State of the Sagebrush: Implementing the Sagebrush Conservation Design to Save a Biome

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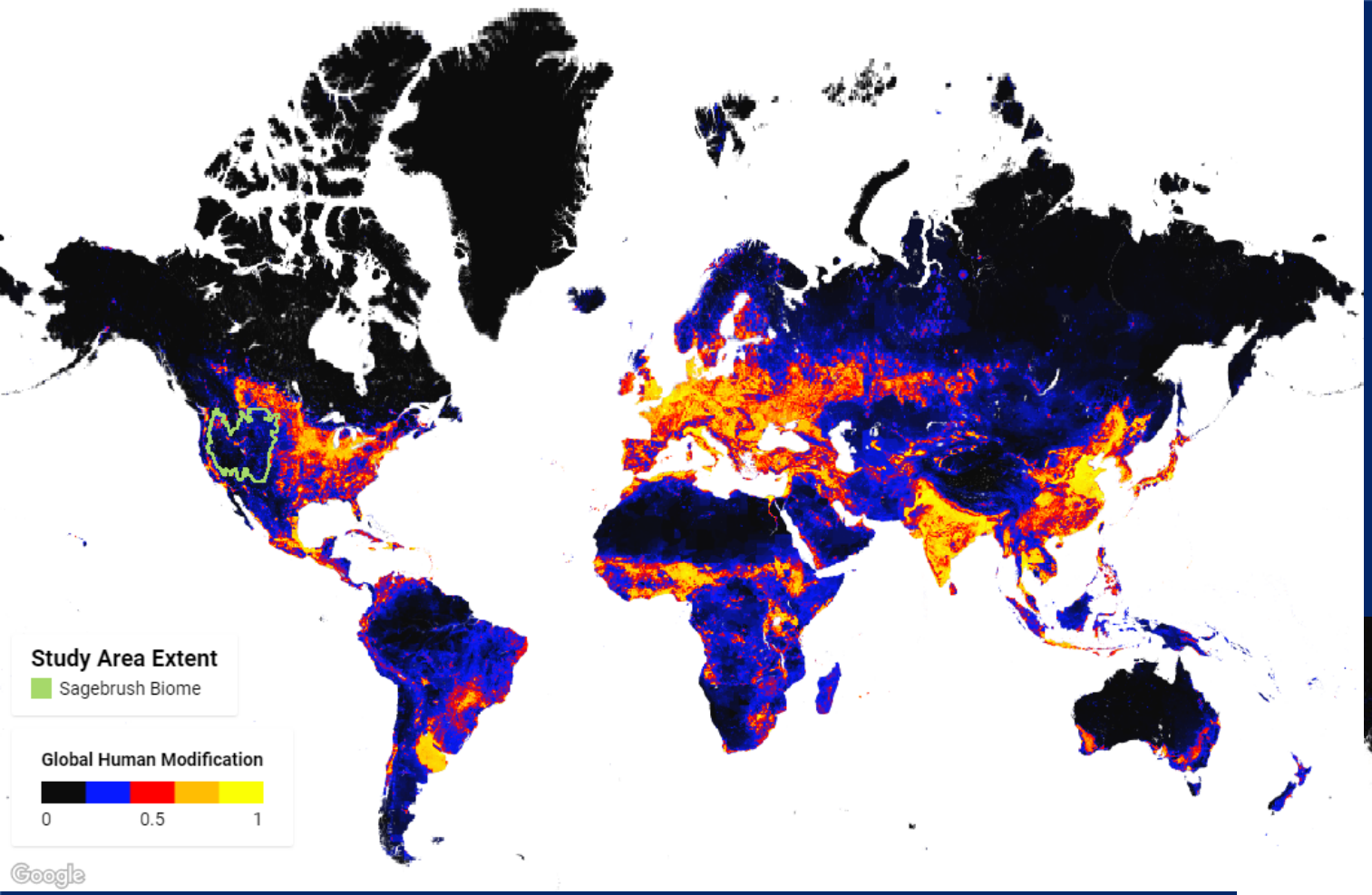
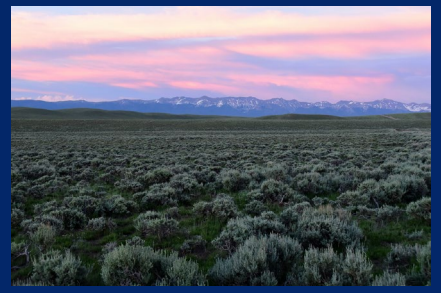
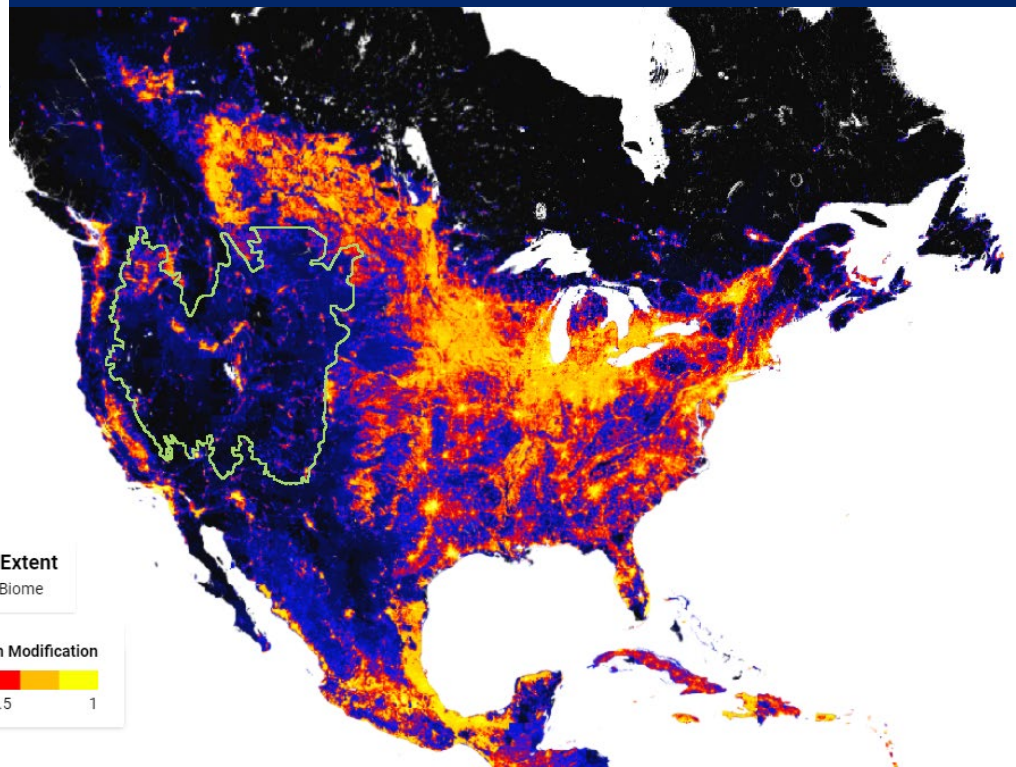
20 Peer-Reviewed Chapters Organized into 6 Themes

The Sagebrush Biome is *one of* the Least Human Modified Landscapes in the World.



