Crosswalk of Management Concepts in Nevada
DRAFT for Discussion - version 5/29/2014

Management Concept	Agency	Year	Category names (Number)	Extent	Relevance/Methods to develop	Notes	Website for download.	Attachment Number
PMU *Population Management Units*	NDOW	2001	Tuscarora, Fish Creek, etc. (61)	Nevada. CA also has same designation.	NDOW's PMUs were initially outlined in 2001 State Pland and refined in 2004 State Plans. They were developed as the basic management unit for sage-grouse in Nevada for threat assessment and mitigation planning. They were delineatedbased on aggregations of leks, understanding of habitat, and potential boundaries to populations (such as mountains and valleys).		Not available online	1
Management Zone	WAFWA	2006	III -Southern Great Basin, IV-Snake River Plain, V-Northern Great Basin, etc. (7)	Range wide	The management zones were developed to guide sage-grouse conservation goals and range-wide management outlined in the 2006 Greater Sage-grouse Comprehensive Conservation Strategy developed by WAFWA. The management zones were delineated based on sage-grouse populations within floristic provinces (See 2006 WAFWA report - pg 1-6).		http://www.wafwa.org/documents/pdf/GreaterSage-grouseConservationStrategy2006.pdf pg. 1-11	2
Breeding Densities *(not management per se, but can be used to guide prioritization)*	Doherty et al. (Mapping breeding densities of GRSG: A tool for range-wide conservation planning)	2010	25% Breeding densities 50% Breeding densities 75% Breeding densities 100% Breeding densities (generally 4, though more have been developed)	Range wide	The breeding bird densities were developed to help spatially, prioritize conservation efforts to areas with large, intact breeding populations. The breeding densities were delineated by using maximum count data from leks based on 25, 50, 75, and 100% of the known breeding population.	Nevada Sage-grouse Committee developed 85% breeding densities for development of their 2012 planning strategy.	http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs.Par.46599.File.tmp/GRSG%20Rangewide%20Breeding%20Density.pdf	3
NDOW Habitat Categorization	NDOW	2012	Essential/Irreplaceable Habitat Important Habitat Habitat of Moderate Importance Low Value habitat/Transitional Range Unsuitable Habitat (5)	Just Nevada	NDOW's Habitat Categorization Map is an analysis tool that was developed to incorporate the best available data (lek observations, telemetry locations, survey and inventory reports, vegetation cover, soils information, and aerial photography) into a statewide prioritization of sage-grouse habitat. Categories were delineated by identifying homogenous habitat patches and individually evaluating them based on overall quality of habitat, patch size, and known sage-grouse activity.		http://www.ndow.org/Nevada_Wildlife/Sage_Grouse/	4
PPH and PGH *Preliminary Priority Habitat and Preliminary General Habitat*	BLM/FS	2012	PPH PGH (2)	Nevada and CA (though term is used range wide)	PPH and PGH were developed for the BLM/FS land use planning strategy (Subregional EIS/LUPA) to indicate where land-use changes could result in an expected negative impact to sage-grouse population health. PPH and PGH were delineated from NDOWs Habitat Categories. PPH is (1) Essential/Irreplaceable Habitat and (2) Important habitat. PGH is (3) habitat of moderate importance.		http://www.blm.gov/pgdata/etc/medialib/blm/nv/wildlife___fishes/sage_grouse.Par.8043.File.dat/BLM-USFS_GSG_Preliminary_Habitat_Map_No.pdf	5
SGMA	2012 Sage-Grouse Committee	2012	no names (14)	Just Nevada	The SGMAs were developed to represent a broad-scale evaluation of sage-grouse habitat. They were delineated based on NDOW's Habitat Categorization Map, PPH and PGH, Doherty et al.'s 85% breeding bird density, and on land use conditions. (See 2012 State Plan)	These delineations have been "**retired**' and are replaced with the 2014 SGMA.	Not available online	6
Occupied, Potential, and Suitable Habitat	2012 Sage-Grouse Committee	2012	never mapped	Just Nevada	These definitions were establisehd to guide management in the 2012 State Plan. A process to delineate these habitat categories was never established.	These terms have been "**retired**" and are replaced with the SEPs Management Categories.	Not available.	Not mapped.
PPMA and PGMA (MA = management areas)	BLM/FS	2013	PPMA PGMA (2)	Nevada and CA (though term is used range wide)	PPMA and PGMA were developed for each alternative in the BLM/FS Subregional EIS/LUPA to identify where management of PPH and PGH, respectively, would be applied. The delineation of PPMA and PGMA for each alternative is outline in Chapter 2, pg 7 of the DEIS.		http://www.blm.gov/pgdata/etc/medialib/blm/nv/wildlife___fishes/sage_grouse/2013_public_workshop.Par.98718.File.dat/alternativeD%20Poster.pdf	7

