

Using broad scale data to inform Land Health Standards



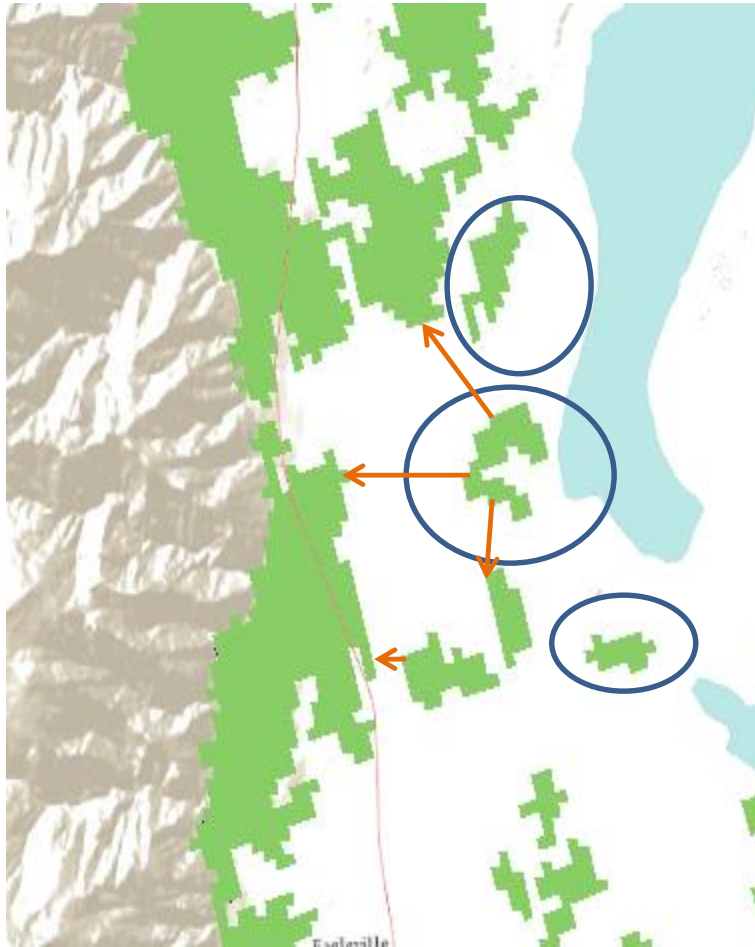
Fragstats and Context Analyses

Land Health Standard 5 – Biodiversity

- Viable, healthy, productive, and diverse populations of native and desired plant and animal species, including special status species, are maintained (*Standards and Guidelines for Rangeland Health in NE CA and NW NV*).
- Assessments characterize the status of current resource conditions, which then allows the evaluation of the status in relation to land health standards (*H-4180-1 Rangeland Health Standards*).
- To assess land health standards we track certain **indicators** over time and compare to baseline or reference conditions



Terminology: Broad Scale Indicators for the Biodiversity Land Health Standard



■ The **spatial distribution** of plant and animal species and their habitats allows for reproduction and recovery from localized catastrophic events

■ **Habitat areas or patches** should be large enough to support viable populations or are **connected** adequately with other similar habitat areas

- **Connectivity** distances can be dispersal or migration
- **Connectance** is the percentage of functional joins between all patches of the same type

Outline

- NorCal Landscape Approach
- Boundaries
- Analyses
 - Wildfire impacts on vegetation
 - Pronghorn habitat analysis
 - Mule Deer
 - Habitat, Dispersal and Migration
 - Aspen
 - Change detection
 - Pygmy Rabbits
 - Patch size and dispersal
 - West-wide Intactness
 - Connectivity/Isolation in context



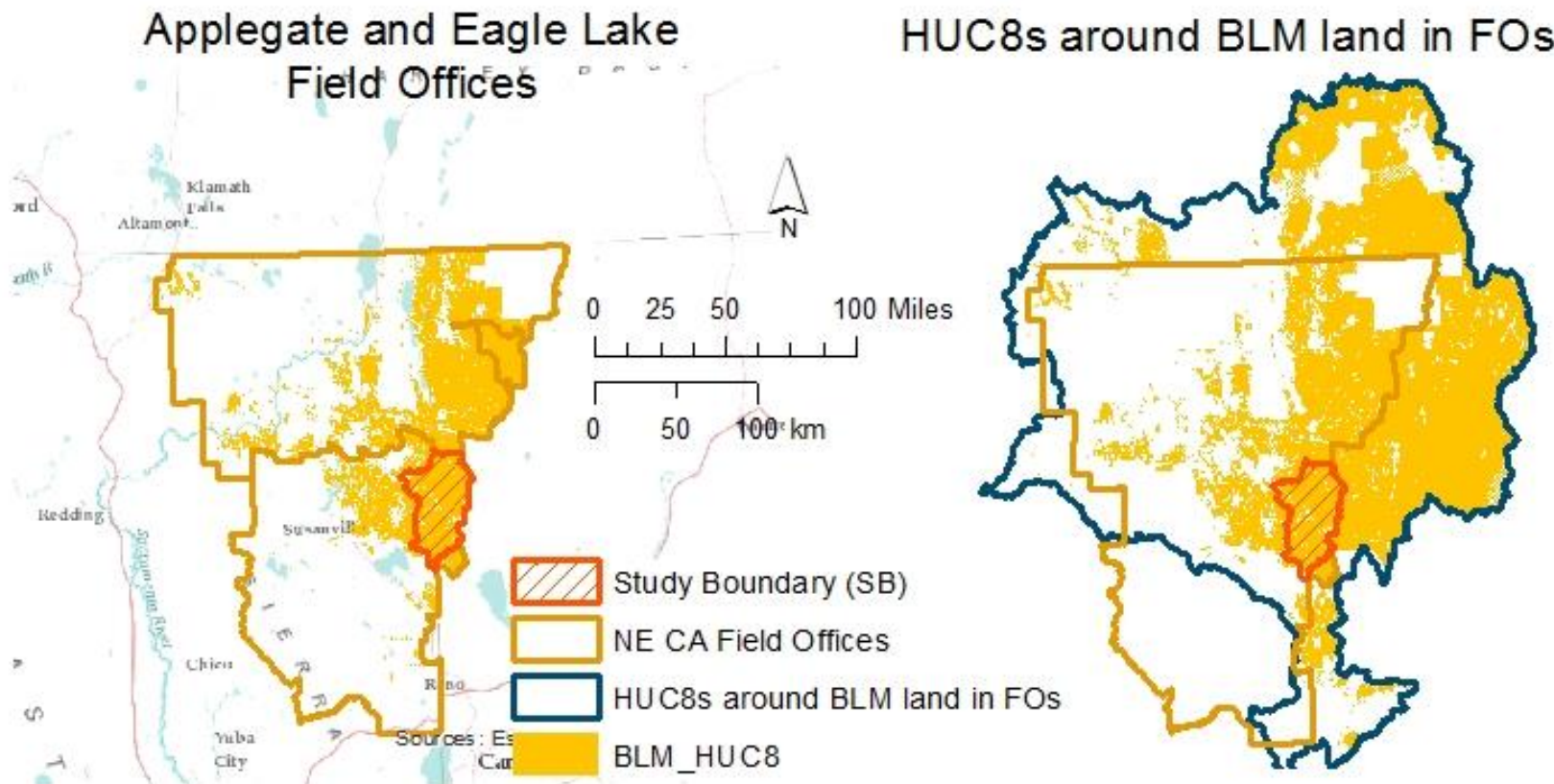
Landscape Approach

- The Need:
 - Increasingly complex management challenges
 - Beyond traditional administrative boundaries
- The Landscape Approach uses consistent and standardized data to:
 - examine resource conditions and trends
 - identify opportunities for resource conservation, restoration, and development.
- The Landscape Approach provides context to:
 - Focus and integrate local management efforts
 - Develop coordinated management strategies with local partners: agencies, Tribes, and stakeholders
- Field offices will continue to prepare land use plans, monitor, and work with local partners and stakeholders using the broader perspective of the LA

Setting NorCal Boundaries (1 of 2)

