



Spatial Science for Applying the Mitigation Hierarchy

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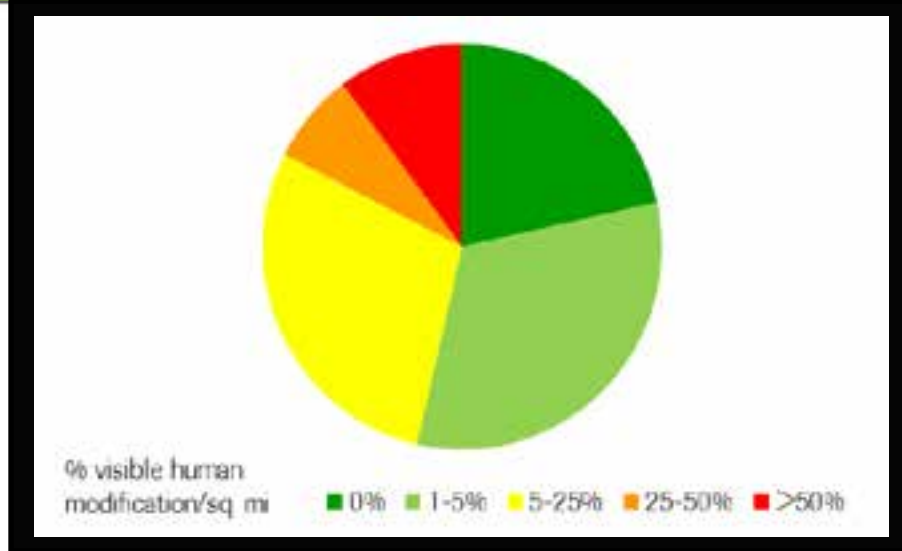
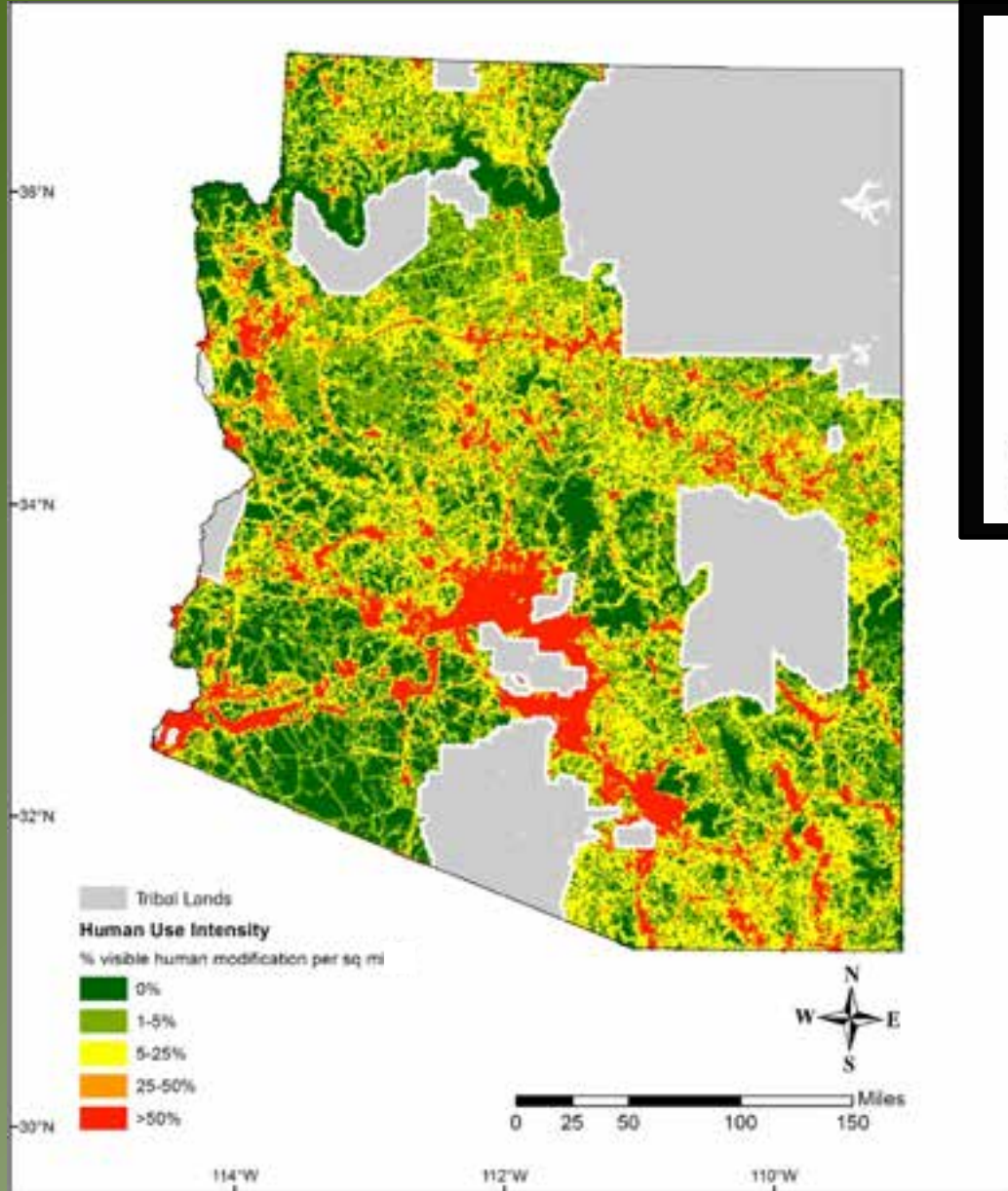
ESRI User Conference

