**Supplementary tables**

Table S1. Candidate models for *O. undulatifolius* percent cover and observed species richness in Experiment 2 via linear mixed models, with dAIC and p-values shown for each model. The top three models are bolded for each predictor.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ***O. undulatifolius* percent cover** | | **Species richness** | |
| **Predictors** | dAIC | p-values | dAIC | p-values |
| Treatment | 244.88 | <.0001 | 168.39 | <.0001 |
| Method | 220.64 | <.0001 | 141.51 | 0.0128 |
| Time | 255.16 | <.0001 | **0.00** | **<.0001** |
| Year | 336.47 | 0.5927 | 92.29 | <.0001 |
| Month | 297.57 | <.0001 | **54.07** | **<.0001** |
| Site | 332.99 | 0.1355 | 131.51 | 0.2795 |
| Treatment + Time + Treatment:Time | **105.04** | **Treatment <.0001**  **Time <.0001**  **Treatment:Time <.0001** | 183.56 | Treatment <.0001  Time <.0001  Treatment:Time 0.3872 |
| Method + Time + Method:Time | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time <.0001** | **66.53** | **Method <.0001**  **Time <.0001**  **Method:Time 0.0984** |
| Treatment + Year + Treatment:Year | 353.38 | Treatment <.0001  Year 0.0005  Treatment: Year 0.0020 | 186.02 | Treatment <.0001  Year <.0001  Treatment:Year 0.4401 |
| Method + Year + Method:Year | 308.62 | Method <.0001  Year 0.0004  Method: Year <.0001 | 126.56 | Method 0.0039  Year <.0001  Method:Year 0.1528 |
| Treatment + Month + Treatment:Month | 353.38 | Treatment <.0001  Month <.0001  Treatment:Month 0.2627 | 148.94 | Treatment <.0001  Month <.0001  Treatment:Month 0.4401 |
| Method + Month + Method:Month | 308.62 | Method <.0001  Month <.0001  Method:Month 0.0078 | 90.91 | Method 0.0039  Month <.0001  Method:Month 0.1528 |
| Treatment + Site + Treatment:Site | **168.11** | **Treatment <.0001**  **Site 0.0606**  **Treatment:Site 0.4042** | 148.94 | Treatment 0.0008  Site 0.2613  Treatment:Site 0.7810 |
| Method + Site + Method:Site | 302.29 | Method <.0001  Site 0.0580  Method:Site 0.0851 | 90.91 | Method 0.0141  Site 0.2722  Method:Site 0.6194 |

Table S2. Candidate models for *O. undulatifolius* percent cover, density (number of stems 0.25 m-2), and biomass (g) in Experiment 3 via linear mixed models, with dAIC and p-values shown for each model (Maryland sites only). The top three models are bolded for each predictor. Blank cells indicate candidate predictors that were not applicable (e.g. Year was not applicable for biomass, which was only collected once).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ***O. undulatifolius* percent cover** | | ***O. undulatifolius* density** | | ***O. undulatifolius* biomass** | |
| **Predictors** | dAIC | p-values | dAIC | p-values | dAIC | p-values | |
| Method | 13562.16 | <.0001 | 3760.60 | <.0001 | **48.13** | **<.0001** | |
| Time | 14478.49 | <.0001 | 3486.99 | <.0001 |  |  | |
| Year | 15004.48 | <.0001 | 4149.77 | <.0001 |  |  | |
| Month | 14729.57 | <.0001 | 3557.07 | <.0001 |  |  | |
| Site | 15234.09 | <.0001 | 4447.36 | <.0001 | **515.50** | **0.0388** | |
| Method + Time + Method:Time | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time <.0001** | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time <.0001** |  |  | |
| Method + Year + Method:Year | **4681.16** | **Method <.0001**  **Year <.0001**  **Method: Year <.0001** | **3090.30** | **Method <.0001**  **Year 0.0004**  **Method: Year <.0001** |  |  | |
| Method + Month + Method:Month | 11825.16 | **Method <.0001**  **Month <.0001**  **Method: Month <.0001** | **1094.13** | **Method <.0001**  **Month <.0001**  **Method: Month <.0001** |  |  | |
| Method + Site + Method:Site | 13100.44 | Method <.0001  Site <.0001  Method: Site <.0001 | 3774.76 | Method <.0001  Site <.0001  Method: Site 0.0065 | **0.00** | **Method <.0001**  **Site <.0001**  **Method: Site <.0001** | |

Table S3. Candidate models for *O. undulatifolius* percent cover, density (number of stems 0.25 m-2), and biomass (g) in Experiment 3 via linear mixed models, with dAIC and p-values shown for each model (Shenandoah only). The top three models are bolded for the first two predictors. Blank cells indicate candidate predictors that were not applicable (e.g. Year was not applicable for biomass, which was only collected once).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ***O. undulatifolius* percent cover** | | ***O. undulatifolius* density** | | ***O. undulatifolius* biomass** | |
| **Predictors** | dAIC | p-values | dAIC | p-values | dAIC | p-values |
| Method | 764.51 | <.0001 | 557.76 | <.0001 | **0.00** | **<.0001** |
| Time | 909.84 | <.0001 | 543.42 | <.0001 |  |  |
| Year | 938.12 | <.0001 | 597.32 | <.0001 |  |  |
| Month | 927.92 | <.0001 | 552.37 | <.0001 |  |  |
| Method + Time + Method:Time | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time <.0001** | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time <.0001** |  |  |
| Method + Year + Method:Year | **641.98** | **Method <.0001**  **Year <.0001**  **Method: Year <.0001** | **472.92** | **Method <.0001**  **Year 0.0004**  **Method: Year <.0001** |  |  |
| Method + Month + Method:Month | **620.20** | **Method <.0001**  **Month <.0001**  **Method: Month <.0001** | **310.55** | **Method <.0001**  **Month <.0001**  **Method: Month <.0001** |  |  |

