



Landscape Scale Vulnerability Assessments for Focal Resources in the Southwest

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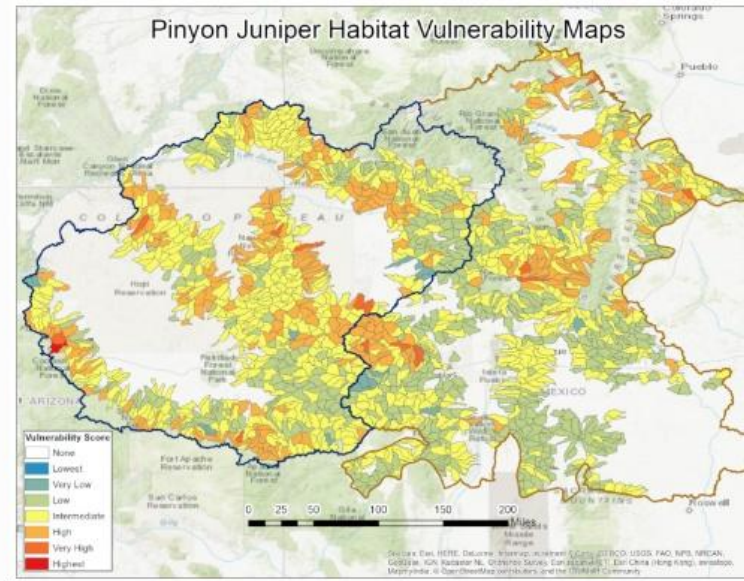


Co-producing landscape scale vulnerability assessments

Date: August 17, 2016

Description Related

Developing and applying a framework for integrating diverse spatial data representing threats and issues for coldwater fish, riparian corridors, pinyon-juniper and sagebrush ecosystems and elk/mule deer in the Four Corners and Upper Rio Grande Regions



Final vulnerability classifications for pinyon-juniper in watersheds in the Four Corners and Upper Rio Grande landscapes.

Principal Investigators:

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Forest Service Partners:

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Dave Hawksworth, Technician
Max Smith, Technician

External Partners:

John Rice, SRLCC Science Coordinator, Bureau of Reclamation,
Kevin Johnson, SRLCC Coordinator, Fish and Wildlife Service,
Mary Williams, Nez Perce Tribe
Tzeidle Wasserman, Northern Arizona University
Stephanie Mueller, Northern Arizona University
Colorado Natural Heritage Program

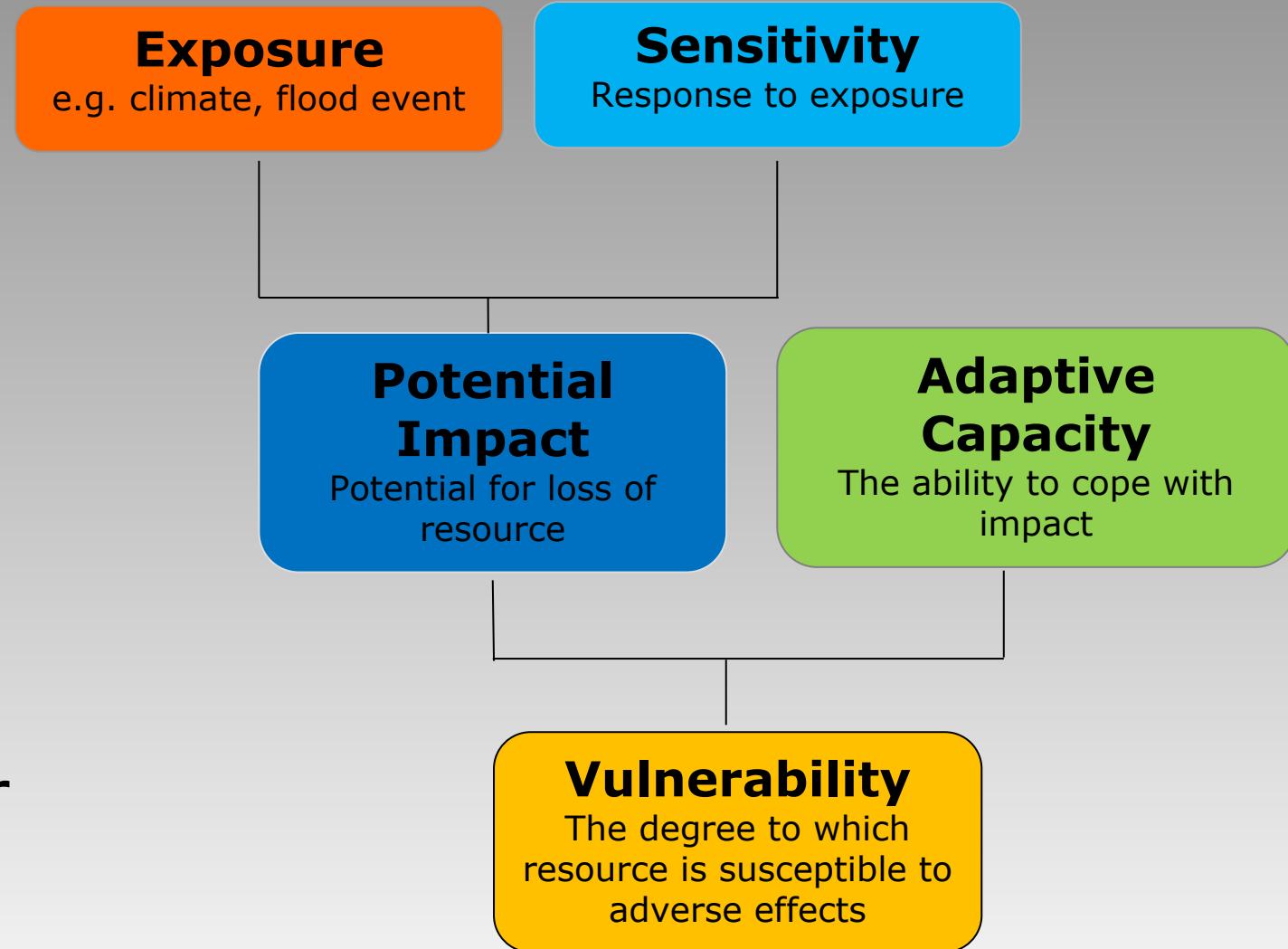
Research Location:

Arizona, Colorado, New Mexico, Utah



Vulnerability Assessment Framework

- Identify and evaluate how and why something is impacted by disturbance
- Prioritize actions and identify opportunities
- Provide guidance under uncertain futures



Landscape Level Assessments



Native Fish & Rivers



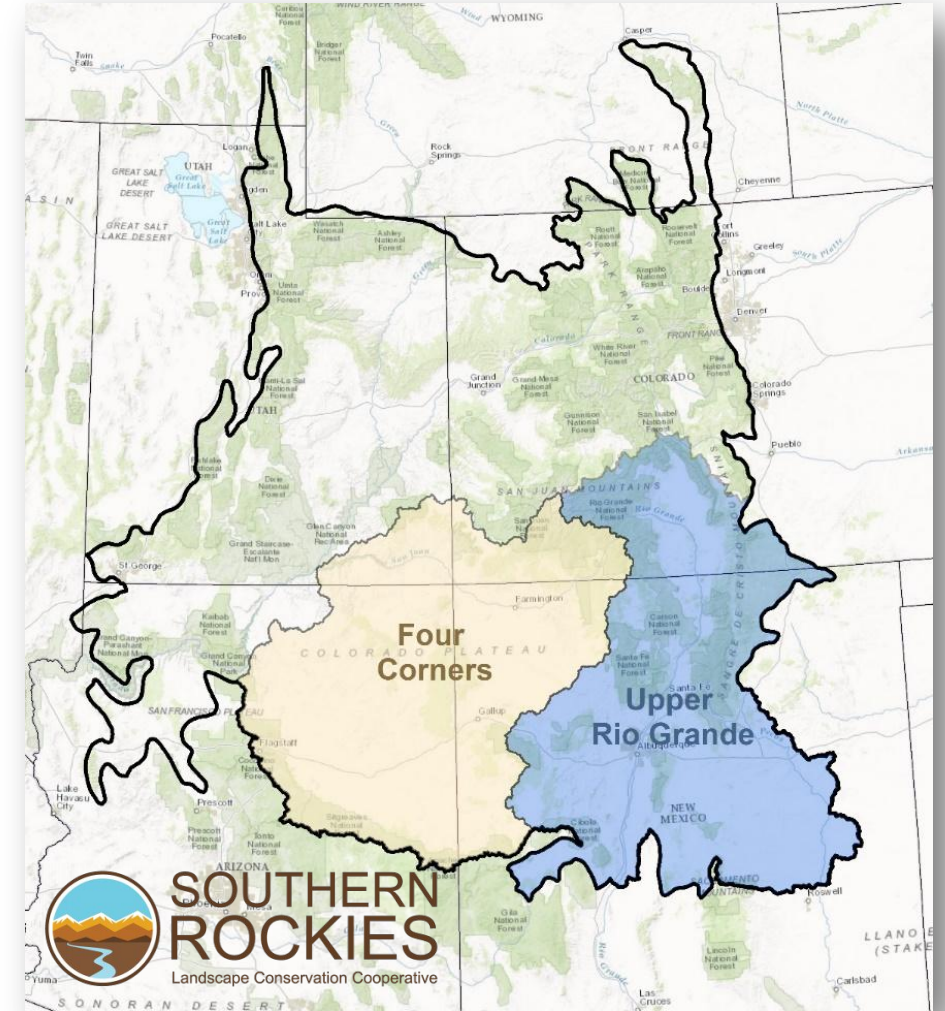
Mule Deer & Elk



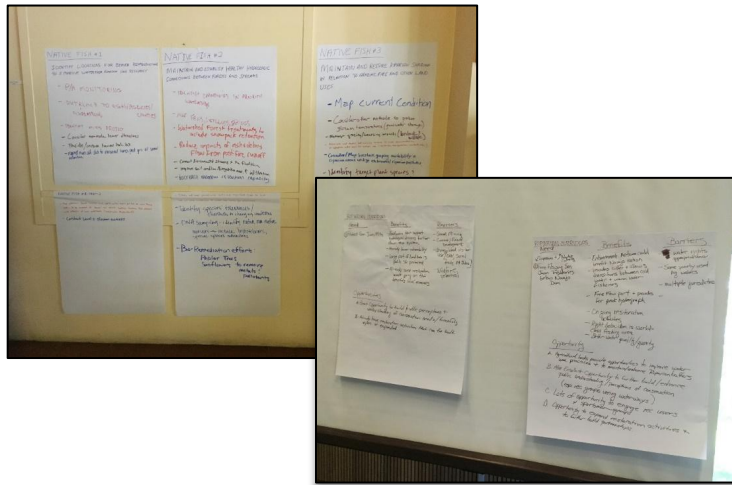
Pinyon-Juniper Ecosystems



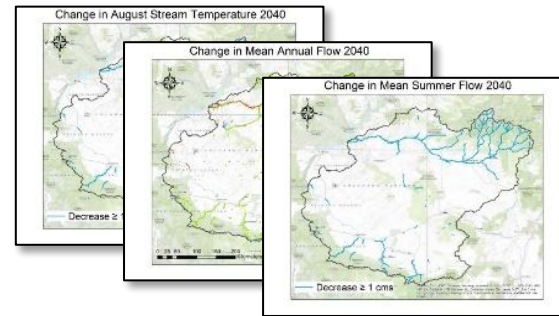
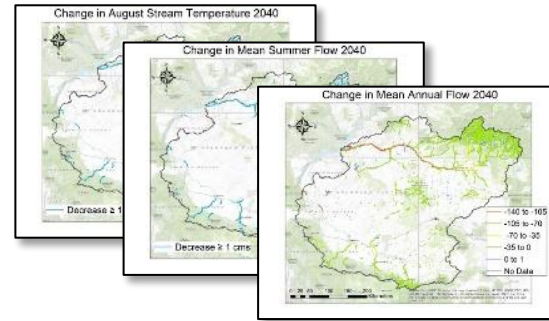
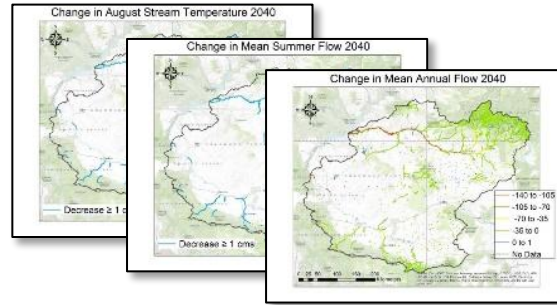
Sagebrush Ecosystems