July 16, 2014

Co-Authors: Marcos Robles, Dale Turner, & Rob Marshall

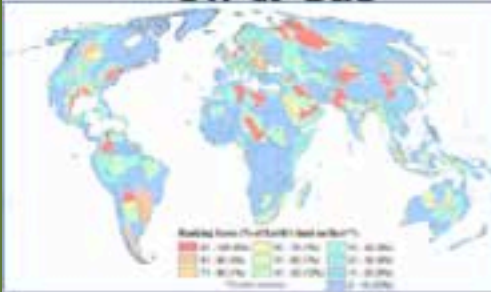


More than Half Arizona's Lands are Relatively Intact



Conservation Challenge

Oil & Gas



Future Energy and Mining Risk

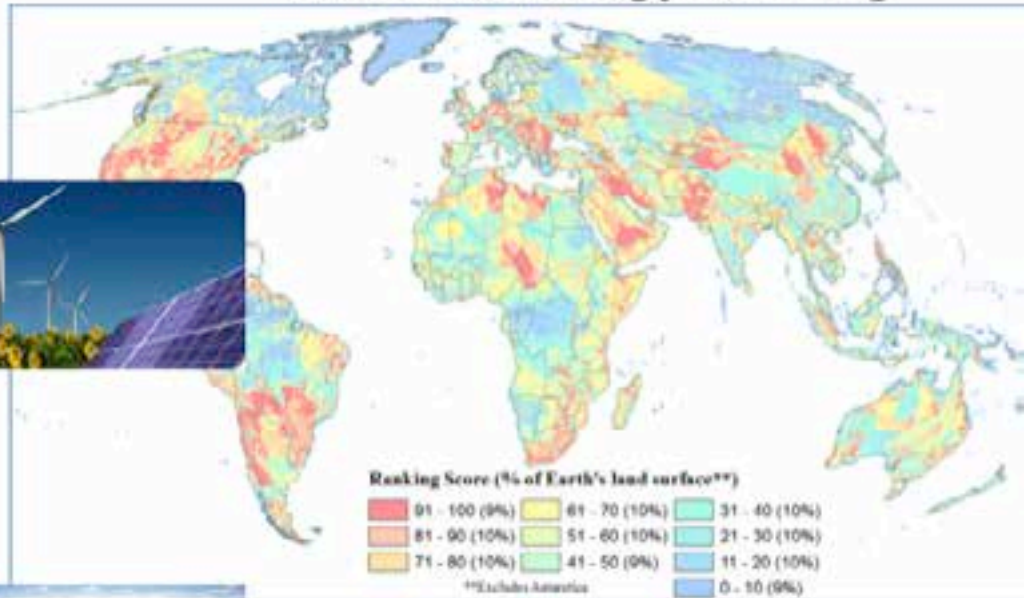
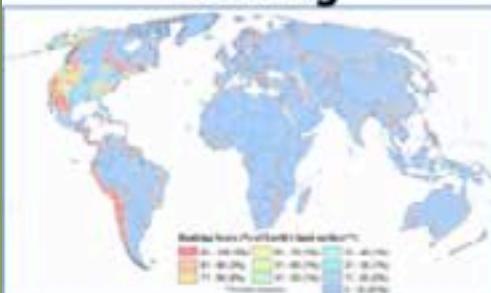


Combined Energy & Mining

+ Renewables



+ Mining

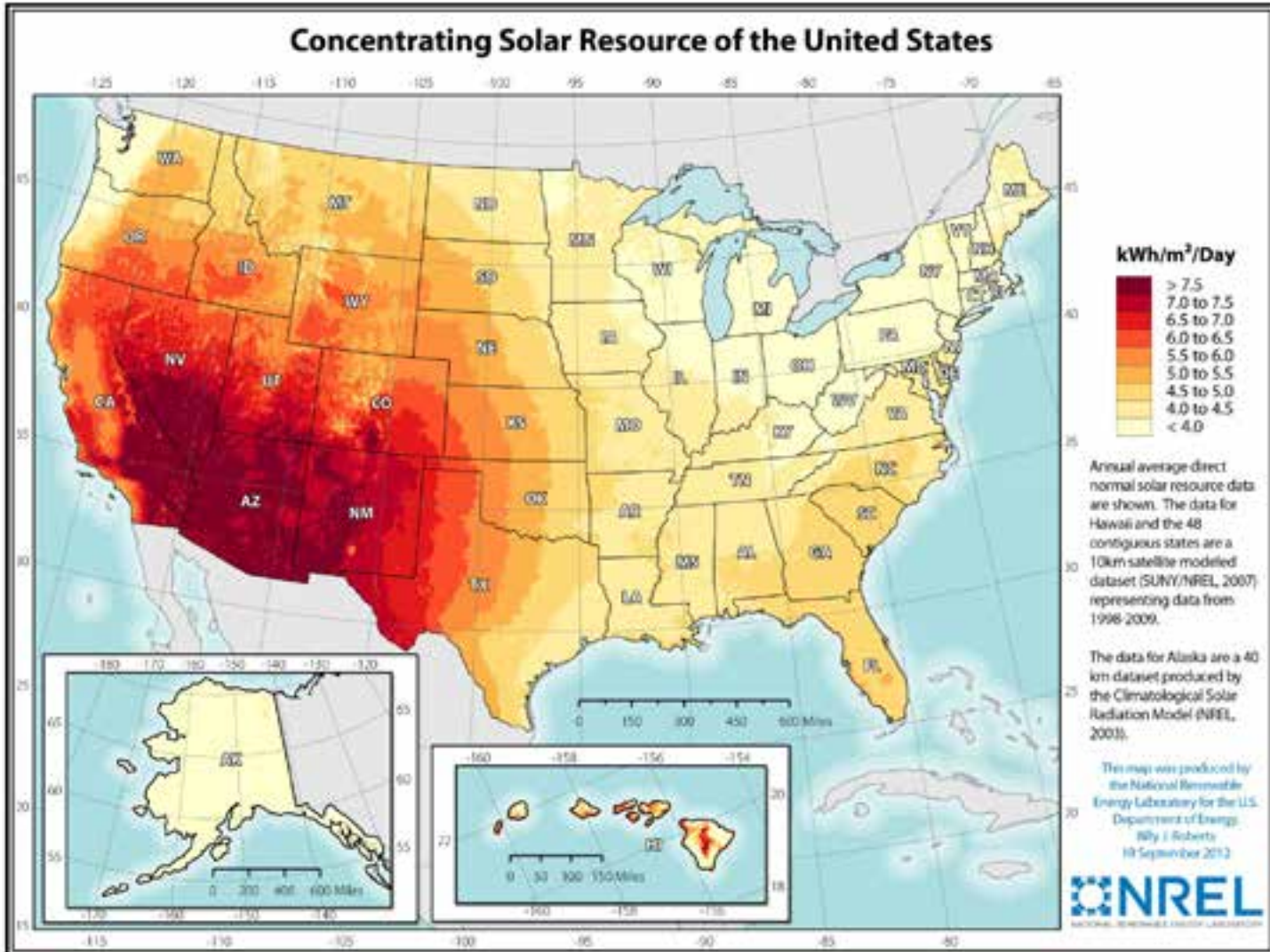


Analysis by Oakleaf, Evans, & Kiesecker 2014

Solution :

