CCS Version 1.8 Improvement

Goal of Improvement

- Incorporate the best science (population metrics) into the Habitat Quantification Tool to collectively account for impacts to sage-grouse populations and habitats
- Increase conservation for greater sage-grouse and inspire greater minimization of potential impacts
- To appropriately quantify impacts from proposed development on or near leks, especially the most productive source leks and their clusters

HQT Update: Measuring impacts to population

Mining

Pratt and Beck (2019): Greater sage-grouse response to bentonite mining

- Adult female mortality increased by 19 times when females were exposed to mining activities within 1.6 km.
  - This increase in morality risk has direct population consequences due to adult females being the linchpin to carrying the population forward year to year.
- Nest site selection decrease by 50% when surface disturbance went from 0 to 12%.
- Signifies additional “knock-off effects” to other vital rates than just loss in nest site selection:
  - Reduction in nest success
  - Lower brood success
  - Risker choices for females because of lower habitat memory/continuity

HQT Update

Renewable and Non-Renewable Energy

Kirol et al. (2020): Greater sage-grouse response to the physical footprint of energy development

- Nest success was negatively correlated with the amount of “press” disturbance (sustained disturbance after initial human activity) out to 8 km of nest location.
- Broods exposed to any press disturbance with 1 km were less likely to survive when compared to non-exposed broods.
- >90% of nest and brood locations were in habitat with < 3% press disturbance within 2.7 km.
- When females' exposure level to press disturbance reached 1 to 2%, the rate of available habitat exceeded the rate of both nest and brood locations.
- At 1.6 km, nest failure increases by 3% for every 5% increase in press disturbance.


Great Basin Center for Geothermal


Dan Searls

HQT Update

Renewable and Non-Renewable Energy – Con't

Harju et al. (2010): Thresholds and time lags in effects of energy development in greater sage-grouse populations

- Observed 704 leks over 12 years.
- Leks within 2 km of energy infrastructure had 35-76% fewer sage-grouse compared to leks with no associated infrastructure.
- Leks that had an energy infrastructure of ≥1 within 0.4 km radius encircling the lek showed a 35-95% lower male attendance.
- Surface disturbance occupancy was negatively correlated out to 4.8 km.
- Time lag effects showed a delay of 2-10 years from initial activity associated with energy development and interpreting the measurable effects on lek attendance.

HQT Update

Powerlines

Gibson et al. (2018): Effects of power lines on habitat use and demography of greater sage-grouse

- Both demographic rates (e.g., nest survival, recruitment, and population growth) and behavior responses (e.g., nest and brood site selection) were negatively affected.
- However, affects could be predominantly tied to the temporal variation in common raven abundance.
    - Linked to indirect functional response (#'s of sage-grouse preyed upon at different densities) and numerical response (change in corvid's reproductive output at varying sage-grouse densities) by corvids.
- Ecological / perceptual trap preceded with project completion.
- Depending on behavior or demographic rate, and contingent on local raven behavior and abundance, effects of power lines extended from 2.5-12.5 km.

