Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment : The FIAT process

Jeanne Chambers, USFS, RMRS

Mike Pellant, BLM

Doug Havlina, BLM

Fire and Invasives Assessment Team (FIAT)

Purpose -

Identify priority habitat areas and management strategies to reduce threats to Greater Sage-Grouse resulting from invasive annual grasses, wildfires, and conifer expansion

➤ Provide regulatory assurance to FWS

➤ "quantified descriptions of future conservation actions to inform the sage-grouse listing decision" (WO IM-2014-134)

Focus-

Western portion of the range of Greater Sage-Grouse

Scientific Basis

Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Mike Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, and Amarina Wuenschel
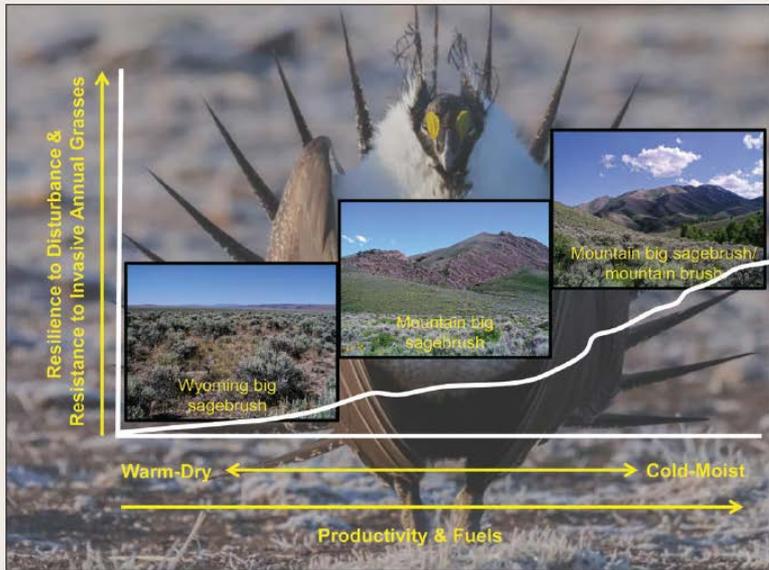
http://www.treesearch.fs.fed.us/pubs/46329

- Strategic, multi-scale approach developed by WAFWA Fire and Invasives working group
- Linked Resilience and Resistance concepts to Sage-Grouse Habitat Requirements
- Approach used to –
  - Prioritize areas for management in the western portion of the range
  - Determine the most effective management strategies at local scales

Collaborative Approach

Development Team

Mike Pellant* (lead)	Dave Pyke*
Jeanne Chambers*	Jeremy Maestas*
Chad Boyd*	Lou Ballard
Doug Havlina	Tim Metzger
Todd Hopkins	Tom Rinkes
Clint McCarthy	Joe Tague
Steve Knick	Mina Wuenschel
Mike Gregg	

* = member of WAFWA fire and invasives working group

Review Team

Laurie Kurth	Chris Theisen
Lauren Mermejo	Glen Stein
Jesse Delia	Mike Ielimi
Tate Fischer	Krista Gollnick Waid
Ken Collum	Chuck Mark
Dave Repass	Peggy Olwell
Don Major	Don Kemner

Assessment Process

Step 1 (Western Portion of Range) -

- Prioritize focal areas for management
  - o Identify important sage-grouse occupied habitats
  - o Assess resilience to disturbance and resistance to invasive annual grasses and wildfire
  - o Assess conifer expansion areas
  - ❖ Identify geospatially explicit management strategies to conserve sage-grouse habitats

❖ March 2013 - August 2014

Greater Sage-Grouse Wildfire, Invasive Annual Grasses & Conifer Expansion Assessment

June 2014

1

F&WS "Priority Areas for Conservation" (PACs) First Filter for Identifying Sage-grouse Habitat
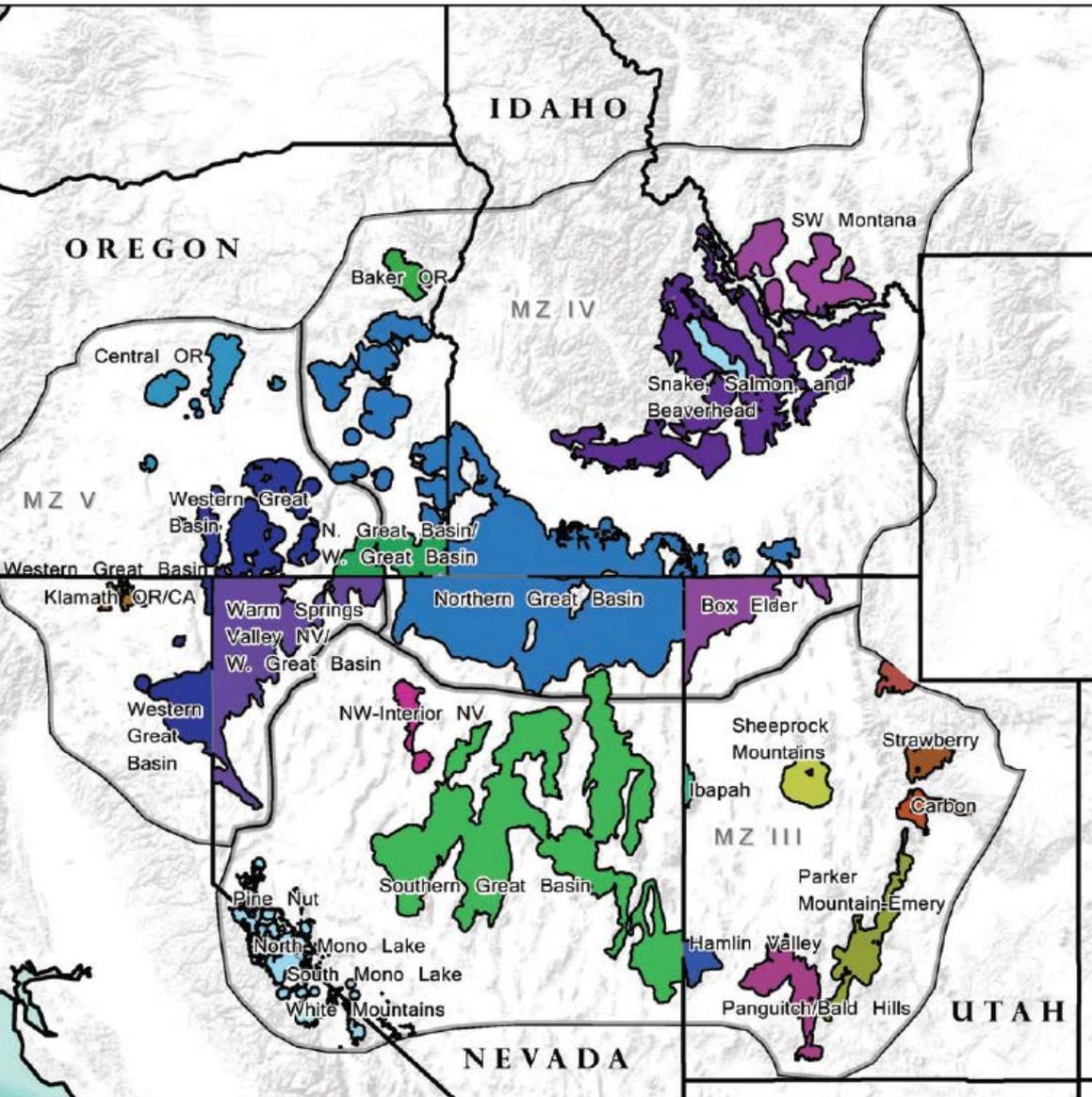
FWS Conservation Objectives Team (COT) Report (2013)