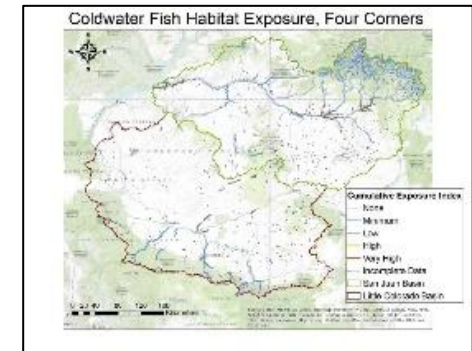
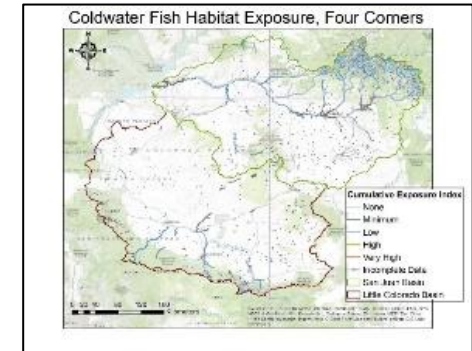
Collaborative: Workshops, webinars, 1 on 1, literature review



Raw data representing **Exposure, Sensitivity, Adaptive Capacity**



Cumulative scores for **Exposure, Sensitivity, Adaptive Capacity**



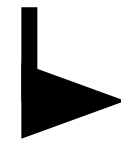
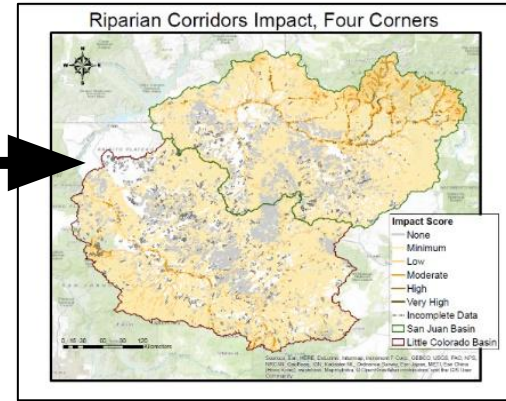
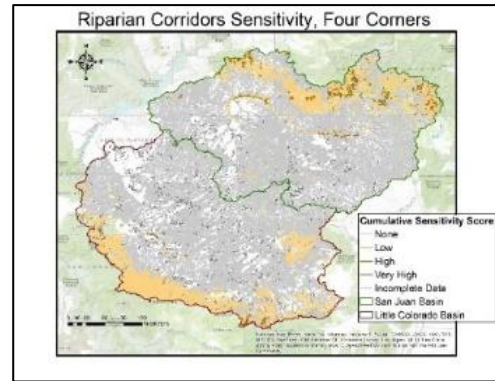
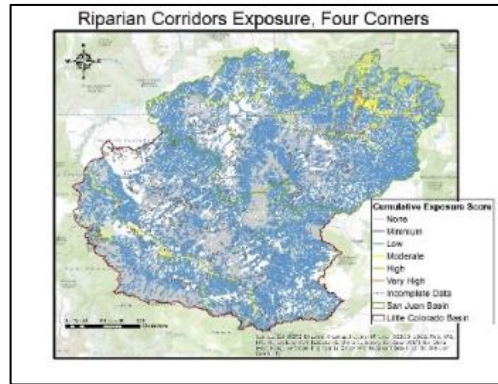
Framework to Maps

Exposure

+

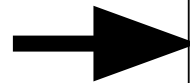
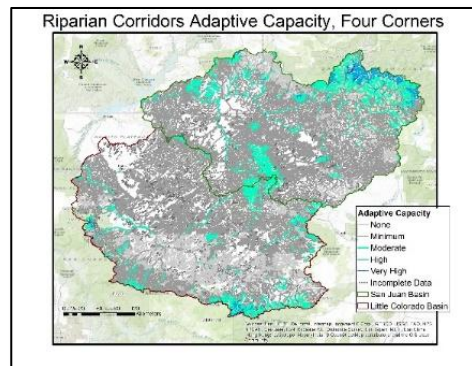
Sensitivity