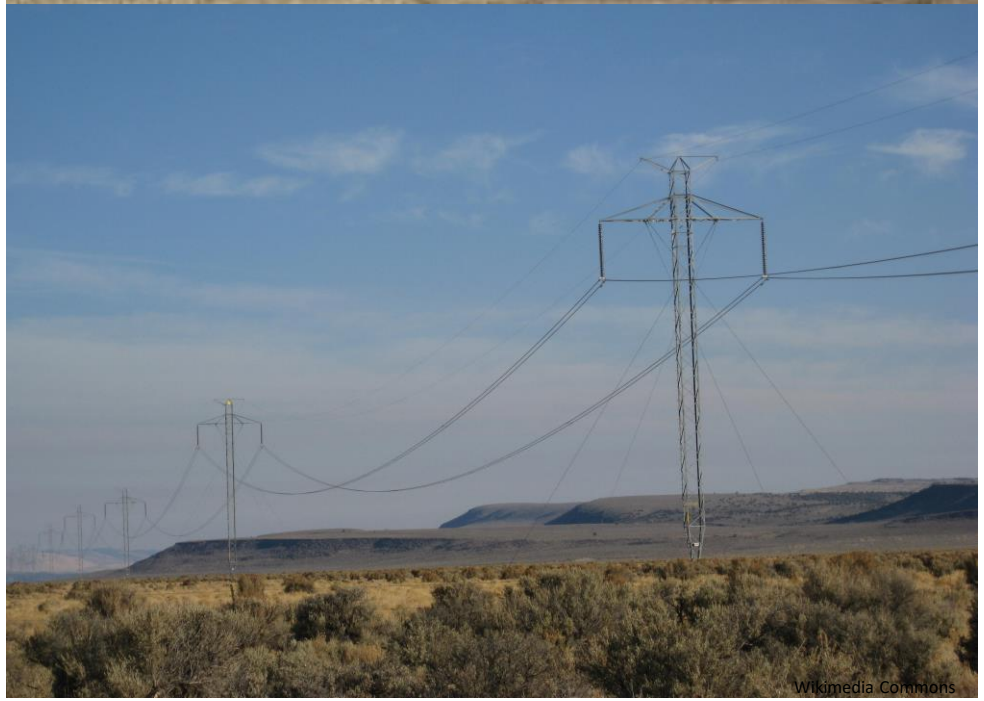
HQT Update

Powerlines

Kohl et al. (2019): The effects of electric power lines on the breeding ecology of sage-grouse.

- Power lines negatively effected lek trends up to 2.8 km.
- However, power lines did not affect lek persistence.
- During nesting and brood-rearing seasons, females avoided transmission lines up to 1.1. and 0.8 km, respectively.
- Nest success was negatively affected by transmission lines up to 2.6 km and brood success up to 1.1 km.
- Unlike transmission lines, distribution lines did not appear to affect reproductive fitness or habitat selection.
- Recommendation to minimize the effects of new transmission power lines by co-locating them in established anthropogenic corridors and incorporate a 2.8 km buffer.