Crosswalk of Management Concepts in Nevada
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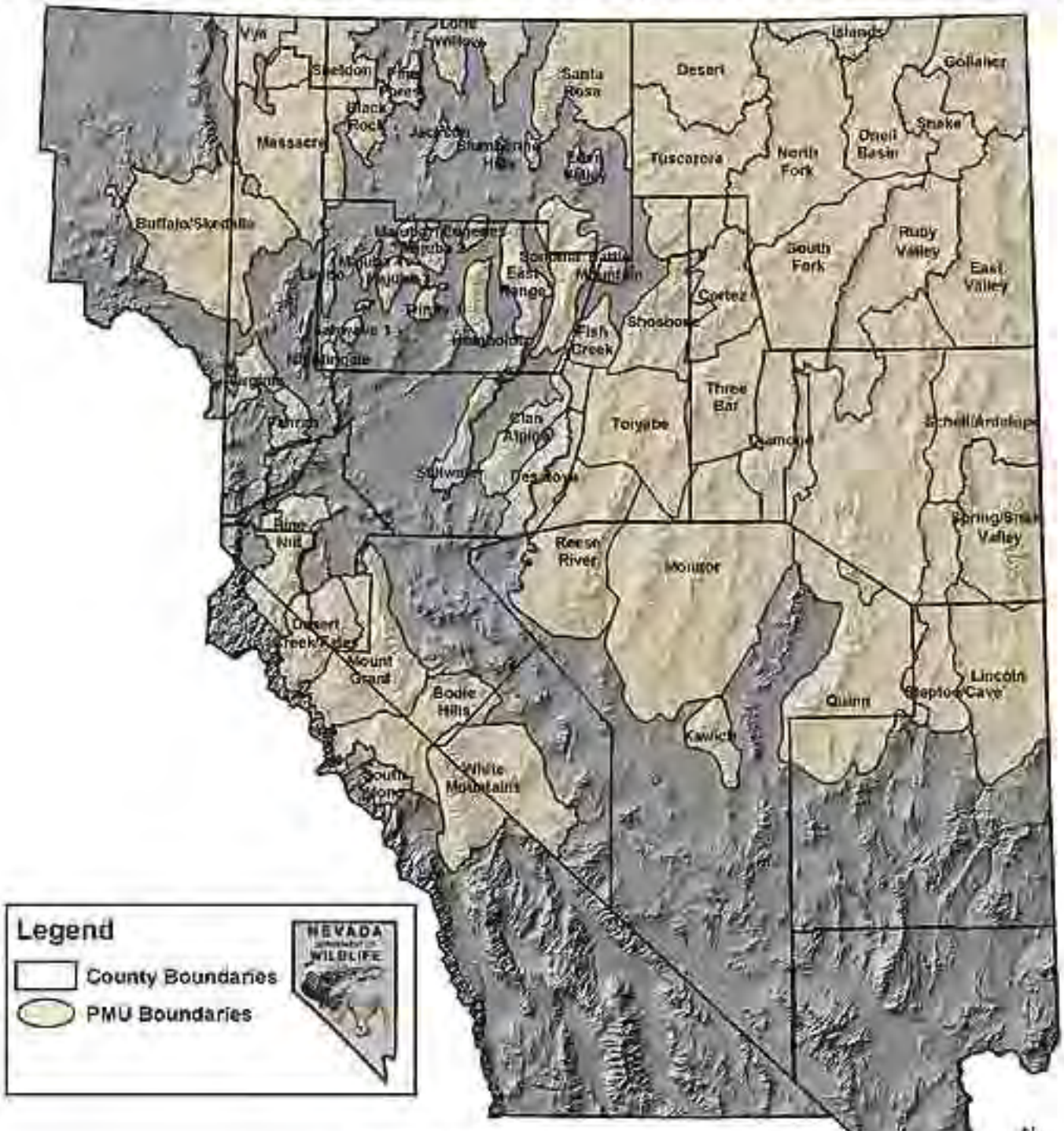
Management Concept	Agency	Year	Category names (Number)	Extent	Relevance/Methods to develop	Notes	Website for download.	Attachment Number
PACs *Priority Areas for Conservation*	FWS	2013	no name (1)	Range wide	PACs were developed to identify areas that are key for conservation of sage-grouse to maintain representative, redundant and resilient populations (See 2013 COT Report). PACs were delineated independently by each state.	Nevada submitted the 2012 SGMAs as the Nevada PACs. Nevada is looking into revising their PACs. However, we are waiting for clarification from FWS on how the PACs will be used moving forward.	http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/COT/COT-Report-with-Dear-Interested-Reader-Letter.pdf	8
SGMA *Sage-grouse Management Area*	SEP	2014	no name (1)	Just Nevada	The SGMA concept was revised during updates to the 2012 State Plan. The revised concept indicated that the SGMA defines the extent of management that triggers consultation with the SETT. The 2014 SGMA was delineated as the extent of the Habitat Suitability Model which provides the range of sage-grouse in Nevada.		The SGMA is depicted on the State of Nevada Management Categories Map and on the State of Nevada Suitable/Non-suitable Map. See below.	9
State of Nevada Habitat Suitability Model (HSM) and Habitat Suitability Index (HSI)	SEP	2014	continuous surface indexed from 0 to 1 (no catgories)	Just Nevada (though CA is developing through same process)	The HSM is being developed through the State of Nevada, USGS and other state and federal partners to provide a relative suitability of sage-grouse habitat in Nevada. The HSM uses resource selection functions to delineate suitability. The HSI is the continous surface output of the HSM. (See White paper for more detail.)	DRAFT products not to be used for management	http://sagebrusheco.nv.gov/HSM/HSM_Work_Products/	10
State of Nevada Suitable/Non-suitable habitat	SEP	2014	Suitable Habitat Non-suitable Habitat (2)	Just Nevada (though CA is developing through same process)	Suitable vs non-suitable were developed to provide a cut point within the Habitat Suitability Index to determine from the contiuum what is generally considered habitat, versus non-habitat. Habitat versus non-habitat was delineated from the Habitat Suitability Index as 1.5 standard deviations below the mean value of the index.	DRAFT products not to be used for management	http://sagebrusheco.nv.gov/HSM/HSM_Work_Products/	10
State of Nevada Management Categories	SEP	2014	Core Management Area Priority Management Area General Management Area Non-habitat Management Area (4)	Just Nevada (though CA is developing through same process)	The management categories were developed to guide management for the "Avoid Process" of the revised 2012 State Plan. The management categories were delineated from habitat suitability, derived from the HSM, and from sage-grouse space use, dervied from lek data, through a state and federal interagency team. See White paper for more detail.	DRAFT products not to be used for management	http://sagebrusheco.nv.gov/HSM/HSM_Work_Products/	10
BSA *Biologically Significant Area* ***Reporting Units*** ***Populations***	all	2014	Bi-State, Monitor, etc. (18)	Just Nevada (though CA indicated they would use their PMUs if NV develops BSAs)	This concept was developed at the request of BLM/FS to represent the scale at which monitoring or reporting would occur, ar at which adaptive management would occur, etc.. These were delineated by merging associated PMUs to provide a broader scale management option that reflects sage grouse populations at a higher scale.	**Tentative concept**	Not available online	Not available yet

Sage Grouse Population Management Units (PMUs)



No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

1 inch equals 54 miles

Map prepared by the Nevada Department of Wildlife
March 8, 2004

Figure 3. Population Management Unit locations and boundaries in the Nevada-California Plan Area