Impact

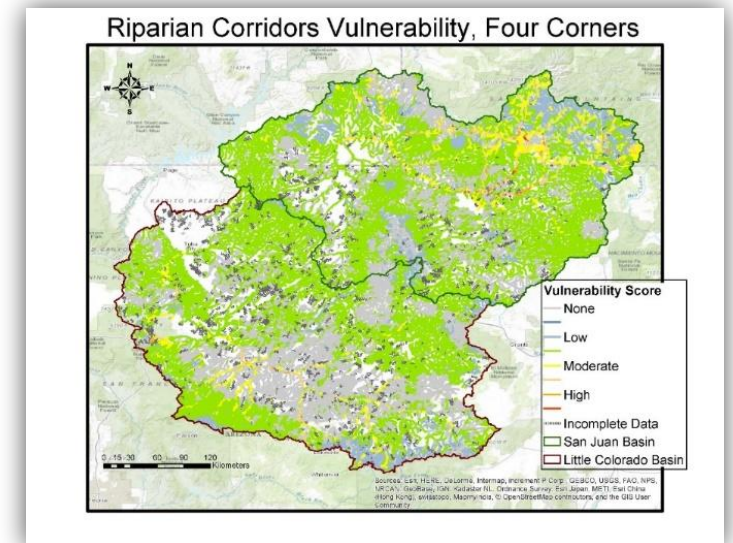
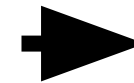


Vulnerability

