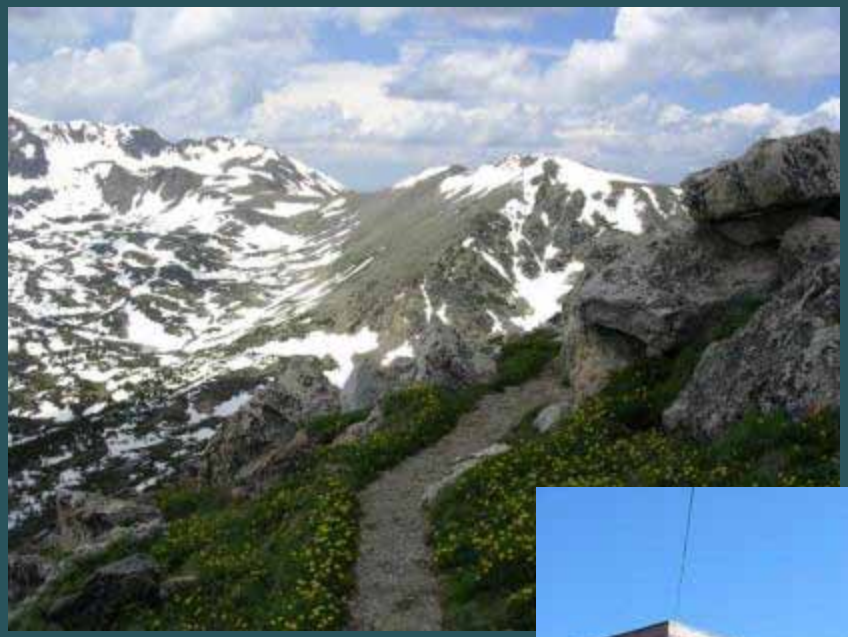
Applications of NPScape Data and Tools

Cheryl McIntyre

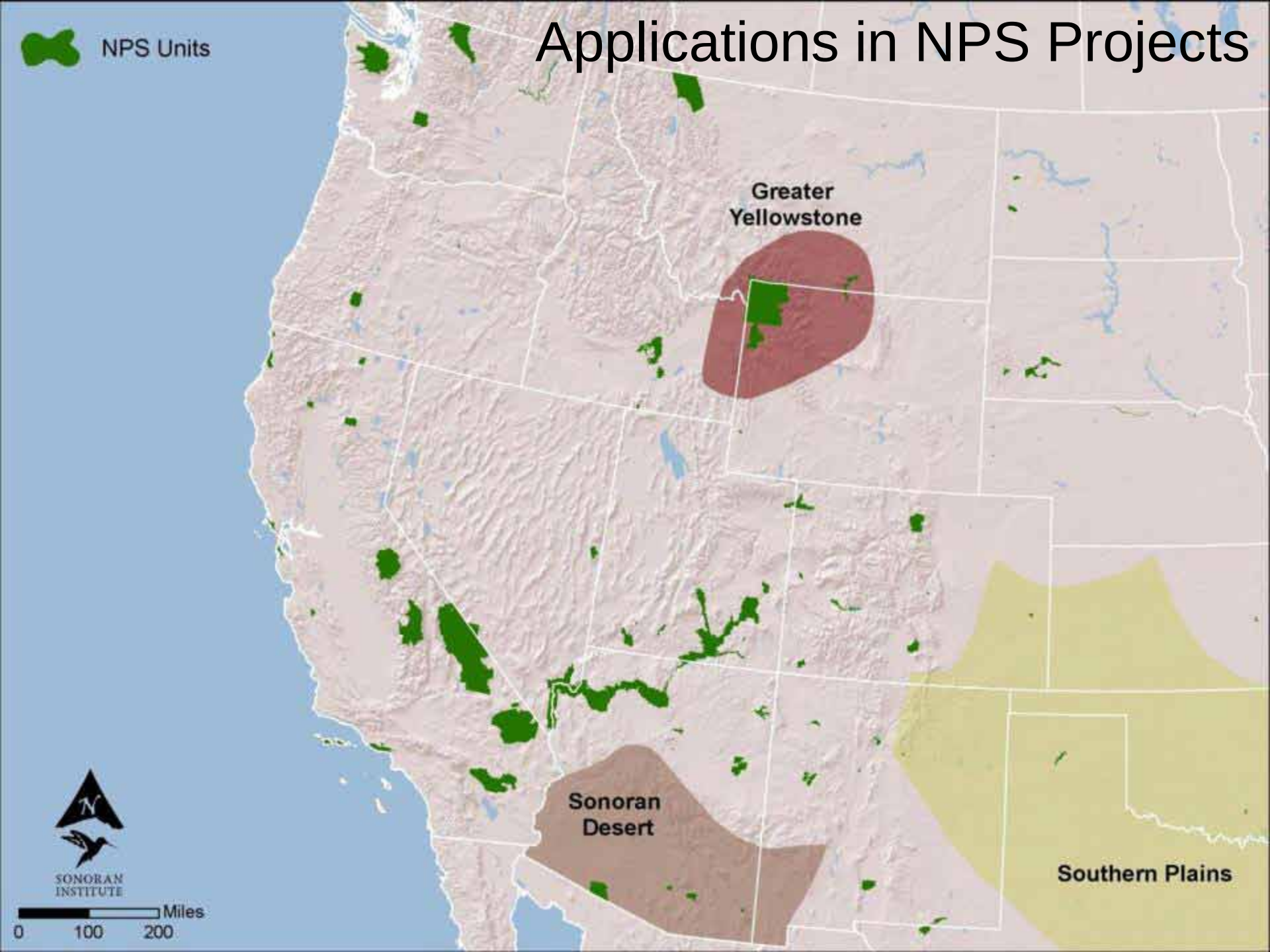
George Wright Society Conference
March 17, 2011

SONORAN INSTITUTE
Shaping the Future of the West

Our Vision – A West of Healthy Landscapes, Resilient Economies and Vibrant Communities



Applications in NPS Projects



Greater Yellowstone Network Land Use Protocol

Ancillary Data

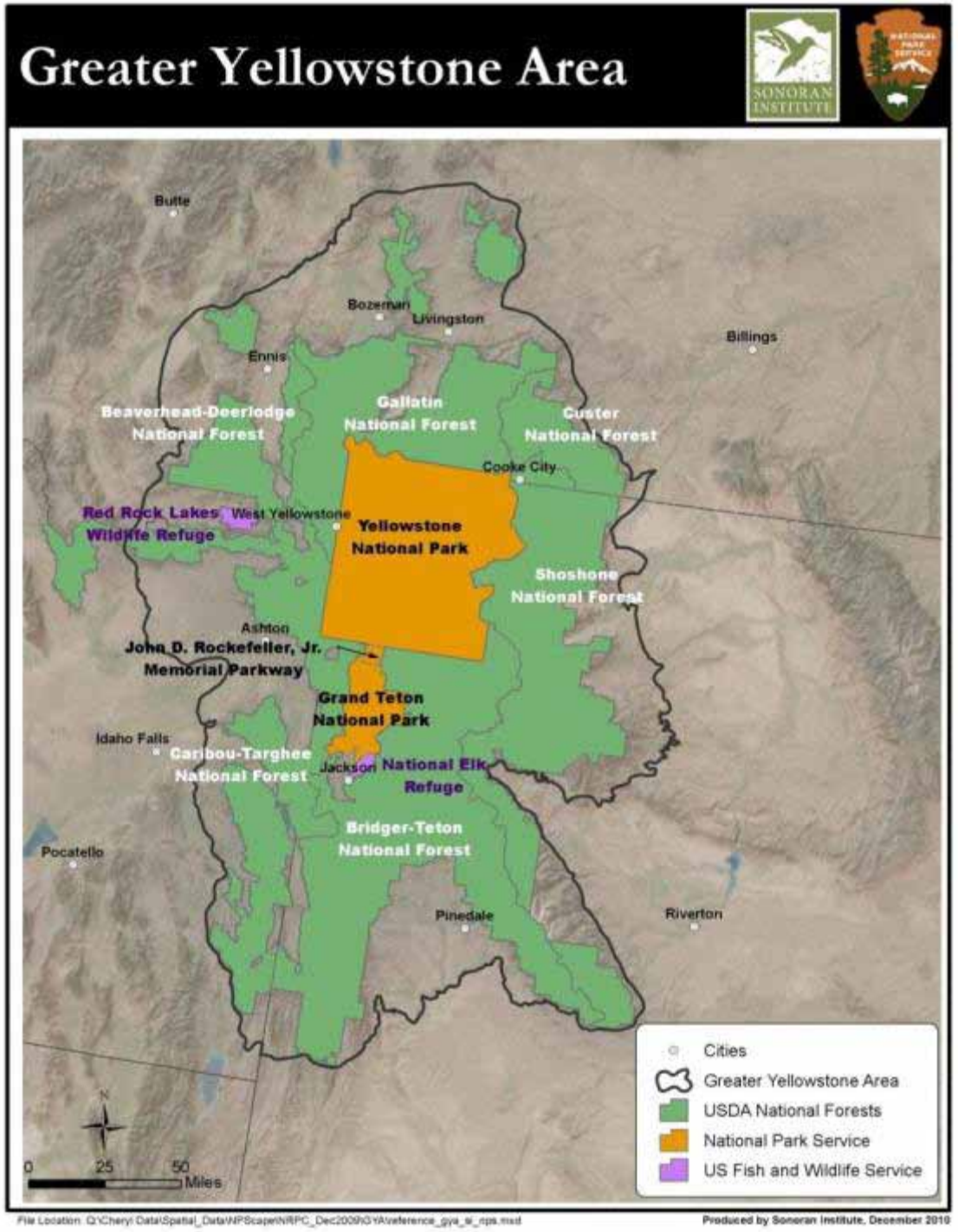
- § Housing
- § Roads
- § Population
- § Agriculture

Tim Crawford

Greater Yellowstone Network
Land Use Report

Ancillary Data
- § Housing
- § Roads
- § Population
- § Agriculture

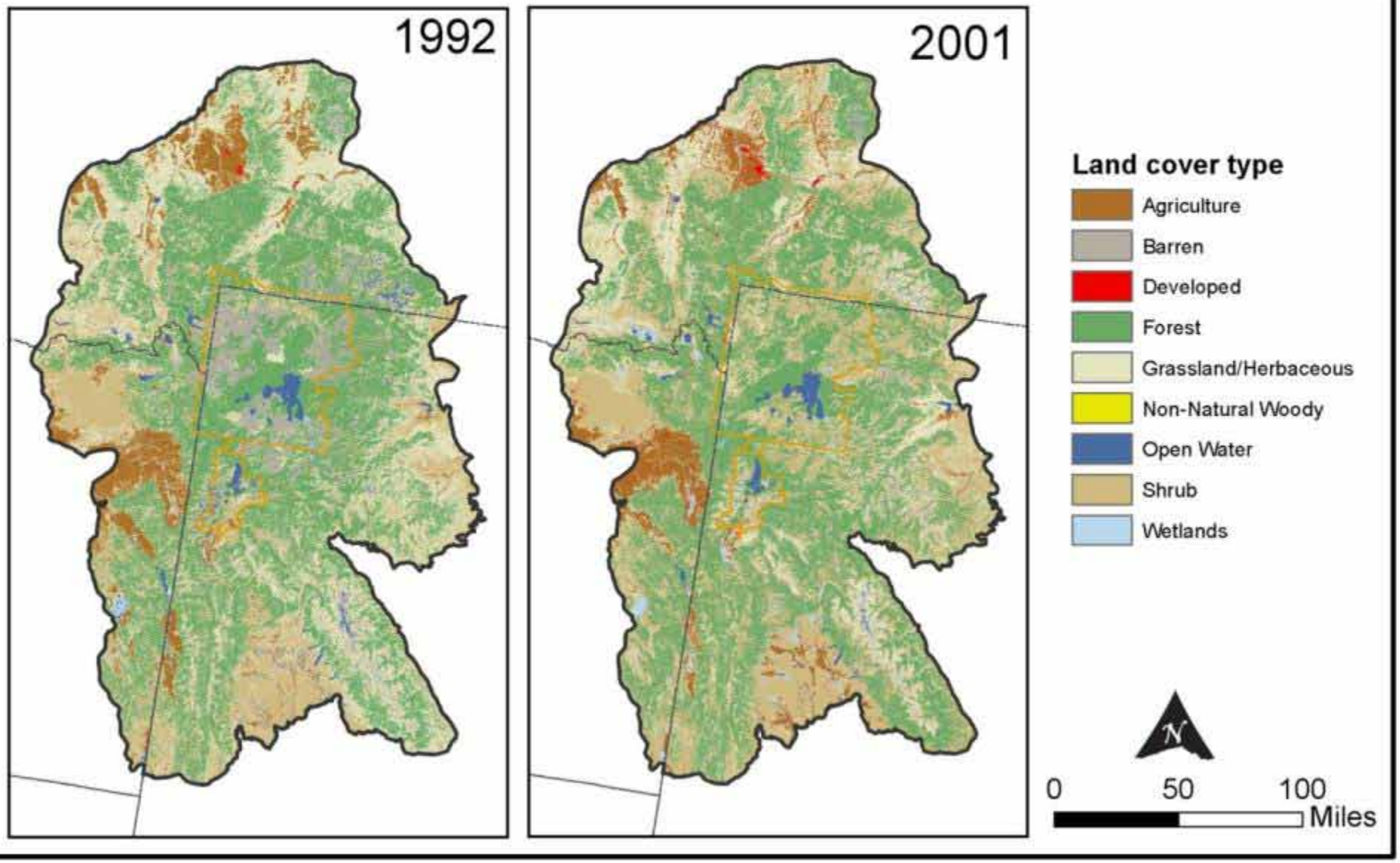
NPScape
- § Housing
- § Roads
- § Population
- § Land cover
- § Pattern



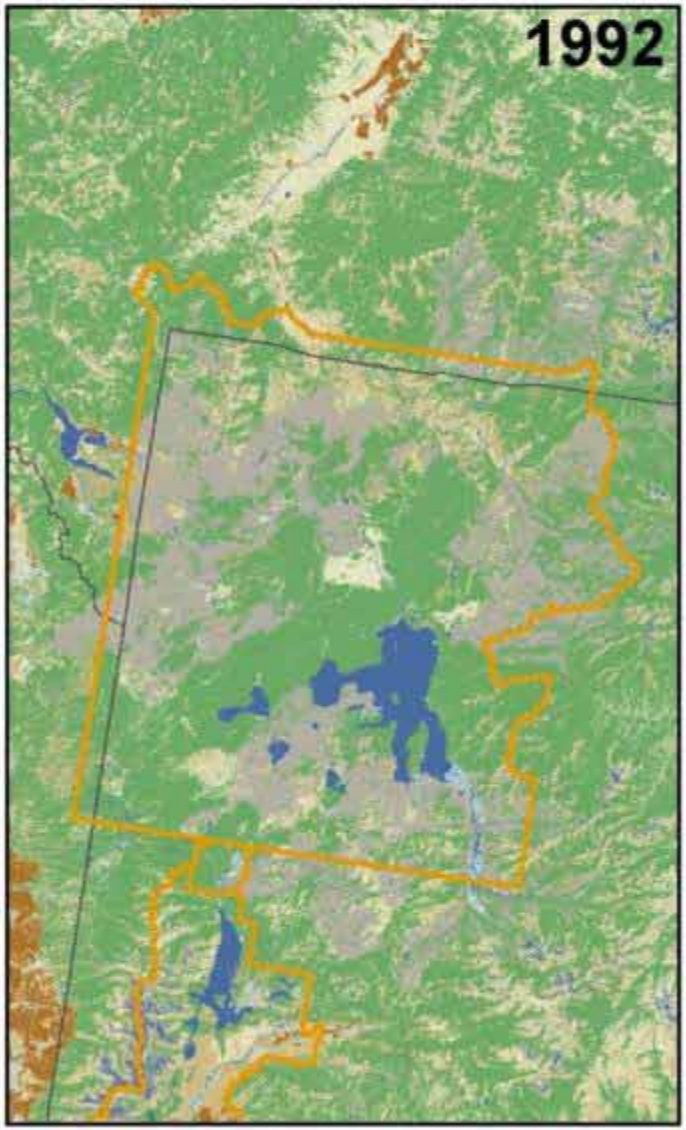
- Standard measures

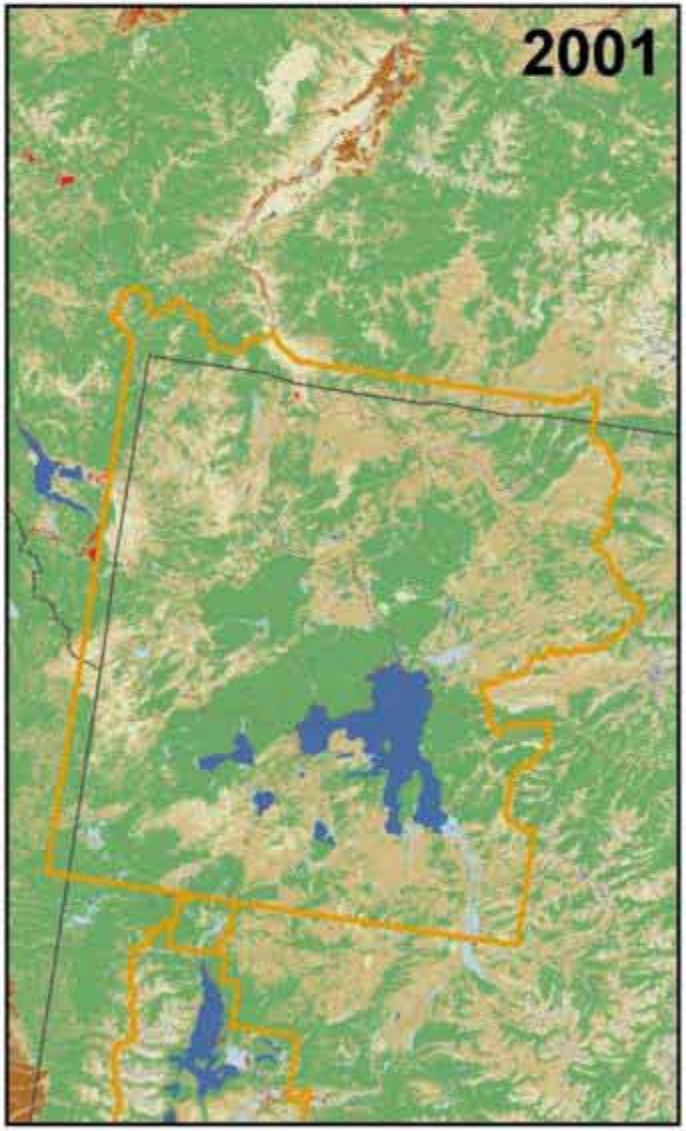
- Housing on edge
- Wildlife habitat
- Corridors
- Agriculture

