Baseline Assessment Progress Report

SageCon Technical Team

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Contributors – Special Thanks!

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- NRCS
  - Jeremy Maestas
- ODFW
  - Dawn Davis
  - Eric Rickerson
- USFWS
  - Jeff Everett
  - Jodie Delavan
  - Angela Sitz
  - Dolores Weisbaum
- Defenders of Wildlife
  - Bruce Taylor
  - Sara O'brien
- BLM
  - Glenn Frederick
  - Rolando Mendez
  - Jeanne Keyes
- OSU
  - Christian Hagen

Thank You!

The Puzzle at Hand

- How do we manage for multiple objectives while conserving sage-grouse and preventing its listing?

Planned Analyses

(1) Current conditions – aka "Baseline"

(2) Past trends

(3) Projected trends

Recent Meetings Review

- Reviewed the threats to sage-grouse

  - Fire

  - Juniper

  - Cheatgrass/invasives

  - Habitat fragmentation

  - Others

- Reviewed research that analyzed and quantified threats, especially human disturbance

- Developed questions to analyze threats

Recent Meetings Review

- Explored ways to quantify current conditions

- Examined complexity of the problem

Began to chart a path forward…

Questions Generated

- What are the natural fire regimes for SE OR?

- Are current conditions departed from the natural range?

- What resources are available for dealing with threats? (e.g., fire-fighting capacity)

- Where is habitat susceptible to cheatgrass or juniper?

Since the last meeting

- Developed key questions to assess current conditions

- Continued to compile and analyze agency and other data

- Researched disturbance policies in other states

- Organized ongoing activities across agencies

- Produced a template to contain analysis results

- Produced preliminary baseline maps as part of a disturbance threshold analysis for Oregon

BASELINE ANALYSIS

Goals

- Identify existing conditions for sage-grouse at the time of the candidate species decision (2010)*

- Inform policy framing efforts to reduce threats and provide protection (at levels acceptable by the USFWS)

* Based on key landscape attributes: developed land, sagebrush, conifers, agriculture

Considerations for Policy

1. What ecological factors are most important?

2. What geographic information is useful?

3. What assessment units/spatial scales are most useful ?

4. Will ecologically meaningful assessment units/spatial scales work in a policy implementation?

Technical Challenges

- Sage-grouse are sensitive to disturbance at low levels.

- Analysis must capture this sensitivity

0.3%

"Slippery slope"

3% - 4%

Leks

Developed land
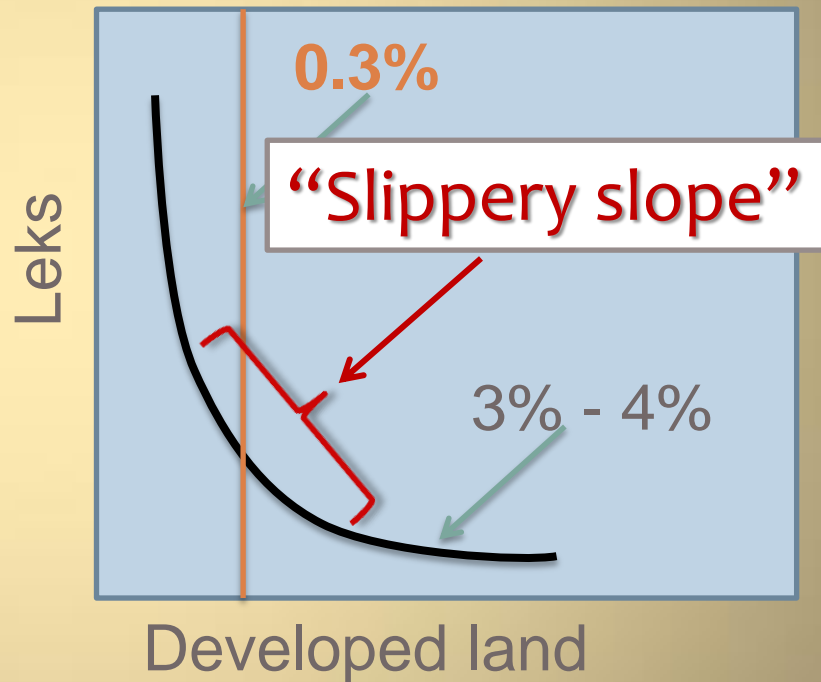
Technical Challenges

- Identifying best assessment unit(s) based on biology and ecology is challenging.

  - Size of assessment unit matters

  - Larger units good for regional planning efforts

  - Smaller units better for project or site level work

Subtasks and requirements

1. Replicate lek-scale analysis by Knick et al . (2013) using more current data

   - Correctly classify leks as "active" or "historic"
   - Correctly classify land cover classes

2. Identify other important assessment units and scales for analysis of existing conditions

3. Ensure identified assessment units can be linked to policy framing and implementation

4. Ensure appropriate use of data

Project Area with Core/Low Density Habitat
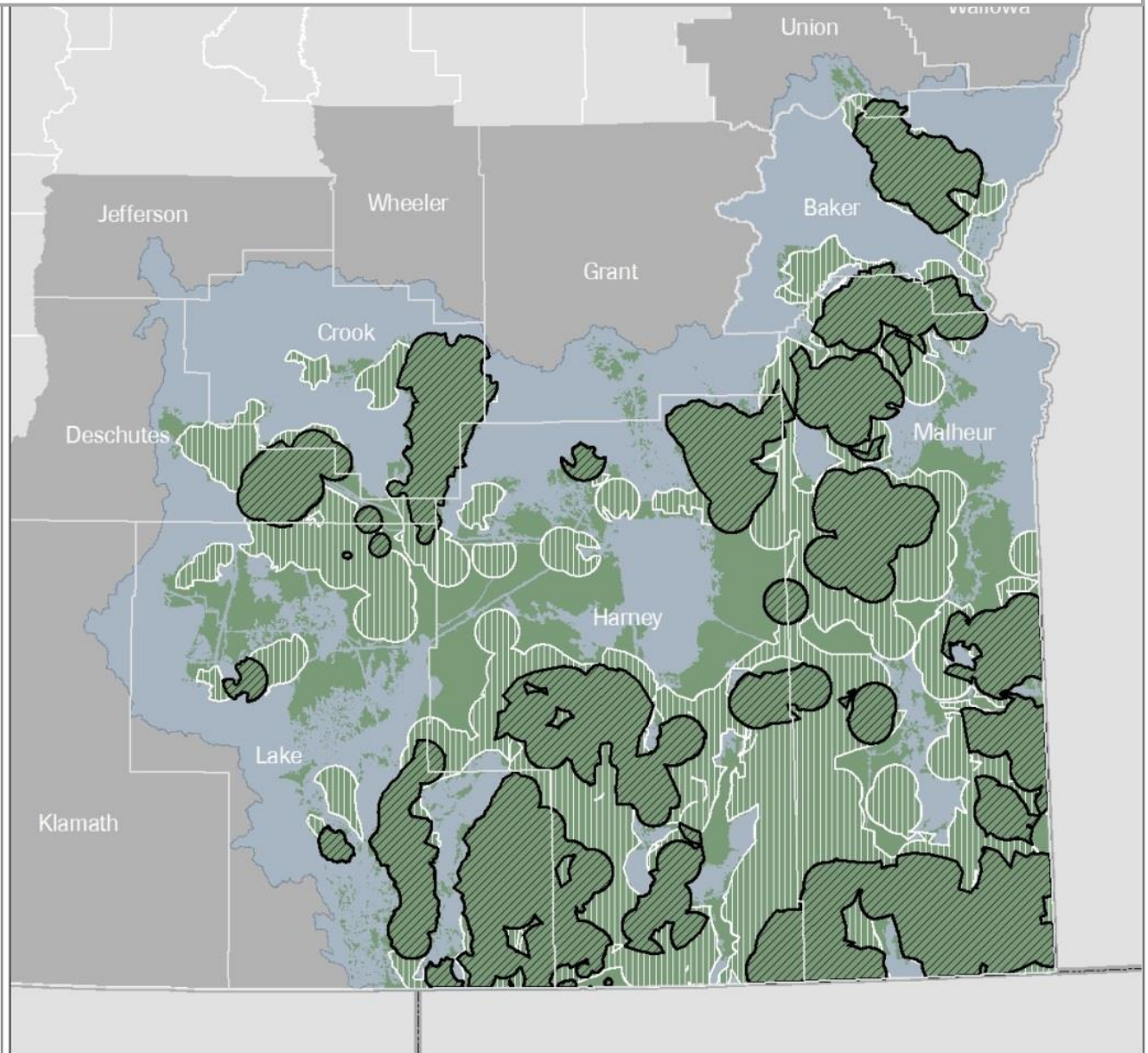
Key Outcomes

- Identified preliminary set of criteria for identifying important ecological and political spatial units

- Mapped distribution of sagebrush, development, and agriculture across OR range

- Related percentages of sagebrush, development, and agriculture to core polygons

Next Steps

- Improve lek groups (active/historic)

- Prioritize spatial assessment units

- Refine analyses based on high priority assessment units

- Perform past conditions assessment (2001)

- Assess conservation and restoration measures

Methods

1. Acquire data

   – Land cover data

   – Lek locations

   – Boundaries

2. Group land cover classes into key landscape attribute classes.

Type	Land cover classes
Agriculture	Cultivated Crops and Irrigated Agriculture
	Fallow
	General
	Pasture/Hay
	Small Grains
Sagebrush	Big Sagebrush Shrubland
	Big Sagebrush Steppe
	Low Sagebrush
	Mountain Sagebrush
	Stiff (Rigid) Sagebrush
Developed	Developed-General
	Developed-High Intensity
	Developed-Low Intensity
	Developed-Medium Intensity
	Developed-Open Space