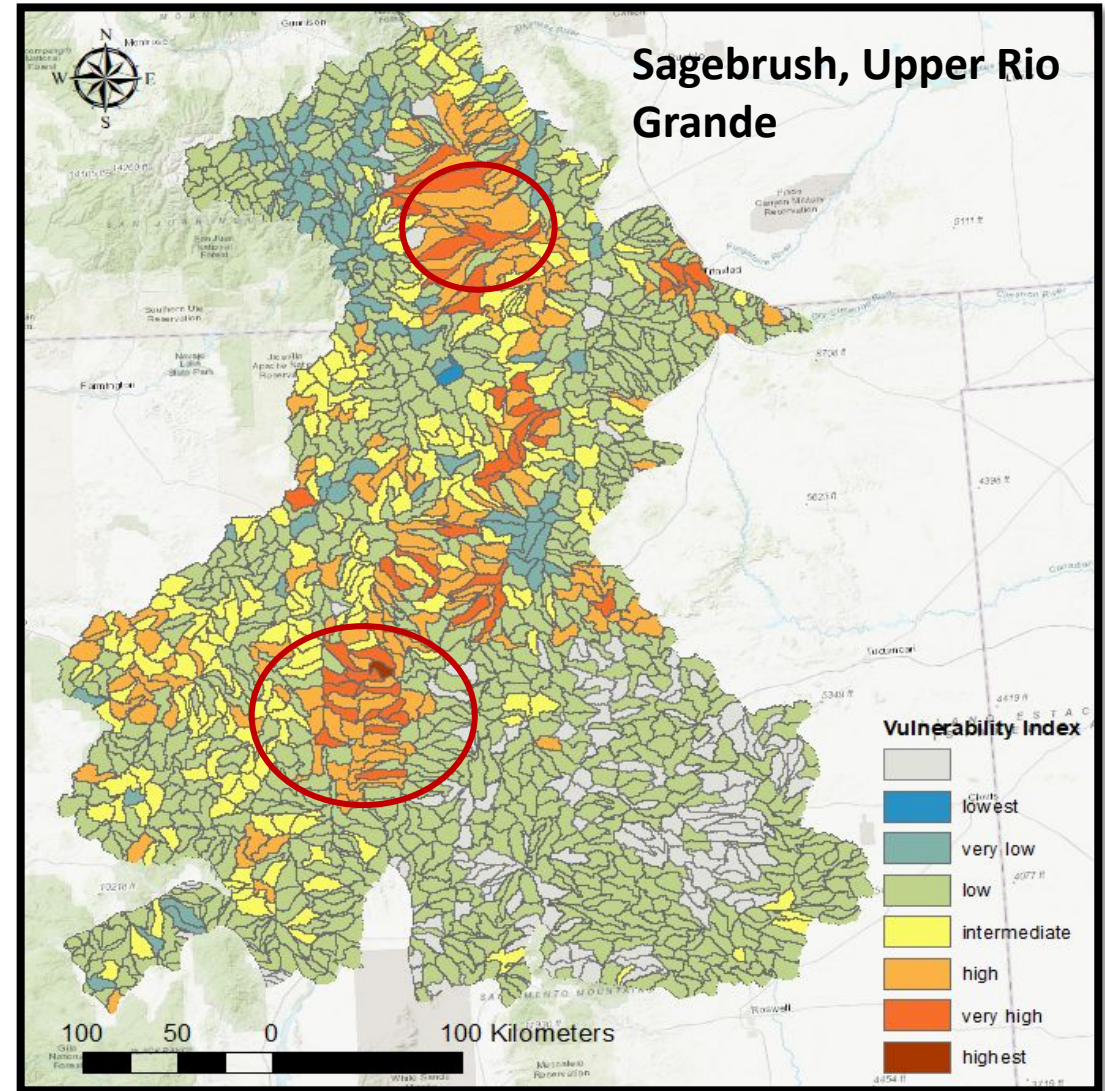
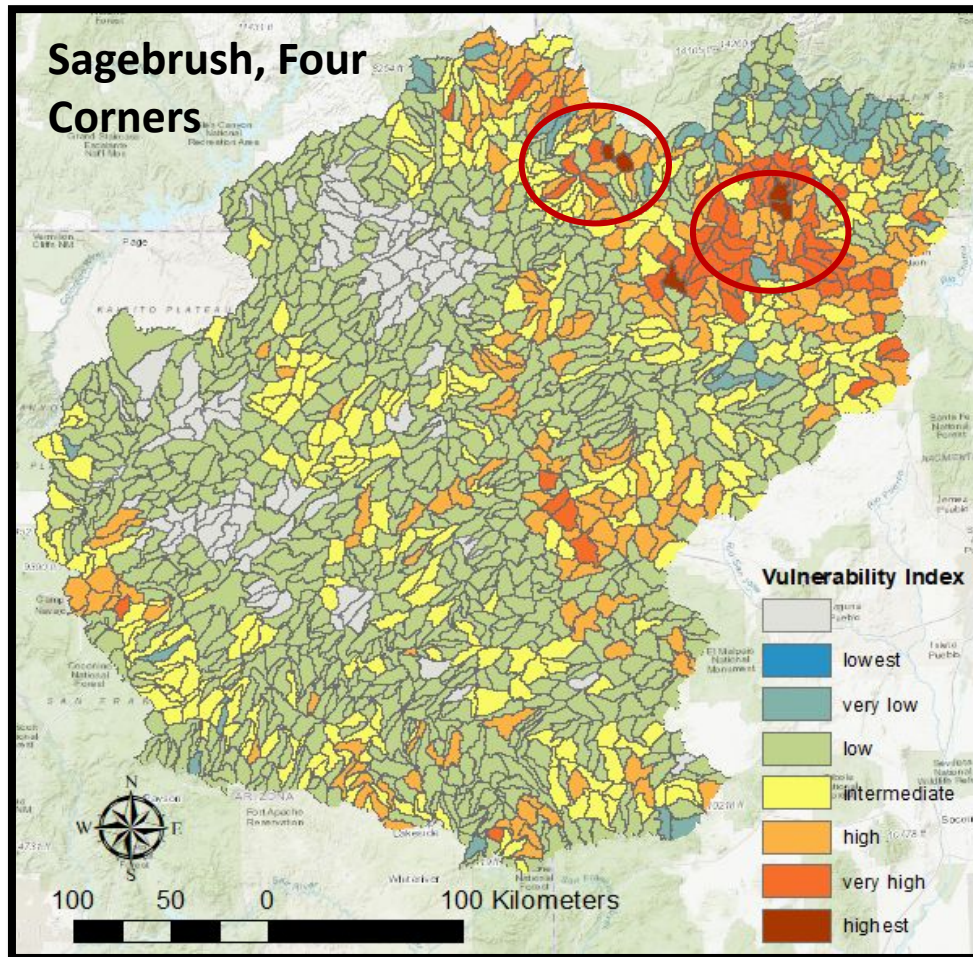
Adaptive Capacity