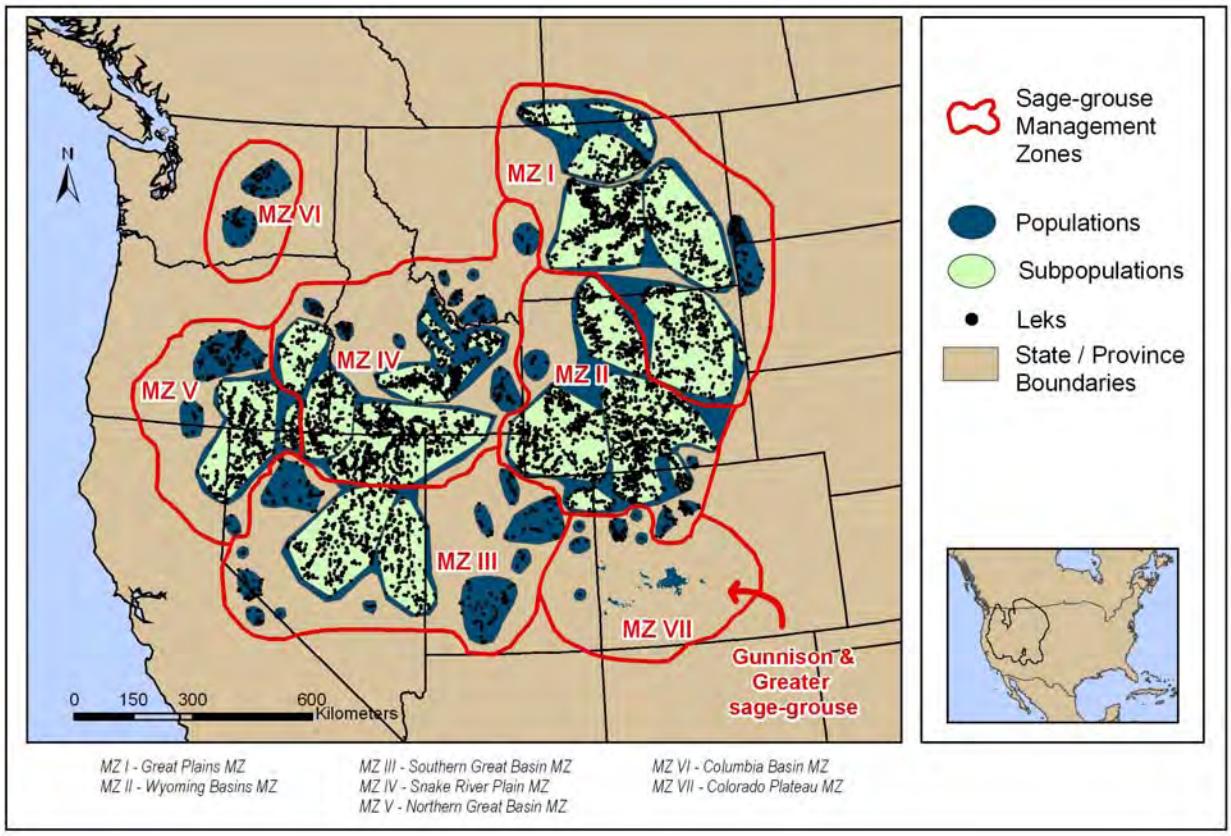
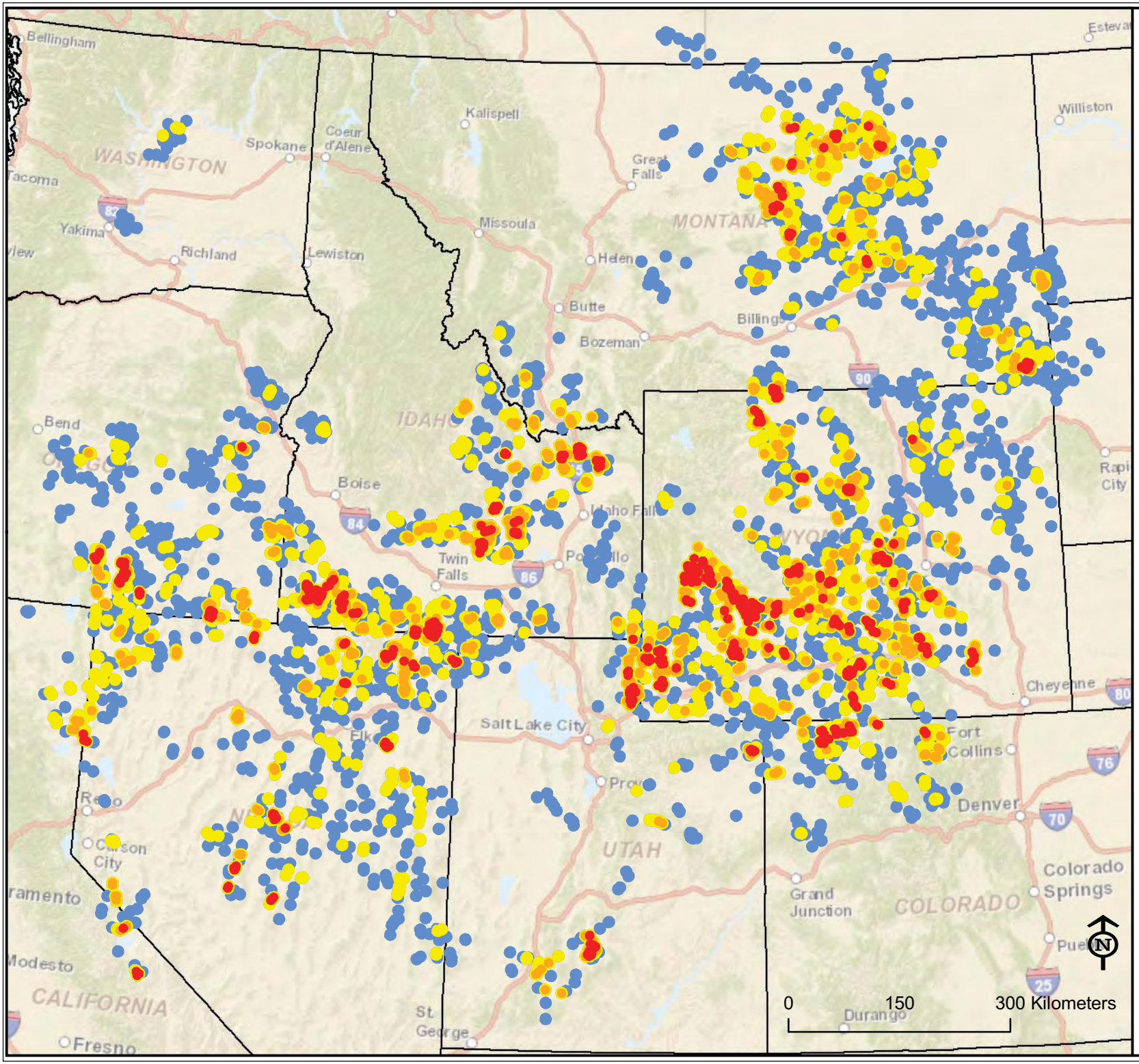


Figure1.3. Greater and Gunnison sage-grouse Management Zones outlined in North America.



Greater Sage-Grouse Range-Wide Breeding Density Thresholds

LEGEND

- 25% Breeding Densities
- 50% Breeding Densities
- 75% Breeding Densities
- 100% Breeding Densities

Doherty K.E., J.D. Tack, J.S. Evans, and D.E. Naugle. 2010. Breeding densities of greater sage-grouse: A tool for range-wide conservation planning.

Nevada Department of Wildlife
Greater Sage-Grouse
Habitat Categorization Map

PMU Boundary

Habitat Categories

- 1 - Essential/Irreplaceable Habitat
- 2 - Important Habitat
- 3 - Habitat of Moderate Importance
- 4 - Low Value Habitat/Transitional Range
- 5 - Unsuitable Habitat
- Pending Completion
- N/A - Non-Habitat

