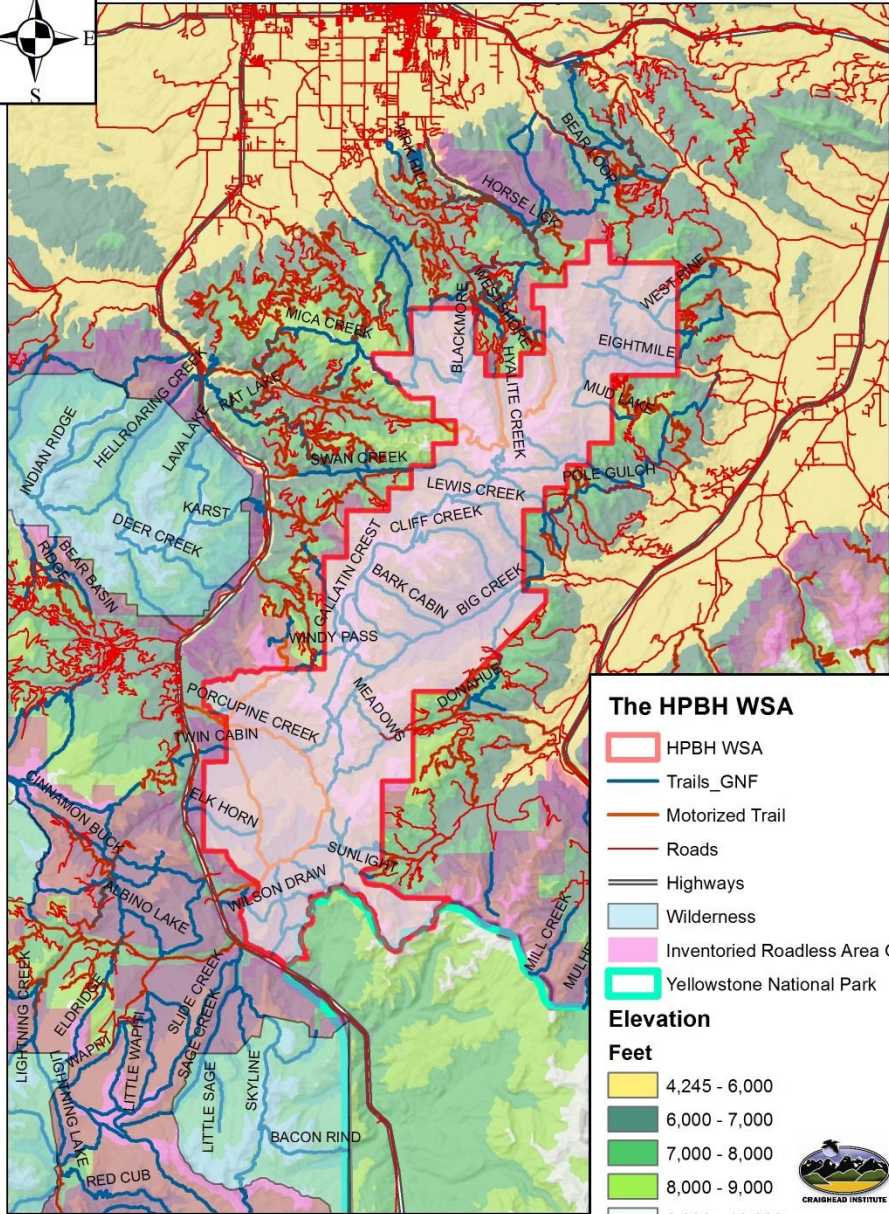


The background of the slide is a landscape photograph. It shows a wide valley with golden-brown grass in the foreground. In the middle ground, there are several clusters of dark evergreen trees. The background features rolling hills and mountains under a sky filled with large, white, fluffy clouds. The overall scene is bright and natural.

# **Wilderness, Wildlife, and Ecological Values of the Hyalite-Porcupine-Buffalo Horn Wilderness Study Area**

A Report for the Lee and Donna Metcalf Foundation  
By The Craighead Institute

# Hyalite-Porcupine-Buffalo Horn Wilderness Study Area



**The HPBH WSA**

- HPBH WSA
- Trails\_GNF
- Motorized Trail
- Roads
- Highways
- Wilderness
- Inventoried Roadless Area GNF
- Yellowstone National Park

**Elevation**

**Feet**

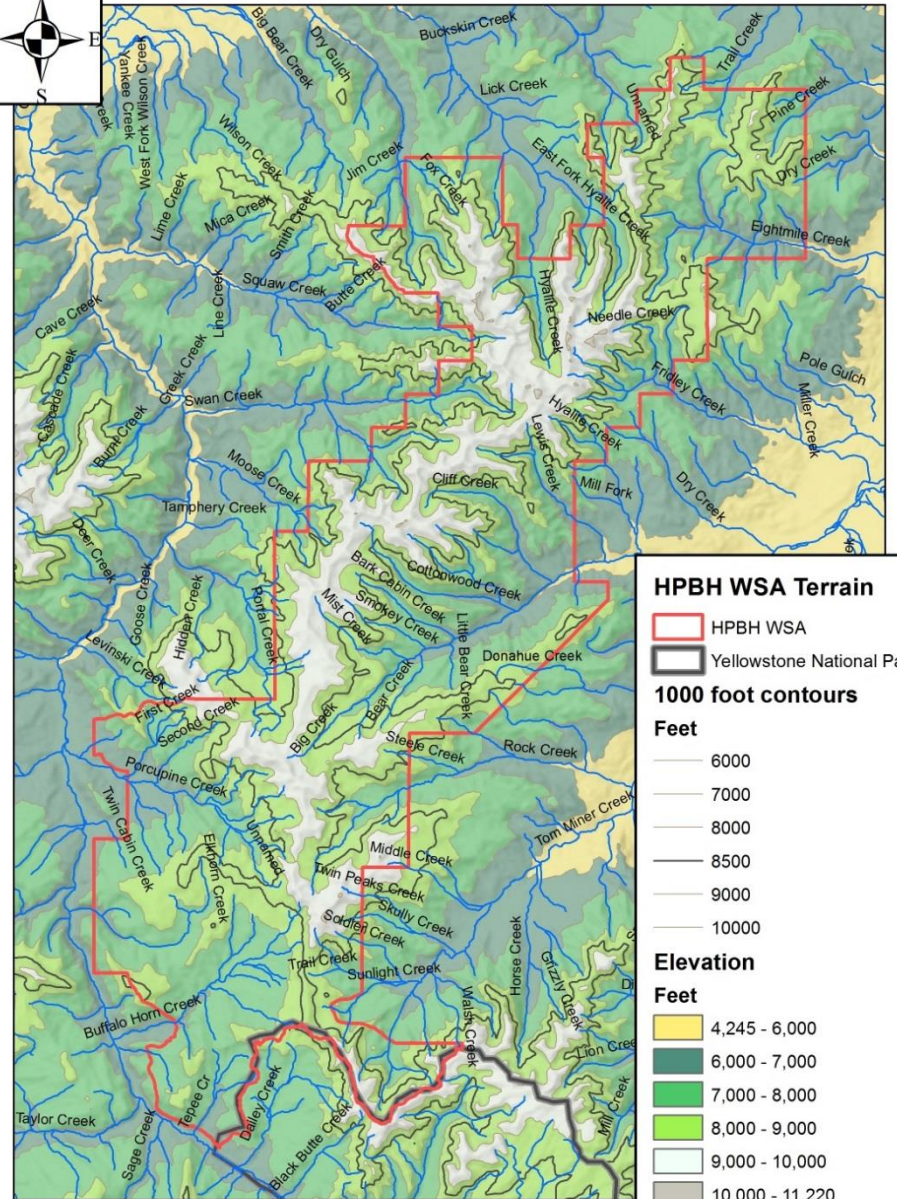
- 4,245 - 6,000
- 6,000 - 7,000
- 7,000 - 8,000
- 8,000 - 9,000
- 9,000 - 10,000
- 10,000 - 11,220



~150,000 acres

10,300 feet to  
5,800 feet elevation

36 miles long by  
4 to 12 miles wide



**HPBH WSA Terrain**

- HPBH WSA
- Yellowstone National Park

**1000 foot contours**

**Feet**


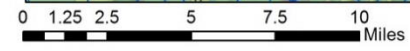
- 6000
- 7000
- 8000
- 8500
- 9000
- 10000

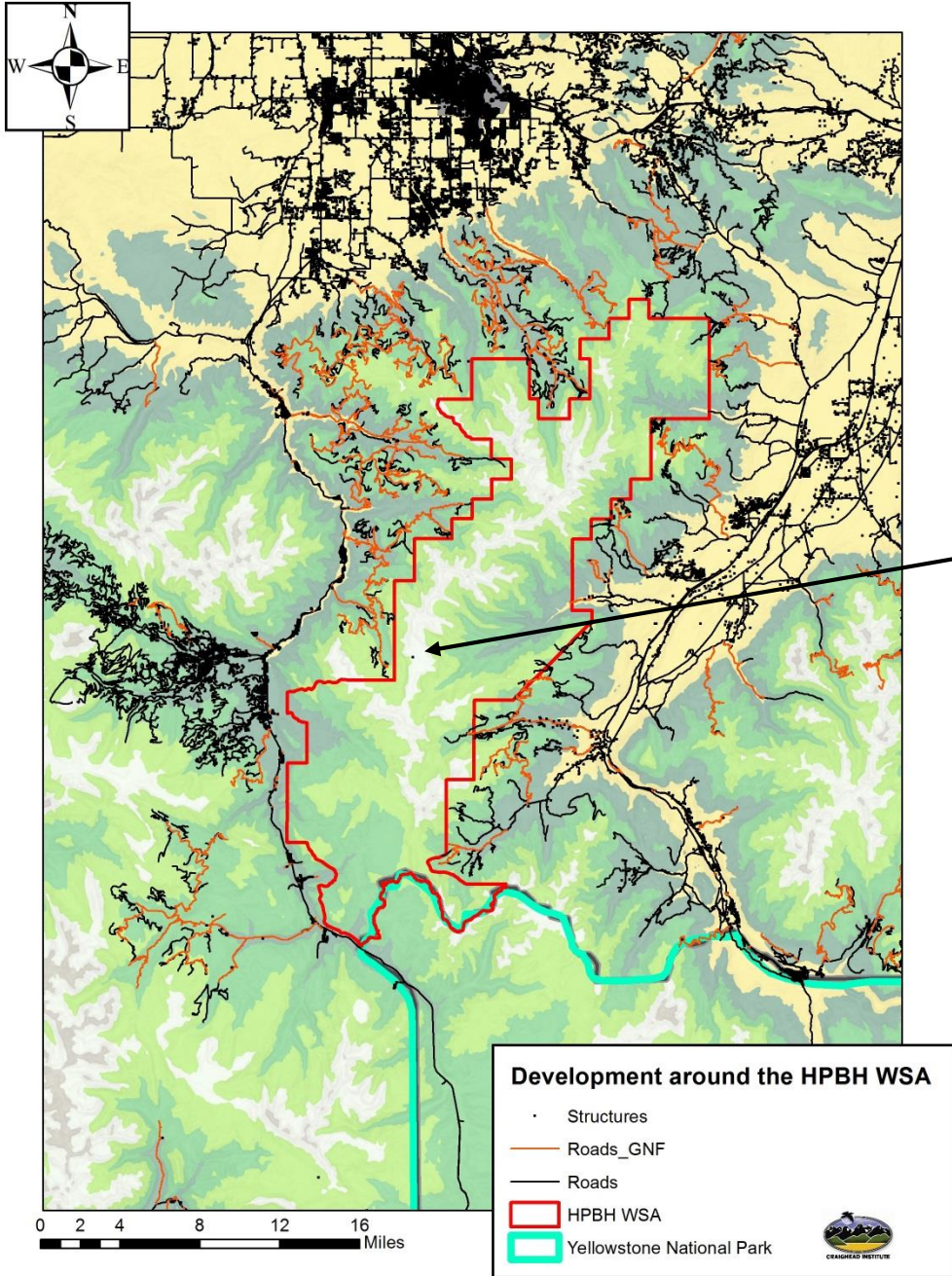
**Elevation**

**Feet**

- 4,245 - 6,000
- 6,000 - 7,000
- 7,000 - 8,000
- 8,000 - 9,000
- 9,000 - 10,000
- 10,000 - 11,220

- Streams



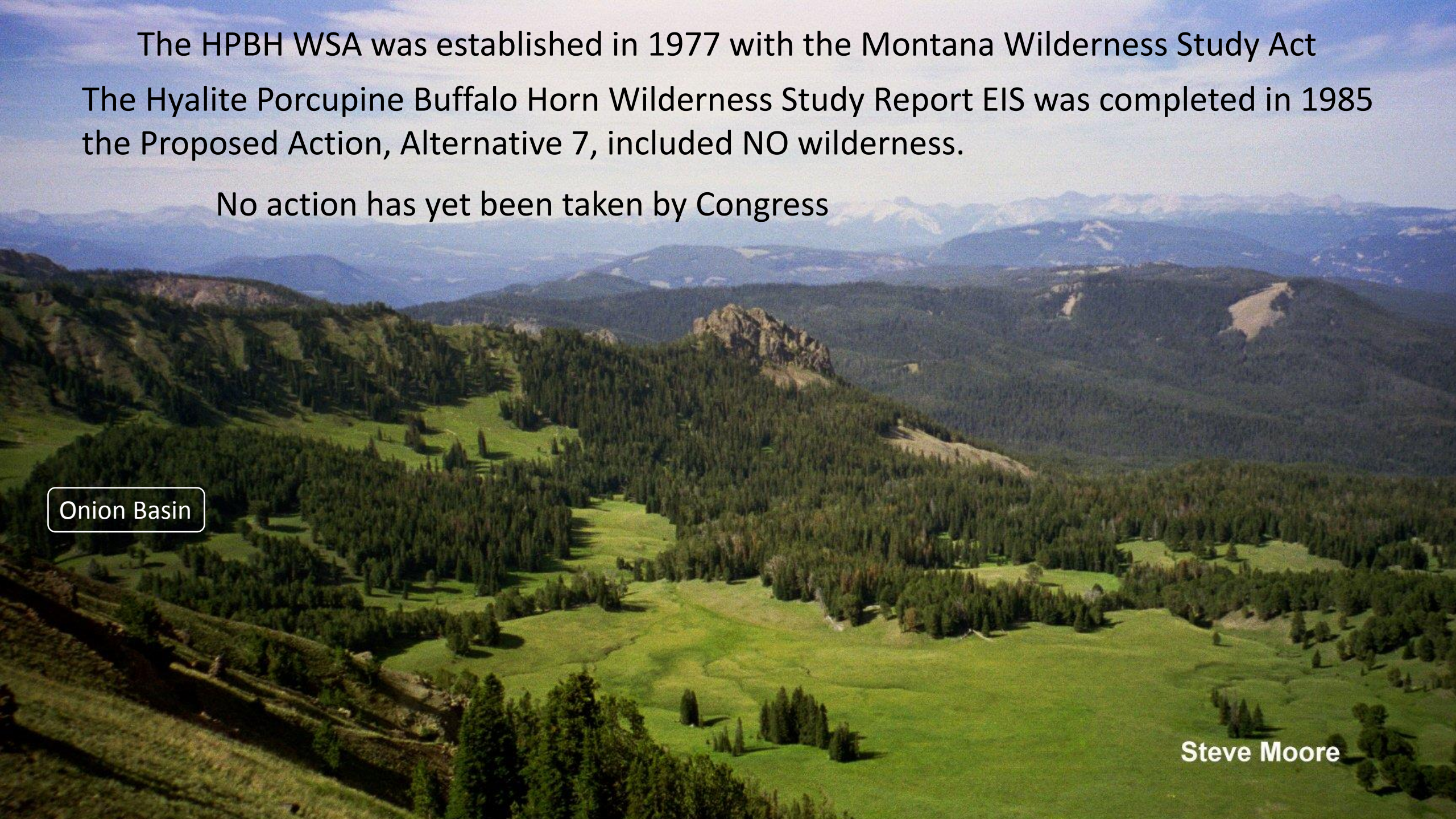
The Windy Pass cabin, the Buffalo Horn administrative cabin, and a small cabin on Eightmile Creek where sheepherders stored salt (burned in 2001)