Susan Montoya Bryan

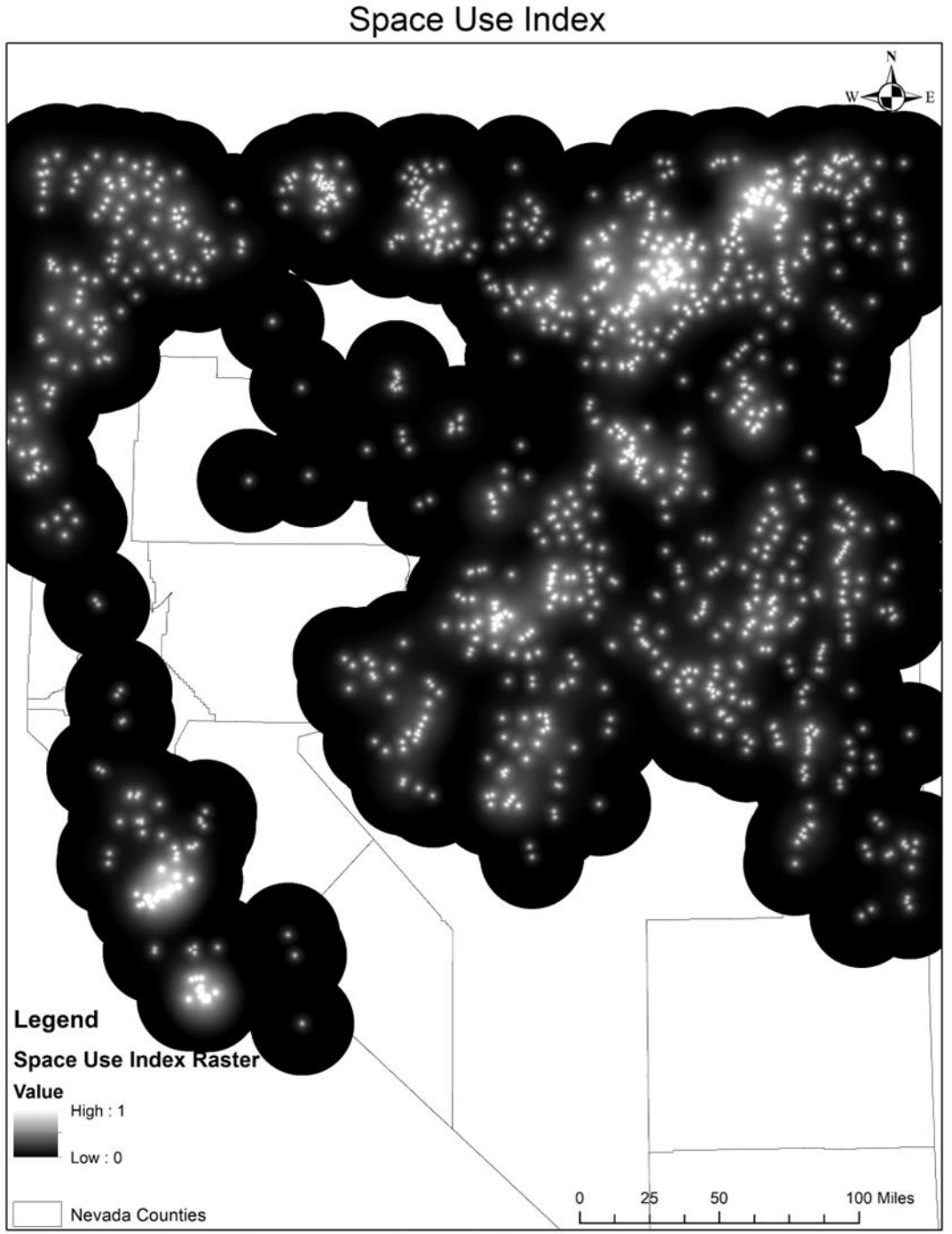


Wikimedia Commons

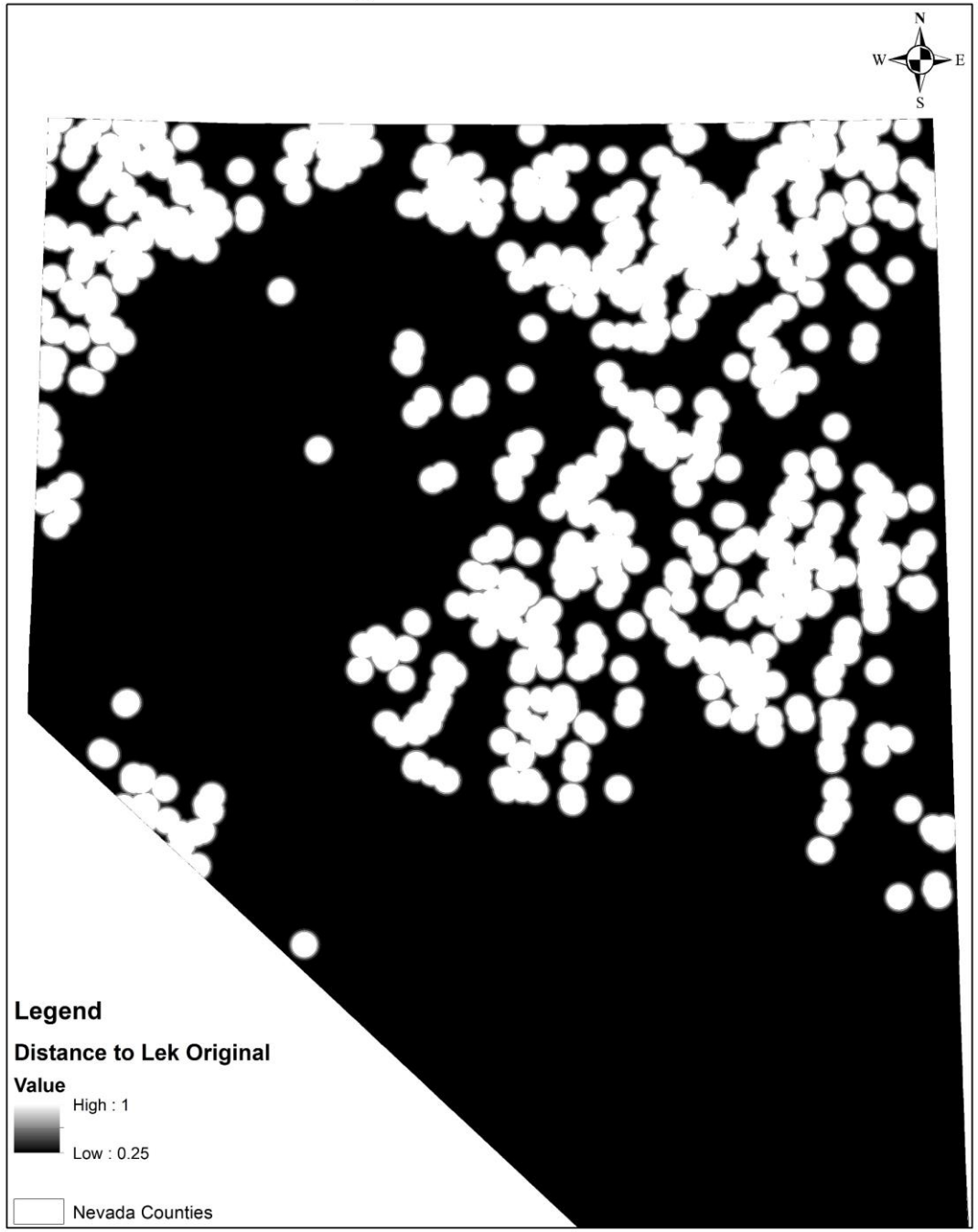
Coates' Space Use Layer

Continuous Raster Space Use Layer Based on Population