WHY

Conservation Challenge: Arizona



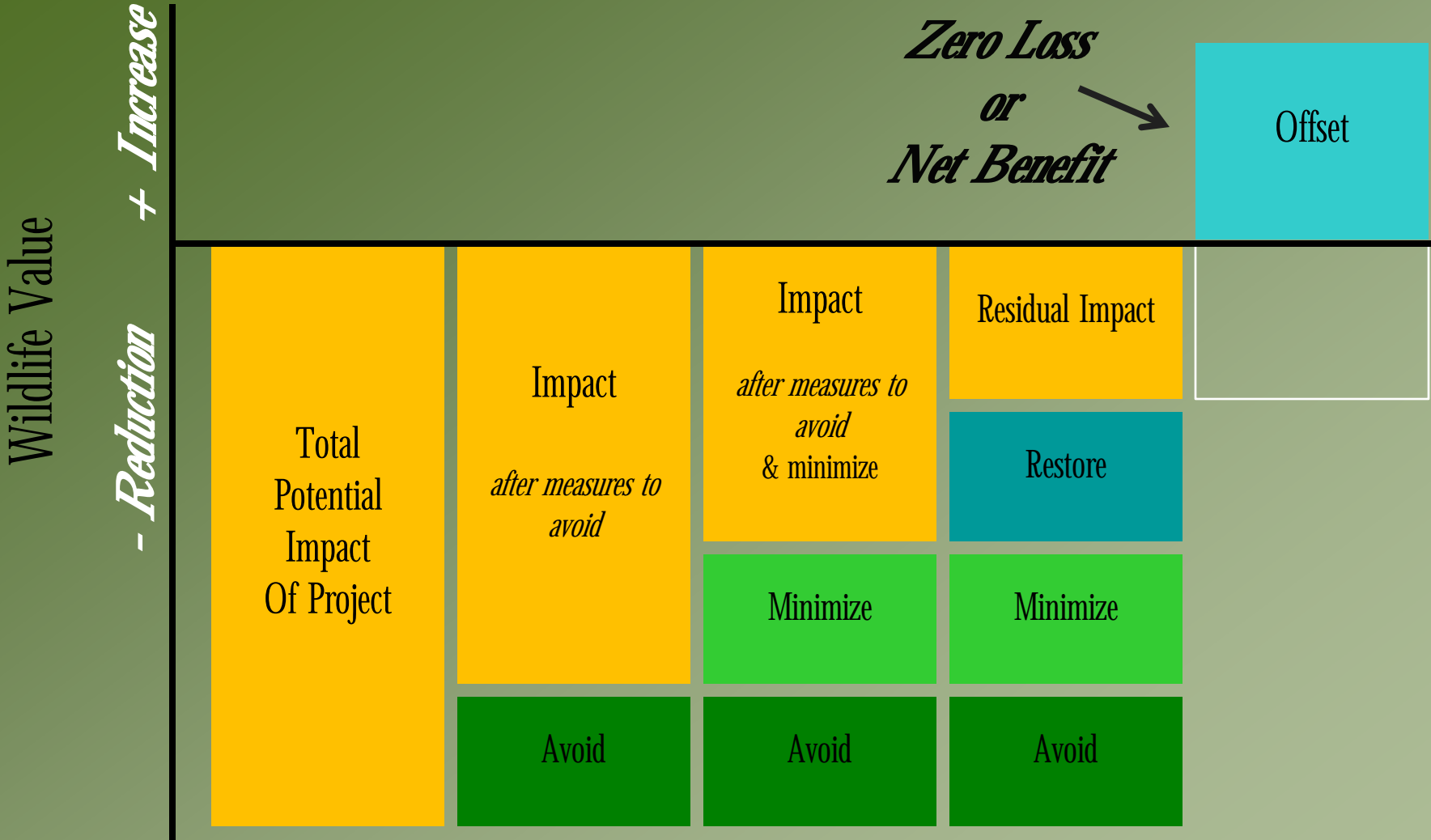
Conservation Challenge: Arizona



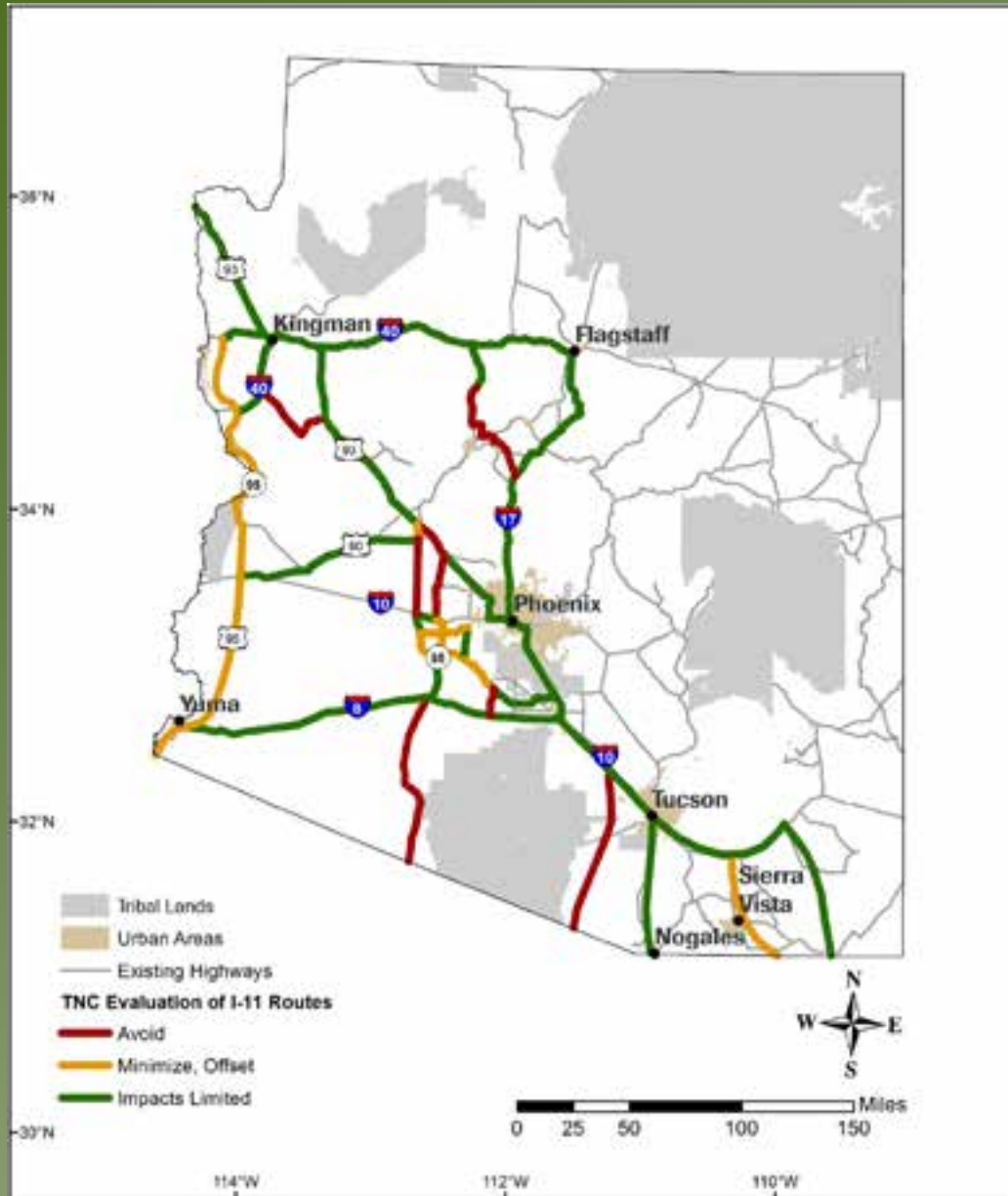
Mitigation Hierarchy: Concept



Mitigation Hierarchy: Concept



Mitigation Hierarchy: Practice



AVOID

**MINIMIZE
& OFFSET**

**IMPACTS
LIMITED**

Where are Large Areas of Intact Lands?