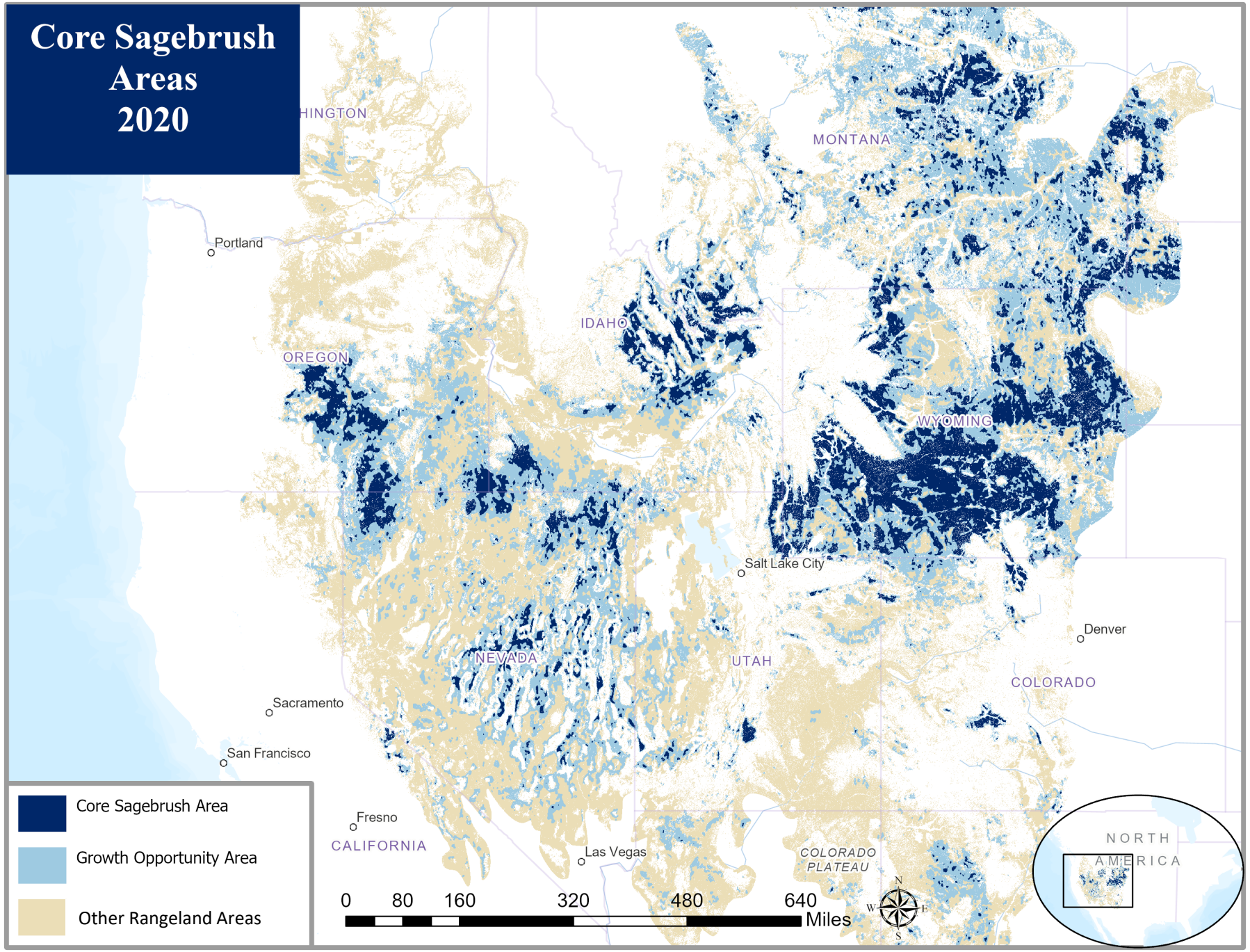


The Sagebrush Biome *is the* largest contiguous open terrain in the Lower 48 States

