

Gunnison Sage-Grouse Biology & Habitat Requirements in Colorado

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Avian Research Biologist

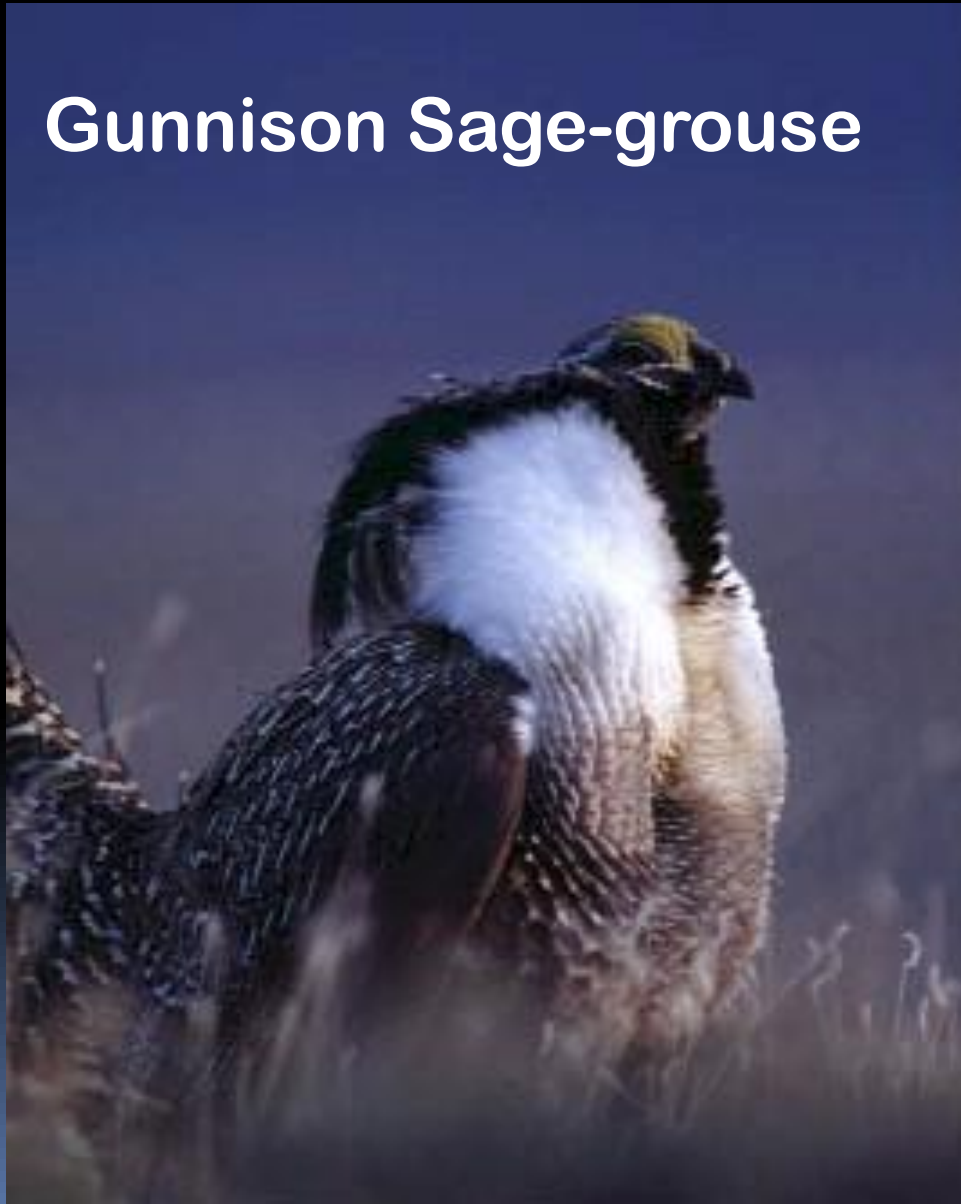


Presentation Outline

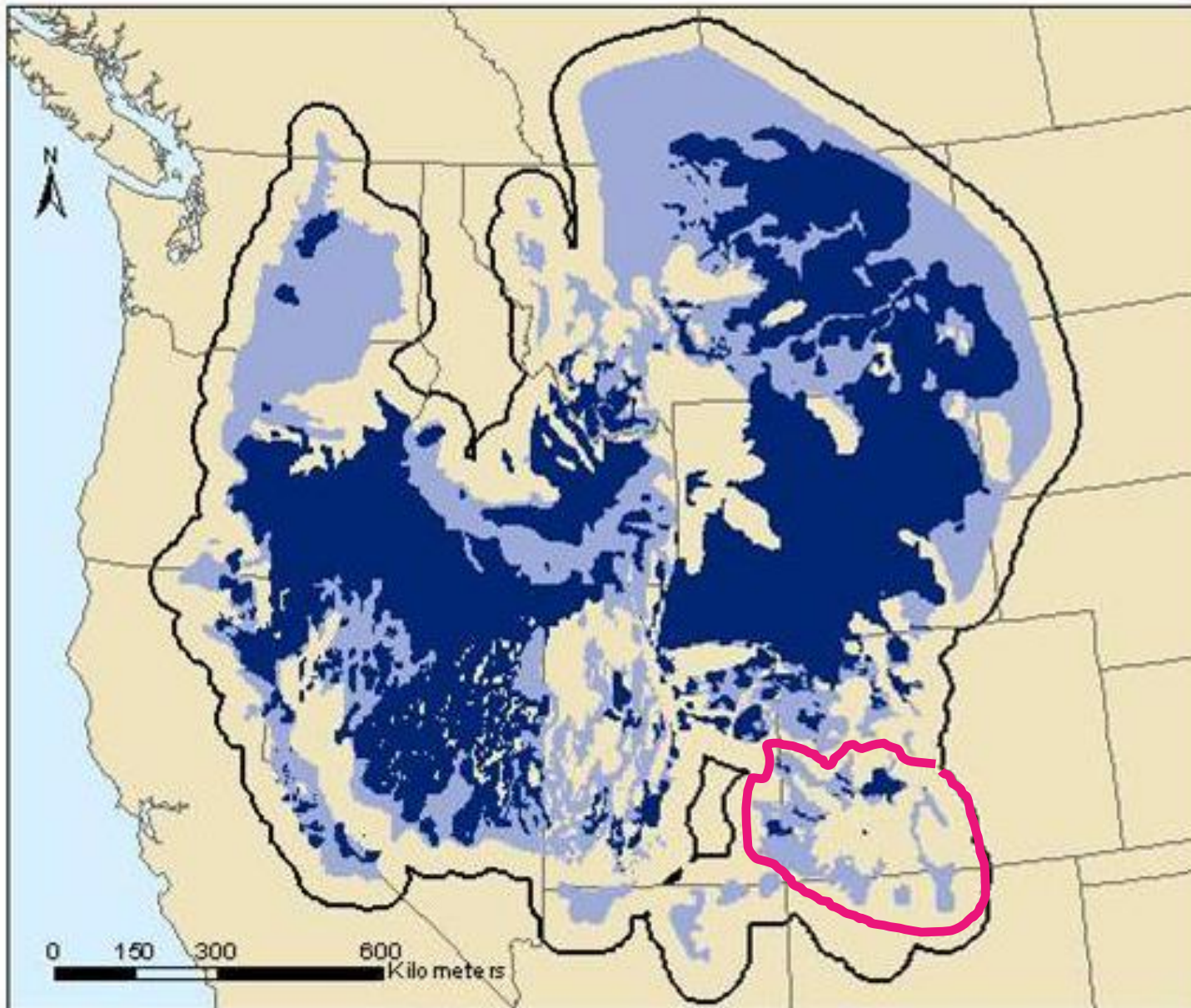
- **Sage-Grouse Biology**
 - **Distribution**
 - **Demography – vital rates**
 - **Productivity - nest success**
 - **Survival**
- **Sage-Grouse Seasonal Habitat**
 - **Scales of Selection**
 - **Fidelity**
 - **Movements**
- **Colorado Habitat Structural Guidelines**

SAGE-GROUSE

Gunnison Sage-grouse



Sage-Grouse Distribution

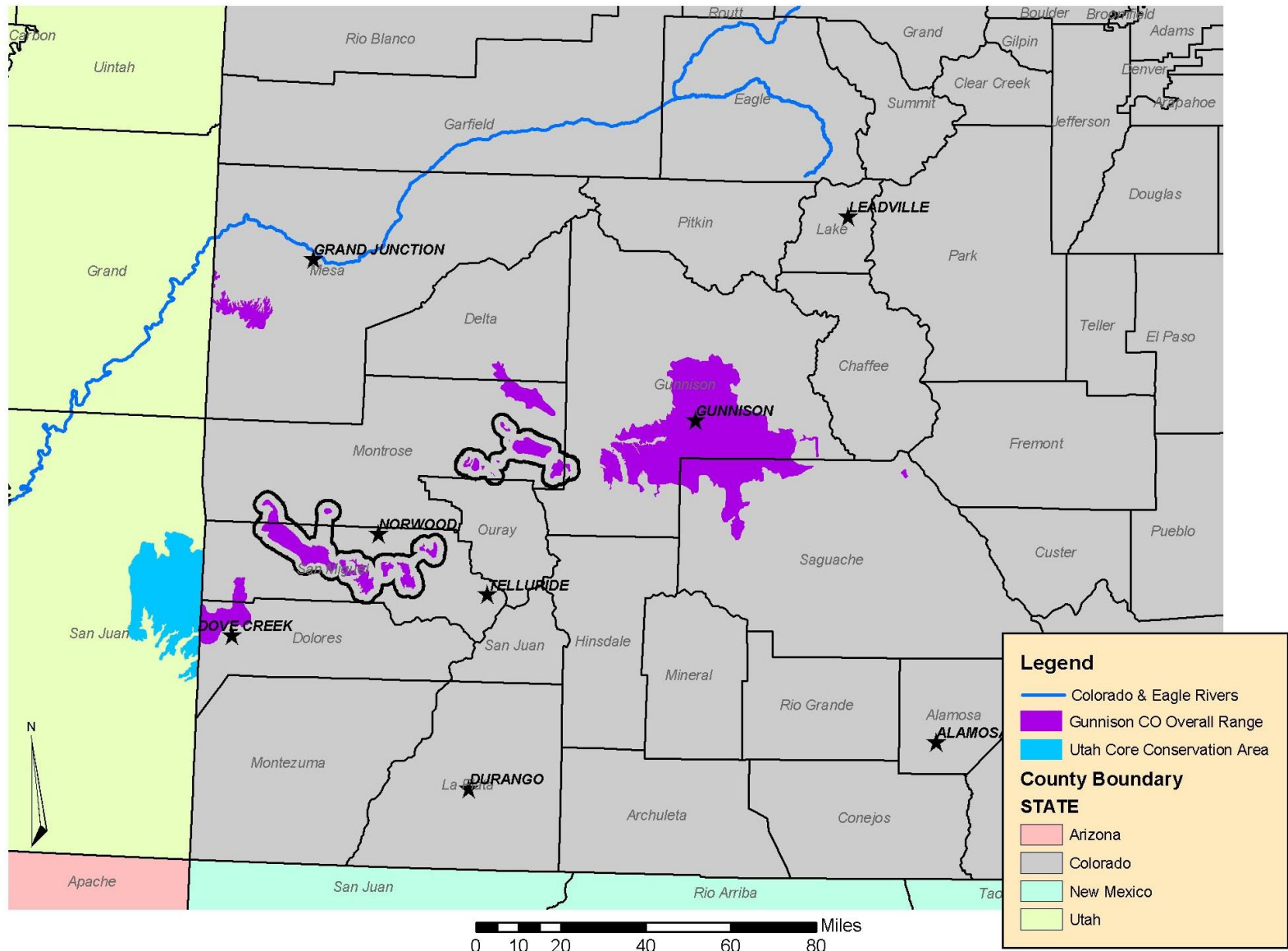


- Pre-Settlement Distribution of Potential Habitat
- Current Sage-Grouse Range
- State / Province Boundaries
- Conservation Assessment Boundary