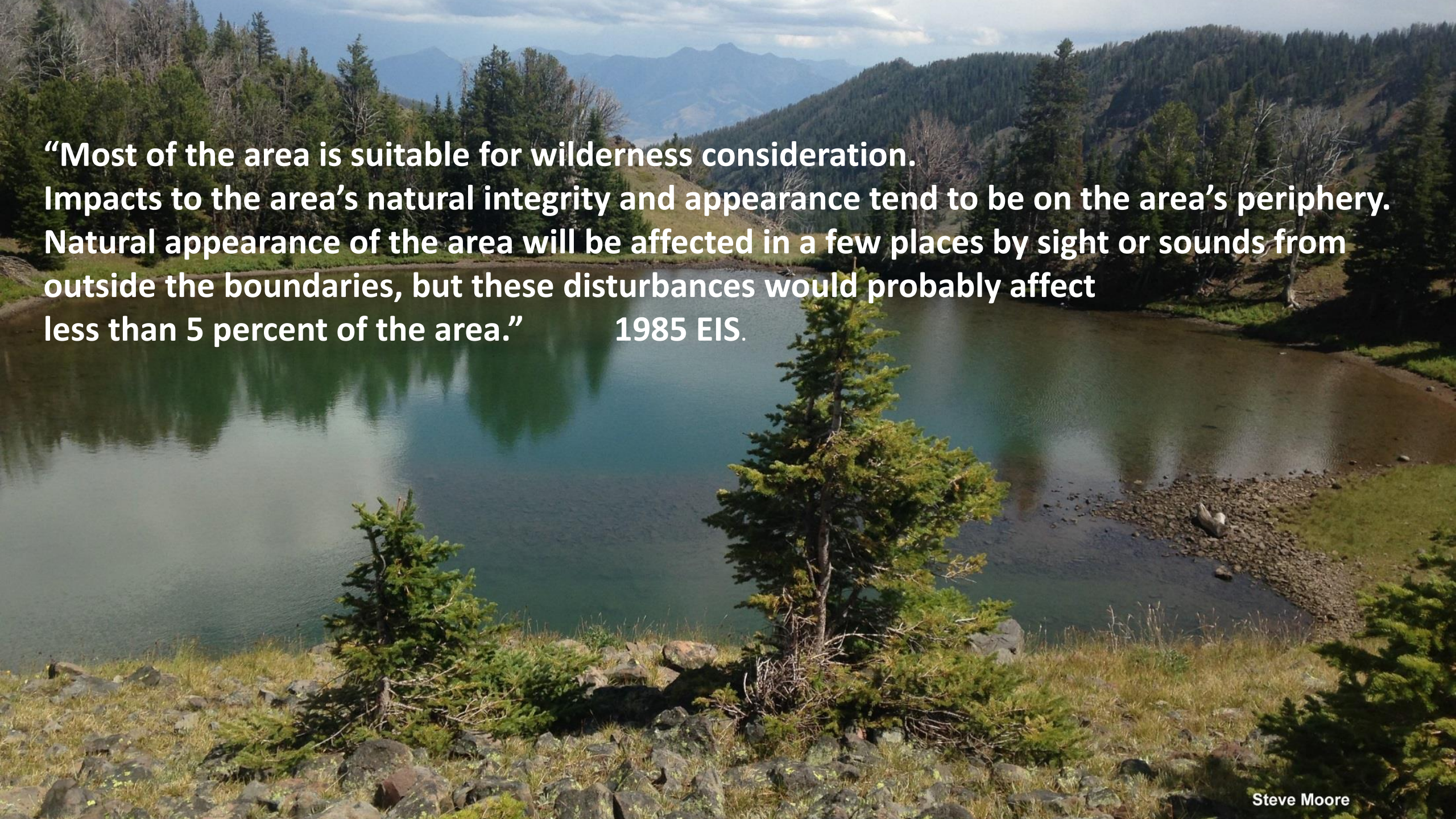
The HPBH WSA was established in 1977 with the Montana Wilderness Study Act  
The Hyalite Porcupine Buffalo Horn Wilderness Study Report EIS was completed in 1985  
the Proposed Action, Alternative 7, included NO wilderness.

No action has yet been taken by Congress

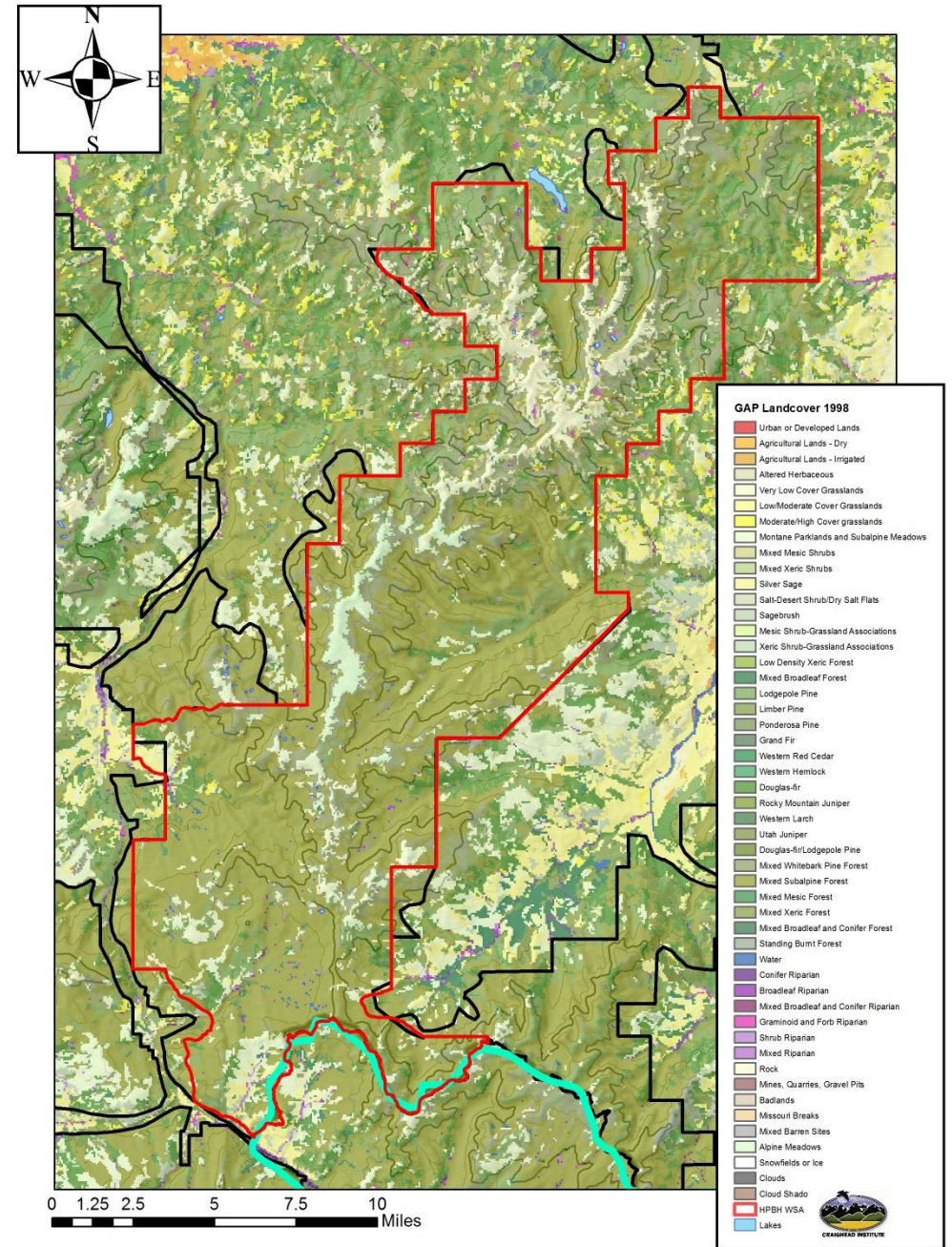
Onion Basin

Steve Moore





**“Most of the area is suitable for wilderness consideration. Impacts to the area’s natural integrity and appearance tend to be on the area’s periphery. Natural appearance of the area will be affected in a few places by sight or sounds from outside the boundaries, but these disturbances would probably affect less than 5 percent of the area.” 1985 EIS.**



To represent the biodiversity of the area we chose seven Focal species.

Bighorn Sheep  
Mountain Goat  
Cutthroat Trout  
Elk  
Grizzly Bear  
Wolverine  
Pika

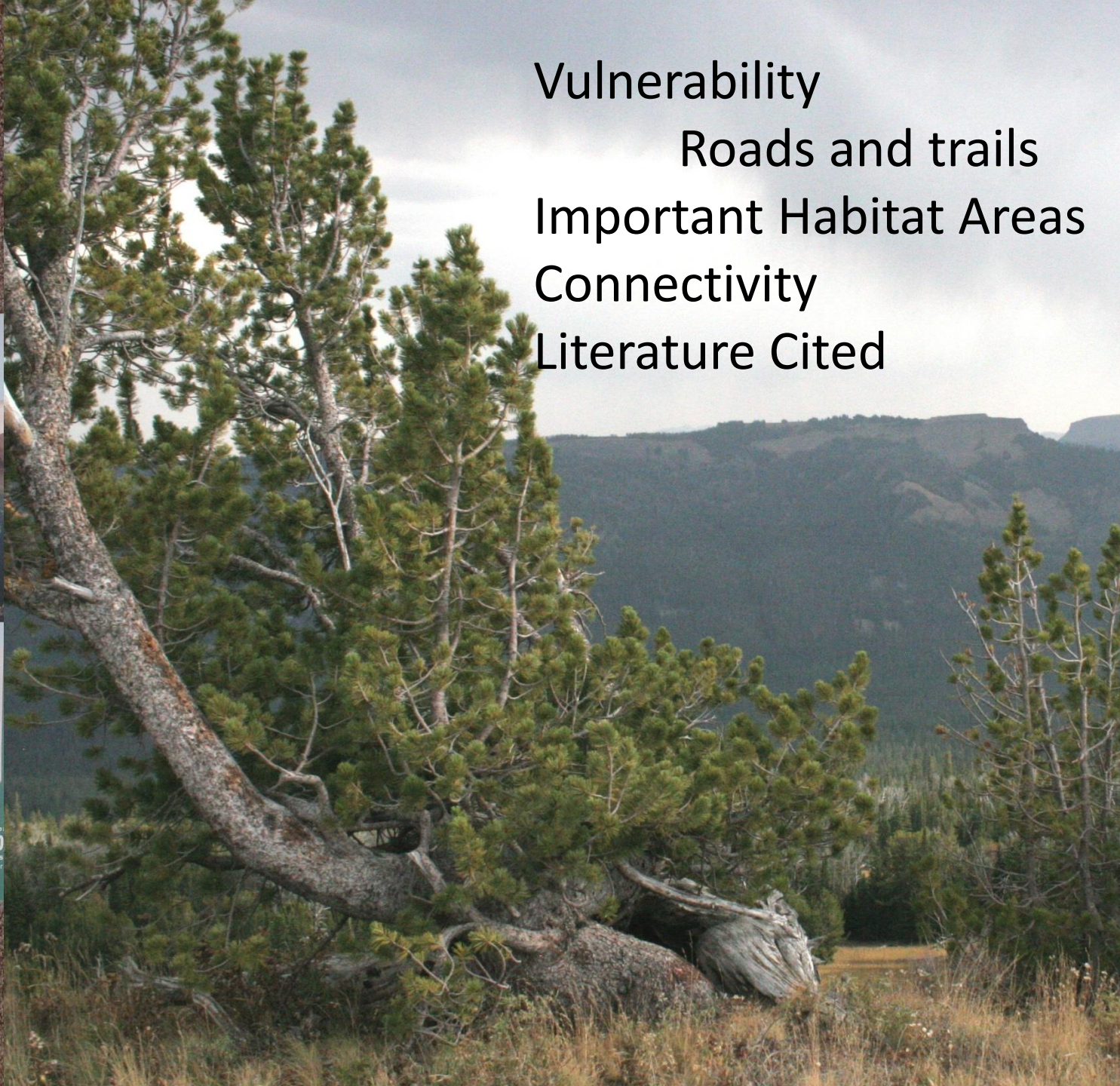
Importance in the ecosystem

Public interest


Available data



Vulnerability  
Roads and trails  
Important Habitat Areas  
Connectivity  
Literature Cited







**Other species mentioned in the report include:**

**Columbia Spotted Frog**

**Boreal Toad**

**Bison**

**Wolf**

**Lynx**

**Fisher**

**Moose**

**Beaver**

# Bighorn Sheep ~219 in 2014

Historically resident

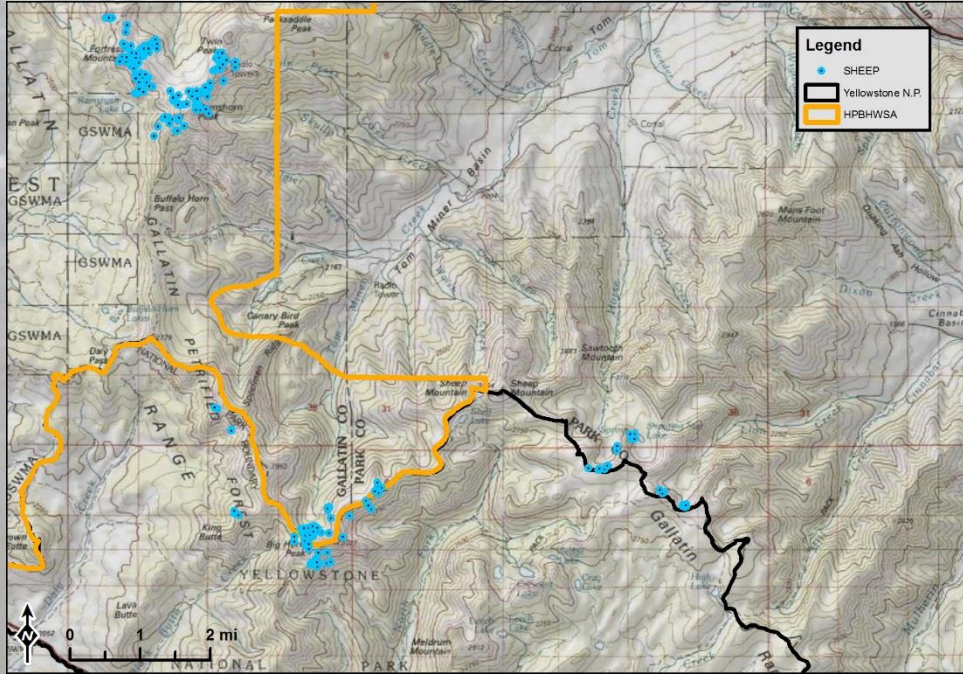


Figure 7. Bighorn Sheep GPS locations in the southern HPBH WSA.  
*Credit – Jesse DeVoe.*

