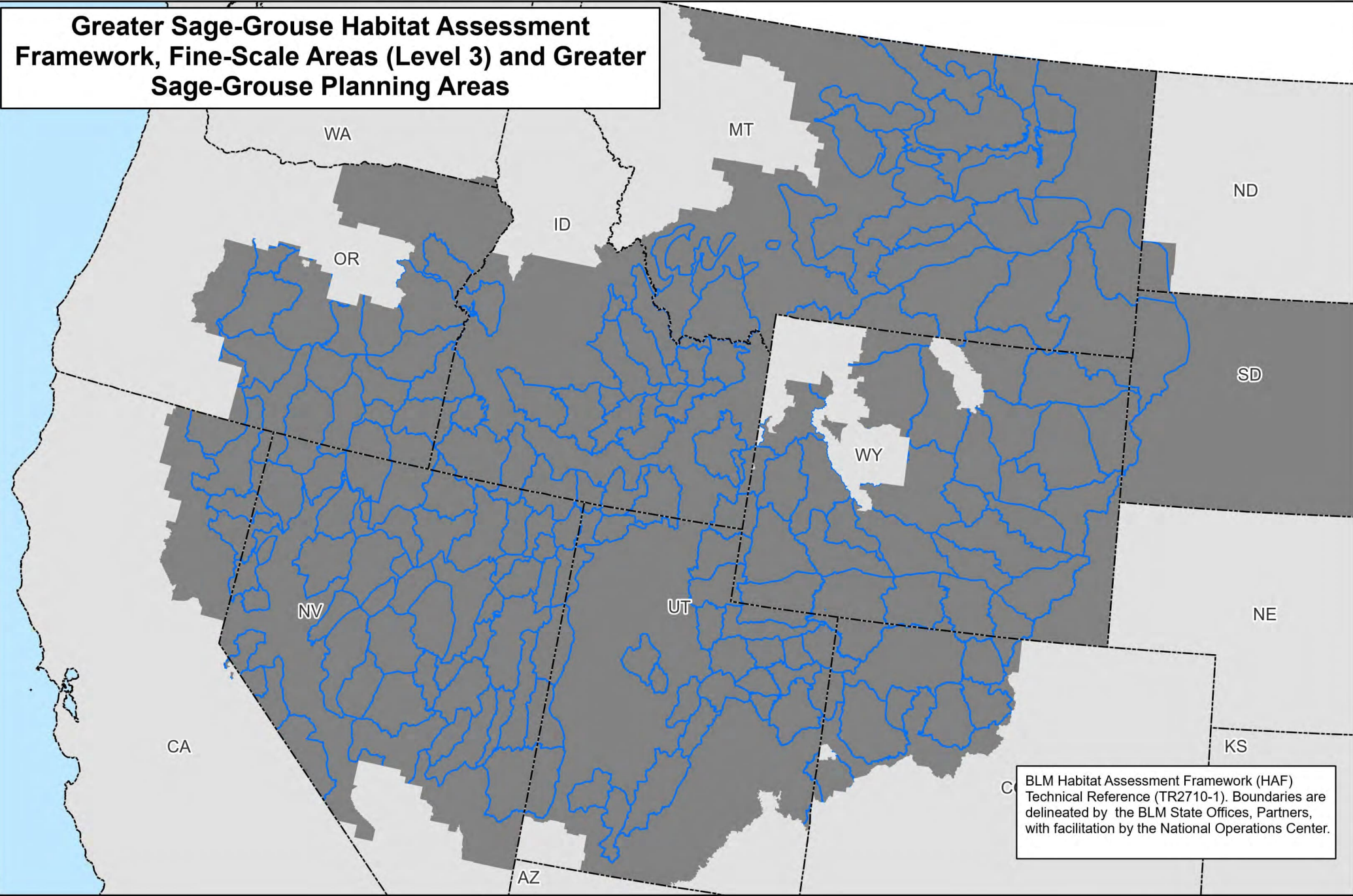
S

W

0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Greater Sage-Grouse Habitat Assessment Framework, Fine-Scale Areas (Level 3) and Greater Sage-Grouse Planning Areas


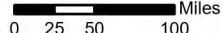


BLM Habitat Assessment Framework (HAF) Technical Reference (TR2710-1). Boundaries are delineated by the BLM State Offices, Partners, with facilitation by the National Operations Center.

Map 3.7

Legend

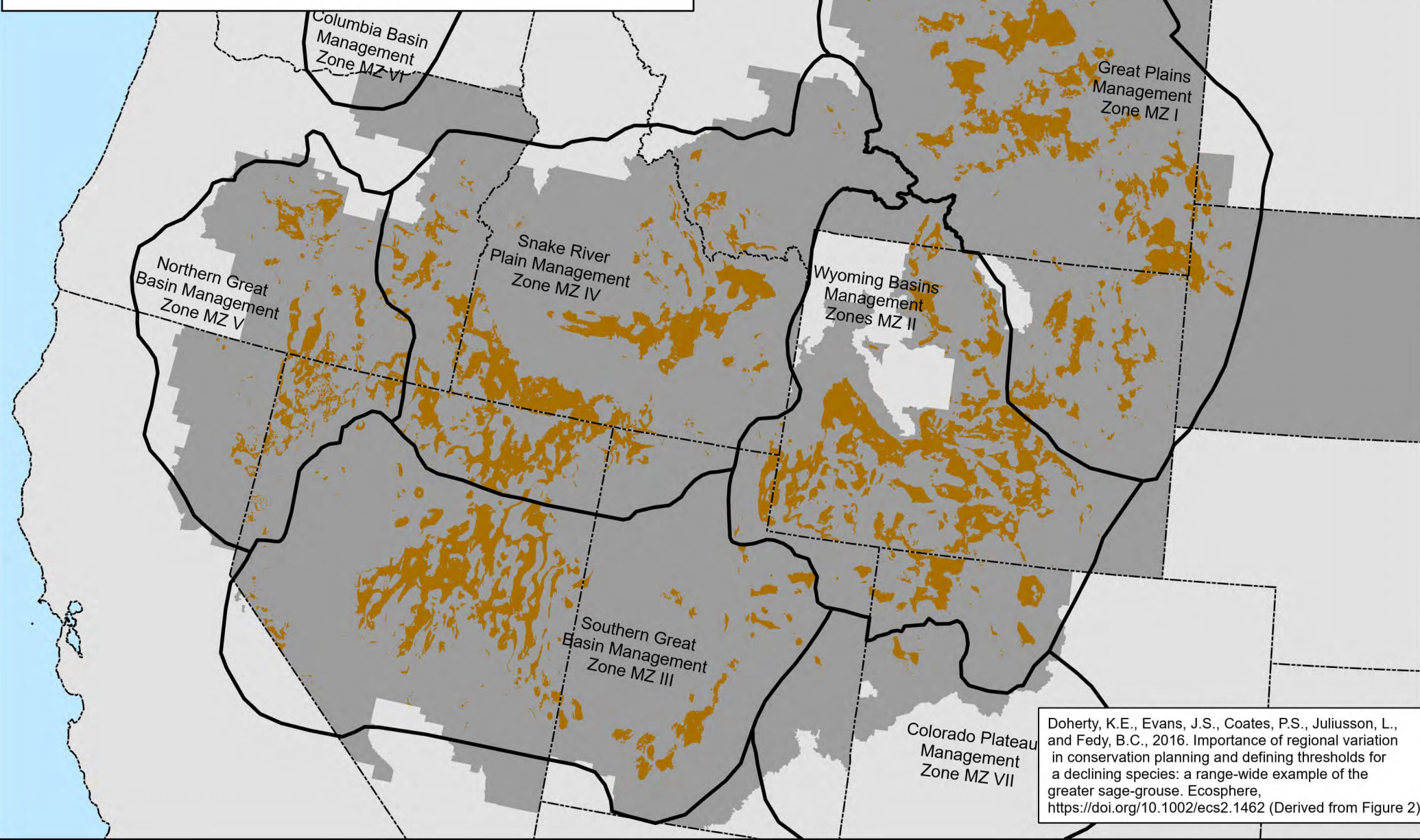
-  HAF Fine-Scale Areas (Level 3)
-  State Boundaries
-  Planning Area Extent

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Greater Sage-Grouse Breeding Habitat Model within Greater Sage-Grouse Planning Areas

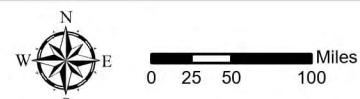


Doherty, K.E., Evans, J.S., Coates, P.S., Juliusson, L., and Fedy, B.C., 2016. Importance of regional variation in conservation planning and defining thresholds for a declining species: a range-wide example of the greater sage-grouse. *Ecosphere*, <https://doi.org/10.1002/ecs2.1462> (Derived from Figure 2)