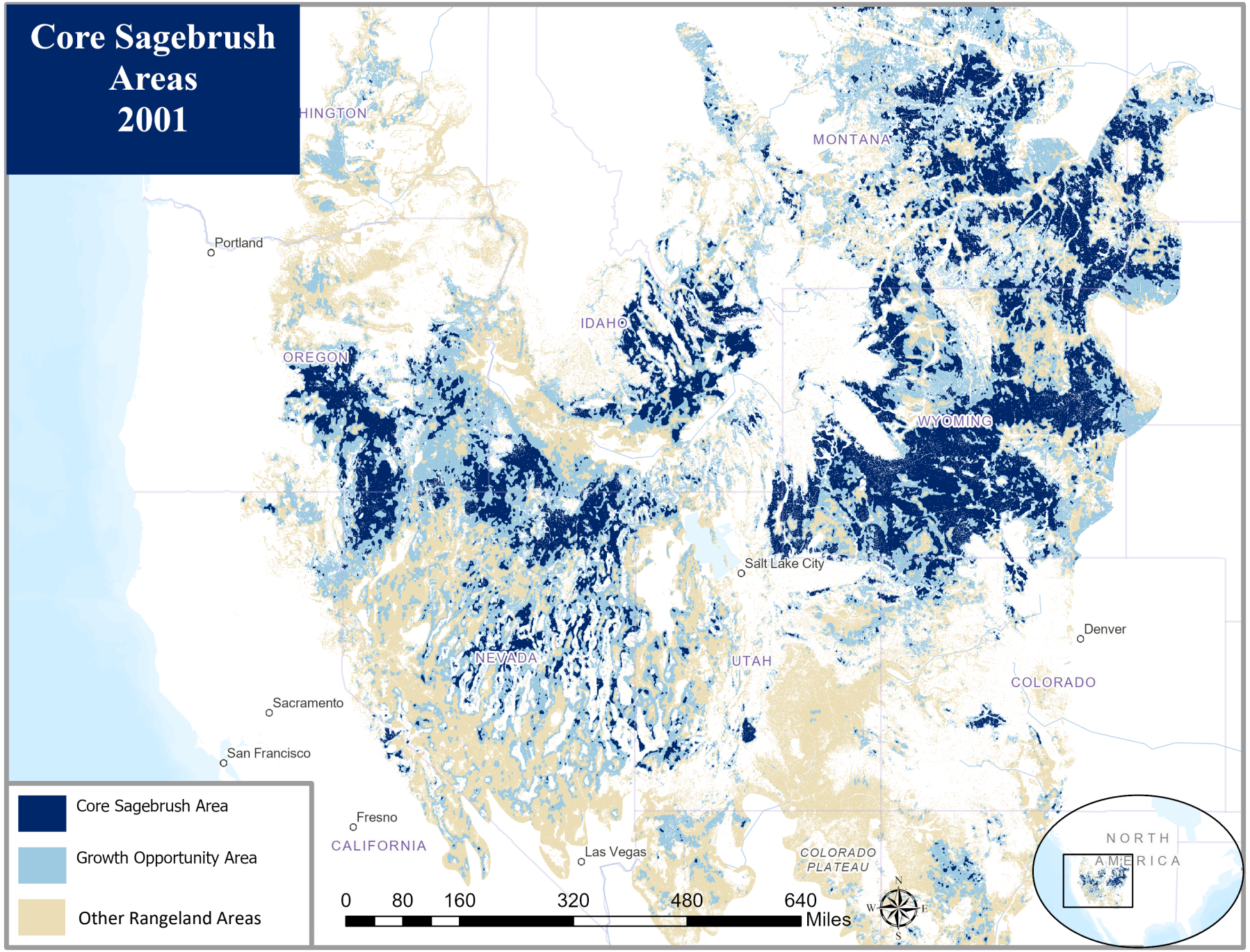


Sagebrush Ecological Integrity & Core Sage Areas

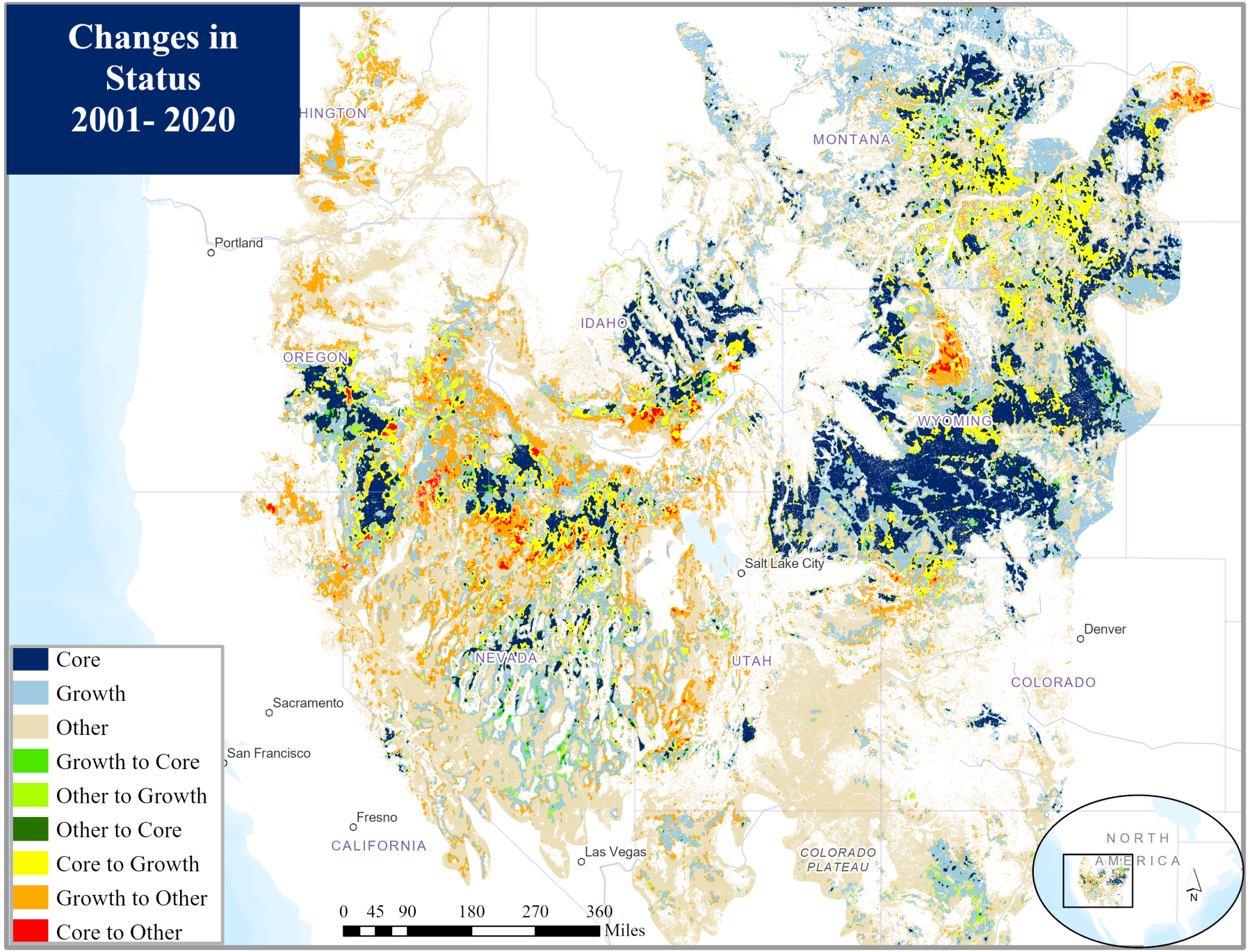
Core Sagebrush Areas 2020



Core Sagebrush Areas 2001



Changes in Status 2001- 2020



What Caused Losses to Sagebrush Cores Over the Last 2 Decades

Loss of Sage = 6%
Loss of Perennial Grass = 4%

Increase in Conifer = 18%

Increase in IAG = 69%

Increase in Human Modification = 3%

Common Interests, Not Stakeholder Positions

Loss of perennial grass = 4%

Perennial grass = stability of the ecosystem & a basis of the rural economy

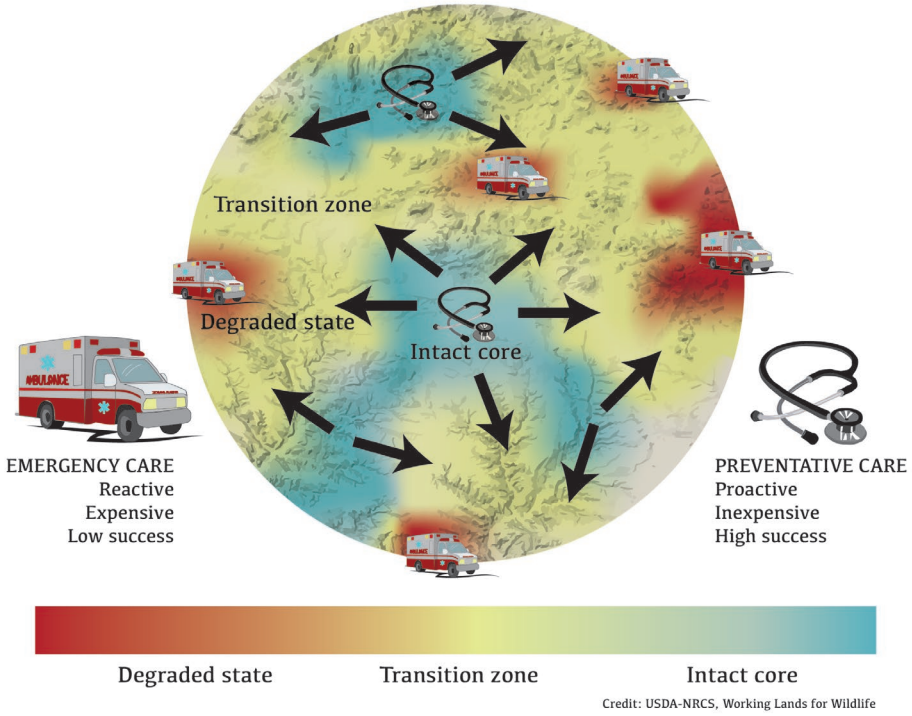
Increase in Conifer = 18%

Increase in IAG = 69%

87% Common Ground on Threats

Business-As-Usual Won't Save the Sagebrush Sea

< 10% of Resources are going into Defending the Core for IAG, ~23% for Conifer

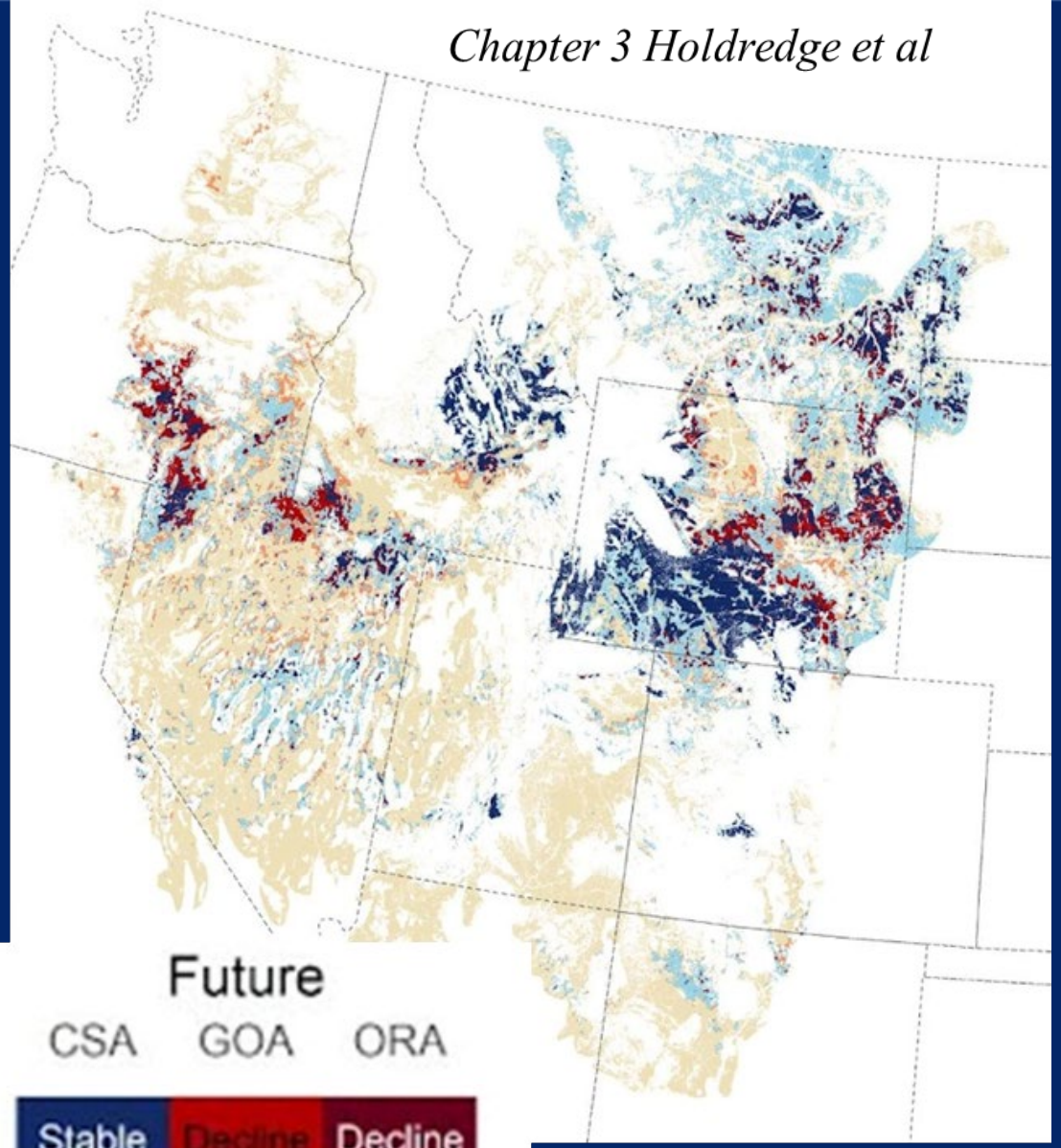


