Biomass analysis

Figures

Compensation and total biomass

Lines are 6-month moving averages. Horizontal lines + ribbons are means and SE or CL from GLM or GLS.

Compensation

Compensation refers to compensatory gains in biomass by small granivores on exclosure plots relative to controls. Calculated as $\frac{SmgranExclosure - SmgranControl}{DipoControl}$. **Total biomass** refers to the overall loss in biomass caused by kangaroo rat removal.

```
## Joining, by = "oera"
```

Total biomass ratio

```
## Joining, by = "oera"
```

Rodent community composition

C. baileyi

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Joining, by = c("period", "oplottype")
```

```
## Joining, by = c("period", "oplottype", "censusdate")
```

Dipodomys

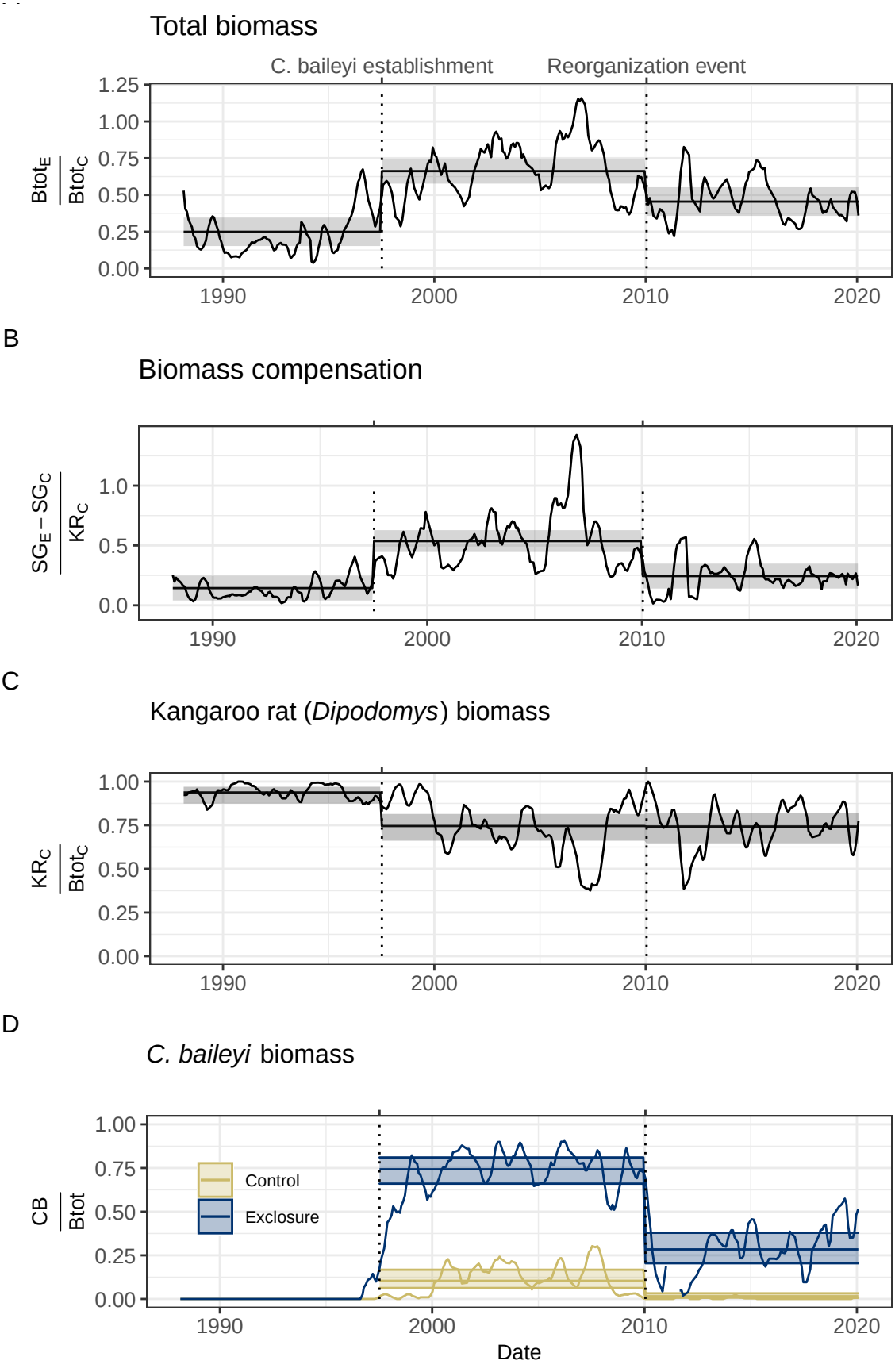
```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Joining, by = c("period", "oplottype")
```