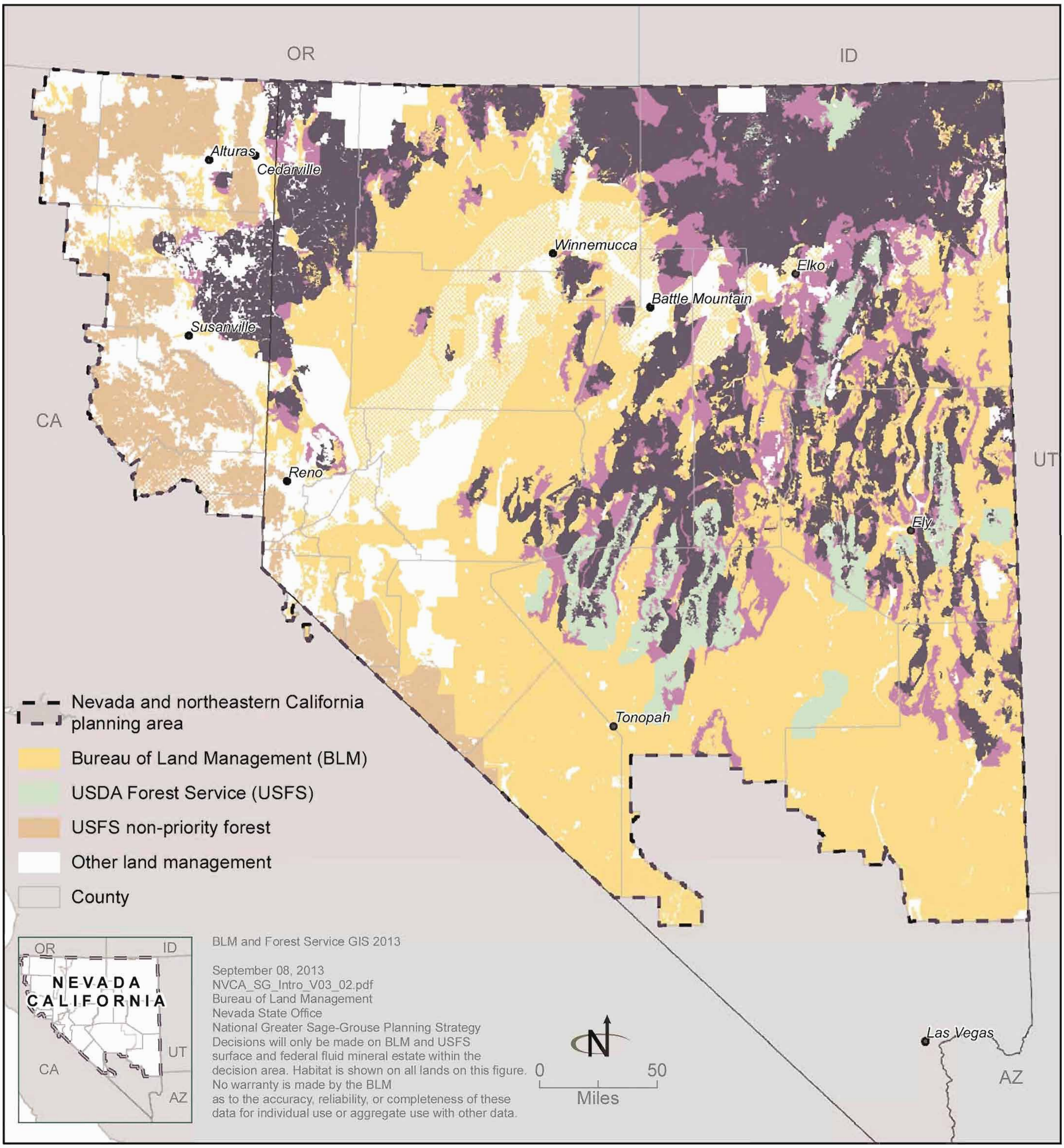
N

0 25 50 75 100 Miles

No warranty is made by the Nevada Department of Wildlife as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

