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Introduction

- Since 1989, approx. **137,783 hectares** of private land w/in the Madrean Archipelago in Arizona and New Mexico have been protected with conservation easements (**Fig. 1** and **Table 1**)
- This area constitutes more than **8.2%** of private land in the ecoregion, and **10.8%** of private grassland areas (**Table 1**)
- We ask if conservation easements are more closely located to existing public protected areas and w/in grasslands, and not simply scattered across the area at random
- If so, this would suggest that either the “buyer” entity purchasing easements, the willing “seller” of the easement, or both parties see benefit in deliberately expanding the protection “footprint” beyond protected areas and within grasslands

Background

- Conservation easements are tool to protect private areas wherein a landowner (the “seller”) sells or donates the development and subdivision rights of a private property to an entity (the “buyer”) for perpetuity
- As many areas with high ecological value occur outside of traditional protected areas, the use of conservation easements for private land conservation is increasing locally, nationally & globally
- Conservation easements in the Madrean Archipelago are highly variable in size and in organizations holding them (**Table 1**, **Fig. 2**, and **Table 2**)

Table 1 – Conservation easement holders in the Madrean Archipelago

Easement Holder	No. of CEs	Area in CEs (ha)	% of CE Area	% of Private Land	% of Private Grasslands
Bureau of Land Management	14	2873.6	2.1	0.2	0.2
US Fish & Wildlife Service	2	8296.8	6.0	0.5	0.7
US Forest Service	1	0.5	0.0	0.0	0.0
National Park Service	1	0.3	0.0	0.0	0.0
Natural Resource Conservation Service	2	1154.2	0.8	0.1	0.0
US Customs & Border Protection	1	753.6	0.5	0.0	0.1
All Federal Agencies	21	13079	9.5	0.8	1.0
Arizona State Parks	1	7101.6	5.2	0.4	0.6
Pima County	39	2536.3	1.8	0.2	0.0
All State & Local Government	40	9637.9	7.0	0.6	0.6
Altar Valley Conservation Alliance	1	80.1	0.1	0.0	0.0
Arizona Land & Water Trust	22	5624.6	4.1	0.3	0.3
Malpai Borderlands Group	6	14960.5	10.9	0.9	1.2
Rincon Institute	3	76.6	0.1	0.0	0.0
The Nature Conservancy	5	94324.5	68.5	5.6	7.6
Non-Governmental Organizations	37	115056.3	83.5	6.9	9.2
Total	98	137,783.1	100.0	8.2	10.8

Fig. 2 – Distribution of Conservation Easement by Area

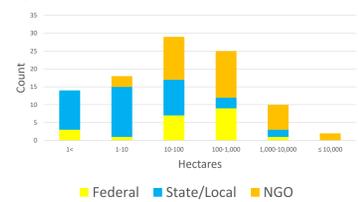


Table 2 – Data Distribution of CEs and Private Land by Area (Ha)

	10 th %	25 th %	50 th %	75 th %	90 th %
All CEs	0.52	3.59	32.69	347.51	1610.06
All Private	5.20	16.13	61.26	195.11	476.26

Data Sources & Methods

- All data utilized is publically available (**Table 3**)
- All federal non-military land, state parks and wildlife areas, and local parks 10 ha or larger were classified as **Protected Areas**
- Distance to nearest **Protected Area** was calculated for all conservation easements and all private lands
- All conservation easements and private lands w/in a 2 Km buffer around **Protected Areas** were calculated
- Total area of conservation easements and private lands w/in grasslands was calculated
- Counts of conservation easements and private parcels w/in grasslands were calculated

Table 3 – Data sources utilized for this analysis.

Data Layer	Source
Madrean Archipelago Ecoregion Boundary	BLM, Rapid Ecological Assessments
Conservation Easements	National Conservation Easement Database; Arizona Land & Water Trust
Arizona Surface Management	BLM, Arizona State Office
New Mexico Surface Management	BLM, New Mexico State Office
Grassland Priority Conservation Areas	Commission for Environmental Cooperation (CEC)