We are off by orders of magnitude with current efforts (e.g. up to 65x more effort needed for IAG)

Better spatial targeting can close the conservation gap

This is a decision in our control today

- Closing the Gap *(CH 2 Mozelewski et al.)*
- Climate resiliency *(CH 3 Holdredge et al.)*
- Sagebrush connectivity *(CH 4 Theobald et al.)*



Current \ Future	CSA	GOA	ORA
CSA	Stable	Decline	Decline
GOA	Increase	Stable	Decline
ORA	Increase	Increase	Stable

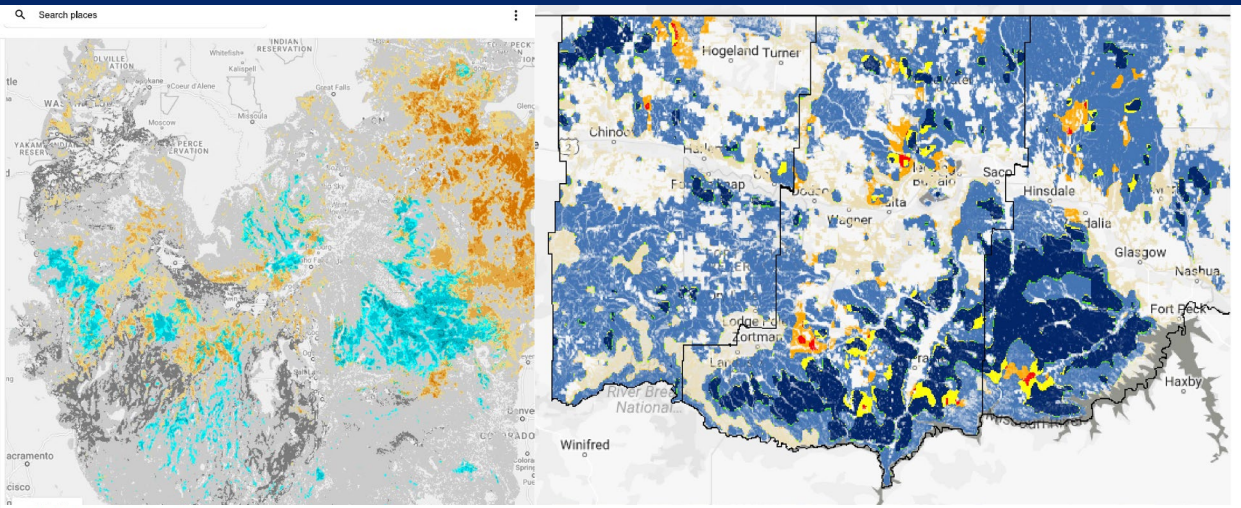
Are Core Sagebrush Areas Climate Resilient?

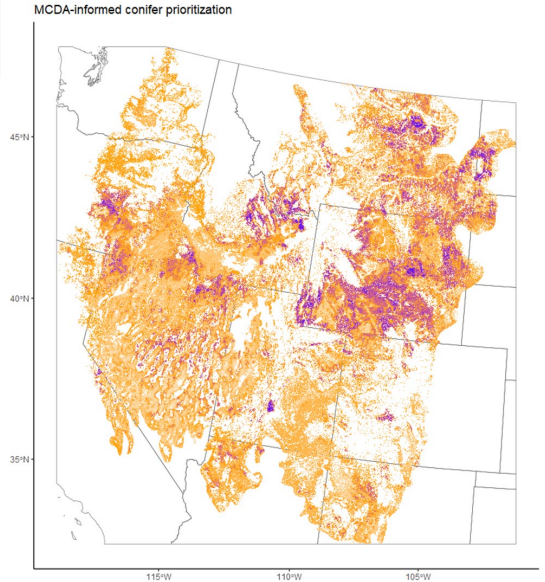
We have vast regions that are resistant to climate change.

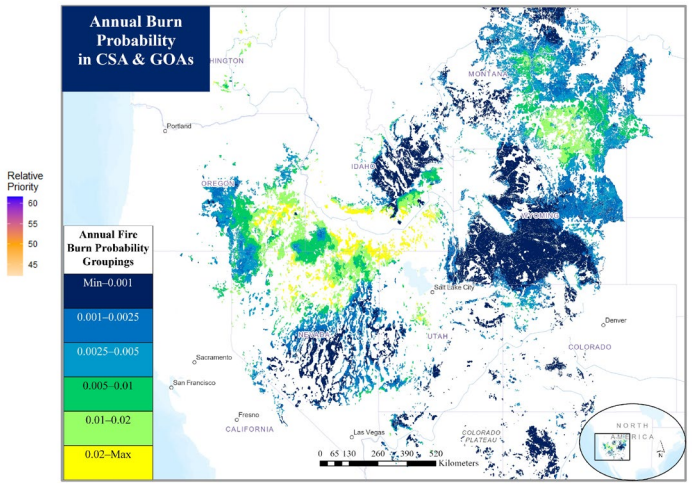
We have 30% of cores that we are likely to lose in the future.

Should we attempt to conserve other rangeland areas (tan) that are projected to be affected by climate change?