## The Mountain Ungulate Research Initiative

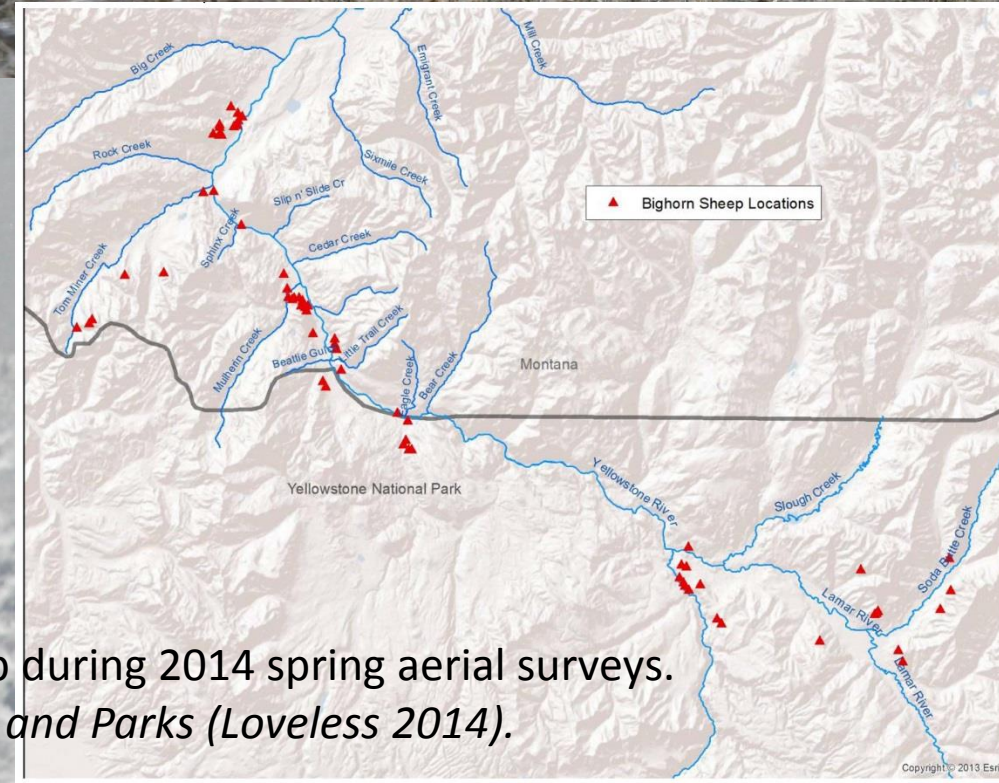


Figure 8. Locations of Bighorn Sheep during 2014 spring aerial surveys.  
*Credit Karen Loveless, Fish, Wildlife, and Parks (Loveless 2014).*



**Madison Valley Wildlife Assessment  
Bighorn Umbrella score = 108/411**

# Mountain Goat

Introduced into the Crazy, Bridger, Madison, Absaroka, and Beartooth Ranges  
between 1941 and 1969 by FWP

Earliest record in HPBH WSA was in 1965 on Bighorn Peak

180 counted in HD314 in 2014  
Increasing since 1990

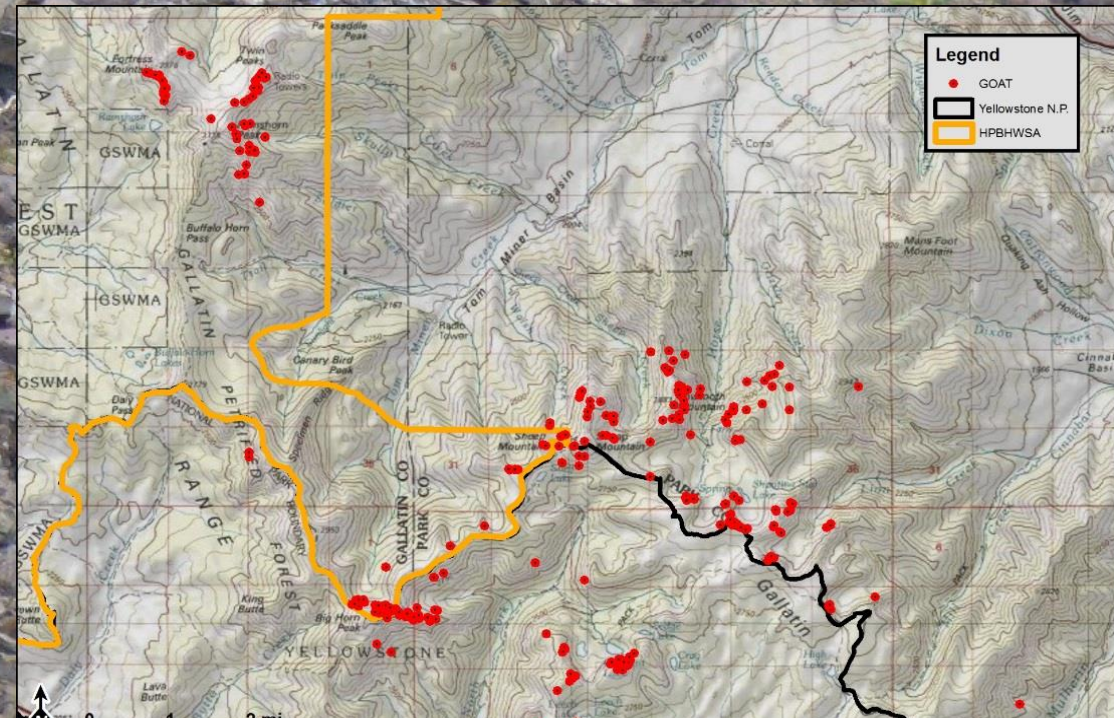


Figure 9. Mountain Goat GPS locations in the southern HPBH WSA.  
Credit: Jesse DeVoe

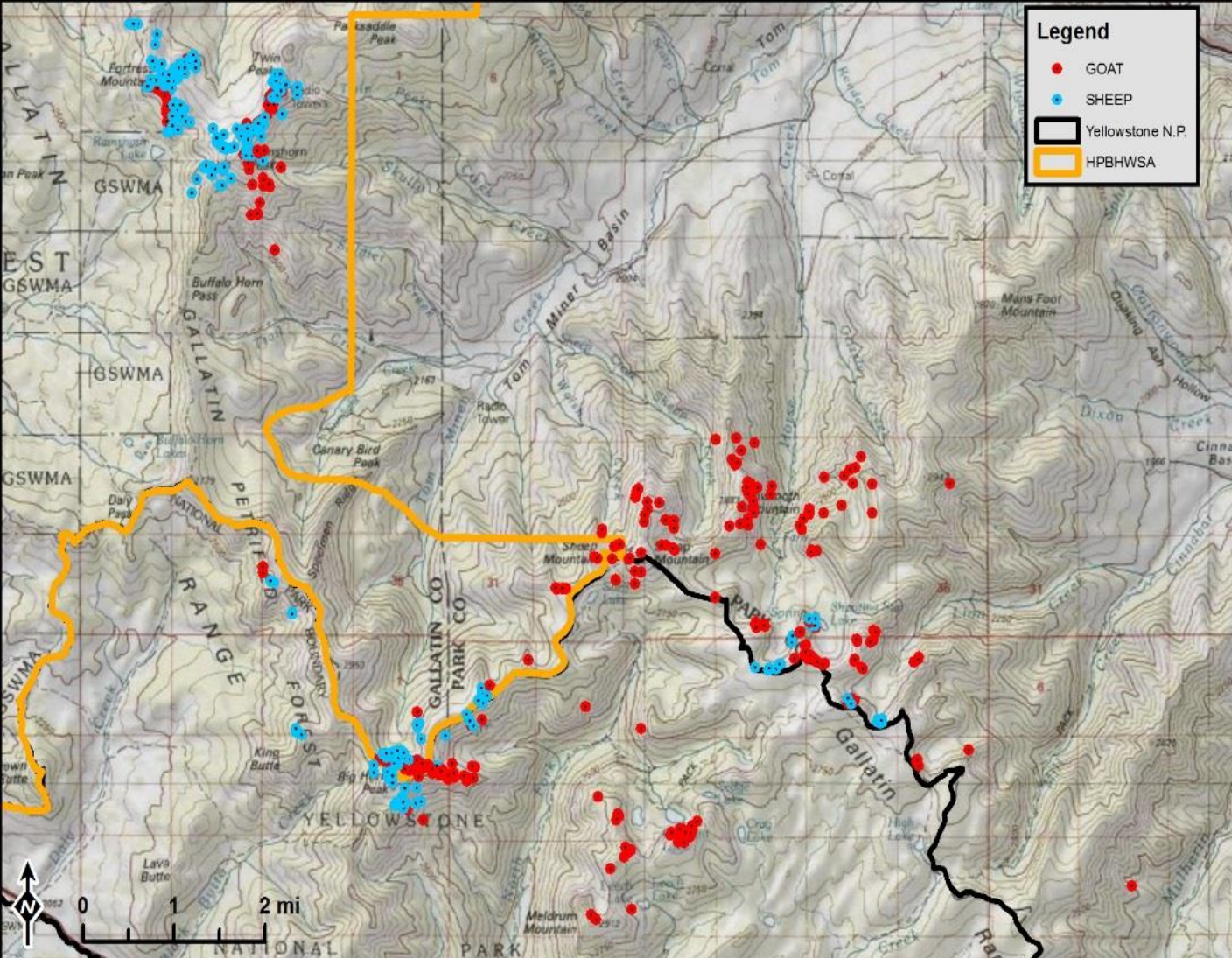


Figure 10. Bighorn Sheep and Mountain Goat GPS locations in the southern HPBH WSA.  
 Credit: Jesse DeVoe

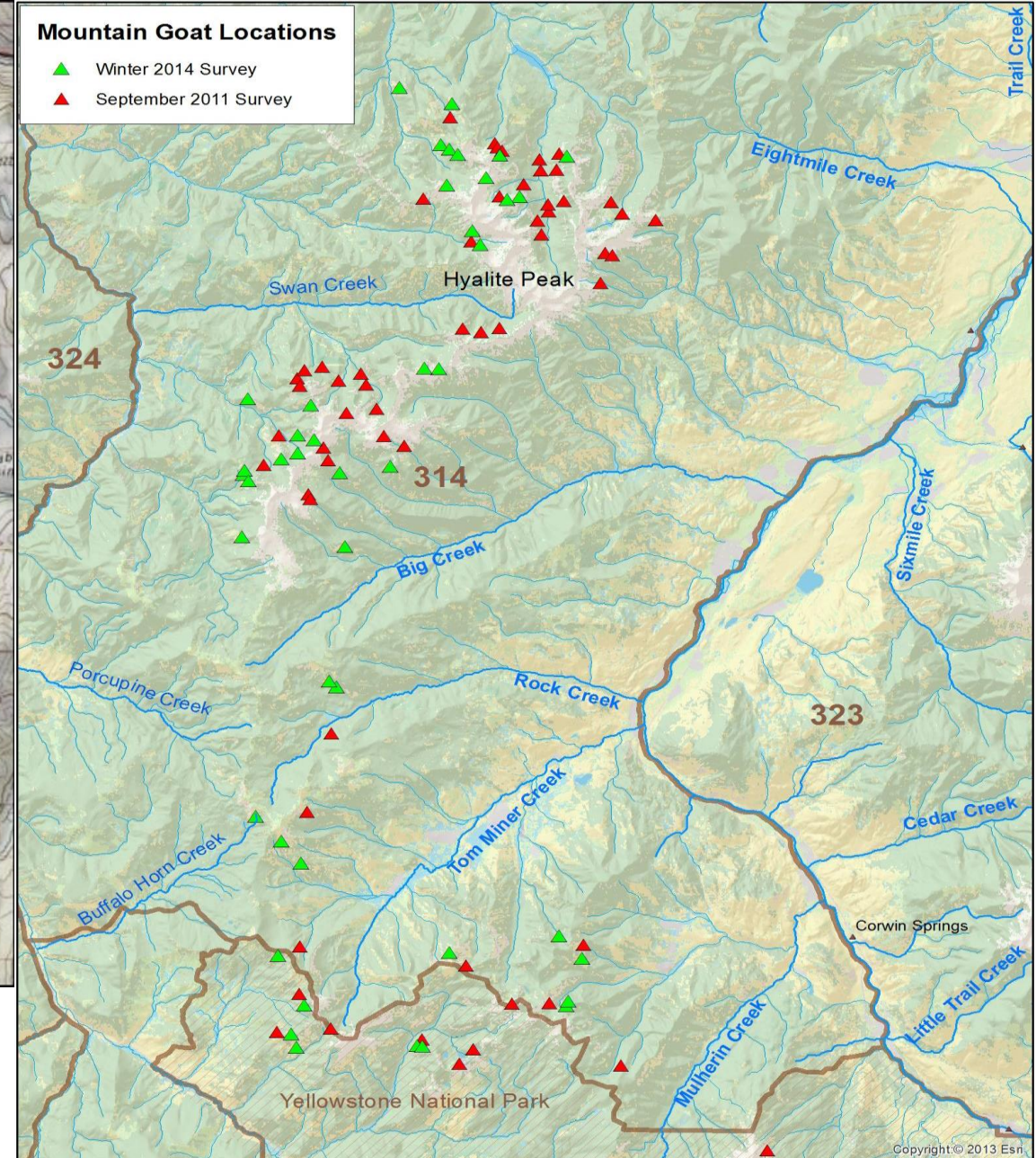
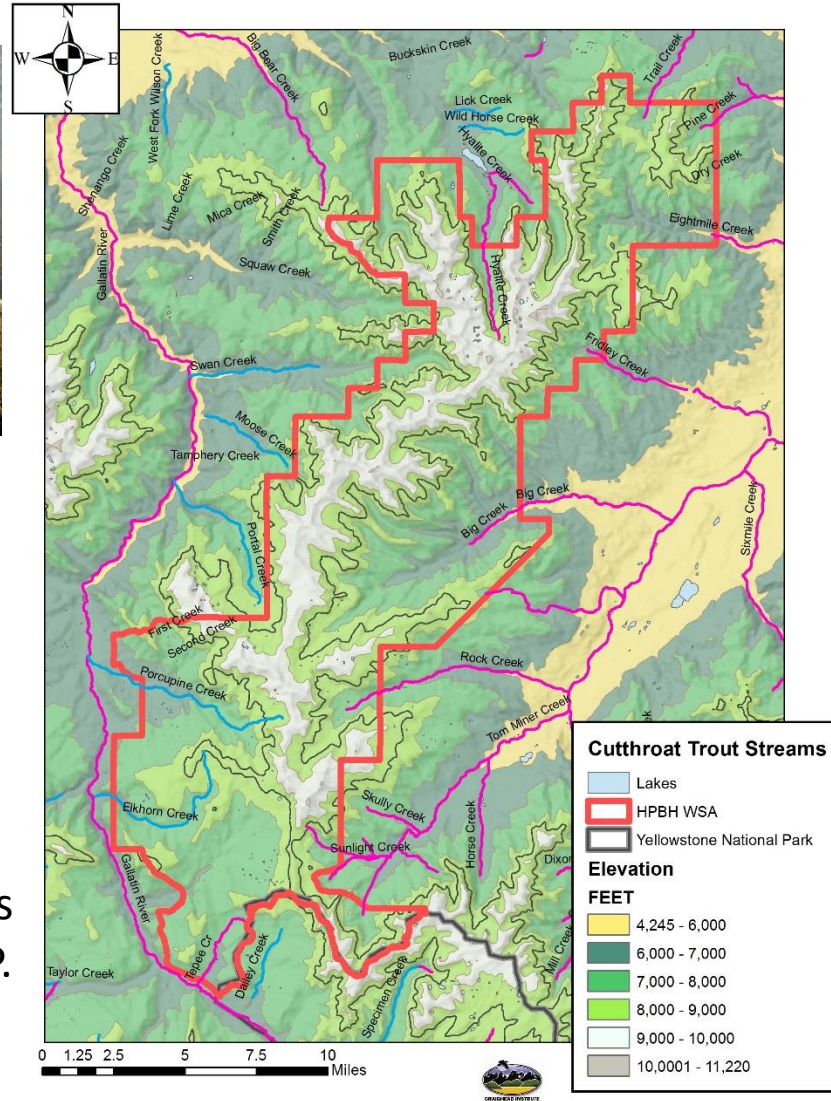


Figure 11. Locations of Mountain goats from aerial surveys of HD314 during 2011 and 2014.  
 Credit: Karen Loveless, Fish Wildlife, and Parks (Loveless 2014).