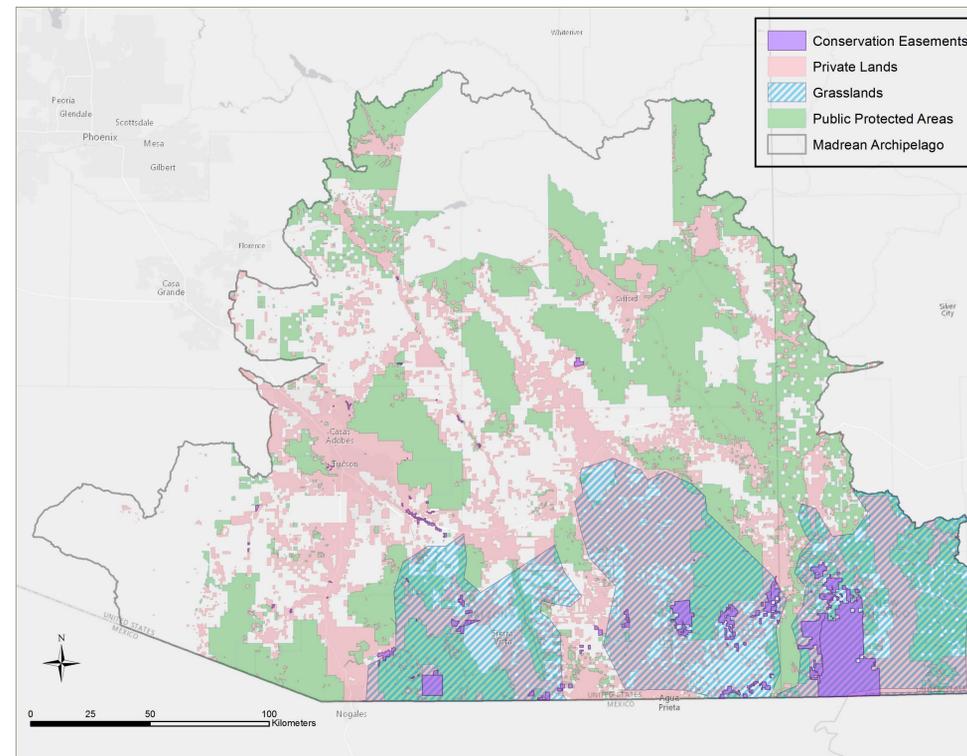


Fig. 1 – Map of conservation easements, private lands, protected areas, and grasslands within the Madrean Archipelago

Preliminary Results

- The mean distance to **Protected Areas** from conservation easements is **less** than that for all private parcels, though this result is variable among type of easement holder (**Fig. 3**)
- Approx. **32%** of all conservation easement area is in the 2 Km buffer of **Protected Areas**, and accounts for approx. **26%** of all private lands within the buffer (**Fig. 4**)
- More than **96%** of all conservation easement area is w/in grasslands (**Fig. 5**), though this only accounts for **40%** of the conservation easements w/in the ecoregion (**Fig. 6**)

Fig. 3 – Mean distance to protected area (Km)

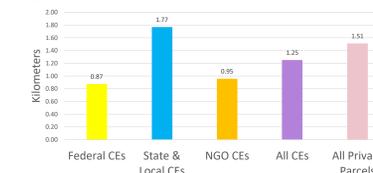


Fig. 4 – Area in 2 Km buffer of Protected Area (Ha)

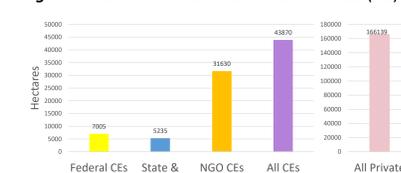


Fig. 5 – Area within Grasslands (Ha)

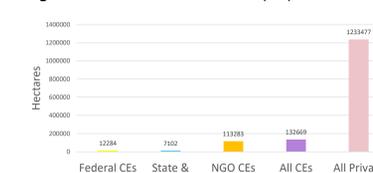
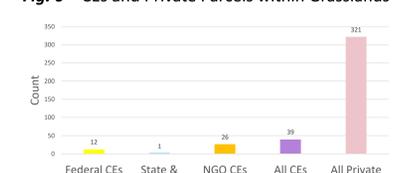


Fig. 6 – CEs and Private Parcels within Grasslands



Discussion

- The market-based easement model can contribute to achieving (currently) non-market conservation goals such as buffering protected areas, protecting native grasslands, and increasing connectivity between protected areas and key resources.
- Preliminary results suggest that the different types of easement holding organizations – Federal agencies, State and Local government, and NGOs – seek to conserve different resources through conservation easements:
 - Federally held easements are closer on average to existing protected areas, suggesting these agencies are seeking to protect their holding by preventing development on the edge of federally held lands (**Fig. 3**)
 - NGOs hold the vast majority of conservation easement area w/in the ecoregion, and these holdings are disproportionately w/in grasslands, suggesting a significant interest and motivation to protect some aspect or character of these grasslands (**Table 1**, **Fig. 5** and **6**)
 - State and Locally held easements are further away from existing protected areas, and contain the least amount of protected area buffer zone and grasslands (**Fig. 3**, **4**, **5** and **6**), representing a different set of motivations and conservation priorities than Federal agencies and NGOs
- Measuring the conservation contributions of conservation easements presents a challenge; simple metrics such as area protected may not capture the full utility of conserving critical areas of private land that provide buffer to protected areas, surround riparian areas, and secure connectivity across the landscape
- Boundaries of existing protected areas are tangible, as are the benefits of protecting these boundaries from development and fragmentation, while the boundaries of grasslands are relatively amorphous. Further study is needed to identify the motivations and discriminations of both “buyers” and “sellers” driving the higher subscription rate of conservation easements w/in grasslands.

Limitations of Analysis

Data Limitations:

- Surface management and land tenure is dynamic and data used may not fully reflect the latest status of land ownership in the ecoregion
- Conservation easement data is missing approximately 5-10 existing easements

Temporal Limitations:

- Conservation easements have been established over a span of over 27 years. Within this period the network of public protected areas has changed, as have the boundaries and condition of grasslands. As a result any inferences must account for this temporal factor.

Next Steps

- Verify all data used, particularly surface management layers, and test the significance of findings
- Assess the motivations and priorities of both conservation easement “buyers” and “sellers” utilizing a grounded theory methodology to better understand the full range of factors – market and non-market – driving conservation easement use
 - Conduct interviews with all organizations involved with conservation easements in the Madrean Archipelago to identify conservation priorities, funding trends, etc.
 - Complete interviews with private landowners to identify conservation motivations, land-use management and decision-making, landowner-easement holder relations, and partnerships with other conservation programs
- Combine results of interviews and spatial analysis to identify relationships between conservation easements, natural resources and other conservation efforts and initiatives
- Results of all research efforts will be utilized to develop recommendations, with input from key regional stakeholders, for future easements in the region.