Map 3.8

Legend

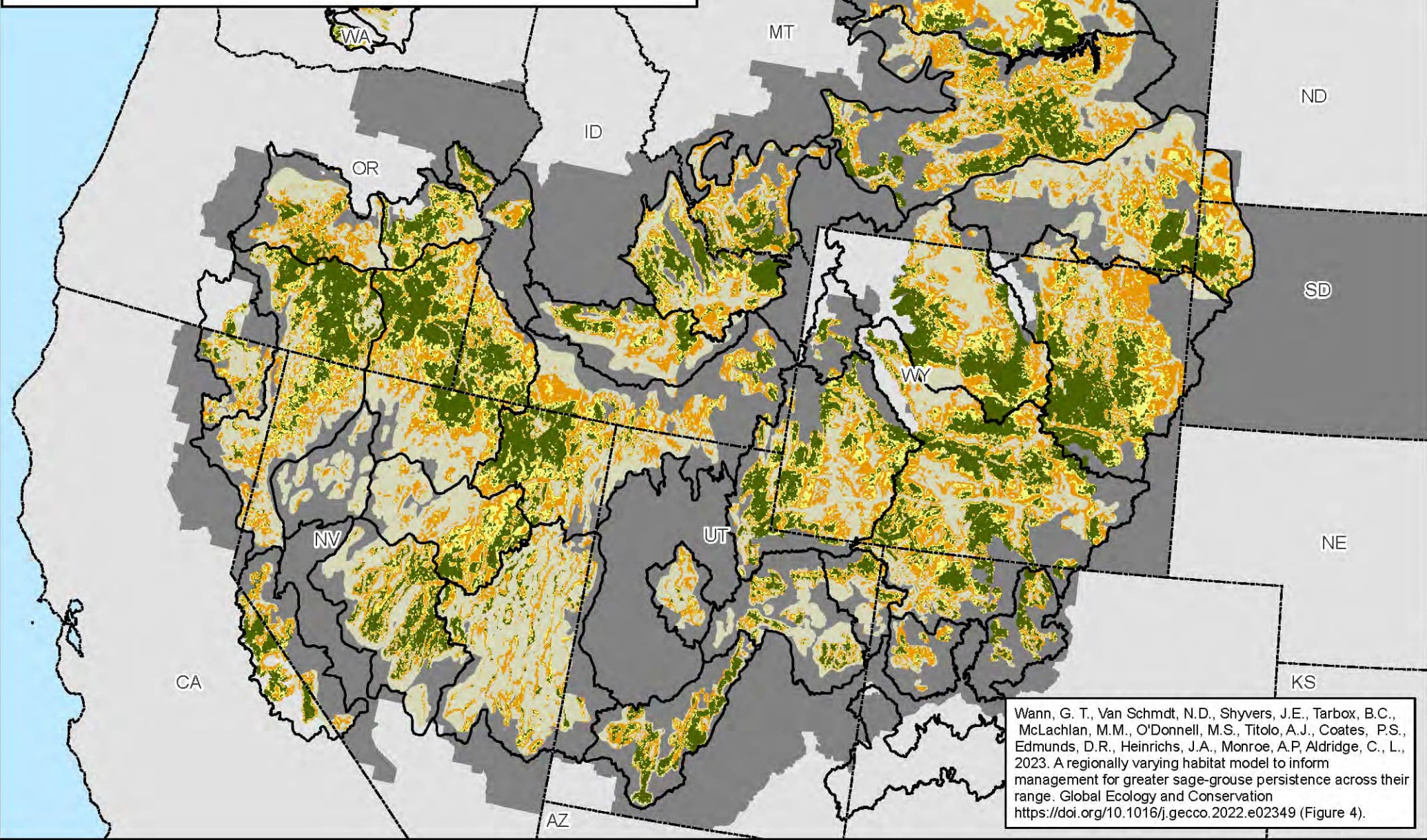
- Probability of Breeding Habitat > 0.65
- State Boundaries
- WAFWA Mgmt Zones
- Planning Area Extent



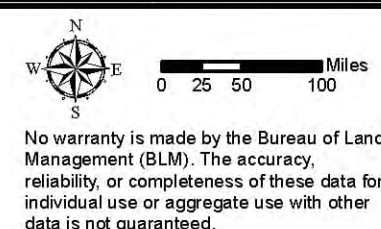
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



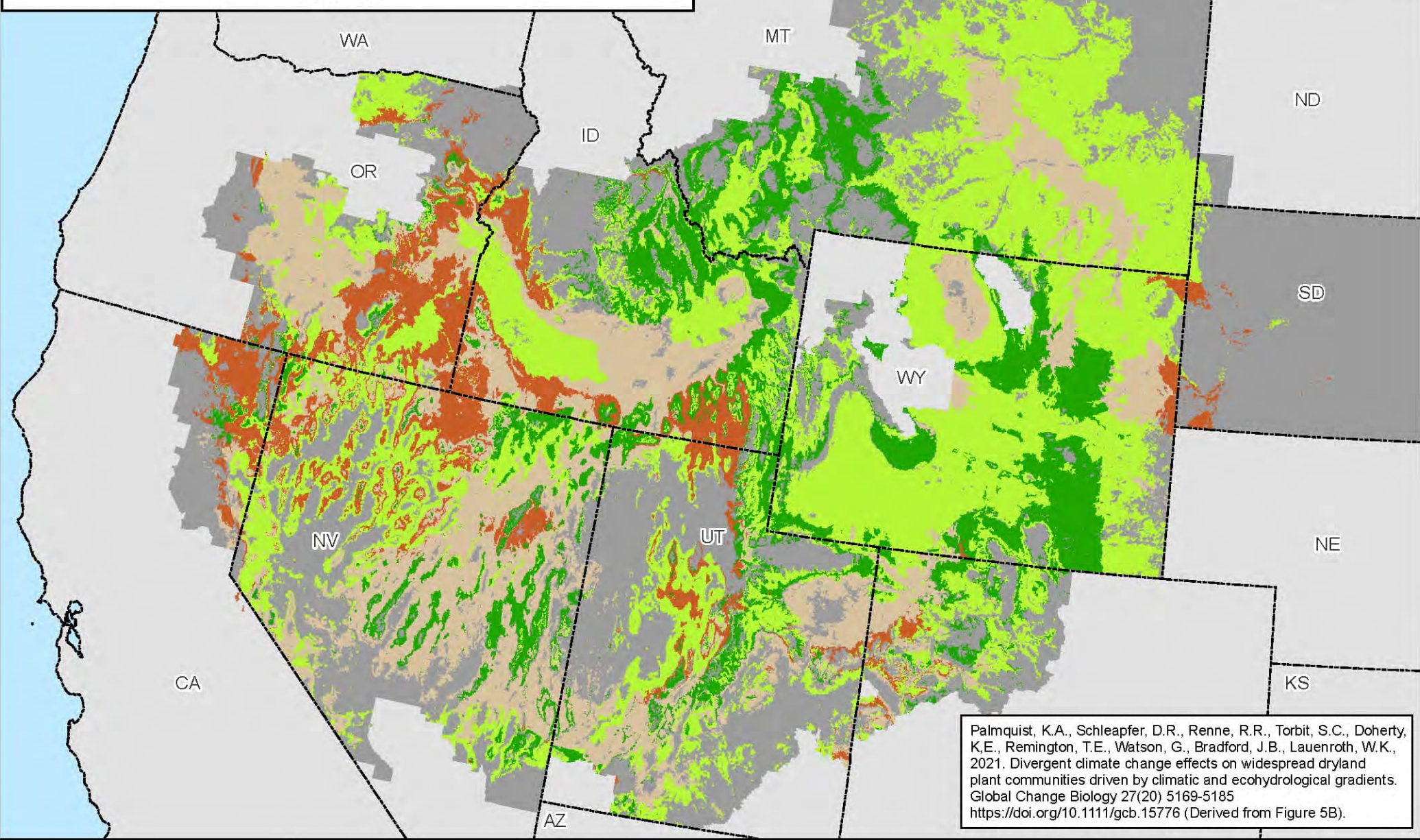
Probability of Greater Sage-Grouse Lek Persistence within Greater Sage-Grouse Planning Areas



Map 3.9



Modeled Potential Change in Sagebrush Biomass (2030-2060) within Greater Sage-Grouse Planning Areas



Palmquist, K.A., Schlepfer, D.R., Renne, R.R., Torbit, S.C., Doherty, K.E., Remington, T.E., Watson, G., Bradford, J.B., Lauenroth, W.K., 2021. Divergent climate change effects on widespread dryland plant communities driven by climatic and ecohydrological gradients. *Global Change Biology* 27(20) 5169-5185
<https://doi.org/10.1111/gcb.15776> (Derived from Figure 5B).