Relatively Intact

< 5% visible modification/sq mile
+
<25% visible modification/sq mile
from dirt roads

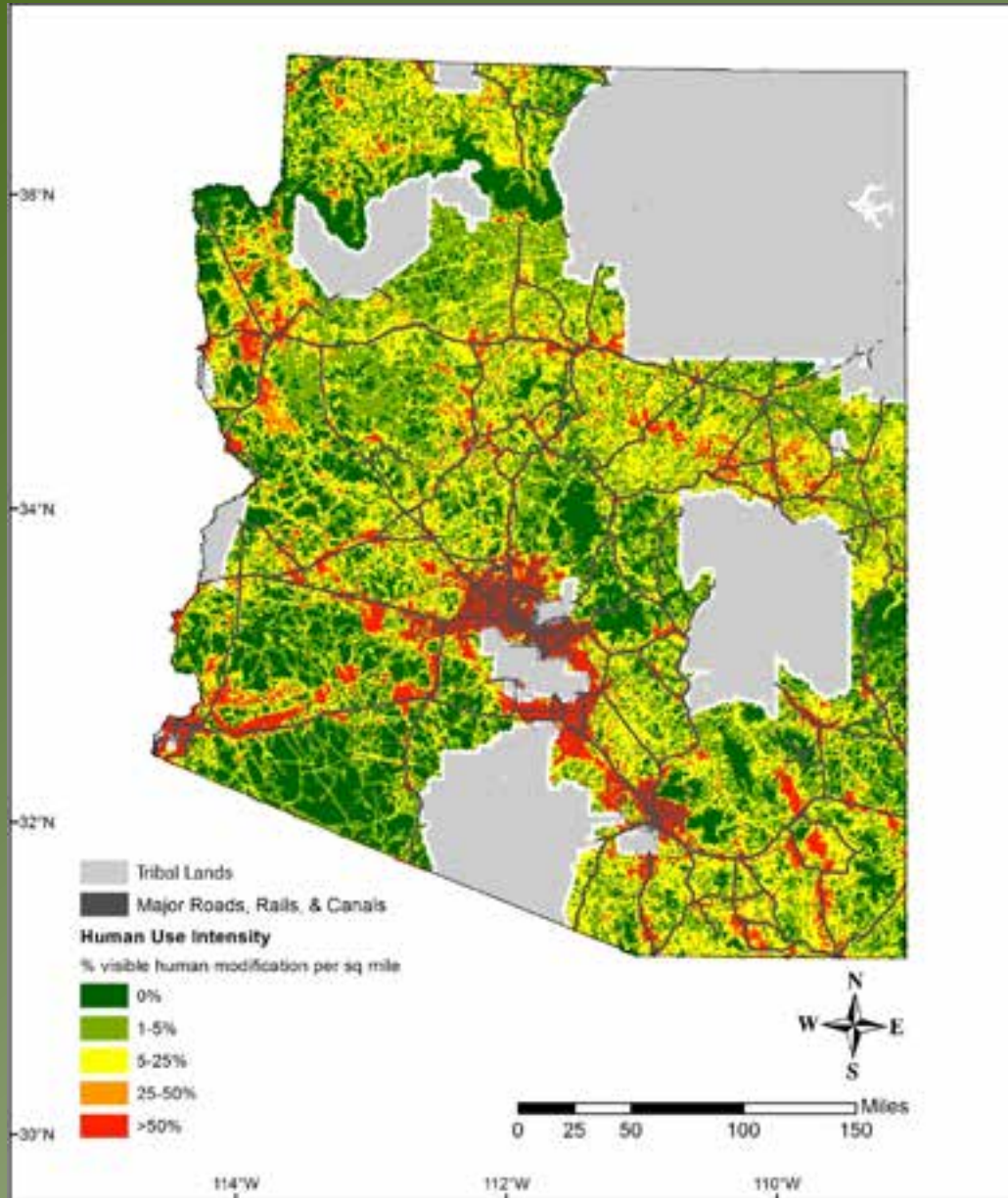
Large Patch

Contiguous + $\geq 5,000$ acres

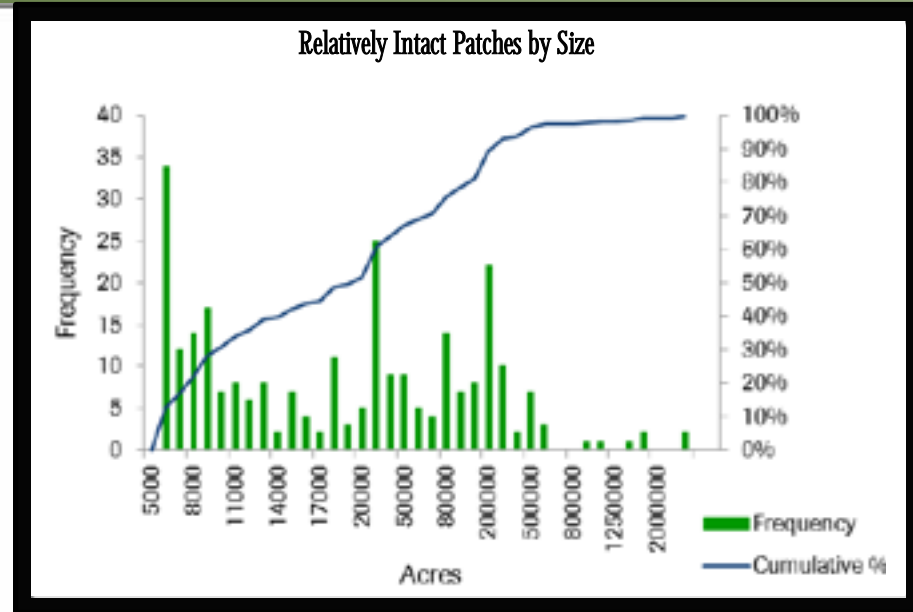
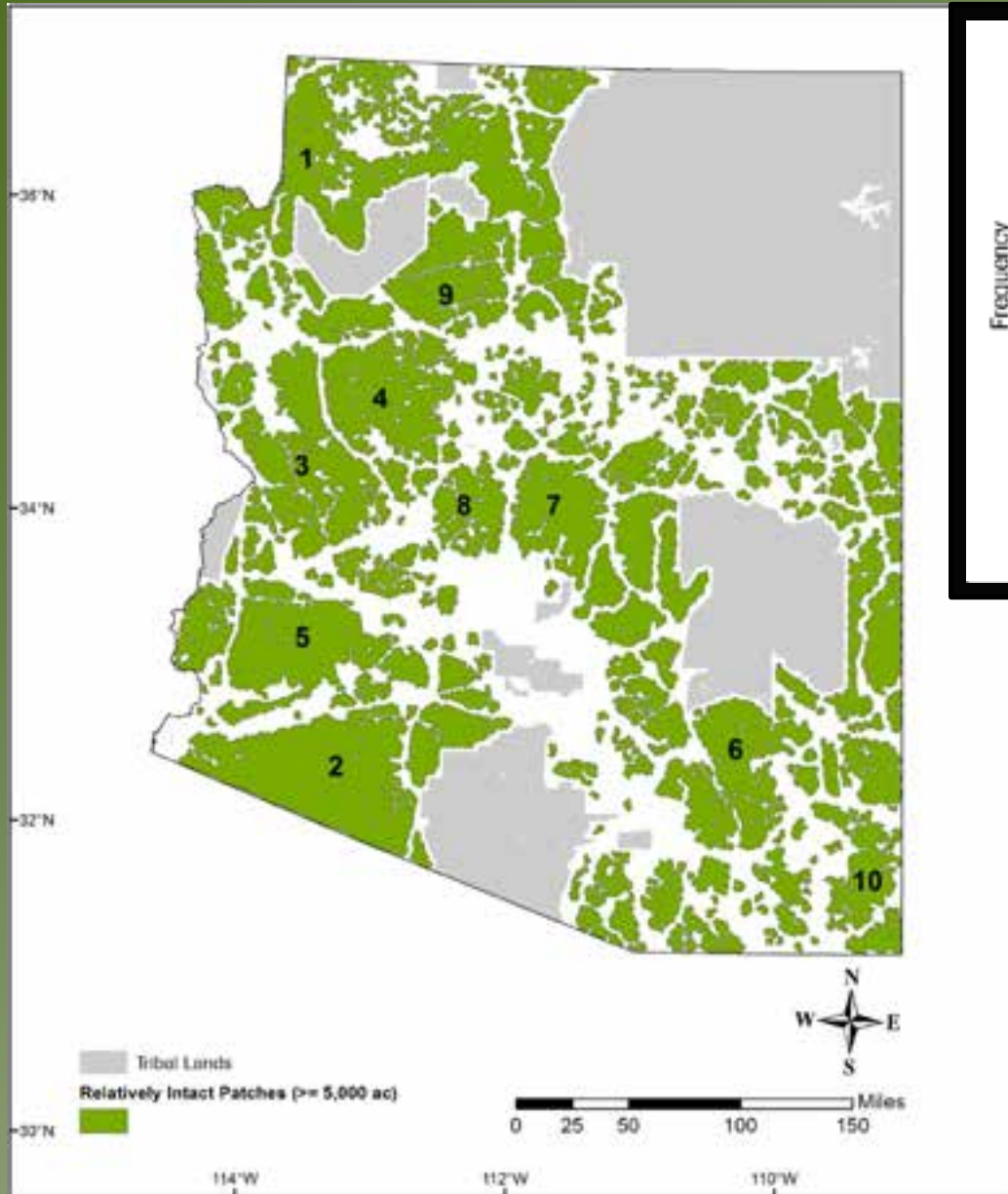
Fragmentation Exclusion