# Cutthroat Trout



YCT were indigenous to the Yellowstone River drainage and WCT were indigenous to the Gallatin River drainage



WCT: 2% in national parks  
19% in FS wilderness areas,  
21% in FS roadless areas  
(excluding wilderness areas),  
and 30% in other federally managed lands.

Madison Valley Wildlife Assessment  
WCT Umbrella score = 288/411



*Pink colored streams in Figure 12 have Yellowstone Cutthroat Trout and Blue colored streams have Westslope Cutthroat Trout.*

# Elk



9 elk herd units utilizing HPBH WSA  
~6,000 wintering elk in 2010



Madison Valley Wildlife Assessment  
Elk Umbrella score = 322/411



## Elk Security Habitat

Lyon's : 0.75 mi/mi<sup>2</sup>

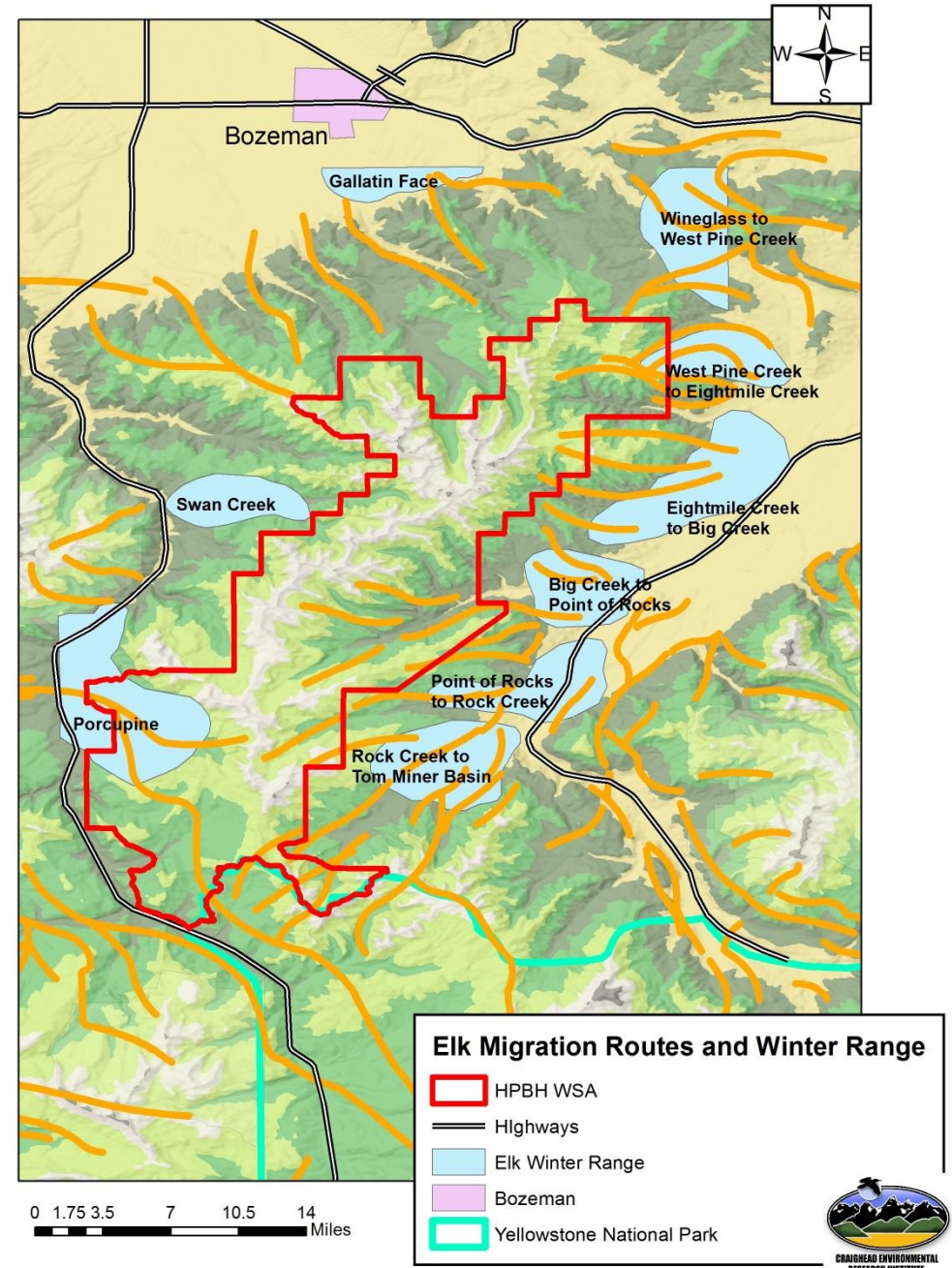
250 acres

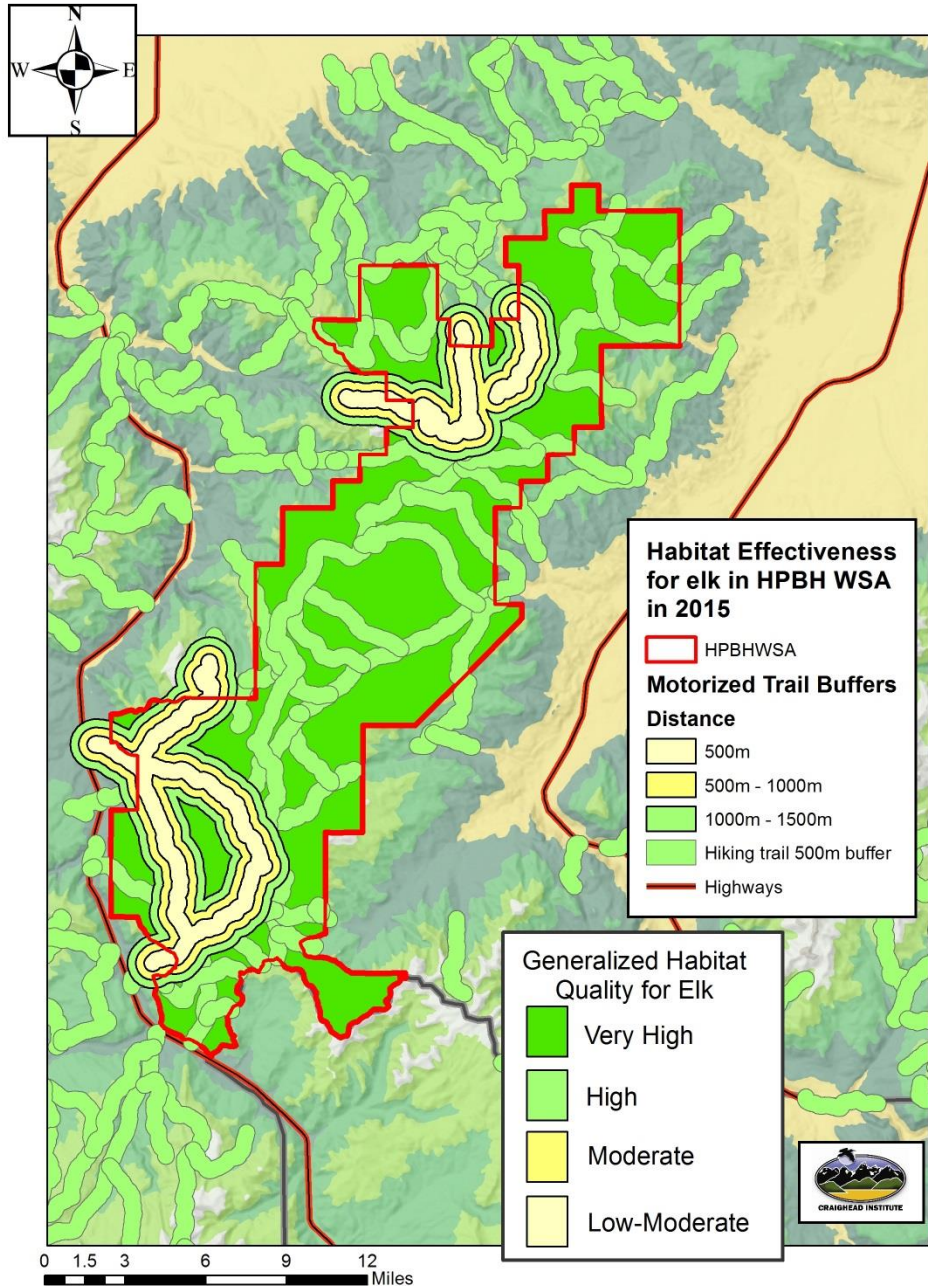
Helena NF: 1,000 acres

Gallatin NF: research underway  
Between USFS and FWP

Displacement of elk (avoidance of habitat near trails) can extend up to 500 meters (550 yards) from a hiker, beyond 750 meters (820 yards) from horseback riders, and beyond 1500 meters (1,640 yards) from mountain bike and ATV riders according to some studies, while other studies arrived at different distances. Most studies agree however that hikers create the least disturbance, followed by horses, mountain bikes, motorcycles and ATV/ORVs

Figure 13. Elk Migration Routes (Orange lines) and Winter Ranges.  
*Credit: Regan Lyons, Wildlife Conservation Society (migration routes) and Steve Gehman, Wild Things Unlimited (winter ranges).*

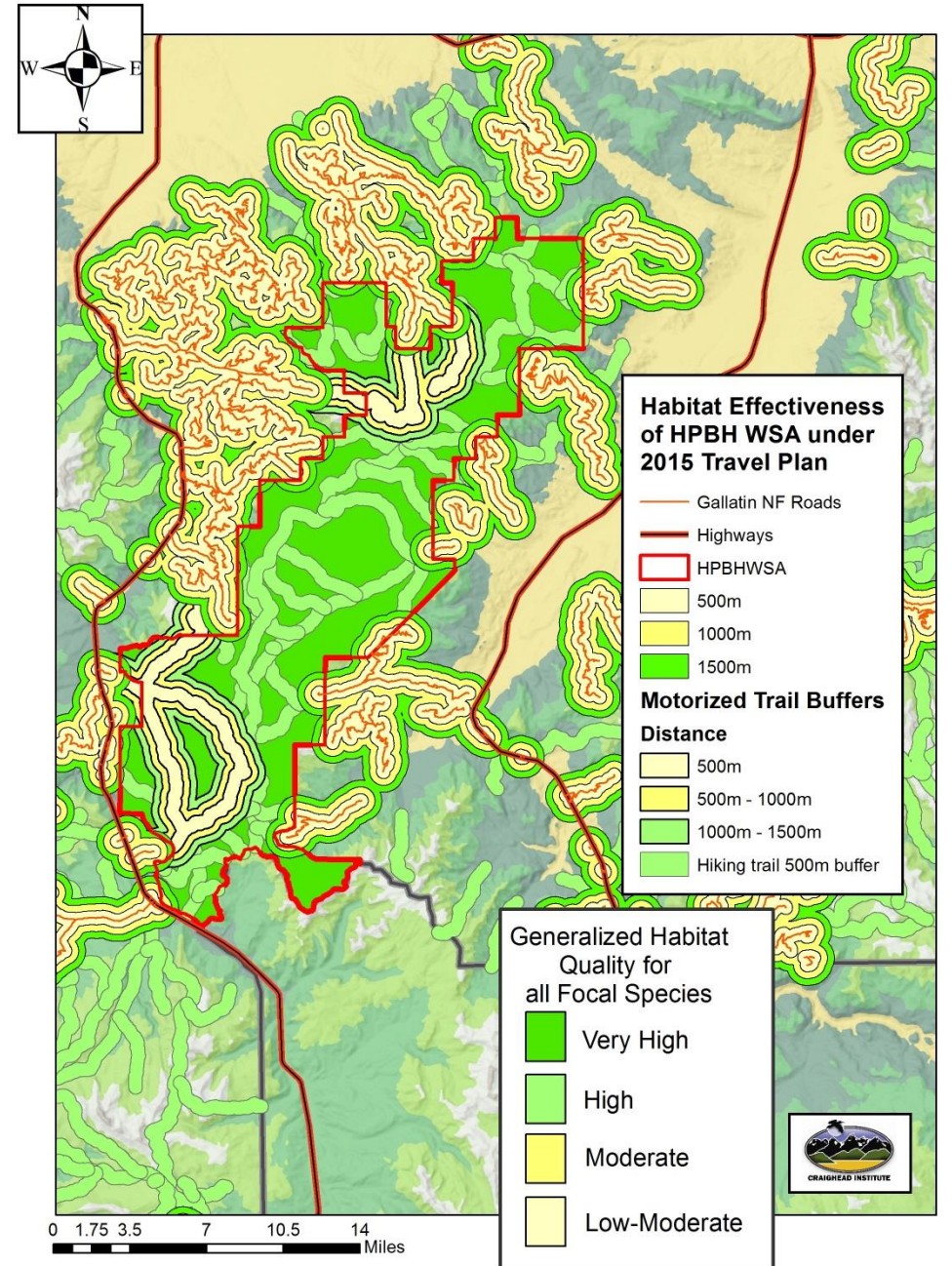




Habitat -  
Capability

Suitability

Effectiveness



# Grizzly Bear

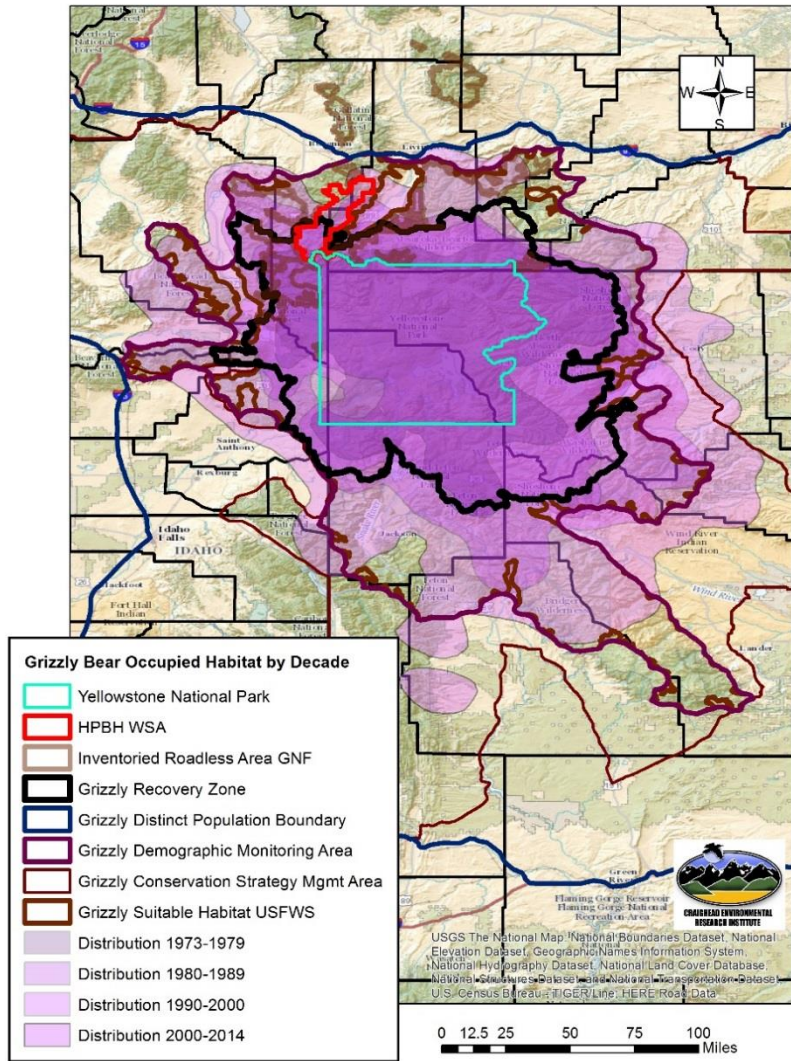
Madison Valley Wildlife Assessment  
Grizzly Umbrella score = 300/411







Roads have been shown to be the most important variable correlating human influence on grizzly habitat. Trails with motorized traffic have effects on wildlife that are similar to roads.