BOUNDARY_SAGECON

Land cover groups

- Other vegetation
- Barren
- Other shrublands
- Conifer
- Developed
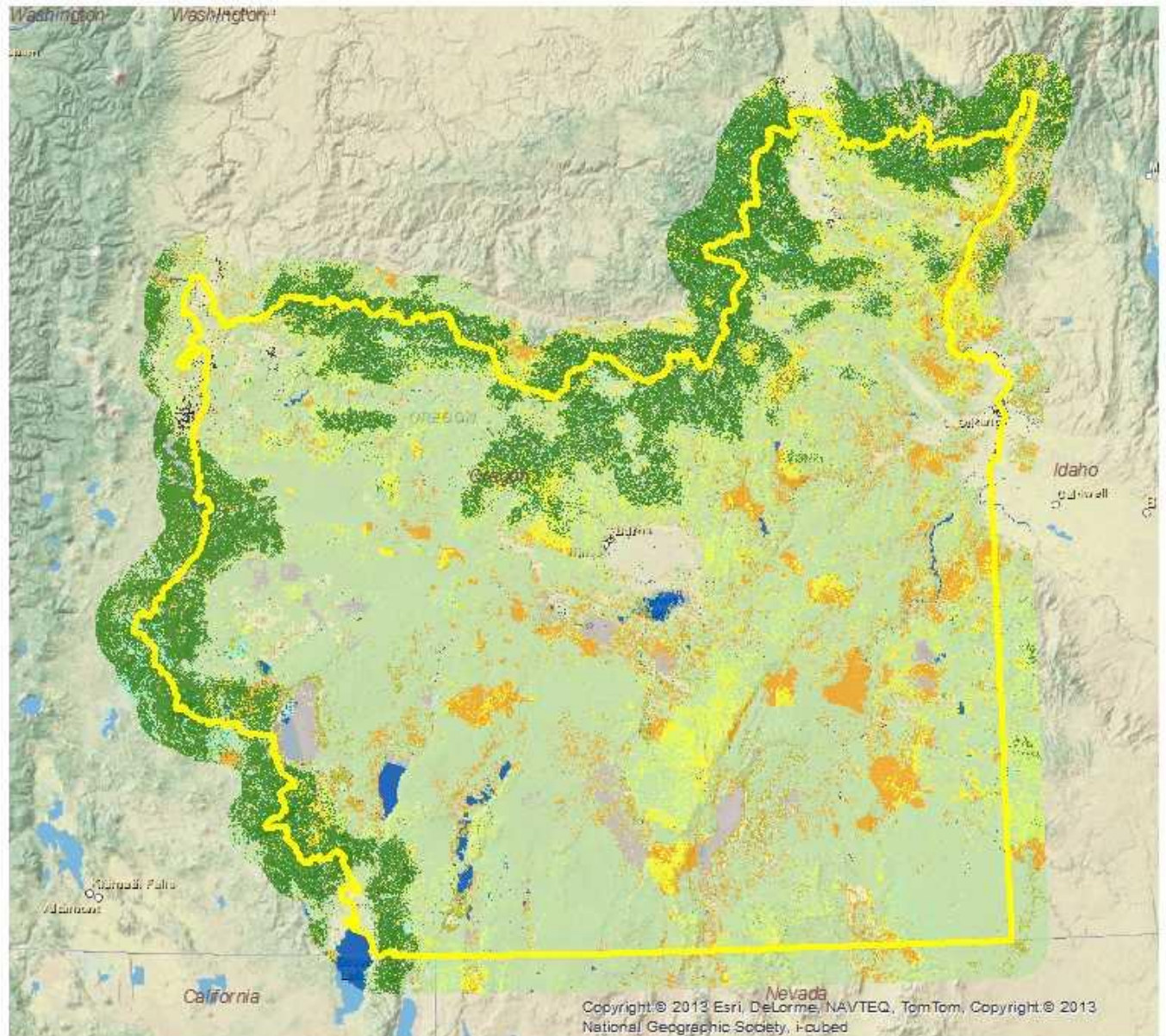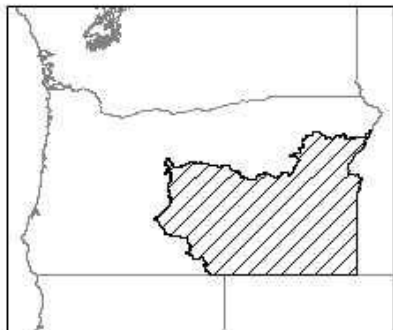- Exotic
- Grassland
- Riparian
- Sagebrush
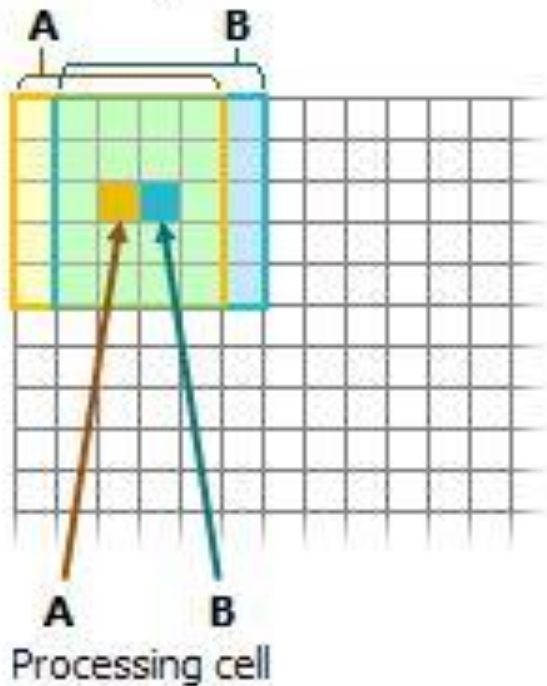- Sparse Vegetation
- Water
- Wetland

N

0   30   60   120 Miles

Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom, Copyright:© 2013
National Geographic Society, i-cubed

Methods, cont

3. Map distribution of key landscape attribute classes.

Focal neighborhoods

A   B

A   B
Processing cell

Focal operation

Input processing raster

Output raster

Input processing raster

Output raster

Methods, cont.

4. Develop lek buffers → circles around leks

5. Overlay lek buffers (or other boundary) on land cover data.

Legend:
- Other vegetation
- Barren
- Other shrublands
- Conifer
- Developed
- Exotic
- Grassland
- Riparian
- Sagebrush
- Sparse Vegetation
- Water
- Wetland
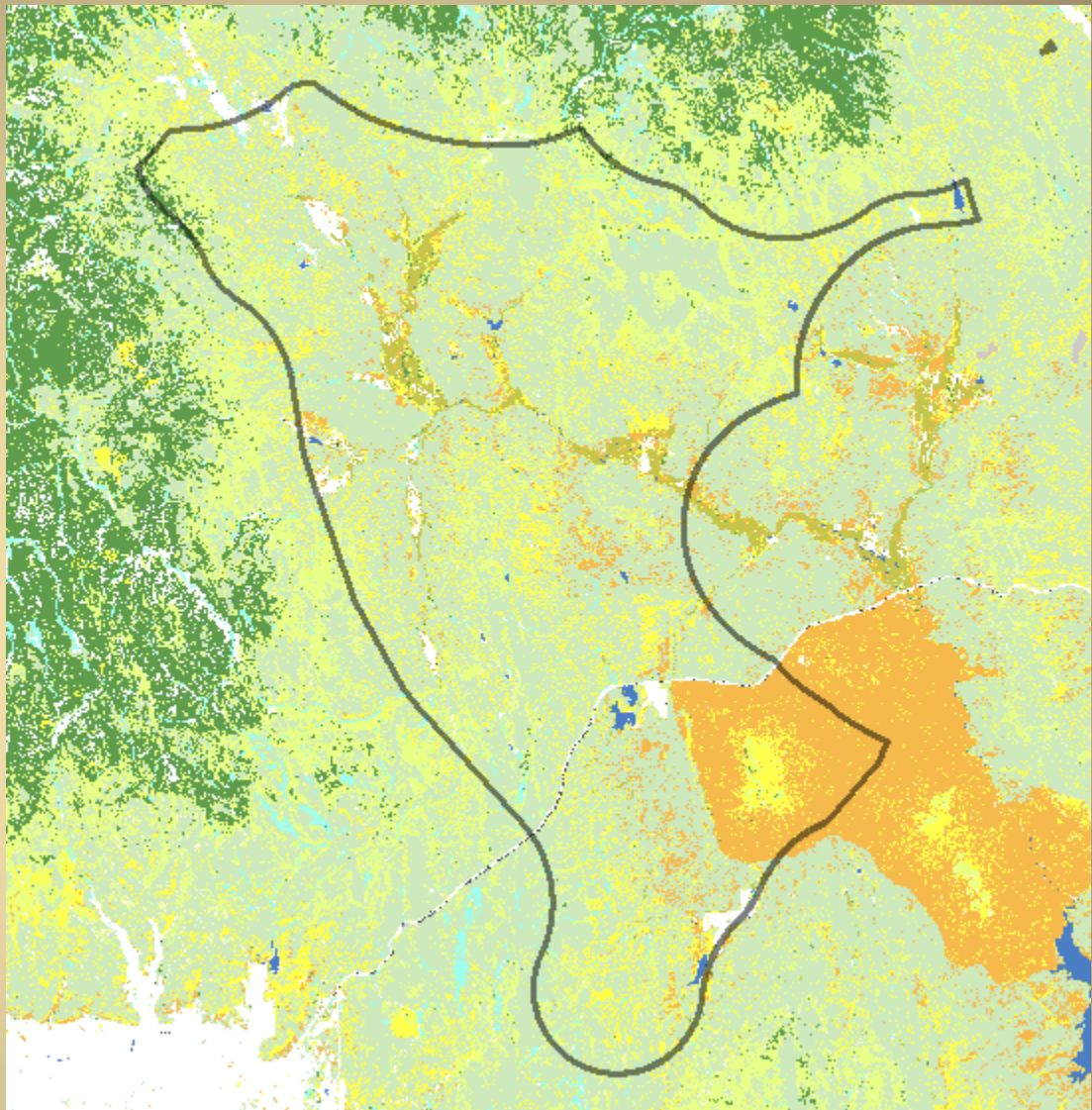
Possible Spatial Units of Analysis

Legend:
- BOUNDARY_SAGECON
- OR_LEKS_20130830

BLM Districts
- BLM Districts
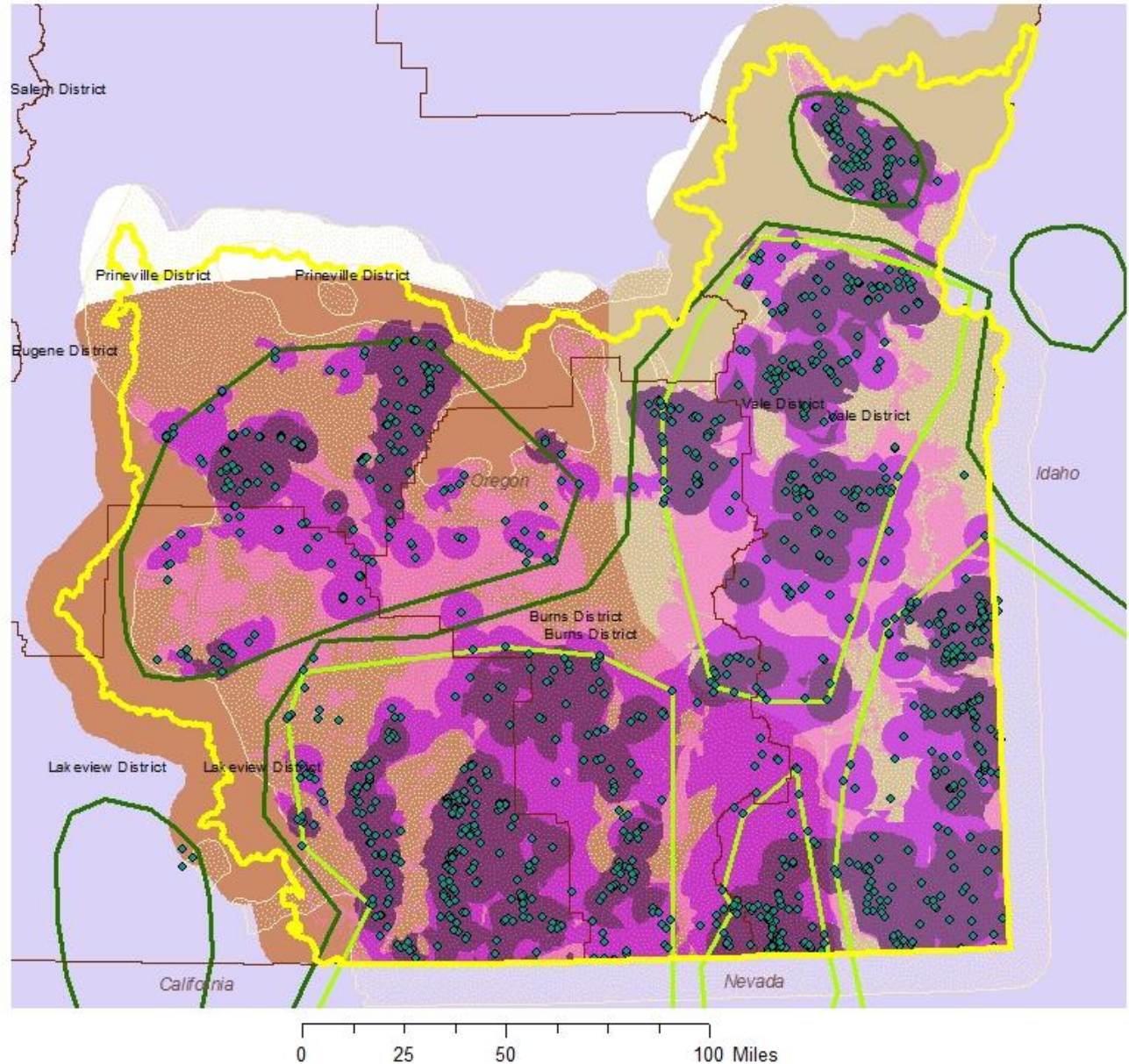- sg_subpopulations
- sg_populations
- GSG_Historic_Habitat

SG Mgmt Zones
- MZ IV
- MZ V

Methods, cont.