```
## Joining, by = "period"
```

Full figure

```
## Setting row to 1

## Setting column to 1

## Setting row to 2

## Setting column to 1

## Setting row to 3

## Setting column to 1

## Setting row to 4

## Setting column to 1

## Warning: Removed 228 row(s) containing missing values (geom_path).
```


Total biomass
C. baileyi establishment
Reorganization event
$\frac{Btot_E}{Btot_C}$
1.25
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
B
Biomass compensation
$\frac{SG_E - SG_C}{KR_C}$
1.0
0.5
0.0
1990
2000
2010
2020
C
Kangaroo rat (*Dipodomys*) biomass
$\frac{KR_C}{Btot_C}$
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
D
C. baileyi biomass
$\frac{CB}{Btot}$
Control
Exclosure
1.00
0.75
0.50
0.25
0.00
1990
2000
2010
2020
Date

Model results

Compensation & total biomass

Compensation

Table S1. Coefficients from GLS for compensation

```
##                   Value  Std.Error   t-value      p-value
## (Intercept)  0.30814431 0.02905391 10.605950 6.936638e-23
## oera.L       0.07114123 0.05141306  1.383719 1.673549e-01
## oera.Q      -0.27991205 0.04652521 -6.016352 4.624854e-09
```

Table S2. Estimates from GLS for compensation

```
##           oera    emmean         SE       df   lower.CL  upper.CL
## 1     a_pre_pb 0.1435663 0.05114193 39.16210 0.04013563 0.2469969
## 2  b_pre_reorg 0.5366915 0.04527450 41.78758 0.44531015 0.6280729
## 3 c_post_reorg 0.2441751 0.05172050 41.05328 0.13972758 0.3486227
```

Table S3. Contrasts from GLS for compensation

```
##                      contrast   estimate         SE       df   t.ratio
## 1     a_pre_pb - b_pre_reorg -0.3931253 0.06738108 43.09746 -5.834357
## 2    a_pre_pb - c_post_reorg -0.1006089 0.07270904 40.24488 -1.383719
## 3 b_pre_reorg - c_post_reorg  0.2925164 0.06780029 44.29593  4.314383
##        p.value
## 1 1.872110e-06
## 2 3.588276e-01
## 3 2.564957e-04
```

Total biomass

Table S4. Coefficients from GLS on total biomass ratio

```
##                   Value  Std.Error   t-value      p-value
## (Intercept)  0.4553971 0.02724184 16.716827 3.547602e-46
## oera.L       0.1454493 0.04779892  3.042941 2.525739e-03
## oera.Q      -0.2531409 0.04273433 -5.923594 7.735453e-09
```

Table S5. Estimates from GLS on total biomass ratio

```
##           oera    emmean         SE       df  lower.CL  upper.CL
## 1     a_pre_pb 0.2492046 0.04765836 33.75206 0.1523249 0.3460842
## 2  b_pre_reorg 0.6620857 0.04195145 35.90882 0.5769967 0.7471747
## 3 c_post_reorg 0.4549009 0.04802155 34.91256 0.3574032 0.5523986
```

Table S6. Contrasts from GLS on total biomass ratio

```
##                     contrast   estimate         SE       df   t.ratio
## 1     a_pre_pb - b_pre_reorg -0.4128811 0.06217389 38.34660 -6.640747
## 2    a_pre_pb - c_post_reorg -0.2056963 0.06759788 34.60306 -3.042941
## 3 b_pre_reorg - c_post_reorg  0.2071848 0.06243247 39.12162  3.318542
##        p.value
## 1 2.151997e-07
## 2 1.207532e-02
## 3 5.455180e-03
```

Community composition

Kangaroo rat proportional biomass

Table S7. Coefficients from GLM on Dipodomys biomass.