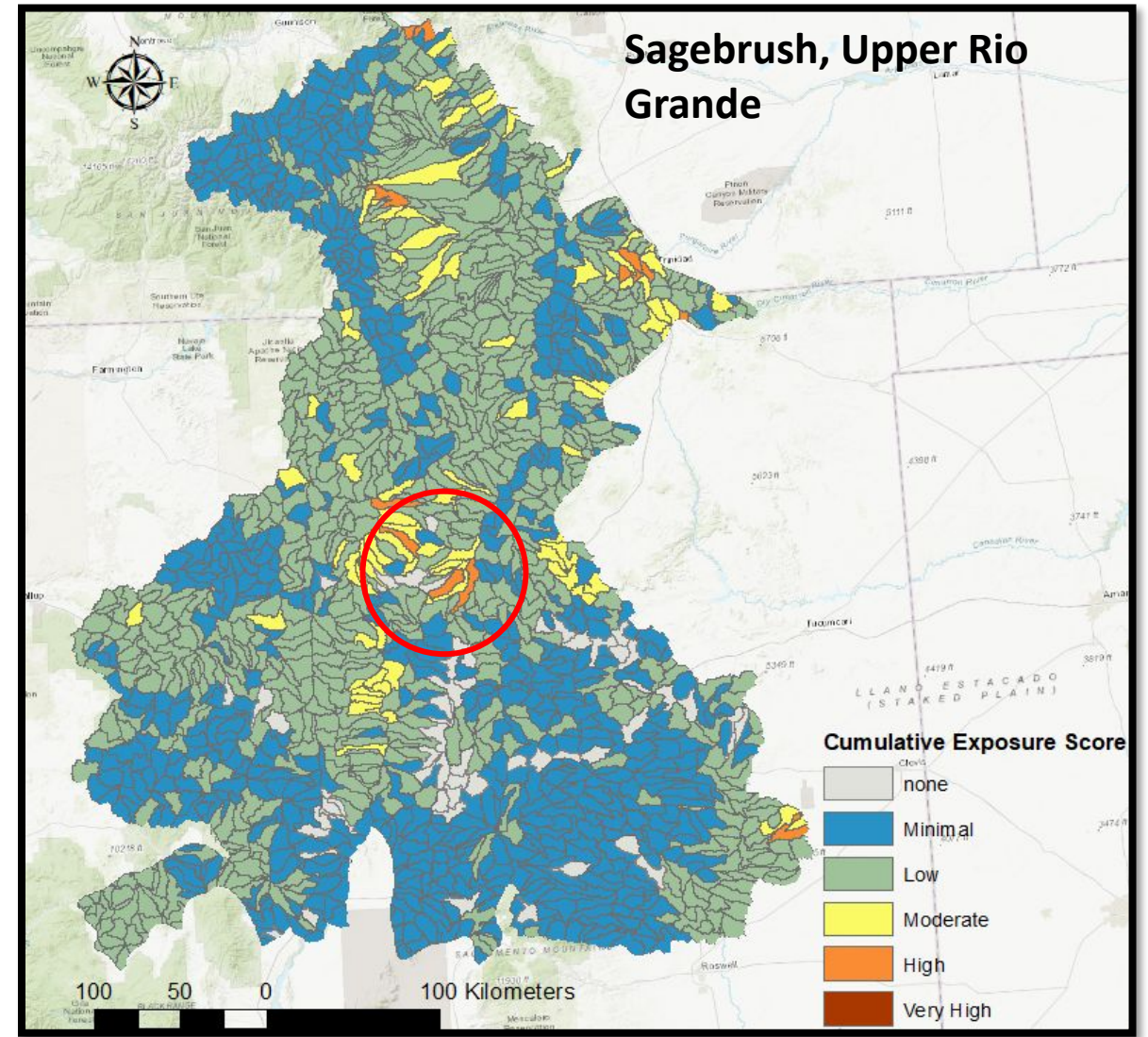
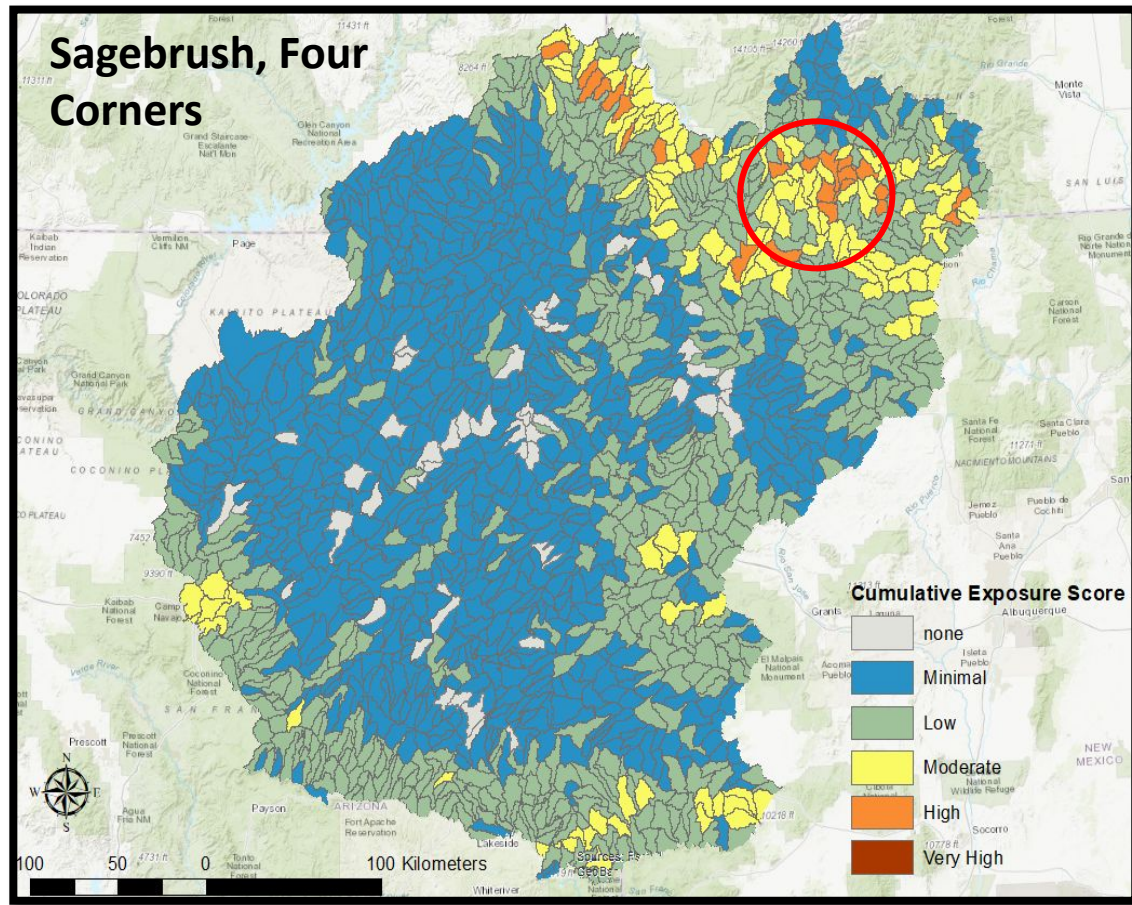
Vulnerability		Impact (E+S) Value				
		Low	Mod	High	Very High	Highest
Adaptive capacity	Low	Low	Mod	High	Very High	Highest
		Low	Mod	High	Very High	Very High
	Very Low	Low	Mod	High	Very High	
	Very Low	Very Low	Mod	High	High	
High	Lowest	Very Low	Mod	Mod	High	