- Identified key areas for sage-grouse conservation based on –

  - ➤ Habitat data
  - ➤ Population data

Sagebrush Landscape Cover - Indicator of Sage-Grouse Habitat
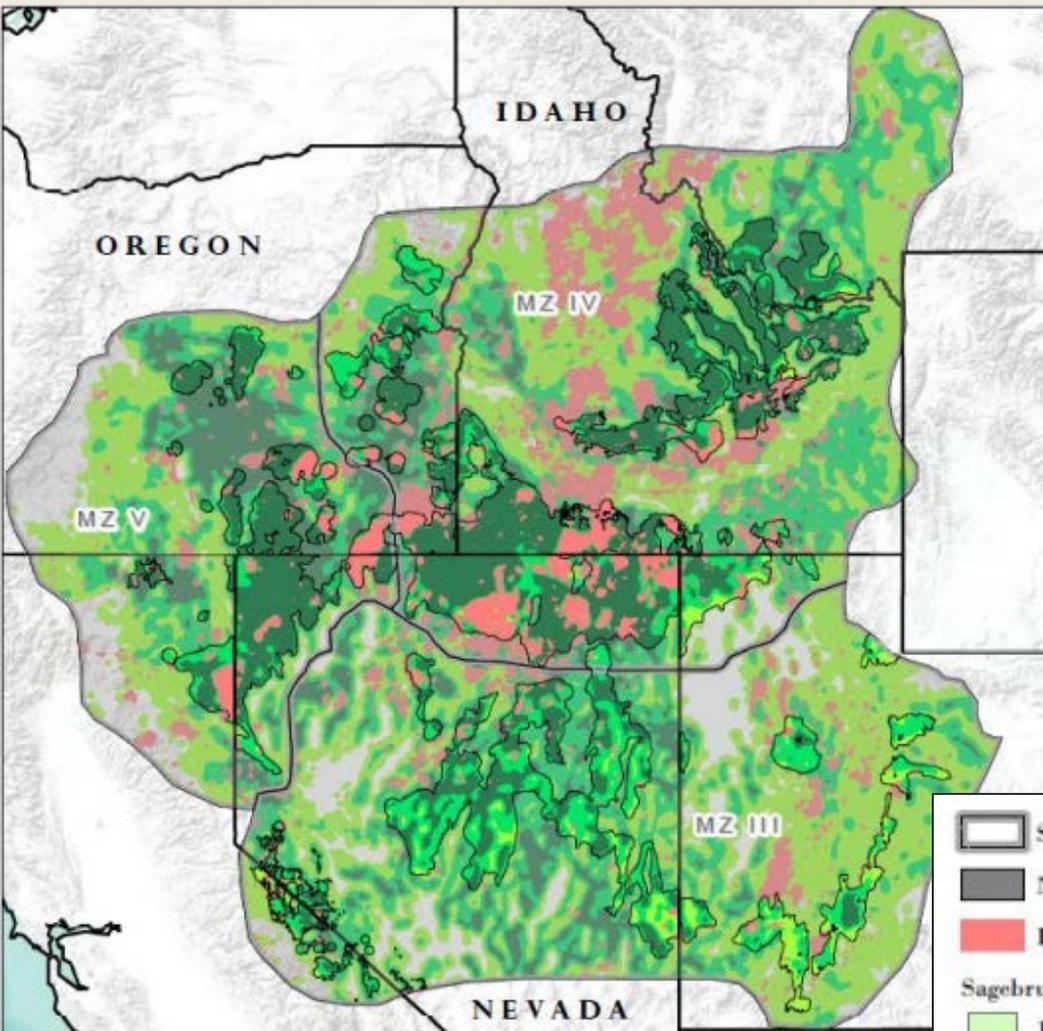
- Strong correlation to sage-grouse persistence (Aldredge & Boyce 2007, Wisdom et al. 2009, Knick et al. 2013).

- FIAT used three classes -
  o 0-25%   Minimal persistence
  o 25-65% Intermediate persistence
  o 65+%   High persistence

- Accounted for recent wildfires (red polygons)

Sage-grouse Management Zone
Non Priority Area for Conservation
Fire Perimeter (post 2000)
Sagebrush % Area within a 5K Radius
1 - 25
25- 65
65 - 100

Sage-grouse Breeding Bird Densities – Population Viability
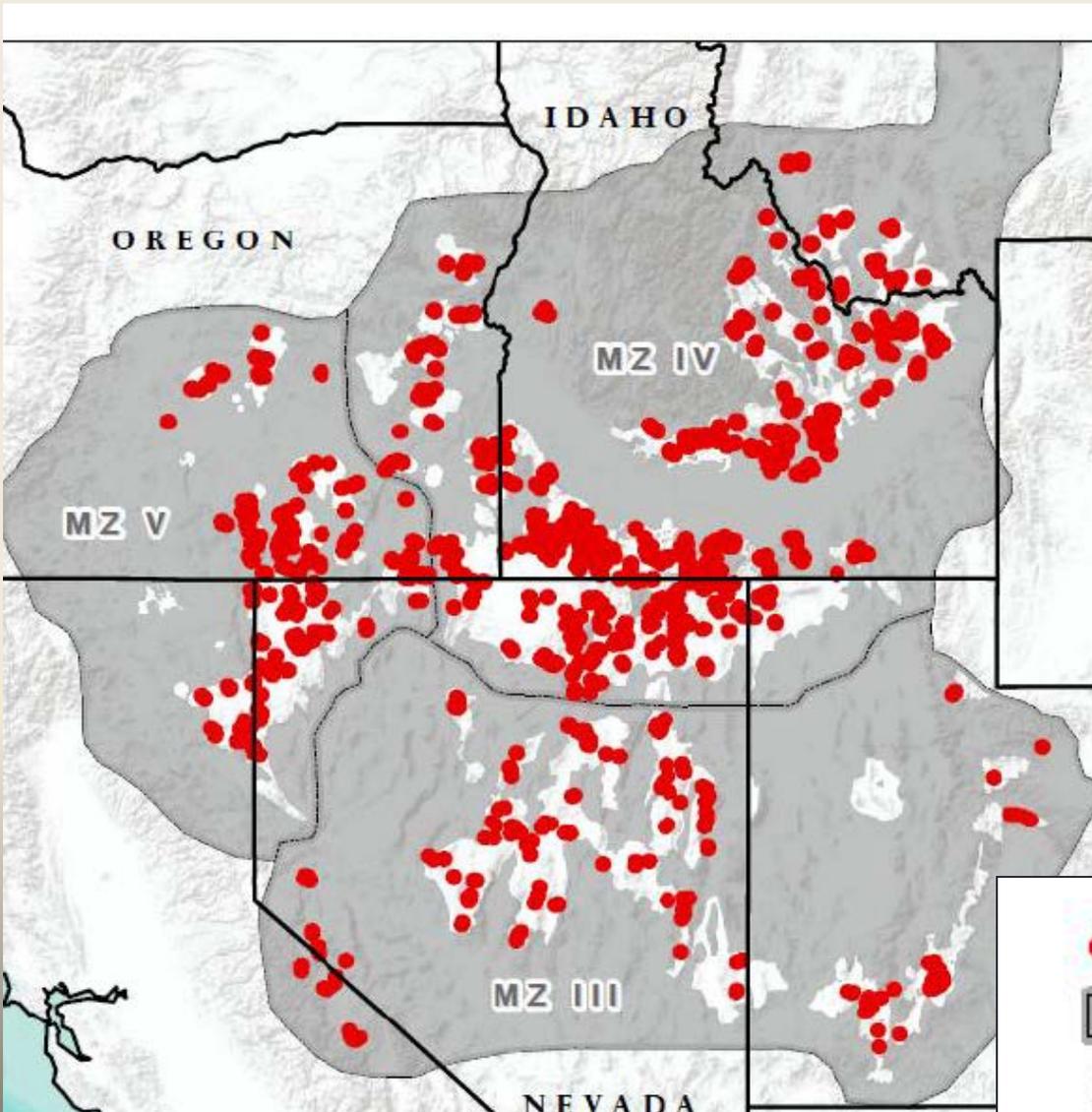
- Best region-wide data on sage-grouse population abundance
- FIAT used areas supporting 75% of breeding bird populations in a 4-5 mile radius around active leks (Doherty et al. 2010)

- Caveat: Does not capture brood rearing or winter habitat

Legend:
- 75% Breeding Bird Density
- Sage-grouse Management Zone
- PAC within Management Zones

Soil Temperature & Moisture Regimes = Indicator of Resilience and Resistance

- Soil temperature/moisture regimes strongly associated with resilience and resistance (Chambers et al. 2014 a, b, c)
- Used by FIAT to indicate invasive annual grass and wildfire threat

Resistance & Resilience

Sage-grouse Management Zone

Soil Moisture & Temperature Regime

■ (blue)	Cold and Moist (Cryic)
■ (light blue)	Cool and Moist (Frigid/Ustic)
■ (pale green)	Cool and Moist (Frigid/ Xeric)
■ (green)	Warm and Moist (Mesic/Ustic)
■ (yellow)	Warm and Moist (Mesic/Xeric)
■ (orange)	Cool and Dry (Frigid/ Aridic)
■ (red)	Warm and Dry (Mesic/ Aridic)
□	Omitted or No Data