Better Spatial Targeting Can Improve Outcomes



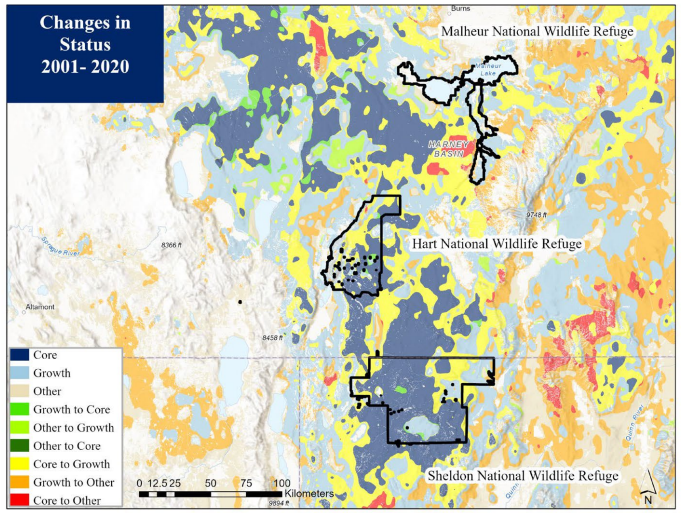




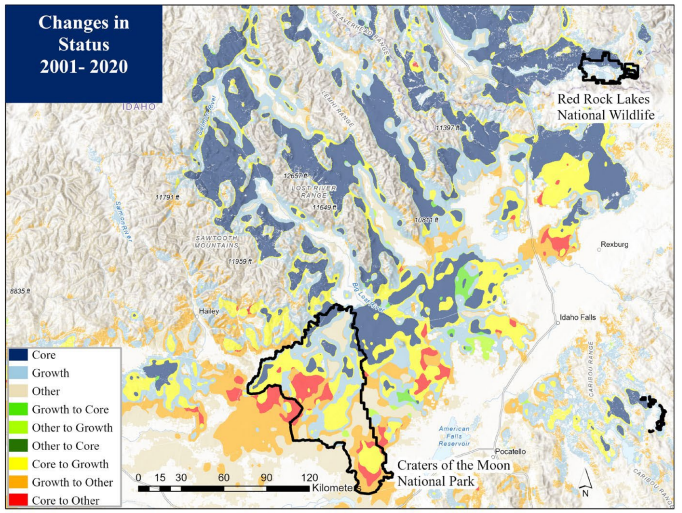
- Expanding Conifers *(CH 5 Reinhardt et al.)*
- Invasive Annual Grasses *(CH 6 Boyd et al.)*
- Cropland Risk *(CH 7 Bedrosian et al.)*
- Wildfire Risk *(Ch 8 Crist et al.)*

Conservation Planning is Needed to Develop Realistic Business Plans

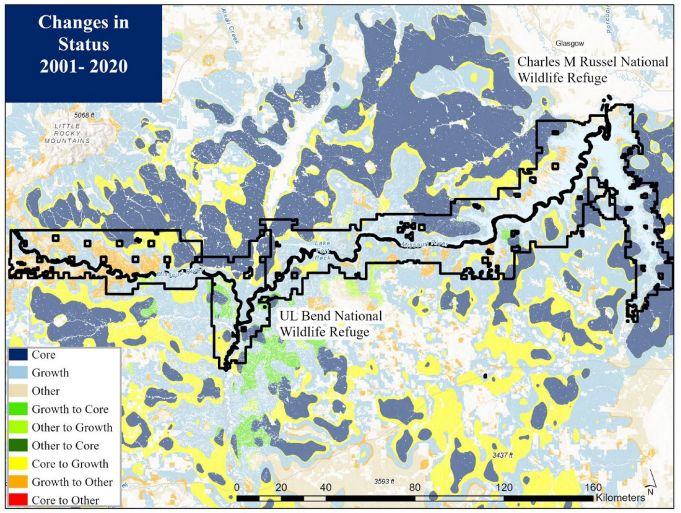
A)



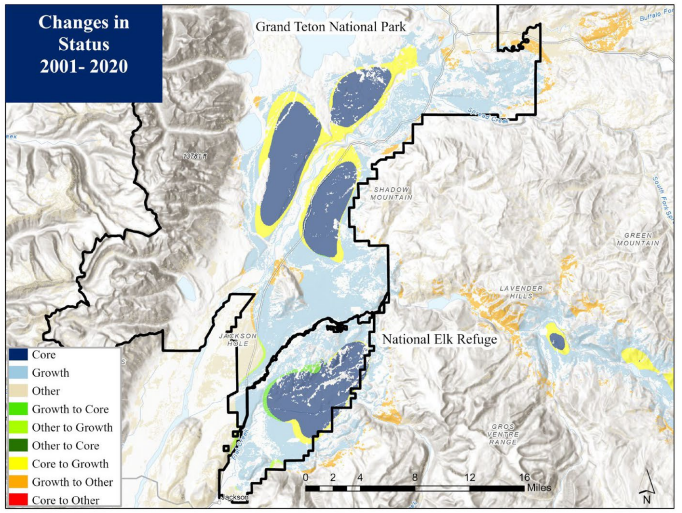
B)



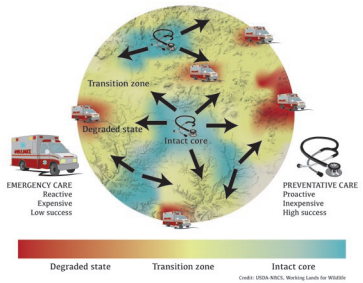
C)



D)

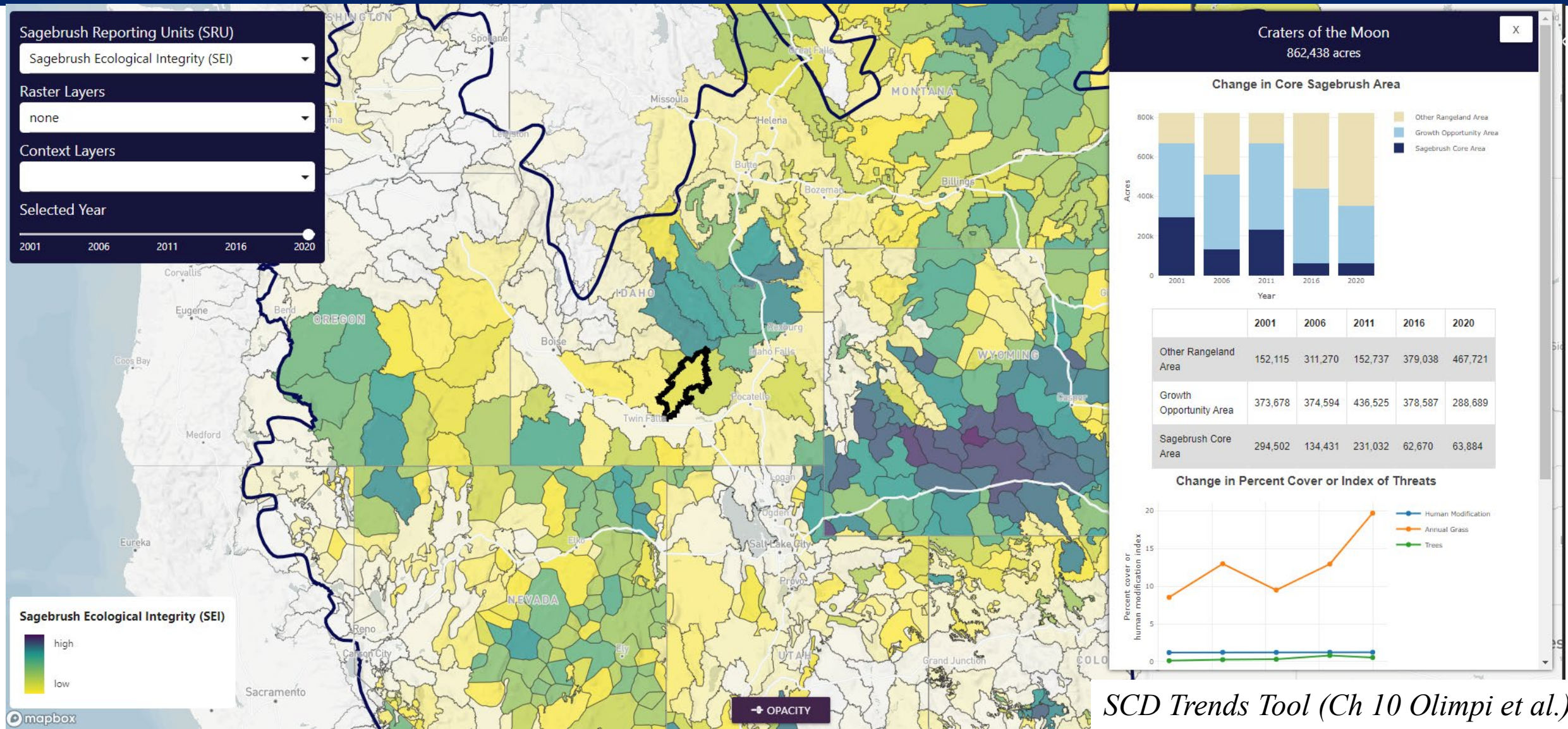


- We are orders of magnitude off in needed resources when looking at the **status and trends of threats** for both the NPS and USFWS Refuges, but…
- Focusing on Refuges and Parks that are in a **preventative ecosystem state** allows us to close the conservation gap