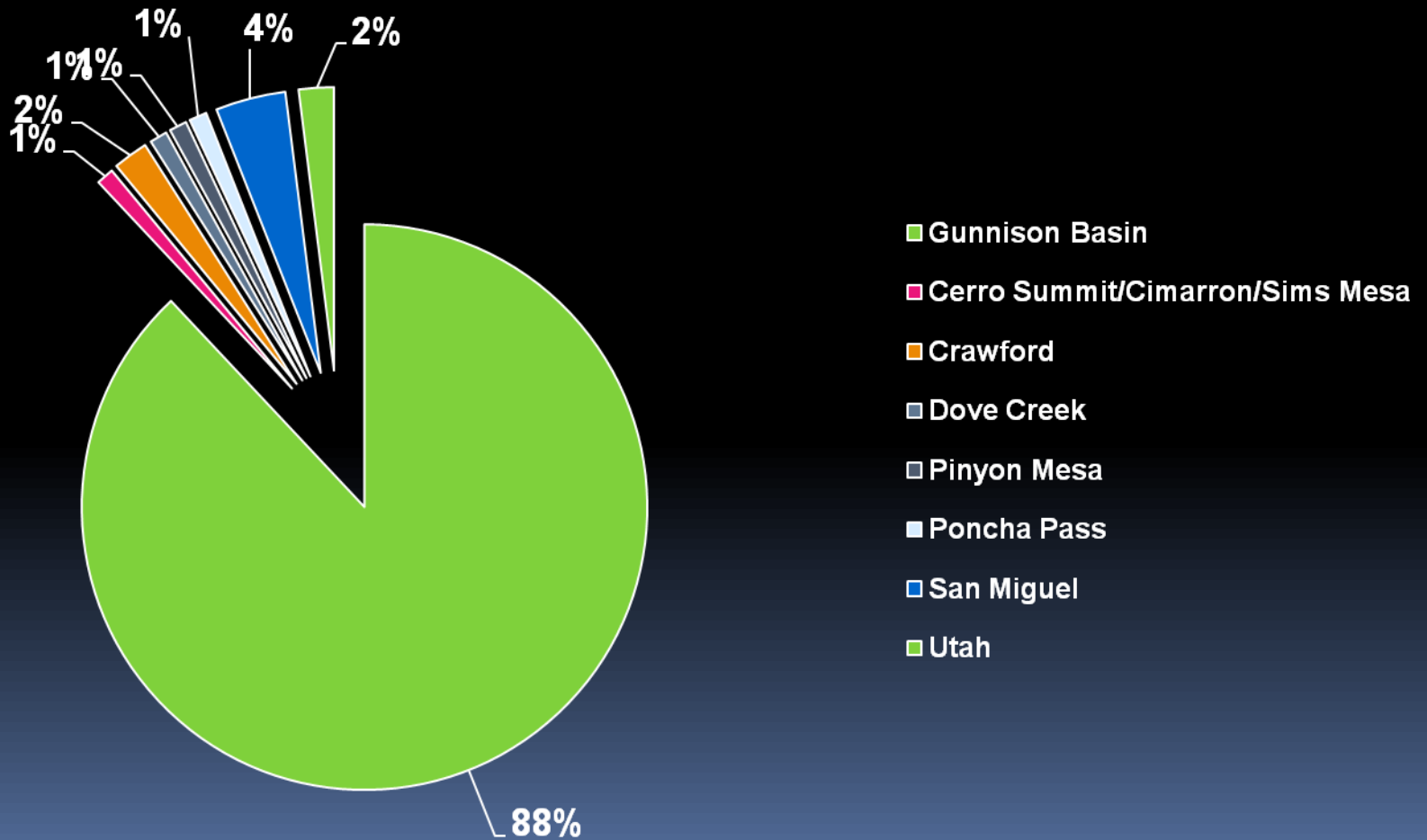


Gunnison Sage-Grouse Distribution

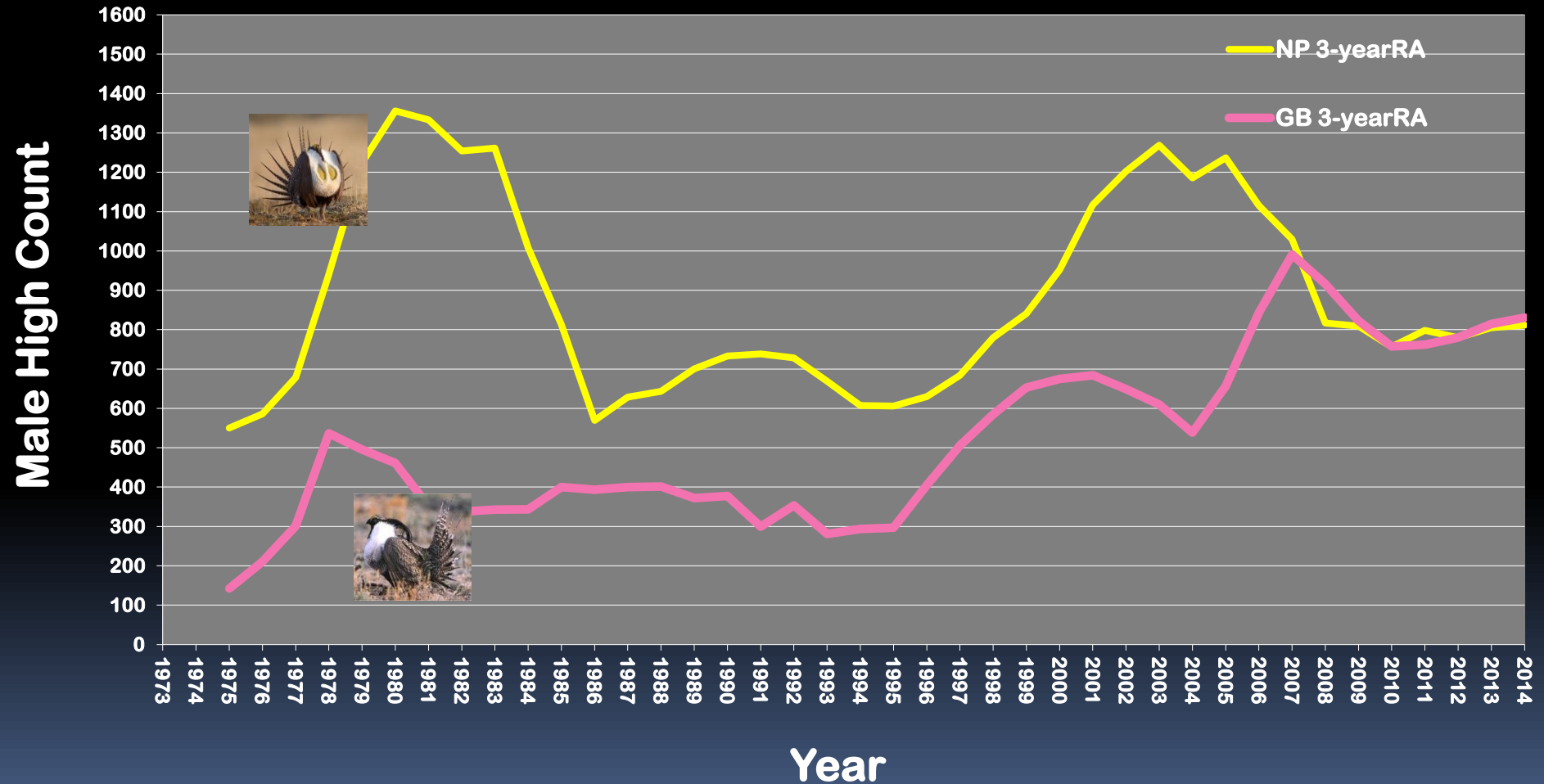
Gunnison Sage-Grouse Range



Gunnison Sage-Grouse



Greater (N Park) & Gunnison (Gunn. Basin) Sage-Grouse



Demography

Vital Rates



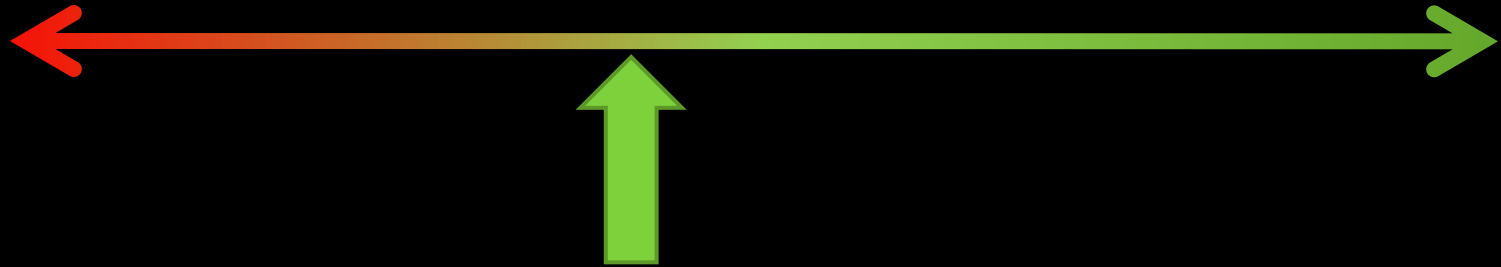
Demography

Apparent Nest Success
(Rangewide GRSG)

14%

48%

86%



4 Research Projects (12 years)
Gunnison Basin 46% (n = 85/186)
Small Populations 20% (n = 15/74)
Range (0 – 60%)



Demography

Chick Survival



Demography

Chick Survival (GRSG)

0.30

0.39

0.47

0.5

0.12

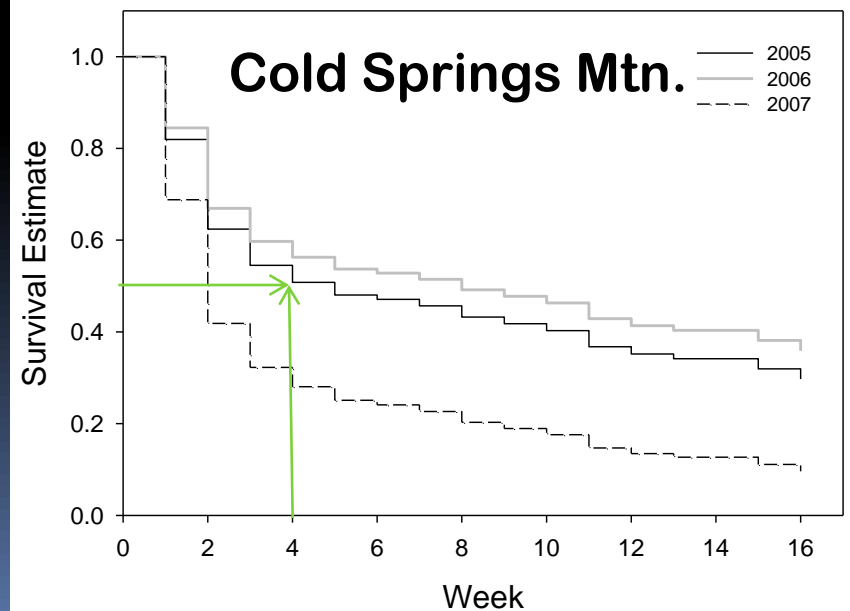
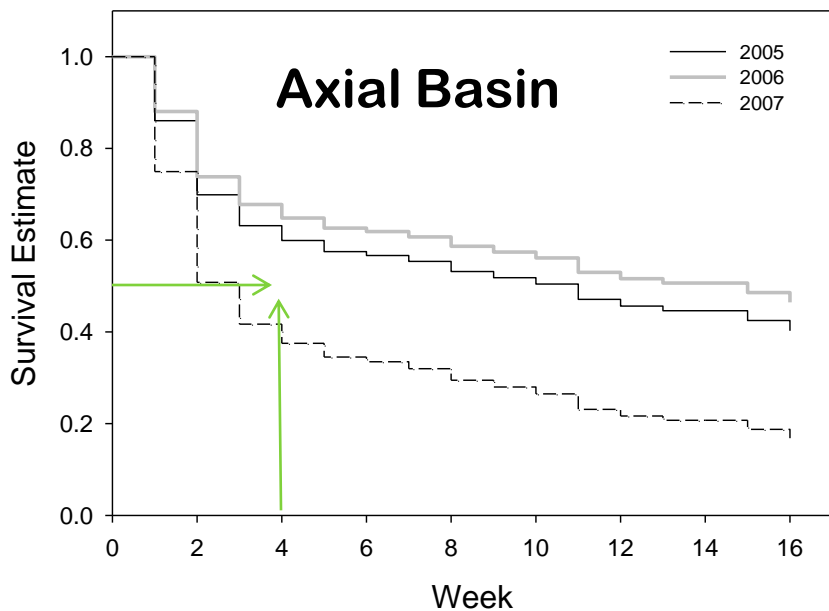
21 days
n = 75

28 days
n = 506

GUSG
30 days
n = 290

42 days
n = 150

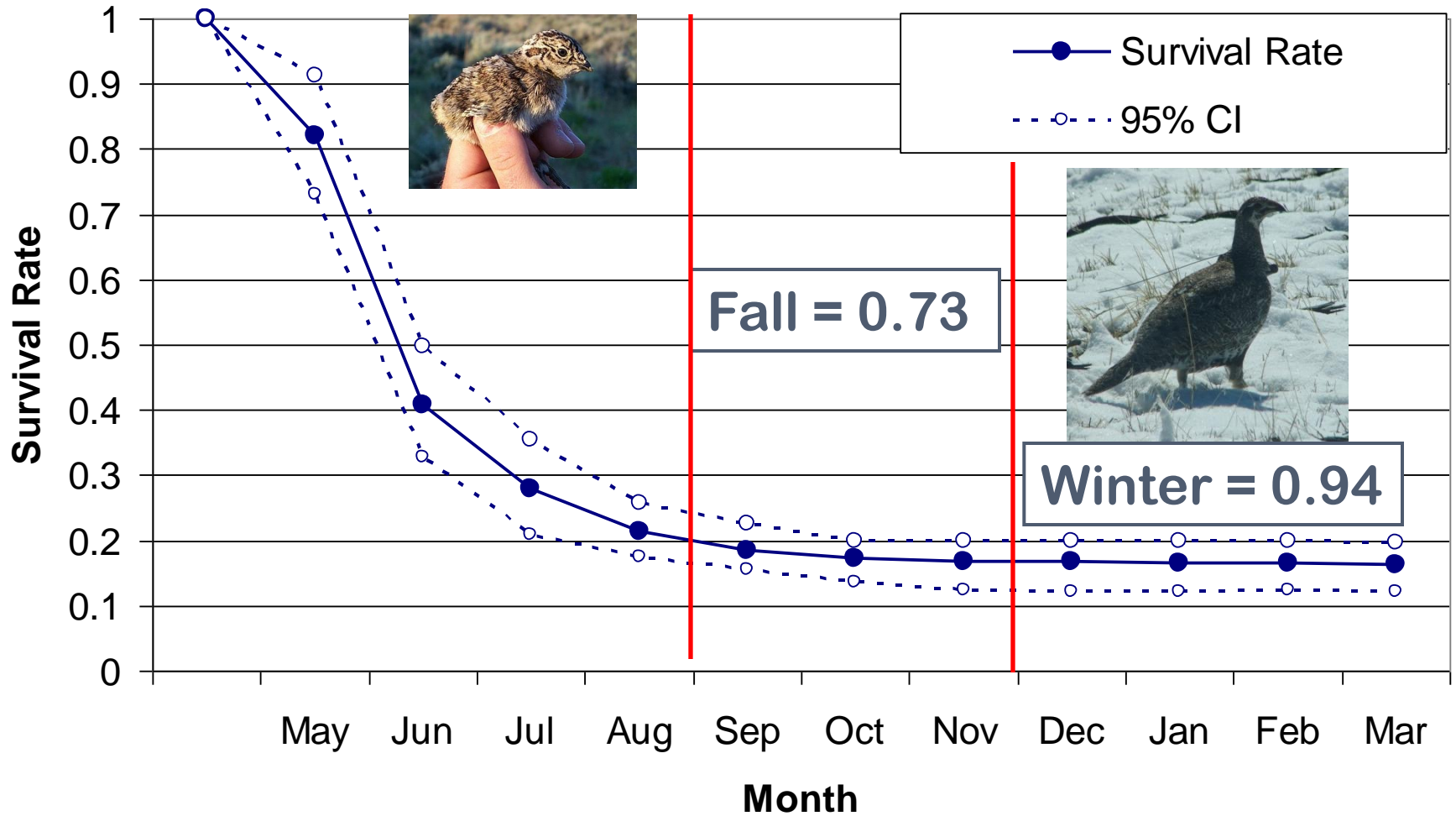
56 days
n = 41



Demography

Chick Survival

2005 – 2008 (n = 415)



Demography

GUSG Juvenile Survival 2005 – 2010 (n = 87) (Davis 2012)

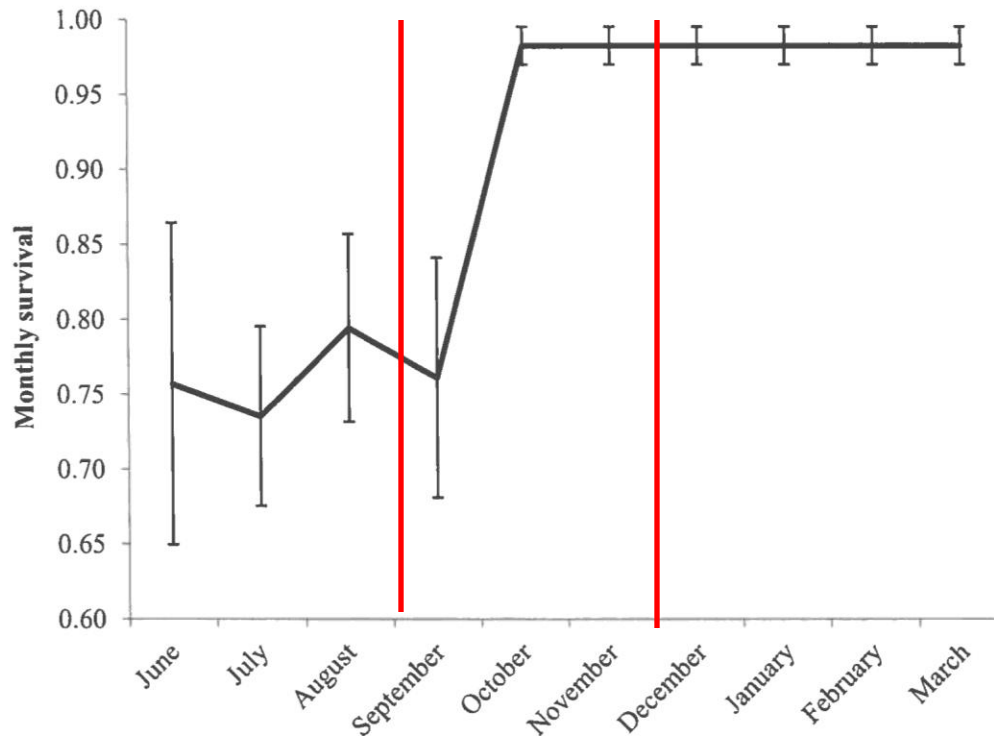
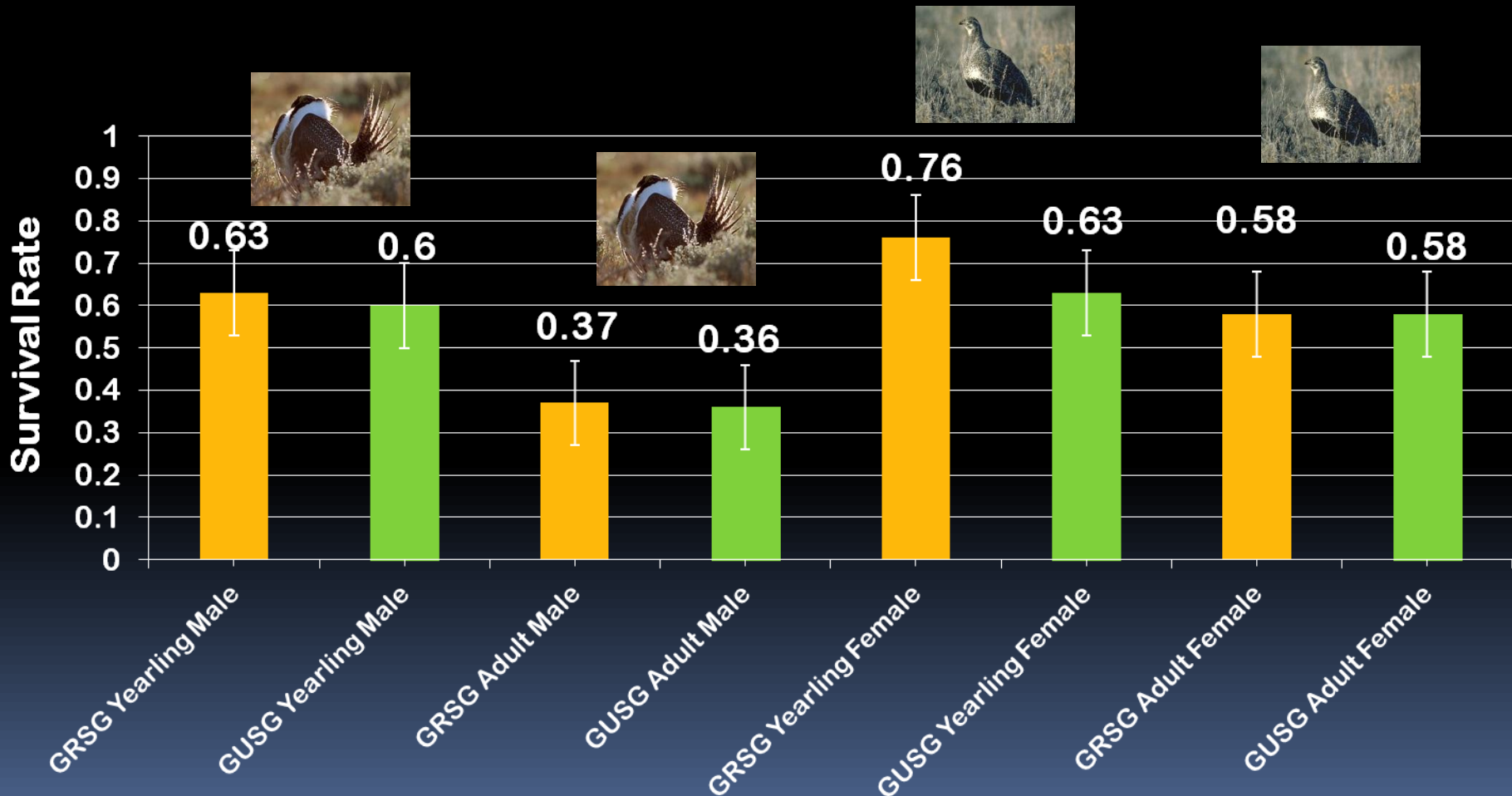