Land Cover in the Greater Yellowstone Area



Land Cover in Yellowstone National Park





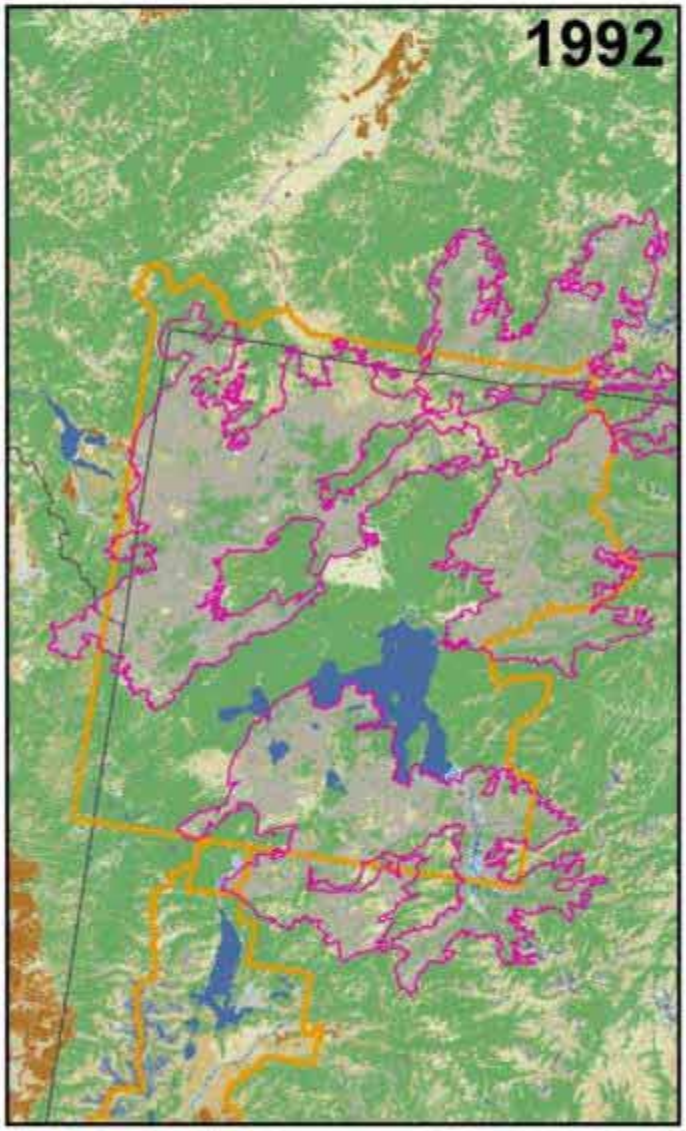
Land cover type

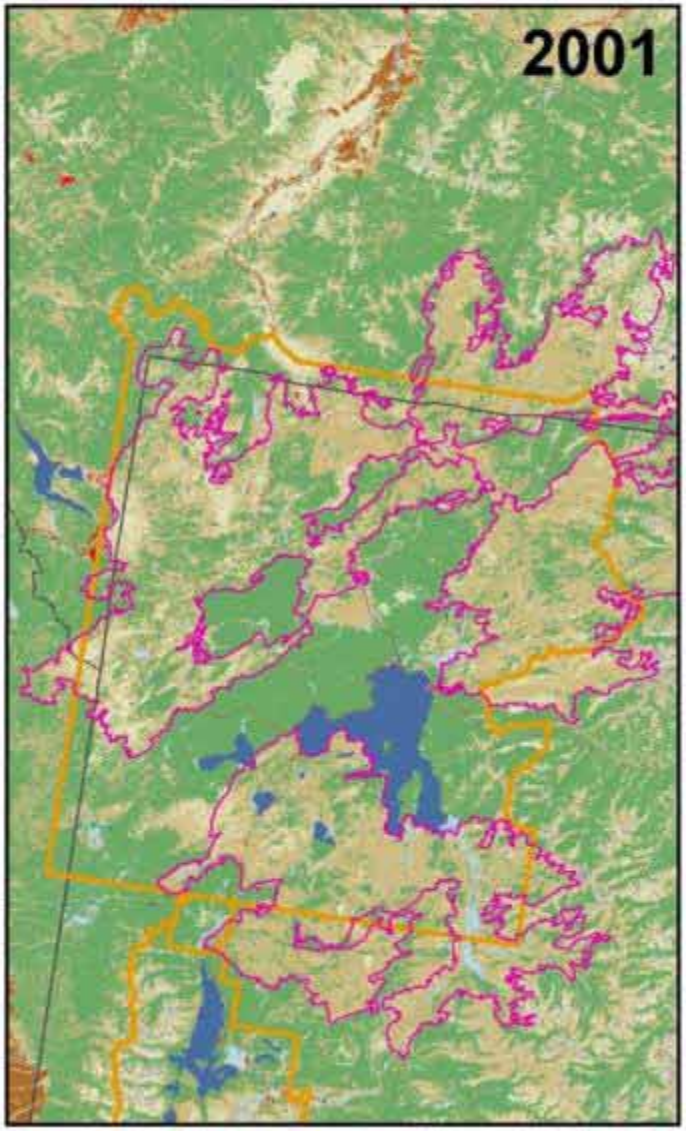
- Agriculture
- Barren
- Developed
- Forest
- Grassland/Herbaceous
- Non-Natural Woody
- Open Water
- Shrub
- Wetlands

N

0 20 40 Miles

Land Cover in Yellowstone National Park





1988 Fires

Land cover type

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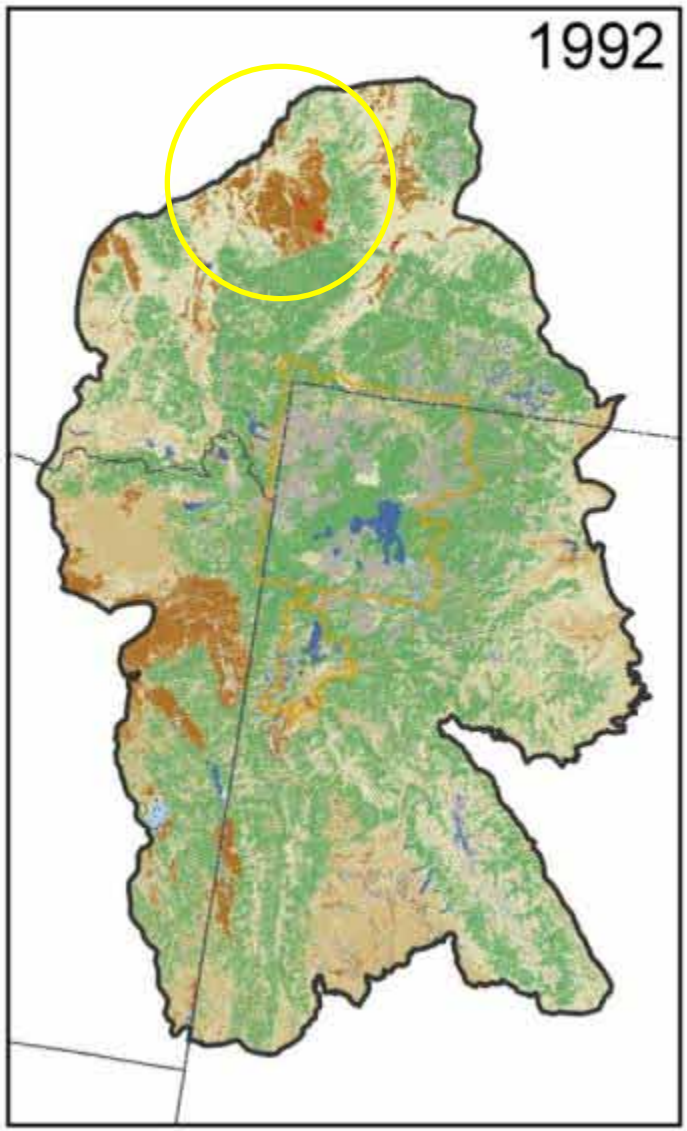
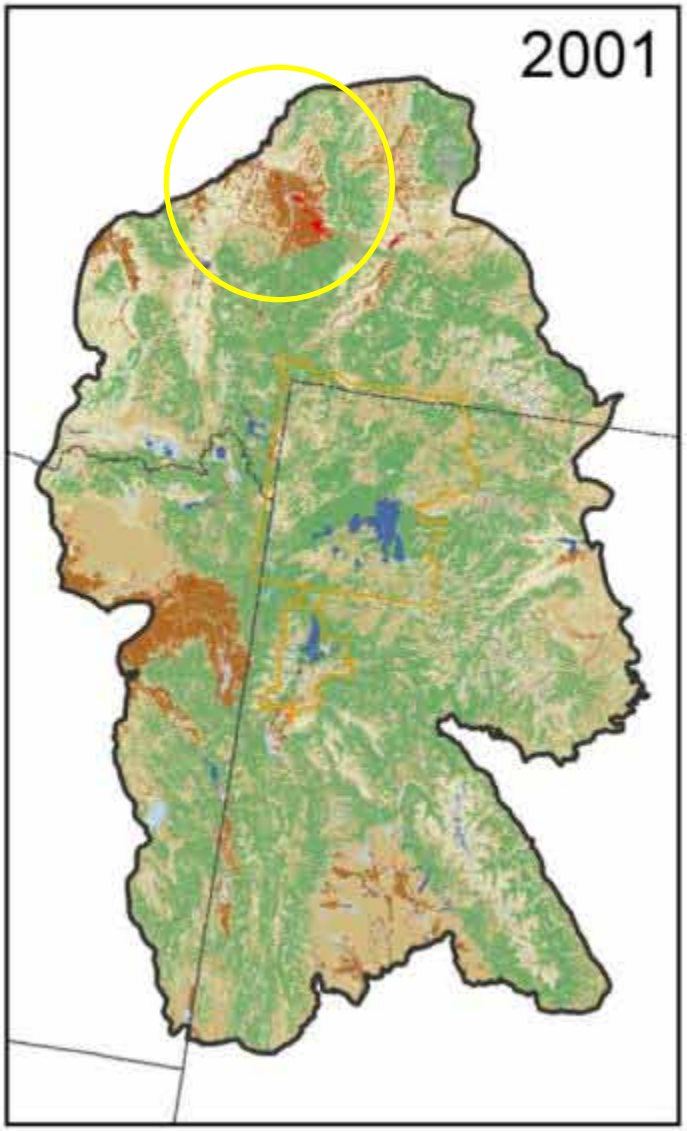
Land Cover in the Greater Yellowstone Area





Land cover type

- Agriculture
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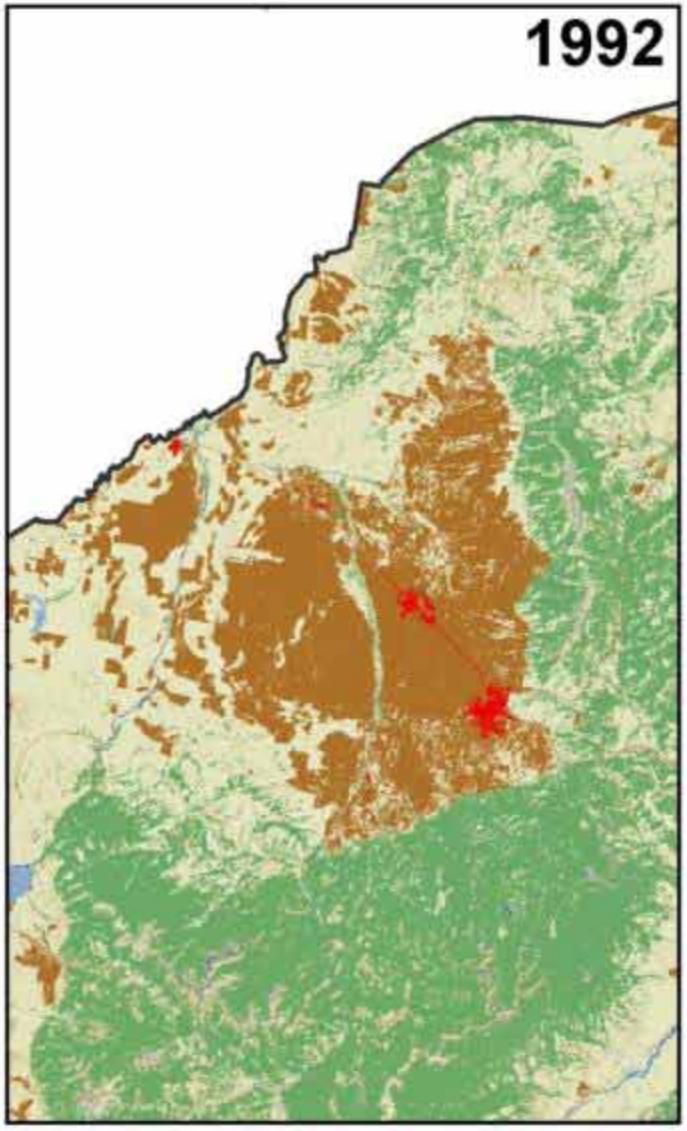
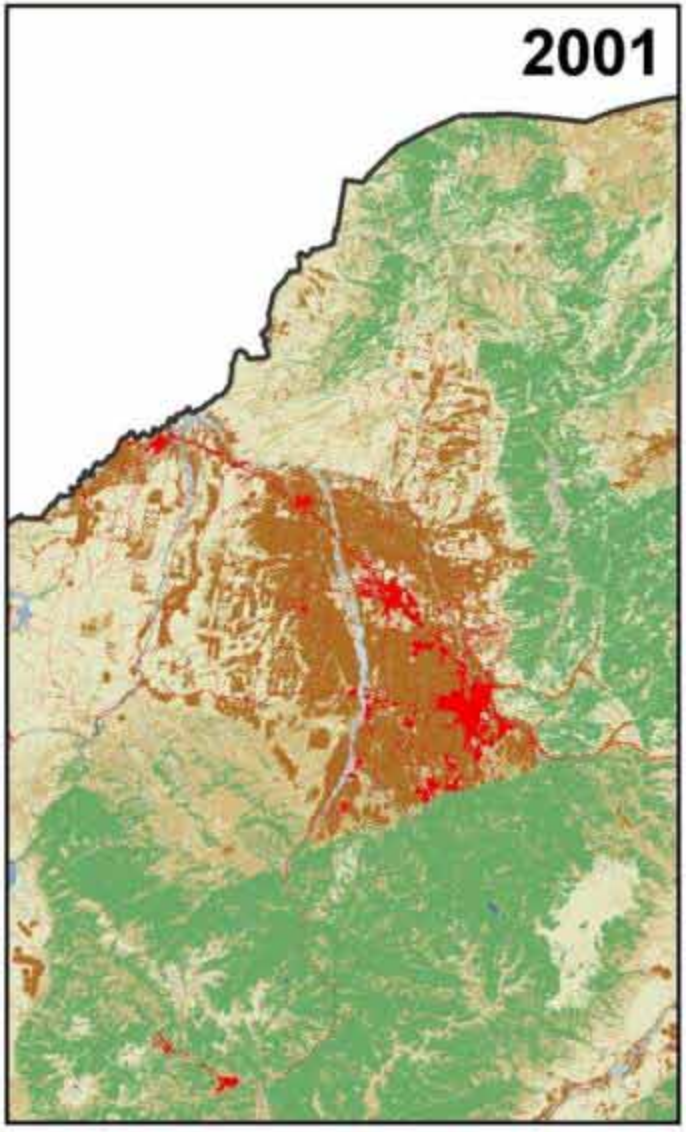
- Non-Natural Woody
- Open Water
- Shrub
- Wetlands