- Over 90% of Core Sagebrush Areas are in just 5 refuges. The same is true for NPS *(Ch 9 Sparklin et al.)*

Conservation Planning is Needed to Develop Realistic Business Plans



	2001	2006	2011	2016	2020
Other Rangeland Area	152,115	311,270	152,737	379,038	467,721
Growth Opportunity Area	373,678	374,594	436,525	378,587	288,689
Sagebrush Core Area	294,502	134,431	231,032	62,670	63,884

SCD Trends Tool (Ch 10 Olimpi et al.)

Targeted Ecosystem Management: Monitoring Shows Managing for Sagebrush Ecological Integrity is Working

"It is *not* dollars spent or acres treated, that will lead to an increase in Core Sagebrush Areas, it is *effective conservation aligning with an overarching strategic ecosystem vision*."

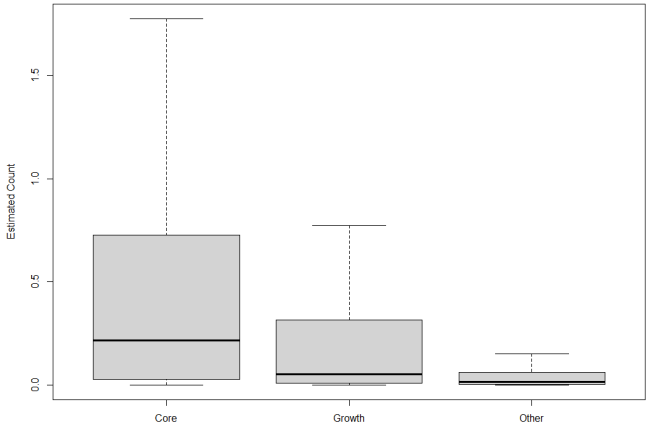
- NRCS Program evaluation *(CH 11 Naugle et al.)*

- Monitoring Conservation Success *(CH 12 Smith et al.)*

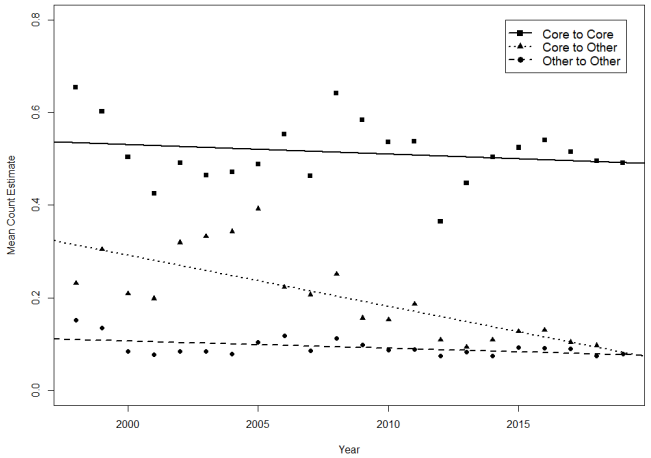
- Conservation Actions aimed at **Sagebrush Ecological Integrity** increased populations of Bi-State Sage-grouse *(CH 13 Coates et al.)*