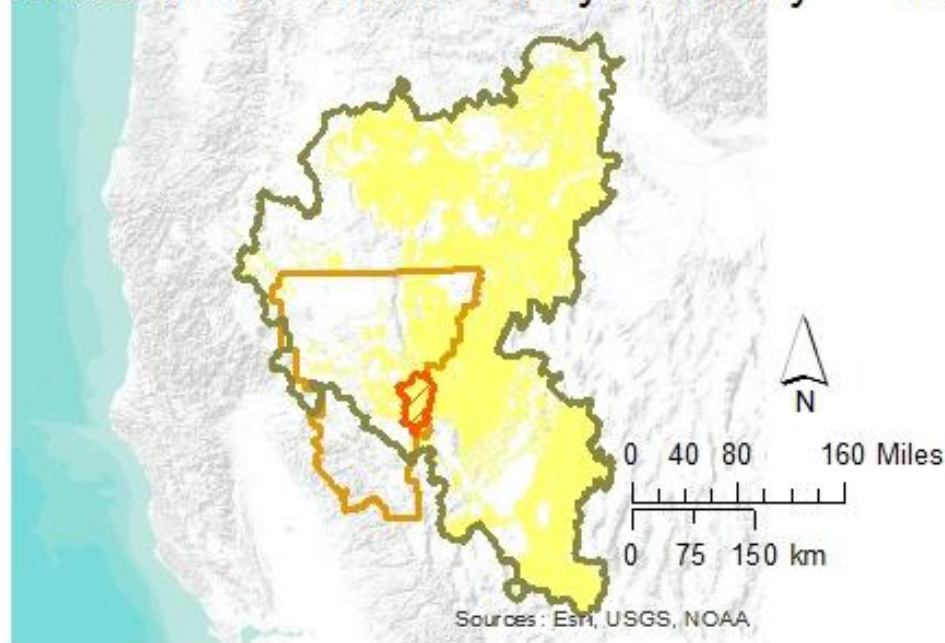
Complex geopolitical, ecological, physiographic region

NorCal: Suggested Boundaries for the Context Analysis

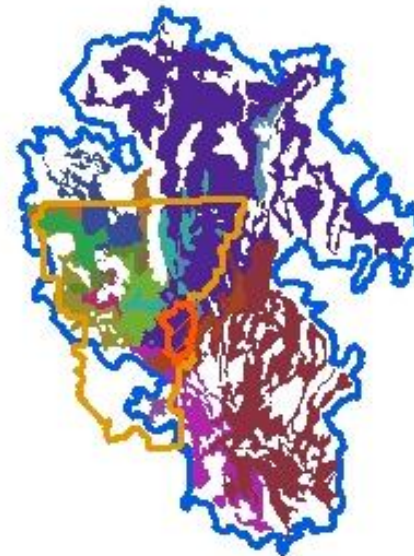


Setting NorCal Boundaries (2 of 2)

NRCS MLRAs around Study Boundary



HUC10s around level 4 ecoregions



- MLRA & HUC10s around study boundary
- Study Boundary (SB)
- NE CA Field Offices
- HUC8s around BLM land in FOs
- HUC 10s around L4 ecoregions
- BLM

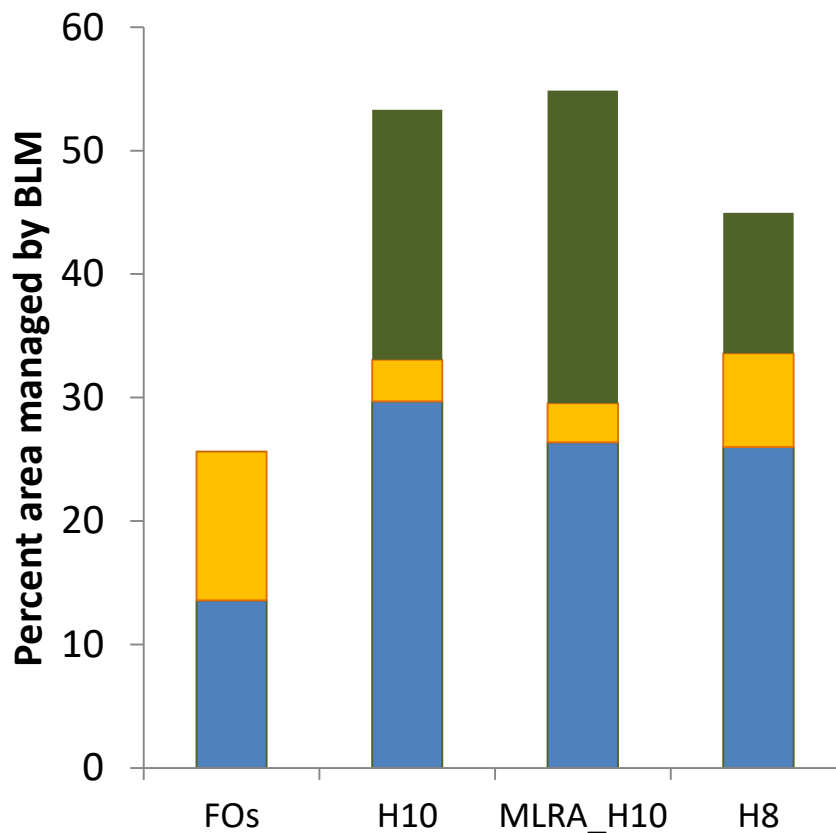
Level 4 ecoregions

US_L4NAME

- Adin/Dixie Low Hills
- California Cascades Eastside Conifer Forest
- High Lava Plains
- Klamath Juniper Woodland/Devils Garden
- Klamath/Goose Lake Basins
- Lahontan Salt Shrub Basin
- Lahontan and Tonopah Playas

- Likely Tableland
- Modoc Lava Flows and Buttes
- Modoc/Lassen Juniper-Shrub Hills and Mountains
- Pit River Valleys
- Pluvial Lake Basins
- Semiarid Uplands
- Sierra Nevada-Influenced Semiarid Hills and Basins
- Sierra Valley

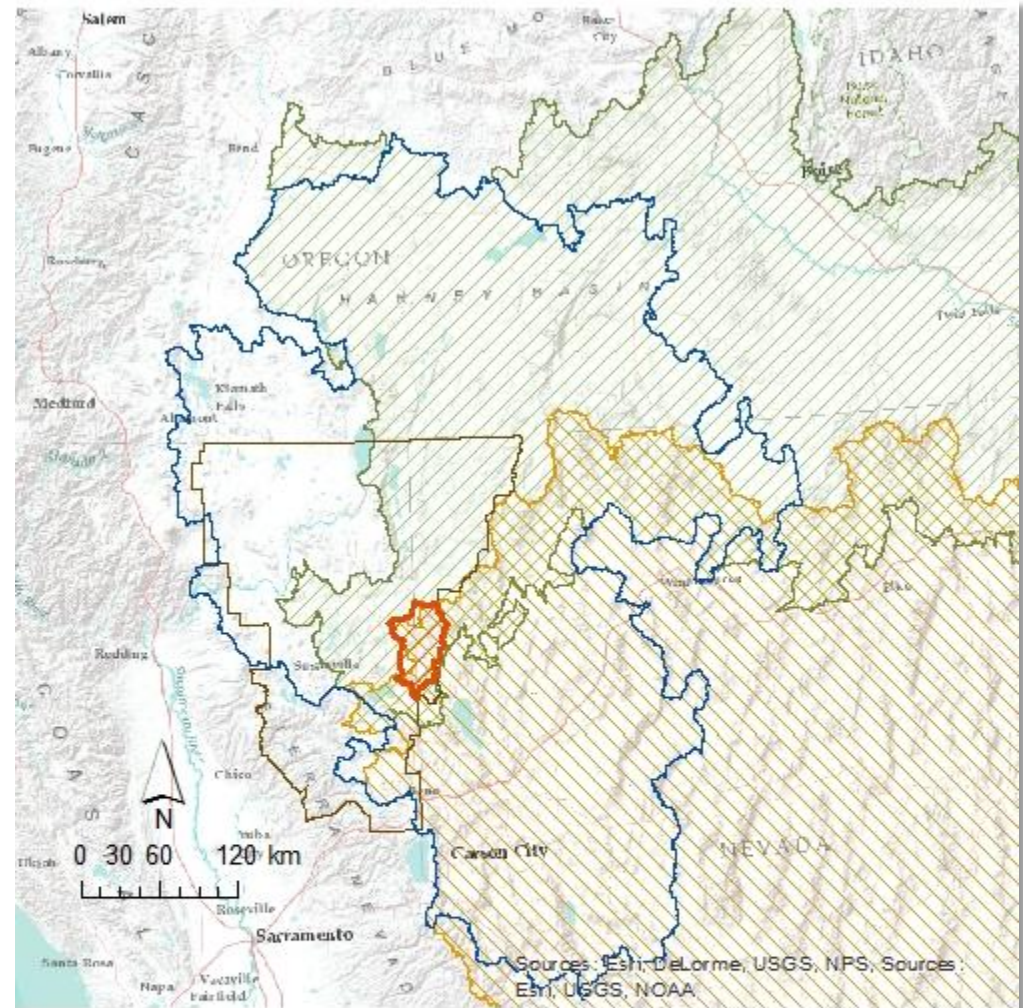
Percent of each boundary area managed by BLM in each state



- Lowest BLM area by percent is in the Eagle Lake and Applegate FOs
- Highest percent area administered by BLM is in the NRCS Major Land Resource Area