Sage-grouse Management Zone

Non Priority Area for Conservation

0   100   200   400   Kilometers

Wildfire and Invasive Annual Grass Threat
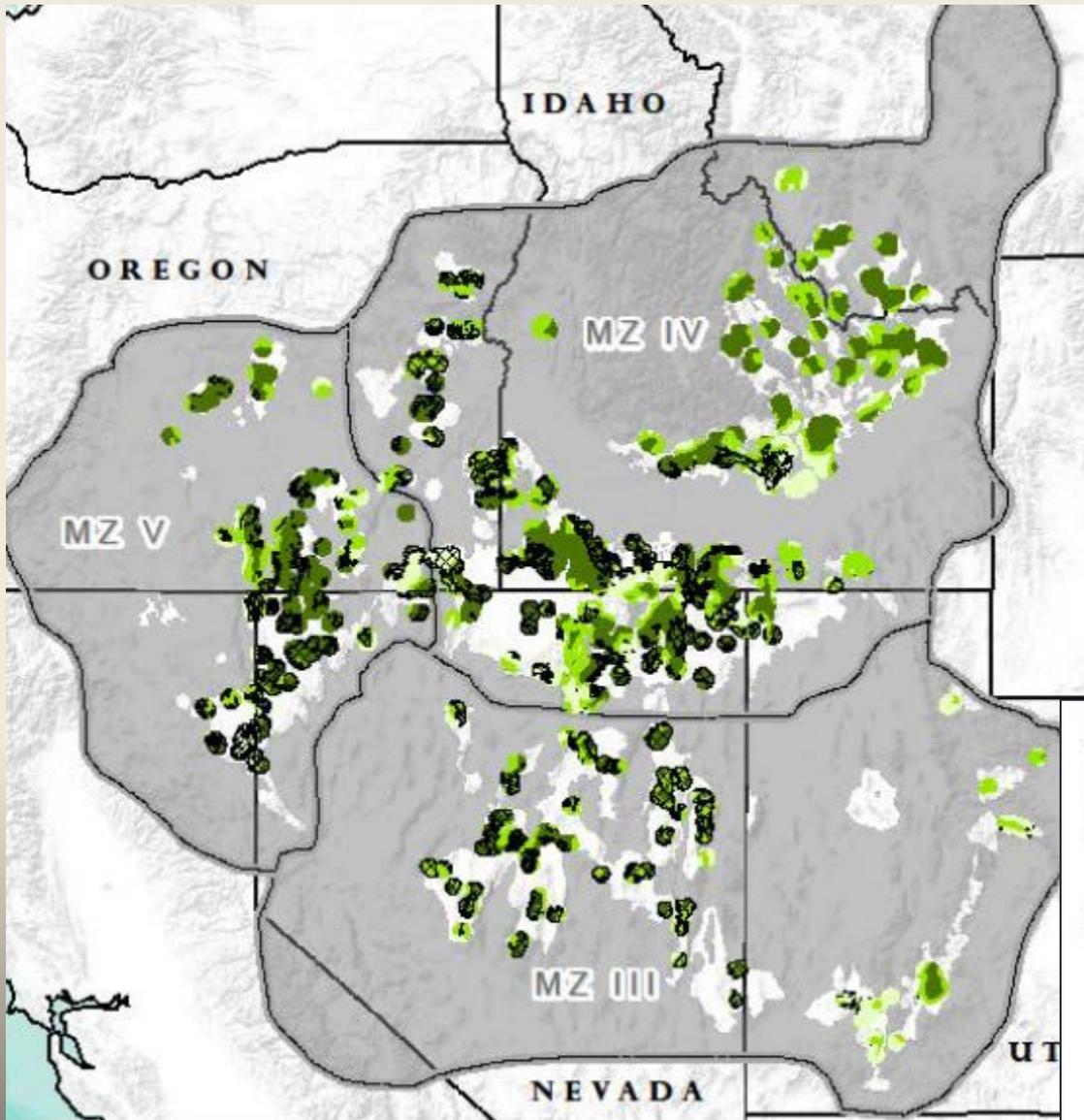
- **Focal Habitats -**
  75% BBD areas in PACS with landscape sagebrush cover > 25%

- **Emphasis Areas –**
  Subsets of focal habitats in warm/dry moisture regimes with sagebrush landscape cover > 25%

IDAHO

OREGON

MZ IV

MZ V

MZ III

NEVADA

UT

High Breeding Bird Density (75%) Overlapping Warm & Dry Regime

Sage-grouse Management Zone

PAC within Management Zones

High Sage-grouse Breeding Bird Density

> 65%

25-65%

< 25%

Sagebrush (%) Area within 5K Radius
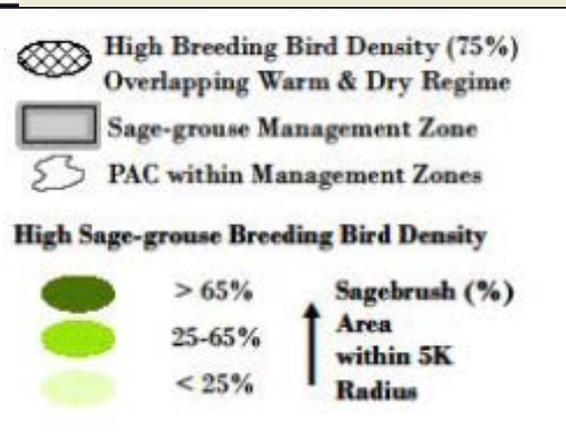
Conifer Expansion Model (Manier et al. 2013) – Conifer Expansion Threat
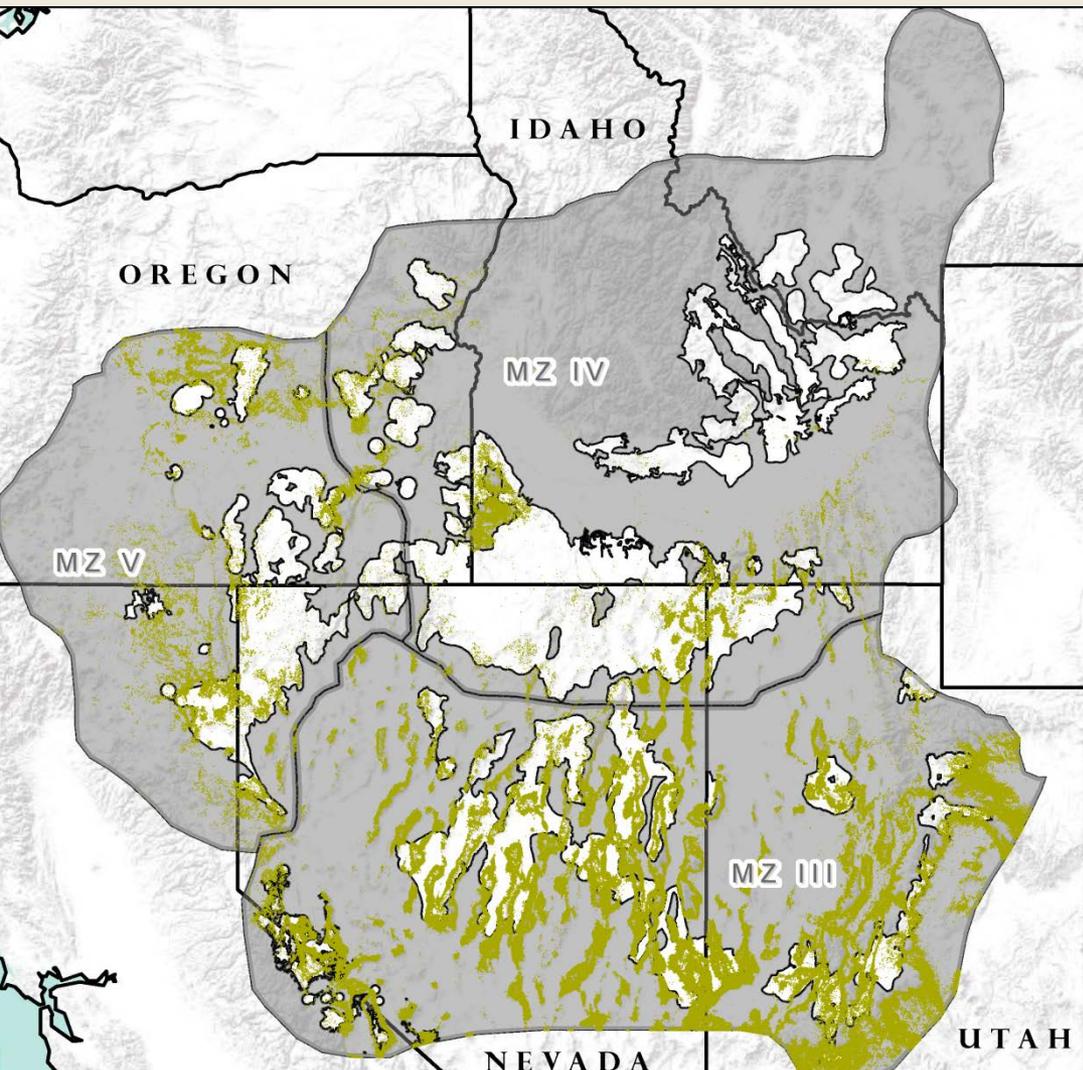
- Conifer expansion data used by FIAT to quantify conifer expansion threat