Table S4. Candidate models for proportion of plots with *O. undulatifolius* flowering stems via logistic regression and the maximum height of those stems in August in Experiment 3 via linear mixed models, with dAIC and p-values shown for each model (Maryland sites only). The top three models are bolded for each predictor. A dash indicates that the model could not be run due to singularity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Prop. plots with *O. undulatifolius* flowering stems** | | **Maximum height of *O. undulatifolius* flowering stems** | |
| **Predictors** | dAIC | p-values | dAIC | p-values |
| Method | **51.06** | **<.0001** | **0.00** | **<.0001** |
| Year | 503.76 | 0.02175 | **153.74** | **0.2863** |
| Site | 500.13 | 0.0041 | **121.07** | **<.0001** |
| Method + Year + Method:Year | **13.65** | **Method <.0001**  **Year <.0001**  **Method: Year <.0001** | **-** | **-** |
| Method + Site + Method:Site | **0.00** | **Treatment <.0001**  **Site <.0001**  **Treatment : Site 0.0044** | **-** | **-** |

Table S5. Candidate models for observed species and native richness in Experiment 3 via linear mixed models at our Maryland sites and Shenandoah, with dAIC and p-values shown for each model. The top three models are bolded. Blank cells indicate candidate predictors that were not applicable (e.g. Site was not applicable for Shenandoah).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Total species richness** | | | | **Native species richness** | | | |
|  | Maryland sites | | Shenandoah | | Maryland sites | | Shenandoah | |
| **Predictor** | dAIC | p-values | dAIC | p-values | dAIC | p-values | dAIC | p-values |
| Method | 1138.99 | <.0001 | 216.83 | <.0001 | 889.64 | <.0001 | 141.78 | <.0001 |
| **Time** | **435.09** | **<.0001** | 216.83 | <.0001 | 1120.3 | <.0001 | 177.48 | <.0001 |
| Year | 1223.36 | <.0001 | 311.53 | 0.0351 | 391.61 | <.0001 | 250.65 | 0.010 |
| Month | 928.78 | <.0001 | 243.31 | <.0001 | 952.6 | <.0001 | 213.06 | <.0001 |
| Site | 1372.41 | <.0001 |  |  | 911.7 | <.0001 |  |  |
| **Method + Time + Method:Time** | **0.00** | **Treatment <.0001**  **Time <.0001**  **Treatment:Time <.0001** | **0.00** | **Method <.0001**  **Time <.0001**  **Method:Time 0.0013** | 1406.74 | Treatment <.0001  Time <.0001  Treatment:Time <.0001 | **0.0** | **Treatment <.0001**  **Time <.0001**  **Treatment:Time 0.030** |
| Method + Year + Treatment:Year | 934.12 | Treatment <.0001  Year <.0001  Treatment:Year <.0001 | **210.39** | **Method <.0001**  **Year 0.0067**  **Method:Year 0.0494** | **0.0** | **Treatment <.0001**  **Year <.0001**  **Treatment:Year <.0001** | **127.34** | **Treatment <.0001**  **Year 0.0006**  **Treatment:Year 0.016** |
| **Method + Month + Method:Month** | **716.22** | **Treatment <.0001**  **Month <.0001**  **Treatment:Month 0.356** | **112.12** | **Method <.0001**  **Month <.0001**  **Method:Month 0.4463** | **644.48** | **Treatment <.0001**  **Month <.0001**  **Treatment:Month 0.1297** | **80.71** | **Treatment <.0001**  **Month <.0001**  **Treatment:Month 0.446** |
| Method + Site + Method:Site | 943.74 | Treatment <.0001  Site <.0001  Treatment:Site <.0001 |  |  | **675.95** | **Treatment <.0001**  **Site <.0001**  **Treatment:Site <.0001** |  |  |

Table S6. Candidate models for percent change in *O. undulatifolius* percent cover and species richness for each time point (in months after treatment) via linear mixed models, with dAIC and p-values shown for each model. The top model for each time point is bolded.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ***O. undulatifolius* percent cover** | | | **Species richness** | | |
| **Time point** | predictor | dAIC | p-values | predictor | dAIC | p-values |
| 1 | Method | 65.94 | <.0001 |  |  |  |
| Experiment | 803.42 | 0.6275 |  |  |  |
| **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.3093**  **Method:Experiment <.0001** |  |  |  |
| 2-3 | Method | 68.85 | <.0001 | Method | 43.99 | <.0001 |
| Experiment | 771.16 | 0.8253 | Experiment | 207.13 | 0.8253 |
| **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.7154**  **Method:Experiment <.0001** | **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.008**  **Method:Experiment 0.0006** |
| 11-12 | Method | 106.25 | <.0001 | Method | 31.88 | 0.2529 |
| Experiment | 630.55 | 0.0520 | Experiment | 42.50 | 0.7829 |
| **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.0052**  **Treatment:Experiment <.0001** | **Method + Experiment** | **0.00** | **Method 0.2476**  **Experiment 0.7824**  **Treatment:Experiment 0.1268** |
| 14-15 | Method | 176.12 | <.0001 | Method | 29.58 | <.0001 |
| Experiment | 710.87 | 0.1239 | Experiment | 61.87 | 0.2257 |
| **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.0084**  **Treatment:Experiment <.0001** | **Method + Experiment** | **0.00** | **Method <.0001**  **Experiment 0.2214**  **Treatment:Experiment 0.4989** |