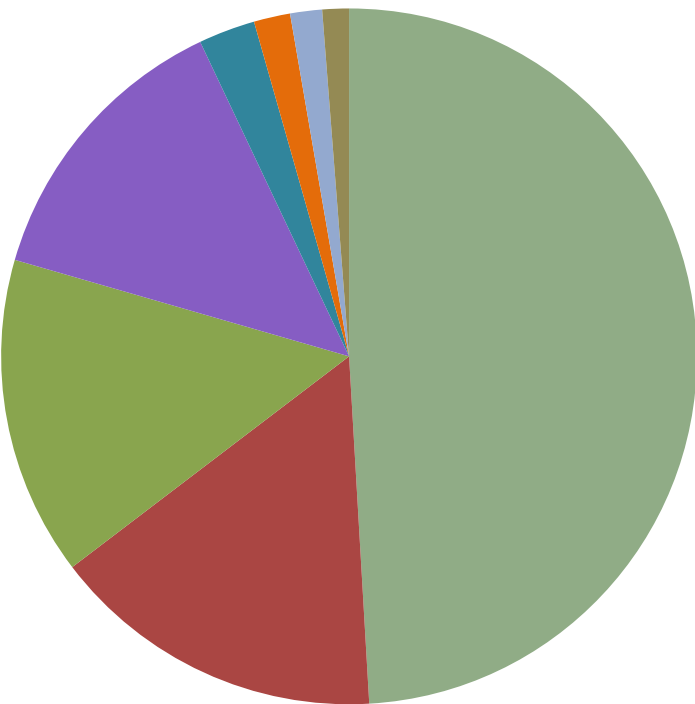
NorCal Context with 2 REA boundaries

- Northern Great Basin (NGB) and Central Basin & Range REAs partially cover the NorCal FOs
- Can extend data on a case-by-case basis

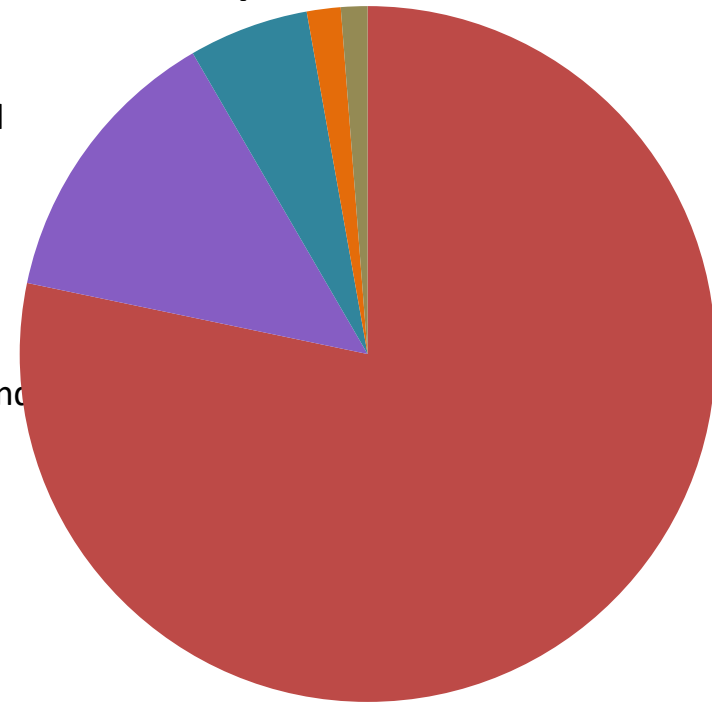


Using LandFire EVT to determine post-fire changes in vegetation: Rush Fire 2012

Rush pre-fire EVT 2010

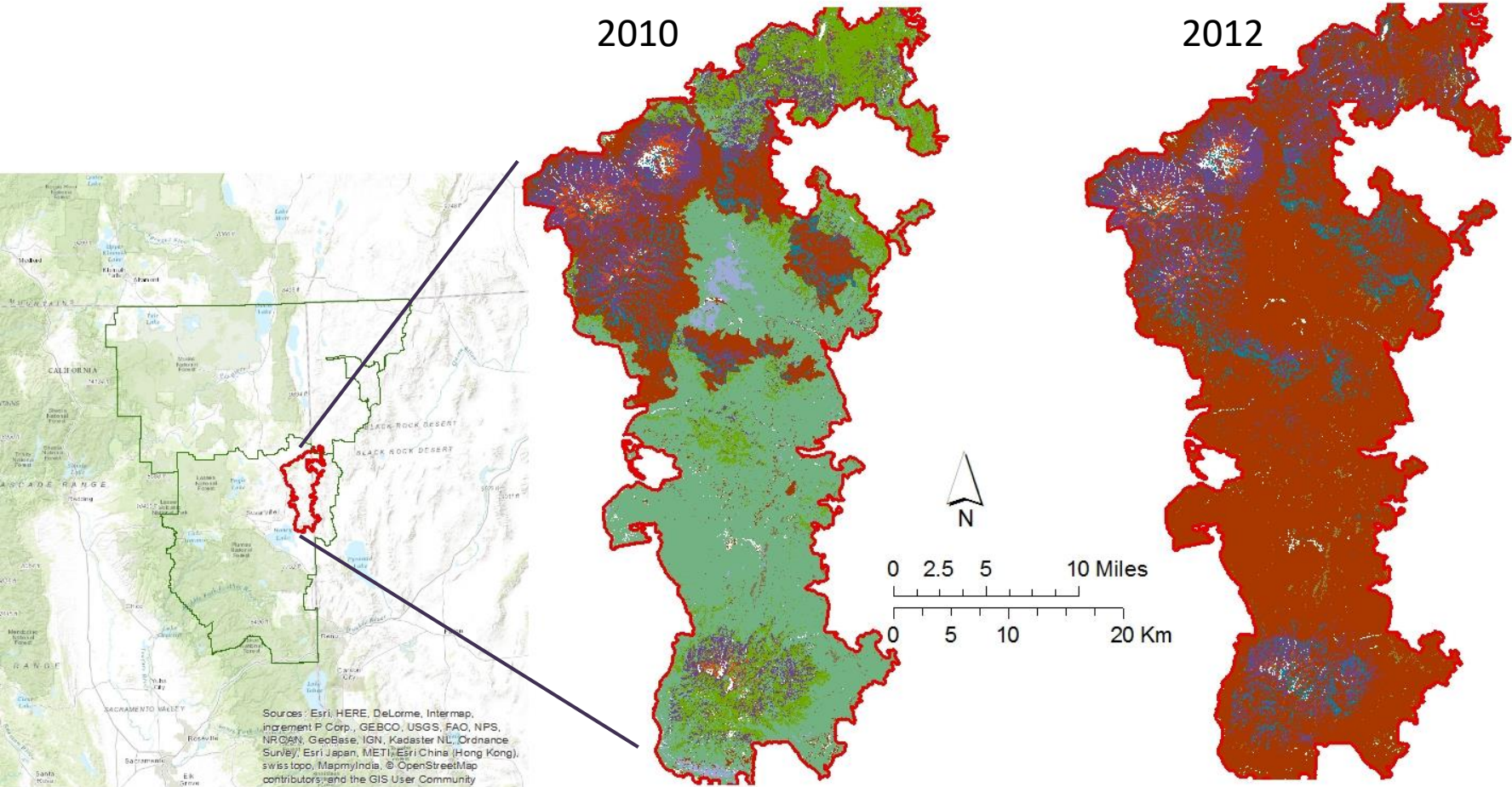


Rush post-fire EVT 2012



Major post-fire changes are from Big Sagebrush and Low Sagebrush to Annual Grassland
Greasewood shrubland disappears
Need to translate to NVCS from LandFire group names