N

0 50 100 Miles

Land Cover in the Greater Yellowstone Area





Land cover type

- Agriculture
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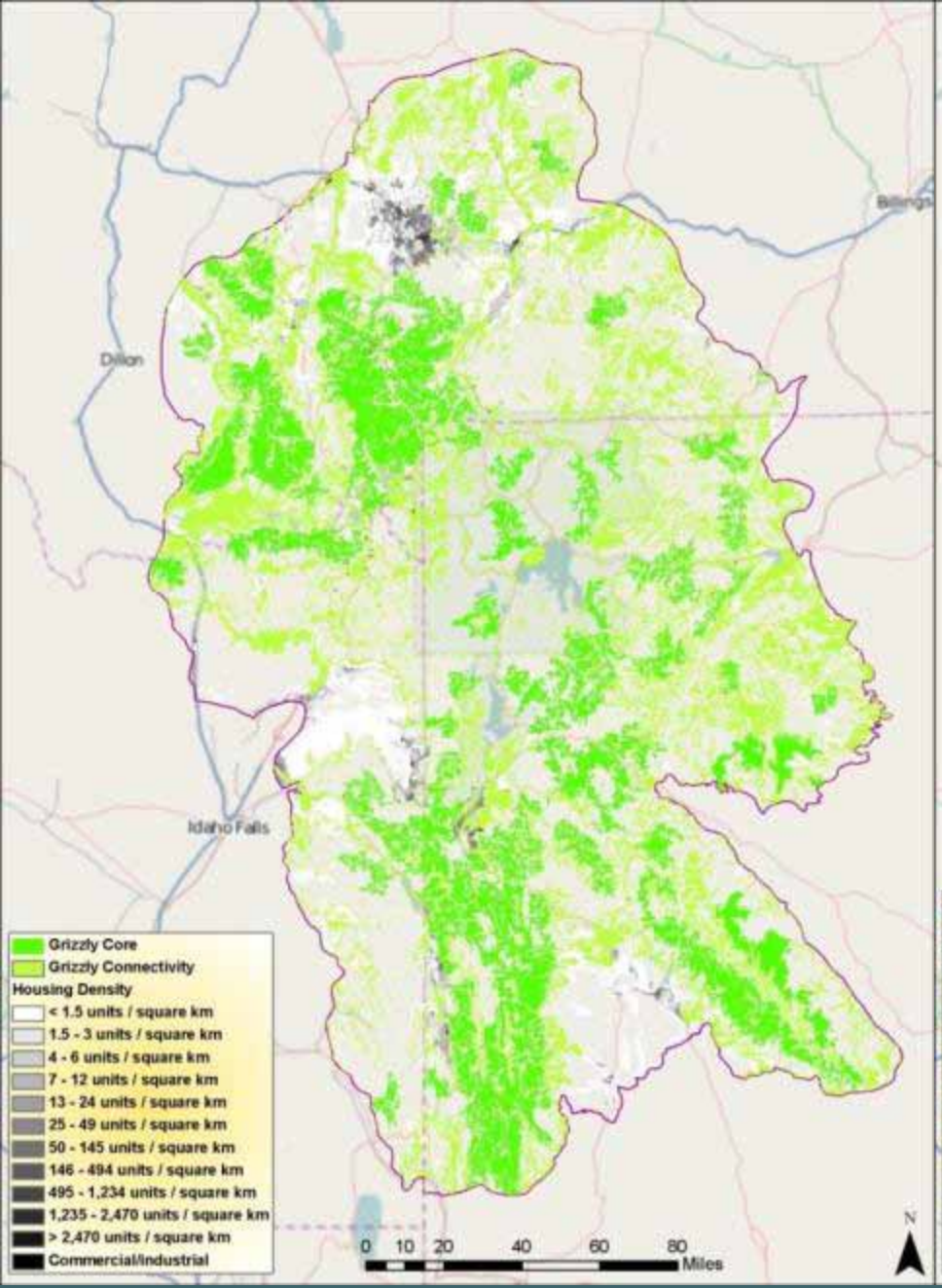
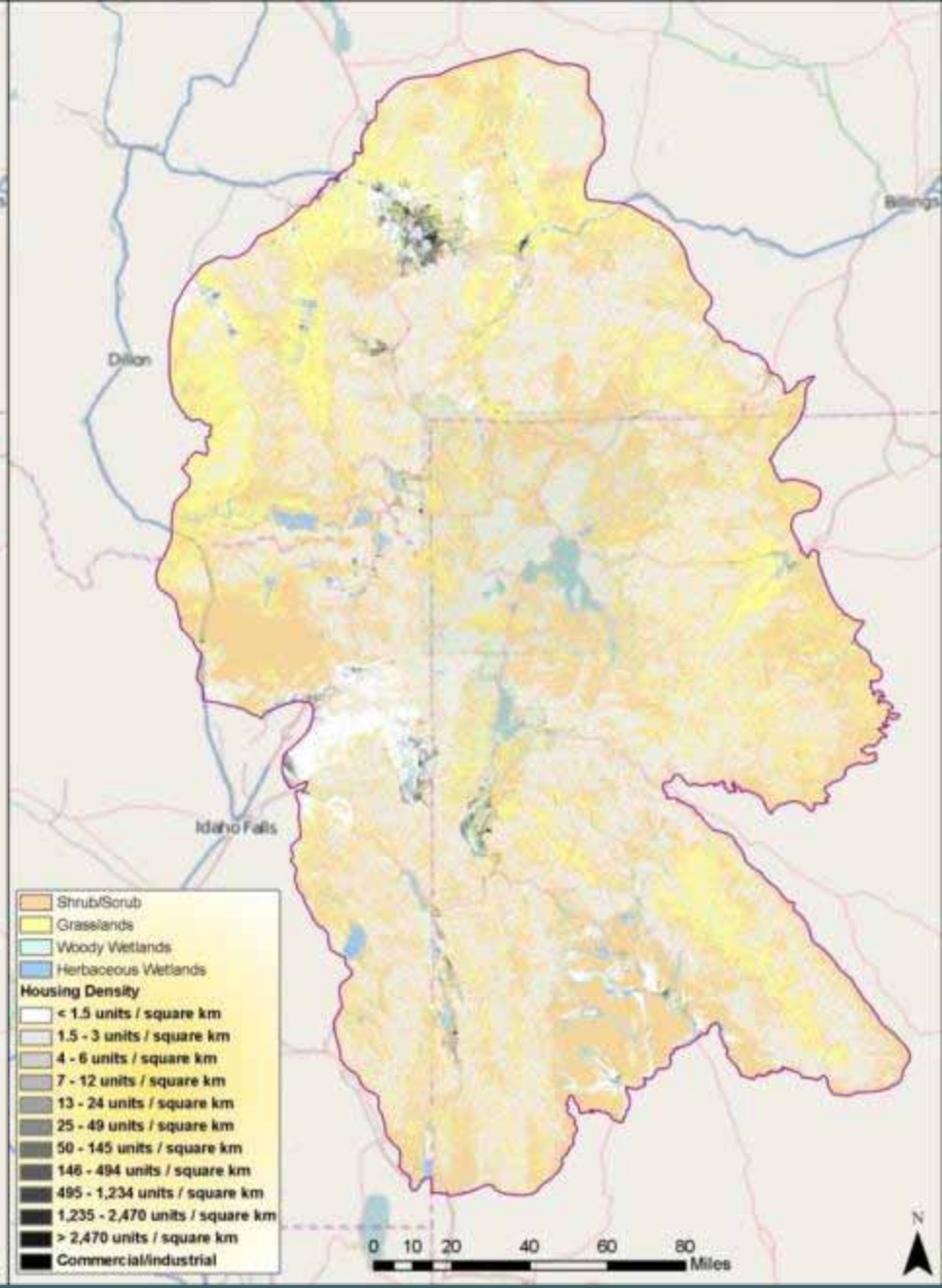
- Shrub
- Wetlands

N

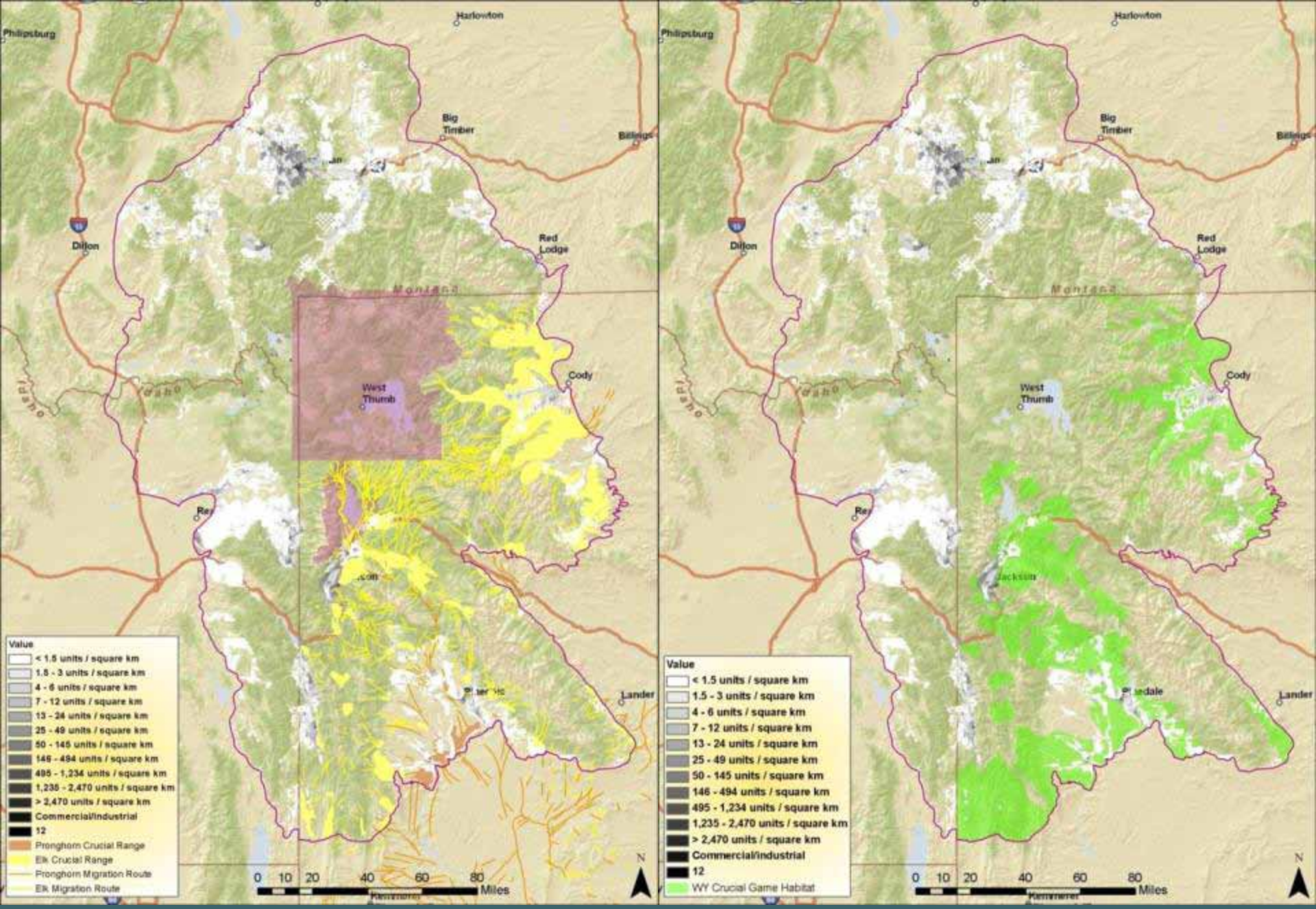
0 10 20 Miles

Produced by Cheryl McIntyre, November 2010





Grizzly data courtesy of Craighead Environmental Research Institute



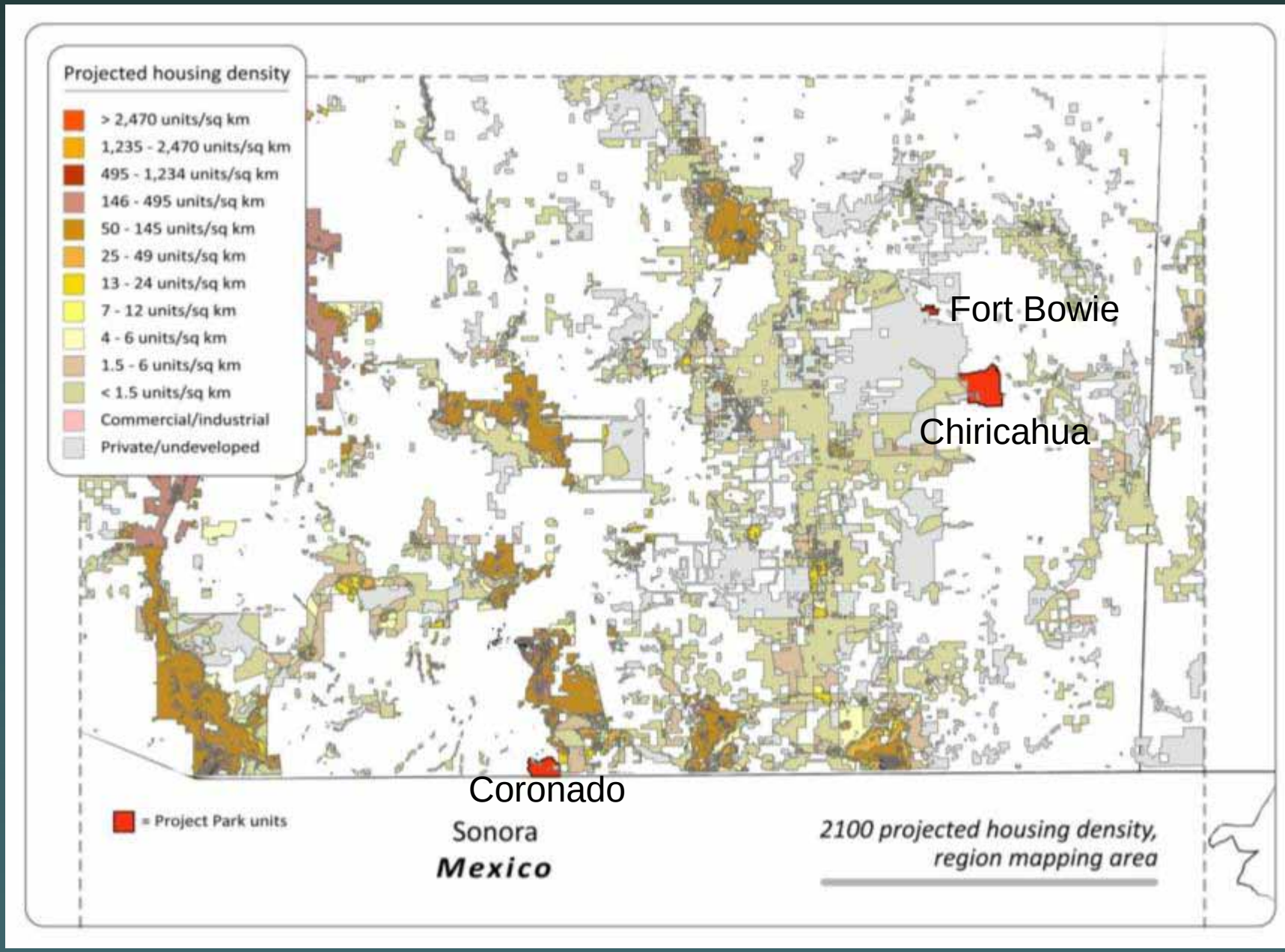
Data courtesy Wyoming Game and Fish Department