4. Count the cells in each class.

5. Calculate class percentages based on size assessment unit sizes (e.g., BLM district or lek buffer) and class cell counts.

Selected Landscape Characteristics

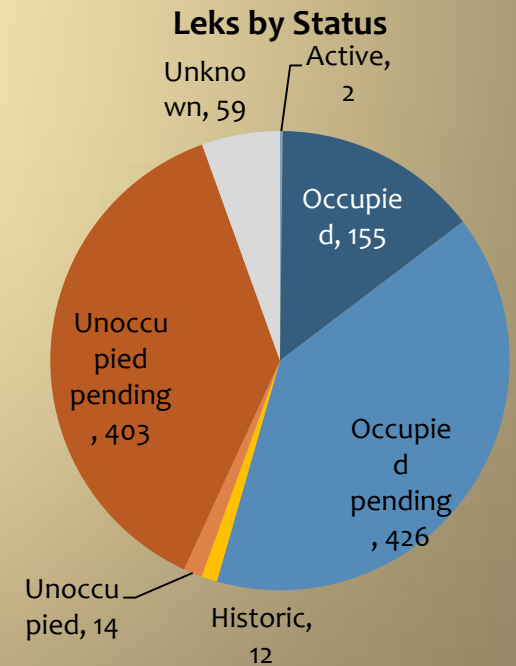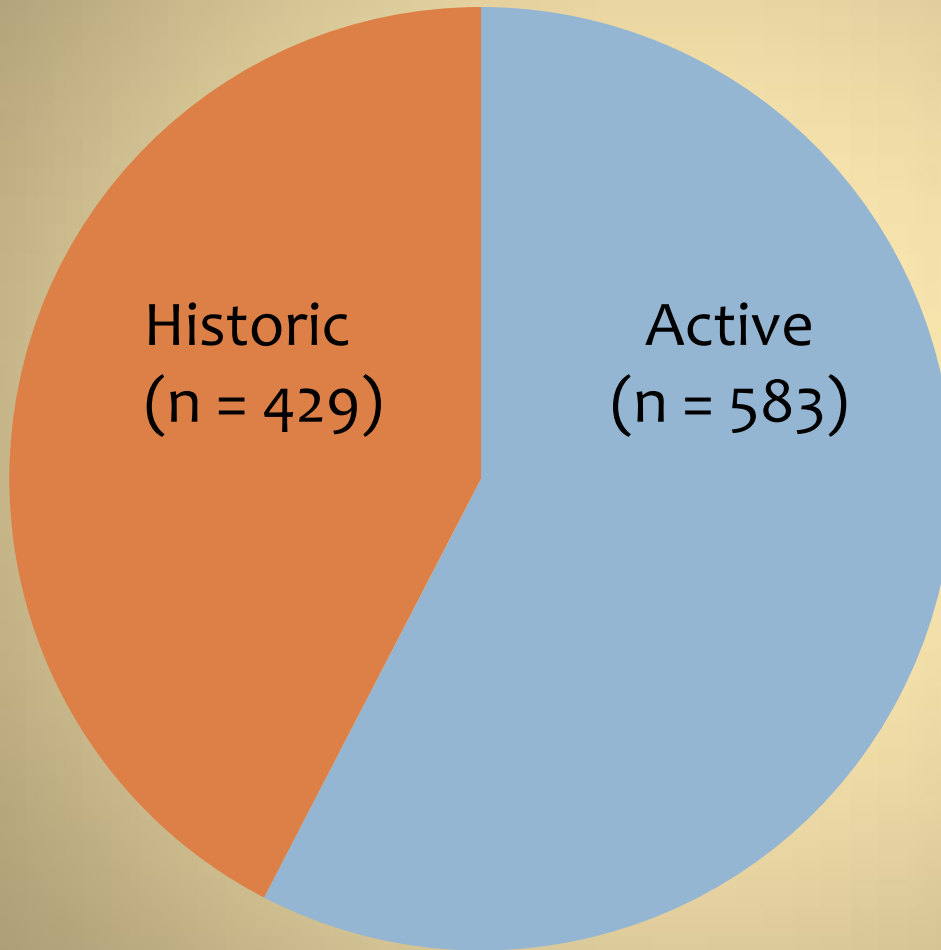|	Active leks	Historic leks	Study Area
Land cover (%)			
All sagebrush	78.84	34.87	27.7
Agriculture	2.1	26.6	8.1
Developed land	0.3	8.7	1.4
Conifer forest	0.8	3.4	12.5
Grassland	2.2	9.8	3.8
Fire			
Burned area 1980–2007 (ha)	1421	587	770
Anthropogenic			
Secondary roads (km/km2)	66.6	164.7	75.7
Interstate highways (km/km2)	0.1	3.8	0.6
Power lines (km/km2)	2.5	14.4	4.3
Comm. towers (towers/km2)	0.1	18.3	0.6

Knick et al. 2013, excerpt from Table 2

Data Sources

- ODFW: lek locations

- LANDFIRE: Land cover - Existing Vegetation (2010, released in 2013)

- GEOMAC: Fire perimeters (same source as BER)

- BLM: District boundaries
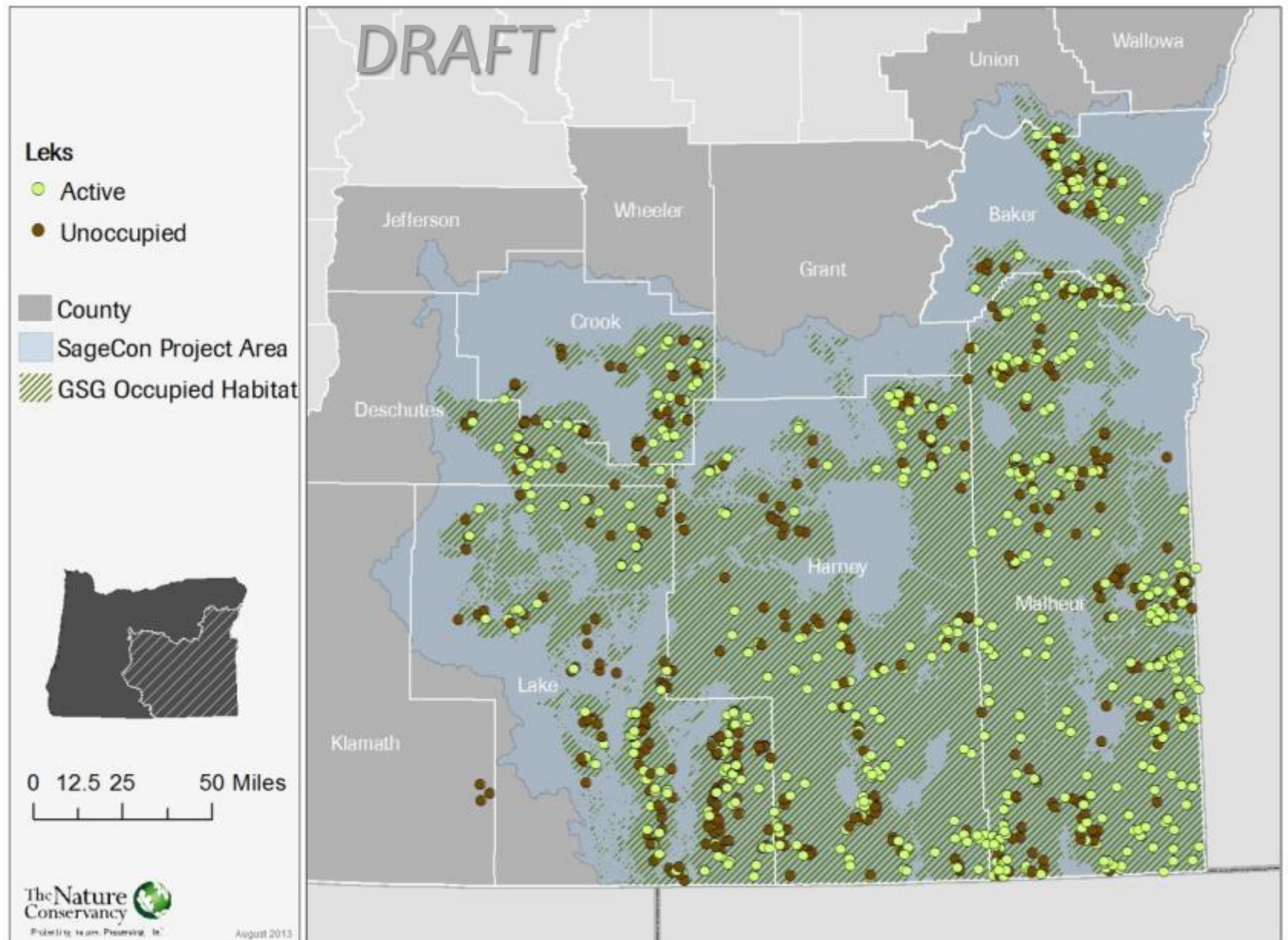
- GEO: County boundaries

Lek-scale Analysis

Historic
(n = 429)

Active
(n = 583)

Leks by Status

Unknown, 59

Active, 2

Occupied, 155

Occupied pending, 426

Unoccupied pending, 403

Unoccupied, 14

Historic, 12

32

Distribution of "Active" and Unoccupied Leks in OR

Maps and Core Habitat Analyses

KEY RESULTS

What assessment units & scales to use?

- Considerations

  - Reporting and monitoring over time

  - Linkages to management units and operation scales

- Action taken:

  - Developed preliminary analyses

  - Developed criteria for selection

Criteria for assessment units

- Biologically relevant

- Scalable to other relevant management units or spatial boundaries (relevant to management and policy)

- Supported by the data used to monitor and report

- Boundaries are stable

  – Transparent and repeatable unit for summarizing landscape conditions

- (Replicable – could the boundaries be constructed by someone else with good agreement?)