Legend:
- Sage-grouse Management Zone
- Priority Areas for Conservation (PACs)
- Area outside of PACs
- Pinyon Juniper Woodland
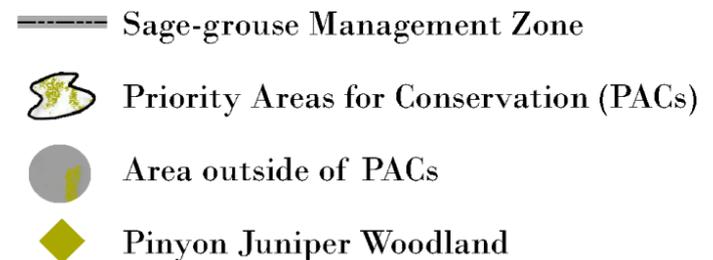
Wildfire and Conifer Expansion Threat
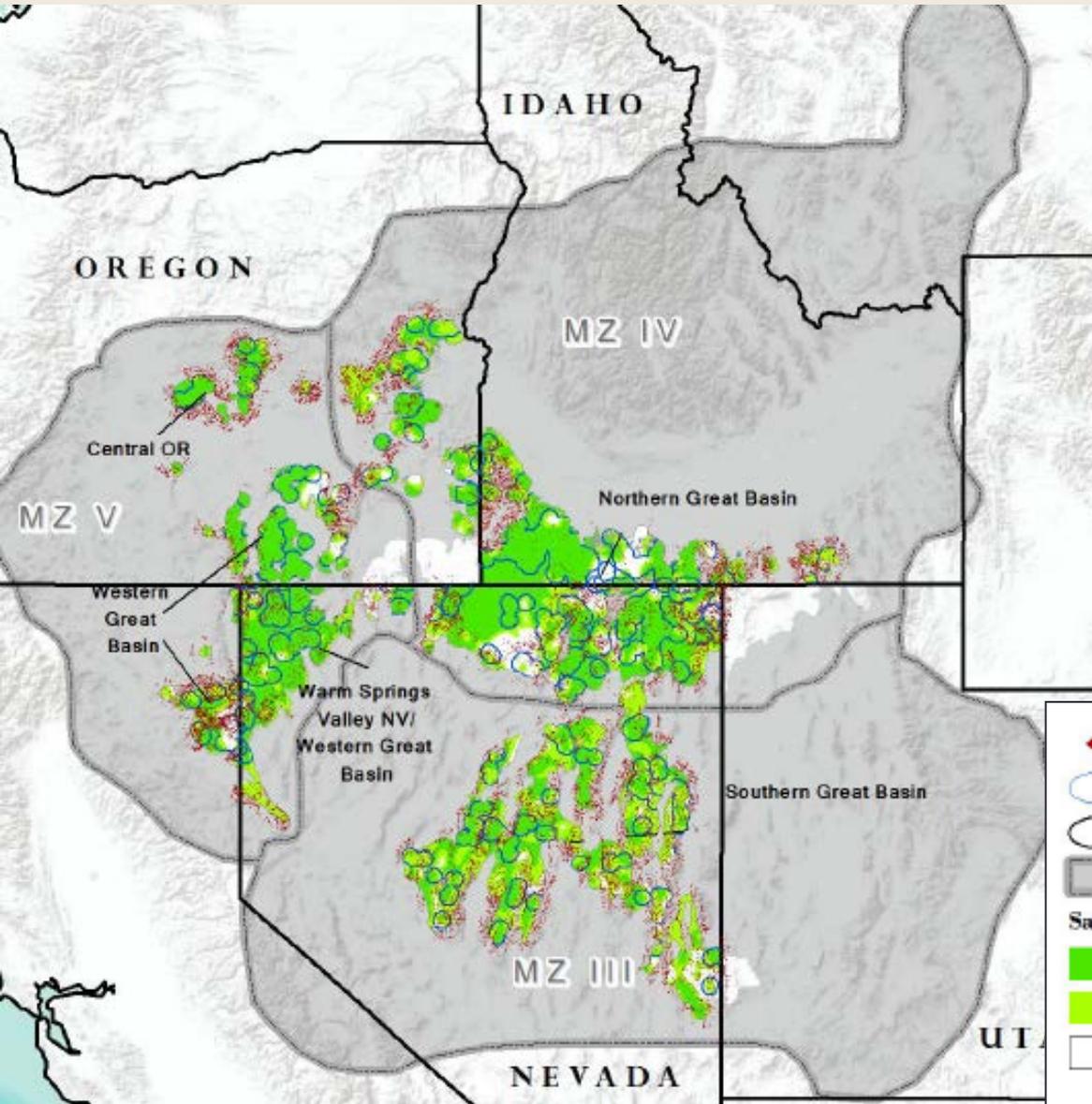
- **Focal habitats -** Areas within or near conifer expansion with > 25% sagebrush landscape cover

- **Emphasis Areas -** Subsets of focal habitats in the 75% BBD areas

Legend:
- ◆ Conifer Expansion (risk model) surrounding PAC
- ◯ 75% Breeding Bird Density Area
- ◯ Sage-grouse High Priority PAC within Management Zones
- ▢ Sage-grouse Management Zone

Sagebrush (%) Area within a 5K Radius
- > 65%
- 25-65%
- < 25%
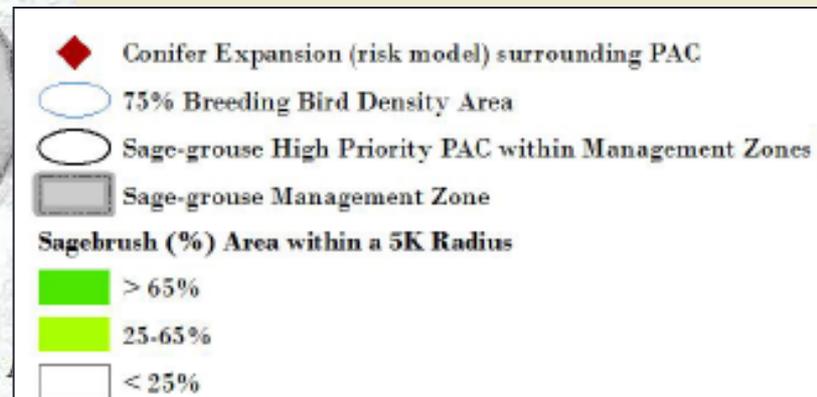
Wildfire and Invasive Annual Grass PACs
Highest Area of 75% BBD *&*
Highest Area of 75% BBD within the Warm/Dry Soil T/M Regime

| Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	Total PAC Acres	Breeding Bird Density (75%) Acres	Percent of Breeding Bird Density (75%) Area within PAC	Warm and Dry Soil Moisture & Temperature Regime within Breeding Bird Density (75%) Acres*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	57%	179551 (2%)	674554 (9%)	1745163 (24%)
3	Southern Great Basin	9461355	3146056	33%	42596 (1%)	792780 (25%)	1062091 (34%)
4	Snake, Salmon, and Beaverhead	5477014	2823205	52%	68107 (2%)	89146 (3%)	95970 (3%)
5	Western Great Basin	3177253	2084626	66%	149399 (7%)	140141 (7%)	202767 (10%)
5	Warm Springs Valley NV/Western Great Basin	3520937	1558166	44%	31458 (2%)	207365 (13%)	741353 (48%)
4	SW Montana	1369076	659475	48%	0 (0%)	0 (0%)	0 (0%)
4	Northern Great Basin/Western Great Basin	1065124	624581	59%	114222 (18%)	85258 (14%)	116513 (19%)
5	Central OR	813699	451755	56%	0 (0%)	6211 (1%)	16463 (4%)
3	Panguitch/Bald Hills	1135785	352258	31%	6883 (2%)	5821 (2%)	0 (0%)
3	Parker Mountain-Emery	1122491	308845	28%	0 (0%)	127 (0%)	0 (0%)
4	Box Elder	1519454	292658	19%	22 (0%)	43325 (15%)	23913 (8%)
4	Baker OR	336540	184813	55%	0 (0%)	46459 (25%)	36214 (20%)
3	NW-Interior NV	371557	108256	29%	576 (1%)	17117 (16%)	25173 (23%)
3	Carbon	355723	97734	27%	255 (0%)	180 (0%)	0 (0%)
3	Strawberry	323219	52635	16%	0 (0%)	0 (0%)	0 (0%)
3	Rich-Morgan-Summit	217033	37005	17%	0 (0%)	0 (0%)	0 (0%)
3	Hamlin Valley	341270	3244	1%	0 (0%)	139 (4%)	3105 (96%)
3	Ibapah	98574	0	0%	0 (NA)	0 (NA)	0 (NA)
3	Sheeprock Mountains	611374	0	0%	0 (NA)	0 (NA)	0 (NA)
5	Klamath OR/CA	162667	0	0%	0 (NA)	0 (NA)	0 (NA)