*Buffered area around permanent
linear features -*

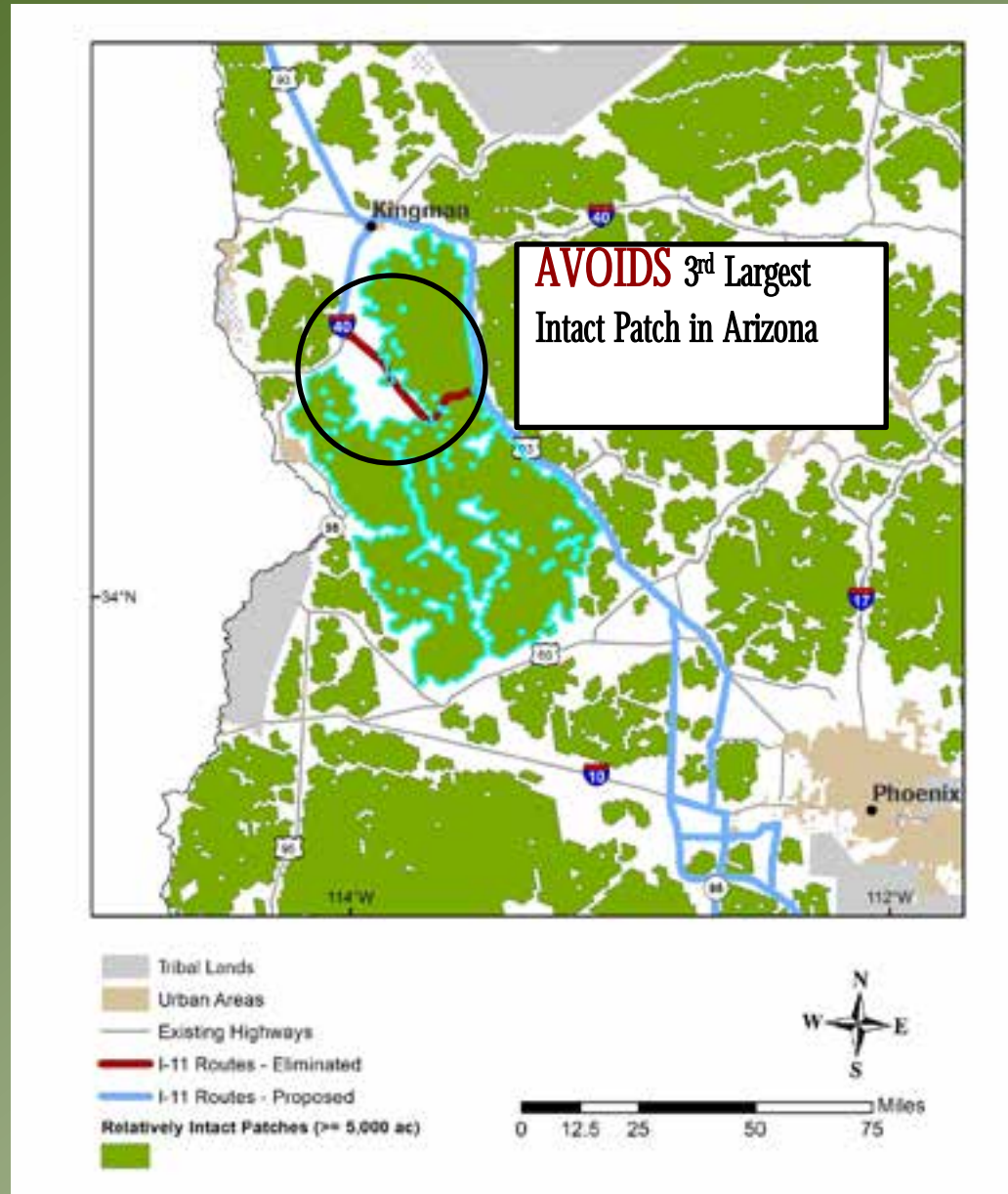
- Roads*
- Railroads*
- Canals*