Example logic table for evaluating criteria

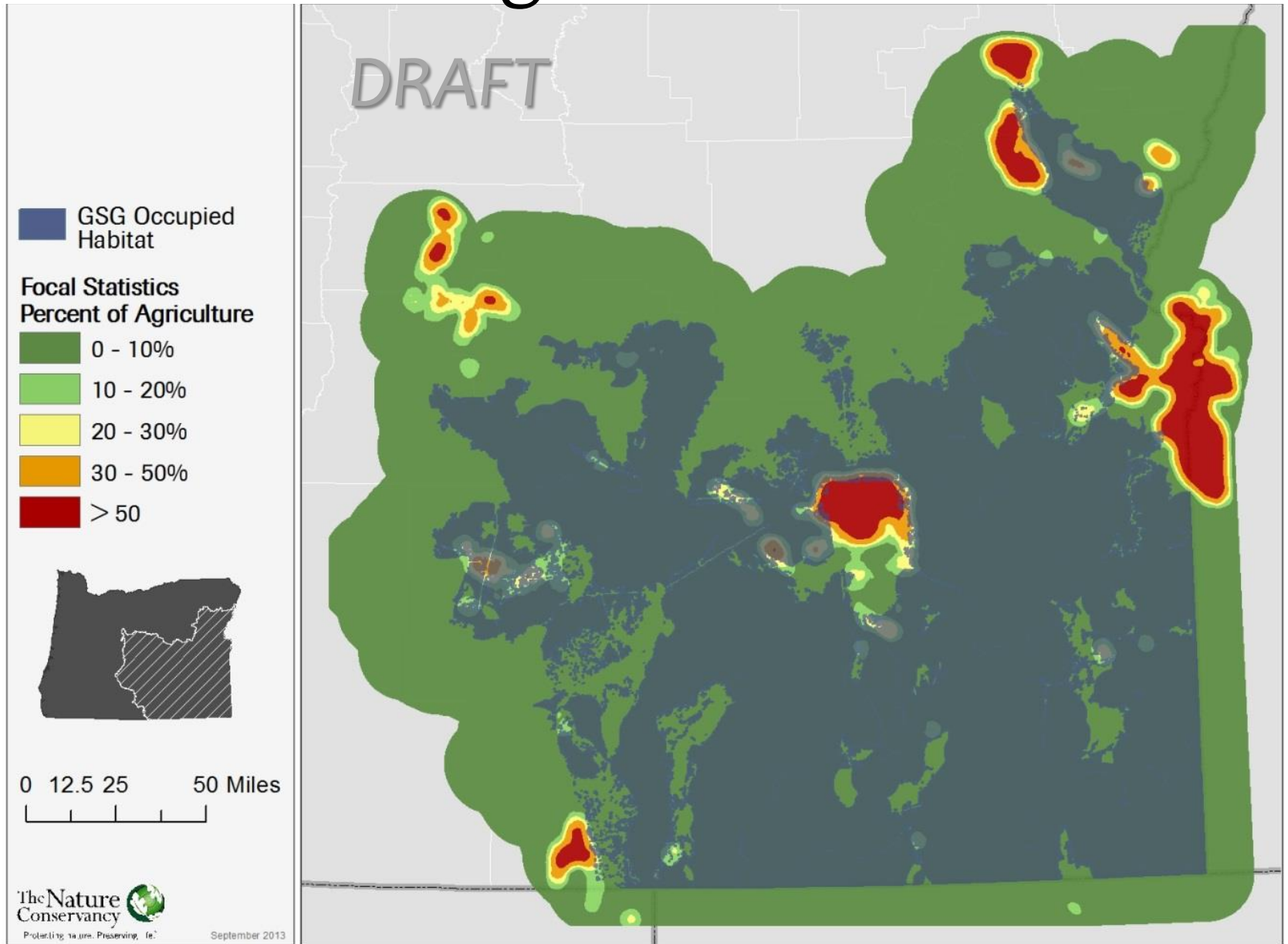|	Biologically relevant	Scalable "Nestable"	Repeatability Transparency	Supported by data	Boundaries are stable	Notes
Key habitat polygons	+	+	+	+	- Infrequently	Which agency's layer to use?
Counties	-	+/- Not scalable down	+ Accessible data		+	
SG Populations	?	+ Across the range	-	Pop. Boundaries don't match up w/ key habitat layers	?	Do not encompass all occupied habitat
Section-Township-Range	-	+	+	+/- GIS data: limited downward Field data: limited upward	+	
HUCs	-	+	+	+	+/- currently being updated, but will only affect sites	
Districts	-	+/- limited downward to RA/FO WMA	+	GIS data: limited downward Field data: limited upward	+	

Proposed assessment units & scales
Monitoring and reporting focus

- Key habitat polygons
  - Biologically relevant
  - Scalable to rangewide evaluations and efforts
  - Supportable using GIS data sets
  - Boundaries are stable over time
  - Replicable?
  - Useful for policy?

- BLM districts
  - Not biologically relevant
  - Scalable to other BLM units
  - Supportable using GIS data sets
  - Boundaries are stable over time
  - Replicable?
  - Useful for policy?

- Probably one other unit to be defined by the policy framework

Distribution Maps

Agriculture

GSG Occupied Habitat

Focal Statistics
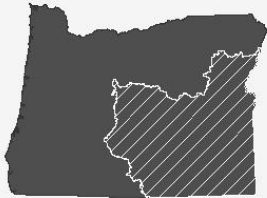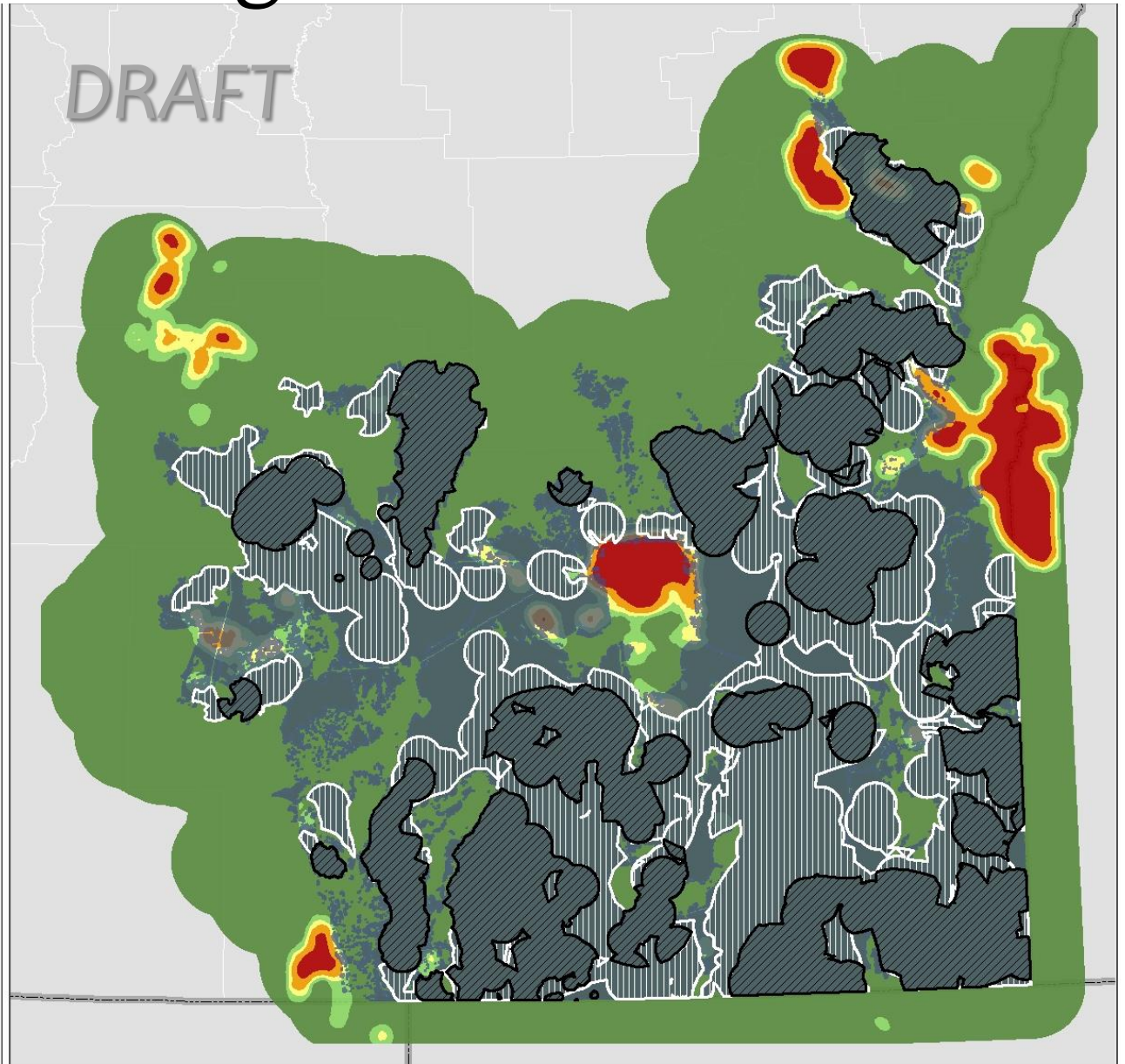**Percent of Agriculture**
- 0 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 50%
- > 50

0 12.5 25   50 Miles

The Nature Conservancy
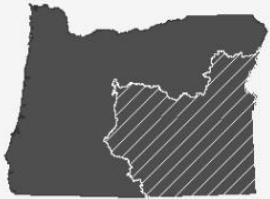Protecting nature. Preserving life.

September 2013

Agriculture

Agriculture

DRAFT

GSG Populations

Greater Sage-grouse
Core Areas
Percent of Agriculture
- 0%
- 0 - 0.5%
- 0.5 - 1%
- 1 - 1.5%
- 1.5% - 2%
- 2% - 2.5%
- 2.5% - 3%
- >3%

0 12.5 25   50 Miles

The Nature Conservancy
Protecting nature. Preserving life.

August 2013

Baker

Central

Great Basin

IDAHO

OREGON

42
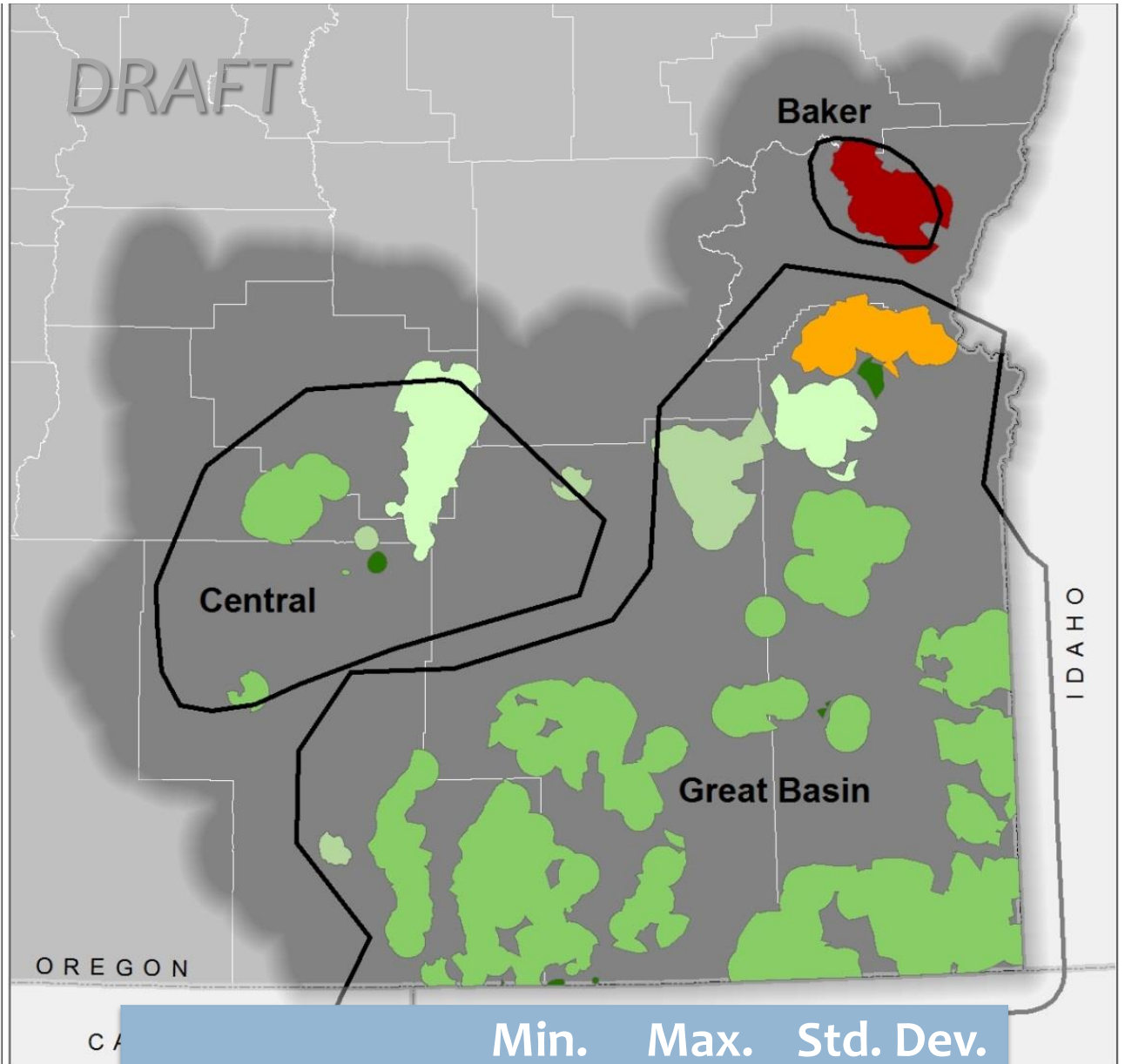
	Min.	Max.	Std. Dev.
% Agriculture	0	4.8	0.91