Rush Fire Existing Vegetation Type for 2010 and 2012



Rush fire 2012

Rush2012_EVT2010.img

Alpine Dwarf-Shrubland, Fell-field and Meadow

Big Sagebrush Shrubland and Steppe

Greasewood Shrubland

Introduced Annual Grassland

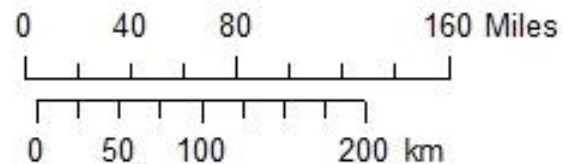
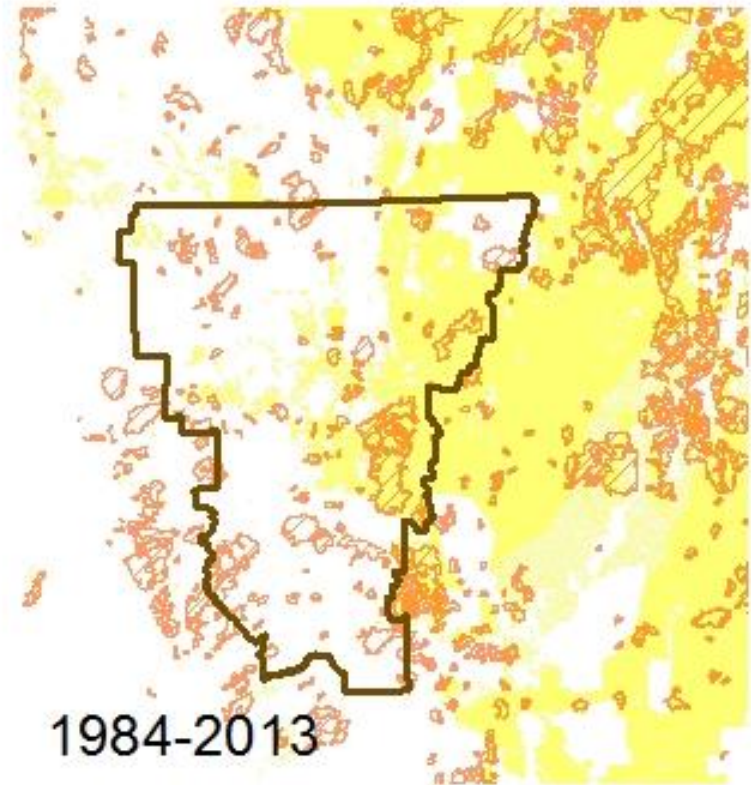
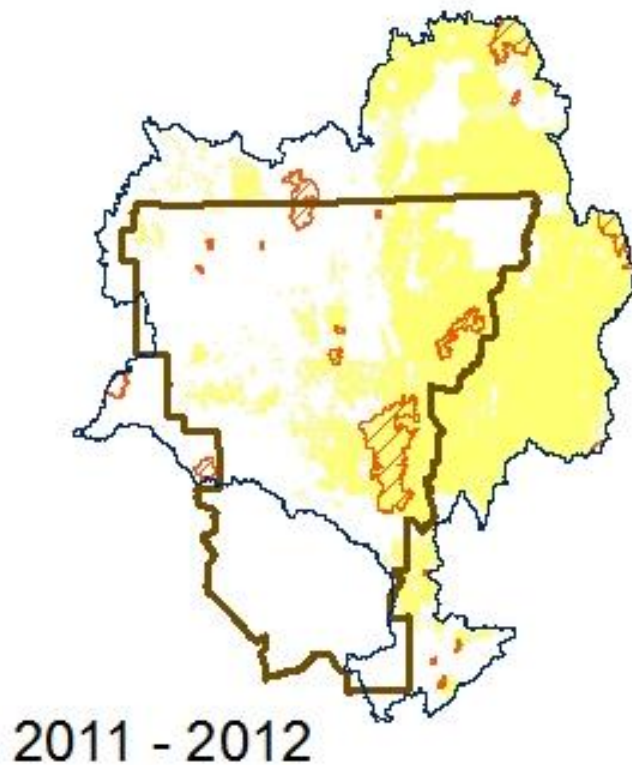
Low Sagebrush Shrubland and Steppe

Mountain Mahogany Woodland and Shrubland

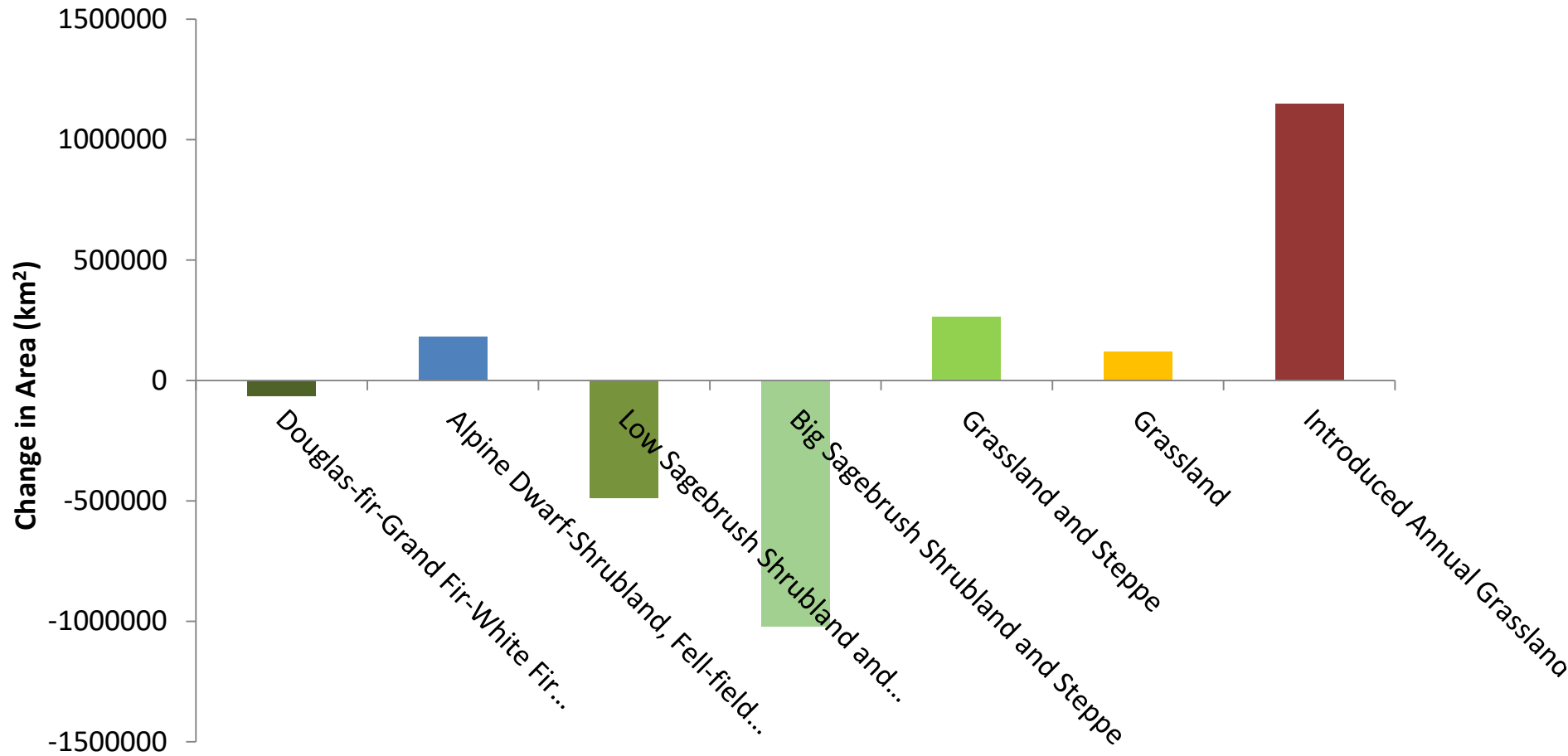
Pinyon-Juniper Woodland

Sparse Vegetation

What are the broader contexts/changes of fire impacts in FOs and in BLM lands?



Changes in dominant EVT (2010-2012) for wildfires 2011-2012: NorCal HUC8s



- Big Sagebrush 31% of HUC8s (-6% wildfire by 2012)
- Low Sagebrush 14% of HUC8s (-6% wildfire by 2012)

Accuracy assessment of the dominant vegetation types in LandFire

Group	Number of points	Average % Agreement	Primary mismatch (# of pixels)	Secondary mismatch
Pinyon-Juniper	1997	82%	Chaparral (46)	Conifer-oak Forest and Woodland (45)
Low Sagebrush Shrubland and Steppe	382	63%	Pinyon-Juniper Woodland (45)	Sparsely Vegetated (11)
Big Sagebrush Shrubland and Steppe	1559	39%	Pinyon-Juniper Woodland (121)	Sparsely Vegetated (89)
Introduced Annual Grassland	184	29%	Ponderosa Pine Forest, Woodland and Savanna (10)	Conifer-Oak Forest and Woodland (10)
Alpine Dwarf-Shrubland, Fell-field and Meadow	179	26%	Western Riparian Woodland and Shrubland (20)	Aspen Forest, Woodland, and Parkland (6)

Wildfire and Vegetation Discussion

- Wildfire can cause major changes in vegetation type
 - Rush fire shows potential for change to annual grasslands such as cheatgrass
 - Potential for habitat loss or fragmentation
- What does the **context** (over the HUC8s in 2010) show about wildfires?
 - caused a large decrease in Big and Low Sagebrush shrubland and steppe (1/6 and 1/2 losses respectively).
 - **How can we use these results to prioritize post-fire restoration?**
- Accuracy assessment varies but is improving!
 - LandFire remap using Landsat 8 for 2015 is due 2018