Map 3.10

Legend

Change in Sagebrush Biomass (g/m²)
 2030 to 2060

■ Highest Decrease

■ Low to Moderate Decrease

■ Low to Moderate Increase

■ Highest Increase

State Boundaries

Planning Area Extent

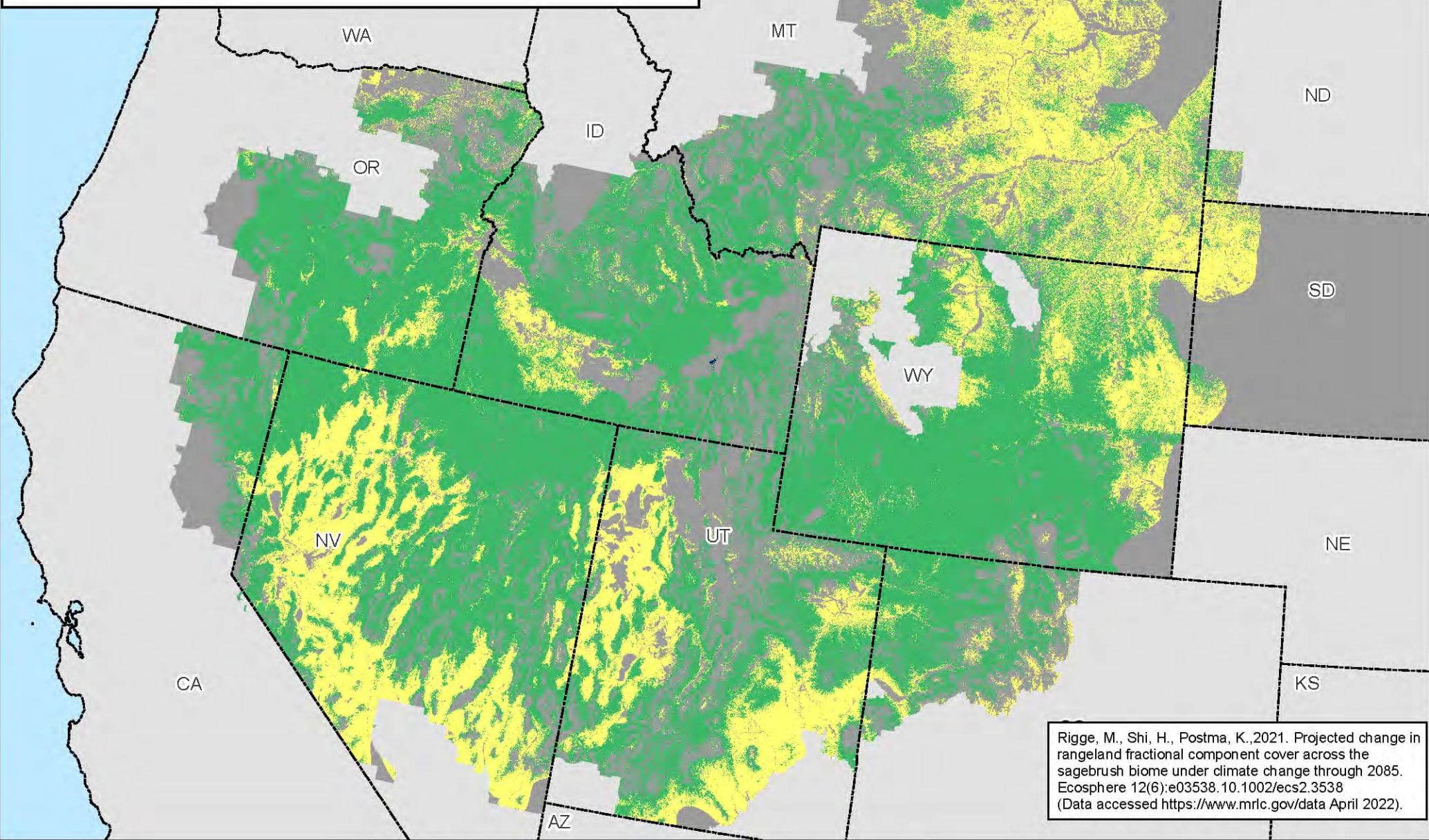


0 25 50 100 Miles

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Modeled Potential Sagebrush Cover (2011-2040) within Greater Sage-Grouse Planning Areas



Rigge, M., Shi, H., Postma, K., 2021. Projected change in rangeland fractional component cover across the sagebrush biome under climate change through 2085. Ecosphere 12(6):e03538.10.1002/ecs2.3538 (Data accessed <https://www.mrlc.gov/data> April 2022).

Map 3.11

% Cover

0 - 4

4 - 25

25 - 58

Legend

State Boundaries

Planning Area Extent

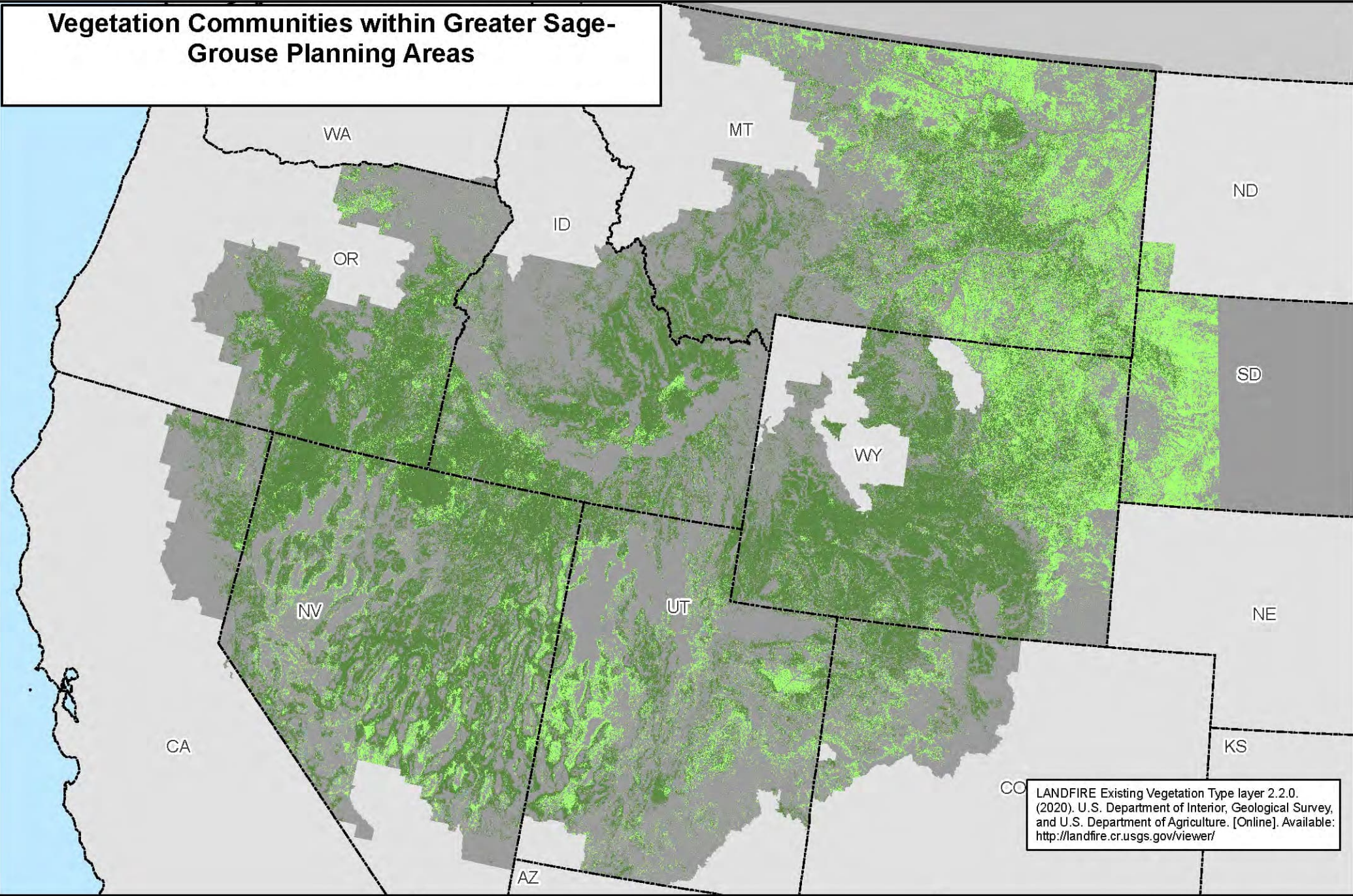


0 25 50 100 Miles

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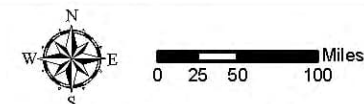
Vegetation Communities within Greater Sage-Grouse Planning Areas



LANDFIRE Existing Vegetation Type layer 2.2.0. (2020). U.S. Department of Interior, Geological Survey, and U.S. Department of Agriculture. [Online]. Available: <http://landfire.cr.usgs.gov/viewer/>