Agriculture

Development
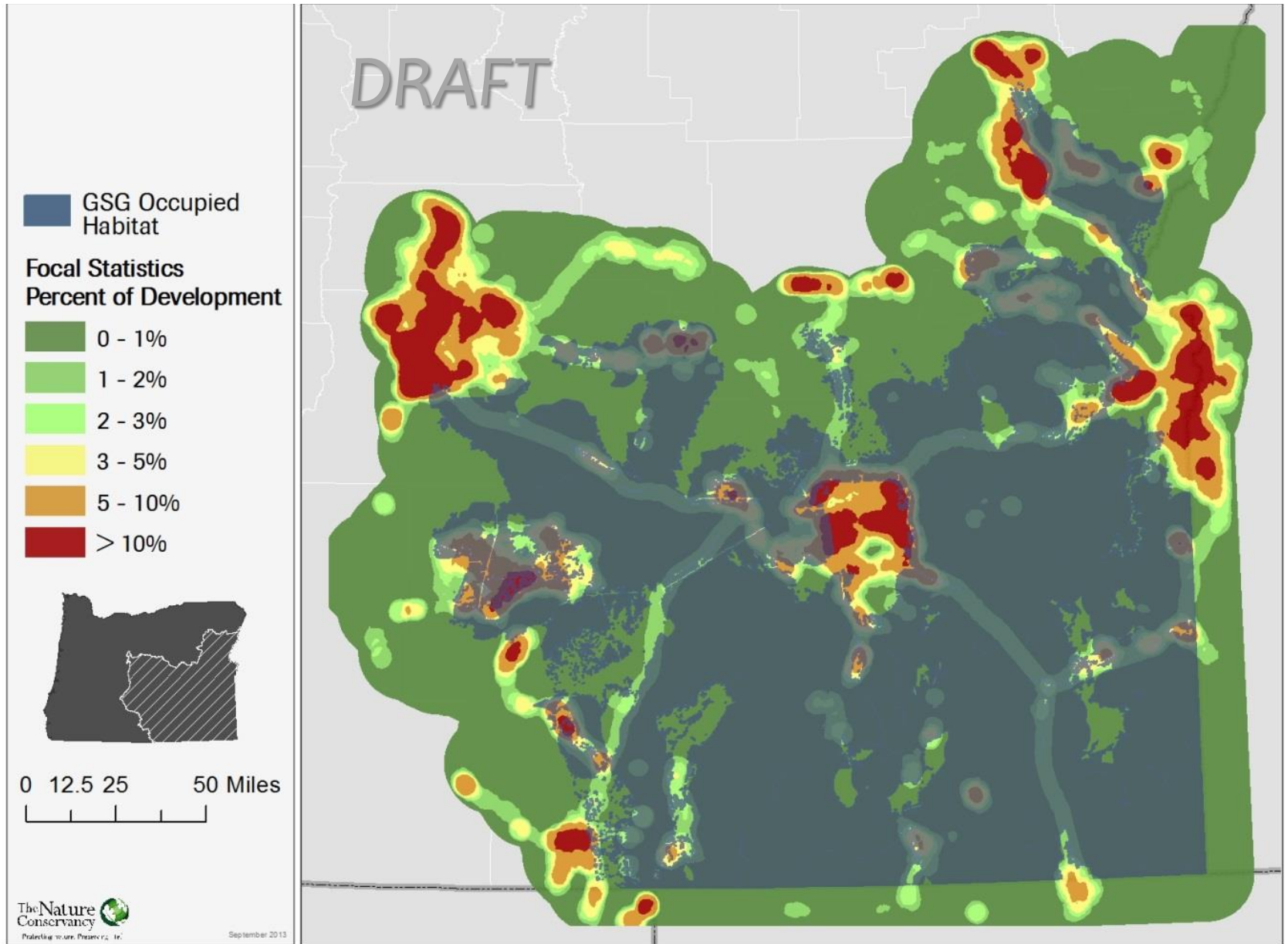
GSG Occupied Habitat

Focal Statistics Percent of Development
- 0 - 1%
- 1 - 2%
- 2 - 3%
- 3 - 5%
- 5 - 10%
- > 10%

0 12.5 25 50 Miles

The Nature Conservancy
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September 2013
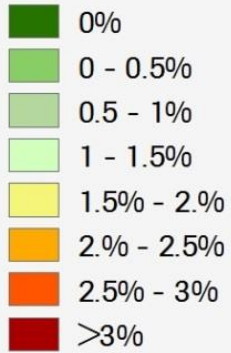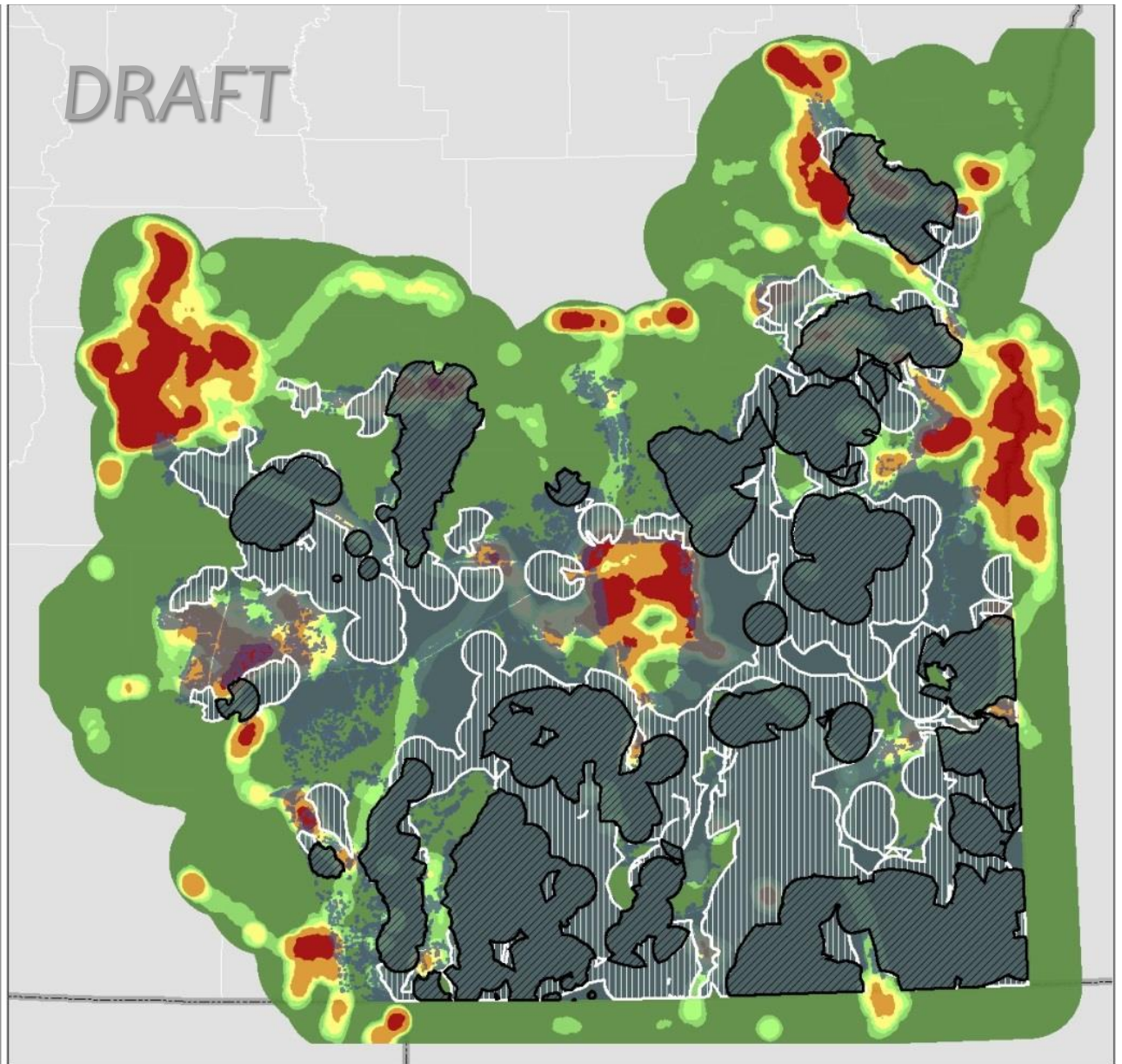
DRAFT

Development

Development

DRAFT

⬭ GSG Populations

Greater Sage-grouse Core Areas Percent of Development
- 🟩 0%
- 🟢 0 - 0.5%
- 🟨 0.5 - 1%
- 🟧 1 - 1.5%
- 🟥 > 1.5%