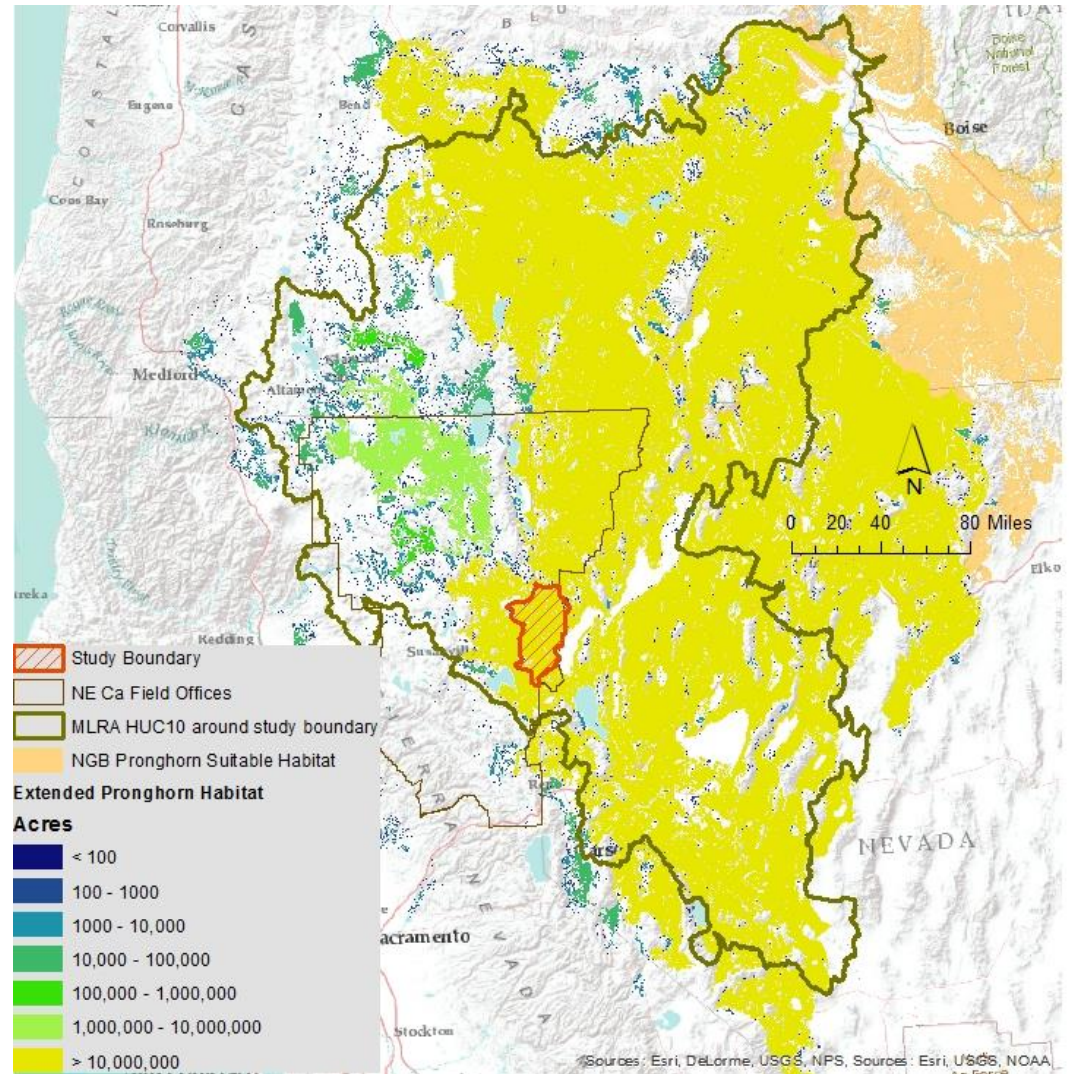
Pronghorn Antelope

- Pronghorn prefer:
 - low gradient areas with high visibility
 - rolling grass and shrub lands
 - they rarely jump fences but can sometimes get under them or will go around them
- Used NGB REA model for suitable habitat
- Calculated habitat patch size, context and connectivity



Pronghorn Suitable Habitat colored by patch size

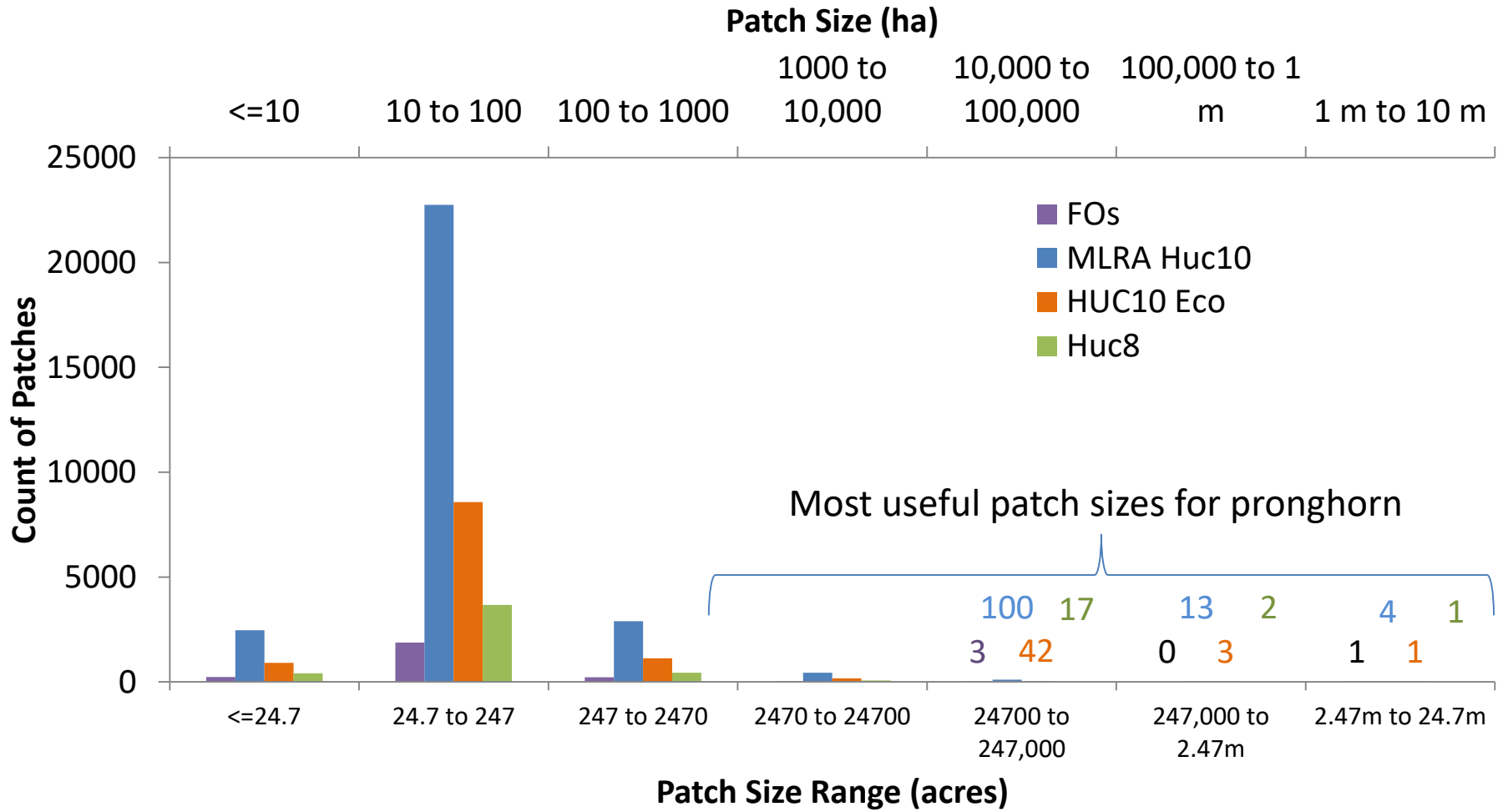
- Extended NGB REA model
- Variables used: Veg type, Slope, Road density, Elevation
- Roads are used as a surrogate for fences
- Pronghorn range broadly over the extended NorCal area so useful to look at the full context
- Habitat is colored by patch size
 - One very large patch over E CA, NW NV, S. OR and ID (yellow/green)