Map 3.12

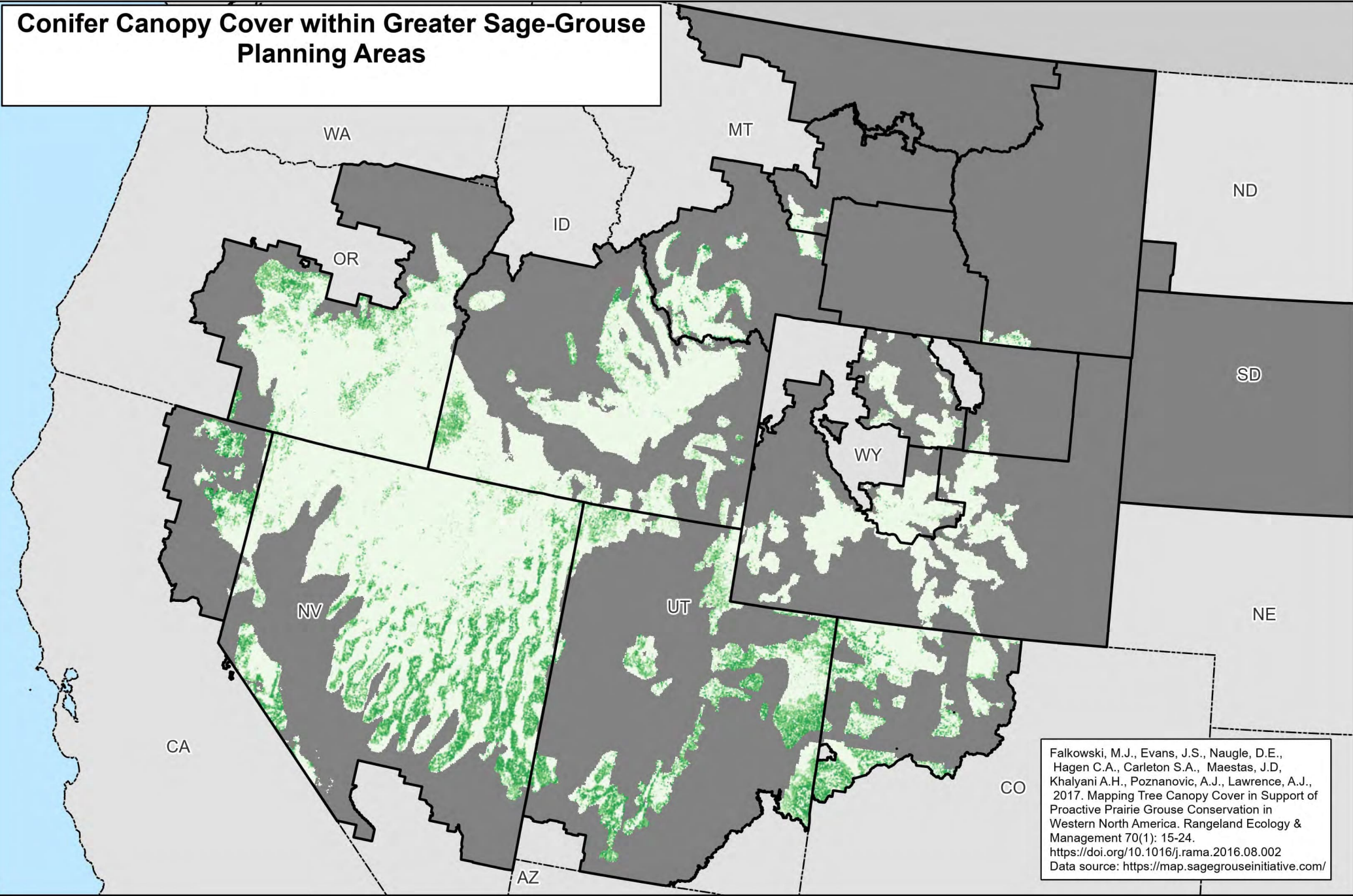
- Legend**
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Reclassified Landfire EVT220 | Non-Sagebrush in Planning Area |
| Existing Sagebrush | |
| Existing Sagebrush Associated | State Boundaries |



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Conifer Canopy Cover within Greater Sage-Grouse Planning Areas



Falkowski, M.J., Evans, J.S., Naugle, D.E., Hagen C.A., Carleton S.A., Maestas, J.D., Khalyani A.H., Poznanovic, A.J., Lawrence, A.J., 2017. Mapping Tree Canopy Cover in Support of Proactive Prairie Grouse Conservation in Western North America. *Rangeland Ecology & Management* 70(1): 15-24. <https://doi.org/10.1016/j.rama.2016.08.002>
Data source: <https://map.sagegrouseinitiative.com/>

Map 3.13

Tree canopy cover (%)

- < 1
- 1 - 4
- 4 - 10
- 10 - 20
- 20 - 50
- > 50

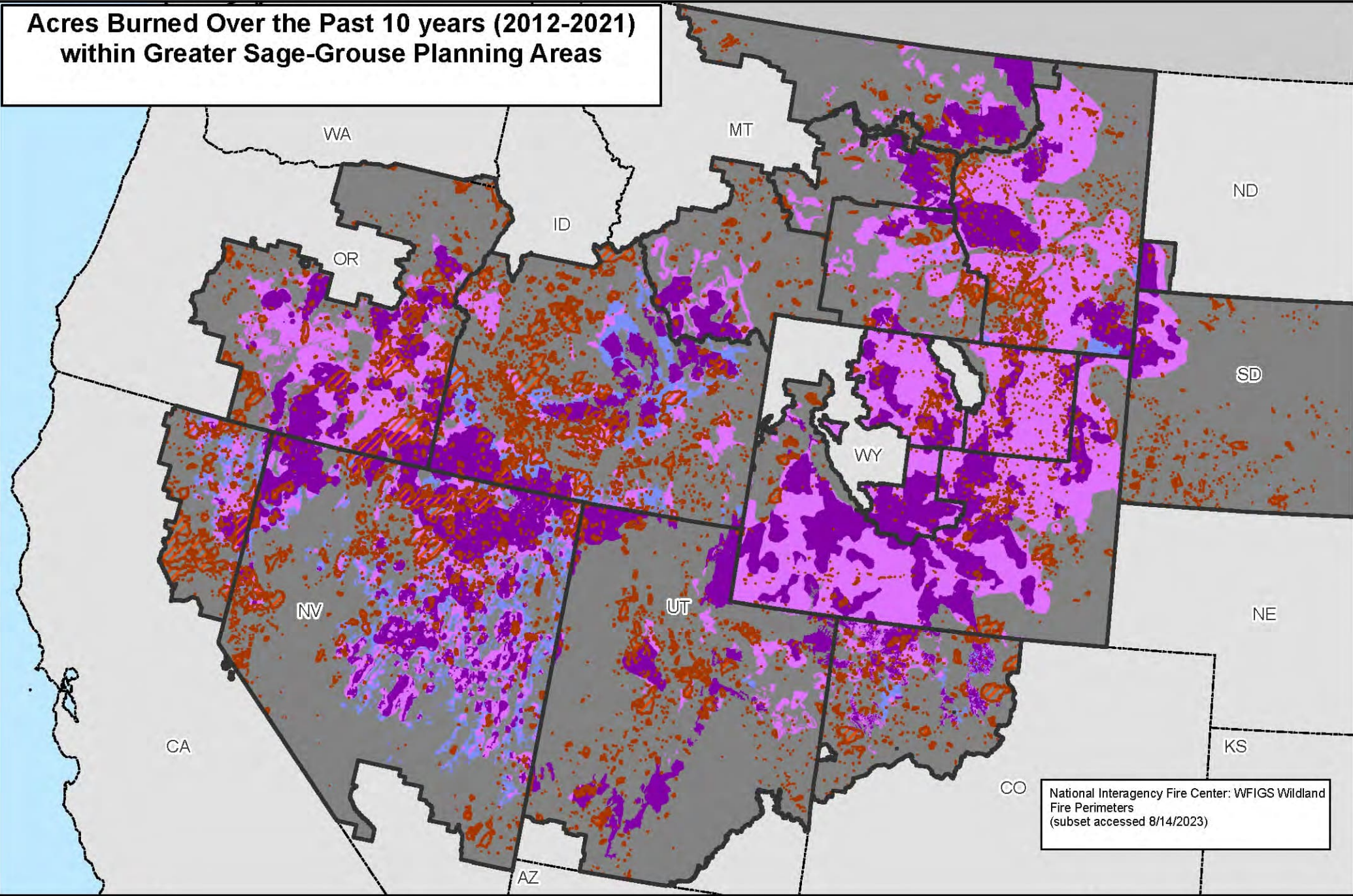
Legend

- Planning Areas not Mapped for Canopy Cover
- State Boundaries

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Acres Burned Over the Past 10 years (2012-2021) within Greater Sage-Grouse Planning Areas



National Interagency Fire Center: WFIGS Wildland Fire Perimeters
(subset accessed 8/14/2023)