Where are resources most vulnerable?

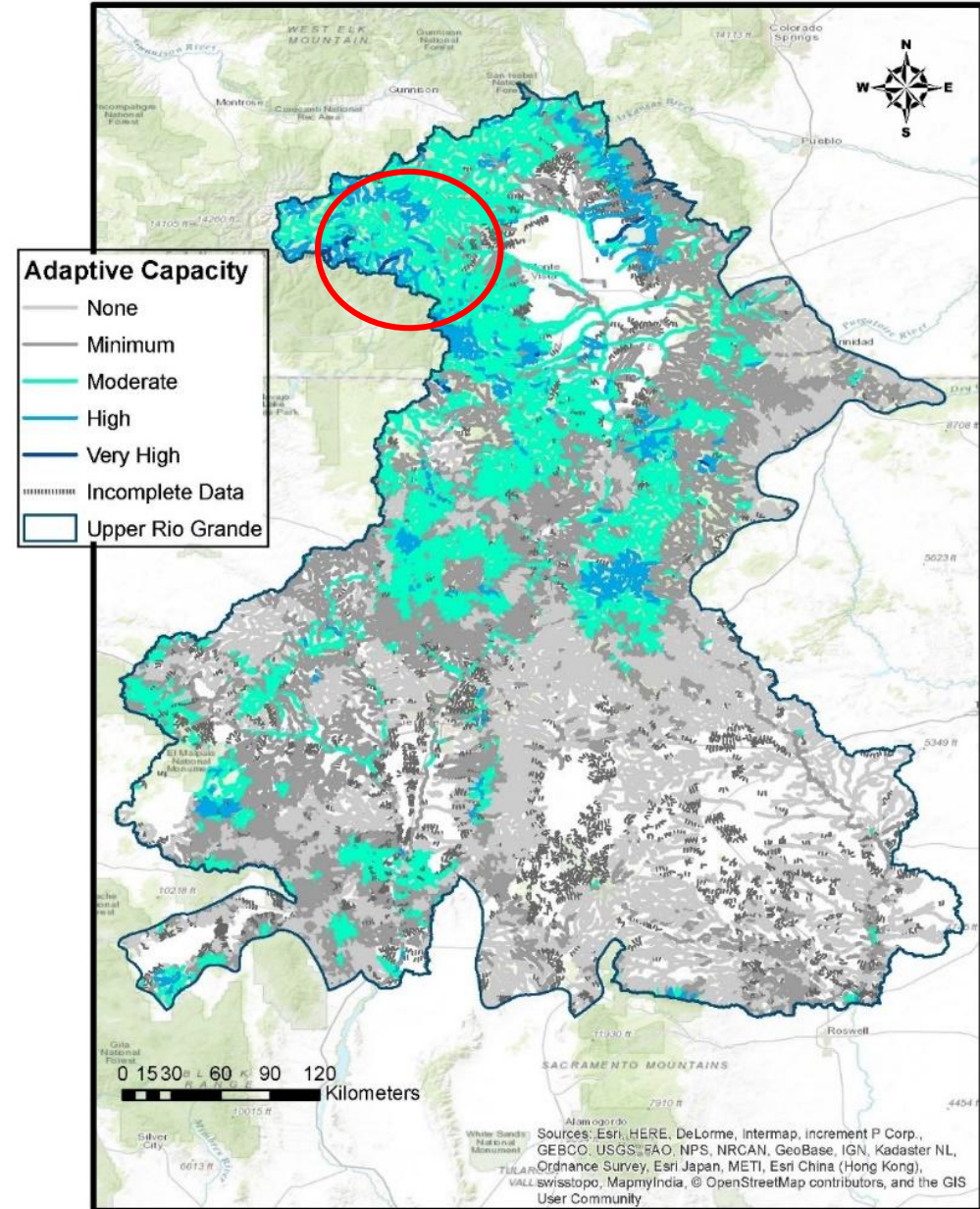


Where do we need to reduce exposure?

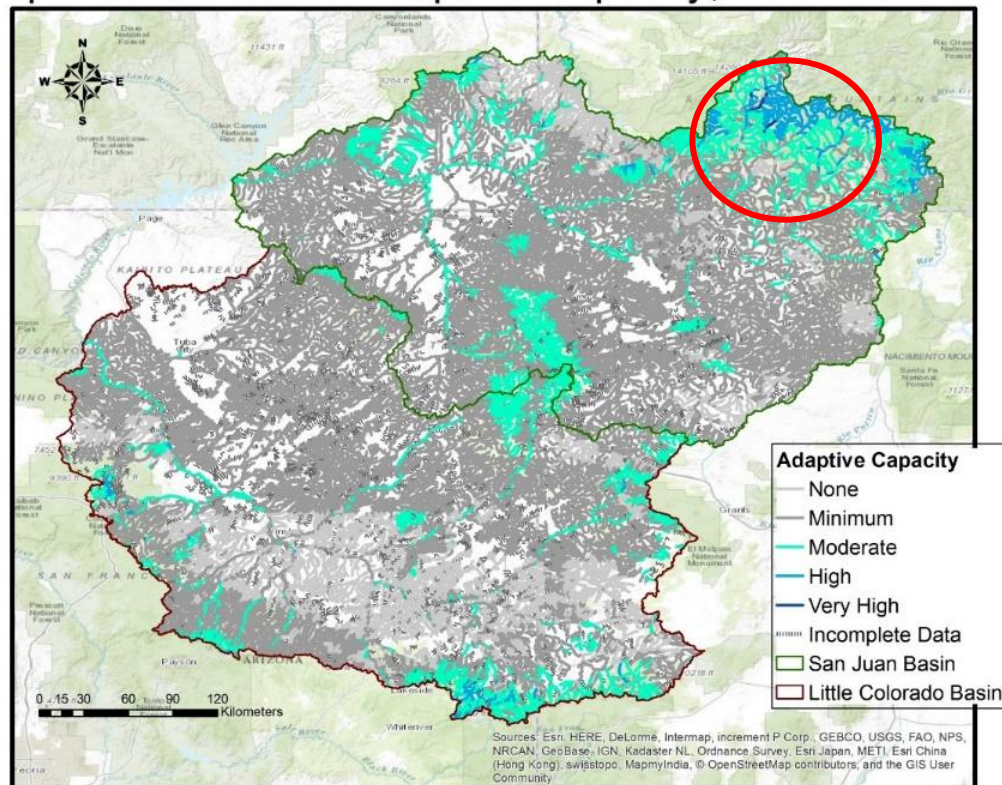


Where can we facilitate adaptive capacity?