Pronghorn Habitat analysis for patch size and connectivity

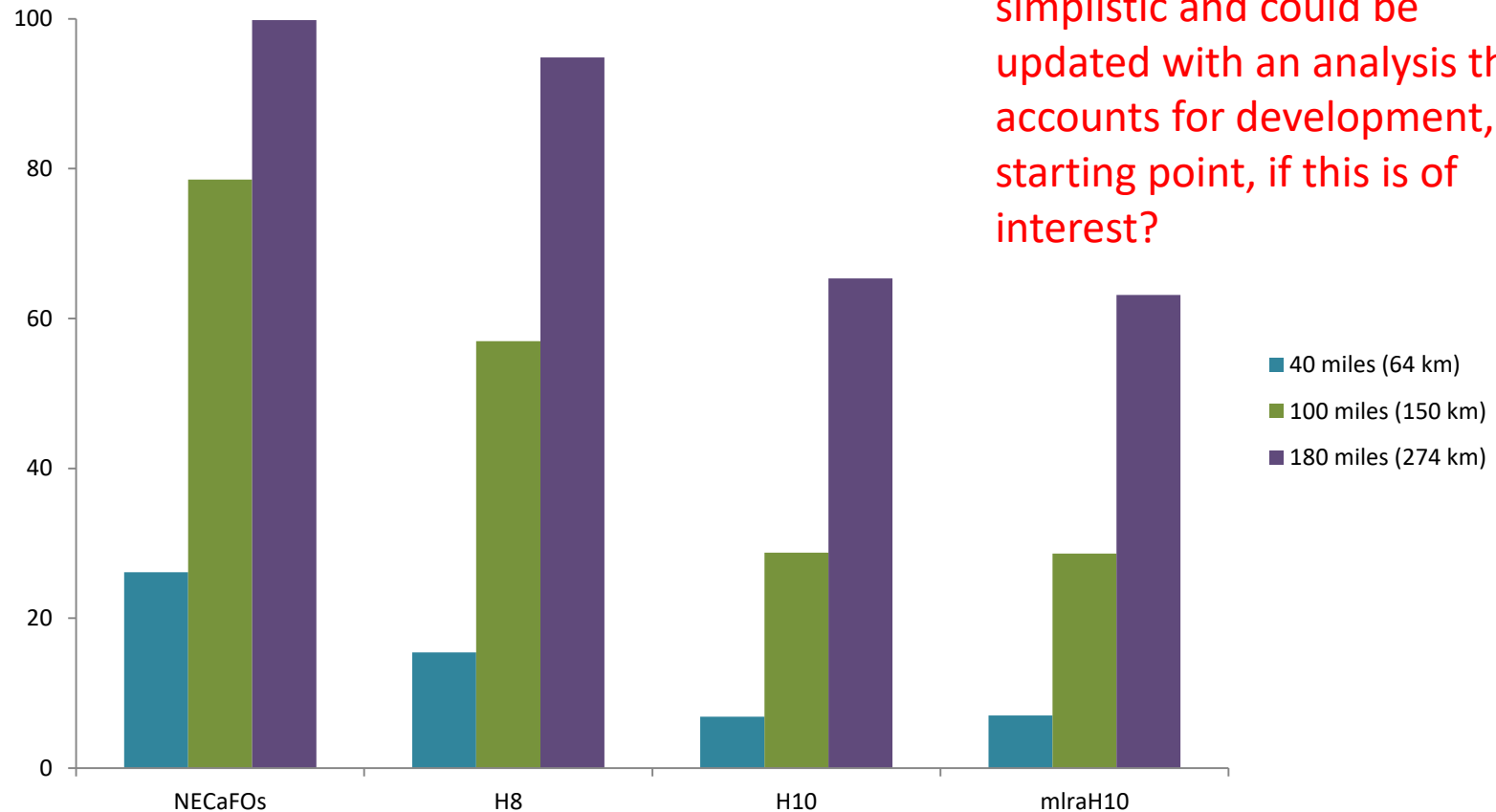
- **Habitat patch sizes using dispersal distances (O’Gara and Yoakum, 2004) P. 433.**
 - Useful patch sizes range: **6400 – 16,000 acres (2600 – 6500 ha)**
- **Connectivity using migration distances range between 40 – 180 miles (64 – 274 km)**
 - Distances vary by study area (ID, CA, WY) – is this population dependent?
 - *Hoskinson and Tester 1980; Sawyer et al. 2005.*
- **How do we know when the area of suitable habitat – patches and connectivity is sufficient? What is adequate?**
 - **Local coordination with state wildlife folks is still critical**

Pronghorn Habitat Patch Analysis



This doesn't mean that pronghorn don't use smaller patches but the smaller patches must be connected to other patches.

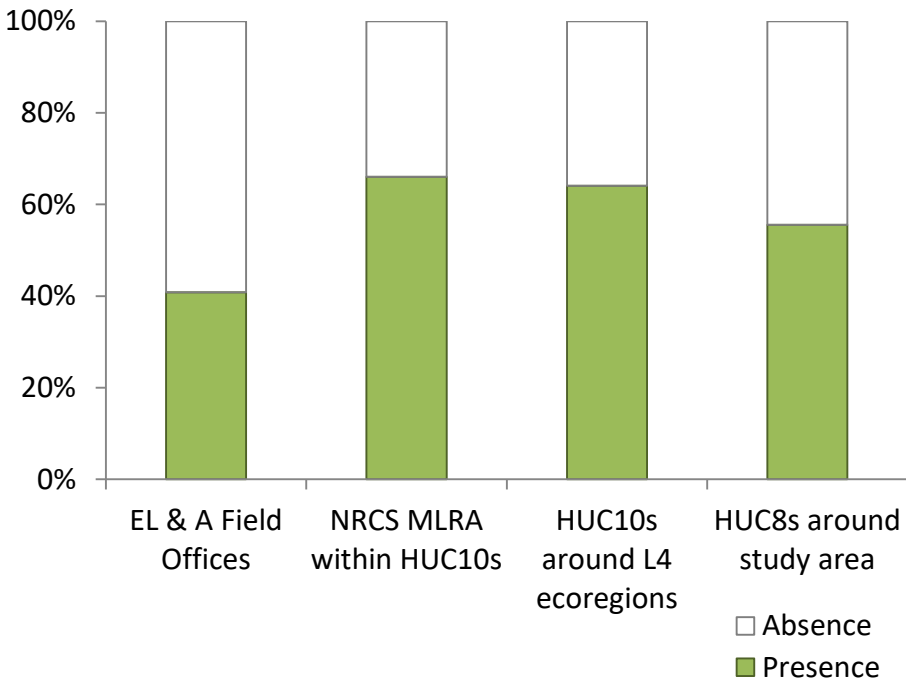
Pronghorn habitat percent connectivity using dispersal and migration distances of 40 – 180 miles (64 - 274 km)



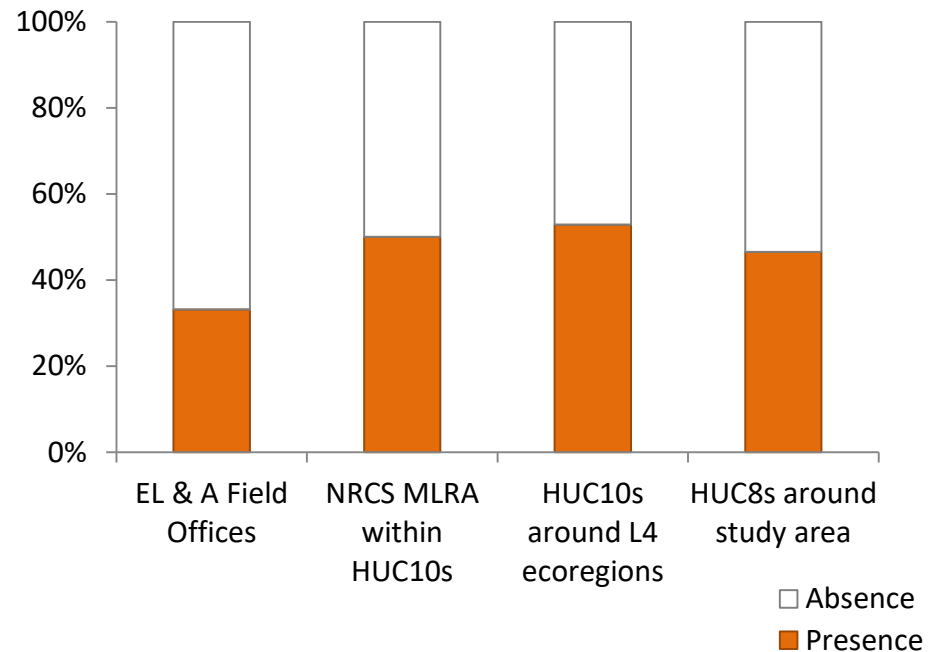
The shortest migration distance of 40 miles does not enable high connectivity between patches – only 7-26% connectivity

Pronghorn suitable habitat by area

Pronghorn suitable habitat by percent of area



Pronghorn suitable habitat with lowest intact areas removed



When the least intact, i.e. most developed areas are withdrawn, PSH decreases, but the relative differences between areas remain similar

Next step is to run the connectivity by making developed areas impassable to pronghorn