Figure 2.3: Juvenile monthly survival rates from 30 days of age to the first breeding season (April 1) with standard errors for Gunnison Sage-grouse

Demography

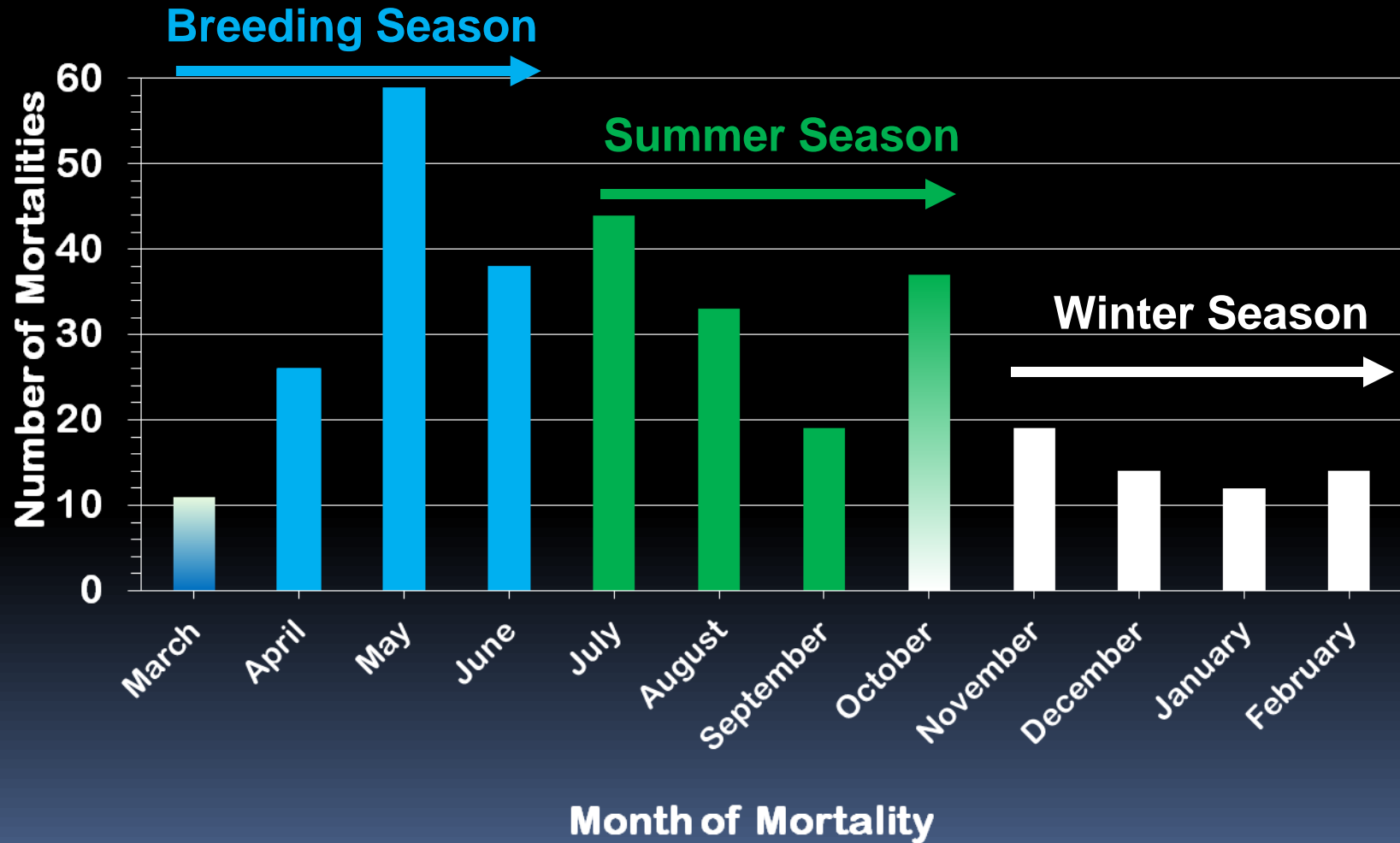
Yearling & Adult Male/Female Survival



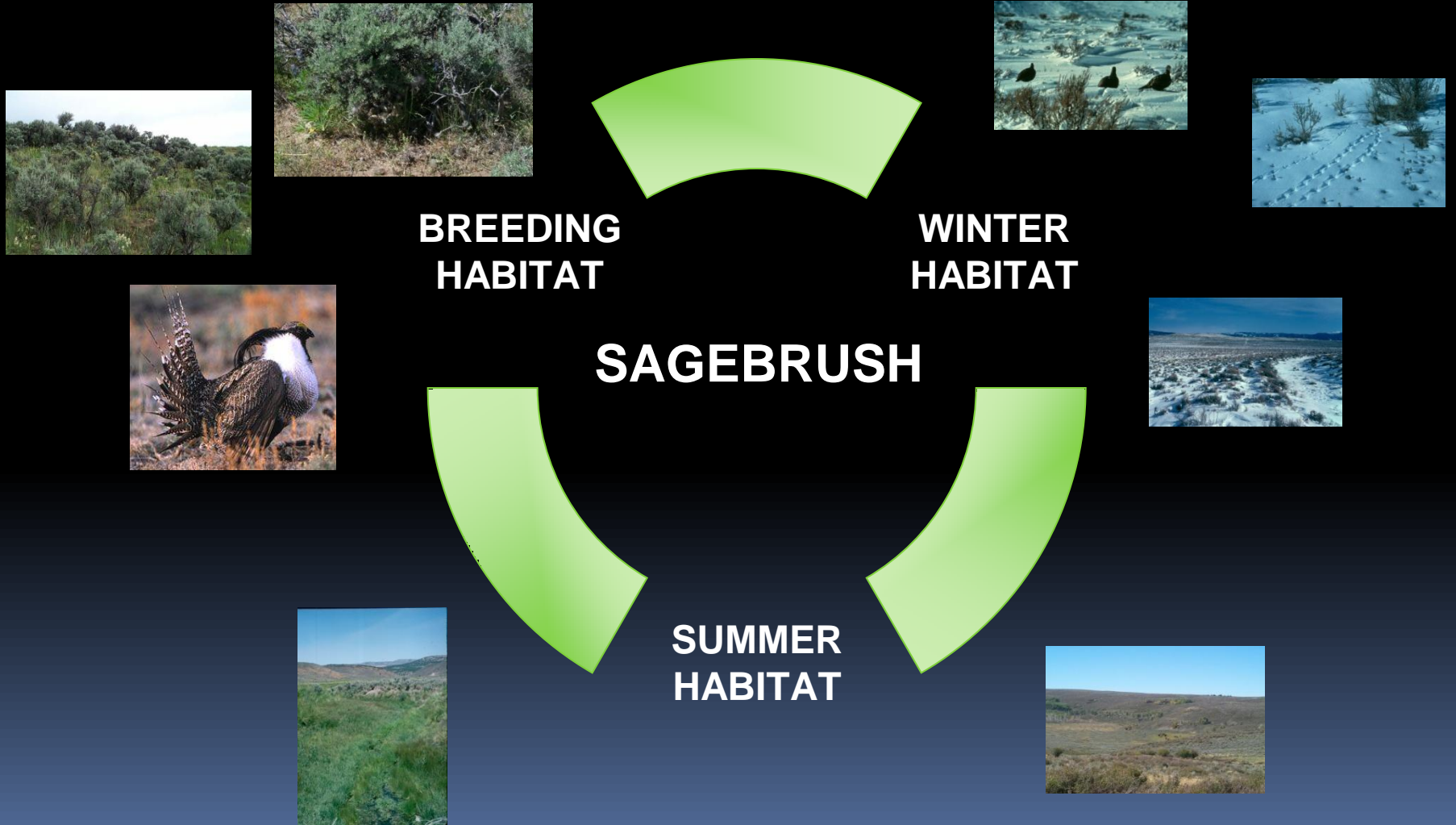
Demography

Monthly Mortality

n = 320



Sage-Grouse Seasonal Habitat



**BREEDING
HABITAT**

**WINTER
HABITAT**

SAGEBRUSH

**SUMMER
HABITAT**

Sage-Grouse Seasonal Habitat



HABITAT

SAGEBRUSH



Sage-Grouse Seasonal Habitat



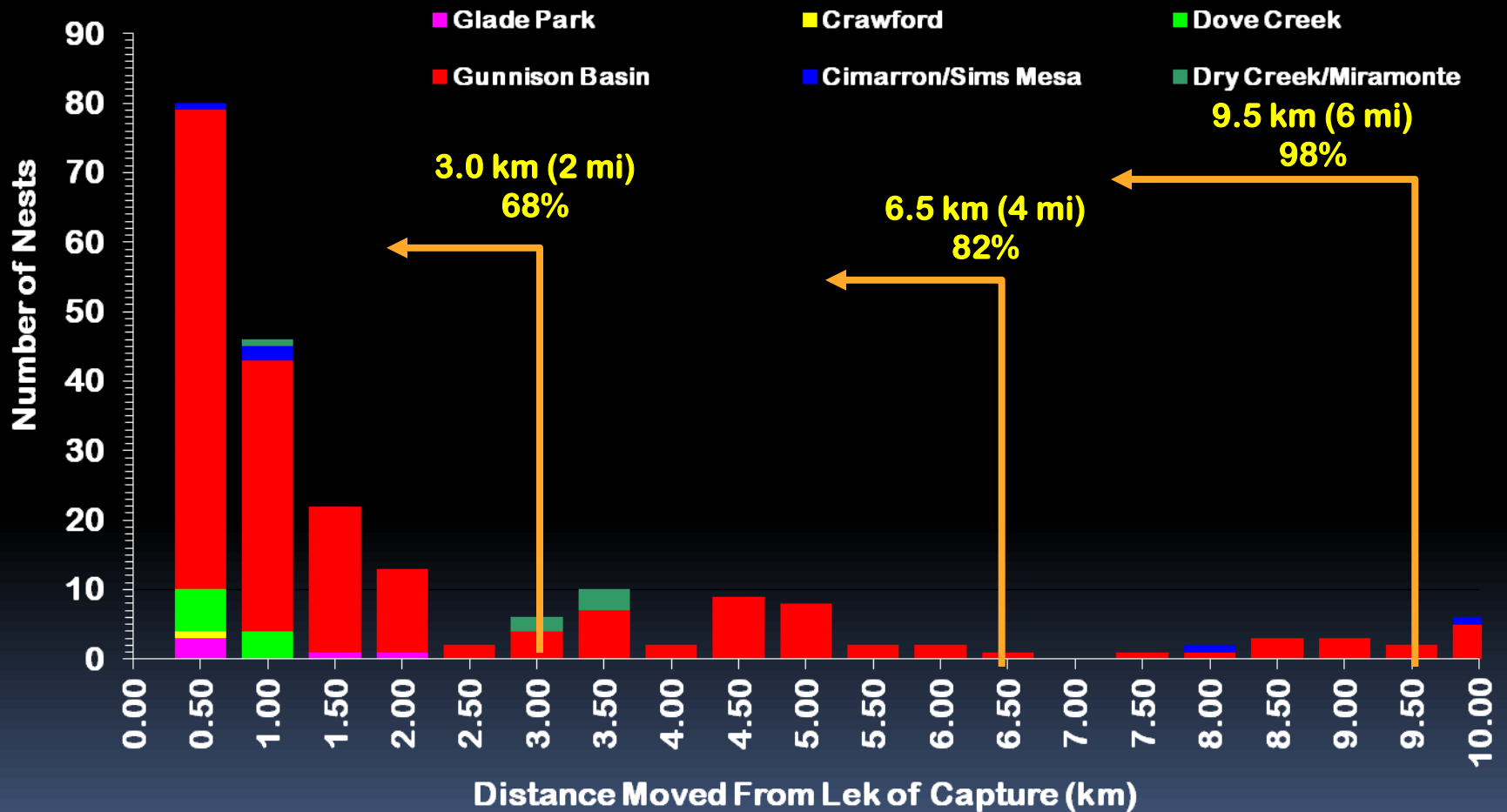
**SUMMER
HABITAT**

Sage-Grouse Seasonal Habitat



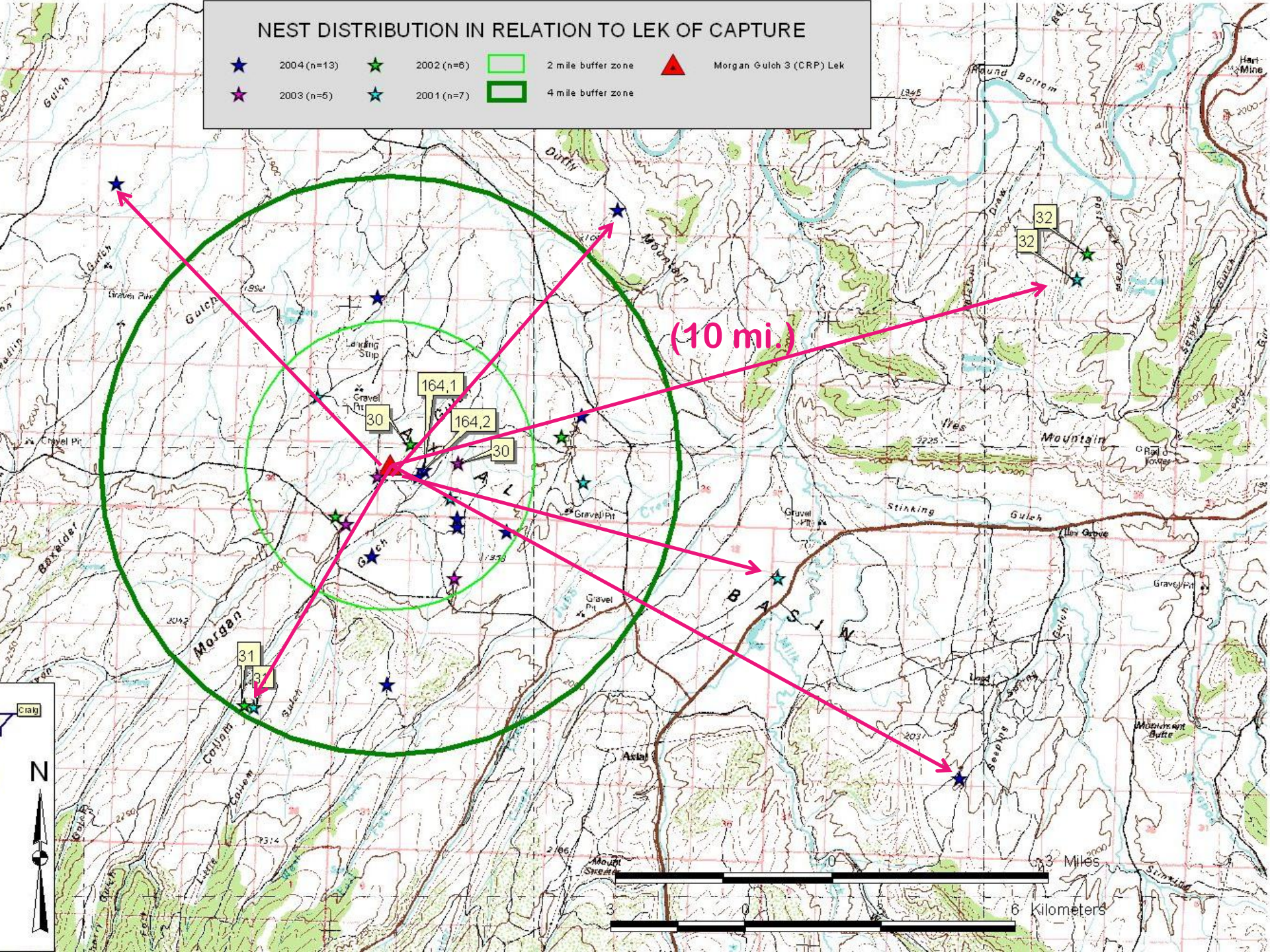
Gunnison Sage-Grouse Lek of Capture to Nest Distribution