Map 3.14

Fires 2012-2021

Anthro Mtn

IHMA

LCHMA

OHMA

PHMA

GHMA

Anthro Mtn

IHMA

LCHMA

OHMA

RHMA

UDH

State Boundaries

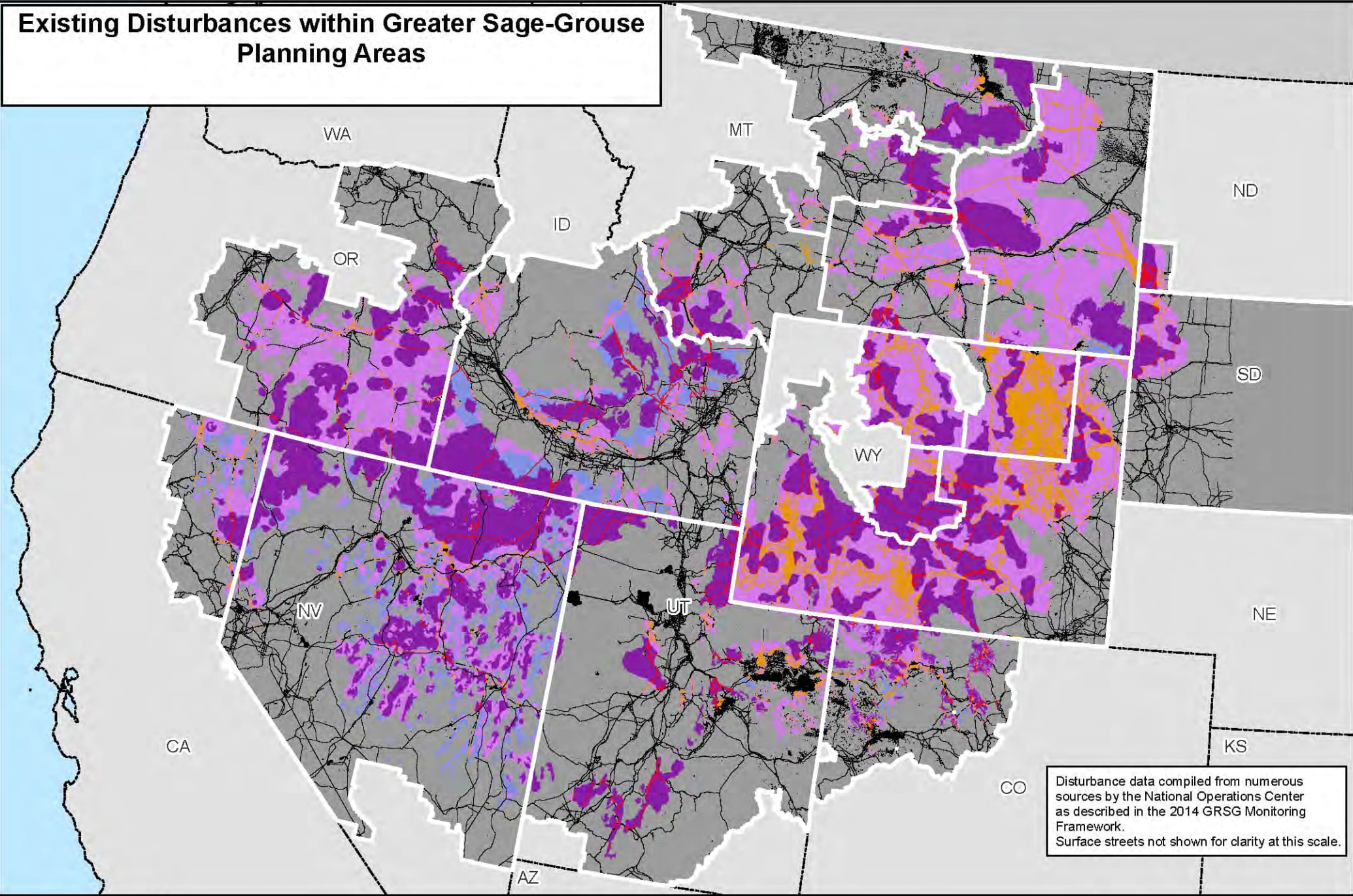
Planning Area Boundaries

Planning Area Extent

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Existing Disturbances within Greater Sage-Grouse Planning Areas



Map 3.15

Disturbance in Habitat Type - no Surface Streets

IHMA; PHMA

Anthro Mtn; GHMA; LCHMA; OHMA; RHMA; UDH

NA

Habitat_Type

PHMA

GHMA

Legend

Anthro Mtn

IHMA

LCHMA

OHMA

RHMA

UDH

State Boundaries

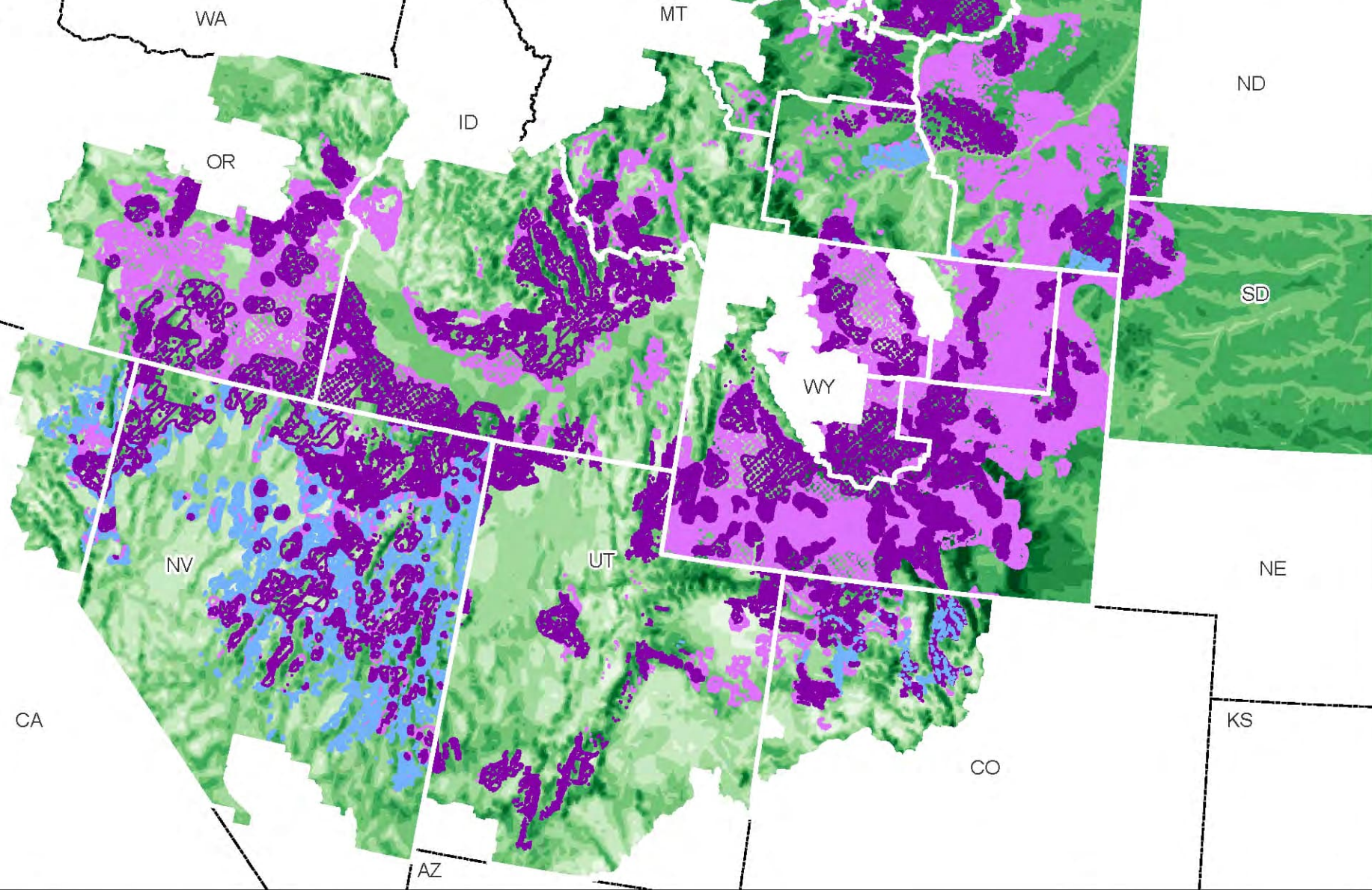
Planning Area



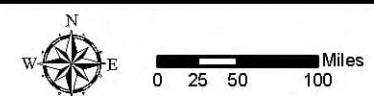
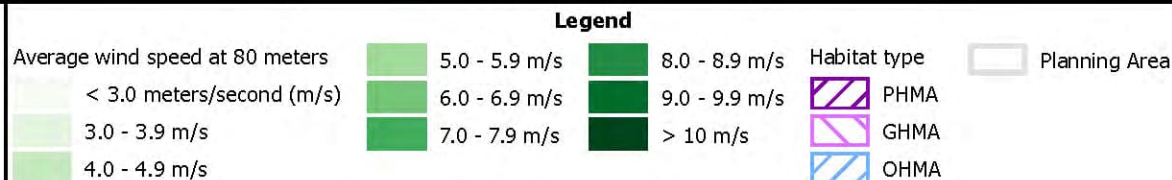
0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Wind Potential