```
##               Estimate Std. Error   z value     Pr(>|z|)
## (Intercept)  1.6149566  0.1644937  9.817741 9.443577e-23
## oera.L      -1.1672395  0.3180813 -3.669626 2.429058e-04
## oera.Q       0.6619048  0.2473324  2.676175 7.446776e-03
```

Table S8. Estimates from GLM on Dipodomys biomass.

```
##           oera      prob         SE  df asymp.LCL asymp.UCL
## 1     a_pre_pb 0.9376458 0.02264595 Inf 0.8932605 0.9820310
## 2  b_pre_reorg 0.7454543 0.03850245 Inf 0.6699909 0.8209177
## 3 c_post_reorg 0.7426552 0.04371710 Inf 0.6569713 0.8283392
```

Table S9. Contrasts from GLM on Dipodomys biomass.

```
##                     contrast    estimate         SE  df    z.ratio      p.value
## 1     a_pre_pb - b_pre_reorg 0.192191469 0.04466854 Inf 4.30261406 5.015406e-05
## 2    a_pre_pb - c_post_reorg 0.194990571 0.04923437 Inf 3.96045595 2.207558e-04
## 3 b_pre_reorg - c_post_reorg 0.002799103 0.05825481 Inf 0.04804929 9.987279e-01
```

C. baileyi proportional biomass

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial glm!
```

```
## [1] 237.6847
```

```
## [1] 231.2374
```

```
## [1] 466.4937
```

```
## Analysis of Deviance Table
##
## Model 1: pb_prop ~ oera * oplottype
## Model 2: pb_prop ~ oera + oplottype
##   Resid. Df Resid. Dev Df Deviance Pr(>Chi)
## 1       451     57.835
## 2       452     59.768 -1   -1.933   0.1644
```

```
## Analysis of Deviance Table
##
## Model 1: pb_prop ~ oera + oplottype
## Model 2: pb_prop ~ oera
##   Resid. Df Resid. Dev Df Deviance  Pr(>Chi)
## 1       452     59.768
## 2       453    210.395 -1  -150.63 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Note that a model fit as `pb_proportional_biomass ~ era + treatment + era:treatment` does not outperform a model fit without the interaction term, or `pb_proportional_biomass ~ era + treatment` (AIC for the no interaction model = 231 compared to 237 for the interaction model; p-value for an anova Chi-squared comparison of the two models = 0.16). We therefore use the model without the interaction term.

Table S10. Coefficients from GLM on C. baileyi biomass

```
##              Estimate Std. Error   z value     Pr(>|z|)
## (Intercept) -1.538798  0.1671239 -9.207525 3.337295e-20
## oera.L      -1.403286  0.2006948 -6.992140 2.707241e-12
## oplottype.L  2.270657  0.2298594  9.878462 5.161898e-23
```

Table S11. Estimates from GLM on C. baileyi biomass

```
##           oera       prob         SE  df  asymp.LCL asymp.UCL
## 1  b_pre_reorg 0.36667107 0.04061520 Inf 0.28706674 0.4462754
## 2 c_post_reorg 0.07370848 0.01748044 Inf 0.03944746 0.1079695
```

Table S12. Contrasts from GLM on C. baileyi biomass.

```
##                     contrast  estimate         SE  df  z.ratio      p.value
## 1 b_pre_reorg - c_post_reorg 0.2929626 0.04132914 Inf 7.088523 1.355508e-12
```