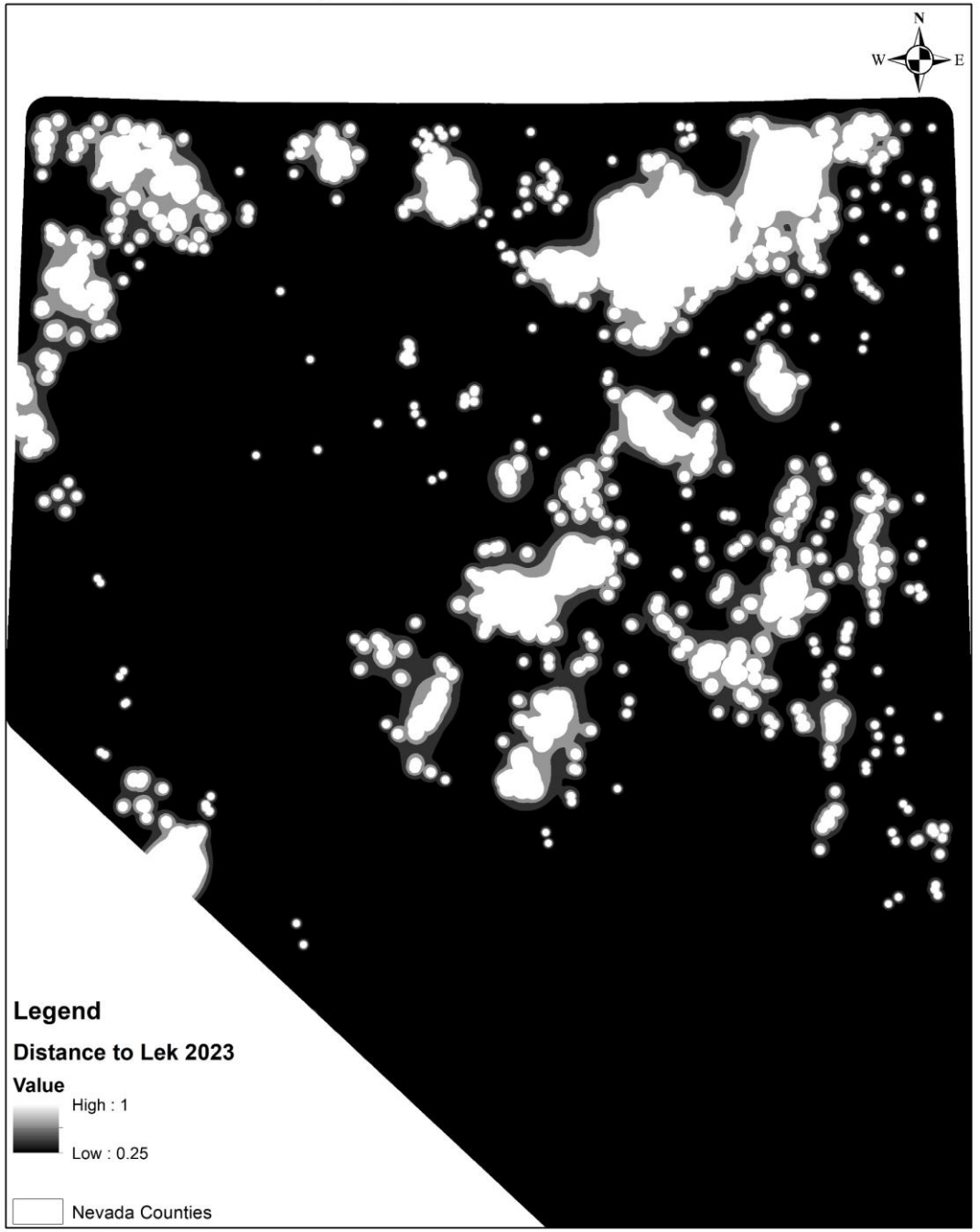
- Raster showing more comprehensive space use as it extends from the leks, from 0% to 100% space use importance
- Size of the space use categories fluctuate around the leks depending on
  - Size of the lek
  - Proximity to other leks
- Aligns with the Habitat Management Categories
- Update Dist_Lek layer
  - Same functional categories as the old Dist_Lek
  - Incorporates best available science