From 1973-1979 grizzlies only occupied the southern tip of the HPBH WSA. From 1980-1989 the population expanded to include Porcupine Creek and Rock Creek drainages and the headwaters of Big Creek. From 1990-2000 the population expanded primarily on the eastern half of the HPBH WSA to include Big Creek, Dry Creek, and Fridley Creek drainages. By 2014, grizzly bears had been documented as using almost all of the HPBH WSA

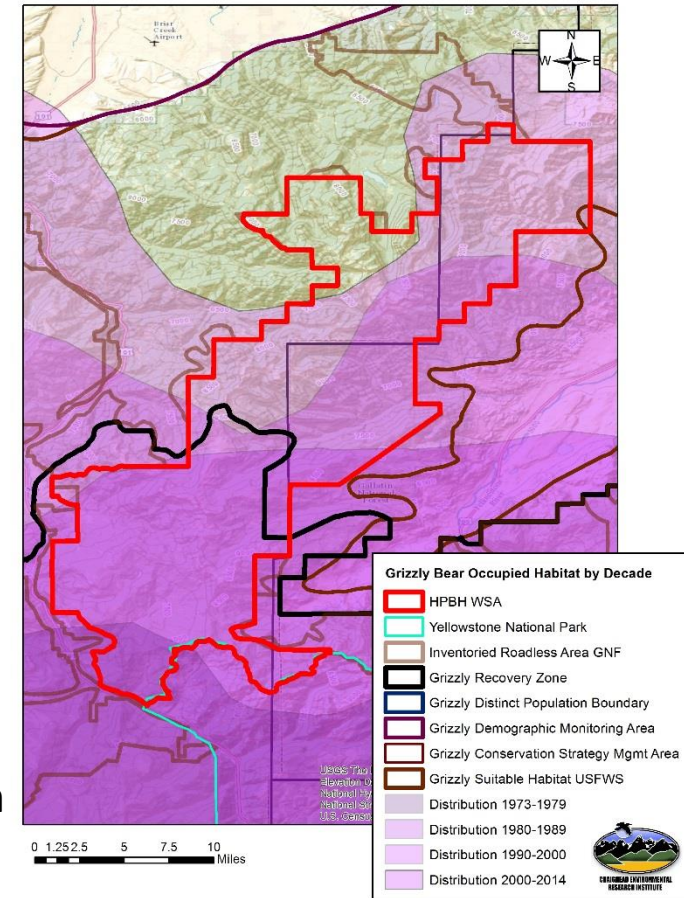


Figure 14. Regional Distribution of Grizzly Bears by Decade in the Greater Yellowstone Ecosystem. *Credit: Interagency Grizzly Bear Study Team.*

Figure 15. Grizzly Bear Population Expansion by Decade in the HPBH WSA. *Credit: Interagency Grizzly Bear Study Team.*

Regional Scale Grizzly Bear  
Combined Analysis for the Central Rockies

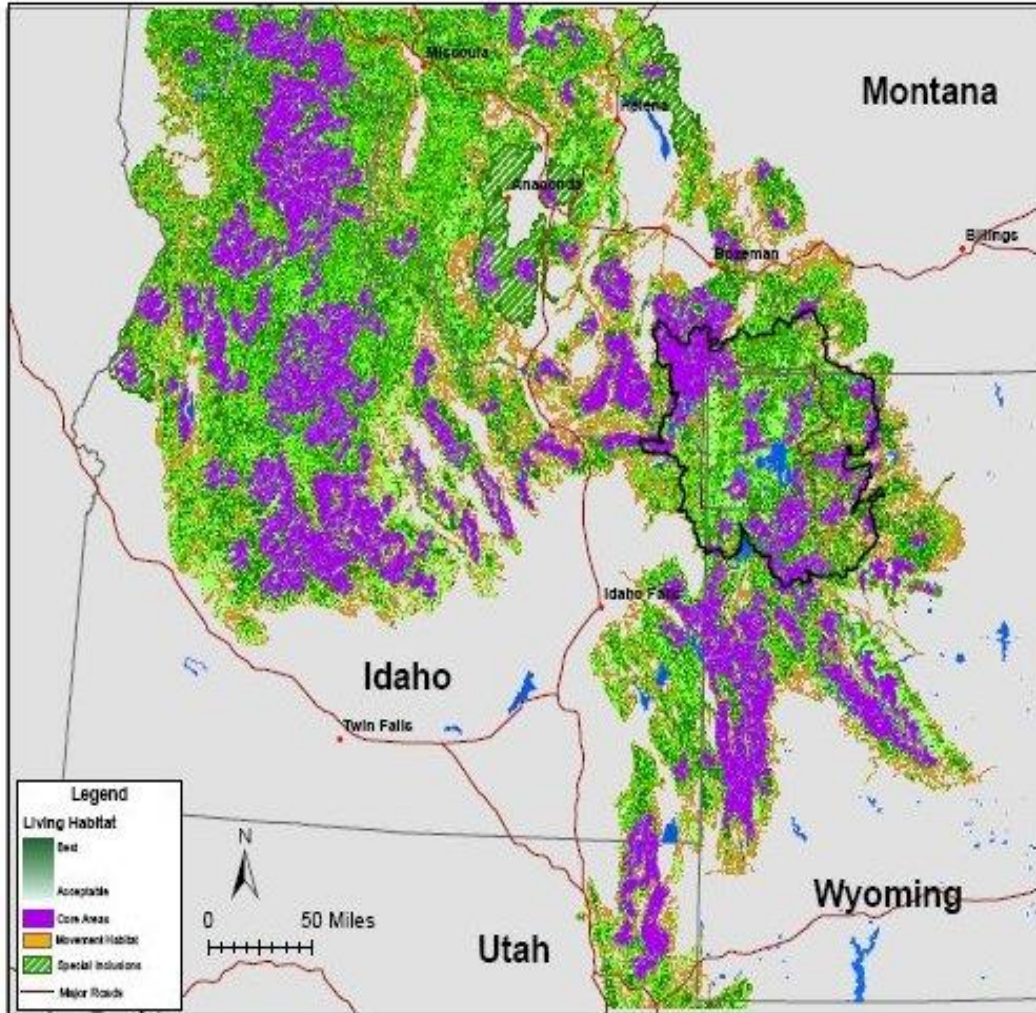


Figure 17. Combined grizzly living and connectivity habitat.  
*Credit: Craighead Institute, Thomas Olenicki*

Regional Scale Grizzly Bear  
Connectivity Analysis for the Central Rockies

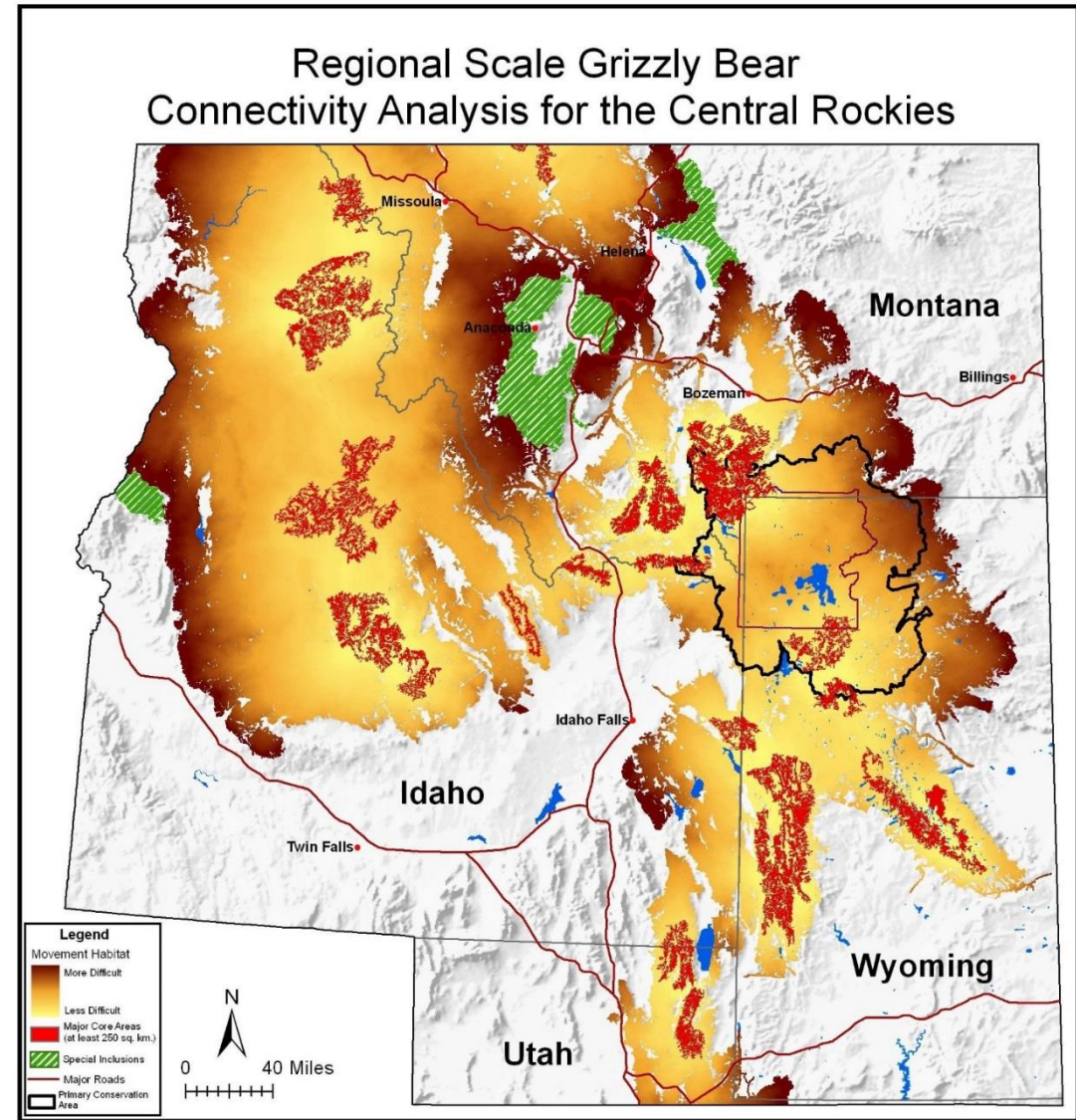
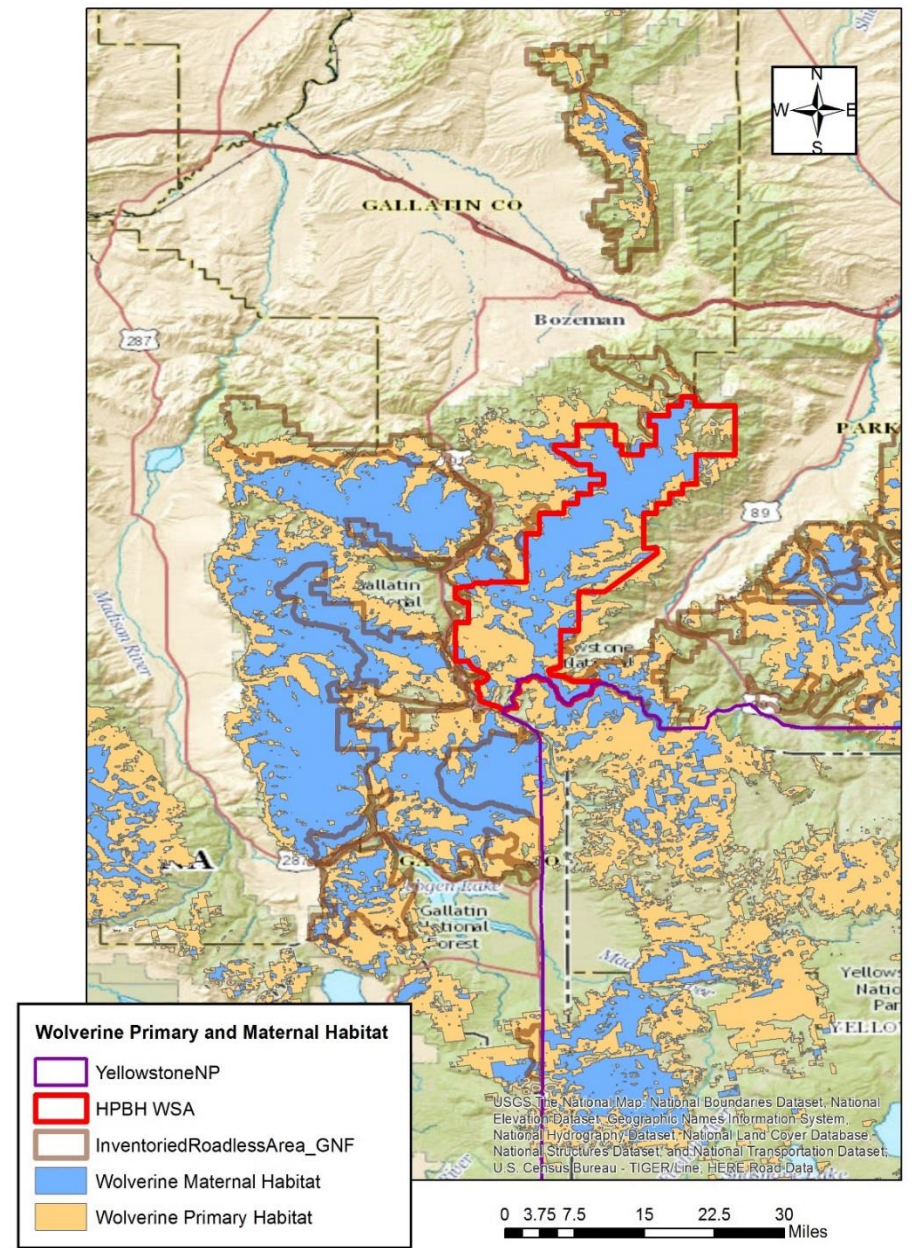


Figure 18. Regional Connectivity for Grizzly Bears.  
*Credit: Craighead Institute, Thomas Olenicki*