This map is available for download at www.ndow.org/wild/conservation/sg

Nevada and Northeastern California
Greater Sage-Grouse Sub-region Planning Area



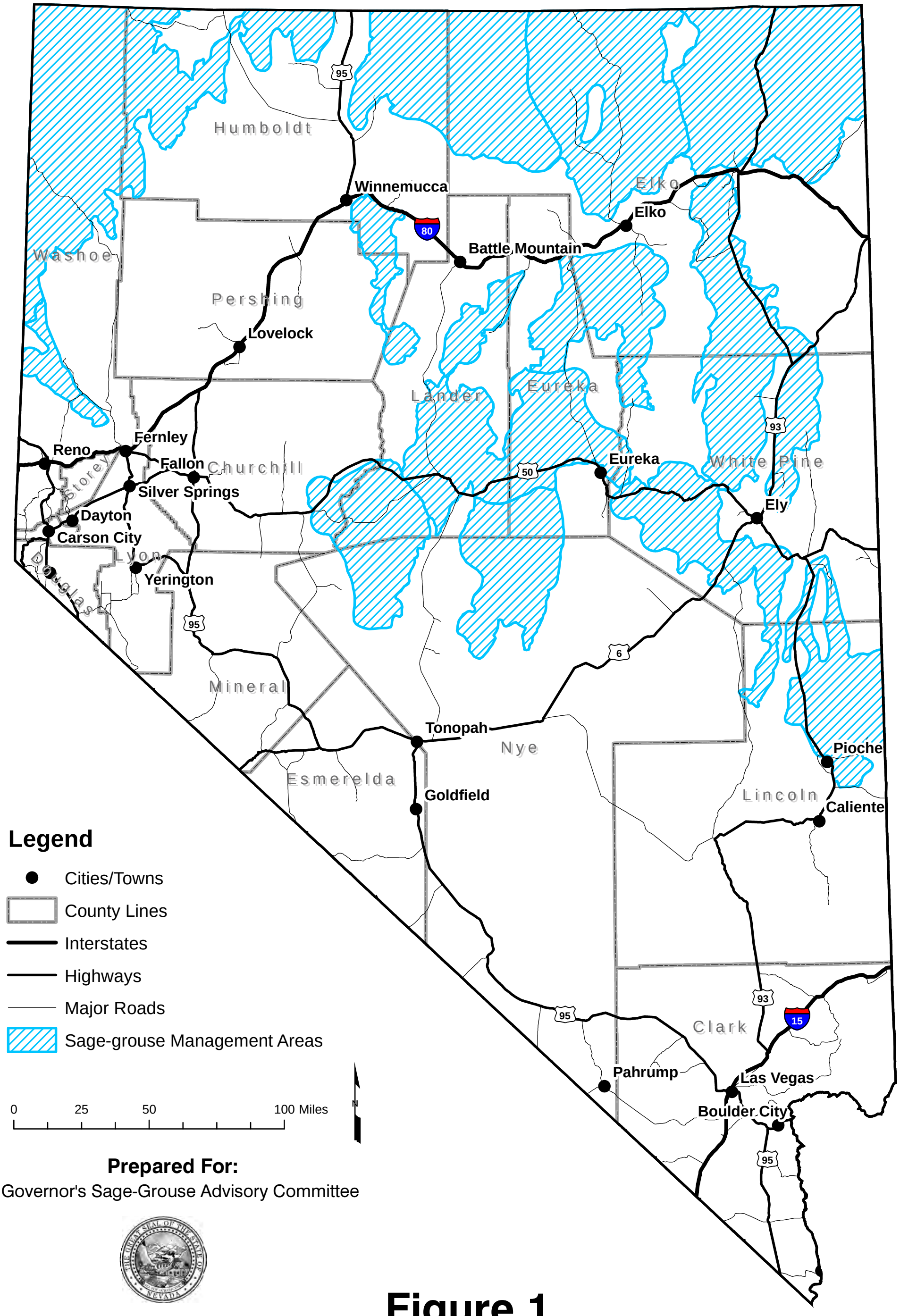
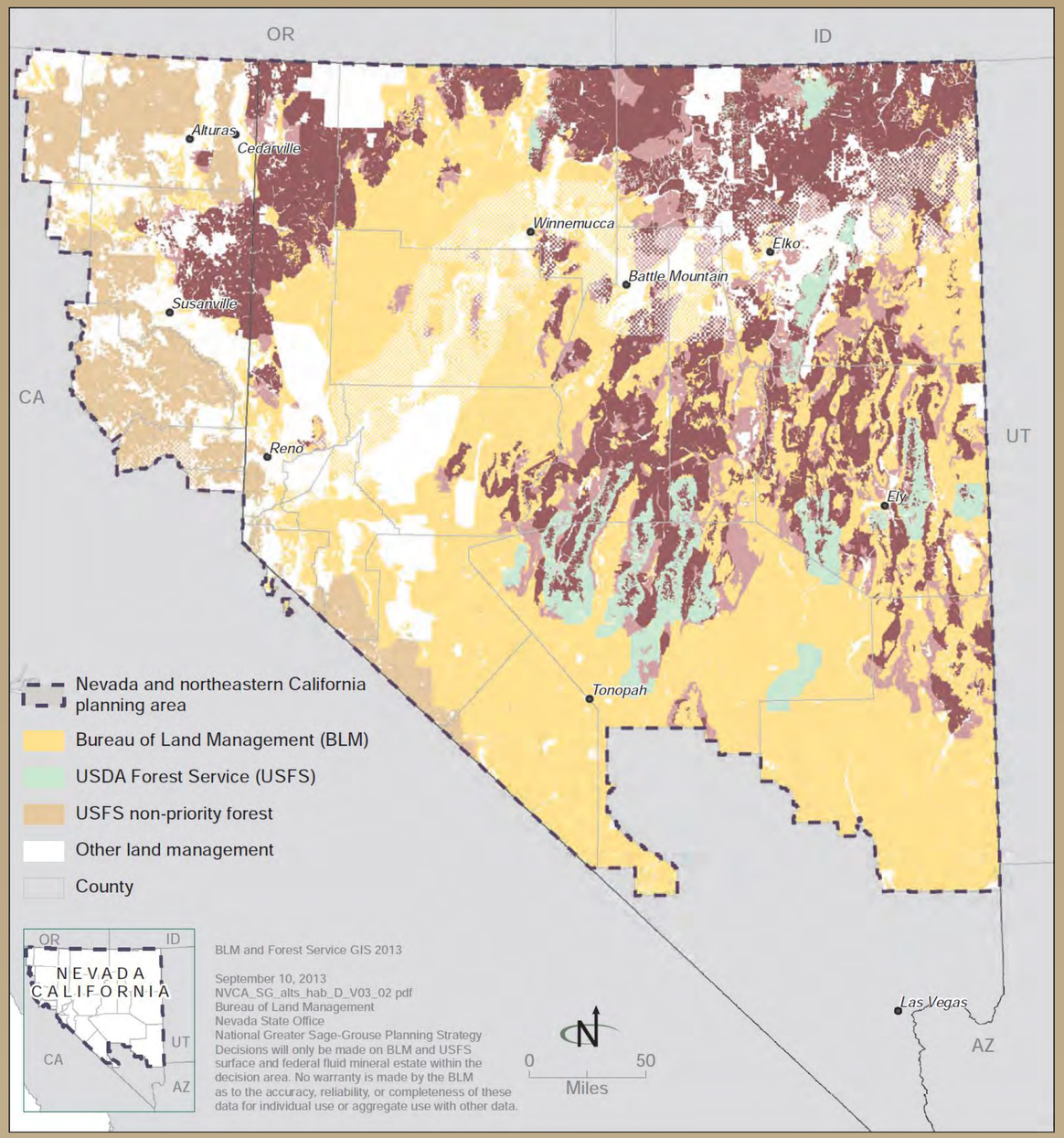


Figure 1
Nevada Sage-Grouse Management Areas

Date: 7/31/2012 Prepared by Resource Concepts Inc.

Path: R:\projects\NDOW\12_133_1\MXDs\NV_NDOW_Statewide\Final_Prelim_Habitat_11x17.mxd

Alternative D - GRSG Preliminary Priority/General Management Areas



	Total PPMA	Total PGMA	% Habitat in PPMA	% Habitat in PGMA
Alternative B	12,693,500	5,039,400	72%	28%
Alternative C	17,732,900	0	100%	0%
Alternative D	**12,927,400**	**4,805,500**	**73%**	**27%**
Alternative E[1]	10,655,300 (SGMA Occupied)[2]	2,295,500 (SGMA Suitable)	82%	18%
Alternative F	12,693,500	5,039,400	72%	28%

[1] Management under Alternative E applies to lands in Nevada only. Proposed management under Alternative E in California would be the same as Alternative A (current management).
[2] SGMA: Sage-Grouse Management Area

Preliminary Priority Management Areas (PPMAs)

Preliminary General Management Areas (PGMAs)