Original Distance to Lek



Newly Proposed Distance to Lek



Coates' Space Use Layer

Debit Projects

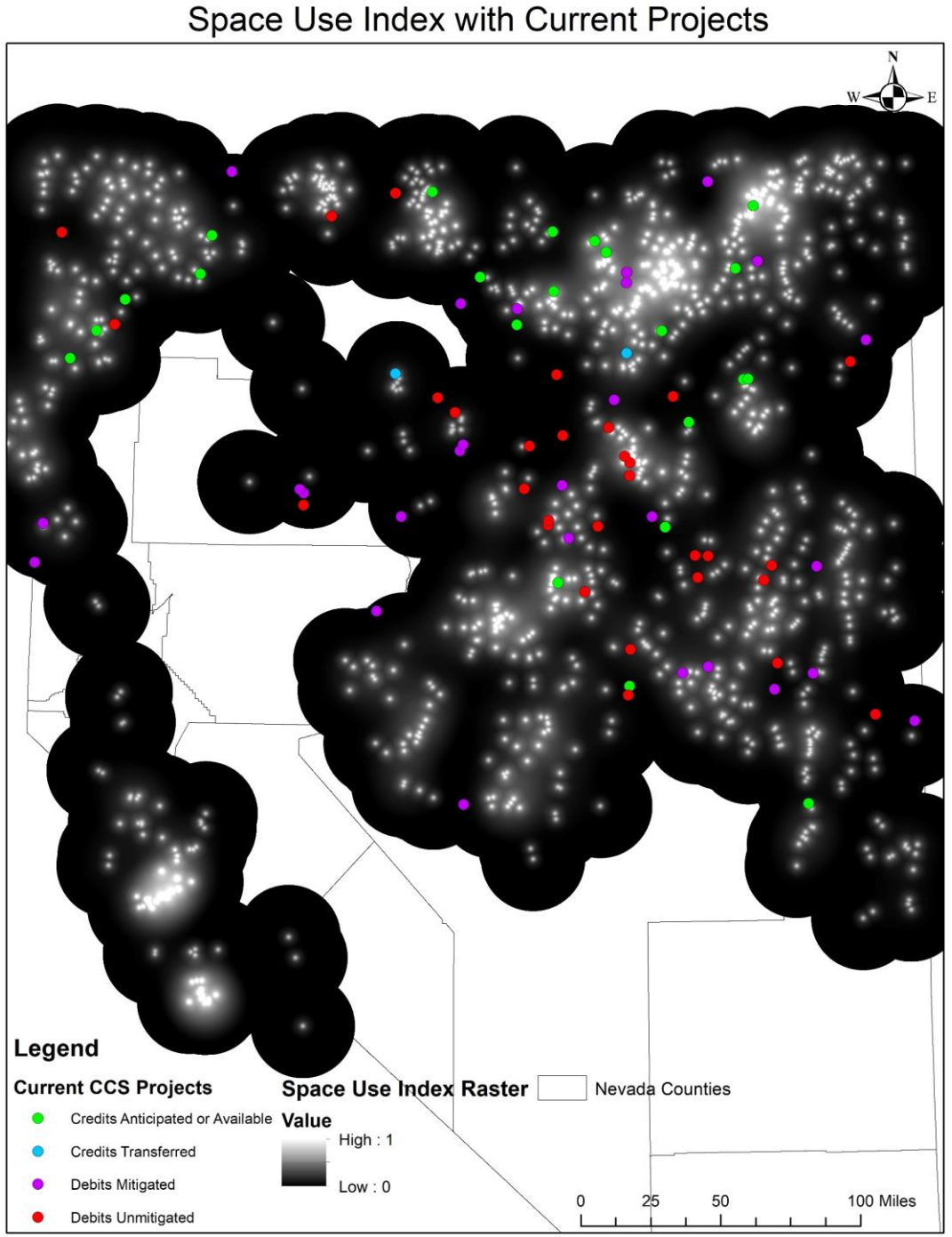
- **Habitat Suitability Index** multiplied with **Space Use Index**.
  - HSI * (1 + SUI)
  - More accurately represents suitability and use near leks
- Debit project scenarios indicate that the debit values (increases and decreases) are variable and largely dependent on:
  - Proximity to leks
  - Lek size
  - Lek type
    - Source vs Satellite

Project	Number of leks w/in 6km	Original Term Debits	Original Perm Debits	HSI*SUI Term Debits	HSI*SUI Perm Debits	% change Term Debits	% change Perm Debits
Exploration	16	129	0	174	0	35%	N/A
Geothermal	1	30	0	30	0	0%	N/A
Mine 1	5	5749	73	6403	80	11%	10%
Mine 2	15	13284	268	18834	348	42%	30%
Mine 3	7	2197	1004	2765	1293	26%	29%
Mine 4	3	1676	0	1792	0	7%	N/A
Powerline	8	0	5031	0	4264	N/A	-15%
Solar	0	2	0	2	0	0%	N/A
Tower 1	2	188	0	204	0	9%	N/A
Tower 2	0	2	0	2	0	0%	N/A