# Wolverine



*Credit: Robert Inman, WCS.*





Madison Valley Wildlife Assessment  
Wolverine Umbrella score = 150/411

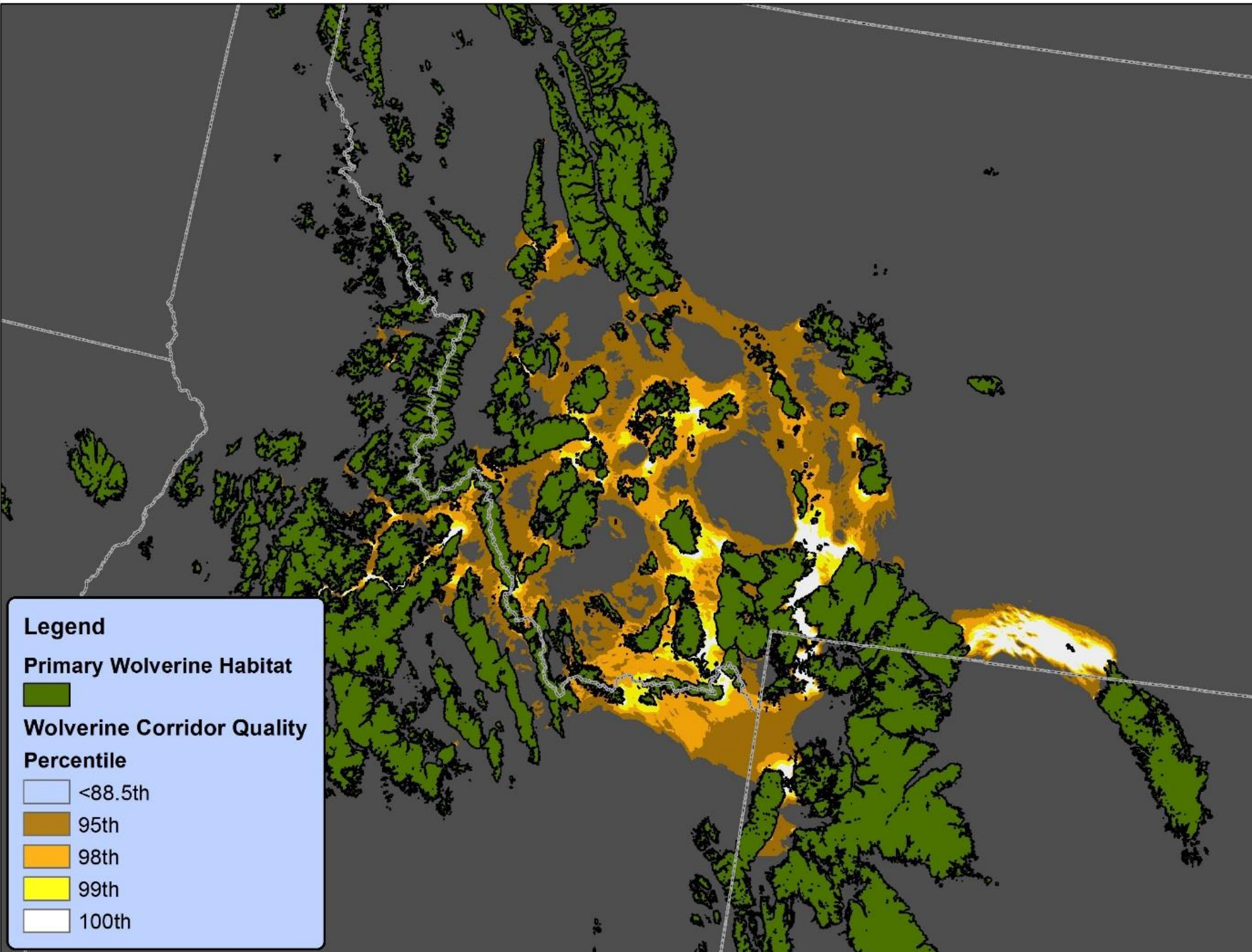


Figure 20. Regional Wolverine Connectivity Corridors. Brighter colors indicate less resistance to movement. Credit: Robert Inman, WCS.

# Pika

A close-up photograph of a pika mouse, a small rodent with a greyish-brown body and long whiskers, perched on a large, light-colored rock. The mouse is facing right, and its tail is visible. The background consists of a dense field of similar rocks, creating a talus slope. The lighting is bright, casting shadows on the rocks.

**Pikas are likely to be found in any large talus slopes above 8,500 ft in the HPBH WSA. In addition there are known colonies as low as 6,000 feet in Gallatin Canyon**

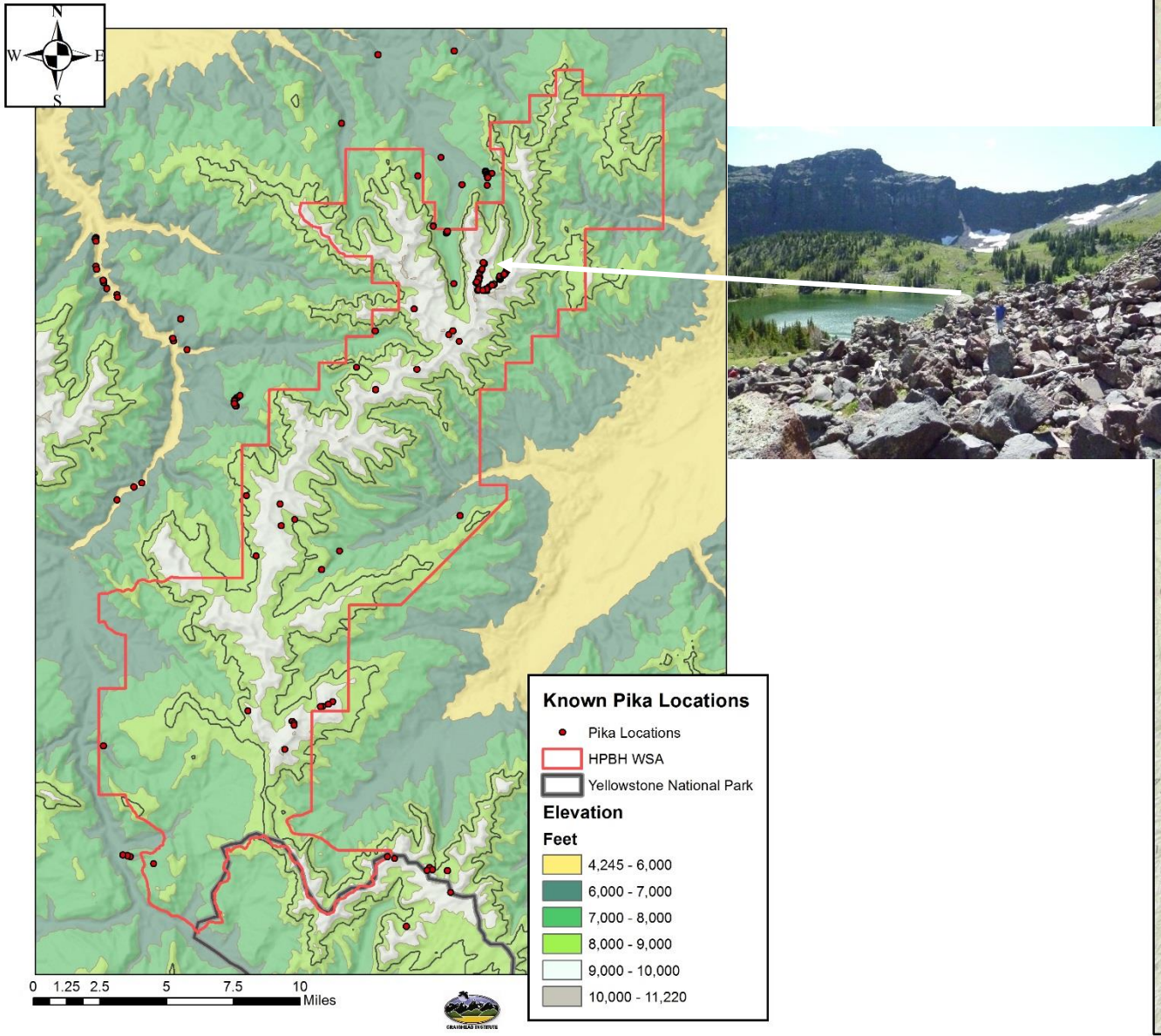


Figure 21. Known Pika Locations 2015.  
 Credit: Craighead Institute, April Craighead

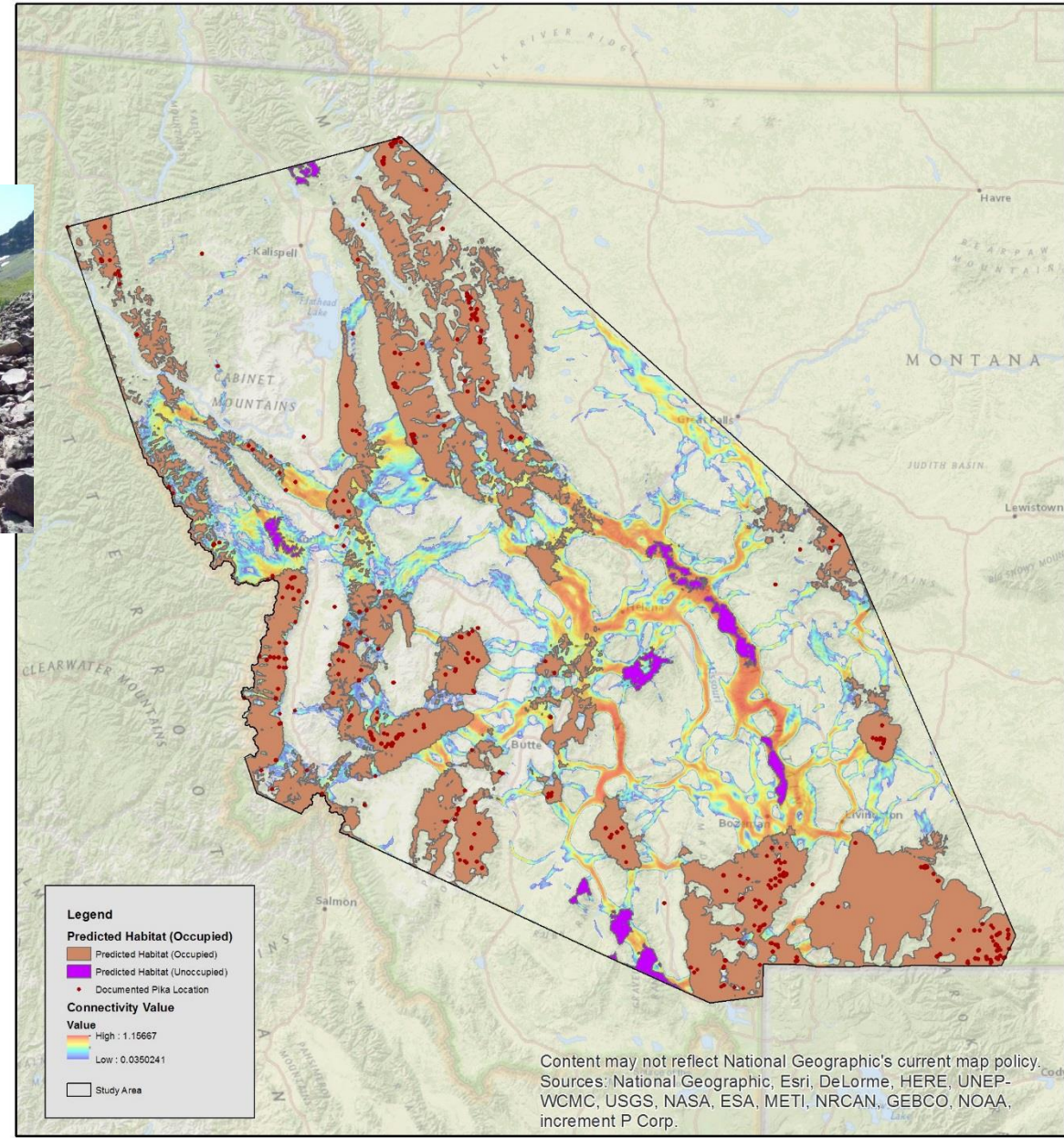


Figure 22. Pika Predicted Habitat and Connectivity in Montana.  
 Credit: Craighead Institute, Brent Brock, April Craighead

Pikas are extremely vulnerable  
to climate change



Bison



# Wolves





Moose



# Lynx and Fisher



Steve Moore

# Amphibians

Madison Valley Wildlife Assessment

Columbia Spotted Frog Umbrella score = **359**

Boreal Toad Umbrella score = **401**



Species	Conservation Value of the northern HPBH WSA	Conservation Value of the central HPBH WSA	Conservation Value of the southern HPBH WSA
Bighorn Sheep	Very High	Very High	Very High
Mountain Goat	Very High	Very High	Very High
Cutthroat Trout	Very High	Very High	Very High
Elk	High-Moderate	Very High	High-Moderate
Grizzly Bear	High-Moderate	Very High	High-Moderate
Wolverine	Very High	Very High	Very High
Pika	Very High	Very High	Very High
Composite	High-Very High	Very High	High-Very High

Table 2. Qualitative Conservation (Habitat Effectiveness) Values of the HPBH WSA.





Steve Moore

<b>Research Natural Area</b>	<b>Highest</b>	<b>Scientific research</b>	<b>Permanent*</b>
<b>National Park</b>	<b>High</b>	<b>Hiking, Skiing, Horseback, no mechanized use, no hunting</b>	<b>Permanent*</b>
<b>National Monument National Conservation Area</b>	<b>High</b>		<b>Permanent*</b>
<b>Wilderness Area</b>	<b>High</b>	<b>Hiking, Skiing, Horseback, hunting, no mechanized use</b>	<b>Permanent*</b>
<b>National Scenic Area</b>		<b>Varies from area to area</b>	<b>Permanent*</b>
<b>Primitive Dispersed Recreation Area</b>		<b>Non-motorized use</b>	<b>Temporary: Travel Plans or Forest Plans are revised</b>
<b>Special Interest Area</b>		<b>Varies from area to area: mechanized use, livestock grazing, and visitor sites.</b>	<b>Temporary:</b>
<b>Special Recreation Area</b>		<b>Varies from area to area</b>	<b>Temporary:</b>
<b>Motorized Dispersed Recreation Area</b>		<b>Motorized use</b>	<b>Temporary:</b>
<b>Motorized Route</b>			
<b>Range Allotment</b>		<b>Livestock grazing</b>	<b>Temporary: requires permit renewal</b>
<b>Timber Harvest Units</b>	<b>Low</b>		<b>Temporary:</b>

Methods of Changing Land Designation	Time frame of Designation
Forest Plan Revision	Temporary
Forest Travel Plan Revision	Temporary
Act of Congress based on NEPA	Permanent*
Act of Congress based on Congressional Bill	Permanent*
Presidential Decree	Permanent*

Special interest-based  
With trade-offs

Science –based with  
public participation

\* Congressional and Presidential actions can generally be revoked by other Congresses or Presidents





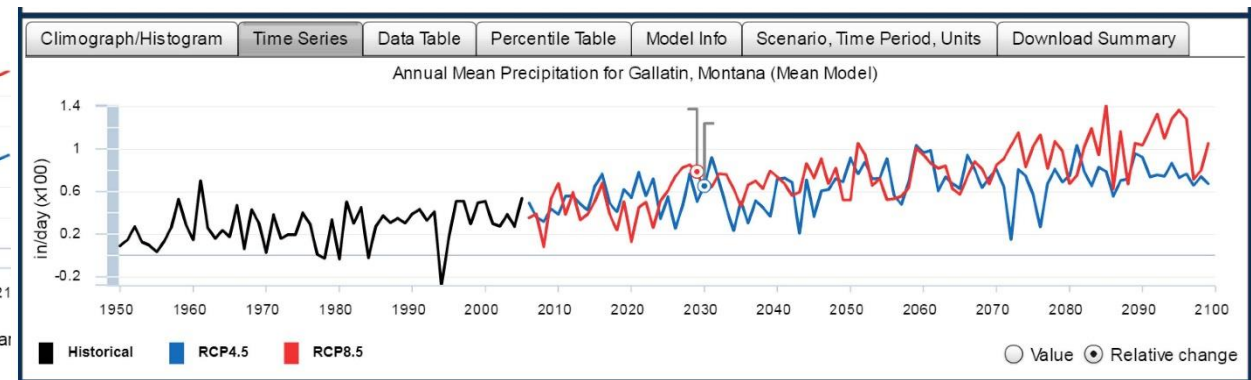
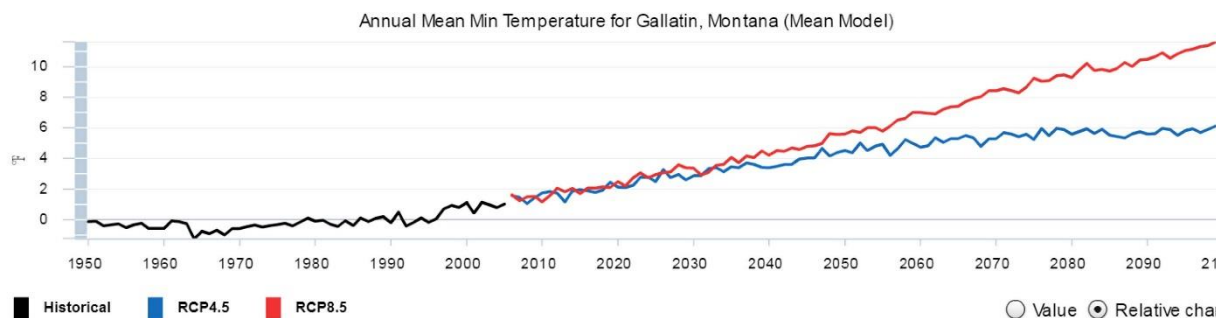
# Climate Change

Recent Climate Change Assessments have concluded that the GYE and Gallatin NF will experience continued warming temperatures, decreasing springtime snowpack, and decreasing late season soil moisture.

