Supporting Information

The potential contribution of private lands to U.S. 30x30 conservation

All code to run analysis and reproduce main text figures is available at: https://github.com/milliechapman/easements-biodiversity

Table S1: Summary of GAP definitions and number of polygons

We classified "Protected areas" as fee owned lands managed for biodiversity (GAP 1 and GAP 2). Our analysis of "public land" vs "private land" leveraged GAP 1-4 protected areas. Because there are incomplete and erroneous polygons in the PAD-US database, we filtered out any invalid polygons from the analysis. Easement data was also acquired from the PAD-US database. US-PAD and NCED data is readily available to download at: https://www.usgs.gov/core-science-systems/science-analytics-and-synthesis/gap/science/protected-areas

Gap Status	Definition	Count	
		protected areas	easements
1	managed for biodiversity: disturbance events proceed	2579	1297
2	managed for biodiversity: disturbance events suppressed	33132	29351
3	managed for multiple uses: subject to extractive or OHV use	*(only included in background public/private land approximations)*	
4	no known mandate for biodiversity protection	*(only included in background public/private land approximations)*	

Figure 1: Image Title

Figure S1: There is no significant correlation between parcel area and mean richness value in either (a) conservation easements (r^2 <0.01) or (b) protected areas (r^2 <0.01) (GAP 1 and GAP 2). Similarly, (c) there is no significant trend when considering all of the data (r^2<0.01).

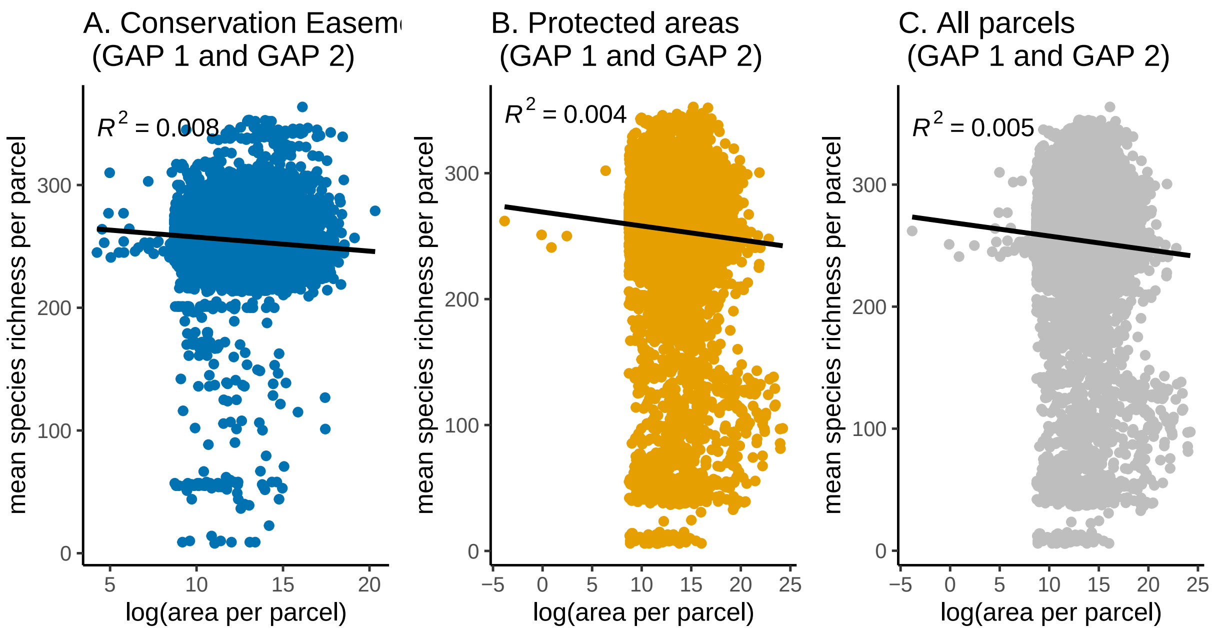
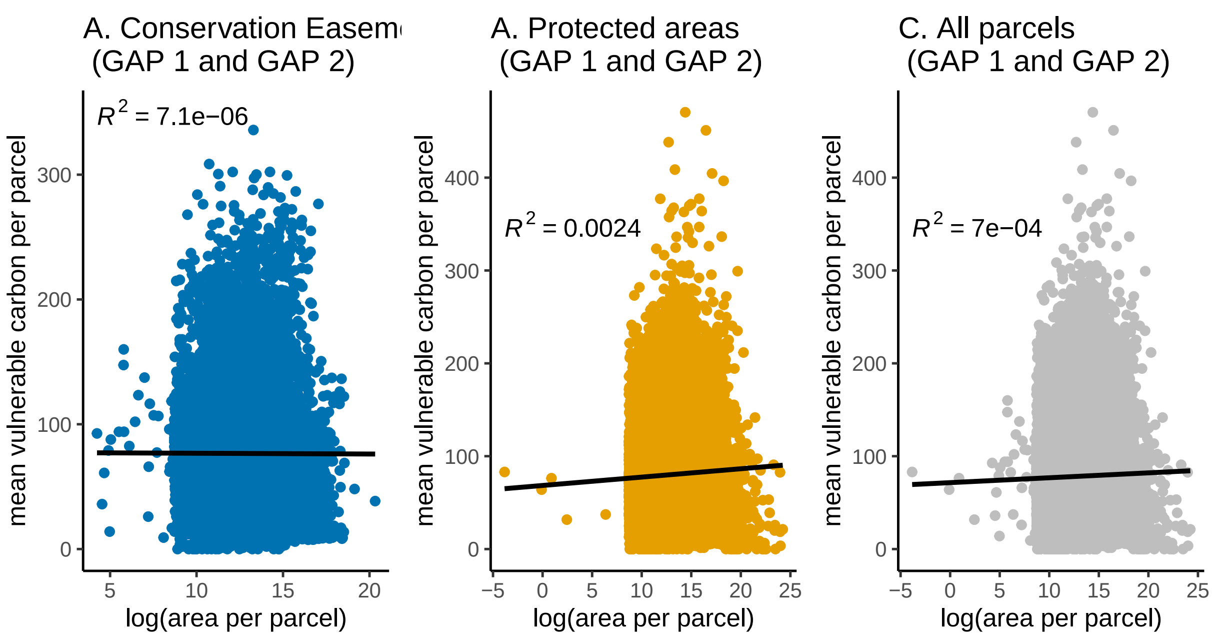