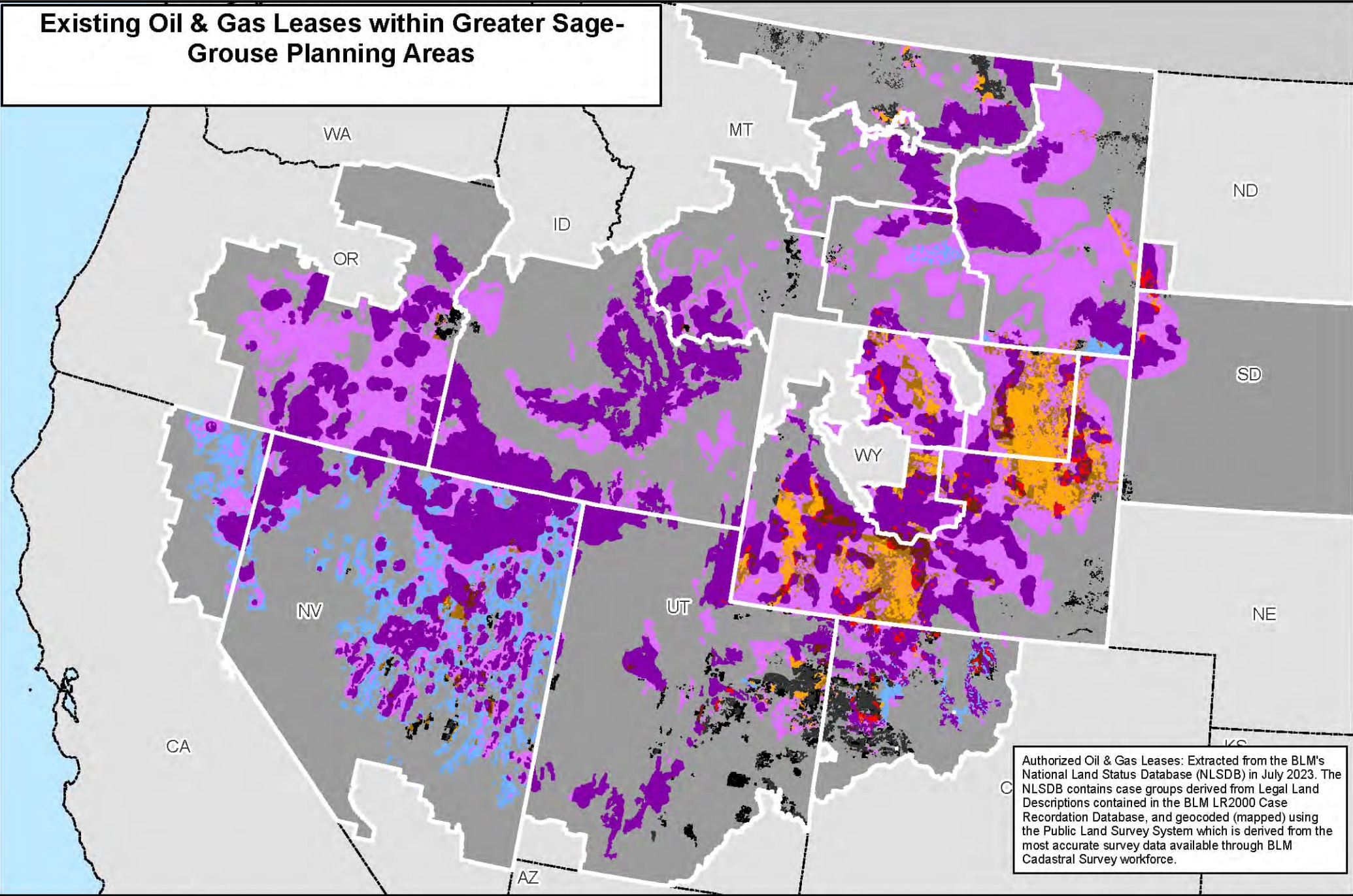
Map 3.16



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Existing Oil & Gas Leases within Greater Sage-Grouse Planning Areas



Authorized Oil & Gas Leases: Extracted from the BLM's National Land Status Database (NLSDB) in July 2023. The NLSDB contains case groups derived from Legal Land Descriptions contained in the BLM LR2000 Case Recordation Database, and geocoded (mapped) using the Public Land Survey System which is derived from the most accurate survey data available through BLM Cadastral Survey workforce.

Map 3.17

Authorized Oil and Gas Leases - Producing

Habitat Type

- PHMA
- Anthro Mtn; GHMA; LCHMA; OHMA; RHMA; UDH
- Non-HMA

Authorized Oil and Gas Leases - Non-Producing / Unknown Production

Habitat Type

- PHMA
- Anthro Mtn; GHMA; LCHMA; OHMA; RHMA; UDH
- Non-HMA

Legend

Habitat Type

- IHMA; PHMA
- GHMA
- Anthro Mtn; LCHMA; OHMA; RHMA; UDH

State Boundaries

Planning Area

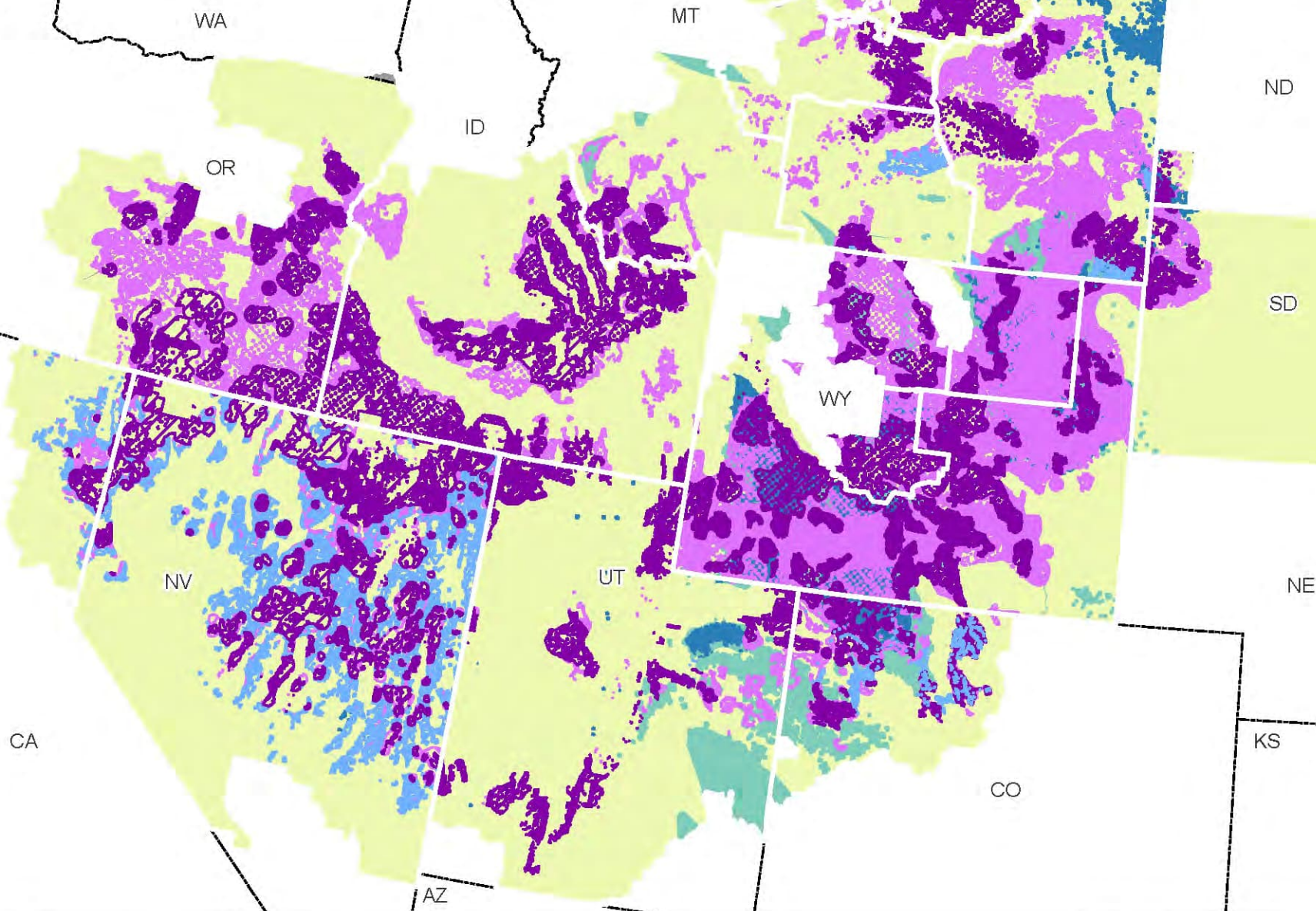


0 25 50 100 Miles

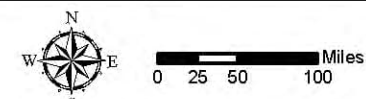
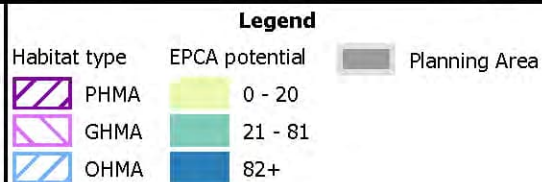
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Oil and Gas Potential