Natural Resource Condition Assessments

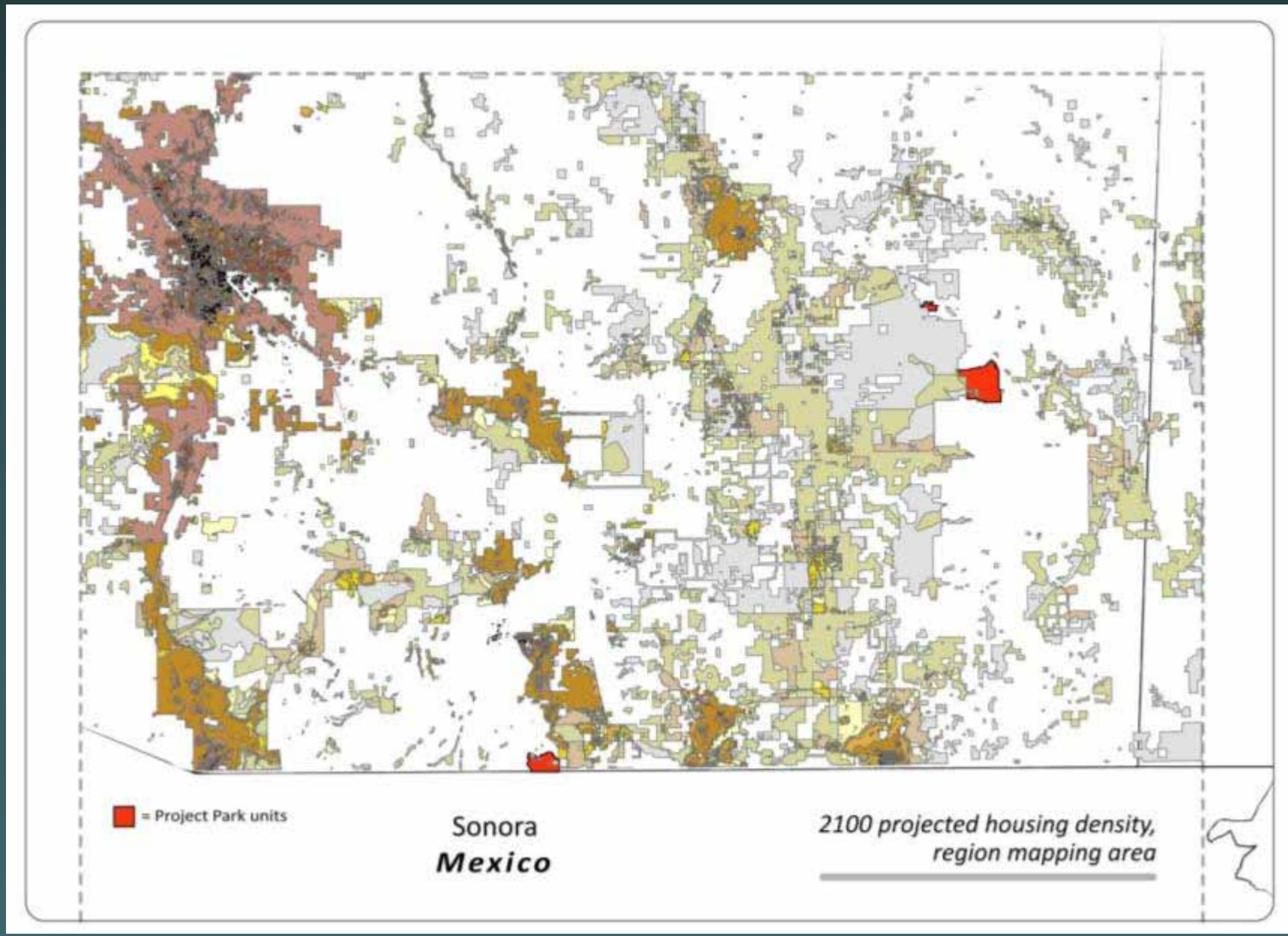
Chiricahua National Monument

Coronado National Memorial

Fort Bowie
National Historic Site

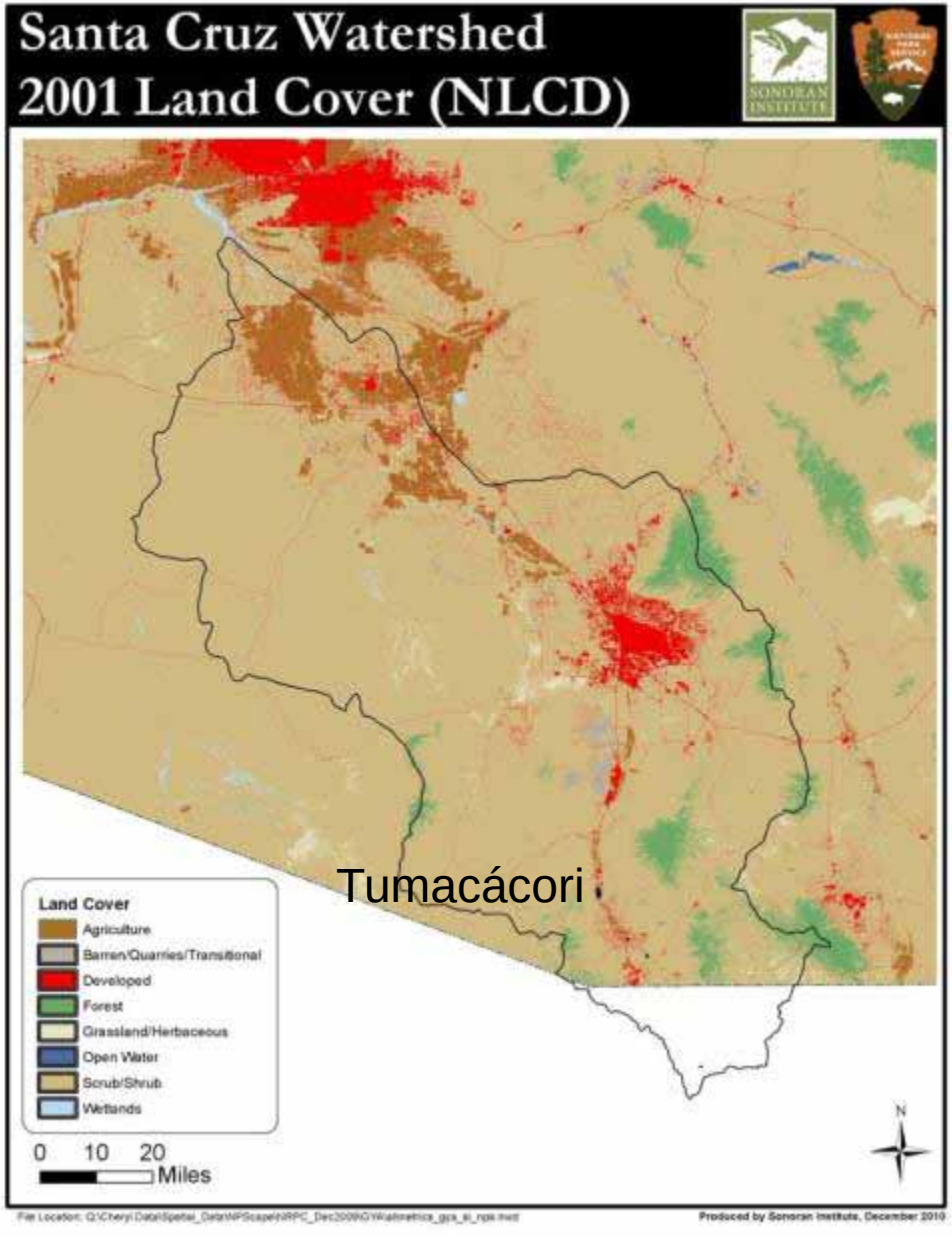


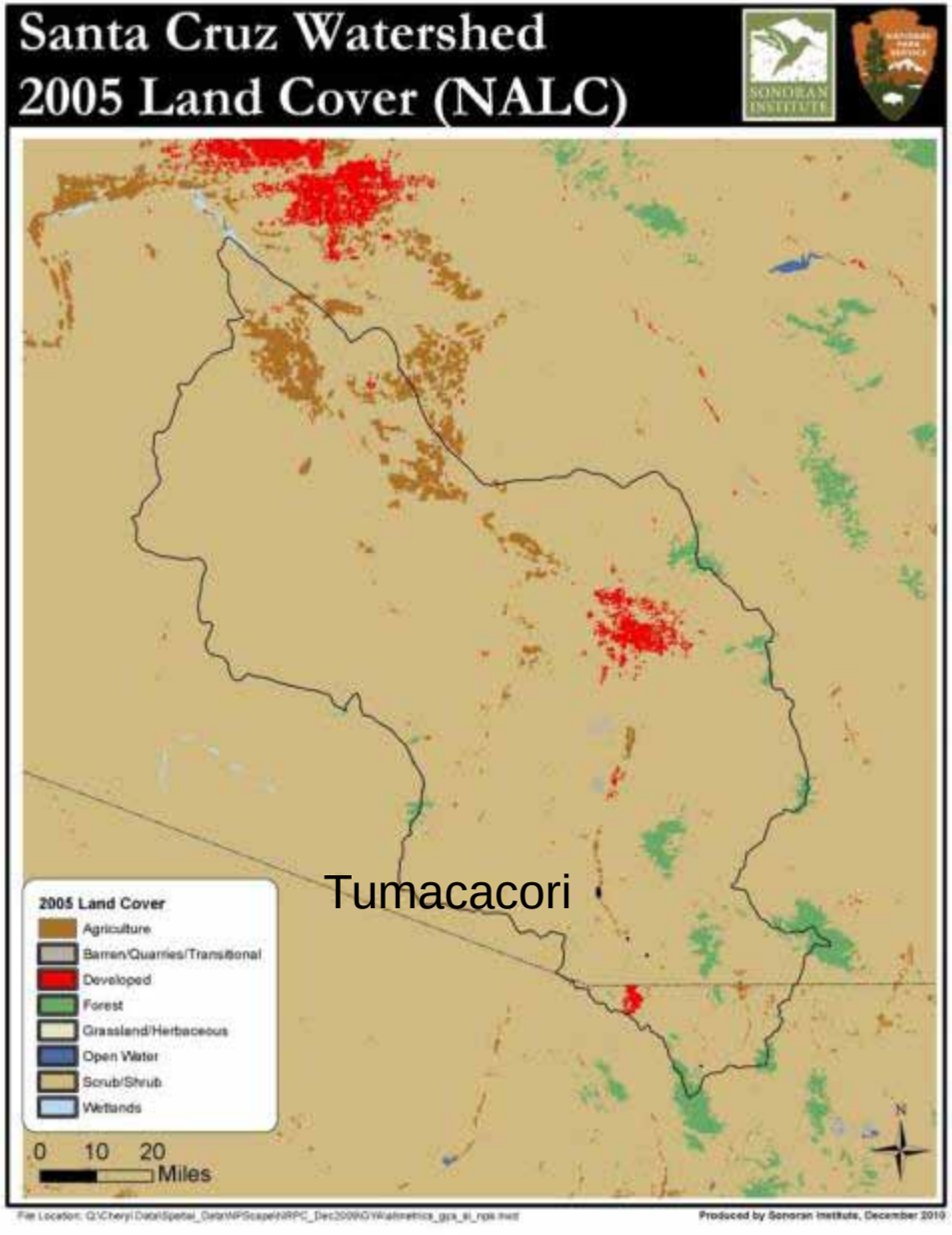
Courtesy Arizona-Sonora Desert Museum



Courtesy Arizona-Sonora Desert Museum

More Natural Resource Condition Assessments


Santa Cruz Watershed
2001 Land Cover (NLCD)
Tumacácori
Land Cover
Agriculture
Barren/Quarries/Transitional
Developed
Forest
Grassland/Herbaceous
Open Water
Scrub/Shrub
Wetlands
0 10 20
Miles
N
Produced by Sonoran Institute, December 2010


Santa Cruz Watershed
2005 Land Cover (NALC)
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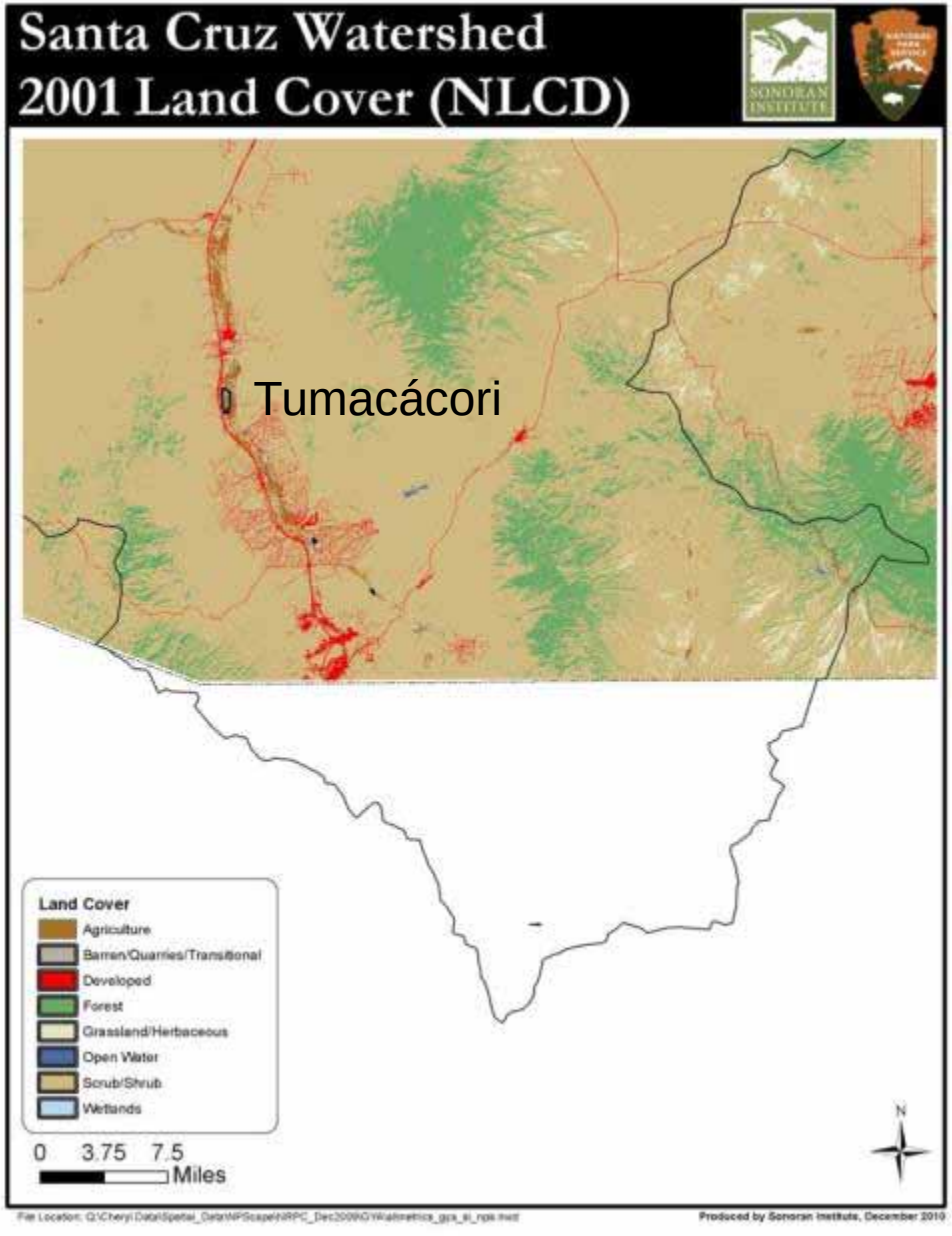
0 10 20
Miles
N
Produced by Sonoran Institute, December 2010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Open Water
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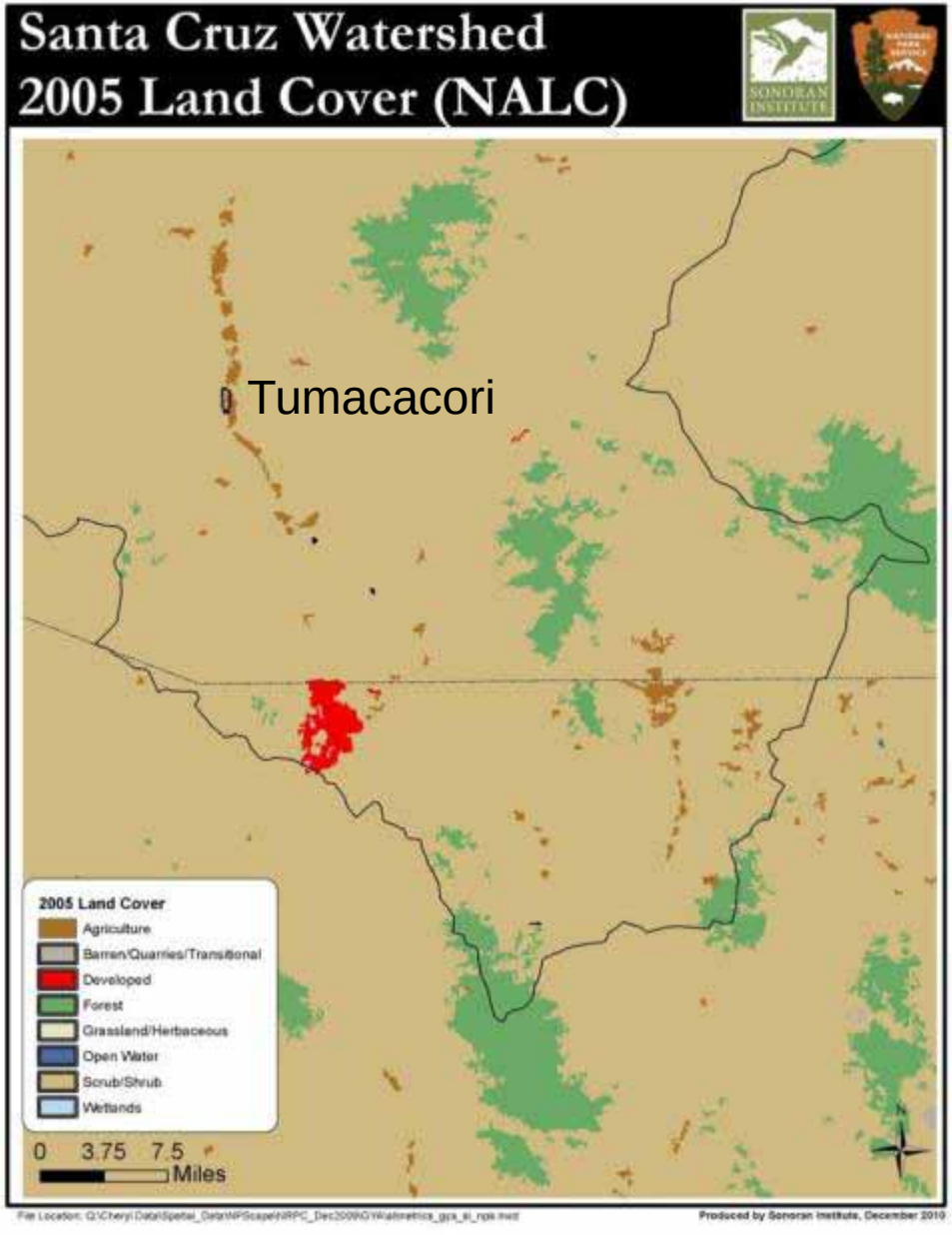
Wetlands
0 3.75 7.5
Miles
N
Produced by Sonoran Institute, December 2010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Open Water
Scrub/Shrub
Wetlands
0 3.75 7.5
Miles
N
Produced by Sonoran Institute, December 2010