This warming is associated with earlier spring snowmelt, warmer summer conditions, and a longer growing season and fire season

The biggest change in precipitation in Gallatin County will come in snowfall amounts and patterns, and snow water equivalences

USGS National Climate Change Viewer - historical (past 56 years) and future climate projections from 30 of the downscaled models for two of the RCP emissions scenarios; RCP 4.5 and RCP 8.5.



# Adaptwest: Climate velocity data for all of North America at 1km resolution

Figure 38. Forward climate velocity 1995-2055 - Scenario 4.5.

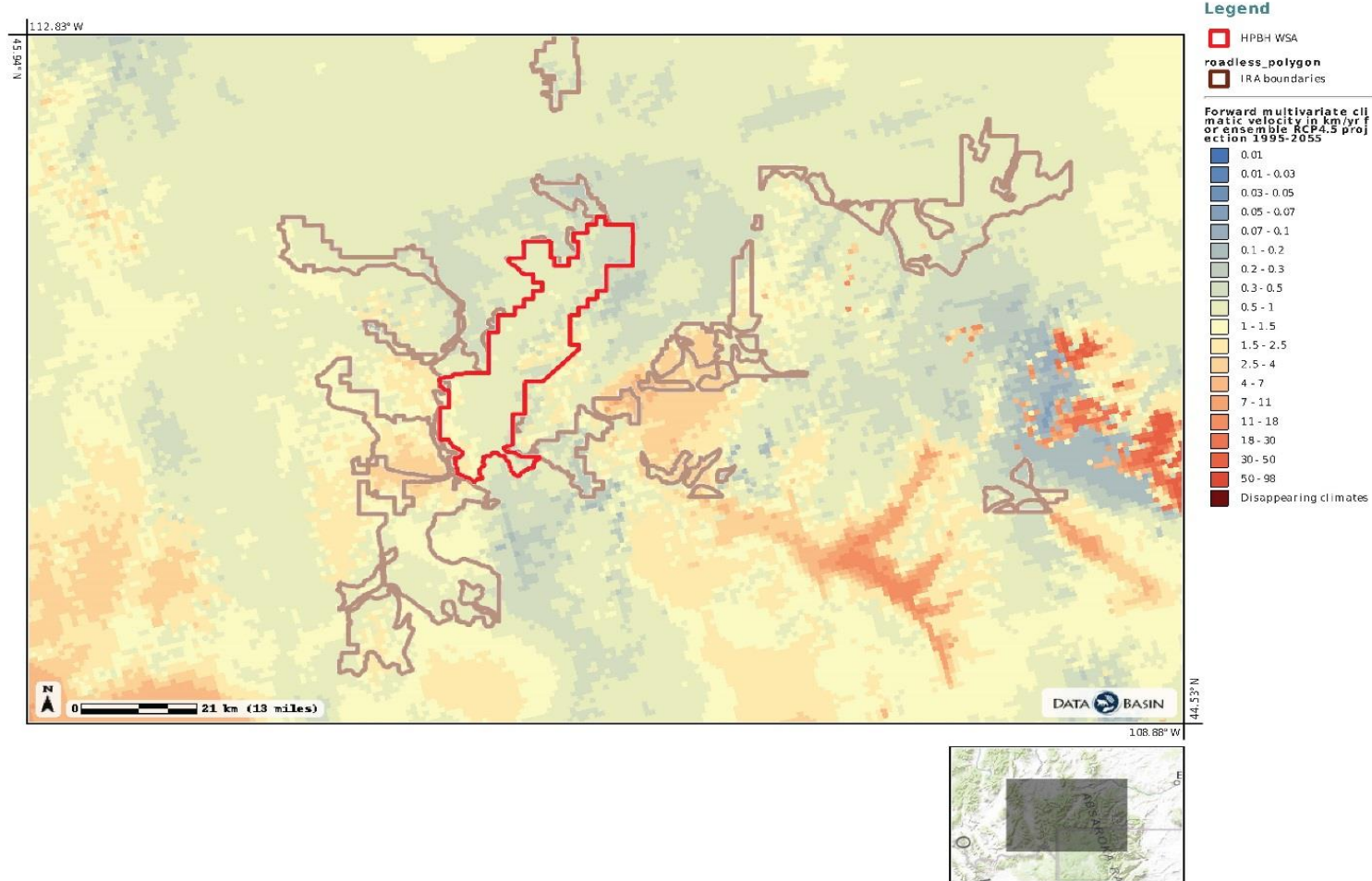


Figure 38 shows predictions for a shorter time frame and assuming great efforts are made right now in reducing greenhouse gas emissions (RCP 4.5). In this scenario the HPBH WSA fares quite well and the current species do not have to move fast or far to find a similar climatic niche (plant and animal communities will not change precipitously).

Figure 39. Forward climate velocity 1995-2085 - Scenario 4.5.

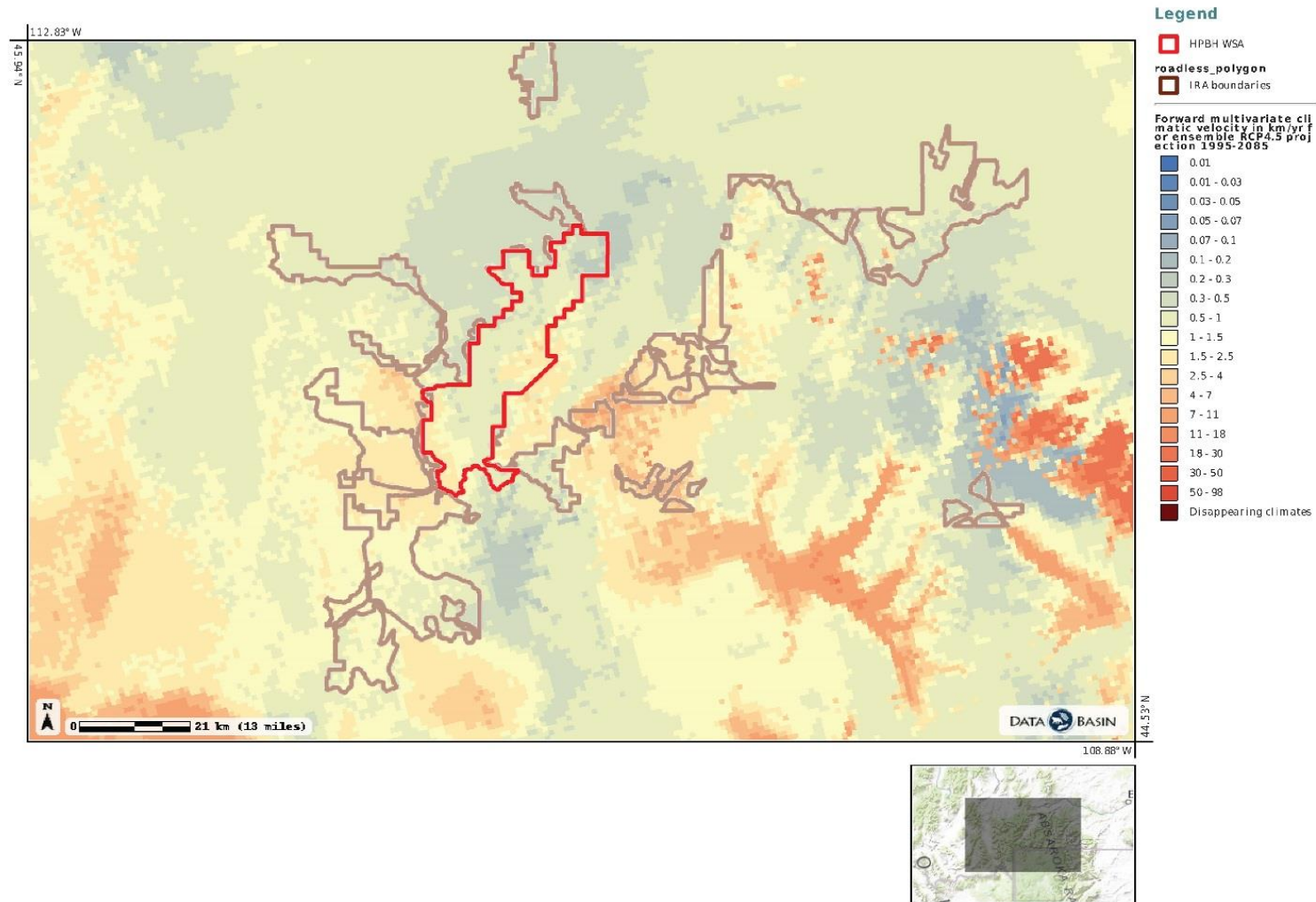


Figure 39 shows predictions for a longer time frame and assuming great efforts are made right now in reducing greenhouse gas emissions (RCP 4.5). In this scenario the HPBH WSA also fares quite well and species do not have to move fast or far to find a similar climatic niche

Figure 40. Forward climate velocity 1995-2055-8.5

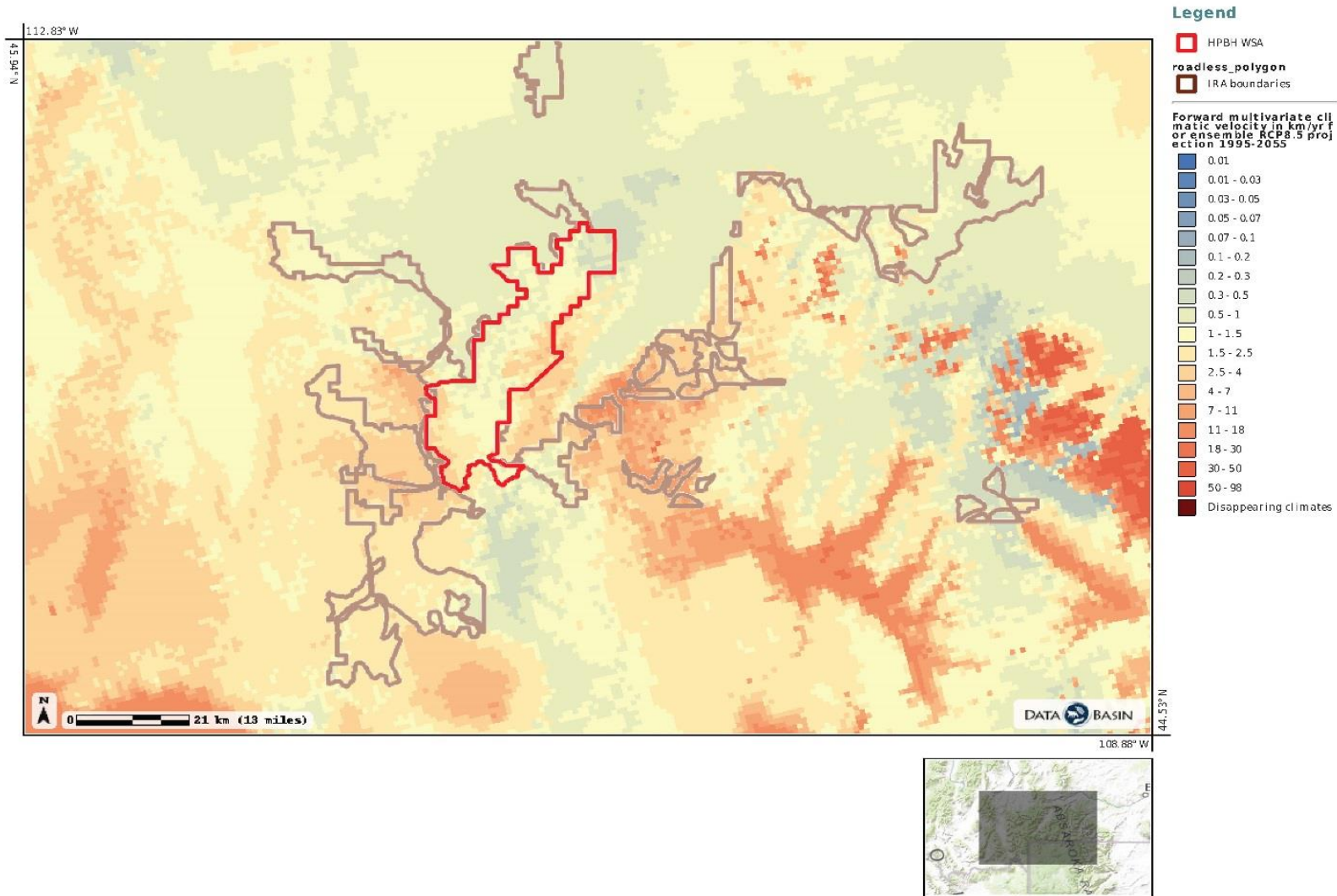


Figure 40 shows predictions for a longer time frame and assuming few efforts are made right now in reducing greenhouse gas emissions (RCP 8.5). In this scenario the HPBH WSA fares moderately well and species have to move moderately fast or far to find a similar climatic niche