0   12.5 25   50 Miles

The Nature Conservancy
Protecting nature. Preserving life.
August 2013

Baker

Central

Great Basin

OREGON

IDAHO
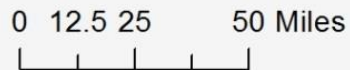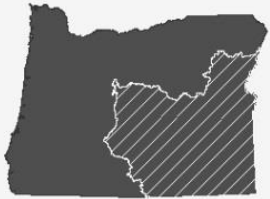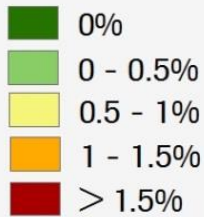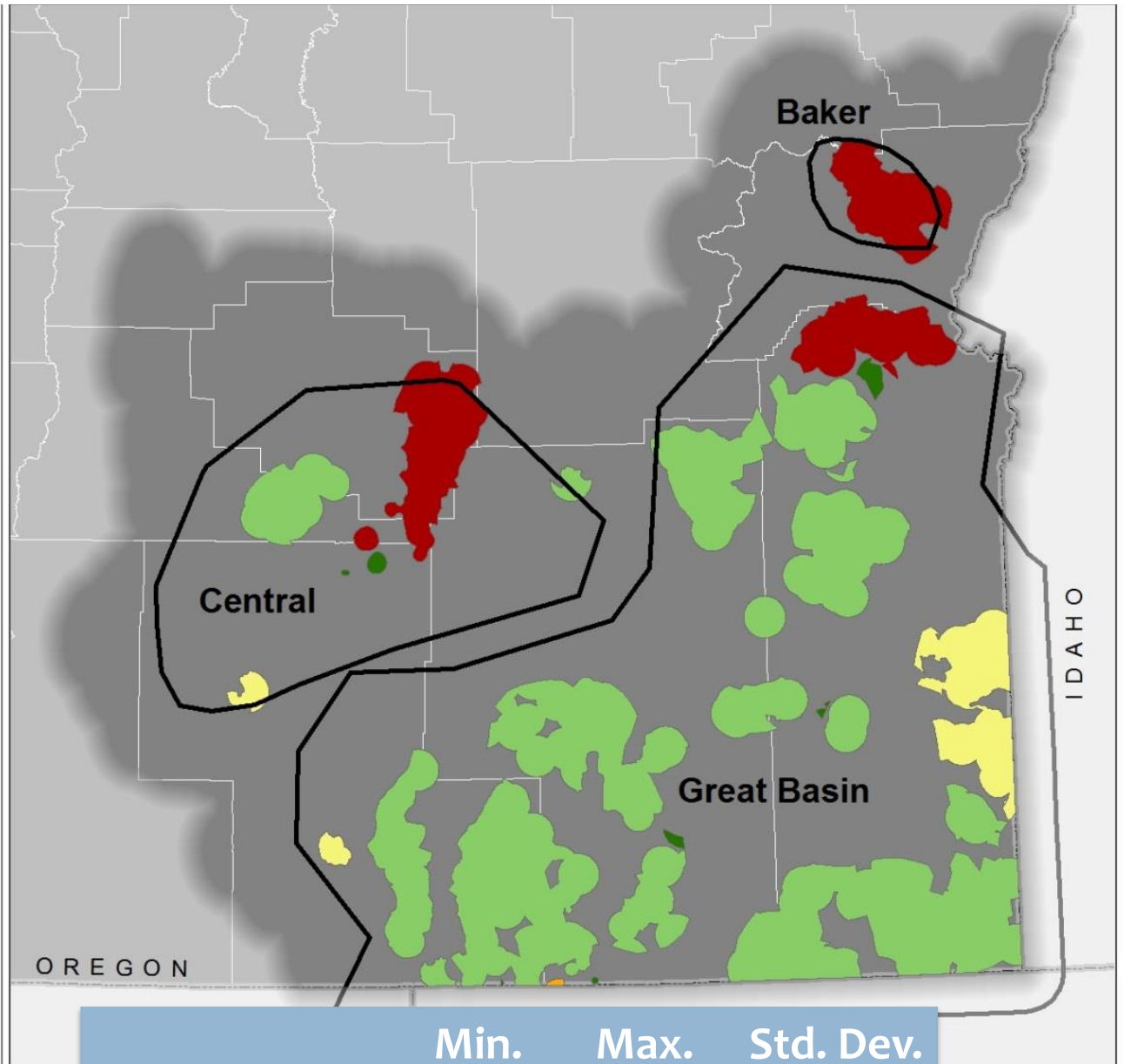
	Min.	Max.	Std. Dev.
% Development	0	1.9	0.58

46

Development

Sagebrush habitat types

	Min.	Max.	Std. Dev.
% Sagebrush	33.4	100	17.5
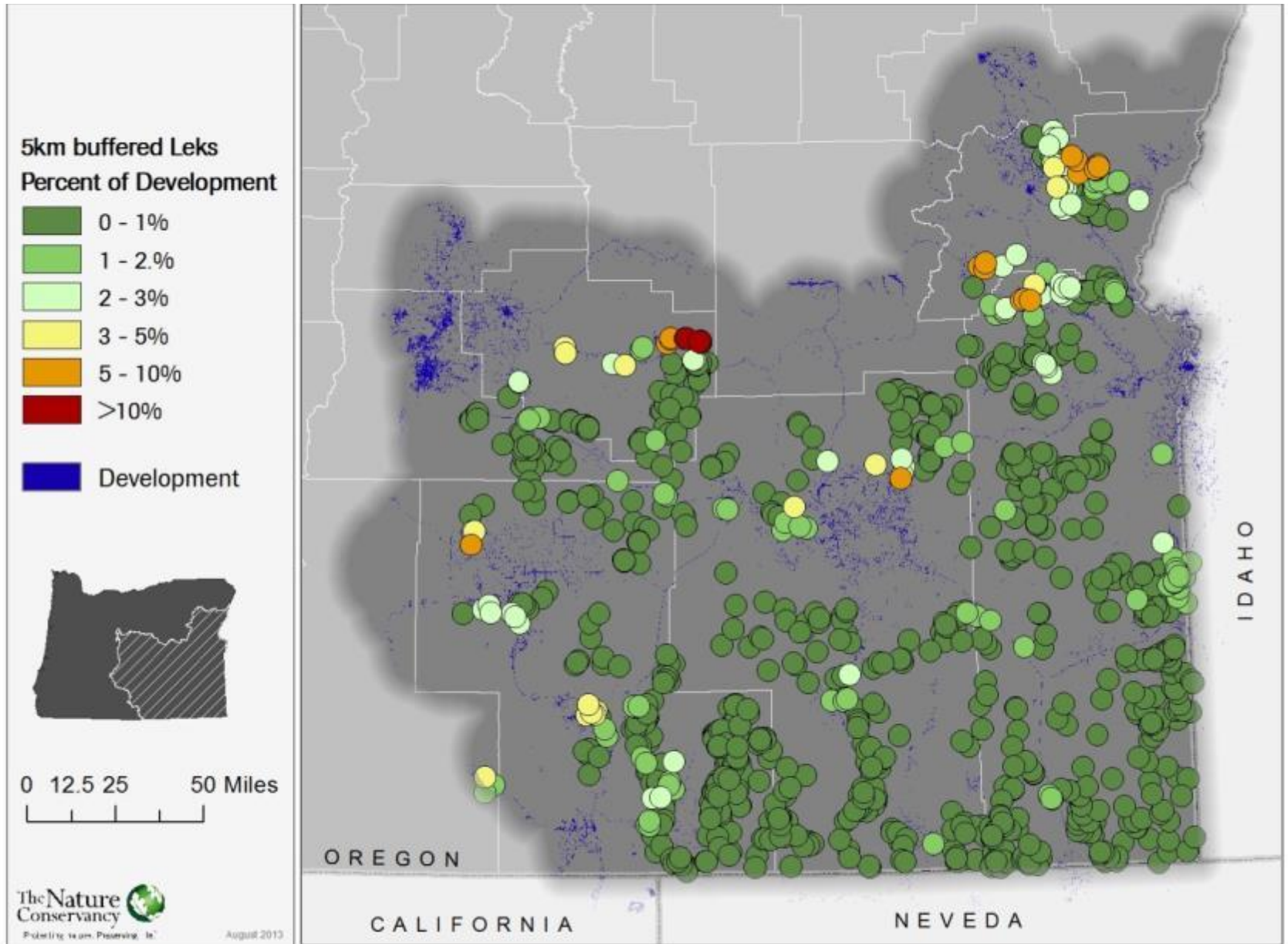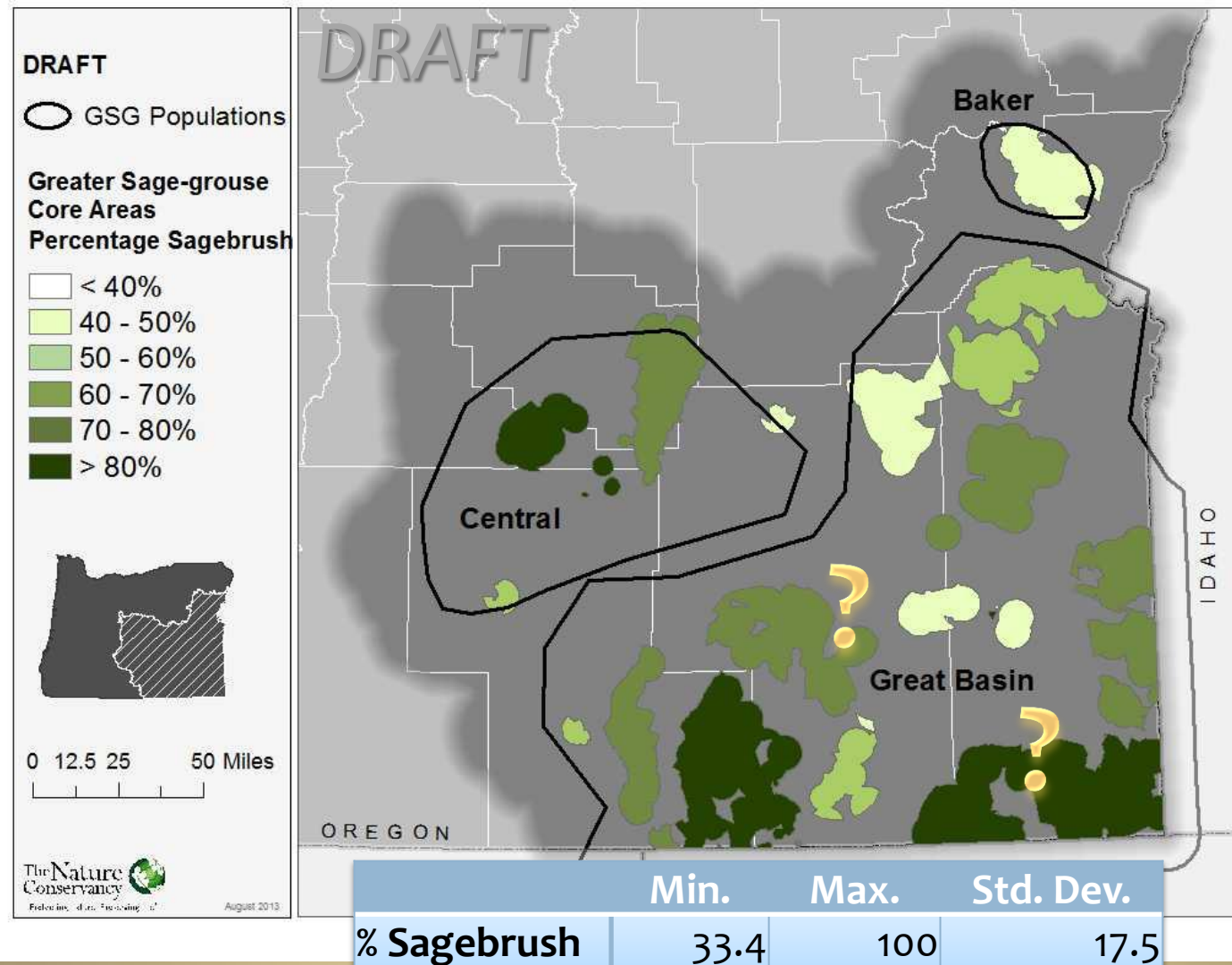
- Understory not included
- Different data paints different picture

- compared to ILAP data these numbers are higher

Review of Fire History

ODFW Sage Grouse Core Areas (April 2011)
- Core Area
- Low Density
- Burn Perimeters 1984-1989
- Burn Perimeters 1990-1999
- Burn Perimeters 2000-2010
- Burn Perimeters 2011-2012
- High Burn Probability