Figure S3: There is no significant correlation between parcel area and mean vulnerable carbon in either (a) conservation easements (r^2 <0.01) or (b) protected areas (r^2 <0.01) (GAP 1 and GAP 2). Similarly, (c) there is no significant trend when considering all of the data (r^2<0.01).



Effect of parcel size on findings

However, size and state which the protected area or easement is located could confound these results. To address this, we used propensity score matching (by area) to test the average treatment effect (or richness difference) accounting for these factors.

```
library("MatchIt")
library("lmtest")
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
library("sandwich")
library("boot")
library("survival")
```

```
##
## Attaching package: 'survival'
```

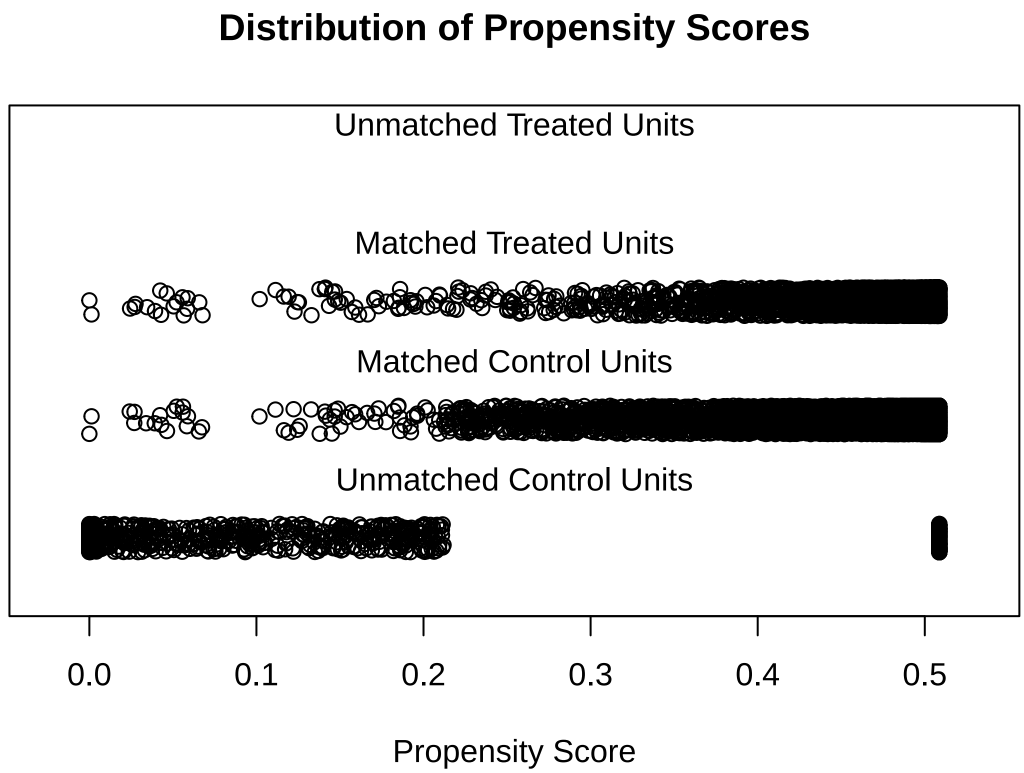
```
## The following object is masked from 'package:boot':
##
##     aml
```

The key components of the m.out1 object are weights (the computed matching weights), subclass (matching pair membership), distance (the estimated propensity score), and match.matrix (which control units are matched to each treated unit).

```
m.out1 <- matchit(type ~ area, data = match_df, method = "nearest", distance = "glm")
```

56 We can plot the matched dataset:

```
plot(m.out1, type = "jitter", interactive = FALSE)
```




```
m.data1 <- match.data(m.out1)
```

Table S3: Easements have significantly higher mean richness values, even when accounting for the potentially confounding effects of size and subnational governance

```
library(kableExtra)
```

```
##
## Attaching package: 'kableExtra'

## The following object is masked from 'package:dplyr':
##
##     group_rows
```

```
fit1 <- lm(richness_all ~ type + area + State_Nm, data = m.data1, weights = weights)

kable(coeftest(fit1, vcov. = vcovCL, cluster = ~subclass)[1:2,])
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	119.1181638	3.1173944	38.210809	0.0e+00
type	0.9853927	0.2044876	4.818838	1.4e-06