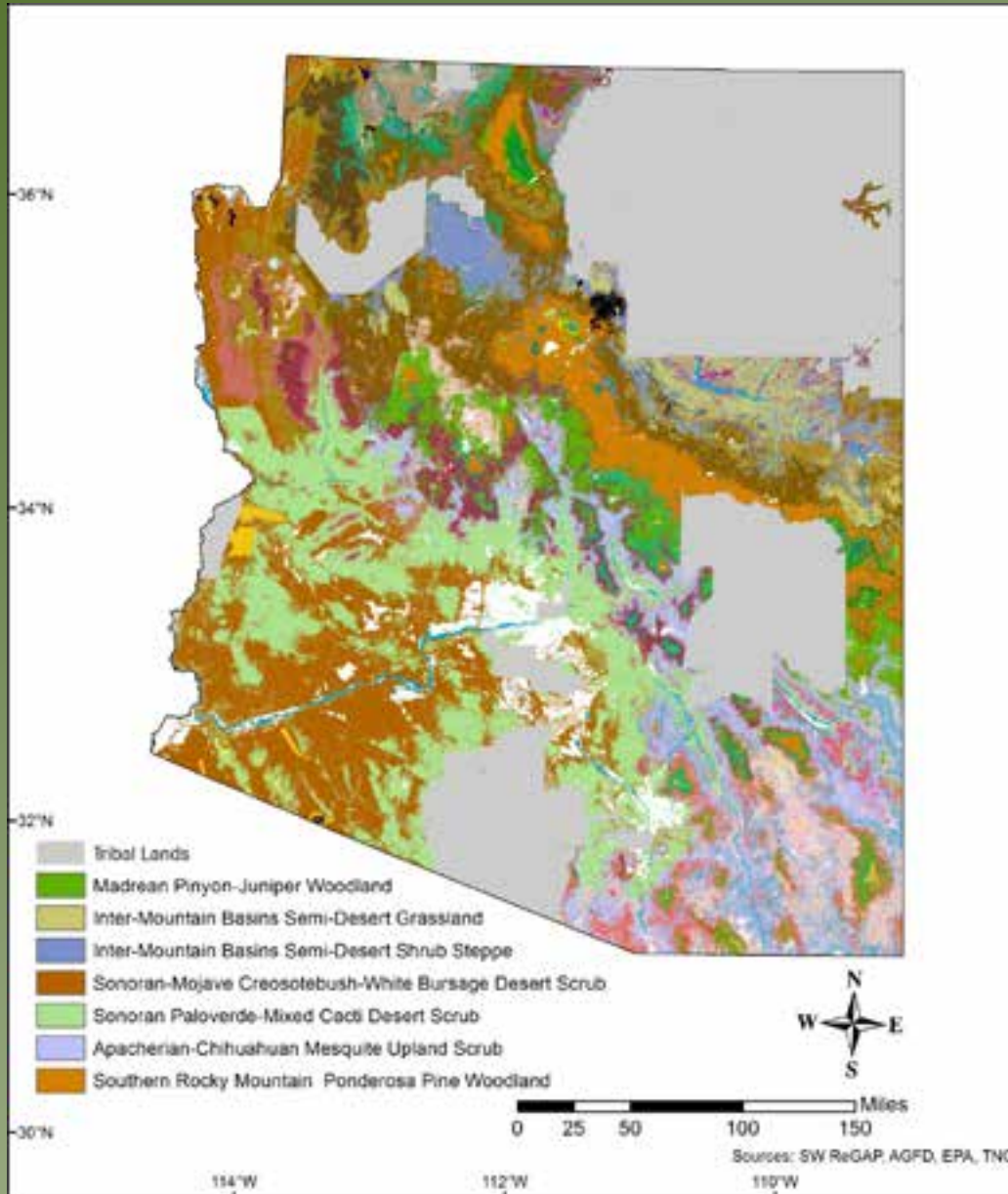
Large Intact Lands



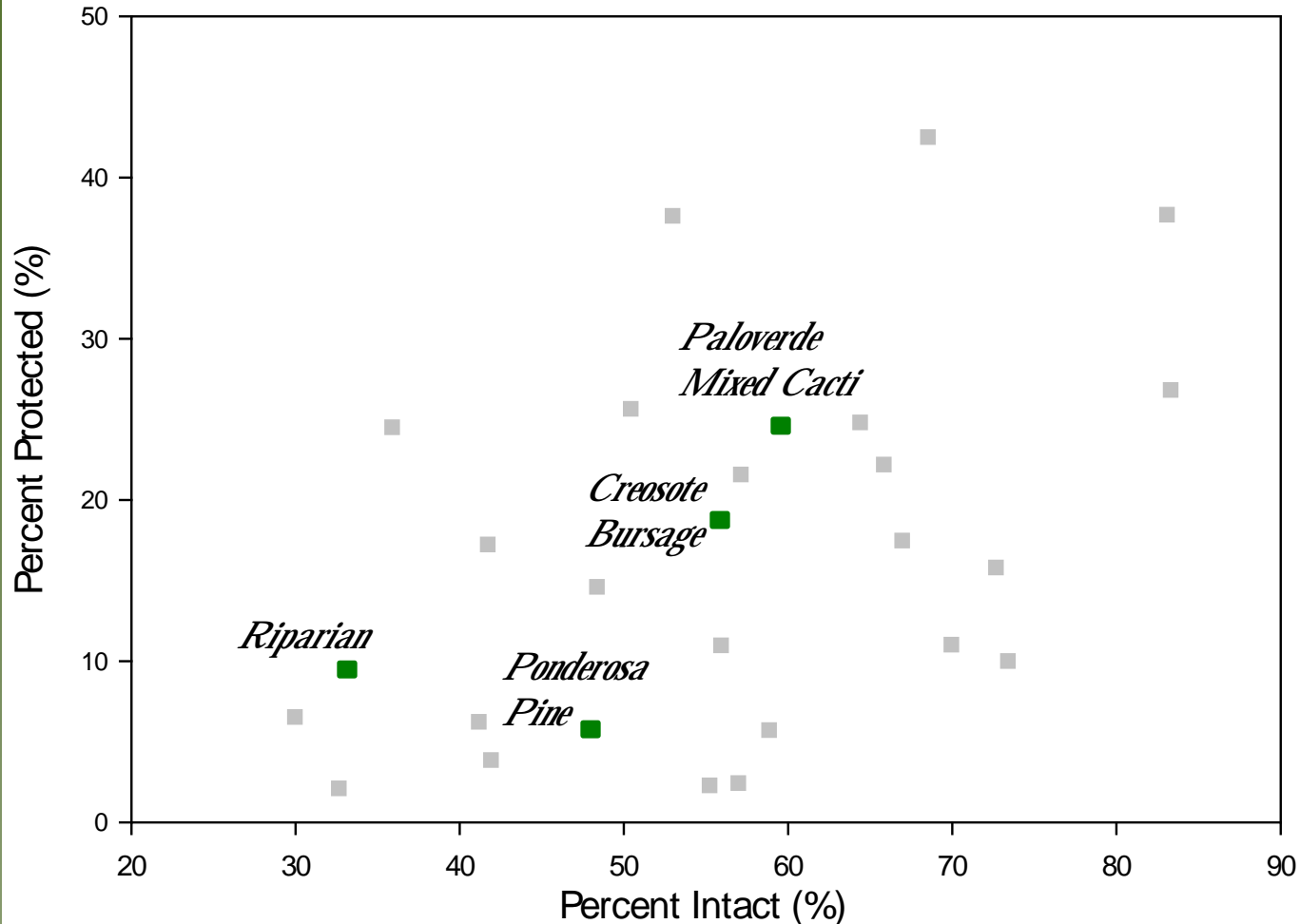
Development should **AVOID** the Largest Intact Lands