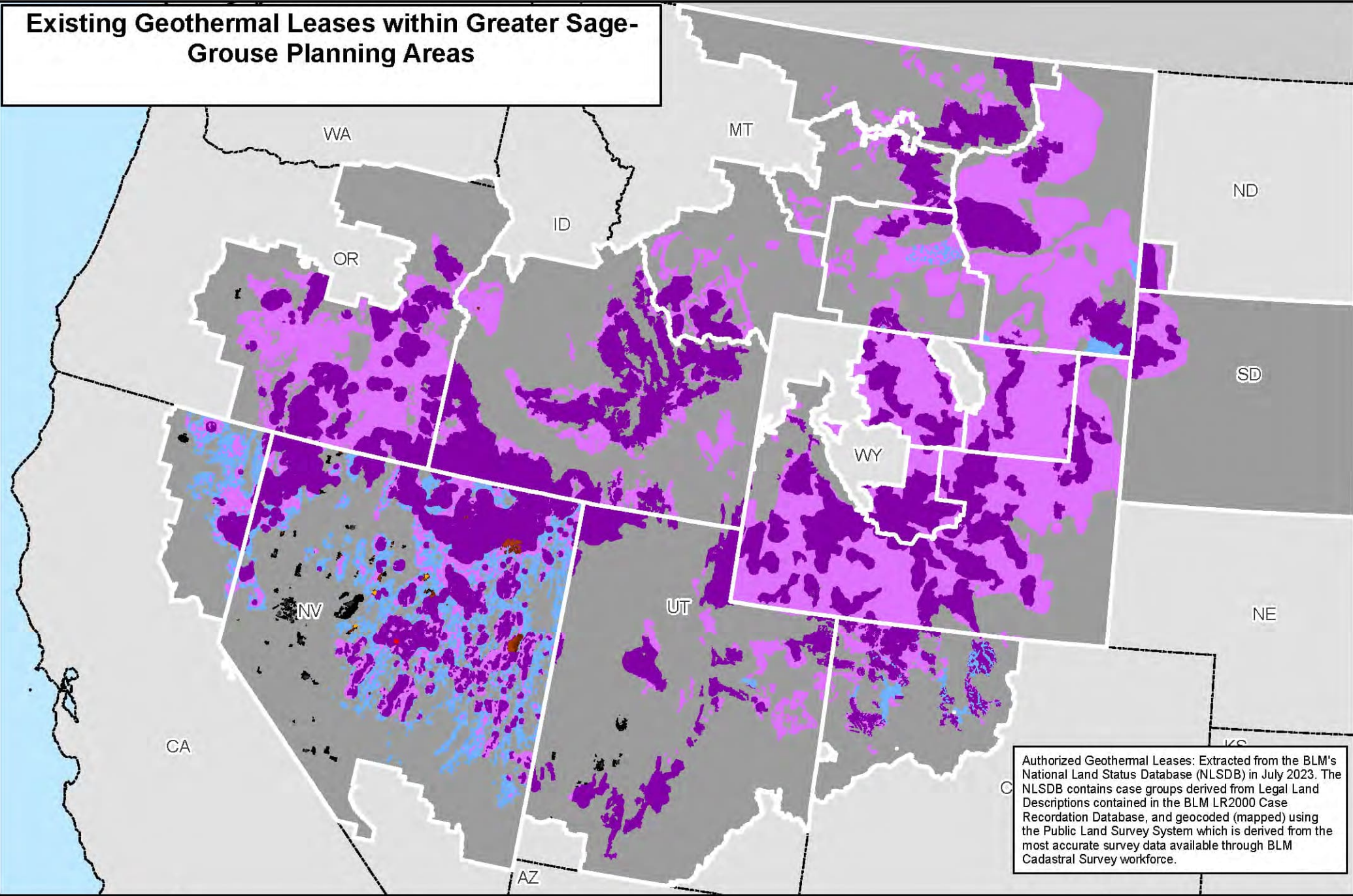
Map 3.18



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



Existing Geothermal Leases within Greater Sage-Grouse Planning Areas



Authorized Geothermal Leases: Extracted from the BLM's National Land Status Database (NLSDB) in July 2023. The NLSDB contains case groups derived from Legal Land Descriptions contained in the BLM LR2000 Case Recordation Database, and geocoded (mapped) using the Public Land Survey System which is derived from the most accurate survey data available through BLM Cadastral Survey workforce.

Map 3.19

Approved / Authorized Geothermal Leases - Producing

Habitat Type

- PHMA
- GHMA; OHMA
- Non-HMA

Approved / Authorized Geothermal Leases - Non-Producing

Habitat Type

- PHMA
- GHMA; OHMA
- Non-HMA

Legend

Habitat Type

- IHMA; PHMA
- GHMA
- Anthro Mtn; LCHMA; OHMA; RHMA; UDH

State Boundaries

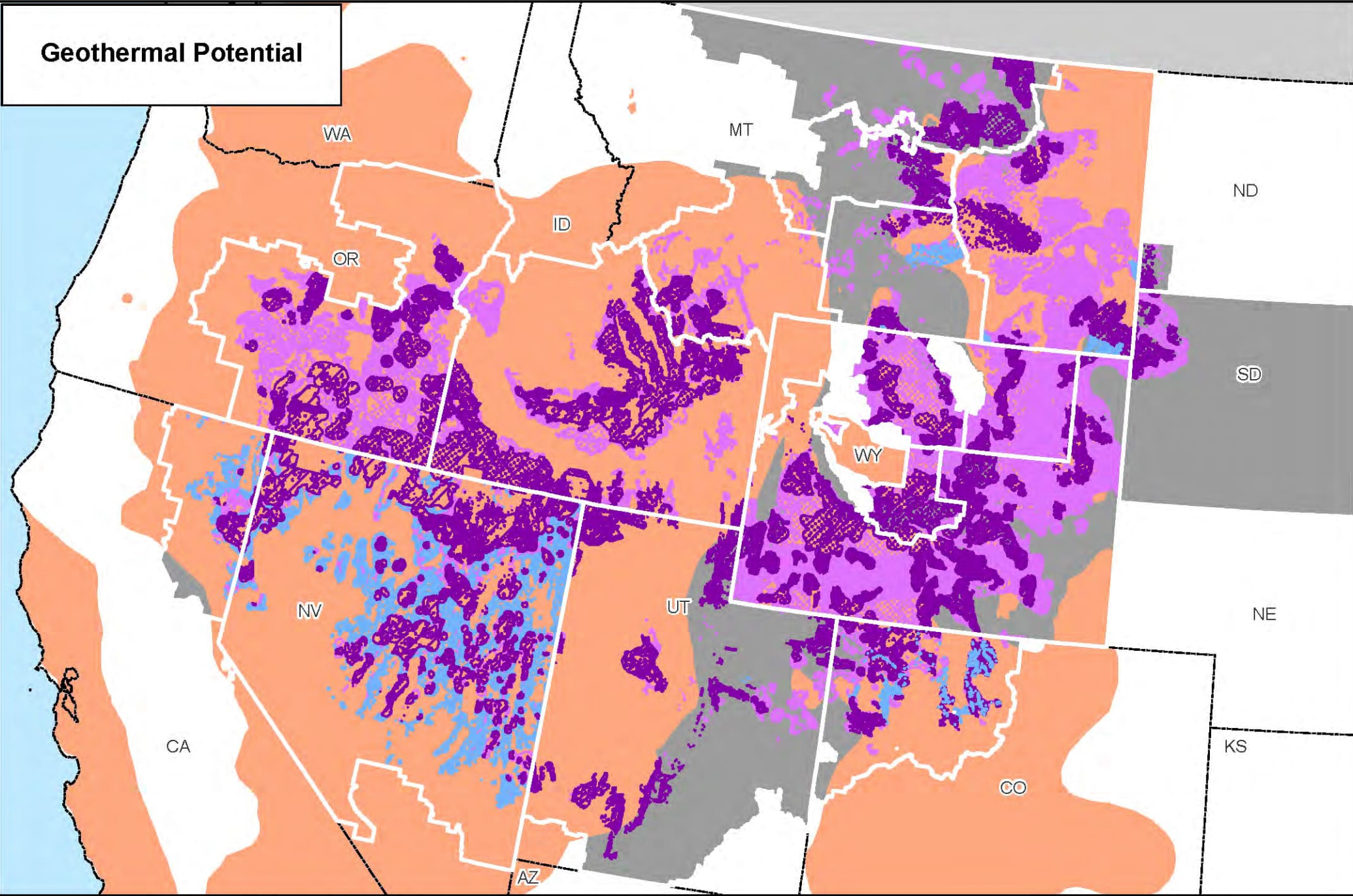
Planning Area



0 25 50 100 Miles

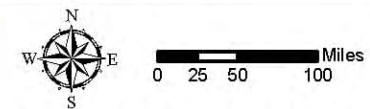
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Geothermal Potential