Figure 41. Forward climate velocity 1995-2085-8.5

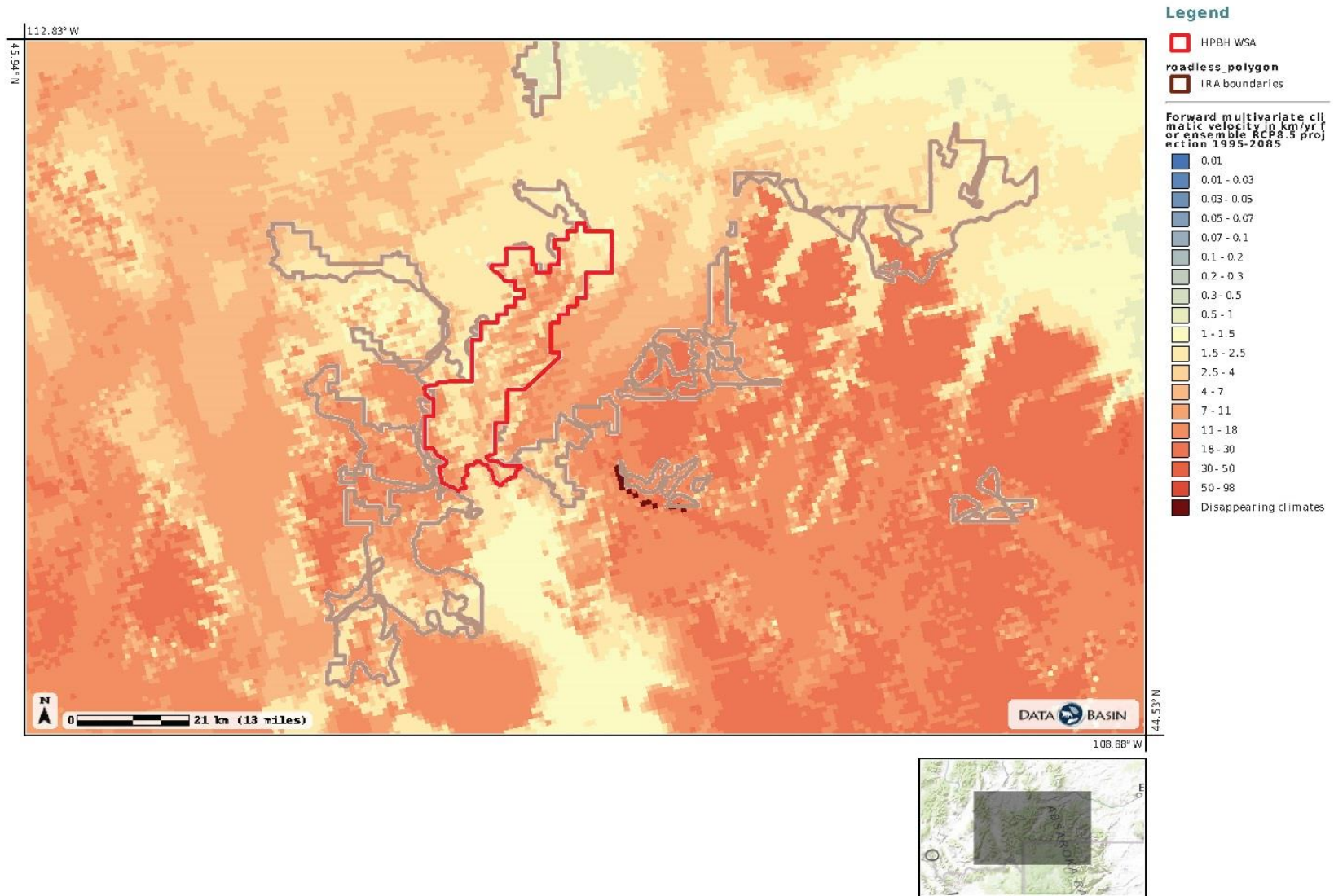


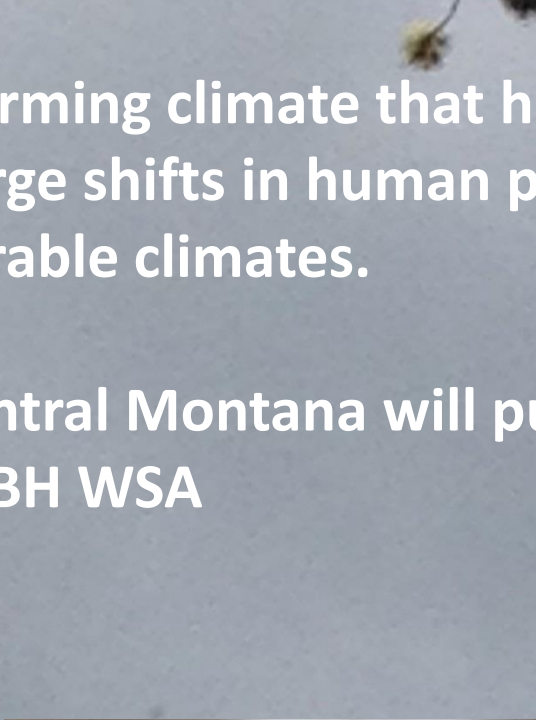
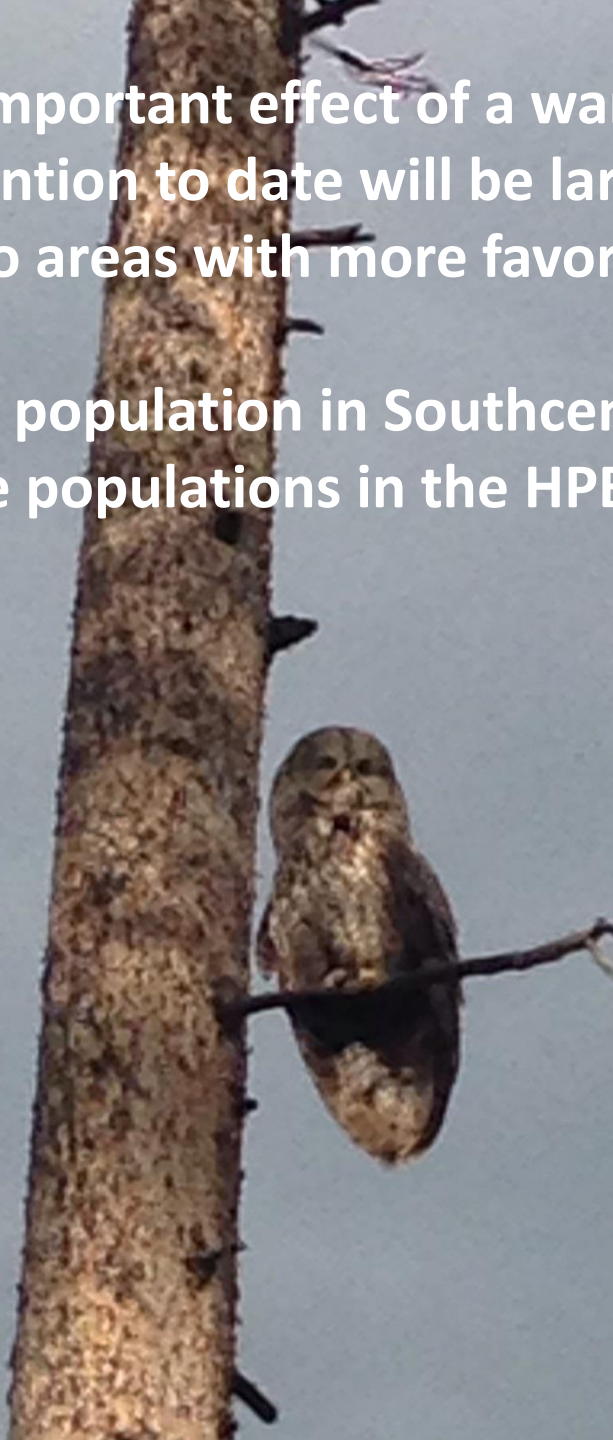
Figure 41 shows predictions for a longer time frame and assuming no significant efforts are made right now in reducing greenhouse gas emissions (RCP 8.5). In this scenario the HPBH WSA fares poorly and species have to move very fast or far to find a similar climatic niche

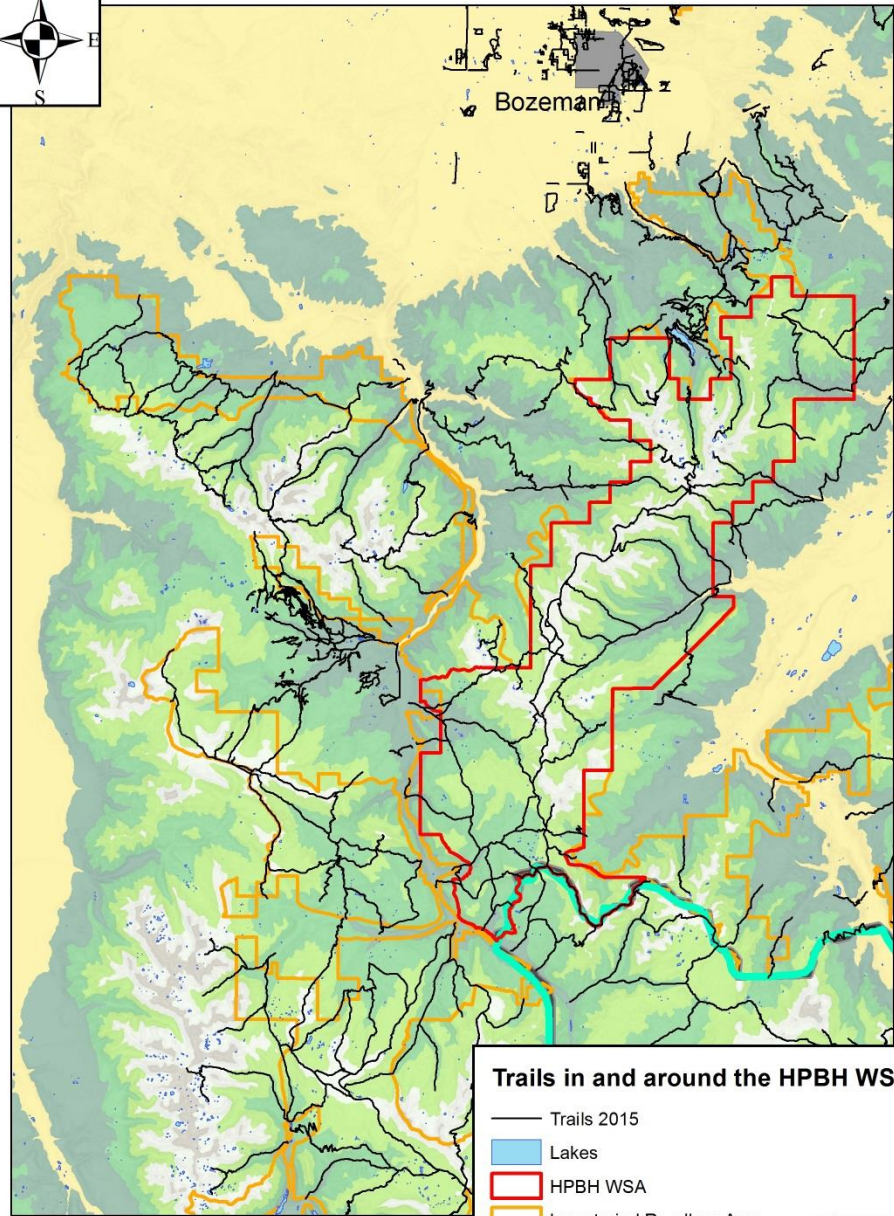
# Whitebark Pine



Another important effect of a warming climate that has not received much attention to date will be large shifts in human populations as people migrate to areas with more favorable climates.


A growing population in Southcentral Montana will put increasing pressure on wildlife populations in the HPBH WSA



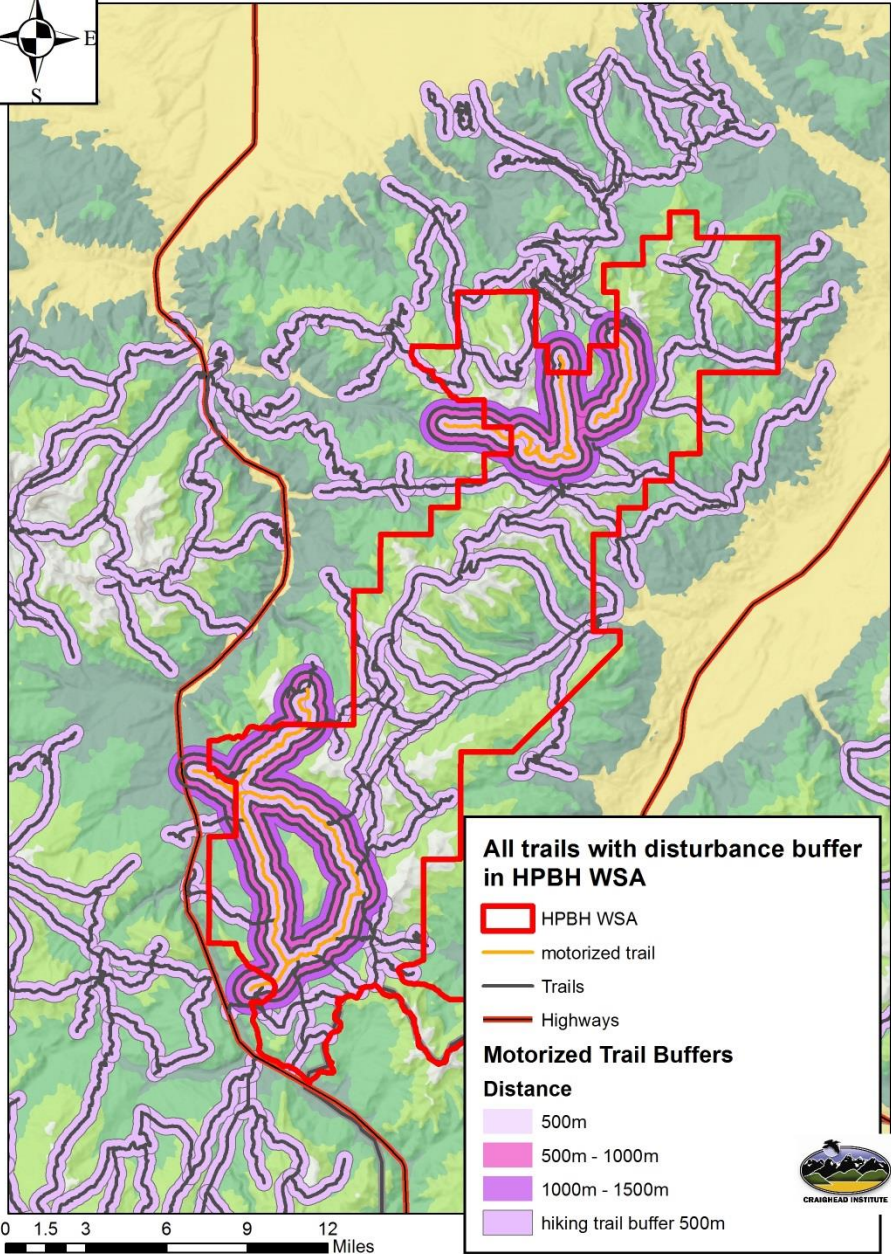


**Trails in and around the HPBH WSA**

- Trails 2015
- Lakes
- HPBH WSA
- Inventoried Roadless Area
- Yellowstone National Park







## Wilderness?

- (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;**
- (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation;**
- (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and**
- (4) may also contain ecological, geological, or other features of scientific, education scenic, or historical value."**

**1964 Wilderness Act**

## How does the HPBH WSA compare?

The WSA is 4.5 times as large as the Rattlesnake Wilderness Area near Missoula  
155,000 versus 34,304 acres

The WSA is a little over half as large as the Boulder-White Clouds Wilderness Area  
155,000 versus 275,000 acres (in 3 areas)  
Created in 2015 in Idaho

The WSA is about 2/3 the size of the Scapegoat Wilderness Area  
155,000 versus 239,936

The WSA is about 15% the size of the Bob Marshall Wilderness Area  
155,000 versus 1,009,352