Another Natural Resource Condition Assessment

Capulin Volcano National Monument

4.1 Viewshed

The primary feature of Capulin Volcano is the cinder cone rising over 304 meters above the surrounding High Plains. Visitors access the top of the volcano by driving a 4 km road, spiraling 360 degrees around the mountain, and can access by foot, the highest point within the Monument of 2,494 meters along the Rim Trail. Unobstructed and sweeping views of the Raton-Clayton Volcanic Field throughout areas in Colorado, Oklahoma, and New Mexico can be seen from within the monument. Even the Sangre de Cristo Range of the Rocky Mountains is visible on clear days (Figure 4).

4.1.1 The Importance of Viewshed

One of the Monument's primary purposes is to "Preserve the scientific, educational, and scenic values of Capulin Volcano and provide for the understanding and enjoyment thereof by the public." Additionally, one of four significance statements, identified in the Monument's 2010 General Management Plan, states, "The dramatic view from the top of the volcano provides people with an exceptional opportunity to connect with and understand the geological and cultural landscape." This emphasis on scenic and view establishes the fundamental resource and value for the park of "an unobstructed view of the Raton-Clayton Volcanic Field".

Visitors have a unique opportunity to view the surrounding landscape scenery, within and adjacent to the park, by driving to the top of the volcano. The Monument's primary interpretive themes are showcased within the viewshed, which include a geologically diverse volcanic field, a meeting place between the shortgrass prairie and the Rocky Mountains, and a dramatic, yet accessible volcano. The opportunity to view these themes within the context and vast scale in which they exist perhaps fosters the understanding of the Monument's purpose.

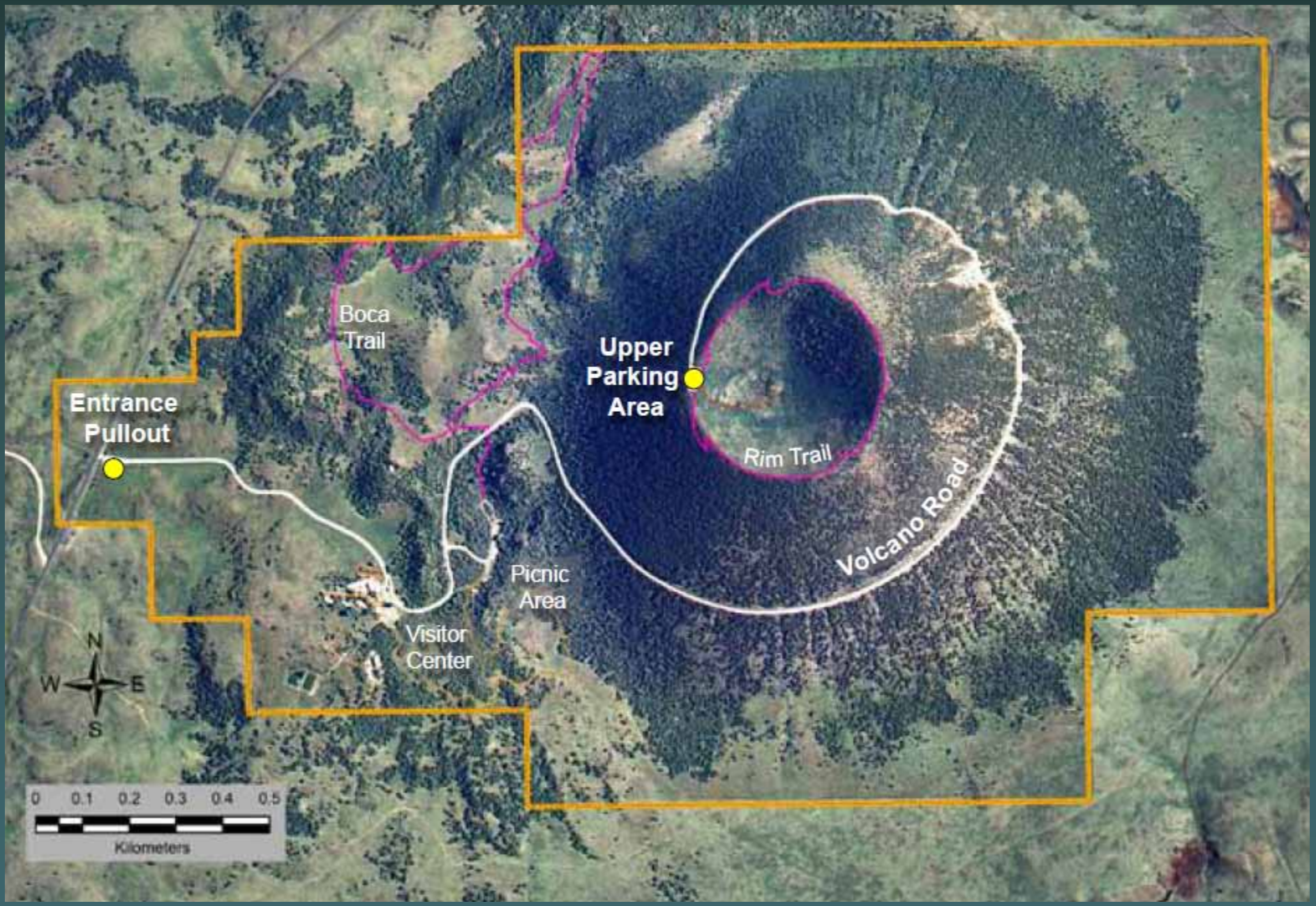
Finally, the conservation of Scenery is established in the NPS Organic Act, ("...to conserve the scenery and the wildlife therein...") reaffirmed by the General Authorities Act, as amended, Management Policies (Section 1.4.6, and 4.0) (Johnson 2008).

4.1.2 Data and Methods

The National Park Service is mandated to protect the scenery within its boundary, and the scenic view from the top of the volcano is explicitly expressed as a significant purpose, statement, resource, and value of the monument, even though the majority of its scenery, as viewed from the pull-outs, parking lots, and Volcano Road, is located on lands that are not administered by the NPS. Johnson et al. (2008) refer to such lands as a "Borrowed Landscape" for the Blue Ridge Parkway.

CREDIT: KIM STRUTHERS

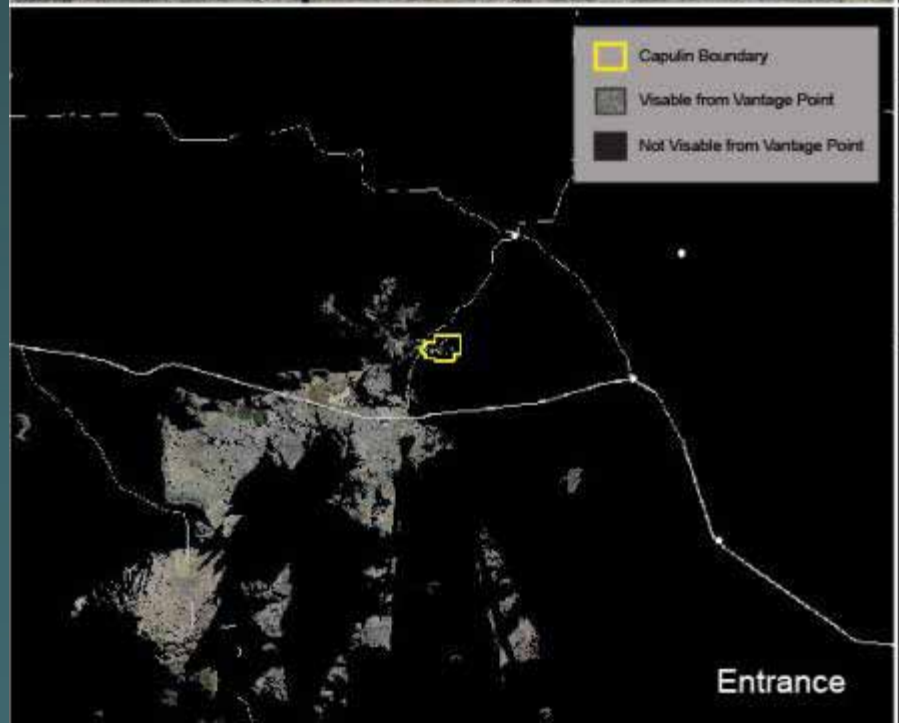
Figure 4. The spectacular view from Capulin Volcano is one of the monuments most important resources.

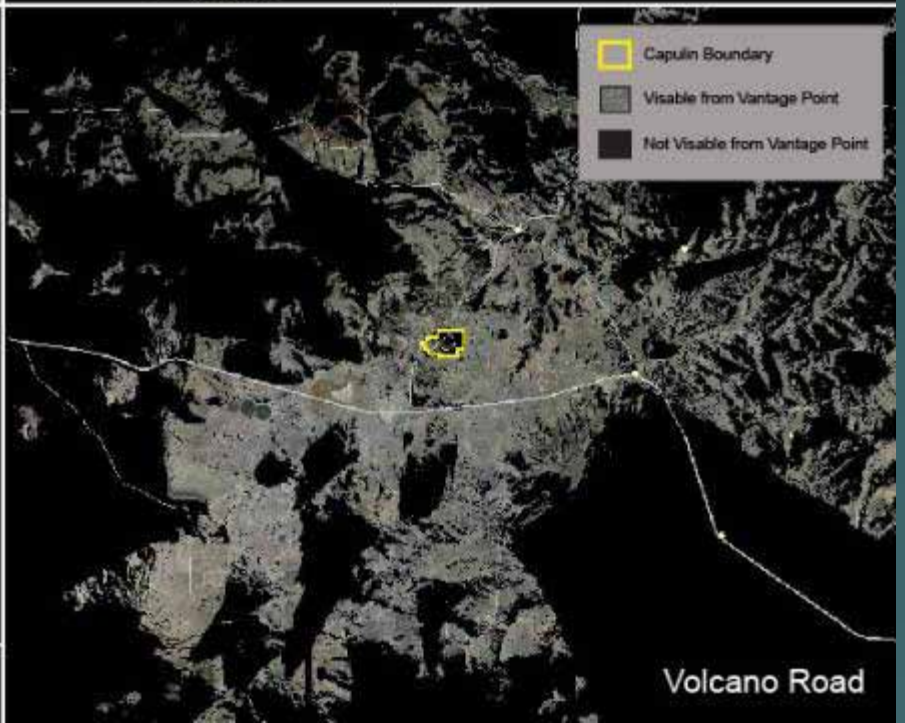

Boca Trail
Upper Parking Area
Entrance Pullout
Rim Trail
Volcano Road
Picnic Area
Visitor Center
N
W
E
S
0 0.1 0.2 0.3 0.4 0.5
Kilometers

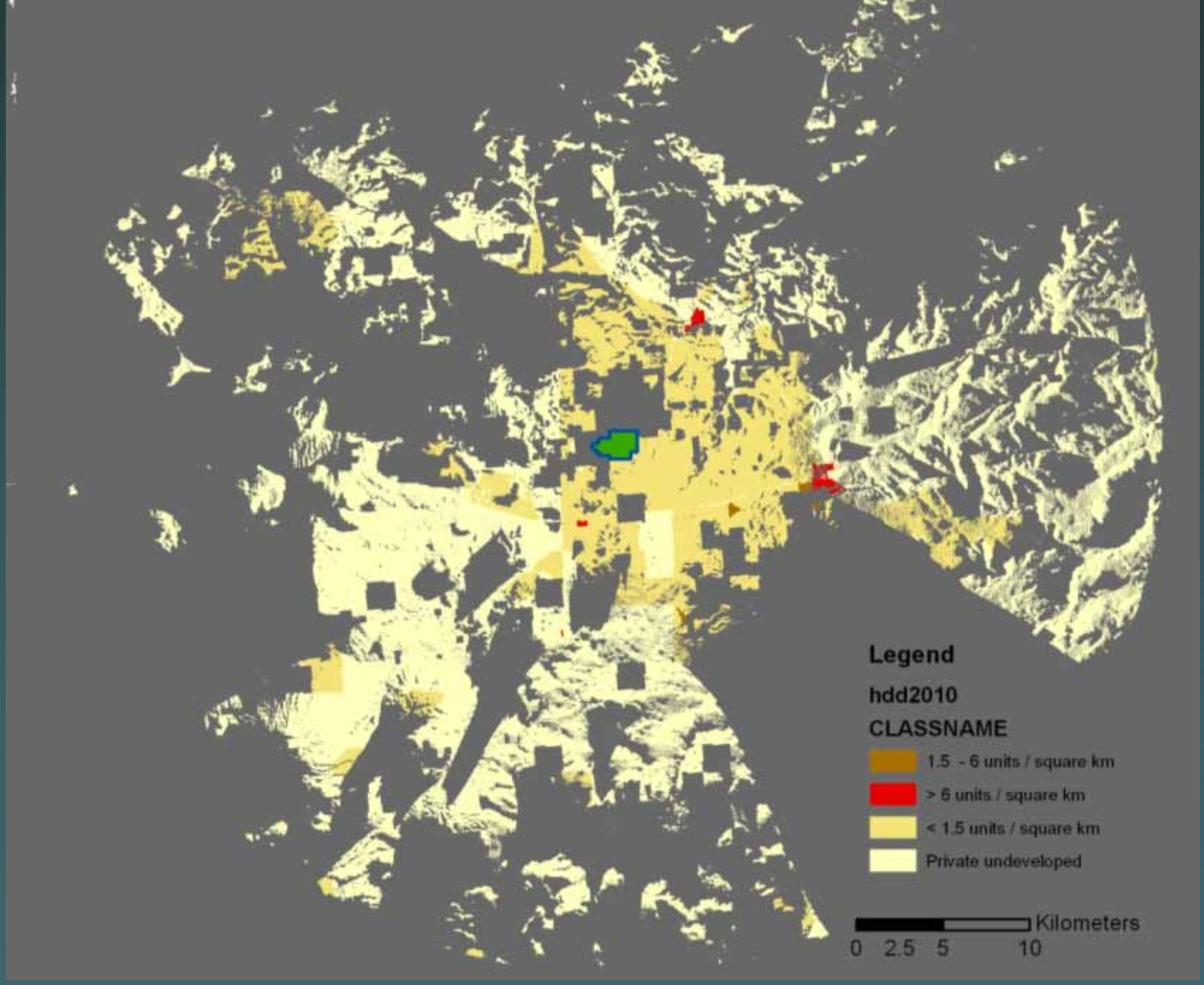
Viewpoints

Region

Capulin Boundary
Visable from Vantage Point
Not Visable from Vantage Point
Parking Area