* Numbers in parenthesis indicate the percent of acres relative to total acres of breeding bird density (75%)

Conifer Expansion PACs
Highest Area of 75% BBD *&* Highest estimated Conifer Expansion in Sagebrush Landscape Cover Classes > 25%

Sage-grouse Management Zone	Sage-grouse Priority Area for Conservation (PAC) Name	Total PAC Acres	Breeding Bird Density (75%) Acres	Percent Breeding Bird Density (75%) Acres	Conifer Expansion (Modeled) Acres within Breeding Bird Density (75%) Areas*		
					0-25% Sagebrush Landscape Cover	25%-65% Sagebrush Landscape Cover	65%+ Sagebrush Landscape Cover
4	Northern Great Basin	13045515	7383442	57%	95714 (1%)	247250 (3%)	272079 (4%)
3	Southern Great Basin	9461355	3146056	33%	23982 (1%)	229389 (7%)	92756 (3%)
4	~~Snake, Salmon, and Beaverhead~~	5477014	2823205	52%	970 (0%)	18367 (1%)	92251 (3%)
5	Western Great Basin	3177253	2084626	66%	57918 (3%)	106130 (5%)	67858 (3%)
5	Warm Springs Valley NV/Western Great Basin	3520937	1558166	44%	9984 (1%)	46846 (3%)	104168 (7%)
4	SW Montana	1369076	659475	48%	90 (0%)	8182 (1%)	21224 (3%)
4	Northern Great Basin/Western Great Basin	1065124	624581	59%	9436 (2%)	1869 (0%)	3587 (1%)
5	Central OR	813699	451755	56%	339 (0%)	27260 (6%)	31765 (7%)
3	Panguitch/Bald Hills	1135785	352258	31%	28515 (8%)	22118 (6%)	0 (0%)
3	Parker Mountain-Emery	1122491	308845	28%	6967 (2%)	15052 (5%)	5980 (2%)
4	Box Elder	1519454	292658	19%	2415 (1%)	22184 (8%)	20316 (7%)
4	Baker OR	336540	184813	55%	1 (0%)	7484 (4%)	195 (0%)
3	NW-Interior NV	371557	108256	29%	4320 (4%)	5718 (5%)	653 (1%)
3	Carbon	355723	97734	27%	3364 (3%)	15832 (16%)	0 (0%)
3	Strawberry	323219	52635	16%	236 (0%)	1007 (2%)	0 (0%)
3	Rich-Morgan-Summit	217033	37005	17%	3913 (11%)	2628 (7%)	0 (0%)
3	Hamlin Valley	341270	3244	1%	0 (0%)	16 (0%)	520 (16%)
3	Ibapah	98574	0	0%	0 (NA)	0 (NA)	0 (NA)
5	Klamath OR/CA	162667	0	0%	0 (NA)	0 (NA)	0 (NA)
3	Sheeprock Mountains	611374	0	0%	0 (NA)	0 (NA)	0 (NA)

* Numbers in parenthesis indicate the percent of acres relative to total acres of breeding bird density (75%)

Greater Sage-Grouse
Priority Areas for Conservation

FIAT - PACS
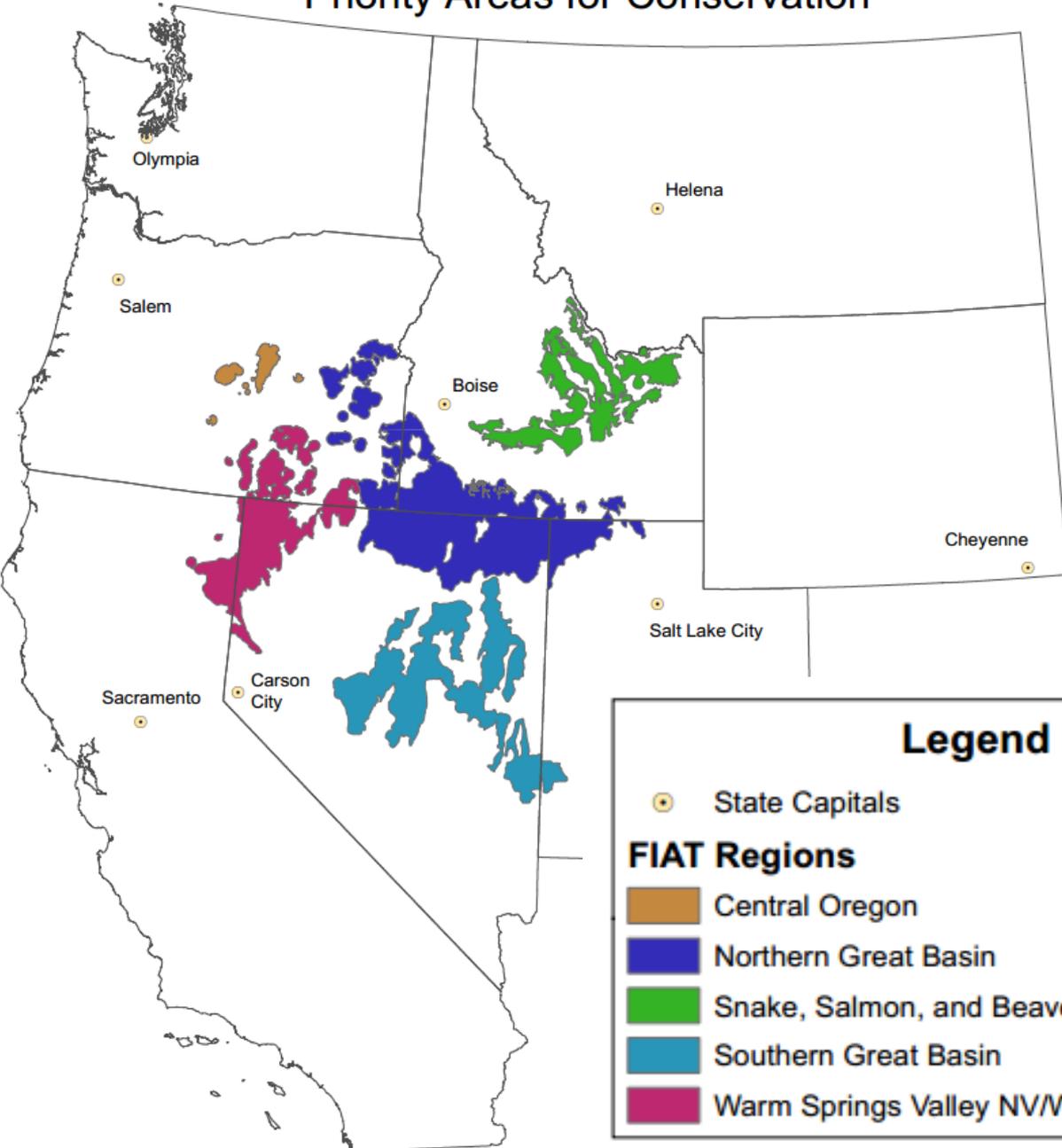
Legend

⊙ State Capitals

FIAT Regions
- Central Oregon
- Northern Great Basin
- Snake, Salmon, and Beaverhead
- Southern Great Basin
- Warm Springs Valley NV/Western Great Basin

Assessment Process

Step 2 (Project Planning Areas) –

- Devise management strategies
  - Collect and evaluate local geospatial data
  - Determine appropriate management activities in or near focal habitats