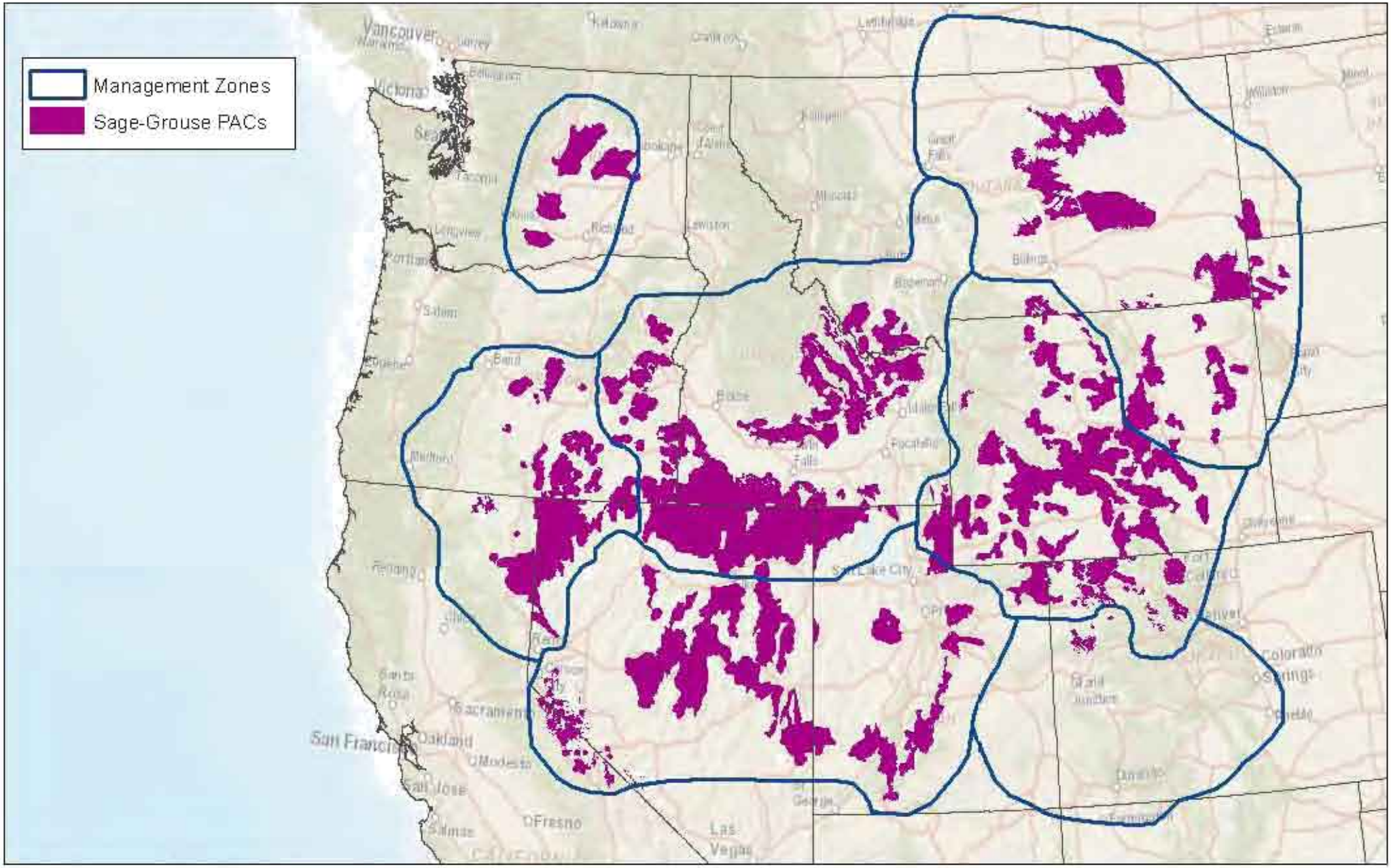
Photo Credit: F. A. Martin

Nevada and Northeastern California Greater Sage-Grouse Draft LUPA/EIS

U.S. Fish & Wildlife Service

Wyoming Ecological Services

COT - Greater Sage-Grouse Priority Areas for Conservation (PACs)



Created By: US FWS, Wyoming ES
Map Date: 3/6/2013
Source: CAFG | COPW | IDFG | MTFWP | NDGF | NDOW | ORDFW | UTDWR | WDFW | WYGFD | BLM | WAFWA | FWS

0 125 250 375 500 Miles

0 125 250 375 500 Kilometers

N

NAD 1927 Albers

Sage-Grouse Management Area (SGMA) 2014

The express purpose of this maps is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. This should not be used for any other purpose.

N

0 25 50

Miles

Nevada Greater Sage-grouse Draft Habitat Suitability Index, Draft Habitat Suitability Map, and Draft Management Categories

Prepared by the Sagebrush Ecosystem Technical Team

February 2014

The following outlines the habitat suitability index, habitat suitability mapping, and management categories as developed by the State of Nevada Sagebrush Ecosystem Program for State of Nevada Greater Sage-grouse Plan and for the State Alternative (E) of the Nevada and Northeaster California Greater Sage-grouse Sub-Regional LUPA and EIS.

DRAFT Habitat Suitability Index for Greater Sage-grouse in Nevada (February 2014)

This map presents the Nevada Habitat Suitability Index that provides a relative suitability of greater sage-grouse habitat in Nevada on a scale of 0 to 1 (excluding the Bi-State DPS). These data were developed in collaboration with the U.S. Geological Survey.

General Methods

Resource Selection Functions (RSFs) were used to develop habitat suitability indices that rank areas based on a continuum of highly used to strongly avoided. This modeling is driven by actual location data obtained using radio-telemetry information. RSFs were developed by modeling the relative probability of occurrence as a function of different environmental factors which consisted of vegetation types, pinyon-juniper cover classes, agriculture, elevation, ruggedness, slope, and water sources. These factors were measured at multiple spatial scales that reflect movement patterns of sage-grouse. The modeling process contrasted these environmental factors for sites used by sage-grouse (>31,000 sage-grouse telemetry locations; >10 years of telemetry data) to available sites (randomly generated locations). Contrasting the environmental factors of used versus available sites provided information about what factors were correlated with greater sage-grouse selection or avoidance (e.g., streams, pinyon-juniper).

RSFs were applied to the map layers developed above to calculate an overall probability of use per pixel. This created a single greater sage-grouse habitat suitability index and resulted in a surface of predicted use by sage-grouse across Nevada. This surface is represented by probability values that ranged across a continuous spectrum of 0.0 to 1.0.

This February 2014 Habitat Suitability Index is a draft product. Continued modeling and incorporation of additional data will continue and a final habitat suitability index will be available in early 2015.

DRAFT Suitable Habitat for Greater Sage-grouse in Nevada (February 2014)

This map displays the extent of suitable habitat for greater sage-grouse in Nevada (excluding the Bi-State DPS). The Sagebrush Ecosystem Program developed this map using the Habitat Suitability Index developed above.

General Methods

To identify suitable habitat, the habitat suitability index described above was reclassified to binary values (suitable habitat and non-suitable habitat) by choosing suitability values above a cutoff value based on the mean of the index values minus 1.5 standard deviations. This cut-off point was also validated by a cost-benefit ratio looking at the trade-off between additional area to telemetry points. The equalization point occurs at 1.5 standard deviations. The binary map was then aggregated at the 1 km scale to account for corridors and smoothed at the 1.2 km scale to remove "islands".

This February 2014 Nevada Habitat Suitability Map is a draft product. A final product will be available in early 2015.

DRAFT Management Categories for Greater Sage-grouse in Nevada (February 2014)

The Sagebrush Ecosystem Program developed the management categories using the Habitat Suitability Index developed above as well as modeled space use by greater sage-grouse. These categories were developed to be used with the management criteria outlined in Table 3-1 of the State of Nevada Greater Sage-grouse Plan.

The Nevada Sage Grouse Management Area (SGMA) encompasses the general range of greater sage-grouse in the state of Nevada (excluding the Bi-State DPS). Proposed anthropogenic disturbances within the SGMA will trigger consultation with the SETT for assessment of impacts to sage-grouse and their habitat and compliance with SEC and other relevant agency policies. Please note that the express purpose of the SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. The SGMA should not be used for any other purpose.

Within the SGMA are four management categories that are defined below.

> The **Core Management Areas** encompass areas of high estimated sage-grouse use in suitable habitat in the State of Nevada. These areas represent the strongholds (or "the best of the best") for sage-grouse populations in the State of Nevada and support the highest density of breeding populations.
>
> The **Priority Management Areas** encompass areas that are determined to be highly suitable habitat for sage-grouse that are not contained within the Core Management Areas.