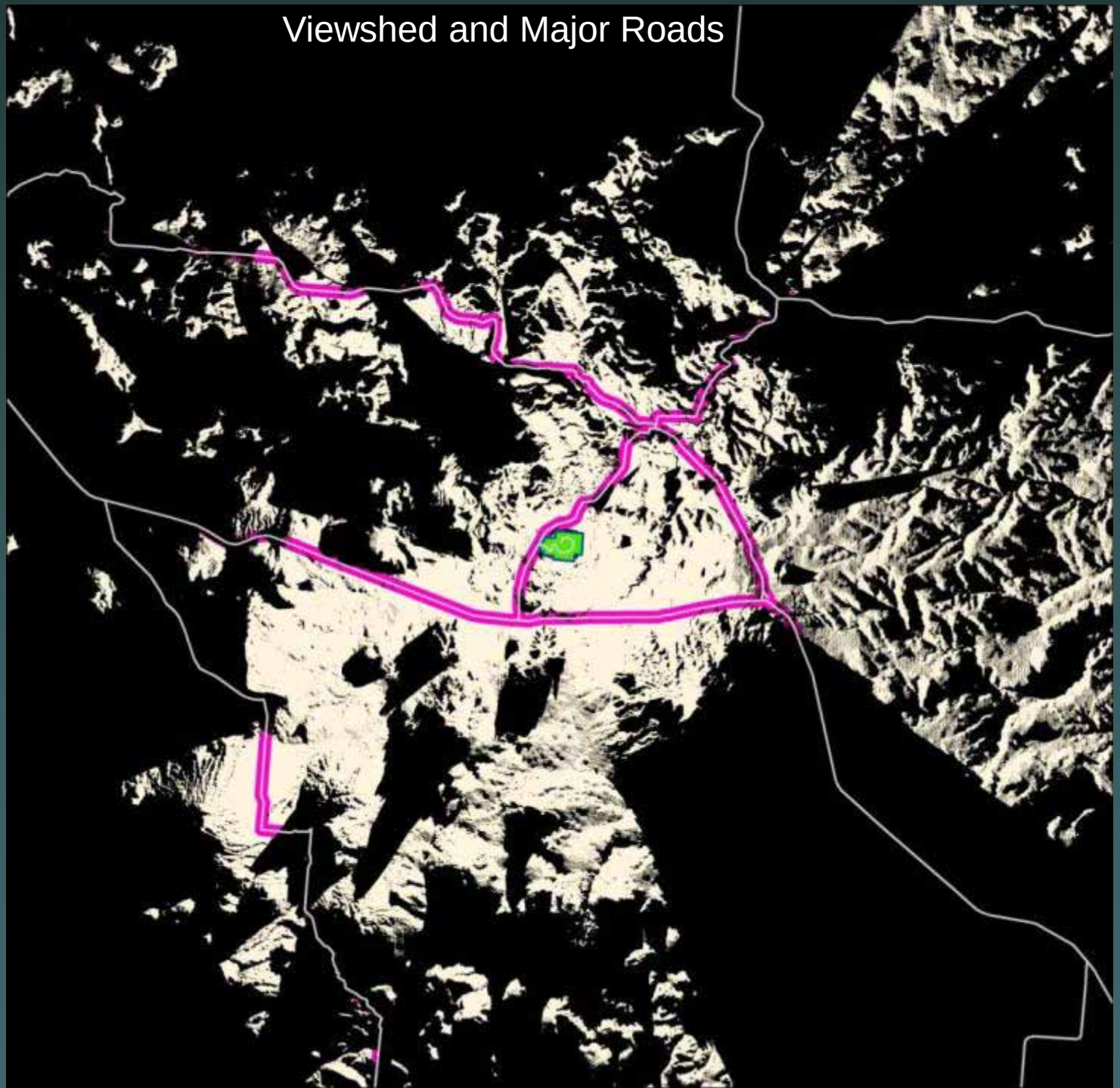

Capulin Boundary
Visable from Vantage Point
Not Visable from Vantage Point
Entrance


Capulin Boundary
Visable from Vantage Point
Not Visable from Vantage Point
Volcano Road

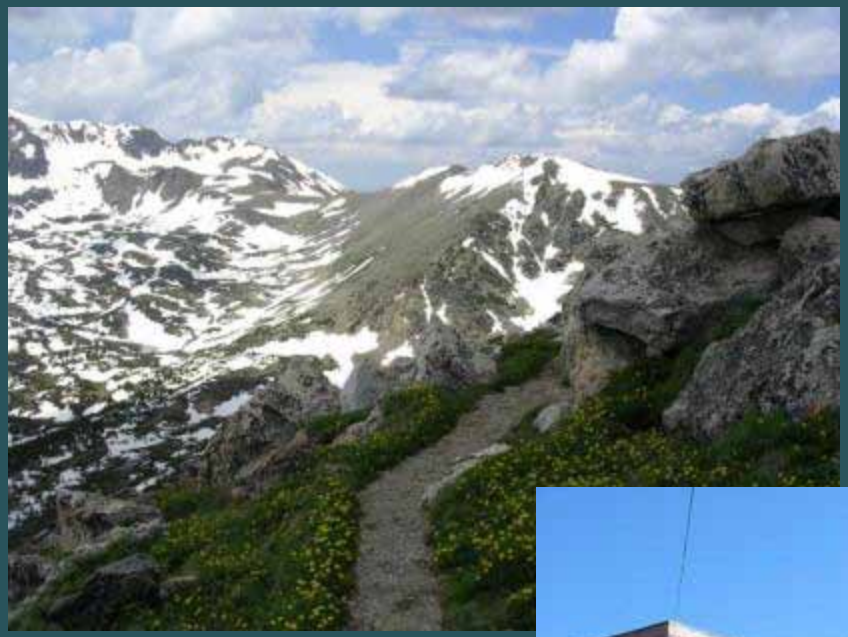


Viewshed and 2010 Spatially Explicit Regional Growth Model (Theobald 2005)