❖ October 1, 2014 - March 27, 2015

http://www.blm.gov/wo/st/en/prog/more/sagegrouse/documents_and_resources.html

Project Planning Areas
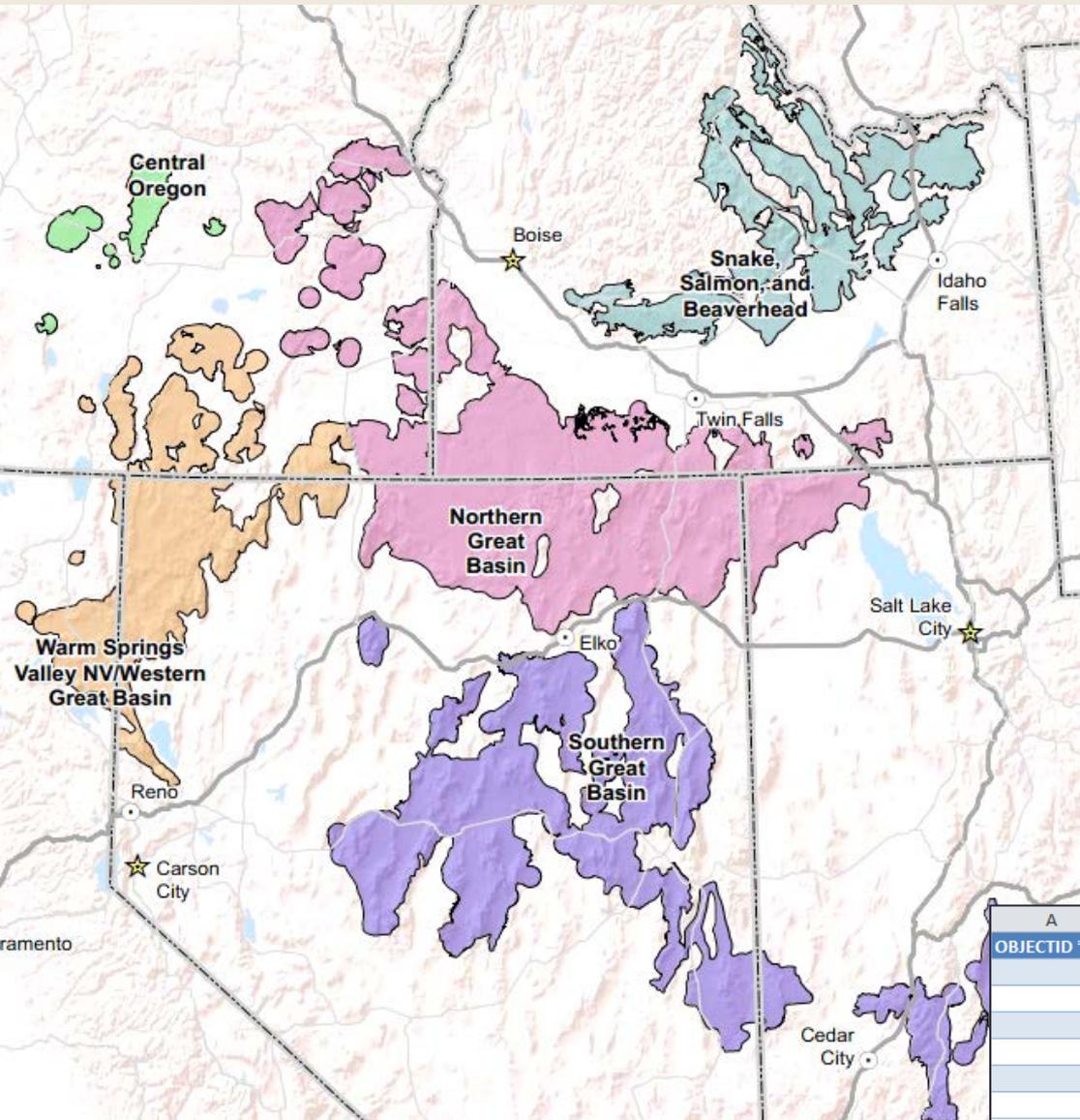
- Designated based on geographical and biological features which create a logical planning unit (e.g., clusters of focal habitats, populations, or connectivity issues)

- Nest well within NFPORs and other planning databases

- FIAT geodatabases contain spatial data for each PPA

A	B	C	D
OBJECTID *	SHAPE *	FIAT Project Planning Area Name *	Total Acres FIAT Project Planning Area
2	Polygon	Beaty's Butte	643612.1
1	Polygon	Clover Flat	31530.95
3	Polygon	Gravelly	29421.18
4	Polygon	North Warner	287418.5
6	Polygon	Orejana	124776.8
5	Polygon	South Warner	37522.99

Breeding Bird Density (Focal Habitat Areas)
Greater Sage-Grouse, Wildfire, Invasive Annual Grasses, and Conifer Expansion Assessments

Southern Great Basin
Bureau of Land Management
U.S. Department of the Interior
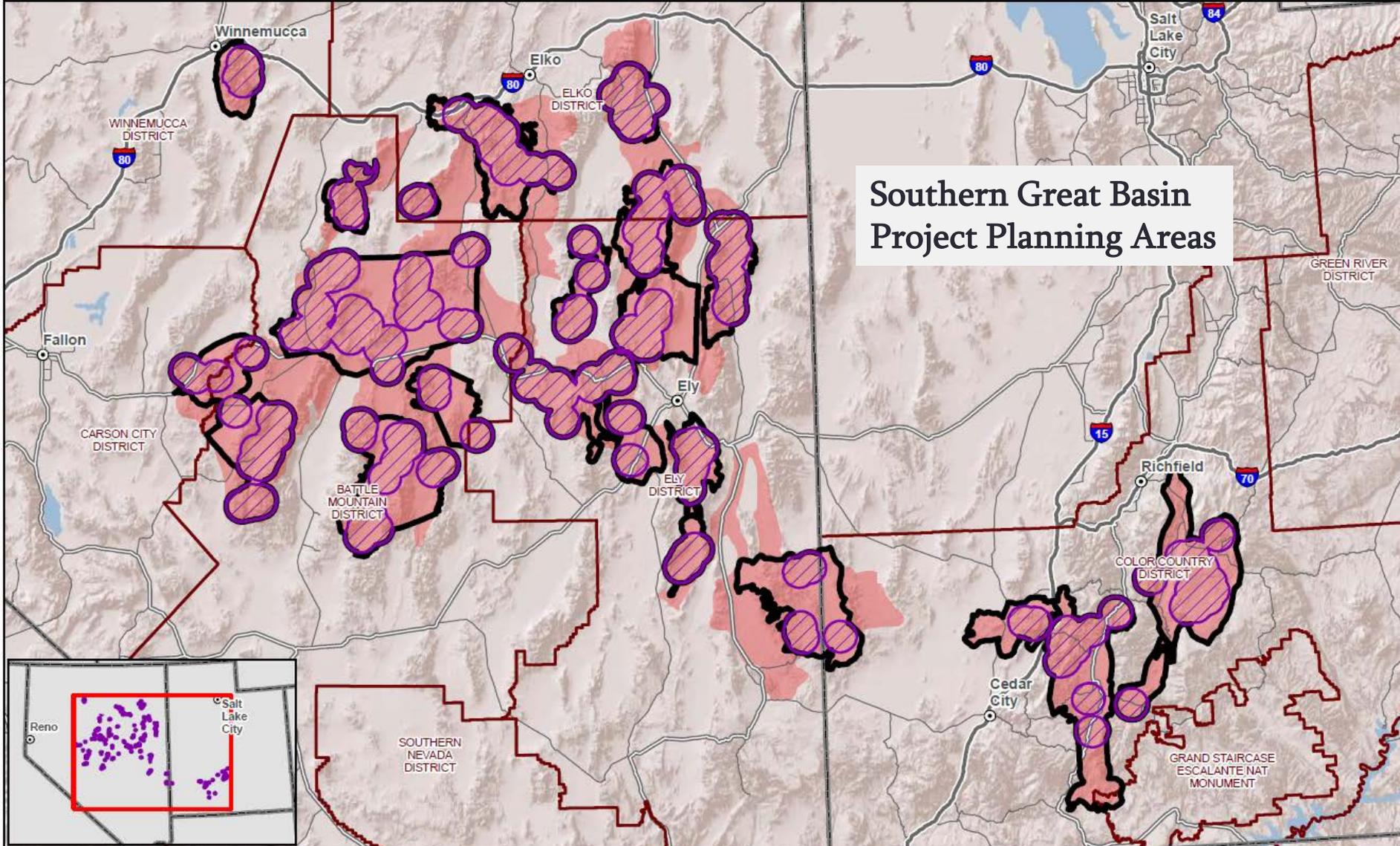
Southern Great Basin
Project Planning Areas

No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

Legend:
- Breeding Bird Density 75%
- Project Planning Area
- Assessment Area
- State Boundary
- BLM District Boundary
- Interstate Hwy
- US Route
- State Route

January 2015
Date Saved: 2/11/2015
Data Sources: Bureau of Land Management, ESRI Basedata
1:2,782,791

SAGE-GROUSE HABITAT MATRIX

Proportion of Landscape Dominated by Sagebrush

Resilience & Resistance of Sagebrush Community

	Low = < 25%	*Medium = 25-65%*	*High = > 65%*
High	**RESTORATION/RECOVERY POTENTIAL HIGH** *Native grasses and forbs sufficient for recovery* *Annual invasive risk low*		
	Requires longer timeframe, enhance connectivity.	Little intervention needed, enhance connectivity.	Little-to-no intervention needed.
Moderate	**RESTORATION/RECOVERY POTENTIAL INTERMEDIATE** *Native grasses and forbs usually adequate for recovery* *Annual invasive risk moderate* *Treatment success depends on site characteristics*		
	Requires longer timeframe and intervention.	Enhance connectivity, minimize risk of invasives.	Little intervention needed, minimize risk of invasives.
Low	**RESTORATION/RECOVERY POTENTIAL LOW** *Native grasses and forbs inadequate for recovery* *Annual invasive risk is high* *May require multiple management interventions*		
	Recovery unlikely.	Long timeframe for recovery, high amount of intervention.	Moderate timeframe for recovery, moderate-high amount of intervention.