DRAFT
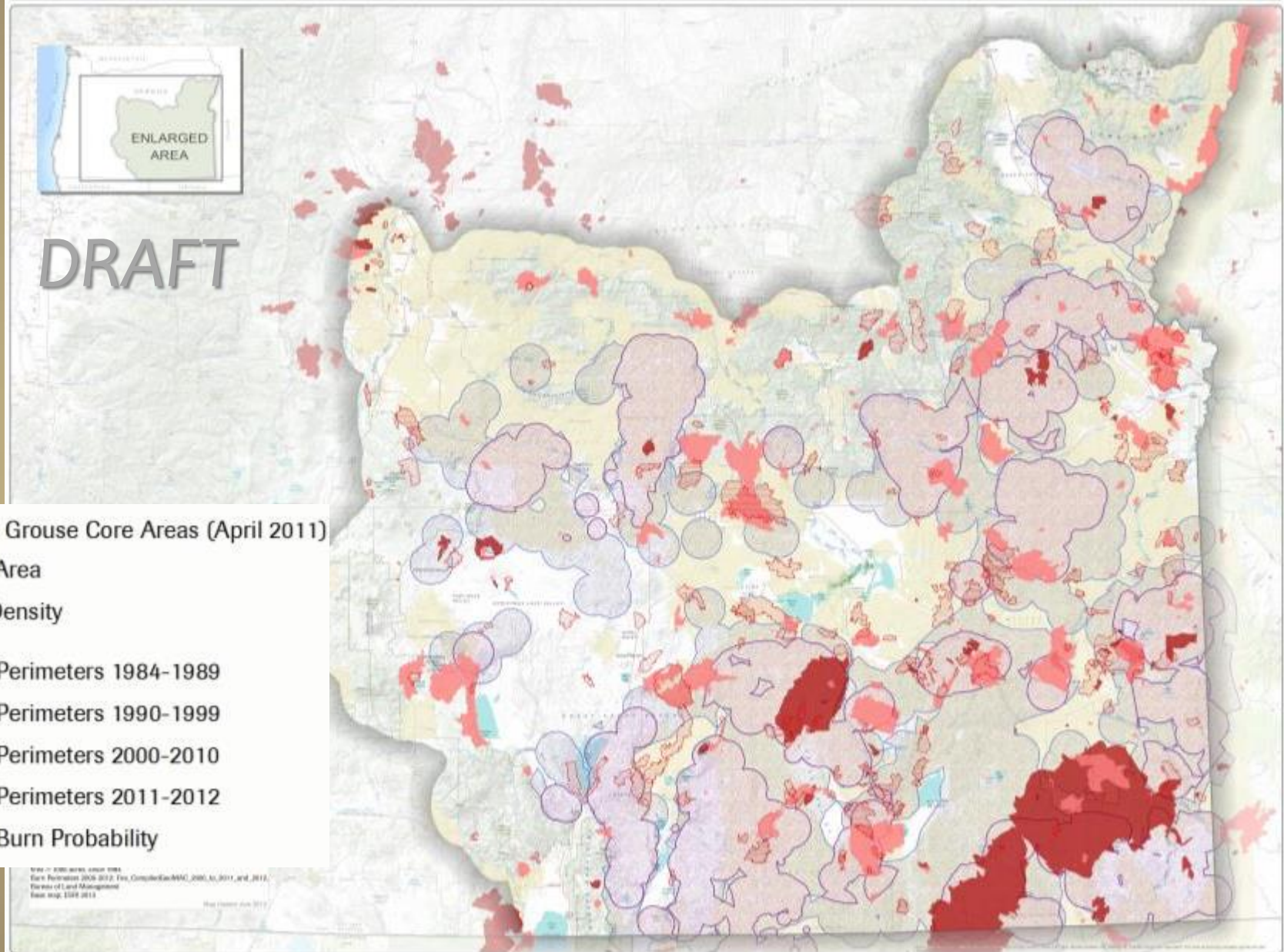
More Next Steps

- Increase the list of landscape attributes analyzed

- Improve lek classification

- Prioritize and select assessment units

- Continue to work with work groups and partners to ensure needs are met

Timeline

Tasks	Resources	Time frame
Initiate SageCon Partnership	GNRO, NRCS, BLM	7/1/2012
Organize work structure and secure funding	All partners	7/2012 – 8/2013
Current status & trends of sage-grouse populations since 2010	ODFW	5/2013 – 11/2013
Baseline analyses of habitat conditions	INR, TNC, NRCS, ODFW, DoW, BLM, USFWS	7/2013 – 11/2013
Trend analyses of threats to sage-grouse [1]	DLCD, ODOT, ODOE, ODFW, INR, PSU, DoGAMI, SE Oregon Counties, OPRD, AOC, TNC	1/2013 – 2/2014
Inventory of ongoing and past conservation measures [2]	ODFW, INR, TNC	8/2013 – 11/2013
Projections of conservation measures and future benefits	ODFW, TNC	11/2013 – 2/2014
Conservation strategy document development	GRNO, TNC, INR	11/2013 – 2/2014
Action plan development [3]	ODFW, GNRO	8/2013 – 2/2014
Mitigation plan development	GRNO, TNC, DoW	9/2013 – 2/2014
Final Plan	tbd	2/2014 – 6/2014

Summary

- Analysis is a work in progress – starting to create a sound frame of reference for planning

- Baseline conditions – look pretty good across most of the range for several key habitat characteristics - caveat - 2012 fires

- Species is highly sensitive to disturbance – development, fire and human uses

Take Away Messages

- Different assessment units lead to different alternatives, so careful selection is key.

- Key landscape attributes vary among core habitat areas across the OR sage-grouse range. This information may be useful for identify where flexibility in policy is possible.

- Due to sage-grouse's fidelity to sites, birds may continue to return to leks many years after habitat disturbances occur – giving a false impression of their ability to withstand disturbance.

- Additional analyses will refine the illustrations presented here by quantifying conditions.

References

Copeland, H. E., A. Pocewicz, D. E. Naugle, T. Griffiths, D. Keinath, J. Evans, and J. Platt. 2013. Measuring the Effectiveness of Conservation: A Novel Framework to Quantify the Benefits of Sage-Grouse Conservation Policy and Easements in Wyoming. PLoS ONE 8: e67261.

Halofsky, J. E., M. K. Creutzburg, and M. A. Hemstrom. *in press*. Integrating Social, Economic, and Ecological Values across Large Landscapes. PNW-GTR-xxx. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.

Knick, S. T., S. E. Hanser, and K. L. Preston. 2013. Modeling ecological minimum requirements for distribution of greater sage-grouse leks: implications for population connectivity across their western range, U.S.A. Ecology and Evolution:n/a-n/a.

Taylor, P.D., L. Fahrig, K. Henein, and G. Merriam. 1993. Connectivity is a vital element of landscape structure. Oikos. 68:571-573.
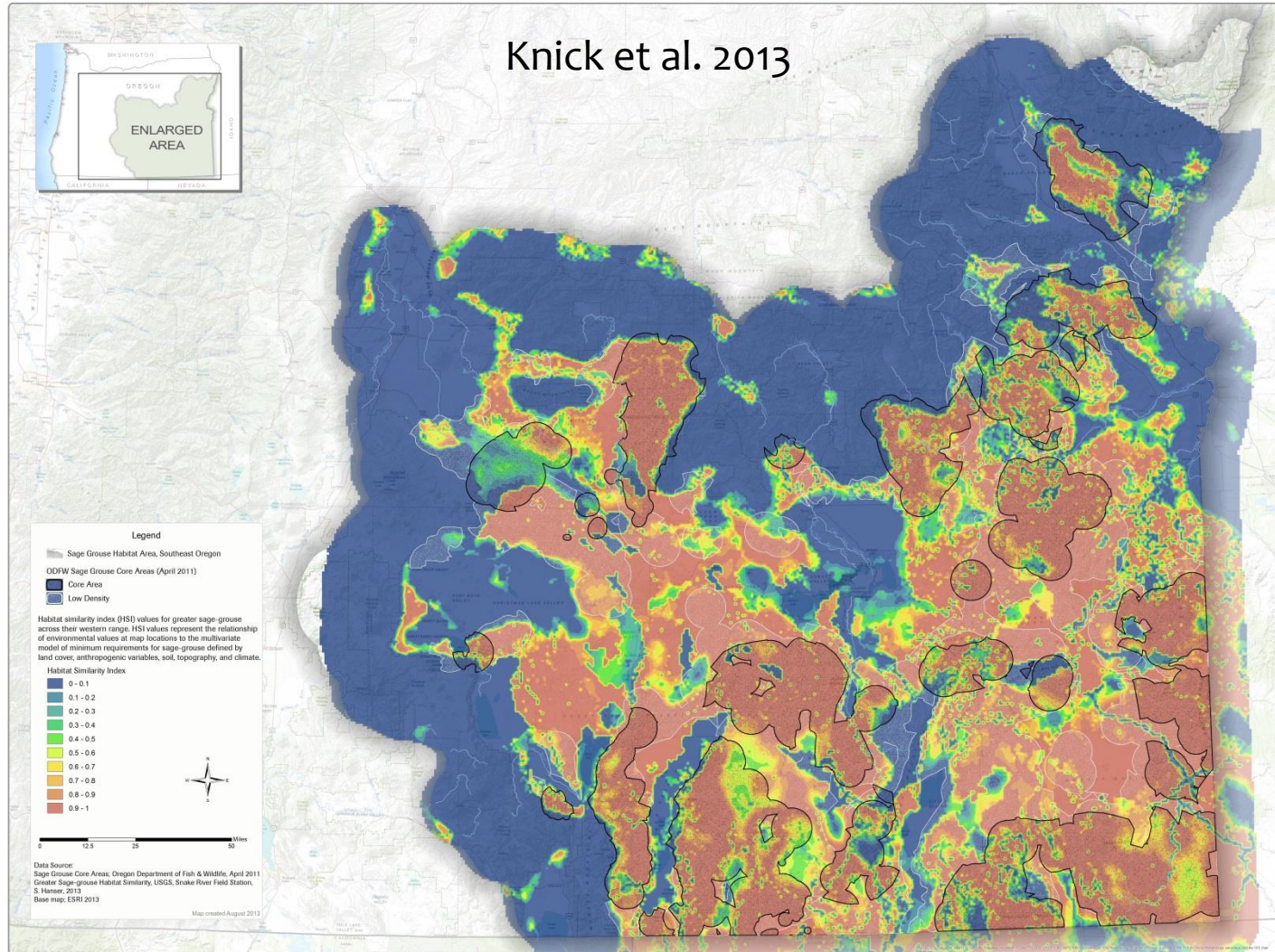
end

Baseline Habitat Similarity

HABITAT SIMILARITY INDEX FOR GREATER SAGE GROUSE IN SOUTHEAST OREGON

Knick et al. 2013

Habitat Similarity

- Multiple variable model of habitat based on habitat characteristics and lek locations