Coates' Space Use Layer

Credit Projects

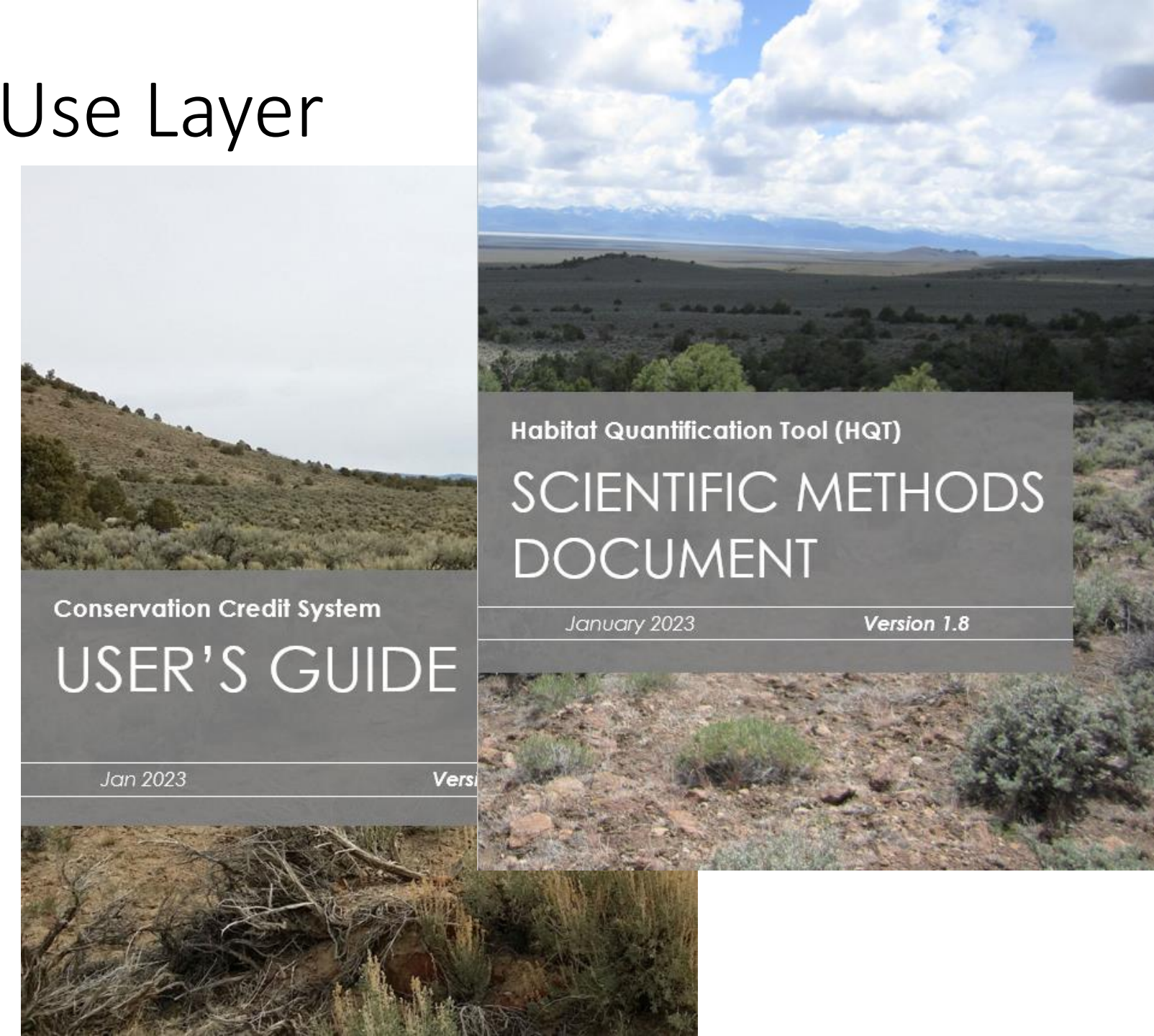
- Will use the same new Dist_Lek layer
- No other changes, heavily incentivized already
  - Maximize net gain for greater sage-grouse
  - Credit projects are approved based on proximity to leks, and space use layer will dial that in further
  - Preservation/maintenance projects are given full credit values
    - Not done in other programs, preservation is only given partial credits
  - Most credit projects already have an 8-time multiplier that incentivizes limited habitats (meadows/LBR)
  - Credit projects have uplift opportunities that incentivize additional conservation (uplift)
    - PJ
    - Lowered baseline
  - Improvement may lead to higher demand for credits



Coates' Space Use Layer

CCS Documents

- Change in the User's Guide
  - "Dist_Lek" to "Space_Use_Index"
  - Corresponding figures
- Change in the Habitat Quantification Tool Document
  - Add a section that explains the origins and use of the Space Use Index
- These will be updated following action taken by the Council




Questions?