The **General Management Areas** encompass areas determined to be suitable habitat for sage-grouse, though less suitable than Priority Management Areas and are not contained within the Core Management Areas.

The **Non-Habitat Management Areas** encompass areas determined to be unsuitable for greater sage-grouse.

General Methods

Habitat suitability categories – these categories are based on the habitat suitability index

High suitability habitat – mean index values minus 0.5 standard deviation (~70% sage-grouse use)

Moderate suitability habitat – mean index values minus 1.5 standard deviations (~93% sage-grouse use)

Non-suitable habitat – mean index values minus greater than 1.5 standard deviations

Space use index - these categories are based on (1) density of sage-grouse leks coupled with attendance at leks and (2) distance sage-grouse are found from leks based on telemetry data

High use areas – greater than or equal to 85th percentile of the space use index

Low use areas– less than 85th percentile of the space use index

The intersection of the 3 suitability definitions and the 2 space use definitions were developed into the four management categories.

Core Management Area – areas of suitable sage-grouse habitat use found within areas of estimated high space use.

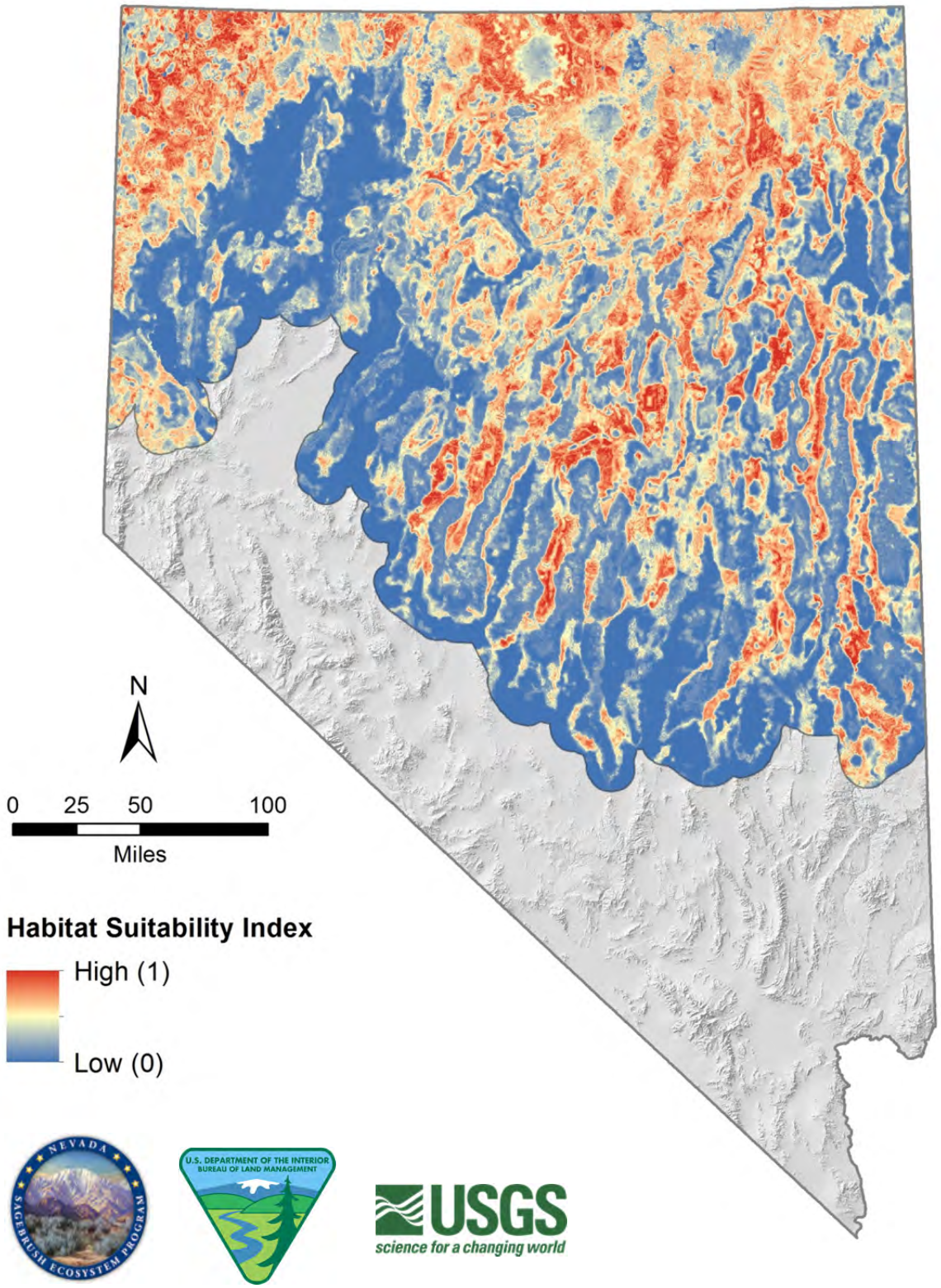
Priority Management Area – high suitability habitat that is found in areas of estimated low space use, and areas of non-habitat that overlap with areas of estimated high space use

General Management Area – moderate suitability habitat that is found in areas of estimated low space use.

Non-habitat Management Area – non-suitable habitat that is found in areas of estimated low space use.