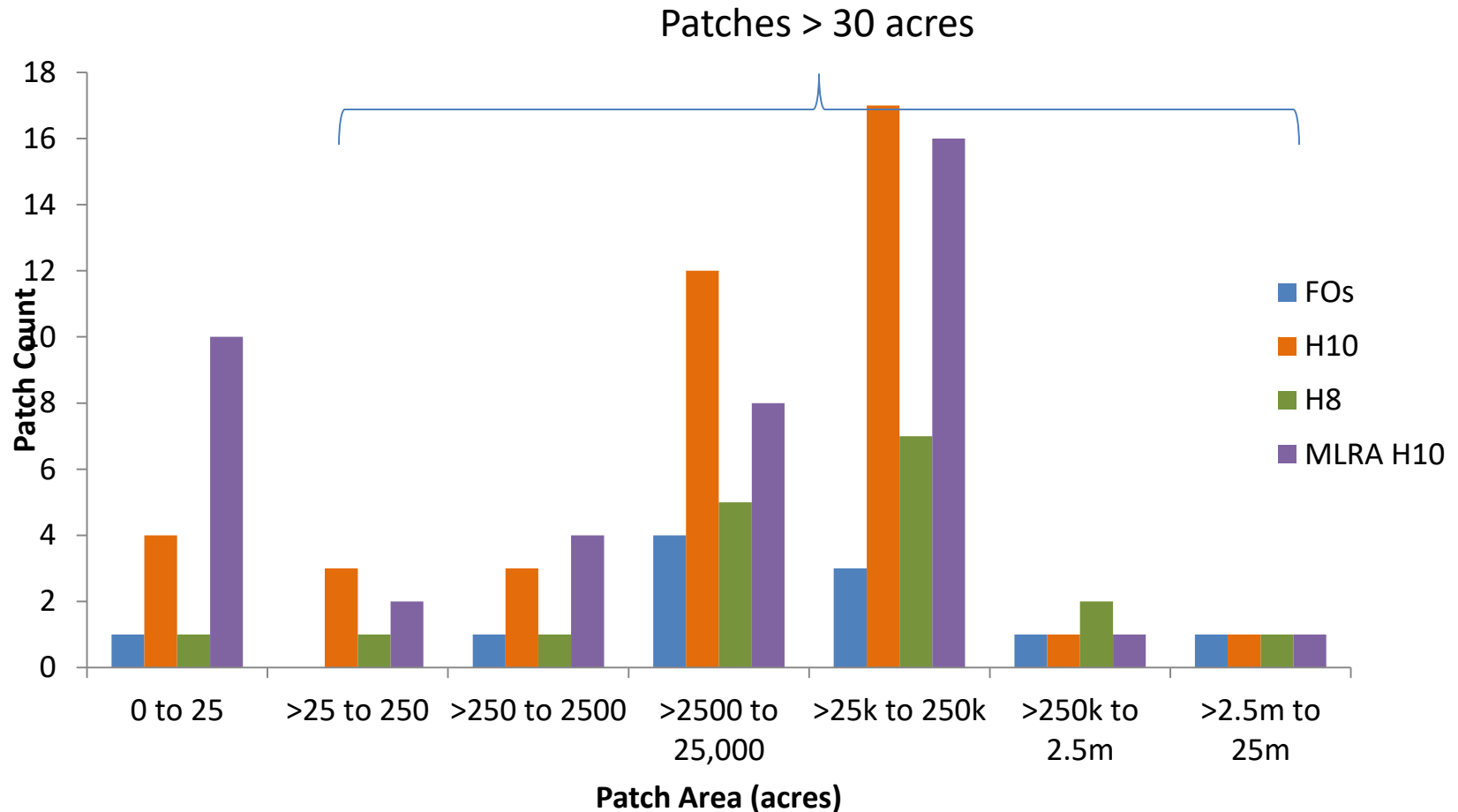
Pronghorn discussion

- Half of the pronghorn suitable habitat is one very large patch
- In NW Applegate and MLRA areas, patches are smaller and more dispersed
 - Can we use broad scale data to identify potential treatment areas to improve connectivity?
 - What other data could be used?
 - Developed areas
 - Conifer percent cover
 - Potential for climate change affecting veg/habitat

Mule Deer Analyses

- Populations are in decline due to habitat loss (see patch analysis slide), recent droughts, and severe winters
- Mule deer data from WAFWA/USU (used as is by CBR and with additions by NGB)
- Winter range, summer range, and year round range data used by CBR REA
- **Habitat areas/patches:** mean annual home ranges generally larger than **74 acres** (30 ha)
- **Dispersal and migration distances or connectivity** needs: **7.5 to 150 mi** (12 to 240 km)

Mule Deer Year Round Range Patch Size Distribution (acres)



Mule deer use a broad range of sizes of habitat patches.
Patches are available in all sizes.

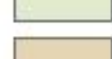
Are these patches enough to say that we have enough habitat?

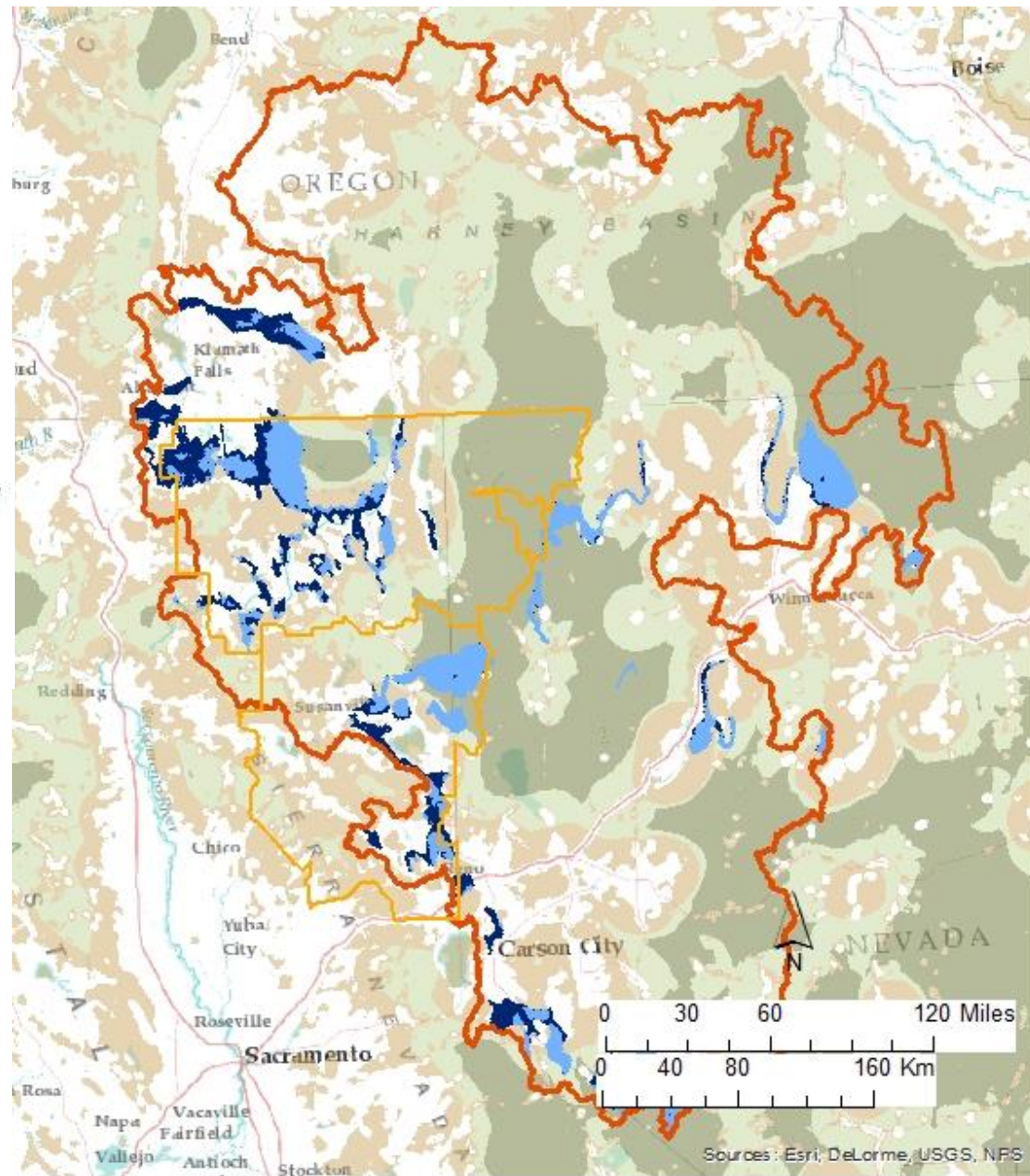
Mule Deer Winter Range

-  NE_CA_Field_Offices_albers
-  HUC10s around L4 ecoregions
-  Mule Deer Winter Range (HUC10) wo DV
-  Mule Deer Winter Range (HUC10)