- Uses

    – Indicate deviation from high quality conditions

    – Could be used to spatially refine polygon habitat designations like low density areas
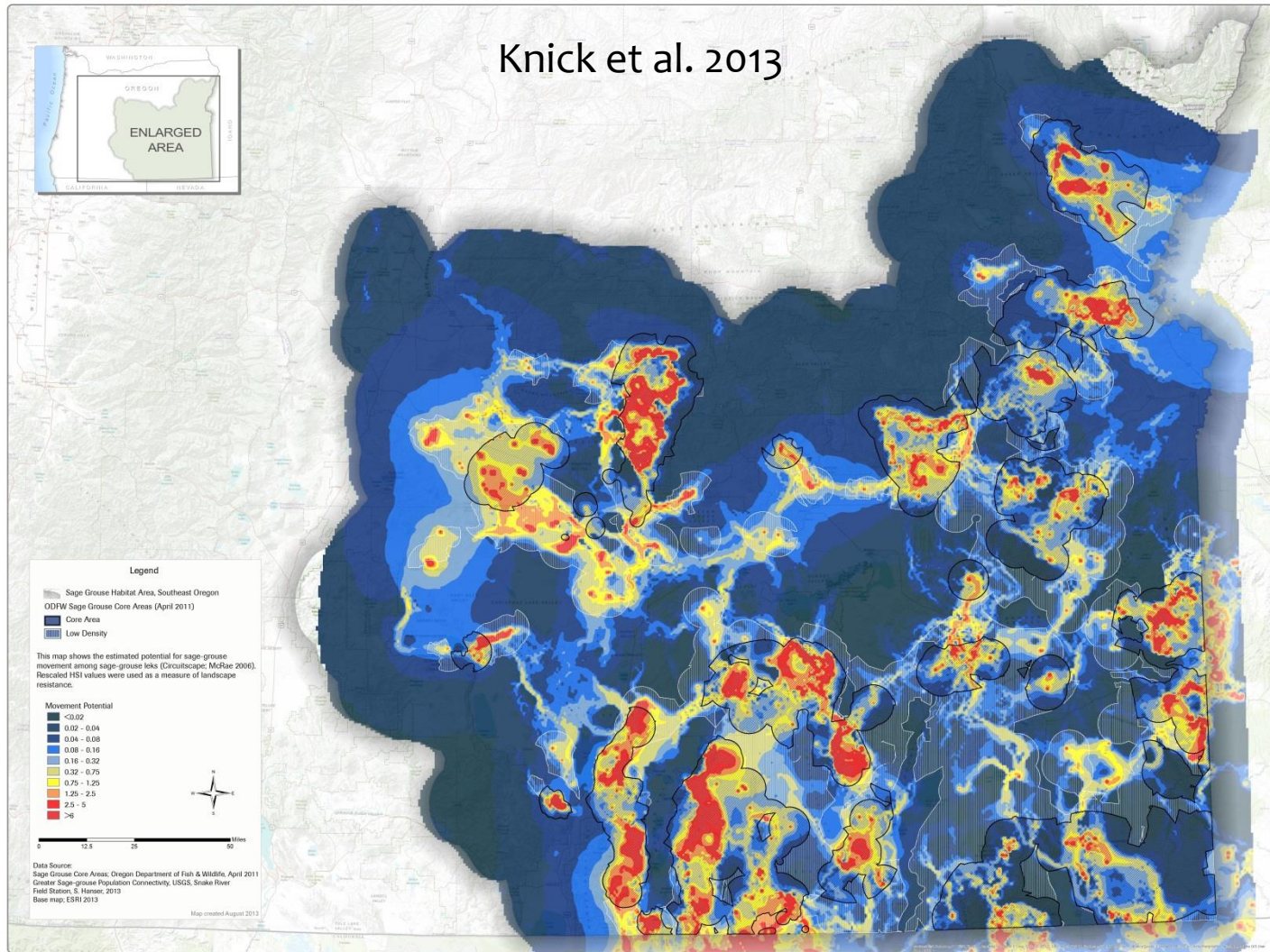
    – Track change over time

Baseline Landscape Connectivity

MOVEMENT POTENTIAL FOR GREATER SAGE GROUSE IN SOUTHEAST OREGON
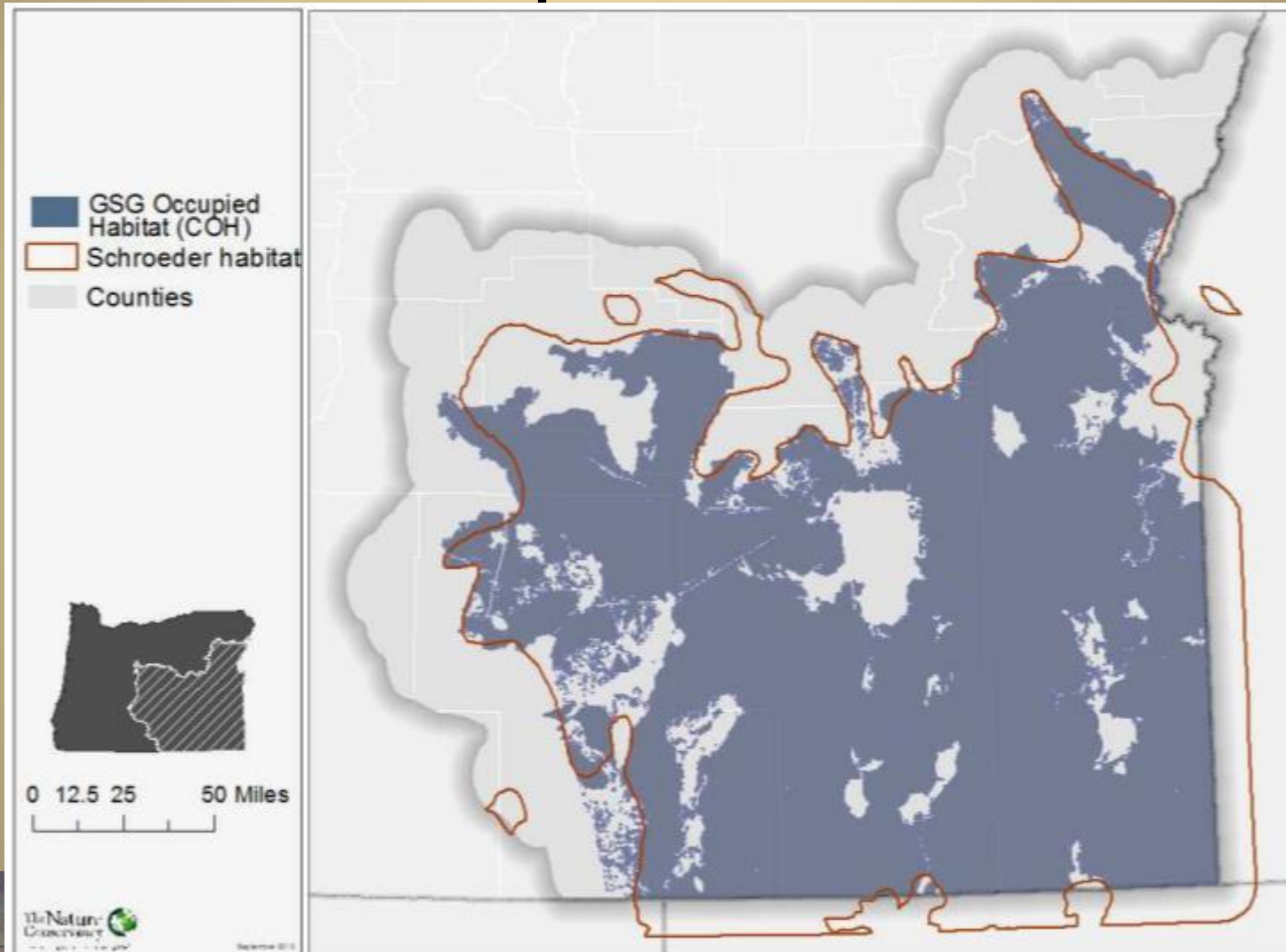
Knick et al. 2013

Landscape Connectivity

- Describes how well the landscape (habitat and non-habitat) helps or hinders movement by wildlife (Taylor et al. 1993)

- Uses

  – Prioritize areas for elevated protection and exclusion

  – Track change over time

Illustration of the occupied habitat options

PLANNED AND POTENTIAL ANALYSES

Past Trends

- Land use trends

  – County level analyses

  – Land use/land cover change

- Population trends

  – ODFW analyses

Future Trends

- Simulation modeling of vegetation (Halofsky et al. *in press*)

  - Mid-scale analysis

  - Includes fire, invasion by annual grasses, juniper encroachment, variety of land management practices
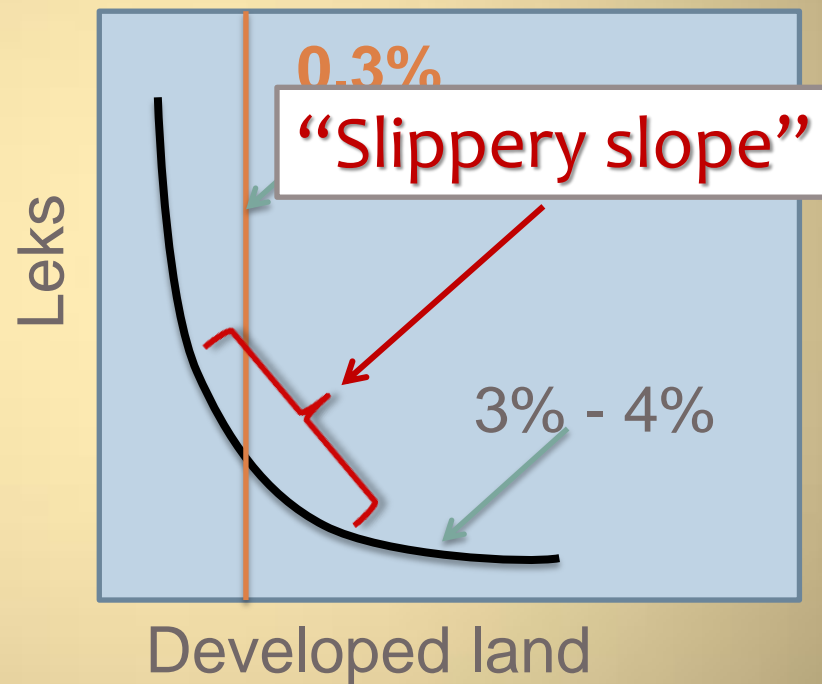
- Development modeling (Copeland et al. 2013)

FRAMING A NEW POLICY FOR OREGON

Technical Challenges to a Flexible Policy

- Sage-grouse are sensitive to disturbance at low levels

0.3%

"Slippery slope"

3% - 4%

Leks

Developed land

Technical Challenges, cont.

- Identifying best assessment unit(s) based on biology and ecology is challenging.

    – Size of assessment unit matters

    – Larger units good for regional planning efforts

    – Smaller units better for project or site level work

Management Challenges

- Success rates for recovering/improving sagebrush habitat are low.

- Sagebrush habitats take 20 - 30 years to mature

- Once a site is disturbed, it may take a *long* time for sage-grouse use to be recovered.

Policy Challenges

- The simplest solution - a single cap - is likely to lead to unacceptable impacts in relatively intact areas

- The "sweet spot" between flexibility and species protection is small.

Trial Balloon Proposal #1

- Conservative threshold or cap framework

- Tie future increases to:

  - Stable or increasing population numbers
  - Documented effectiveness of offset actions based on:
    - population response to restoration treatments
    - effectiveness of threat reduction measures

- Consider multiple thresholds by disturbance type

  - agriculture, roads, transmission lines, solar

- Consider applying a disturbance allowance to all Core Habitat or a percent of Core Habitat

Potential assessment units for policy

- Leks and their surrounding area

- Individual core habitat polygons (key habitat polygons)

- Breeding complexes (and the area associated with them)