Ecological Systems in Arizona

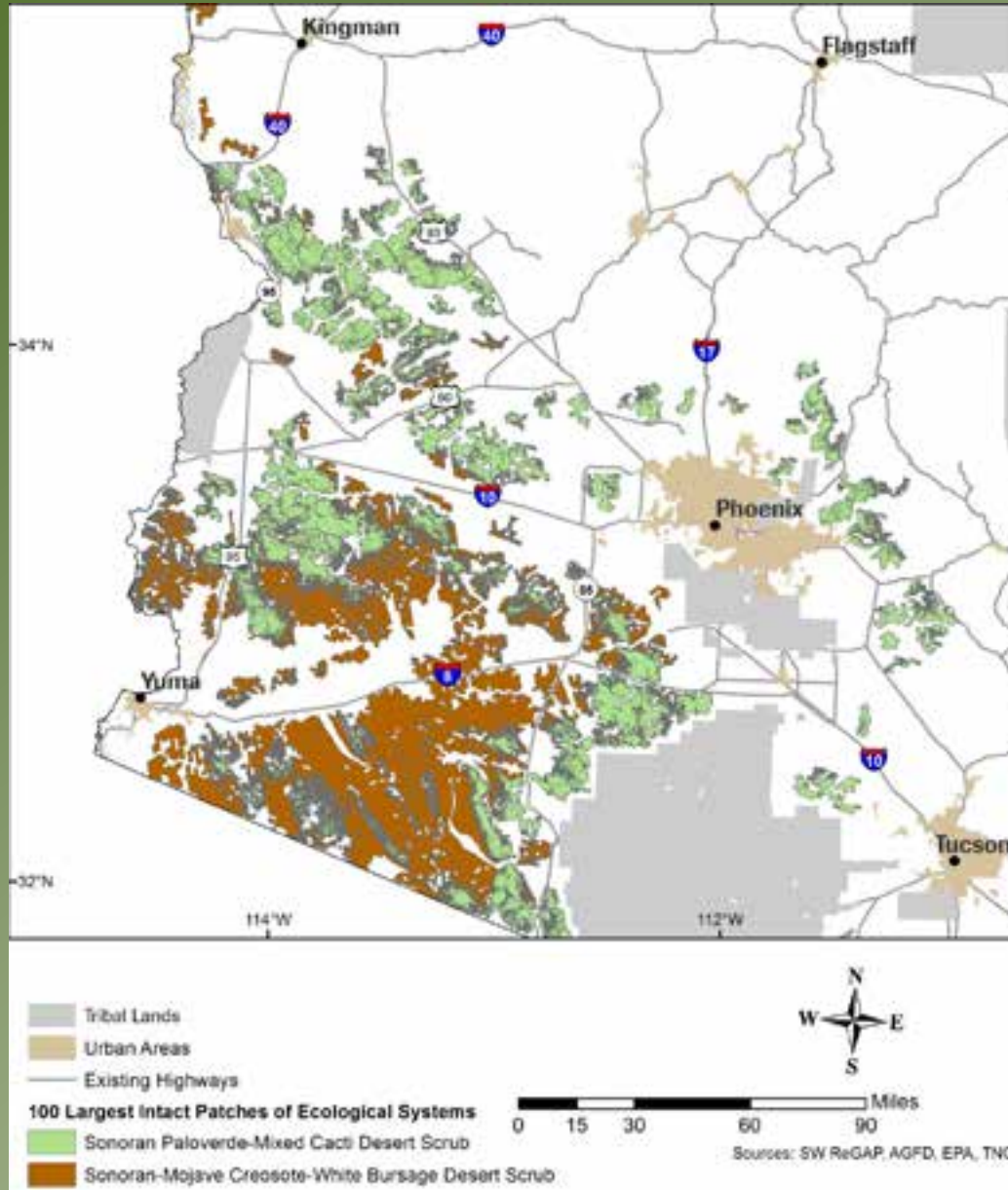


Ecological System Priorities Based on Degree of Intactness & Protection

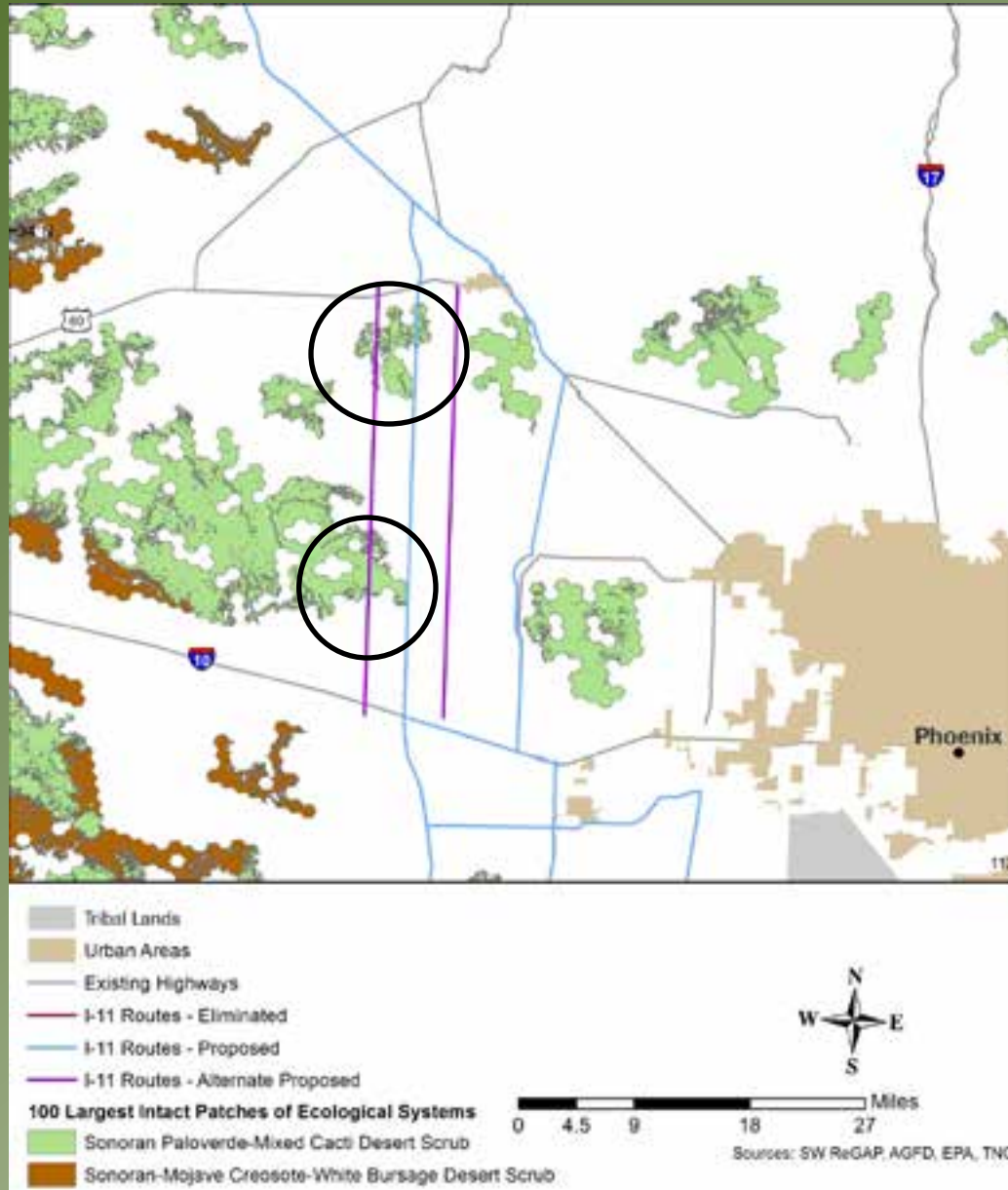


* only ecological systems mapped at > 40% accuracy (SW ReGAP) and with < 50% within protected areas are included here