Map 3.20

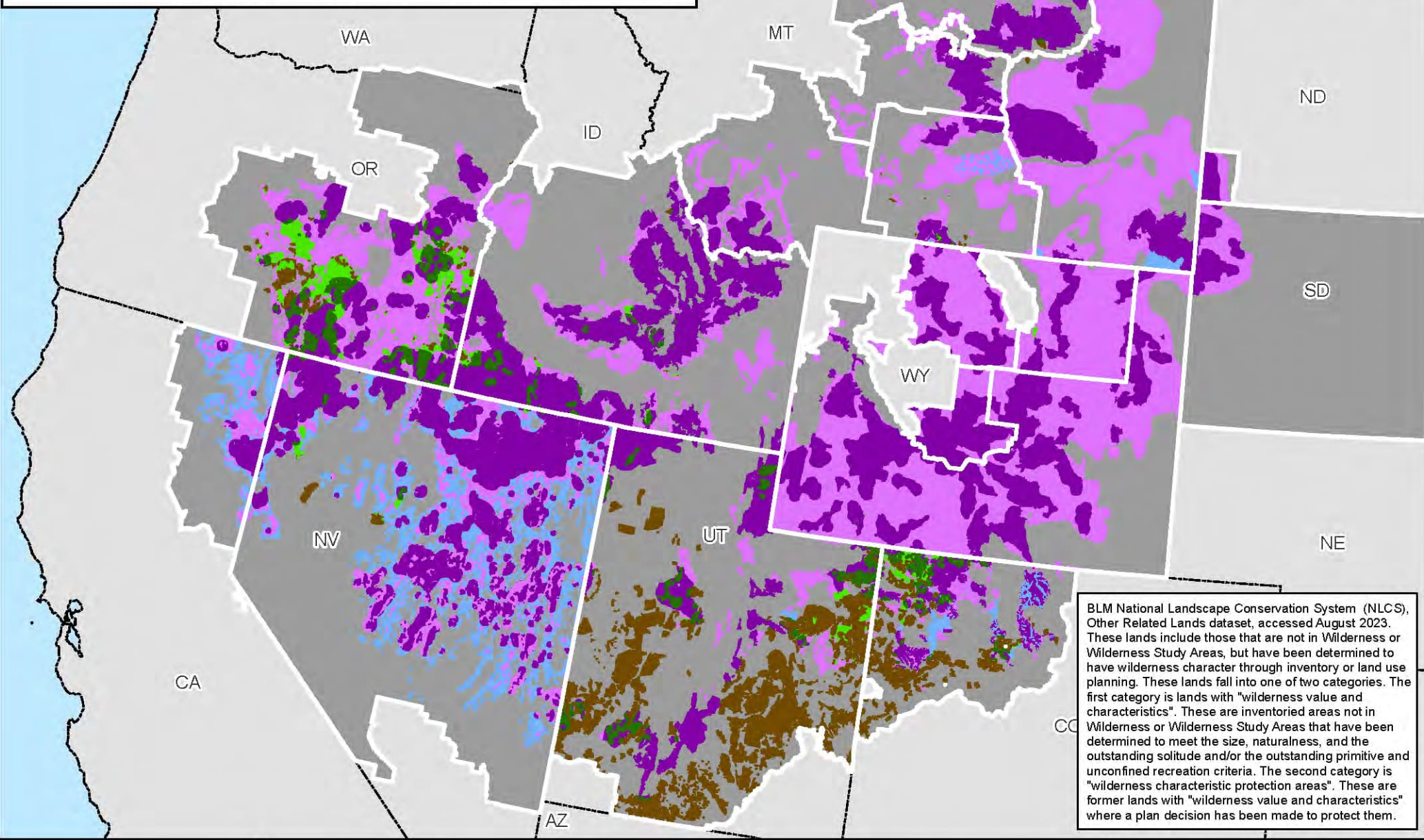
- Legend**
- | | |
|--------------|---------------------------|
| Habitat type | Geothermal potential area |
| PHMA | Geothermal potential area |
| GHMA | Planning Area |
| OHMA | |



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



BLM National Landscape Conservation System (NLCS), Other Related Lands within Greater Sage-Grouse Planning Areas



BLM National Landscape Conservation System (NLCS), Other Related Lands dataset, accessed August 2023. These lands include those that are not in Wilderness or Wilderness Study Areas, but have been determined to have wilderness character through inventory or land use planning. These lands fall into one of two categories. The first category is lands with "wilderness value and characteristics". These are inventoried areas not in Wilderness or Wilderness Study Areas that have been determined to meet the size, naturalness, and the outstanding solitude and/or the outstanding primitive and unconfined recreation criteria. The second category is "wilderness characteristic protection areas". These are former lands with "wilderness value and characteristics" where a plan decision has been made to protect them.

Map 3.21

Other Related NLCS Lands

Habitat Type

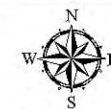
- PHMA; IHMA
- Anthro Mtn; LCHMA; GHMA; OHMA
- Non-HMA

Legend

Habitat Type

- PHMA; IHMA
- GHMA
- Anthro Mtn; LCHMA; OHMA; RHMA; UDH

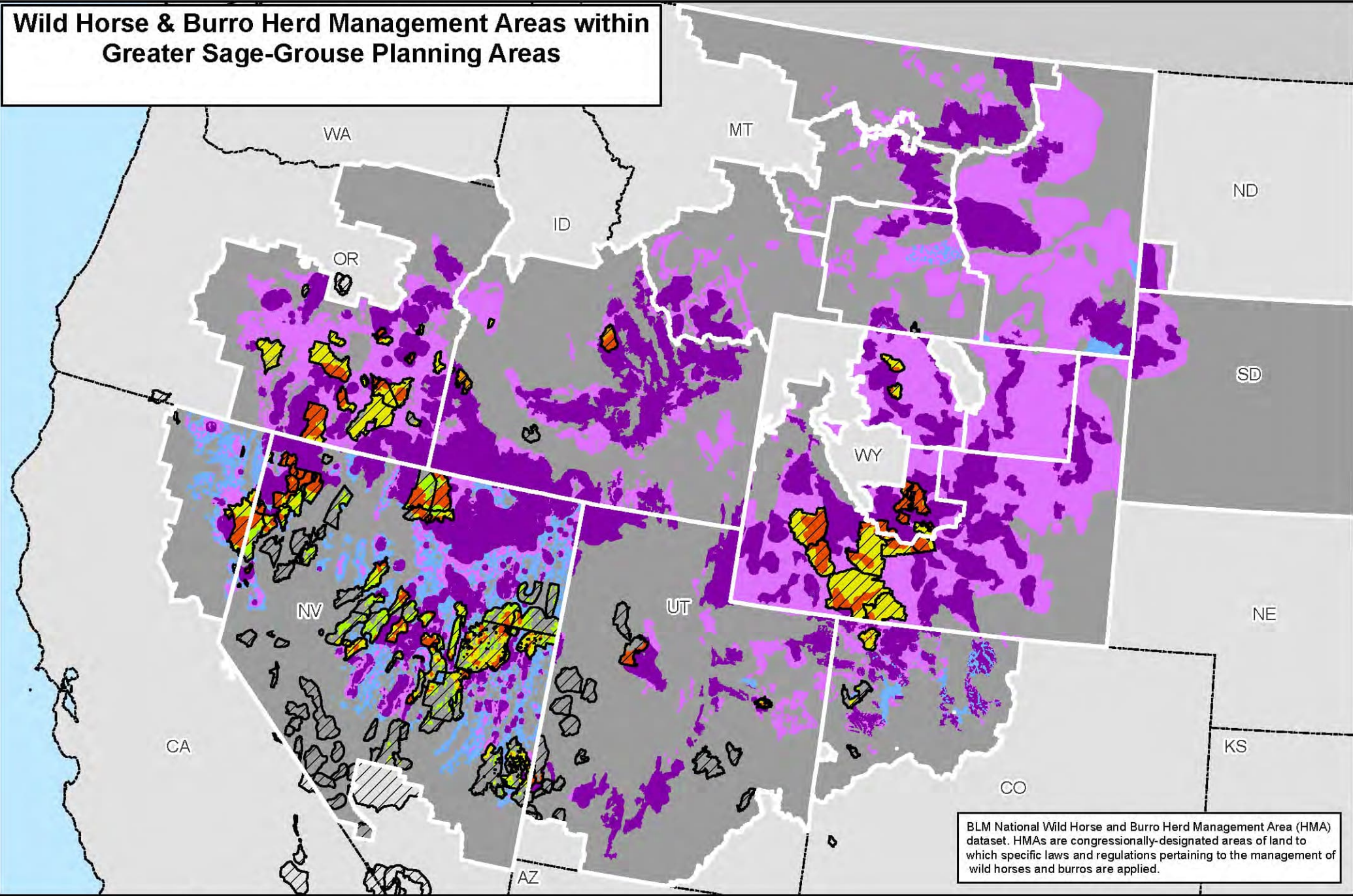
- State Boundaries
- Planning Area



0 25 50 100 Miles

No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Wild Horse & Burro Herd Management Areas within Greater Sage-Grouse Planning Areas



Map 3.22