2.5 km and 20 km scale

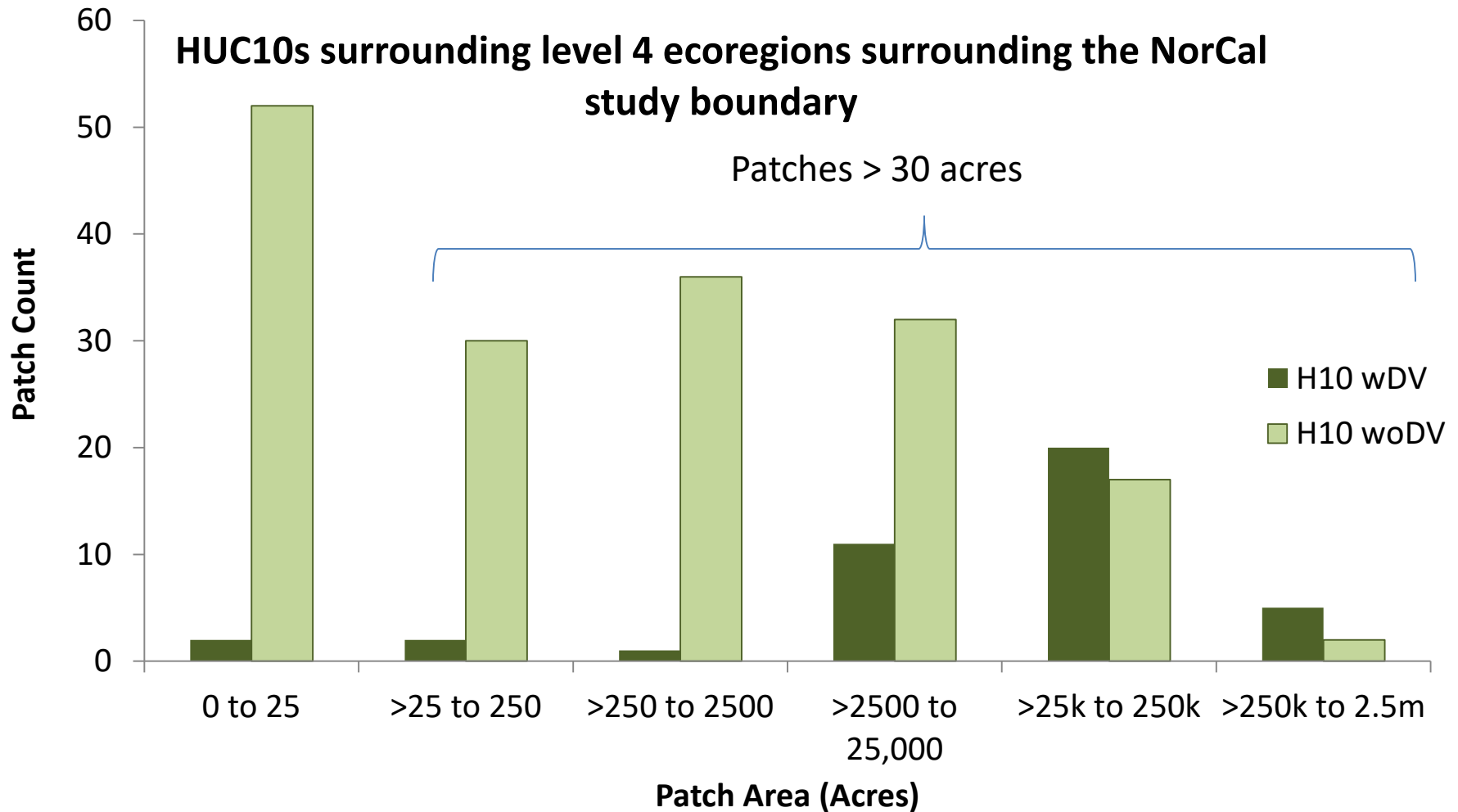
Intactness Classes

-  Lowest Intactness
-  Highest Intactness
-  Second Highest Intactness
-  Lowest Intactness at one scale



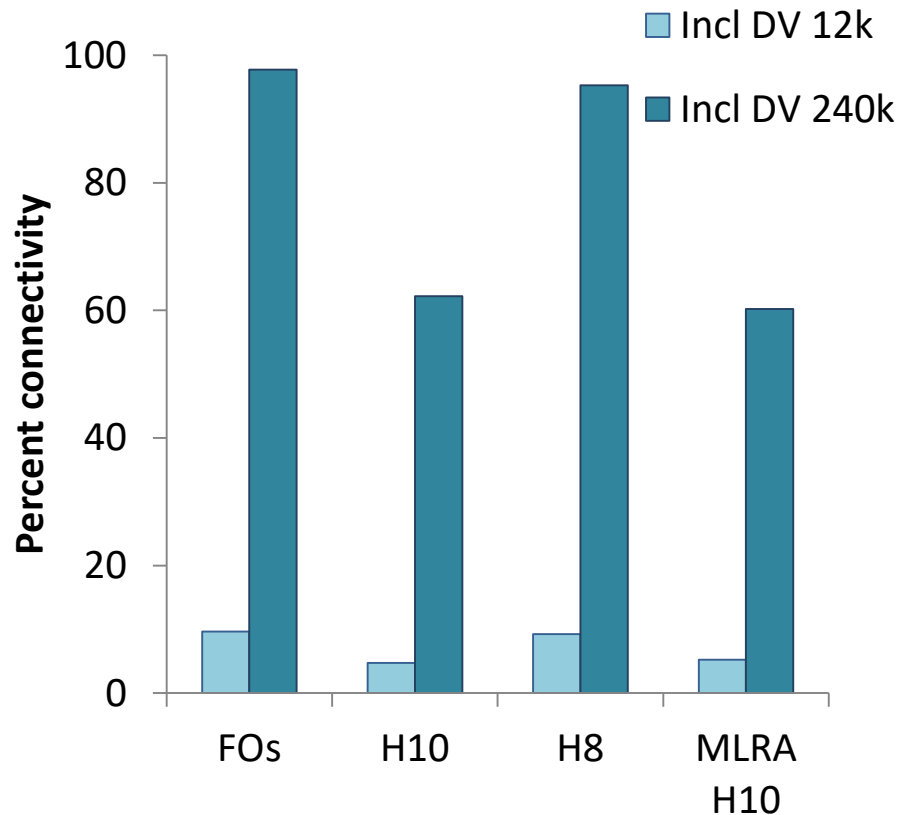
Mule Deer Winter Range

patch frequency with and without areas of 3% development (H10 w[o]DV)

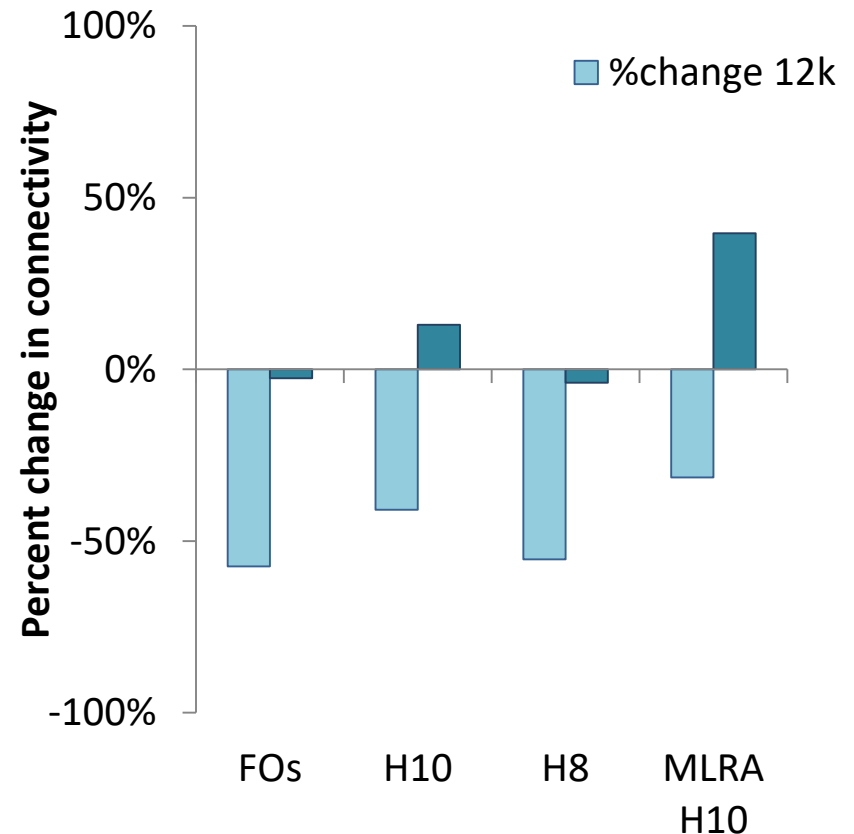


Mule Deer Winter Range Connectivity Analyses

**Winter connectivity for distances of
7.5 mi (12k) and 150 mi (240k)**



**Percent change in connectivity
when developed areas are
removed**



Revisit the LHS

- Viable, healthy, productive, and diverse populations of native and desired plant and animal species, including special status species, are maintained (*Standards and Guidelines for Rangeland Health in NE CA and NW NV*).
- Broad scale data and tools can help
 - Focus management concerns
 - Provide context of an area
 - Determine location and distribution of habitat
 - Prioritize potential project areas

Questions?



All photos from BLM Flickr – taken in N. Nevada