2002 & 2005-2010 (n = 217)



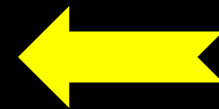
NEST DISTRIBUTION IN RELATION TO LEK OF CAPTURE

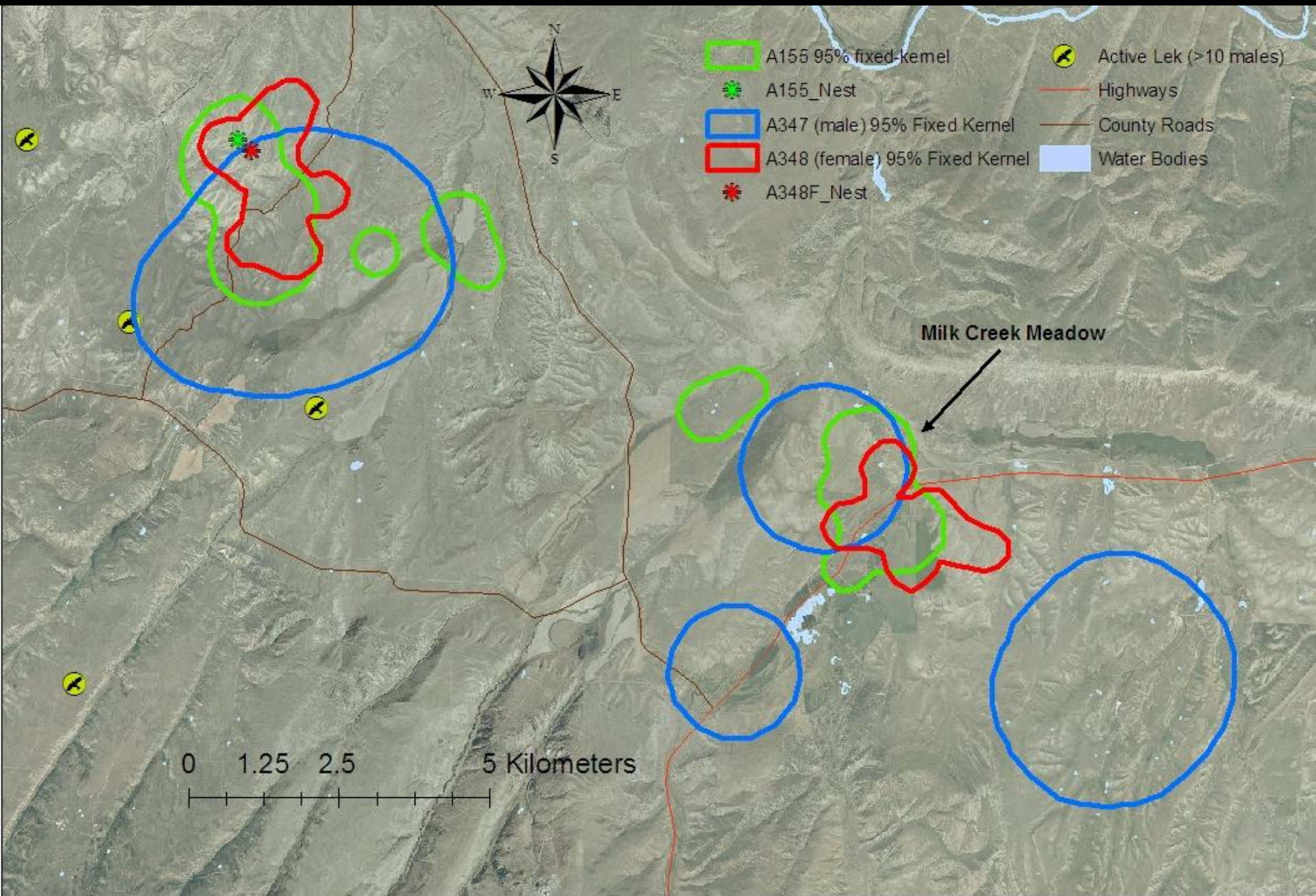
- ★ 2004 (n=13)
- ★ 2002 (n=6)
- 2 mile buffer zone
- ▲ Morgan Gulch 3 (CRP) Lek
- ★ 2003 (n=5)
- ★ 2001 (n=7)
- 4 mile buffer zone



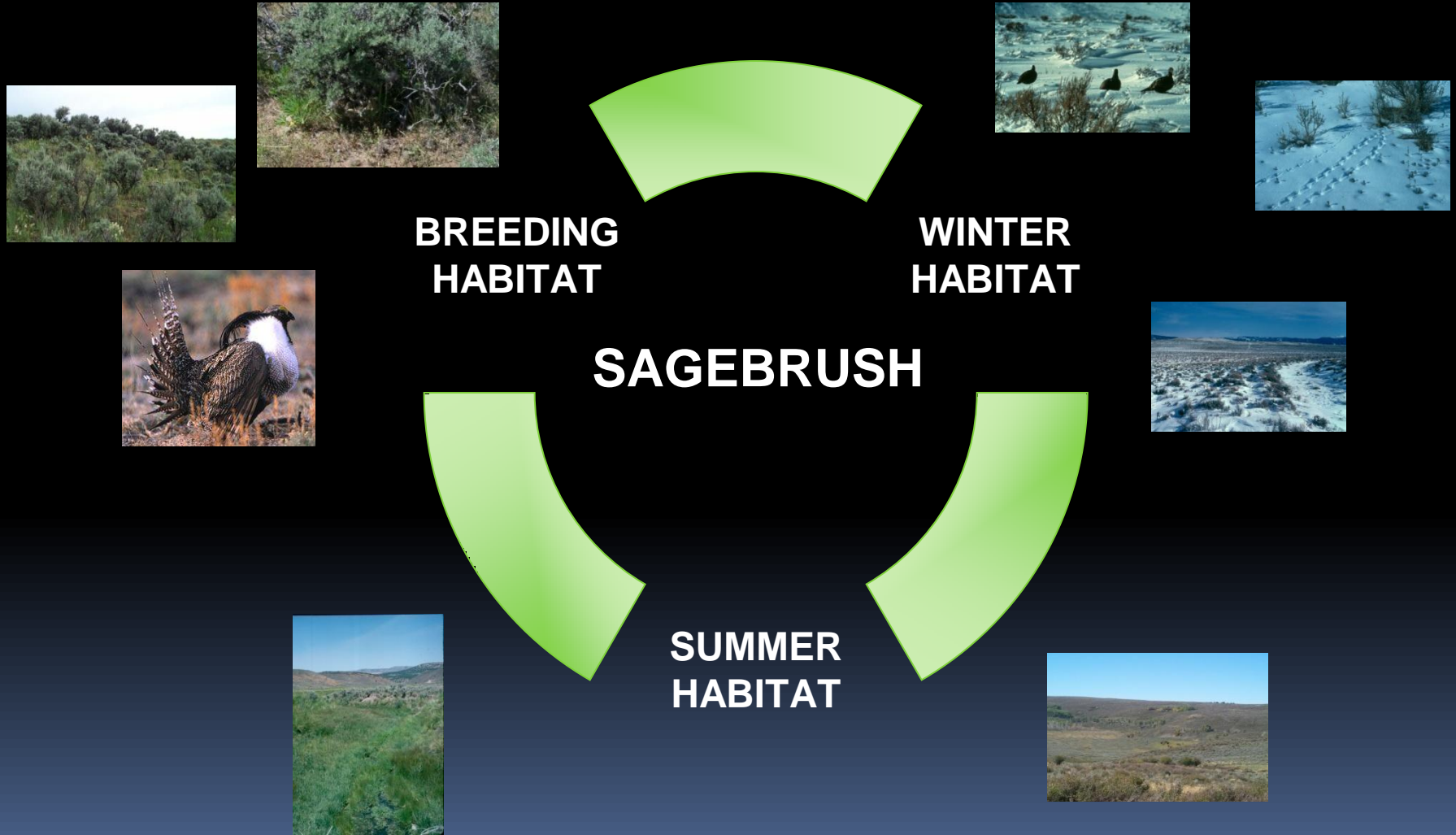
NEST SITE FIDELITY

Generational Breeding Habitat Fidelity
Mother and Daughter





Sage-Grouse Seasonal Habitat



Scale of Habitat Selection

(Johnson 1980)

- **1st Order**
 - **Geographical range of the population of interest**
- **2nd Order**
 - **Home range of individuals or subpopulations of interest (e.g. lek area or lek complex)**
- **3rd Order**
 - **Seasonal habitats within the home range**
- **4th Order**
 - **Structural or quality and quantity of food or cover**

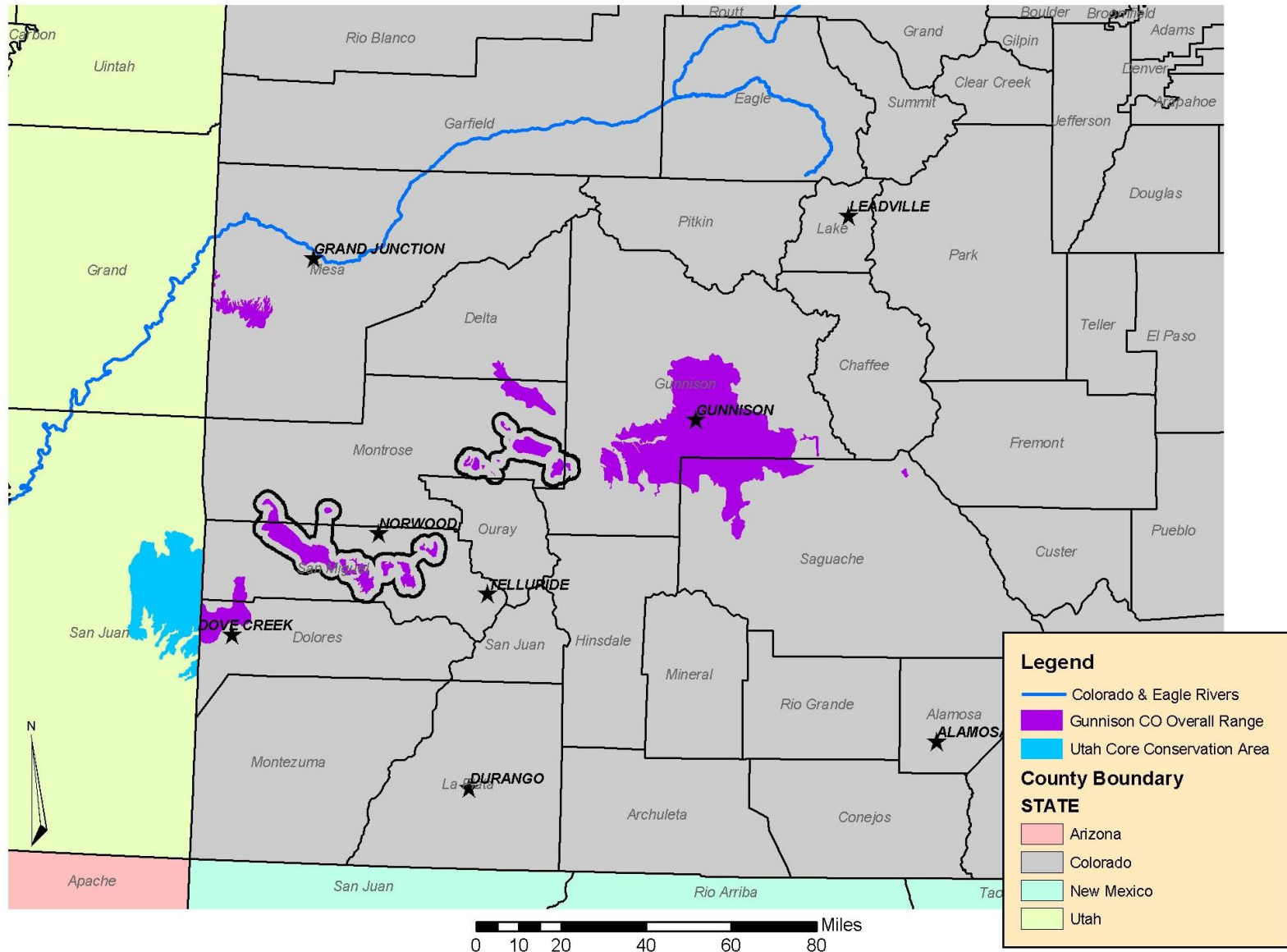
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1st Order Selection