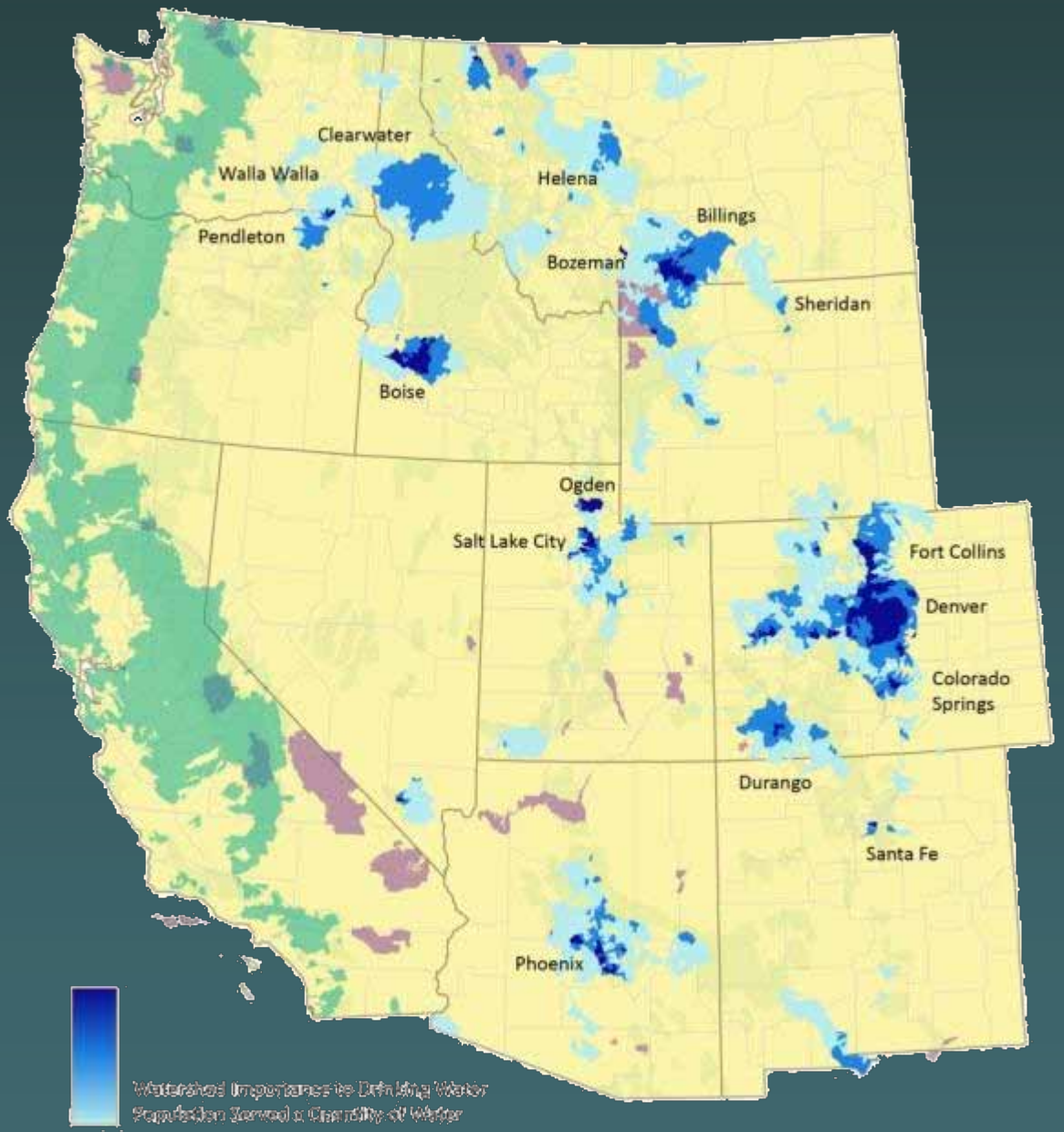
Viewshed and Major Roads

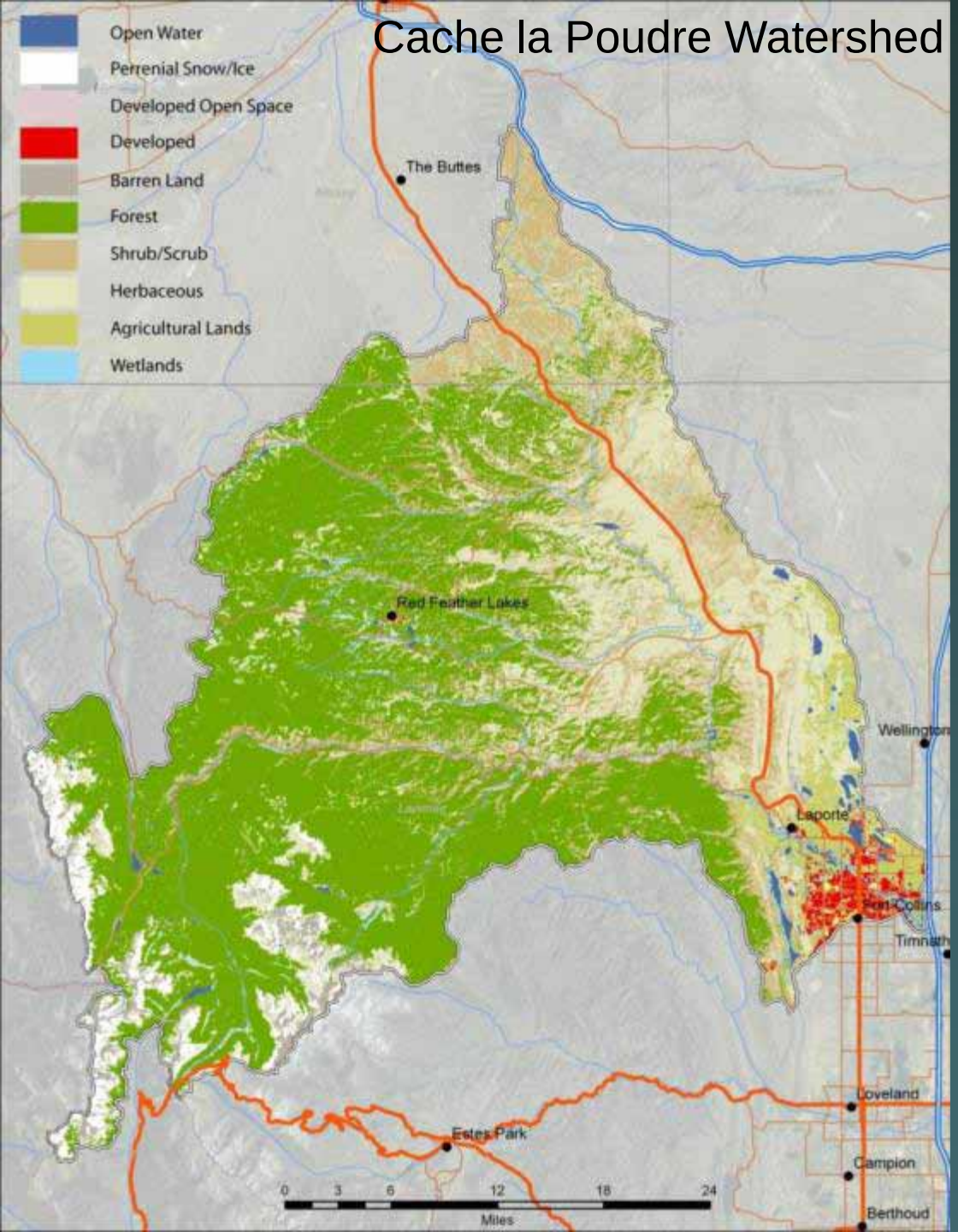


NPScape Applications
Broader Sonoran Institute



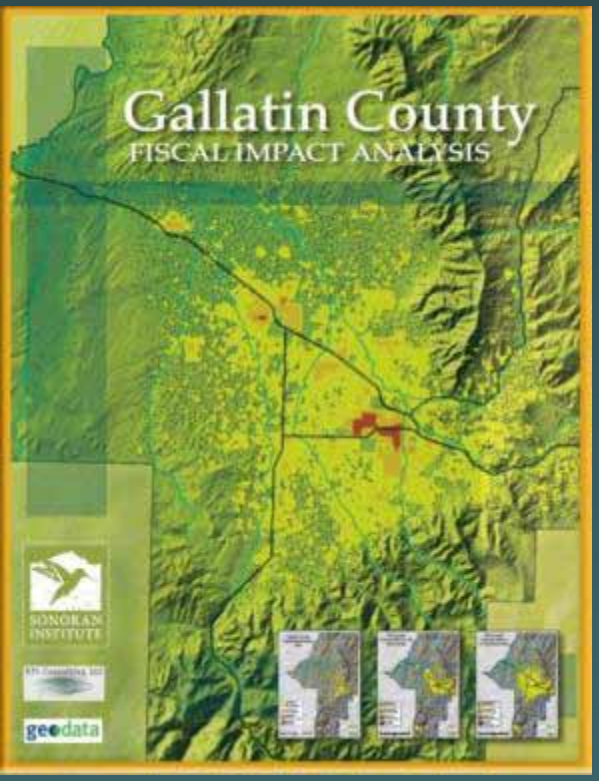
Ecosystem Services

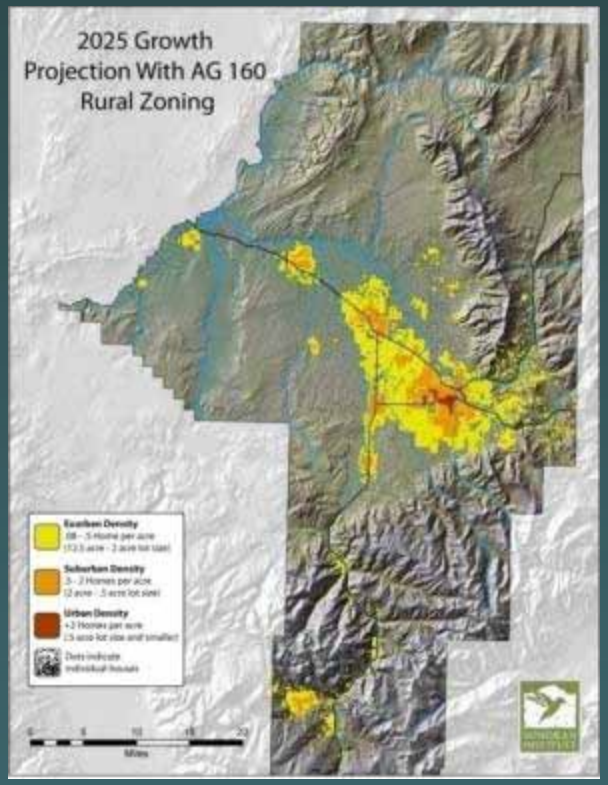




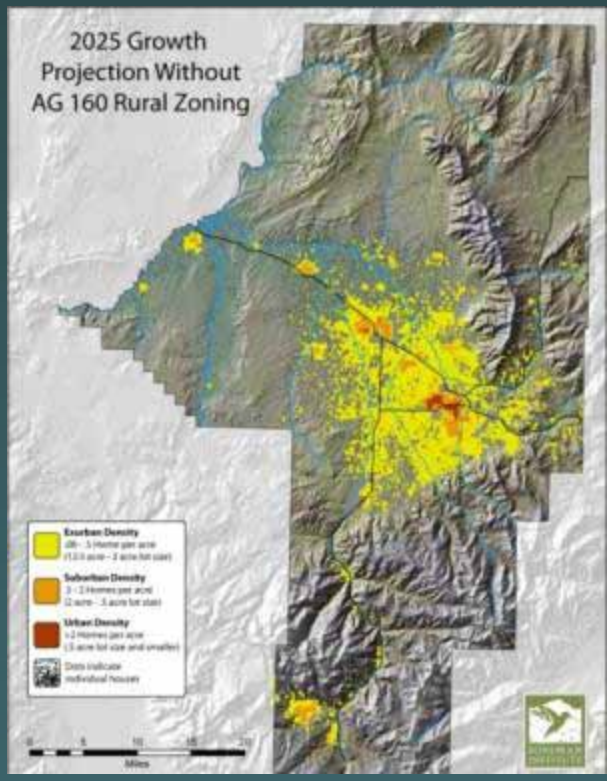
NPScape Data
§ 2001 NLCD

Sonoran Institute Growth Model



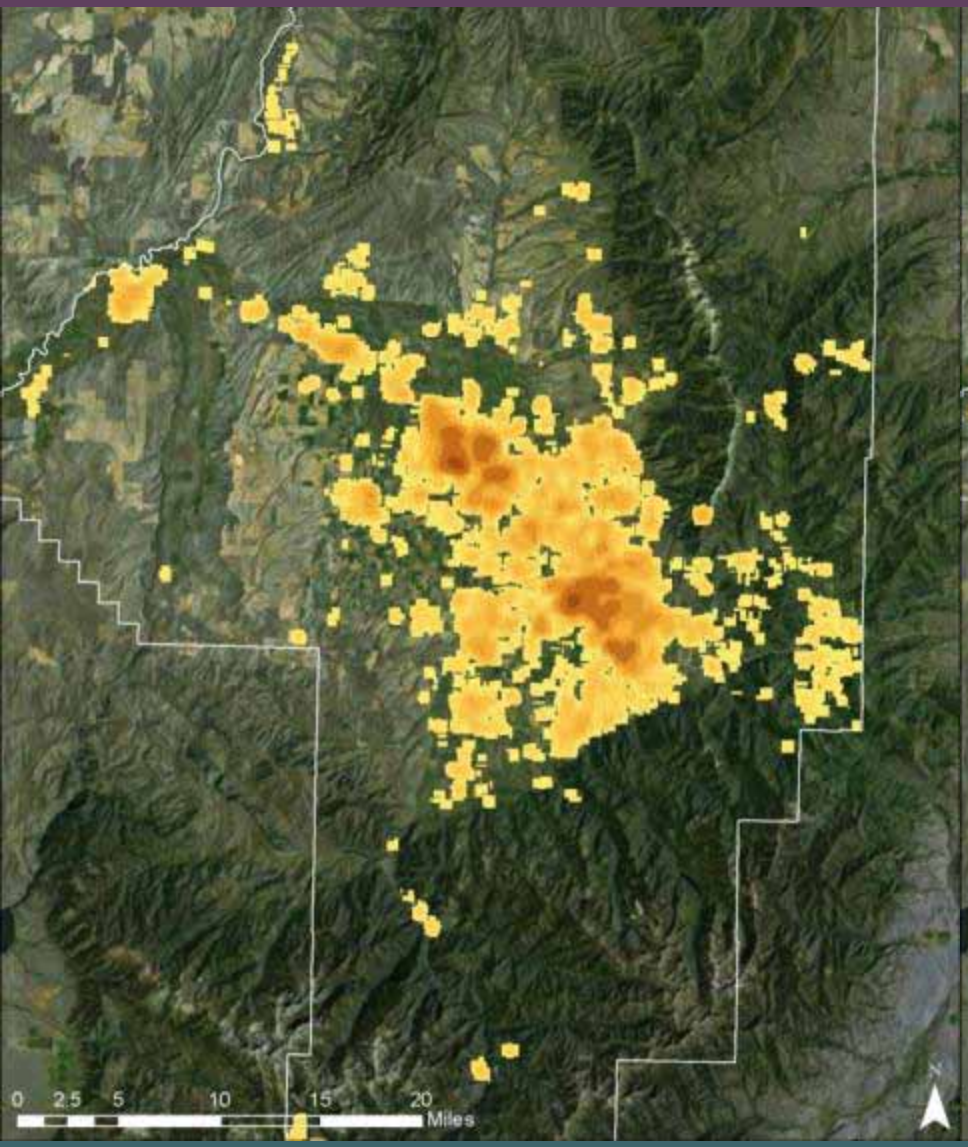


98,000 acres developed
$55,000,000 savings

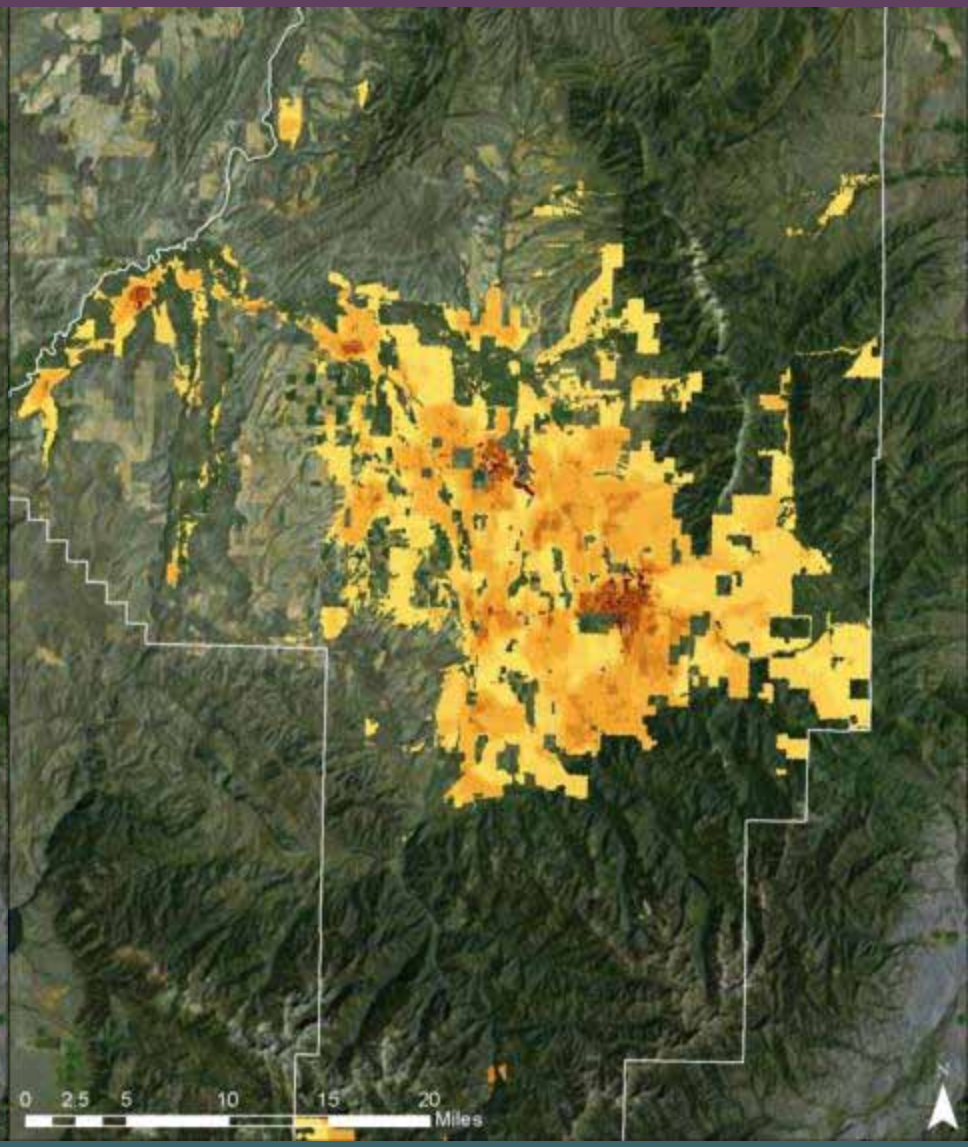


137,000 acres developed

Gallatin County, MT
2030

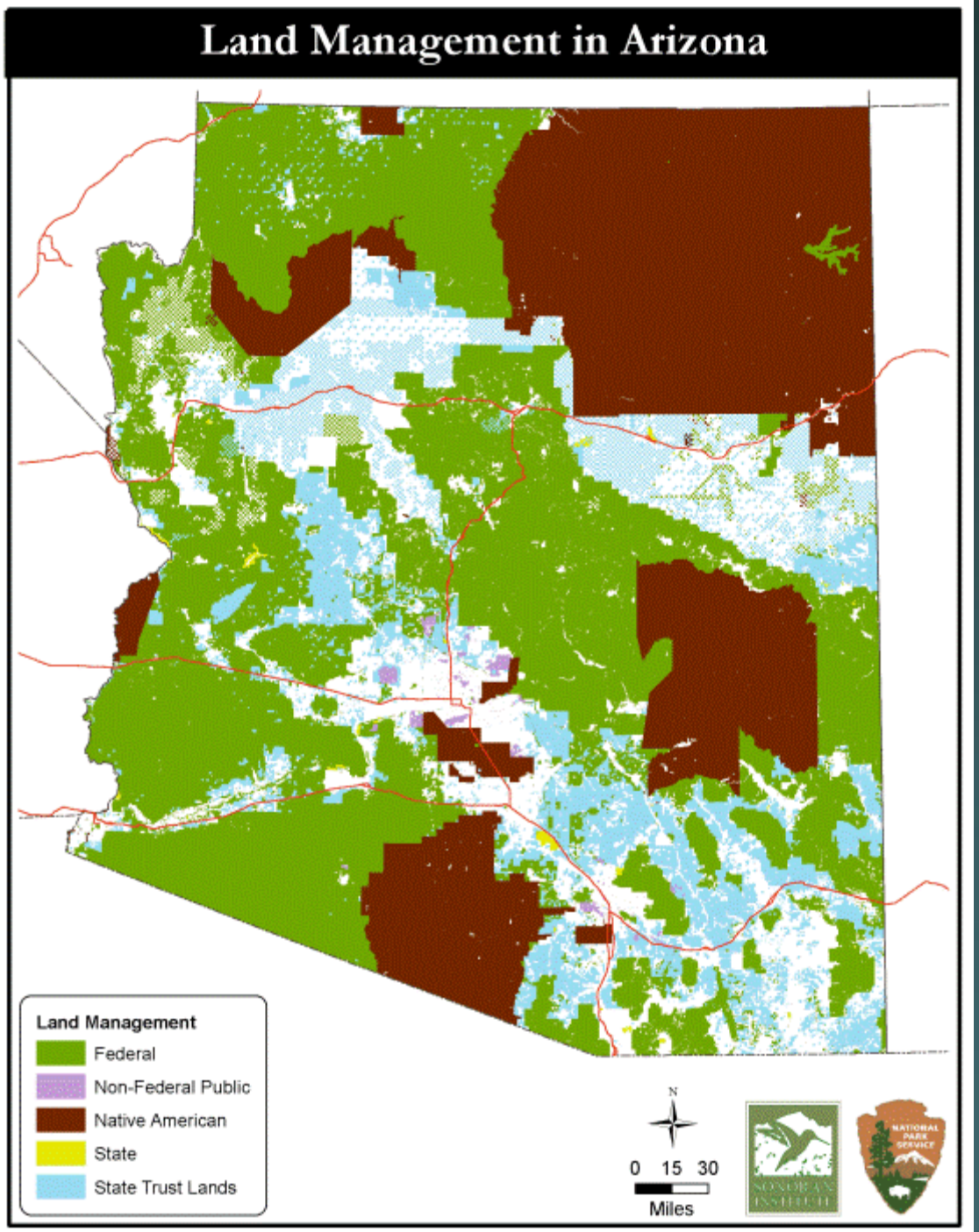


Sonoran Institute Growth Model

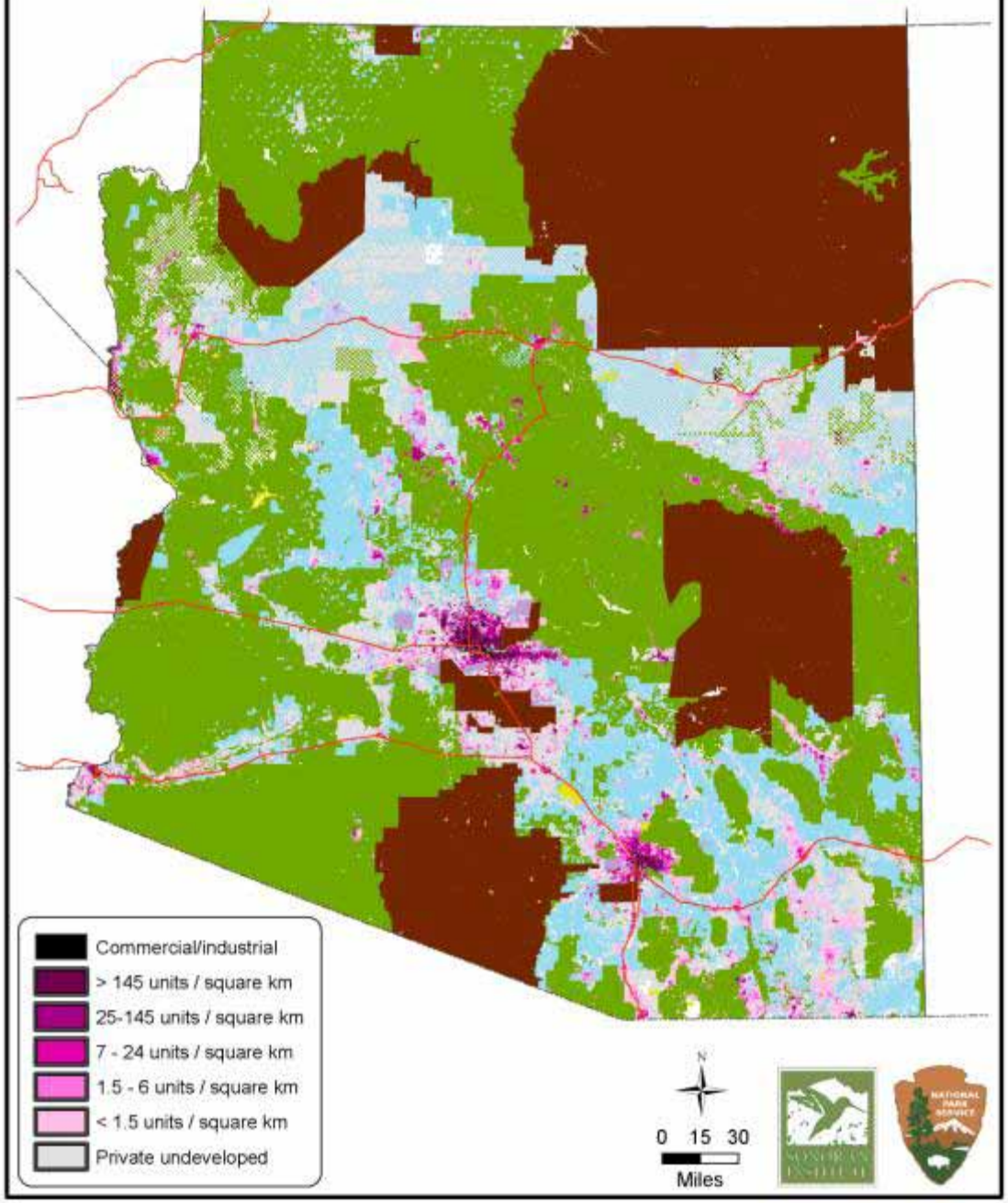


Spatially Explicit Regional Growth Model
Dave Theobald, Colorado State University