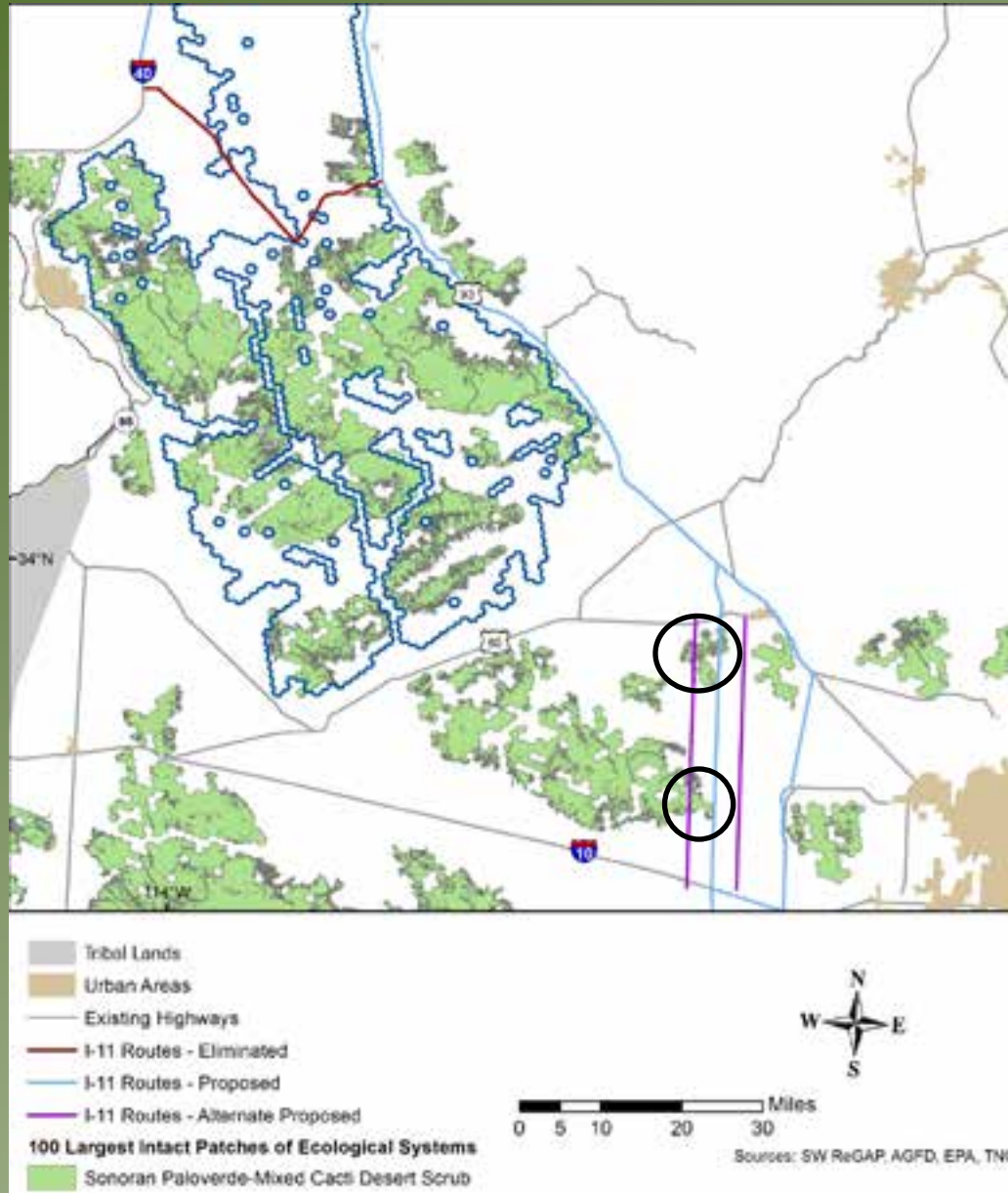
Patches of Intact Desert



Applying Results to a Mitigation Scenario



Applying Results to a Mitigation Scenario



Summary

> 50% of Arizona = Intact

Empirically-derived

Easy to understand & explain

Helps meet conservation challenge of widespread development

Spatial configuration matters

Powerful when combined with other data

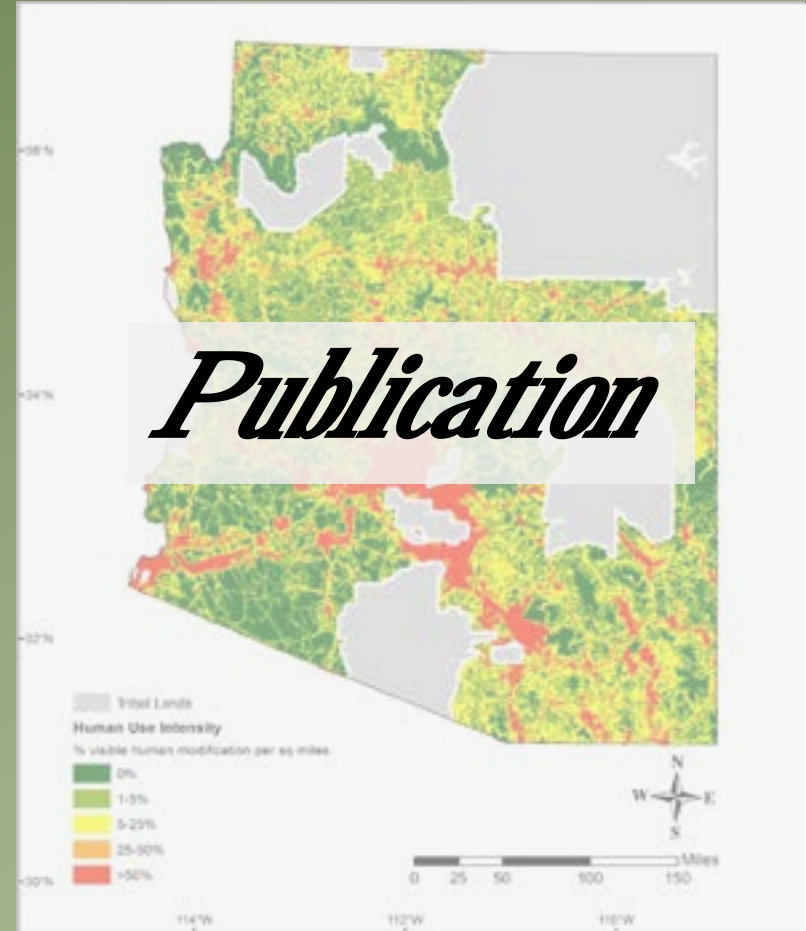


*Can inform **AVOID** & **OFFSET** mitigation recommendations*

Next Steps



Partnerships





THANK YOU!

Websites:

<http://azconservation.org>
www.nature.org/arizona

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