Gunnison Sage-Grouse Range



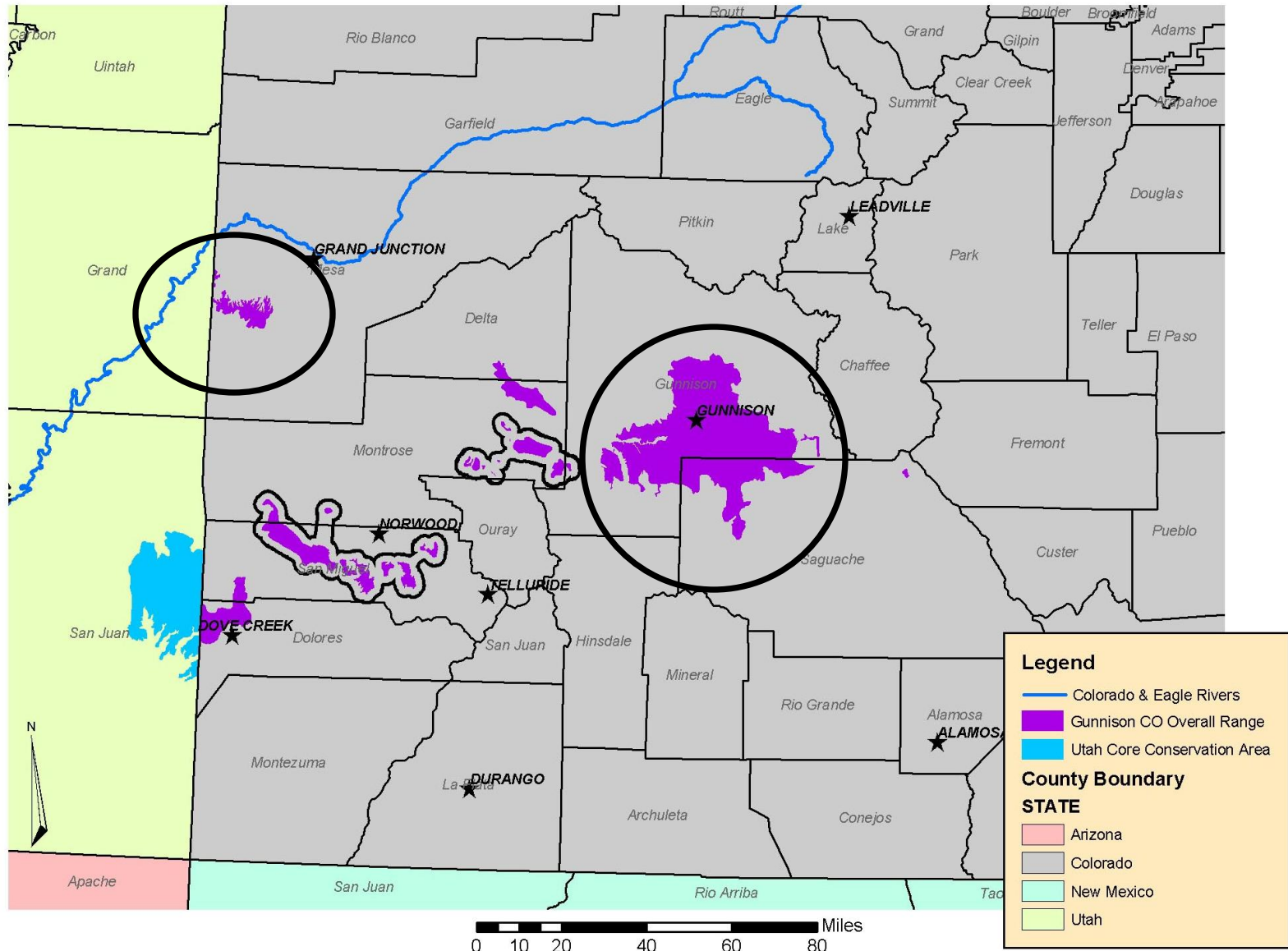
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 - Structural or quality and quantity of food or cover

2nd Order Selection

Gunnison Sage-Grouse Range



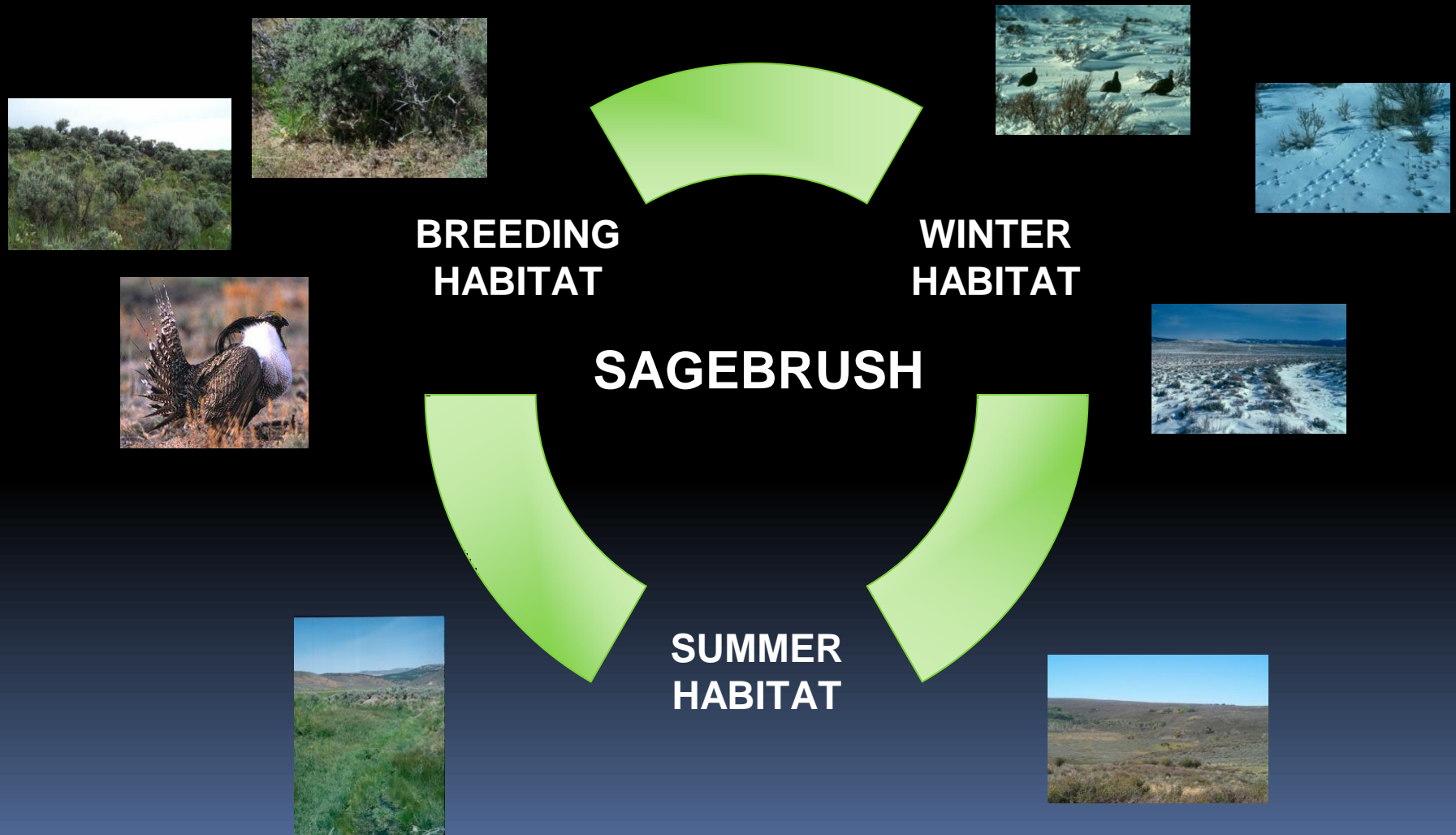
Scale of Habitat Selection

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- 4th Order
 - Structural or quality and quantity of food or cover

Sage-Grouse Habitat Selection

Seasonal (3rd Order) Habitat Configuration

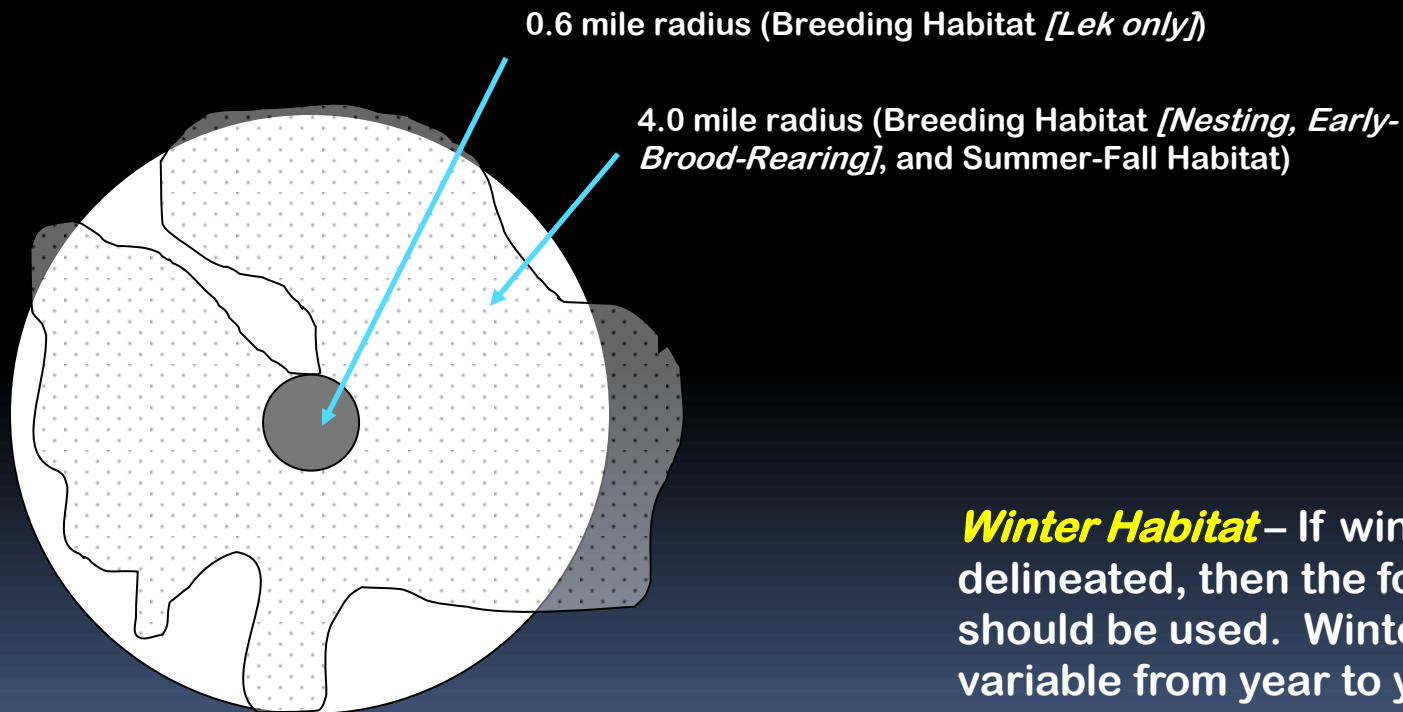


Unmapped Seasonal Habitats

Breeding Habitat and Summer-Fall Habitat - If these seasonal habitats are not mapped and field-validated, they should be designated by 2 concentric circles around active leks (Fig. B-1).

Mapped Seasonal Habitats

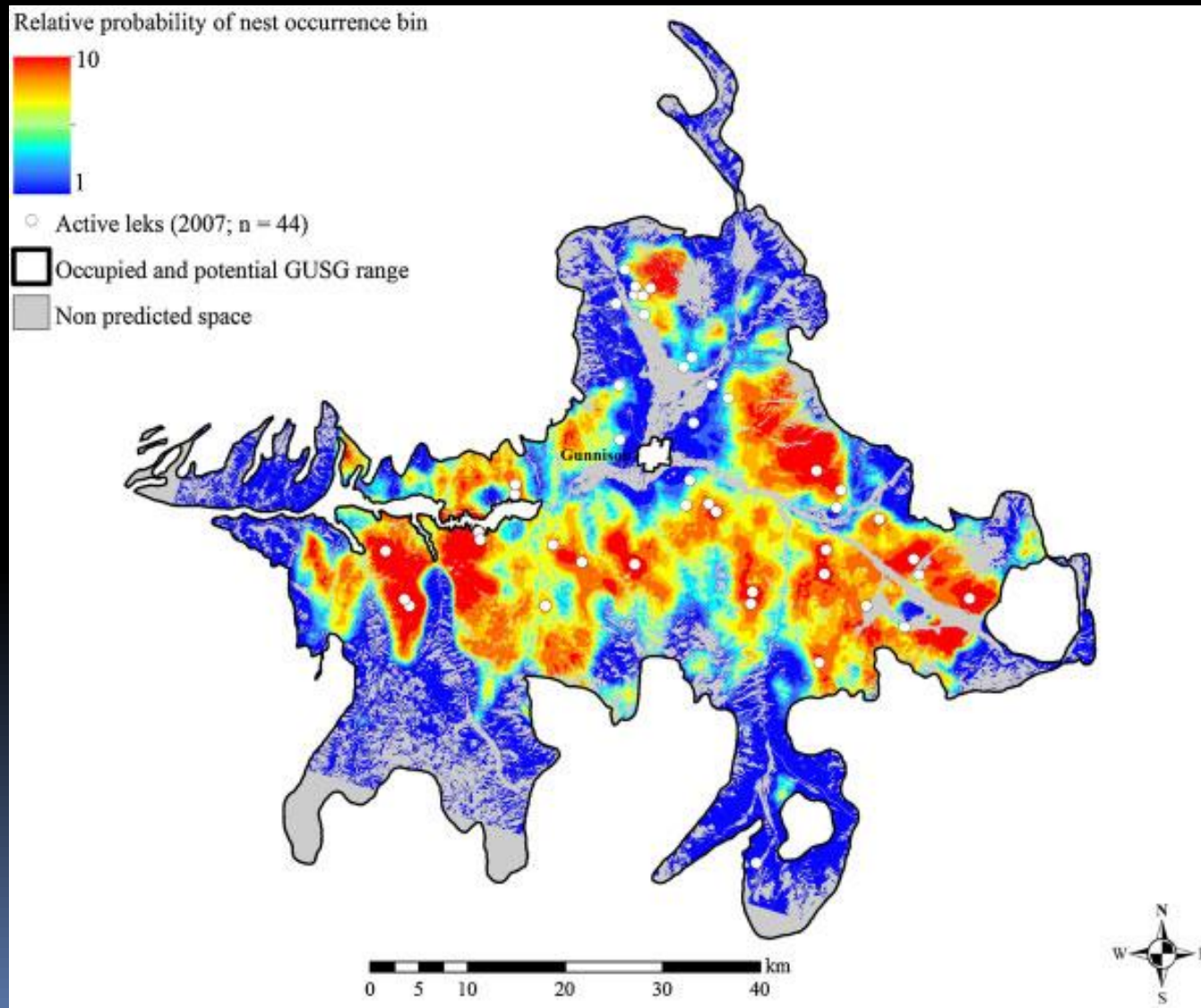
If seasonal habitats have been mapped (Fig. B-1), the following guidelines should be followed in, and relative to, the mapped habitat.

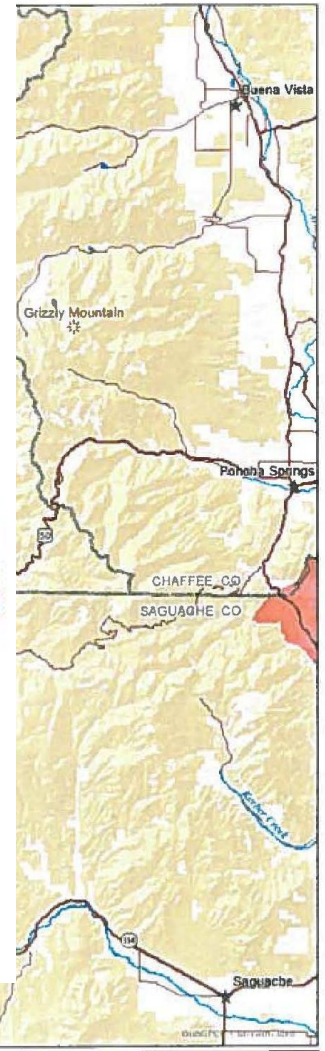
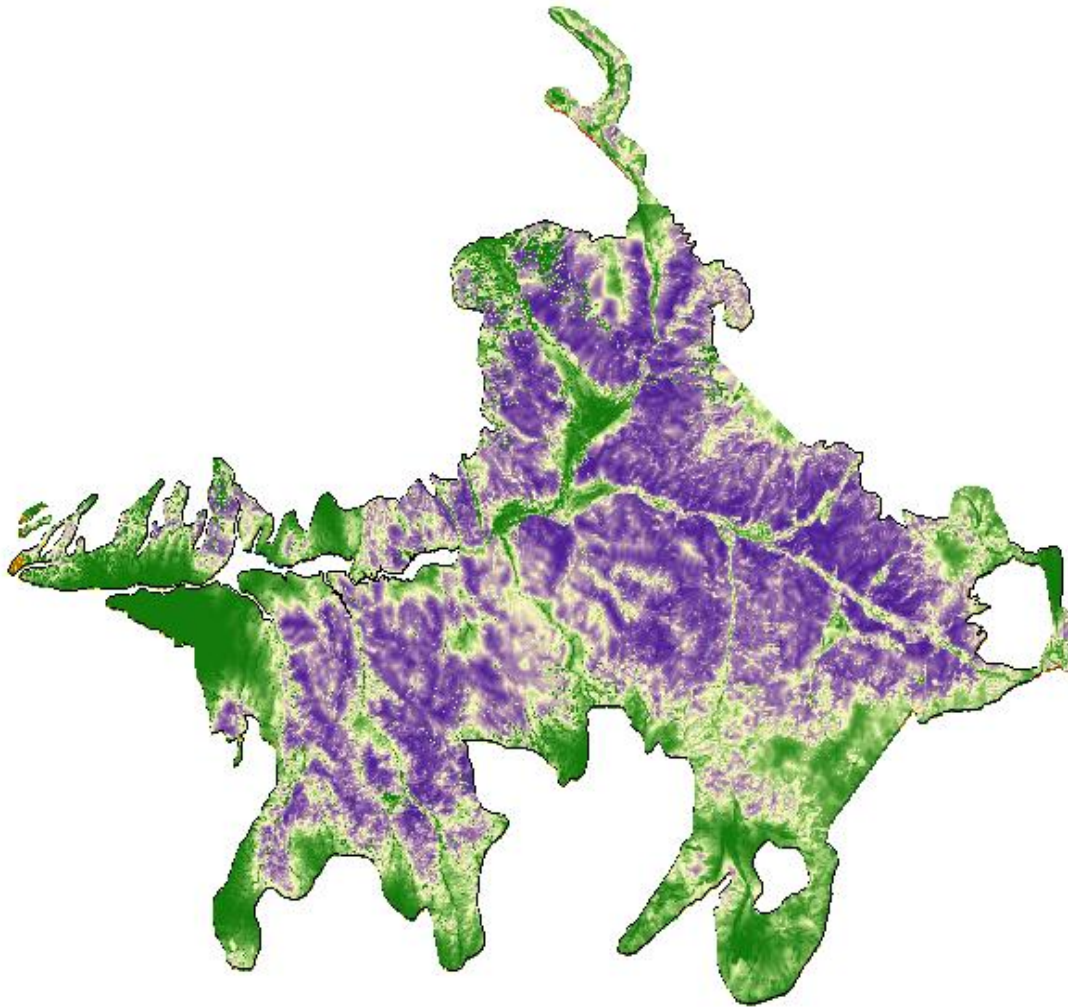
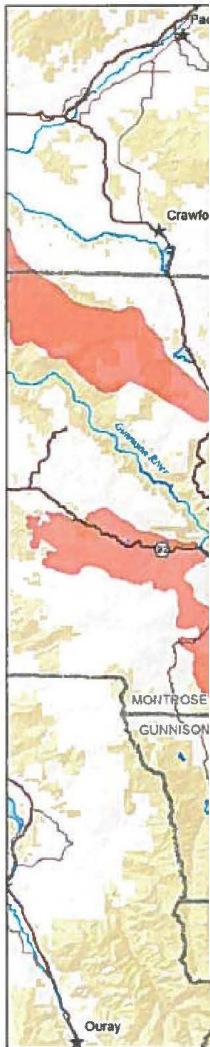