Maintaining Sagebrush Ecological Integrity is Ecologically Relevant

Sagebrush Obligate Songbirds *(Ch 15 Kumar et al.)*

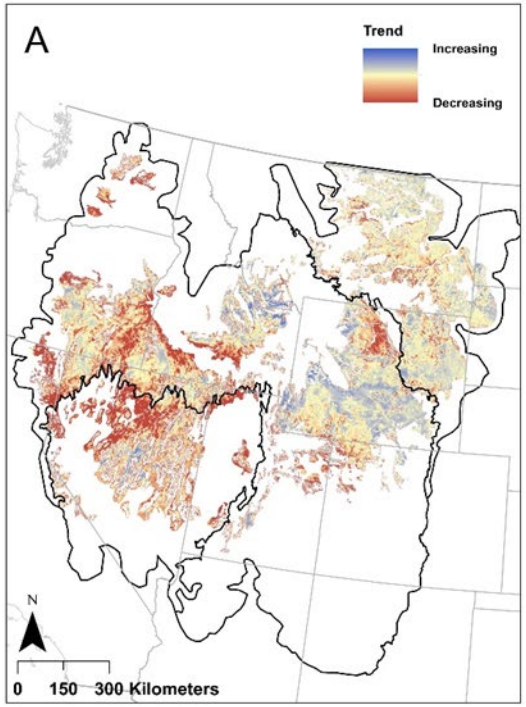


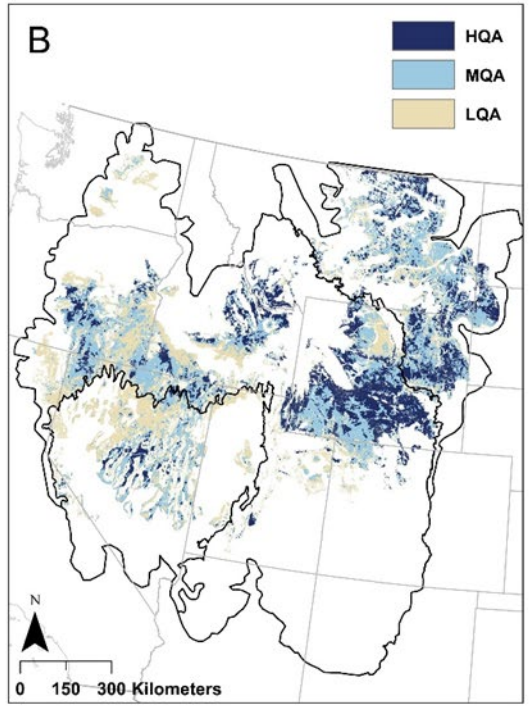
10x Higher Densities of Birds



58% population loss when Cores transition to Other Rangeland Areas

Greater Sage-grouse *(Ch 14 Prochaza et al)*



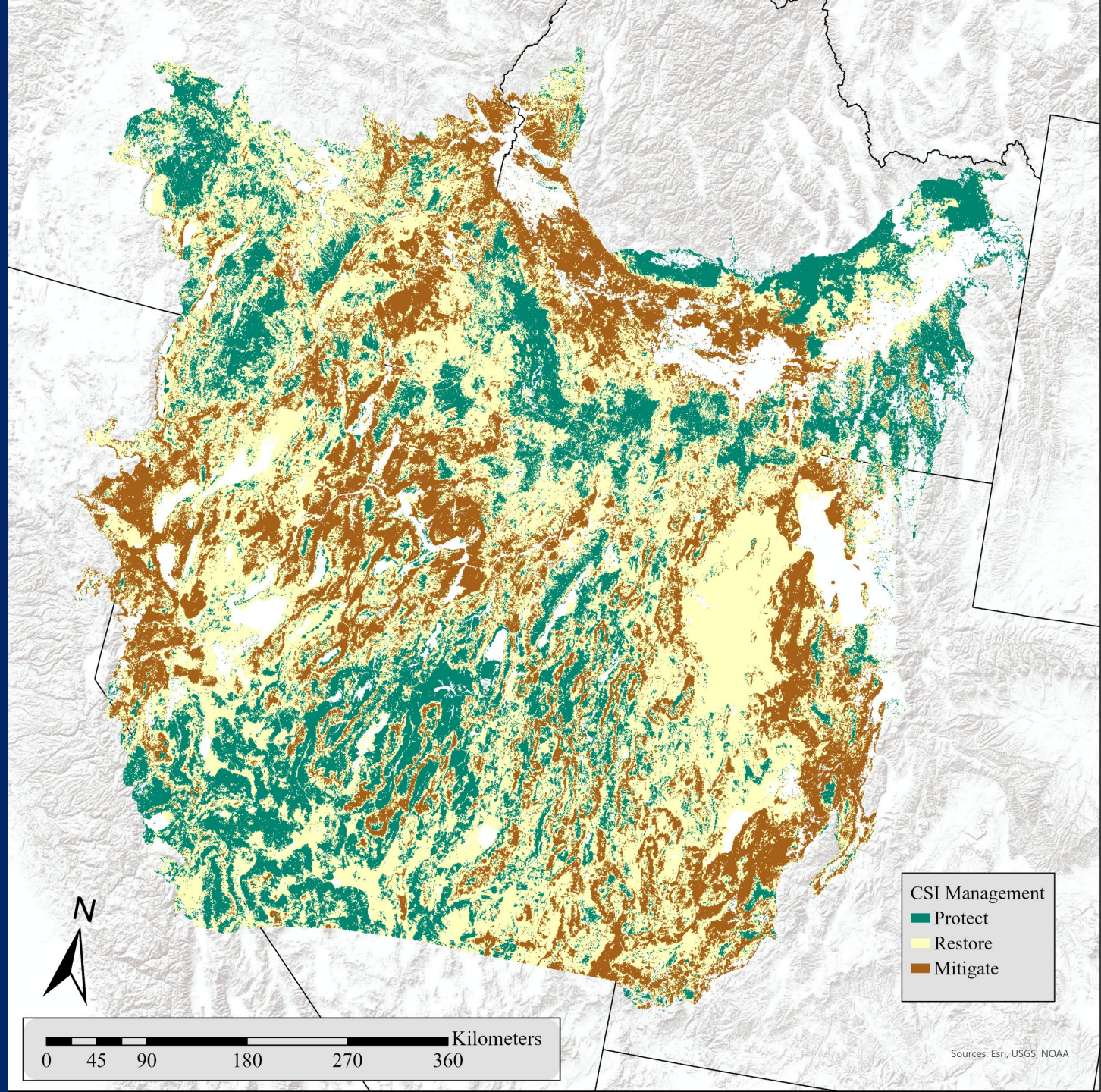


CSA = +3%, GOA = -16% , ORA = -62% from 1996 to 2022

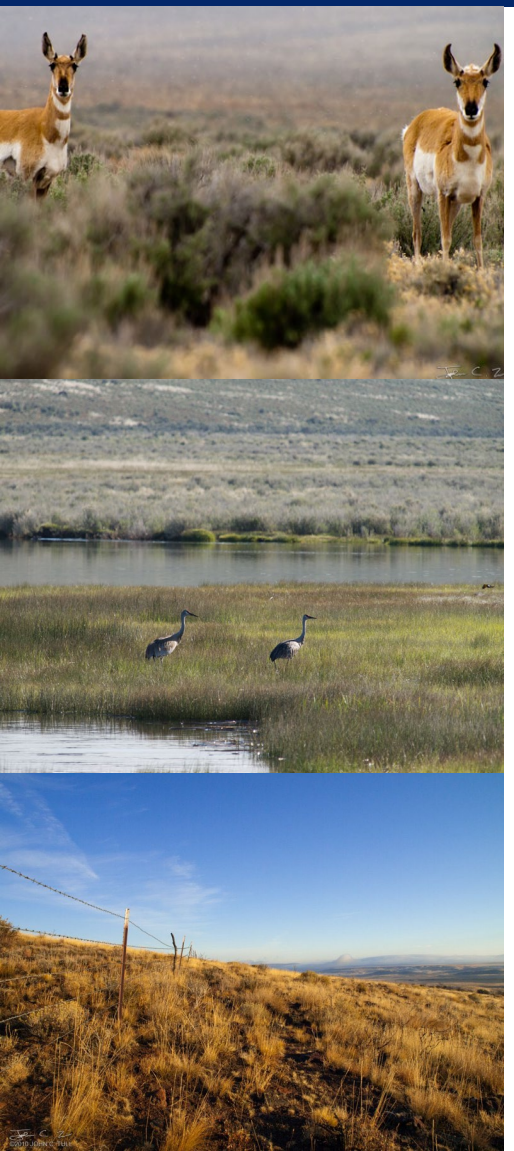
Carbon Security

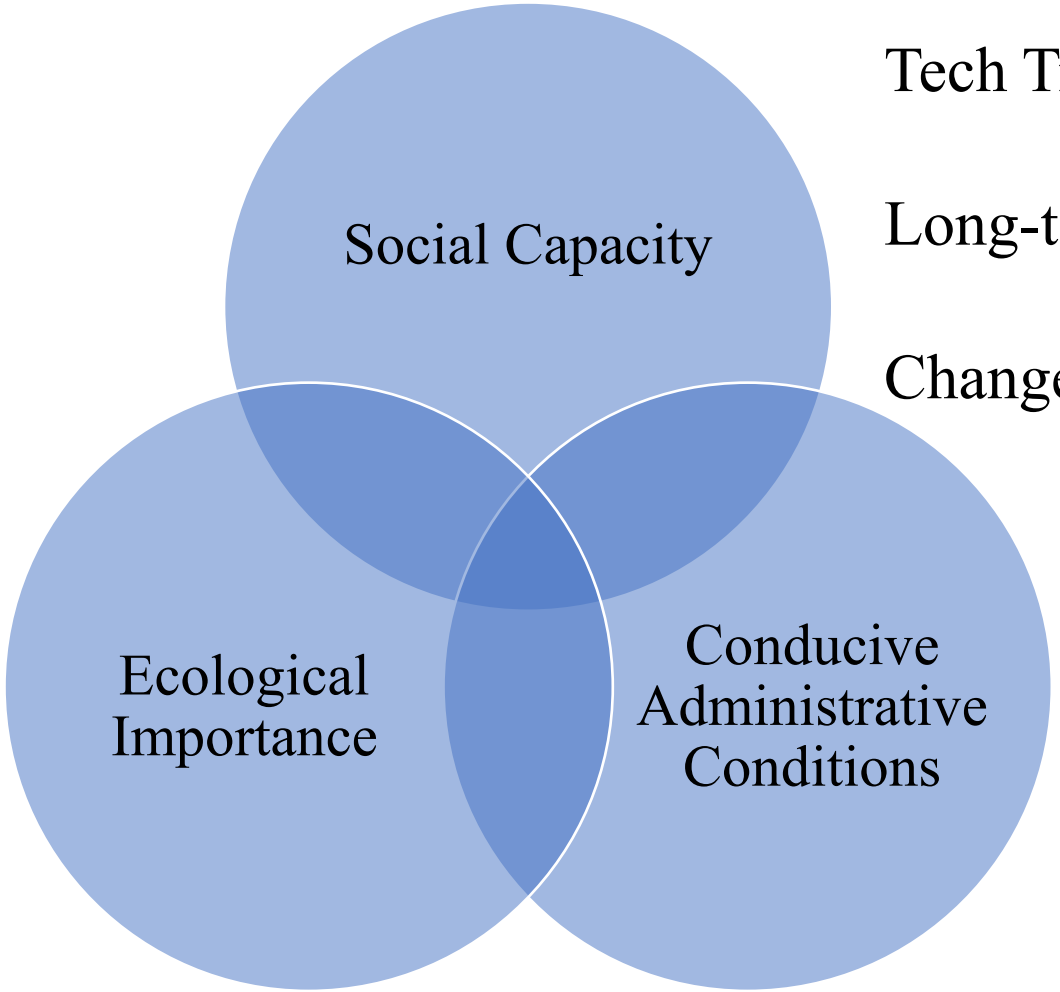
The indexed value of potential carbon being protected and stored at a location at a point in time.