Community Outreach



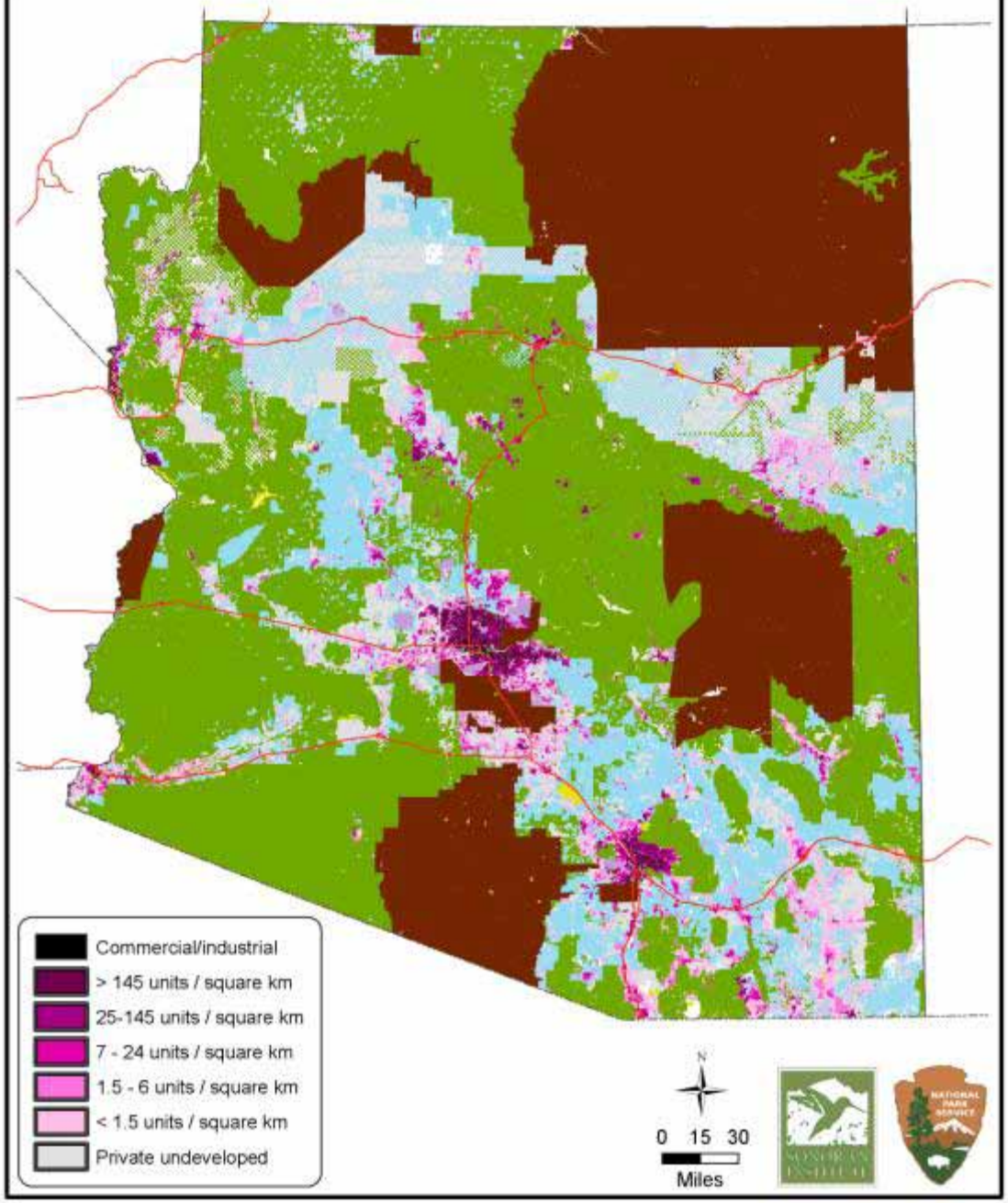
1970 Historic Housing Density in Arizona



Housing Density Source: National Park Service, NPScape landscape dynamics monitoring project, housing density measure based on Spatially Explicit Regional Growth Model (SERGoM), December 2009

Produced by Sonoran Institute, December 2010

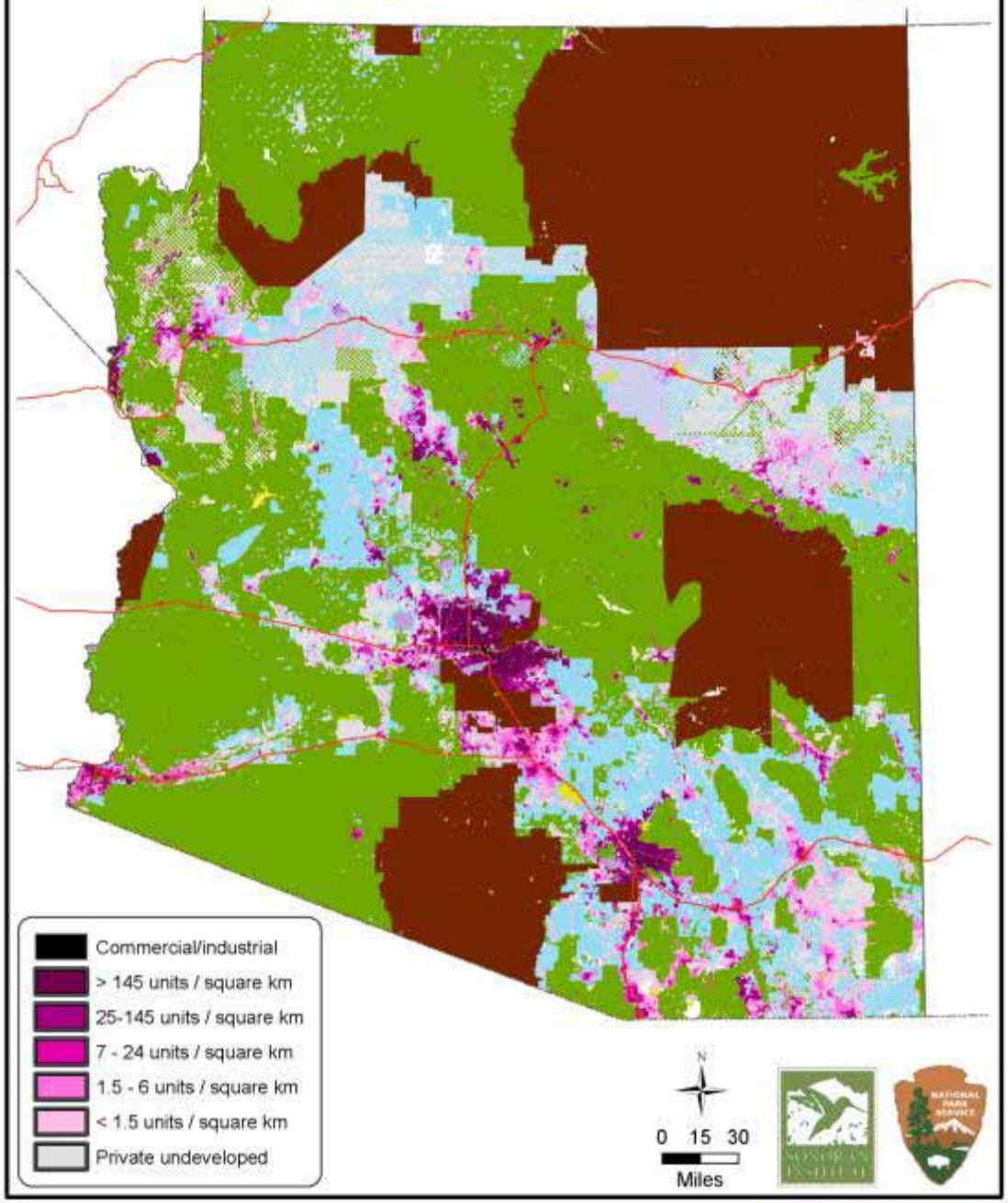
1990 Historic Housing Density in Arizona



Housing Density Source: National Park Service, NPScape landscape dynamics monitoring project, housing density measure based on Spatially Explicit Regional Growth Model (SERGoM), December 2009

Produced by Sonoran Institute, December 2010

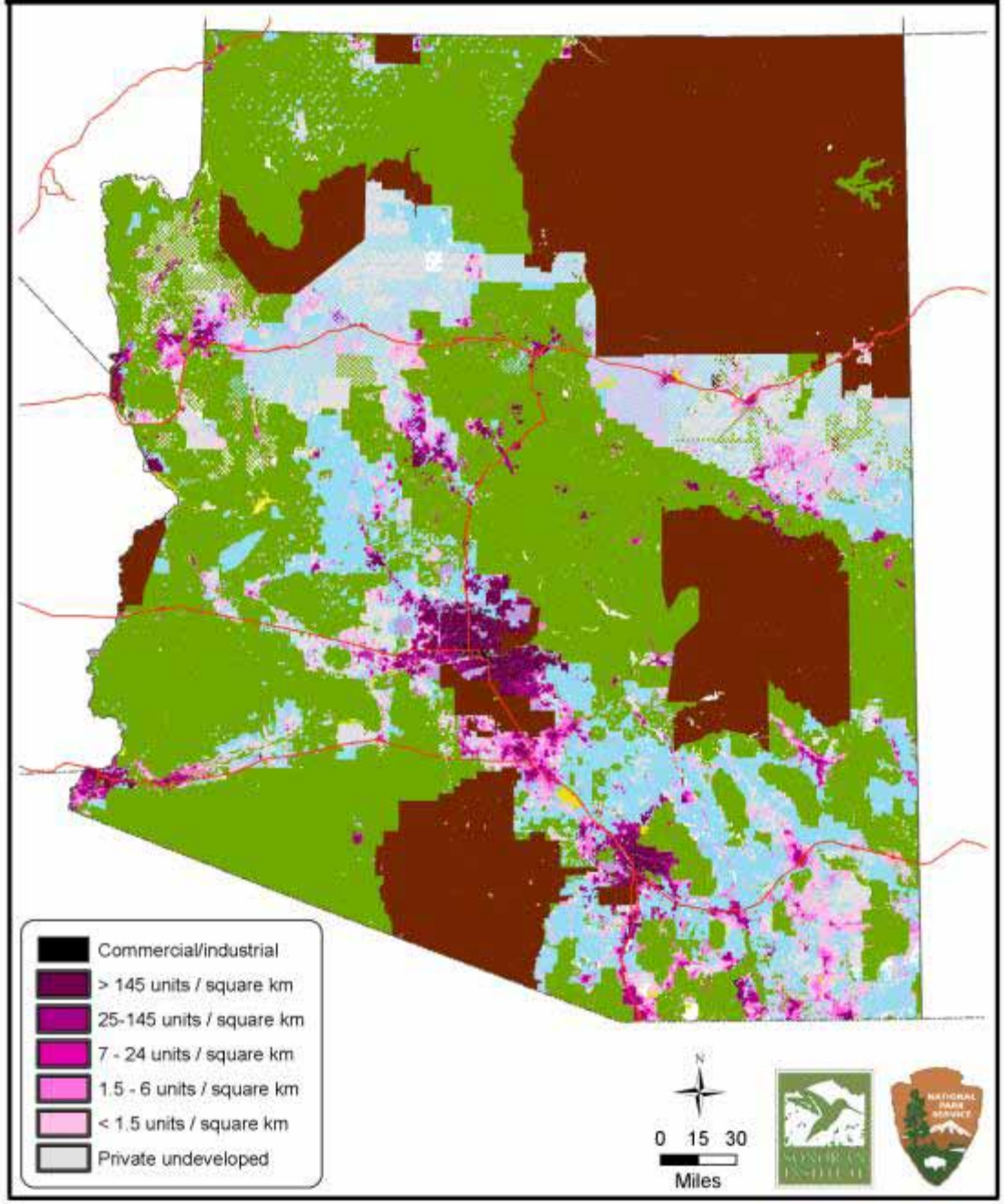
2010 Estimated Housing Density in Arizona



Housing Density Source: National Park Service, NPScape landscape dynamics monitoring project, housing density measure based on Spatially Explicit Regional Growth Model (SERGoM), December 2009

Produced by Sonoran Institute, December 2010

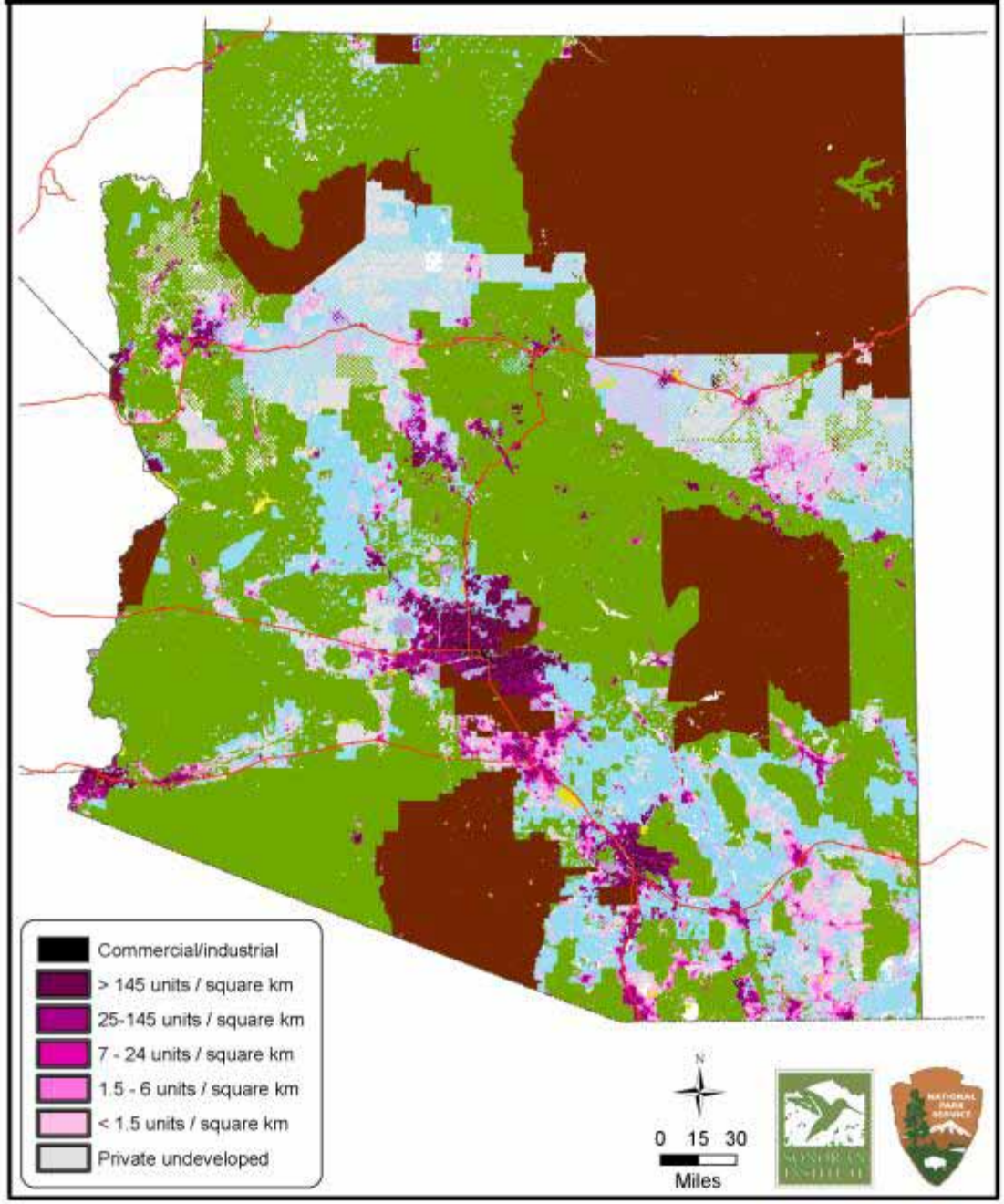
2030 Projected Housing Density in Arizona



Housing Density Source: National Park Service, NPScape landscape dynamics monitoring project, housing density measure based on Spatially Explicit Regional Growth Model (SERGoM), December 2009

Produced by Sonoran Institute, December 2010

2050 Projected Housing Density in Arizona



Housing Density Source: National Park Service, NPScape landscape dynamics monitoring project, housing density measure based on Spatially Explicit Regional Growth Model (SERGoM), December 2009

Produced by Sonoran Institute, December 2010

Thank You

Greater Yellowstone Network - Cathie Jean, Rob Daley, Kristen Legg
Southern Plains Network – Rob Bennetts
NPScape – Bill Monahan
Sonoran Desert Network – Andy Hubbard, Kristen Beaupre
Intermountain Region – Colleen Filippone
Sonoran Institute – Cameron Ellis
Arizona-Sonora Desert Museum – Joel Viers