Winter Habitat – If winter habitat is not delineated, then the following guidance should be used. Winter habitat is highly variable from year to year, depending upon winter conditions (especially snow depth).

Sage-Grouse Habitat Selection

Seasonal (3rd Order) Breeding Habitat
(Aldridge et al. 2012) – Critical Nesting Habitat





Land Ownership

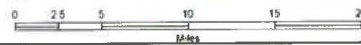
- Private
- Public

- ★ Towns
- Streams
- Roads

- ✱ Peaks
- Lakes
- County Boundary

Habitat Status

- Occupied

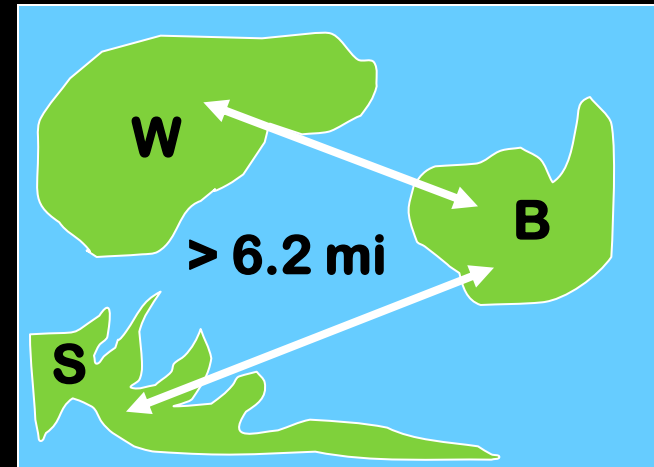


3rd ORDER SEASONAL HABITAT CONFIGURATION

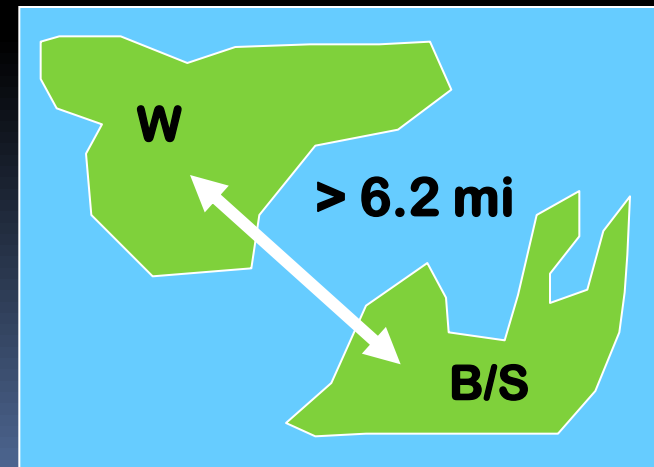
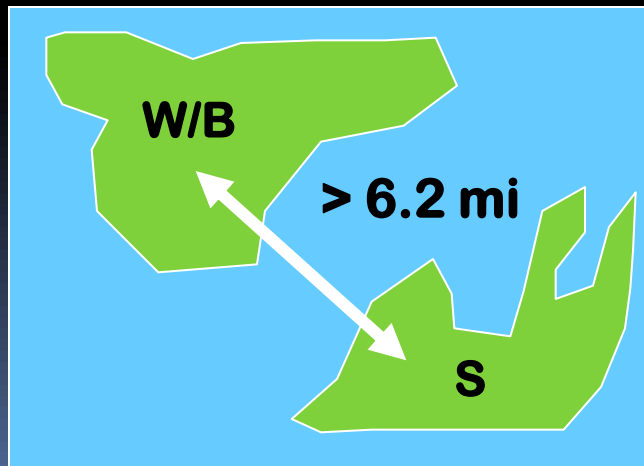
NONMIGRATORY



2-STAGE MIGRATORY



1 STAGE MIGRATORY



Sage-Grouse Habitat Selection

Seasonal (4th Order) Habitat

- 1st Order
 - Geographical range of the population of interest
- 2nd Order
 - Home range of individuals or subpopulations of interest (e.g. lek area or lek complex)
- 3rd Order
 - Seasonal habitats within the home range
- 4th Order
 - **Structural or quality and quantity of food or cover**

4th Order Selection

Birds select habitat based on horizontal and vertical structure as well as floristic composition



4th Order Selection

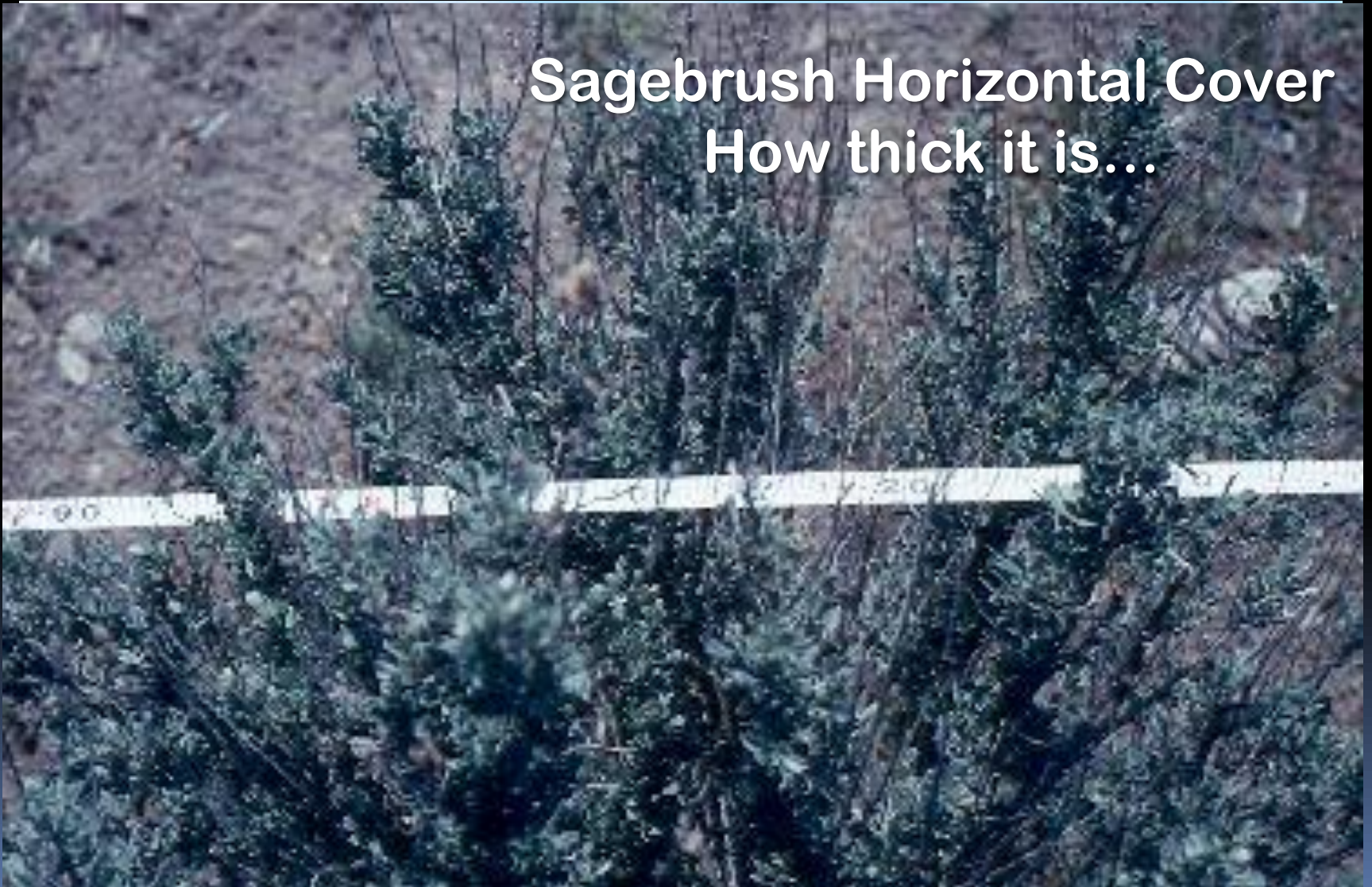
Birds select habitat based on horizontal and vertical structure as well as floristic composition



4th Order Selection

Sagebrush...What is Measured?

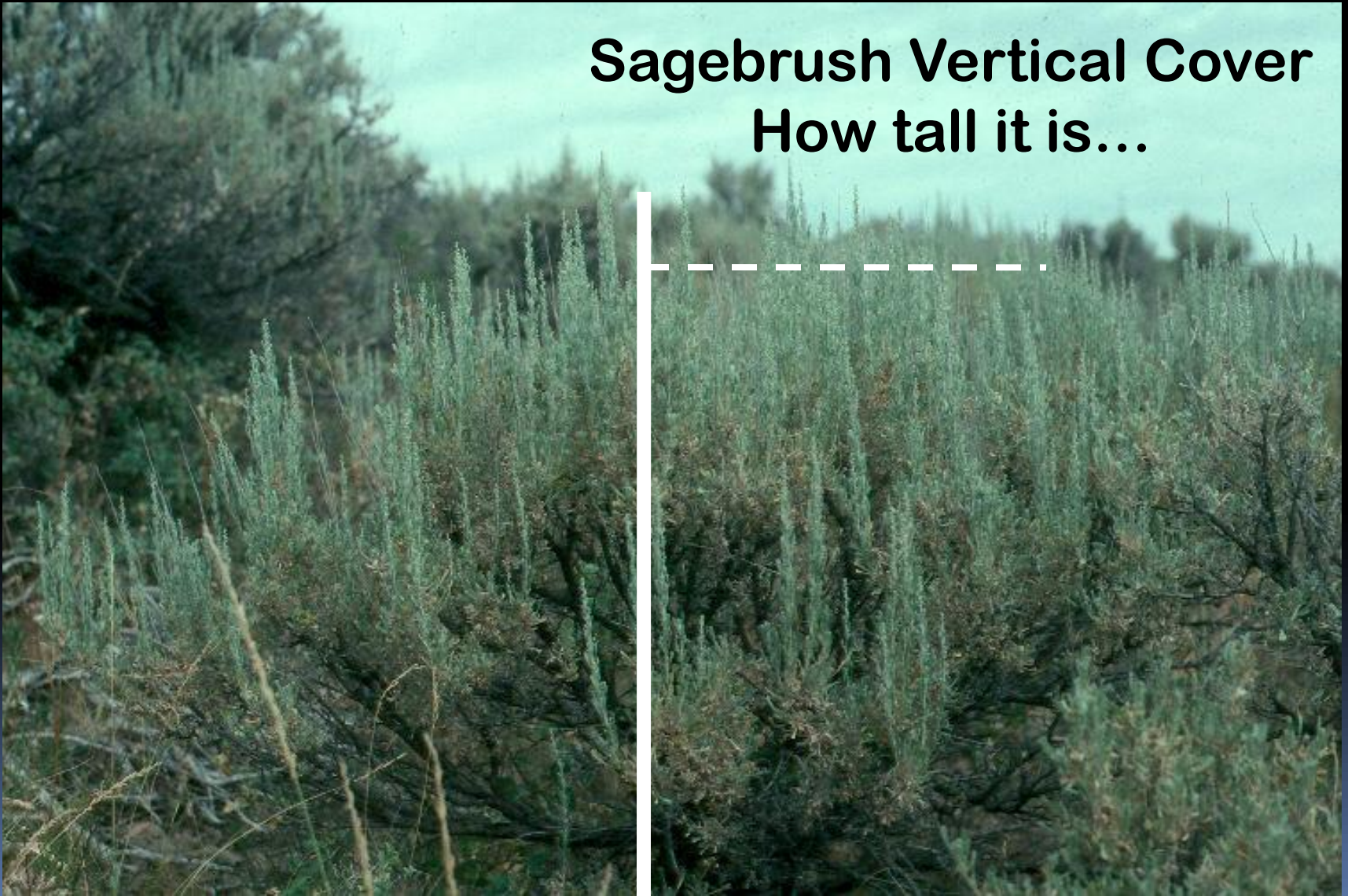
Sagebrush Horizontal Cover
How thick it is...



4th Order Selection

Sagebrush...What is Measured?