Riparian Corridors Adaptive Capacity, Upper Rio Grande



Riparian Corridors Adaptive Capacity, Four Corners



Products

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Workshops

Adaptation Forums were held for each landscape to identify the issues and resources most relevant to local land managers. The first round, held in 2016, was facilitated by the Colorado Natural Heritage Program. The purpose of these forums was to identify targets of importance and the final report can be found here:

- [2016 Adaptation Forum workshop](#) (PDF - 691 kb)

The second set, held in 2017, were facilitated by SRLCC and RMRS. These forums were preceded by a webinar series that presented preliminary results of vulnerability assessments and were designed to get feedback from participants to customize the assessment products. In addition, presentations and activities introduced the process for developing adaptation strategies based on assessment findings. See the final report here:

- [2017 Adaptation Forum workshop](#) (PDF - 1.05 MB)

Webinars

Prior to the second adaptation forum workshop, preliminary assessment results were presented in a series of webinars. Links to the webinar recordings are available below:

- [Native fish and riparian resources vulnerability assessment](#)
- [Mule deer and elk vulnerability assessment](#)
- [Sagebrush ecosystems vulnerability assessment](#)
- [Pinyon-juniper ecosystems vulnerability assessment](#)
- [Close out webinar](#)
 - [Final LLC Assessments](#) (PDF - 5.4 MB)

Final reports and associated data

Final reports and spatial data for the assessments can be found here:

- [Upper Rio Grande assessments](#)
- [Four Corners assessments](#)

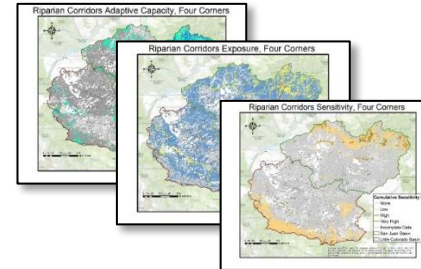
Or PDFs of the final reports can also be found here:

- [Coldwater fish/Riparian corridors](#) (PDF - 7.28 MB)
 - [Coldwater fish appendix 1](#) (PDF - 5.26 MB)
 - [Coldwater fish appendix 2](#) (PDF - 562 kb)
 - [Coldwater fish appendix 3](#) (PDF - 796 kb)
- [Sagebrush](#) (PDF - 2.31 MB)
- [Pinyon-juniper](#) (PDF - 4.34 MB)
- [Elk/Mule deer](#) (PDF - 2.61 MB)

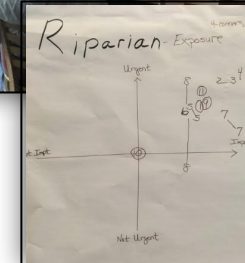
Interactive PDFs are also available for each assessment with the exception of elk and mule deer.

- [Coldwater fish](#) (PDF - 44.38 MB)
- [Riparian corridors](#) (PDF - 44.44 MB)
- [Sagebrush](#) (PDF - 9.11 MB)
- [Pinyon-Juniper](#) (PDF - 6.97 MB)

Maps, Data



Workshop Reports



Reports, Publications

A Spatially Explicit and Quantitative Vulnerability Assessment of Coldwater Fish Habitat and Riparian Corridors in the Intermountain West



Prepared by D. Max Smith and Megan M. Friggens
United States Forest Service Rocky Mountain Research Station
Albuquerque, New Mexico
December 2017

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journal homepage: www.elsevier.com/locate/ecolind

Using science management partnerships to develop landscape level indicators and assessments to measure vulnerability of Piñon-Juniper woodlands

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ARTICLE INFO ABSTRACT

Keywords: Co-production, Climate change, Riparian management, Watershed, Wild woodlands, Resource management

The process of identifying tangible actions to conserve important resources in the face of climate change is challenged because of uncertainties regarding future conditions. There is also a lack of existing methods for evaluating the effectiveness of proposed management actions for mitigating negative impacts. For piñon-juniper (PJ) ecosystems within the Southwestern U.S., efforts are further hampered by a lack of information on the drivers and drivers of changing population trends. PJ ecosystems, while ecologically important, have been the focus of eradication efforts due to perceptions that they are encroaching into important grasslands. However, recent impacts of drought, insect outbreaks, and fire increasingly threaten these ecosystems. It is unclear at this time where and to what extent PJ ecosystems are vulnerable to climate change and other disturbances, challenging management. To develop a method for determining the current and future status of PJ ecosystems, we engaged with local land managers to identify key indicators and drivers of PJ population change and developed a vulnerability assessment approach based on these indicators. Our goal was to use this process to create data products that would assist resource managers dealing with rapidly changing landscapes. Borrowing from other

<https://www.fs.usda.gov/rmrs/science-spotlights/co-producing-landscape-scale-vulnerability-assessments>

https://www.fs.usda.gov/rm/pubs_journals/2020/rmrs_2020_friggens_m001.pdf