Ch 16: O’Connor et al.



There is Only Hope if We Manage Change





Its more than Ecology*(CH 18 Wollstein et al)*

Tech Transfer *(CH 17 Olsen et al.)*

Long-term *(CH 19 Remington et al.)*

Change management *(CH 20 Cahill et al.)*

IF WE MANAGE CHANGE, THERE IS HOPE!

State of the Sagebrush: Implementing the Sagebrush Conservation Design to Save a Biome

Chapter	Lead author	Title
1	Doherty	The State of the Sagebrush: Implementing the Sagebrush Conservation Design to Save a Biome
2	Mozelewski	Closing the Conservation Gap: Spatial Targeting and Exceptional Coordination are Needed for Conservation Efforts to Keep Pace with Ecosystem Losses
3	Holdredge	Climate change amplifies ongoing declines in sagebrush ecological integrity
4	Theobald	Anchoring sagebrush conservation to core landscapes by understanding the decline of sagebrush ecosystem connectivity from 2001-2021
5	Reinhardt	A Spatial Prioritization of Conifer Management to Defend and Grow Sagebrush Cores
6	Boyd	A strategic and science-based framework for management of invasive annual grasses in the Sagebrush Biome
7	Bedrosian	Modeling cropland conversion risk to scale-up averted loss of core sagebrush rangelands
8	Crist	Will it burn? Characterizing wildfire risk for the Sagebrush Conservation Design
9	Sparklin	An Assessment of Conservation Opportunities within Sagebrush Ecosystems of US National Parks and Wildlife Refuges
10	Olimpi	An interactive tool to promote stepping down the Sagebrush Conservation Design to local conservation planning
11	Naugle	From a Bird to a Biome: Exploring the Sage Grouse Initiative's Role in Defending and Growing Sagebrush Core Areas
12	Smith	Using satellite remote sensing to assess shrubland vegetation responses to large-scale conifer removal in the northern Great Basin
13	Coates	Assessing performance of cooperative conservation actions on population growth of greater sage-grouse
14	Prochazka	Evaluating the Sagebrush Conservation Design Strategy through the Performance of a Sagebrush Indicator Species
15	Kumar	Defend and grow the core for birds: How a sagebrush conservation strategy benefits rangeland birds
16	O'Connor	The Carbon Security Index: A novel approach to assessing how secure carbon is in sagebrush ecosystems within the Great Basin
17	Olsen	Crossing the chasm: using technical transfer to bridge science production and management action
18	Wollstein	Operationalizing strategic conservation: A multi-level framework to identify opportunities and actions
19	Remington	Where do we go from here with sagebrush conservation: A long-term perspective
20	Cahill	There is no hope without change: a perspective on how we conserve the sagebrush biome

State of the Sagebrush: Implementing the Sagebrush Conservation Design to Save a Biome

Organized the 20 Peer-Reviewed Chapters Into 6 Themes:

Theme 1 Business-As-Usual Won't Save the Sagebrush Sea

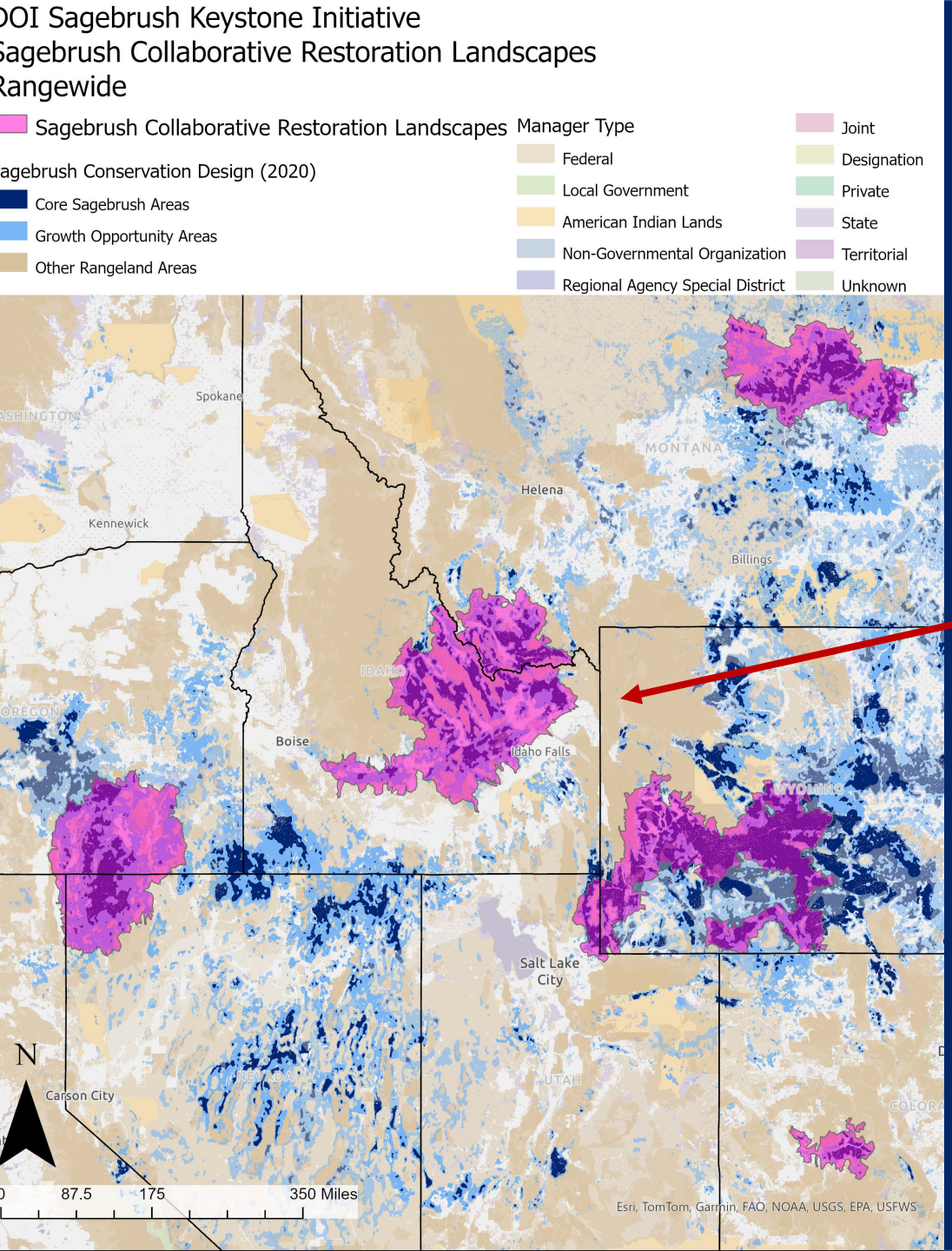
Theme 2: Better Spatial Targeting Can Improve Outcomes

Theme 3: Conservation Planning is Needed to Develop Realistic Business Plans

Theme 4: Targeted Ecosystem Management: Monitoring Shows Managing for Sagebrush Ecological Integrity is Working

Theme 5: Maintaining Sagebrush Ecological Integrity is Ecologically Relevant

Theme 6: There is Only Hope if We Manage Change



What's next?

- Special issue of Rangeland Ecology and Management – Summer / Fall 2024
- We Expect Lots of National Focus
- Ongoing tech transfer, workshops, and science development
- The Strategy is more than a map!

State of the Sagebrush:
Implementing the Sagebrush Conservation Design to Save a Biome

QUESTIONS & DISCUSSION