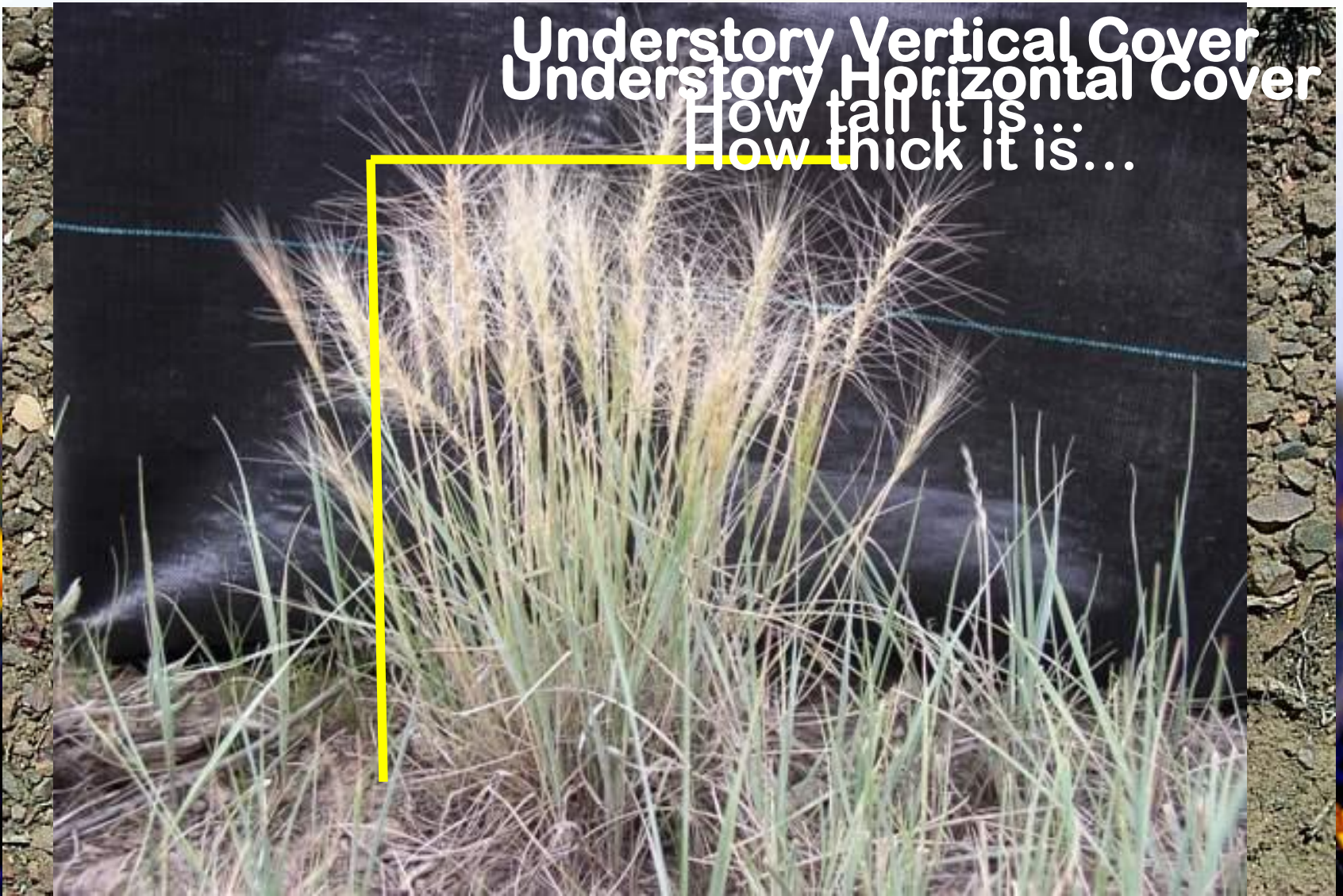
Sagebrush Vertical Cover
How tall it is...



4th Order Selection

Understory...What is Measured?

Understory Vertical Cover
Understory Horizontal Cover
How tall it is
How thick it is...



Habitat Guidelines



Sage-Grouse Habitat Guidelines

The History

- Braun et al. (1977)
 - *“Guidelines for Maintenance of Sage Grouse Habitats”*
- Connelly et al. (2000)
 - *“Guidelines to Manage Sage Grouse Populations and Their Habitats”*
- Gunnison Sage-grouse Rangewide Steering Committee (2005)
 - *“Gunnison sage-grouse Rangewide Conservation Plan (Appendix H)”*

Sage-Grouse Habitat Guidelines

The History

Which Guidelines Or
Recommendations Should We Use?

NATIONAL?

LOCAL?

Sage-Grouse Habitat Guidelines

The History

- ~~Braun et al. (1977)~~
 - ~~“Guidelines for Maintenance of Sage Grouse Habitats”~~
- Connelly et al. (2000)
 - *“Guidelines to Manage Sage Grouse Populations and Their Habitats”*
- Gunnison Sage-grouse Rangewide Steering Committee (2005)
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Sage-Grouse Habitat Guidelines

Connelly et al. (2000)



Sage-Grouse Habitat Guidelines

Connelly et al. (2000:975)

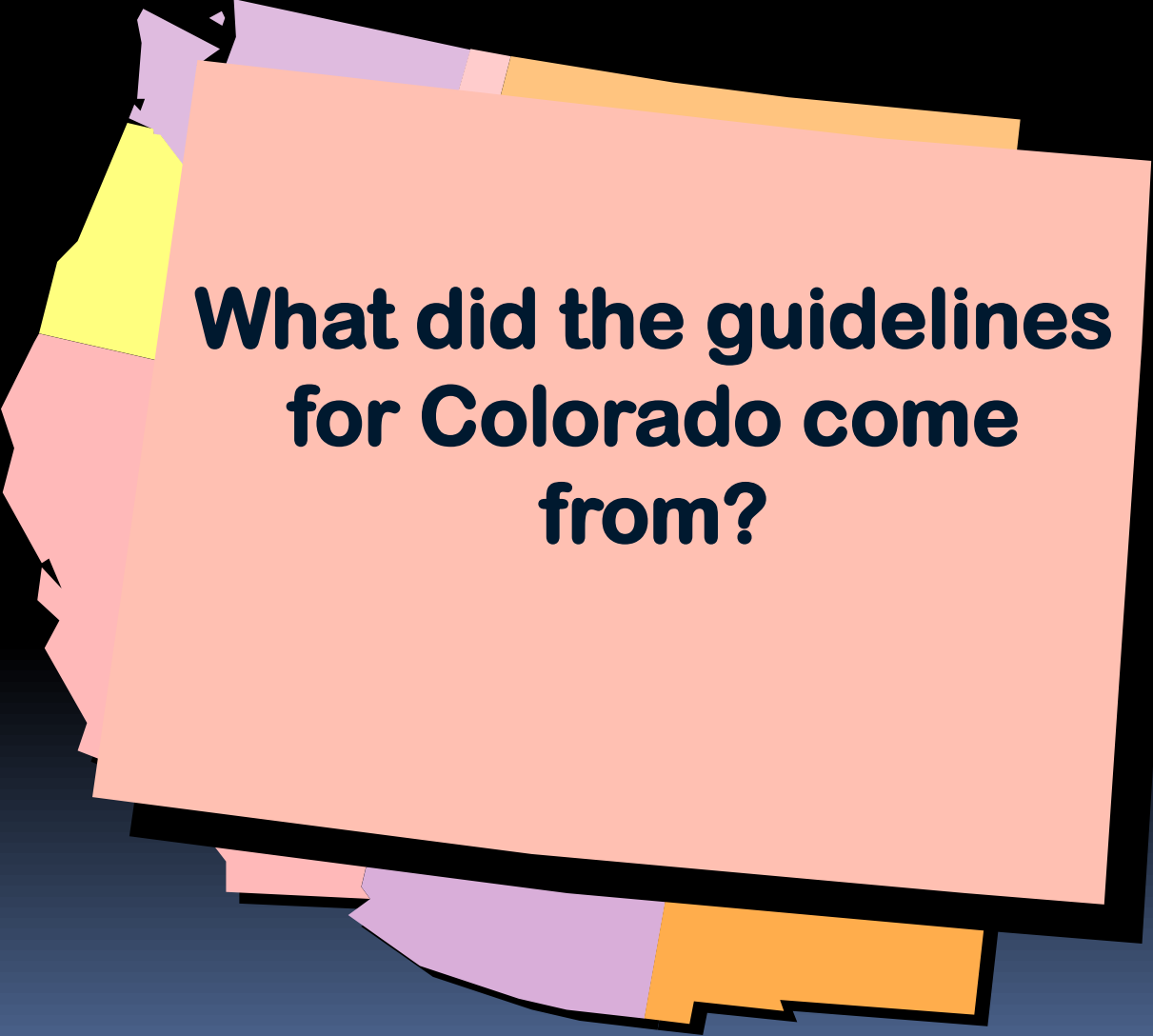
“Because of gaps in knowledge and regional variation in habitat characteristics, the judgments of local biologists and quantitative data from population and habitat monitoring are necessary to implement the guidelines correctly.”

Sage-Grouse Habitat Guidelines

The History

- ~~Braun et al. (1977)~~
 - ~~*“Guidelines for Maintenance of Sage Grouse Habitats”*~~
- ~~Connelly et al. (2000)~~
 - ~~*“Guidelines to Manage Sage Grouse Populations and Their Habitats”*~~
- Gunnison Sage-grouse Rangewide Steering Committee (2005)
 - *“Gunnison sage-grouse Rangewide Conservation Plan (Appendix H)”*

Sage-Grouse Habitat Guidelines

A stack of several overlapping papers with irregular, torn edges. The papers are colored in shades of purple, yellow, pink, and orange. The topmost paper is light pink and contains the text.

**What did the guidelines
for Colorado come
from?**

Colorado Sage-Grouse Habitat Guidelines

“In developing these habitat guidelines, we summarized *only Colorado GUSG habitat use data...*”

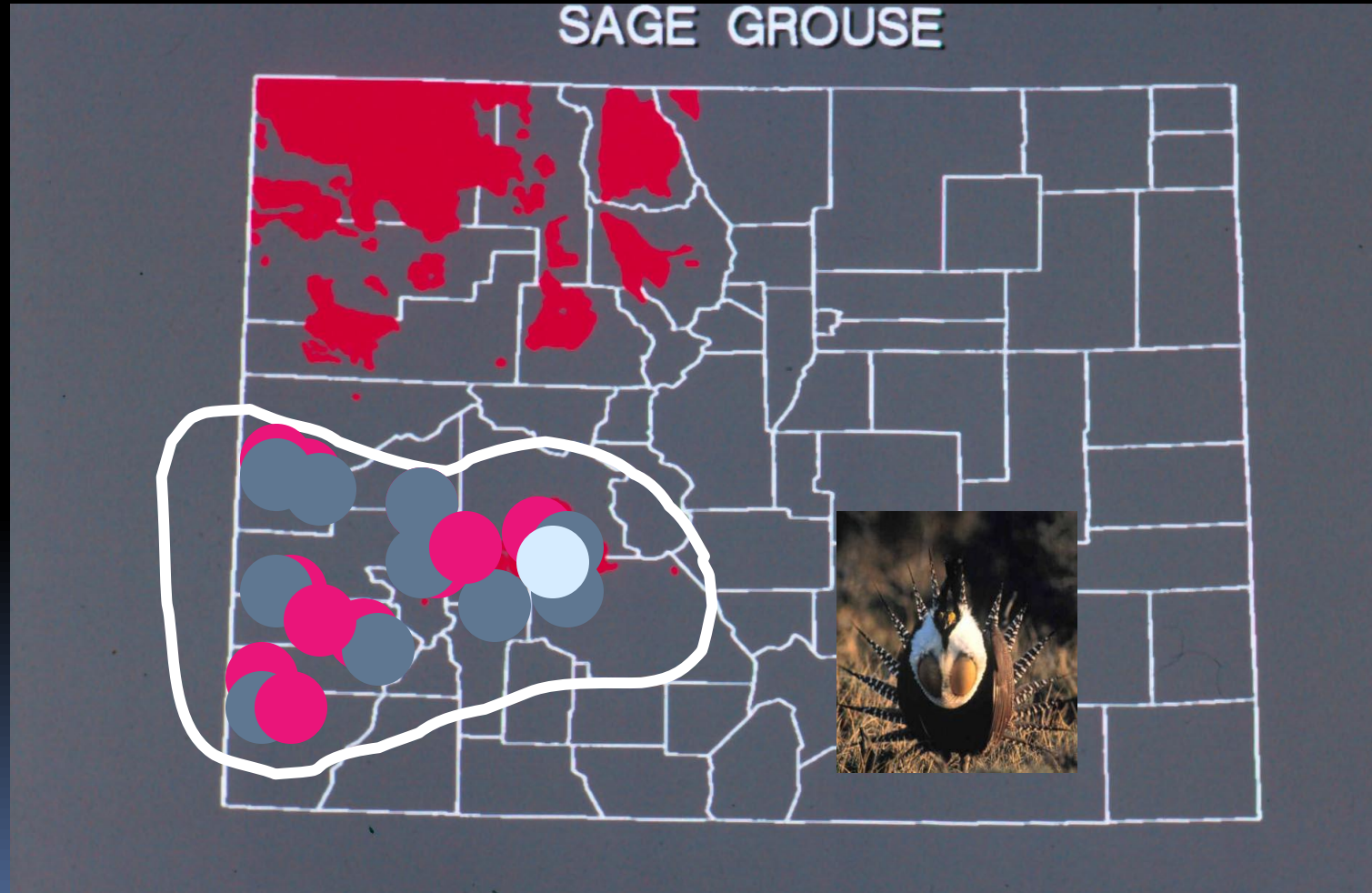
Colorado Sage-Grouse Habitat Guidelines

The vegetation structure guidelines...
should be interpreted as minimum standards, and managers should strive to meet the full potential of any given site.”

-Gunnison Sage-grouse Rangewide Plan (2005:H-5)

Gunnison Sage-Grouse

Where did CO guidelines come from?



Sage-Grouse Habitat Guidelines

Gunnison Sage-Grouse Rangewide Plan

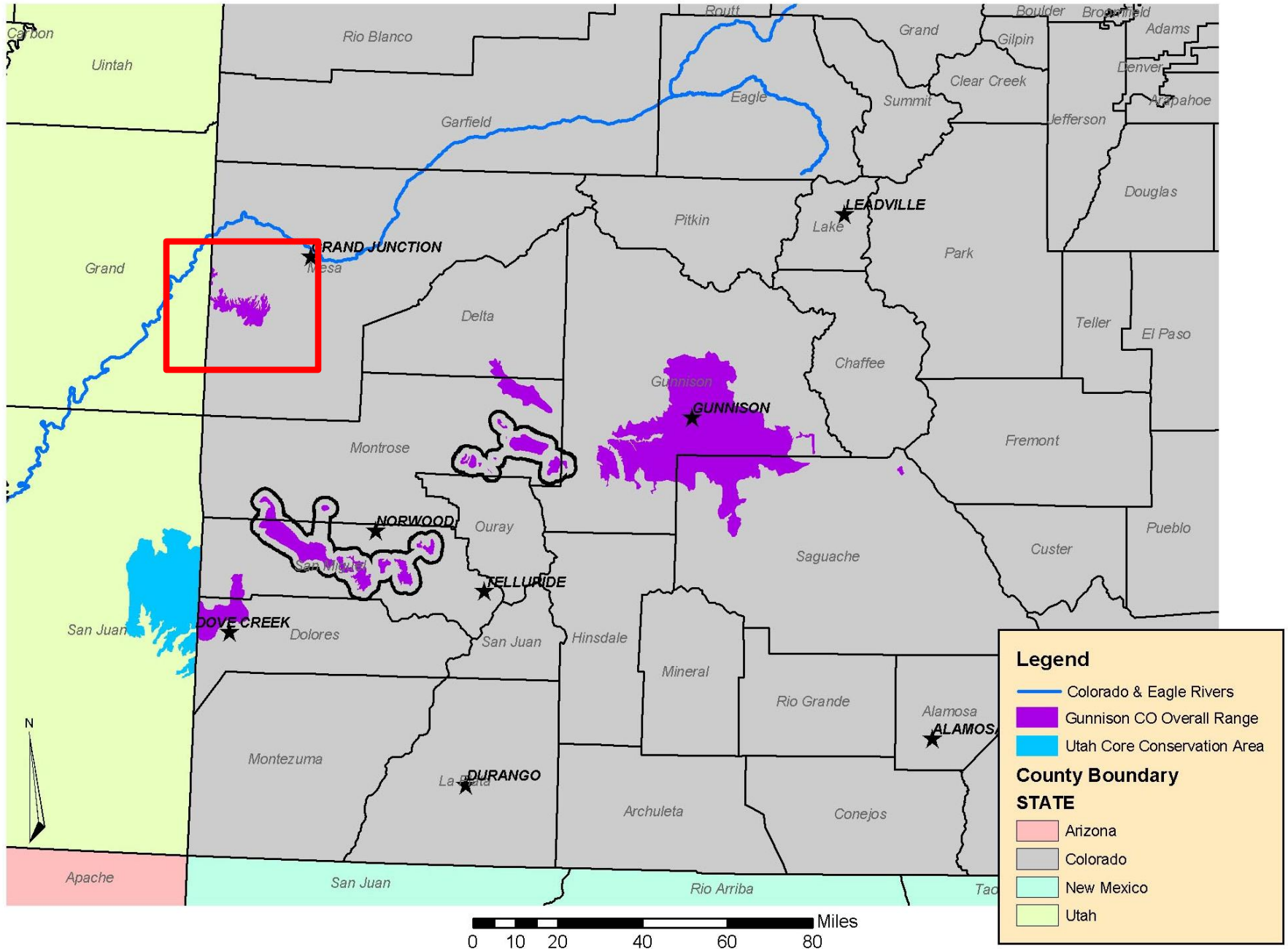
“These habitat guidelines should be considered **adaptive, and interim in nature**. The guidelines were developed from actual grouse use sites, but should be **considered as guidance and not absolute values**.