SAGE-GROUSE HABITAT MATRIX

Proportion of Landscape Dominated by Sagebrush

Resilience & Resistance of Sagebrush Community

	Low = < 25%	Medium = 25-65%	High = > 65%
High	**RESTORATION/RECOVERY POTENTIAL HIGH** *Native grasses and forbs sufficient for recovery* *Annual invasive risk low*		
	Requires longer timeframe, enhance connectivity.	Little intervention needed, enhance connectivity.	Little-to-no intervention needed.
Moderate	**RESTORATION/RECOVERY POTENTIAL INTERMEDIATE** *Native grasses and forbs usually adequate for recovery* *Annual invasive risk moderate* *Treatment success depends on site characteristics*		
	Requires longer timeframe and intervention.	Enhance connectivity, minimize risk of invasives.	Little intervention needed, minimize risk of invasives
Low	**RESTORATION/RECOVERY POTENTIAL LOW** *Native grasses and forbs inadequate for recovery* *Annual invasive risk is high* *May require multiple management interventions*		
	Recovery unlikely.	Long timeframe for recovery, high amount of intervention.	Moderate timeframe for recovery, moderate-high amount of intervention.

Sage-Grouse Habitat Matrix

Proportion of Landscape Dominated by Sagebrush

Resilience & Resistance of Sagebrush Community

Low = < 25% *Medium = 25-65%* *High = > 65%*

RESTORATION/RECOVERY POTENTIAL HIGH
Native grasses and forbs sufficient for recovery
Annual invasive risk low

High

1A Requires longer time, enhance connectivity.

1B Little intervention, enhance connectivity.

1C Little-to-no intervention needed.

RESTORATION/RECOVERY POTENTIAL INTERMEDIATE
Native grasses and forbs usually adequate for recovery
Annual invasive risk moderate
Treatment success depends on site characteristics

Moderate

2A Requires longer timeframe and intervention.

2B Enhance connectivity, minimize risk of invasives.

2C Little intervention, minimize risk of invasives.

RESTORATION/RECOVERY POTENTIAL LOW
Native grasses and forbs inadequate for recovery
Annual invasive risk is high
May require multiple management interventions

Low

3A Recovery unlikely.

3B Long timeframe for recovery, high amount of intervention.

3C Mod timeframe for recovery, moderate high amount of intervention.

Conifer Expansion Prioritizations

❖ Wildfire and invasive annual grass considerations still apply as they relate to site recovery potential
❖ Old growth is avoided

		Conifer Expansion Prioritization Proportion of Landscape Dominated by Sagebrush		
		Low < 25%	**Moderate 25-65%**	**High >65%**
Phase	III	No Treatments	Third priority	Third priority
	II	No Treatments	First priority-75% BBD Second-Remainder of focal habitat	First priority-75% BBD Second-Remainder of focal habitat
	I	No Treatments	First-75% BBD Second-Remainder of focal habitat	First-75% BBD Second-Remainder of focal habitat

Management Strategies

*Potential management actions organized within resilience and resistance categories*

- Fire Operations – Preparedness, Prevention and Suppression

- Fuels Management

- Post-fire Rehabilitation

- Habitat Recovery/Restoration

Treatment Prioritization for Wildfire and Invasives
Soil Temperature/Moisture Regimes and Sagebrush Cover
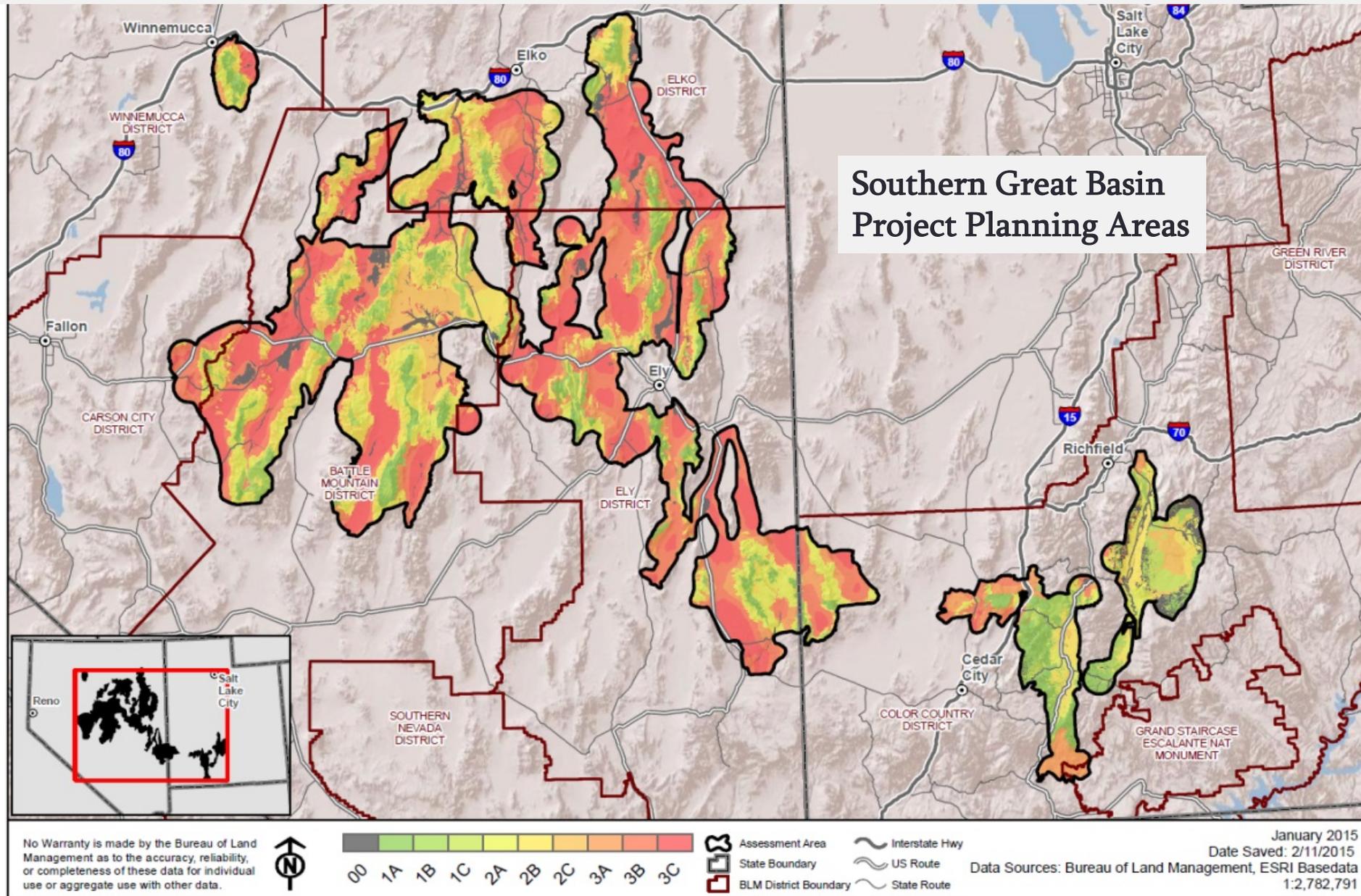
Southern Great Basin
Project Planning Areas

Management strategies and potential treatments
Identified in and adjacent to focal habitats