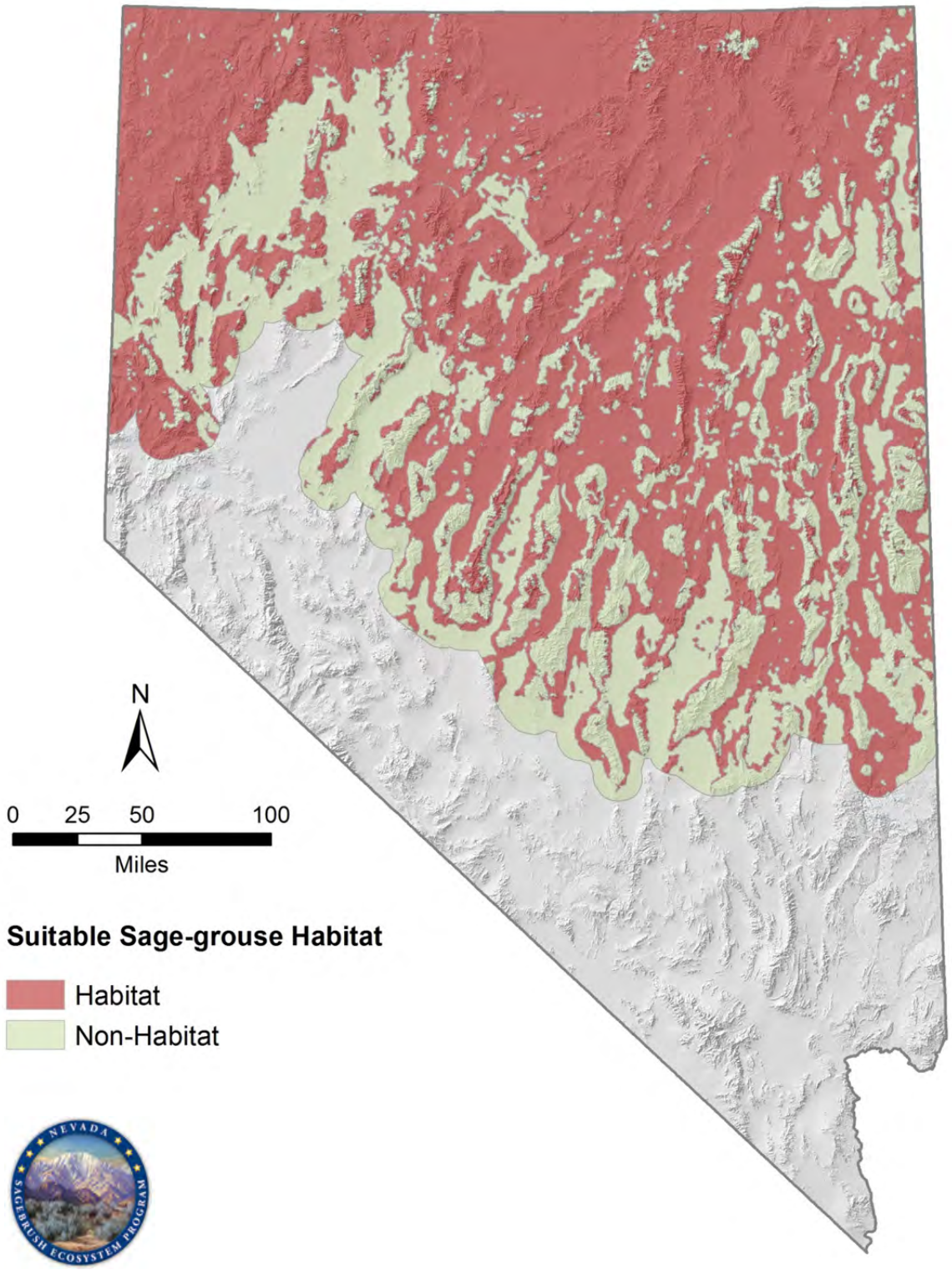
This February 2014 Nevada Management Categories Map is a draft product. A final product will be available in early 2015.

DRAFT Habitat Suitability Index for Greater Sage-grouse in Nevada (February 2014)



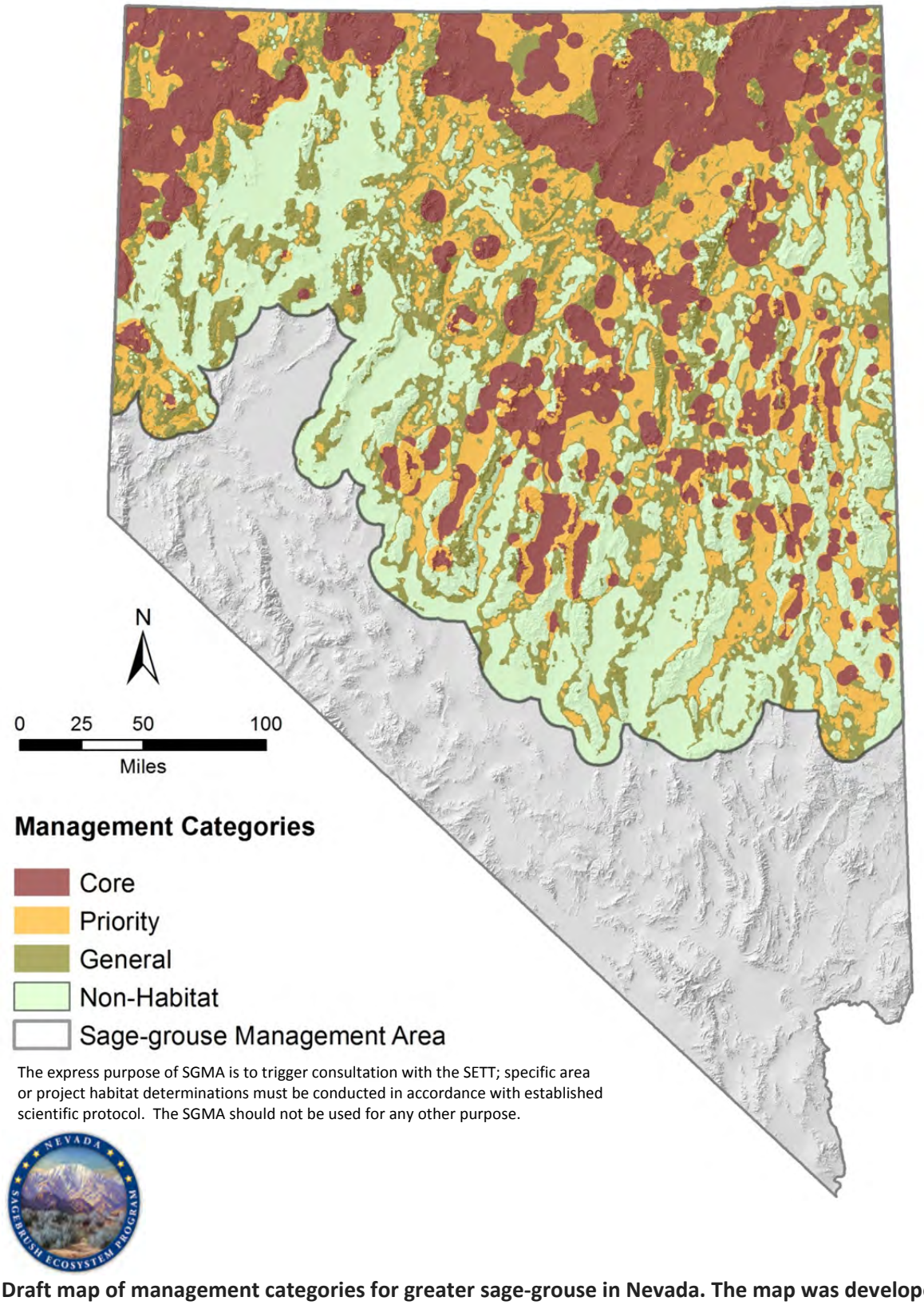
Draft map of a relative habitat suitability index modeled for greater sage-grouse in Nevada. The map was developed in collaboration with the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.

DRAFT Suitable Habitat for Greater Sage-grouse in Nevada (February 2014)



Draft map of habitat and non-habitat for greater sage-grouse in Nevada. The map was developed by the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.

DRAFT Management Categories for Greater Sage-grouse in Nevada (February 2014)



The express purpose of SGMA is to trigger consultation with the SETT; specific area or project habitat determinations must be conducted in accordance with established scientific protocol. The SGMA should not be used for any other purpose.

Draft map of management categories for greater sage-grouse in Nevada. The map was developed by the Nevada Sagebrush Ecosystem Program. Results are not guaranteed by the Sagebrush Ecosystem Program and this map should be interpreted with caution. This map does not cover the extent of the Bi-State Distinct Population Segment within Nevada. The final version of this map is anticipated in December 2014.