Landscapes are diverse; some areas on the landscape will **not meet** these guidelines, some areas will **meet** the guidelines, and some will **exceed** these guidelines. As new information is collected, these guidelines, as well as this plan are **meant to be adaptable**.

Sage-Grouse Habitat Guidelines (Breeding Habitat)

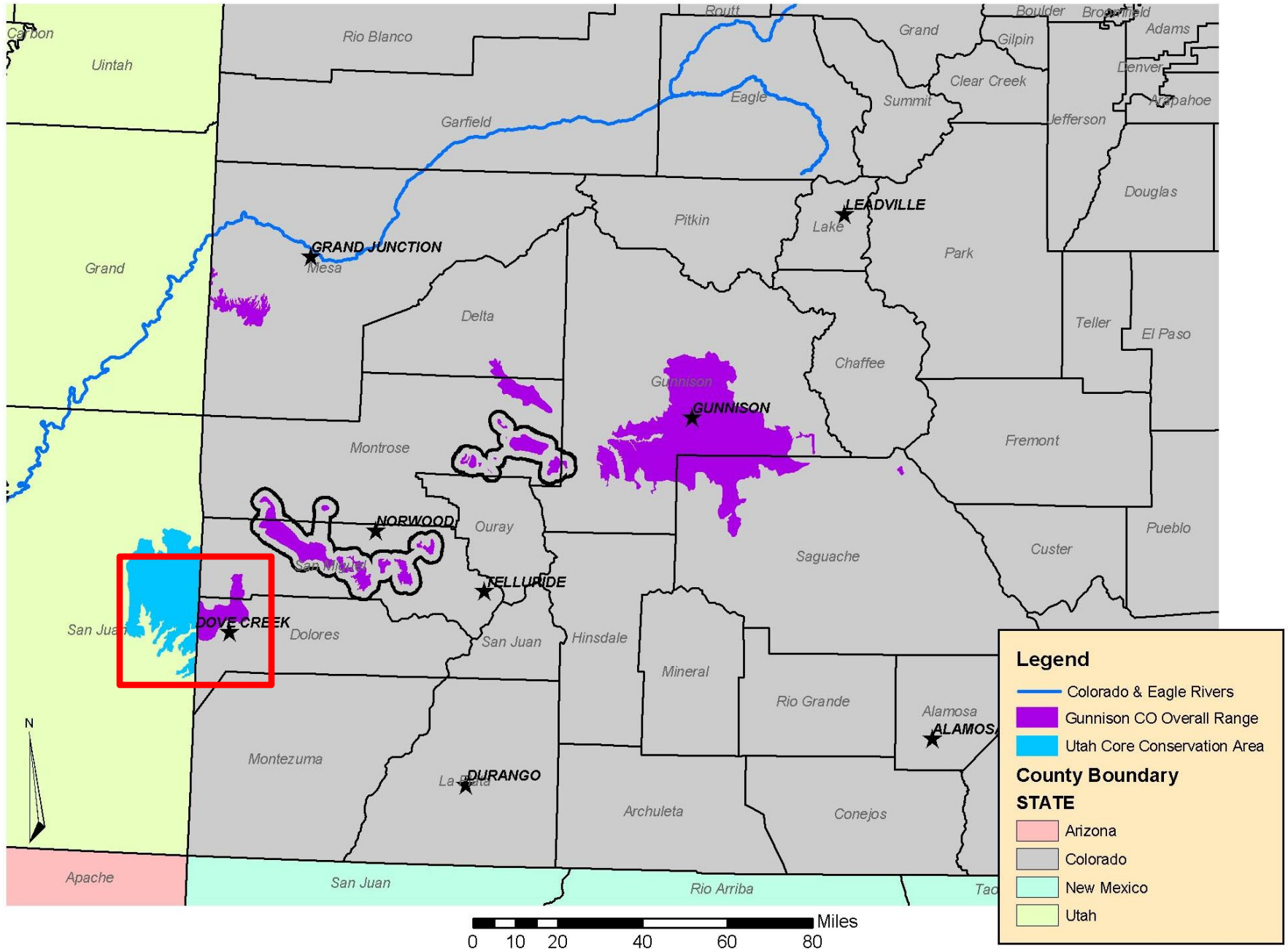


Gunnison Sage-Grouse Range





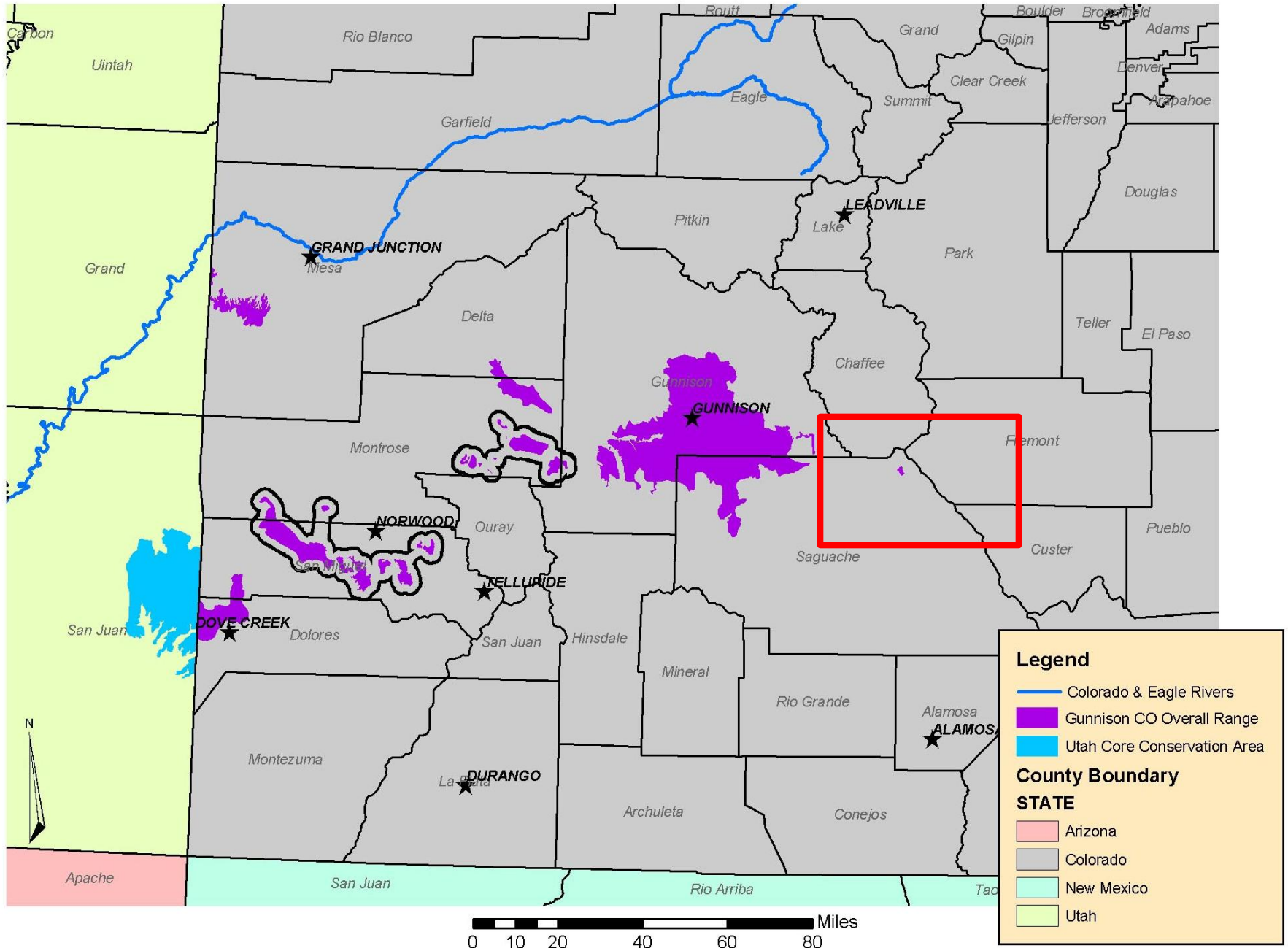
Gunnison Sage-Grouse Range





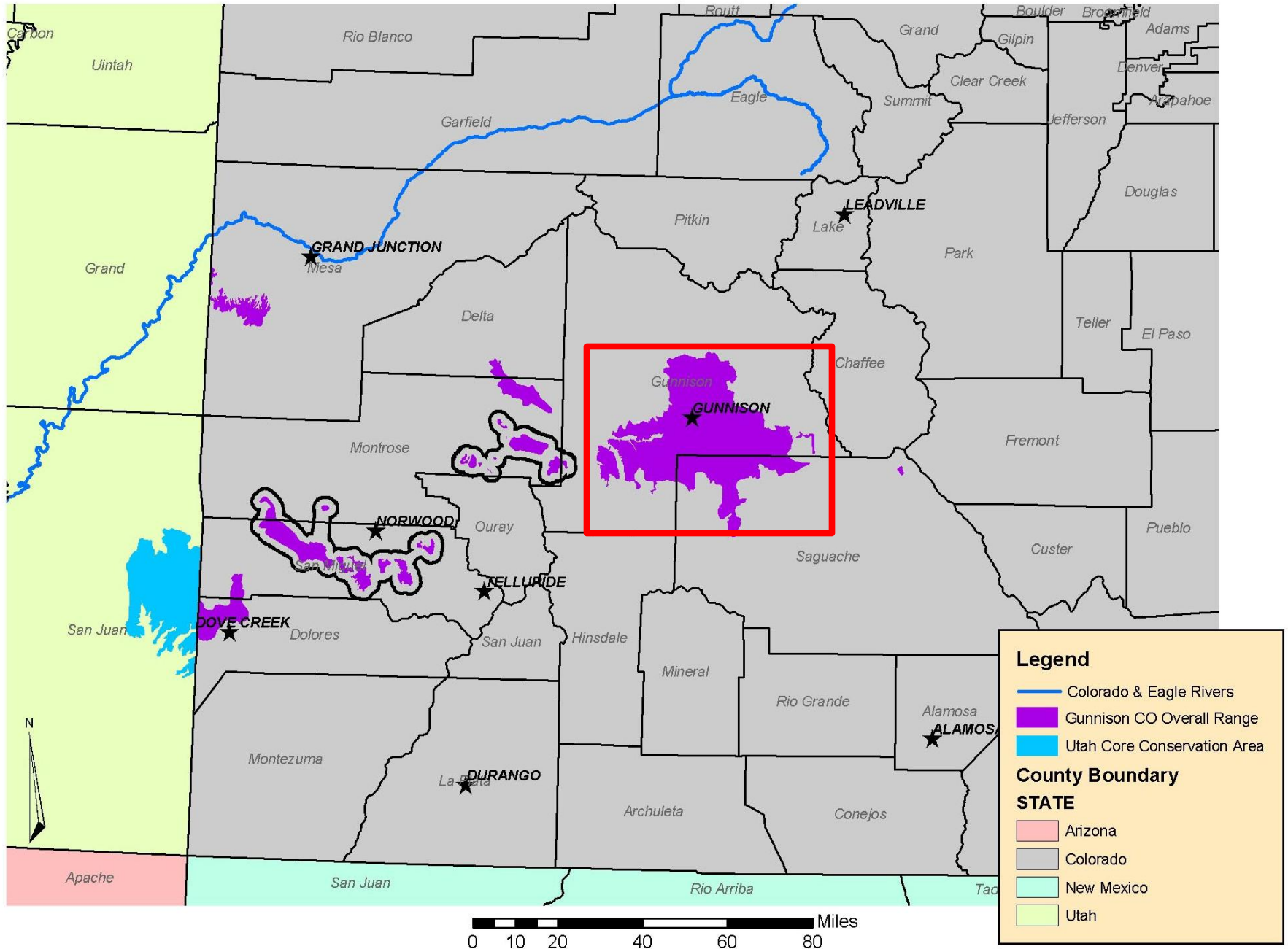


Gunnison Sage-Grouse Range





Gunnison Sage-Grouse Range





Habitat Structural Guidelines

(Breeding)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	15 - 25	10 - 20
Non-SB Cover (%)	5 - 15	5 - 15
Total Shrub Cover (%)	20 - 40	15 - 35
SB Height (cm)	25 - 50	30 - 50
Grass Cover (%)	10 - 30	20 - 40
Forb Cover (%)	5 - 15	20 - 40
Grass Height (cm)	10 - 15	10 - 15
Forb Height (cm)	5 - 10	5 - 15

Habitat Structural Guidelines

(Breeding)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	15 - 25	10 - 20
Non-SB Cover (%)	5 - 15	5 - 15
Total Shrub Cover (%)	20 - 40	15 - 35
SB Height (cm)	25 - 50	30 - 50
Grass Cover (%)	10 - 30	20 - 40
Forb Cover (%)	5 - 15	20 - 40
Grass Height (cm)	10 - 15	10 - 15
Forb Height (cm)	5 - 10	5 - 15

Habitat Structural Guidelines

(Breeding)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	15 - 25	10 - 20
Non-SB Cover (%)	5 - 15	5 - 15
Total Shrub Cover (%)	20 - 40	15 - 35
SB Height (cm)	25 - 50	30 - 50
Grass Cover (%)	10 - 30	20 - 40
Forb Cover (%)	5 - 15	20 - 40
Grass Height (cm)	10 - 15	10 - 15
Forb Height (cm)	5 - 10	5 - 15

Habitat Structural Guidelines

(Breeding)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	15 - 25	10 - 20
Non-SB Cover (%)	5 - 15	5 - 15
Total Shrub Cover (%)	20 - 40	15 - 35
SB Height (cm)	25 - 50	30 - 50
Grass Cover (%)	10 - 30	20 - 40
Forb Cover (%)	5 - 15	20 - 40
Grass Height (cm)	10 - 15	10 - 15
Forb Height (cm)	5 - 10	5 - 15

Habitat Structural Guidelines

(Breeding – New Local Data)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	15 - 25	10 - 20
Gunn. Basin/North Park	16 - 37	
Non-SB Cover (%)		
Grass Cover (%)	10 - 30	20 - 40
Gunnison Basin	3 - 21	
Sagebrush Height (cm)	25 - 50	30 - 50
Gunnison Basin	23 - 56	

Habitat Structural Guidelines

(Summer)

	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover %	5 - 15	5 - 20
Non-SB Cover (%)	5 - 15	5 - 15
Total Shrub Cover (%)	10 - 30	10 - 35
SB Height (cm)	20 - 40	25 - 50
Grass Cover (%)	10 - 25	10 - 35
Forb Cover (%)	5 - 15	15 - 35
Grass Height (cm)	10 - 15	10 - 15
Forb Height (cm)	3 - 10	5 - 10

Habitat Structural Guidelines (Winter)



Habitat Structural Guidelines

(Winter)

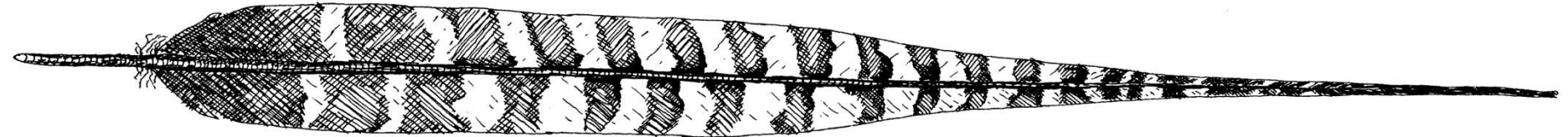
	Gunnison sage-grouse	
Vegetation Variable	Arid	Mesic
SB Cover (%)	30 - 40	-
SB Height (cm)	40 - 55	-

Summary

- Sagebrush, sagebrush, sagebrush.
- Three seasons of use: breeding, summer, and winter.
- Grouse select habitat at differing scales.
- Grouse demonstrate seasonal, annual, and generational site fidelity.
- Braun et al. (1977) and Connelly et al. (2000) are not applicable to Colorado because we have better local data.

Summary

- Habitat guidelines are based on bird selection at the 4th order scale and are specific to Colorado.
- Measurements at a local scale for Gunnison sage-grouse habitat may meet, may not meet, or may exceed current guidelines.



Paris Leighton-Greene, Nez Perce Nation



Questions?



CHICKEN DANCE

U of S Pow - wow 2007

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