Threatment Priotization for Conifer Expansion
Data sources: REAs, LANDFIRE, Peter Coates, Ecological Site Inventories, NRCS
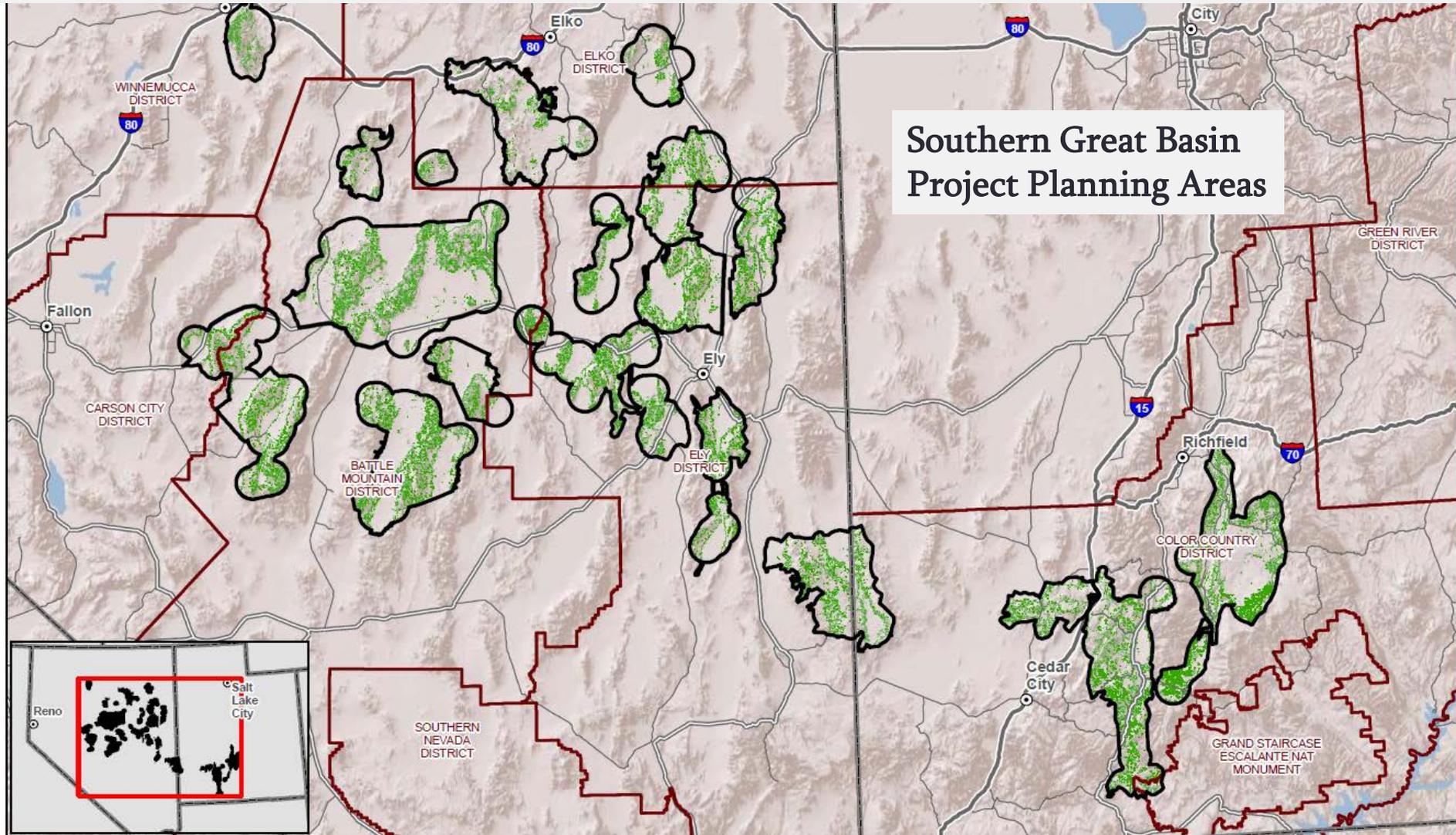
Southern Great Basin Project Planning Areas

Legend:
- ◆ Conifer Expansion
- ⬡ Project Planning Area
- ▭ State Boundary
- ▭ BLM District Boundary
- ∿ Interstate Hwy
- ∿ US Route
- ∿ State Route

January 2015
Date Saved: 1/9/2015
Data Sources: Bureau of Land Management, ESRI Basedata
1:2,782,791

Potential habitat restoration treatments identified using conifer expansion data intersected with BBD and sagebrush cover
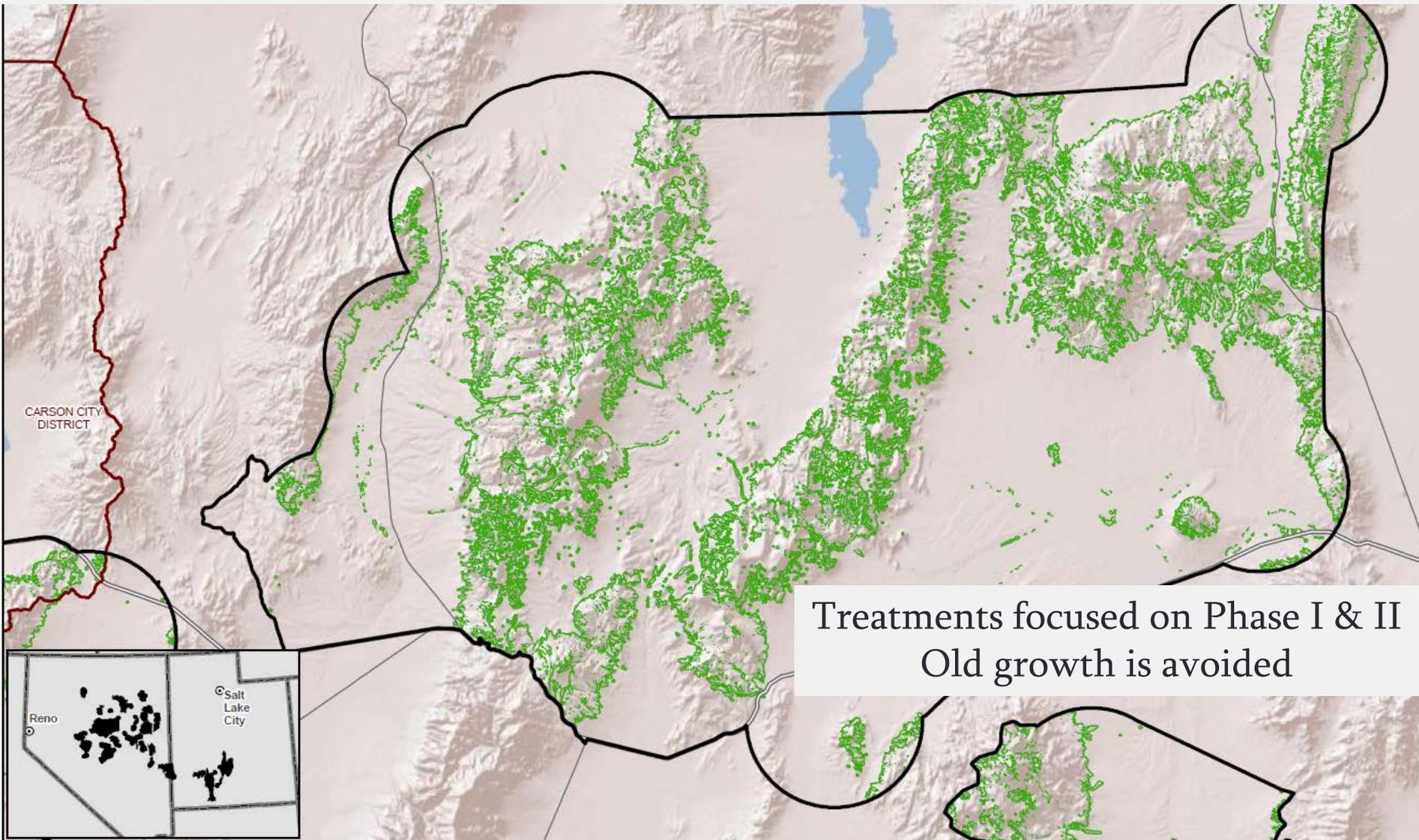
Treatments focused on Phase I & II
Old growth is avoided

CARSON CITY DISTRICT

Reno

Salt Lake City

No Warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

N

Conifer Expansion
Project Planning Area

State Boundary
BLM District Boundary

Interstate Hwy
US Route
State Route

January 2015
Date Saved: 1/9/2015
Data Sources: Bureau of Land Management, ESRI Basedata
1:516,191

FIAT Team

❑ Doug Havlina - FIAT Team Coordinator

       (Fire Ecologist)

❑ Craig Goodell: Central Oregon

       (OR/WA Fire Ecologist)

❑ Joe Adamski: (1) N. Great Basin

       (ID Forestry Lead   (2) Snake/Salmon/Beaverhead

❑ Sandy Gregory: S. Great Basin

       (NV Fuels Lead)

❑ Ken Collum: W. Great Basin/Warm Springs Valley

       (Eagle Lake Field Office Manager)

FIAT in Summary

❑ Strategic Landscape Approach

❑ Collaborative

❑ Application of management strategies based in science

❑ Represents an integrated framework for analysis and planning

❑ Answers "why here, why now?"

Down the Road

❑ Forest Service FIAT
  o Includes all sage-grouse habitat
     on Forest Service lands
  o Threat based

❑ WAFWA Fire & Invasives Group
  o Scientific basis for using resilience
     and resistance concepts in eastern
     portion of the sage-grouse range